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December 2016

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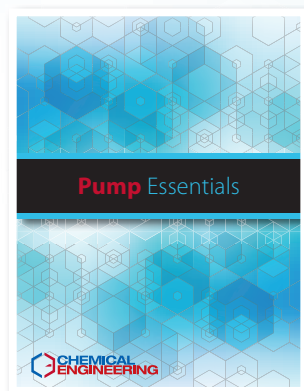
## Pump Essentials

Most engineers would agree that pumps represent the workhorse component in any chemical process industries (CPI) facility. Every day, countless decisions must be made related to the proper selection and specification, sizing and installation, operation and maintenance, and troubleshooting of these critical machines.

This *Chemical Engineering* reference book provides a wealth of practical engineering guidance on the proper use and operation of several different types of pumps. Articles focus on the sizing and selection of centrifugal pumps, and tips for managing the impact of pumps whose operation deviates from the best efficiency point (BEP). Others provide engineering tips for understanding and optimizing magnetically driven and sealless pumps, and guidance for calculating net positive suction head (NPSH).

Included is detailed information on condition monitoring and maintenance of pumps, recommendations for designing and operating safe and accurate pressure-relief systems, and selecting variable frequency drives (VFD) for centrifugal pumps.

Text also encompasses data related to lifecycle cost analysis, construction-cost indices for CPI equipment, and budget considerations for capital-intensive CPI operations.

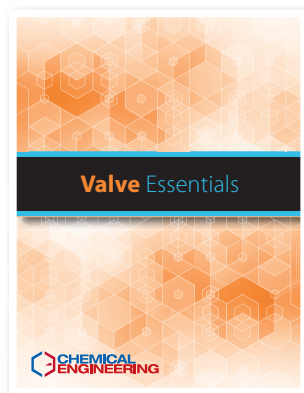


## Valve Essentials

Engineers are routinely challenged when it comes to the proper selection, specification and sizing, and installation, operation and maintenance, and troubleshooting of valves to control fluid flow while ensuring overall reliability and safety.

This resource provides engineering articles which focus on the proper selection and operation of control valves and control valve positioners and sensors. Included is information provide sizing calculations for pressure-relief valves and related systems, plus tips for using pressure-relief valves with rupture disks.

Guidance is offered on reducing fugitive emissions and troubleshooting valves in the field, as well as engineering recommendations related to material selection, planning for plant revamps, improving operability, and managing challenges associated with hygienic operation.



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## Building on the Paris Agreement

December 2015 marked a landmark international agreement to lower greenhouse gas (GHG) emissions in order to limit the rise in global temperatures to less than 2°C above pre-industrial temperatures. This agreement, made at the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21) in Paris, France, came into force last month on November 4, the 30th day after at least 55 parties, representing at least 55% of GHG emissions, formally accepted the agreement. At the time of writing this column in mid-November, 110 parties had ratified the agreement according to the United Nations website ([unfccc.int/paris\\_agreement/items/9485.php](http://unfccc.int/paris_agreement/items/9485.php)).

November also marked the gathering of participants for this year's Conference of the Parties, COP22 (November 7–18), in Marrakesh, Morocco, where action and implementation of the Paris Agreement were high on the agenda. Continuing worldwide focus on climate change is stimulating action on many fronts.

### Technology leaders mobilize

Investments in technology to address climate change globally are on the rise. On November 4th, the Oil and Gas Climate Initiative (OGCI; [www.oilandgasclimateinitiative.com](http://www.oilandgasclimateinitiative.com)) announced a \$1-billion investment over the next ten years to develop low-emissions technologies, such as carbon capture, use and storage (CCUS), and reducing methane emissions. Investments to improve “energy and operational efficiencies in energy-intensive industries” were also cited in OGCI's announcement. The OGCI is led by CEOs of ten major oil-and-gas companies, including BP, CNPC, Eni, Pemex, Reliance Industries, Repsol, Saudi Aramco, Royal Dutch Shell, Statoil and Total. Saudi Aramco president and CEO Amin Nasser said “Technology-enabled solutions are key to managing climate change, and this announcement by OGCI to collectively fund \$1 billion is paramount to our long-term commitment in meeting rising energy demand.” He further described the OGCI as a “wider industry-led response to climate change.”

Several months ago, construction and commissioning of a \$122-million commercial carbon capture facility on a steel plant, the first in the Middle East, was completed. The project for Emirates Steel Industries was the first project under Al Reyadah, a joint venture between Masdar ([www.masdar.ae](http://www.masdar.ae)) and Abu Dhabi National Oil Company (ADNOC; [www.adnoc.ae](http://www.adnoc.ae)). The facility is expected to capture 800,000 tons/yr of CO<sub>2</sub>. The Global CCS Institute ([www.globalccsinstitute.com](http://www.globalccsinstitute.com)) has called this project a “critical milestone in making industrial carbon capture and storage a commercial reality.”

### Looking ahead

There is much work to be done to attain the goals of the Paris Agreement and the scientific and industrial communities are clearly making progress on the technological fronts. There has been some concern and uncertainty about the future momentum of the Paris Agreement in light of the changing political leadership in the U.S. What is good for the environment, however, can also be good for business. Andrew Steer, president and CEO of the World Resources Institute ([www.wri.org](http://www.wri.org)) stated that “...smart climate action can promote economic growth...” Economics can be the driver to help keep the momentum going. ■



*Dorothy Lozowski, Editor in Chief*

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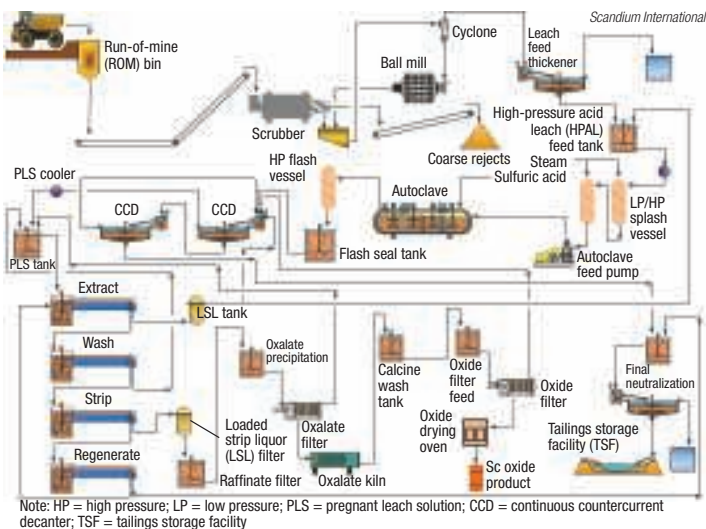
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## This mine is the first to target scandium

**S**candium International Mining Corp. (Sparks, Nev.; [www.scandiummining.com](http://www.scandiummining.com)) is about to become the first company to achieve production from a primary scandium mine, with its project near the small town of Nyngan, New South Wales, Australia. The production of scandium from the mine is expected to start in 2018.

Scandium (Sc) – a silvery-white metal with atomic number 21 and atomic weight 45 – is quite abundant and is usually extracted from a few deposits of rare-earth elements and uranium. However, because of its low availability and the difficulties of extracting the metallic element, applications of Sc have not yet been fully developed. Scandium's standard commercial form is as its oxide,  $Sc_2O_3$ , which has a price tag of \$2,500–3,000/kg. However, scandium's properties make it very attractive for many applications, especially as an alloy with aluminum. Al-Sc alloys exhibit great corrosion resistance, heat tolerance, and weldability.

Nyngan's resource is a typical tertiary laterite composed of limonites and saprolites. The scandium recovery and beneficiation will use a conventional flowsheet (diagram) employing continuous high-pressure acid-leach



and solvent-extraction techniques. A number of key elements of the flowsheet have been the subject of the company's U.S. patent applications.

A feasibility study undertaken earlier this year indicates the availability of an oxide amount averaging 37,680 kg/yr, over 20 years. The study envisages a process plant receiving only limonite mill feed. Limonite resources sit above saprolite in the deposit and exhibit significantly higher scandium grades. Best results would require distinct processes to optimize recovery from each type.

The processing and refining plant flowsheet was modeled and validated from METSIM modeling and extensive pilot scale metallurgical test work using Nyngan resource material.

## Converting sewage into fuels

**P**acific Northwest National Laboratory (PNNL; Richland, Wash.; [www.pnnl.gov](http://www.pnnl.gov)) has developed a hydrothermal liquification (HTL) process that converts sewage sludge directly into "biocrude oil," which can then be refined by conventional methods into liquid fuels, such as gasoline, diesel and jet fuels. An independent assessment of the process says the process has a high carbon-conversion efficiency, with nearly 60% of available carbon in primary sludge becoming bio-crude.

With HTL, pressurized sludge (3,000 psi) is continuously fed to a tubular reactor system operating at about 660°F. The heat and pressure cause the cells of the waste material to break down into different fractions – biocrude and an aqueous liquid phase. The liquid phase can be further catalyzed to cre-

ate other fuels and chemical products. The small amount of solid material generated contains nutrients, such as phosphorus, which can be recovered for fertilizer.

PNNL has licensed its HTL technology to Genifuel Corp. (Salt Lake City, Utah; [www.genifuel.com](http://www.genifuel.com)), which is now working with Metro Vancouver, a partnership of 23 local authorities in British Columbia, Canada, to build a demonstration plant. The pilot project will cost \$8–9 million (Canadian). Once funding is in place, Metro Vancouver plans to move to the design phase in 2017, followed by equipment fabrication, with startup occurring in 2018.

Wastewater treatment plants across the U.S. treat approximately 34 billion gal/d of sewage; that amount could produce the equivalent of up to approximately 30 million barrels (bbl) of oil per year.

Edited by:  
**Gerald Ondrey**

### BIO FOAM CONTROL

Last month, Novozymes A/S (Bagsvaerd, Denmark; [www.novozymes.com](http://www.novozymes.com)) introduced Fermox, an enzyme protease that prevents foam development during the sugarcane ethanol fermentation process, while delivering improved control and replacing chemicals. For an average size plant, trialing partners experienced a cost reduction of up to 20% when using Fermox, as compared with using anti-foaming chemicals.

Foam develops during the fermentation process as the yeast produces ethanol and  $CO_2$ . The  $CO_2$  creates foam, which can cause overflow of the fermentation tank and lead to production losses. Excessive foaming also forces plants to increase fermentation time and operate at lower capacity.

Unlike traditional anti-foam products, Fermox does not remove the foam, but prevents it from forming in the first place. The enzyme changes the foam structure by breaking down the stabilizing proteins to make it lighter and less dense. This enables better fermentation control, which allows producers to operate their plants more efficiently.

Fermox can completely replace, or work in combination with, traditional dispersant chemicals to boost their activity. It can also save up to 70% of anti-foam chemicals, says Novozyme.

### STYRENE CATALYST

Last month, Clariant (Munich, Germany; [www.clariant.com](http://www.clariant.com)) launched its new high-performance ethylbenzene-dehydrogenation catalyst, StyroMax UL3. The catalyst is said to achieve outstanding activity and selectivity at conditions of ul-

(Continues on p. 8)



tra-low steam-to-oil ratio (also known as steam-to-hydrocarbon ratio, SHR). Thereby, it produces styrene monomer far more efficiently than many other state-of-the-art catalysts, says the company.

The new catalyst was installed at the Grand Pacific Petrochemical Corp. (GPPC) styrene production plant in Taiwan in May 2016, and design styrene-monomer production rate has already been achieved at lower temperatures than previous operation, says Clariant. Also, catalyst selectivity has improved by 0.5% compared to former catalyst performance, the company adds.

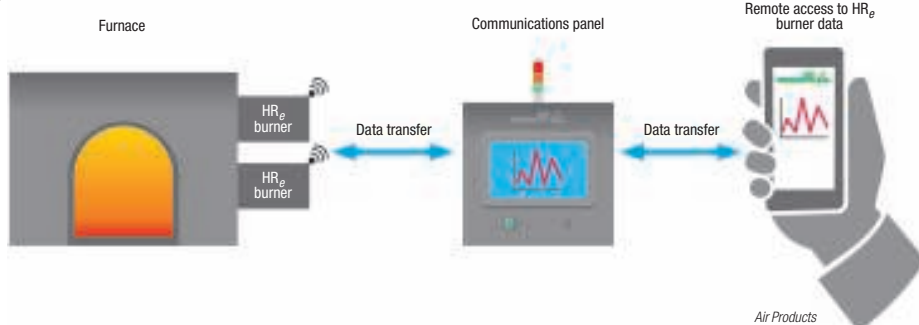
### ISLAND BIOFUELS

A small-scale, distributed bio-fuel production system with a centralized ion-exchange-resin recycling facility has begun operation on the isolated island of Tanegashima, in Southern Japan. The facility has been optimized for both local production and consumption of biodiesel fuel, which is produced from inedible vegetable oils using a process developed by Tohoku University (Sendai, www.tohoku.ac.jp) and Epsilon Co., Ltd. (Tokyo; www.epsilon-global.com), with support from the New Energy and Industrial Technology Development Organization (NEDO, Kawasaki City, www.nedo.go.jp).

For the transesterification reactions, Tohoku University developed an ion-exchange-resin catalyst system that eliminates the additional steps associated with traditional alkaline catalysts, such as product separation and purification, and wastewater treatment.

The system consists of two fixed-bed columns connected in series, which are packed with ion-exchange resins. The first column is packed with cationic resins, and the second with anionic resins. In the first column, free fatty acids are reacted with methanol over the cationic resins to produce fatty acid methyl esters (FAME), and in

## Bringing the Internet of Things to glass-furnace burners



The glass industry's needs are extremely diverse, and manufacturers demand stability and precision in their furnace operations. Air Products (Lehigh Valley, Pa.; www.airproducts.com/glass) has released an advanced burner, the patent-pending Cleanfire HR<sub>p</sub>, which is said to be the first smart burner specifically aimed at the needs of the glass industry.

The burner is designed with high-temperature-compatible electronic components, to withstand the extreme conditions experienced around glass furnaces without requiring any external cooling, and it is equipped with a long-lasting battery to eliminate the need for wiring. What sets apart this new burner, however, is its capability for smart reporting via the Internet of Things (IoT) — the

device includes sensors that continuously monitor and report on the burner's operating condition both locally and remotely to alert of abnormal behavior (diagram). Monitored parameters include pressure, temperature, position and battery life. Furthermore, new operating information is available to engineers, enabling plant engineers to optimize combustion, reduce emissions and verify equipment operation. Realtime information, including critical alerts, is available via text message or email, and this wealth of data allows for more advanced analytics and optimization. Field testing has revealed numerous benefits for the burner's smart-communication capabilities, including maintenance monitoring and alerts, operations optimizations and more precise burner settings.

## Low-cost carbon-fiber production plant poised to break ground

Demand for carbon fiber (CF), which can be used to make strong, lightweight composite materials for improving vehicle fuel economy and wind-power generation, has been growing. However, widespread use of these advanced composites has been limited by the high production costs of CF. LeMond Composites (Oak Ridge, Tenn.; www.lemond.cc) plans to break ground in early 2017 on a CF manufacturing plant that employs an advanced manufacturing process designed to bring the costs down.

Using technology licensed from Oak Ridge National Laboratory (ORNL; Oak Ridge, Tenn.; www.ornl.gov), LeMond has developed a process for making CF that reduces energy demand by 60%, and costs by more than 50% compared to conventional processes for industrial-grade CF.

As a precursor, the LeMond process requires a hybrid material made from a combination of conventional CF starting material (polyacrylonitrile) and fibers made using next-generation technology. The process

has three major unit operations: oxidation, carbonization and surface treatment. "The steps have been engineered and configured to maximize the efficiency of capital and operational resources," says Connie Jackson, CEO at LeMond Composites, a company founded by former professional cyclist Greg LeMond.

The reduction of energy consumed in the process is achieved as a result of the higher volume of material produced and the higher throughput of the process. "The increased fiber mass becomes a heat source in the oxidation step," explains Jackson. "With LeMond's high-volume technology, the mass of the fiber increases to an extent that the exothermic energy released in the oxidation process is sufficient to allow a reduction in the heat required from the ovens."

LeMond is targeting lightweighting in the automobile industry and wind-power components as its initial applications. It plans commercial-scale production of the low-cost, high-volume CF by 2018.

(Continues on p. 10)



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the second column, the remaining lipids are converted into fuel over an anionic resin. A 100% yield is achieved in a single pass, because byproducts (water in the first column and glycerin in the second) are simultaneously separated by adsorption on the resins, thereby driving the reactions to completion. This design also eliminates the need to add excess alcohol, and is driven by waste heat.

### ENHANCED FERTILIZER

Last month, Solvay S.A. (Brussels, Belgium; [www.solvay.com](http://www.solvay.com)) and Petrovietnam Ca Mau Fertilizer Joint Stock Company (PVCFC; Ho Chi Minh City, Vietnam; [www.pvcfc.com.vn](http://www.pvcfc.com.vn)) signed a Memorandum of Under-

(Continues on p. 11)

## Additives retain starch in cardboard recycling

Starch is essential for imparting strength to corrugated cardboard boxes, but millions of tons of starch are lost in cardboard recycling processes annually because conditions are ripe for bacteria to thrive, and the microorganisms degrade starch by converting it to glucose for food. In addition to the lost raw material, degraded starch also causes problems in the cardboard recycling process, and increases biochemical oxygen demand (BOD) in wastewater treatment.

Newly patented additives from specialty chemical maker Solenis (Wilmington, Del.; [www.solenis.com](http://www.solenis.com)) can control bacterial growth and retain the starch in cardboard and paper recycling processes. The company has developed a two-step process, known as the Biobond Improving the Sustainability of Paper program, that both controls bacterial growth and retains starch. In the Biobond program,

specifically selected biocides control starch-consuming bacteria, and specially designed cationic polymers retain the starch in the paperboard.

"The increased microbial contamination resulting from starch degradation leads to a host of operational issues in the production of recycled cardboard, including slime deposition, pH drops from bacterial acids and increased conductivity because of more dissolved calcium at lower pH, among others," explains Stéphane Ménard, global marketing director for Solenis.

"With the Biobond program, the strength in the paperboard made from recycled material is increased, because the technology enables a reduction in conductivity in the wet end of the paper machine, which allows the dry-strength chemicals to perform better," Ménard adds.

Solenis is currently converting end-users to its Biobond technology.

## Design project for 'clean coal' oxyfuel combustion pilot plant

A group of organizations, lead by the Southwest Research Institute (SWRI; San Antonio, Tex.; [www.swri.org](http://www.swri.org)) has begun a project to design a power-generation pilot plant featuring a flameless, pressurized oxyfuel combustion technology that allows the capture of 100% of the CO<sub>2</sub> emissions from the coal fuel and is more efficient than conventional coal-power generation.

The project objective is to generate a detailed design, plus specifications, costs and a construction schedule, for a 10-MW-scale power plant based on this type of oxyfuel combustion technology, which has been demonstrated previously in Italy.

Oxyfuel combustion refers to processes where the oxidant is pure oxygen, rather than air. Such processes generate exhaust that is highly enriched in CO<sub>2</sub>. The technology for this project uses an air-separation unit (ASU) to generate oxygen, which undergoes a flameless combustion reaction (meaning that reactants are above self-ignition temperatures and there is no visible flame) with pulverized coal in a pressurized reactor. The closed-loop power cycle can operate in either Rankine-cycle or Brayton-cycle modes, with an environment of supercritical CO<sub>2</sub> that results in an exhaust stream of concentrated and pressurized CO<sub>2</sub>.

"Supercritical CO<sub>2</sub> has good thermodynamic properties, so this oxyfuel combustion technology allows power generation that is more efficient than a conventional steam Rankine cycle," says Klaus Brun, program director for machinery, fluids and machinery engineering at SWRI. "This technology also eliminates CO<sub>2</sub> emissions, since we are able to capture all of the CO<sub>2</sub> from the combustion."

Also involved in the project, which is funded by the National Energy Technology Laboratory (NETL; part of the Dept. of Energy; [www.netl.gov](http://www.netl.gov)), are Jacobs Energy, EPRI, ITEA S.p.A., Peter Reineck Associates and General Electric Global Research.

## Cost-effective LGF-PP process

A new process for making long glass fiber polypropylene (LGF-PP) concentrates (glass-fiber-containing plastic pellets) allows a higher glass-fiber content than is possible with conventional processes. Plastics maker Trinseo (Berwyn, Pa.; [www.trinseo.com](http://www.trinseo.com)) has developed the process, which is capable of making LGF-PP concentrates with 85% glass, compared to the maximum 60% glass load with the traditional method. Higher glass content leads to greater cost-effectiveness for the component makers,

because the LGF-PP concentrate can be diluted with more of the lower-cost neat PP.

LGF-PP is widely used in the automotive industry to make stiff semi-structural components, such as door modules, instrument panels, tailgates and others, for vehicles. Trinseo's proprietary process is an infusion impregnation technique that is capable of wetting the fiber bundles completely, even at higher glass-fiber loadings.

"We had to engineer the process so that all individual fiber filaments are covered with polymer," explains Nor-

win van Riel, development leader at Trinseo. "With the full fiber impregnation, we have ensured that the LGF-PP granules were robust enough to withstand handling and transport without releasing fine glass particles, which can clog conveying equipment," van Riel adds. Another advantage of the LGF-PP made by this process is the low VOC emissions, van Riel notes.

The new process, along with LGF-PP granules made from it (known as the EN-LITE product line), was recently launched at the Society of Plastics Engineers automotive meeting in Detroit, Mich.



## A German research project aims to make methanol from biomass or CO<sub>2</sub>

The Karlsruhe Institute of Technology (KIT; Germany; [www.kit.edu](http://www.kit.edu)) is cooperating with research institutions and industry partners to develop a novel process chain for the synthesis of methanol, either without the use of fossil resources or by reusing CO<sub>2</sub> from undesired by-product streams from industry. As part of the so-called OptiMeOH project, theoretical and experimental studies will focus on energy-efficient biogas production by high-pressure (30 bars or more) fermentation of biomass. In addition, a new reactor concept will be developed for methanol synthesis, and a new process will be designed for processing industry gases by scrubbing with ionic liquids.

The new process chain will be compared to established processes and assessed with respect to various economic and ecological factors. A feasibility study will cover use of this technology at two different locations, a big industrial park and a decentralized facility. "The

process will be analyzed holistically, its efficiency and ecobalance will be compared to those of methanol production processes based on coal, oil or natural gas," says Siegfried Bajohr, head of the Catalytic Fuel Conversion Unit of the Engler-Bunte Institute of KIT.

The OptiMeOH project, which is scheduled to run through the end of 2019, is funded with about €1.4 million by the Federal Ministry of Education and Research (BMBF; Bonn) and €300,000 provided by the industry partners. The project partners are: KIT, with its Engler-Bunte Institute and its DVGW (the German Technical and Scientific Assn. for Gas and Water) test laboratory; Stuttgart University, with its Holistic Balancing Unit of the Dept. of Building Physics; TU Kaiserslautern, with its Chair of Separation Science and Technology; and industry partners Infraser GmbH & Co. Höchst KG (Frankfurt am Main), Mitsubishi Hitachi Power Systems Europe (Duisburg) and Keep It Green GmbH (Starnberg).

standing (MOU) to launch an enhanced fertilizer that is said to increase crop yield while decreasing nitrogen losses to the air, soil and water. The proprietary and patented AgRho N Protect series, developed by Solvay Novocare, is a full range of nitrogen stabilizers based on advanced formulations, which facilitate the incorporation of urease and nitrification inhibitors into granular and liquid fertilizers. These stabilizers limit nitrogen volatilization and leaching, therefore increasing the amount of time the nitrogen remains in the soil and is available to the plant for absorption.

Both parties have been conducting laboratory and field trials on rice, maize, coffee and pomelo/orange plantations at several locations in Vietnam since 2015. Under the terms of this agreement, the successful outcome of these trials will enable PVCFC to launch new fertilizers in the coming months.

### CO<sub>2</sub> TO ETHYLENE GLYCOL

Converting CO<sub>2</sub> directly into ethylene glycol (EG) has been achieved in a photoelectrochemical system being developed by Toshiba Corp. (Tokyo, Japan; [www.toshiba.co.jp](http://www.toshiba.co.jp)). The achievement

(Continues on p. 12)



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is said to be the first solar-based CO<sub>2</sub> reduction to form a compound with a carbon-carbon bond.

Last year, the researchers reported that imidazolium ion-terminated self-assembled monolayer (IL-SAM)-modified electrodes promote electrochemical conversion of CO<sub>2</sub> to EG with high selectivity in an aqueous electrolyte solution. Now, they have found that the SAM-modified electrodes promote the solar-energy conversion of CO<sub>2</sub> to EG, with a solar-to-EG efficiency of 0.48%.

Toshiba's patent-pending system uses a silicon-based photovoltaic (PV) cell as the source of electrons. The electrochemical cell consists of two chambers separated by an anion-exchange membrane, with a platinum anode, a SAM-modified cathode (immobilized imidazolium ion on gold) and an aqueous potassium-bicarbonate solution as the electrolyte. CO<sub>2</sub> is bubbled into the cathode cell, and artificial sunlight irradiates the PV cell.

EG is an important industrial building block used for the manufacture of polyethylene terephthalate (PET) bottles, polyester fibers and resins. Toshiba will continue to develop the technology, targeting commercialization of a highly efficient system by the 2020s. □

## A milestone in 'power-to-liquids'

Last month, the first compact plant to produce synthetic fuels from solar energy and CO<sub>2</sub> extracted from air was commissioned in Finland, as part of the Soletair project, which is coordinated by the Technical Research Center of Finland (VTT: Espoo; www.vttresearch.com). The so-called power-to-liquid plant will be taken into operation at the Bioruukki Piloting Center of VTT this year, with operation planned to be continued on the campus of the Lappeenranta University of Technology (LUT; www.lut.fi) in 2017. The Soletair project will be completed in mid-2018. It is funded with €1 million by the Finnish Funding Agency for Technology and Innovation (Tekes) and a number of industrial companies.

The plant consists of three components. A direct air-capture unit, developed by VTT, extracts CO<sub>2</sub> from air; an electrolysis unit, developed by LUT, produces the required H<sub>2</sub> by means a solar-powered water-electrolysis

system; a microstructured chemical reactor, developed by the Karlsruhe Institute of Technology (KIT; www.kit.edu), converts the H<sub>2</sub> and CO<sub>2</sub> into liquid fuels, such as gasoline, diesel and kerosene, via Fischer-Tropsch synthesis. The compact plant was developed to maturity and is now being commercialized by Ineratec GmbH (Karlsruhe, Germany; www.ineratec.de), a spinoff company of KIT.

In the future, KIT, Ineratec and VTT plan to extend their cooperation. Under the national research alliances of "Energy Lab 2.0" and "Neo-Carbon Energy," work will focus on the investigation and development of innovative energy systems based on renewable energy sources, novel storage technologies, and the conversion of renewable energies into chemical energy carriers. In addition, KIT and Ineratec are also part of "Power-to-X" Kopernikus project, funded by the German Ministry of Education and Research (BMBF; Bonn). ■

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### Plant Watch

**GTC to provide aromatics extraction technology to JG Summit's Batangas site**  
November 11, 2016 — GTC Technology US LLC (Houston; [www.gtctech.com](http://www.gtctech.com)) has signed an agreement with JG Summit Petrochemical Corp. (Mandaluyong City, the Philippines; [jgspetrochem.com](http://jgspetrochem.com)) to provide its technologies for an aromatics extraction unit at JG Summit's petrochemical complex in Batangas, the Philippines. The new unit will be designed to produce around 170,000 metric tons per year (m.t./yr) of benzene-toluene-xylenes (BTX).

### Maire Tecnimont announces EPCC contract award for Petronas HDPE unit

November 10, 2016 — A joint venture (JV) of Maire Tecnimont S.p.A. (Milan, Italy; [www.mairetecnimont.com](http://www.mairetecnimont.com)) and China HuanQiu Contracting & Engineering Corp. was awarded a \$328-million contract to provide engineering, procurement, construction and commissioning (EPCC) services to PRPC Polymers Sdn Bhd, a wholly owned subsidiary of Petronas Chemicals Group ([www.petronaschemicals.com.my](http://www.petronaschemicals.com.my)) for a new high-density polyethylene (HDPE) unit. The HDPE unit, which is expected to be completed in 2019, will have a capacity of 400,000 m.t./yr.

### Wacker expands pyrogenic-silica production capacity at Burghausen

November 7, 2016 — Wacker Chemie AG (Munich, Germany; [www.wacker.com](http://www.wacker.com)) is expanding production capacity for pyrogenic silica at its hydrophobic-silica-specialties plant in Burghausen, Germany. The plant's capacity will rise by 40%, with capital expenditures on the project amounting to €1.4 million. With work beginning early next year, project completion is expected in the third quarter of 2017.

### Solvay starts production of highly dispersible silica in Gunsan

November 2, 2016 — Solvay S.A. (Brussels, Belgium; [www.solvay.com](http://www.solvay.com)) has launched the production of highly dispersible silica (HDS) at its new plant in Gunsan, South Korea. The plant has a capacity of more than 80,000 m.t./yr for producing Solvay's most advanced grades of HDS.

### W.R. Grace to provide process technology for Braskem PP plant

November 2, 2016 — W.R. Grace & Co. (Columbia, Md.; [www.grace.com](http://www.grace.com)) will provide its Unipol polypropylene (PP) process technology to Braskem's (São Paulo, Brazil; [www.braskem.com.br](http://www.braskem.com.br)) planned PP facility in La Porte, Tex. The new plant is designed to produce 450,000 m.t./yr of PP, and is slated for startup in 2019.

### Amec Foster Wheeler wins contract for steam reformer heater in Egypt

November 2, 2016 — Amec Foster Wheeler (London, U.K.; [www.amecfw.com](http://www.amecfw.com)) was awarded a contract by Agrochem to supply material and detailed engineering for a steam reformer heater for its fertilizer facility in Alexandria, Egypt. The steam reformer heater will operate as the primary reformer in the ammonia production unit, which has a capacity of 250 m.t./d. The scope of work is scheduled for completion at the end of 2016.

### PPG completes silica capacity expansion in the Netherlands

October 28, 2016 — PPG Industries, Inc. (Pittsburgh, Pa.; [www.ppg.com](http://www.ppg.com)) held a ceremony marking the completion of a project to increase precipitated-silica production capacity at its Delfzijl, Netherlands, manufacturing location. The expansion adds capacity of more than 15,000 m.t./yr of precipitated silica products.

### Trinseo to expand capacity for styrene butadiene rubber

October 25, 2016 — Trinseo (Berwyn, Pa.; [www.trinseo.com](http://www.trinseo.com)) will expand production capacity for solution-styrene butadiene rubber (S-SBR) at its manufacturing complex in Schkopau, Germany. The expansion will add 50,000 m.t. of S-SBR capacity, increasing the company's global S-SBR production by 33%. This additional capacity is expected to come online in January 2018.

### Invista opens nylon production facility in Shanghai

October 27, 2016 — Invista (Wichita, Kansas; [www.invista.com](http://www.invista.com)) opened its new nylon 6,6 facility at the Shanghai Chemical Industry Park (SCIP) in China. The site includes a new 215,000-m.t./yr hexamethylene diamine (HMD) plant and a 150,000-m.t./yr polymer plant.

### Mergers & Acquisitions

#### PPG acquires remaining interest in Italian coatings joint venture

November 11, 2016 — PPG has purchased the remaining 50% ownership interest in PPG Univer S.p.A from its JV partner, Univer Italiana S.r.l. Financial terms were not disclosed. PPG Univer manufactures architectural and liquid industrial coatings and maintains administrative offices and a production facility in Cavallirio, Italy.

#### Siemens and Bentley Systems advance strategic alliance with joint investments

November 10, 2016 — Siemens AG (Munich, Germany; [www.siemens.com](http://www.siemens.com)) and Bentley Systems (Exton, Pa.; [www.bentley.com](http://www.bentley.com)) have formalized a strategic alliance to drive new business value by accelerating digitalization



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to advance project delivery and asset performance in complementary business areas. The companies will initially invest at least €50 million in developing joint solutions to leverage new cloud services to converge respective digital engineering models from both companies.

### **Saudi Aramco acquires Converge polyol technology from Novomer**

November 3, 2016 — Saudi Aramco (Dhahran; [www.saudiaramco.com](http://www.saudiaramco.com)) has acquired the Converge product line and associated operations and technologies from Novomer Inc. (Waltham, Mass.; [www.novomer.com](http://www.novomer.com)). The transaction is valued at up to \$100 million. Converge technology is said to provide a more sustainable alternative to conventional petroleum-based polyols.

### **Ineos acquires HDPE pipe manufacturer WLP Holding**

November 2, 2016 — Ineos Technologies (Rolle, Switzerland; [www.ineos.com](http://www.ineos.com)) announced that Ineos O&P USA has acquired WLP Holding Corp. (Fort Worth, Tex.), one of the largest HDPE pipe manufacturers in North America. WLP has production facilities in Kentucky, South Dakota, Utah, Texas and Wyoming, as well as a facility in Georgia that is currently under construction.

### **Clariant increases mining footprint with two acquisitions**

November 2, 2016 — Clariant (Muttenz, Switzerland; [www.clariant.com](http://www.clariant.com)) has agreed to acquire Chemical & Mining Services, Pty., a provider of specialty chemicals and technical services to mining industry clients located primarily in Australia. Clariant has also acquired the specialty mining chemicals business from SNF Flomin, a U.S.-based subsidiary of the SNF Group, which manufactures and distributes reagents for the minerals processing industry.

### **HollyFrontier to acquire Petro-Canada Lubricants for \$854 million**

October 31, 2016 — HollyFrontier Corp. (Dallas, Tex.; [www.hollyfrontier.com](http://www.hollyfrontier.com)) will acquire Petro-Canada Lubricants from Suncor Energy (Calgary, Alta, Canada; [www.suncor.com](http://www.suncor.com)) for around \$845 million. The Petro-Canada Lubricants plant, located in Mississauga, Ontario, is the largest producer of base oils in Canada with 15,600 bbl/d. The transaction is expected to close in the first quarter of 2017.

### **Aspen Technology acquires MTelligence for \$37 million**

October 31, 2016 — Aspen Technology, Inc. (Bedford, Mass.; [www.aspentech.com](http://www.aspentech.com)) has acquired Mtelligence Corp. (San Diego, Calif.; [www.mtell.com](http://www.mtell.com)), a provider of predictive and prescriptive maintenance software. The purchase price of the transaction was \$37 million.

### **Showa Denko to acquire graphite electrode business from SGL**

October 21, 2016 — Showa Denko K.K. (SDK; Tokyo, Japan; [www.sdk.co.jp](http://www.sdk.co.jp)) will acquire SGL GE Holding GmbH, the graphite electrode business of SGL Carbon SE (Wiesbaden, Germany), for an enterprise value of €350 million. Both parties expect to close the transaction in early- to mid-2017.

*Mary Page Bailey*



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## CPI Employment Landscape: Snapshot 2016

Insights about complex CPI workforce issues come from a variety of sources, including survey data on corporate attitudes, salary and diversity

### IN BRIEF

#### EXECUTIVE ATTITUDES

#### CPI WORKPLACE DIVERSITY

#### SALARY SURVEY

#### TECHNOLOGY IN TRAINING

The chemical process industries (CPI) continue to face an interconnected web of workforce challenges, including the retirement wave of older workers and skills shortages in the younger workers who will replace them. Recent information from a variety of sources paints a picture of a complex set of issues, along with strategies for addressing them.

### Executive attitudes

A host of workforce insights came from a recent survey of chemical industry executives and managers conducted by the American Chemistry Council (ACC; Washington, D.C.; [www.americanchemistry.com](http://www.americanchemistry.com)) and the consulting firm Accenture (Chicago, Ill.; [www.accenture.com](http://www.accenture.com)). The ACC-Accenture study surveyed over 100 “C-suite” executives from North American chemical companies, as well as 400 lower-level executives (see box, p. 22).

“The survey results show a deep awareness of the talent challenges facing companies and a wide appreciation for the complexity of the issues,” comments Stephanie Rogers-Whaley, managing director at Accenture focused on chemicals, natural resources, oil and gas and utilities.

Issues of talent recruitment, training, worker retention and replacing retirees all have multiple dimensions and layers, including industry-sector differences, geographical considerations and others. The upshot of that, from the perspective of CPI companies, is that leaders need to take a nuanced approach to solutions and be “razor-sharp” about exactly what capabilities they need and in exactly how they address specific workforce

challenges, says Rogers-Whaley. “Talent and workforce challenges are not only a challenge for [human resources], this is definitely now a ‘C-suite’-level challenge,” she says.

“We are now seeing companies diving in and starting various initiatives and programs aimed at having an impact on these challenges,” Rogers-Whaley says. For example, companies have improved greatly in the area of “onboarding” employees when they begin work at a particular company and job site. Many companies are using programs that allow new employees to go through “rotations” in all of operating areas of a site to gain exposure to a breadth of experiences, tools and equipment. The approach seems to rate positively for young workers, she notes.

“It’s possible that such an approach may require small sacrifices in initial worker productivity, but over the longer term, having new employees ‘shadow’ experienced workers in various parts of the process helps them better comprehend the nuances of the job and build a wider set of skills by getting them closely involved,” Rogers-Whaley says.

As companies embrace talent challenges, one area of focus is addressing the culture differences among different generations of workers. “One key to replacing the workers from the ‘Baby Boom’ generation [those born from 1945 to 1964] is a robust mentoring program for the younger workers in the ‘millennial’ generation [born 1977–1995],” Rogers-Whaley explains. “And ‘Generation-X’ [born 1965–1976] is a smaller population overall, which makes it even harder to fill the gaps in the middle, those with mid-level experience.

“Generation X workers often have an ap-

## THE ACC-ACCENTURE SURVEY OF CHEMICAL INDUSTRY LEADERS: SELECTED FINDINGS

The following is a sample of some of the results from the 2016 ACC/Accenture survey of leaders at North American chemical companies:

- **Retirements:** 88% of respondents said for their companies, at least 10% of their employees will be eligible for retirement in 3–5 years (40% of respondents said over 20% of their workforce will be eligible for retirement in that time)
- **Chemical industry image:** 40% strongly agree and 47% agree with the statement that the chemical industry need to do more to change its image into a dynamic, exciting and meaningful place to spend your career
- **Impact on profits:** 37% strongly agree and 49% agree with the statement that profitability in the chemical industry will suffer significantly if the aging workforce challenge is not resolved within the next 3–5 years
- **Knowledge transfer:** 82% of respondents said that their companies have knowledge transfer program/process to ensure a smooth handover of information
- **Security:** 31% strongly agree and 47% agree with the statement that workplace security protocols need to be changed to reflect the trusting nature of millennials
- **Safety:** 76% of respondents said they need to change safety programs that were developed by Baby Boomers
- **Training:** 81% agree that they can hire non-technical workers and train them for technical jobs
- **Talent recruitment:** The greatest competitor for talent in the chemical industry and the greatest source of talent is other chemical companies
- **Workforce profile:** Of the existing chemical workforce, 16% are millennials, 50% are Generation-X and 34% are Baby Boomers. Because of slow hiring for the past decade, the 15–25-year experienced workers have a larger share of the workforce

preciation for the Baby-Boom generation, so we have seen them (in some cases) serve as kind of a ‘decoy ring’ between the boomers and the millennials,” Rogers-Whaley says, and therefore, companies need to work hard to find Generation-X workers to fill key roles where they can lead and help guide younger workers.”

While the ACC-Accenture study concludes that North American chemical companies need to resolve

workforce turnover issues in order to avoid higher hiring, training and safety costs in the future, these companies may be helped by a possible stabilization in the rate of retirements. Charles Wiseman, director of human resources for the U.S. and Canada at Dow Chemical Co. (Midland, Mich.; [www.dow.com](http://www.dow.com)), says that this year’s number of Baby Boomer retirements has remained the same as last year’s total. “If anything, Dow

is seeing a lesser rate of retirements than expected from projections five years ago, as workers are choosing to stay in the workforce longer,” Wiseman remarks.

### CPI workplace diversity

Another aspect of the CPI workforce for which new data are available is the experience of women in engineering workplaces.

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## ADDITIONAL RESULTS FROM THE 2016 CE SURVEY ON CPI SALARIES

Other findings of the CE salary survey include the following:

- 45.8% of survey respondents said they anticipate higher pay this year than last year, while another 44% said they anticipate about the same pay. Only 10% said they anticipate lower compensation this year than last year.
- 92.8% of respondents reported being employed full time, 3.3% reported part-time work and 2.1% said they were unemployed.
- 30.3% of respondents said their company has experienced greater than 15 retirements of engineers and technical personnel in the past 2 years
- 64% of respondents said their companies were either somewhat or greatly affected by retirements in the last year, versus 13% who said their employer was not affected at all

(Chicago, Ill.; [societyofwomenengineers.swe.org](http://societyofwomenengineers.swe.org)) recently conducted a Workplace Experiences Survey in collaboration with the Center for Work Life Law at the University of California (Berkeley; [www.berkeley.edu](http://www.berkeley.edu)) Hastings School of Law. The survey drew over 3,000 respondents and received almost 900 free-response comments. Among the aims of the survey was to examine implicit gender and racial bias in engineering workplaces. The survey asked respondents to what extent they had experienced any or all of a group of specific patterns of gender and racial bias that have been repeatedly documented in social psychology studies.

The survey found significant gender gaps for three specific bias patterns, known as “Prove-it-again” bias, “Tightrope” bias and “Maternal wall” bias. In Prove-it-again bias, workers feel that they need to continually prove themselves in the workplace to receive the same level of respect and recognition as their colleagues. Tightrope bias refers to the experience of workers needing to remain within a narrower range of acceptable behavior than their col-

leagues. Maternal wall bias has to do with how having children affects colleagues’ perceptions of work commitment and competence.

The report states, “Three separate regression analyses showed that, after controlling for many other variables, women still reported more Prove-It-Again, Tightrope and Maternal Wall bias [than men].” Evidence for a fourth pattern of gender bias, (called “Tug-of-War” bias) was weaker, the report notes (see box, p. 19).

The SWE report, including many open-ended comments from respondents, can be downloaded at <http://research.swe.org/swe-research/>

### Salary survey

Another source of CPI workforce data is the annual salary survey conducted by *Chemical Engineering* magazine. Overall, salary information indicates CPI engineers have a low rate of unemployment, and have seen an apparent rise in salaries. More than 850 CPI professionals responded to the CE survey in October 2016.

The average annual salary for all full-time employed respondents, including 275 international respon-

dents, was \$108,500. This compares to \$104,000 last year and \$109,000 from a similar survey in 2014. For North American respondents, the average salary was \$131,000, which is 3.9% higher than the North American average from 2015 (\$126,000). The CE survey drew many respondents with considerable work experience (61.2% with 20 or more years experience), so the average salary skewed higher than if the distribution of work experience was more even (see box above).

### Technology in training

Several factors, including the Baby-Boomer retirement wave and an emphasis on process safety, have focused attention on training for new workers. The rapid advance of information technology (IT) tools and capabilities, along with rising computing power, are allowing new IT systems to play a larger role in worker training. Two technologies poised for rapid growth and increasing use in training contexts are virtual reality (VR) and augmented reality (AR) systems. These are increasingly being explored and applied to improve worker competency, engagement and safety.

Virtual reality refers to a fully enclosed 3-D interactive space, while augmented reality refers to mixing views of the real world with overlaid information projected on a viewing device. VR allows workers to fully immerse in a virtual hazardous environment to learn without being exposed to real-world dangers. AR allows employees access to additional realtime information overlaid on the real-world, helping guide proper decisions. For example, CPI plant employees might wear AR-equipped safety glasses to view realtime environmental information, such as airborne chemical concentrations or oxygen levels, as they work in the real-world plant.

Convergence



**FIGURE 1.** 3-D animations, along with augmented-reality and virtual-reality systems, are among the technologies being increasingly employed for CPI worker training

## SWE SURVEY ON GENDER AND RACIAL BIAS IN THE ENGINEERING WORKPLACE: SELECTED FINDINGS

Among the SWE survey's findings are the following:

- The survey found that 61% of women engineers felt they had to repeatedly prove themselves to their colleagues, while only 35% of Caucasian men reported the same
- 40% of women engineers reported that they work more but get paid less than their colleagues, versus 29% of males
- Women engineers reported that a narrower range of behavior was accepted in women than men. Women engineers were less likely than white men to say they could behave assertively (51% versus 67%) or show anger without pushback (49% versus 59%)
- Nearly 80% of men said having children did not change their colleagues' perceptions of their work commitment or competence; only 55% of women said the same
- Racial gaps were reported for two patterns of bias: For Prove-It-Again bias, 68% of engineers of color (men as well as women) reported having to prove themselves repeatedly, as compared to 35% of white men; and Tightrope Bias: Engineers of color were less likely than white men to say they could behave assertively (49% versus 67%) or show anger without receiving pushback (45% versus 59%)
- Engineers of color were more likely than white men to report pressures to let others take the lead (39% versus 16%) and were less likely to report having the same access to desirable assignments (55% versus 85%)

"There has been a persistent gap between academic theory and industrial practice. Incorporating virtual reality and augmented reality tools into training and education can help bridge this gap," comments David Lafargue, dean of the School of Industrial Technology at Southwest Louisiana (SOWELA) Technical Community College (Lake Charles, La.; [www.sowela.edu](http://www.sowela.edu)).

AR and VR technology are poised for rapid growth in the next year, Lafargue remarks, because there has been a great deal of investment in developing AR and VR systems, and major players in this industry will soon release tools that will allow programming the VR and AR systems with minimal coding required.

Lafargue's institution is taking a leadership role in integrating AR and VR technology into education. Students at SOWELA's training center will be among the first to be able to utilize AR and VR training as part of their process technology curriculum. Lafargue says the college has already begun integrating VR and AR systems into courses and the spring semester will see heavier use of these technologies. For example, SOWELA has developed an AR platform where students can view an animation of the internal workings of a distillation process by wearing a set of glasses to overlay the animation on top of the real-world distillation apparatus.

"We have been working hard to find effective ways to integrate this technology into student learning, so that after you get past the 'wow factor,' there is actual added value with this technology for educational applications," explains Lafargue.

Many CPI companies are exploring AR and VR options for a variety of applications, including training of new process operators, equipment maintenance personnel and engineers. The offerings of VR- and AR-based tools for industrial settings is growing rapidly, and users have begun a process of determining how to make best use of them. "In terms of adoption of this kind of technology, we are kind of at a tipping point right now," says Peter Richmond, product manager at Schneider Electric (Lake Forest, Calif. [www.software.schneider-electric.com](http://www.software.schneider-electric.com)). "There has been a reasonable amount of adoption of VR and AR technology for extending traditional training thus far, across all continents," Richmond says, but companies are still trying to determine how to get the most for their investment buck. "There has been a huge investment into these devices and software, so that will catalyze faster spreading of the technology."


Richmond manages Schneider Electric's SimSci EYESIM product family, which includes the company's proprietary immersive, 3-D training environment specifically for the industrial space. It allows workers to train in a simulated, live, interactive control room, and also allows field workers to utilize AR simulations on the plant floor. Schneider offers both customized AR and VR systems that can exactly match a user's facility, as well as more generalized, off-the-shelf options to help training of more common equipment. More information can be found here: <https://goo.gl/7QrWeS>.

Another company working on new training tools is Convergence Training (Vancouver, Wash.; [\[gencetraining.com\]\(http://gencetraining.com\)\). The company has developed both general and customized training modules featuring 3-D animations that offer views and perspectives not available with photos and classroom materials. Some of the areas where such 3-D animations can be applied are viewing the internal workings of a process or a piece of equipment, or looking at step-by-step procedures for equipment maintenance. Convergence animations can be based directly on engineering drawings, so companies can begin training before a piece of equipment even arrives at a plant site, says CEO Randy Kohltfarber.](http://www.conver-</a></p></div><div data-bbox=)

Kohltfarber says the company can also develop virtual-reality and augmented-reality systems, but is being strategic about where and how these technologies can be best applied. Convergence has already worked with clients in many CPI sectors, including mining, food & beverage, pulp & paper, brewing and others.

A host of other companies are offering VR- and AR-based products for industry as well. Siemens AG (Munich, Germany; [www.siemens.com](http://www.siemens.com)) and Bentley Systems Inc. (Exton, Pa.; [www.bentley.com](http://www.bentley.com)) collaborated on Comos Walk-inside, a 3-D VR viewer for plant design and engineering. DAQRI (Los Angeles, Calif.; [www.daqri.com](http://www.daqri.com)) offers the Smart Helmet, a AR-enabled hardhat. Echelon VR (Milpitas, Calif.; [www.echelonvr.com](http://www.echelonvr.com)) and XVR Simulation B.V. (Delft, the Netherlands; [www.xvr.com](http://www.xvr.com)) are also among the growing number of companies now providing advanced training tools in the industrial setting. ■

Scott Jenkins

 Editor's note: For an expanded version of this article, visit [www.chemengonline.com](http://www.chemengonline.com)

## Air Emissions: Overcoming Monitoring & Control Challenges

Modern technology tackles CPI's air-emissions concerns

### IN BRIEF

UNRELIABLE DATA

GHG REGULATIONS

DECLINING SKILLS BASE

THE COSTS OF MONITORING

CONTROLLING FUGITIVE EMISSIONS

MULTIPLE CONTAMINANTS

Air emissions monitoring and control is a major concern for all chemical processors, but the product being manufactured, the process used to make it, the resulting byproducts and pollutants, and the location of a facility and associated regulatory mandates all dictate the specific methods or technologies that must be employed to monitor and control air emissions at each facility. As a

result, monitoring and control requirements vary greatly from processor to processor, and from location to location. However, there are several across-the-board challenges regarding air emissions monitoring and control in the chemical process industries (CPI). Here, monitoring and control technology experts discuss the issues of concern and the solutions they've designed to ease the burden of compliance.

#### Challenge: unreliable data

"In today's regulatory climate, just monitoring for air pollutants isn't enough," says Hank Braly, vice president of sales and marketing with Mocon-Baseline (Lyons, Colo.; [www.baseline-mocon.com](http://www.baseline-mocon.com)). "Processors have to be sure they're getting good data out of their instruments and, too often, we hear that there's a lack of confidence in the



Endress+Hauser

**FIGURE 1.** E+H's Promass 200 Coriolis mass flowmeters are used to monitor natural gas or other hydrocarbon feeds to furnaces and boilers for GHG emission monitoring and to provide certified integral and redundant calibration verification

accuracy of the data."

**Solution: Smarter instrumentation.** "The onset of microprocessors going into instruments has allowed a lot of the analyzers to become more automated than they used to be," says Braly. "As a result, many instruments now include automatic calibration and self-diagnostics, which provide more reliable data."

Braly says Mocon-Baseline's Series 9000 total hydrocarbon analyzer and Series 9100 gas chromatograph are both designed for accurate and reliable analysis. Automatic calibration features provide long-term analytical stability of the instruments above and beyond what can be achieved via manual calibrations. "Microprocessors are allowing us to get into the diagnostics of instrumentation, as well, so that if anything appears to be getting



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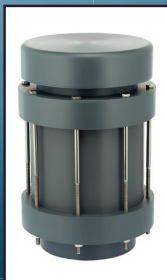
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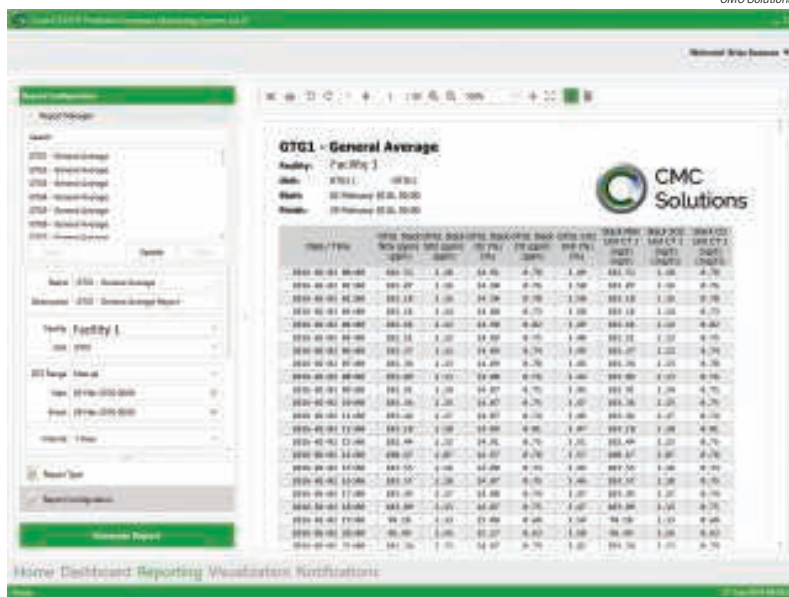
**FIGURE 2.** The Rosemount CT5100 continuous gas analyzer is a Quantum Cascade Laser (QCL) for process gas analysis and emissions monitoring

out of line, users can be alerted that the instrument needs some attention before the data become skewed and before the instrument is out of compliance.”

### GHG regulations

Meeting current and potentially new and more-restrictive regulations from the U.S. Environmental Protection Agency (EPA; Washington, D.C.; [www.epa.gov](http://www.epa.gov)) and state regulators is one of the greatest emissions monitoring and control challenges for chemical processors, especially with today's focus on greenhouse gases (GHG). “In areas with already high concentrations of greenhouse gas emissions entrants, potential new emitters in areas that do not currently have significant GHG production may run up against local environmental opposition,” explains Craig McIntyre, industry manager for Endress+Hauser (Greenwood, Ind.; [www.us.endress.com](http://www.us.endress.com)). “For example, a company that is working to reduce coal consumption planned to build a world class methanol plant in Washington, but ran into enough environmental opposition that it cancelled its plans to build there.”

Compounding the issue is that regulations require that GHG monitoring systems periodically verify that their calibrations are producing measurement accuracies within certain values. “Verification and documentation to prove the calibra-



**FIGURE 3.** SmartCEMS-60 PEMS provides continuous data recording and report generation compliant with U.S. EPA 40 CFR Part 60 regulations and provides a secure and reliable means of collecting, storing and reporting compliance data. It can be used on most combustion sources that fire gaseous or liquid fuels and for most compliance parameters

tion is acceptable normally requires removal of the equipment,” says McIntyre. “This exposes the system to damage during removal, transport and reinstallation and adds more costs.”

He continues to say that some monitoring systems offer in-situ “push-button” calibration verification, but that these may not always be traceable or accredited to an international standard.

**Solution: ISO-compliant instrumentation.** McIntyre says that if an organization is ISO 9001:2008 certified, it needs to address Clause 7.6a Control of Monitoring and Measuring Devices, which states: “Where necessary to ensure valid results, measuring equipment shall...be calibrated or verified at specified intervals, or prior to use, against measurement standards traceable to international or national measurement standards.”

New monitoring systems provide certified integral or redundant references that facilitate calibration verification via accredited and traceable means, and, thus, can have their measurement calibration regularly verified in situ, removing the risk and cost associated with taking the instruments out of service.

E+H's Promass 200 Coriolis mass flowmeters (Figure 1) are used to monitor natural gas or other hydrocarbon feeds to furnaces and boilers for GHG emission monitoring and to provide certified integral and redundant calibration verification. “These are calibrated and can be verified in situ via attested (TÜV) and traceable means, which addresses the ISO 9001:2008 Clause 7.6a trace-ability requirements,” says McIntyre.

### Declining skills base

“People that can read and look after analyzers are getting harder to find and more expensive to pay,” says Shane Hale, director of product marketing for gas analysis with Emerson (St. Louis, Mo.; [www.emerson.com](http://www.emerson.com)).

**Solution: Easier-to-use instrumentation.** “Because we recognize that skilled [technicians] are hard to find, we are always developing our technology in an effort to make it easier to use,” says Hale. This includes employing built-in diagnostics, as well as the inclusion of simplified sampling techniques.

The Rosemount CT5100 continuous gas analyzer is a quantum cascade laser (QCL) for process gas analysis and emissions monitoring



(Figure 2). “The quantum cascade lasers can measure multiple components in gas streams simultaneously, which is very unique, and allows us to measure these multiple components through a single sample chamber,” says Hale.

Traditional analyzers require a separate chamber and analyzer bench for each component, he says. “But the quantum cascade laser adds significant ease of use because it is a single system, rather than having to have multiple technologies in a single box, which is quite a big advantage.”

Other features include low long-term drift, which minimizes calibration intervals, low maintenance, continuous health-diagnostics reporting and an intuitive, simple front-panel user interface that allows access to all instrument functions, all of which help ease the burden on the workforce.

### The costs of monitoring

“If you look at monitoring systems, there are costs associated with the initial purchase price, with mainte-

nance and repair of each instrument and its support systems and with calibration and quality assurance, as well as additional costs related to sample transport and handling,” says Brian Swanson, president of CMC Solutions (Farmington Hills, Mich.; [www.cmcpe.com](http://www.cmcpe.com)).

**Solution: Software-based systems.** “Our solutions, the SmartCEMS-60 PEMS (predictive emissions monitoring system) and the SmartCEMS VPA (virtual process analytics), are software solutions,” says Swanson. “There’s no hardware other than the computer it runs on, so right there, our customers see initial investment costs that are one-half to one-third the price of a physical analyzer. On top of that, there is no installation cost, no associated access platforms or test ports and there is no necessary maintenance and no sample transport issues.”

SmartCEMS-60 PEMS provides continuous data recording and report generation compliant under

U.S. EPA 40 CFR Part 60 regulations and provides a secure and reliable means of collecting, storing and reporting compliance data (Figure 3). It can be used on most combustion sources that fire gaseous or liquid fuels and for most compliance parameters. The VPA product is a set of tools and software to be used in a process plant environment to model process inputs in realtime and run plant-operating scenarios.

“These products, by far, offer the lowest total cost of ownership of any monitoring system for process control or stack monitoring,” he says. However, he adds, there is sometimes skepticism regarding use of a virtual system. “Many process engineers really like to hold onto those instruments,” he says. “We understand this and often propose our solution as a redundancy to a physical analyzer or suggest initial trials where the measurement isn’t as critical and, after a while, they see that our models

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**FIGURE 4.** Shown here is a catalytic hot-gas filtration system installed in the glass industry by Dürr

are very robust and that they provide readings that are 100% reliable without the additional costs. We also like to remind people who are arguing safety and reliability that traditional instruments drip, plug and fail, but a virtual instrument never has these issues."

### Controlling fugitive emissions

"The greatest control challenges we see often surround fugitive emissions," says Kari Kohonen, strategic account manager for oil and gas with Valin Corp. (San Jose, Calif.; [www.valin.com](http://www.valin.com)) "And, the challenges encountered in this area are directly related to the reliability of existing equipment, as well as the use of outdated valve technologies and correct installation procedures to ensure that they are remaining compliant with EPA standards."

**Solution: Mitigating valve leaks and increasing reliability.** "It is important to provide solutions with technologies that contain and reduce fugitive emissions by mitigating leak potential and providing greater reliability," says Kohonen. Valin of-

fers three solutions to assist here: rotary globe control valves, transmitter manifold valves and instrument tubing connections.

While conventional globe control valves use a linear rising stem that inherently pulls process fluids or gases up through the valve stem packing, increasing the risk and probability of introducing emissions into the environment, the Metso/Neles rotary globe valve, Series ZX, reduces that risk because the valve stem rotates within the packing, thus reducing the risk of emission leaks as the stem is not trying to pull process fluids or gases up through the packing.

Parker's PGI transmitter manifold valves feature the company's Pressure-Core stem-seal system for reliability and a virtually leak-free bonnet, which requires no maintenance. The leak-free design means no fugitive emissions in process level, flow, pressure and differential-pressure transmitter locations. And, the Phastite tubing connection system from Parker eliminates the requirement of welding and combines quick

installation with a single-assembly process, achieving a tube connector that can be used in applications with pressures up to 20,000 psi (1,380 bars).

### Multiple contaminants

The most challenging aspect of emissions control today is that chemical processors and other industrial manufacturers are required to address the capture of not only volatile organic compounds (VOCs) and gaseous contaminants, but there are also restrictions on particulate matter, acid gases, oxides of nitrogen (NOx) emissions and more. "Today's emissions regulations cover all sorts of pollutants and there is not necessarily one piece of equipment that can address all of the emissions in one shot," says Steven George, key account manager with Dürr Systems (Southfield, Mich.; [www.durr-northamerica.com](http://www.durr-northamerica.com)).

**Solution: Integrated control systems.** "To overcome this issue, we've been providing integrated system solutions," he says. According to George, traditional integrated systems might look like this: a bag house technology on the front end to address the particulate matter, followed by a regenerative thermal oxidizer (RTO) for the thermal destruction of VOCs, followed by a wet scrubber to remove acid gases generated by the thermal destruction process. "You end up with a staged approach to emission control, rather than one piece of equipment," he explains. The newest technology to be incorporated into this line of defense is catalytic hot gas filtration (Figure 4), says George, because it addresses multiple needs. "Not only can you use it to remove particulate matter, but it can also address NOx issues," he says. "And when this is combined with dry sorbent injection, it can also address acid gas removal, SOx and NOx all in one piece of equipment."

So, no matter the chemical being produced, the location of the facility or the greatest emissions challenge, there is likely a solution available to meet the need. ■

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# Rotating Equipment



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## Motor analyzer aids in troubleshooting efforts

The Fluke 438-II motor analyzer (photo) provides analysis data for both the electrical and mechanical characteristics of the motor while it is in operation. It uses proprietary algorithms to analyze and measure the three-phase current and voltage waveforms and compares them against rated specification to calculate motor mechanical performance. The device analyzes not only three-phase power quality, but also torque, efficiency and speed to determine system performance and detect overloaded conditions. This device eliminates the need for motor-load sensors and allows operators to make adjustments before failures cause an operational shutdown, says the company. — *Fluke Corp., Everett, Wash.*

[www.fluke.com](http://www.fluke.com)



HBM Test and Measurement

## Measure torque in high-speed motors and drives

The compact T40HS torque transducer (photo) measures dynamic torque in high-speed drives, turbines, transmission test rigs, adjustable actuators and complete power trains that operate at high rotational speeds. It offers high torsional stiffness, is made of light titanium and ensures maximum precision, says the company. This space- and cost-saving torque flange requires no additional bearings (reducing maintenance overhead), and is designed for rotational speeds up to 45,000 rpm, for non-contacting transfer of signals while ensuring maximum precision. — *HBM Test and Measurement, Marlborough, Mass.*

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sonic transducer design allows for 100% utilization of the screen surface, and its ultra-low-profile design allows minimum space consumption, making it possible to fit in tight spots between storage and process equipment. The device is designed with a quick screen-change system, making it easy to clean in a timely fashion. Available screen-frame sizes range from 17 to 48 in. — *Cleveland Vibrator, Cleveland, Ohio*

[www.clevelandvibrator.com](http://www.clevelandvibrator.com)

## Disc couplings improve stress distribution and reduce loads

The new High Performance Disc Coupling 2.0 for turbomachinery (photo) has a lighter-weight, second-generation design that is 15–30% lighter than previous generations and competitive designs, thanks to engineering optimization of the assembly, hardware and major components, says the company. The expanded range of 22 sizes allows users to select the smallest, lightest coupling needed for an application's torque requirement and service factor. — *Kop-Flex, a unit of Regal-Beloit Corp., Florence, Ky.*

[www.regalpts.com](http://www.regalpts.com)

## Sensors transform motors into intelligent machines

The monitoring and preventive maintenance of low-voltage motors can be time-consuming and expensive. This company's smart sensors provide insight on operating and condition parameters (such as vibration, temperature and overload), and calculate power consumption. Using proprietary software, the data are relayed through wireless transmission in the form of graphics that assist with maintenance planning. These sensors can reduce the downtime of low-voltage motors by up to 70%, extend asset lifetime by up to 30%, and reduce energy consumption by as much as 10%, helping the condition-monitoring solution to pay for itself, says the company. — *ABB, Zurich, Switzerland*

[www.abb.com](http://www.abb.com)



Kop-Flex

## Ultra-low-profile sifter fits easily in tight spots

The HK Twin Motor Sifter (photo) provides a three-dimensional motion, allowing for greater throughput (and increased product yield), by reducing screen blinding and reducing screening time of very fine materials from hours to minutes. The ultra-

## Motion-sensing product safeguards rotating machinery

The interval between a rotating machine being switched off and coming to a complete standstill can be 15–30 minutes — a



Castell

time that is most dangerous for workers needing to access the unit. The BEMF unit (photo) is a motion-monitoring product designed to protect workers. It ensures that large, motor-driven rotating equipment up to 600-V with a variable rundown time has completely stopped completely (even after it has been switched off) before access is possible. The BEMF unit detects zero electromotive force (EMF) from the motor, and releases a “trapped key” corresponding to a lock on the machine’s guard hatch. Access cannot be granted without the use of this key, and power can-

not be restored to the motor until the key is returned, says the company. — *Castell, Chicago, Ill.*

[www.castell.com](http://www.castell.com)

## Simulation solutions help to optimize rotating machinery

This company’s simulation solutions allow engineers to develop more efficient and reliable rotating machinery of all types. For instance, the company’s simulation products support turbomachinery-specific design and simulation tools for gas-turbine combustion and rotordynamics, transient blade-row simulation that allows for faster, more accurate aerodynamics simulation and expanded investigative scope, and aeromechanics simulation. — *Ansys, Canonsburg, Pa.*

[www.ansys.com](http://www.ansys.com)

## System lets turbine operators test trip valves while in service

This patent-pending pneumatic trip system (photo) provides an important safety function for steam turbines. Testing the trip system regularly

helps to reduce turbine tripping and potential catastrophic failure. This new pneumatic trip system with partial stroke actuation provides turbine operators with a safe and effective way to regularly test the trip valve without interfering with the turbine’s operation and its ability to trip. The system completes a partial stroke of the trip valve within seconds, enabling operators to quickly determine if the trip valve is working properly. It is available for new turbines and retrofits, and operators can initiate the partial stroke locally or remotely via a distributed control system (DCS). — *Elliott Group, Jeannette, Pa.*



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## Motor-control system provides feedback for positioning

The DCH403-10 is a low-voltage electronic motor-control system with a single-phase a.c. line source. The

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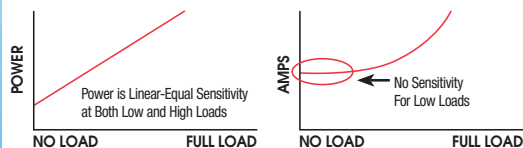
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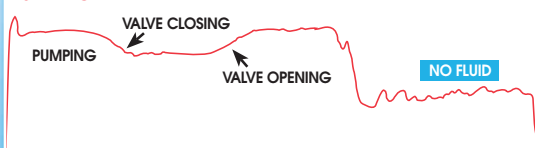
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DCH403-10 combines a custom “regen-capable” switching power supply with a low-voltage drive to allow control over low-voltage motors without the negative effects of currents spikes or the large BUS voltage associated with typical 115/230 VAC controls. The unit’s built-in circuitry diverts regenerative current to a dump resistor, allowing for quicker braking than most PWM drives, says the company. The DCH Series is ideal for applications including solar-powered devices, mobile equipment and actuator control. — *American Control Electronics, South Beloit, Ill.*

[www.amcntrl.com](http://www.amcntrl.com)

### These induction motors have improved heat dissipation

The family of IMfinity induction motors has been expanded with the Liquid Cooled (LC) series (photo). The latest-generation frame housing, with cast iron or steel flanges, allows for excellent heat dissipation. Its advanced cooling system maintains thermal efficiency, enabling the motor to be used together with a variable-speed drive for heavy-duty applications that require constant torque, says the company. Its noise level is decreased by an average 10–20 dB compared to air-cooled motors due to the lack of a fan. Its reduced power-to-weight ratio (a reflection of increased power in the same motor frame size) and its compactness (saving up to 25% volume compared to air-cooled motors) allow for easier and less costly installation within existing machine systems. — *Emerson Industrial Automation, St. Louis, Mo.*

[emersonindustrialautomation.com](http://emersonindustrialautomation.com)

### A new stator design reduces maintenance and downtime

The iFD-Stator 2.0 (photo) features a two-part reusable stator housing and replaceable stator. It delivers reduced pulsation and improved fluid flow compared to conventional stator designs, and considerably higher efficiency due to a reduced starting and running torque. It is compatible with all 11 models in the NEMO NM series of progressing-cavity pumps. Changing the stator within the housing is very easy, with compression-free assembly and disassembly, says the company. The defined compression for the iFD-Stator 2.0 is automatically generated when the elastomer collar

is fastened — *Netzsch Pumps North America LLC, Exton, Pa.*

[www.netzsch.com](http://www.netzsch.com)

### Drives are easy to install, need no special programming

The digital a.c. Hybrid Drives (photo) are part of this company’s ACCU-Series lines of variable-speed and inverter-duty products. The 1–10-horsepower drives can be up and running in minutes, says the firm. The off-the-shelf drives’ enclosures range from basic to those used for watertight indoor/outdoor applications. Drives can also be customized. — *Nidec Motor Corp., St. Louis, Mo.*

[www.nidec-motor.com](http://www.nidec-motor.com)

### Two new members added to this pump family

The introduction of two new motors — the Pipeline Duty Specification Motor (photo) and the Petro-Chem Value Motor — expand this company’s motor portfolio. The Pipeline Duty Motor features low vibration, high reliability and assured variable-speed performance. The Petro-Chem Value Motor is suitable for general-purpose petroleum and chemical applications. Both motors feature low vibration and cooler operating temperatures, which improves motor and drive-train reliability. — *Siemens, Atlanta, Ga.*

[www.siemens.com](http://www.siemens.com)

### This laser-based device makes precision alignment easy

The Easy-Laser E720 is all-in-one solution for the installation and alignment of rotating machinery. For machine installations, the E720 measures base twist, straightness of piping, rolls and shafts, parallelism of surfaces and flatness and levelness of machine foundations and bases. For shaft alignment, it measures misalignment as well as any “soft foot” condition. The system has built-in Alignment Tolerances and Thermal Growth Compensation features. Alignment data can be stored in the device and printed as a PDF report, or archived and managed using free Easy-Link software. Using optional accessories, the E720 can also align belt drives and check overall vibration levels. — *Ludeca, Inc., Doral, Fla.*

[www.ludeca.com](http://www.ludeca.com)

Suzanne Shelley



Netzsch Pumps North America



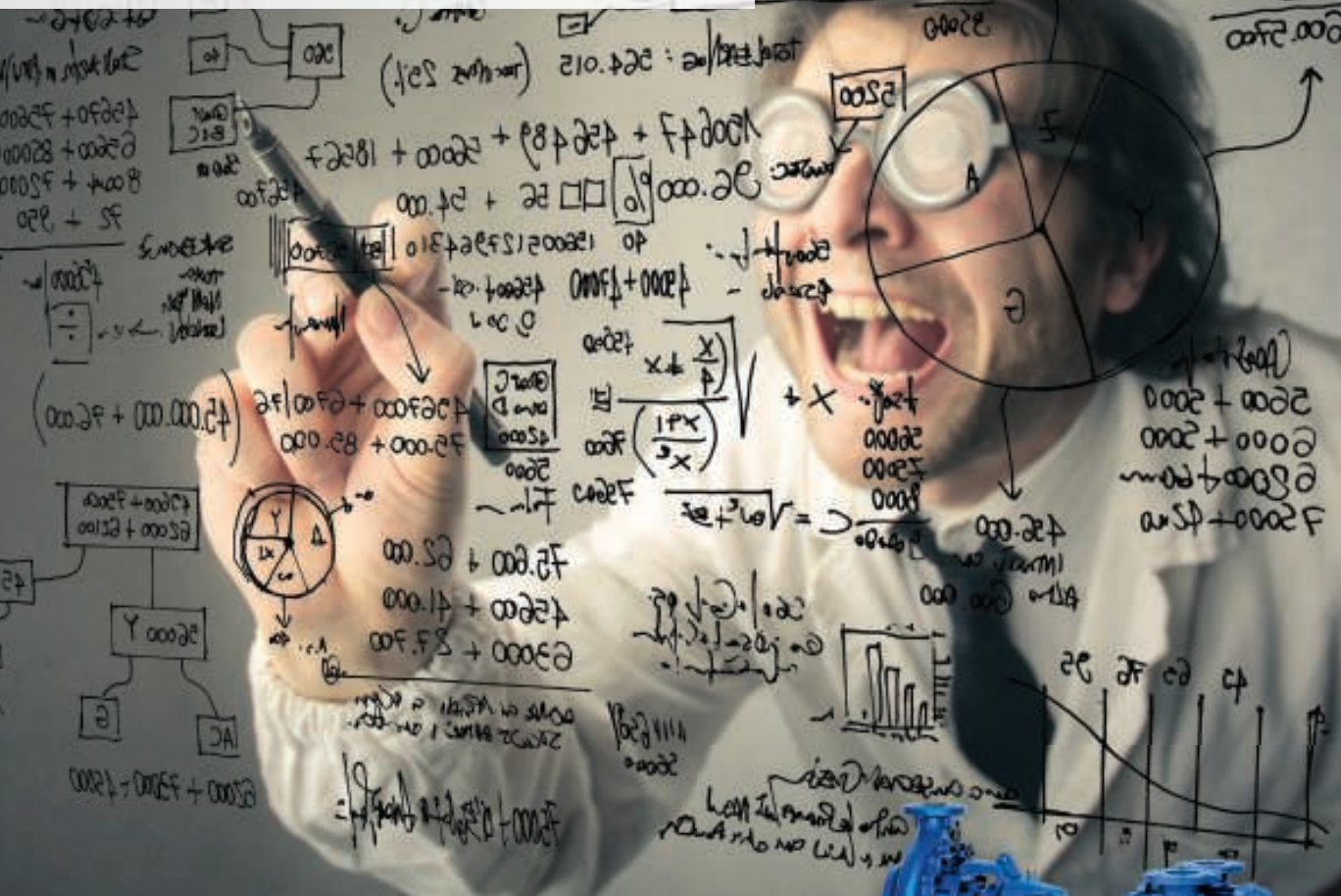
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Emerson Automation Solutions



## A handheld communicator with built-in diagnostic software

The handheld AMS Trex Device Communicator (photo) is built to withstand harsh industrial environments, and makes device and loop diagnostics simple to understand and field activities easier to complete. Protected against moisture and extreme temperatures, the Trex communicator boasts a rugged design that can withstand the bumps and drops that come from normal use in the plant. The large, full-color touchscreen display adjusts to lighting conditions and aids troubleshooting in areas where too much or too little light makes other devices difficult to read. Using the Trex communicator's built-in Foundation Fieldbus and HART device diagnostic software, technicians can isolate and repair problems while the devices continue to run. Simple issues can be addressed on the spot, avoiding unnecessary production interruptions. Segment and loop diagnostic tools allow users to validate loop and fieldbus segment characteristics for streamlined troubleshooting. With the ValveLink Mobile app, technicians can analyze valve diagnostics results easily on the communicator's larger screen. — Emerson Automation Solutions, St. Louis, Mo.

[www.emerson.com/trex](http://www.emerson.com/trex)



Check-All Valve Mfg.



TSI

## A new series of check valves engineered for silent operation

The Epic series consists of spring-loaded, poppet-type inline check valves (photo) that are designed to be simple, rugged and efficient in any flow orientation. The valves are streamlined so that media flows through the valve over smooth, contoured surfaces with very little change in direction, minimizing the pressure drop across the valve. The patent-pending Epic series features a complete, drop-in, replaceable insert that is engineered for silent operation. The valve closes quickly and smoothly to avoid fluid hammer. A variety of connection options are available, including male, female and flared-tube. — Check-All Valve Mfg. Co., West Des Moines, Iowa

[www.checkall.com](http://www.checkall.com)



PAC

## These condensers and chillers are explosion proof

This company's line of condensing and chiller units are now available in explosion-proof designs (photo). The product line consists of a number of models, including air-cooled condensing units, remote air-cooled condensers, water-cooled chillers and evaporative condensing chillers for both indoor and outdoor use. With explosion-proof design, these units are suitable for use in petrochemical refineries, oil-and-gas applications, grain elevators, power plants, coal mines and chemical production plants. The explosion-proof products are built in accordance with National Electric Code (NEC) requirements for various hazardous environments where fire or explosion risks may exist due to flammable gases or vapors, flammable liquids, combustible dust, ignitable fibers or flyings. — Technical Systems Inc. (TSI), A Division of RAE Corp., Pryor, Okla.

[www.raecorp.com](http://www.raecorp.com)

## Measure nitrogen and sulfur with a single analyzer

The NSure analyzer (photo) offers users the ability to measure total sulfur, total nitrogen or both in a single analyzer. By utilizing the same technology that laboratories use to qualify products, NSure enables plants to ensure regulatory compliance while operating close to the upper limit to maximize profitability with continuous and precise measurements that correlate with the primary test methods. NSure's innovative design can operate over a wide range and withstand process swings. Its complete combustion of the sample allows for fast response even in difficult process conditions. — PAC, Houston

[www.paclp.com](http://www.paclp.com)

## An online library for industrial lubricants

This company recently introduced the Industrial Lubricants Digital Knowledge Center, which includes an extensive catalog of equipment maintenance best-practice tips, as well as insights on the trends that are impacting a wide range of industrial sectors, such as general manufacturing, mining, oil-and-gas, power-generation



and food-and-beverage. Available online on the company's website, this new information hub contains nearly a hundred pieces of educational content, including techniques to improve energy efficiency and cost-savings calculation methods. — *ExxonMobil Fuels & Lubricants, Spring, Tex.*  
[www.mobil.com/industrial](http://www.mobil.com/industrial)

### New steam traps offer fast condensate removal

The FT62 range of ASME 600 float and thermostatic steam traps (photo) is suitable for industries that need fast and efficient condensate removal. The FT62 range is available in sizes ranging from 1/2 to 1 in. with screwed, socket-welded and flanged connections, and with body materials of either stainless steel or carbon steel. With features such as an integral bi-metal air vent and strainer, the FT62 range has been

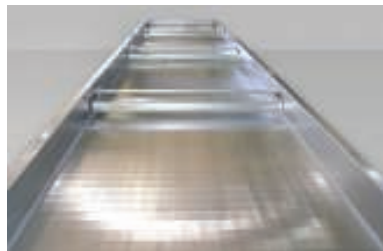


*Spirax Sarco*

designed specifically for maintainable drainage of small, high-pressure process applications. Typical applications include installations for stripper reboilers, steam-turbine inlet drains and separator drainage. — *Spirax Sarco, Inc., Blythewood, S.C.*  
[www.spiraxsarco.com](http://www.spiraxsarco.com)

### This fluid-bed dryer has an enhanced conveying surface

This company's vibrating fluid-bed dryers (photo) are engineered with a series of proprietary design innovations that protect and maintain particle size and shape during processing to prevent costly product attrition. Featuring a narrow-slot, wedgewire conveying surface that provides uniform air distribution and maximum heat transfer, these dryers are said to provide several benefits versus drilled-hole deck designs, which create pockets of high- and low-velocity air, invite clogging and allow product to leak through the conveying surface. These systems also include the company's signature vibrating action set



*The Witte Co.*

at a low frequency and amplitude to minimize impact on the product and provide supplemental movement that ensures the product gently advances downstream in a first-in, first-out treatment and arrives at the discharge within planned drying specifications. — *The Witte Co., Washington, N.J.*  
[www.witte.com](http://www.witte.com)

### Improving the visibility of glass level gages

The Jerguson LumaStar EPL-316 Illuminator (photo, p. 32) provides high-contrast, white LED light for any transparent glass level gage, delivering superior gage visibility in either day or night. With its 316 stainless-

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Clark-Reliance



steel construction, the LumaStar Illuminator is suitable for severe service environments. It is approved for use in Class I, Div. 1, Group B, C & D and Zone 1 & 2 environments. A single explosion-proof power supply with intrinsically safe lighting circuit can service illuminators up to 58 in. long. The illuminators are field-upgradeable to fit any glass gage, says the manufacturer. — *Clark-Reliance Corp., Strongsville, Ohio*  
[www.clark-reliance.com](http://www.clark-reliance.com)

### Reduce liquid or gas pressure in new or retrofit installations

Whisperjet reduction devices (photo) reduce liquid or gas pressure through a series of multi-pressure reduction stages. Designed for new or retrofit installations, these simple, long-lasting devices result in virtually no part erosion. With steam applications, noise is significantly reduced, because orifices on each stage are sized to keep the flow of steam below critical velocity. Whisperjet devices are available in conjunction with Clampseal globe valves or as standalone equipment, in ASME pressure classes up to 4500#, in sizes 1/2 in. and up, with socket-weld, butt-weld or flanged connections. Depending on the application, standard materials are carbon steel A105, Chromalloy SA 182-F22, F91 and 316/316L stainless steel. Optional materials and end connections are also available. — *Conval, Somers, Conn.*  
[www.conval.com](http://www.conval.com)



Conval



PANalytical

### New software for SIS and alarm management

The new IPL Assurance software provides realtime predictive analytics on the health and availability of safety instrumented systems (SIS), alarm management systems and other independent protection layers (IPL). In addition to managing operational risk, IPL Assurance reduces compliance costs by automatically reporting on the SIS performance during a demand on the safety system. The software delivers information on instruments, alarms, control loops and operational boundaries to streamline compliance activities and expose operational risk, allowing plant personnel to mitigate abnormal situation before they create adverse impacts. The software pro-

vides a number of analytics and alerts, including: performance management for safety instrumented functions; testing and maintenance management; safety-system bypass management; demand on safety-system rate tracking; and status of safety-related alarms. — *PAS, Inc., Houston*  
[www.pas.com](http://www.pas.com)

### Launch of a new benchtop X-ray powder diffractometer

The Aeris is a new X-ray powder diffraction (XRD) benchtop instrument (photo). The device's built-in touch screen features an intuitive interface and directly displays all results. Aeris only requires a single-phase power outlet and does not require either cooling water or compressed air. Data quality and speed of data acquisition are comparable to full-power systems. Additionally, Aeris is said to be the first benchtop XRD system that is fully automatable and can easily be incorporated in industrial production control. — *PANalytical B.V., Almelo, the Netherlands*  
[www.panalytical.com](http://www.panalytical.com)

### A hand-held scanner device for hazardous areas

The Ident-Ex 01 for Div. 1 / Zone 1 & 21 (photo) is a powerful, intrinsically safe all-in-one barcode scanner and RFID reader for use in hazardous areas. With its unique modular design, the ultra-rugged Bluetooth-capable Ident-Ex 01 can be specifically configured to a customer's needs, and can be operated with just one hand. The changeable head modules — RFID, 1-D or 2-D barcode — allow users to read a wide range of RFID tags, as well as 1-D and 2-D barcode types from every angle and different distances from 15 cm and up to 15 m. In combination with GPS-enabled, connected devices, operating material and plant components can be quickly located. Workers can now assign assets more quickly and accurately. Especially in emergency situations, critical assets can be located more quickly, in order to swiftly and efficiently identify damage and prevent accidents. — *ecom instruments GmbH, Assamstadt, Germany*  
[www.ecom-ex.com](http://www.ecom-ex.com)



ecom instruments

## Reduce drying times and utility costs with this vertical dryer

The Guedu vertical dryers (photo) offer benefits for drying powders in the chemical process industries, including cosmetics and food applications. The vertical dryers operate differently than hot-air and tray dryers. Powder is stirred under vacuum, which shortens the drying time by a factor 2 to 10 compared to tray dryers. Also, by reducing the necessary handling, a similar shortening of the total cycle time is achieved, says the manufacturer. The improved heat transfer during drying leads to a reduction in utilities costs. Mechanical mixing during drying leads to an improved product homogeneity, and the product emerges with residual moisture values below 0.1% where required, says the company.



De Dietrich Process Systems

— De Dietrich Process Systems, Niederbronn Cedex, France  
[www.dedietrich.com](http://www.dedietrich.com)

## Cure rubber parts with this truck oven

The No. 860 is a 500°F truck oven (photo) that is currently used for post-cure of rubber parts. Workspace dimensions of this oven measure 36-in. width, 36-in. depth and 60-in. height. The oven uses Nicrome-wire heating elements for a power of 34.8 kW to heat the workspace, while a 2,000-ft<sup>3</sup>/min., 2-h.p. recirculating blower provides horizontal airflow to the workload. This truck oven features 4-in. insulated walls, a top-mounted heat chamber, aluminized-steel interior and exterior, plus front and rear double doors. Other features include safety equipment for handling



The Grieve Corp.

flammable solvents, including explosion-venting door hardware and 325 ft<sup>3</sup>/min powered exhauster. — The Grieve Corp., Round Lake, Ill.  
[www.grievcorp.com](http://www.grievcorp.com)

## Locate hotspots with multipoint temperature-measuring system



Siemens

The Sitrans TO500 multipoint temperature measuring system (photo) enables complex temperature measurements and detection of the precise position of critical hotspots in a variety of applications, including tubular and tube-bundle reactors. The fiber-optics-based device uses a fiber Bragg grating (FBG) for the measure-

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Wika Alexander Wiegand



Haver &amp; Boecker OHG

ments. The Sitrans TO500 can evaluate 48 FBGs in each of four channels (a total of 192 measuring points), thus enabling precise determination of temperature changes in the smallest spaces. It is said to be the first device to enable FBG-based measurements in industrial environments, such as harsh plant conditions and at high temperatures. The precise determination of the temperature profile enables users to detect critical operating states quickly and initiate countermeasures, thereby lengthening the service life of plants. — Siemens AG, Nuremberg, Germany

[www.siemens.com](http://www.siemens.com)

### Surge protection for rack mounting

This company has developed what is said to be the first pluggable surge-protective devices (photo) for use in standard rackmount housings. Based on the Valvetrab product range, these products feature a new mounting position in order to optimize surge protection for rackmount applications. With the new positioning at the front of the housing, users can check the status indicator without having to remove the cover or disconnect the power supply. The clear arrangement of the pluggable surge-protective devices makes maintenance and troubleshooting extremely easy, says the company. The performance of the surge-protective device is enhanced by the new wiring configuration, which saves space, thereby allowing for a high density of protective devices. The two base elements can also be installed in series or in parallel. — Phoenix Contact GmbH & Co. KG, Blomberg, Germany

[www.phoenixcontact.com](http://www.phoenixcontact.com)

### A flow switch with temperature monitoring

The new model FSD-3 electronic flow switch with digital display (photo) was developed for applications using liquid media. Switching and analog outputs for flow, temperature and diagnostics enable strong versatility, says the manufacturer. The model FSD-3 can support process control in a number of ways: as a flow monitor, via the switching function; as a trend indica-

tor for media flow, via the analog signal; and with integrated temperature measurement (-20 to 85°C). The optional diagnostic function acts on sensor defect (switching function), and whenever the measuring ranges for flow and temperature are exceeded (display indication). The new flow switch is easy to parameterize via the onsite display and an intuitive menu navigation in accordance with the VDMA standard. The FSD-3 functions on the calorimetric measuring principle, where the heat dissipation from a heated sensor is directly related to the flowrate. This method of measurement has no moving parts, so the flow switch operates wear-free. — Wika Alexander Wiegand SE & Co. KG, Klingenberg, Germany

[www.wika.com](http://www.wika.com)

### Convey dry materials with this pneumatic vacuum system

Powered by compressed air, the Material Mover is a portable, inline vacuum system that was developed to transport materials. Commonly used to clean combines and seeders, the Material Mover is ideal for work in seed plants or mills where there is a critical need for clean equipment and a desire to avoid wasting product. Unlike traditional vacuums, the Material Mover does not damage the products it moves. Utilizing a patented supersonic nozzle, the Material Mover delivers superior performance by sucking up 1 to 2 ft<sup>3</sup>/min of dry material. The vacuum system features a 15-ft long, 2.5-in. dia. flexible vacuum hose and a 5-ft polycarbonate vacuum wand, so users can easily grab objects that are farther away. — Guardair Corp., Chicopee, Mass.

[www.guardair.com](http://www.guardair.com)

### Precision-weight, large-package filling with high stability

The new Elementra EGF Big Bag filling system (photo) is especially suited for loose, bulk materials of every type, especially for the construction, chemicals and food industries. Its modular design offers a high degree of flexibility, and the following options can be added: filling spouts that can be swiveled; different dosing units; inflatable sleeves;



hooks (rigid, rotatable or replaceable, instead of a carrying arm); movable filling head or conveyor unit; vibration base; and conveying system. The greatest technical innovation for improving safety and preventing machine stoppages is the double-belt drive, which replaces the maintenance-intensive chain drive. This new drive fulfills explosion-protection requirements, and because of its special plastic material, it is suited for use in the food industry and in dusty environments. The Elementra EGF Big Bag filling system can fill all large packages, independent of size, material or design. — *Haver & Boecker OHG, Oelde, Germany*  
[www.haverboecker.com](http://www.haverboecker.com)

### This centrifugal dryer offers energy-efficient pellet drying

The new Cyclo Centrifugal Dryer (photo) provides efficient, reliable pellet drying in any application. It is compatible with the company's underwater pelletizers, which handle a wide

range of polymers and thermoplastics, including polyolefins, styrene polymers, polyacetals, polycarbonates, polyesters, polyamides, thermoplastic elastomers, polyurethanes, hot-melt adhesives, rubber and natural and synthetic resins. The Cyclo Centrifugal Dryer is available with drying capacities ranging from 3,000 to 8,500 kg/h. With the Cyclo, up to 95% of process water is removed by centrifugal force. Surface water that adheres to the pellets is largely removed through air flow or mechanical movement, and the residual heat of the pellets is mostly used to evaporate remaining surface moisture. Its compact design allows for a small footprint and easy access for cleaning and maintenance. — *Maag, A Dover Corp. company, Oberglatt, Switzerland*  
[www.maag.com](http://www.maag.com)



Maag

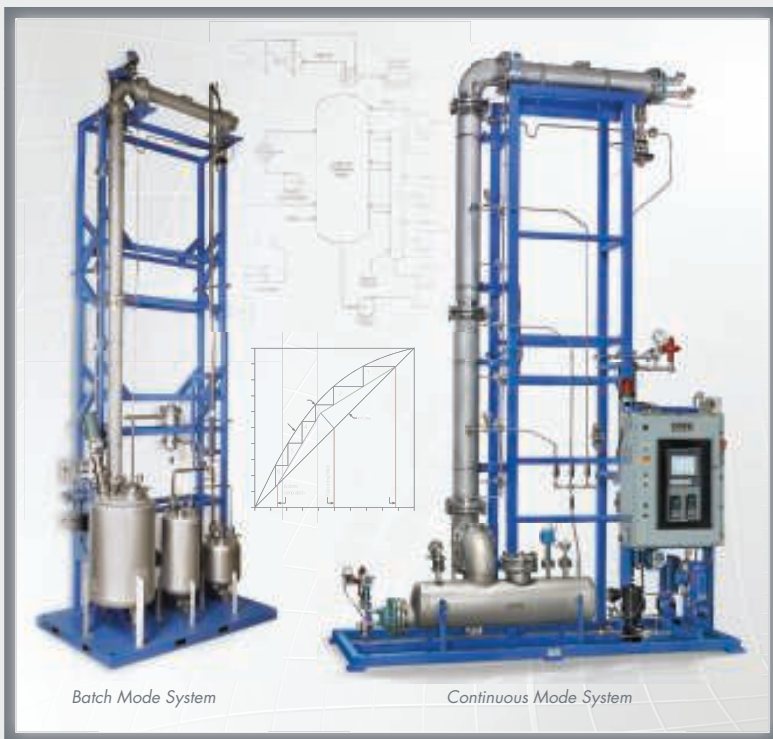
### Digitalization for the plastics industry

This company is moving a step closer to plant-component digitalization for the plastics industry with its Smart Components app (photo), which greatly facilitates engineers' daily work. The new app supports maintenance technicians by automatically identifying components and providing specific information to mobile devices. It provides precise information on specifications, spare-parts lists, commissioning instructions, operation, maintenance and service intervals. Furthermore, users can chat in realtime with an expert through this app, as well as transfer pictures and videos. — *Zeppelin Plant Engineering, Friedrichshafen, Germany*  
[www.zeppelin.com](http://www.zeppelin.com)  
*Mary Page Bailey and Gerald Ondrey*



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## Solid-Liquid Separation: Classification, Design and Testing

Department Editor: Scott Jenkins

Whether to remove solid contaminants from a liquid or separate a solid product from a solvent, solid-liquid (S-L) separation is a common unit operation across the chemical process industries (CPI). This one-page reference provides an overview of S-L methods, design and testing.

### Sedimentation versus filtration

Solid-liquid separation technologies can be classified according to thermal methods (dryers) or mechanical methods, where the flow direction of the solid and the liquid phases becomes a differentiating factor. In filtration technologies, both phases flow in the same direction, while sedimentation methods refer to those where the two phases flow in opposing directions (Figure 1). A special case, in which the flow directions of the solid and liquid phases are at right angles to each other, is referred to as cross-flow filtration.

In most sedimentation processes, the difference in density between the solid and liquid phases is utilized, but it is also possible to use electric or magnetic fields for separating purposes. In some cases, the natural sedimentation caused by the earth's gravitational field is used to this end, for example gravity thickeners. Natural sedimentation can be enhanced by superimposing a centrifugal field, as is done by cyclones and centrifuges.

Filtration uses a filter medium that retains the solid phase while allowing the liquid phase to flow through.

The driving potential that moves the liquid phase, or filtrate, through the filter medium distinguishes various filtration methods. Separation can take place using gravity or by imposing a pressure gradient (pressure applied to filter side, or vacuum applied to the filtrate side; Figure 2)

### Process design

Several issues must be considered in the design of a new filtration process, or the optimization of an existing one. These include the following:

**Feed solids content.** Confusion must be avoided by clearly stating whether the solids content is expressed on a weight or volume basis. Insoluble solids content is usually given in volume percent, but not always.

**Particle-size distribution.** The solids in a slurry are often characterized by average particle size. While this is useful, the size distribution is also important. Filters must be designed to retain the smallest particles that need to be removed. The tendency for particles to agglomerate, shifting the distribution toward larger sizes, may also be a factor.

**Nature of solids.** The physical characteristics of the solids have a sub-

stantial effect on the level of difficulty of the filtration process, and in turn on the appropriate type of filter and operating conditions. For example, particles that are incompressible (rigid) are usually easier to filter than those that are soft and compressible. If the particles are slimy or gelatinous, filtration becomes even more challenging.

### Laboratory testing

Before S-L separation equipment is selected, the nature and properties of materials being filtered should be determined by laboratory testing. Knowledge gained through laboratory testing is necessary for specifying filter media, filter aids, filter area, cake space needed and cake discharge technique, as well as for the design of the S-L separation system.

Laboratory filters must have pressure-measuring devices to measure the feed and the discharge pressures. A sample feed solution is prepared in a container that allows measurement of the volume of the test batch for filtration. The filtered solution (filtrate) is collected in a receptacle that allows measurement of the filtrate volume after a measured filtration time. A stopwatch or timer is used to track the time required for the filtration process from start to finish. If laboratory testing is not feasible at your plant, filter equipment companies, filter aid suppliers and consultants are available to assist with test work.

**Editor's note:** This edition of "Facts at your Fingertips" was adapted from the following articles: 1) Schmidt, P., Filtration Centrifuges: An Overview, *Chem. Eng.*, December 2010, pp. 34-38; 2) Gabelman, A., An Overview of Filtration, *Chem. Eng.*, November 2015, pp. 50-58; and 3) Sentmanat, J., Clarifying Liquid Filtration, *Chem. Eng.*, October 2011, pp. 38-47.

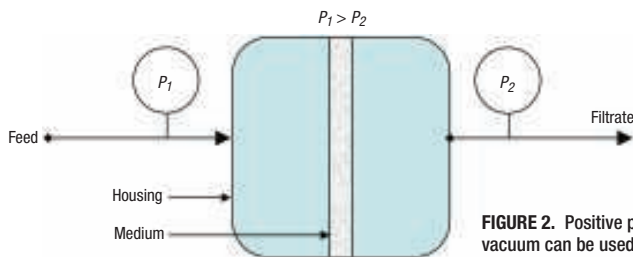


FIGURE 2. Positive pressure or vacuum can be used in filtration

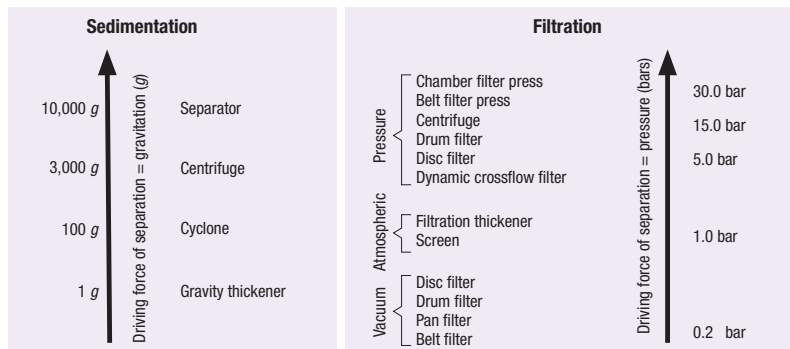


FIGURE 1. In sedimentation-based processes, the driving force is the earth's gravity, while either positive or negative pressure drives filtration processes

## MTBE Production from C4 Raffinate-1

By Intratec Solutions

**M**ethyl tertiary-butyl ether (MTBE) is an organic compound used mainly as a fuel additive to enhance octane rating. It has low cost, high octane value, and is easy to incorporate into fuel blends.

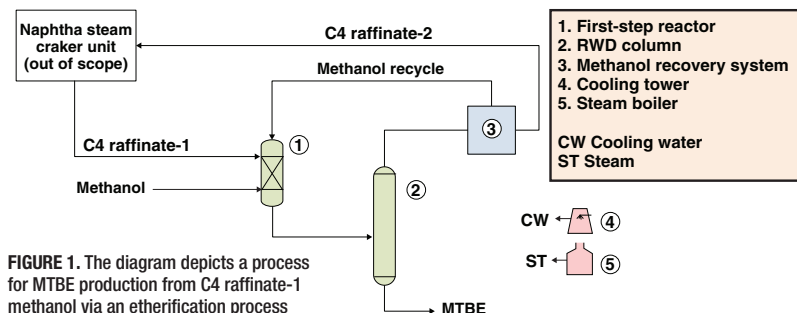
In the 1980s, the use of MTBE as a replacement to tetraethyl lead in gasoline was stimulated by governments looking to meet air-quality goals. Concerns over the safety of using MTBE arose in light of contaminations of surface and groundwater. In this context, gasoline manufacturers, particularly in the U.S., started replacing MTBE in fuel with safer alternatives, mainly ethanol and ETBE (ethyl tertiary-butyl ether), to comply with new environmental legislation. Currently, MTBE is still used as a gasoline additive outside the U.S., mainly in Middle East countries and in the Asia-Pacific region.

MTBE is produced via an etherification reaction between methanol and isobutylene in a liquid state. The major sources of isobutylene are the following: C4 raffinate-1 from naphtha steam-cracking units, the C4 stream from petroleum-refinery catalytic crackers, on-purpose isomerization and dehydrogenation of butane to isobutylene, and the dehydration of *tert*-butyl alcohol.

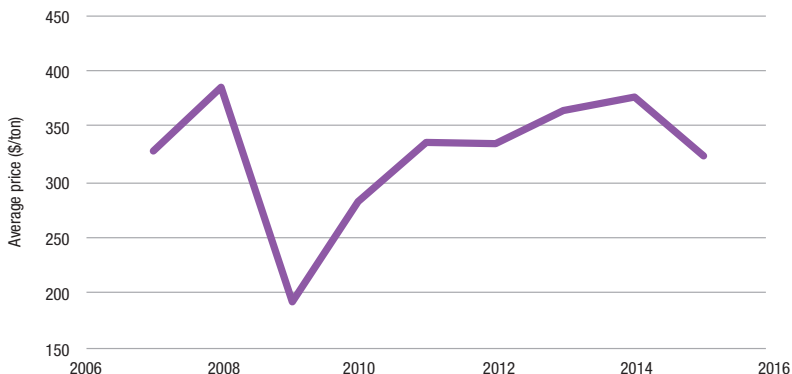
### The process

In the process described in the following paragraphs, MTBE is produced from methanol and C4 raffinate-1, which consists mostly of isobutylene, butylenes, and butanes. Figure 1 presents a simplified flow diagram of this process.

**Etherification reaction.** The etheri-



**FIGURE 1.** The diagram depicts a process for MTBE production from C4 raffinate-1 methanol via an etherification process



**FIGURE 2.** The graph plots yearly average prices for methanol

fication reaction is conducted in the presence of an acidic ion-exchange resin in a two-step system. In the first step, fresh raffinate-1 and a molar excess of methanol are fed into an adiabatic reactor. About 90% of the isobutylene is converted, and side reactions between other hydrocarbons in the raffinate-1 feed are kept to a minimum. In the second step, the output from the first reactor is fed to a reaction-with-distillation (RWD) column, a distillation column in which one section is replaced by a catalyst packing section. Methanol and unconverted isobutylene flow upward into the catalyst section and are converted to MTBE. The RWD column makes it possible to surpass the equilibrium constraints of the reaction and reach a conversion rate close to 99%. High-purity MTBE is recovered from the bottoms of the RWD column.

**Methanol recovery.** Inert C4 olefins and paraffins, along with the excess methanol, are recovered from the top of the RWD column and fed to a wash column. Excess methanol is extracted with water, resulting in a methanol-

water mixture and a stream containing the C4s (raffinate-2 byproduct). Finally, the methanol-water mixture is fed to a distillation column, water from the bottoms is recycled to the wash column and methanol from the top is recycled to the first-step reactor.

### Economic performance

In a hypothetical scenario in which this MTBE production plant would be built near a naphtha steam-cracking unit in the U.S., the plant cost estimated for the construction of the MTBE facility with capacity to produce 150,000 metric tons per year of MTBE from raffinate-1 and methanol would be about \$50 million (data from Q2 2013). The plant cost presented includes the inside and outside battery limits (production units, storage installations, utilities facilities and auxiliary buildings). Raw material costs are the major components in the MTBE production cost. The manufacturing variable costs (raw materials and utilities) are estimated at about \$850/ton of MTBE. Figure 2 presents historical annual average prices for methanol.

This column is based on "MTBE production from Raffinate-1 - Cost Analysis," a report published by Intratec. It can be found at: [www.intratec.us/analysis/mtbe-production-cost](http://www.intratec.us/analysis/mtbe-production-cost).

Edited by Scott Jenkins

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# Considerations for Estimating the Costs of Pilot-Scale Facilities

The differences between industrial-scale facilities and pilot plants go beyond size, and these intricacies must be understood when estimating the costs associated with pilot-scale facilities

**Rob Nunley**  
MATRIC

## IN BRIEF

PILOT VERSUS  
COMMERCIAL SCALE

ESTIMATING METHODS

REVIEWING THE  
ESTIMATE

CONTEMPLATING  
CONTINGENCY

CLOSING THOUGHTS



**FIGURE 1.** Instrumentation is one area in pilot plants that typically does not scale up — very small tanks likely still have instrumentation requirements similar to 15,000-gal tanks in a commercial plant

Estimating the construction costs of pilot plant facilities can be tricky, and many of the traditional methods used for a commercial-scale chemical facility simply do not apply. However, these methods are usually the most familiar to project managers, estimators and business managers, who may not delve into the world of pilot-scale operations on a routine basis. The results of applying these methods can be quite misleading if the differences in pilot-plant construction and scope are not properly evaluated. This article explores some key differences that should be taken into ac-

count for pilot-plant cost estimates and presents some basic methods used for simplified cost estimating.

Before beginning any cost estimates, we must examine the definition of a pilot plant. This term can mean different things to different people depending on the particular nature of your business, your personal experiences and the corporate or academic culture you are working in. A pilot plant for a large, commodity chemicals business may mean a standalone facility that is capable of producing several thousand tons per year. It could be intended for production of large-scale market-development samples,



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or it could be intended to serve as a longterm mini-plant used for continuous improvement and experiments that cannot be done effectively in the larger plants. In many ways, these plants are similar to small commercial plants in their design and the methods used to engineer and construct them. In these cases, traditional methods of estimating are likely to be quite appropriate.

For a small startup company, academia, or for very early development, a pilot plant may mean a small bench-scale unit producing a few grams per minute. These systems are often built in a small laboratory using off-the-shelf items, and they are frequently operated with considerable manual intervention. Often, these systems can be estimated rather easily based on equipment quotes and a rough estimate of a technician's time to build (if the process of estimating the costs is even of value at all). In these cases, the following discussion should still be considered, as it may still be applicable to this situation.

In the author's experience, the term pilot plant has most often meant an intermediate scale of operation – something larger than a laboratory bench, but certainly smaller than a standalone plant. For the purposes of this article, this is the definition which will take the major focus.

These pilot facilities are typically designed to provide a wealth of information, including: engineering design data; validation of process models; process studies, including the impact of recycles on the process and product quality; and validation of continuous operations at a reasonable scale. They often have column diameters in the 2- to 6-in. range and reactors designed to provide sound scaleup information. Production rates commonly run between one and a few hundred pounds per hour, depending on the nature of the process. Although these pilot plants can be either skid-mounted or stick-built, this article will focus primarily on stick-built units constructed within an existing structure and that take advantage of available infrastructure, such as con-

trol rooms, utilities and sometimes control systems. These are typically cost-effective designs, and the type that would most likely require engineers to develop their own cost estimate. Stick-built plants are those assembled on-site from individual pieces, including the piping and controls, as opposed to modular construction, where skids or racks are used to assemble large portions of the plant off-site and are shipped to the final location.

### Pilot versus commercial scale

As mentioned, there are some very important differences between pilot and commercial facilities that will impact the cost and the estimating methods. The more critical differences are discussed in the following sections.

**Field instrumentation.** Perhaps the most important difference for cost estimating stems from an area in which there is actually very little difference between commercial and pilot operations. Field instrumentation – the instruments on the equipment that tie back into the control system – are often very similar in scope for both types of facilities. Whether a reactor is 20,000 gallons or 2 gallons in size, both are likely to have a level transmitter, pressure transmitter, thermocouples, feed flow control and some level of safety shutdowns. In many of these cases, the instruments will even be the same make and model, or they will at least be comparable in price (Figure 1). Therefore, instrumentation is an area that simply doesn't scale up in most cases. In other words, you cannot assume that a pilot plant that is a hundred times smaller than a commercial plant will have some predictably smaller scope or cost for instrumentation. Oftentimes, the two will be very comparable, and in some cases, the pilot plant instrumentation may actually be more expensive if the plans include collecting extensive design data for the commercial plant.

**Analytical systems.** The analytical plan for a pilot plant is another area that can have a huge impact on its cost. Usually, one of the key drivers



**FIGURE 2.** It is extremely difficult to utilize a factored estimate for equipment costs in pilot plants due to the large variability in size and instrumentation requirements

for a pilot plant is to validate the system's performance. That could mean evaluating overall yield, efficiency, purity specifications, impurity buildup and so on. All of that means collecting data, and that often means analytical data. While some processes may be capable of utilizing offline sample collection and analysis, all of this data collection frequently means online analysis. It is certainly not out of the question for a \$500,000 pilot plant to have a \$250,000 process mass-spectrometry system connected to it — and that cost may not even include all of the automatic sampling systems, method development effort and installation costs.

There may also be a need to analyze components online inside of the process for safety purposes. Furthermore, there could also be a requirement for area monitoring in enclosed operating bays to detect toxic or flammable gases or oxygen-deficient atmospheres.

With all of this potential for high-dollar instrumentation, it is imperative to understand the analytical scope and to have considerable upfront discussion with analytical experts. Those discussions should include a review of the equipment costs as well as the costs to develop the analytical methods and the impact on the schedule. At a minimum, obtain a good budget quote for any early estimates, and if possible, get a firm quote with a performance specification for an authorization-level estimate

for any complex equipment if it is a large portion of the total costs.

**Control systems.** In addition to field instrumentation, the control hardware itself must also be taken into account. In a modernized facility, this is typically a centralized distributed-control system (DCS) or possibly a slightly less complicated programmable logic controller (PLC). In a centralized pilot plant with a common DCS that operates multiple pilot facilities, the cost considerations normally involve the number of input/output (I/O) cards, any extra cabinets and operating-station modifications. Special licenses and occasionally some additional networking may also be required.

In a facility without a shared control system, the cost of the control system must be included in the cost estimate. This is best handled by working with the control-system vendors to obtain budget quotes. Be sure to take into account the need for future expansion of the system. At an early stage of the project, it is unlikely that you will have thought of all of the instruments that will ultimately be installed. Pilot plants also have a way of growing their need for data collection as the scope and experimental run plan develop, so be sure to allocate adequate room to add instrumentation later as needed. For this purpose, consider 20% spare I/O capability as a minimum design criteria.

**Engineering.** Expenditures for engi-



neering can be vastly different, not only between commercial and pilot plant applications, but from company to company. Typical commercial-scale engineering involves a process engineering team developing a well-defined scope package, then turning that package over to specialized disciplines, such as mechanical, civil, electrical and instrument engineering to create detailed packages for construction. This whole process can take many months in your own shop, then many more months at an engineering, procurement and construction (EPC) contractor shop. This is an expensive endeavor, and typical engineering costs run from 20–30% of the total installed cost of a commercial facility that may run into the hundreds of millions of dollars cost range.

For a pilot-scale facility with an engineering and construction staff experienced at working on this scale, this whole process may be compressed into a matter of weeks. Different companies have different work processes, but in the author's experience, operating technicians typically construct from a set of

TABLE 1. EXAMPLE LABOR ESTIMATE FOR SMALL PILOT-PLANT PROJECT			
	Engineering	Construction	Commissioning and startup
Duration	3 weeks	12 weeks	2 weeks
	% of time	% of time	% of time
Project manager	10%	50%	15%
Engineer	80%	30%	25%
Construction manager	25%	50%	30%
Technician #1	5%	100%	100%
Technician #2	0%	100%	25%
Instrument/electrical tech.	0%	75%	20%
Chemist	5%	0%	0%
Management oversight	2%	5%	10%
Subject matter expert	5%	2%	0%
EHS support	10%	5%	10%
Analytical chemist	10%	5%	15%
Analytical technician	0%	2%	15%
	\$37,136	\$265,530	\$23,640

process and instrumentation diagrams (P&IDs), an equipment list and a general layout sketch. These are a fraction of the deliverables of the commercial process-design package, and much of the detailed design documentation is also absent. Using this documentation and a flowsheet describing the process conditions and material balance, the engineer can work directly with the technicians and construction and procurement manager to purchase the required com-



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**FIGURE 3.** Reactor size, as well as instrumentation and analysis requirements, must be taken into account for obtaining accurate cost estimates in pilot plants

ponents and to construct the facility. Similar simplified work processes are in place for field wiring and control terminations.

The key here is that nearly all of the piping and instrumentation are field-routed. It still requires discipline and an experienced technician staff, and you must start construction from a solid, safety-reviewed P&ID basis, but it eliminates the need for costly detailed isometric drawings and similar wiring packages. These are replaced with less expensive as-built documentation for compliance and future reference. Occasionally, issues do arise during construction that require some rework,

but with rework generally being done in field-routed tubing, the costs are typically minimal and do not justify the additional engineering. Besides, there can be just as much rework with fully designed, fabricated piping systems in commercial installations.

That is not to say that engineers from specific disciplines are never required. There are occasions to expand structures to accommodate larger pilot plants, to re-evaluate structures or vessels for new and more severe services or to pull in electrical engineering support. These situations are handled on a case-by-case basis, and after a brief conversation with engineering partners, an appropriate amount of money is allocated for the engineering support of these activities in the cost estimate.

The bottom line is that stick building onsite with an experienced crew and specially developed work processes for pilot-plant and research-scale facilities results in considerable savings during engineering. If traditional factors are applied for engineering, or you are going through all of these disciplines for support on this scale, either your estimating methods or your engineering work process may be killing your project.

**Modular construction.** Modular construction has well outgrown small skid-mounted equipment. These days, entire commercial-scale plants can be built with modular designs, and there are

companies that specialize in just this type of construction. There are enough pros and cons between these two methods that they deserve their own article, but the condensed version is that for modular construction, there is a trade off of lower onsite labor costs for additional engineering, planning and shipping at the pilot scale. Modular construction can be particularly attractive if you plan to build and operate the pilot plant on your own site, but you lack the particular skills for constructing small-scale processes. However, modular construction does require more planning, as lines and wiring on multiple skids have to line up properly to be erected efficiently in the field.

The simplest way of generating a cost estimate for modular construction is simply to ask the modular-construction contractor for a quote. They may be willing to give you a budgetary quote based on some preliminary information for free, but they may require you to cover the costs of developing a more detailed estimate once you get further down the project timeline. Of course, you still need to consider the costs that you will incur on your site to prepare for the skids, to tie-in to the infrastructure, and to complete construction once the modules are on site.

**Utility infrastructure.** Per this article's definition of a pilot plant, we are assuming that the facility will have the basic utilities and infrastructure in place. This may include steam, nitrogen, plant air, electricity and other common utility services. If the services are in place, there may be little to account for in the cost estimate other than some piping and tie-in labor. Of course, if that is not the case, a plan must be executed to provide these services, and these costs must be accounted for. Cylinder or bulk-container supplies of gases may be cost effective if the usage allows, but steam generators and air compressors with drying systems can be more expensive and should be carefully accounted for in cost estimates.

### Estimating methods

With all of these differences, it should be clear that estimating methods that are used for commercial facilities normally do not do a good job of estimating pilot-plant construction costs. For example, one of the most trusted methods used for early estimating of commercial plants

is a factored estimate. Using this method, the estimator takes the cost of the major equipment and multiplies it by a total installed cost factor to get a rough cost estimate for budgetary purposes. It is nearly impossible to apply this method to a plant in which the primary equipment could be an extremely small reactor made of pipe, and the factor is intended to account for the tens of thousands of dollars worth of instruments and analytical equipment attached to it (Figure 2). Even if a factor were back-calculated for the next application, that next project could include a larger, half-million-dollar reactor with a handful of thermocouples and heater controls (Figure 3). Hence, the extreme variability in pilot-plant design simply makes this method very difficult, if not impossible, to use.

Instead, we tend to use simplified methods that somewhat mimic the more detailed estimates that are generated later in the project life for a commercial plant. Even for preliminary cost estimates, we normally generate a flowsheet and an equipment list that includes much of the instrumentation. From that list, we use experienced-based estimates for the equipment purchase costs, including an estimate for the field instruments required based on the types of equipment in use. For specialized or particularly expensive equipment, it is best to call the vendors for budgetary quotes to give a more accurate estimate.

Preliminary labor and engineering costs are developed based on a rough overall schedule broken down into labor, construction and checkout and commissioning. The number of weeks required for each activity are estimated, and the percentage of personnel time and their loaded labor rate are applied to get an approximate labor cost (Table 1).

The loaded labor rate means the person's pay rate plus an allocation for overhead costs (or simply their billing rate if the person is a contractor with a set hourly pay rate). If you are using internal resources and are unsure about the loaded labor rate you should use, contact your business' accounting department for specific advice.

Example labor costs for a single person can be calculated as follows: if someone's loaded labor rate is \$120 per hour and you expect them to work on the project for 60% of their time during a 12-week construction period, their labor cost during that phase of the work can be calculated as follows:

$$0.6 \times (12 \text{ weeks}) \times (40 \text{ h/week}) \times (\$120/\text{h}) = \$34,560$$

Allocating time for each person and stage of the project in this manner can give you an overall labor estimate for the project. Tables and spreadsheets, such as the one shown in Table 1, can be used to simplify the calculations for different cases or projects, and they make a good summary for the project team to review for accuracy. Note that the percentages and durations are just examples of a typical estimate. The



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**TABLE 2. COST ESTIMATE FOR A SAMPLE PROJECT**

Equipment	\$80,000
Internal labor	\$130,000
Contract labor	\$25,000
Waste disposal	\$5,000
Subtotal	\$240,000
Uncertainty allocation	\$48,000 at 20% of the subtotal
Special considerations	
Wastewater permit	\$3,000
<b>Total Installed Cost:</b>	<b>\$290,000</b>
At a $\pm 20\%$ confidence level, this estimate represents a range of \$230,000–350,000.	

actual percentages need to be estimated for each type of project based on the scope and complexity of the technology.

Once you have defined the equipment and labor costs, a contingency factor (which will be discussed in more detail later) is applied, and any special items, such as permits or unusual contractor fees, are added in for a total installed-cost estimate.

Once the project scope is better developed, P&IDs are available and a process design and safety review has been completed, we typically revisit the cost estimate to validate it. At that time, the instrument count is well defined, and we usually have firm quotes for much of the equipment and budgetary quotes for the rest. The labor costs can also be validated at this time, if justified. This usually involves taking a task-based approach to the labor requirements for construction. Each task, such as installing a pump, is evaluated and the man-hours required for technicians and electricians are estimated for each task. All of the tasks are compiled, which can provide useful information for evaluating the schedule and overall manpower to validate the prior estimate. This also takes much of the uncertainty out of the estimate and can reduce the contingency factor before presenting the new estimate for total installed cost. However, this is a long and complicated process, so you will need to decide if it is worth the effort for your particular project or whether the shortcut method is still valid and acceptable to use.

### Reviewing the estimate

Once you have a cost estimate in hand, by all means, review it in considerable detail with the project team and with the first or possibly the second level of management, depending on the nature of your organization. Different people with varied backgrounds bring different perspectives, and they may have valuable insight

into the estimate that you may not have thought through.

Beware of attempts to reject the estimate just because it is higher than expected. However, do not be afraid to reduce the estimate if the review points are valid. Keep an open mind during the review, but don't cave in to unwarranted pressure. Keep in mind that too aggressive of an estimate may mean you will run out of money and have to go through the unenviable task of asking for additional funding later. On the other hand, a well-meaning conservative estimate can result in a high number that may unnecessarily kill the project before it even gets off the ground. Your task is to provide the most accurate estimate possible, and if the project is justified, it will move forward. If not, you may try to find ways to reduce costs, but in the end, it may simply not be justified or affordable.

When presenting the estimate to the project's sponsors (those providing funding), provide a simplified breakdown of costs. Most of the time, these individuals are not concerned with the details as long as they are comfortable that you have done an adequate job of putting together the estimate. Typically, the technical discussion at this stage is minimal. However, be prepared to answer questions for the manager who feels the need to delve into the minutiae.

Also, provide a range based on your confidence level in the estimate. The number you have generated is your best estimate of the cost, but it should be considered a midpoint in a cost-estimate range. If you have provided as accurate an estimate as you can, theoretically you have a 50% chance of being over the estimate and a 50% chance of being under the estimate. This is the reason that most cost estimators try to show the cost range based on their confidence level in the estimate. For example, an estimate of \$100,000 with a confidence level of  $\pm 20\%$  would be expressed as a cost estimate range of \$80,000–120,000. Your sponsors may insist on knowing that midpoint best-guess figure, but at least providing the range makes the upper and lower limits more real. When setting the funding limits, make sure you have some room above the midpoint figure before you have to reauthorize. Some businesses handle this by providing an overrun allow-

ance that is some percentage above the midpoint, and some prefer to use a value closer to the upper end of the cost range as the limit. Just be sure you understand the expectations and everyone is on the same page in terms of the accuracy and authorization conditions.

The accuracy ranges for pilot plants don't tend to be as well defined as they are for commercial-scale estimates that have years of manpower poured into creating databases and methods for determining accuracy. While there are some general guidelines for pilot plants, part of it also comes down to how comfortable we are that the scope and technology are well defined.

You may notice two things about the summary report in Table 2. First, all numbers have been rounded to two significant figures. This is a general rule of thumb that is consistent among professionals who have worked with cost estimates a great deal. Two significant figures should represent the accuracy limits of your information — reporting anything more than that simply makes the sum-

mary appear too busy and adds no real value, since the estimate is not that good, no matter what level of detail you've attempted to put into it. You may have also noticed that where many may have used the term "contingency," Table 2 has replaced it with the term "uncertainty allocation." This is a change to reduce the confusion associated with the term contingency, which is further discussed in the following section. For more information about contingency, please see *Improve Your Contingency Estimates for More Realistic Project Budgets*, *Chem. Eng.*, Dec. 2014, pp. 36–43.

### Contemplating contingency

In the author's experience, contingency has always meant money that is estimated to account for the unexpected problems that come up on a project. It is a project-execution fund, plain and simple. An example is if you dig up an underground line that you expected to tie into and find that it is partially damaged and a section needs to be replaced to allow the tie-in. This is a replacement

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expense that was not accounted for, but is nonetheless still required to make the project work. Instead of having to go back and ask for more funding every time a small problem is encountered, project managers and cost estimators have used the contingency fund to cover these “expected, yet unexpected” problems. Over time, they have become quite good at predicting the level of contingency required based on how well the scope is defined, and how much work has gone into investigating the details of the installation. In all cases, all project managers expect the contingency fund to be spent, although they never know exactly what it will be spent on at the beginning of the project.

Contingency for a project may start out high. The contingency can be set as high as 30% for projects that are poorly defined and in an early stage of development. The contingency may be as low as 10–15% if it is far along the project timeline and well understood.

There are few terms as confusing to people as contingency. It may be because so many companies have different work processes and each may have a different set of terminology. Perhaps it is due to the nature of pilot-scale projects that typically require working directly with researchers and program managers that have an R&D background instead of a project-execution background, and they are simply not as familiar with common project terminology.

In either case, it seems that no two project sponsors see the contingency fund in the same way. Some see the fund as money allocated toward plant changes that will be made later once the plant is running and more is learned about the process. Others see the fund as money that will not be spent unless the funding is authorized at the sponsor’s level. This is not generally the case, as it defeats the purpose of providing the fund for the project manager to utilize in the first place. Others see the fund as money to cover their scope changes as they go along and change their mind about the program’s direction.

If you continue to struggle with separating contingency from future technology-development funding, it could prove valuable to create a separate line item for technology development or risk management. Pulling out those costs from

traditional contingency funding may help to clarify the situation.

Even with updated, more specific terminology, the concept of contingency may still be unclear. It is critical to discuss contingency with sponsors and make sure that they understand the definition and the intent of that fund. Time spent up front clarifying this point will prevent considerable anxiety in the future.

## Closing thoughts

Pilot plant work is unique, not only in its scale, but also in its work processes and nuances. Cost estimating for pilot plants is but one of these unique aspects. While the chemical process industries have worked with EPC contractors to develop common tools, protocols and language to manage projects, the world of R&D is quite different. Not only is each project very different in its objectives and its scope, but there are few set protocols and standard methods for activities like cost estimating.

But while each company may do things a little differently, the important thing is to recognize that they are unique facilities, and the tools required to do the job are different than those used in a commercial setting. That includes the intellectual tools, such as cost-estimating methods. Once you have figured out the differences, and as long as you approach the estimate in a logical and thorough manner, you should end up with a reliable estimate and a manageable budget. ■

*Edited by Mary Page Bailey*

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**Rob Nunley** joined MATRIC (Mid-Atlantic Technology, Research and Innovation Center; 1740 Union Carbide Drive, South Charleston, WV 25303; Phone: (304) 720-6707; Email: rob.nunley@matricinnovates.com; Website: www.matricinnovates.com) in 2013 as pilot plant programs manager. In this capacity, he oversees the construction and operations of pilot plants in MATRIC’s facilities and the build-out of skid units for shipment to customer locations. Nunley has 24 years of engineering experience in the chemical industry with a broad background spanning multiple functions, including process engineering, conceptual process design, new products development, manufacturing and project management. In prior positions, he supervised plant operations, production and raw-material planning and has extensive startup, troubleshooting and crisis-management experience. Nunley has served as lead engineer and project manager on projects ranging from \$2 to 30 million and has served lead roles on conceptual designs including a \$2-billion grassroots chemical complex. He earned his B.S.Ch.E. from the University of Rochester and his M.S. in Engineering Science from Marshall University.



# Evaluating Preliminary Investment Feasibility

Before any engineering or design work can take place, a project's feasibility must be considered. Reasonably accurate costs can be obtained using the preliminary estimate methodologies presented here

**Alejandro Anaya Durand, Raúl Fernández Marbán, Mauricio Galicia Armas, Itzayana Montesinos Aguilar**

National Autonomous University of Mexico

## IN BRIEF

PROJECT SELECTION
PRODUCT QUALITY
CAPITAL COST ESTIMATIONS
PRODUCTION COSTS AND REVENUES
DEPRECIATION
PROFITABILITY ANALYSIS

Evaluating the feasibility early in an investment project's timeline is critical for streamlining decision-making and avoiding unnecessary efforts. This article presents a combination of estimation methods and calculation examples that can be used as a model for an evaluation of the preliminary feasibility of an investment for a plant, project or product. The examples take on an established order that should be followed step by step in order to obtain the desired results.

In conjunction with the initial step of establishing the idea of what project or product the investment will promote, a preliminary strategy must be considered. For example, throughout this article (for practical purposes), we will look at a capital project for an ethanol production plant (Figure 1) and how to proceed throughout the different phases of the feasibility evaluation. To investigate preliminary feasibility, this article describes not just the advantages and disadvantages of the project, but also considers issues related to workforce, localization of the plant and raw materials, as well as many other factors.

Once the strategic analysis has been completed, the financial feasibility must be investigated — this is the most important factor in choosing whether to terminate the project right away or to continue, because this step is where analyses can reveal that the poten-



**FIGURE 1.** Large capital projects, such as the construction of an ethanol production facility, require considerable investments in finances and effort. If the feasibility of the proposed project is thoroughly investigated, more informed decision-making is possible

tial profits may outweigh the risks. It is also important to remember that although this strategy is just an approximation, the methodology is robust, and results will be a relatively accurate approximation. Another final point that should be mentioned is that prices fluctuate from one year to another, but this particular point will not be addressed further in this article.

The analysis provided in this article provides some of the essential knowledge for feasibility determination. Various elements are taken into account, and the methodology outlined here requires both sensitivity and careful calculations.

### Project selection

Each individual project should aim to follow a procedure known as the S.M.A.R.T. model (Table 1) in the early stages of project definition [1]. This will provide guidance to transition from an abstract idea to a main and specific goal. Each letter from

**TABLE 1. S.M.A.R.T MODEL DEFINITION**

<b>S</b>	Specific	State your goals as a company, and what you would like to accomplish — the company should ask itself questions like: what are we doing, why are we doing this, where should our project take place and what does it need to be completed?
<b>M</b>	Measurable	Determine the impact of the project by evaluating the extent of your goal. If the project is not measurable, then it is hard to decide whether the company is making progress toward successful completion or moving backwards. This point is intended to keep the enterprise on the right track to reach its targets. An important question to ask at this stage is “how will we know if the project is reliable or not?”
<b>A</b>	Achievable	Discuss how realistic the project is in terms of reliability — the goal should not be extremely far-fetched, at least in the very beginning of the process. That means that the goals as an enterprise are neither out of reach nor below standard performance. In order for this determination to be made, first, the company must write down the main targets and consider the ways to bring them to fruition. This can include changing habits or attitudes, but it can also help develop the skills and financial capacity to reach goals.
<b>R</b>	Realistic	In order to follow the fourth criteria, the project must have an objective toward which the team is both willing and able to work. It must be a goal that shows substantial progress. According to studies, higher goals are more frequently achieved in comparison to less ambitious ones, because a lower target does not inspire as much collective motivation. Therefore, it is generally better to aim for higher goals once the project moves out of the hands of the individual and into the hands of a team, so that the employees will put forth the most effort to achieve them.
<b>T</b>	Timely	All entrepreneurs should pay special attention to this point, because all projects — no matter how big or small — should be grounded within a timeframe, and when there is no date established, it is highly probable that the project will not succeed.

this model represents a key element for the project.

The SWOT (strength, weaknesses, opportunities, threats) matrix is another very useful tool for analysis, and when well made, it can show what the status of the project would be with respect to other similar projects [2].

The best aspect of the SWOT method is that it does not just apply for projects, but also for people, products and entire industries. To execute this method, first we must specify the target of the business, or whatever we want to study, and then identify the internal (strengths and weaknesses) and external (opportunities and threats) factors as well, since those can begin to describe the evaluated project. A simple example of a SWOT matrix for a proposed ethanol manufacturing business is given in Table 2. The following sections detail each element of the SWOT matrix.

**Strengths.** This section should outline the characteristics of the business or project that give a company an advantage over others. It addresses what a company can offer to the marketplace, including, for example, competitive prices, hiring more talented employees or offering products of higher purity, volume or quality, among many others.

**Weaknesses.** Although sometimes dif-

ficult to address, this part will raise many questions. What can be improved? What should we avoid? What affects our market? Here, the company must realize what competitors may do better, and which important factors could have been overlooked, but nevertheless should be taken into account.

**Opportunities.** One of the most important factors is following the trends of the moment — not just thinking about what you can make, but what you could offer that hasn't been already invented, or how you could implement a product in an unexpected way. In order to do this, it is important to possess an awareness of the changes in global patterns, population profiles, shifts in government and policies, lifestyle and so on.

**Threats.** When we speak about threats, we do not always mean direct ones, but rather cultivating an understanding of the types of obstacles that may be faced during the development of the project and what could change. Examples of threat areas include the following: prices of supplies or raw materials; taxes, inflation and deflation; workforce uncertainty; and resource availability. If the technology changes, how would that affect you? And how would you prevent loss of yield and efficiency? Those are key questions that must be answered before making decisions.

### Product quality

It is very important to consider the relationship between quality and price — when the client is purchasing something expensive, the client is expecting a good product. The optimal price point versus quality will be the combination that satisfies the requirements of the market. If we consider these facts, then we can locate the product in the market

**TABLE 2. SWOT MATRIX FOR AN ETHANOL PRODUCER IN THE AUTOMOTIVE FUELS INDUSTRY**

TABLE 2. SWOT MATRIX FOR AN ETHANOL PRODUCER IN THE AUTOMOTIVE FUELS INDUSTRY	
STRENGTHS	WEAKNESSES
One of the best substitutes for gasoline	High distribution costs
Leads to less expensive fuels	Interactions with foreign companies
Reduces the importation of foreign oil	Lower performance compared to traditional fuels
High miles per gallon	Industry volatility
Reduction of air pollution	Little worldwide recognition as an alternative fuel
OPPORTUNITIES	THREATS
Continuously growing	Increased costs of raw materials
Government subsidies	Better technology availability for competitors
Increase of exports	Changing regulations
Increasing interest in alternative fuels	Change of market due to anti-ethanol movements

using the price-quality matrix (Figure 2). Some additional contributing factors are described in the sections below.

**Strategic plant location.** With regard to the proposed location of the facility, there are several factors to keep in mind, such as resources, workforce availability, cost of transportation and land, as well as the different services the process will require.

**Raw materials.** To ensure coverage of demand, the plant will need sufficient supplies. A plant location that is close in proximity to raw-material resources allows the enterprise to prevent incurring high costs for transportation and storage, and it helps to guarantee the availability of materials. In many cases, this could mark the difference with the competition.

**Workforce.** If the project requires many jobs in the area, and results in a high employment demand, it could indicate an advantage for the success of the project. However, even if there is considerable local interest in employment opportunities, it is important to remember that hiring talented, qualified groups of employees is key.

**Land and transportation.** How are the products going to be sent to the final destinations? This is another relevant issue for the operation of a business, keeping in mind that a good transportation service offers cost advantages, delivery promptness, efficiency, security, flexibility and quality client services. Transportation considerations further underline the importance of the plant's location, since this is closely related to the achievable operational scale and technology utilization. The best location for a plant will be the one that offers the lowest prices at the plant's total capacity. In trying to reduce costs, we should not consider only the current, immediate costs, but also the intangible factors influenced by possible changes in costs of the plant that may affect the attitude of local authorities and citizens in the region.

**Industrial services.** Another issue to take into account is the availability and costs of essential services and utilities, such as electricity, water and fuels.

### Capital cost estimations

Making capital cost estimates before energy and mass balances is a very useful

Product quality	Quality-price matrix		
	Low	Medium	High
High	Underpriced	Ideal for penetration	Premiere offering
Medium	Bargain	Average	Overpriced
Low	Cheap goods	Unhappy customers	Make the sale and run

FIGURE 2. This matrix enables an evaluation of potential product prices [4]

activity. As a project proceeds from initial conception through detailed design to startup, costs begin to accumulate. At the same time, the ability of the engineers to decrease the project's costs is minimal. There is therefore a strong incentive to try to estimate project costs at as early a stage as possible, even if the design information is incomplete, so that the project can be optimized and evaluated and possibly abandoned if it is not attractive [5].

This predesign method identifies a certain number of units and then applies an average capital cost correlated per unit. This average capital cost is associated with the complexity, conditions and yield of the process and construction materials. The following sections detail some methods for capital cost estimations. Calculation examples for each method are shown in the box on p. 50.

These are order-of-magnitude (OOM) methods, meaning that they depend on the size and capacity of the new plant, and they typically cannot achieve actual accuracy greater than  $\pm 30\%$ . You may choose one of these methods based on the quantity of information available, and by con-

TABLE 3. PROCESS-SPECIFIC COEFFICIENTS [5]

Type of Process	Value of exponent $n$
Processes that use a great deal of mechanical work or gas compression (methanol, paper pulping)	0.8–0.9
Petrochemical processes	0.7
Average process or if sufficient data are not available	0.6
Small-scale, highly instrumented	0.4–0.5

TABLE 4. LANG FACTORS (BASED ON INDUSTRIAL SECTOR) [5]

Item		Fluids	Fluids-Solids	Solids
Installation factor	$F$	4.74	3.63	3.61
Equipment erection	$f_{er}$	0.3	0.5	0.6
Piping	$f_p$	0.8	0.6	0.2
Instrumentation and control	$f_i$	0.3	0.3	0.2
Electrical	$f_{el}$	0.2	0.2	0.15
Civil	$f_c$	0.3	0.3	0.2
Structures and buildings	$f_s$	0.2	0.2	0.1
Cladding and paint	$f_j$	0.1	0.1	0.05
Offsites	$OS$	0.3	0.4	0.4
Design and engineering	$DE$	0.3	0.25	0.2
Contingency	$X$	0.1	0.1	0.1



## ESTIMATION EXAMPLES

The following examples illustrate how each estimation method is applied, and how the results of the various methods can differ. Consider a plant that produces 125,000 m.t./yr of ethanol that had a cost in 1975 of \$40,000,000. We will use the unitary and exponential methods to calculate the cost of an ethanol plant in 2014 that has a capacity of 200,000 m.t./yr. The CEPCI for 1975 is 192.1, and the 2014 CEPCI is 576.1.

First, the unitary cost method is used:

$$UC = \$40,000,000/125,000 \text{ m.t./yr} = \$320/\text{m.t./yr}$$

$$Cost = \$320/\text{m.t./yr} \times 200,000 \text{ m.t./yr} \times (576.1/192.1) = \$191,933,368$$

Next, the exponential method is applied, assuming  $n = 0.8$  (for a mechanical process):

$$Cost = (200,000 \text{ m.t./yr}/125,000 \text{ m.t./yr})^{0.8} \times \$40,000,000 = \$58,258,054$$

$$Cost = \$58,258,054 \times (576.1/192.1) = \$174,713,509$$

For the next two methods, we will be calculating the total capital costs of the plant, assuming that the cost of the plant's equipment in the present year is \$40,000,000.

For the following factorial method example, we will refer back to the Lang factors given in Table 4:

$$\phi_1 = 1 + 0.3 + 0.8 + 0.3 + 0.2 + 0.3 + 0.2 + 0.1 = 3.2$$

$$\phi_2 = (1 + 0.3) \times (1 + 0.3 + 0.1) = 1.82$$

$$Cost = (3.2) \times (1.82) \times (\$40,000,000) = \$232,960,000$$

Finally, the percentage method, applying the values from Table 6, is used to determine the capital costs:

$$Total \text{ Capital Cost} = \$40,000,000 \times 569\% = \$227,600,000$$



sidering the similarity between the new plant and the sample plant. If they are very similar in size, then the unitary cost method should be chosen, because scale factors will not take into account variations in the total cost. However, if the plants are not very similar, then the exponential method could be more accurate, since it takes into account the specifics of the process.

**Unitary cost method.** For this method, it is necessary to obtain the unitary cost ( $UC$ ) of the plant by dividing the given cost ( $C$ ) at a certain year ( $x$ ) by its capacity ( $PC$ ) in metric tons per year (m.t./yr), as shown in Equation (1).

$$UC = C_x/PC \quad (1)$$

Once the unitary cost is established, the estimated cost of the plant is obtained by multiplying the unitary cost and the capacity of the new plant. Since the  $UC$  result is from a different year than the current year, the *Chemical Engineering Plant Cost Index* (CEPCI; [www.chemengonline.com/pci](http://www.chemengonline.com/pci)) is useful to update the costs. Therefore, the updated estimated cost is the product of the estimated cost of the plant and the current CEPCI over the given data year CEPCI, as shown in Equation (2).

$$C = UC \times (\text{New plant's capacity}) \times (\text{current CEPCI/former CEPCI}) \quad (2)$$

**Exponential method.** This method uses the well-known sixth-tenths rule, given in Equation (3), which states that as size increases, cost increases by an exponent of six-tenths. However, this exponent has been adjusted according to the chemical process it represents, as listed in Table 3.

$$(Cost_1/Cost_2) = (Size_1/Size_2)^n \quad (3)$$

After obtaining the desired cost, just as in the unitary cost method, updating the cost-related data for the current year is necessary. Therefore, we perform the last step of multiplying the result by the relation of the current and former indices.

**Factorial method.** Capital cost estimates for chemical process plants are often based on an estimate of the purchased cost of the major equipment items required for the process, with the other costs being estimated as a factor of the equipment cost. Lang proposed that the inside battery limits (ISBL) fixed capital cost ( $C$ ) of a plant is given as a function of the total purchased equip-

ment cost ( $C_e$ ) and an installation factor ( $F$ ), as shown in Equation (4). These factors depend on the type of industry they are applied to, and the materials of construction used, given in Tables 4 and 5, respectively.

$$C = FC_e \quad (4)$$

When more detailed design information is available, then the installation factor can be estimated somewhat more rigorously, by considering direct-cost items incurred in the construction of a plant aside from the cost of equipment, as in Equation (5).

$$C = \varphi_1 \varphi_2 C_e \quad (5)$$

$\varphi_1$  is either defined by Equation (6), which refers to the sum of the factor related to equipment erection, piping or instrumentation and control, or by Equation (7), which must be used when a material other than carbon steel is used.

$$\varphi_1 = 1 + f_{er} + f_p + f_i + f_{el} + f_c + f_s + f_l \quad (6)$$

$$\varphi_1 = (1 + f_p)f_m + f_{er} + f_i + f_{el} + f_c + f_s + f_l \quad (7)$$

In Equation (8), the material factor,  $f_m$ , is defined in relation to the purchased cost of an item in carbon steel.

$$f_m = \text{Cost}_{\text{exotic material}} / \text{Cost}_{\text{steel}} \quad (8)$$

Finally, Equation (9) defines  $\varphi_2$  as follows, considering the costs derived from offsites (OS), design and engineering (DE) and contingency (X) in the installation factors.

$$\varphi_2 = (1 + OS)(1 + DE + X) \quad (9)$$

**Percentage method.** Based on the total equipment cost, there are empirical data in the form of percentages that relates this quantity to other categories within the direct and indirect costs, therefore obtaining the total capital costs, as shown in Table 6.

### Production costs and revenues

A very useful resource in determining raw material information is ICIS (www.icis.com), which publishes chemical prices on a weekly basis. Another source of chemical prices is *Chemical Week*, pub-

lished by IHS (London, U.K.; www.ihs.com). The factors included in the estimation of variable costs of production are dependant not only on the consumption of raw materials by the process, but also the consumption of utilities, including fuel, steam, cooling water, electricity, raw water, instrument air, nitrogen and other services. As previously stated, the raw material costs will depend greatly on the plant location.

The other portion of the total cost of production is the fixed production costs, which account for operating labor, supervision, direct salary overhead, maintenance, property taxes and insurance, general plant overhead, running licenses fees, capital charges and marketing costs.

To calculate the net profit, the first step is to calculate the cash cost of production (CCOP), which consists of the sum of the fixed and variable production costs. In order to know the gross profit, we need to subtract the CCOP from the main product revenues. Then, the taxes are subtracted from the gross profit to give the net profit.

For example, consider that the price of ethanol in December 2012 was \$400/m.t., according to IHS. Assuming that the CCOP is about 50% of the price, around 15% of the CCOP represents the cost of utilities, and the rest represents the fixed costs, at an estimated tax rate of 20%, the net profit per metric ton is approximately \$160.

Another important factor in valuing costs is the working capital, which is the basis of the operation of the plant. This amount is usually equal to the CCOP minus 14 day's feedstock cost plus 1% of the fixed capital investment.

If the technology that will be used is not property of the plant owner, but is licensed from a third party, royalties will need to be added to the costs — a good estimate here is around 0.5% of the revenues. Therefore, in these cases, we also need to sum the royalties and the cash cost of production.

### Depreciation

The shelf life of the equipment must also be taken into account by including depreciation in the financials of the enterprise. A sound method to estimate assets' depreciation is important for any project. Some depreciation methods include straight-line depreciation and mul-

**TABLE 5. LANG FACTORS (BASED ON MATERIALS OF CONSTRUCTION) [5]**

Material	$f_m$
Carbon steel	1.0
Aluminum and bronze	1.07
Cast steel	1.1
304 stainless steel	1.3
316 stainless steel	1.3
321 stainless steel	1.5
Hastelloy C	1.55
Monel	1.65
Nickel and Inconel	1.7

**TABLE 6. PERCENTAGES [6]**

Category	Percent of total equipment cost, %
<b>Direct costs</b>	
Total equipment cost	100
Equipment installation	47
Instrumentation and control	18
Piping	66
Electrical installations	11
Civil work	18
Ground improvement	10
Services	70
Land	6
<b>TOTAL DIRECT COST</b>	<b>346</b>
<b>Indirect Costs</b>	
Engineering and supervision	33
Construction expenses	41
<b>TOTAL INDIRECT COST</b>	<b>74</b>
<b>TOTAL INDIRECT AND DIRECT COSTS</b>	<b>420</b>
Contractor's fees	21
Contingency	42
Working Capital	86
<b>TOTAL CAPITAL COST</b>	<b>569</b>



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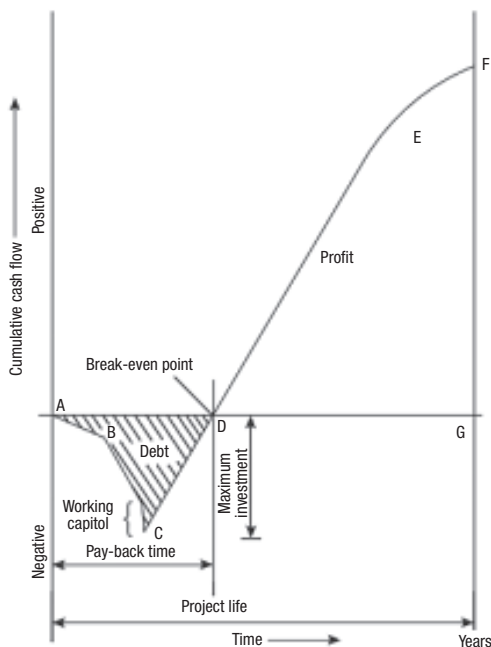
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**FIGURE 3.** A typical cash flow diagram is divided into discrete segments to define capital throughout the entirety of a project's life [5]

multiple straight-line depreciation, as well as the methods of decreased balance and double-decreased balance.

Depreciation is a tax allowance that can be useful to calculate and take advantage of. The way the equipment will depreciate depends on the country where the plant is established.

The simplest method to calculate depreciation is straight-line depreciation, shown in Equation (10). This algorithm divides the depreciable value ( $C_d$ ), which is the initial cost of the fixed capital investment minus the salvage value at the end of the depreciable life, by the years it will depreciate,  $n$ . In the case of chemical plants, the salvage value is zero, because plants usually continue operating for many years after the depreciable life has ended.

$$D_i = C_d/n \quad (10)$$

If the asset has salvage value, we should consider it by subtracting this value from the depreciable value. An important term here is the book value ( $B_m$ ), which refers to the total amount a company would be paid if it sells its assets and paid back all its liabilities (from an accounting point of view). If the book value is equal to the salvage value, the asset will be fully depreciated. Calculating  $B_m$  is shown in Equation (11) for the total years for which the asset will be depreciated

( $m$ ); typically, ten years is assumed here.

$$B_m = C - m(C_d/n) \quad (11)$$

Calculating the amount of incentives for investment will give the cash flow ( $CF$ ) after taxes in terms of the profit ( $P$ ), the tax rate ( $tr$ ) and the depreciation allowances ( $D$ ).

$$CF = P(1 - tr) + (D \times tr) \quad (12)$$

As an example, consider the calculation of cash flow for an investment of \$10,000,000 that is going to be depreciated in 10 years. The gross profit of the enterprise is \$5,000,000 per year and the tax rate is 20%. Using Equations (10) and (12), the cash flow is determined as follows:

$$D = \$10,000,000/10 = \$1,000,000/\text{yr}$$

$$CF = (\$5,000,000 \times (1 - 0.2)) + (\$1,000,000 \times 0.2) = \$4,200,000$$

### Profitability analysis

It is important to keep in mind that the purpose of investing in a plant or product is to earn profits. This part will be the last judgment step to determine if a project proceeds or if it should be stopped right away. The simplest way to calculate or examine the earnings is with respect to the investment of



capital. At the very beginning of the project, there could be numerous expenses due to all of the costs associated with engineering, equipment, plant construction, operations and workforce. However, once the plant operations have begun, the revenues will begin to flow back into the company. This cash is the difference between earnings and expenditure. A cash flow diagram (Figure 3) can be useful to visualize many aspects of the project's finances. The different segments of a typical cash flow diagram are:

- A–B: The investment required to design the plant
- B–C: The flow of capital to build the plant and provide funds for startup, including working capital
- C–D: In this part, the process comes onstream and income is generated from sales. The net cash flow is now positive, but the cumulative amount remains negative
- Point D: The break-even point refers to the revenue or income required to fully cover fixed and variable expenses for a specific period of time. In industry, this is often defined as the percentage of plant capacity where the income equals the cost of production, so there are basically no profits or losses. Note that the time to reach the break-even point is called the pay-back time
- D–E: In this region, the cumulative cash flow is positive
- E–F: Near the end of project life, the rate of cash flow may tend to fall off, due to increased operating costs, as well as falling sales volume and prices due to obsolescence of the plant
- Point F: Final cumulative net cash flow at the end of the project life

The profitability of assets is an essential metric for cost estimation. Several simple models for determining profitability are covered in the following sections.

**Rate of profit.** This method is often used to calculate the return of earnings with respect to the invested capital as a percentage. It is separated into two parts: the annual profitability before taxes (*apb*), and the annual profitability after taxes (*apa*), given

in Equations (13) and (14), respectively, in terms of the fixed investment (*I*), the gross profit (*G*) and the net earnings (*E*).

$$apb = (G \times 100)/I \quad (13)$$

$$apa = (E \times 100)/I \quad (14)$$

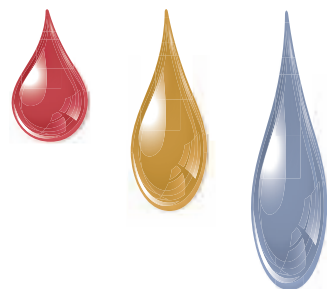
The *apb*, which measures the return on investment, is used to compare the efficiency of projects. The project that shows the highest percentage here is likely the best option, but we must be careful, because similar results can be obtained for different projects with different fixed investments and profitability before taxes or gross profit. In these cases, the time necessary to recover the investment is the detail that indicates the most appropriate project. The *apa* is very similar to *apb*, but includes taxes in the calculation, which could play an important role if the projects will be established in different countries.

**Payback period method.** The goal with this method is an economical study related to the purchase of new plants or equipment, and how long recovering the investment will take, given by Equation (15). This method considers the payback period of the plant (*Pbp*) as a function of the fixed investment (*f<sub>i</sub>*) and the gross profits (*G*).

$$Pbp = f_i/G \quad (15)$$

The result will give the necessary time to recover the investment of the plant or equipment. The decision will depend on the amount of recovery time that is acceptable to the project team. The project with the shortest time will be the most attractive.

**Present value method.** This is a more accurate method because it considers the present value (*PV*) of the currency at the age or time when the calculation is being made (*C<sub>n</sub>*), and it can be obtained through return on investment (ROI) calculations where the interest rate (*i*) reduces the present value to zero, as shown in Equation (16) for a period of investment of *n* years.



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$$PV = \sum [C_n / (1 + i)^n] \quad (16)$$

**Profit criteria.** Net present value (*NPV*) is represented financially as the sum of the present values of incoming and outgoing cash flows over a period of time. The *NPV* gives the actual value of the cash generated in excess of the invested funds, as shown in Equation (17).

$$NPV = I - PV \quad (17)$$

When project proposals are made, often the option that results in the largest *NPV* is chosen. This method is efficient when the purpose is to choose the best project among several projects of the same scale. If the projects are not of the same size or scale, using *NPV* results for comparison purposes can cause confusion and potentially drive an incorrect decision.

## Complexity necessitates the evaluation of numerous factors when estimating project costs

Another similar metric that is commonly used is profit margin, which relates the net earnings and revenues. It is important to consider the dividends distributed among active parties — these are the costs after taxes and final executive decisions. The profits must be first calculated by subtracting the net profits from the equity profits. Another criterion deals with the reimbursement rate of the discounted cash flow or internal rate of reimbursement. This technique gives a discount rate obtained by successive trials that lead to a *PV* of zero.

For an entrepreneur, the business world is a complex environment where inexperienced individuals may be given few opportunities. This complexity necessitates the evaluation of numerous factors when estimating project costs. With the guidelines in this article, the obtained results provide a path to make informed decisions and optimal project selections in a short amount of time. However, if a more thorough investigation of costs is desired, it is recommended to use a simulation program that has tools for estimating bulk costs, installation costs and the cost of labor and materials. ■

*Edited by Mary Page Bailey*

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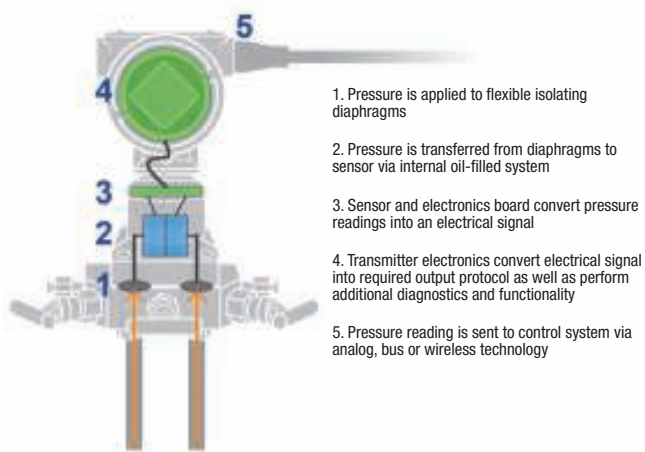
# Pressure Measurement: Handling Difficult Process Applications

A better understanding of what pressure instruments do and how they work can help improve measurement performance, especially in troublesome applications

Effective use of process instrumentation is critical in any chemical manufacturing environment. These instruments are strategically located throughout various units and measure all types of process variables, and are the operators' eyes and ears to the world inside the vessels and pipes. Ensuring good performance requires careful selection, proper installation and on-going maintenance.

These concepts apply to all types of instrumentation, including flow, level, temperature, pressure and other measurement categories. We will concentrate on pressure in this article because these instruments are at the heart of many techniques for measuring not only pressure, but also flow and level. Getting reliable and accurate pressure measurements can be a challenge, often due to installation difficulties and other issues. But modern industrial pressure instruments address many of these issues and are exceptionally stable, accurate and durable.

Spending a few moments thinking about how pressure is measured can help a user sort through the mechanics of an application and ensure that it performs exactly as desired. The simplest pressure instrument is a manometer, a U-shaped tube partially filled with a liquid of known density such as water. If both ends are open to the atmosphere, the two sides of the liquid slug will be of equal height. If pressure is applied on one end but not the other, the liquid will go down on the side where pressure is applied and up on the



**FIGURE 1.** This is a representative illustration of the working internals of a differential pressure instrument

1. Pressure is applied to flexible isolating diaphragms
2. Pressure is transferred from diaphragms to sensor via internal oil-filled system
3. Sensor and electronics board convert pressure readings into an electrical signal
4. Transmitter electronics convert electrical signal into required output protocol as well as perform additional diagnostics and functionality
5. Pressure reading is sent to control system via analog, bus or wireless technology

other. The difference in height can be measured, and this unit of measure is commonly used to determine pressure.

If unequal pressure above atmospheric pressure is exerted on both ends, the greater pressure will overcome the lesser. This is differential pressure (DP), since there are two dynamic sources of pressure on opposite sides of the slug of liquid.

Pressure measurements can be thought of as differential measurements referenced to different points. These reference points can be tied to atmospheric pressure in the case of a gage transmitter, vacuum in the case of an absolute pressure transmitter, or other process points in terms of a DP reading. Most applications use gage or DP, although for some applications, absolute pressure readings are necessary.

### What is a pressure instrument?

In the manometer tube, the liquid indicates the pressure visually. With a pressure instrument, a diaphragm essentially replaces

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## IN BRIEF

WHAT IS A PRESSURE INSTRUMENT?

THE TRANSMITTER

FUNCTION INFLUENCES APPLICATION

IMPULSE LINES

DIFFERENTIAL PRESSURE CHALLENGES

CHALLENGES WITHIN THE CPI

NEW INSTRUMENTS IN OLD ENVIRONMENTS

WEATHER AND ENVIRONMENTAL ISSUES

LISTENING TO THE DIAGNOSTICS

WORKING WITH FLOW MEASUREMENTS





**FIGURE 2.** Manifolds have a wide variety of configurations to assist with routine maintenance activities

the slug of liquid in the manometer tube, and there is a mechanism capable of measuring the amount of displacement. The diaphragm and its measuring mechanism together make up the sensor, which creates an electrical signal in proportion to the pressure.

Consider what a pressure instrument does and its construction (Figure 1). Measuring process pressure requires a liquid, gas, slurry or some other media to apply pressure against an isolating diaphragm capable of moving the sensor to create a signal. In the example in Figure 1,



**FIGURE 3.** This remote seal configuration can be mounted in direct contact with the process fluid, and the pressure transmitted via an inert fluid to the pressure sensor

when pressure is applied, the isolator applies pressure to the fill fluid, often oil, which in turn will move the sensor. The movement of the sensor can then be electronically processed by the transmitter.

This measurement mechanism can be capacitive, where the capacitance between the moving diaphragm and stationary surface can be measured, or mechanical, where a strain on the sensor causes flexing. The key function of the sensor is to convert small mechanical movements into electrical signals. These signals are then often converted mathematically in the transmitter to produce a pressure reading. The

final output of an instrument uses a standardized signal protocol, which can be integrated into an automation system.

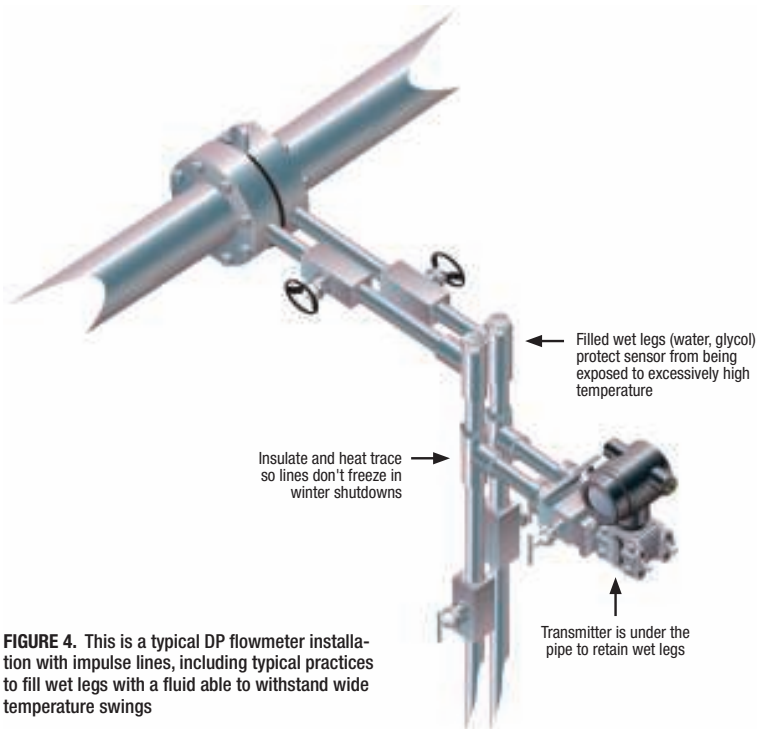
With simple pressure-measuring devices, such as manometers or Bourdon-tube gages, the process fluid is often allowed to flow into the instrument and come into direct contact with the sensor, which can work well for non-corrosive types of applications, such as water. In these simple examples, the sensor is often referenced to the atmosphere, thus displaying a gage reading.

If, on the non-process side of the sensor, the air has been evacuated to create a vacuum, this yields an absolute pressure measurement. Another way to create an absolute pressure reading is to correct a conventional gage value by deducting atmospheric pressure. For a DP instrument, the backside of the diaphragm is connected to a second process pressure inlet.

For most applications, the sensor's raw signal is not very useful, so the pressure instrument processes the signal and converts it to a standardized format or engineering unit, such as bars, pounds per square inch (psi) or inches of water (in. H<sub>2</sub>O). This processing is necessary because pressure sensors are non-linear and affected by temperature.

Therefore, the transmitter also includes at least one temperature sensor to compensate the pressure readings for temperature conditions. The transmitter will often make this additional measurement available digitally. The processor in the transmitter will also convert this information to a digital protocol so the transmitter can report the pressure to an automation system. For instance, this can be done with a 4–20-mA output with the HART protocol.

For small, inexpensive pressure devices, often referred to as transducers, the sensor and transmitter may all be built into a single compact housing with a threaded inlet and wire pigtailed for the connection. For typical chemical-process installations, pressure instruments are often designed with DP configurations with the sensor housed in a manifold. Connections can be made using



**FIGURE 4.** This is a typical DP flowmeter installation with impulse lines, including typical practices to fill wet legs with a fluid able to withstand wide temperature swings

impulse lines from the process penetration. If used in a gage pressure application, the second connection is simply left open to atmosphere. Elaborate manifold configurations (Figure 2) can be outfitted with valves to close off and bleed the impulse line, simplifying maintenance.

In some situations, where the process is especially hot or fluid characteristics are dangerous, containment is critical and impulse lines are undesirable. A remote seal can be installed at the process penetration, and its connection back to the instrument can be filled with oils, inert liquids or other fluids, which move the sensitive electronics away from the hot conditions via remote seal lines (Figure 3). These seal lines also act as a temperature barrier. The pressure information is passed hydraulically via the fill fluid to the sensor, while containing the process fluid in the piping or vessel.

This same methodology can be used for installations in hazardous environments, which often also use an isolator to separate the transmitter electronics from the process connection. The remote seals add one or more additional layers of process protection, especially important in highly corrosive installations. If the diaphragm fails and allows process fluid to escape, some less robust instruments may provide a path for process fluid to flow through the housing and out the electrical conduit, allowing it to reach the connection point or some point in between. More advanced transmitters provide isolation with dual compartment housings able to isolate the sensing side from the loop connection side.

### The transmitter

The transmitter is integrated into the overall pressure instrument and contains a significant amount of electronics to perform a variety of functions to make it widely usable for many different applications. Understanding what these devices do can help clarify equipment selection for specific applications.

As previously mentioned, the electronics in the transmitter are responsible for taking the raw sensor information and turning it into pressure

information. Depending on the sensor type, this correction addresses things like sensor non-linearity and temperature correction, as well as providing the other features found in the transmitter.

In many cases, pressure transmitters require a temperature sensor near the pressure measurement point for correction of the pressure reading. In some cases the electronics can also accommodate a process temperature sensor, which is very helpful for multi-variable DP flowmeters where process temperature correction is required in the flow calculations. These temperature and pressure measurements are often available as secondary variables and can be conveyed digitally to an automation system.

Additionally, the transmitter must convert the pressure information into an output signal, which may be an analog current or voltage value, or a digital signal. For analog, 4–20 mA is by far the most common transmitter interface, often including digital

HART data superimposed on the analog signal.

Digital signals are usually Foundation Fieldbus, Profibus PA, WirelessHART or other industrial protocols. Few field instruments these days are simple analog, with most including both analog and digital capabilities. With the digital capabilities, these instruments can transmit data in addition to the process variable including configuration, secondary variables and critical diagnostic information.

With the flexibility added by configuration features, pressure transmitters enable users to set many parameters often including the following:

**Ranging.** A pressure sensor has a fixed useful range. With that said, many transmitters offer range-down capabilities. This enables a transmitter with a wider sensor range to be ranged down to meet an application with lower pressure requirements. This range-down is limited by accuracy, so care must be taken to ensure sufficient measurement

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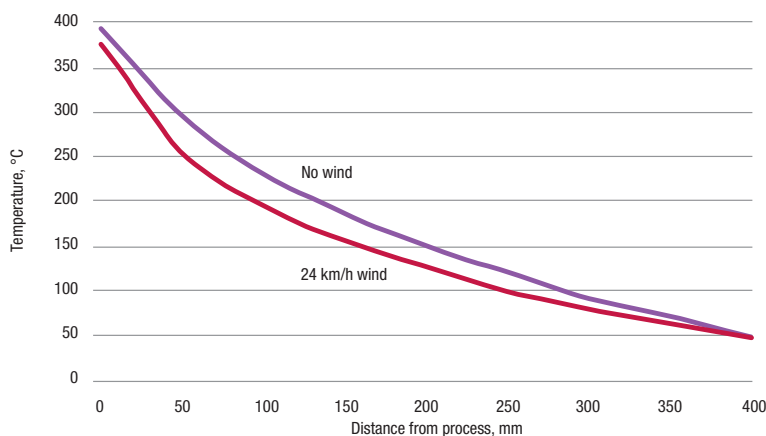


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**FIGURE 5.** This graph shows process heat dissipation versus distance from transmitter curve (Redrawn from Ref. 1)

sensitivity even at very low pressure changes. If a sensor has a useful working range of 0–250 in. H<sub>2</sub>O, using it to measure 0–25 in. H<sub>2</sub>O is a reasonable range-down of 10:1. Even though the range can be set for the lower values, this will not affect the mechanical characteristics of the sensor and some accuracy will be lost. Investing in devices with a wider range-down capability can optimize pressure instrument inventories.

**Diagnostics.** Some pressure instruments are aware of their surroundings and what is happening with the process. They get used to the normal operating patterns and can warn operators when conditions change. The transmitter also typically monitors itself, looking for changes in its own internal components. If given the means to communicate, as with a digital instrument, it can report changes and developing problems to the automation system and operators, so action can be taken before failure.

**Temperature.** As mentioned, sensor technologies are often affected by temperature. As a result, an instrument will have a useful working temperature range to protect sensitive electronics, as well as suitable process temperatures for which correction is possible, just as it has a working pressure range. Some applications can be too hot or cold for the sensor and electronics, an area which will be covered in more detail later in this article.

**Protocol.** Pressure instruments need

mechanisms to convey all their information, which digital communication uses to get more information from the field to the automation system. For example, in the case of a field-bus protocol, digital information is provided with regular updates. With greater sophistication comes greater complexity as adding capabilities requires more settings and configuration. The protocol selection is often hardware based. A Foundation Field-bus instrument cannot be changed to HART via a menu. However, external devices can add wireless connectivity, sending and receiving data via WirelessHART, but this is defined by the hardware components rather than by setting a configuration.

**Hazardous location requirements.** Most modern field instruments are designed to operate in many environments, including hazardous areas such as Class 1/Div. 1 or Zone 0, provided they are installed and maintained properly. But, it is still very important to determine what ratings are required for each application.

### Function influences application

Once the working fundamentals of pressure instruments are clear, it is easier to see where one might encounter difficulties. Incorrect specifications can happen, such as choosing operational characteristics unsuited to the application. For example, choosing a 0–10-bars instrument for an application where the normal working pressure is 10 bars is not correct, because the



**FIGURE 6.** In some hot applications, it is required to add additional separation from the process heat to the transmitter. This shows an example cut-away view where the oil fill lines extend to the sensor and protect the temperature of the transmitter

working pressure is too close to the instrument's maximum measurement range. Instruments installed incorrectly can interfere with normal operation. Manufacturers provide extensive information as to installation practices, and it is important to follow these for reliable performance.

Maintenance problems can be the result of misspecification. Instruments made over the last 10 years or more are calibrated at the factory using highly sophisticated and accurate equipment and are exceptionally stable. Maintenance workers who may believe electronic sensors need to be tweaked out of the box for accuracy, like a mechanical gage, will often take the instrument out of specification if they do not have the proper training and calibration equipment. After some number of years, most manufacturers do recommend recalibration. The traditional concepts of "sensor drift" applied to mechanical instruments have evolved, and recommended best practices are to calibrate when required.

Process pressure spikes can cause damage to pressure equipment. These can come from improper valve movements, process upsets and sudden pressure events.



Installing instruments with high-pressure ranges capable of withstanding these spikes is one solution, but running a process at the lower end of an instrument's range may cause sensitivity issues. Selecting quality instrumentation able to handle overpressure conditions can help withstand pressure spikes and deliver good measurement performance.

### Impulse lines

One option when measuring pressure is to transmit the process media condition hydraulically. A pipe or tube can be mounted between the sensor and the tap, allowing the sensor to be mounted a considerable distance from the process equipment (Figure 4). This approach works because the pressure is static, so there is no significant pressure loss over the length of the tube. An instrument can be mounted in a location based on easier access, distance from a hot or dangerous process, or proximity to both ends of a differential measurement.

Where gases are involved, usually the process gas fills the impulse lines, which are called dry legs. As long as they stay dry, there are rarely problems, but liquid can find its way into these dead legs through condensation or other sources. Liquid intrusion doesn't necessarily cause immediate problems, but if the liquid freezes, it can block the line or damage the tubing or sensor due to expansion. Bleeding dry legs routinely, particularly during cold weather, may be necessary.

Where liquids are involved, the process liquid fills the impulse lines, which are called wet legs. Again, if the lines are filled completely with liquid, no problems may develop. However, gas can become trapped in a line, and adding a compressible element to the chain can interfere with accurate pressure transmission. Bleeding wet legs to eliminate gas slugs may be necessary.

Additionally, in either wet- or dry-leg installations, mounting best practices can help eliminate mea-

surement challenges. By mounting a pressure device with a liquid leg below the process connection, gas bubbles that form can work their way out to the process, keeping the wet leg filled. Mounting the pressure transmitter above a gas line can also help liquids flow out of the impulse lines.

Either type of line can become clogged either through sediment or frozen liquid. Bleeding can clear the line, or at least confirm the clog exists.

But having wet legs filled with process fluid has drawbacks. The fluid's hazardous nature may make it dangerous, its characteristics outside of the process may change, and it may be subject to viscosity changes at different temperatures. Where wet legs have challenges, remote seals can often be used as an alternative to solve some of these problems.

A remote seal can be added at the process tap point(s), with fill fluid added to the line and permanently sealed in the space next to the actual measuring sensor diaphragm. It



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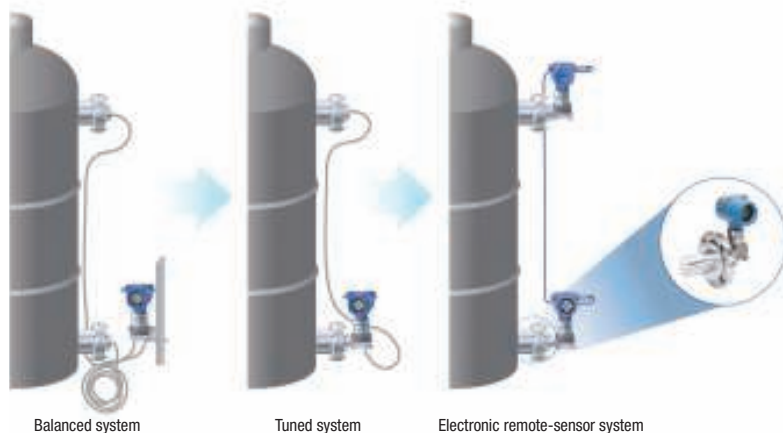
is important to select the correct fill fluid suitable for the specific application. As is the case with most fluids, characteristics change as a function of temperature. Viscosity increases as temperature decreases, and if it gets too hot, the fill fluid can flash into vapor.

If the fill-fluid line is long, the temperature difference between a hot process and a sensor some distance away in a cold climate could easily be 200°F or more. Some heat will be transmitted down the line, but even with stainless steel tubing, it dissipates quickly. A good rule of thumb is that a fill fluid can lose 100°F for every foot, though this can be significantly more depending on installations and ambient conditions. Figure 5 highlights this rapid heat loss in relation to installed distance [1]. One end can be hot while the other is cool, causing slow measurement response. Heat tracing is one solution, but it is expensive and maintenance-intensive. Another approach uses an integral enclosure to protect the impulse lines and minimize heat transfer problems (Figure 6).

In tough applications where process temperatures are extreme or ambient temperatures swing significantly throughout the year, dual seals with multiple fill fluids can help. In some instances, electronic remote sensors can eliminate several of the traditional challenges. This approach eliminates the need for a long capillary by connecting the two transmitters electronically, one at each tap point, rather than using a single device and long impulse lines or capillaries. Electronic remote sensors also eliminate heat tracing and associated maintenance challenges. Using systems with closed fill fluids or electronic remote sensors can overcome many challenging combinations of temperatures likely to be encountered in process plants and facilities.

### Differential pressure challenges

DP measurements are made in all kinds of process plant areas. Examples include measuring level in tanks, flows through pipes, clogging in strainers, and many more applications. Since DP installations need



**FIGURE 7.** These illustrations show three typical level measuring approaches each providing measurement benefits in different applications

connections to two process points, and those points could be some distance apart, they may call for the longest impulse lines.

Consider this example: measuring level in a large pressurized tank (Figure 7, left panel). The pressure instrument is mounted near the tank with an impulse line from a spud near the bottom connected to the high side of the DP manifold. The low side is a line running to the top of the tank, say 10-m high, to measure the pressure in the headspace above the liquid. This dry leg comes down the side of the tank and is connected to the low side of the manifold. The two sides may present significantly different temperatures depending on the contents of the tank. But as long as everything works properly, the level measurement will be correct within the accuracy limits of the process connections. However, there is a risk that the dry leg could collect liquid or the wet leg could trap some gas, in either case introducing potential problems.

A different approach is to utilize a tuned remote seal on the lower connection (Figure 7, center and right) instead of an impulse line. This avoids any potential for clogging of the wet leg. Of course it is still important to select the correct capillary fill fluid for optimal temperature performance.

A third alternative, if static pressure isn't too high, is to mount a second pressure instrument on top of the tank instead of using an impulse line (Figure 7, right panel). For optimal performance, an electrical connection between the two instruments provides a means to syn-

chronize the measurements. This configuration removes the capillary piping and significantly reduces temperature effects. This pressure measurement system can be configured as a single instrument, with the DP reading sent to the automation system as the primary variable, and the two static pressure measurements sent to the automation system as secondary variables. This approach eliminates many of the challenges inherent to impulse lines and capillaries (for more on this approach, see Part 2, "Measuring Differential Pressure: Mechanical or Electronic?" pp. 63–66).

### Challenges within the CPI

Many chemical manufacturing processes involve a variety of toxic, flammable or corrosive products at a huge range of possible temperatures. While conventional stainless-steel construction is well suited to most chemical environments, special materials may be necessary in particularly difficult situations. High-nickel alloys (for example, various grades of Hastelloy, Inconel and so on) are common, along with zirconium in applications such as urea production.

These special materials are higher cost, so they should be used strategically in appropriate applications where they perform significantly better than traditional materials. Using the right material not only extends the life of the instrument, but reduces the probability of failure with consequent leak points and possible shutdowns.

Applications where special materi-

als are required need careful design to avoid becoming overly expensive and complex. For example, using conventional impulse line configurations requires the use of special tubing and fittings along with the non-standard instrument manifold. If a transmitter can be selected with a remote seal, the special impulse line can be eliminated, and only the single wetted part needs to be made from the special material.

### New devices, old environments

Many chemical plants were built decades ago. Compared to current practices, plant designs of those times had sparse instrumentation and automation. Older automation platforms usually support only simple analog field instruments, with no built-in support for digital instruments.

Adding communication from today's digital instruments can be challenging, but when applied properly and coupled with suitable work practices, it is well worth the effort. Communication from existing HART



**FIGURE 8.** Example of an orifice plate utilized in flow applications

instruments can be added using three basic approaches:

- Replacing analog input cards with HART input cards. These upgraded I/O cards enable digital communications with field equipment, but must be supported by the automation control system
- In the case where the automation system doesn't support HART, multiplexers can tap into the existing I/O and extract the HART data, and transmit these data via



**FIGURE 9.** Newer DP-based flowmeters use an integrated design, simplifying the construction and reducing potential maintenance problems

- discrete or 4–20-mA signals
- If the need is to access specific field instruments for strategic information, external wireless adapters

## A Guide to Advanced and Next-Generation Battery Technology and Materials

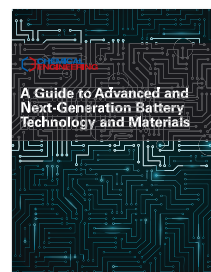
This comprehensive guidebook provides descriptions of the major battery technologies and materials in the advanced and next-generation battery markets, as well as information on many of the companies operating in the advanced and next-generation battery industries.

Included in this guidebook is a table that represents a list of selected technology-development companies in the advanced battery space, along with their areas of focus, contact information and technology status. It lists both established companies and startup companies that have made technological strides in recent years toward commercially viable battery technologies.

- Major application areas for advanced and next-generation batteries
- Key parameters for advanced and next-generation batteries
- A sampling of academic and national laboratory research groups and lead investigators that are focused on technology for advanced batteries

### Details Include:

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- Wearable batteries
- Lithium-sulfur battery technology
- Redox flow batteries
- Battery materials and components
- Production capacity
- Research stage
- Advanced battery companies and specific technologies
- References





can be added. These adapters send digital data to a gateway, with the gateway hard-wired to the automation system. These devices do not interfere with normal operation of the analog loop, but are powered by the loop. They act just as if the device was hooked up to a modem, and provide access to valuable data along with instrument configuration capabilities.

Adding new field instruments where cable trays are crowded and automation system I/O panels are filled to the maximum is difficult and expensive. Wireless instruments avoid these infrastructure problems and can be deployed throughout a plant without extra cabling or conduit.

Most wireless instruments are entirely self-contained with internal power supplies capable of operating for many years. They can also be placed in most hazardous environments without the usual concerns related to conventional wiring infrastructure installation and maintenance.

### Weather & environmental issues

Chemical plants are not always located in temperate hospitable environments. Those sited with petroleum-production facilities can be very hot or very cold. Temperatures in the Middle East can routinely reach 50°C with daily swings of 15°C. The Athabasca oil sands in Canada can go the opposite direction, requiring field instruments to operate at -55°C and even lower.

This can play havoc with impulse lines by causing blockages due to frozen fill fluids, measurement latency caused by high viscosity of fill fluids at low temperatures, or low-molecular-weight fill fluids being vaporized by heat. Sensitive electronics can also be affected by ambient conditions. Where temperatures are extreme but steady, finding a solution is usually manageable. Bigger problems occur where temperatures fluctuate from very cold to very hot.

With a continuous process, the process temperature stays stable, but batch processes change as they start up and shut down. If appropriate compensation is not included, the same batch process starting at

5:00 a.m. in Saudi Arabia can perform differently when starting at 5:00 p.m. due to significant ambient environment temperature swings. By selecting fill fluids and appropriately rated devices, accommodations can be made to deal with these issues.

In addition, modern instruments monitor the transmitter temperature and therefore know when it is outside of its reliable operating range. These instruments can warn operators via diagnostics of potential problems with the readings so that corrective measures can be taken.

### Listening to the diagnostics

A surprise failure of a smart pressure instrument (short of it receiving damage from an external source) should be a rare event. Many failures are not immediate, nor are they difficult for the transmitter's own diagnostic routines to detect. If a plant is monitoring the rich diagnostic data available from a modern digital pressure instrument, warnings of a growing device problem often become evident well in advance of failure.

Some pressure instruments can monitor for subtle process changes. Sensors can function as a process diagnostic tool by analyzing noise signatures. Since good modern transmitters sample data in excess of 20 times per second, additional process insights can be identified. Over time, normal operation creates a specific noise signature, and signature changes can warn operators of an impending problem. For example, if the amplitude of the process noise falls, it may be due to an impulse line clogging.

Of course, diagnostics depend on automation systems and operators. For plants where field instruments communicate via a fieldbus or with native HART-enabled I/O, this is a simple matter to implement. Older systems using analog I/O will need to use a HART multiplexer or wireless solution to benefit from this enhanced available information.

### Flow measurements

DP instruments are at the heart of many flow-measuring techniques, using disruptions in moving process media streams caused by an obstruction, such as an orifice plate

(Figure 8). The characteristics of these technologies have been the topic of many articles, but some difficulties are caused when the pressure instrument is not performing optimally due to a mounting or maintenance issue.

Most flowmeters are designed to minimize the amount of pressure loss they create since this is a waste of energy. Therefore, the pressure instrument has to be very sensitive and precise when measuring what might be a very small differential, even though the line pressure could be very high. Impulse lines should be kept as short as possible since even a small obstruction can affect a low level measurement.

Some newer flowmeter designs eliminate impulse lines entirely, building the flow-disruption device and pressure sensor into one integrated unit (Figure 9). This simplifies installation and maintenance, particularly in situations where special materials are needed.

Situations with high line pressures but a low differential can be difficult, especially when it comes to maintenance. Anyone installing or working on such an installation should be careful not to pressurize only one side of the pressure instrument, as this would subject the sensor to full line pressure. If the sensor can't withstand this overpressure, damage or even a leak could result. ■

*Edited by Gerald Ondrey*

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### Author



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# Measuring Differential Pressure: Mechanical or Electronic?

Users should consider both options when selecting a DP device. Understanding the differences can help make the decision for a given set of process conditions

Differential pressure (DP) measurements are used in many branches of the chemical process industries (CPI) for a variety of measuring tasks. Besides mechanical measurements via active pressure lines or chemical seals, electronic differential pressure measurements are now also available. But what is the optimum solution for the user? This article explains the operating

mode for both, as well as the differences between the two systems. The main focus is on the measuring accuracy and selection criteria. A few practical examples are also presented.

## Operating modes

The mechanical differential-pressure measurement always operates according to the same principle, regardless of the instrument's manufacturer. Two pressure values are applied to a differential pressure transmitter. Active pressure pipes or capillaries bring the process, so to speak, from the measuring point to the field instrument. The measuring cell calculates the pressure difference mechanically, and transmits this value in an electrical signal output as a measured DP value (see also Part 1 on pp. 55–62).

The electronic DP measurement differs in that the two pressure values are measured individually, directly at the measuring points, by a master/slave sensor pair. The two instruments are electrically connected, and the pressure difference is electronically

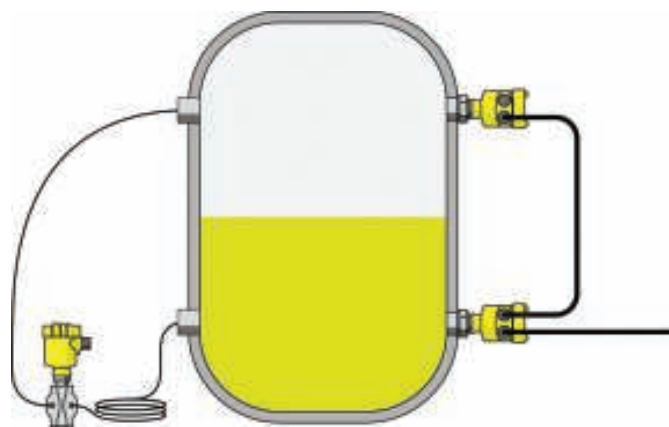


FIGURE 1. To measure the level in a pressure vessel, mechanical (left) or electronic (right) DP measurement can be used

transmitted from the master sensor. Figure 1 shows the difference between mechanical and electronic DP measurement, using level measurement in a pressurized vessel as an example.

## Applications & operational conditions

A typical application for DP is level measurement in pressurized or vacuumed vessels. These may be filling tanks in breweries, stock deaerators in the paper industry, reactors in the chemical industry or condensate collector tanks in power plants. Another area of application is the flow measurement in pipelines via orifice plates or pitot tubes (Figure 2).

DP is often used in steam generation and distribution, or in the production of biogas. Other widely used applications are the measurement of DP between input and output of filters or pumps to monitor for the occurrence of contamination of the filters or wear of pumps.

The requirements and operating conditions for pressure measurements can be very different, for example high static pres-

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## IN BRIEF

OPERATING MODES

APPLICATION  
AND OPERATING  
CONDITIONS

CALCULATING TOTAL  
DEVIATION

CALCULATION EXAMPLE

SELECTION CRITERIA

APPLICATION  
EXAMPLES



**FIGURE 2.** This photo shows flow measurement via an orifice plate and mechanical DP measurement. The static pressure is measured by an additional sensor

sures of up to 9.140 psi (630 bars); minimum pressure differences of a few millibars; high process temperatures of up to 750°F (400°C); strong temperature fluctuations; extreme continuous vacuum; suction and pressure surges; abrasion by the measuring medium; and more. As will be seen below, these operating conditions can help in selecting the DP technology that is most suitable for a given application.

### Calculating total deviation

The total deviation of a pressure transmitter indicates the maximum measuring error to be expected in practice. According to the German Pressure Standard DIN 16086, the total deviation  $F_{total}$  is the sum of the basic accuracy  $F_{perf}$  and the long-term stability  $F_{stab}$ :

$$F_{total} = F_{perf} + F_{stab} \quad (1)$$

The basic accuracy  $F_{perf}$  is made up of the thermal change of the zero signal and output range  $F_T$  as well as the measuring deviation  $F_{KI}$ :

$$F_{perf} = \sqrt{F_T^2 + F_{KI}^2} \quad (2)$$

Initially, this only applies to the digital signal output via HART, Profibus PA or Foundation Fieldbus. For a 4–20-mA output, there is also the thermal change of the current out-

put  $F_a$ :

$$F_{perf} = \sqrt{F_T^2 + F_{KI}^2 + F_a^2} \quad (3)$$

Where:

$F_{total}$  = Total deviation

$F_{perf}$  = Basic accuracy

$F_{stab}$  = Long-term drift

$F_T$  = Thermal change of zero signal and output range (temperature error)

$F_{KI}$  = Measuring deviation

$F_a$  = Thermal change of the current output

### Calculation example

As an example, consider the measurement of level in a pressure vessel. Using the German Pressure Standard DIN 16086 as outlined above, we can calculate and compare the total deviations for both the mechanical and the electronic DP measurements. This is done for four different examples, as shown in Table 1.

Table 1 shows that the electronic DP measurement delivers a higher measuring accuracy, especially at large temperature differences. This is also the case with a high turndown ratio. But it also shows that turn-

down and measuring accuracy in the mechanical differential pressure measurement are independent of the pressure range — at least when the temperature difference is low.

### Selection criteria

In addition to the desired accuracy, a number of other factors are important in the selection of a DP technology. Table 2 provides a concise comparison of the performance of mechanical and electronic DP measuring systems for a number of different criteria.

### Application examples

The following three examples illustrate specific applications where electronic DP measurement can be advantageous over traditional mechanical DP technology.

**The pharmaceutical industry.** In this example, solvents for an active ingredient extraction are recovered in a distillation tower that is approximately 8.2 ft (2.5 m) tall. Evaporation takes place at about 120–140°F (50–60°C) under a vacuum of approximately 0.75 psi (50 mbar abs).

Mechanical DP systems with



**FIGURE 3.** Shown here is a master sensor for an electronic DP measurement in a distillation tower



**TABLE 1. COMPARISON OF MECHANICAL AND ELECTRONIC DP MEASUREMENT**



Examples	Mechanical differential pressure		Electronic differential pressure	
	Capillary length	16 ft		
	Process connection (+)	Flange 2 in.	Process connection (+)	Flange 2 in.
	Process connection (-)	Flange 2 in.	Process connection (-)	Flange 2 in.
Measurement range	2.9 psi			
<i>P1</i>	61 psi			
<i>P2</i>	58 psi			
<i>T1</i>	68°F			
<i>T2</i>	158°F			
$\Delta T$	50 K			
Measuring cell		7.25 psi		72.5 psi
Turndown		2.5:1		25:1
Total deviation		30%		4%
Measurement range	2.9 psi			
<i>P1</i>	148 psi			
<i>P2</i>	145 psi			
<i>T1</i>	68°F			
<i>T2</i>	158°F			
$\Delta T$	50 K			
Measuring cell		7.25 psi		145 psi
Turndown		2.5:1		50:1
Total deviation		30%		9%
Measurement range	2.9 psi			
<i>P1</i>	4,2 bar			
<i>P2</i>	58 psi			
<i>T1</i>	68°F			
<i>T2</i>	86°F			
$\Delta T$	10 K			
Measuring cell		7.25 psi		72.5 psi
Turndown		2.5:1		25:1
Total deviation		3%		4%
Measurement range	2.9 psi			
<i>P1</i>	583 psi			
<i>P2</i>	58 psi			
<i>T1</i>	68°F			
<i>T2</i>	86°F			
$\Delta T$	10 K			
Measuring cell		7.25 psi		870 psi
Turndown		2.5:1		300:1
Total deviation		3%		25%

chemical seal systems and capillaries were previously used with this kind of application. The high vacuum and the temperatures involved, however, caused degassing of the filling oil, and thus led to a drift in the measured value. The measurement only achieved short service lives and quickly became unusable.

Electronic DP (Figure 3), on the contrary, does not require any laying of capillary lines. The oil-free ceramic measuring cell also operates reliably and in the long term with vacuum, even at high temperatures and without any drift.

**Power generation.**

The combustion air for coal power stations is provided by so-called forced draft fans, which are powerful axial fans. For an optimum combustion within the boiler, the air throughput must be measured and controlled. To do so, several pressure measurements in the range of approximately 0.4–0.6 psi (30–40 mbar) are required (Figure 4).

These measurements are usually realized via DP transmitters with small measuring ranges and long impulse lines. This results in a high installation effort, a measured value drift due to temperature influences and blockages by dust and condensation formation. Another disadvantage of mechanical DP in this situation is the poor access during regular maintenance operations.

With electronic DP technology, on the other hand, the sensors are directly placed at the measuring points. There is no

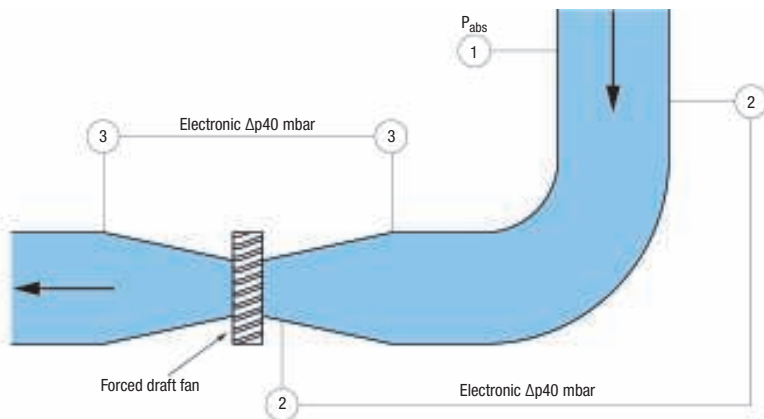


FIGURE 4. Electronic DP measurement can be applied on a forced draft fan in a power plant

need for laborious laying of impulse lines. Moreover, the expenses for the required additional heat of the lines can be saved. The oil-free ceramic measuring cell works reliably and, in the long-term, without any drift independently of the ambient temperatures. Thanks to the ceramic measuring cell, no cleaning or maintenance work on the sensor are required.

**District heating network.** In district heating grids, several compensation tanks with a height of approximately 70 ft (21 m) assist with maintaining the pressure. They compensate for any leakages, as

well as temperature-related volume fluctuations within the grid.

The necessary level measurement, until now, was realized via DP transmitters with flanges and long capillary lines. These were laid outdoors and equipped with an additional heating system. For the total pressure to be measured in addition, another sensor needed to be installed.

In contrast, the electronic DP measurement (Figure 5) is significantly less expensive and easier to handle. All the desired measured values can be transferred to the control system. An additional sensor for the total pressure is not required.

## Final remarks

The electronic DP measurement is an interesting alternative to the traditional DP measurements. Electronic DP measurement is especially advantageous when temperature differences are large, as well as operation under vacuum or abrasive conditions. Electronic DP measurement is an economical reduction of measuring points.

On the other hand, large pressure differences and a high static pressure will continue to be the domain for mechanical DP measurement. The final decision as to which technology to adopt ultimately depends on the application in question.

*Edited by Gerald Ondrey*

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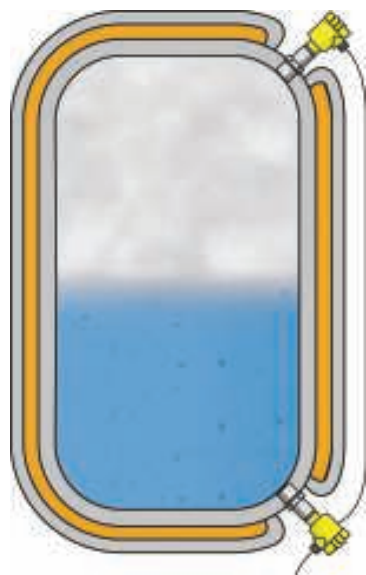


FIGURE 5. Shown here is the use of electronic DP measurement on a compensation tank in a district heating supply

TABLE 2. COMPARISON OF MECHANICAL AND ELECTRONIC DP MEASUREMENT

Criterion	Mechanical DP	Electronic DP
High static pressure	++	-
Temperature fluctuations during the process	-	++
Vacuum	-	++
Abrasion (ceramic)	-	++
High process temperature	++	+
Low installation and maintenance effort	-	++
High measuring accuracy at turn down > 20:1	++	+
Compact structure	+	-
Variety of process fittings	+	++
Measured value at total pressure	-	+
Measured value at static pressure	-	+
Measured value level	+	+
Measurement of minimal pressure differences	+	-
High temperature difference between the measuring points	-	+
Density and interface measurement	+	++

++ very suitable  
+ suitable  
- unsuitable

## Pump Safety: Flirting with Disaster

Be vigilant about parallel pumping conditions that can lead to catastrophic failures

**Robert X. Perez**  
Machinery Engineer

**D**uring my career, I have seen several massive centrifugal pump failures caused by pump users attempting to operate pumps in parallel without the proper equipment review, procedural review or instrumentation. Parallel pump operation happens when two centrifugal pumps are installed side by side with common suction and discharge headers (Figures 1 and 2). In an ideal scenario, if both pumps have essentially identical head flow characteristics, then each pump should contribute equally to the total flow going into the discharge header, barring any unexpected line restrictions. However, problems often arise when operators assume that both that the pumps are identical in head, and that flow characteristics and flows will remain similar throughout the pumps' lifetimes.

### Operating parallel pumps

Let's look at a case (Figure 2) where, due to manufacturing and assembly differences, the first pump delivers 300 gal/min and the second pump delivers 315 gal/min. The total flow is 615 gal/min, which means that the first pump is delivering 48.8% of the total flow and the second pump is delivering 51.2% of the total flow.

If these pumps have best efficiency point (BEP) flows of 400 gal/min, then the first pump is running at 75% of its BEP flow, and the second pump is operating at 78.8% of its BEP flow. This example probably represents a typical situation in which pumps provide similar head flow characteristics to the job at hand.

When centrifugal pumps are operated in parallel, individual pump flows are additive, while pump heads are not. After studying Figure 3, the reader will surmise that, when operated in parallel, individual pump



**FIGURE 1.** When parallel pumps are installed and operated in parallel, individual pump flows are additive, but pump heads are not. Problems often arise when operators assume the pumps are identical in head and flow characteristics and that flows will remain similar throughout the pumps' lifetimes

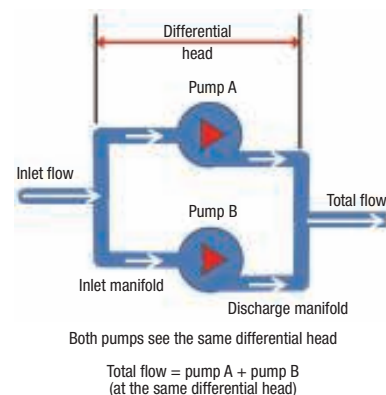
flows add to the right of the head-flow curves while the head that each pump experiences remains the same. For example, as shown in Figure 3, at a value of about 288 ft of head, each pump delivers about 400 gal/min, yielding a total combined flow of 800 gal/min. Remember that this example assumes identical pumps are piped in parallel — which is rarely the case in the real world.

Now, let's look at a situation where one of the pumps operating in parallel has some wear. For example, Figure 4 shows the pump curves for a healthy and a worn pump on a single plot. For simplification, the pump curves have been linearized. As seen in Figure 4, the worn pump produces less head at all flows. As the wear becomes more and more severe, there will be a flow value where the healthy pump will completely overcome the worn pump and cause its flow to drop to zero.

A zero-flow condition occurs because, even at shut-in flow conditions, the weaker pump can no longer generate sufficient head pres-

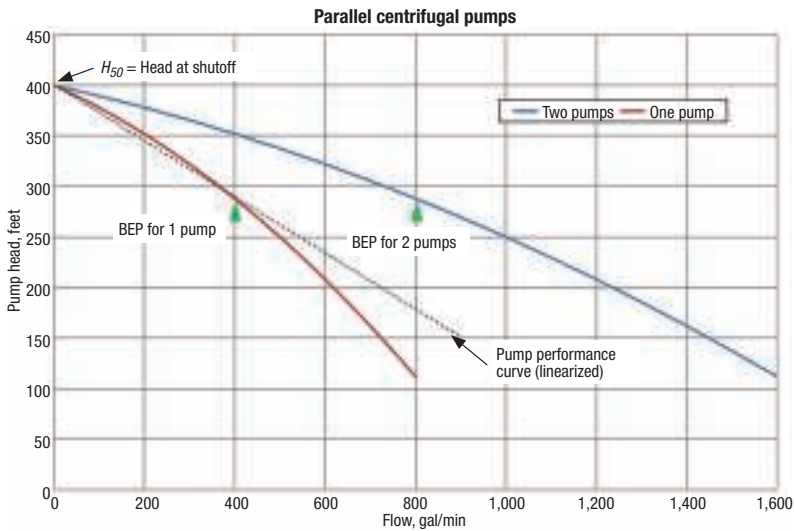
sure to overcome the discharge header pressure and open its discharge check valve. It goes without saying that zero flow is very bad for centrifugal pumps.

It has been well-documented in the literature that operating centrifugal pumps at low-flow conditions relative to their BEP can lead to excessive vibration, pressure pulsations, accelerated bearing and seal wear,



**FIGURE 2.** Diagram of two centrifugal pumps installed in a parallel pumping arrangement





**FIGURE 3.** Shown here are performance curves where pump head is plotted against flow for a single centrifugal pump, and for two identical centrifugal pumps operating in parallel

and rapid internal heating. We also know that prolonged operation of centrifugal pumps at very low or zero flow can lead to rapid catastrophic failures, which can result in expensive pump repairs, product releases and fires.

### The pump-shutoff triangle

Looking at the upper left of the two curves in Figure 5, one can imagine a triangle comprised of the healthy pump curve, a horizontal line that intersects the pump head axis at the location of the worn pump shut-off head ( $H_{SO}$ ), and the pump head axis (the ordinate). The orange

oval shown in Figure 5 highlights a closeup of the low-flow regions of the performance curves.

By observation, the slope of the healthy pump curve can be written as follows:

$$\text{slope} = m = \frac{H_{BEP} - H_{SO}}{Q_{BEP}} \quad (1)$$

Here we assume the pump curve is fairly flat and can be reasonably estimated by a straight line, where:

$m$  = slope of the healthy pump's head flow curve (linearized)

$H_{BEP}$  = Head at the best efficiency flow

$H_{SO}$  = Head at shut-off

$Q_{BEP}$  = Flow at BEP

By inspection, we can write the following relationship to define the "pump shut-off triangle":

$$\text{slope} = m = \frac{H_{SO}^* - H_{SO}}{Q_{SO}} \quad (2)$$

$H_{SO}^*$  = Head at shutoff of the degraded pump

$Q_{SO}$  = Flow of the healthy pump that will produce the head required to shut off the degraded pump

Setting these two equations equal to the slope  $m$ , we arrive at the following:

$$\frac{H_{SO}^* - H_{SO}}{Q_{SO}} = m = \frac{H_{BEP} - H_{SO}}{Q_{BEP}} \quad (3)$$

If we solve the new relationship for  $Q_{SO}/Q_{BEP}$  we get:

$$\frac{Q_{SO}}{Q_{BEP}} = \frac{\left(\frac{H_{SO}^*}{H_{SO}} - 1\right)}{\left(\frac{H_{BEP}}{H_{SO}} - 1\right)} \quad (4)$$

The term  $Q_{SO}/Q_{BEP}$  is the flow ratio that will result in the shutoff of the degraded pump.

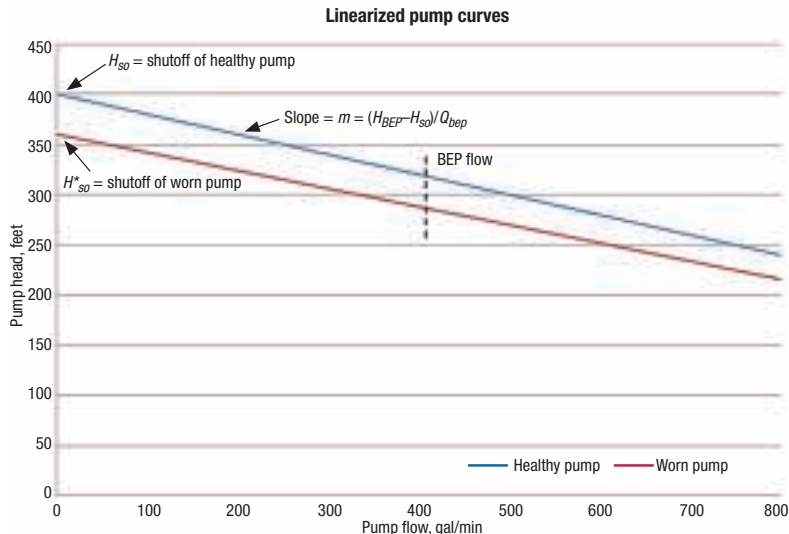
We will run through a few examples to better understand the value of this new equation.

**Example 1.** Let's assume that one of the pumps is 100% healthy and the sister pump has degraded to the point where it is producing only 90% of its original head. After doing some research, you find that the ratio of the head at BEP and shut-off head ( $H_{BEP}/H_{SO}$ ) is 0.8. If we plug this information into the  $Q_{SO}/Q_{BEP}$  equation we get the following:

$$\frac{Q_{SO}}{Q_{BEP}} = \frac{(0.9 - 1)}{(0.8 - 1)} = 0.5 \quad (5)$$

The result means that for this set of conditions we can expect the "weaker" pump to experience a shutoff condition when the "healthier" pump reaches a flow of 50% of its BEP.

**Example 2.** Now, let's assume that one of the pumps is 100% healthy and the sister pump has degraded



**FIGURE 4.** The blue line represents a linearized form of a healthy centrifugal pump curve, and the red line represents a linearized form of a pump curve for a worn centrifugal pump

to the point where it is producing only 95% of its original head. After doing some research, you determine that the ratio of the head at BEP and shutoff head ( $H_{BEP}/H_{SO}$ ) is 0.85. If we plug this information into the  $Q_{SO}/Q_{BEP}$  equation we get the following:

$$\frac{Q_{SO}}{Q_{BEP}} = \frac{(0.95 - 1)}{(0.85 - 1)} = 0.333 \quad (6)$$

In this example, we see that we can drop the flow on the “healthy” pump down to 33.3% of the BEP flow before a shutoff flow conditions is experienced.

**Example 3.** Finally, let’s assume that one of the pumps is 100% healthy and the sister pump has degraded to the point where it is producing only 95% of its original head. After doing some research, you find that the ratio of the head at BEP and shutoff head ( $H_{BEP}/H_{SO}$ ) is 0.7. The reader will notice that the  $Q_{SO}/Q_{BEP}$  ratio is much lower in this example, which means that this pump curve has a higher head rise to shutoff. If we plug this information into the  $Q_{SO}/Q_{BEP}$  equation we get:

$$\frac{Q_{SO}}{Q_{BEP}} = \frac{(0.95 - 1)}{(0.75 - 1)} = 0.20 \quad (7)$$

Notice that when there is a larger head to rise to shutoff, a lower “healthy” pump flow can be tolerated before a shutoff condition is reached. The converse to this statement is that pumps with flat head-flow curves are much more sensitive to flow imbalance when internal wear occurs.

## Recommendations

When multiple pumps are run in parallel, there is a very real likelihood of experiencing imbalanced flows during the course of their operation. Pump manufacturing differences, internal pump wear, large swings in process conditions, internal pluggage and asymmetrical piping designs can all contribute to unbalanced pump flows. No matter how hard you try, there will always be a possibility that a laggard pump could one day crash if performance degradation goes unnoticed before a shut-in condition occurs.



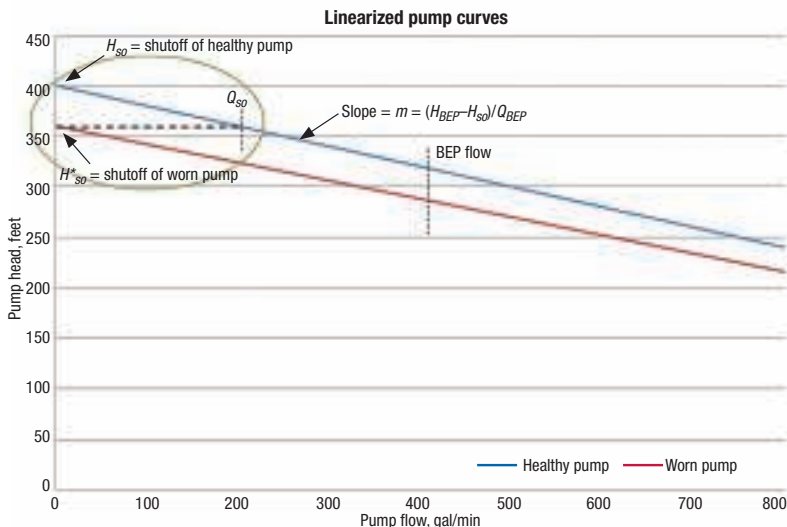
**FIGURE 6.** Centrifugal pump failures are often caused by pump users attempting to operate pumps in parallel without the proper equipment review, procedural review or instrumentation

The safest philosophy is to assume there will always be some level of pump flow imbalance, so operators should continuously monitor individual pump flows as a means of avoiding catastrophic low-flow conditions.

Here are some guidelines for designing parallel pump installations:

- Always try to install parallel pumps with similar head-flow characteristics. Running dissimilar pumps in parallel is asking for trouble

- Ensure that the associated pump piping is symmetrical so that flows are better balanced
- Never operate pumps in parallel that were not designed for such operation
- Parallel pumps should have dedicated flowmeters installed on each pump. Flowmeters installed to measure the total pump flow in parallel applications are useful for process control, but can mislead you into thinking that everything is



**FIGURE 5.** The “pump-shutoff triangle” is constructed using the linearized curve for the “healthy” centrifugal pump, the linearized pump curve for the “worn” pump and the ordinate

normal. Each pump needs to have a healthy flow at all times

- Use flowmeters to provide low-flow shutdowns on each pump for protection. As a general rule of thumb, shutdowns can be set at about 30% of BEP flow
- Install flow-imbalance alarms on each pump to provide alerts about flow differences. Activate an alarm whenever a flow difference of greater than 10% between individual pump flows occurs
- Set low-flow alarms on each pump at 40 to 50% of BEP flow
- Designate one pump as the lead pump and one as the lagging pump, so that if flows are essentially equal and total flow drops for some reason, the lagging pump will be shut down and the lead pump will continue running
- Don't be talked into using power meters or current meters to indicate flow. The relationship between power and flow varies based on the pump's hydraulic design and may not provide an

accurate indication of flow

- In variable-frequency drive (VFD) installations, always operate all of the pumps running in parallel at the same speed to ensure that they are generating approximately the same head
- A PLC (programmable logic controller) can be used to switch pumps off and on based on the current process demand, or to alert operators when pumps should be started or shut down based on the process requirements

The thoughtful design and careful installation of a parallel pumping system (Figure 6) will greatly increase the chances of reliable operation for years. Remember to train operators to treat parallel pumps with extra care and to keep an eye out for signs of early trouble, such as increased vibration or pressure pulsation levels. Plant personnel are the eyes and ears of your organization. ■

*Edited by Suzanne Shelley*

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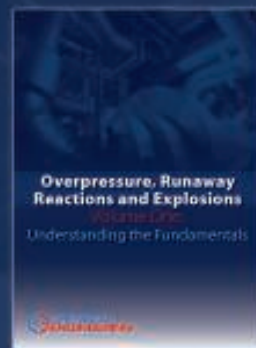
# Overpressure, Runaway Reactions and Explosions

## Volume: 1

## Understanding the Fundamentals

This Chemical Engineering guidebook contains dozens of practical, how-to engineering articles to better help you do your job. It addresses engineering challenges and solutions related to the prevention of overpressure situations, runaway reactions, plant upsets and potentially explosive operating conditions.

These tutorial-style articles focus on monitoring pressure in the chemical process environment, selecting and operating pressure-relief valves. Also provided are engineering recommendations for safely handling and storing reactive chemicals, and the design and operation of explosion-protection devices and systems.





## Process Plant Layout — Becoming a Lost Art?

Plant layout is as important a part of process plant design as it ever was, but it is rarely taught as part of chemical engineering courses

**Seán Moran**  
Expertise Ltd.

While process plant layout is a critical aspect of chemical process industries (CPI) operations, the majority of the seminal works in this area have been published in trade journals [1–10] or classic texts such as Perry's Handbook [11]. Too often, process plant layout is covered in only a cursory fashion in the engineering curricula; as a result, much of the knowledge of how to lay out process plants resides in the heads of engineers who are nearing the end of their careers. This article was developed from a recently updated book on process plant layout by the author [12].

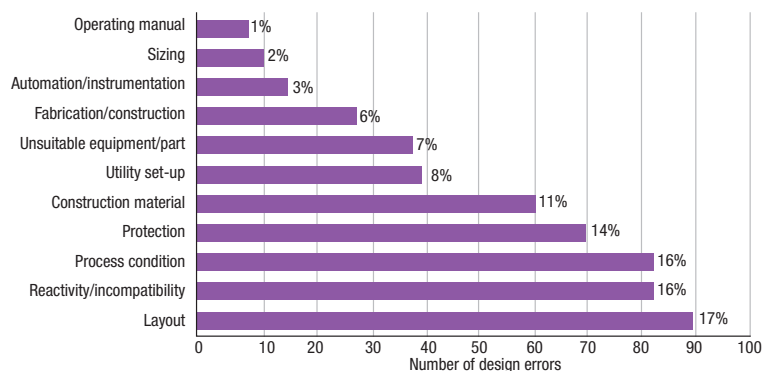
Good plant layout is as important as ever today. A recent study by Kidam and Herme [13] showed that 79% of process plant accidents involved a design error, and the most common type of design error leading to accidents was poor layout, as shown in Figure 1.

This article reviews the common terms and discusses the basic methodology for sound plant layout.

### What is layout design?

The discipline of layout design refers to that part of process-plant design that determines how the equipment and supporting structures needed for a process — along with their interconnection by means of pipes, ducts, conveyors, vehicles, wired or wireless connections — are to be laid out. Layout designers have to satisfy several key criteria to ensure that their designs do the following:

- Ensure reliable and safe plant operation
- Provide safe and convenient access for maintenance of items, and for the removal or in situ repair of components or process equipment
- Ensure acceptable levels of hazard



**FIGURE 1.** In this study of design errors that occur most often in the CPI, plant layout emerges as the most prominent factor to blame (Reprinted with permission from [14])

and nuisance to the public

- Provide adequate levels of security to protect against the risk of crime, vandalism and, potentially, terrorism
- Facilitate safe and efficient construction
- Realize effective, economical and ergonomic use of space
- Demonstrate compliance with local planning regulations regarding aesthetics
- Ensure compliance with U.S. Environmental Protection Agency (EPA) or equivalent requirements
- Demonstrate compliance with any other relevant codes and standards
- Guarantee that the supply of services to the plant and access to the periphery of the plant for maintenance, construction and emergency services are supported by the location and layout of the site

On a new “greenfield” site, the layout design will need to reflect the known needs of the process plant or process units to be constructed. Alternatively, a plant may be placed on a number of plots on an existing “brownfield” site.

In the latter case, it is a common scenario that requirements of the newer plant may not have been foreseen at the time of the original site layout. As a result, at least some of

the access arrangements that would normally be provided on a new site will have to be provided *post hoc* by the layout designers. Existing access arrangements may need to be re-considered to suit the evolving inter-relationships between the existing site and the new plant or equipment.

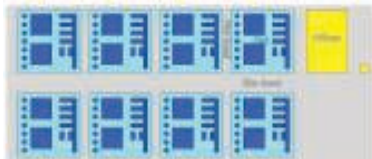
### Site, plot and equipment layout

There is widespread disagreement about what the terms site, plot and equipment mean. This article attempts to standardize the description and use of these terms to avoid confusion, following the naming convention set forth in Ref. 12.

In a brownfield situation, layout designers have to consider three separate things:

- **Site layout** — How plots relate to each other within the overall site, and with other activities outside the site
- **Plot layout** — The consideration of how process units relate to each other's disposition within a plot
- **Equipment layout** — The consideration of the arrangement of process units and associated or attendant items around a process unit

This article, and the book on which it is based [12], do not use the term



**FIGURE 2.** This figure illustrates, in simplified form, a process production facility or “site” (A site, depicted here by the grey box, is defined as “... bounded land within which a process plant sits”). A site may contain a number of process plants (which themselves may occupy several plots, each of which typically contain many types of equipment), as well as non-process plant and buildings

“plant layout” for any of these activities, as it is loosely used to describe several of them individually and several combinations of them. Rather, we define a “plant” as being the whole collection of equipment necessary to make a product.

In traditional chemical process plants, an ideal site would be split up into individual plots by its principal road system, with additional access roads provided for the larger plots. However, in many sectors, plants may not be big enough to have such a road system. A complete set of individual process units (known as a plant) may fit onto a single plot, although larger plants may need two or more plots, and a site may contain a number of plots.

**Process plant (or more simply plant).** A process plant is defined as “a complete set of process units and direct supporting infrastructure required to provide a total operational function to produce a product or products...”

**Plot layout.** Plants may be arranged across a number of plots, to include “an area of a site most commonly defined as being bounded by the road system...” Plots are shown in aqua in Figure 2. (Note: The term plant is sometimes used by practitioners synonymously with plot, reflecting the reasonably common occurrence where a plant occupies a single plot.)

**Piping layout.** Within the discipline of layout design, a distinction is commonly made between piping layout (defined as “the layout of piping and associated support systems...”) and equipment layout (defined as “layout at the level of a single process unit and associated ancillaries”). Both of these disciplines are often referred to colloquially as plant layout.

Initially, plot layout involves mainly equipment layout, and piping layout

comes in later, at the detailed design stage. Plot layout often occurs in the context of a “masterplan,” that aims to define the site’s overall design intent, especially if architects are involved. In such cases, it may be important to follow the architect’s approach to site and operational layout through the use of masterplanning (an approach outlined in Ref. 12, Appendix E).

### How to lay out process plants

One can identify six broad layout philosophies (the first one is less formal, and the other five are based on more formal methodologies):

- **Intuition based on experience.** Using this approach, an experienced plant layout designer simply permutes and combines configurations that have been used successfully in the past, analyzing and evaluating the resulting combinations
- **Economic optimization.** Such efforts typically aim to minimize distances traveled by materials; this approach is particularly well suited to be incorporated into software. This approach also clearly relates to the first approach
- **Critical examination.** This approach, similar to HAZOP, was recommended by Mecklenburgh [14] but never taken up by practitioners. It might, however, have value in academic settings
- **Rating** — Rating approaches assign values to equipment, plots and so on, from the point of view of interconnectedness, various hazards and more, in order to allow grouping and separation relationships to be generated
- **Mathematical modeling.** There are a number of academic approaches based on this, but they are currently at an early stage of development
- **Software-based approaches.** Modern 3-D CAD software often includes programs to develop a rough layout of pipework once the equipment location is specified

For any given project, several of these approaches are often combined in various ways in different sectors, and such combinations vary among layout designers of different disciplines.

A formal technique is any logical method that provides definitive in-

formation on relationships between items or numerical data on spacing distances. It must be based on a procedure that is adequately defined and recorded and can be examined and criticized.

Before starting a layout, the relevant information should ideally be assembled. Such information typically includes process and site data, regulatory and contract requirements, company and other recognized codes of practice. Often, not all such data are available at the start of a project. To avoid delays and to provide a starting point, it is useful to have information on typical spacings. However, it is emphasized that such spacings are rough and must be confirmed or replaced later by the proper project data or design.

A first layout is almost always based on process flow. Intuition drawn from experience indicates that such a layout is basically a good one and can be altered successfully to accommodate the specific requirements of operation, maintenance and safety. The intuition (and experience) of the engineering design team usually indicates immediately what the principal alterations to this default case should be. Thereafter, the formalized methods shown in the bulleted list above should be used to finetune and improve the preliminary design that was put together based on the initial intuitive approach.

Historically, formal layout methods, mainly developed within the CPI, have tended toward optimization for minimum capital cost. However, the impetus for developing formal layout methods was generated by the changing attitude of society toward the CPI, and to the consequences of accidents in CPI operations.

Although safety has always been a major constraint in plant layout, its most visible effect on the layout was typically related to relatively simple rules for spacing and electrical zoning in accordance with codes of practice. The adoption of more dangerous processes, the increasing scale of plants and associated chemical storage, and the shortage of skilled staff, coupled with greater public concern, have required companies to be able to justify the reasons for selection of a given layout to a far greater extent than was necessary in the past. Today, engineering teams

are required to develop and maintain records of potential problems, alternatives that were considered (with supporting data) to justify design decisions to satisfy prevailing legislation and to support a legal defense in the event that problems arise later.

There are still very few formal layout techniques available to the designer, and none can completely replace the designer's abilities either to conceive new solutions or to evaluate alternatives. As with all engineering, plants built without experience and intuition are "bad plants." The intuitive approach is tested and corrected as the result of using other formal techniques along with more experience. Computer-aided techniques can supplement but not replace engineering by experts.

Formal techniques reported appear to aim at one or more of three main objectives:

- a. Generation of spatial relationships between items
- b. Specification of distances between items
- c. Comparison of alternative layouts by numerate rational examination

When used to supplement or verify the designer's experience, the formal techniques available today are able to improve the layout and provide rational justification of layout decisions.

Ref. 12 discusses ten formal approaches to plant layout that are widely followed by chemical engineers, piping designers and process architects in different CPI sectors. The approach discussed below is a modified Mecklenburgh method [15], adapted from that given by Mecklenburgh in the first edition Ref. 14.

When considering a greenfield site, the development typically follows this sequence (each of the steps is described briefly below):

- Preliminary plot layout (Steps 1–9)
- Preliminary site layout (Steps 10–15)
- Design sanction, possible site purchase
- Detailed site layout (Steps 16–17)
- Detailed plot layout (Steps 18–19)

However, existing brownfield sites (with their pre-existing conditions) will impose particular constraints, so some of the following site-layout steps may not be needed.

The layout methods described below suggest a highly formalized, structured, rigorous and frankly,

expensive process. The version of the layout process suggested here is typically only appropriate to the largest process plants. Professional judgment is required to understand how much of this approach is appropriate, given the site-specific requirements and constraints of the project being considered.

### Preliminary plot layout

**Step 1. Plot data.** The data needed at this step include preliminary process flow diagrams (PFDs) and piping and instrumentation diagrams (P&IDs), which must show the size of major pipework and suggested elevations of major equipment), process engineering design for the equipment (such as size and shape), the results of preliminary hazard assessments of the flowsheet, and the codes of practice to be followed in the plant design.

**Step 2. Plot layout.** The layout is made using the data gathered in Step 1, in the sequence of the process flow using the experience of the engineer to recognize constraints, such as major piping and cabling. Typical layout spacings (described in Ref. 12, Appendix C) are useful at this stage. Simple drawings and cutouts are typically employed.

**Step 3. Elevation.** The elevation assumptions in the flowsheet should be questioned. This enables the process objectives and constraints on elevation to be defined. Various alternative elevation arrangements are generated, possibly by using formal techniques, such as travel and correlation charts.

The cost of each potential elevation alternative is examined, primarily for differences between, for example, the number of plant items needed to achieve the objective, or differences in the material-transfer costs, such as piping, pumping required to elevate items and power consumption.

Simple elevation drawings can be prepared showing only heights and relative positions of items, but structure and floor levels are not introduced at this point.

**Step 4. Plot plan.** Plant items, buildings and principal pipe and cable runs are laid out in a plan, to ensure that the obvious layout constraints (operation, maintenance, construction, environmental, safety and drainage areas) are accommodated. Cutouts

are helpful at this stage. A cost assessment is made of each competing arrangement being considered. The more promising arrangements may be optimized to produce even more economical layouts.

**Step 5. Plot buildings.** Housing CPI plants inside buildings is more expensive than having plants in the open, even for plants on elevated structures. The need for enclosed buildings specified in the process design should therefore be examined critically.

**Step 6. Plot layout.** The selected plan and elevation layouts are now combined with building studies to determine possible positions of support and access structures, and to study civil requirements (such as foundations). These may force relaxation of earlier constraints. The layout alternatives are usually presented as 2-D drawings, though 3-D computer models may also be used (Figure 3).

These models will help both the layout designer and other disciplines to visualize functional and safety aspects. Consequently, it is useful at this stage to have brief and mainly intuitive reviews of the layout be carried out by the various disciplines.

Cost evaluations are carried out again or finetuned for the acceptable layouts and a short list of particular layout arrangements is developed and recorded as plot plans (ideally just one selection is chosen, but in some cases, competing options are still on the short list).

**Step 7. Hazard assessment of plot layout.** Areas within the plot where loss of containment can occur must be identified, and the amount of materials that could potentially be lost must be quantified by analyzing various potential hazard scenarios. The consequences of each loss with respect to explosion, fire or toxicity should be calculated.

Within the plant, these calculations will indicate separation distances between potential sources of ignition and sources of leaks and will specify the various hazard zones for electrical equipment and fired equipment. The safe positioning and protection of control rooms will also be calculated. These calculations are also essential to assess and predict the potential losses that could occur at various distances outside the plot,



with regard to the danger to people, equipment and buildings from fire, explosion and toxicity. The layout may well have to be adjusted.

The Mond Index method [15] may be used prior to (but not instead of) the above assessments.

**Step 8. Layout of piping and other connections.** The principal piping and pipe routes are confirmed during this step. Principal electrical mains routes are also checked. Various connecting arrangements are considered and the most promising ones are further optimized. Piping models can be used as aids and computerized versions can be used to support optimization efforts. The best layout arrangement should now be selected and recorded.

**Step 9. Critical examination of plot layout.** The proposed arrangement should satisfy all of the obvious requirements in light of all the information available. It should be examined formally by the various disciplines to make sure less obvious features (discussed below) have not been omitted.

Specific aspects to examine include:

- Ease of operation
- Ease of maintenance
- Ease of construction
- Ease of commissioning
- Ease of escape and firefighting
- Safety of operators and other personnel during construction, commissioning, operation and maintenance
- Environmental impact
- Future expansion

3-D models can be good aids to the review process, though they are expensive to produce. Check lists to assist with this process can be found in Ref. 12.

The results of the critical examinations carried out by the various disciplines, and the results of the hazard assessment, must be reconciled. Carrying out such a multi-disciplinary consultation is essential.

In some cases, it may be found that the layout is impractical or even impossible. When this occurs, it will be necessary to rethink the process design or even undertake further laboratory and other development work. In most cases, though, the results of the critical examination will mean adjusting the layout by means of further iteration from Step 2 onward.



FIGURE 3. The output of a typical 3-D plant layout model is shown here. This model of a solids-handling facility was produced using CADWorx from Intergraph

### Preliminary site layout

**Step 10. Site data.** Steps 1–9 will be carried out for each separate plant and storage area within the proposed site. This will provide the size and shape of each plot, will help to define access requirements (for vehicles and people during construction, operation, maintenance and emergencies), and will provide an approximate evaluation of the separation needed around each plant to ensure proper hazard containment.

Using the process data of the various plants, the layout engineer should compile information related to the site materials and utilities PFDs, pedestrian and vehicular traffic capacities (for both internal and external movements), size and shape of the plots, buildings, and required utilities, central services and amenities.

**Step 11. Site layout.** The PFD for the site allows the various processes to be positioned relative to one another. The flow pattern may be modified in order to isolate hazardous processes and to accommodate the proposed rail and road entry points or wharf positions.

Next, services, such as the boiler house and effluent plant, are added in the most convenient positions, subject to the provision that they are not likely to be put out of action by a disaster. The central buildings are placed so that the distances traveled by personnel who use them are minimized, providing that these buildings are in safe places.

After this, the road and rail sys-

tems are marked in greater detail. Try to keep the various types of traffic segregated as far as is possible and desirable. There should be access from at least two directions to all parts of the site, to allow for emergencies, as shown in in Figure 4.

The size of the site is determined from the area of individual plants, storage areas and central buildings plus the clearances between the plants. It is also necessary to allow ample space for things like parking, loading and unloading, stores and firefighting water storage. Typical clearances, size and areas are given in Ref. 12. During the development of this layout, allowance must be made for future plant expansion and for general construction and other access considerations.

It is essential to establish, within the overall layout, all the important positional relationships between elements of the layout that must be maintained. This consideration is crucial because available sites may not conform in shape or topography to the preliminary layout and some compromises and amendments to the layout are almost certain to be needed. In light of this, it must be known which relationships can be relaxed to fit the plant in the available space.

Simple drawings and paper cut-outs are very useful for site-layout development. Physical and 3-D computer models may also be used especially to gauge the visual impact.

**Step 12. Hazard assessment of site layout.** The plots on the site

where loss of containment can possibly occur are noted. Vulnerable parts of the site are listed, such as offices, central utilities, key commercial plants and the site boundary (representing the start of the public domain).

The consequences of each loss through fire, explosion or toxicity on the vulnerable items are calculated. The layout is adjusted so that the consequences become acceptable; in particular, the chance of escalation of an occurrence throughout the site (via the "domino effect") is made less likely. Ref. 12 goes into further detail on this topic.

#### **Step 13. Site-layout optimization.**

When there are feasible alternative arrangements, cost estimations should be developed for each with respect to transport and piping connections between the various plots and so on. The most economical layout can then be subject to further optimization of the plot spacings, subject to the hazard constraints.

#### **Step 14. Critical examination of site layout.**

The proposed site plan should ideally be examined critically by the various disciplines first separately and then together. Points to review include the following:

- Containment of hazards and safety of employees and public
- Emergencies
- Transport and piping systems
- Access for construction and maintenance
- Environmental impact, including drift of airborne effluents and discharge of liquid effluents
- Future expansion

Additional points are included in the checklist in Ref. 12. In the worst case, it may become obvious during the review that one or more of the proposed plants is unacceptable, but in most cases, the review will result in adjustments to the site layout, iterating from Step 11 onward.

#### **Step 15. Site selection.**

- The results of site layout will be:
- a. The size and shape of the site
  - b. The pipeline, road, rail and water access needed to the site
  - c. Necessary hazard-separation distances around the site
  - d. Position of the various structures and their foundation loading

These factors, plus the others outlined in Ref. 12, will guide the selection of a suitable site.

### **Detailed site layout**

**Step 16. Site data.** No site will be ideal, however much care is taken in its selection. So after site purchase, the engineer has to adjust the layout to the constraints of the site and it is important that these are clearly established. They could include:

- a. Site topographical details referring to:
  - The load-bearing ability of the soil and subsurface conditions
  - Site grading and drainage features
- b. The atmospheric conditions with regard to:
  - Extremes of weather, which may make it desirable to provide special shelter or protection for equipment or operators
  - Prevailing wind direction for consideration when locating intake or exhaust stacks, or furnaces up- or downwind in relation to the remainder of the plant. Also sand, sea-spray and leaves can be blown by the wind onto a plant
- c. Environmental conditions relating to adjacent properties, such as residential property or public places, neighbors' hazardous or vibratory operations, roads, railways, airfields or rivers
- d. Site boundary and service parameters for normal and emergency conditions, such as access from public roads, waterways and rail systems, sewers, water supplies, power supplies, pipe trenches, drains, public paths and rights of way
- e. Legal requirements, such as planning and building laws and by-laws, requirements for dealing with effluent pollution and noise, traffic regulations, fire, insurance and other safety requirements

The following items should be based on the owner's and national standards and codes of practice:

- Road width, radii and gradients
- Service corridors
- Pipe-bridge heights over roads, railways and pipe-trenches
- Building lines
- Architectural finish to buildings

It is likely that while the site is being selected and purchased, further process and engineering design and market research work has been undertaken on the individual plants and their products. The plot layouts

could have been updated and the further information, relevant to the site layout, made available.

**Site 17. Site layout.** Steps 11–14 should be repeated, but in greater detail and subject to the constraints of the selected site. Possible layout changes to the original plan could be caused by the following:

- The desirability of placing a heavy plant on good load-bearing soil
- The position of road, rail and service access points
- The need to put hazardous plants away from public places, such as schools, and to take note of neighboring hazards
- The desirability to have a good environmental impact (as described in Section 3.8 of Ref. 12)
- Planning restrictions

The hazard assessment can now take account of known vulnerable features outside the site boundary. The critical examination will, in addition to the items given in Step 14, also check that site constraints and standards have not been violated. Extensive consultation will be made with the various regulatory and emergency authorities during the detailed layout stage.

The final site plan will show the roads, railways, site pipe routes, sewers, central buildings and services. It will ideally be produced in the form of, and with the aid of, detailed drawings and possibly models, whether computer, manual or both.

### **Detailed plot layout**

**Step 18. Plot layout data.** The detailed plot layout information includes the following:

- a. Standards, in particular:
  - Owner's basic practices and standards
  - National and international codes of practice, standards, specifications and regulations
  - Contractor's standards where the above are not available
- b. The detailed site information given in Step 16, which could impinge on plot layout
- c. Site plans and details giving the features that might influence the plot layout
  - Location and relationship of roads and railways surrounding the plot and estimates of traffic that might interact with the plot's loading and unloading facilities



FIGURE 4. This site layout model, produced using CADWorx from Intergraph, shows piped, road and rail links

- Steam, water, sewage disposal, and other services, particularly the terminal points relating to the plot
  - Raw material and product pipeline terminals
  - Sources of atmospheric pollution that might affect the process operators or maintenance staff
- d. The detailed process engineering design, which contains:
- P&IDs indicating (with identification codes) the process equipment and instrument requirements and showing the pipeline connections
  - PFDs showing the flows and composition of each stream
  - Line schedules giving each pipe its size, specification and the temperature and pressure conditions
  - Equipment schedules and drawings providing the specification of each item together with its plant size, register number, critical dimensions, process power requirements, process and utility nozzle connections and flows, materials of construction, process conditions, operation and maintenance requirements
  - Process design datasheets containing the process design data, philosophy and calculations and indicating any process layout requirements
  - The results of the hazard and

operability studies of the process design

- The drawing conceived in Steps 1–9

**Step 19. Plot layout.** Most of the initial steps, particularly Step 4, and 6–9 are repeated in greater detail and subjected to the site constraints given in Step 18.

It is important that, in repeating Step 6, there is good coordination between the layout, process, operating, piping, civil, structural and mechanical disciplines. The piping arrangement studies (repeat of Step 8) done here are discussed in more detail in Ref. 12.

The hazard reassessment (Step 9) will be mainly concerned with internal plant spacings, such as area hazard classification zones and control room and other plant building positions. Inter-plot spacings are considered in hazard assessment of the site layout. The repeat of the critical examination should (as well as considering the aspects given in Step 9) also see that standards, regulations and site constraints on the plot have not been violated.

### Hazard assessment

Increasingly, regulatory authorities will require a combined hazard assessment of the site and plot layouts after both have been tentatively finalized. Some existing activities will be required to submit hazard assessments. These include the following:

- Interactions between items within the plot
- Interactions between plots within the site
- Interactions between the site and its surroundings

The approach discussed here is a formalized summary of the steps that are typically taken by chemical engineers on large or dangerous plants. Less formal approaches are more commonly used in practice, however, for reasons of economy and practicality. Critical examination in particular is a resource-hungry exercise. ■

*Edited by Suzanne Shelley*

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**buyers guide** corporate capabilities

# Exotherm Corporation

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## UNIFLUX/EXOTHERM

Exotherm Corporation is a leader in providing custom designed fired heaters to the chemical processing and oil and gas processing industries.



### CONVECTION HEAT TRANSFER

Exotherm's Uniflux Convection Heater was developed fifty years ago to overcome the problems of overheating and degrading heat

sensitive process fluids that customers experienced with their existing fired heaters.

The Uniflux Convection Heater is custom designed for processes requiring 100,000 to 70,000,000 Btu/hr absorbed duty. The heater is designed to utilize the circulation of high velocity exhaust gases around the process tubes to produce convective heat transfer. This heat transfer is uniform around the periphery of the process tubes. The result is lower tube wall and film temperatures compared with the radiant heat transfer method used in most heaters.

### NO FLAME IMPINGEMENT

The high velocity Uniflux burner has a very short flame extension, preventing flame impingement on the process tubes. This in turn reduces tube failure and coking.

### EFFICIENCY

The forced draft burner operates at very low excess air. This feature allows the Uniflux Convection Heater to operate at higher efficiencies than can be achieved with conventional radiant, natural draft heaters. Uniflux Convection Heaters equipped with process pre-heat economizers can achieve efficiencies as high as 95% for some processes, and the forced draft design allows the Uniflux heater to maintain the efficiency over the entire operating range.



### TURNDOWN

The normal turndown ratio of the Uniflux Convection Heater is 10:1. Turndown ratios of 40:1 can be achieved with custom designed burner controls.



### SAFETY AND RELIABILITY

Each Uniflux Convection Heater is equipped with a field proven burner management system and safety controls. The heater and all of its controls are completely shop assembled. The control system is tested at the factory to ensure safe and reliable operation when installed.

### LOWER INSTALLATION COSTS

The Uniflux Convection Heater is designed as a package and is completely assembled at the factory. Smaller heaters are shipped as a complete package. Larger heaters are disassembled into three major components. This makes installation easy and less costly.

### FIELD SERVICE

Qualified, experienced technicians are available to assist the customer with start-up, operator training, preventative maintenance programs and trouble shooting.

### APPLICATIONS

Uniflux Convection Heaters are used worldwide in numerous industries for a variety of heating applications. A few are listed below:

- Heat Transfer Fluids
- Cryogenic fluids
- LNG Liquefaction & Vaporization
- Regeneration Gas
- Crude Oil
- Natural Gas Processing
- Glycol-water
- Emulsions
- Offshore Production Processing
- Air & Nitrogen
- Vaporizers
- Specialty Chemical Processes



### OTHER PRODUCTS

Exotherm Forced Draft Water Bath Heaters, Q-PAK Direct Fired Air Heaters, and Heat Media Circulation Systems.

# Paharpur Cooling Towers Ltd.

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In a world of water shortage and an increasing awareness of water problems, Paharpur has grown from a small lumber saw mill to one of the largest cooling tower manufacturers in the world.

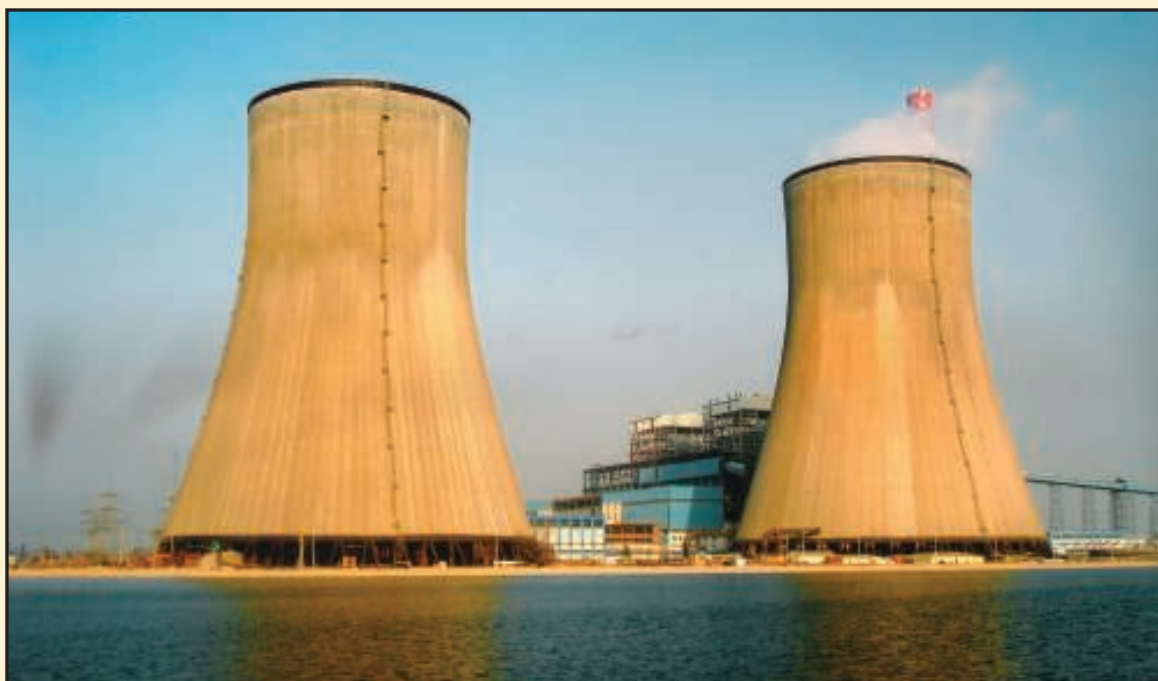
There are few problems Paharpur cannot solve related to the cooling of water or other liquids. We have a first class Research and Development centre which has consistently produced innovative concepts that have now become industry standards. All components or materials are carefully selected and tested under the adverse conditions applicable in operation. Our engineering and production standards often exceed general



standards, the objective being to supply a prime quality product which will provide low cost and reliable service to our customers over many years.

Major industries such as electricity generating, petroleum refining, chemical processing, sugar, air-conditioning and refrigeration, steel and so on use a vast assortment of cooling towers and air cooled heat exchangers. Whether you wish to cool the centralized air-conditioning plant of your building, dissipate heat from your processing plant or cool the water in your industrial complex, we at Paharpur are at your service.

No matter where you go, Paharpur is on the job to help keep you more comfortable.....to keep plants running profitably..





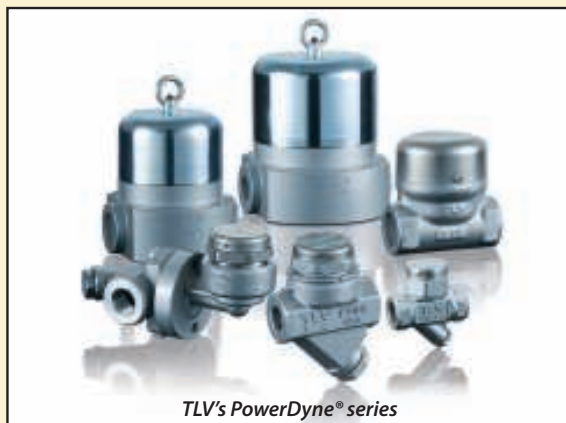
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Since its debut in 1950 with the first "Trouble-Less Valve", TLV has continued to provide industry leading advancements in steam control technology. Today, TLV is a global company offering a broad range of high performance products which deliver extended service life and improved energy efficiency. Manufacturer TLV CO., LTD. Kakogawa, Japan, is approved to ISO 9001 and ISO 14001 standards.



TLV's PowerDyne<sup>®</sup> series

**GREATER SIMPLICITY = HIGHER RELIABILITY**

**Buying TLV traps and related products means getting longer service life.** Our design philosophy is to reduce the number of moving parts, thereby improving reliability. This principle is demonstrated in both our Free Float<sup>®</sup> and PowerDyne<sup>®</sup> traps.

TLV introduced the **Free Float<sup>®</sup>** concept to the steam industry over 45 years ago. Unlike other designs, there are no levers or linkages. The balanced float itself is the only moving part and can achieve a nearly perfect sphericity, creating an unmatched sealing performance. **PowerDyne<sup>®</sup>** disc traps include an air vent developed and patented by TLV to enable mirror-finish surfaces. The result is that both series provide exceptional energy efficiency.

TLV Free Float<sup>®</sup> and PowerDyne<sup>®</sup> traps are designed for severe service operation. Even at high pressures and temperatures, they provide excellent durability and resistance to water hammer and superheat, ensuring long and reliable operation.

**STEAM SYSTEM MANAGEMENT**

TLV offers technical assistance, on-site service, and training to help customers optimize the performance of their steam systems. We also offer diagnostic tools you can use to help ensure proper management of the steam trap population. Such system capabilities help maximize productivity, extend reliability, improve energy efficiency, and fulfill safety/environment requirements.

**The TrapMan<sup>®</sup> Steam Trap Management System** includes the TM5N portable data collection and measurement unit and Windows<sup>®</sup>-based TrapManager<sup>®</sup> software, which is loaded on a personal computer. The TM5N captures both ultrasound and contact temperature measurements from traps at the site. When uploaded to a PC, TrapManager<sup>®</sup> analyzes the data and makes an automatic judgment of the trap's condition, highlighting steam traps that require attention. TrapManager<sup>®</sup> provides detailed printed reports including trap logs, histories, and results analysis to effect optimal maintenance budget allocation.

**SERVICES**

**TLV also offers Consulting & Engineering Services.** CES engineers, who are certified AEE energy managers and DOE steam system specialists, can provide process recommendations and fully-piped packaged solutions for improving your new or existing steam system. CES services can provide a full steam and condensate balance to enable effective short and mid-term planning.

TLV believes that true customer satisfaction can only be obtained by finding solutions to the various challenges encountered while running businesses and operating steam plants. TLV Consulting & Engineering Services is designed to find the best solutions to increase productivity, maximize energy savings, improve quality and promote environmental conservation. CES activities are the embodiment of a complete customer satisfaction philosophy.

3

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**BELTRAN TECHNOLOGIES, INC, 1133 East 35 Street, Brooklyn, NY 11210 (718-338-3311; FAX: 718-253-9028; e-mail: info@beltran-technologies.com; web site: www.beltran-technologies.com)**

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Bepex International LLC, 333 N.E. Taft St., Minneapolis, MN 55413-2810 (800-607-2470; 612-331-4370; FAX: 612-627-1444; e-mail: info@bepex.com; web site: www.bepex.com)

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IL, Berndorf Bell Technology Inc., 59 Prairie Parkway, Gilberts 60136 ((1) 800-393-8450)

International, Berndorf Band Engineering GmbH, Berndorf, 0, AUT (+43 2672 800-0)

beroplan GmbH Membran- und Prozesstechnik, Zur Schnapphahner Dell 8a, St. Ingbert 66386 (+49 49 6894 8950600; FAX: +49 6894 8950601; e-mail: info@beroplan.de; web site: www.beroplan.de)

Berthold Technologies GmbH & Co.KG, Calmbacher Str. 22, Bad Wildbad 75323 ((+49) 7081 177 0; FAX: (+49) 7081 177 100; e-mail: info@berthold.com; web site: www.berthold.com)

BEST, ORAN, DZA 31000 (e-mail: obenami1985@yahoo.fr)

**BETE Fog Nozzle Inc., 50 Greenfield St, Greenfield, MA 01301 (800-235-0049; 413-772-0846; FAX: 413-772-6729; e-mail: sales@bete.com; web site: www.bete.com)**

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BHS-Sonthofen Inc., 14300 South Lakes Drive, Charlotte, NC 28273 (704-845-1190; FAX: 704-845-1902; e-mail: info@bhs-filtration.com; web site: www.bhs-filtration.com)

Biazzi SA, 25 ch de la Tavallaz, P.O. Box 84, Chailly/Montreux, 01816 (41-21-989-2121; FAX: 41-21-989-2120; e-mail: cw@biazzi.com; web site: www.biazzi.com)

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Bioengineering AG, Sagenrainstrasse 7, Wald, , CHE 8636 (41-55-256-81-11; FAX: 41-55-256-82-56; e-mail: info@bioengineering.ch; web site: www.bioengineering.ch)

Bioengineering Inc., 35 Medford Street, Suite 213, Somerville, MA 02143 (001 617 996 1212; FAX: 001 617 996 1213; e-mail: info@bioengineering-inc.com; web site: www.bioengineering-inc.com/www.bioengineering.ch)



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**BLACKHAWK TECHNOLOGY COMPANY, 21 W 211 Hill Avenue, Glen Elyn, IL 60137 (630-469-4916; FAX: 630-469-4896; e-mail: mbertane@blackhawkco.com; web site: www.blackhawkco.com)**

Blackmer, part of PSC, a Dover company, 1809 Century Ave. S.W., Grand Rapids, MI 49503 (616-241-1611; FAX: 616-241-3752; e-mail: blackmer@blackmer.com; web site: www.blackmer.com)

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BOERGER PUMPS, 2860 Water Tower Place, Chanhassen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)

Boerger Pumps Asia Pte. Ltd., 16 Boon Lay Way, #01-48 TradeHub21, Singapore 609965 (65-6562-9540; FAX: 65-6562-9542; e-mail: asia@boerger.com; web site: www.boerger.com)

Brabender Technologie GmbH & Co. KG, Kulturstrasse 55-73, Duisburg 47055 (+49 203 9984-0; FAX: +49 203 9984-155; e-mail: email@brabender-technologie.com; web site: www.brabender-technologie.com)

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Bronkhorst USA Inc., 57 S. Commerce Way, Suite 120, Bethlehem, Pennsylvania 18017 (610) 866-6750; FAX: (610) 866-9212; e-mail: sales@bronkhorstusa.com; web site: www.bronkhorstusa.com)

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IL, Brookfield AMETEK, Midwest Regional Office, Mt. Prospect 60056 (847-368-8472)

International, AMETEK GmbH, Lorch, Germany (49/7172/927100; FAX: 7172/927105)

International, AMETEK (GB) Limited, Harlow, Essex, England, 0, GBR (44/1279/451774; FAX: 44 1279/451775)

International, AMETEK Commercial Enterprise (Shanghai) Co., Ltd. Yuexiu District Guangzhou, 0, CHN (86 20/3760-0995; FAX: 86 20/3760-0548)

Bryan Steam LLC, 783 North Chili Avenue, Peru, IN 46970 (765-473-6651; FAX: 765-473-3074; e-mail: inquiry@bryansteam.com; web site: www.bryanboilers.com)

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Buchi Pilot Plant & Reactor systems, Headquarter, Gschwaderstrasse 12, Uster, New York, CHE 8610 (+41449055111; FAX: +41449055122; e-mail: r.zimmermann@buchiglas.com; web site: www.buchiglas.com)

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**Bungartz GmbH & Co. KG, Paul, Düsseldorf Straße 79, Düsseldorf, Germany 40455 (0049 211 57 79 05 -0; e-mail: pumpen@bungartz.de; web site: www.bungartz.de)**

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Burkert Fluid Control Systems, 2915 Whitehall Park Suite 650, Charlotte, NC 28273 (800-325-1405; 704-504-4440; FAX: 949-223-3198; e-mail: marketing-usa@burkert.com; web site: www.burkert-usa.com)

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Busch LLC, 516 Viking Dr., Virginia Beach, VA 23452 (800-USA-PUMP; 757-463-7800; FAX: 757-463-7407; e-mail: marketing@buschusa.com; web site: www.buschusa.com)

Buschjost GmbH, Detmolder Str. 256, Bad Oeynhausen 32545 (+49 5731 791-0; FAX: +49 5731 791-179; e-mail: mail@buschjost.de; web site: www.buschjost.com)

BUSS ChemTech AG BUSS ChemTech AG, Hohenrainstrasse 12A, Pratteln 1 CH-4133 (+41 (0)61 825 64 62; FAX: +41 (0)61 825 67 37; e-mail: info@buss-ct.com; web site: www.buss-ct.com)

**BUSS-SMS-CANZLER GMBH, Kaiserstr. 13-15, Butzbach, 35510 (49-6033-85-0; FAX: 49-6033-85-249; e-mail: info@sms-vt.com; web site: www.sms-vt.com)**

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International, Branch Office Pratteln, Hohenrainstr.10, Pratteln 4133 (+41 61 8256 869; FAX: +41 61 8256 766)



International, Branch Office Dueren, Am Langen Graben 7, Dueren 52353 (+49 2421 705 1; FAX: +49 2421 705 80)

Bustin Industrial Products, 401 Oak St, East Stroudsburg, PA 18201-1493 (800-933-5166; 570-424-6500; FAX: 570-424-6453; e-mail: slukas@bustin-usa.com; web site: www.bustin-usa.com)

Butterworth Inc., 16737 West Hardy Rd., Houston, TX 77060 (281.821.7300; FAX: 281.821.5550; e-mail: sales@butterworth.com; web site: www.butterworth.com)

**BUTTING GROUP, Gifhorner Straße 59, Knebeck, Germany 29379 (e-mail: mareike.wolter@butting.de) — See our ad on page 17**

BWB Technologies UK Ltd, Unit 8, The Galloway Centre, Hambridge Lane, Newbury RG14 5TL (800 608 9870; 441787273 451; FAX: 441787274 870; e-mail: sales@bwbtech.com; web site: www.bwbtech.com)

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**CASHCO, 607 W. 15th St., Ellsworth, KS 67439 (785-472-4461; e-mail: dimitya@cashco.com; web site: www.cashco.com)**

Cass Polymers, Inc., 311 NW 122 St, Oklahoma City, OK 73114 (405-755-8448; FAX: 405-755-8450; e-mail: casspolymers@casspolymers.com; web site: www.casspolymers.com)

Cat Pumps, 1681 94th Lane NE, Minneapolis, MN 55449 (763-780-5440; FAX: 763-780-2958; e-mail: info@cat-pumps.com; web site: www.catpumps.com)

Catalytic Products Intl. Inc., 980 Ensell Rd., Lake Zurich, IL 60047 (847-438-0334; FAX: 847-438-0944; e-mail: info@cpilink.com; web site: www.cpilink.com)

CB&I, 2103 Research Forest Drive, The Woodlands, TX 77380 (832-513-1000; FAX: 832-513-1005; e-mail: info@cbi.com; web site: www.CBI.com)

CECO Filters, a CECO Environmental Company, 700 Emlen Way, Telford, PA 18969 (800-220-8021; FAX: 610-825-3108; e-mail: sales@cecofilters.com; web site: www.cecofilters.com)

CEJN Industrial Corp., 212 Ambrogio Dr., Gurnee, Illinois 60031 (847-263-7200; FAX: 847-263-7207; e-mail: customer.service@cejnusa.com; web site: www.cejn.us)

CelesTech, Inc., 221 Kings Highway West, Haddonfield, NJ 08033 (e-mail: annakessler@celestech.com)

CellMark Deutschland GmbH, Chemicals, Hamborner Strasse 53, Duesseldorf, 0 40472 (0049-211-5238-0; e-mail: chemicals-europe@cellmark.com; web site: www.cellmark.com/our-divisions/cellmark-chemicals)

CG Thermal LLC, 8950 Dutton Drive, Twinsburg, Ohio 44087 ((330) 405-0844; FAX: (330) 487-0304; e-mail: gregb@cgthermal.com; web site: cgthermal.com)

**CHARLES ROSS & SON CO., 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com) — See our ad on page 9**

FL, Ross Mixing Inc., 1249 SE Industrial Blvd., Port St. Lucie 34952 (772 337 0900; FAX: 772 337 0911)

GA, Ross Engineering Inc., 32 Westgate Blvd., Savannah 31405 (912 238 3300; FAX: 912 238 5983)

NY, Ross Metal Fabricators Inc., 225 Marcus Blvd., Deer Park 11729 (631 586 7000; FAX: 631 586 7006)

International, Ross (Wuxi) Equipment Company Ltd., 20 Chunsun W.Rd., Xishan Industrial Park, Wuxi, 0, CHN 214101 (0510-88261225; FAX: 0510-88263400)

International, Ross Process Equipment Pvt. Ltd., Plot No. D- 233/3, Chakan Industrial Area, Phase II, Village- Bhamboli, Tal. Khed, Pune, 0, IND 410 501 (+91 2135 628400/1/02/03; FAX: +91 9595090311)

GA, Ross Systems & Controls (SysCon), 34 Westgate Blvd, Savannah 31405 (866-797-2660; 912-238-5800; FAX: 912-238-1905)

Chattanooga Boiler and Tank Co., 1011 E. Main St., P.O. Box 110, Chattanooga, TN 37401 (423-266-7118; FAX: 423-755-6708; e-mail: sales@cbtank.com; web site: www.cbtank.com)

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Chemical Information Services, 9101 LBJ Frwy, Suite 310, Dallas, Texas 75243 ((214) 349-6200; FAX: (214) 349-6286; e-mail: sales@chemicalinfo.com; web site: www.chemicalinfo.com)

Chemir, A Division of Evans Analytical Group, 2672 Metro Blvd., Maryland Heights, MO 63043 (800-659-7659, 314-261-6620; FAX: 314-291-6630; e-mail: info.chemir@eag.com; web site: www.chemir.com)

Chemline Plastics Limited, 55 Guardsman Road, CAN L3T 6L2 (e-mail: snagy@chemline.com)

Chemstations Europe GmbH, Lindencorso Unter den Linden 21, Berlin 10117 (+49) (0)30 20 200 600; FAX: +49 (0)30 2092 4200; e-mail: info@chemstations.eu; web site: www.chemstations.eu/)

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International, Chemstations Europe GmbH, Lindencorso, Unter den Linden 21, 10117, Berlin (49 30 20 200 600)

Chicago Blower Corp., 1675 Glen Elyn Rd., Glendale Heights, IL 60139 (630-858-2600; FAX: 630-858-7172; e-mail: fans@chicagoblower.com; web site: www.chicagoblower.com)

Chilworth Technology, Inc., 113 Campus Drive, N/A, Princeton, NJ 08540 (609-799-4449; 609-799-4449; FAX: 609-799-5559; e-mail: safety-usa@chilworthglobal.com; web site: www.chilworth.com)

Clean Air Engineering, 500 W. Wood St., Palatine, IL 60067 (800-627-0033; 847-991-3300; FAX: 847-991-3385; e-mail: contact@cleanair.com; web site: www.cleanair.com)

Clean Air Express Equipment, 500 W. Wood St., Palatine, IL 60067 (800-223-3977; 847-991-3611; FAX: 847-991-6577; e-mail: contact@cleanair.com; web site: www.cleanair.com)

Clean Air Instrument Rental, 500 W. Wood St., Palatine, IL 60067 (800-553-5511; 847-991-3300; FAX: 847-934-8260; e-mail: contact@cleanair.com; web site: www.cleanair.com)

Clean Harbors, 42 Longwater Drive, Norwell, MA 02061 (800-282-0058; 781-792-5000; FAX: 781-792-5938; e-mail: customerservice@cleanhARBORS.com; web site: www.cleanhARBORS.com)

Clearfield Machine Co., P.O. Box 992A, 520 South 3rd St., Clearfield, PA 16830 (814-765-6544; FAX: 814-765-4581; e-mail: info@clearfieldmachine.com; web site: www.clearfieldmachine.com)

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Coastal Technologies Inc., P.O. Box 624, Hampton, SC 29924 (803-943-4822; FAX: 803-943-4744; e-mail: sales@cti-sc.com; web site: www.coastaltechnologiesinc.com)

Cober, Inc., 30 Moffitt Street, Stratford, CT 06615 (203-855-8755 x332; FAX: 203-855-7511; e-mail: sales@cober.com; web site: www.cober.com)

Cobey, 1 Ship Canal Parkway, Buffalo, NY 14218 (716-362-9550; e-mail: quotes@cobey.com; web site: www.cobey.com)

Cole Chemical, 1500 S. Dairy Ashford Rd, Suite 450, Houston, TX 77077 (800-444-2171; 713-465-2653; FAX: 713-461-3462; e-mail: colechem@colechem.com; web site: www.colechem.com)

Cole-Parmer, 625 E. Bunker Ct., Vernon Hills, IL 60061 (800-323-4340; FAX: 847-247-2983; e-mail: info@coleparmer.com; web site: www.coleparmer.com)

**COLLINS INSTRUMENT CO INC., P.O. Box 938, Angleton, TX 77516 (979-849-8266; FAX: 979-848-0783; e-mail: cicc@collinsinst.com; web site: www.collinsinst.com/) — See our ad on page 33**

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, 0 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

Compressor Products International, 4410 Greenbriar Drive, Stafford, TX 77477 ((281) 207-4619; FAX: (281) 207-4612; e-mail: info@c-p-i.com; web site: www.c-p-i.com)

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Conbraco Industries, Inc., P.O. Box 247, Matthews, NC 28106 (704-847-6000; FAX: 704-841-6020; e-mail: www.apollovalves.com; web site: customerservice@conbraco.com)

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Control Instruments Corp., 25 Law Dr., Fairfield, NJ 07004-3295 (973-575-9114; FAX: 973-575-0013; e-mail: sales@controlinstruments.com; web site: www.controlinstruments.com)



**CONVAL, INC., 265 Field Road, Somers, CT 06071 (860-749-0761; FAX: 860-763-3557; e-mail: mhendrick@conval.com; web site: www.conval.com)**

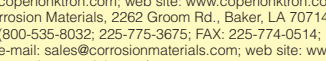
Conversion Technology, Inc., 2190 N. Norcross Tucker Rd., Ste. 202, Norcross, GA 30071 (770-263-6330; FAX: 770-263-8348; e-mail: cti@conversiontechnology.com; web site: www.conversiontechnology.com/)

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Covestro LLC, 1 Covestro Circle, Pittsburgh, PA 15205 (844-646-0545; 412-413-2000; web site: www.covestro.com)

CPC (Colder Products Company), 1001 Westgate Drive, St. Paul, MN 55114 (800-444-2474; 651-645-0091; FAX: 651-645-5404; e-mail: info@cpworldwide.com; web site: www.cpcworldwide.com)

CPFD-Software, 10899 Montgomery NE Suite B, Albuquerque, New Mexico 87111 (e-mail: sales@cpfd-software.com; web site: www.cpfds-soft.com)

CPI Wirecloth & Screens Inc., P.O. Box 1710, Pearland, TX 77587 (800-255-6374; 281-485-2300; FAX: 281-485-8937; e-mail: Sales@cpwirecloth.com; web site: Www.cpiwirecloth.com)

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CTP Sinto America, LLC, 3001 W Main St, Lansing, MI 48917 (e-mail: david.poo@ctp-us.com)  
CU SERVICES LLC, 725 Parvle Circle, Elk Grove, IL 60007 (847-439-2303; FAX: 847-895-1602; e-mail: rcronfel@cuservices.net; web site: www.cuservices.net)  
Cyclonaire Corp., P.O. Box 366, York, NE 68467 (800-445-0730; 402-362-2000; FAX: 402-362-2001; e-mail: sales@cyclonaire.com; web site: www.cyclonaire.com)

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Delphian Corp., 220 Pegasus Ave., Northvale, NJ 07647 (800-288-3647; 201-767-7300; FAX: 201-767-1741; e-mail: contact@delphian.com; web site: www.delphian.com)

Delta Cooling Towers Inc., 185 US Highway 206, Roxbury Township, NJ 07836 (973-586-2201; FAX: 973-586-2243; e-mail: info@deltacooling.com; web site: www.deltacooling.com)

Delta M Corp., 1003 Larsen Dr., Oak Ridge, TN 37830 (800-922-0083; 865-483-1569; FAX: 865-483-1142; web site: www.deltamcorp.com)

Dematic Corp., 507 Plymouth Ave. N.E., Grand Rapids, MI 49505 (877-725-7500; 616-913-7700; FAX: 616-913-7701; e-mail: USinfo@dematic.com; web site: www.dematic.us)

Denver Mineral Engineers, Inc., 10641 Flatiron Rd, Littleton, CO 80124 (303-932-6280, e-mail: sales@denvermineral.com; web site: www.denvermineral.com)

Diamond Refractory Services, 8412 Mosley Rd., TX 77075 (e-mail: evanlee@diamondrefractory.com)

Diamond Refractory Services, LLC, 8412 Mosley Road, Houston, TX 77075 (713-378-9200; e-mail: cdcrake@diamondrefractory.com; web site: www.diamondrefractory.com)

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Digital Applications International, Axtell House, 24 Warwick St., London W1B 5NQ (44-20 7292 7500; FAX: 44-207-439-2077; e-mail: john.millard@dai.co.uk; web site: www.dai.co.uk)

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Diversified Toll Services, 50 Willowbrook Drive, Cheshire, CT 06410 (203 915-0279; e-mail: djcicenzo@diversifiedtollservices.com; web site: www.diversifiedtollservices.com)

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Dr. Thiedig GmbH & Co KG, Prinzenallee 78 - 79, Berlin, Germany 13357 (030-497769-0; FAX: 030-497769-25; e-mail: info@thiedig.com; web site: www.thiedig.com)

DraCool USA, 30 Eagle Court, Carlisle, OH 45005 (937) 743-5899; FAX: (937) 743-6075; e-mail: ross@dracool-usa.com; web site: www.dracool-usa.com)

**Dräger Safety, Inc., 101 Technology Dr., Pittsburgh, PA 15275 (412-787-8383; Fax: 412-787-2207; e-mail: prodinfo@draeger.com; web site: www.draeger-safety.com)**

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Duke's Root Control, Inc., 1020 Hiawatha Blvd., West, NY 13204 (e-mail: lynn@dukes.com)

Durr Systems, Inc., Clean Technology Systems, 40600 Plymouth Road, Plymouth, MI 48170 (1(866)DURR1ST; (734) 459-6800; FAX: (734) 459-5837; e-mail: CTS-sales@durrusa.com; web site: www.durr-cleantechnology.com)

Dymax Corp., 318 Industrial Lane, Torrington, CT 06790 (877-396-2988; 860-482-1010; FAX: 860-496-0608; e-mail: info@dymax.com; web site: www.dymax.com)

Dynamic Air Inc., 1125 Willow Lake Blvd., St. Paul, MN 55110-5193 (651-484-2900; FAX: 651-484-7015; e-mail: info@dynamicair.com; web site: www.dynamicair.com)



**DYNATEK LOADING SYSTEMS, PO Box 215, North Prairie, WI 53153 (e-mail: garyk@dynatekloadingsystems.com)**

## E

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EDWARDS US HEADQUARTERS, 6416 Induco Drive West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)

**EDWARDS VACUUM, 6416 Induco Drive West, Sanborn, NY 14132 (800-848-9800; e-mail: matt.murray@edwardsvacuum.com; web site: www.edwardsvacuum.com)**

EK USA, 575 W 3200 S, Logan, UT 84321 (435-753-8448; e-mail: candis@ekusa.com; web site: www.ekusa.com)

**EKATO RUEHR- UND MISCHTECHNIK GMBH, Hohe-Flum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: + 49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)**

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Electroswitch, 180 King Ave., Weymouth, MA 02188 (800-366-2459; 781-335-5200; FAX: 781-335-4253; e-mail: info@electroswitch.com; web site: www.electroswitch.com)

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Elway Industries, Inc., 8339 Kempwood Drive, Houston, Texas 77055 (877-793-2800; (713) 690-9900; FAX: (713) 690-2022; e-mail: info@elwayinc.com; web site: www.elwayinc.com)

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Enerquip, LLC, 611 North Road, Medford, WI 54451 (715.748.5888; FAX: 715.748.6484; e-mail: sales@enerquip.com; web site: www.enerquip.com)

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Entex Technologies Inc, 400 Silver Cedar Ct, Suite 200, Chapel Hill, NC 27514 (919.933.2770; FAX: 919.287.2258; e-mail: dick.pehrson@entexinc.com; web site: www.entexinc.com)

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 EVEREST INTERSCIENCE, 733 North 9th Street, OR 97420 (e-mail: info@everestinterscience.com)  
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 NY, FLEXIM AMERICAS Corporation, 250-V Executive Drive, Edgewood, New York 11717 ((631) 492-2300; FAX: (631) 492-2117)  
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 FLSmidth, Mineral Processing, 7158 S. FLSmidth Drive, Midvale, UT 84047 (801-871-7000; FAX: 801-871-7001; e-mail: info.slc@flsmidth.com; web site: www.flsmidth.com)  
 Fluid Imaging Technologies, Inc., 200 Enterprise Drive, Scarborough, ME 04074 (207-289-3200; FAX: 207-289-3101; e-mail: info@fluidimaging.com; web site: www.fluidimaging.com)

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Mehrher Compression GmbH, Rosenfelder Str. 35, Balingen D-72336 (+49 7433 26 05 0; FAX: +49 7433 26 05 41; e-mail: sales@mehrher.de; web site: www.mehrher.de)

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Met-Pro Global Pump Solutions, a CECO Environmental Company, 700 Emlen Way, Telford, PA 18969 (800-392-7125; 215-723-8155; FAX: 215-723-2197; e-mail: info@mp-gps.com; web site: www.mp-gps.com)

Metal Samples Co., 152 Metal Samples Rd., Munford, AL 36268 (256-358-4202; FAX: 256-358-4515; e-mail: msc@alspi.com; web site: www.metalsamples.com)

Metano IBC Services, Inc., 2 Merkin Drive, Perrineville, NJ 08535 (800-634-4128; 732-566-9600; FAX: 732-792-2402; e-mail: info@metanousa.com; web site: www.metanousa.com)

Metso Flow Control Inc, Vanha Porvoontie 229, Vantaa, Finland, FIN 01301 (+358 20 483 150; FAX: +358 20 483 151; e-mail: flowcontrol@metso.com; web site: www.metso.com/valves)

Metso Minerals Industries, Inc., 2715 Pleasant Valley Road (zip 17402), P.O. Box 15043, York, PA 17405 (717-843-8671; 800-479-0362; FAX: 717-845-5154; e-mail: minerals-info@metso.com; web site: www.metso.com)

Mettler-Toledo, Inc., 1900 Polaris Pkwy., Columbus, OH 43240-4518 (800-523-5123; 614-438-4511; FAX: 614-438-4518; e-mail: indinfo@mt.com; web site: www.mt.com)

Meyer Tool & Mfg., Inc., 4601 w. southwest highway, oaklawn, IL 60453 (708)4259080; 7732308168; FAX: 7084252612; e-mail: m.carr@mtm-inc.com)

Microdyn Technologies, Inc., 2700 Sumner Blvd, Suite 136, Raleigh, NC 27616 (919-341-5936; FAX: 919-341-5935; e-mail: info@microdyn-nadir.com; web site: www.microdyntech.com)

**MICRODYN-NADIR GMBH, Kasteler Str. 45, Wiesbaden, Germany D-65203 (+49 (0)611-962-6001; FAX: +49 (0)611-962-9237; e-mail: info@microdyn-nadir.de; web site: www.microdyn-nadir.de)**

**MICROMOLD PRODUCTS, INC., 7 Odell Plaza #133, Yonkers, NY 10701 (914-969-2850)**

Midwest Steel Company Inc, 9825 Moers Road, Houston, Texas 77075 ((713) 991-7843; FAX: (713) 991-4745; web site: www.midwest-steel.com)

Mil-Ram Technology, Inc., 48009 Fremont Blvd., Fremont, CA 94538 (888-464-5726; 510-656-2004; FAX: 510-656-2004; e-mail: sts@mil-ram.com; web site: www.mil-ram.com)

Milamar Coatings L.L.C., 311 NW 122 St, Suite 100, Oklahoma City, OK 73114 (800-459-7659; 405-755-8448; FAX: 405-755-8450; e-mail: milamar@casspolymers.com; web site: www.milamar.com)

**Miller-Stephenson Chemical Co., Inc., 55 Backus Ave., Danbury, CT 06810 (800-992-2424; 203-743-4447; FAX: 203-791-8702; e-mail: Support@mschem.com; web site: www.miller-stephenson.com)**

Millward Alloys, 500 Mill Street, Lockport, NY 14094 (800-833-6600; 716-434-5536; FAX: 716-434-3257; e-mail: Millward@millward.com; web site: www.millward.com)

MM Industries, Inc., Vortli-Siv, 36135 Salem Grange Rd., PO Box 720, Salem, OH 44460 (800-227-7487 USA; 330-332-4958; 330-332-0545; FAX: 330-332-1543; e-mail: info@vortli-siv.com; web site: www.vortli-siv.com)

M. O. Industries, 9 Whippary Rd, Unit B1-2, Whippary, NJ 07981 (973-386-9228; FAX: 973-428-0221; e-mail: sales@moindustries.com; web site: www.moindustries.com)

Mobile Modular, 4445 East Sam Houston Pkwy South, Pasadena, Texas 77055 ((866) 361-1888; (281) 487-1222; FAX: (281) 487-1289; web site: www.mobilemodularrentals.com)

MOCON, Inc. - Baseline, 19661 Highway 36, PO Box 669, Lyons, CO 80540 (800-321-4665 USA; 303-823-6411; FAX: 303-823-5151; e-mail: info@baselineindustries.com; web site: www.baseline-mocon.com)

Modern Process Equipment, Inc., 3125 S. Kolin Ave., Chicago, IL 60623 (773-254-3929; FAX: 773-254-3935; e-mail: solution@mpechicago.com; web site: www.mpechicago.com)

MoistTech Corp., 1283 Tallevast Rd, Sarasota, FL 34243 (9413517870; 9413517870; FAX: 9413517870; e-mail: afordham@moisttech.com)

Mokon, 2150 Elmwood Ave., Buffalo, NY 14207 (716-876-9951; FAX: 716-874-8048; e-mail: sales@mokon.com; web site: www.mokon.com)

Momentive Performance Materials Inc., 260 Hudson River Road, Waterford, NY 12188 (800-295-2392; 614-986-2495; FAX: 614-986-2496; e-mail: 4inforation@momentive.com; web site: www.momentive.com)

Moore Industries International, Inc., 16650 Schoenborn St., North Hills, CA 91343 (800-999-2900 Within United States; 818-894-7111; FAX: 818-891-2816; e-mail: info@miinet.com; web site: www.miinet.com)

Mott Corporation, 84 Spring Lane, Farmington, CT 06032-3159 (800-289-6688; 860-747-6333; FAX: 860-747-6739; e-mail: quest@mottcorp.com; web site: www.mottcorp.com)

MTR Software, 77 Carlton Street, Suite 808, Toronto, M5S 2S6 (416-596-1499; e-mail: support@fitall.com; web site: www.fitall.com)

MTS World, LLC, 26511 Opal Hollow Lane, Cypress, TX 77433 (314-258-3536; e-mail: mts@mtsworld.com; web site: www.mtsworld.com)

**MUELLER GMBH, P.O. Box 1409, Rheinfelden, Germany**  
79604 (+49-76-23-9690; FAX: +49-7623-96969; e-mail: info@mueller-gmbh.com; web site: www.mueller-gmbh.com)



**MULTITHERM LLC, 11 GENERAL WARREN BLVD., MALVERN, PA 19355 (1-800-225-7440; FAX: 610-409-8365; E-MAIL: TECHINFO@MULTITHERM.COM; WEB SITE: WWW.MULTITHERM.COM)**

Munson Machinery Company, Inc., 210 Seward Avenue, Ulica, NY 13502-5750 (800-944-6644; 315-797-0090; FAX: 315-797-5582; e-mail: info@munsonmachinery.com; web site: www.munsonmachinery.com)

Munters Corporation, 225 S. Magnolia Avenue, Buena Vista, VA 24416 (800-843-5360; 540-291-1111; FAX: 540-291-3333; e-mail: dhinfo@munters.com; web site: www.munters.us)

Munters Corporation, Air Treatment, 79 Monroe St., P.O. Box 640, Amesbury, MA 01913-0640 (800-843-5360; 978-241-1100; FAX: 978-241-1214; e-mail: dhinfo@munters.com; web site: www.munters.us)

Munters Corporation, Zeol, 79 Monroe Street, Amesbury, MA 01913-0600 (800-843-5360; 978-241-1100; FAX: 978-241-1220; e-mail: dhinfo@munters.com; web site: www.munters.us)

Munters GmbH, Hans-Duncker-Str. 8, Germany 21035 (e-mail: andrea.lindemann@munters.de)

Musco Engineering Associates, 375 Morgan Lane, Unit 307, West Haven, CT 06516 (203-932-1901; FAX: 203-931-1550; e-mail: mmusco@muscoengineering.com)

**MYRON L COMPANY, 2450 IMPALA DR., CARLSBAD, CA 92010 (+1 760-438-2021; e-mail: advertising@myronl.com; web site: www.myronl.com)**  
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## N

Nash, a Gardner Denver Product, PO Box 130, Bentleyville, PA 15314 (800-553-NASH; 7242391500; 7242391500; FAX: 724-239-1502; e-mail: nash@gardnerdenver.com; web site: www.GDNash.com)

Nash Europe Ltd., Road One, Industrial Estate, Winsford, Cheshire CW7 3PL (44-1606-542400; FAX: 44-1606-542434; e-mail: nash@gardnerdenver.com; web site: www.GDNash.com)

**NATIONAL OILWELL VARCO (NOV), 10353 Richmond Avenue, Houston, TX 77024 (e-mail: lauren.landry@nov.com)**

National Pump Company, 7706 N. 71st Ave., Glendale, AZ 85303 (800-966-5240; 623-979-3560; FAX: 623-979-2177; e-mail: info@natpump.com; web site: www.nationalpumpcompany.com)

Neilsoft Ltd., Pride Parmar Galaxy, 8th Floor, 10/10 + A, Sadhu Vaswani Chowk, Pune, Maharashtra 411001, Pune, IND 411001 (e-mail: mangesh.neharkar@neilsoft.com)

NETZSCH Pumpen & Systeme GmbH, Geretsrieder Str. 1, Waldkraiburg, Germany 84478 (+49 8638 63-0; FAX: +49 8638 67981; e-mail: info.nps@netzsch.com; web site: https://pumpen.netzsch.com/de/)

**NEUHAUS NEOTEC MASCHINEN- UND ANLAGENBAU GMBH, Dieselstrasse 5-9, D-21465 Reinbek (+49-40-72771-500; FAX: +49-40-72771-550; e-mail: sales@neuhaus-neotec.de; web site: www.neuhaus-neotec.de)**

NewAge Industries, Inc., 145 James Way, Southampton, PA 18966 (800-506-3924 US Only; 215-526-2300; FAX: 215-526-2190; e-mail: info@newageindustries.com; web site: www.newageindustries.com)

Newman Regency Group, 12705 S. Kirkwood, Stafford, TX 77429 (281) 980-7448; FAX: (281) 980-7447; e-mail: jeff@newmanregency.com; web site: www.newmanregencygroup.com)

NexGen Enviro Systems Inc., 190 East Hoffman Avenue, Lindenhurst, NY 11757 (800-842-1630; 631-226-2930; FAX: 631-226-3125; e-mail: info@nexgenenviro.com; web site: www.nexgenenviro.com)

Nier Systems Inc, 6678 Newport Lake Circl, Boca Raton, Florida 33496 (1-561-989-0049; FAX: 1-561-995-6763; e-mail: nieryst@bellsouth.net; web site: www.nierystems.com)

Niles Steel Tank, 725 Talamore Drive, Ambler, PA 19002 (215-641-2114; FAX: 215-646-7984; e-mail: info@nilesst.com; web site: www.nilesst.com)



**NOL-TEC SYSTEMS, INC., 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)**

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Nordfab Ducting, 150 Transit Avenue, Thomasville, NC 27360 (800-532-0830; FAX: 336-889-7873; e-mail: info@nordfab.com; web site: www.nordfab.com)

Nordson SEALANT EQUIPMENT, 45677 Helm St., P.O. Box 701460, Plymouth, MI 48170 (734-459-8600; FAX: 734-459-8686; e-mail: sales@sealantequipment.com; web site: www.sealantequipment.com)

**Novaflex Group, 1024 Industrial Dr., West Berlin, NJ 08091-9164, USA (609-744-8414; FAX: 856-768-2385; www.novaflex.com)**

Northwest Analytics, Inc., 111 SW Fifth Avenue #800, Portland, OR 97204 (888-692-7638; 503-224-7727; FAX: 503-224-5236; e-mail: nwa@nwasoft.com; web site: www.nwasoft.com)

NOV, P.O. Box 1123, 5870 Poe Ave., Dayton, OH 45414-3442 (800-643-0641; 937-454-3200; FAX: 937-454-3379; e-mail: chemineer@nov.com; web site: www.nov.com/mixing)

## O

Obetego, PO Box 487, 100 Gradyville Road, Glen Mills, Pennsylvania 19342 (610) 959-1631; e-mail: obetego@gmail.com; web site: www.obetego.com

OHL Guterath Industrial Valves GmbH, Helmershauser Strasse 9 + 12, Altenstadt 63674 (+49 6047 8006 0; FAX: +49 6047 8006 29; e-mail: og@ohl-guterath.de; web site: www.ohl-guterath.de)

Omega Engineering Inc., One Omega Dr., P.O. Box 4047, Stamford, CT 06907-0047 (800-826-6342; 203-359-1660; FAX: 203-359-7700; e-mail: info@omega.com; web site: www.omega.com)

Omni-Lift, Inc., 1485 S. 300 W., Salt Lake City, UT 84115-5137 (801-486-3700; FAX: 801-486-3780; e-mail: omni-belt@aol.com; web site: www.omni-lift.com)

ONLY Technology LTD, wuhan.China (e-mail: info@only-whdf.com; web site: www.onlywhdf.com)

optek-Danulat, Inc., N118W18748 Bunsen Drive, Germantown, WI 53022 (888-864-4288; e-mail: chem@optek.com; web site: www.optek.com)

Optel Vision, 2680 Blvd du Parc Technologique, CAN G1P 4S6 (e-mail: ken.fallu@optelvision.com)

**ORION INSTRUMENTS, 2105 Oak Villa Blvd., Baton Rouge, LA 70815 (e-mail: judgas@orioninstruments.com)**

**ORIVAL WATER FILTERS, 213 S Van Brunt St., Englewood, NJ 07631-9902 (800-567-9767; 201-568-3311; FAX: 201-568-1916; e-mail: filters@orival.com; web site: www.orival.com)**

**Ovivo USA, 4255 Lake Park Blvd Ste. 100, Salt Lake City, UT 84120 (801-931-3000; Fax: 801-931-3080; www.evtwork.com)**

Oseco, 1701 W. Tacoma, P.O. Box 1327, Broken Arrow, OK 74013-1327 (800-395-3475; 918-258-5626; FAX: 918-251-2809; e-mail: sales@oseco.com; web site: www.oseco.com)

Osram Sylvania, 100 Endicott St., Danvers, MA 01923-3623 (800-544-4828; 978-777-1900; FAX: 978-750-2152; web site: www.sylvania.com)

Ototech (USA), Inc., 8280 Staylor Dr., Ste M, Jussup, MD 20794 (301) 543 1200; e-mail: filters@ototech.com)

Oxford Lasers, Inc., 2 Shaker Road, Unit B104, Shirley, MA 01464 (800-222-3632; 978-425-0755; FAX: 978-425-4487; e-mail: oxford.inc@oxfordlasers.com; web site: www.oxfordlasers.com)

## P

Pacific Scale Co., Inc., 16002 S.E. 106, P.O. Box 1606, Clackamas, OR 97015 (800-537-1886; 503-657-7500; FAX: 503-657-5561; e-mail: pscoc@pacifier.com; web site: www.pacificscale.com)

**Paharpur Cooling Towers Ltd, Paharpur House, 8/1/B Diamond Harbour Road, Kolkata, O 700027 (+913340133000; FAX: +913340133499; e-mail: pttccu@paharpur.com; web site: www.paharpur.com)**  
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Palmer Wahl Temperature Instruments, 234 Old Weaverville Road, Asheville, NC 28804-1260 (800-421-2853; 828-658-3131; FAX: 828-658-0728; e-mail: info@palmerwahl.com; web site: www.palmerwahl.com)

PANalytical BV, Lelyweg 1, P.O. Box 13, Almelo, , NLD 7600 AA (8002797297; 31-546-534-444; FAX: 31-546-534-598; e-mail: info@panalytical.com; web site: www.panalytical.com)

**Paratherm - Heat Transfer Fluids, 2009 Renaissance Boulevard, King of Prussia, PA 19406 (800-222-3611 (US, CAN, Caribbean); 610-941-4900; FAX: 610-941-9191; e-mail: info@paratherm.com; web site: www.paratherm.com)**

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Parker Hannifin O-Ring Division, 2360 Palumbo Drive, Lexington, KY 40509 (859) 269-2351; FAX: (859) 335-5123; e-mail: ordmailbox@parker.com; web site: www.parker.com/orings)

Parsec, Inc., 180 North Riverview, No. 300, Anaheim, CA 92808 (714-996-5302; FAX: 714-996-1845; e-mail: info@parsec-corp.com; web site: www.parsec-corp.com)

Particle Reduction Service, 65 Scott St., Elk Grove Village, IL 60007 (847-593-2025; FAX: 847-593-2046; e-mail: particlereduction@att.net)

**PAS, INC., 16055 Space Center Blvd., Suite 600, Houston, TX 77062 ((281) 286-8565; e-mail: sales@pas.com; web site: www.pas.com)**

**PAUL O. ABBE, 735 East Green St., Bensenville, IL 60106 (800-524-2188 US; 630-350-3012; FAX: 630-238-7584; e-mail: sales@pauloabbe.com; web site: www.pauloabbe.com)**

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PCA GmbH, Lebacher Strasse 60, Building 60, Heusweiler 66265 (49 6806 603730; FAX: 49 6806 603731; e-mail: s.mueller\_z@pca-gmbh.com; web site: www.pca-gmbh.com)

PCD Machines, Inc., Warwick Commons, 1875 Stout Dr., P.O. Box 2733, Warminster, PA 18974 (215-443-9442; FAX: 215-443-8530; e-mail: info@pcdmachines.com; web site: www.pcdmachines.com)

PCR-Separations LLC, 3 Old Meadow Way, Palm Beach Gardens, FL 33418 (561 818-8445; FAX: 561 429-4541; e-mail: info@pdr-separations.com; web site: www.pdr-separations.com)

Pennsylvania Scale Company, 665 North Reservoir Street, Lancaster, PA 17602 (e-mail: rsw@pascale.com; web site: www.pennsylvaniascale.net)

Pentair Valves & Controls, 3950 Greenbriar St., Stafford, TX 77477 (281-274-4400; FAX: 281-274-4655; web site: valves.pentair.com)

**PEPPERL + FUCHS GMBH, Lilienthalstrasse 200, Mannheim, Germany 68037 (0621-776-0; FAX: 0621-776-1000; e-mail: info@de.pepperl-fuchs.com; web site: www.pepperl-fuchs.com)**

PerMix Tec. Co. Ltd, P.O. Box 240, ISR 1794000 (e-mail: sruga@permixtec.com)

Petron Plus Global, Inc., PO Box 644, Hutchinson, Kansas 67504-0644 (620-663-8559; e-mail: gary.clark@ppxlor-mul7.com; web site: www.petronplusglobal.com)

Pfaltz & Bauer, Inc., 172 E. Aurora St., Waterbury, CT 06708 (800-225-5172; 203-574-0075; FAX: 203-574-3181; e-mail: sales@paltzandbauer.com; web site: www.paltzandbauer.com)

**PFEIFFER VACUUM GMBH, Berliner Strasse 43, Asslar, Germany 35614 (+49-6441-802 0; FAX: +49-6441-802 1202; e-mail: info@pfeiffer-vacuum.de; web site: www.pfeiffer-vacuum.com)**

— See our ad on page 39  
Pfeiffer Vacuum, Inc., 24 Trafalgar Square, Nashua, NH 03063 (800-248-8254; 1-603-578-6500; FAX: 603-578-6550; e-mail: contact@pfeiffer-vacuum.com; web site: www.pfeiffer-vacuum.com)

**PHOENIX CONTACT GMBH & CO.KG, Flachsmarktstr. 8, Blomberg, Germany 32825 (+49 (0)5235-300; FAX: +49 (0)5235-341200; e-mail: info@phoenixcontact.com; web site: www.phoenixcontact.com)**

PHOENIX Conveyor Belt Systems GmbH, Hannoversche Strasse 88, Hamburg 21079 (+49 40 7667 -03; FAX: +49 40 7667 2413; e-mail: info@phoenix-cbs.com; web site: www.phoenix-conveyor-belts.com)

**PICK HEATERS, INC., 730 S. Indiana Ave., P.O. Box 516, West Bend, WI 53095 (262-338-1191; FAX: 262-338-8489; e-mail: info@pickheaters.com; web site: www.pickheaters.com)**

**PLAST-O-MATIC VALVES INC., 1384 Popton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)**

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Pneumatech, Inc., 1800 Overview Dr, Rock Hill, SC 29730 (800-336-2285; 262-658-4300; FAX: 803-817-7211; e-mail: Jon.Sanders@pneumatech.com; web site: www.pneumatech.com)

PNR AMERICA, LLC, One Civic Center Plaza, Suite 303, Poughkeepsie, NY 12601 (845-483-7770; FAX: 845-483-7755; e-mail: info@pnramerica.com; web site: www.pnramerica.com)

Pollution Control Systems, Inc., 5827 Happy Hollow Rd., Suite 1B, Milford, OH 45150-1839 (513-831-1165; FAX: 513-965-4812; e-mail: polconsys@aol.com; web site: www.pollutioncontrolsystems.com)

PolyScience, 6600 W. Touhy Ave., Niles, IL 60714 (800-229-7569; 847-647-0611; FAX: 847-647-1155; e-mail: sales@polyscience.com; web site: www.polyscience.com)



**PROCESS ENGINEERING ASSOCIATES, LLC, 700 South Illinois Ave., Suite A-202, Oak Ridge, TN 37830 (865-220-8722; FAX: 865-220-8729; e-mail: info@processengr.com; web site: www.processengr.com)**

PA, Eastern Regional Office, 329 East Second Street, Boyertown 19512 (610) 369-2747; FAX: (865) 220-8729)

TN, Process Engineering International, LLC, 700 South Illinois Ave., Suite A-201, Oak Ridge 37830 (865) 220-8722; FAX: (865) 220-8729)

AL, Gulf Coast Regional Office, 25353 Friendship Road, Suite B, Daphne 36526 ((251) 709-6730)

WA, Pacific Coast Regional Office, 1933 Jadwin Avenue, Suite 225, Richland 99354 (509) 430-5328)

**PROCESS SYSTEMS ENGINEERING LLC, INDUSTRIAL AUTOMATION AND PROCESS SAFETY ENGINEERING, 636 Prospect St., Westfield, NJ 07090 (908)9673807; e-mail: psep@prosyseng.com; web site: www.prosyseng.com)**

Process Systems Enterprise, Inc., 3 Wing Drive, Suite 103, NJ 07927 (e-mail: j.wade@penterprise.com)

Process Systems Enterprise Limited, 5th Floor East, 26-28 Hammersmith Grove, London W6 7HA (44-20-8563-0888; FAX: 44-20-8563-0999; e-mail: info@penterprise.com; web site: www.penterprise.com)

**PROCO PRODUCTS, INC., 2431 N. Wigwam Dr. - 95205, P.O. Box 590, Stockton, CA 95201-0590 (800-344-3246 USA & Canada; 209-943-6088; FAX: 209-943-0242; e-mail: sales@procoproducts.com; web site: www.procoproducts.com)**

Progressive Recovery Inc., 700 Industrial Dr., Dupo, IL 62239-0126 (800-732-3793; 618-286-5000; FAX: 618-286-5009; e-mail: sales@progressive-recovery.com; web site: www.progressive-recovery.com)

PRÜFTECHNIK Dieter Busch AG, Oskar-Messter-Str. 19-21, Ismaning, Germany 85737 (89-99616-0; FAX: 89-99616-200; e-mail: info@pruftechnik.com; web site: www.pruftechnik.com)

PSL USA, Cliffside Research Park, 3944 North Mountain View Drive, STE. 100, Boise, ID 83704 (208 376 7008; FAX: 208-378-7008; e-mail: pslusa@powdersystems.com; web site: www.powdersystems.com)

Psychsoftpc, Rte 53, Quincy, MA 02171 (617-417-8733; e-mail: sales@psychsoftpc.com; web site: www.psychsoftpc.com)

Pulsair Systems, Inc., Office 13643 NE 126th Place, Kirkland, WA 98034-8705, Mail PO Box 562 Bellevue, WA 98009-0562, Bellevue, WA 98009 (800-582-7797 North America; 425-455-1263; FAX: 425-451-7312; e-mail: sales@pulsair.com; web site: www.pulsair.com)

Pump Solutions Group, 22069 Van Buren Street, Grand Terrace, California 92313 (909) 422-1739; FAX: (909) 512-1209; e-mail: info@psgdgroup.com; web site: www.pumpsg.com)

PureAire Monitoring Systems, Inc., 557 Capital Dr., Lake Zurich, IL 60047-6711 (888-788-8050 USA & Canada; 847-726-6000; FAX: 847-726-6051; e-mail: info@pureair.net; web site: www.pureairmonitoring.com)

## Q

Q-Lab Corporation, 800 Canterbury Rd., Westlake, OH 44145 (+1-440-835-8700; FAX: +1-440-835-8738; e-mail: info@q-lab.com; web site: www.q-lab.com)

Quadro Engineering Corp., 613 Colby Drive, WATERFLOO, 0 N2V 1A1 (519-894-9660; FAX: 519-894-0253; e-mail: quadrosales@idexcorp.com; web site: www.quadro.com)

Quadro Liquids, 613 Colby Drive, Waterloo, CAN N2V 1A1 (e-mail: info@quadroliquids.com)

Quality America, Inc., PO Box 30591, Tucson, AZ 85751 (800-722-6154 US; 520-722-6154; FAX: 520-722-6705; e-mail: sales@qualityamerica.com; web site: www.qualityamerica.com)

**Quest Integrity, 19823 58th Place South, WA 98032 (e-mail: c.levy@questintegrity.com)**

## R

R. STAHL, Am Bahnhof 30, Waldenburg 74638 (+49 (0) 7942-943-0; FAX: +49 (0) 7942-943-4333; e-mail: info@stahl.de; web site: www.stahl.de)

Radleys, Radleys, GBR CB11 3AZ (e-mail: marketing@radleys.co.uk)

RAS Process Equipment Inc., 324 Meadowbrook Rd., Robbinsville, NJ 08691 (609-371-1000; FAX: 609-371-1200; e-mail: sales@ras-inc.com; web site: www.ras-inc.com)

Polyguard Products, Inc., P.O. Box 755, Ennis, TX 75120-0755 (800-541-4994; 972-875-8421; FAX: 972-875-9425; e-mail: polyguard@polyguardproducts.com; web site: www.polyguardproducts.com)

Polytec, Inc., Process Analytics, East Coast Office, 25 South Street, Suite A, Hopkinton 01748 (508) 417-1035; FAX: (508) 281-4725; e-mail: analytics@polytec.com; web site: www.analytics-online.com)

**POMPETRAVAINI SPA, via per turbigo 44, Castano Primo, 0 20022 (+39 0331 889 000; FAX: +39 0331 889 057; e-mail: sales@pompetravaini.it; web site: www.pompetravaini.it)**

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VA, Travaini Pumps USA, 200 Newsome Drive, Yorktown 23692 (757 988 3930; FAX: 757 988 3975)

International, Flow Teams Brazil, Rua Padre Anchieta 2050, sala 1002, Bairro Bigorinho, Curitiba PR, 0, BRA 80730-000 (+55 41 8801 0573)

International, Travaini Pumpen GmbH, Krefelder Strasse 153, Aachen, Germany 52070 (+49 2401 805125; FAX: +49 2401 805199)

International, Travaini Pumpen BeNeLux B.V., Van Ederenlaan 4, Waarde, 0, NLD 5581 WJ (+31 40 223 2222; FAX: +31 40 223 2220)

International, Pompetravaini-Nsb ag, G'yterstrasse 80, Pratteln, 0, CHE CH 4133 (+41 613381818; FAX: +41 613381800)

International, Flow Teams Turkey, Baglarbasi Mahallesi Atay'rk, Caddesi Sakarya Sokak 35/1, Maltepe Istanbul, 0, TUR (+90 216 706 1812)

International, Premier Fluid Systems Inc., 4161 Morris Drive, Unit 5, Burlington, Ontario, 0, CAN L7L 5L5 (+1 905 6372611; FAX: +1 905 3334722)

International, Pompes Travaini France e.u.r.l., Rue de Lorraine 29, Mantes La Jolie, 0, FRA 78200 (+33 01 3033 4566; FAX: +33 01 3033 4529)

International, Travaini Pompy Polska Sp.z.o.o., ul Budowlana 8A, Katowice, 0, POL 40-301 (+48 32 206 3296; FAX: +48 32 204 3257)



**POPE SCIENTIFIC, INC., P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)**

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Porvair Filtration Group Inc, 10190 Maple Leaf Court, Ashland, VA 23005 (804 550 1600; FAX: 804 550 3262; e-mail: info@porvairfiltration.com; web site: www.porvairfiltration.com)

Posi-filac, 1125 Willow Lake Blvd., St. Paul, MN 55110-5193 (651-484-5800; FAX: 651-484-7015; e-mail: info@posi-filac.com; web site: www.posi-filac.com)

Powder Systems Ltd, Estuary Business Park, Liverpool L24 8RG (+44 151 448 7700; FAX: +44 151 448 7702; e-mail: info@powdersystems.com; web site: www.powdersystems.com)

PP PUBLICO Publications, Julienstr. 40, Essen, NRW D-45130 (+49-201-79-12-12; FAX: 49-201-79-88-278; e-mail: pp-publico@online.de; web site: www.pp-publico.de)

PO Systems, 210B E Spring Valley Rd, Dayton, OH 45458 (8007773020; 9378134700; FAX: 9378134701; e-mail: sales@pqsystms.com; web site: www.pqsystms.com)

PRAJ INDUSTRIES LIMITED, Praj Tower' 274 & 275, Bhunskar Chowk-Hinjewadi Road., Hinjewadi, Pune 411057. (+912022951511; FAX: +912022951718; e-mail: info@praj.net; web site: www.praj.net)

Prater-Sterling, 2 Sammons Court, Bollingbrook, IL 60440 (800-323-5735; 630-759-9595; FAX: 630-759-6099; e-mail: info@prater-sterling.com; web site: www.prater-sterling.com)

Presto Lifts Inc., 50 Commerce Way, Norton, MA 02766 (800-343-9322; 508-222-0177; FAX: 508-222-2996; e-mail: sales@prestolifts.com; web site: www.prestolifts.com)

Primer Technology, 2 Carlson Parkway North, Plymouth, Minnesota 55447 ((763) 475-6676; FAX: (763) 475-6677; e-mail: sales@primer.com; web site: www.primerlabel.com)

ProSim SA, Immeuble Strategie A, 51, rue Ampere, LABEGE 31670 (+33(0)5 62 88 24 30; FAX: +33 (0)5 62 88 24 39; e-mail: info@prosim.net; web site: www.prosim.net)

ProSonic LLC, P.O. Box 26676, Milwaukee, WI 53226 (800-849-1130 North America; 800-849-1130; FAX: 414-755-1177; e-mail: info@pro-sonic.com; web site: www.pro-sonic.com)

ProSys, Inc., 2822 O'Neil Lane Bldg A, Baton Rouge, LA 70816 (225-291-9591; FAX: 225-291-9594; e-mail: sales@prosys.com; web site: www.prosys.com)

Raytek Corp., 1201 Shaffer Rd., Bldg. #2, Santa Cruz, CA 95060 (800-227-8074; 831-458-3900; FAX: 831-458-1497; e-mail: solutions@raytek.com; web site: www.raytek.com)

Raytek GmbH, Blankenburger Str. 135, Berlin 13127 (+49304780080; +49304710251; e-mail: raytek@raytek.de; web site: www.ircon.de)

**READCO KURIMOTO, LLC, 460 Grim Lane, York, PA 17406 (e-mail: jboufford@readco.com)**

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Red Dog Services LLC, 207 West Main Street, Allen, TX 75013 (214 707 5809; e-mail: tom@reddogservices.com; web site: www.reddogservices.com)

**REDGUARD, 4340 S. West Street, Wichita, KS 67217 (855.REDGUARD; 855.733.4827; FAX: 316-440-1800; web site: www.redguard.com)**

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Red Seal Measurement, 1310 Emerald Rd., Greenwood, SC 29646 (800-833-3357; 864-223-1212; FAX: 800-833-6971; e-mail: support@redsealmeasurement.com; web site: www.redsealmeasurement.com)

Regal Industries, Inc., 857 Richmond Rd, Painesville, OH 44077 (888-910-9400; 440-352-9600; FAX: 440-352-9682; e-mail: regalindus@sbcglobal.net; web site: www.regal-industries.com)

**REMBE GMBH SAFETY + CONTROL, Gallbergweg 21, Brilon, Germany 59929 (+49 2961 7405-0; FAX: +49 2961 50714; e-mail: info@rembe.de; web site: www.rembe.de)**

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**REMBE INC., 3809 Beam Road Ste K, Charlotte, NC 28217 (+1 704 716 7022; FAX: +1 704 716 7025; e-mail: info@rembe.us; web site: www.rembe.us)**

— See our ad on page 23

RF Valves, Inc., 1342 Charwood Road, Hanover, MD 21076 (410-850-4404; FAX: 410-850-4464; e-mail: rfvalves@rfvalve.com; web site: www.rfvalve.com)

Rice Lake Weighing Systems, 230 W. Coleman St., Rice Lake, WI 54686-0272 (800-472-6703; 715-234-9171; FAX: 715-234-6967; e-mail: prodinfo@rlw.com; web site: www.ricelake.com)

Richman Chemical, 768 North Bethlehem Pike, Ste 204, Lower Gwynedd, PA 19002 ((215) 628-2946; e-mail: dl@richmanchemical.com; web site: www.richmanchemical.com)

Richter Chemie-Technik GmbH, Otto-Schott-Str. 2, P.O. Box 100609, Kempen 47906 (+49-2152-146-0; FAX: +49-2152-146-190; e-mail: richter-info@idexcorp.com; web site: www.richter-ct.com)

River Consulting, One Robinson Plaza, Suite 400, Pittsburgh, PA 15202 (412 471 5900; FAX: 412 722 1681; web site: riverconsulting.com)

RKI Instruments, Inc., 33248 Central Avenue, Union City, CA 94587-2010 (800-754-5165; 510 441-5656; FAX: 510 441-5650; e-mail: orders@rkinstruments.com)

Rockwell Automation, Inc., 1201 South Second Street, Milwaukee, WI 53204-2496 (414-382-2000; 800-223-5354; FAX: 414-382-4444; e-mail: webmaster@rockwellautomation.com; web site: www.rockwellautomation.com)

Rockwell Software Brand, Rockwell Automation, Inc., 1201 South Second Street, Milwaukee, WI 53204-2496 (800-223-5354; 414-382-2000; FAX: 414-382-4444; e-mail: webmaster@rockwellautomation.com; web site: www.rockwellautomation.com)

**ROTH PUMP, P.O. Box 4330, Rock Island, IL 61204 (1-888-444-ROTH; 1-309-787-1791; FAX: 1-309-787-5142; e-mail: roth.pump@rothpump.com; web site: www.rothpump.com)**

Roto-Disc, 514 Enterprise Dr., Unit A, Erlanger, KY 41017 (513-871-2600; FAX: 513-871-9013; e-mail: info@rotodisc.com; web site: www.rotodisc.com)

RPS Engineering, Inc., 1300 Crispin Drive, PO Box 5186, Elgin, IL 60123 (800-931-1950 usa/canada; 847-931-1950; FAX: 847-931-4274; e-mail: rpnstans@rpsengineering.com; web site: www.rpsengineering.com)

Russelectric Inc., South Shore Park, Hingham, MA 02043-4387 (800-225-5250; 781-749-6000; FAX: 781-749-4205; e-mail: info@russelectric.com; web site: www.russelectric.com)

RVT Process Equipment, Inc., 9047 Executive Park Drive, Suite 222, Knoxville, TN 37923 ((865) 694-2089; FAX: (865) 560-3115; e-mail: info@rvtpe.net; web site: www.rvtpe.net)

## S

S&C Electric Company, 6601 N. Ridge Blvd., Chicago, IL 60626-3997 (773-338-1000; FAX: 773-338-5102; e-mail: steven.strand@sandc.com; web site: www.sandc.com)

Sahyadri Engineering Corporation, 7, Diamond Industrial Estate, Opp. Virwani Industrial Estate, Near Western Express Highway, Goregaon (East), Mumbai - 400 063, W-142, 70 Bungalov, Tarapur Industrial Area, Tarapur - 401 506., IND 400063 (e-mail: info@sahyadriengcorp.com)

**SAINT-GOBAIN CERAMICS/STRUCTURAL CERAMICS, 23 Acheson Dr., Niagara Falls, NY 14303 (716-278-6233; FAX: 716-278-2373; e-mail: scd.sales@saint-gobain.com; web site: www.hexoloy.com)**

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Samco Technologies Inc, One River Rock Drive, Buffalo, New York 14207 (716) 743-9000; FAX: (716) 743-1220; e-mail: sales@samcotech.com; web site: www.samcotech.com)

SAMSON Controls, Inc., 4111 Cedar Blvd., Baytown, TX 77523-5888 (281-383-3677; FAX: 281-383-3690; e-mail: contactus@samsongroupna.com; web site: www.samsoncontrols.com)

Samuel Pressure Vessel Group, 2121 Cleveland Ave, Marinette, WI 54143 (800-247-8265, ext 30418; FAX: 715-735-5488; e-mail: spvg@samuel.com; web site: www.samuelpressurevesselgroup.com)

Sandvik Materials Technology, Tubular Products, P.O. Box 1220, Scranton, PA 18501 (800-755-8823; 570-585-7500; FAX: 570-585-7642; web site: www.smt.sandvik.com)

**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK MATERIALS TECHNOLOGY DEUTSCHLAND GMBH, Sailerstr. 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: info.spds@sandvik.com; web site: www.process-systems.sandvik.com)**

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**SANDVIK PROCESS SYSTEMS, INC., 21 Campus Rd., Totowa, NJ 07512 (973-790-1600; FAX: 973-790-3377; e-mail: info@sandvik.com; web site: www.process-systems.sandvik.com)**

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Sauereisen, 160 Gamma Dr., Pittsburgh, PA 15238-2989 (412-963-0303; FAX: 412-963-7620; e-mail: questions@sauereisen.com; web site: www.sauereisen.com)

SAWA Pumpentechnik AG, Taastrasse 40, Degersheim, CHECH 91-13 (+41 71 372 08 08; FAX: +41 71 372 08 09; e-mail: info@sawa.ch; web site: www.sawa.ch)

SBS STEEL BELT SYSTEMS S.r.l., Legal Seat: Via Roncaglia, 14 - 20146 Milano - ITALY, Workshop & Offices: Via E. Mattei, 3, Venegono Inferiore, ITA 21040 (0039 0331 864841; e-mail: cc@steelbeltsystems.it; web site: www.steelbeltsystems.com)

Scenic Precise Element Inc., No.5, Sin-Jhan Rd., Chian-Jhen District., Kaohsiung City 80672 ((886-7)811-1359; ext: 220; FAX: (886-7)822-1033; e-mail: scenic@scenic-seals.com; web site: www.scenic-seals.com)

**SCHENCK PROCESS, 7901 NW 107th Terrace, Kansas City, MO 64153 (888-657-3094; FAX: 816-891-8336; e-mail: mktg@schcnkprocess.com; web site: www.macprocess.com)**

Schenck Process GmbH, Pallaswiesenstr. 100, Darmstadt 64293 (0049 (0) 6151 1531-0; FAX: 0049 (0) 6151 1531-66; e-mail: info@schcnkprocess.com; web site: www.schcnkprocess.com)

Schurter, Inc., 447 Aviation Blvd., Santa Rosa, CA 95403 ((707) 636-3000; FAX: (707) 636-3033; e-mail: info@schurterinc.com; web site: www.schurterinc.com)

Schutte & Koerting, 2510 Metropolitan Drive, Trevose, PA 19053 (800-752-8558; 215-639-0900; FAX: 215-639-1597; e-mail: sales@s-k.com; web site: www.s-k.com)

Schutte & Koerting, 2510 Metropolitan Drive, Trevose, PA 19053 (800-752-8558; 215-639-0900; FAX: 215-639-1597; e-mail: sales@s-k.com; web site: www.s-k.com)

Schutte & Koerting, 2510 Metropolitan Drive, Trevose, PA 19053 (800-752-8558; 215-639-0900; FAX: 215-639-1597; e-mail: sales@s-k.com; web site: www.s-k.com)

Scientific Dust Collectors, 4101 W. 126th St., Alsip, IL 60803-1901 (708-597-7090; FAX: 708-597-0313; e-mail: scidustcollectors@scientificdust.com; web site: www.scientificdustcollectors.com)

Scientific Glass & Instruments, Inc., 2521 Fairway Park Dr, Houston, TX 77092 (e-mail: doug.muller@sginstr.com)

Security Engineered Machinery, P.O. Box 1045, Westboro, MA 01581 (800-225-9293; 508-366-1488; FAX: 508-366-6814; e-mail: info@semshred.com; web site: www.semshred.com)

**SEEPEx INC., 511 Speedway Dr., Enon, OH 45323 (800-695-3659; 937-864-7150; FAX: 937-864-7157; e-mail: sales@seepex.net; web site: sales.us@seepex.com)**

International, seepex Inc., 511 Speedway Drive, Enon, Ohio 45323 (937-864-7150; FAX: 937-864-7157)

Sefar Inc., 111 Calumet St., Buffalo, NY 14043 (800-995-0531; 800-995-0531; FAX: 716-683-4053; e-mail: sales@sefar.us; web site: www.sefar.us)

SensoTech GmbH, Steinfeldstr. 1, Magdeburg-Barleben, Germany 39179 (+49 39203 514 100; FAX: +49 39203 514 109; e-mail: info@sensotech.com; web site: www.sensotech.com)

SensoTech Inc., 1341 Hamburg Turnpike, Suite 2-3, Wayne, NJ 07093 (973 832 4575; FAX: 973 832 4576; e-mail: sales-usa@sensotech.com; web site: www.sensotech.com)

Sensor Electronics Corporation, 12730 Creek View Avenue, Savage, MN 55378 (800.285.3651; 952.938.9486; FAX: 952.938.9617; e-mail: sales@sensorelectronic.com; web site: www.sensorelectronic.com)

Sensor Technology Ltd, Apollo Park, Ironstone Lane, Wroton, Banbury OX15 6AY (44 1869 238400; e-mail: info@sensors.co.uk; web site: www.sensors.co.uk)

**SENTRY EQUIPMENT CORP, 966 Blue Ribbon Circle North, Oconomowoc, WI 53066 (262-567-7256; FAX: 262-567-4523; e-mail: sales@sentry-equip.com; web site: www.sentry-equip.com)**

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Separation Technologists, Inc., 7 Raymond Ave., Unit A-7, Salem, NH 03079 (603-898-0020; e-mail: thayes@separationtech.com; web site: www.separationtech.com)

Sera ComPress GmbH, sera-Str. 1, Immenhausen, 0 34376 (+49 (0)5673 999-04; FAX: +49 (0)5673 999-05; e-mail: info-compress@sera-web.com; web site: www.sera-web.com/en/compressor-technology)

Sera ProDos GmbH, sera-Str. 1, Immenhausen, 0 D- 34376 (+49 (0)5673 999-02; FAX: +49 (0)5673 999-03; e-mail: info-prodos@sera-web.com; web site: www.sera-web.com/en/dosing-technology)

Servomex Group Ltd., 12300 Dairy Ashford, Suite 400, Sugar Land, TX 77478 (+1 800 862 0200, 281 295 5800; FAX: 281-295-5899; e-mail: americas\_sales@servomex.com; web site: www.servomex.com)

SGB GmbH, Hofstr. 10, Siegen 57076 (+49 271 48964-0; FAX: +49 271 48964-6; e-mail: sgb@sgb.de; web site: www.sgb.de)

Sharpless Filters (I) Pvt. Ltd., Sales, R-664, Rabale MIDC., Rabale, Navimumbai 400086 (91-22-27696339; 912227696322; FAX: 91-22-27696325; e-mail: sharpless@vsnl.com; web site: www.sharpless.com)

Shimadzu Scientific Instruments, 7102 Riverwood Dr., Columbia, MD 21046 (800-477-1227; 410-381-1227; FAX: 410-381-1222; e-mail: webmaster@shimadzu.com; web site: www.ssi.shimadzu.com)

Shimadzu Scientific Instruments, 7102 Riverwood Dr., Columbia, MD 21046 (800-477-1227; 410-381-1227; FAX: 410-381-1222; e-mail: webmaster@shimadzu.com; web site: www.ssi.shimadzu.com)

Shiv Shakti Process Equipment P. Ltd., International Marketing & Sales, 407, Shivam Chambers., S V Road, Goregaon West., Mumbai 400104 (9870646500; 9821633589; FAX: 912226798284; e-mail: sales@shivshaktiequipments.com; web site: www.shivshaktiequipments.com)

SIAD Macchine Impianti, Via Canovine, 2/4, Bergamo 24126 (0039 035 327611; FAX: 0039 035 316131; e-mail: siadmi@siad.eu; web site: www.siadmi.com)

Sias, Churchmans Center, 11A Parkway Circle, New Castle, DE 19720 (302-326-0433; FAX: 302-326-0492; e-mail: info@sias.biz; web site: www.sias.biz)

**SIEMENS AG, Siemensallee 84, Karlsruhe, Germany D- 76187 (+49(0)721/595-0; web site: www.siemens.com/chemicals)**

Siemens Analytical Products & Services, 408 U.S. Highway 60, Bartlesville, OK 74003 (800-241-4453; 918-662-7000; FAX: 918-662-7052; e-mail: helpline.sii@siemens.com; web site: www.usa.siemens.com/industry)

Siemens Process Industries and Drives, 3333 Old Milton Parkway, Alpharetta, GA 30005-4437 (800-241-4453; 770-751-2000; FAX: 678-297-8316; e-mail: helpline.sii@siemens.com; web site: www.usa.siemens.com/industry)

Siemens Process Industries and Drives, 5300 Triangle Pkwy., Norcross, GA 30092 (770-871-3800 800-241-4453; 770 871 3800; FAX: 770-871-3999; e-mail: helpline.sii@siemens.com; web site: www.usa.siemens.com/industry)

Siemens Process Industries and Drives, 1201 Sunnyside Pike, Spring House, PA 19477 (800-241-4453; 215-646-7400; FAX: 215-646-6212; e-mail: helpline.sii@siemens.com; web site: www.usa.siemens.com/industry)

**SIERRA INSTRUMENTS, INC., 5 Harris Ct., Bldg. L, Monterey, CA 93940 (800-866-0200; 831-373-0200; FAX: 831-373-4402; e-mail: info@sierrainstruments.com; web site: www.sierrainstruments.com)**

Sierra Monitor Corp., 1991 Tarob Ct., Milpitas, CA 95035 (800-727-4377; 408-262-6611; FAX: 408-262-9042; e-mail: sales@sierramonitor.com; web site: www.sierramonitor.com)

Sigma Thermal Inc., 4875 Deen Road, Marietta, GA 30066 (7704275770; FAX: 6782541762; e-mail: sales@sigmathe-thermal.com; web site: www.sigmathe-thermal.com)

Sigrist Photometer AG, Hofstr. 1, Ennetbuergen 6373 (41-41-624-5454; FAX: 41-41-624-5455; e-mail: info@photometer.com; web site: www.photometer.com)

Singleton Corp., 3280 W. 6th Place, Cleveland, OH 44102 (216-651-7800; FAX: 216-651-4247; e-mail: info@single-toncorp.com; web site: www.singletoncorp.com)

Solutia Inc., A subsidiary of Eastman Chemical Co., 575 Maryville Centre Dr., St. Louis, MO 63141 (800-428-2463; (314) 674-1000; 800-433-6997; FAX: (314) 674-7433; e-mail: team.therminol@eastman.com; web site: www.therminol.com)

**SONICAIRE, 3831 Kimwell Drive, Winston Salem, NC 27103 (e-mail: moreinfo@iesclean.com)**

Southworth Products Corp., P.O. Box 1380, Portland, ME 04104-1380 (800-743-1000; 207-878-0700; FAX: 207-797-4734; e-mail: salesinfo@southworthproducts.com; web site: www.southworthproducts.com)

S-Products Inc., 141 Kings Highway E., Fairfield, CT 06825 (203-331-9546; FAX: 203-335-2723; e-mail: s-products@usa.net; web site: www.s-products.com)

Spaltech International Inc., 37 Charles Street, Halton Hills, L7G 2Z4 (905-877-2771; e-mail: info@spaltech.com; web site: www.spaltech.com)

Spartan Chemical Services Inc., P.O. Box 4207, Jersey City, NJ 07304-0207 (917-975-2268; FAX: 845-583-8062; e-mail: spartancsi@aol.com)

Spee Dee Packaging Machinery, 1360 Grandview Parkway, Sturtevant, WI 53177 (877-375-2121; 262-886-4402; FAX: 262-886-5502; e-mail: info@spee-dee.com; web site: www.spee-dee.com)

Spee-Dee Packaging Machinery, Inc., 1360 Grandview Parkway, WI 53177 (e-mail: tjohnson@spee-dee.com)

Spill Containment Direct, 208 Capital Dr., Buffalo, MN 55313 (7637623453; 7637623453; e-mail: sales@spill-containmentdirect.com)

Spirax Sarco, Inc., 1150 Northport Blvd., Blythwood, SC 29016 (800-883-4411; 803-714-2000; FAX: 803-714-2222; e-mail: us.inquiry@us.spiraxsarco.com; web site: www.spiraxsarco.com/global/us)

Sporian Microsystems, Inc., 515 Courtney Way - Suite B, Lafayette, CO 80026 (303-516-9075 X 19; e-mail: info@sporian.com; web site: www.sporian.com)

Spray Drying Systems, Inc., 5320 Enterprise Street, Suite J, Eldersburg, MD 21784 (410-549-8090; FAX: 410-549-8091; e-mail: sales@spraydrysys.com; web site: www.spraydrysys.com)

SPX Cooling Technologies, 7401 W 129 St., Overland Park, KS 66213 (913-664-7400; FAX: 913-664-7439; e-mail: spxcooling@spx.com; web site: spxcooling.com)

SPX Flow Technology, 4647 S.W. 40th Ave., Ocala, FL 34474 (352-237-1220; FAX: 352-873-5770; e-mail: pneumatic.sales@spx.com; web site: www.pneumaticproducts.com)

SRS Crisafulli, Inc., 1610 Crisafulli Dr., PO Box 1051, Glen- dale, MI 59330-1051 (800-442-7867; 406-365-3393; FAX: 406-365-8088; e-mail: srsc@crisafulli.com; web site: www.crisafullipumps.com)

Stainless Fabrication, Inc., 4455 W. Kearney, Springfield, MO 65803 (800-397-8265; 417-865-5696; FAX: 417-865-7863; e-mail: sfi-info@stainlessfab.com; web site: www.stainlessfab.com)

Staplex Co., Air Sampler Div., 777 Fifth Ave., Brooklyn, NY 11232-1626 (800-221-0822 (Not NYC); 718-768-3333; FAX: 718-965-0750; e-mail: info@staplex.com; web site: www.staplex.com)

StatPoint Technologies Inc., 560 Broadway Avenue, Suite 201, Warrenton, WA 20186 (800-232-7828; 540-428-0084; FAX: 540-428-0089; e-mail: info@statpoint.com; web site: www.statpoint.com)

Stedman, 129 Franklin Ave., Aurora, IN 47001 (800-262-5401; 812-926-0038; FAX: 812-926-3482; e-mail: sales@stedman-machine.com; web site: www.stedman-machine.com)

**Stonhard, Inc., One Park Ave, Maple Shade, NJ 08052 (856-779-7500; Fax: (856) 321-7525)**

Strobic Air, a CEEO Environmental Company, 700 Emlen Way, Telford, PA 18699 (800-722-3267; 215-723-4700; FAX: 215-723-7401; e-mail: tristack@strobicair.com; web site: www.strobicair.com)

Sturtevant Inc., 348 Circuit St., Hanover, MA 02339-2129 (800-992-0209 North America Only; 781-829-6501; FAX: 781-829-6515; e-mail: sales@sturtevantinc.com; web site: www.sturtevantinc.com)

SULPHURNET, Rietveldseweg 8, Culemborg, NLD NL1405LG (+31345476627; e-mail: info@sulphurnet.com; web site: www.sulphurnet.com)

**SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)**

International, Sulzer Chemtech Pte. Ltd., 10 Benoi Sector, Singapore 629845 (+65 6515 5500; FAX: +65 6862 7563)

OK, Sulzer Chemtech USA, Inc., 1 Sulzer Way, Tulsa 74107 (918 446 6672; FAX: 918 446 5321)



International, Sulzer Chemtech, 19F Hong Jia Tower, No. 388 Fushan Road, Pudong New District, Shanghai 200 122 (+86 21 6036 5100; FAX: 86 21 6036 5100 100)

**SULZER CHEMTECH USA, INC., 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rodney.alario@sulzer.com; web site: www.sulzer.com)**

International, Sulzer Chemtech, 5218 - 68 Avenue, Edmonton T6B 2X7 (780 577 7979; FAX: 780 577 7980)  
International, Sulzer Chemtech, Calz. a la Venta No. 19, Fracc. Industrial Cuamatla, Edo 54730 (52 55 50 01 68 00; FAX: 52 55 50 01 68 98)

International, Sulzer Chemtech, Rua dos Pardais 114, Vinhedo CEP 13280-000 (55 19 3876 2740; FAX: 55 19 3876 4989)

Summit Industrial Products, P.O. Box 131359, Tyler, TX 75713 (1-800-749-5823; 903.534.8021; e-mail: TonyD@ktsunmit.com; web site: www.ktsunmit.com/www.sublimedescaler.com)

Sumter Transport Company, 170 S Lafayette Dr, Sumter, SC 29150 (803-775-1002; FAX: (803) 778-0118; e-mail: rfmail@sumtertransport.com; web site: www.sumtertransport.com)

Supercritical Fluid Technologies, Inc., One Innovation Way, DE 19711 (e-mail: ken.krewson@supercriticalfluids.com)  
Sur-Loc Inc., 501 E. Swager Dr., P.O. Box 750, Fremont, IN 46737 (800-223-7517; 260-495-4065; FAX: 260-495-4205; e-mail: sales@swager.com; web site: www.surloc.com)

Sure Flow Products, 28265 Beck Road, Unit C-11, Wixom, MI 48393 (248-380-3569; FAX: 248-380-3568; e-mail: sales@sureflowproducts.com; web site: www.flowmeter-source.com)

Swagelok Co., 31500 Aurora Rd., Solon, OH 44139-2764 (440-349-5934; FAX: 440-349-5843; e-mail: publicrelations@swagelok.com; web site: www.swagelok.com)

Swager Communications, 501 E. Swager Dr., PO Box 656, Fremont, IN 46737 (800-968-5601; 260-495-2515; FAX: 800-882-3414; e-mail: sales@swager.com; web site: www.swager.com)

Swenson Technology, 26000 S. Whiting Way, Monee, IL 60449 (e-mail: sales@swensontechnology.com)  
Symmetric Research, 9101 W Sahara Ave Ste 105 PMB 209, Las Vegas, NV 89117 (702-341-9325; e-mail: info@symres.com; web site: www.symres.com)

Sympatec GmbH, System | Partikel | Technik , Am Pulverhaus 1, Clausthal-Zellerfeld, Germany 38678 (+49 5323 717 0 ; FAX: +49 5323 717 229; e-mail: sales@sympatec.com ; web site: www.sympatec.com )

Sympatec, Inc., System | Partikel | Technik, 1600, Reed Rd., Suite C, Pennington, NJ 08534 (609-303-0066; FAX: 609-303-0365; e-mail: usa@sympatec.com; web site: www.sympatec.com)

Synthetic Surfaces Inc., P.O. Box 241, Scotch Plains, NJ 07076 (908-233-6803; FAX: 908-233-6844; e-mail: info@nordot.com; web site: www.nordot.com)

Systech Instruments Ltd (Systech Illinois), 17 Thame Park Business Centre, Wenman Road, Thame OX9 3XA (+44 (0) 1844 216838; FAX: +44 (0) 1844 217220; e-mail: sales.uk@systechillinois.com; web site: www.systechillinois.com)

## T

TankLink, a wholly-owned subsidiary of Tetra Pak, 311 S Wacker Drive #4300, Chicago, IL 60606 (800) 835-8527; FAX: (312) 379-8310; e-mail: pbarron@tetrapak.com; web site: www.TankLink.com)

Tapflo Group, Filaregatan 4, S-442 34 Kungälv, Sweden, SWE (+46) 303 63390; FAX: (+46) 303 19916; e-mail: sales@tapflo.com; web site: www.tapflo.com)

**Team Industrial Services, Inc., 200 Hermann Dr., Alvin, TX 77511 (800-662-8326; 800-662-8326; FAX: 281-331-4107; e-mail: contact@teaminc.com; web site: www.teamindustrialservices.com)**

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tec5USA, 80 Skyline Dr., Plainville, NY 11803 (516-653-2000; FAX: 516-939-0555; e-mail: info@tec5usa.com; web site: www.tec5usa.com)

TECAM GROUP, Horts d'en Mateu, 26, ESP 08450 (e-mail: info@tecamgroup.com)

TechEng Designs, 120 Leland Road, London, CAN N6K1T3 (e-mail: nblack@rogers.com)

**TECHNICAL DATABASE SERVICES, INC. (TDS), Planetarium Station, P.O. Box 45, New York, NY 10024-1755 (646-669-8900; FAX: 646-669-7478; e-mail: info@tds-tds.com; web site: www.tds-tds.com)**

Technical Glass Products, 881 Callender Blvd, Painesville, OH 44077 (440-639-6399; FAX: 440-639-1292; e-mail: tgp@tgpohio.com; web site: www.technicalglass.com)

Techo Weigh Systems Pvt. Ltd, 276/8 Allied Complex, GIDC Makarpura, Vadodara, IND 390010 (e-mail: vikas@twspil.com)

Tef Cap Industries, 1155 Phoenixville Pike, Suite 103, West Chester, PA 19380 (e-mail: cnu@tefcap.com)

Teikoku USA, Inc., 959 Mearns Road, Westminster, PA 18974 (215-343-6000; e-mail: info@TeikokuPumps.com; web site: www.TeikokuPumps.com)

Tel-Tru Manufacturing Co., 408 St. Paul St., Rochester, NY 14605 (800-232-5335; 585-232-1440; 585 295-0235; FAX: 585-232-3857; e-mail: info@teltru.com; web site: www.teltru.com)

Tema Systems, Inc., 7806 Redsky Dr., Cincinnati, OH 45249 (513-489-7811; FAX: 513-489-4817; e-mail: sales@tema.net; web site: www.tema.net)

Temp-Pro Inc., 200 Industrial Dr., PO Box 89, Northampton, MA 01061-0089 (800-991-9093; 413-584-3165; FAX: 413-586-3625; e-mail: sales@temp-pro.com; web site: www.temp-pro.com)

Tempco Electric Heater Co., 607 N Central Ave, IL 60191 (e-mail: dennispadlo@tempco.com)

Tengs Valve International Limited, Keji Building, Jiangbei Subdistrict, Wenzhou, CHN 325100 (FAX: +86 577 56994546; e-mail: sales@tengsvalve.com; web site: www.tengsvalve.com)

TestOil, 20338 Progress Drive, Strongsville, OH 44149 (2162512510; e-mail: kwilliams@testoil.com; web site: www.testoil.com)

Tex-Fin, Inc., 19115 Aldine Westfield, Houston, Texas 77073 (1-800-932-8471; (281) 821-7150; FAX: (281) 821-1220; e-mail: sales@tex-fin.com; web site: www.tex-fin.com)

Texas Rope Rescue, PO Box 206, Northheim, TX 78141 (855-820-3058; 361-938-7080; FAX: 866-864-4741; e-mail: info@texasropesecue.com; web site: www.texasropesecue.com)

The Fitzpatrick Company, 832 Industrial Drive, Elmhurst, IL 60126 (630-530-3333; FAX: 630-530-0832; e-mail: fitzinfo@dexcorp.com; web site: www.fitzmill.com)

The Industrial Controls Company, Inc., 0 (e-mail: info@theindustrialcontrolsco.com; web site: www.theindustrialcontrolsco.com)

**The Lubrizol Corporation, 9911 Brecksville Rd., Cleveland, OH 44141-3247 (888-234-2436; 216-447-7397; FAX: 216-447-5750; web site: www.lubrizol.com)**

**THERMAL FLUID SYSTEMS INC., 3046 Matlock Drive, Kennesaw, GA 30144 (770-425-5556; FAX: 770-425-9559; e-mail: sales@tfsheat.com; web site: www.tfsheat.com)**

Thermal Spray Coatings - A&A Coatings, 2700 South Clinton Avenue, South Plainfield, NJ 7080 (888) 725-0150; FAX: 908-561-4201; e-mail: victoria@thermalspray.com; web site: www.thermalspray.com)

Thermal Spray Solutions, Inc., 1105 International Plaza, Suite B, Chesapeake, Virginia 23323 (757-673-2468; FAX: 757-673-3128; e-mail: Info@thermalsprayusa.com; web site: www.thermalsprayusa.com)

Thermionics Corp., 41 Hampden Rd., Mansfield, MA 02048 (800-628-4722; 781-688-2300; e-mail: sales@thermionics.com; web site: www.thermionics.com)

Thermotron, 291 Kollen Park Dr., Holland, MI 49423 (616-393-4580; FAX: 616-392-5643; e-mail: info@thermotron.com; web site: www.thermotron.com)

Thorburn Flex, 173 Oneida Drive, Pointe-Claire Quebec, CAN (810)772-0205; web site: www.thorburnflex.com)

ThyssenKrupp Industrial Solutions AG, Business Unit Process Technologies, Friedrich-Uhde-Str. 15, Dortmund 44141 (49-231-547-0; FAX: 49-231-547-3032; e-mail: process-technologies@thyssenkrupp.com; web site: www.thyssenkrupp-industrial-solutions.com)

Tiger Tower Services, 8774 Fawn Trail, Conroe, TX 77385 (281-951-2500; FAX: 281-951-2520; e-mail: info@tigertowerservices.com; web site: www.tigertowerservices.com)

Tiger Tower Services, LLC, 8774 Fawn Trail, Conroe, TX 77385 (281-951-2500; e-mail: barbour@tigertowerservices.com; web site: www.tigertowerservices.com)

**TITAN Metal Fabricators, Engineered Products, 352 Balboa Circle, Camarillo, CA 93012 (805 487 5050; FAX: 805 487 5050; e-mail: info@titanmf.com; web site: www.titanmf.com)**

**TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)**

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TMTS Associates, Inc., Combustion/Air Pollution Control, 399 Pavilion St., Atlanta, GA 30315-1452 (404-627-4722; e-mail: tmcgowan@mindspring.com; web site: www.tmtsassociates.com)

Toll Blender Network, 50 Willowbrook Drive, CT 06410 (e-mail: djdicenzo@tollblendernetwork.com)

Topp Industries, Inc., 420 State Highway 25 North, Rochester, IN 46975 (800-354-4534; 574-223-3681; FAX: 574-223-6106; e-mail: toppindustries@toppindustries.com; web site: www.toppindustries.com)

TowerScan, 3560 Pine Grove Ave., Ste. 497, Port Huron, MI 48060 (888-724-1798; 888-724-1798; FAX: 281-966-6983; e-mail: info@towerscan.com; web site: www.towerscan.com)

TowerScan, 834 Upper Canada Dr., Sarnia, N7W1A4 (888 724-1798; 519 344-7132; FAX: 519 336-8340; e-mail: info@towerscan.com; web site: www.towerscan.com)

Trans Environmental Systems, Inc., 1363 Wimbledon Way, Charlottesville, VA 22901 (800-220-2466; 434-975-2872; e-mail: TESInfo@transenv.com; web site: www.transenv.com)

Tranter Ltd., Unit 50, Monckton Rd. Industrial Estate, Wakefield WF2 7AL (44-1924-298393; FAX: 44-1924-291596; e-mail: info@se.tranter.com; web site: www.tranter.com)

**Tri-Mer Corp., 1400 Monroe St., P.O. Box 730, Owosso, MI 48867, United States (989-723-7838; FAX: 989-723-7844; e-mail: sales@tri-mer.com; web site: www.tri-mer.com)**

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Triark Pumps Ltd., The Sail Loft, Burnham Business Park, Springfield Road, Burnham-on-Crouch, Essex, GBR CM0 8TE (0800 9 788844; FAX: +44 (0) 1621 781155; e-mail: sales@tri-ark.com; web site: tri-ark.com)

Trinity Consultants, 1270 Meritt Drive, Suite 900, Dallas, TX 75251 (800-229-6655; 972-661-8100; FAX: 972-385-9203; e-mail: Iredmon@trinityconsultants.com; web site: www.trinityconsultants.com)

ts-systemfilter gmbh, Gaensaecker 9, Ahorn-Berolzheim 74744 (+49 06296880; FAX: +49 062968855; e-mail: info@ts-systemfilter.de; web site: www.ts-systemfilter.de)

Tuf-Lok International, P.O. Box 5078, Madison, WI 53705 (608-270-9478; FAX: 608-270-2080; e-mail: info@tuflok.com; web site: www.tuflok.com)

Turner Designs Hydrocarbon Instruments, Inc., 2023 N. Gateway Blvd., Ste. 101, Fresno, CA 93727 (559-253-1414; FAX: 559-253-1090; e-mail: medwards@oilwatermonitors.com; web site: www.oilwatermonitors.com)

Turner EnviroLogic, Inc., 1140 S.W. 34th Avenue, Deerfield Beach, FL 33442 (800-933-8385; 954-422-9787; FAX: 954-422-9723; e-mail: sales@tenviro.com; web site: www.tenviro.com)

**TUTHILL VACUUM & BLOWER SYSTEMS, 4840 W. Kearney Street, Springfield, MO 65803-8702 (800-825-6937; 417-865-8715; FAX: 417-865-2950; e-mail: vacuum@tuthill.com; web site: tuthillvacuumblower.com)**

TW Metals, 760 Constitution Dr., Ste. 204, Exton, PA 19341 (800-545-5000; 610-458-1300; FAX: 610-458-1399; e-mail: sales@twmetals.com; web site: www.twmetals.com)

## U

UIC Inc., 1225 Channahon Rd., P.O. Box 863, Joliet, IL 60434-0863 (800-342-5842 (Not IL); 815-744-4477; FAX: 815-744-1561; e-mail: warmstrong@uicinc.com; web site: www.uicinc.com)

Ultrachem, Inc., 900 Centerpoint Blvd, New Castle, DE 19720 (302-325-9880; FAX: 302-325-0335; e-mail: info@ultracheminc.com; web site: ultracheminc.com/)



**UNIFLUX / EXOTHERM CORP., 888 Wilcrest Drive, Houston, TX 77042 (713-981-9100; FAX: 713-981-7081; e-mail: info@exotherm.com; web site: www.exotherm.com)**

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Union Special, LLC, One Union Special Plaza, Huntley, IL 60142 (800-344-9698; 847-669-4500; FAX: 847-669-4239; e-mail: sales@unionspecial.com; web site: www.unionspecial.com)

**UNITED ELECTRIC CONTROLS CO., 180 Dexter Ave., Watertown, MA 02471-9143 (617-926-1000; FAX: 617-926-2568; web site: www.ueonline.com)**

United Filtration Systems, Inc., 6558 Diplomat Dr, Sterling Heights, MI 48314 (1-800-311-5561; 586-802-5561; FAX: 586-802-5562; web site: www.unitedfiltration.com)

United Manufacturing International 2000 Activated Carbon, 820 Kimball Road, Ste. 1002, Red Bluff, CA 96080 (530-528-1361; FAX: 530-528-1361; e-mail: activecarbon@jps.net; web site: umi20001.tripod.com)

United Performance Metals, 12223 F.M. 529, Houston, TX 77041 (866.588.3637; 832.243.0008; FAX: 832.243.9432; e-mail: sales@upmet.com; web site: www.upmet.com)

Universal Flow Monitors, Inc., P.O. Box 249, Hazel Park, MI 48030 (888-569-3090; 248-542-9635; FAX: 248-398-4274; e-mail: [ufm@flowmeters.com](mailto:ufm@flowmeters.com); web site: [www.flowmeters.com](http://www.flowmeters.com))

Universal Tank & Fabrication, 8025 Chavenelle Road, Dubuque, IA 52002 (563-556-5889; FAX: 563-556-5870; e-mail: [red@universaltank.com](mailto:red@universaltank.com); web site: [www.universaltank.com](http://www.universaltank.com))

URACA GmbH & Co. KG, Sirchinger Str. 15, Bad Urach, O 72574 (07125-133-0; FAX: 07125-133-202; e-mail: [info@uraca.de](mailto:info@uraca.de); web site: [www.uraca.com](http://www.uraca.com))

**USA INDUSTRIES, INC., 302 State Street, S. Houston, TX 77587 (800-456-8721; 713-941-3797; 713-941-3797; FAX: 713-941-1086; e-mail: [info@usaindustries.com](mailto:info@usaindustries.com); web site: [www.usaindustries.com](http://www.usaindustries.com))**

US Underwater Services, 101 Northeast Haskew, Burlington, Texas 76028 (800) 860-2178; 817-447-7321; FAX: (817) 447-0021; web site: [www.usunderwaterservices.com](http://www.usunderwaterservices.com))

## V

V2 Flow Controls, 1333 Burr Ridge Parkway Suite 200, Burr Ridge, IL 60527 ((630)962-6870; web site: [www.v2flowcontrols.com](http://www.v2flowcontrols.com))

VanDeMark Chemical Inc., One North Transit Road, Lockport, NY 14094 (800-836-8253; 716-433-6764; FAX: 716-433-2850; e-mail: [sales@vdmchemical.com](mailto:sales@vdmchemical.com); web site: [www.vdmchemical.com](http://www.vdmchemical.com))

Van London-pHoenix Co., 6103 Glenmont Drive, Houston, TX 77081 (800-522-7920; 713-772-6641; FAX: 713-772-4671; e-mail: [info@VL-PC.com](mailto:info@VL-PC.com); web site: [www.VL-PC.com](http://www.VL-PC.com))

**VANTON PUMP & EQUIPMENT CORP., 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: [mkt@vanton.com](mailto:mkt@vanton.com); web site: [www.vanton.com](http://www.vanton.com))**

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**Vari-Flow Products, PO Box 78278, Baton Rouge, LA 70837 (225-261-3180; Fax: 225-261-3189; [www.ictsinc.com](http://www.ictsinc.com))**

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VDMA, Process Plant and Equipment Association, Lyoner Str. 18, Frankfurt am Main, Germany 60528 (+49 69 6603-1432; FAX: +49 69 6603-2432; e-mail: [vtma@vdma.org](mailto:vtma@vdma.org); web site: [www.vdma.org](http://www.vdma.org))

VDM Metals GmbH, Plettenberger Str. 2, P.O. Box 1820, Werdohl, NRW D-58778 (+49-2392-55-0; FAX: 49-2392-55-2217; e-mail: [vdm@vdm-metals.com](mailto:vdm@vdm-metals.com); web site: [www.vdm-metals.com](http://www.vdm-metals.com))

Vector Technologies Ltd., 6820 N. 43rd St., Milwaukee, WI 53209 (800-832-4010; 414-247-7100; FAX: 414-247-7110; e-mail: [sales@vector-vacuums.com](mailto:sales@vector-vacuums.com); web site: [www.vector-vacuums.com](http://www.vector-vacuums.com))

VEGA Americas, Inc., 4170 Rosslyn Drive, Cincinnati, OH 45209 (513 2720131; FAX: 513 2720133; e-mail: [americas@vega.com](mailto:americas@vega.com); web site: [www.vega-americas.com](http://www.vega-americas.com))

**VEGA GRIESHABER KG, Am Hohenstein 113, Schiltach, Germany, 77761 (+49 7836 50-0; FAX: +49 7836 50-201; e-mail: [info.de@vega.com](mailto:info.de@vega.com); web site: [www.vega.com](http://www.vega.com))**

Vent-A-Fume, 51 Botsford Place, Buffalo, NY 14216 (877-876-8368; 716-876-2023; FAX: 716-876-4383; e-mail: [info@ventafume.com](mailto:info@ventafume.com); web site: [www.VentAKiln.com](http://www.VentAKiln.com))

Veolia Environmental Services, 200 E. Randolph, Ste. 7900, Chicago, Illinois 60601 ((312) 552-2800; FAX: (312) 552-2837; web site: [www.veoliaes.com](http://www.veoliaes.com))

Veolia Water Solutions & Technologies, 250 Airside Drive, Airside Business Park, Moon Township, PA 15108 (412-809-6000; FAX: 412-809-6512; e-mail: [waterinfo@veoliawater.com](mailto:waterinfo@veoliawater.com); web site: [www.veoliawater.usa.com](http://www.veoliawater.usa.com))

Vibra-Metrics, div. of Mistras Holdings, 195 Clarksville Rd, Princeton Junction, NJ 08550 (609-716-4000; FAX: 609-716-0706; e-mail: [sales@mistrasgroup.com](mailto:sales@mistrasgroup.com); web site: [www.mistrasgroup.com](http://www.mistrasgroup.com))

Vibra Screw Inc., 755 Union Blvd., P.O. Box 229, Totowa, NJ 07511 (973-256-7410; FAX: 973-256-7567; e-mail: [info@vibrascrewinc.com](mailto:info@vibrascrewinc.com); web site: [www.vibrascrew.com](http://www.vibrascrew.com))

Viega, 301 N. Main, 9th Floor, Wichita, Kansas 67202 ((316) 425-7400; FAX: (316) 425-7618; e-mail: [inside-sales@viega.com](mailto:inside-sales@viega.com); web site: [www.viega.com](http://www.viega.com))

Vista Control Systems, Inc., 2101 Trinity Drive, Ste Q, Los Alamos, NM 87544 (505-662-2484; FAX: 505-662-3956; e-mail: [clout@vista-control.com](mailto:clout@vista-control.com); web site: [www.vista-control.com](http://www.vista-control.com))

Voith Turbo GmbH & Co. KG, Voithstr. 1, Craisheim, Germany 74564 (+49 7951 32-0; FAX: +49 7951 32-500; e-mail: [info.voithturbo@voith.com](mailto:info.voithturbo@voith.com); web site: [www.voith.com](http://www.voith.com))

Vortab Company, 1755 La Costa Meadows Drive, San Marcos, CA 92078 ((800) 854-9959; (760) 736-6114; FAX: (760) 736-6250; e-mail: [FCIcmrcom@fluidcomponents.com](mailto:FCIcmrcom@fluidcomponents.com); web site: [www.vortab.com](http://www.vortab.com))

Vortex, 1725 Vortex Avenue, Salina, KS 67401-1768 (888-829-7821; 785-825-7177; FAX: 785-825-7194; e-mail: [vortex@vortexvalves.com](mailto:vortex@vortexvalves.com); web site: [www.vortexvalves.com](http://www.vortexvalves.com))

## W

W.L. Gore & Associates, Sealant Technologies, 201 Airport Road, P.O. Box 1488, Elkton, MD 21921 (410-392-3200; FAX: 410-392-4817; web site: [www.gore.com/sealants](http://www.gore.com/sealants))



**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: [info@wabash-power.com](mailto:info@wabash-power.com); web site: [www.wabashpower.com](http://www.wabashpower.com))**

Walchem, IWAKI America, Inc., 5 Boynton Rd., Holliston, MA 01746 (508-429-1110; FAX: 508-429-7433; e-mail: [info@walchem.com](mailto:info@walchem.com); web site: [www.walchem.com](http://www.walchem.com))

Walker Magnetics, 60C Solferino Street, Wor, MA 01604 (414-321-9739; FAX: 414-321-9756; e-mail: [mormag@earthlink.net](mailto:mormag@earthlink.net); web site: [www.walker-magnet.com](http://www.walker-magnet.com))

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WaterProfessionals, 2004 Highway 75, P.O. Box 1037 TCAS, Blountville, TN 37617 (1-800-999-4195; 18009994195; 18009994195; e-mail: [waterprofessionals@gmail.com](mailto:waterprofessionals@gmail.com); web site: [www.waterprofessionals.com](http://www.waterprofessionals.com))

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## X

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## Z

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# TLV® STEAM TRAPS

LONG LIFE, ENERGY EFFICIENCY, & MAXIMUM PROCESS PRODUCTION

## Free Float® and Float-Dynamic® Steam Traps

Free Float and Float-Dynamic steam traps are designed for drip, tracer, clean steam, and process service to 1,740 psig. Capacities of Float-Dynamic models are as high as 350,000 lb/hr with drain trap leakage rating equivalent to Class 6. Free Float stainless steel ball float serves as main valve and responds instantly to condensate flow. Entire surface of ball serves as main valve. No hinges or linkages are used. Separate thermostatic element removes any air present in the system. TLV's Float-Dynamic steam traps utilize a Free Float ball valve to actuate a piston operated main valve to provide a high condensate drainage capacity. Traps provide reduced maintenance, lower operating costs, and long service life.

### SST Series

Stainless steel traps, all stainless steel internals. For drip, tracer, and clean steam applications to 650 psig. Connection NPT, S.W. or flanged. ½ - 1" horizontal & vertical configurations.



### SJ, J, JL Series

Cast steel and cast iron float traps, stainless steel internals for all applications to 300 psig, capacities to 131,850 lb/hr. NPT, flanged connections ½ - 4" straight through horizontal or same side parallel sizes.



### SH, JH(R)(L) Series

Carbon steel or chrome moly traps, all stainless steel internals. Steam tight even under low condensate flow conditions for high pressure superheat applications to 1,740 psig, capacities to 350,000 lb/hr. NPT, S.W., or flanged connections. ½ - 1" in horizontal or vertical configurations.



## PowerTrap® Non-Electric Pumps: GP & GT Series

TLV's unique, patented, non-electric pumps permit the return of condensate or other fluids by using the motive force of steam or compressed air. TLV pumps eliminate the problems associated with electric pumps (leaking seals, faulty motor controls, cavitation, failed motors, and hazardous locations). The patented float operated mechanism uses an Inconel spring which compresses rather than stretches to activate the pump. Other internals are stainless steel with critical wearing parts first heat treated, then an additional super hard coating is applied to deliver the most reliable non-electric pump available. Cast iron, carbon steel, or stainless steel non-electric pumps with capacities exceeding 80,000 lb/hr. Available in pump or pump/trap combinations for wide range of applications. NPT or S.W. connections from 1 - 3".



## PowerDyne™ Steam Traps

TLV's PowerDyne steam traps offer the widest pressure range of any thermodynamic steam trap available and combine both a thermodynamic disc and a thermostatic air vent to provide fast, efficient removal of condensate and air. PowerDyne steam traps are available with in-line replacement modules for ease of maintenance.

### P Series

Carbon steel and stainless steel traps, all stainless steel internals. For drip, tracer, and light processes to 1,400 psig, capacities to 4,550 lb/hr. NPT, S.W., or flanged connection in ¼ - 1" horizontal configurations.



### QuickTrap® Series

Two-bolt replacement system enables installation in minutes. Universal flange design permits correct installation in any configuration. Choose from Free Float, Thermodynamic or Thermostatic up to 650 psig. ½ - 1" available in NPT, S.W. or flanged.



### HR Series

Chrome moly traps with in-line replacement modules for high pressure drip applications to 3,700 psig, capacities to 1,050 lb/hr. NPT, S.W. or flanged Connections ½ - 1" horizontal configurations.



## Thermostatic Steam Traps

TLV's thermostatic steam traps deliver the benefits of efficient operation and long service life. Design of stainless steel internal components, bimetallic elements or patented balanced pressure capsule, along with high temperature rating (572°F) make traps suitable for use on all applications.

### L Series

Maintainable carbon or stainless steel traps with patented "fail-open" design for drip, tracer, and clean steam, to 650 psig, capacities to 1,700 lb/hr. NPT, S.W., or flanged in ½ - 1" horizontal or vertical configurations.



## TrapMan®

Computerized Steam Trap Management System. Complete measurement and analysis consisting of Trapman hardware, a precise ultrasonic and temperature testing instrument, and TrapManager® software, a comprehensive Windows 7 program designed to enable extensive data analysis and database management of the entire trap population.



# TLV®

TLV CORPORATION  
13901 South Lakes Drive  
Charlotte, NC 28273-6790  
Tel: 704-597-9070 Fax: 704-583-1610  
www.tlv.com

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# 1

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## Fans, axial

AIRLANCO, Falls City, NE  
Chicago Blower Corp., Glendale Heights, IL  
Strobic Air, a CECO Environmental Company, Telford, PA  
**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)

## Fans, centrifugal

AIRLANCO, Falls City, NE  
AirPro Fan & Blower Company, WI  
Chicago Blower Corp., Glendale Heights, IL  
HEE-DUALL, A CECO ENVIRONMENTAL COMPANY, Owosso, MI  
**HEMCO CORPORATION**, 711 South Powell Road, Independence, MO 64056 (800-779-4362; 816-796-2900; FAX: 816-796-3333; e-mail: info@hemcocorp.com; web site: www.HEMCOcorp.com)

Strobic Air, a CECO Environmental Company, Telford, PA  
**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)

## Fans, cooling tower

SPX Cooling Technologies, Overland Park, KS

## Fans, corrosion resistant

Chicago Blower Corp., Glendale Heights, IL  
Creative Pultrusions, Inc., Alum Bank, PA  
HEE-DUALL, A CECO ENVIRONMENTAL COMPANY, Owosso, MI  
**HEMCO CORPORATION**, 711 South Powell Road, Independence, MO 64056 (800-779-4362; 816-796-2900; FAX: 816-796-3333; e-mail: info@hemcocorp.com; web site: www.HEMCOcorp.com)

Strobic Air, a CECO Environmental Company, Telford, PA

## Fans, exhaust

Chicago Blower Corp., Glendale Heights, IL  
HEE-DUALL, A CECO ENVIRONMENTAL COMPANY, Owosso, MI  
**HEMCO CORPORATION**, 711 South Powell Road, Independence, MO 64056 (800-779-4362; 816-796-2900; FAX: 816-796-3333; e-mail: info@hemcocorp.com; web site: www.HEMCOcorp.com)

Strobic Air, a CECO Environmental Company, Telford, PA  
Vent-A-Fume, Buffalo, NY

## Fans, exhaust or ventilating, general use

Chicago Blower Corp., Glendale Heights, IL  
HEE-DUALL, A CECO ENVIRONMENTAL COMPANY, Owosso, MI  
Hepa Corporation, Anaheim, CA  
Strobic Air, a CECO Environmental Company, Telford, PA

## Fans, explosion resistant

**HEMCO CORPORATION**, 711 South Powell Road, Independence, MO 64056 (800-779-4362; 816-796-2900; FAX: 816-796-3333; e-mail: info@hemcocorp.com; web site: www.HEMCOcorp.com)

Strobic Air, a CECO Environmental Company, Telford, PA

## Fans, heavy duty

Chicago Blower Corp., Glendale Heights, IL  
**INDECK POWER EQUIPMENT CO.**, 1111 Willis Ave. (CE), Wheeling, IL 60090 (800-446-3325; 847-541-8300; FAX: 847-541-9984; e-mail: info@indeck-power.com; web site: www.indeck.com)

Strobic Air, a CECO Environmental Company, Telford, PA  
**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)

## Fans, high temperature

Chicago Blower Corp., Glendale Heights, IL  
Strobic Air, a CECO Environmental Company, Telford, PA  
**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)

## Fans, other

Strobic Air, a CECO Environmental Company, Telford, PA

## FLEXIBLE HOSE, METALLIC & NONMETALLIC

### Hose, air

Aflex Hose USA, LLC, Pipersville, PA  
NewAge Industries, Inc., Southampton, PA  
PHOENIX Conveyor Belt Systems GmbH, Hamburg

### Hose, chemically resistant

Aflex Hose USA, LLC, Pipersville, PA  
ELAFLEX - Gummi Ehlers GmbH, Hamburg, Germany  
NewAge Industries, Inc., Southampton, PA  
PHOENIX Conveyor Belt Systems GmbH, Hamburg  
Tef Cap Industries, West Chester, PA

### Hose, electrically heated

Aflex Hose USA, LLC, Pipersville, PA  
Clean Air Express Equipment, Palatine, IL  
Clean Air Instrument Rental, Palatine, IL

### Hose fittings

Aflex Hose USA, LLC, Pipersville, PA  
ELAFLEX - Gummi Ehlers GmbH, Hamburg, Germany  
NewAge Industries, Inc., Southampton, PA  
Thorburn Flex, Pointe-Claire Quebec, CAN

### Hose, high pressure

ELAFLEX - Gummi Ehlers GmbH, Hamburg, Germany  
PHOENIX Conveyor Belt Systems GmbH, Hamburg  
Thorburn Flex, Pointe-Claire Quebec, CAN  
Witzenmann GmbH, Pforzheim

### Hose, jacketed

Aflex Hose USA, LLC, Pipersville, PA

### Hose, metallic

Hyspan Precision Prod. Inc., Chula Vista, CA  
**PROCO PRODUCTS, INC.**, 2431 N. Wigwam Dr. - 95205, P.O. Box 590, Stockton, CA 95201-0590 (800-344-3246 USA & Canada; 209-943-6088; FAX: 209-943-0242; e-mail: sales@procoproducts.com; web site: www.procoproducts.com)

### Hose, nonmetallic, fluoroplastic

Aflex Hose USA, LLC, Pipersville, PA  
**PROCO PRODUCTS, INC.**, 2431 N. Wigwam Dr. - 95205, P.O. Box 590, Stockton, CA 95201-0590 (800-344-3246 USA & Canada; 209-943-6088; FAX: 209-943-0242; e-mail: sales@procoproducts.com; web site: www.procoproducts.com)

Tef Cap Industries, West Chester, PA

### Hose, sanitary

Aflex Hose USA, LLC, Pipersville, PA

Tef Cap Industries, West Chester, PA

## Hose, steam

Aflex Hose USA, LLC, Pipersville, PA  
Witzenmann GmbH, Pforzheim

## Hose, vacuum

Escitec, Mesa, AZ  
Flowrox Oy, Lappeenranta  
NewAge Industries, Inc., Southampton, PA  
Vector Technologies Ltd., Milwaukee, WI  
Witzenmann GmbH, Pforzheim

## Hose, water

NewAge Industries, Inc., Southampton, PA  
Witzenmann GmbH, Pforzheim

## PIPE FITTINGS & COUPLINGS, METALLIC & NONMETALLIC

### Bends, pipe

**BUTTING GROUP**, Gifhorner Straße 59, Knesebeck, Germany 29379 (e-mail: mareike.wolter@butting.de)

— See our ad on page 17

**FR. JACOB SOEHNE GMBH & CO. KG**, Niedemfeldweg 14, Porta Westfalica, NRW, Germany 32457 (49-571-9558-0; FAX: 49-571-9558-160; e-mail: post@jacob-rohre.de; web site: www.jacob-rohre.de)

Viega, Wichita, Kansas

### Couplings, flexible

**GENERAL RUBBER CO.**, 861 Washington Ave, Carlstadt, NJ 07072 (800-233-6294; (201) 935-1900; FAX: (201) 935-1915; web site: general-rubber.com)

Thorburn Flex, Pointe-Claire Quebec, CAN  
Voith Turbo GmbH & Co. KG, Craisheim, Germany

### Couplings, quick connect

Bee Valve Inc., Elyria, OH  
CEJN Industrial Corp., Gurnee, Illinois  
CPC (Colder Products Company), St. Paul, MN  
Green Leaf Inc., Fontanet, IN  
Thorburn Flex, Pointe-Claire Quebec, CAN  
Tuf-Lok International, Madison, WI  
WALTHER-PRAEZISION, Quick Coupling Systems, Germany

### Couplings, rigid

CPC (Colder Products Company), St. Paul, MN  
Tuf-Lok International, Madison, WI

### Couplings, self aligning

Tuf-Lok International, Madison, WI

### Elbows, pipe

Green Leaf Inc., Fontanet, IN  
HammerTek Corporation, Landisville, PA  
Viega, Wichita, Kansas

### Expansion bellows

ELAFLEX - Gummi Ehlers GmbH, Hamburg, Germany  
Thorburn Flex, Pointe-Claire Quebec, CAN

### Expansion joints, flexible

ELAFLEX - Gummi Ehlers GmbH, Hamburg, Germany  
**GENERAL RUBBER CO.**, 861 Washington Ave, Carlstadt, NJ 07072 (800-233-6294; (201) 935-1900; FAX: (201) 935-1915; web site: general-rubber.com)

Hyspan Precision Prod. Inc., Chula Vista, CA  
**PROCO PRODUCTS, INC.**, 2431 N. Wigwam Dr. - 95205, P.O. Box 590, Stockton, CA 95201-0590 (800-344-3246 USA & Canada; 209-943-6088; FAX: 209-943-0242; e-mail: sales@procoproducts.com; web site: www.procoproducts.com)

Thorburn Flex, Pointe-Claire Quebec, CAN  
Witzenmann GmbH, Pforzheim

### Flanges

ELAFLEX - Gummi Ehlers GmbH, Hamburg, Germany  
**HAYWARD FLOW CONTROL**, One Hayward Industrial Drive, Clemmons, NC 27012 (888-429-4635 USA/Canada; 888-429-4635; FAX: 888-778-8410; e-mail: hflow@hayward.com; web site: www.haywardflowcontrol.com)

**MICROMOLD PRODUCTS, INC.**, 7 Odell Plaza #133, Yonkers, NY 10701 (914-969-2850)

Tengs Valve International Limited, Wenzhou, CHN  
**USA INDUSTRIES, INC.**, 302 State Street, S. Houston, TX 77587 (800-456-8721; 713-941-3797; 713-941-3797; FAX: 713-941-1088; e-mail: info@usaindustries.com; web site: www.usaindustries.com)

Viega, Wichita, Kansas



## Flow conditioners

Vortab Company, San Marcos, CA

## Hangers, pipe & tube

Tuf-Lok International, Madison, WI  
Witzenmann GmbH, Pforzheim

## Joints, swivel

ELAFLEX - Gummi Ehlers GmbH, Hamburg, Germany

## Pipe adapters

Afflex Hose USA, LLC, Pipersville, PA  
**FR. JACOB SOEHNE GMBH & CO. KG, Niedemfeldweg 14, Porta Westfalica, NRW, Germany 32457 (49-571-9558-0; FAX: 49-571-9558-160; e-mail: post@jacob-rohre.de; web site: www.jacob-rohre.de)**  
Viega, Wichita, Kansas

## Pipe fittings, emergency repair

Team Industrial Services, Inc., Alvin, TX  
— See our ad on back cover  
Viega, Wichita, Kansas

## Pipe fittings, high pressure

Kraissl Co. Inc., Hackensack, NJ  
Tuf-Lok International, Madison, WI

## Pipe fittings, jacketed

Dueker GmbH & Co. KGaA, Laufach  
Kraissl Co. Inc., Hackensack, NJ

## Pipe fittings, lined

Abresist Kalenborn Corporation, Urbana, IN  
Afflex Hose USA, LLC, Pipersville, PA

## Pipe fittings, metallic

Bee Valve Inc., Elyria, OH

## Pipe fittings, nonmetallic

AGRU Kunststofftechnik GmbH, Bad Hall  
Corzan Industrial Systems, Cleveland, OH  
**GENERAL RUBBER CO., 861 Washington Ave, Carlstadt, NJ 07072 (800-233-6294; (201) 935-1900; FAX: (201) 935-1915; web site: general-rubber.com)**  
Green Leaf Inc, Fontanet, IN  
**MICROMOLD PRODUCTS, INC., 7 Odell Plaza #133, Yonkers, NY 10701 (914-969-2850)**  
**PROCO PRODUCTS, INC., 2431 N. Wigwam Dr. - 95205, P.O. Box 590, Stockton, CA 95201-0590 (800-344-3246 USA & Canada; 209-943-6088; FAX: 209-943-0242; e-mail: sales@procoproducts.com; web site: www.procoproducts.com)**

## Pipe fittings, sanitary

**MICROMOLD PRODUCTS, INC., 7 Odell Plaza #133, Yonkers, NY 10701 (914-969-2850)**

## Pipe strainers

Kraissl Co. Inc., Hackensack, NJ  
**MICROMOLD PRODUCTS, INC., 7 Odell Plaza #133, Yonkers, NY 10701 (914-969-2850)**

## Sleeves, pipe

**GENERAL RUBBER CO., 861 Washington Ave, Carlstadt, NJ 07072 (800-233-6294; (201) 935-1900; FAX: (201) 935-1915; web site: general-rubber.com)**

## Unions, pipe

Viega, Wichita, Kansas

## PIPE, ALLOY STEEL

### Pipe, high-alloy steel

TW Metals, Exton, PA

### Pipe, nickel & nickel alloy

Arch City Steel, Fenton, Missouri  
**BUTTING GROUP, Gifhorner Straße 59, Kneesebeck, Germany 29379 (e-mail: mareike.wolter@butting.de) — See our ad on page 17**  
Corrosion Materials, Baker, LA  
Regal Industries, Inc., Painesville, OH  
Sandvik Materials Technology, Tubular Products, Scranton, PA  
TW Metals, Exton, PA  
Viega, Wichita, Kansas

### Pipe, stainless steel

Arch City Steel, Fenton, Missouri  
Regal Industries, Inc., Painesville, OH  
Sandvik Materials Technology, Tubular Products, Scranton, PA  
TW Metals, Exton, PA  
Viega, Wichita, Kansas  
Wolsley Industrial Group, Newport News, VA

## PIPE, ALUMINUM & ALUMINUM ALLOYS

### Pipe, aluminum

**BUTTING GROUP, Gifhorner Straße 59, Kneesebeck, Germany 29379 (e-mail: mareike.wolter@butting.de) — See our ad on page 17**  
TW Metals, Exton, PA

## PIPE, CARBON STEEL

### Pipe, carbon steel, seamless

Wolsley Industrial Group, Newport News, VA

## PIPE, COPPER & COPPER ALLOYS

### Pipe, copper alloy

**BUTTING GROUP, Gifhorner Straße 59, Kneesebeck, Germany 29379 (e-mail: mareike.wolter@butting.de) — See our ad on page 17**

## PIPE, LINED

### Pipe, plastic lined

FABRICATED PLASTICS LIMITED, MAPLE  
Wolsley Industrial Group, Newport News, VA

## PIPE, NONMETALLIC

### Pipe, graphite

CG Thermal LLC, Twinsburg, Ohio

### Pipe, rubber

**GENERAL RUBBER CO., 861 Washington Ave, Carlstadt, NJ 07072 (800-233-6294; (201) 935-1900; FAX: (201) 935-1915; web site: general-rubber.com)**  
**PROCO PRODUCTS, INC., 2431 N. Wigwam Dr. - 95205, P.O. Box 590, Stockton, CA 95201-0590 (800-344-3246 USA & Canada; 209-943-6088; FAX: 209-943-0242; e-mail: sales@procoproducts.com; web site: www.procoproducts.com)**

## PIPE, OTHER

### Pipe, custom fabricated

Abresist Kalenborn Corporation, Urbana, IN  
FABRICATED PLASTICS LIMITED, MAPLE

### Pipe, flanged

Abresist Kalenborn Corporation, Urbana, IN  
**FR. JACOB SOEHNE GMBH & CO. KG, Niedemfeldweg 14, Porta Westfalica, NRW, Germany 32457 (49-571-9558-0; FAX: 49-571-9558-160; e-mail: post@jacob-rohre.de; web site: www.jacob-rohre.de)**

### Pipe, jacketed

Dueker GmbH & Co. KGaA, Laufach

## PIPE, PLASTIC

### Pipe, ABS

Georg Fischer Piping Systems Ltd., Schaffhausen

### Pipe, PTFE

**MICROMOLD PRODUCTS, INC., 7 Odell Plaza #133, Yonkers, NY 10701 (914-969-2850)**  
**PROCO PRODUCTS, INC., 2431 N. Wigwam Dr. - 95205, P.O. Box 590, Stockton, CA 95201-0590 (800-344-3246 USA & Canada; 209-943-6088; FAX: 209-943-0242; e-mail: sales@procoproducts.com; web site: www.procoproducts.com)**

### Pipe, chlorinated PVC

Corzan Industrial Systems, Cleveland, OH  
Georg Fischer Piping Systems Ltd., Schaffhausen

### Pipe, polyethylene

AGRU Kunststofftechnik GmbH, Bad Hall  
Georg Fischer Piping Systems Ltd., Schaffhausen

### Pipe, polypropylene

AGRU Kunststofftechnik GmbH, Bad Hall  
Georg Fischer Piping Systems Ltd., Schaffhausen

## Pipe, polyvinylidene fluoride

AGRU Kunststofftechnik GmbH, Bad Hall  
Georg Fischer Piping Systems Ltd., Schaffhausen

## Pipe, vinyl ester - glass

ZCL Dualam, Inc., Edmonton,

## PUMP PARTS & FITTINGS

### Bushings, pump

Iwaki America, Holliston, MA  
3M Technical Ceramics, Kempton, Germany  
Scenic Precise Element Inc., Kaohsiung City

### Pumps parts & accessories

FLUX-GERAETE GMBH, Maulbronn, Germany  
Triark Pumps Ltd., Essex, , GBR

### Sleeves, pump

Thermal Spray Solutions, Inc., Chesapeake, Virginia

## PUMPS, CENTRIFUGAL

### Pumps, centrifugal, ANSI

Allweiler GmbH, Radolfzell  
Blackmer, part of PSG, a Dover company, Grand Rapids, MI  
**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com) — See our ad on page 15**

Hermetic-Pumpen GmbH, Gundelfingen  
ITT - Goulds Pumps, Seneca Falls, NY  
Iwaki America, Holliston, MA  
Met-Pro Global Pump Solutions, a CECO Environmental Company, Telford, PA  
National Pump Company, Glendale, AZ  
Richter Chemie-Technik GmbH, Kempen  
Teikoku USA, Inc., Warminster, PA  
**VANTON PUMP & EQUIPMENT CORP., 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com) — See our ad on page 25**

### Pumps, centrifugal, double suction

**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)**

### Pumps, centrifugal, dry running

Bungartz GmbH & Co. KG, Paul, Duesseldorf, Germany  
Iwaki America, Holliston, MA  
Met-Pro Global Pump Solutions, a CECO Environmental Company, Telford, PA  
Triark Pumps Ltd., Essex, , GBR  
**VANTON PUMP & EQUIPMENT CORP., 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com) — See our ad on page 25**

### Pumps, centrifugal, inline

ITT - Goulds Pumps, Seneca Falls, NY  
Met-Pro Global Pump Solutions, a CECO Environmental Company, Telford, PA  
**VANTON PUMP & EQUIPMENT CORP., 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com) — See our ad on page 25**

### Pumps, centrifugal, multistage

Dickow Pump Co., Marietta, GA  
**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com) — See our ad on page 15**  
**POMPETRAVINI SPA, via per turbigo 44, Castano Primo, 20022 (+39 0331 889 000; FAX: +39 0331 889 057; e-mail: sales@pompetravini.it; web site: www.pompetravini.it) — See our ad on page 29**  
Teikoku USA, Inc., Warminster, PA

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)

— See our ad on page 25

## Pumps, centrifugal, process, medium duty

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

— See our ad on page 15

**GORMAN-RUPP CO.**, 600 S. Airport Rd., Mansfield, OH 44903 (419-755-1011; FAX: 419-755-1251; e-mail: gr-sales@gormanrupp.com; web site: www.GRPumps.com)

Iwaki America, Holliston, MA

Met-Pro Global Pump Solutions, a CECO Environmental Company, Telford, PA

Teikoku USA, Inc., Warminster, PA

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)

— See our ad on page 25

## Pumps, centrifugal, self-priming

Dickow Pump Co., Marietta, GA

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

— See our ad on page 15

**GORMAN-RUPP CO.**, 600 S. Airport Rd., Mansfield, OH 44903 (419-755-1011; FAX: 419-755-1251; e-mail: gr-sales@gormanrupp.com; web site: www.GRPumps.com)

Hermetic-Pumpen GmbH, Gundelfingen

ITT - Goulds Pumps, Seneca Falls, NY

Iwaki America, Holliston, MA

Met-Pro Global Pump Solutions, a CECO Environmental Company, Telford, PA

National Pump Company, Glendale, AZ

**POMPETRAVINI SPA**, via per turbigo 44, Castano Primo, 20022 (+39 0331 889 000; FAX: +39 0331 889 057; e-mail: sales@pompetravini.it; web site: www.pompetravini.it)

— See our ad on page 29

SAWA Pumpentechnik AG, Degersheim, CHE

SRS Crisafulli, Inc., Glendive, MT

Tapflo Group, S-442 34 Kungälv, Sweden, SWE

Teikoku USA, Inc., Warminster, PA

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)

— See our ad on page 25

## Pumps, centrifugal, single stage

ARBO Pompen en Filters BV, Smilde, NLD

Bungartz GmbH & Co. KG, Paul, Duesseldorf, Germany

Dickow Pump Co., Marietta, GA

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

— See our ad on page 15

**GORMAN-RUPP CO.**, 600 S. Airport Rd., Mansfield, OH 44903 (419-755-1011; FAX: 419-755-1251; e-mail: gr-sales@gormanrupp.com; web site: www.GRPumps.com)

**HAYWARD FLOW CONTROL**, One Hayward Industrial Drive, Clemmons, NC 27012 (888-429-4635 USA/Canada; 888-429-4635; FAX: 888-778-8410; e-mail: hflow@hayward.com; web site: www.haywardflow-control.com)

Met-Pro Global Pump Solutions, a CECO Environmental Company, Telford, PA

**POMPETRAVINI SPA**, via per turbigo 44, Castano Primo, 20022 (+39 0331 889 000; FAX: +39 0331 889 057; e-mail: sales@pompetravini.it; web site: www.pompetravini.it)

— See our ad on page 29

SAWA Pumpentechnik AG, Degersheim, CHE

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)

— See our ad on page 25

Weir Specialty Pumps, Salt Lake City, UT

## Pumps, leakproof

Bungartz GmbH & Co. KG, Paul, Duesseldorf, Germany

Dickow Pump Co., Marietta, GA

FELUWA Pumpen GmbH, Muerlenbach

Hermetic-Pumpen GmbH, Gundelfingen

Met-Pro Global Pump Solutions, a CECO Environmental Company, Telford, PA

**ROTH PUMP, P.O.** Box 4330, Rock Island, IL 61204 (1-888-444-ROTH; 1-309-787-1791; FAX: 1-309-787-5142; e-mail: roth.pump@rothpump.com; web site: www.rothpump.com)

Teikoku USA, Inc., Warminster, PA

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)

— See our ad on page 25

## Pumps, propeller

Allweiler GmbH, Radolfzell

Friatec AG Division Rheinhuette Pumpen, Wiesbaden

National Pump Company, Glendale, AZ

## Pumps, screw centrifugal

Allweiler GmbH, Radolfzell

Busch LLC, Virginia Beach, VA

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)

Weir Specialty Pumps, Salt Lake City, UT

## Pumps, turbine

Iwaki America, Holliston, MA

Met-Pro Global Pump Solutions, a CECO Environmental Company, Telford, PA

National Pump Company, Glendale, AZ

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)

## Pumps, turbine, regenerative

**ROTH PUMP, P.O.** Box 4330, Rock Island, IL 61204 (1-888-444-ROTH; 1-309-787-1791; FAX: 1-309-787-5142; e-mail: roth.pump@rothpump.com; web site: www.rothpump.com)

## PUMPS, LINED

### Pumps, ceramic lined

Abresist Kalenborn Corporation, Urbana, IN

**FLUID METERING, INC.**, 5 Aerial Way, Suite 500, Syoset, NY 11791 (800-223-3388; 516-922-6050; FAX: 516-624-8261; e-mail: pumps@fmipump.com; web site: www.fmipump.com)

— See our ad on page 115

**KNF Neuberger, Inc.**, USA, Trenton, NJ

### Pumps, other lined

**KNF Neuberger, Inc.**, USA, Trenton, NJ

### Pumps, plastic lined

**FLUID METERING, INC.**, 5 Aerial Way, Suite 500, Syoset, NY 11791 (800-223-3388; 516-922-6050; FAX: 516-624-8261; e-mail: pumps@fmipump.com; web site: www.fmipump.com)

— See our ad on page 115

Friatec AG Division Rheinhuette Pumpen, Wiesbaden

ITT - Goulds Pumps, Seneca Falls, NY

Iwaki America, Holliston, MA

**KNF Neuberger, Inc.**, USA, Trenton, NJ

Richter Chemie-Technik GmbH, Kempen

### Pumps, rubber lined

Flowrox Oy, Lappeenranta

Metsu Flow Control Inc, Vantaa, Finland, FIN

NETZSCH Pumpen & Systeme GmbH, Waldkraiburg, Germany

## PUMPS, OTHER

### Pumps, acid, corrosive

BJM Pumps, LLC, Old Saybrook, CT

**BLACKHAWK TECHNOLOGY COMPANY**, 21 W 211 Hill Avenue, Glen Eilyn, IL 60137 (630-469-4916; FAX: 630-469-4896; e-mail: mbertane@blackhawkco.com; web site: www.blackhawkco.com)

Blackmer, part of PSG, a Dover company, Grand Rapids, MI

Dickow Pump Co., Marietta, GA

**FLUID METERING, INC.**, 5 Aerial Way, Suite 500, Syoset, NY 11791 (800-223-3388; 516-922-6050; FAX: 516-624-8261; e-mail: pumps@fmipump.com; web site: www.fmipump.com)

— See our ad on page 115

Friatec AG Division Rheinhuette Pumpen, Wiesbaden

GRI Pumps, Bellville, OH

**GORMAN-RUPP CO.**, 600 S. Airport Rd., Mansfield, OH 44903 (419-755-1011; FAX: 419-755-1251; e-mail: gr-sales@gormanrupp.com; web site: www.GRPumps.com)

**HAYWARD FLOW CONTROL**, One Hayward Industrial Drive, Clemmons, NC 27012 (888-429-4635 USA/Canada; 888-429-4635; FAX: 888-778-8410; e-mail: hflow@hayward.com; web site: www.haywardflow-control.com)

Hermetic-Pumpen GmbH, Gundelfingen

ITT - Goulds Pumps, Seneca Falls, NY

JLS International, Inc., Charlotte, NC

**KNF Neuberger, Inc.**, USA, Trenton, NJ

**LEWA GMBH**, Ulmer Str. 10, Leonberg, O 71229 (49-7152-14-0; FAX: 49-7152-14-1303; e-mail: lewa@lewa.de; web site: www.lewa.com)

Met-Pro Global Pump Solutions, a CECO Environmental Company, Telford, PA

NETZSCH Pumpen & Systeme GmbH, Waldkraiburg, Germany

**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)

— See our ad on page 21

Richter Chemie-Technik GmbH, Kempen

Teikoku USA, Inc., Warminster, PA

URACA GmbH & Co. KG, Bad Urach, O

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)

— See our ad on page 25

WITTE PUMPS & TECHNOLOGY GmbH, 25436 Tornesch

Weir Specialty Pumps, Salt Lake City, UT

sera ProDos GmbH, Immenhausen,

## Pumps, air driven

**BLACKHAWK TECHNOLOGY COMPANY**, 21 W 211 Hill Avenue, Glen Eilyn, IL 60137 (630-469-4916; FAX: 630-469-4896; e-mail: mbertane@blackhawkco.com; web site: www.blackhawkco.com)

**ROLL-REYNOLDS CO. INC.**, Six Campus Drive, Parsippany, NJ 07054 (908-232-4200; FAX: 908-232-2146; e-mail: info@roll.com; web site: www.roll.com)

Met-Pro Global Pump Solutions, a CECO Environmental Company, Telford, PA

**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)

— See our ad on page 21

Triark Pumps Ltd., Essex, GBR

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)

— See our ad on page 25

## Pumps, axial flow

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)

## Pumps, battery-powered

FLUX-GERAETE GMBH, Maulbronn, Germany

**FLUID METERING, INC.**, 5 Aerial Way, Suite 500, Syoset, NY 11791 (800-223-3388; 516-922-6050; FAX: 516-624-8261; e-mail: pumps@fmipump.com; web site: www.fmipump.com)

— See our ad on page 115

**KNF Neuberger, Inc.**, USA, Trenton, NJ

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)

— See our ad on page 25

## Pumps, canned motor

Teikoku USA, Inc., Warminster, PA

## Pumps, carboy or drum

Met-Pro Global Pump Solutions, a CECO Environmental Company, Telford, PA

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)

— See our ad on page 25

## Pumps, condensate return

**ROTH PUMP, P.O.** Box 4330, Rock Island, IL 61204 (1-888-444-ROTH; 1-309-787-1791; FAX: 1-309-787-5142; e-mail: roth.pump@rothpump.com; web site: www.rothpump.com)

TLV CORPORATION, Charlotte, NC

— See our ad on page 108

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)

— See our ad on page 25

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)

## Pumps, cryogenic

Busch LLC, Virginia Beach, VA  
Teikoku USA, Inc., Warminster, PA

## Pumps, dry vacuum

**EDWARDS US HEADQUARTERS**, Sanborn, NY

E-Vac Technologies, LLC, McMurray, PA

**KNF Neuberger, Inc.**, USA, Trenton, NJ

**PFEIFFER VACUUM GMBH**, Berliner Strasse 43, Asslar, Germany 35614 (+49-6441-802 0; FAX: +49-6441-802 1202; e-mail: info@pfeiffer-vacuum.de; web site: www.pfeiffer-vacuum.com)

— See our ad on page 39

Pfeiffer Vacuum, Inc., Nashua, NH

**TUTHILL VACUUM & BLOWER SYSTEMS**, 4840 W.

Kearney Street, Springfield, MO 65803-8702 (800-825-6937; 417-865-8715; FAX: 417-865-2950; e-mail: vacuum@tuthill.com; web site: tuthillvacuumblower.com)

## Pumps, explosion proof

ABEL GmbH & Co. KG, Buechen, Germany

Allweiler GmbH, Radolfzell

**BJM Pumps, LLC**, Old Saybrook, CT

**BLACKHAWK TECHNOLOGY COMPANY**, 21 W 211 Hill Avenue, Glen Ellyn, IL 60137 (630-469-4916; FAX: 630-469-4896; e-mail: mbertane@blackhawkco.com; web site: www.blackhawkco.com)

Boerger GmbH, Borken-Weseste

**BOERGER PUMPS**, 2860 Water Tower Place, Chanhassen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)

Boerger Pumps Asia Pte. Ltd., Singapore

**Bungartz GmbH & Co. KG**, Paul, Duesseldorf, Germany

— See our ad on page 23

**EDWARDS US HEADQUARTERS**, Sanborn, NY

FLUX-GERAETE GMBH, Maulbronn, Germany

**FLUID METERING, INC.**, 5 Aerial Way, Suite 500, Syoset, NY 11791 (800-223-3388; 516-922-6050; FAX: 516-624-8261; e-mail: pumps@fmipump.com; web site: www.fmipump.com)

— See our ad on page 15

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045

(800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

— See our ad on page 15

**GORMAN-RUPP CO.**, 600 S. Airport Rd., Mansfield, OH

44903 (419-755-1011; FAX: 419-755-1251; e-mail: gr-sales@gormanrupp.com; web site: www.GRPumps.com)

**KNF Neuberger, Inc.**, USA, Trenton, NJ

Met-Pro Global Pump Solutions, a CECO Environmental Company, Telford, PA

Nash, a Gardner Denver Product, Bentleyville, PA

SAWA Pumpentechnik AG, Degersheim, CHE

SRS Crisalfulli, Inc., Glendive, MT

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland

Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)

— See our ad on page 25

WITTE PUMPS & TECHNOLOGY GmbH, 25436 Tornesch

## Pumps, flexible impeller

Cole-Parmer, Vernon Hills, IL

## Pumps, hand

Beamex, Inc., Marietta, GA

**GORMAN-RUPP CO.**, 600 S. Airport Rd., Mansfield, OH

44903 (419-755-1011; FAX: 419-755-1251; e-mail: gr-sales@gormanrupp.com; web site: www.GRPumps.com)

## Pumps, high pressure

Allweiler GmbH, Radolfzell

AquFlow, Irvine, CA

Beamex, Inc., Marietta, GA

Cat Pumps, Minneapolis, MN

Compressor Products International, Stafford, TX

**Dickow Pump Co.**, Marietta, GA

FELUWA Pumpen GmbH, Muerlenbach

Fluitron, Inc., Ixvlyland, PA

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045

(800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

— See our ad on page 15

**GORMAN-RUPP CO.**, 600 S. Airport Rd., Mansfield, OH 44903 (419-755-1011; FAX: 419-755-1251; e-mail: gr-sales@gormanrupp.com; web site: www.GRPumps.com)

Hammelmann Corp., Miamisburg, OH

JLS International, Inc., Charlotte, NC

**LEWA GMBH**, Ulmer Str. 10, Leonberg, 0 71229 (49-7152-14-0; FAX: 49-7152-14-1303; e-mail: lewa@lewa.de; web site: www.lewa.com)

Maag Pump Systems AG, Oberglatt / ZH, CHE

**POMPETRAVAINI SPA**, via per turbigo 44, Castano

Primo, 20022 (+39 0331 889 000; FAX: +39 0331 889 057; e-mail: sales@pompetravaini.it; web site: www.pompetravaini.it)

— See our ad on page 29

**ROTH PUMP, P.O. Box 4330**, Rock Island, IL 61204

(1-888-444-ROTH; 1-309-787-1791; FAX: 1-309-787-5142; e-mail: roth.pump@rothpump.com; web site: www.rothpump.com)

SAWA Pumpentechnik AG, Degersheim, CHE

Supercritical Fluid Technologies, Inc., DE

Teikoku USA, Inc., Warminster, PA

URACA GmbH & Co. KG, Bad Urach, 0

WITTE PUMPS & TECHNOLOGY GmbH, 25436 Tornesch

WOMA Corp., Edison, NJ

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter

Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)

Weir Specialty Pumps, Salt Lake City, UT

## Pumps, jacketed

Blackmer, part of PSG, a Dover company, Grand Rapids, MI

**Bungartz GmbH & Co. KG**, Paul, Duesseldorf, Germany

— See our ad on page 23

**Dickow Pump Co.**, Marietta, GA

Hermetic-Pumpen GmbH, Gundelfingen

**LEWA GMBH**, Ulmer Str. 10, Leonberg, 0 71229 (49-7152-14-0; FAX: 49-7152-14-1303; e-mail: lewa@lewa.de; web site: www.lewa.com)

Teikoku USA, Inc., Warminster, PA

WITTE PUMPS & TECHNOLOGY GmbH, 25436 Tornesch

## Pumps, magnetically driven

Allweiler GmbH, Radolfzell

Blackmer, part of PSG, a Dover company, Grand Rapids, MI

**Bungartz GmbH & Co. KG**, Paul, Duesseldorf, Germany

— See our ad on page 23

**Dickow Pump Co.**, Marietta, GA

FLUX-GERAETE GMBH, Maulbronn, Germany

Friatec AG Division Rheinhuetten Pumpen, Wiesbaden

GRI Pumps, Bellville, OH

ITT - Goulds Pumps, Seneca Falls, NY

Iwaki America, Holliston, MA

JLS International, Inc., Charlotte, NC

Maag Pump Systems AG, Oberglatt / ZH, CHE

Met-Pro Global Pump Solutions, a CECO Environmental

Company, Telford, PA

**PFEIFFER VACUUM GMBH**, Berliner Strasse 43, Asslar,

Germany 35614 (+49-6441-802 0; FAX: +49-6441-802 1202; e-mail: info@pfeiffer-vacuum.de; web site: www.pfeiffer-vacuum.com)

— See our ad on page 39

**POMPETRAVAINI SPA**, via per turbigo 44, Castano

Primo, 20022 (+39 0331 889 000; FAX: +39 0331 889 057; e-mail: sales@pompetravaini.it; web site: www.pompetravaini.it)

— See our ad on page 29

SAWA Pumpentechnik AG, Degersheim, CHE

Tapflo Group, S-442 34 Kungälv, Sweden, SWE

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland

Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)

— See our ad on page 25

WITTE PUMPS & TECHNOLOGY GmbH, 25436 Tornesch

sera ProDos GmbH, Immenhausen, 0

## Pumps, mixed flow

**BLACKHAWK TECHNOLOGY COMPANY**, 21 W 211 Hill

Avenue, Glen Ellyn, IL 60137 (630-469-4916; FAX: 630-469-4896; e-mail: mbertane@blackhawkco.com; web site: www.blackhawkco.com)

**Bungartz GmbH & Co. KG**, Paul, Duesseldorf, Germany

— See our ad on page 23

**FLUID METERING, INC.**, 5 Aerial Way, Suite 500, Syoset,

NY 11791 (800-223-3388; 516-922-6050; FAX: 516-624-8261; e-mail: pumps@fmipump.com; web site: www.fmipump.com)

— See our ad on page 15

National Pump Company, Glendale, AZ

Teikoku USA, Inc., Warminster, PA

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)

— See our ad on page 25

## Pumps, oil free

Busch LLC, Virginia Beach, VA

**EDWARDS US HEADQUARTERS**, Sanborn, NY

**KNF Neuberger, Inc.**, USA, Trenton, NJ

Nash, a Gardner Denver Product, Bentleyville, PA

**PFEIFFER VACUUM GMBH**, Berliner Strasse 43, Asslar,

Germany 35614 (+49-6441-802 0; FAX: +49-6441-802 1202; e-mail: info@pfeiffer-vacuum.de; web site: www.pfeiffer-vacuum.com)

— See our ad on page 39

Pfeiffer Vacuum, Inc., Nashua, NH

Siemens Process Industries and Drives, Alpharetta, GA

Teikoku USA, Inc., Warminster, PA

**TUTHILL VACUUM & BLOWER SYSTEMS**, 4840 W.

Kearney Street, Springfield, MO 65803-8702 (800-825-6937; 417-865-8715; FAX: 417-865-2950; e-mail: vacuum@tuthill.com; web site: tuthillvacuumblower.com)

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland

Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)

— See our ad on page 25

## Pumps, open impeller

**Bungartz GmbH & Co. KG**, Paul, Duesseldorf, Germany

— See our ad on page 23

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045

(800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

— See our ad on page 15

ITT - Goulds Pumps, Seneca Falls, NY

Met-Pro Global Pump Solutions, a CECO Environmental

Company, Telford, PA

**POMPETRAVAINI SPA**, via per turbigo 44, Castano

Primo, 20022 (+39 0331 889 000; FAX: +39 0331 889 057; e-mail: sales@pompetravaini.it; web site: www.pompetravaini.it)

— See our ad on page 29

SAWA Pumpentechnik AG, Degersheim, CHE

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland

Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)

— See our ad on page 25

Weir Specialty Pumps, Salt Lake City, UT

## Pumps, other

Elmridge Inc., Livonia, MI

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045

(800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

— See our ad on page 15

Hermetic-Pumpen GmbH, Gundelfingen

Met-Pro Global Pump Solutions, a CECO Environmental

Company, Telford, PA

Nash, a Gardner Denver Product, Bentleyville, PA

## Pumps, peristaltic

Allweiler GmbH, Radolfzell

Bioengineering Inc., Somerville, MA

Cole-Parmer, Vernon Hills, IL

Fluorox Oy, Lappeenranta

Sias, New Castle, DE

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland

Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)

— See our ad on page 25

## Pumps, pressure powered

Spirax Sarco, Inc., Blythwood, SC

**TLV CORPORATION**, Charlotte, NC

— See our ad on page 108

## Pumps, recessed impeller

Met-Pro Global Pump Solutions, a CECO Environmental

Company, Telford, PA

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland

Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)

— See our ad on page 25

Weir Specialty Pumps, Salt Lake City, UT

## Pumps, sealless

ABEL GmbH & Co. KG, Buechen, Germany

**Bungartz GmbH & Co. KG**, Paul, Duesseldorf, Germany

— See our ad on page 23

Friatec AG Division Rheinhuetten Pumpen, Wiesbaden

GRI Pumps, Bellville, OH

ITT - Goulds Pumps, Seneca Falls, NY

Iwaki America, Holliston, MA

JLS International, Inc., Charlotte, NC



**LEWA GMBH**, Ulmer Str. 10, Leonberg, 0 71229 (49-7152-14-0; FAX: 49-7152-14-1303; e-mail: lewa@lewa.de; web site: [www.lewa.com](http://www.lewa.com))

Met-Pro Global Pump Solutions, a CECO Environmental Company, Telford, PA

Richter Chemie-Technik GmbH, Kempen

**ROTH PUMP, P.O. Box 4330, Rock Island, IL 61204** (1-888-444-ROTH; 1-309-787-1791; FAX: 1-309-787-5142; e-mail: [rothpump@rothpump.com](mailto:rothpump@rothpump.com); web site: [www.rothpump.com](http://www.rothpump.com))

SAWA Pumpentechnik AG, Degersheim, CHE  
Teikoku USA, Inc., Warminster, PA

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: [mkt@vanton.com](mailto:mkt@vanton.com); web site: [www.vanton.com](http://www.vanton.com))

— See our ad on page 25

## Pumps, sludge

ABEL GmbH & Co. KG, Buechen, Germany

**BLACKHAWK TECHNOLOGY COMPANY**, 21 W 211 Hill Avenue, Glen Ellyn, IL 60137 (630-469-4916; FAX: 630-469-4896; e-mail: [mbertane@blackhawkco.com](mailto:mbertane@blackhawkco.com); web site: [www.blackhawkco.com](http://www.blackhawkco.com))

Boerger GmbH, Borken-Weseko

**BOERGER PUMPS**, 2860 Water Tower Place, Chanhassen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: [america@boerger.com](mailto:america@boerger.com); web site: [www.boerger.com](http://www.boerger.com))

Boerger Pumps Asia Pte. Ltd., Singapore

FELUWA Pumpen GmbH, Muerlenbach

Flowrox Oy, Lappeenranta

**GORMAN-RUPP CO.**, 600 S. Airport Rd., Mansfield, OH 44903 (419-755-1011; FAX: 419-755-1251; e-mail: [gr-sales@gormanrupp.com](mailto:gr-sales@gormanrupp.com); web site: [www.GRPumps.com](http://www.GRPumps.com))

**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: [info@komline.com](mailto:info@komline.com); web site: [www.komline.com](http://www.komline.com))

— See our ad on page 148

Met-Pro Global Pump Solutions, a CECO Environmental Company, Telford, PA

NETZSCH Pumpen & Systeme GmbH, Waldkraiburg, Germany

Newman Regency Group, Stafford, TX

SRS Crisafulli, Inc., Glendive, MT

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: [mkt@vanton.com](mailto:mkt@vanton.com); web site: [www.vanton.com](http://www.vanton.com))

— See our ad on page 25

Weir Specialty Pumps, Salt Lake City, UT

**SEEPEX INC.**, 511 Speedway Dr., Enon, OH 45323 (800-695-3659; 937-864-7150; FAX: 937-864-7157; e-mail: [sales@seepepex.net](mailto:sales@seepepex.net); web site: [sales.us@seepepex.com](http://sales.us@seepepex.com))

## Pumps, slurry

ABEL GmbH & Co. KG, Buechen, Germany

AquFlow, Irvine, CA

BJM Pumps, LLC, Old Saybrook, CT

**BLACKHAWK TECHNOLOGY COMPANY**, 21 W 211 Hill Avenue, Glen Ellyn, IL 60137 (630-469-4916; FAX: 630-469-4896; e-mail: [mbertane@blackhawkco.com](mailto:mbertane@blackhawkco.com); web site: [www.blackhawkco.com](http://www.blackhawkco.com))

Boerger GmbH, Borken-Weseko

**BOERGER PUMPS**, 2860 Water Tower Place, Chanhassen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: [america@boerger.com](mailto:america@boerger.com); web site: [www.boerger.com](http://www.boerger.com))

Boerger Pumps Asia Pte. Ltd., Singapore

**Bungartz GmbH & Co. KG**, Paul, Duesseldorf, Germany

— See our ad on page 23

FELUWA Pumpen GmbH, Muerlenbach

Flowrox Oy, Lappeenranta

**FLUID METERING, INC.**, 5 Aerial Way, Suite 500, Syosset, NY 11791 (800-223-3388; 516-922-6050; FAX: 516-624-8261; e-mail: [pumps@fmipump.com](mailto:pumps@fmipump.com); web site: [www.fmipump.com](http://www.fmipump.com))

— See our ad on page 115

**GORMAN-RUPP CO.**, 600 S. Airport Rd., Mansfield, OH 44903 (419-755-1011; FAX: 419-755-1251; e-mail: [gr-sales@gormanrupp.com](mailto:gr-sales@gormanrupp.com); web site: [www.GRPumps.com](http://www.GRPumps.com))

**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: [info@komline.com](mailto:info@komline.com); web site: [www.komline.com](http://www.komline.com))

— See our ad on page 148

Met-Pro Global Pump Solutions, a CECO Environmental Company, Telford, PA

Metso Flow Control Inc, Vantaa, Finland, FIN

Metso Minerals Industries, Inc., York, PA

NETZSCH Pumpen & Systeme GmbH, Waldkraiburg, Germany

SRS Crisafulli, Inc., Glendive, MT

Teikoku USA, Inc., Warminster, PA

URACA GmbH & Co. KG, Bad Urach,

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: [mkt@vanton.com](mailto:mkt@vanton.com); web site: [www.vanton.com](http://www.vanton.com))

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**SEEPEX INC.**, 511 Speedway Dr., Enon, OH 45323 (800-695-3659; 937-864-7150; FAX: 937-864-7157; e-mail: [sales@seepepex.net](mailto:sales@seepepex.net); web site: [sales.us@seepepex.com](http://sales.us@seepepex.com))

## Pumps, transfer

**BLACKHAWK TECHNOLOGY COMPANY**, 21 W 211 Hill Avenue, Glen Ellyn, IL 60137 (630-469-4916; FAX: 630-469-4896; e-mail: [mbertane@blackhawkco.com](mailto:mbertane@blackhawkco.com); web site: [www.blackhawkco.com](http://www.blackhawkco.com))

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: [sales.northamerica@gea.com](mailto:sales.northamerica@gea.com); web site: [www.gea.com](http://www.gea.com))

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GRI Pumps, Bellville, OH

**GORMAN-RUPP CO.**, 600 S. Airport Rd., Mansfield, OH 44903 (419-755-1011; FAX: 419-755-1251; e-mail: [gr-sales@gormanrupp.com](mailto:gr-sales@gormanrupp.com); web site: [www.GRPumps.com](http://www.GRPumps.com))

Hermetic-Pumpen GmbH, Gundelfingen

JLS International, Inc., Charlotte, NC

KNF Neuberger, Inc., USA, Trenton, NJ

**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: [info@komline.com](mailto:info@komline.com); web site: [www.komline.com](http://www.komline.com))

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Maag Pump Systems AG, Oberglatt / ZH, CHE

Met-Pro Global Pump Solutions, a CECO Environmental Company, Telford, PA

**ROTH PUMP, P.O. Box 4330, Rock Island, IL 61204** (1-888-444-ROTH; 1-309-787-1791; FAX: 1-309-787-5142; e-mail: [rothpump@rothpump.com](mailto:rothpump@rothpump.com); web site: [www.rothpump.com](http://www.rothpump.com))

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## Pumps, water

**BOERGER PUMPS**, 2860 Water Tower Place, Chanhassen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: [america@boerger.com](mailto:america@boerger.com); web site: [www.boerger.com](http://www.boerger.com))

Cat Pumps, Minneapolis, MN

Dickow Pump Co., Marietta, GA

**FLUID METERING, INC.**, 5 Aerial Way, Suite 500, Syosset, NY 11791 (800-223-3388; 516-922-6050; FAX: 516-624-8261; e-mail: [pumps@fmipump.com](mailto:pumps@fmipump.com); web site: [www.fmipump.com](http://www.fmipump.com))

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**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: [sales.northamerica@gea.com](mailto:sales.northamerica@gea.com); web site: [www.gea.com](http://www.gea.com))

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GRI Pumps, Bellville, OH

**GORMAN-RUPP CO.**, 600 S. Airport Rd., Mansfield, OH 44903 (419-755-1011; FAX: 419-755-1251; e-mail: [gr-sales@gormanrupp.com](mailto:gr-sales@gormanrupp.com); web site: [www.GRPumps.com](http://www.GRPumps.com))

Hammelmann Corp., Miamisburg, OH

Hermetic-Pumpen GmbH, Gundelfingen

Met-Pro Global Pump Solutions, a CECO Environmental Company, Telford, PA

NETZSCH Pumpen & Systeme GmbH, Waldkraiburg, Germany

National Pump Company, Glendale, AZ

SRS Crisafulli, Inc., Glendive, MT

URACA GmbH & Co. KG, Bad Urach, O

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: [mkt@vanton.com](mailto:mkt@vanton.com); web site: [www.vanton.com](http://www.vanton.com))

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## PUMPS, PROPORTIONING

### Pumps, diaphragm (proportioning)

ABEL GmbH & Co. KG, Buechen, Germany

KNF Neuberger, Inc., USA, Trenton, NJ

Walchem, IWAKI America, Inc., Holliston, MA

### Pumps, metering

Allweiler GmbH, Radolfzell


Cole-Parmer, Vernon Hills, IL

## Pilot Plant Pumps

*Valveless, Ceramic*



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**FLUID METERING, INC.**, 5 Aerial Way, Suite 500, Syoset, NY 11791 (800-223-3388; 516-922-6050; FAX: 516-624-8261; e-mail: pumps@fmpump.com; web site: www.fmpump.com)  
— See our ad on page 115

GRI Pumps, Bellville, OH

**HAYWARD FLOW CONTROL**, One Hayward Industrial Drive, Clemmons, NC 27012 (888-429-4635 USA/Canada; 888-429-4635; FAX: 888-778-8410; e-mail: hflow@hayward.com; web site: www.haywardflow-control.com)

**KNF Neuberger, Inc.**, USA, Trenton, NJ  
**LEWA GMBH**, Ulmer Str. 10, Leonberg, 0 71229 (49-7152-14-0; FAX: 49-7152-14-1303; e-mail: lewa@lewa.de; web site: www.lewa.com)

Nordson SEALANT EQUIPMENT, Plymouth, MI

PDC Machines, Inc., Warmminster, PA

**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)  
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**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)  
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**WITTE PUMPS & TECHNOLOGY GmbH**, 25436 Tornesch Walchene, IWAKI America, Inc., Holliston, MA

**SEEPLEX INC.**, 511 Speedway Dr., Enon, OH 45323 (800-695-3659; 937-864-7150; FAX: 937-864-7157; e-mail: sales@seepex.net; web site: sales.us@seepex.com)

## Pumps, plunger

ABEL GmbH & Co. KG, Buechen, Germany

**BLACKHAWK TECHNOLOGY COMPANY**, 21 W 211 Hill Avenue, Glen Ellyn, IL 60137 (630-469-4916; FAX: 630-469-4896; e-mail: mbertane@blackhawkco.com; web site: www.blackhawkco.com)

Cat Pumps, Minneapolis, MN

**FLUID METERING, INC.**, 5 Aerial Way, Suite 500, Syoset, NY 11791 (800-223-3388; 516-922-6050; FAX: 516-624-8261; e-mail: pumps@fmpump.com; web site: www.fmpump.com)  
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## PUMPS, RECIPROCATING

### Pumps, diaphragm (reciprocating)

ABEL GmbH & Co. KG, Buechen, Germany

AquFlow, Irvine, CA

Cat Pumps, Minneapolis, MN

Cole-Parmer, Vernon Hills, IL

FLUX-GERAETE GMBH, Maulbronn, Germany

**KNF Neuberger, Inc.**, USA, Trenton, NJ

**LEWA GMBH**, Ulmer Str. 10, Leonberg, 0 71229 (49-7152-14-0; FAX: 49-7152-14-1303; e-mail: lewa@lewa.de; web site: www.lewa.com)

**PFEIFFER VACUUM GMBH**, Berliner Strasse 43, Asslar, Germany 35614 (+49-6441-802 0; FAX: +49-6441-802 1202; e-mail: info@pfeiffer-vacuum.de; web site: www.pfeiffer-vacuum.com)  
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sera ProDos GmbH, Immenhausen

Tapflo Group, S-442 34 Kungälv, Sweden, STE

URACA GmbH & Co. KG, Bad Urach

### Pumps, piston

ABEL GmbH & Co. KG, Buechen, Germany

**BLACKHAWK TECHNOLOGY COMPANY**, 21 W 211 Hill Avenue, Glen Ellyn, IL 60137 (630-469-4916; FAX: 630-469-4896; e-mail: mbertane@blackhawkco.com; web site: www.blackhawkco.com)

Cat Pumps, Minneapolis, MN

Compressor Products International, Stafford, TX

**EDWARDS US HEADQUARTERS**, Sanborn, NY

**FLUID METERING, INC.**, 5 Aerial Way, Suite 500, Syoset, NY 11791 (800-223-3388; 516-922-6050; FAX: 516-624-8261; e-mail: pumps@fmpump.com; web site: www.fmpump.com)  
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Nordson SEALANT EQUIPMENT, Plymouth, MI

**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)  
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sera ProDos GmbH, Immenhausen

### Pumps, piston-diaphragm

ABEL GmbH & Co. KG, Buechen, Germany

FELUWA Pumpen GmbH, Muerlenbach

**KNF Neuberger, Inc.**, USA, Trenton, NJ

**LEWA GMBH**, Ulmer Str. 10, Leonberg, 0 71229 (49-7152-14-0; FAX: 49-7152-14-1303; e-mail: lewa@lewa.de; web site: www.lewa.com)

sera ProDos GmbH, Immenhausen

## Pumps, plunger

ABEL GmbH & Co. KG, Buechen, Germany

AquFlow, Irvine, CA

Hammelmann Corp., Miamisburg, OH

**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: info@komline.com; web site: www.komline.com)  
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**LEWA GMBH**, Ulmer Str. 10, Leonberg, 0 71229 (49-7152-14-0; FAX: 49-7152-14-1303; e-mail: lewa@lewa.de; web site: www.lewa.com)

## PUMPS, ROTARY

### Pumps, gear

Allweiler GmbH, Radolfzell

Boerger Pumps Asia Pte. Ltd., Singapore

GRI Pumps, Bellville, OH

**GORMAN-RUPP CO.**, 600 S. Airport Rd., Mansfield, OH 44903 (419-755-1011; FAX: 419-755-1251; e-mail: grsales@gormanrupp.com; web site: www.GRPumps.com)

IGW - IG Watteeuw International nv, Headquarters, Oost-kamp

JLS International, Inc., Charlotte, NC

Maag Pump Systems AG, Oberglatt / ZH, , CHE

Nordson SEALANT EQUIPMENT, Plymouth, MI

SAWA Pumpentechnik AG, Degersheim, , CHE

**WITTE PUMPS & TECHNOLOGY GmbH**, 25436 Tornesch

### Pumps, lobe

Boerger GmbH, Borken-Weseke

**BOERGER PUMPS**, 2860 Water Tower Place, Chanhassen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)

Boerger Pumps Asia Pte. Ltd., Singapore

E-Vac Technologies, LLC, McMurray, PA

**EDWARDS US HEADQUARTERS**, Sanborn, NY

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)  
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### Pumps, progressing cavity

Boerger Pumps Asia Pte. Ltd., Singapore

**EDWARDS US HEADQUARTERS**, Sanborn, NY

FLUX-GERAETE GMBH, Maulbronn, Germany

NETZSCH Pumpen & Systeme GmbH, Waldkraiburg, Germany

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### Pumps, rotary cycloidal

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)  
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### Pumps, rotary helical gear

Boerger GmbH, Borken-Weseke

Boerger Pumps Asia Pte. Ltd., Singapore

IGW - IG Watteeuw International nv, Headquarters, Oost-kamp

### Pumps, rotary liquid ring

**EDWARDS US HEADQUARTERS**, Sanborn, NY

GARO S.P.A., Monza (MB)

Nash, a Gardner Denver Product, Bentleyville, PA

**POMPETRAVINI SPA**, via per turbigo 44, Castano

Primo, 20022 (+39 0331 889 000; FAX: +39 0331 889 057; e-mail: sales@pompetravini.it; web site: www.pompetravini.it)  
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### Pumps, rotary piston

Boerger GmbH, Borken-Weseke

Boerger Pumps Asia Pte. Ltd., Singapore

E-Vac Technologies, LLC, McMurray, PA

**EDWARDS US HEADQUARTERS**, Sanborn, NY

## Pumps, rotary positive displacement

Blackmer, part of PSG, a Dover company, Grand Rapids, MI

Boerger GmbH, Borken-Weseke

**BOERGER PUMPS**, 2860 Water Tower Place, Chanhassen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)

Boerger Pumps Asia Pte. Ltd., Singapore

Cat Pumps, Minneapolis, MN

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Kraissl Co. Inc., Hackensack, NJ

Maag Pump Systems AG, Oberglatt / ZH, , CHE

Nordson SEALANT EQUIPMENT, Plymouth, MI

**PFEIFFER VACUUM GMBH**, Berliner Strasse 43, Asslar, Germany 35614 (+49-6441-802 0; FAX: +49-6441-802 1202; e-mail: info@pfeiffer-vacuum.de; web site: www.pfeiffer-vacuum.com)  
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Pfeiffer Vacuum, Inc., Nashua, NH

**WITTE PUMPS & TECHNOLOGY GmbH**, 25436 Tornesch

## Pumps, rotary sliding vane

Blackmer, part of PSG, a Dover company, Grand Rapids, MI

**EDWARDS US HEADQUARTERS**, Sanborn, NY

## Pumps, screw

Boerger Pumps Asia Pte. Ltd., Singapore

**EDWARDS US HEADQUARTERS**, Sanborn, NY

E-Vac Technologies, LLC, McMurray, PA

Newman Regency Group, Stafford, TX

## PUMPS, SPECIAL MATERIALS

### Pumps, ceramic

3M Technical Ceramics, Kempten, Germany

**FLUID METERING, INC.**, 5 Aerial Way, Suite 500, Syoset, NY 11791 (800-223-3388; 516-922-6050; FAX: 516-624-8261; e-mail: pumps@fmpump.com; web site: www.fmpump.com)  
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Friatec AG Division Rheinhuetten Pumpen, Wiesbaden

**WITTE PUMPS & TECHNOLOGY GmbH**, 25436 Tornesch

### Pumps, fiberglass-reinforced plastic

BJM Pumps, LLC, Old Saybrook, CT

Met-Pro Global Pump Solutions, a CECO Environmental

Company, Telford, PA

### Pumps, nickel-based alloy

Bungartz GmbH & Co. KG, Paul, Duesseldorf, Germany

Dickow Pump Co., Marietta, GA

**SEEPLEX INC.**, 511 Speedway Dr., Enon, OH 45323 (800-695-3659; 937-864-7150; FAX: 937-864-7157; e-mail: sales@seepex.net; web site: sales.us@seepex.com)

### Pumps, nonmetallic

Iwaki America, Holliston, MA

Met-Pro Global Pump Solutions, a CECO Environmental

Company, Telford, PA

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland

Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-

686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)

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### Pumps, other special materials

Boerger GmbH, Borken-Weseke

**Bungartz GmbH & Co. KG**, Paul, Duesseldorf, Germany

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Friatec AG Division Rheinhuetten Pumpen, Wiesbaden

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)  
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**GORMAN-RUPP CO.**, 600 S. Airport Rd., Mansfield, OH 44903 (419-755-1011; FAX: 419-755-1251; e-mail: g-sales@gormanrupp.com; web site: www.GRPumps.com)

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JLS International, Inc., Charlotte, NC

**KNF Neuberger, Inc.**, USA, Trenton, NJ

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NETZSCH Pumpen & Systeme GmbH, Waldkraiburg, Germany

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## Pumps, plastic

BJM Pumps, LLC, Old Saybrook, CT

FLUX-GERAETE GMBH, Maulbronn, Germany

**FLUID METERING, INC.**, 5 Aerial Way, Suite 500, Syosset, NY 11791 (800-223-3388; 516-922-6050; FAX: 516-624-8261; e-mail: pumps@fmipump.com; web site: www.fmipump.com)

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Friatec AG Division Rheinhuetten Pumpen, Wiesbaden

GRI Pumps, Bellville, OH

**KNF Neuberger, Inc., USA**, Trenton, NJ

Meflag, a CECO Environmental Company, Owosso, MI  
Met-Pro Global Pump Solutions, a CECO Environmental Company, Telford, PA

**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)

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## Pumps, stainless steel

BJM Pumps, LLC, Old Saybrook, CT

Blackmer, part of PSG, a Dover company, Grand Rapids, MI

Boerger GmbH, Borken-Weseke

**Bungartz GmbH & Co. KG**, Paul, Duesseldorf, Germany

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Cat Pumps, Minneapolis, MN

**Dickow Pump Co., Marietta, GA**

FLUX-GERAETE GMBH, Maulbronn, Germany

**FLUID METERING, INC.**, 5 Aerial Way, Suite 500, Syosset, NY 11791 (800-223-3388; 516-922-6050; FAX: 516-624-8261; e-mail: pumps@fmipump.com; web site: www.fmipump.com)

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**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

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**GORMAN-RUPP CO.**, 600 S. Airport Rd., Mansfield, OH 44903 (419-755-1011; FAX: 419-755-1251; e-mail: g-sales@gormanrupp.com; web site: www.GRPumps.com)

Hermetic-Pumpen GmbH, Gundelfingen

ITT - Goulds Pumps, Seneca Falls, NY

**KNF Neuberger, Inc., USA**, Trenton, NJ

**LEWA GMBH**, Ulmer Str. 10, Leonberg, 0 71229 (49-7152-14-0; FAX: 49-7152-14-1303; e-mail: lewa@lewa.de; web site: www.lewa.com)

**NETZSCH Pumpen & Systeme GmbH**, Waldkraiburg, Germany

Nash, a Gardner Denver Product, Bentleyville, PA

National Pump Company, Glendale, AZ

Nordson SEALANT EQUIPMENT, Plymouth, MI

SAWA Pumpentechnik AG, Degersheim, CHE

URACA GmbH & Co. KG, Bad Urach, 0

WITTE PUMPS & TECHNOLOGY GmbH, 25436 Tornesch

Weir Specialty Pumps, Salt Lake City, UT

**SEEPEX INC.**, 511 Speedway Dr., Enon, OH 45323 (800-695-3659; 937-864-7150; FAX: 937-864-7157; e-mail: sales@seepe.net; web site: sales.us@seepe.com)

## Pumps, titanium

**Bungartz GmbH & Co. KG**, Paul, Duesseldorf, Germany

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Hermetic-Pumpen GmbH, Gundelfingen

ITT - Goulds Pumps, Seneca Falls, NY

Met-Pro Global Pump Solutions, a CECO Environmental Company, Telford, PA

**SEEPEX INC.**, 511 Speedway Dr., Enon, OH 45323 (800-695-3659; 937-864-7150; FAX: 937-864-7157; e-mail: sales@seepe.net; web site: sales.us@seepe.com)

## PUMPS, VACUUM & EJECTOR

### Pumps, jet, sanitary

Elmridge Inc., Livonia, MI

### Pumps, vacuum, dry

Busch LLC, Virginia Beach, VA

E-Vac Technologies, LLC, McMurray, PA

**EDWARDS US HEADQUARTERS**, Sanborn, NY  
**EDWARDS VACUUM**, 6416 Inducon Drive West, Sanborn, NY 14132 (800-848-9800; e-mail: matt.murray@edwardsvacuum.com; web site: www.edwards-vacuum.com)

Escotec, Mesa, AZ

**KNF Neuberger, Inc., USA**, Trenton, NJ

**PFEIFFER VACUUM GMBH**, Berliner Strasse 43, Asslar, Germany 35614 (+49-6441-802 0; FAX: +49-6441-802 1202; e-mail: info@pfeiffer-vacuum.de; web site: www.pfeiffer-vacuum.com)

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Schutte & Koerting, Treviso, PA

**TUTHILL VACUUM & BLOWER SYSTEMS**, 4840 W.

Kearney Street, Springfield, MO 65803-8702 (800-825-6937; 417-865-8715; FAX: 417-865-2950; e-mail: vacuum@tuthill.com; web site: tuthillvacuumblower.com)

## Pumps, vacuum, liquid ring

Busch LLC, Virginia Beach, VA

E-Vac Technologies, LLC, McMurray, PA

**EDWARDS VACUUM**, 6416 Inducon Drive West, Sanborn, NY 14132 (800-848-9800; e-mail: matt.murray@edwardsvacuum.com; web site: www.edwards-vacuum.com)

**EDWARDS US HEADQUARTERS**, Sanborn, NY

GARO S.P.A., Monza (MB)

Nash Europe Ltd., Winsford, Cheshire

Nash, a Gardner Denver Product, Bentleyville, PA

**POMPETRAVAINI SPA**, via per turbigo 44, Castano Primo, 20022 (+39 0331 889 000; FAX: +39 0331 889 057; e-mail: sales@pompetravaini.it; web site: www.pompetravaini.it)

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**TUTHILL VACUUM & BLOWER SYSTEMS**, 4840 W. Kearney Street, Springfield, MO 65803-8702 (800-825-6937; 417-865-8715; FAX: 417-865-2950; e-mail: vacuum@tuthill.com; web site: tuthillvacuumblower.com)

## Pumps, vacuum, once-through-oil

Busch LLC, Virginia Beach, VA

## Pumps, vacuum, other

Busch LLC, Virginia Beach, VA

Compressor Products International, Stafford, TX

**CROLL-REYNOLDS CO. INC.**, Six Campus Drive, Parsippany, NJ 07054 (908-232-4200; FAX: 908-232-2146; e-mail: info@croll.com; web site: www.croll.com)

E-Vac Technologies, LLC, McMurray, PA

**EDWARDS US HEADQUARTERS**, Sanborn, NY

**EDWARDS VACUUM**, 6416 Inducon Drive West, Sanborn, NY 14132 (800-848-9800; e-mail: matt.murray@edwardsvacuum.com; web site: www.edwards-vacuum.com)

FPZ Inc., Saukville, WI

Friatec AG Division Rheinhuetten Pumpen, Wiesbaden

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

— See our ad on page 15

**Italvacuum Srl**, Via Stroppiana No. 3, Borgaro T.se, Turin, Italy, 10071 (+39-011-4704651; e-mail: marketing@italvacuum.com; web site: www.italvacuum.com)

**KNF Neuberger, Inc., USA**, Trenton, NJ

**KOERTING HANNOVER AG**, Badenstedter Str. 56, 30453 Hannover, Germany (+49 511 2129-0; e-mail: st@koerting.de, web site: www.koerting.de)

— See our ad on page 117

**PFEIFFER VACUUM GMBH**, Berliner Strasse 43, Asslar, Germany 35614 (+49-6441-802 0; FAX: +49-6441-802 1202; e-mail: info@pfeiffer-vacuum.de; web site: www.pfeiffer-vacuum.com)

— See our ad on page 39

Pfeiffer Vacuum, Inc., Nashua, NH

**TLV CORPORATION**, Charlotte, NC

— See our ad on page 108

**TUTHILL VACUUM & BLOWER SYSTEMS**, 4840 W. Kearney Street, Springfield, MO 65803-8702 (800-825-6937; 417-865-8715; FAX: 417-865-2950; e-mail: vacuum@tuthill.com; web site: tuthillvacuumblower.com)

Vector Technologies Ltd., Milwaukee, WI

## Pumps, vacuum, rotary piston

Aerzener Maschinenfabrik GmbH, Aerzen

**EDWARDS US HEADQUARTERS**, Sanborn, NY

E-Vac Technologies, LLC, McMurray, PA

**EDWARDS VACUUM**, 6416 Inducon Drive West, Sanborn, NY 14132 (800-848-9800; e-mail: matt.murray@edwardsvacuum.com; web site: www.edwards-vacuum.com)

**TUTHILL VACUUM & BLOWER SYSTEMS**, 4840 W. Kearney Street, Springfield, MO 65803-8702 (800-825-6937; 417-865-8715; FAX: 417-865-2950; e-mail: vacuum@tuthill.com; web site: tuthillvacuumblower.com)

## Steam jet ejectors



**CROLL-REYNOLDS CO. INC.**, Six Campus Drive, Parsippany, NJ 07054 (908-232-4200; FAX: 908-232-2146; e-mail: info@croll.com; web site: www.croll.com)

**EDWARDS US HEADQUARTERS**, Sanborn, NY  
Elmridge Inc., Livonia, MI  
**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

— See our ad on page 15

JLS International, Inc., Charlotte, NC

**KOERTING HANNOVER AG**, Badenstedter Str. 56, 30453 Hannover, Germany (+49 511 2129-0; e-mail: st@koerting.de, web site: www.koerting.de)

— See our ad on page 117

Nash Europe Ltd., Winsford, Cheshire

Nash, a Gardner Denver Product, Bentleyville, PA

Schutte & Koerting, Treviso, PA


## Vacuum pumping systems

Busch LLC, Virginia Beach, VA

**CROLL-REYNOLDS CO. INC.**, Six Campus Drive, Parsippany, NJ 07054 (908-232-4200; FAX: 908-232-2146; e-mail: info@croll.com; web site: www.croll.com)

**EDWARDS US HEADQUARTERS**, Sanborn, NY

E-Vac Technologies, LLC, McMurray, PA



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Circle 17 on p. 202 or go to [adlinks.chemengonline.com/61502-17](http://adlinks.chemengonline.com/61502-17)



**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045  
(800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com

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**Italvacuum Srl**, Via Stroppiana No. 3, Borgaro T.se, Turin, Italy, 10071 (+39-011-4704651); e-mail: marketing@italvacuum.com; web site: www.italvacuum.com

**KNF Neuberger, Inc.**, USA, Trenton, NJ  
**KOERTING HANNOVER AG**, Badenstedter Str. 56, 30453 Hannover, Germany (+49 511 2129-0, e-mail: st@koerting.de, web site: www.koerting.de)

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Nash Europe Ltd., Winstford, Cheshire

Pfeiffer Vacuum, Inc., Nashua, NH

**POMPETRAVINI SPA**, via per turbigo 44, Castano Primo, 20022 (+39 0331 889 000; FAX: +39 0331 889 057; e-mail: sales@pompetravini.it; web site: www.pompetravini.it)

— See our ad on page 29

Schutte & Koerting, Trevose, PA

**TUTHILL VACUUM & BLOWER SYSTEMS**, 4840 W. Kearney Street, Springfield, MO 65803-8702 (800-825-6937; 417-865-8715; FAX: 417-865-2950; e-mail: vacuum@tuthill.com; web site: tuthillvacuumblower.com)

Vector Technologies Ltd., Milwaukee, WI

## PUMPS, VERTICAL & DEEP WELL

### Pumps, dewatering, submersible

BJM Pumps, LLC, Old Saybrook, CT

SRS Crisafulli, Inc., Glendive, MT

### Pumps, packless

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)

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### Pumps, submersible

Allweiler GmbH, Radolfzell

BJM Pumps, LLC, Old Saybrook, CT

Boerger GmbH, Borken-Weseke

**BOERGER PUMPS**, 2860 Water Tower Place, Chanhausen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)

**GORMAN-RUPP CO.**, 600 S. Airport Rd., Mansfield, OH 44903 (419-755-1011; FAX: 419-755-1251; e-mail: g-sales@gormanrupp.com; web site: www.GRPumps.com)

NETZSCH Pumpen & Systeme GmbH, Waldkraiburg, Germany

National Pump Company, Glendale, AZ

SRS Crisafulli, Inc., Glendive, MT

Weir Specialty Pumps, Salt Lake City, UT

### Pumps, sump

BJM Pumps, LLC, Old Saybrook, CT

**BLACKHAWK TECHNOLOGY COMPANY**, 21 W 211 Hill Avenue, Glen Ellyn, IL 60137 (630-469-4916; FAX: 630-469-4896; e-mail: mbertane@blackhawkco.com; web site: www.blackhawkco.com)

**GORMAN-RUPP CO.**, 600 S. Airport Rd., Mansfield, OH 44903 (419-755-1011; FAX: 419-755-1251; e-mail: g-sales@gormanrupp.com; web site: www.GRPumps.com)

Met-Pro Global Pump Solutions, a CECO Environmental Company, Telford, PA

NETZSCH Pumpen & Systeme GmbH, Waldkraiburg, Germany

SRS Crisafulli, Inc., Glendive, MT

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)

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### Pumps, vertical centrifugal

**Bungartz GmbH & Co. KG**, Paul, Duesseldorf, Germany  
**FLUX-GERAETE GMBH**, Maulbronn, Germany

**Friatec AG Division Rheinhuetten Pumpen**, Wiesbaden

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 (800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com

— See our ad on page 15

**HAYWARD FLOW CONTROL**, One Hayward Industrial Drive, Clemmons, NC 27012 (888-429-4635 USA/Canada; 888-429-4635; FAX: 888-778-8410; e-mail: hflow@hayward.com; web site: www.haywardflow-control.com)

Met-Pro Global Pump Solutions, a CECO Environmental Company, Telford, PA

SAWA Pumpentechnik AG, Degersheim, CHE

SRS Crisafulli, Inc., Glendive, MT

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)

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Weir Specialty Pumps, Salt Lake City, UT

### Pumps, vertical inline

Greene, Tweed & Co. Ltd., Nottingham, Notts

National Pump Company, Glendale, AZ

**SEEPEX INC.**, 511 Speedway Dr., Enon, OH 45323 (800-695-3659; 937-864-7150; FAX: 937-864-7157; e-mail: sales@seepex.net; web site: sales.us@seepex.com)

### Pumps, vertical turbine

National Pump Company, Glendale, AZ

## SEALS, GASKETS & PACKING MATERIALS

### Gaskets, fluoroplastic

**PROCO PRODUCTS, INC.**, 2431 N. Wigwam Dr. - 95205, P.O. Box 590, Stockton, CA 95201-0590 (800-344-3246 USA & Canada; 209-943-6088; FAX: 209-943-0242; e-mail: sales@procoproducts.com; web site: www.procoproducts.com)

### Gaskets, ring

W.L. Gore & Associates, Sealant Technologies, Elkton, MD

### Gaskets, rubber

Apple Rubber Products, Lancaster, NY

**PROCO PRODUCTS, INC.**, 2431 N. Wigwam Dr. - 95205, P.O. Box 590, Stockton, CA 95201-0590 (800-344-3246 USA & Canada; 209-943-6088; FAX: 209-943-0242; e-mail: sales@procoproducts.com; web site: www.procoproducts.com)

### Gaskets, sheet

W.L. Gore & Associates, Sealant Technologies, Elkton, MD

### Gaskets, silicone

Dymax Corp., Torrington, CT

### Packings, braided

**A.W.CHESTERTON COMPANY**, 860 Salem St, Groveland, MA 01834 (1 844-592-0458; e-mail: christine.metcalf@chesterton.com; web site: www.chesterton.com)

W.L. Gore & Associates, Sealant Technologies, Elkton, MD

### Packings, carbon

HOERBIGER Kompressortechnik Holding GmbH, Vienna

### Packings, molded

Compressor Products International, Stafford, TX

### Packings, plastic

HOERBIGER Kompressortechnik Holding GmbH, Vienna

### Packings, pump

**A.W.CHESTERTON COMPANY**, 860 Salem St, Groveland, MA 01834 (1 844-592-0458; e-mail: christine.metcalf@chesterton.com; web site: www.chesterton.com)

W.L. Gore & Associates, Sealant Technologies, Elkton, MD

### Packings, ring

Compressor Products International, Stafford, TX

HOERBIGER Kompressortechnik Holding GmbH, Vienna

### Packings, valve stem

W.L. Gore & Associates, Sealant Technologies, Elkton, MD

### Seals, balanced pressure

**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hoheflum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: +49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)

— See our ad on page 163

Scenic Precise Element Inc., Kaohsiung City

### Seals, bearing

AEGIS Bearing Protection Rings, Mechanic Falls, ME

**A.W.CHESTERTON COMPANY**, 860 Salem St, Groveland, MA 01834 (1 844-592-0458; e-mail: christine.metcalf@chesterton.com; web site: www.chesterton.com)

**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hoheflum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: +49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)

— See our ad on page 163

Greene, Tweed & Co., Kulpville, PA

Greene, Tweed & Co. Ltd., Nottingham, Notts  
3M Technical Ceramics, Kempton, Germany  
Scenic Precise Element Inc., Kaohsiung City

### Seals, bellows

Scenic Precise Element Inc., Kaohsiung City

### Seals, diaphragm

WIKa Instrument, LP, Lawrenceville, GA

### Seals, gas-lubricated

**A.W.CHESTERTON COMPANY**, 860 Salem St, Groveland, MA 01834 (1 844-592-0458; e-mail: christine.metcalf@chesterton.com; web site: www.chesterton.com)

### Seals, magnetic

**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hoheflum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: +49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)

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### Seals, mechanical

**A.W.CHESTERTON COMPANY**, 860 Salem St, Groveland, MA 01834 (1 844-592-0458; e-mail: christine.metcalf@chesterton.com; web site: www.chesterton.com)

Compressor Products International, Stafford, TX

**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hoheflum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: +49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)

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3M Technical Ceramics, Kempton, Germany

Scenic Precise Element Inc., Kaohsiung City

### Seals, noncontacting

Scenic Precise Element Inc., Kaohsiung City

### Seals, shaft

Greene, Tweed & Co., Kulpville, PA

Greene, Tweed & Co. Ltd., Nottingham, Notts

Scenic Precise Element Inc., Kaohsiung City

### Seals, spring

Greene, Tweed & Co., Kulpville, PA

Greene, Tweed & Co. Ltd., Nottingham, Notts

## STEAM TRAPS

### Steam traps, disc

**TLV CORPORATION**, Charlotte, NC

— See our ad on page 108

### Steam traps, float

**TLV CORPORATION**, Charlotte, NC

— See our ad on page 108

### Steam traps, float & thermostatic

Spirax Sarco, Inc., Blythwood, SC

**TLV CORPORATION**, Charlotte, NC

— See our ad on page 108

Tengs Valve International Limited, Wenzhou, CHN

### Steam traps, inverted bucket

Spirax Sarco, Inc., Blythwood, SC

**TLV CORPORATION**, Charlotte, NC

— See our ad on page 108

### Steam traps, thermostatic

Spirax Sarco, Inc., Blythwood, SC

**TLV CORPORATION**, Charlotte, NC

— See our ad on page 108

## TANKS & OTHER LIQUID STORAGE VESSELS

### Bulk liquid storage services

**ASSMANN CORP. OF AMERICA**, 300 N. Taylor Rd., Garrett, IN 46738 (888-357-3181; 260-357-3181; FAX: 260-357-3738; e-mail: info@assmann-usa.com; web site: www.assmann-usa.com)

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Gilbert Industries, Sparta, MO

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BETE Fog Nozzle Inc., Greenfield, MA

## Tank fittings & accessories

**ASSMANN CORP. OF AMERICA**, 300 N. Taylor Rd., Garrett, IN 46738 (888-357-3181; 260-357-3181; FAX: 260-357-3738; e-mail: info@assmann-usa.com; web site: www.assmann-usa.com)

BS & B Safety Systems, Inc., Tulsa, OK

**MICROMOLD PRODUCTS, INC.**, 7 Odell Plaza #133, Yonkers, NY 10701 (914-969-2850)

## Tanks, PVC

HEE-DUALL, A CECO ENVIRONMENTAL COMPANY, Owosso, MI

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)

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## Tanks, air

Advance Boiler & Tank Co., West Allis, WI  
Universal Tank & Fabrication, Dubuque, IA

## Tanks, aluminum

Chattanooga Boiler and Tank Co., Chattanooga, TN

## Tanks, bladder

**ASSMANN CORP. OF AMERICA**, 300 N. Taylor Rd., Garrett, IN 46738 (888-357-3181; 260-357-3181; FAX: 260-357-3738; e-mail: info@assmann-usa.com; web site: www.assmann-usa.com)

Nier Systems Inc, Boca Raton, Florida  
Universal Tank & Fabrication, Dubuque, IA

## Tanks, carbon steel

Advance Boiler & Tank Co., West Allis, WI

**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)

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Chattanooga Boiler and Tank Co., Chattanooga, TN  
Gilbert Industries, Sparta, MO

Hoover Container Solutions, Houston, TX

Midwest Steel Company Inc, Houston, Texas

Niles Steel Tank, Ambler, PA

Samuel Pressure Vessel Group, Marinette, WI

Universal Tank & Fabrication, Dubuque, IA

Willbros Tank Company, Channelview, TX

## Tanks, cryogenic

CB&I, The Woodlands, TX  
Gilbert Industries, Sparta, MO  
Linde AG, Engineering Division, Pullach

**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)

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SIAD Macchine Impianti, Bergamo

## Tanks, cryogenic, vacuum jacketed

**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)

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Meyer Tool & Mfg., Inc., oaklawn, IL

**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)

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SIAD Macchine Impianti, Bergamo

## Tanks, custom fabricated

Advance Boiler & Tank Co., West Allis, WI

**ASSMANN CORP. OF AMERICA**, 300 N. Taylor Rd., Garrett, IN 46738 (888-357-3181; 260-357-3181; FAX: 260-357-3738; e-mail: info@assmann-usa.com; web site: www.assmann-usa.com)

**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)

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Chattanooga Boiler and Tank Co., Chattanooga, TN

Gilbert Industries, Sparta, MO

HEE-DUALL, A CECO ENVIRONMENTAL COMPANY,

Owosso, MI

INOX-TECH INC., Ste. Catherine

Koch Knight, LLC, East Canton, OH

Niles Steel Tank, Ambler, PA

**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)

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Samuel Pressure Vessel Group, Marinette, WI

Stainless Fabrication, Inc., Springfield, MO

Universal Tank & Fabrication, Dubuque, IA

Willbros Tank Company, Channelview, TX

ZCL Composites Inc, Corrosion Division, Edmonton, CAN

## Tanks, double jacketed

**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)

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Chattanooga Boiler and Tank Co., Chattanooga, TN  
**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)

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## Tanks, dome roof

HEE-DUALL, A CECO ENVIRONMENTAL COMPANY, Owosso, MI

Willbros Tank Company, Channelview, TX

## Tanks, double containment

**ASSMANN CORP. OF AMERICA**, 300 N. Taylor Rd., Garrett, IN 46738 (888-357-3181; 260-357-3181; FAX: 260-357-3738; e-mail: info@assmann-usa.com; web site: www.assmann-usa.com)

Chattanooga Boiler and Tank Co., Chattanooga, TN

Universal Tank & Fabrication, Dubuque, IA

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)

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Willbros Tank Company, Channelview, TX

## Tanks, epoxy-fiberglass

Topp Industries, Inc., Rochester, IN

## Tanks, epoxy lined

Advance Boiler & Tank Co., West Allis, WI

Chattanooga Boiler and Tank Co., Chattanooga, TN

Universal Tank & Fabrication, Dubuque, IA

## Tanks, field-erected

**ASSMANN CORP. OF AMERICA**, 300 N. Taylor Rd., Garrett, IN 46738 (888-357-3181; 260-357-3181; FAX: 260-357-3738; e-mail: info@assmann-usa.com; web site: www.assmann-usa.com)

CB&I, The Woodlands, TX

Gilbert Industries, Sparta, MO

INOX-TECH INC., Ste. Catherine

Topp Industries, Inc., Rochester, IN

Willbros Tank Company, Channelview, TX

## Tanks, fluoroplastic

**MICROMOLD PRODUCTS, INC.**, 7 Odell Plaza #133, Yonkers, NY 10701 (914-969-2850)

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)

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## Tanks, galvanized

Hoover Container Solutions, Houston, TX

Willbros Tank Company, Channelview, TX

## Tanks, glass lined

EquipNet, Inc., Canton, MA

Glasslined Technology, Inc, Greensboro, Georgia

Niles Steel Tank, Ambler, PA

Willbros Tank Company, Channelview, TX

## Tanks, heated

**ASSMANN CORP. OF AMERICA**, 300 N. Taylor Rd., Garrett, IN 46738 (888-357-3181; 260-357-3181; FAX: 260-357-3738; e-mail: info@assmann-usa.com; web site: www.assmann-usa.com)

INOX-TECH INC., Ste. Catherine

Kloepfer-Therm GmbH & Co. KG, Dortmund

**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)

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Willbros Tank Company, Channelview, TX

## Tanks, internal floating deck

Willbros Tank Company, Channelview, TX

## Tanks, mixing

**ASSMANN CORP. OF AMERICA**, 300 N. Taylor Rd., Garrett, IN 46738 (888-357-3181; 260-357-3181; FAX: 260-357-3738; e-mail: info@assmann-usa.com; web site: www.assmann-usa.com)

**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)

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Chattanooga Boiler and Tank Co., Chattanooga, TN

EquipNet, Inc., Canton, MA

Gilbert Industries, Sparta, MO

Hoover Container Solutions, Houston, TX

**JAYGO, INCORPORATED**, 7 Emery Ave., Randolph, NJ 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

**LOTUS MIXERS INC.**, North Venice, FL  
Metano IBC Services, Inc., Perrinville, NJ  
**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)

— See our ad on page 35

Stainless Fabrication, Inc., Springfield, MO

## Tanks, nickel or nickel alloys

Chattanooga Boiler and Tank Co., Chattanooga, TN

Stainless Fabrication, Inc., Springfield, MO

United Performance Metals, Houston, TX

Willbros Tank Company, Channelview, TX

## Tanks, phenolic lined

Advance Boiler & Tank Co., West Allis, WI

Chattanooga Boiler and Tank Co., Chattanooga, TN

## Tanks, polyethylene

**ASSMANN CORP. OF AMERICA**, 300 N. Taylor Rd., Garrett, IN 46738 (888-357-3181; 260-357-3181; FAX: 260-357-3738; e-mail: info@assmann-usa.com; web site: www.assmann-usa.com)

Delta Cooling Towers Inc., Roxbury Township, NJ

Hoover Container Solutions, Houston, TX

Metano IBC Services, Inc., Perrinville, NJ

Nier Systems Inc, Boca Raton, Florida

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)

— See our ad on page 25

## Tanks, polypropylene

HEE-DUALL, A CECO ENVIRONMENTAL COMPANY, Owosso, MI

Nier Systems Inc, Boca Raton, Florida

Singleton Corp., Cleveland, OH

**VANTON PUMP & EQUIPMENT CORP.**, 201 Sweetland Ave., Hillside, NJ 07205 (908-688-4216; FAX: 908-686-9314; e-mail: mkt@vanton.com; web site: www.vanton.com)

— See our ad on page 25

## Tanks, pressurized storage

Advance Boiler & Tank Co., West Allis, WI

**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)

— See our ad on page 9

Chattanooga Boiler and Tank Co., Chattanooga, TN

Gilbert Industries, Sparta, MO

Meyer Tool & Mfg., Inc., oaklawn, IL

**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)

— See our ad on page 35

Samuel Pressure Vessel Group, Marinette, WI

Universal Tank & Fabrication, Dubuque, IA

## Tanks, rubber lined

Advance Boiler & Tank Co., West Allis, WI

Chattanooga Boiler and Tank Co., Chattanooga, TN

Universal Tank & Fabrication, Dubuque, IA

## Tanks, stainless steel

Aaron Process Equipment Co., Bensenville, IL

Advance Boiler & Tank Co., West Allis, WI

**BUTTING GROUP**, Giffhorne Straße 59, Knesebeck, Germany 29379 (e-mail: mareike.wolter@butting.de)

— See our ad on page 17

**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)

— See our ad on page 9

Chattanooga Boiler and Tank Co., Chattanooga, TN

Enerquip, LLC, Medford, WI

Enerquip, LLC, Medford, WI  
 Gilbert Industries, Sparta, MO  
 Hoover Container Solutions, Houston, TX  
 Midwest Steel Company Inc, Houston, Texas  
**MUELLER GMBH, P.O. Box 1409, Rheinfelden, Germany**  
 79604 (+49-76-23-9690; FAX: +49-7623-96969; e-mail: info@mueller-gmbh.com; web site: www.mueller-gmbh.com)

Niles Steel Tank, Ambler, PA  
**POPE SCIENTIFIC, INC., P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)**  
 — See our ad on page 35

Samuel Pressure Vessel Group, Marinette, WI  
 Stainless Fabrication, Inc., Springfield, MO  
 United Performance Metals, Houston, TX  
 Universal Tank & Fabrication, Dubuque, IA

## Tanks, stainless steel, lined

Chattanooga Boiler and Tank Co., Chattanooga, TN  
**POPE SCIENTIFIC, INC., P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)**  
 — See our ad on page 35

## Tanks, tapered wall

**CHARLES ROSS & SON CO., 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)**  
 — See our ad on page 9

## Tanks, vinyl ester - fiberglass

Top Industries, Inc., Rochester, IN

## Tanks, water

**ASSMANN CORP. OF AMERICA, 300 N. Taylor Rd., Garrett, IN 46738 (888-357-3181; 260-357-3181; FAX: 260-357-3738; e-mail: info@assmann-usa.com; web site: www.assmann-usa.com)**

CB&I, The Woodlands, TX  
 Delta Cooling Towers Inc., Roxbury Township, NJ  
 Nier Systems Inc, Boca Raton, Florida  
 Universal Tank & Fabrication, Dubuque, IA

## TUBING & TUBE FITTINGS, METALLIC & NONMETALLIC

### Coils, tubing

Arch City Steel, Fenton, Missouri  
 Tef Cap Industries, West Chester, PA

### Tube fittings

CPC (Colder Products Company), St. Paul, MN  
 CPI Wirecloth & Screens Inc, Pearland, TX  
 Dockweiler AG, Neustadt-Glewe  
 Fluid Line Products Inc., Willoughby, OH  
 HammerTek Corporation, Landsville, PA  
 NewAge Industries, Inc., Southampton, PA  
 Swagelok Co., Solon, OH  
**USA INDUSTRIES, INC., 302 State Street, S. Houston, TX 77587 (800-456-8721; 713-941-3797; 713-941-3797; FAX: 713-941-1086; e-mail: info@usaindustries.com; web site: www.usaindustries.com)**  
 Viega, Wichita, Kansas

### Tube sheets

Arch City Steel, Fenton, Missouri  
 United Performance Metals, Houston, TX

### Tubing, condenser

Sandvik Materials Technology, Tubular Products, Scranton, PA

### Tubing, evaporator

Sandvik Materials Technology, Tubular Products, Scranton, PA

### Tubing, finned

**FIN TUBE PRODUCTS, INC., 188 S Lyman St., Suite 100, Wadsworth, OH 44281 (800-334-3736; 330-334-3736; FAX: 330-334-3848; e-mail: mb@fintube.com; web site: www.fintube.com)**

### Tubing, flexible metal

Hyspan Precision Prod. Inc., Chula Vista, CA  
 Thorburn Flex, Pointe-Claire Quebec, CAN

### Tubing, heat exchanger

**FIN TUBE PRODUCTS, INC., 188 S Lyman St., Suite 100, Wadsworth, OH 44281 (800-334-3736; 330-334-3736; FAX: 330-334-3848; e-mail: mb@fintube.com; web site: www.fintube.com)**  
 Kloepper-Therm GmbH & Co. KG, Dortmund

**SAINT-GOBAIN CERAMICS/STRUCTURAL CERAMICS, 23 Acheson Dr., Niagara Falls, NY 14303 (716-278-6233; FAX: 716-278-2373; e-mail: scd.sales@saint-gobain.com; web site: www.hexoloy.com)**

— See our ad on page 176  
 Sandvik Materials Technology, Tubular Products, Scranton, PA

Tef Cap Industries, West Chester, PA

### Tubing, high pressure

Sandvik Materials Technology, Tubular Products, Scranton, PA

### Tubing, high temperature

NewAge Industries, Inc., Southampton, PA  
 Regal Industries, Inc., Painesville, OH  
 Tef Cap Industries, West Chester, PA

### Tubing, instrument

Arch City Steel, Fenton, Missouri  
 Sandvik Materials Technology, Tubular Products, Scranton, PA

### Tubing, nonmetallic

Creative Pultrusions, Inc., Alum Bank, PA  
**SAINT-GOBAIN CERAMICS/STRUCTURAL CERAMICS, 23 Acheson Dr., Niagara Falls, NY 14303 (716-278-6233; FAX: 716-278-2373; e-mail: scd.sales@saint-gobain.com; web site: www.hexoloy.com)**  
 — See our ad on page 176

### Tubing, plastic

Associated Bag Company, Milwaukee, WI  
 NewAge Industries, Inc., Southampton, PA

### Tubing, pneumatic

Sandvik Materials Technology, Tubular Products, Scranton, PA

### Tubing, refractory

**SAINT-GOBAIN CERAMICS/STRUCTURAL CERAMICS, 23 Acheson Dr., Niagara Falls, NY 14303 (716-278-6233; FAX: 716-278-2373; e-mail: scd.sales@saint-gobain.com; web site: www.hexoloy.com)**  
 — See our ad on page 176

### Tubing, rubber

NewAge Industries, Inc., Southampton, PA

### Tubing, seamless

Arch City Steel, Fenton, Missouri  
 Dockweiler AG, Neustadt-Glewe  
 Sandvik Materials Technology, Tubular Products, Scranton, PA  
 TW Metals, Exton, PA

### Tubing, silicone

NewAge Industries, Inc., Southampton, PA

### Tubing, vacuum

Escitec, Mesa, AZ

### Tubing, welded

Arch City Steel, Fenton, Missouri  
 Dockweiler AG, Neustadt-Glewe  
 TW Metals, Exton, PA

## VALVES

### Valve-locking devices

Apollo Valves, Matthews, NC  
 Conbraco Industries, Inc., Matthews, NC

### Valve parts & fittings

**BADGER METER, INC., 4545 W Brown Deer RD, PO Box 245036, Milwaukee, WI 53224-9536 (800-876-3837; FAX: 918-832-9962; e-mail: infocentral@badgermeter.com; web site: www.badgermeter.com)**  
 Dueker GmbH & Co. KGaA, Laufach  
 HOERBIGER Kompressortechnik Holding GmbH, Vienna  
**HAYWARD FLOW CONTROL, One Hayward Industrial Drive, Clemmons, NC 27012 (888-429-4635 USA/Canada; 888-429-4635; FAX: 888-778-8410; e-mail: hflow@hayward.com; web site: www.haywardflowcontrol.com)**

### Valves, air

Apollo Valves, Matthews, NC  
**CHECK-ALL VALVE MFG. CO., 1800 Fuller Rd., West Des Moines, IA 50265 (515-224-2301; FAX: 515-224-2326; e-mail: sales@checkall.com; web site: www.checkall.com)**  
 Conbraco Industries, Inc., Matthews, NC

**PLAST-O-MATIC VALVES INC., 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)**

— See our ad on page 211

SAMSON Controls, Inc., Baytown, TX

### Valves, airlock rotary

AIRLANCO, Falls City, NE  
 Buhler Inc., Minneapolis, MN  
 Coperion GmbH, Weingarten, Wuertt., O  
 Coperion K-Tron, Sewell, NJ  
 DMN Incorporated, AR

**NOL-TEC SYSTEMS, INC., 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)**

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Prater-Sterling, Bollingbrook, IL

### Valves, angle

**ARCA REGLER GMBH, Kempener Str. 18, Toenisvorst, Germany 47918 (49-2156-7709-0; FAX: 49-2156-770955; e-mail: sale@arca-valve.com; web site: www.arca-valve.com)**

**BADGER METER, INC., 4545 W Brown Deer RD, PO Box 245036, Milwaukee, WI 53224-9536 (800-876-3837; FAX: 918-832-9962; e-mail: infocentral@badgermeter.com; web site: www.badgermeter.com)**

Burkert Fluid Control Systems, Charlotte, NC

**BURKERT FLUID CONTROL SYSTEMS, Christian-Buerkert-Str. 13-17, Ingelfingen, Germany 74653 (+49 7940 10-0; FAX: +49 7940 10-91 201; e-mail: info@burkert.com; web site: www.burkert.com)**

Buschjost GmbH, Bad Oeynhausen

Cashco, Inc., Ellsworth, KS

OHL Guterath Industrial Valves GmbH, Altenstadt

**PLAST-O-MATIC VALVES INC., 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)**  
 — See our ad on page 211

SAMSON Controls, Inc., Baytown, TX

### Valves, backflow

Apollo Valves, Matthews, NC  
 Conbraco Industries, Inc., Matthews, NC

### Valves, ball

AA S&K AUTOMATION, Valves, Automated Valves and Control Valves, Plymouth, MN

Apollo Valves, Matthews, NC

Bee Valve Inc., Elyria, OH

Chemline Plastics Limited, CAN

Conbraco Industries, Inc., Matthews, NC

**CONVAL, INC., 265 Field Road, Somers, CT 06071 (860-749-0761; FAX: 860-763-3557; e-mail: mhendrick@conval.com; web site: www.conval.com)**

**EDWARDS US HEADQUARTERS, Sanborn, NY**

Flodyne Controls Inc., Murray Hill, NJ

Flowserve Corp., Flow Control Div., Cookeville, TN

Green Leaf Inc, Fontanet, IN

**HAYWARD FLOW CONTROL, One Hayward Industrial Drive, Clemmons, NC 27012 (888-429-4635 USA/Canada; 888-429-4635; FAX: 888-778-8410; e-mail: hflow@hayward.com; web site: www.haywardflowcontrol.com)**

ITT, Engineered Valves, Lancaster, PA

**INLINE INDUSTRIES, INC., 9056 Garvey Ave., Rosemead, CA 91770 (800-568-8998 United States and Canada; 626-813-6188; e-mail: info@ballvalve.com; web site: www.ballvalve.com)**

**JAYGO, INCORPORATED, 7 Emery Ave., Randolph, NJ 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)**

Metso Flow Control Inc, Vantaa, Finland, FIN

**PLAST-O-MATIC VALVES INC., 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)**

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Richter Chemie-Technik GmbH, Kempen

SAMSON Controls, Inc., Baytown, TX

Swagelok Co., Solon, OH

Viega, Wichita, Kansas

Waisley Industrial Group, Newport News, VA



## Valves, bellows sealed

**ARCA REGLER GMBH**, Kempener Str. 18, Toenisvorst, Germany 47918 (49-2156-7709-0; FAX: 49-2156-770955; e-mail: sale@arca-valve.com; web site: www.arca-valve.com)

**Cashco, Inc., Ellsworth, KS**  
**CONVAL, INC.**, 265 Field Road, Somers, CT 06071 (860-749-0761; FAX: 860-763-3557; e-mail: mhendrick@conval.com; web site: www.conval.com)

**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)  
— See our ad on page 211

Richter Chemie-Technik GmbH, Kempen

SAMSON Controls, Inc., Baytown, TX

## Valves, butterfly

**AA S&K AUTOMATION**, Valves, Automated Valves and Control Valves, Plymouth, MN

**Apollo Valves**, Matthews, NC

**Cashco, Inc., Ellsworth, KS**

Chemline Plastics Limited, CAN

Conbraco Industries, Inc., Matthews, NC

**EDWARDS US HEADQUARTERS**, Sanborn, NY

Flowserve Corp., Flow Control Div., Cookeville, TN

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)  
— See our ad on page 15

**HAYWARD FLOW CONTROL**, One Hayward Industrial Drive, Clemmons, NC 27012 (888-429-4635 USA/Canada; 888-429-4635; FAX: 888-778-8410; e-mail: hflow@hayward.com; web site: www.haywardflow-control.com)

**ITT**, Engineered Valves, Lancaster, PA  
L.B. Bohle Maschinen + Verfahren GmbH, Ennigerloh M. O. Industries, Whippany, NJ

Met-Pro Global Pump Solutions, a CECO Environmental Company, Telford, PA

Metso Flow Control Inc, Vantaa, Finland, , FIN

**MUELLER GMBH**, P.O. Box 1409, Rheinfelden, Germany 79604 (+49-76-23-9690; FAX: +49-7623-96969; e-mail: info@mueller-gmbh.com; web site: www.mueller-gmbh.com)

**OHL Guterth Industrial Valves GmbH**, Altenstadt Posi-flate, St. Paul, MN

Richter Chemie-Technik GmbH, Kempen

SAMSON Controls, Inc., Baytown, TX

Walseley Industrial Group, Newport News, VA

## Valves, ceramic lined

SAMSON Controls, Inc., Baytown, TX

## Valves, check

**CPI Wirecloth & Screens Inc**, Pearlard, TX

**CHECK-ALL VALVE MFG. CO.**, 1800 Fuller Rd., West Des Moines, IA 50265 (515-224-2301; FAX: 515-224-2326; e-mail: sales@checkall.com; web site: www.checkall.com)

**CONVAL, INC.**, 265 Field Road, Somers, CT 06071 (860-749-0761; FAX: 860-763-3557; e-mail: mhendrick@conval.com; web site: www.conval.com)

Fluid Line Products Inc., Willoughby, OH

**HOERBIGER** Kompressortechnik Holding GmbH, Vienna

**HAYWARD FLOW CONTROL**, One Hayward Industrial Drive, Clemmons, NC 27012 (888-429-4635 USA/Canada; 888-429-4635; FAX: 888-778-8410; e-mail: hflow@hayward.com; web site: www.haywardflow-control.com)

**ITT**, Engineered Valves, Lancaster, PA

**Kraissl Co. Inc.**, Hackensack, NJ

**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)  
— See our ad on page 211

Schutte & Koerting, Trevoise, PA

**TLV CORPORATION**, Charlotte, NC

— See our ad on page 108

Walseley Industrial Group, Newport News, VA

## Valves, control, electric

**AA S&K AUTOMATION**, Valves, Automated Valves and Control Valves, Plymouth, MN

**AUMA RIESTER GMBH & CO. KG**, Aumastrasse 1, P.O. Box 1362, Muellheim, Germany 93799 (+49 7631 8090; FAX: +49 7631 8091250; e-mail: info@auma.com; web site: www.auma.com)

Auma Actuators Inc., Cannonsburg, PA

**BADGER METER, INC.**, 4545 W Brown Deer RD, PO Box 245036, Milwaukee, WI 53224-9536 (800-876-3837; FAX: 918-832-9962; e-mail: infocentral@badgermeter.com; web site: www.badgermeter.com)

Buschjost GmbH, Bad Oeynhausen

**Cashco, Inc., Ellsworth, KS**

Chemline Plastics Limited, CAN

**CONVAL, INC.**, 265 Field Road, Somers, CT 06071 (860-749-0761; FAX: 860-763-3557; e-mail: mhendrick@conval.com; web site: www.conval.com)

**HAYWARD FLOW CONTROL**, One Hayward Industrial Drive, Clemmons, NC 27012 (888-429-4635 USA/Canada; 888-429-4635; FAX: 888-778-8410; e-mail: hflow@hayward.com; web site: www.haywardflow-control.com)

**INLINE INDUSTRIES, INC.**, 9056 Garvey Ave., Rosemead, CA 91770 (800-568-8998 United States and Canada; 626-813-6188; e-mail: info@ballvalve.com; web site: www.ballvalve.com)

**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)  
— See our ad on page 211

RF Valves, Inc., Hanover, MD

SAMSON Controls, Inc., Baytown, TX

Spirax Sarco, Inc., Blythewood, SC

## Valves, control, hydraulic

**CONVAL, INC.**, 265 Field Road, Somers, CT 06071 (860-749-0761; FAX: 860-763-3557; e-mail: mhendrick@conval.com; web site: www.conval.com)

**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)  
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RF Valves, Inc., Hanover, MD

SAMSON Controls, Inc., Baytown, TX

Spirax Sarco, Inc., Blythewood, SC

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**BURKERT FLUID CONTROL SYSTEMS**, Christian-Buerkert-Str. 13-17, Ingelfingen, Germany 74653 (+49 7940 10-0; FAX: +49 7940 10-91 204; e-mail: info@burkert.com; web site: www.burkert.com)

Buschjost GmbH, Bad Oeynhausen

**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)  
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SAMSON Controls, Inc., Baytown, TX

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SAMSON Controls, Inc., Baytown, TX  
Swagelok Co., Solon, OH  
**USA INDUSTRIES, INC.**, 302 State Street, S. Houston, TX 77587 (800-456-8721; 713-941-3797; 713-941-3797; FAX: 713-941-1086; e-mail: info@usaindustries.com; web site: www.usaindustries.com)  
Wolseley Industrial Group, Newport News, VA

## Valves, flush-bottom tank

Dueker GmbH & Co. KGaA, Laufach  
**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 (800) 722-6622; e-mail: sales.northeramerica@gea.com; web site: www.gea.com  
— See our ad on page 15  
JLS International, Inc., Charlotte, NC

## Valves, gate

Chemline Plastics Limited, CAN  
**CONVAL, INC.**, 265 Field Road, Somers, CT 06071 (860-749-0761; FAX: 860-763-3557; e-mail: mhendrick@conval.com; web site: www.conval.com)  
Coperion GmbH, Weingarten, Wuertt., O  
Tengs Valve International Limited, Wenzhou., CHN  
Vortex, Salina, KS  
Wolseley Industrial Group, Newport News, VA

## Valves, glass lined

Dueker GmbH & Co. KGaA, Laufach  
**GEMU VALVES, INC.**, 3800 Camp Creek Parkway, Building 2600 Suite 120, Atlanta, GA 30331 (678-553-3400; FAX: 404-344-9350; e-mail: info@gemu.com; web site: www.gemu.com)  
Glasslined Technology, Inc., Greensboro, Georgia  
ITT, Engineered Valves, Lancaster, PA

## Valves, globe

AA S&K AUTOMATION, Valves, Automated Valves and Control Valves, Plymouth, MN  
**ARCA REGLER GMBH, Kempener Str. 18, Toenisvorst, Germany 47918 (49-2156-7709-0; FAX: 49-2156-770955; e-mail: sale@arca-valve.com; web site: www.arca-valve.com)**  
Cashco, Inc., Ellsworth, KS  
**CONVAL, INC.**, 265 Field Road, Somers, CT 06071 (860-749-0761; FAX: 860-763-3557; e-mail: mhendrick@conval.com; web site: www.conval.com)  
**GEMU VALVES, INC.**, 3800 Camp Creek Parkway, Building 2600 Suite 120, Atlanta, GA 30331 (678-553-3400; FAX: 404-344-9350; e-mail: info@gemu.com; web site: www.gemu.com)

Metso Flow Control Inc., Vantaa, Finland, FIN  
Pentair Valves & Controls, Stafford, TX  
**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)  
— See our ad on page 21

SAMSON Controls, Inc., Baytown, TX

## Valves, high pressure

**ARCA REGLER GMBH, Kempener Str. 18, Toenisvorst, Germany 47918 (49-2156-7709-0; FAX: 49-2156-770955; e-mail: sale@arca-valve.com; web site: www.arca-valve.com)**  
Badger Meter Europa GmbH, Neuffen  
**BADGER METER, INC.**, 4545 W Brown Deer RD, PO Box 245036, Milwaukee, WI 53224-9536 (800-876-3837; FAX: 918-832-9962; e-mail: info@central@badgermeter.com; web site: www.badgermeter.com)

CPI Wirecloth & Screens Inc., Pearland, TX  
**CHECK-ALL VALVE MFG. CO.**, 1800 Fuller Rd., West Des Moines, IA 50265 (515-224-2301; FAX: 515-224-2326; e-mail: sales@checkall.com; web site: www.checkall.com)

**CONVAL, INC.**, 265 Field Road, Somers, CT 06071 (860-749-0761; FAX: 860-763-3557; e-mail: mhendrick@conval.com; web site: www.conval.com)

Coperion GmbH, Weingarten, Wuertt.  
Fike, Blue Springs, MO  
Flodyne Controls Inc., Murray Hill, NJ  
Fluid Line Products Inc., Willoughby, OH  
HOERBIGER Kompressortechnik Holding GmbH, Vienna  
**INLINE INDUSTRIES, INC.**, 9056 Garvey Ave., Rosemead, CA 91770 (800-568-8998 United States and Canada; 626-813-6188; e-mail: info@ballvalve.com; web site: www.ballvalve.com)

JLS International, Inc., Charlotte, NC  
Metso Flow Control Inc., Vantaa, Finland, FIN  
Nordson SEALANT EQUIPMENT, Plymouth, MI  
Posi-flate, St. Paul, MN  
RF Valves, Inc., Hanover, MD  
Roto-Disc, Erlanger, KY  
SAMSON Controls, Inc., Baytown, TX  
Schutte & Koerting, Treviso, PA  
**SENTRY EQUIPMENT CORP**, 966 Blue Ribbon Circle North, Oconomowoc, WI 53066 (262-567-7256; FAX: 262-567-4523; e-mail: sales@sentry-equip.com; web site: www.sentry-equip.com)  
— See our ad on page 43  
Swagelok Co., Solon, OH

**TLV CORPORATION, Charlotte, NC**  
— See our ad on page 108

Vortex, Salina, KS  
**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)

## Valves, high temperature

**ARCA REGLER GMBH, Kempener Str. 18, Toenisvorst, Germany 47918 (49-2156-7709-0; FAX: 49-2156-770955; e-mail: sale@arca-valve.com; web site: www.arca-valve.com)**  
**BADGER METER, INC.**, 4545 W Brown Deer RD, PO Box 245036, Milwaukee, WI 53224-9536 (800-876-3837; FAX: 918-832-9962; e-mail: info@central@badgermeter.com; web site: www.badgermeter.com)

Buschjost GmbH, Bad Oeynhausen  
**CHECK-ALL VALVE MFG. CO.**, 1800 Fuller Rd., West Des Moines, IA 50265 (515-224-2301; FAX: 515-224-2326; e-mail: sales@checkall.com; web site: www.checkall.com)

**CONVAL, INC.**, 265 Field Road, Somers, CT 06071 (860-749-0761; FAX: 860-763-3557; e-mail: mhendrick@conval.com; web site: www.conval.com)

DMN Incorporated, AR  
HOERBIGER Kompressortechnik Holding GmbH, Vienna  
JLS International, Inc., Charlotte, NC  
Metso Flow Control Inc., Vantaa, Finland, FIN  
Roto-Disc, Erlanger, KY  
SAMSON Controls, Inc., Baytown, TX  
Swagelok Co., Solon, OH  
**TLV CORPORATION, Charlotte, NC**  
— See our ad on page 108  
Vortex, Salina, KS

## Valves, hopper

Posi-flate, St. Paul, MN  
RF Valves, Inc., Hanover, MD  
Roto-Disc, Erlanger, KY

## Valves, jacketed

Apollo Valves, Matthews, NC  
Conbraco Industries, Inc., Matthews, NC  
JLS International, Inc., Charlotte, NC  
OHL Gutermuth Industrial Valves GmbH, Altenstadt Roto-Disc, Erlanger, KY  
SAMSON Controls, Inc., Baytown, TX

## Valves, knife-gate

ITT, Engineered Valves, Lancaster, PA  
Pentair Valves & Controls, Stafford, TX  
Vortex, Salina, KS

## Valves, metal seated

Cashco, Inc., Ellsworth, KS  
**CHECK-ALL VALVE MFG. CO.**, 1800 Fuller Rd., West Des Moines, IA 50265 (515-224-2301; FAX: 515-224-2326; e-mail: sales@checkall.com; web site: www.checkall.com)

**CONVAL, INC.**, 265 Field Road, Somers, CT 06071 (860-749-0761; FAX: 860-763-3557; e-mail: mhendrick@conval.com; web site: www.conval.com)

Flowsolve Corp., Flow Control Div., Cookeville, TN  
JLS International, Inc., Charlotte, NC  
OHL Gutermuth Industrial Valves GmbH, Altenstadt Posi-flate, St. Paul, MN  
Roto-Disc, Erlanger, KY  
SAMSON Controls, Inc., Baytown, TX  
Wolseley Industrial Group, Newport News, VA

## Valves, mixing

AA S&K AUTOMATION, Valves, Automated Valves and Control Valves, Plymouth, MN  
**ARCA REGLER GMBH, Kempener Str. 18, Toenisvorst, Germany 47918 (49-2156-7709-0; FAX: 49-2156-770955; e-mail: sale@arca-valve.com; web site: www.arca-valve.com)**  
Nordson SEALANT EQUIPMENT, Plymouth, MI  
OHL Gutermuth Industrial Valves GmbH, Altenstadt  
SAMSON Controls, Inc., Baytown, TX

## Valves, motor operated

AA S&K AUTOMATION, Valves, Automated Valves and Control Valves, Plymouth, MN  
**BADGER METER, INC.**, 4545 W Brown Deer RD, PO Box 245036, Milwaukee, WI 53224-9536 (800-876-3837; FAX: 918-832-9962; e-mail: info@central@badgermeter.com; web site: www.badgermeter.com)

**CONVAL, INC.**, 265 Field Road, Somers, CT 06071 (860-749-0761; FAX: 860-763-3557; e-mail: mhendrick@conval.com; web site: www.conval.com)

Flodyne Controls Inc., Murray Hill, NJ  
Flowsolve Corp., Raleigh, NC  
SAMSON Controls, Inc., Baytown, TX

**TLV CORPORATION, Charlotte, NC**  
— See our ad on page 108

## Valves, multiport

AA S&K AUTOMATION, Valves, Automated Valves and Control Valves, Plymouth, MN  
**CONVAL, INC.**, 265 Field Road, Somers, CT 06071 (860-749-0761; FAX: 860-763-3557; e-mail: mhendrick@conval.com; web site: www.conval.com)  
Flodyne Controls Inc., Murray Hill, NJ  
Flowsolve Corp., Flow Control Div., Cookeville, TN  
Fluid Line Products Inc., Willoughby, OH  
**HAYWARD FLOW CONTROL, One Hayward Industrial Drive, Clemmons, NC 27012 (888-429-4635 USA/Canada; 888-429-4635; FAX: 888-778-8410; e-mail: hflow@hayward.com; web site: www.haywardflowcontrol.com)**  
Hilliard Corp., Elmira, NY

**INLINE INDUSTRIES, INC.**, 9056 Garvey Ave., Rosemead, CA 91770 (800-568-8998 United States and Canada; 626-813-6188; e-mail: info@ballvalve.com; web site: www.ballvalve.com)  
JLS International, Inc., Charlotte, NC  
Kraissl Co. Inc., Hackensack, NJ  
**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)  
— See our ad on page 21

SAMSON Controls, Inc., Baytown, TX  
Vortex, Salina, KS

## Valves, needle

CPI Wirecloth & Screens Inc., Pearland, TX  
Fluid Line Products Inc., Willoughby, OH  
SAMSON Controls, Inc., Baytown, TX  
Swagelok Co., Solon, OH

## Valves, nuclear

**CONVAL, INC.**, 265 Field Road, Somers, CT 06071 (860-749-0761; FAX: 860-763-3557; e-mail: mhendrick@conval.com; web site: www.conval.com)  
ITT, Engineered Valves, Lancaster, PA  
Pentair Valves & Controls, Stafford, TX

## Valves, other

Buschjost GmbH, Bad Oeynhausen  
**CONVAL, INC.**, 265 Field Road, Somers, CT 06071 (860-749-0761; FAX: 860-763-3557; e-mail: mhendrick@conval.com; web site: www.conval.com)  
**INDECK POWER EQUIPMENT CO.**, 1111 Willis Ave. (CE), Wheeling, IL 60090 (800-446-3325; 847-541-8300; FAX: 847-541-9984; e-mail: info@indeck-power.com; web site: www.indeck.com)  
RF Valves, Inc., Hanover, MD  
SAMSON Controls, Inc., Baytown, TX

## Valves, packless

Cashco, Inc., Ellsworth, KS  
Flowsolve Corp., Flow Control Div., Cookeville, TN  
Pentair Valves & Controls, Stafford, TX  
SAMSON Controls, Inc., Baytown, TX

## Valves, pilot operated

Buschjost GmbH, Bad Oeynhausen  
Cashco, Inc., Ellsworth, KS  
Flodyne Controls Inc., Murray Hill, NJ  
Fluid Line Products Inc., Willoughby, OH  
**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)  
— See our ad on page 21  
SAMSON Controls, Inc., Baytown, TX

## Valves, pinch

Flowrox Oy, Lappeenranta  
Pentair Valves & Controls, Stafford, TX  
**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)  
— See our ad on page 21  
RF Valves, Inc., Hanover, MD  
SAMSON Controls, Inc., Baytown, TX

## Valves, plastic

**CHECK-ALL VALVE MFG. CO.**, 1800 Fuller Rd., West Des Moines, IA 50265 (515-224-2301; FAX: 515-224-2326; e-mail: sales@checkall.com; web site: www.checkall.com)  
Chemline Plastics Limited, CAN  
Corzan Industrial Systems, Cleveland, OH  
**GEMU VALVES, INC.**, 3800 Camp Creek Parkway, Building 2600 Suite 120, Atlanta, GA 30331 (678-553-3400; FAX: 404-344-9350; e-mail: info@gemu.com; web site: www.gemu.com)  
Georg Fischer Piping Systems Ltd., Schaffhausen  
Green Leaf Inc., Fontanet, IN

**HAYWARD FLOW CONTROL**, One Hayward Industrial Drive, Clemmons, NC 27012 (888-429-4635 USA/Canada; 888-429-4635; FAX: 888-778-8410; e-mail: hflow@hayward.com; web site: www.haywardflow-control.com)

Met-Pro Global Pump Solutions, a CECO Environmental Company, Telford, PA

**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)  
— See our ad on page 21i

## Valves, plastic lined

**CHECK-ALL VALVE MFG. CO.**, 1800 Fuller Rd., West Des Moines, IA 50265 (515-224-2301; FAX: 515-224-2326; e-mail: sales@checkall.com; web site: www.checkall.com)

Flowsolve Corp., Flow Control Div., Cookeville, TN  
**GEMU VALVES INC.**, 3800 Camp Creek Parkway, Building 2600 Suite 120, Atlanta, GA 30331 (678-553-3400; FAX: 404-344-9350; e-mail: info@gemu.com; web site: www.gemu.com)

ITT, Engineered Valves, Lancaster, PA  
Richter Chemie-Technik GmbH, Kempen  
SAMSON Controls, Inc., Baytown, TX

## Valves, plug

Flowsolve Corp., Flow Control Div., Cookeville, TN  
Hilliard Corp., Elmira, NY  
JLS International, Inc., Charlotte, NC  
**JAYGO, INCORPORATED**, 7 Emery Ave., Randolph, NJ 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

**Kraissl Co. Inc., Hackensack, NJ**  
SAMSON Controls, Inc., Baytown, TX  
Schutte & Koerting, Treviso, PA

## Valves, pneumatic

AA S&K AUTOMATION, Valves, Automated Valves and Control Valves, Plymouth, MN  
**BURKERT FLUID CONTROL SYSTEMS, Christian-Buerkert-Str. 13-17, Ingelfingen, Germany 74653 (+49 7940 10-0; FAX: +49 7940 10-91 204; e-mail: info@burkert.com; web site: www.burkert.com)**

Burkert Fluid Control Systems, Charlotte, NC  
**Cashco, Inc., Ellsworth, KS**

DMN Incorporated, AR  
Dueker GmbH & Co. KGaA, Laufach

**EDWARDS US HEADQUARTERS, Sanborn, NY**  
Flodyne Controls Inc., Murray Hill, NJ  
Flowrox Oy, Lappeenranta

**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045**  
(800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)  
— See our ad on page 15

**INLINE INDUSTRIES, INC.**, 9056 Garvey Ave., Rosemead, CA 91770 (800-568-8998 United States and Canada; 626-813-6188; e-mail: info@ballvalve.com; web site: www.ballvalve.com)

LA-MAN Corp., Mazeppa, MN  
**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)  
— See our ad on page 21i

RF Valves, Inc., Hanover, MD  
SAMSON Controls, Inc., Baytown, TX

## Valves, pressure reducing

**Cashco, Inc., Ellsworth, KS**  
Chemline Plastics Limited, CAN  
**CONVAL, INC.**, 265 Field Road, Somers, CT 06071 (860-749-0761; FAX: 860-763-3557; e-mail: mhendrick@conval.com; web site: www.conval.com)

Fika, Blue Springs, MO  
Oseco, Broken Arrow, OK  
**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)  
— See our ad on page 21i

SAMSON Controls, Inc., Baytown, TX  
**SENTRY EQUIPMENT CORP.**, 966 Blue Ribbon Circle North, Oconomowoc, WI 53066 (262-567-7256; FAX: 262-567-4523; e-mail: sales@sentry-equip.com; web site: www.sentry-equip.com)  
— See our ad on page 43

Spirax Sarco, Inc., Blythwood, SC  
**TLV CORPORATION, Charlotte, NC**  
— See our ad on page 108

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

## Valves, proportional

Chemline Plastics Limited, CAN  
SAMSON Controls, Inc., Baytown, TX

## Valves, pump protection

**CHECK-ALL VALVE MFG. CO.**, 1800 Fuller Rd., West Des Moines, IA 50265 (515-224-2301; FAX: 515-224-2326; e-mail: sales@checkall.com; web site: www.checkall.com)

**EDWARDS US HEADQUARTERS, Sanborn, NY**  
**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 (800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)  
— See our ad on page 15

**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)  
— See our ad on page 21i

## Valves, quick closing

Flodyne Controls Inc., Murray Hill, NJ  
**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)  
— See our ad on page 21i

SAMSON Controls, Inc., Baytown, TX  
**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

## Valves, relief

Blakmer, part of PSG, a Dover company, Grand Rapids, MI

**Cashco, Inc., Ellsworth, KS**  
Chemline Plastics Limited, CAN  
**EDWARDS US HEADQUARTERS, Sanborn, NY**  
**HAYWARD FLOW CONTROL**, One Hayward Industrial Drive, Clemmons, NC 27012 (888-429-4635 USA/Canada; 888-429-4635; FAX: 888-778-8410; e-mail: hflow@hayward.com; web site: www.haywardflow-control.com)

Pentair Valves & Controls, Stafford, TX  
**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)  
— See our ad on page 21i

**REMBE GMBH SAFETY + CONTROL**, Gallbergweg 21, Brilon, Germany 59929 (+49 2961 7405-0; FAX: +49 2961 50714; e-mail: info@rembe.de; web site: www.rembe.de)  
— See our ad on page 23

## Valves, rubber lined

Flowrox Oy, Lappeenranta  
ITT, Engineered Valves, Lancaster, PA  
SAMSON Controls, Inc., Baytown, TX

## Valves, safety

Apollo Valves, Matthews, NC  
Conbraco Industries, Inc., Matthews, NC  
Metsco Flow Control Inc, Vantaa, Finland, , FIN  
Oseco, Broken Arrow, OK  
Pentair Valves & Controls, Stafford, TX  
Richter Chemie-Technik GmbH, Kempen

## Valves, sampling

JLS International, Inc., Charlotte, NC  
**JAYGO, INCORPORATED**, 7 Emery Ave., Randolph, NJ 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

SAMSON Controls, Inc., Baytown, TX  
**SENTRY EQUIPMENT CORP.**, 966 Blue Ribbon Circle North, Oconomowoc, WI 53066 (262-567-7256; FAX: 262-567-4523; e-mail: sales@sentry-equip.com; web site: www.sentry-equip.com)  
— See our ad on page 43

Swagelok Co., Solon, OH

## Valves, slide

Vortex, Salina, KS

## Valves, slurry

Apollo Valves, Matthews, NC  
Conbraco Industries, Inc., Matthews, NC  
Flowrox Oy, Lappeenranta  
ITT, Engineered Valves, Lancaster, PA  
Posi-plate, St. Paul, MN  
RF Valves, Inc., Hanover, MD  
Roto-Disc, Erlanger, KY  
SAMSON Controls, Inc., Baytown, TX

## Valves, tank blanketing

Pentair Valves & Controls, Stafford, TX  
SAMSON Controls, Inc., Baytown, TX

**CASHCO**, 607 W. 15th St., Ellsworth, KS 67439 (7854724461; e-mail: dimitiya@cashco.com; web site: www.cashco.com)

## Valves, tank venting

Cashco, Inc., Ellsworth, KS  
**CHECK-ALL VALVE MFG. CO.**, 1800 Fuller Rd., West Des Moines, IA 50265 (515-224-2301; FAX: 515-224-2326; e-mail: sales@checkall.com; web site: www.checkall.com)

JLS International, Inc., Charlotte, NC  
Oseco, Broken Arrow, OK  
Pentair Valves & Controls, Stafford, TX  
**CASHCO**, 607 W. 15th St., Ellsworth, KS 67439 (7854724461; e-mail: dimitiya@cashco.com; web site: www.cashco.com)

## Valves, titanium

Apollo Valves, Matthews, NC  
**CHECK-ALL VALVE MFG. CO.**, 1800 Fuller Rd., West Des Moines, IA 50265 (515-224-2301; FAX: 515-224-2326; e-mail: sales@checkall.com; web site: www.checkall.com)

Conbraco Industries, Inc., Matthews, NC  
Flodyne Controls Inc., Murray Hill, NJ  
Flowsolve Corp., Flow Control Div., Cookeville, TN  
JLS International, Inc., Charlotte, NC  
OHL Gutermuth Industrial Valves GmbH, Altenstadt  
SAMSON Controls, Inc., Baytown, TX

## Valves, vacuum

**CHECK-ALL VALVE MFG. CO.**, 1800 Fuller Rd., West Des Moines, IA 50265 (515-224-2301; FAX: 515-224-2326; e-mail: sales@checkall.com; web site: www.checkall.com)

**EDWARDS US HEADQUARTERS, Sanborn, NY**  
Equilibr Precision Pressure Control, NC  
**PFEIFFER VACUUM GMBH**, Berliner Strasse 43, Asslar, Germany 35614 (+49-6441-802 0; FAX: +49-6441-802 1202; e-mail: info@pfeiffer-vacuum.de; web site: www.pfeiffer-vacuum.com)  
— See our ad on page 39

Pfeiffer Vacuum, Inc., Nashua, NH  
**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)  
— See our ad on page 21i

Posi-plate, St. Paul, MN  
RF Valves, Inc., Hanover, MD  
Roto-Disc, Erlanger, KY  
SAMSON Controls, Inc., Baytown, TX

## Valves, vacuum relief

**CHECK-ALL VALVE MFG. CO.**, 1800 Fuller Rd., West Des Moines, IA 50265 (515-224-2301; FAX: 515-224-2326; e-mail: sales@checkall.com; web site: www.checkall.com)

**EDWARDS US HEADQUARTERS, Sanborn, NY**  
**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 (800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)  
— See our ad on page 15

Oseco, Broken Arrow, OK  
**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)  
— See our ad on page 21i

**REMBE INC.**, 3809 Beam Road Ste K, Charlotte, NC 28217 (+1 704 716 7022; FAX: +1 704 716 7025; e-mail: info@rembe.us; web site: www.rembe.us)  
— See our ad on page 23

## Valves, vent, low pressure

**Cashco, Inc., Ellsworth, KS**  
**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 (800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)  
— See our ad on page 15

Oseco, Broken Arrow, OK  
**REMBE GMBH SAFETY + CONTROL**, Gallbergweg 21, Brilon, Germany 59929 (+49 2961 7405-0; FAX: +49 2961 50714; e-mail: info@rembe.de; web site: www.rembe.de)  
— See our ad on page 23

## Valves, zirconium

Flowsolve Corp., Flow Control Div., Cookeville, TN  
JLS International, Inc., Charlotte, NC  
OHL Gutermuth Industrial Valves GmbH, Altenstadt  
SAMSON Controls, Inc., Baytown, TX



# 2

## SOLIDS HANDLING

<b>124</b>	<b>Bins &amp; other dry storage equipment</b>	<b>127</b>	<b>Lifting equipment</b>
<b>125</b>	<b>Bulk carriers, loading &amp; unloading equipment</b>	<b>127</b>	<b>Packaging containers</b>
<b>125</b>	<b>Coating, forming &amp; agglomeration equipment</b>	<b>127</b>	<b>Packaging equipment</b>
<b>126</b>	<b>Conveyors &amp; elevators for bulk materials</b>	<b>127</b>	<b>Solids handling equipment &amp; systems, other</b>
		<b>128</b>	<b>Weighing, feeding &amp; proportioning equipment</b>

### BINS & OTHER DRY STORAGE EQUIPMENT

#### Bin activators

Acrison Inc., Moonachie, NJ  
 Brabender Technologie GmbH & Co. KG, Duisburg  
 Cleveland Vibrator Co., Cleveland, OH  
 Dynamic Air Inc., St. Paul, MN  
 Geroldinger GmbH, Sigharting, AUT  
 Kinergy Corp., Louisville, KY  
 Martin Engineering, Neponset, IL

NOL-TEC SYSTEMS, INC., 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)  
 — See our ad on page 45  
 Vibra Screw Inc., Totowa, NJ

#### Bins

CHARLES ROSS & SON CO., 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)  
 — See our ad on page 9  
 Geroldinger GmbH, Sigharting, AUT  
 Hapman, Kalamazoo, MI

Jenike & Johanson Inc., Tyngsboro, MA  
 MUELLER GMBH, P.O. Box 1409, Rheinfelden, Germany 79604 (+49-76-23-9690; FAX: +49-7623-96969; e-mail: info@mueller-gmbh.com; web site: www.mueller-gmbh.com)

SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK MATERIALS TECHNOLOGY DEUTSCHLAND GMBH, Salierstr. 35, Postfach 4262, Fellbach, , Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: info.spsde@sandvik.com; web site: www.process-systems.sandvik.com)  
 — See our ad on page 53

Stainless Fabrication, Inc., Springfield, MO  
 YOUNG INDUSTRIES, INC, 16 Painter St, Muncy, PA 17756 (e-mail: wjmahoney@younginds.com)

## Bins, weighing

Bascale Company, Inc., Houston, TX  
Hapman, Kalamazoo, MI

**NOL-TEC SYSTEMS, INC.**, 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)  
— See our ad on page 45

Rice Lake Weighing Systems, Rice Lake, WI

**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK MATERIALS TECHNOLOGY DEUTSCHLAND GMBH**, Salierstr. 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: info.spsde@sandvik.com; web site: www.process-systems.sandvik.com)  
— See our ad on page 53

Schenck Process GmbH, Darmstadt

## Gates, hopper

Jenike & Johanson Inc., Tyngsboro, MA  
YOUNG INDUSTRIES, INC., 16 Painter St., Muncy, PA 17756 (e-mail: wjmahoney@younginds.com)

## Hoppers

**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)  
— See our ad on page 9

Filtera-Systems Co., Farmington Hills, MI

**FLEXICON CORP.**, 2400 Emrick Blvd., Bethlehem, PA 18020-8006 (610-814-2400; FAX: 610-814-0600; e-mail: sales@flexicon.com; web site: www.flexicon.com)

Geroldinger GmbH, Sigharting, AUT  
Hapman, Kalamazoo, MI

Jenike & Johanson Inc., Tyngsboro, MA

M. O. Industries, Whippany, NJ

Martin Vibration Systems, Marine City, MI

**MUELLER GMBH, P.O. Box 1409, Rheinfelden, Germany** 79604 (+49-76-23-9690; FAX: +49-7623-96969; e-mail: info@mueller-gmbh.com; web site: www.mueller-gmbh.com)

**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK MATERIALS TECHNOLOGY DEUTSCHLAND GMBH**, Salierstr. 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: info.spsde@sandvik.com; web site: www.process-systems.sandvik.com)  
— See our ad on page 53

## Hoppers, weighing

Cyclonaire Corp., York, NE  
Emery Winslow Scale Co., Seymour, CT

Geroldinger GmbH, Sigharting, AUT

Hapman, Kalamazoo, MI

Martin Vibration Systems, Marine City, MI

**NOL-TEC SYSTEMS, INC.**, 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)  
— See our ad on page 45

Rice Lake Weighing Systems, Rice Lake, WI

**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK MATERIALS TECHNOLOGY DEUTSCHLAND GMBH**, Salierstr. 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: info.spsde@sandvik.com; web site: www.process-systems.sandvik.com)  
— See our ad on page 53

Schenck Process GmbH, Darmstadt

## Silos

Geroldinger GmbH, Sigharting, AUT  
Gilbert Industries, Sparta, MO

INOX-TECH INC., Ste. Catherine

Jenike & Johanson Inc., Tyngsboro, MA

**MUELLER GMBH, P.O. Box 1409, Rheinfelden, Germany** 79604 (+49-76-23-9690; FAX: +49-7623-96969; e-mail: info@mueller-gmbh.com; web site: www.mueller-gmbh.com)

**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK MATERIALS TECHNOLOGY DEUTSCHLAND GMBH**, Salierstr. 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: info.spsde@sandvik.com; web site: www.process-systems.sandvik.com)  
— See our ad on page 53

Zeppelin Systems GmbH, Rödermark, Germany

## BULK CARRIERS, LOADING & UNLOADING EQUIPMENT

### Dumpers

**FLEXICON CORP.**, 2400 Emrick Blvd., Bethlehem, PA 18020-8006 (610-814-2400; FAX: 610-814-0600; e-mail: sales@flexicon.com; web site: www.flexicon.com)

M. O. Industries, Whippany, NJ

Material Transfer & Storage Inc., Allegan, MI

## Lift tables

Presto Lifts Inc., Norton, MA  
Southworth Products Corp., Portland, ME

## Lift trucks

M. O. Industries, Whippany, NJ  
Presto Lifts Inc., Norton, MA  
Southworth Products Corp., Portland, ME

## Loaders, car

Buhler Inc., Minneapolis, MN  
Luxme International Ltd., Brossard, QC., CAN

## Loading arms



**DYNATEK LOADING SYSTEMS, PO Box 215, North Prairie, WI 53153 (e-mail: garyk@dynatekloadingsystems.com)**

## Pallet trucks

M. O. Industries, Whippany, NJ  
Presto Lifts Inc., Norton, MA  
Southworth Products Corp., Portland, ME

## Unloaders, barge

Buhler Inc., Minneapolis, MN  
Heyl & Patterson Inc., Renneburg Division, Pittsburgh, PA  
Vector Technologies Ltd., Milwaukee, WI

## Unloaders, bulk bag

AIRLANCO, Falls City, NE  
Bascale Company, Inc., Houston, TX  
Brabender Technologie GmbH & Co. KG, Duisburg  
Cyclonaire Corp., York, NE  
Dynamic Air Inc., St. Paul, MN  
**FLEXICON CORP.**, 2400 Emrick Blvd., Bethlehem, PA 18020-8006 (610-814-2400; FAX: 610-814-0600; e-mail: sales@flexicon.com; web site: www.flexicon.com)  
Luxme International Ltd., Brossard, QC, CAN  
Material Transfer & Storage Inc., Allegan, MI

**NEUHAUS NEOTEC MASCHINEN- UND ANLAGENBAU GMBH**, Dieselstrasse 5-9, D-21465 Reinbek (+49-40-72771-500; FAX: +49-40-72771-550; e-mail: sales@neuhaus-neotec.de; web site: www.neuhaus-neotec.de)

**NOL-TEC SYSTEMS, INC.**, 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)  
— See our ad on page 45

**SCHENCK PROCESS**, 7901 NW 107th Terrace, Kansas City, MO 64153 (888-657-3094; FAX: 816-891-8336; e-mail: mktg@schenckprocess.com; web site: www.macprocessinc.com)

## Unloaders, hopper car

Cyclonaire Corp., York, NE  
Kinergy Corp., Louisville, KY  
Martin Vibration Systems, Marine City, MI  
**NOL-TEC SYSTEMS, INC.**, 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)  
— See our ad on page 45  
Vector Technologies Ltd., Milwaukee, WI

## Unloaders, other

Buhler Inc., Minneapolis, MN  
**FLEXICON CORP.**, 2400 Emrick Blvd., Bethlehem, PA 18020-8006 (610-814-2400; FAX: 610-814-0600; e-mail: sales@flexicon.com; web site: www.flexicon.com)  
Hapman, Kalamazoo, MI  
Omni-Lift, Inc., Salt Lake City, UT

## Unloaders, tank car

Hapman, Kalamazoo, MI  
Luxme International Ltd., Brossard, QC., CAN  
Vector Technologies Ltd., Milwaukee, WI

## Unloaders, tank truck

Buhler Inc., Minneapolis, MN  
Cyclonaire Corp., York, NE  
Hapman, Kalamazoo, MI

## COATING, FORMING & AGGLOMERATION EQUIPMENT

### Agglomerators

**AMANDUS KAHL GmbH & Co. KG, Reinbek**  
AVA-Huep GmbH u. Co. KG, Herrsching, Germany  
Alexanderwerk AG, Remscheid

Bepex International LLC, Minneapolis, MN  
FEECO International, Inc., Green Bay, WI  
Hosokawa Micron B.V., Mixing, Drying & Agglomeration, Doinchem, NLD

**JAYGO, INCORPORATED**, 7 Emery Ave., Randolph, NJ 07869 (908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

Ludman Industries, Milwaukee, WI  
Mars Mineral, Mars, PA  
**SANDVIK PROCESS SYSTEMS, INC.**, 21 Campus Rd., Totowa, NJ 07512 (973-790-1600; FAX: 973-790-3377; e-mail: info@sandvik.com; web site: www.process-systems.sandvik.com)

— See our ad on page 53  
The Fitzpatrick Company, Elmhurst, IL  
**Wyssmont Co. Inc., Fort Lee, NJ**  
— See our ad on page 149

## Briquetting systems

Bepex International LLC, Minneapolis, MN  
Ludman Industries, Milwaukee, WI  
Security Engineered Machinery, Westboro, MA  
The Fitzpatrick Company, Elmhurst, IL

## Calenders

Davis-Standard, LLC, Pawcatuck, CT  
Thermal Spray Solutions, Inc., Chesapeake, Virginia

## Coaters & coating machinery

BETE Fog Nozzle Inc., Greenfield, MA  
Bepex International LLC, Minneapolis, MN  
Davis-Standard, LLC, Pawcatuck, CT  
Gebrueder Loedige Maschinenbau GmbH, Paderborn L.B. Bohle Maschinen + Verfahren GmbH, Ennigerloh  
Thermal Spray Solutions, Inc., Chesapeake, Virginia

## Compactors

**AMANDUS KAHL GmbH & Co. KG, Reinbek**  
Alexanderwerk AG, Remscheid  
Bepex International LLC, Minneapolis, MN  
Ludman Industries, Milwaukee, WI  
Prater-Sterling, Bollingbrook, IL  
The Fitzpatrick Company, Elmhurst, IL

## Densifiers

Bepex International LLC, Minneapolis, MN  
Mars Mineral, Mars, PA

## Extruders

B & P Process Equipment, Saginaw, MI  
BUSS ChemTech AG, Pratteln 1  
Bepex International LLC, Minneapolis, MN  
Coperion K-Tron, Sewell, NJ  
Davis-Standard, LLC, Pawcatuck, CT  
**JAYGO, INCORPORATED**, 7 Emery Ave., Randolph, NJ 07869 (908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)  
**PAUL O. ABBE**, 735 East Green St., Bensenville, IL 60106 (630-350-3012; FAX: 630-238-7584; e-mail: sales@pauloabbe.com; web site: www.pauloabbe.com)  
— See our ad on page 17

## Granulators & granulating mills

**AMANDUS KAHL GmbH & Co. KG, Reinbek**  
AVA-Huep GmbH u. Co. KG, Herrsching, Germany  
Alexanderwerk AG, Remscheid  
Bepex International LLC, Minneapolis, MN  
Herbold Meckesheim USA, Resource Recycling Systems Inc., Slatersville, RI  
**JAYGO, INCORPORATED**, 7 Emery Ave., Randolph, NJ 07869 (908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

Kemutek Group, Inc., Bristol, PA  
L.B. Bohle Maschinen + Verfahren GmbH, Ennigerloh  
Ludman Industries, Milwaukee, WI  
Modern Process Equipment, Inc., Chicago, IL  
**NEUHAUS NEOTEC MASCHINEN- UND ANLAGENBAU GMBH**, Dieselstrasse 5-9, D-21465 Reinbek (+49-40-72771-500; FAX: +49-40-72771-550; e-mail: sales@neuhaus-neotec.de; web site: www.neuhaus-neotec.de)

**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK MATERIALS TECHNOLOGY DEUTSCHLAND GMBH**, Salierstr. 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: info.spsde@sandvik.com; web site: www.process-systems.sandvik.com)  
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**SANDVIK PROCESS SYSTEMS, INC.**, 21 Campus Rd., Totowa, NJ 07512 (973-790-1600; FAX: 973-790-3377; e-mail: info@sandvik.com; web site: www.process-systems.sandvik.com)  
— See our ad on page 53  
The Fitzpatrick Company, Elmhurst, IL  
**Wyssmont Co. Inc., Fort Lee, NJ**  
— See our ad on page 149

## Pelletizers

**AMANDUS KAHL GmbH & Co. KG, Reinbek 0**  
 BUSS ChemTech AG, Pratteln 1  
 Bepex International LLC, Minneapolis, MN  
 Coperion K-Tron, Sewell, NJ  
 Davis-Standard, LLC, Pawcatuck, CT  
 FEECO International, Inc., Green Bay, WI  
 Maag Pump Systems AG, Oberglatt / ZH, Switzerland  
 Mars Mineral, Mars, PA  
**SANDVIK PROCESS SYSTEMS, INC., 21 Campus Rd., Totowa, NJ 07512 (973-790-1600; FAX: 973-790-3377; e-mail: info@sandvik.com; web site: www.process-systems.sandvik.com)**  
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## CONVEYORS & ELEVATORS FOR BULK MATERIALS

### Chutes

Jenike & Johanson Inc., Tyngsboro, MA

### Conveyor accessories

Bunting Magnetics Co., Newton, KS  
 Martin Engineering, Neponset, IL  
 RPS Engineering, Inc., Elgin, IL

### Conveyor belting

AWT World Trade Inc., Chicago, IL  
**BERNDORF BAND GMBH, Leobersdorferstr. 26, Berndorf, AUT 2560 (43-2672-800-0; FAX: 43-2672-84176; e-mail: band@berndorf.at; web site: www.berndorf-band.at)**  
 Bunting Magnetics Co., Newton, KS  
 Omni-Lift, Inc., Salt Lake City, UT

### Conveyors, apron

Aumund Fordertechnik GmbH, Rheinberg  
**BEUMER GROUP GMBH & CO. KG, Oelder Str. 40, Beckum, Germany 59269 (+49 2521 240; FAX: +49 2521 24280; e-mail: beumer@beumergroup.com; web site: www.beumergroup.com)**  
 Dematic Corp., Grand Rapids, MI  
 Stedman, Aurora, IN

### Conveyors, belt

ABI LTD., Concord,  
 AWT World Trade Inc., Chicago, IL  
**BEUMER GROUP GMBH & CO. KG, Oelder Str. 40, Beckum, Germany 59269 (+49 2521 240; FAX: +49 2521 24280; e-mail: beumer@beumergroup.com; web site: www.beumergroup.com)**  
**BERNDORF BAND GMBH, Leobersdorferstr. 26, Berndorf, AUT 2560 (43-2672-800-0; FAX: 43-2672-84176; e-mail: band@berndorf.at; web site: www.berndorf-band.at)**  
 Berthold Technologies GmbH & Co. KG, Bad Wildbad  
 Bunting Magnetics Co., Newton, KS  
 Industrial Magnetics, Inc., Boyne City, MI  
**KAISER PROCESS AND BELT TECHNOLOGY GMBH, Siemensring 54-56, Willich, Germany 47877 (+49 (0) 2154 89107 - 0; FAX: +49 (0) 2154 89107 - 284; e-mail: info@kaiser-pbt.de; web site: www.kaiser-pbt.de)**

Magnetic Products, Inc., Highland, MI  
 Martin Engineering, Neponset, IL  
 Omni-Lift, Inc., Salt Lake City, UT

**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK MATERIALS TECHNOLOGY DEUTSCHLAND GMBH, Salierring 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: info.spsde@sandvik.com; web site: www.process-systems.sandvik.com)**  
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**SANDVIK PROCESS SYSTEMS, INC., 21 Campus Rd., Totowa, NJ 07512 (973-790-1600; FAX: 973-790-3377; e-mail: info@sandvik.com; web site: www.process-systems.sandvik.com)**  
 — See our ad on page 53

Stedman, Aurora, IN  
 Union Special, LLC, Huntley, IL

### Conveyors, bucket

Aumund Fordertechnik GmbH, Rheinberg  
 Omni-Lift, Inc., Salt Lake City, UT

### Conveyors, cooling

ABI LTD., Concord,  
**KAISER PROCESS AND BELT TECHNOLOGY GMBH, Siemensring 54-56, Willich, Germany 47877 (+49 (0) 2154 89107 - 0; FAX: +49 (0) 2154 89107 - 284; e-mail: info@kaiser-pbt.de; web site: www.kaiser-pbt.de)**  
 SBS STEEL BELT SYSTEMS S.r.l., Venegono Inferiore, ITA  
**SANDVIK PROCESS SYSTEMS, INC., 21 Campus Rd., Totowa, NJ 07512 (973-790-1600; FAX: 973-790-3377; e-mail: info@sandvik.com; web site: www.process-systems.sandvik.com)**  
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## Conveyors, drag

Buhler Inc., Minneapolis, MN  
 Filtra-Systems Co., Farmington Hills, MI  
**FLEXICON CORP., 2400 Emrick Blvd., Bethlehem, PA 18020-8006 (610-814-2400; FAX: 610-814-0600; e-mail: sales@flexicon.com; web site: www.flexicon.com)**  
 Hapman, Kalamazoo, MI  
 Luxme International Ltd., Brossard, QC, CAN  
 Modern Process Equipment, Inc., Chicago, IL

## Conveyors, flexible

**FLEXICON CORP., 2400 Emrick Blvd., Bethlehem, PA 18020-8006 (610-814-2400; FAX: 610-814-0600; e-mail: sales@flexicon.com; web site: www.flexicon.com)**  
 Hapman, Kalamazoo, MI

## Conveyors, flight

Buhler Inc., Minneapolis, MN  
 Hapman, Kalamazoo, MI

## Conveyors, fluidizing

CPFD-Software, Albuquerque, New Mexico  
 Hapman, Kalamazoo, MI

## Conveyors, gravity

**FR. JACOB SOEHNE GMBH & CO. KG, Niedemfeldweg 14, Porta Westfalica, NRW, Germany 32457 (49-571-9558-0; FAX: 49-571-9558-160; e-mail: post@jacob-rohre.de; web site: www.jacob-rohre.de)**

## Conveyors, magnetic

Bunting Magnetics Co., Newton, KS  
 Industrial Magnetics, Inc., Boyne City, MI  
 Magnetic Products, Inc., Highland, MI

## Conveyors, other

ABI LTD., Concord,  
 Bunting Magnetics Co., Newton, KS  
 Conveyor Components Co., Material Control, Inc., Crosswell, MI  
 Dymax Corp., Torrington, CT  
**FLEXICON CORP., 2400 Emrick Blvd., Bethlehem, PA 18020-8006 (610-814-2400; FAX: 610-814-0600; e-mail: sales@flexicon.com; web site: www.flexicon.com)**  
**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)**  
 — See our ad on page 15  
 Hapman, Kalamazoo, MI  
 Luxme International Ltd., Brossard, QC, CAN  
 Modern Process Equipment, Inc., Chicago, IL

## Conveyors, overhead track

Bunting Magnetics Co., Newton, KS

## Conveyors, pneumatic

AIRLANCO, Falls City, NE  
 Buhler Inc., Minneapolis, MN  
 Coperion GmbH, Weingarten, Wuertt., G  
 Coperion K-Tron, Sewell, NJ  
 Cyclonaire Corp., York, NE  
 Dematic Corp., Grand Rapids, MI  
 Dynamic Air Inc., St. Paul, MN  
 Filtra-Systems Co., Farmington Hills, MI  
**FLEXICON CORP., 2400 Emrick Blvd., Bethlehem, PA 18020-8006 (610-814-2400; FAX: 610-814-0600; e-mail: sales@flexicon.com; web site: www.flexicon.com)**  
 HammerTek Corporation, Landisville, PA  
 Hapman, Kalamazoo, MI  
**Jenike & Johanson Inc., Tyngsboro, MA**  
**NEUHAUS NEOTEC MASCHINEN- UND ANLAGENBAU GMBH, Dieselstrasse 5-9, D-21465 Reinbek (+49-40-72771-500; FAX: +49-40-72771-550; e-mail: sales@neuhaus-neotec.de; web site: www.neuhaus-neotec.de)**  
**NOL-TEC SYSTEMS, INC., 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)**  
 — See our ad on page 45  
**SCHENCK PROCESS, 7901 NW 107th Terrace, Kansas City, MO 64153 (FAX: 816-891-8336; e-mail: mktg@schenckprocess.com; web site: www.macprocessinc.com)**

Vector Technologies Ltd., Milwaukee, WI  
 YOUNG INDUSTRIES, INC., 16 Painter St, Muncy, PA 17756  
 (e-mail: wjmahoney@younginds.com)

## Conveyors, portable

Bunting Magnetics Co., Newton, KS  
 Cyclonaire Corp., York, NE  
 Hapman, Kalamazoo, MI  
 Omni-Lift, Inc., Salt Lake City, UT

## Conveyors, screen

Kinergy Corp., Louisville, KY

## Conveyors, screw

**FLEXICON CORP., 2400 Emrick Blvd., Bethlehem, PA 18020-8006 (610-814-2400; FAX: 610-814-0600; e-mail: sales@flexicon.com; web site: www.flexicon.com)**  
 Geroldinger GmbH, Sigharting, AUT  
 Hapman, Kalamazoo, MI  
 INOX-TECH INC., Ste. Catherine  
 Stedman, Aurora, IN  
 Vibra Screw Inc., Totowa, NJ  
**Wyssmont Co. Inc., Fort Lee, NJ**  
 — See our ad on page 149

## Conveyors, vacuum

Buhler Inc., Minneapolis, MN  
**CROLL-REYNOLDS CO. INC., Six Campus Drive, Parsippany, NJ 07054 (908-232-4200; e-mail: info@croll.com; web site: www.croll.com)**  
 Cyclonaire Corp., York, NE  
**DEC GROUP - DIETRICH ENGINEERING CONSULTANTS SA, Z.I. Larges Pieces A - Chemin du Devent, Ecublens, Switzerland 1024-CH (+41-21-694 20 40; FAX: +41-21-694 20 59; e-mail: info@dec-group.ch; web site: www.dec-group.net)**

Hapman, Kalamazoo, MI  
**NOL-TEC SYSTEMS, INC., 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)**  
 — See our ad on page 45

Schutte & Koerting, Treviso, PA  
 Vector Technologies Ltd., Milwaukee, WI

## Conveyors, vertical

Luxme International Ltd., Brossard, QC, CAN  
 Omni-Lift, Inc., Salt Lake City, UT

## Conveyors, vibrating

Cleveland Vibrator Co., Cleveland, OH  
 Hapman, Kalamazoo, MI  
 Kinergy Corp., Louisville, KY  
 Magnetic Products, Inc., Highland, MI  
**Schenck Process GmbH, Darmstadt**  
 Stedman, Aurora, IN  
 Vibra Screw Inc., Totowa, NJ

## Conveyors, weighing

Cyclonaire Corp., York, NE  
 Hapman, Kalamazoo, MI  
 Rice Lake Weighing Systems, Rice Lake, WI

## Couplings, pneumatic conveyors

Hapman, Kalamazoo, MI  
 Tuf-Lok International, Madison, WI  
 Vector Technologies Ltd., Milwaukee, WI  
**Zeppelin Systems GmbH, Rödermark, Germany**

## Elevators, belt

Aumund Fordertechnik GmbH, Rheinberg  
 Omni-Lift, Inc., Salt Lake City, UT

## Elevators, bucket

Aumund Fordertechnik GmbH, Rheinberg  
**BEUMER GROUP GMBH & CO. KG, Oelder Str. 40, Beckum, Germany 59269 (+49 2521 240; FAX: +49 2521 24280; e-mail: beumer@beumergroup.com; web site: www.beumergroup.com)**  
 FEECO International, Inc., Green Bay, WI

## Hose, pneumatic conveyors

Elmridge Inc., Livonia, MI  
 Vector Technologies Ltd., Milwaukee, WI

## Solids feeders, airock

Buhler Inc., Minneapolis, MN  
 DMN Incorporated, AR  
**SCHENCK PROCESS, 7901 NW 107th Terrace, Kansas City, MO 64153 (888-657-3094; FAX: 816-891-8336; e-mail: mktg@schenckprocess.com; web site: www.macprocessinc.com)**  
**Wyssmont Co. Inc., Fort Lee, NJ**  
 — See our ad on page 149

## Solids feeders, batch

Acron Inc., Moonachie, NJ  
 Bioengineering Inc., Somerville, MA  
 Brabender Technologie GmbH & Co. KG, Duisburg  
**FLEXICON CORP., 2400 Emrick Blvd., Bethlehem, PA 18020-8006 (610-814-2400; FAX: 610-814-0600; e-mail: sales@flexicon.com; web site: www.flexicon.com)**  
**Jenike & Johanson Inc., Tyngsboro, MA**  
 Kubota Corporation, Singapore



**NOL-TEC SYSTEMS, INC.**, 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)  
— See our ad on page 45

Siemens, Spring House, PA  
Vibra Screw Inc., Totowa, NJ

## Solids feeders, constant weight

Brabender Technologie GmbH & Co. KG, Duisburg  
Kubota Corporation, Singapore

**NOL-TEC SYSTEMS, INC.**, 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)  
— See our ad on page 45

Vibra Screw Inc., Totowa, NJ

## Solids feeders, continuous flow

Brabender Technologie GmbH & Co. KG, Duisburg  
Geroldinger GmbH, Sigharting, AUT

**Jenike & Johanson Inc.**, Tyngsboro, MA

Kubota Corporation, Singapore  
**SCHENCK PROCESS**, 7901 NW 107th Terrace, Kansas City, MO 64153 (888-657-3094; FAX: 816-891-8336; e-mail: mktg@schenckprocess.com; web site: www.macprocessinc.com)

**Wyssmont Co. Inc.**, Fort Lee, NJ

— See our ad on page 149

## Solids feeders, disc

Yoshikawa Corporation, Kagoshima, JPN

## Solids feeders, gravimetric

Acrison Inc., Moonachie, NJ  
Brabender Technologie GmbH & Co. KG, Duisburg  
Coperion K-Tron, Sewell, NJ

**DEC GROUP - DIETRICH ENGINEERING CONSULTANTS SA, Z.I. Larges Pieces A - Chemin du Devent, Ecublens, Switzerland 1024-CH (+41-21-694 20 40; FAX: +41-21-694 20 59; e-mail: info@dec-group.ch; web site: www.dec-group.net)**

Kubota Corporation, Singapore  
**NOL-TEC SYSTEMS, INC.**, 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)  
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Vibra Screw Inc., Totowa, NJ

## Solids feeders, high-pressure

DMN Incorporated, AR

## Solids feeders, proportioning

Acrison Inc., Moonachie, NJ  
Brabender Technologie GmbH & Co. KG, Duisburg  
Kubota Corporation, Singapore

## Solids feeders, rotary

Buhler Inc., Minneapolis, MN

Prater-Sterling, Bollingbrook, IL

**Wyssmont Co. Inc.**, Fort Lee, NJ

— See our ad on page 149

## Solids feeders, vibrating or oscillating

Brabender Technologie GmbH & Co. KG, Duisburg  
Cleveland Vibrator Co., Cleveland, OH

Kubota Corporation, Singapore

Magnetic Products, Inc., Highland, MI

Martin Engineering, Neponset, IL

Martin Vibration Systems, Marine City, MI

Stedman, Aurora, IN

## Solids feeders, volumetric

Acrison Inc., Moonachie, NJ

Brabender Technologie GmbH & Co. KG, Duisburg

Buhler Inc., Minneapolis, MN

Coperion K-Tron, Sewell, NJ

DMN Incorporated, AR

**FLEXICON CORP.**, 2400 Emrick Blvd., Bethlehem, PA 18020-8006 (610-814-2400; FAX: 610-814-0600; e-mail: sales@flexicon.com; web site: www.flexicon.com)

**Jenike & Johanson Inc.**, Tyngsboro, MA

Kubota Corporation, Singapore

**SCHENCK PROCESS**, 7901 NW 107th Terrace, Kansas City, MO 64153 (888-657-3094; FAX: 816-891-8336; e-mail: mktg@schenckprocess.com; web site: www.macprocessinc.com)

Vibra Screw Inc., Totowa, NJ

**Wyssmont Co. Inc.**, Fort Lee, NJ

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## LIFTING EQUIPMENT

### Hoists

M. O. Industries, Whippany, NJ

Material Transfer & Storage Inc., Allegan, MI

**MUELLER GMBH, P.O. Box 1409, Rheinfelden, Germany 79604 (+49-76-23-9690; FAX: +49-7623-96969; e-mail: info@mueller-gmbh.com; web site: www.mueller-gmbh.com)**

## PACKAGING CONTAINERS

### Bags

Associated Bag Company, Milwaukee, WI

**CORTEC CORP.**, 4119 White Bear Pkwy., St. Paul, MN 55110 (651-429-1100; FAX: (651) 429-1122; e-mail: productinfo@cor-tecvc.com; web site: www.cor-tecvc.com)

Diversified Toll Services, Cheshire, CT

**HAYER & BOECKER OHG**, Wire Weaving and Machinery Division, OELDE

Nier Systems Inc, Boca Raton, Florida

Union Special, LLC, Huntley, IL

### Barrels & drums

Diversified Toll Services, Cheshire, CT

**HAYER & BOECKER OHG**,

M. O. Industries, Whippany, NJ

**MUELLER GMBH, P.O. Box 1409, Rheinfelden, Germany 79604 (+49-76-23-9690; FAX: +49-7623-96969; e-mail: info@mueller-gmbh.com; web site: www.mueller-gmbh.com)**

### Cartons

Associated Bag Company, Milwaukee, WI

Diversified Toll Services, Cheshire, CT

### Drums & drum liners, corrosion resistant

Associated Bag Company, Milwaukee, WI

### Intermediate bulk containers

**ASSMANN CORP. OF AMERICA**, 300 N. Taylor Rd., Garrett, IN 46738 (260-357-3181; FAX: 260-357-3738; e-mail: info@assmann-usa.com; web site: www.assmann-usa.com)

Bascale Company, Inc., Houston, TX

Hoover Container Solutions, Houston, TX

Metano IBC Services, Inc., Perrineville, NJ

Nier Systems Inc, Boca Raton, Florida

### Pails & cans

**HAYER & BOECKER OHG**

## PACKAGING EQUIPMENT

### Bag closing machines

Associated Bag Company, Milwaukee, WI

**HAYER & BOECKER OHG**

Union Special, LLC, Huntley, IL

### Bag, empty, handling systems

**BEUMER GROUP GMBH & CO. KG, Oelder Str. 40, Beckum, Germany 59269 (+49 2521 240; FAX: +49 2521 24280; e-mail: beumer@beumergroup.com; web site: www.beumergroup.com)**

**DEC GROUP - DIETRICH ENGINEERING CONSULTANTS SA, Z.I. Larges Pieces A - Chemin du Devent, Ecublens, Switzerland 1024-CH (+41-21-694 20 40; FAX: +41-21-694 20 59; e-mail: info@dec-group.ch; web site: www.dec-group.net)**

Geroldinger GmbH, Sigharting, AUT

Luxme International Ltd., Brossard, QC, CAN

### Bag filling machines

**BEUMER GROUP GMBH & CO. KG, Oelder Str. 40, Beckum, Germany 59269 (+49 2521 240; FAX: +49 2521 24280; e-mail: beumer@beumergroup.com; web site: www.beumergroup.com)**

Coperion GmbH, Weingarten, Wuertt.

Diversified Toll Services, Cheshire, CT

**FLEXICON CORP.**, 2400 Emrick Blvd., Bethlehem, PA 18020-8006 (610-814-2400; FAX: 610-814-0600; e-mail: sales@flexicon.com; web site: www.flexicon.com)

**HAYER & BOECKER OHG**, Wire Weaving and Machinery Division, OELDE

Material Transfer & Storage Inc., Allegan, MI

Spee-Dee Packaging Machinery, Inc., WI

Techno Weigh Systems Pvt. Ltd, Vadodara, IND

Vibra Screw Inc., Totowa, NJ

YS Inc., Collinsville, AL

### Bag filling machines, vacuum

**DEC GROUP - DIETRICH ENGINEERING CONSULTANTS SA, Z.I. Larges Pieces A - Chemin du Devent, Ecublens, Switzerland 1024-CH (+41-21-694 20 40; FAX: +41-21-694 20 59; e-mail: info@dec-group.ch; web site: www.dec-group.net)**

Vector Technologies Ltd., Milwaukee, WI

### Drum filling equipment

**DEC GROUP - DIETRICH ENGINEERING CONSULTANTS SA, Z.I. Larges Pieces A - Chemin du Devent, Ecublens, Switzerland 1024-CH (+41-21-694 20 40; FAX: +41-21-694 20 59; e-mail: info@dec-group.ch; web site: www.dec-group.net)**

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Material Transfer & Storage Inc., Allegan, MI

**MUELLER GMBH, P.O. Box 1409, Rheinfelden, Germany 79604 (+49-76-23-9690; FAX: +49-7623-96969; e-mail: info@mueller-gmbh.com; web site: www.mueller-gmbh.com)**

PSL USA, Boise, ID

Powder Systems Ltd, Liverpool

Vector Technologies Ltd., Milwaukee, WI

**MUELLER GMBH, P.O. Box 1409, Rheinfelden, Germany 79604 (+49-76-23-9690; FAX: +49-7623-96969; e-mail: info@mueller-gmbh.com; web site: www.mueller-gmbh.com)**

PSL USA, Boise, ID

Powder Systems Ltd, Liverpool

Vector Technologies Ltd., Milwaukee, WI

### Packaging equipment, liquids

Bascale Company, Inc., Houston, TX

EquipNet, Inc., Canton, MA

**HAYER & BOECKER OHG**, Wire Weaving and Machinery Division, OELDE

YS Inc., Collinsville, AL

### Packaging equipment, solids

**BEUMER GROUP GMBH & CO. KG, Oelder Str. 40, Beckum, Germany 59269 (+49 2521 240; FAX: +49 2521 24280; e-mail: beumer@beumergroup.com; web site: www.beumergroup.com)**

Coperion K-Tron, Sewell, NJ

EquipNet, Inc., Canton, MA

G.R. Sprenger Engineering, Inc., Golden, CO

**HAYER & BOECKER OHG**, Wire Weaving and Machinery Division, OELDE

Quadrel Labeling Systems

Spee-Dee Packaging Machinery, Inc., WI

Union Special, LLC, Huntley, IL

**YS Inc.**, Collinsville, AL

**BEUMER GROUP GMBH & CO. KG, Oelder Str. 40, Beckum, Germany 59269 (+49 2521 240; FAX: +49 2521 24280; e-mail: beumer@beumergroup.com; web site: www.beumergroup.com)**

Coperion K-Tron, Sewell, NJ

EquipNet, Inc., Canton, MA

G.R. Sprenger Engineering, Inc., Golden, CO

**HAYER & BOECKER OHG**, Wire Weaving and Machinery Division, OELDE

Quadrel Labeling Systems

Spee-Dee Packaging Machinery, Inc., WI

Union Special, LLC, Huntley, IL

### Packers, bag

Cleveland Vibrator Co., Cleveland, OH

**HAYER & BOECKER OHG**, Wire Weaving and Machinery Division, OELDE

Martin Engineering, Neponset, IL

### Packers, vibrating

Cleveland Vibrator Co., Cleveland, OH

Martin Engineering, Neponset, IL

## SOLIDS HANDLING EQUIPMENT & SYSTEMS, OTHER

### Balers

Security Engineered Machinery, Westboro, MA

Security Engineered Machinery, Westboro, MA

Security Engineered Machinery, Westboro, MA

Security Engineered Machinery, Westboro, MA

Security Engineered Machinery, Westboro, MA

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Bunting Magnetics Co., Newton, KS  
Coperion GmbH, Weingarten, Wuert., O  
Coperion K-Tron, Sewell, NJ  
Cyclonaire Corp., York, NE

Dematic Corp., Grand Rapids, MI  
Dynamic Air Inc., St. Paul, MN  
FEECO International, Inc., Green Bay, WI  
Geroldinger GmbH, Sigharting, AUT  
Hapman, Kalamazoo, MI

**Jenike & Johanson Inc., Tyngsboro, MA**  
Luxme International Ltd., Brossard, QC., CAN

M. O. Industries, Whippany, NJ  
Magnetic Products, Inc., Highland, MI  
Martin Engineering, Neponset, IL  
Material Transfer & Storage Inc., Allegan, MI

**NOL-TEC SYSTEMS, INC., 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)**

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Omni-Lift, Inc., Salt Lake City, UT  
PSL USA, Boise, ID  
Powder Systems Ltd, Liverpool

**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK MATERIALS TECHNOLOGY DEUTSCHLAND GMBH, Saliestr. 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: info.spsde@sandvik.com; web site: www.process-systems.sandvik.com)**

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Southworth Products Corp., Portland, ME  
Vector Technologies Ltd., Milwaukee, WI  
Vibra Screw Inc., Totowa, NJ

Yoshikawa Corporation, Kagoshima, JPN  
**Zeppelin Systems GmbH, Rödermark, Germany**

## Palletizers

**BEUMER GROUP GMBH & CO. KG, Oelder Str. 40, Beckum, Germany 59269 (+49 2521 240; FAX: +49 2521 24280; e-mail: beumer@beumergroup.com; web site: www.beumergroup.com)**

Bascale Company, Inc., Houston, TX  
HAVER & BOECKER OHG, Wire Weaving and Machinery Division, OELDE

Industrial Magnetics, Inc., Boyne City, MI

**MUELLER GMBH, P.O. Box 1409, Rheinfelden, Germany 79604 (+49-76-23-9690; FAX: +49-7623-96969; e-mail: info@mueller-gmbh.com; web site: www.mueller-gmbh.com)**

SBS STEEL BELT SYSTEMS S.r.l., Venegono Inferiore, ITA  
Southworth Products Corp., Portland, ME

## Robotic components

**BEUMER GROUP GMBH & CO. KG, Oelder Str. 40, Beckum, Germany 59269 (+49 2521 240; FAX: +49 2521 24280; e-mail: beumer@beumergroup.com; web site: www.beumergroup.com)**

## Storage systems

Dematic Corp., Grand Rapids, MI  
Geroldinger GmbH, Sigharting, AUT  
HAVER & BOECKER OHG, Wire Weaving and Machinery Division, OELDE

**Jenike & Johanson Inc., Tyngsboro, MA**  
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## Valves, diverter conveyor

Buhler Inc., Minneapolis, MN  
**NOL-TEC SYSTEMS, INC., 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)**

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Vortex, Salina, KS

## Valves, powder

DMN Incorporated, AR

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Posti-flate, St. Paul, MN  
SAMSON Controls, Inc., Baytown, TX  
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Buhler Inc., Minneapolis, MN  
Coperion K-Tron, Sewell, NJ  
Emery Winslow Scale Co., Seymour, CT  
**ENDRESS & HAUSER INC, 2350 Endress Place, Greenwood, IN 46143 (317-535-7138; FAX: 317-535-8498; e-mail: info@us.endress.com; web site: www.us.endress.com)**

**FLEXICON CORP., 2400 Emrick Blvd., Bethlehem, PA 18020-8006 (610-814-2400; FAX: 610-814-0600; e-mail: sales@flexicon.com; web site: www.flexicon.com)**

Hapman, Kalamazoo, MI  
Hardy Process Solutions, Inc., Industrial Weighing, San Diego, CA

**Jenike & Johanson Inc., Tyngsboro, MA**  
**LEWA GMBH, Ulmer Str. 10, Leonberg, 71229 (49-7152-14-0; FAX: 49-7152-14-1303; e-mail: lewa@lewa.de; web site: www.lewa.com)**

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Rice Lake Weighing Systems, Rice Lake, WI  
**YS Inc., Collinsville, AL**  
YOUNG INDUSTRIES, INC., 16 Painter St, Muncy, PA 17756 (e-mail: wjmahoney@younginds.com)

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**FLUID METERING, INC., 5 Aerial Way, Suite 500, Syosset, NY 11791 (516-922-6050; FAX: 516-624-8261; e-mail: pumps@fmipump.com; web site: www.fmipump.com)**

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Nordson SEALANT EQUIPMENT, Plymouth, MI

### Scales, automatic weighing

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Rice Lake Weighing Systems, Rice Lake, WI

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HAVER & BOECKER OHG, Wire Weaving and Machinery Division, OELDE  
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Pennsylvania Scale Company, Lancaster, PA  
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### Scales, continuous weighing

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Rice Lake Weighing Systems, Rice Lake, WI

Schenck Process GmbH, Darmstadt

### Scales, conveying

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Rice Lake Weighing Systems, Rice Lake, WI  
Siemens Process Industries and Drives, Process Instrumentation & Analytics, Spring House, PA

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Mettler-Toledo, Inc., Columbus, OH  
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Rice Lake Weighing Systems, Rice Lake, WI

### Scales, floor, platform

A & D Weighing, San Jose, CA  
Bascale Company, Inc., Houston, TX  
Emery Winslow Scale Co., Seymour, CT  
Hardy Process Solutions, Inc., Industrial Weighing, San Diego, CA

Kubota Corporation, Singapore  
Mettler-Toledo, Inc., Columbus, OH  
Pacific Scale Co., Inc., Clackamas, OR  
Pennsylvania Scale Company, Lancaster, PA  
Rice Lake Weighing Systems, Rice Lake, WI

### Scales, gas cylinder filling

A & D Weighing, San Jose, CA

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Emery Winslow Scale Co., Seymour, CT  
Hapman, Kalamazoo, MI  
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Pacific Scale Co., Inc., Clackamas, OR  
Rice Lake Weighing Systems, Rice Lake, WI

### Scales, portable

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### Scales, railroad car

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Rice Lake Weighing Systems, Rice Lake, WI  
**Schenck Process GmbH, Darmstadt**

### Scales, recording

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Rice Lake Weighing Systems, Rice Lake, WI

### Scales, remote indicating

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Force Flow, Concord, CA  
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### Scales, tank

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Force Flow, Concord, CA  
Hardy Process Solutions, Inc., Industrial Weighing, San Diego, CA  
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Pacific Scale Co., Inc., Clackamas, OR  
Rice Lake Weighing Systems, Rice Lake, WI

### Scales, totalizing

A & D Weighing, San Jose, CA  
Pacific Scale Co., Inc., Clackamas, OR  
Rice Lake Weighing Systems, Rice Lake, WI

### Scales, truck

A & D Weighing, San Jose, CA  
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Mettler-Toledo, Inc., Columbus, OH  
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- Complete header box range – plug, cover, manifold, D type.
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**PAHARPUR USA**, Inc. Suite 135, 18300 East 71<sup>st</sup> Avenue Denver, CO 80249, USA • Phone : +1-303-989 7200

Fax : +1-720-962 8400 • [info@paharpurusa.com](mailto:info@paharpurusa.com)



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# 3

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### Bushings

Isotech, Inc, Hatfield, PA  
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## BOILERS, INDUSTRIAL

### Boiler accessories

Bryan Steam LLC, Peru, IN

**INDECK POWER EQUIPMENT CO.**, 1111 Willis Ave. (CE), Wheeling, IL 60090 (800-446-3325; 847-541-8300; FAX: 847-541-9984; e-mail: info@indeck-power.com; web site: www.indeck.com)

**John Zink Hamworthy Combustion, Tulsa, OK USA INDUSTRIES, INC.**, 302 State Street, S. Houston, TX 77587 (800-456-8721; 713-941-3797; 713-941-3797; FAX: 713-941-1086; e-mail: info@usaindustries.com; web site: www.usaindustries.com)

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)

### Boilers, automatic, packaged

**INDECK POWER EQUIPMENT CO.**, 1111 Willis Ave. (CE), Wheeling, IL 60090 (800-446-3325; 847-541-8300; FAX: 847-541-9984; e-mail: info@indeck-power.com; web site: www.indeck.com)

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

### Boilers, coal fired

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

### Boilers, fire tube

**INDECK POWER EQUIPMENT CO.**, 1111 Willis Ave. (CE), Wheeling, IL 60090 (800-446-3325; 847-541-8300; FAX: 847-541-9984; e-mail: info@indeck-power.com; web site: www.indeck.com)

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

### Boilers, fluidized bed

CPFD-Software, Albuquerque, New Mexico

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

### Boilers, integral furnace

**INDECK POWER EQUIPMENT CO.**, 1111 Willis Ave. (CE), Wheeling, IL 60090 (800-446-3325; 847-541-8300; FAX: 847-541-9984; e-mail: info@indeck-power.com; web site: www.indeck.com)

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

### Boilers, natural gas fired

Bryan Steam LLC, Peru, IN  
HTT Energy GmbH, Herford, Germany

**INDECK POWER EQUIPMENT CO.**, 1111 Willis Ave. (CE), Wheeling, IL 60090 (800-446-3325; 847-541-8300; FAX: 847-541-9984; e-mail: info@indeck-power.com; web site: www.indeck.com)

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)

### Boilers, oil fired

Bryan Steam LLC, Peru, IN  
HTT Energy GmbH, Herford, Germany

**INDECK POWER EQUIPMENT CO.**, 1111 Willis Ave. (CE), Wheeling, IL 60090 (800-446-3325; 847-541-8300; FAX: 847-541-9984; e-mail: info@indeck-power.com; web site: www.indeck.com)

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)

### Boilers, waste heat recovery

Advanced Heat Recovery, Inc., Division of AQUA Innovations, Inc., Baltimore, MD

Diamond Refractory Services, LLC, Houston, TX  
HTT Energy GmbH, Herford, Germany

**INDECK POWER EQUIPMENT CO.**, 1111 Willis Ave. (CE), Wheeling, IL 60090 (800-446-3325; 847-541-8300; FAX: 847-541-9984; e-mail: info@indeck-power.com; web site: www.indeck.com)

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)

### Boilers, water tube

Bryan Steam LLC, Peru, IN

**CLEAVER-BROOKS, INC.**, 6940 Cornhusker Highway, Lincoln, NE 68507 (e-mail: afink@cleaverbrooks.com) — See our ad on page Inside front cover

**INDECK POWER EQUIPMENT CO.**, 1111 Willis Ave. (CE), Wheeling, IL 60090 (800-446-3325; 847-541-8300; FAX: 847-541-9984; e-mail: info@indeck-power.com; web site: www.indeck.com)

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)

## DRIVES, OTHER

### Couplings, shaft

IGW - IG Watteuw International nv, Headquarters, Oost-kamp  
Voith Turbo GmbH & Co. KG, Crailsheim, Germany

### Drives, belt

Isotech, Inc, Hatfield, PA

### Drives, conveyor

Rockwell Automation, Inc., Milwaukee, WI  
Voith Turbo GmbH & Co. KG, Crailsheim, Germany

### Drives, crusher

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)

### Drives, gear

IGW - IG Watteuw International nv, Headquarters, Oost-kamp  
Voith Turbo GmbH & Co. KG, Crailsheim, Germany

### Drives, pump

Rockwell Automation, Inc., Milwaukee, WI  
Voith Turbo GmbH & Co. KG, Crailsheim, Germany



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sales@readco.com

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### Drives, variable speed, centrifuge

Rockwell Automation, Inc., Milwaukee, WI

### Drives, variable speed, electrical

IGW - IG Watteew International nv, Headquarters, Oostkamp  
Rockwell Automation, Inc., Milwaukee, WI  
Siemens Process Industries and Drives, Alpharetta, GA

### Drives, variable speed, mechanical

IGW - IG Watteew International nv, Headquarters, Oostkamp  
Voith Turbo GmbH & Co. KG, Crailsheim, Germany

### Drives, variable speed, mixer

Rockwell Automation, Inc., Milwaukee, WI

### Gears

IGW - IG Watteew International nv, Headquarters, Oostkamp  
Regal Industries, Inc., Painesville, OH

### Joints, universal

Voith Turbo GmbH & Co. KG, Crailsheim, Germany

### Shafting

IGW - IG Watteew International nv, Headquarters, Oostkamp  
Regal Industries, Inc., Painesville, OH

### Speed reducers

IGW - IG Watteew International nv, Headquarters, Oostkamp  
**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)**

### Transmissions

IGW - IG Watteew International nv, Headquarters, Oostkamp

## DRIVES, TURBINE

### Generator drives, steam

Cobey, Buffalo, NY  
**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)**

### Turbines, combined steam-gas

HIMA Paul Hildebrandt GmbH + Co KG, Bruehl  
MAN Diesel & Turbo SE, Augsburg  
**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)**

### Turbines, mechanical drive, gas

MAN Diesel & Turbo SE, Augsburg  
**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)**

### Turbines, mechanical drive, steam

MAN Diesel & Turbo SE, Augsburg  
**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)**

## ELECTRICAL & POWER GENERATION EQUIPMENT

### Cogeneration systems & equipment

AIR PRODUCTS AND CHEMICALS, INC., 7201 Hamilton Blvd., Allentown, PA 18195-1501 (800-345-3148; 610-481-4911; FAX: 610-481-4381; e-mail: cheminfo@airproducts.com; web site: www.airproducts.com/chemprocessing)  
ProSim SA, LABEGE  
Russelectric Inc., Hingham, MA

**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)**

### Engine-generator sets

**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)**

### Expanders

MAN Diesel & Turbo SE, Augsburg

### Generators, electrical

**INDECK POWER EQUIPMENT CO., 1111 Willis Ave. (CE), Wheeling, IL 60090 (800-446-3325; 847-541-8300; FAX: 847-541-9984; e-mail: info@indeck-power.com; web site: www.indeck.com)**  
**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)**

### Generator-turbine sets

MAN Diesel & Turbo SE, Augsburg  
**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)**

### Power supplies, emergency

Russelectric Inc., Hingham, MA  
S&C Electric Company, Chicago, IL  
**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)**

## ELECTRICAL HEATING EQUIPMENT

### Bands, electric heating

Kloepfer-Therm GmbH & Co. KG, Dortmund

### Heaters, electric immersion

Dalton Electric Heating Co., Inc., Ipswich, MA  
Kloepfer-Therm GmbH & Co. KG, Dortmund  
PolyScience, Niles, IL

### Heaters, thermal fluid electric

Kloepfer-Therm GmbH & Co. KG, Dortmund  
Mokon, Buffalo, NY  
Spalltech International Inc., Halton Hills,

### Strips, electric heating

Kloepfer-Therm GmbH & Co. KG, Dortmund

### Tape, electric heating

BARTEC GmbH, Bad Mergentheim, Germany  
Kloepfer-Therm GmbH & Co. KG, Dortmund

## LIGHTING FIXTURES

### Lamps, incandescent

Osram Sylvania, Danvers, MA

### Lamps, infrared

Osram Sylvania, Danvers, MA

### Lamps, mercury vapor

Osram Sylvania, Danvers, MA

### Lamps, photochemical

Osram Sylvania, Danvers, MA

### Lamps, ultraviolet

Dymax Corp., Torrington, CT  
McPherson, Chelmsford, MA  
Osram Sylvania, Danvers, MA

### Lighting equipment, emergency

Osram Sylvania, Danvers, MA

### Lighting, explosion proof

Osram Sylvania, Danvers, MA  
R. STAHL, Waldenburg

### Lighting: panelboards, instruments & gages

Osram Sylvania, Danvers, MA

## MOTOR CONTROLS

### Actuators or starters, motor

Hilliard Corp., Elmira, NY

## MOTORS, ELECTRIC

### Motors, A.C.

Siemens Process Industries and Drives, Alpharetta, GA  
**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)**

### Motors, explosion proof

BARTEC GmbH, Bad Mergentheim, Germany

### Motors, submersible

MM Industries, Inc., Vorti-Siv, Salem, OH

## OTHER ELECTRICAL EQUIPMENT

### Circuit breakers

**PHOENIX CONTACT GMBH & CO.KG, Flachmarktstr. 8, Blomberg, Germany 32825 (+49 (0)5235-300; FAX: +49 (0)5235-341200; e-mail: info@phoenixcontact.com; web site: www.phoenixcontact.com)**  
Schurter, Inc., Santa Rosa, CA

### Electrical equipment, other

Conveyor Components Co., Material Control, Inc., Crosswell, MI  
Electroswitch, Weymouth, MA  
**PHOENIX CONTACT GMBH & CO.KG, Flachmarktstr. 8, Blomberg, Germany 32825 (+49 (0)5235-300; FAX: +49 (0)5235-341200; e-mail: info@phoenixcontact.com; web site: www.phoenixcontact.com)**  
Russelectric Inc., Hingham, MA  
S&C Electric Company, Chicago, IL  
Schurter, Inc., Santa Rosa, CA  
The Industrial Controls Company, Inc.

### Switches, electrical

Electroswitch, Weymouth, MA  
Madison Co., Branford, CT  
S&C Electric Company, Chicago, IL  
Schurter, Inc., Santa Rosa, CA  
Siemens Process Industries and Drives, Alpharetta, GA

### Switchgear & other power distribution equipment

Madison Co., Branford, CT  
Russelectric Inc., Hingham, MA  
S&C Electric Company, Chicago, IL  
Schurter, Inc., Santa Rosa, CA  
The Industrial Controls Company, Inc.  
**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)**

### Transformers

**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)**



# 4

# INSTRUMENTATION & CONTROLS

- 134 Actuators, operators**
- 134 Analyzers, offstream**
- 135 Analyzers, onstream**
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## ACTUATORS, OPERATORS

### Actuators

**ARCA REGLER GMBH**, Kempener Str. 18, Toenisvorst, Germany 47918 (49-2156-7709-0; FAX: 49-2156-770955; e-mail: sale@arca-valve.com; web site: www.arca-valve.com)

**AUMA RIESTER GMBH & CO. KG**, Aumastrasse 1, P.O. Box 1362, Muellheim, Germany 79379 (+49 7631 8090; FAX: +49 7631 8091250; e-mail: info@auma.com; web site: www.auma.com)

Auma Actuators Inc., Cannonsburg, PA

**BURKERT FLUID CONTROL SYSTEMS**, Christian-Buerkert-Str. 13-17, Ingelfingen, Germany 74653 (+49 7940 10-0; FAX: +49 7940 10-91 204; e-mail: info@burkert.com; web site: www.burkert.com)

Burkert Fluid Control Systems, Charlotte, NC

Georg Fischer Piping Systems Ltd., Schaffhausen

**HAYWARD FLOW CONTROL**, One Hayward Industrial Drive, Clemmons, NC 27012 (888-429-4635 USA/Canada; 888-429-4635; FAX: 888-778-8410; e-mail: hflow@hayward.com; web site: www.haywardflow-control.com)

**INLINE INDUSTRIES, INC.**, 9056 Garvey Ave., Rosemead, CA 91770 (800-568-8998 United States and Canada; 626-813-6188; e-mail: info@ballvalve.com; web site: www.ballvalve.com)

Isotech, Inc, Hatfield, PA

Pentair Valves & Controls, Stafford, TX

**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsmimmons@plastomatic.com; web site: www.plastomatic.com)

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Posi-flate, St. Paul, MN

Rockwell Automation, Inc., Milwaukee, WI

SAMSON Controls, Inc., Baytown, TX

Spirax Sarco, Inc., Blythewood, SC

**Voith Turbo GmbH & Co. KG**, Crailsheim, Germany

### Cylinders, pneumatic

Isotech, Inc, Hatfield, PA

### Valve operators, diaphragm

SAMSON Controls, Inc., Baytown, TX

### Valve operators, electrohydraulic

SAMSON Controls, Inc., Baytown, TX

**Voith Turbo GmbH & Co. KG**, Crailsheim, Germany

### Valve operators, electropneumatic

SAMSON Controls, Inc., Baytown, TX

### Valve operators, motor operated

SAMSON Controls, Inc., Baytown, TX

### Valve operators, piston

**AUMA RIESTER GMBH & CO. KG**, Aumastrasse 1, P.O. Box 1362, Muellheim, Germany 79379 (+49 7631 8090; FAX: +49 7631 8091250; e-mail: info@auma.com; web site: www.auma.com)

Auma Actuators Inc., Cannonsburg, PA

SAMSON Controls, Inc., Baytown, TX

### Valve operators, pneumatic

Burkert Fluid Control Systems, Charlotte, NC

**BURKERT FLUID CONTROL SYSTEMS**, Christian-Buerkert-Str. 13-17, Ingelfingen, Germany 74653 (+49 7940 10-0; FAX: +49 7940 10-91 204; e-mail: info@burkert.com; web site: www.burkert.com)

Flowserve Corp., Flow Control Div., Cookeville, TN

**GEMU VALVES, INC.**, 3800 Camp Creek Parkway, Building 2600 Suite 120, Atlanta, GA 30331 (678-553-3400; FAX: 404-344-9350; e-mail: info@gemu.com; web site: www.gemu.com)

Posi-flate, St. Paul, MN

SAMSON Controls, Inc., Baytown, TX

### Valve operators, solenoid

**GEMU VALVES, INC.**, 3800 Camp Creek Parkway, Building 2600 Suite 120, Atlanta, GA 30331 (678-553-3400; FAX: 404-344-9350; e-mail: info@gemu.com; web site: www.gemu.com)

SAMSON Controls, Inc., Baytown, TX

### Valve positioners, microprocessor equipped

**ARCA REGLER GMBH**, Kempener Str. 18, Toenisvorst, Germany 47918 (49-2156-7709-0; FAX: 49-2156-770955; e-mail: sale@arca-valve.com; web site: www.arca-valve.com)

**GEMU VALVES, INC.**, 3800 Camp Creek Parkway, Building 2600 Suite 120, Atlanta, GA 30331 (678-553-3400; FAX: 404-344-9350; e-mail: info@gemu.com; web site: www.gemu.com)

SAMSON Controls, Inc., Baytown, TX

Siemens Process Industries and Drives, Norcross, GA

### Valve positioners, other

SAMSON Controls, Inc., Baytown, TX

### Valve, position indicators

**GEMU VALVES, INC.**, 3800 Camp Creek Parkway, Building 2600 Suite 120, Atlanta, GA 30331 (678-553-3400; FAX: 404-344-9350; e-mail: info@gemu.com; web site: www.gemu.com)

**HANS TURCK GMBH & CO. KG**, Witzlebenstr. 7, Muelheim an der Ruhr, 45472 (+49 208 4952-0; FAX: +49 208 4952-264; e-mail: more@turck.com; web site: www.turck.com)

SAMSON Controls, Inc., Baytown, TX

## ANALYZERS, OFFSTREAM

### Analyzers, VOCs

Analytical Systems Int'l / KECO R&D, Houston, TX

Idealab Inc., Franklin, MA

MOCON, Inc. - Baseline, Lyons, CO

Sporian Microsystems, Inc., Lafayette, CO

### Analyzers, VOCs, oil in water

**HACH**, 5600 Lindbergh Dr, Loveland, CO 80538

(9706631377; e-mail: amsteine@hach.com; web site: hach.com)

### Analyzers, air quality

Clean Air Engineering, Palatine, IL

HORIBA Instruments, Irvine, CA

MOCON, Inc. - Baseline, Lyons, CO

Sierra Monitor Corp., Milpitas, CA

Sporian Microsystems, Inc., Lafayette, CO

Staplex Co., Air Sampler Div., Brooklyn, NY

### Analyzers, biological

Fluid Imaging Technologies, Inc., Scarborough, ME

Turner Designs Hydrocarbon Instruments, Inc., Fresno, CA

### Analyzers, carbon dioxide or monoxide

Analytical Systems Int'l / KECO R&D, Houston, TX

Delphian Corp., Northvale, NJ

GOW-MAC Instrument Co., Bethlehem, PA

HORIBA Instruments, Irvine, CA

Servomex Group Ltd., Sugar Land, TX

Siemens Process Industries and Drives, Bartlesville, OK

Sierra Monitor Corp., Milpitas, CA

Systech Instruments Ltd (Systech Illinois), Thame

UIC Inc., Joliet, IL

### Analyzers, chlorine

CHEMetrics Inc., Calverton, VA

HORIBA Instruments, Irvine, CA

PANalytical BV, Almelo, NLD

Servomex Group Ltd., Sugar Land, TX

Sierra Monitor Corp., Milpitas, CA

### Analyzers, chromatographic

BARTEC GmbH, Bad Mergentheim, Germany

GOW-MAC Instrument Co., Bethlehem, PA

Hidden Isochema, GBR

PDR-Separations LLC, Palm Beach Gardens, FL

Shimadzu Scientific Instruments, Columbia, MD

Siemens Process Industries and Drives, Bartlesville, OK

### Analyzers, combustible gases

Control Instruments Corp., Fairfield, NJ

Delphian Corp., Northvale, NJ

HORIBA Instruments, Irvine, CA

Sensor Electronics Corporation, Savage, MN

Sierra Monitor Corp., Milpitas, CA

### Analyzers, combustion

Clean Air Instrument Rental, Palatine, IL

LAR Process Analyzers AG, Berlin

Servomex Group Ltd., Sugar Land, TX

### Analyzers, concentration

Anton PAAR GmbH, Graz

Automation Products Inc. (Dynatrol Div.), Houston, TX

Berthold Technologies GmbH & Co.KG, Bad Wildbad

**FLEXIM AMERICAS**, 250 V Executive Drive, Edgewood, NY 11717 (1-888-852-2117; e-mail: salesus@flexim.com; web site: www.flexim.com)

**FLEXIM, FLEXIBLE INDUSTRIEMESSTECHNIK GMBH**, Wolfener Str. 36, Berlin, Germany D-12681 (49 0 30 936 676 60; FAX: 49 0 30 936 676 80; e-mail: info@flexim.com; web site: www.flexim.com)

Fluid Imaging Technologies, Inc., Scarborough, ME

HORIBA Instruments, Irvine, CA

Polytec, Inc., Process Analytics, Hopkinton

SensoTech GmbH, Magdeburg-Barleben, Germany

## Instrumentation & controls

SensoTech Inc., Wayne, NJ  
Sierra Monitor Corp., Milpitas, CA  
tec5USA, Plainview, NY

### Analyzers, conductivity

**ENDRESS & HAUSER INC**, 2350 Endress Place, Greenwood, IN 46143 (800-428-4344; 317-535-7138; FAX: 317-535-8498; e-mail: info.us.endress.com; web site: www.us.endress.com)

HORIBA Instruments, Irvine, CA

JUMO GmbH & Co. KG, Fulda, Germany

Krohne, Inc., Peabody, MA

Systech Instruments Ltd (Systech Illinois), Thame

Van London-pHoenix Co., Houston, TX

Yokogawa Corporation of America, Sugar Land, TX

### Analyzers, corrosion rate

Metal Samples Co., Munford, AL

### Analyzers, emission

Control Instruments Corp., Fairfield, NJ

HORIBA Instruments, Irvine, CA

M&C TechGroup, Ventura, CA

Servomex Group Ltd., Sugar Land, TX

Siemens Process Industries and Drives, Bartlesville, OK

### Analyzers, environmental conditions

HORIBA Instruments, Irvine, CA

Idealab Inc., Franklin, MA

Sierra Monitor Corp., Milpitas, CA

Sporian Microsystems, Inc., Lafayette, CO

Staplex Co., Air Sampler Div., Brooklyn, NY

Turner Designs Hydrocarbon Instruments, Inc., Fresno, CA

### Analyzers, fats & oils

Fluid Imaging Technologies, Inc., Scarborough, ME

MoistTech Corp., Sarasota, FL

### Analyzers, gas density

**PFEIFFER VACUUM GMBH**, Berliner Strasse 43, Asslar, Germany 35614 (+49-6441-802 0; FAX: +49-6441-802 1202; e-mail: info@pfeiffer-vacuum.de; web site: www.pfeiffer-vacuum.com)

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Pfeiffer Vacuum, Inc., Nashua, NH

Systech Instruments Ltd (Systech Illinois), Thame

Yokogawa Corporation of America, Sugar Land, TX

### Analyzers, hydrocarbons

Analytical Systems Int'l / KECO R&D, Houston, TX

BARTEC GmbH, Bad Mergentheim, Germany

Control Instruments Corp., Fairfield, NJ

GOW-MAC Instrument Co., Bethlehem, PA

HORIBA Instruments, Irvine, CA

Sensor Electronics Corporation, Savage, MN

Servomex Group Ltd., Sugar Land, TX

Siemens Process Industries and Drives, Bartlesville, OK

Sierra Monitor Corp., Milpitas, CA

Sporian Microsystems, Inc., Lafayette, CO

Turner Designs Hydrocarbon Instruments, Inc., Fresno, CA

### Analyzers, hydrogen

Control Instruments Corp., Fairfield, NJ

Servomex Group Ltd., Sugar Land, TX

Sierra Monitor Corp., Milpitas, CA

Systech Instruments Ltd (Systech Illinois), Thame

### Analyzers, infrared

Analytical Systems Int'l / KECO R&D, Houston, TX

HORIBA Instruments, Irvine, CA

Idealab Inc., Franklin, MA

McPherson, Chelmsford, MA

PANalytical BV, Almelo, NLD

Siemens Process Industries and Drives, Bartlesville, OK

Sierra Monitor Corp., Milpitas, CA

### Analyzers, mass spectrometer

**PFEIFFER VACUUM GMBH**, Berliner Strasse 43, Asslar, Germany 35614 (+49-6441-802 0; FAX: +49-6441-802 1202; e-mail: info@pfeiffer-vacuum.de; web site: www.pfeiffer-vacuum.com)

— See our ad on page 39

Pfeiffer Vacuum, Inc., Nashua, NH

Siemens Process Industries and Drives, Bartlesville, OK

Yokogawa Corporation of America, Sugar Land, TX

### Analyzers, moisture content

A & D Weighing, San Jose, CA

BARTEC GmbH, Bad Mergentheim, Germany

Polytec, Inc., Process Analytics, Hopkinton

Siemens Process Industries and Drives, Norcross, GA

Systech Instruments Ltd (Systech Illinois), Thame

### Analyzers, near infrared

BARTEC GmbH, Bad Mergentheim, Germany

Guided Wave, Rancho Cordova, CA

Idealab Inc., Franklin, MA

McPherson, Chelmsford, MA  
 PANalytical BV, Almelo, NLD  
 Polytec, Inc., Process Analytics, Hopkinton  
 tecUSA, Plainview, NY

## Analyzers, nitrogen

Servomex Group Ltd., Sugar Land, TX  
 Sporian Microsystems, Inc., Lafayette, CO  
 Systech Instruments Ltd (Systech Illinois), Thame

## Analyzers, nitrogen oxide

HORIBA Instruments, Irvine, CA  
 Sierra Monitor Corp., Milpitas, CA

## Analyzers, nitrogen, total

LAR Process Analysers AG, Berlin  
 Shimadzu Scientific Instruments, Columbia, MD

## Analyzers, oil content

Fluid Imaging Technologies, Inc., Scarborough, ME  
 HORIBA Instruments, Irvine, CA  
 Sigrist Photometer AG, Ennetbuergen  
 Turner Designs Hydrocarbon Instruments, Inc., Fresno, CA

## Analyzers, organic carbon

Analytical Systems Int'l / KECO R&D, Houston, TX  
 LAR Process Analysers AG, Berlin  
 Sigrist Photometer AG, Ennetbuergen  
 UIC Inc., Joliet, IL

## Analyzers, organic carbon, total

**HACH, 5600 Lindbergh Dr, Loveland, CO 80538**  
**(9706631377; e-mail: amsteine@hach.com; web site: hach.com)**

LAR Process Analysers AG, Berlin  
 PANalytical BV, Almelo, NLD  
 Shimadzu Scientific Instruments, Columbia, MD  
 UIC Inc., Joliet, IL

## Analyzers, oxygen content

AirSep Corp., A Chart Industries Company, Buffalo, NY  
**ENDRESS & HAUSER INC, 2350 Endress Place, Greenwood, IN 46143 (800-428-4344; 317-535-7138; FAX: 317-535-8498; e-mail: info@us.endress.com; web site: www.us.endress.com)**

HORIBA Instruments, Irvine, CA  
 Sierra Monitor Corp., Milpitas, CA  
 Systech Instruments Ltd (Systech Illinois), Thame  
 Yokogawa Corporation of America, Sugar Land, TX

## Analyzers, oxygen demand

LAR Process Analysers AG, Berlin  
 Yokogawa Corporation of America, Sugar Land, TX

## Analyzers, oxygen, dissolved

Anton PAAR GmbH, Graz, O  
 Dr. Thiedig GmbH & Co KG, Berlin, Germany  
 Van London-pHoenix Co., Houston, TX  
 Yokogawa Corporation of America, Sugar Land, TX

## Analyzers, ozone content

Sigrist Photometer AG, Ennetbuergen

## Analyzers, pH

Analytical Measurements, Chester, NJ  
 HORIBA Instruments, Irvine, CA  
 JUMO GmbH & Co. KG, Fulda, Germany  
 Krohne, Inc., Peabody, MA  
 Van London-pHoenix Co., Houston, TX  
 Walchem, IWAKI America, Inc., Holliston, MA  
 Yokogawa Corporation of America, Sugar Land, TX

## Analyzers, particle size

**BROOKFIELD AMETEK, INC., INSTRUMENTATION & SPECIALTY CONTROLS DIVISION, 11 Commerce Blvd., Middleboro, MA 02346 (800-628-8139 (Not MA); 508-946-6200; e-mail: pumps@fmipump.com; brookfieldengineering.com; web site: www.brookfieldengineering.com)**

FRITSCH GmbH, Milling and Sizing, Idar-Oberstein  
 Fluid Imaging Technologies, Inc., Scarborough, ME  
 G.R. Sprenger Engineering, Inc., Golden, CO  
 HAVER & BOECKER, Wire Weaving, Oelde, Germany  
 HORIBA Instruments, Irvine, CA  
 Oxford Lasers, Inc., Shirley, MA  
 Shimadzu Scientific Instruments, Columbia, MD  
 Sympatec GmbH, System | Partikel | Technik, Clausthal-Zellerfeld, Germany

## Analyzers, photometric

CHEMetrics Inc., Calverton, VA

## Analyzers, sodium ion concentration

Dr. Thiedig GmbH & Co KG, Berlin, Germany  
 HORIBA Instruments, Irvine, CA

## Analyzers, sound

SensoTech GmbH, Magdeburg-Barleben, Germany

## Analyzers, spectrometer

Idealab Inc., Franklin, MA  
 McPherson, Chelmsford, MA  
 Pfeiffer Vacuum, Inc., Nashua, NH  
 Polytec, Inc., Process Analytics, Hopkinton  
 Shimadzu Scientific Instruments, Columbia, MD  
 Sporian Microsystems, Inc., Lafayette, CO

## Analyzers, spectrophotometer

Idealab Inc., Franklin, MA  
 McPherson, Chelmsford, MA  
 Shimadzu Scientific Instruments, Columbia, MD  
 Shimadzu Scientific Instruments, Columbia, MD  
 Sias, New Castle, DE  
 tecUSA, Plainview, NY

## Analyzers, stack gases

HORIBA Instruments, Irvine, CA  
 Siemens Process Industries and Drives, Bartlesville, OK

## Analyzers, sulfur dioxide

Control Instruments Corp., Fairfield, NJ  
 HORIBA Instruments, Irvine, CA  
 PureAire Monitoring Systems, Inc., Lake Zurich, IL  
 Siemens Process Industries and Drives, Bartlesville, OK  
 Sierra Monitor Corp., Milpitas, CA

## Analyzers, sulfur, total

HORIBA Instruments, Irvine, CA  
 PANalytical BV, Almelo, NLD  
 Siemens Process Industries and Drives, Bartlesville, OK

## Analyzers, surface area

HORIBA Instruments, Irvine, CA

## Analyzers, suspended solids

Automation Products Inc. (Dynatrol Div.), Houston, TX  
 Fluid Imaging Technologies, Inc., Scarborough, ME  
 Markland Specialty Engineering Ltd., Georgetown,  
 Sigrist Photometer AG, Ennetbuergen

## Analyzers, thermal

ATS RheoSystems, Cannon Instrument Company, Borden-town, NJ  
 Shimadzu Scientific Instruments, Columbia, MD

## Analyzers, thin film

PANalytical BV, Almelo, NLD  
 tecUSA, Plainview, NY

## Analyzers, titration

CHEMetrics Inc., Calverton, VA

## Analyzers, ultraviolet

McPherson, Chelmsford, MA  
 tecUSA, Plainview, NY

## Analyzers, vapor pressure

BARTEC GmbH, Bad Mergentheim, Germany

## Analyzers, water quality

Analytical Systems Int'l / KECO R&D, Houston, TX  
 Dr. Thiedig GmbH & Co KG, Berlin, Germany  
 Fluid Imaging Technologies, Inc., Scarborough, ME  
 HORIBA Instruments, Irvine, CA

**HACH, 5600 Lindbergh Dr, Loveland, CO 80538**  
**(9706631377; e-mail: amsteine@hach.com; web site: hach.com)**

LAR Process Analysers AG, Berlin  
 Sporian Microsystems, Inc., Lafayette, CO  
 Turner Designs Hydrocarbon Instruments, Inc., Fresno, CA  
 Van London-pHoenix Co., Houston, TX

## Detectors, dust

Auburn Systems, LLC, Danvers, MA

## Detectors, explosion

Compur Monitors GmbH & Co. KG, Munich  
 Fike, Blue Springs, MO

## Detectors, flame

Fike, Blue Springs, MO  
 General Monitors, Lake Forest, CA

## Detectors, gases

Analytical Systems Int'l / KECO R&D, Houston, TX  
 Compur Monitors GmbH & Co. KG, Munich  
 Control Instruments Corp., Fairfield, NJ  
 Delphian Corp., Northvale, NJ  
 ENMET, Ann Arbor, MI  
 GOW-MAC Instrument Co., Bethlehem, PA  
 General Monitors, Lake Forest, CA  
 GIG Instrumentation, Inc., Ann Arbor, MI  
 HORIBA Instruments, Irvine, CA

Mil-Ram Technology, Inc., Fremont, CA  
 PureAire Monitoring Systems, Inc., Lake Zurich, IL  
 Sensor Electronics Corporation, Savage, MN  
**SIERRA INSTRUMENTS, INC., 5 Harris Ct, Bldg. L, Monterey, CA 93940 (800-866-0200; 831-373-0200; FAX: 831-373-4402; e-mail: info@sierrainstruments.com; web site: www.sierrainstruments.com)**

Sierra Monitor Corp., Milpitas, CA  
 Systech Instruments Ltd (Systech Illinois), Thame

## Detectors, gases, combustible

Control Instruments Corp., Fairfield, NJ  
 Delphian Corp., Northvale, NJ  
 ENMET, Ann Arbor, MI  
 General Monitors, Lake Forest, CA  
 GIG Instrumentation, Inc., Ann Arbor, MI  
 HORIBA Instruments, Irvine, CA  
 Mil-Ram Technology, Inc., Fremont, CA  
 PureAire Monitoring Systems, Inc., Lake Zurich, IL  
 Sensor Electronics Corporation, Savage, MN  
 Sierra Monitor Corp., Milpitas, CA

## Detectors, gases, toxic

Analytical Systems Int'l / KECO R&D, Houston, TX  
 Control Instruments Corp., Fairfield, NJ  
 Delphian Corp., Northvale, NJ  
 ENMET, Ann Arbor, MI  
 General Monitors, Lake Forest, CA  
 GIG Instrumentation, Inc., Ann Arbor, MI  
 Mil-Ram Technology, Inc., Fremont, CA  
 PureAire Monitoring Systems, Inc., Lake Zurich, IL  
 Sensor Electronics Corporation, Savage, MN  
 Sierra Monitor Corp., Milpitas, CA

## Detectors, liquid-leak

Analytical Systems Int'l / KECO R&D, Houston, TX  
**ASSMANN CORP. OF AMERICA, 300 N. Taylor Rd., Garrett, IN 46738 (888-357-3181; 260-357-3181; FAX: 260-357-3738; e-mail: info@assmann-usa.com; web site: www.assmann-usa.com)**  
 SensoTech GmbH, Magdeburg-Barleben, Germany

## Detectors, metal

Bunting Magnetics Co., Newton, KS

## Detectors, moisture

Berthold Technologies GmbH & Co.KG, Bad Wildbad

## Detectors, other

PANalytical BV, Almelo, NLD  
 PDR-Separations LLC, Palm Beach Gardens, FL  
**USA INDUSTRIES, INC., 302 State Street, S. Houston, TX 77587 (800-456-8721; 713-941-3797; FAX: 713-941-1086; e-mail: info@usaindustries.com; web site: www.usaindustries.com)**

## Detectors, radiation

Berthold Technologies GmbH & Co.KG, Bad Wildbad  
 TowerScan, Sarnia  
 TowerScan, Port Huron, MI

## Detectors, sludge blanket level

Madison Co., Branford, CT  
 Markland Specialty Engineering Ltd., Georgetown,

## Detectors, vibration

PRÜFTECHNIK Dieter Busch AG, Ismaning, Germany  
 Sporian Microsystems, Inc., Lafayette, CO  
**TLV CORPORATION, Charlotte, NC**  
 — See our ad on page 108

## Samplers, automatic

**FLUID METERING, INC., 5 Aerial Way, Suite 500, Syoset, NY 11791 (800-223-3388; 516-922-6050; FAX: 516-624-8261; e-mail: pumps@fmipump.com; web site: www.fmipump.com)**  
 — See our ad on page 115

Markland Specialty Engineering Ltd., Georgetown,  
 Tema Systems, Inc., Cincinnati, OH

## Samplers, gas, air

Clean Air Express Equipment, Palatine, IL  
 Clean Air Instrument Rental, Palatine, IL  
 HORIBA Instruments, Irvine, CA  
 M&C TechGroup, Ventura, CA  
 Staplex Co., Air Sampler Div., Brooklyn, NY

## Samplers, liquid

**FLUID METERING, INC., 5 Aerial Way, Suite 500, Syoset, NY 11791 (800-223-3388; 516-922-6050; FAX: 516-624-8261; e-mail: pumps@fmipump.com; web site: www.fmipump.com)**  
 — See our ad on page 115

Markland Specialty Engineering Ltd., Georgetown,



# PRODUCT DIRECTORY

**SENTRY EQUIPMENT CORP.** 966 Blue Ribbon Circle  
North, Oconomowoc, WI 53066 (262-567-7256; FAX:  
262-567-4523; e-mail: sales@sentry-equip.com; web  
site: www.sentry-equip.com)

— See our ad on page 43

Sias, New Castle, DE  
Xiril AG, Hombrechtikon

## Samplers, solids

HAYER & BOECKER, Wire Weaving, Oelde, Germany  
Sympatec GmbH, System | Partikel | Technik, Clausthal-  
Zellerfeld, Germany

## ANALYZERS, ONSTREAM

### Chromatographs, onstream

MOCON, Inc. - Baseline, Lyons, CO  
Siemens Process Industries and Drives, Bartlesville, OK

### Monitors, VOCs

Analytical Systems Int'l / KECO R&D, Houston, TX  
Clean Air Express Equipment, Palatine, IL  
Clean Air Instrument Rental, Palatine, IL  
Mil-Ram Technology, Inc., Fremont, CA  
Sporian Microsystems, Inc., Lafayette, CO

### Monitors, air quality

Altech PCME, IL  
ENMET, Ann Arbor, MI  
HORIBA Instruments, Irvine, CA  
MOCON, Inc. - Baseline, Lyons, CO  
Siemens Process Industries and Drives, Norcross, GA  
Sierra Monitor Corp., Milpitas, CA

### Monitors, ammonia

Altech PCME, IL  
GIG Instrumentation, Inc., Ann Arbor, MI  
Mil-Ram Technology, Inc., Fremont, CA  
PureAire Monitoring Systems, Inc., Lake Zurich, IL  
SensoTech GmbH, Magdeburg-Barleben, Germany

### Monitors, carbon dioxide or monoxide

Altech PCME, IL  
Delphian Corp., Northvale, NJ  
ENMET, Ann Arbor, MI  
GOW-MAC Instrument Co., Bethlehem, PA  
General Monitors, Lake Forest, CA  
GIG Instrumentation, Inc., Ann Arbor, MI  
HORIBA Instruments, Irvine, CA  
Mil-Ram Technology, Inc., Fremont, CA  
PureAire Monitoring Systems, Inc., Lake Zurich, IL  
Sierra Monitor Corp., Milpitas, CA

### Monitors, chlorine

ENMET, Ann Arbor, MI  
Force Flow, Concord, CA  
GIG Instrumentation, Inc., Ann Arbor, MI  
Mil-Ram Technology, Inc., Fremont, CA  
PureAire Monitoring Systems, Inc., Lake Zurich, IL  
SensoTech GmbH, Magdeburg-Barleben, Germany  
Sierra Monitor Corp., Milpitas, CA  
optek-Danulat, Inc., Germantown, WI

### Monitors, colorimetric

Guided Wave, Rancho Cordova, CA  
Guided Wave Inc., El Dorado Hills, CA  
optek-Danulat, Inc., Germantown, WI

### Monitors, combustible gases, or vapors

Control Instruments Corp., Fairfield, NJ  
Delphian Corp., Northvale, NJ  
ENMET, Ann Arbor, MI  
**ENDRESS & HAUSER INC.** 2350 Endress Place, Green-  
wood, IN 46143 (800-428-4344; 317-535-7138; FAX:  
317-535-8498; e-mail: info@us.endress.com; web  
site: www.us.endress.com)

General Monitors, Lake Forest, CA  
GIG Instrumentation, Inc., Ann Arbor, MI  
HORIBA Instruments, Irvine, CA  
Mil-Ram Technology, Inc., Fremont, CA  
PureAire Monitoring Systems, Inc., Lake Zurich, IL  
Sierra Monitor Corp., Milpitas, CA

### Monitors, composition

**FLEXIM AMERICAS**, 250 V Executive Drive, Edgewood,  
NY 11717 (1 888 852 74 73 North America; 631-492-  
2300; FAX: 631-492-2117; e-mail: salesus@flexim.  
com; web site: www.flexim.com)

**FLEXIM, FLEXIBLE INDUSTRIEMESSTECHNIK GMBH**,  
Woffener Str. 36, Berlin, Germany D-12681 (49 0 30  
936 676 60; FAX: 49 0 30 936 676 80; e-mail: info@  
flexim.com; web site: www.flexim.com)

Guided Wave, Rancho Cordova, CA  
Guided Wave Inc., El Dorado Hills, CA

SensoTech GmbH, Magdeburg-Barleben, Germany  
SensoTech Inc., Wayne, NJ

### Monitors, conductivity

HORIBA Instruments, Irvine, CA  
Yokogawa Corporation of America, Sugar Land, TX  
optek-Danulat, Inc., Germantown, WI

### Monitors, dust

Auburn Systems, LLC, Danvers, MA  
Clean Air Instrument Rental, Palatine, IL  
Matsushita Measure Tech, Des Plaines, IL  
Sigrist Photometer AG, Ennetbuergen

### Monitors, emissions, continuous

Altech PCME, IL  
Auburn Systems, LLC, Danvers, MA  
Clean Air Engineering, Palatine, IL  
**FCI-FLUID COMPONENTS INTERNATIONAL**, 1755 La  
Costa Meadows Dr., San Marcos, CA 92078 ((800)  
854-1993; 760-744-6950; FAX: 760-736-6250; e-mail:  
FCI@marcom@fluidcomponents.com; web site: www.  
fluidcomponents.com)  
HORIBA Instruments, Irvine, CA  
Servomex Group Ltd., Sugar Land, TX  
**SIERRA INSTRUMENTS, INC.**, 5 Harris Ct., Bldg. L,  
Monterey, CA 93940 (800-866-0200; 831-373-0200;  
FAX: 831-373-4402; e-mail: info@sierrainstruments.  
com; web site: www.sierrainstruments.com)

### Monitors, humidity

S-Products Inc., Fairfield, CT  
Yokogawa Corporation of America, Sugar Land, TX

### Monitors, hydrocarbon content

Analytical Systems Int'l / KECO R&D, Houston, TX  
Clean Air Express Equipment, Palatine, IL  
ENMET, Ann Arbor, MI  
General Monitors, Lake Forest, CA  
GIG Instrumentation, Inc., Ann Arbor, MI  
HORIBA Instruments, Irvine, CA  
MOCON, Inc. - Baseline, Lyons, CO  
SensoTech GmbH, Magdeburg-Barleben, Germany  
Sierra Monitor Corp., Milpitas, CA  
Turner Designs Hydrocarbon Instruments, Inc., Fresno, CA

### Monitors, hydrogen cyanide content

PureAire Monitoring Systems, Inc., Lake Zurich, IL  
Sierra Monitor Corp., Milpitas, CA

### Monitors, hydrogen sulfide content

Analytical Systems Int'l / KECO R&D, Houston, TX  
ENMET, Ann Arbor, MI  
General Monitors, Lake Forest, CA  
GIG Instrumentation, Inc., Ann Arbor, MI  
HORIBA Instruments, Irvine, CA  
Sierra Monitor Corp., Milpitas, CA

### Monitors, octane

Guided Wave, Rancho Cordova, CA  
Guided Wave Inc., El Dorado Hills, CA

### Monitors, oil content

Fluid Imaging Technologies, Inc., Scarborough, ME  
SensoTech GmbH, Magdeburg-Barleben, Germany  
SensoTech Inc., Wayne, NJ  
Sigrist Photometer AG, Ennetbuergen  
Turner Designs Hydrocarbon Instruments, Inc., Fresno, CA  
optek-Danulat, Inc., Germantown, WI

### Monitors, opacitiy

Altech PCME, IL  
Durag Inc., Environmental Hardware, Mendota Heights,  
MN

### Monitors, oxygen content

ENMET, Ann Arbor, MI  
**ENDRESS & HAUSER INC.** 2350 Endress Place, Green-  
wood, IN 46143 (800-428-4344; 317-535-7138; FAX:  
317-535-8498; e-mail: info@us.endress.com; web  
site: www.us.endress.com)

General Monitors, Lake Forest, CA  
GIG Instrumentation, Inc., Ann Arbor, MI  
HORIBA Instruments, Irvine, CA  
PureAire Monitoring Systems, Inc., Lake Zurich, IL  
Servomex Group Ltd., Sugar Land, TX  
Sierra Monitor Corp., Milpitas, CA  
Yokogawa Corporation of America, Sugar Land, TX

### Monitors, pH

Analytical Measurements, Chester, NJ  
**ENDRESS & HAUSER INC.** 2350 Endress Place, Green-  
wood, IN 46143 (800-428-4344; 317-535-7138; FAX:  
317-535-8498; e-mail: info@us.endress.com; web  
site: www.us.endress.com)  
HORIBA Instruments, Irvine, CA

## Instrumentation & controls

**HACH**, 5600 Lindbergh Dr, Loveland, CO 80538  
(9706631377; e-mail: amsteine@hach.com; web site:  
hach.com)

Van London-pHoenix Co., Houston, TX  
Yokogawa Corporation of America, Sugar Land, TX

### Monitors, particle size

Fluid Imaging Technologies, Inc., Scarborough, ME  
G.R. Sprenger Engineering, Inc., Golden, CO  
HAYER & BOECKER, Wire Weaving, Oelde, Germany  
Sympatec GmbH, System | Partikel | Technik, Clausthal-  
Zellerfeld, Germany

### Monitors, stack gases

Altech PCME, IL  
Clean Air Engineering, Palatine, IL  
**FCI-FLUID COMPONENTS INTERNATIONAL**, 1755 La  
Costa Meadows Dr., San Marcos, CA 92078 ((800)  
854-1993; 760-744-6950; FAX: 760-736-6250; e-mail:  
FCI@marcom@fluidcomponents.com; web site: www.  
fluidcomponents.com)

HORIBA Instruments, Irvine, CA  
M&C TechGroup, Ventura, CA  
Mil-Ram Technology, Inc., Fremont, CA  
Sigrist Photometer AG, Ennetbuergen

### Monitors, sulfur

SensoTech Inc., Wayne, NJ

### Monitors, viscosity

Automation Products Inc. (Dynatrol Div.), Houston, TX  
BARTEC GmbH, Bad Mergentheim, Germany  
**BROOKFIELD AMETEK, INC., INSTRUMENTATION &  
SPECIALTY CONTROLS DIVISION**, 11 Commerce  
Blvd., Middleboro, MA 02346 (800-628-8139 (Not  
MA); 508-946-6200; FAX: 508-946-6262; e-mail: info@  
brookfieldengineering.com; web site: www.brook-  
fieldengineering.com)

Hydramotion Ltd, Malton

**LOAD CONTROLS, INC.**, 53 Technology Park Rd., Stur-  
bridge, MA 01566 (888-600-3247; 508-347-2606; FAX:  
508-347-2064; web site: www.loadcontrols.com)  
— See our ad on page 27

### Monitors, water quality

Analytical Systems Int'l / KECO R&D, Houston, TX  
Fluid Imaging Technologies, Inc., Scarborough, ME  
HORIBA Instruments, Irvine, CA  
**HACH**, 5600 Lindbergh Dr, Loveland, CO 80538  
(9706631377; e-mail: amsteine@hach.com; web site:  
hach.com)

LAR Process Analyzers AG, Berlin  
Sigrist Photometer AG, Ennetbuergen  
Sporian Microsystems, Inc., Lafayette, CO  
Turner Designs Hydrocarbon Instruments, Inc., Fresno, CA  
Van London-pHoenix Co., Houston, TX  
optek-Danulat, Inc., Germantown, WI

### Spectrometer accessories or services

Guided Wave, Rancho Cordova, CA  
Guided Wave Inc., El Dorado Hills, CA  
McPherson, Chelmsford, MA  
Polytec, Inc., Process Analytics, Hopkinton  
tec5USA, Plainview, NY

### Spectrometers

Guided Wave, Rancho Cordova, CA  
Guided Wave Inc., El Dorado Hills, CA  
McPherson, Chelmsford, MA  
Pfeiffer Vacuum, Inc., Nashua, NH  
Polytec, Inc., Process Analytics, Hopkinton  
optek-Danulat, Inc., Germantown, WI  
tec5USA, Plainview, NY

## COMPUTERS, PROCESS CONTROL

### Analog process control computers

Acromag, Inc., Wixom, MI

### Direct digital process control computers

Acromag, Inc., Wixom, MI  
**EMERSON**, 1100 W. Louis Henna Blvd., Round Rock, TX  
78681 (512-834-7039; e-mail: victor.obrien@emerson.  
com; web site: emerson.com)  
Siemens Process Industries and Drives, Alpharetta, GA  
Sierra Monitor Corp., Milpitas, CA

### Input-output equipment

Acromag, Inc., Wixom, MI  
Bedrock Automation, Canton, MA

**EMERSON, 1100 W. Louis Henna Blvd., Round Rock, TX 78681 (512-834-7039; e-mail: victor.obrien@emerson.com; web site: emerson.com)**

HIMA Paul Hildebrandt GmbH + Co KG, Bruehl  
**HANS TURCK GMBH & CO. KG, Witzlebenstr. 7, Muelheim an der Ruhr, 45472 (+49 208 4952-0; FAX: +49 208 4952-264; e-mail: more@turck.com; web site: www.turck.com)**

Moore Industries International, Inc., North Hills, CA  
 R. STAHL, Waldenburg  
 Sierra Monitor Corp., Milpitas, CA  
 Symmetric Research, Las Vegas, NV  
 Yokogawa Corporation of America, Sugar Land, TX

## Supervisory process control computers

Acromag, Inc., Wixom, MI  
 Bedrock Automation, Canton, MA  
 Digital Applications International, London  
 Sierra Monitor Corp., Milpitas, CA  
 Vista Control Systems, Inc., Los Alamos, NM

## CONTROLLERS

### Controllers, air conditioning

SAMSON Controls, Inc., Baytown, TX

### Controllers, batching or weighing

A & D Weighing, San Jose, CA  
 Acrison Inc., Moonachie, NJ  
 Bascale Company, Inc., Houston, TX  
 Force Flow, Concord, CA  
**NOL-TEC SYSTEMS, INC., 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)**  
 — See our ad on page 45

Red Seal Measurement, Greenwood, SC  
 Rice Lake Weighing Systems, Rice Lake, WI  
 Yokogawa Corporation of America, Sugar Land, TX

### Controllers, bin level

Automation Products Inc. (Dynatrol Div.), Houston, TX  
 Conveyor Components Co., Material Control, Inc., Crosswell, MI

**NOL-TEC SYSTEMS, INC., 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)**  
 — See our ad on page 45

### Controllers, boiler

**INDECK POWER EQUIPMENT CO., 1111 Willis Ave. (CE), Wheeling, IL 60090 (800-446-3325; 847-541-8300; FAX: 847-541-9984; e-mail: info@indeck-power.com; web site: www.indeck.com)**

SAMSON Controls, Inc., Baytown, TX  
**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)**  
 Yokogawa Corporation of America, Sugar Land, TX

### Controllers, combustion

**INDECK POWER EQUIPMENT CO., 1111 Willis Ave. (CE), Wheeling, IL 60090 (800-446-3325; 847-541-8300; FAX: 847-541-9984; e-mail: info@indeck-power.com; web site: www.indeck.com)**

**UNIFLUX / EXOTHERM CORP., 888 Wilcrest Drive, Houston, TX 77042 (713-981-9100; FAX: 713-981-7081; e-mail: info@exotherm.com; web site: www.exotherm.com)**

**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)**  
 Yokogawa Corporation of America, Sugar Land, TX

### Controllers, electric

HIMA Paul Hildebrandt GmbH + Co KG, Bruehl  
 SAMSON Controls, Inc., Baytown, TX  
 Sierra Monitor Corp., Milpitas, CA  
**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)**  
 Yokogawa Corporation of America, Sugar Land, TX

### Controllers, flow & flow ratio

AquFlow, Irvine, CA  
 Bronkhorst High-Tech BV, Ruurlo  
 Burkert Fluid Control Systems, Charlotte, NC  
**BURKERT FLUID CONTROL SYSTEMS, Christian-Buerkert-Str. 13-17, Ingelfingen, Germany 74653 (+49 7940 10-0; FAX: +49 7940 10-91 204; e-mail: info@burkert.com; web site: www.burkert.com)**  
 Conveyor Components Co., Material Control, Inc., Crosswell, MI

Delta M Corp., Oak Ridge, TN

**FCI-FLUID COMPONENTS INTERNATIONAL, 1755 La Costa Meadows Dr., San Marcos, CA 92078 ((800) 854-1993; 760-744-6950; FAX: 760-736-6250; e-mail: FCI@marcom@fluidcomponents.com; web site: www.fluidcomponents.com)**

**PLAST-O-MATIC VALVES INC., 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)**  
 — See our ad on page 211

Red Seal Measurement, Greenwood, SC  
 SAMSON Controls, Inc., Baytown, TX  
 Siemens Process Industries and Drives, Process Instrumentation & Analytics, Spring House, PA

**SIERRA INSTRUMENTS, INC., 5 Harris Ct., Bldg. L, Monterey, CA 93940 (800-866-0200; 831-373-0200; FAX: 831-373-4402; e-mail: info@sierrainstruments.com; web site: www.sierrainstruments.com)**

V2 Flow Controls, Burr Ridge, IL  
 Yokogawa Corporation of America, Sugar Land, TX

### Controllers, humidity

S-Products Inc., Fairfield, CT  
 Thermotron, Holland, MI  
 Yokogawa Corporation of America, Sugar Land, TX

### Controllers, hydraulic

Yokogawa Corporation of America, Sugar Land, TX

### Controllers, liquid level

Delta M Corp., Oak Ridge, TN  
**FCI-FLUID COMPONENTS INTERNATIONAL, 1755 La Costa Meadows Dr., San Marcos, CA 92078 ((800) 854-1993; 760-744-6950; FAX: 760-736-6250; e-mail: FCI@marcom@fluidcomponents.com; web site: www.fluidcomponents.com)**

Georg Fischer Piping Systems Ltd., Schaffhausen  
 Levelese, Inc., Denver, Colorado  
 Madison Co., Branford, CT  
 Met-Pro Global Pump Solutions, a CECO Environmental Company, Telford, PA

Siemens Process Industries and Drives, Process Instrumentation & Analytics, Spring House, PA  
**SIERRA INSTRUMENTS, INC., 5 Harris Ct., Bldg. L, Monterey, CA 93940 (800-866-0200; 831-373-0200; FAX: 831-373-4402; e-mail: info@sierrainstruments.com; web site: www.sierrainstruments.com)**  
 Yokogawa Corporation of America, Sugar Land, TX

### Controllers, pH

Analytical Measurements, Chester, NJ  
 Siemens Process Industries and Drives, Process Instrumentation & Analytics, Spring House, PA  
 Van London-pHoenix Co., Houston, TX  
 Walchem, IWAKI America, Inc., Holliston, MA  
 Yokogawa Corporation of America, Sugar Land, TX

### Controllers, pneumatic

Cashco, Inc., Ellsworth, KS  
**NOL-TEC SYSTEMS, INC., 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)**  
 — See our ad on page 45

Pneumatech, Inc., Rock Hill, SC  
 SAMSON Controls, Inc., Baytown, TX  
 Yokogawa Corporation of America, Sugar Land, TX

### Controllers, pressure

Cashco, Inc., Ellsworth, KS  
**PLAST-O-MATIC VALVES INC., 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)**  
 — See our ad on page 211

SAMSON Controls, Inc., Baytown, TX  
 Strobic Air, a CECO Environmental Company, Telford, PA  
**TRV CORPORATION, Charlotte, NC**  
 — See our ad on page 108  
**UNITED ELECTRIC CONTROLS CO., 180 Dexter Ave., Watertown, MA 02471-9143 (617-926-1000; FAX: 617-926-2568; web site: www.ueonline.com)**  
 Yokogawa Corporation of America, Sugar Land, TX

### Controllers, process

Automation Products Inc. (Dynatrol Div.), Houston, TX  
 Bedrock Automation, Canton, MA  
**BROOKFIELD AMETEK, INC., INSTRUMENTATION & SPECIALTY CONTROLS DIVISION, 11 Commerce Blvd., Middleboro, MA 02346 (800-628-8139 (Not MA); 508-946-6200; FAX: 508-946-6262; e-mail: info@brookfieldengineering.com; web site: www.brookfieldengineering.com)**  
**EMERSON, 1100 W. Louis Henna Blvd., Round Rock, TX 78681 (512-834-7039; e-mail: victor.obrien@emerson.com; web site: emerson.com)**  
 JUMO GmbH & Co. KG, Fulda, Germany

**NOL-TEC SYSTEMS, INC., 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)**  
 — See our ad on page 45

Rockwell Automation, Inc., Milwaukee, WI  
 Siemens Process Industries and Drives, Norcross, GA  
**SIERRA INSTRUMENTS, INC., 5 Harris Ct., Bldg. L, Monterey, CA 93940 (800-866-0200; 831-373-0200; FAX: 831-373-4402; e-mail: info@sierrainstruments.com; web site: www.sierrainstruments.com)**  
 Sierra Monitor Corp., Milpitas, CA  
 Yokogawa Corporation of America, Sugar Land, TX

### Controllers, product

Strobic Air, a CECO Environmental Company, Telford, PA  
 Yokogawa Corporation of America, Sugar Land, TX

### Controllers, programmable

Bedrock Automation, Canton, MA  
 JUMO GmbH & Co. KG, Fulda, Germany  
**NOL-TEC SYSTEMS, INC., 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)**  
 — See our ad on page 45

**PHOENIX CONTACT GMBH & CO. KG, Flachsmarktstr. 8, Blomberg, Germany 32825 (+49 (0)5235-300; FAX: +49 (0)5235-341200; e-mail: info@phoenixcontact.com; web site: www.phoenixcontact.com)**

Rockwell Automation, Inc., Milwaukee, WI  
 Siemens Process Industries and Drives, Alpharetta, GA  
 Sierra Monitor Corp., Milpitas, CA  
 Strobic Air, a CECO Environmental Company, Telford, PA  
 The Industrial Controls Company, Inc., O  
 Walchem, IWAKI America, Inc., Holliston, MA  
 Yokogawa Corporation of America, Sugar Land, TX

### Controllers, pump

**FLUID METERING, INC., 5 Aerial Way, Suite 500, Syosset, NY 11791 (800-223-3388; 516-922-6050; FAX: 516-624-8261; e-mail: pumps@fmipump.com; web site: www.fmipump.com)**

— See our ad on page 115  
**Pfeiffer Vacuum, Inc., Nashua, NH**  
 — See our ad on page 39

### Controllers, sludge level

Madison Co., Branford, CT  
 Markland Specialty Engineering Ltd., Georgetown,

### Controllers, temperature

CTP Corp., Northport, NY  
**Cashco, Inc., Ellsworth, KS**  
 Delta M Corp., Oak Ridge, TN  
 HTT Energy GmbH, Herford, Germany  
**HONEYWELL PROCESS SOLUTIONS, 1250 W Sam Houston Pkwy S, Houston, TX 77042 (+1-800-822-7673; web site: www.honeywellprocess.com)**

Iron, Inc., Santa Cruz, CA  
 LAUDA DR. R. WOBSE GMBH & CO. KG, Lauda-Koenigshofen, O  
 Mokou, Buffalo, NY  
 Omega Engineering Inc., Stamford, CT  
 PolyScience, Niles, IL  
 Raytek Corp., Santa Cruz, CA  
 SAMSON Controls, Inc., Baytown, TX  
 Tempco Electric Heater Co., IL  
 Thermotron, Holland, MI  
**UNITED ELECTRIC CONTROLS CO., 180 Dexter Ave., Watertown, MA 02471-9143 (617-926-1000; FAX: 617-926-2568; web site: www.ueonline.com)**  
 Yokogawa Corporation of America, Sugar Land, TX

### Controllers, vacuum

**NOL-TEC SYSTEMS, INC., 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)**  
 — See our ad on page 45

**PLAST-O-MATIC VALVES INC., 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)**  
 — See our ad on page 211

### Controllers, viscosity

**BROOKFIELD AMETEK, INC., INSTRUMENTATION & SPECIALTY CONTROLS DIVISION, 11 Commerce Blvd., Middleboro, MA 02346 (800-628-8139 (Not MA); 508-946-6200; FAX: 508-946-6262; e-mail: info@brookfieldengineering.com; web site: www.brookfieldengineering.com)**

### Regulators, air

LA-MAN Corp., Mazeppa, MN  
 SAMSON Controls, Inc., Baytown, TX  
**TRV CORPORATION, Charlotte, NC**  
 — See our ad on page 108

### Regulators, back pressure

AquFlow, Irvine, CA

# PRODUCT DIRECTORY

**CASHCO**, 607 W. 15th St., Ellsworth, KS 67439  
(7854724461; e-mail: dimitya@cashco.com; web site: www.cashco.com)

**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)

— See our ad on page 21  
**SAMSON Controls, Inc.**, Baytown, TX  
**TLV CORPORATION**, Charlotte, NC  
— See our ad on page 108

## Regulators, flow

Bronkhorst High-Tech BV, Ruurlo  
**CASHCO**, 607 W. 15th St., Ellsworth, KS 67439  
(7854724461; e-mail: dimitya@cashco.com; web site: www.cashco.com)

Met-Pro Global Pump Solutions, a CECO Environmental Company, Telford, PA

**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)

— See our ad on page 21  
**SAMSON Controls, Inc.**, Baytown, TX

## Regulators, gas

**SAMSON Controls, Inc.**, Baytown, TX

## Regulators, pressure

**AIR PRODUCTS AND CHEMICALS, INC.**, 7201 Hamilton Blvd., Allentown, PA 18195-1501 (800-345-3148; 610-481-4911; FAX: 610-481-4381; e-mail: cheminfo@airproducts.com; web site: www.airproducts.com/chemprocessing)

**CASHCO**, 607 W. 15th St., Ellsworth, KS 67439  
(7854724461; e-mail: dimitya@cashco.com; web site: www.cashco.com)

**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)

— See our ad on page 21  
**SAMSON Controls, Inc.**, Baytown, TX  
**TLV CORPORATION**, Charlotte, NC  
— See our ad on page 108

## Regulators, temperature

PolyScience, Niles, IL  
**SAMSON Controls, Inc.**, Baytown, TX  
**TLV CORPORATION**, Charlotte, NC  
— See our ad on page 108

## Regulators, vacuum

**TLV CORPORATION**, Charlotte, NC  
— See our ad on page 108

## DATA PRESENTATION EQUIPMENT

### Counters

Acromag, Inc., Wixom, MI  
Yokogawa Corporation of America, Sugar Land, TX

### Data logging systems

Acromag, Inc., Wixom, MI  
PRÜFTECHNIK Dieter Busch AG, Ismaning, Germany  
Sierra Monitor Corp., Milpitas, CA  
Symmetric Research, Las Vegas, NV  
Yokogawa Corporation of America, Sugar Land, TX

### Totalizers

Acromag, Inc., Wixom, MI  
Ernst, John, Co., Inc., Sparta, NJ  
Sierra Monitor Corp., Milpitas, CA  
Sure Flow Products, Wixom, MI  
Yokogawa Corporation of America, Sugar Land, TX

## INDICATORS

### Alarms, annunciator

Acromag, Inc., Wixom, MI  
Fike, Blue Springs, MO  
Yokogawa Corporation of America, Sugar Land, TX

### Alarms, carbon monoxide

Delphian Corp., Northvale, NJ  
Fike, Blue Springs, MO  
Sierra Monitor Corp., Milpitas, CA

### Alarms, combustible gases

Control Instruments Corp., Fairfield, NJ  
Delphian Corp., Northvale, NJ  
Sierra Monitor Corp., Milpitas, CA

## Alarms, combustion

**HONEYWELL PROCESS SOLUTIONS**, 1250 W Sam Houston Pkwy S, Houston, TX 77042 (+1-800-822-7673; web site: www.honeywellprocess.com)

## Alarms, flame

Fike, Blue Springs, MO  
**HONEYWELL PROCESS SOLUTIONS**, 1250 W Sam Houston Pkwy S, Houston, TX 77042 (+1-800-822-7673; web site: www.honeywellprocess.com)

## Alarms, flow

Delta M Corp., Oak Ridge, TN  
**ENDRESS & HAUSER INC**, 2350 Endress Place, Greenwood, IN 46143 (800-428-4344; 317-535-7138; FAX: 317-535-8498; e-mail: info@us.endress.com; web site: www.us.endress.com)

**FCI-FLUID COMPONENTS INTERNATIONAL**, 1755 La Costa Meadows Dr., San Marcos, CA 92078 ((800) 854-1993; 760-744-6950; FAX: 760-736-6250; e-mail: FCI@marcom@fluidcomponents.com; web site: www.fluidcomponents.com)

**HONEYWELL PROCESS SOLUTIONS**, 1250 W Sam Houston Pkwy S, Houston, TX 77042 (+1-800-822-7673; web site: www.honeywellprocess.com)

Madison Co., Branford, CT  
Magnetrol, 705 Enterprise Street, Aurora, IL  
Oseco, Broken Arrow, OK  
Universal Flow Monitors, Inc., Hazel Park, MI

## Alarms, liquid level

Delta M Corp., Oak Ridge, TN  
**ENDRESS & HAUSER INC**, 2350 Endress Place, Greenwood, IN 46143 (800-428-4344; 317-535-7138; FAX: 317-535-8498; e-mail: info@us.endress.com; web site: www.us.endress.com)

**FCI-FLUID COMPONENTS INTERNATIONAL**, 1755 La Costa Meadows Dr., San Marcos, CA 92078 ((800) 854-1993; 760-744-6950; FAX: 760-736-6250; e-mail: FCI@marcom@fluidcomponents.com; web site: www.fluidcomponents.com)

Force Flow, Concord, CA  
**HONEYWELL PROCESS SOLUTIONS**, 1250 W Sam Houston Pkwy S, Houston, TX 77042 (+1-800-822-7673; web site: www.honeywellprocess.com)

Levelase, Inc., Denver, Colorado  
Madison Co., Branford, CT  
Magnetrol, 705 Enterprise Street, Aurora, IL  
Moore Industries International, Inc., North Hills, CA  
TankLink, a wholly-owned subsidiary of Telular Corporation, Chicago, IL

## Alarms, other

Acromag, Inc., Wixom, MI  
**PAS, INC.**, 16055 Space Center Blvd., Suite 600, Houston, TX 77062 ((281) 286-6565; e-mail: sales@pas.com; web site: www.pas.com)

## Alarms, portable (gas, vapor)

Sierra Monitor Corp., Milpitas, CA

## Alarms, pressure

**ENDRESS & HAUSER INC**, 2350 Endress Place, Greenwood, IN 46143 (800-428-4344; 317-535-7138; FAX: 317-535-8498; e-mail: info@us.endress.com; web site: www.us.endress.com)

Fike, Blue Springs, MO  
Moore Industries International, Inc., North Hills, CA  
Oseco, Broken Arrow, OK

**UNITED ELECTRIC CONTROLS CO.**, 180 Dexter Ave, Watertown, MA 02471-9143 (617-926-1000; FAX: 617-926-2568; web site: www.ueonline.com)

## Alarms, solids level

Berthold Technologies GmbH & Co.KG, Bad Wildbad  
Conveyor Components Co., Material Control, Inc., Crosswell, MI  
**ENDRESS & HAUSER INC**, 2350 Endress Place, Greenwood, IN 46143 (800-428-4344; 317-535-7138; FAX: 317-535-8498; e-mail: info@us.endress.com; web site: www.us.endress.com)

## Alarms, temperature

Acromag, Inc., Wixom, MI  
**FCI-FLUID COMPONENTS INTERNATIONAL**, 1755 La Costa Meadows Dr., San Marcos, CA 92078 ((800) 854-1993; 760-744-6950; FAX: 760-736-6250; e-mail: FCI@marcom@fluidcomponents.com; web site: www.fluidcomponents.com)

Moore Industries International, Inc., North Hills, CA  
TankLink, a wholly-owned subsidiary of Telular Corporation, Chicago, IL

## Instrumentation & controls

**UNITED ELECTRIC CONTROLS CO.**, 180 Dexter Ave, Watertown, MA 02471-9143 (617-926-1000; FAX: 617-926-2568; web site: www.ueonline.com)

## Flowmeters, differential pressure

Badger Meter Europa GmbH, Neuffen  
**Badger Meter, Inc.**, Milwaukee, WI  
**ENDRESS & HAUSER INC**, 2350 Endress Place, Greenwood, IN 46143 (800-428-4344; 317-535-7138; FAX: 317-535-8498; e-mail: info@us.endress.com; web site: www.us.endress.com)

Ernst, John, Co., Inc., Sparta, NJ  
JUMO GmbH & Co. KG, Fulda, Germany  
**SAMSON Controls, Inc.**, Baytown, TX  
Spirax Sarco, Inc., Blythewood, SC  
Universal Flow Monitors, Inc., Hazel Park, MI  
Yokogawa Corporation of America, Sugar Land, TX

## Flowmeters, electromagnetic

Badger Meter Europa GmbH, Neuffen  
Heinrichs Messtechnik GmbH, Koeln  
Krohne, Inc., Peabody, MA  
Sure Flow Products, Wixom, MI

## Flowmeters, magnetic

**BURKERT FLUID CONTROL SYSTEMS**, Christian-Buerkert-Str. 13-17, Ingelfingen, Germany 74653 (+49 7940 10-0; FAX: +49 7940 10-91 204; e-mail: info@burkert.com; web site: www.burkert.com)

Burkert Fluid Control Systems, Charlotte, NC  
**ENDRESS & HAUSER INC**, 2350 Endress Place, Greenwood, IN 46143 (800-428-4344; 317-535-7138; FAX: 317-535-8498; e-mail: info@us.endress.com; web site: www.us.endress.com)

Yokogawa Corporation of America, Sugar Land, TX

## Flowmeters, mass

Berthold Technologies GmbH & Co.KG, Bad Wildbad  
Bronkhorst High-Tech BV, Ruurlo  
Delta M Corp., Oak Ridge, TN  
**ENDRESS & HAUSER INC**, 2350 Endress Place, Greenwood, IN 46143 (800-428-4344; 317-535-7138; FAX: 317-535-8498; e-mail: info@us.endress.com; web site: www.us.endress.com)

**FCI-FLUID COMPONENTS INTERNATIONAL**, 1755 La Costa Meadows Dr., San Marcos, CA 92078 ((800) 854-1993; 760-744-6950; FAX: 760-736-6250; e-mail: FCI@marcom@fluidcomponents.com; web site: www.fluidcomponents.com)

Heinrichs Messtechnik GmbH, Koeln  
Krohne, Inc., Peabody, MA  
Kurz Instruments Inc., Monterey, CA  
Magnetrol, 705 Enterprise Street, Aurora, IL  
Matsushima Measure Tech, Des Plaines, IL  
Red Seal Measurement, Greenwood, SC



**SIERRA INSTRUMENTS, INC.**, 5 Harris Ct., Bldg. L, Monterey, CA 93940 (800-866-0200; 831-373-0200; FAX: 831-373-4402; e-mail: info@sierrainstruments.com; web site: www.sierrainstruments.com)

Sure Flow Products, Wixom, MI  
Yokogawa Corporation of America, Sugar Land, TX

## Flowmeters, orifice plate

Heinrichs Messtechnik GmbH, Koeln  
**SAMSON Controls, Inc.**, Baytown, TX  
Yokogawa Corporation of America, Sugar Land, TX

## Flowmeters, positive displacement

Badger Meter Europa GmbH, Neuffen  
**BADGER METER, INC.**, 4545 W Brown Deer Rd, PO Box 245036, Milwaukee, WI 53224-9536 (800-876-3837; FAX: 918-832-9962; e-mail: info@central@badgermeter.com; web site: www.badgermeter.com)

Red Seal Measurement, Greenwood, SC

Sure Flow Products, Wixom, MI

## Flowmeters, rotameters

Cole-Parmer, Vernon Hills, IL  
Heinrichs Messtechnik GmbH, Koeln  
Universal Flow Monitors, Inc., Hazel Park, MI

## Flowmeters, turbine

Badger Meter Europa GmbH, Neuffen  
**BADGER METER, INC.**, 4545 W Brown Deer Rd, PO Box 245036, Milwaukee, WI 53224-9536 (800-876-3837; FAX: 918-832-9962; e-mail: info@central@badgermeter.com; web site: www.badgermeter.com)

Ernst, John, Co., Inc., Sparta, NJ  
Sure Flow Products, Wixom, MI  
V2 Flow Controls, Burr Ridge, IL



## Flowmeters, ultrasonic

Accusonic Technologies, Inc., West Wareham, MA  
Badger Meter Europa GmbH, Neuffen  
**ENDRESS & HAUSER INC.**, 2350 Endress Place, Greenwood, IN 46143 (800-428-4344; 317-535-7138; FAX: 317-535-8498; e-mail: info@us.endress.com; web site: www.us.endress.com)

**FLEXIM AMERICAS**, 250 V Executive Drive, Edgewood, NY 11717 (1 888 852 74 73 North America; 631-492-2300; FAX: 631-492-2117; e-mail: salesus@flexim.com; web site: www.flexim.com)

**FLEXIM, FLEXIBLE INDUSTRIEMESSTECHNIK GMBH**, Wolfener Str. 36, Berlin, Germany D-12681 (49 0 30 936 676 60; FAX: 49 0 30 936 676 80; e-mail: info@flexim.com; web site: www.flexim.com)

Krohne, Inc., Peabody, MA  
Siemens Process Industries and Drives, Norcross, GA  
**SIERRA INSTRUMENTS, INC.**, 5 Harris Ct., Bldg. L, Monterey, CA 93940 (800-866-0200; 831-373-0200; FAX: 831-373-4402; e-mail: info@sierrainstruments.com; web site: www.sierrainstruments.com)

## Flowmeters, variable area

Badger Meter Europa GmbH, Neuffen  
Cole-Parmer, Vernon Hills, IL

**GEMU VALVES, INC.**, 3800 Camp Creek Parkway, Building 2600 Suite 120, Atlanta, GA 30331 (678-553-3400; FAX: 404-344-9350; e-mail: info@gemu.com; web site: www.gemu.com)

Heinrichs Messtechnik GmbH, Koeln  
Krohne, Inc., Peabody, MA  
Sure Flow Products, Wixom, MI  
Universal Flow Monitors, Inc., Hazel Park, MI

## Flowmeters, vortex shedding

Badger Meter Europa GmbH, Neuffen

**ENDRESS & HAUSER INC.**, 2350 Endress Place, Greenwood, IN 46143 (800-428-4344; 317-535-7138; FAX: 317-535-8498; e-mail: info@us.endress.com; web site: www.us.endress.com)

Heinrichs Messtechnik GmbH, Koeln  
Krohne, Inc., Peabody, MA

**SIERRA INSTRUMENTS, INC.**, 5 Harris Ct., Bldg. L, Monterey, CA 93940 (800-866-0200; 831-373-0200; FAX: 831-373-4402; e-mail: info@sierrainstruments.com; web site: www.sierrainstruments.com)

Universal Flow Monitors, Inc., Hazel Park, MI  
Yokogawa Corporation of America, Sugar Land, TX

## Flowmeters, weirs & flumes

Badger Meter Europa GmbH, Neuffen  
Levelese, Inc., Denver, Colorado

## Gages, density

Berthold Technologies GmbH & Co.KG, Bad Wildbad  
Heinrichs Messtechnik GmbH, Koeln  
Markland Specialty Engineering Ltd., Georgetown, SensoTech Inc., Wayne, NJ

## Gages, liquid level

Delta M Corp., Oak Ridge, TN

**ENDRESS & HAUSER INC.**, 2350 Endress Place, Greenwood, IN 46143 (800-428-4344; 317-535-7138; FAX: 317-535-8498; e-mail: info@us.endress.com; web site: www.us.endress.com)

Ernst, John, Co., Inc., Sparta, NJ

**FCI-FLUID COMPONENTS INTERNATIONAL**, 1755 La Costa Meadows Dr., San Marcos, CA 92078 ((800) 854-1993; 760-744-6950; FAX: 760-736-6250; e-mail: FCI@marcom@fluidcomponents.com; web site: www.fluidcomponents.com)

Force Flow, Concord, CA

Heinrichs Messtechnik GmbH, Koeln  
Krohne, Inc., Peabody, MA

Levelese, Inc., Denver, Colorado

**ORION INSTRUMENTS**, 2105 Oak Villa Blvd., Baton Rouge, LA 70815 (e-mail: jdugas@orioninstruments.com)

TankLink, a wholly-owned subsidiary of Telular Corporation, Chicago, IL

TowerScan, Sarnia

TowerScan, Port Huron, MI

VEGA Americas, Inc., Cincinnati, OH

**VEGA GRIESHABER KG**, Am Hohenstein 113, Schiltach, Germany, 77761 (+49 7836 50-0; FAX: +49 7836 50-201; e-mail: info.de@vega.com; web site: www.vega.com)

## Gages, liquid level, sanitary

Madison Co., Branford, CT

## Gages, mechanical force

Sensor Technology Ltd, Banbury

## Gages, nuclear radiation

TowerScan, Sarnia

TowerScan, Port Huron, MI

## Gages, pressure

Omega Engineering Inc., Stamford, CT  
Palmer Wahl Temperature Instruments, Asheville, NC  
**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)  
— See our ad on page 211

Tel-Tru Manufacturing Co., Rochester, NY

VEGA Americas, Inc., Cincinnati, OH

**VEGA GRIESHABER KG**, Am Hohenstein 113, Schiltach, Germany, 77761 (+49 7836 50-0; FAX: +49 7836 50-201; e-mail: info.de@vega.com; web site: www.vega.com)

WIKA Instrument, LP, Lawrenceville, GA

## Gages, tank

**ASSMANN CORP. OF AMERICA**, 300 N. Taylor Rd., Garrett, IN 46738 (888-357-3181; 260-357-3181; FAX: 260-357-3738; e-mail: info@assmann-usa.com; web site: www.assmann-usa.com)

Ernst, John, Co., Inc., Sparta, NJ

Levelese, Inc., Denver, Colorado  
TankLink, a wholly-owned subsidiary of Telular Corporation, Chicago, IL

VEGA Americas, Inc., Cincinnati, OH

**VEGA GRIESHABER KG**, Am Hohenstein 113, Schiltach, Germany, 77761 (+49 7836 50-0; FAX: +49 7836 50-201; e-mail: info.de@vega.com; web site: www.vega.com)

WIKA Instrument, LP, Lawrenceville, GA

## Gages, temperature

Palmer Wahl Temperature Instruments, Asheville, NC

S-Products Inc., Fairfield, CT

TankLink, a wholly-owned subsidiary of Telular Corporation, Chicago, IL

Tel-Tru Manufacturing Co., Rochester, NY

WIKA Instrument, LP, Lawrenceville, GA

## Gages, vacuum & differential pressure

TankLink, a wholly-owned subsidiary of Telular Corporation, Chicago, IL

VEGA Americas, Inc., Cincinnati, OH

**VEGA GRIESHABER KG**, Am Hohenstein 113, Schiltach, Germany, 77761 (+49 7836 50-0; FAX: +49 7836 50-201; e-mail: info.de@vega.com; web site: www.vega.com)

WIKA Instrument, LP, Lawrenceville, GA

## Gages, water

Levelese, Inc., Denver, Colorado

VEGA Americas, Inc., Cincinnati, OH

**VEGA GRIESHABER KG**, Am Hohenstein 113, Schiltach, Germany, 77761 (+49 7836 50-0; FAX: +49 7836 50-201; e-mail: info.de@vega.com; web site: www.vega.com)

## Glasses, furnace

Technical Glass Products, Painesville, OH

## Glasses, gage

Ernst, John, Co., Inc., Sparta, NJ

## Glasses, sight flow

Ernst, John, Co., Inc., Sparta, NJ

**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)

— See our ad on page 211

Technical Glass Products, Painesville, OH

Wyssmont Co. Inc., Fort Lee, NJ

## Indicators, bin level

Conveyor Components Co., Material Control, Inc., Crosswell, MI

**ENDRESS & HAUSER INC.**, 2350 Endress Place, Greenwood, IN 46143 (800-428-4344; 317-535-7138; FAX: 317-535-8498; e-mail: info@us.endress.com; web site: www.us.endress.com)

Matsushima Measure Tech, Des Plaines, IL

VEGA Americas, Inc., Cincinnati, OH

**VEGA GRIESHABER KG**, Am Hohenstein 113, Schiltach, Germany, 77761 (+49 7836 50-0; FAX: +49 7836 50-201; e-mail: info.de@vega.com; web site: www.vega.com)

Yokogawa Corporation of America, Sugar Land, TX

## Indicators, carbon monoxide

Sierra Monitor Corp., Milpitas, CA

Yokogawa Corporation of America, Sugar Land, TX

## Indicators, color

Yokogawa Corporation of America, Sugar Land, TX

## Indicators, combustible gases

American Gas & Chemical Co Ltd, NJ  
Clean Air Express Equipment, Palatine, IL  
Sierra Monitor Corp., Milpitas, CA  
Yokogawa Corporation of America, Sugar Land, TX

## Indicators, dewpoint or humidity

S-Products Inc., Fairfield, CT

Yokogawa Corporation of America, Sugar Land, TX

## Indicators, flow

Auburn Systems, LLC, Danvers, MA

**Badger Meter, Inc.**, Milwaukee, WI

Delta M Corp., Oak Ridge, TN

**ENDRESS & HAUSER INC.**, 2350 Endress Place, Greenwood, IN 46143 (800-428-4344; 317-535-7138; FAX: 317-535-8498; e-mail: info@us.endress.com; web site: www.us.endress.com)

Ernst, John, Co., Inc., Sparta, NJ

**FCI-FLUID COMPONENTS INTERNATIONAL**, 1755 La Costa Meadows Dr., San Marcos, CA 92078 ((800) 854-1993; 760-744-6950; FAX: 760-736-6250; e-mail: FCI@marcom@fluidcomponents.com; web site: www.fluidcomponents.com)

**FLEXIM AMERICAS**, 250 V Executive Drive, Edgewood, NY 11717 (1 888 852 74 73 North America; 631-492-2300; FAX: 631-492-2117; e-mail: salesus@flexim.com; web site: www.flexim.com)

**FLEXIM, FLEXIBLE INDUSTRIEMESSTECHNIK GMBH**, Wolfener Str. 36, Berlin, Germany D-12681 (49 0 30 936 676 60; FAX: 49 0 30 936 676 80; e-mail: info@flexim.com; web site: www.flexim.com)

**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)

— See our ad on page 211

Red Seal Measurement, Greenwood, SC

Siemens Process Industries and Drives, Process Instrumentation & Analytics, Spring House, PA

**SIERRA INSTRUMENTS, INC.**, 5 Harris Ct., Bldg. L, Monterey, CA 93940 (800-866-0200; 831-373-0200; FAX: 831-373-4402; e-mail: info@sierrainstruments.com; web site: www.sierrainstruments.com)

Sure Flow Products, Wixom, MI

Universal Flow Monitors, Inc., Hazel Park, MI

Yokogawa Corporation of America, Sugar Land, TX

## Indicators, liquid level

Automation Products Inc. (Dynatrol Div.), Houston, TX

Delta M Corp., Oak Ridge, TN

**ENDRESS & HAUSER INC.**, 2350 Endress Place, Greenwood, IN 46143 (800-428-4344; 317-535-7138; FAX: 317-535-8498; e-mail: info@us.endress.com; web site: www.us.endress.com)

Ernst, John, Co., Inc., Sparta, NJ

**FCI-FLUID COMPONENTS INTERNATIONAL**, 1755 La Costa Meadows Dr., San Marcos, CA 92078 ((800) 854-1993; 760-744-6950; FAX: 760-736-6250; e-mail: FCI@marcom@fluidcomponents.com; web site: www.fluidcomponents.com)

Levelese, Inc., Denver, CO

Madison Co., Branford, CT

Magnetrol, 705 Enterprise Street, Aurora, IL

**ORION INSTRUMENTS**, 2105 Oak Villa Blvd., Baton Rouge, LA 70815 (e-mail: jdugas@orioninstruments.com)

**PLAST-O-MATIC VALVES INC.**, 1384 Pompton Ave., Cedar Grove, NJ 07009-1095 (973-256-3000; FAX: 973-256-4745; e-mail: tsimmons@plastomatic.com; web site: www.plastomatic.com)

— See our ad on page 211

**SIERRA INSTRUMENTS, INC.**, 5 Harris Ct., Bldg. L, Monterey, CA 93940 (800-866-0200; 831-373-0200; FAX: 831-373-4402; e-mail: info@sierrainstruments.com; web site: www.sierrainstruments.com)

TankLink, a wholly-owned subsidiary of Telular Corporation, Chicago, IL

VEGA Americas, Inc., Cincinnati, OH

**VEGA GRIESHABER KG**, Am Hohenstein 113, Schiltach, Germany, 77761 (+49 7836 50-0; FAX: +49 7836 50-201; e-mail: info.de@vega.com; web site: www.vega.com)

Yokogawa Corporation of America, Sugar Land, TX

## Indicators, mass flow

Clean Air Express Equipment, Palatine, IL

Conveyor Components Co., Material Control, Inc., Crosswell, MI

Delta M Corp., Oak Ridge, TN

**ENDRESS & HAUSER INC.**, 2350 Endress Place, Greenwood, IN 46143 (800-428-4344; 317-535-7138; FAX: 317-535-8498; e-mail: info@us.endress.com; web site: www.us.endress.com)

**FCI-FLUID COMPONENTS INTERNATIONAL**, 1755 La Costa Meadows Dr., San Marcos, CA 92078 ((800) 854-1993; 760-744-6950; FAX: 760-736-6250; e-mail: FCI@marcom@fluidcomponents.com; web site: www.fluidcomponents.com)

Red Seal Measurement, Greenwood, SC

**SIERRA INSTRUMENTS, INC.**, 5 Harris Ct., Bldg. L, Monterey, CA 93940 (800-866-0200; 831-373-0200; FAX: 831-373-4402; e-mail: info@sierrainstruments.com; web site: www.sierrainstruments.com)  
Yokogawa Corporation of America, Sugar Land, TX

## Indicators, moisture

A & D Weighing, San Jose, CA  
MoistTech Corp., Sarasota, FL  
Siemens Process Industries and Drives, Norcross, GA  
Yokogawa Corporation of America, Sugar Land, TX

## Indicators, other

Schurter, Inc., Santa Rosa, CA  
Sierra Monitor Corp., Milpitas, CA  
Yokogawa Corporation of America, Sugar Land, TX

## Indicators, pressure

**ENDRESS & HAUSER INC**, 2350 Endress Place, Greenwood, IN 46143 (800-428-4344; 317-535-7138; FAX: 317-535-8498; e-mail: info@us.endress.com; web site: www.us.endress.com)  
Tel-Tru Manufacturing Co., Rochester, NY  
Yokogawa Corporation of America, Sugar Land, TX

## Indicators, solids level

Automation Products Inc. (Dynatrol Div.), Houston, TX  
Conveyor Components Co., Material Control, Inc., Crosswell, MI

**ENDRESS & HAUSER INC**, 2350 Endress Place, Greenwood, IN 46143 (800-428-4344; 317-535-7138; FAX: 317-535-8498; e-mail: info@us.endress.com; web site: www.us.endress.com)

Magnetrol, 705 Enterprise Street, Aurora, IL  
VEGA Americas, Inc., Cincinnati, OH

**VEGA GRIESHABER KG**, Am Hohenstein 113, Schiltach, Germany, 77761 (+49 7836 50-0; FAX: +49 7836 50-201; e-mail: info.de@vega.com; web site: www.vega.com)

Yokogawa Corporation of America, Sugar Land, TX

## Indicators, specific gravity

Automation Products Inc. (Dynatrol Div.), Houston, TX  
Red Seal Measurement, Greenwood, SC  
SensoTech Inc., Wayne, NJ  
Yokogawa Corporation of America, Sugar Land, TX

## Indicators, temperature

Acromag, Inc., Wixom, MI

**ENDRESS & HAUSER INC**, 2350 Endress Place, Greenwood, IN 46143 (800-428-4344; 317-535-7138; FAX: 317-535-8498; e-mail: info@us.endress.com; web site: www.us.endress.com)

**FCI-FLUID COMPONENTS INTERNATIONAL**, 1755 La Costa Meadows Dr., San Marcos, CA 92078 (800) 854-1993; 760-744-6950; FAX: 760-736-6250; e-mail: FCI@marcom.com; web site: www.fluidcomponents.com)

Hampshire Controls Corp., Dover, NH  
Iron, Inc., Santa Cruz, CA

Omega Engineering Inc., Stamford, CT  
Raytek Corp., Santa Cruz, CA  
S-Products Inc., Fairfield, CT

Tel-Tru Manufacturing Co., Rochester, NY  
**UNITED ELECTRIC CONTROLS CO.**, 180 Dexter Ave., Watertown, MA 02471-9143 (617-926-1000; FAX: 617-926-2568; web site: www.ueonline.com)

Williamson Corporation, Concord, MA  
Yokogawa Corporation of America, Sugar Land, TX

## Indicators, turbidity

Yokogawa Corporation of America, Sugar Land, TX

## Indicators, vacuum

**ENDRESS & HAUSER INC**, 2350 Endress Place, Greenwood, IN 46143 (800-428-4344; 317-535-7138; FAX: 317-535-8498; e-mail: info@us.endress.com; web site: www.us.endress.com)

Yokogawa Corporation of America, Sugar Land, TX

## Indicators, valve position

**HANS TURCK GMBH & CO. KG**, Witzlebenstr. 7, Muelheim an der Ruhr, 45472 (+49 208 4952-0; FAX: +49 208 4952-264; e-mail: more@turck.com; web site: www.turck.com)

Yokogawa Corporation of America, Sugar Land, TX

## Indicators, viscosity

Hydramotion Ltd, Malton

**LOAD CONTROLS, INC.**, 53 Technology Park Rd., Sturbridge, MA 01566 (888-600-3247; 508-347-2606; FAX: 508-347-2064; web site: www.loadcontrols.com)  
— See our ad on page 27

Yokogawa Corporation of America, Sugar Land, TX

## Indicators, weight

A & D Weighing, San Jose, CA  
Emery Winslow Scale Co., Seymour, CT  
Force Flow, Concord, CA

Mettler-Toledo, Inc., Columbus, OH  
Pacific Scale Co., Inc., Clackamas, OR  
Pennsylvania Scale Company, Lancaster, PA  
Rice Lake Weighing Systems, Rice Lake, WI  
Yokogawa Corporation of America, Sugar Land, TX

## Thermistors

GiC Thermodynamics, Charlevoix, MI  
Temp-Pro Inc., Northampton, MA  
**UNITED ELECTRIC CONTROLS CO.**, 180 Dexter Ave., Watertown, MA 02471-9143 (617-926-1000; FAX: 617-926-2568; web site: www.ueonline.com)

## Thermocouples

**BASF Corporation, Catalysts & Adsorbents, Iselin, NJ**  
Clean Air Express Equipment, Palatine, IL  
Cole-Parmer, Vernon Hills, IL  
GiC Thermodynamics, Charlevoix, MI  
Harrop Industries, Inc., Columbus, OH  
JUMO GmbH & Co. KG, Fulda, Germany  
Moore Industries International, Inc., North Hills, CA  
S-Products Inc., Fairfield, CT  
Temp-Pro Inc., Northampton, MA  
**UNITED ELECTRIC CONTROLS CO.**, 180 Dexter Ave., Watertown, MA 02471-9143 (617-926-1000; FAX: 617-926-2568; web site: www.ueonline.com)

## Thermometers, bimetallic

Tel-Tru Manufacturing Co., Rochester, NY  
Temp-Pro Inc., Northampton, MA  
WIK A Instrument, LP, Lawrenceville, GA

## Thermometers, dial

Tel-Tru Manufacturing Co., Rochester, NY  
Temp-Pro Inc., Northampton, MA  
**UNITED ELECTRIC CONTROLS CO.**, 180 Dexter Ave., Watertown, MA 02471-9143 (617-926-1000; FAX: 617-926-2568; web site: www.ueonline.com)  
WIK A Instrument, LP, Lawrenceville, GA

## Thermometers, digital

Palmer Wahl Temperature Instruments, Asheville, NC  
Raytek GmbH, Berlin  
S-Products Inc., Fairfield, CT  
Tel-Tru Manufacturing Co., Rochester, NY  
Yokogawa Corporation of America, Sugar Land, TX

## Thermometers, electrical

Raytek Corp., Santa Cruz, CA  
Temp-Pro Inc., Northampton, MA  
**UNITED ELECTRIC CONTROLS CO.**, 180 Dexter Ave., Watertown, MA 02471-9143 (617-926-1000; FAX: 617-926-2568; web site: www.ueonline.com)

## Thermometers, infrared

Omega Engineering Inc., Stamford, CT  
Palmer Wahl Temperature Instruments, Asheville, NC  
Williamson Corporation, Concord, MA  
Yokogawa Corporation of America, Sugar Land, TX

## Thermometers, precision

CTP Corp., Northport, NY

## Thermometers, recording

Raytek Corp., Santa Cruz, CA  
**UNITED ELECTRIC CONTROLS CO.**, 180 Dexter Ave., Watertown, MA 02471-9143 (617-926-1000; FAX: 617-926-2568; web site: www.ueonline.com)

## Thermometers, resistance temperature detectors

GiC Thermodynamics, Charlevoix, MI  
Heinrichs Messtechnik GmbH, Koeln  
JUMO GmbH & Co. KG, Fulda, Germany  
Moore Industries International, Inc., North Hills, CA  
Palmer Wahl Temperature Instruments, Asheville, NC  
S-Products Inc., Fairfield, CT  
Temp-Pro Inc., Northampton, MA  
**UNITED ELECTRIC CONTROLS CO.**, 180 Dexter Ave., Watertown, MA 02471-9143 (617-926-1000; FAX: 617-926-2568; web site: www.ueonline.com)

## Thermometers, surface

Iron, Inc., Santa Cruz, CA  
Raytek Corp., Santa Cruz, CA  
Raytek GmbH, Berlin  
S-Products Inc., Fairfield, CT  
Temp-Pro Inc., Northampton, MA

## Thermostats

LAUDA DR. R. WOBSE GMBH & CO. KG, Laudakoenigshofen, O  
S-Products Inc., Fairfield, CT

**UNITED ELECTRIC CONTROLS CO.**, 180 Dexter Ave., Watertown, MA 02471-9143 (617-926-1000; FAX: 617-926-2568; web site: www.ueonline.com)

## Thermowells

GiC Thermodynamics, Charlevoix, MI  
**MICROMOLD PRODUCTS, INC.**, 7 Odell Plaza #133, Yonkers, NY 10701 (914-969-2850)  
Moore Industries International, Inc., North Hills, CA  
Palmer Wahl Temperature Instruments, Asheville, NC  
S-Products Inc., Fairfield, CT  
Tel-Tru Manufacturing Co., Rochester, NY  
Temp-Pro Inc., Northampton, MA  
**UNITED ELECTRIC CONTROLS CO.**, 180 Dexter Ave., Watertown, MA 02471-9143 (617-926-1000; FAX: 617-926-2568; web site: www.ueonline.com)  
WIK A Instrument, LP, Lawrenceville, GA

## MEASUREMENT & TESTING EQUIPMENT

### Alloy identification equipment

Acromag, Inc., Wixom, MI

### Calibration gas standards

Clean Air Engineering, Palatine, IL  
Clean Air Instrument Rental, Palatine, IL  
Gasco, Oldsmar, FL  
**SIERRA INSTRUMENTS, INC.**, 5 Harris Ct., Bldg. L, Monterey, CA 93940 (800-866-0200; 831-373-0200; FAX: 831-373-4402; e-mail: info@sierrainstruments.com; web site: www.sierrainstruments.com)

### Calibration & test equipment

A & D Weighing, San Jose, CA  
ATS RheoSystems, Cannon Instrument Company, Borden-town, NJ  
Atlas Material Testing Technology LLC, Mount Prospect, IL  
Beamex, Inc., Marietta, GA  
**BROOKFIELD AMETEK, INC., INSTRUMENTATION & SPECIALTY CONTROLS DIVISION**, 11 Commerce Blvd., Middleboro, MA 02346 (800-628-8139 (Not MA); 508-946-6200; FAX: 508-946-6262; e-mail: info@brookfieldengineering.com; web site: www.brookfieldengineering.com)

Clean Air Engineering, Palatine, IL  
Clean Air Express Equipment, Palatine, IL  
**FLEXIM AMERICAS**, 250 V Executive Drive, Edgewood, NY 11717 (1 888 852 74 73 North America; 631-492-2300; FAX: 631-492-2117; e-mail: salesus@flexim.com; web site: www.flexim.com)  
**FLEXIM, FLEXIBLE INDUSTRIEMESSTECHNIK GMBH**, Wolfener Str. 36, Berlin, Germany D-12681 (49 0 30 936 676 60; FAX: 49 0 30 936 676 80; e-mail: info@flexim.com; web site: www.flexim.com)

FRITSCH GmbH, Milling and Sizing, Idar-Oberstein  
HAVER & BOECKER, Wire Weaving, Oelde, Germany  
Iron, Inc., Santa Cruz, CA

Koflo Corp., Cary, IL  
Konica Minolta Sensing Americas, Ramsey, NJ  
LAUDA DR. R. WOBSE GMBH & CO. KG, Laudakoenigshofen, O

McPherson, Chelmsford, MA  
MoistTech Corp., Sarasota, FL  
PRÜFTECHNIK Dieter Busch AG, Ismaning, Germany

Palmer Wahl Temperature Instruments, Asheville, NC  
Raytek Corp., Santa Cruz, CA  
Raytek GmbH, Berlin  
Rice Lake Weighing Systems, Rice Lake, WI  
Sensor Technology Ltd, Banbury

**SIERRA INSTRUMENTS, INC.**, 5 Harris Ct., Bldg. L, Monterey, CA 93940 (800-866-0200; 831-373-0200; FAX: 831-373-4402; e-mail: info@sierrainstruments.com; web site: www.sierrainstruments.com)

Sierra Monitor Corp., Milpitas, CA  
Systech Instruments Ltd (Systech Illinois), Thame  
WIK A Instrument, LP, Lawrenceville, GA  
Yokogawa Corporation of America, Sugar Land, TX  
burster praezisionsmesstechnik gmbh & co kg, Gernsbach, Germany

### Cameras, high-speed

Oxford Lasers, Inc., Shirley, MA  
Raytek GmbH, Berlin

### Chambers, test

Atlas Material Testing Technology LLC, Mount Prospect, IL  
Koflo Corp., Cary, IL  
McPherson, Chelmsford, MA  
Q-Lab Corporation, Westlake, OH  
Singleton Corp., Cleveland, OH  
Thermicon Corp. Mansfield, MA  
Thermotron, Holland, MI

### Colorimeters

CHEMetrics Inc., Calverton, VA  
Konica Minolta Sensing Americas, Ramsey, NJ

optek-Danulat, Inc., Germantown, WI

## Corrosion measurement equipment

Applus RTD USA, Houston, TX  
Metal Samples Co., Munford, AL  
Singleton Corp., Cleveland, OH

## Density-measuring equipment

Anton PAAR GmbH, Graz  
Automation Products Inc. (Dynatrol Div.), Houston, TX  
Berthold Technologies GmbH & Co.KG, Bad Wildbad  
**BROOKFIELD AMETEK, INC., INSTRUMENTATION & SPECIALTY CONTROLS DIVISION**, 11 Commerce Blvd., Middleboro, MA 02346 (800-628-8139 (Not MA); 508-946-6200; FAX: 508-946-6262; e-mail: info@brookfieldengineering.com; web site: www.brookfieldengineering.com)

Heinrichs Messtechnik GmbH, Koeln  
Jenike & Johanson Inc., Tyngsboro, MA  
Konica Minolta Sensing Americas, Ramsey, NJ  
LAUDA DR. R. WOBSEER GMBH & CO. KG, Lauda-Koenigshofen, O

Markland Specialty Engineering Ltd., Georgetown, Red Seal Measurement, Greenwood, SC  
SensoTech GmbH, Magdeburg-Barleben, Germany  
SensoTech Inc., Wayne, NJ  
TowerScan, Port Huron, MI  
TowerScan, Sarnia  
Yokogawa Corporation of America, Sugar Land, TX

## Detectors, interface

Automation Products Inc. (Dynatrol Div.), Houston, TX  
**FCI-FLUID COMPONENTS INTERNATIONAL**, 1755 La Costa Meadows Dr., San Marcos, CA 92078 ((800) 854-1993; 760-744-6950; FAX: 760-736-6250; e-mail: FCI@fluidcomponents.com; web site: www.fluidcomponents.com)

**FLEXIM, FLEXIBLE INDUSTRIEMESSTECHNIK GMBH**, Wolfener Str. 36, Berlin, Germany D-12681 (49 0 30 936 676 60; FAX: 49 0 30 936 676 80; e-mail: info@flexim.com; web site: www.flexim.com)

Markland Specialty Engineering Ltd., Georgetown, SensoTech Inc., Wayne, NJ  
TowerScan, Port Huron, MI  
TowerScan, Sarnia

## Detectors, leak

**ASSMANN CORP. OF AMERICA**, 300 N. Taylor Rd., Garrett, IN 46738 (888-357-3181; 260-357-3181; FAX: 260-357-3738; e-mail: info@assmann-usa.com; web site: www.assmann-usa.com)

Auburn Systems, LLC, Danvers, MA  
BS & B Safety Systems, Inc., Tulsa, OK  
Durag Inc., Environmental Hardware, Mendota Heights, MN

**FCI-FLUID COMPONENTS INTERNATIONAL**, 1755 La Costa Meadows Dr., San Marcos, CA 92078 ((800) 854-1993; 760-744-6950; FAX: 760-736-6250; e-mail: FCI@fluidcomponents.com; web site: www.fluidcomponents.com)

**FLEXIM, FLEXIBLE INDUSTRIEMESSTECHNIK GMBH**, Wolfener Str. 36, Berlin, Germany D-12681 (49 0 30 936 676 60; FAX: 49 0 30 936 676 80; e-mail: info@flexim.com; web site: www.flexim.com)

GOW-MAC Instrument Co., Bethlehem, PA  
Mil-Ram Technology, Inc., Fremont, CA  
Pfeiffer Vacuum, Inc., Nashua, NH  
RKI Instruments, Inc., Union City, CA  
SGB GmbH, Siegen

**SIERRA INSTRUMENTS, INC.**, 5 Harris Ct., Bldg. L, Monterey, CA 93940 (800-866-0200; 831-373-0200; FAX: 831-373-4402; e-mail: info@sierrainstruments.com; web site: www.sierrainstruments.com)

Sierra Monitor Corp., Milpitas, CA  
**TLV CORPORATION**, Charlotte, NC  
— See our ad on page 108

Turner Designs Hydrocarbon Instruments, Inc., Fresno, CA  
**USA INDUSTRIES, INC.**, 302 State Street, S. Houston, TX 77587 (800-456-8721; 713-941-3797; 713-941-3797; FAX: 713-941-1086; e-mail: info@usaindustries.com; web site: www.usaindustries.com)

Yokogawa Corporation of America, Sugar Land, TX

## Detectors, metal

Acromag, Inc., Wixom, MI  
Bunting Magnetics Co., Newton, KS  
Magnetic Products, Inc., Highland, MI

## Electrodes, ion-sensitive

HORIBA Instruments, Irvine, CA

## Electrodes, pH

Analytical Measurements, Chester, NJ  
HORIBA Instruments, Irvine, CA  
Omega Engineering Inc., Stamford, CT  
Van London-pHoenix Co., Houston, TX  
Walchem, IWAKI America, Inc., Holliston, MA  
Yokogawa Corporation of America, Sugar Land, TX

## Enclosures, instrument

**REDGUARD**, 4340 S. West Street, Wichita, KS 67217 (855.REDGUARD; 855.733.4827; FAX: 316-440-1800; web site: www.redguard.com)

— See our ad on page 31

The Industrial Controls Company, Inc.

## Flash points, automatic

Anton PAAR GmbH, Graz

## Fluidic systems

**FLEXIM AMERICAS**, 250 V Executive Drive, Edgewood, NY 11717 (1 888 852 74 73 North America; 631-492-2300; FAX: 631-492-2117; e-mail: salesus@flexim.com; web site: www.flexim.com)

**FLEXIM, FLEXIBLE INDUSTRIEMESSTECHNIK GMBH**, Wolfener Str. 36, Berlin, Germany D-12681 (49 0 30 936 676 60; FAX: 49 0 30 936 676 80; e-mail: info@flexim.com; web site: www.flexim.com)

Oxford Lasers, Inc., Shirley, MA

## Gas dilution systems

Clean Air Instrument Rental, Palatine, IL

## Gas sampling bags

Clean Air Express Equipment, Palatine, IL  
Clean Air Instrument Rental, Palatine, IL

## Ion measurement or selection

Pfeiffer Vacuum, Inc., Nashua, NH  
Van London-pHoenix Co., Houston, TX

## Laser systems

Elos Fixturlaser AB, Molndal  
Oxford Lasers, Inc., Shirley, MA  
PRÜFTECHNIK Dieter Busch AG, Ismaning, Germany

## Load cells

Force Flow, Concord, CA  
Hardy Process Solutions, Inc., Industrial Weighing, San Diego, CA

Kubota Corporation, Singapore  
Load Cell Central, PA  
Omega Engineering Inc., Stamford, CT  
Rice Lake Weighing Systems, Rice Lake, WI  
**Schenck Process GmbH, Darmstadt**  
Sensor Technology Ltd, Banbury  
burster praezisionsmesstechnik gmbh & co kg, Gernsbach, Germany

## Manometers

VEGA Americas, Inc., Cincinnati, OH  
**VEGA GRIESHABER KG**, Am Hohenstein 113, Schiltach, Germany, 0 77761 (+49 7836 50-0; FAX: +49 7836 50-201; e-mail: info.de@vega.com; web site: www.vega.com)

Yokogawa Corporation of America, Sugar Land, TX

## Meters, air

Clean Air Express Equipment, Palatine, IL  
**FCI-FLUID COMPONENTS INTERNATIONAL**, 1755 La Costa Meadows Dr., San Marcos, CA 92078 ((800) 854-1993; 760-744-6950; FAX: 760-736-6250; e-mail: FCI@fluidcomponents.com; web site: www.fluidcomponents.com)

**SIERRA INSTRUMENTS, INC.**, 5 Harris Ct., Bldg. L, Monterey, CA 93940 (800-866-0200; 831-373-0200; FAX: 831-373-4402; e-mail: info@sierrainstruments.com; web site: www.sierrainstruments.com)

Sure Flow Products, Wixom, MI  
V2 Flow Controls, Burr Ridge, IL

## Meters, chlorine

CHEMetrics Inc., Calverton, VA

## Meters, conductivity

Dr. Thiedig GmbH & Co KG, Berlin, Germany  
Walchem, IWAKI America, Inc., Holliston, MA  
burster praezisionsmesstechnik gmbh & co kg, Gernsbach, Germany

## Meters, displacement

**Badger Meter, Inc., Milwaukee, WI**  
PRÜFTECHNIK Dieter Busch AG, Ismaning, Germany  
Red Seal Measurement, Greenwood, SC  
burster praezisionsmesstechnik gmbh & co kg, Gernsbach, Germany

## Meters, electrical

Escitec, Mesa, AZ  
Yokogawa Corporation of America, Sugar Land, TX

## Meters, gas

**FCI-FLUID COMPONENTS INTERNATIONAL**, 1755 La Costa Meadows Dr., San Marcos, CA 92078 ((800) 854-1993; 760-744-6950; FAX: 760-736-6250; e-mail: FCI@fluidcomponents.com; web site: www.fluidcomponents.com)

**FLEXIM, FLEXIBLE INDUSTRIEMESSTECHNIK GMBH**, Wolfener Str. 36, Berlin, Germany D-12681 (49 0 30 936 676 60; FAX: 49 0 30 936 676 80; e-mail: info@flexim.com; web site: www.flexim.com)

Krohne, Inc., Peabody, MA

**SIERRA INSTRUMENTS, INC.**, 5 Harris Ct., Bldg. L, Monterey, CA 93940 (800-866-0200; 831-373-0200; FAX: 831-373-4402; e-mail: info@sierrainstruments.com; web site: www.sierrainstruments.com)

Sure Flow Products, Wixom, MI  
V2 Flow Controls, Burr Ridge, IL

## Meters, heat flow

**FCI-FLUID COMPONENTS INTERNATIONAL**, 1755 La Costa Meadows Dr., San Marcos, CA 92078 ((800) 854-1993; 760-744-6950; FAX: 760-736-6250; e-mail: FCI@fluidcomponents.com; web site: www.fluidcomponents.com)

**FLEXIM AMERICAS**, 250 V Executive Drive, Edgewood, NY 11717 (1 888 852 74 73 North America; 631-492-2300; FAX: 631-492-2117; e-mail: salesus@flexim.com; web site: www.flexim.com)

**FLEXIM, FLEXIBLE INDUSTRIEMESSTECHNIK GMBH**, Wolfener Str. 36, Berlin, Germany D-12681 (49 0 30 936 676 60; FAX: 49 0 30 936 676 80; e-mail: info@flexim.com; web site: www.flexim.com)

## Meters, oxygen

CHEMetrics Inc., Calverton, VA  
Dr. Thiedig GmbH & Co KG, Berlin, Germany  
**ENDRESS & HAUSER INC**, 2350 Endress Place, Greenwood, IN 46143 (800-428-4344; 317-535-7138; FAX: 317-535-8498; e-mail: info@us.endress.com; web site: www.us.endress.com)

RKI Instruments, Inc., Union City, CA  
Yokogawa Corporation of America, Sugar Land, TX

## Meters, ozone

CHEMetrics Inc., Calverton, VA

## Meters, pH

CHEMetrics Inc., Calverton, VA  
Cole-Parmer, Vernon Hills, IL  
Dr. Thiedig GmbH & Co KG, Berlin, Germany  
**ENDRESS & HAUSER INC**, 2350 Endress Place, Greenwood, IN 46143 (800-428-4344; 317-535-7138; FAX: 317-535-8498; e-mail: info@us.endress.com; web site: www.us.endress.com)

HORIBA Instruments, Irvine, CA  
Van London-pHoenix Co., Houston, TX  
Walchem, IWAKI America, Inc., Holliston, MA  
Yokogawa Corporation of America, Sugar Land, TX

## Meters, recording

Analytical Measurements, Chester, NJ  
**BADGER METER, INC.**, 4545 W Brown Deer RD, PO Box 245036, Milwaukee, WI 53224-9536 (800-876-3837; FAX: 918-832-9962; e-mail: info@centraf@badgermeter.com; web site: www.badgermeter.com)

## Meters, sludge

Markland Specialty Engineering Ltd., Georgetown,

## Meters, surface tension

KRUSSE GmbH, Marketing, Hamburg  
LAUDA DR. R. WOBSEER GMBH & CO. KG, Lauda-Koenigshofen, O

## Meters, turbidity

HORIBA Instruments, Irvine, CA  
Krohne, Inc., Peabody, MA  
Sigrist Photometer AG, Ennetbuergen  
Yokogawa Corporation of America, Sugar Land, TX  
optek-Danulat, Inc., Germantown, WI

## Meters, ultrasonic

**ENDRESS & HAUSER INC**, 2350 Endress Place, Greenwood, IN 46143 (800-428-4344; 317-535-7138; FAX: 317-535-8498; e-mail: info@us.endress.com; web site: www.us.endress.com)

**FLEXIM AMERICAS**, 250 V Executive Drive, Edgewood, NY 11717 (1 888 852 74 73 North America; 631-492-2300; FAX: 631-492-2117; e-mail: salesus@flexim.com; web site: www.flexim.com)

**FLEXIM, FLEXIBLE INDUSTRIEMESSTECHNIK GMBH**, Wolfener Str. 36, Berlin, Germany D-12681 (49 0 30 936 676 60; FAX: 49 0 30 936 676 80; e-mail: info@flexim.com; web site: www.flexim.com)

Force Flow, Concord, CA  
Götsch Fischer Piping Systems Ltd., Schaffhausen  
SensoTech GmbH, Magdeburg-Barleben, Germany  
SensoTech Inc., Wayne, NJ



Siemens Process Industries and Drives, Norcross, GA  
**SIERRA INSTRUMENTS, INC.**, 5 Harris Ct., Bldg. L,  
 Monterey, CA 93940 (800-866-0200; 831-373-0200;  
 FAX: 831-373-4402; e-mail: info@sierrainstruments.  
 com; web site: www.sierrainstruments.com)  
**TLV CORPORATION**, Charlotte, NC  
 — See our ad on page 108

## Meters, ultraviolet

Dymax Corp., Torrington, CT  
 optek-Danulat, Inc., Germantown, WI

## Meters, vibration

PRÜFTECHNIK Dieter Busch AG, Ismaning, Germany  
 Vibra-Metrics, div. of Mistras Holdings, Princeton Junction, NJ

## Meters, water

Badger Meter, Inc., Milwaukee, WI  
 Ernst, John, Co., Inc., Sparta, NJ  
**FOI-FLUID COMPONENTS INTERNATIONAL**, 1755 La  
 Costa Meadows Dr., San Marcos, CA 92078 (800)  
 854-1993; 760-744-6950; FAX: 760-736-6250; e-mail:  
 FCImarc.com@fluidcomponents.com; web site: www.  
 fluidcomponents.com)

**FLEXIM AMERICAS**, 250 V Executive Drive, Edgewood,  
 NY 11717 (1 888 852 74 73 North America; 631-492-  
 2300; FAX: 631-492-2117; e-mail: salesus@flexim.  
 com; web site: www.flexim.com)

**FLEXIM, FLEXIBLE INDUSTRIEMESSTECHNIK GMBH**,  
 Wolfener Str. 36, Berlin, Germany D-12681 (49 30  
 936 676 60; FAX: 49 30 936 676 80; e-mail: info@  
 flexim.com; web site: www.flexim.com)

Red Seal Measurement, Greenwood, SC  
 Turner Designs Hydrocarbon Instruments, Inc., Fresno, CA  
 V2 Flow Controls, Burr Ridge, IL

## Meters, zeta potential

Anton PAAR GmbH, Graz, O

## Permeation tubes

Clean Air Instrument Rental, Palatine, IL

## Photometers

Guided Wave, Rancho Cordova, CA  
 Guided Wave Inc., El Dorado Hills, CA  
 Konica Minolta Sensing Americas, Ramsey, NJ  
 Sias, New Castle, DE  
 Turner Designs Hydrocarbon Instruments, Inc., Fresno, CA  
 optek-Danulat, Inc., Germantown, WI

## Pyrometers

EVEREST INTERSCIENCE, OR  
 Iron, Inc., Santa Cruz, CA  
 Raytek Corp., Santa Cruz, CA  
 Raytek GmbH, Berlin  
 Williamson Corporation, Concord, MA

## Refractometers

Anton PAAR GmbH, Graz, O  
**FLEXIM AMERICAS**, 250 V Executive Drive, Edgewood,  
 NY 11717 (1 888 852 74 73 North America; 631-492-  
 2300; FAX: 631-492-2117; e-mail: salesus@flexim.  
 com; web site: www.flexim.com)  
**FLEXIM, FLEXIBLE INDUSTRIEMESSTECHNIK GMBH**,  
 Wolfener Str. 36, Berlin, Germany D-12681 (49 30  
 936 676 60; FAX: 49 30 936 676 80; e-mail: info@  
 flexim.com; web site: www.flexim.com)

## Rheometers

ATS RheoSystems, Cannon Instrument Company, Borden-  
 town, NJ

Anton PAAR GmbH, Graz, O

**BROOKFIELD AMETEK, INC.**, INSTRUMENTATION &  
**SPECIALTY CONTROLS DIVISION**, 11 Commerce  
 Blvd., Middleboro, MA 02346 (800-628-8139 (Not  
 MA); 508-946-6200; FAX: 508-946-6262; e-mail: info@  
 brookfieldengineering.com; web site: www.brook-  
 fieldengineering.com)

Davis-Standard, LLC, Pawcatuck, CT  
 Freeman Technology Inc, Wayne, PA

## Temperature Sensor

EVEREST INTERSCIENCE, OR  
 Hampshire Controls Corp., Dover, NH  
 Williamson Corporation, Concord, MA

## Testers, flash point

Anton PAAR GmbH, Graz, O

## Testers, hardness

**BROOKFIELD AMETEK, INC.**, INSTRUMENTATION &  
**SPECIALTY CONTROLS DIVISION**, 11 Commerce  
 Blvd., Middleboro, MA 02346 (800-628-8139 (Not  
 MA); 508-946-6200; FAX: 508-946-6262; e-mail: info@  
 brookfieldengineering.com; web site: www.brook-  
 fieldengineering.com)

Shimadzu Scientific Instruments, Columbia, MD

## Testers, tensile strength

**BROOKFIELD AMETEK, INC.**, INSTRUMENTATION &  
**SPECIALTY CONTROLS DIVISION**, 11 Commerce  
 Blvd., Middleboro, MA 02346 (800-628-8139 (Not  
 MA); 508-946-6200; FAX: 508-946-6262; e-mail: info@  
 brookfieldengineering.com; web site: www.brook-  
 fieldengineering.com)

Shimadzu Scientific Instruments, Columbia, MD

## Testing equipment, other

Atlas Material Testing Technology LLC, Mount Prospect, IL  
**BROOKFIELD AMETEK, INC.**, INSTRUMENTATION &  
**SPECIALTY CONTROLS DIVISION**, 11 Commerce  
 Blvd., Middleboro, MA 02346 (800-628-8139 (Not  
 MA); 508-946-6200; FAX: 508-946-6262; e-mail: info@  
 brookfieldengineering.com; web site: www.brook-  
 fieldengineering.com)

CHEMetrics Inc., Calverton, VA

EVEREST INTERSCIENCE, OR

G.R. Sprenger Engineering, Inc., Golden, CO

Harrop Industries, Inc., Columbus, OH

**HAWK MEASUREMENT**, 96 Glenn Street, Lawrence, MA  
 01843 (978-344-3000; e-mail: hawksales@hawkmea-  
 sure.com; web site: www.hawkmeasure.com)

Jenike & Johanson Inc., Tyrngsboro, MA

Konica Minolta Sensing Americas, Ramsey, NJ

MoistTech Corp., Sarasota, FL

Q-Lab Corporation, Westlake, OH

Raytek GmbH, Berlin

Sensor Technology Ltd, Banbury

**SIERRA INSTRUMENTS, INC.**, 5 Harris Ct., Bldg. L,  
 Monterey, CA 93940 (800-866-0200; 831-373-0200;  
 FAX: 831-373-4402; e-mail: info@sierrainstruments.  
 com; web site: www.sierrainstruments.com)

Singleton Corp., Cleveland, OH

Systech Instruments Ltd (Systech Illinois), Thame

**TLV CORPORATION**, Charlotte, NC

— See our ad on page 108

Thermotron, Holland, MI

UIC Inc., Joliet, IL

Yokogawa Corporation of America, Sugar Land, TX

burster praezisionsmesstechnik gmbh & co kg, Gerns-  
 bach, Germany

— See our ad on page 108

Thermotron, Holland, MI

UIC Inc., Joliet, IL

Yokogawa Corporation of America, Sugar Land, TX

burster praezisionsmesstechnik gmbh & co kg, Gerns-  
 bach, Germany

## Viscometers, melt

**BROOKFIELD AMETEK, INC.**, INSTRUMENTATION &  
**SPECIALTY CONTROLS DIVISION**, 11 Commerce  
 Blvd., Middleboro, MA 02346 (800-628-8139 (Not  
 MA); 508-946-6200; FAX: 508-946-6262; e-mail: info@  
 brookfieldengineering.com; web site: www.brook-  
 fieldengineering.com)

Hydramotion Ltd, Malton

LAUDA DR. R. WOBSEER GMBH & CO. KG, Lauda-  
 Koenigshofen, O

— See our ad on page 108

## Viscosity or consistency

### instruments, other

ATS RheoSystems, Cannon Instrument Company, Borden-  
 town, NJ

Anton PAAR GmbH, Graz, O

**BROOKFIELD AMETEK, INC.**, INSTRUMENTATION &  
**SPECIALTY CONTROLS DIVISION**, 11 Commerce  
 Blvd., Middleboro, MA 02346 (800-628-8139 (Not  
 MA); 508-946-6200; FAX: 508-946-6262; e-mail: info@  
 brookfieldengineering.com; web site: www.brook-  
 fieldengineering.com)

Cole-Parmer, Vernon Hills, IL

Hydramotion Ltd, Malton

LAUDA DR. R. WOBSEER GMBH & CO. KG, Lauda-  
 Koenigshofen, O

**LOAD CONTROLS, INC.**, 53 Technology Park Rd., Stur-  
 bridge, MA 01566 (888-600-3247; 508-347-2606; FAX:  
 508-347-2064; web site: www.loadcontrols.com)

— See our ad on page 27

Sensor Technology Ltd, Banbury

## Voltmeters

Escitec, Mesa, AZ

Symmetric Research, Las Vegas, NV

Yokogawa Corporation of America, Sugar Land, TX

burster praezisionsmesstechnik gmbh & co kg, Gerns-  
 bach, Germany

— See our ad on page 108

## X-ray & gamma ray equipment

TowerScan, Port Huron, MI

TowerScan, Sarina

## RECORDER

### Recorder parts & accessories

Yokogawa Corporation of America, Sugar Land, TX

## Recorders, bin level

**ENDRESS & HAUSER INC**, 2350 Endress Place, Green-  
 wood, IN 46143 (800-428-4344; 317-535-7138; FAX:  
 317-535-8498; e-mail: info@us.endress.com; web  
 site: www.us.endress.com)

Yokogawa Corporation of America, Sugar Land, TX

## Recorders, humidity

Yokogawa Corporation of America, Sugar Land, TX

## Recorders, liquid flow

**ENDRESS & HAUSER INC**, 2350 Endress Place, Green-  
 wood, IN 46143 (800-428-4344; 317-535-7138; FAX:  
 317-535-8498; e-mail: info@us.endress.com; web  
 site: www.us.endress.com)

V2 Flow Controls, Burr Ridge, IL

Yokogawa Corporation of America, Sugar Land, TX

## Recorders, liquid level

**ENDRESS & HAUSER INC**, 2350 Endress Place, Green-  
 wood, IN 46143 (800-428-4344; 317-535-7138; FAX:  
 317-535-8498; e-mail: info@us.endress.com; web  
 site: www.us.endress.com)

Madison Co., Branford, CT

Met-Pro Global Pump Solutions, a CEO Environmental  
 Company, Telford, PA

Yokogawa Corporation of America, Sugar Land, TX

## Recorders, mass flow

**ENDRESS & HAUSER INC**, 2350 Endress Place, Green-  
 wood, IN 46143 (800-428-4344; 317-535-7138; FAX:  
 317-535-8498; e-mail: info@us.endress.com; web  
 site: www.us.endress.com)

**SIERRA INSTRUMENTS, INC.**, 5 Harris Ct., Bldg. L,  
 Monterey, CA 93940 (800-866-0200; 831-373-0200;  
 FAX: 831-373-4402; e-mail: info@sierrainstruments.  
 com; web site: www.sierrainstruments.com)

V2 Flow Controls, Burr Ridge, IL

Yokogawa Corporation of America, Sugar Land, TX

## Recorders, moisture

Yokogawa Corporation of America, Sugar Land, TX

## Recorders, other

Yokogawa Corporation of America, Sugar Land, TX

## Recorders, pressure

**ENDRESS & HAUSER INC**, 2350 Endress Place, Green-  
 wood, IN 46143 (800-428-4344; 317-535-7138; FAX:  
 317-535-8498; e-mail: info@us.endress.com; web  
 site: www.us.endress.com)

Palmer Wahl Temperature Instruments, Asheville, NC

Yokogawa Corporation of America, Sugar Land, TX

## Recorders, temperature

Cole-Parmer, Vernon Hills, IL

**ENDRESS & HAUSER INC**, 2350 Endress Place, Green-  
 wood, IN 46143 (800-428-4344; 317-535-7138; FAX:  
 317-535-8498; e-mail: info@us.endress.com; web  
 site: www.us.endress.com)

JUMO GmbH & Co. KG, Fulda, Germany

Omega Engineering Inc., Stamford, CT

Palmer Wahl Temperature Instruments, Asheville, NC

Raytek Corp., Santa Cruz, CA

**UNITED ELECTRIC CONTROLS CO.**, 180 Dexter Ave.,  
 Watertown, MA 02471-9143 (617-926-1000; FAX: 617-  
 926-2568; web site: www.ueonline.com)

Williamson Corporation, Concord, MA

Yokogawa Corporation of America, Sugar Land, TX

## Recorders, time

Yokogawa Corporation of America, Sugar Land, TX

## Recorders, turbidity

Yokogawa Corporation of America, Sugar Land, TX

## Recorders, viscosity

**BROOKFIELD AMETEK, INC.**, INSTRUMENTATION &  
**SPECIALTY CONTROLS DIVISION**, 11 Commerce  
 Blvd., Middleboro, MA 02346 (800-628-8139 (Not  
 MA); 508-946-6200; FAX: 508-946-6262; e-mail:  
 info@brookfieldengineering.com; web site: www.  
 brookfieldengineering.com)

Yokogawa Corporation of America, Sugar Land, TX

Yokogawa Corporation of America, Sugar Land, TX

Yokogawa Corporation of America, Sugar Land, TX

Yokogawa Corporation of America, Sugar Land, TX

Yokogawa Corporation of America, Sugar Land, TX

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Yokogawa Corporation of America, Sugar Land, TX

Yokogawa Corporation of America, Sugar Land, TX

Yokogawa Corporation of America, Sugar Land, TX

**PEPPERL + FUCHS GMBH**, Lilienthalstrasse 200, Mannheim, Germany 68307 (0621-776-0; FAX: 0621-776-1000; e-mail: info@de.pepperl-fuchs.com; web site: www.pepperl-fuchs.com)

**PHOENIX CONTACT GMBH & CO.KG**, Flachmarktstr. 8, Blomberg, Germany 32825 (+49 (0)5235-300; FAX: +49 (0)5235-341200; e-mail: info@phoenixcontact.com; web site: www.phoenixcontact.com)

R. STAHL, Waldenburg  
S-Products Inc., Fairfield, CT  
Yokogawa Corporation of America, Sugar Land, TX

## Data transmission, wireless

DATA-LINC GROUP, WA

**HANS TURCK GMBH & CO. KG**, Witzlebenstr. 7, Muelheim an der Ruhr, 45472 (+49 208 4952-0; FAX: +49 208 4952-264; e-mail: more@turck.com; web site: www.turck.com)

Levelese, Inc, Denver, Colorado

**PEPPERL + FUCHS GMBH**, Lilienthalstrasse 200, Mannheim, Germany 68307 (0621-776-0; FAX: 0621-776-1000; e-mail: info@de.pepperl-fuchs.com; web site: www.pepperl-fuchs.com)

**PHOENIX CONTACT GMBH & CO.KG**, Flachmarktstr. 8, Blomberg, Germany 32825 (+49 (0)5235-300; FAX: +49 (0)5235-341200; e-mail: info@phoenixcontact.com; web site: www.phoenixcontact.com)

R. STAHL, Waldenburg

## Electrical equipment, intrinsic safety

HIMA Paul Hildebrandt GmbH + Co KG, Bruehl

**HANS TURCK GMBH & CO. KG**, Witzlebenstr. 7, Muelheim an der Ruhr, 45472 (+49 208 4952-0; FAX: +49 208 4952-264; e-mail: more@turck.com; web site: www.turck.com)

**PEPPERL + FUCHS GMBH**, Lilienthalstrasse 200, Mannheim, Germany 68307 (0621-776-0; FAX: 0621-776-1000; e-mail: info@de.pepperl-fuchs.com; web site: www.pepperl-fuchs.com)

**PHOENIX CONTACT GMBH & CO.KG**, Flachmarktstr. 8, Blomberg, Germany 32825 (+49 (0)5235-300; FAX: +49 (0)5235-341200; e-mail: info@phoenixcontact.com; web site: www.phoenixcontact.com)

R. STAHL, Waldenburg  
The Industrial Controls Company, Inc.

## Radio remote control systems

**PEPPERL + FUCHS GMBH**, Lilienthalstrasse 200, Mannheim, Germany 68307 (0621-776-0; FAX: 0621-776-1000; e-mail: info@de.pepperl-fuchs.com; web site: www.pepperl-fuchs.com)

**PHOENIX CONTACT GMBH & CO.KG**, Flachmarktstr. 8, Blomberg, Germany 32825 (+49 (0)5235-300; FAX: +49 (0)5235-341200; e-mail: info@phoenixcontact.com; web site: www.phoenixcontact.com)

## Relays, time delay

**PEPPERL + FUCHS GMBH**, Lilienthalstrasse 200, Mannheim, Germany 68307 (0621-776-0; FAX: 0621-776-1000; e-mail: info@de.pepperl-fuchs.com; web site: www.pepperl-fuchs.com)

**PHOENIX CONTACT GMBH & CO.KG**, Flachmarktstr. 8, Blomberg, Germany 32825 (+49 (0)5235-300; FAX: +49 (0)5235-341200; e-mail: info@phoenixcontact.com; web site: www.phoenixcontact.com)

## Telemetry & data transmission systems

Moore Industries International, Inc., North Hills, CA

## Transducers

Clean Air Instrument Rental, Palatine, IL

**FLEXIM, FLEXIBLE INDUSTRIEMESSTECHNIK GMBH**, Wolfener Str. 36, Berlin, Germany D-12681 (49 0 30 936 676 60; FAX: 49 0 30 936 676 80; e-mail: info@flexim.com; web site: www.flexim.com)

Omega Engineering Inc., Stamford, CT

**PHOENIX CONTACT GMBH & CO.KG**, Flachmarktstr. 8, Blomberg, Germany 32825 (+49 (0)5235-300; FAX: +49 (0)5235-341200; e-mail: info@phoenixcontact.com; web site: www.phoenixcontact.com)

Sensor Technology Ltd, Banbury

Yokogawa Corporation of America, Sugar Land, TX  
burster praezisionsmesstechnik gmbh & co kg, Gernsbach, Germany

## Transmitters, level

Berthold Technologies GmbH & Co.KG, Bad Wildbad  
Burkert Fluid Control Systems, Charlotte, NC

**BURKERT FLUID CONTROL SYSTEMS**, Christian-Buerkert-Str. 13-17, Ingelfingen, Germany 74653 (+49 7940 10-0; FAX: +49 7940 10-91 204; e-mail: info@burkert.com; web site: www.burkert.com)

**ENDRESS & HAUSER INC**, 2350 Endress Place, Greenwood, IN 46143 (800-428-4344; 317-535-7138; FAX: 317-535-8498; e-mail: info@us.endress.com; web site: www.us.endress.com)

**FCI-FLUID COMPONENTS INTERNATIONAL**, 1755 La Costa Meadows Dr., San Marcos, CA 92078 (800) 854-1993; 760-744-6950; FAX: 760-736-6250; e-mail: FCImarcom@fluidcomponents.com; web site: www.fluidcomponents.com)

Force Flow, Concord, CA

**HONEYWELL PROCESS SOLUTIONS**, 1250 W Sam Houston Pkwy S, Houston, TX 77042 (+1-800-822-7673; web site: www.honeywellprocess.com)

Levelese, Inc, Denver, Colorado

**PEPPERL + FUCHS GMBH**, Lilienthalstrasse 200, Mannheim, Germany 68307 (0621-776-0; FAX: 0621-776-1000; e-mail: info@de.pepperl-fuchs.com; web site: www.pepperl-fuchs.com)

VEGA Americas, Inc., Cincinnati, OH

**VEGA GRIESHABER KG**, Am Hohenstein 113, Schiltach, Germany, 77761 (+49 7836 50-0; FAX: +49 7836 50-201; e-mail: info.de@vega.com; web site: www.vega.com)

WIKA Instrument, LP, Lawrenceville, GA

Yokogawa Corporation of America, Sugar Land, TX

## Transmitters, mass flow

Berthold Technologies GmbH & Co.KG, Bad Wildbad  
Bronkhorst High-Tech BV, Ruurlo

**ENDRESS & HAUSER INC**, 2350 Endress Place, Greenwood, IN 46143 (800-428-4344; 317-535-7138; FAX: 317-535-8498; e-mail: info@us.endress.com; web site: www.us.endress.com)

**FCI-FLUID COMPONENTS INTERNATIONAL**, 1755 La Costa Meadows Dr., San Marcos, CA 92078 (800) 854-1993; 760-744-6950; FAX: 760-736-6250; e-mail: FCImarcom@fluidcomponents.com; web site: www.fluidcomponents.com)

**FLEXIM, FLEXIBLE INDUSTRIEMESSTECHNIK GMBH**, Wolfener Str. 36, Berlin, Germany D-12681 (49 0 30 936 676 60; FAX: 49 0 30 936 676 80; e-mail: info@flexim.com; web site: www.flexim.com)

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Sure Flow Products, Wixom, MI

Yokogawa Corporation of America, Sugar Land, TX

## Transmitters, pressure

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**HANS TURCK GMBH & CO. KG**, Witzlebenstr. 7, Muelheim an der Ruhr, 45472 (+49 208 4952-0; FAX: +49 208 4952-264; e-mail: more@turck.com; web site: www.turck.com)

**HONEYWELL PROCESS SOLUTIONS**, 1250 W Sam Houston Pkwy S, Houston, TX 77042 (+1-800-822-7673; web site: www.honeywellprocess.com)

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Siemens Process Industries and Drives, Norcross, GA

Tel-Tru Manufacturing Co., Rochester, NY

**UNITED ELECTRIC CONTROLS CO.**, 180 Dexter Ave, Watertown, MA 02471-9143 (617-926-1000; FAX: 617-926-2568; web site: www.ueonline.com)

VEGA Americas, Inc., Cincinnati, OH

**VEGA GRIESHABER KG**, Am Hohenstein 113, Schiltach, Germany, 77761 (+49 7836 50-0; FAX: +49 7836 50-201; e-mail: info.de@vega.com; web site: www.vega.com)

WIKA Instrument, LP, Lawrenceville, GA

Yokogawa Corporation of America, Sugar Land, TX  
burster praezisionsmesstechnik gmbh & co kg, Gernsbach, Germany

## Transmitters, temperature

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GIC Thermodynamics, Charlevoix, MI

Hampshire Controls Corp., Dover, NH

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Moore Industries International, Inc., North Hills, CA

Omega Engineering Inc., Stamford, CT

**PEPPERL + FUCHS GMBH**, Lilienthalstrasse 200, Mannheim, Germany 68307 (0621-776-0; FAX: 0621-776-1000; e-mail: info@de.pepperl-fuchs.com; web site: www.pepperl-fuchs.com)

**PHOENIX CONTACT GMBH & CO.KG**, Flachmarktstr. 8, Blomberg, Germany 32825 (+49 (0)5235-300; FAX: +49 (0)5235-341200; e-mail: info@phoenixcontact.com; web site: www.phoenixcontact.com)

S-Products Inc., Fairfield, CT

Siemens Process Industries and Drives, Norcross, GA

Tel-Tru Manufacturing Co., Rochester, NY

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GEA Refrigeration North America, York, PA

KOERTING HANNOVER AG, Badenstedter Str. 56, 30453 Hannover, Germany (+49 511 2129-0, e-mail: st@koerting.de, web site: www.koerting.de)

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Pneumatech, Inc., Rock Hill, SC

PolyScience, Niles, IL

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### Refrigeration equipment & systems

Applied E-Simulators Software, P. O. Box 4032, West Richland, WA 99353 United States (509-967-5730; Fax: 509-967-5730; e-mail: bgplace@bgplace.cnc.net; www.ae-sim.com)

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WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

### Centrifuges, batch, perforated basket

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### Centrifuges, other

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### Liquid-liquid processing

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Franken Filtertechnik KG, Germany, Huerth, Germany

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(305 233-4249; FAX: 305 233-8687; e-mail: sales@kimre.com; web site: www.kimre.com)

SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65,

Winterthur 8404 (+41 52 262 11 22; FAX: +41 52 262

00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

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## Thickeners, centrifugal

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Flottweg SE, Vilsbiburg  
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## Thickeners, gravity

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Outotec (USA), Inc., Jussup, MD  
Westech Engineering Inc., Salt Lake City, UT

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Cobey, Buffalo, NY

Dipesh Engineering Works, Mumbai, IND

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Mokon, Buffalo, NY  
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**NOL-TEC SYSTEMS, INC., 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)**  
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PSL USA, Boise, ID  
**PAUL O. ABBE, 735 East Green St., Bensenville, IL 60106 (800-524-2188 US; 630-350-3012; FAX: 630-238-7584; e-mail: sales@pauloabbe.com; web site: www.pauloabbe.com)**  
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tec5USA, Plainview, NY

## Equipment, process, custom, cryogenic

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LAUDA DR. R. WOBSEER GMBH & CO. KG, Lauda-Koenigshofen, O  
Modern Process Equipment, Inc., Chicago, IL

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### Dryers, air

Bepex International LLC, Minneapolis, MN  
LA-MAN Corp., Mazeppa, MN  
Lectrodryer, Richmond, KY  
Leister Technologies AG, Kaegiswil  
SIAD Macchine Impianti, Bergamo  
SPX Flow Technology, Ocala, FL

### Dryers, batch

AVA-Americas, Herrsching, Germany  
AVA-Huep GmbH u. Co. KG, Herrsching, Germany

**CHARLES ROSS & SON CO., 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)**  
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COMESSA, Strasbourg  
**JAYGO, INCORPORATED, 7 Emery Ave., Randolph, NJ 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)**

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Shiv Shakti Process Equipment P. Ltd., International Marketing & Sales, Mumbai  
Spray Drying Systems, Inc., Eldersburg, MD

### Dryers, belt

AKW Apparate + Verfahren GmbH, Hirschau, Bavaria  
**AMANDUS KAHL GmbH & Co. KG, Reinbek**  
AWT World Trade Inc., Chicago, IL  
**BERNDORF BAND GMBH, Leobersdorferstr. 26, Berndorf, AUT 2560 (43-2672-800-0; FAX: 43-2672-84176; e-mail: band@berndorf.at; web site: www.berndorf-band.at)**  
COMESSA, Strasbourg

### Dryers, centrifugal

Bepex International LLC, Minneapolis, MN  
**JLS International, Inc., Charlotte, NC**  
KINESPIN, Division of Kinifac Corporation, Worcester, MA  
Maag Pump Systems AG, Oberglatt / ZH, CHE  
Metso Minerals Industries, Inc., York, PA  
Singleton Corp., Cleveland, OH  
Spray Drying Systems, Inc., Eldersburg, MD  
Tema Systems, Inc., Cincinnati, OH

### Dryers, chamber

EDWARDS US HEADQUARTERS, Sanborn, NY  
McGill AirPressure LLC, Columbus, OH  
**Wysmont Co. Inc., Fort Lee, NJ**  
— See our ad on page 149

### Dryers, closed circuit

Bepex International LLC, Minneapolis, MN  
**BUSS-SMS-CANZLER GMBH, Kaiserstr. 13-15, Butzbach, 35510 (49-6033-85-0; FAX: 49-6033-85-249; e-mail: info@sms-vt.com; web site: www.sms-vt.com)**  
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COMESSA, Strasbourg

Dedert Corporation, Homewood, Illinois

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Lectrodryer, Richmond, KY

Spray Drying Systems, Inc., Eldersburg, MD

Wyssmont Co. Inc., Fort Lee, NJ

— See our ad on page 149

## Dryers, conical, vacuum

AVA-Americas, Herrsching, Germany

AVA-Huep GmbH u. Co. KG, Herrsching, Germany

**CHARLES ROSS & SON CO.**, 710 Old Willets Path,  
P.O. Box 12308, Hauppauge, NY 11788-0615 (800-  
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7622 290; FAX: + 49 7622 29 213; e-mail: info@ekato.  
com; web site: www.ekato.com)

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Doetinchem, , NLD

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keting & Sales, Mumbai

## Dryers, continuous

**AMANDUS KAHL GmbH & Co. KG**, Reinbek, 0  
**ANDRITZ GOUDA**, Coenecoop 88, Waddinxveen, 0 2741  
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gouda@andritz.com; web site: www.andritz.com/  
gouda)

AVA-Americas, Herrsching, Germany

AVA-Huep GmbH u. Co. KG, Herrsching, Germany

Aaron Equipment Company, Bensenville, IL

Bepex International LLC, Minneapolis, MN

**BUSS-SMS-CANZLER GMBH**, Kaiserstr. 13-15, Butz-  
bach, 0 35510 (49-6033-85-0; FAX: 49-6033-85-249; e-  
mail: info@sms-vt.com; web site: www.sms-vt.com)

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Cober, Inc., Stratford, CT

COMESSA, Strasbourg

**EDWARDS US HEADQUARTERS**, Sanborn, NY

Epcon Industrial Systems, LP, The Woodlands, TX

Eureka Dry Tech Desiccator Cabinets, Export, Taipei, TWN

GIG Karasek GmbH, Gloggnitz-Stuppach

Heyl & Patterson Inc., Renneburg Division, Pittsburgh, PA

Hosokawa Micron B.V., Mixing, Drying & Agglomeration,  
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Kason Corp., Millburn, NJ

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LIST AG, Arisdorf

Lectrodryer, Richmond, KY

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systems.sandvik.com)

— See our ad on page 53

Spray Drying Systems, Inc., Eldersburg, MD

Wyssmont Co. Inc., Fort Lee, NJ

— See our ad on page 149

## Dryers, conveyor

AWT World Trade Inc., Chicago, IL

Bepex International LLC, Minneapolis, MN

Cober, Inc., Stratford, CT

COMESSA, Strasbourg

**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Hol-  
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## Dryers, desiccant, disposable cartridge

SPX Flow Technology, Ocala, FL

## Dryers, desiccant, package unit

AAAmachine, Inc., Des Plaines, IL

Eureka Dry Tech Desiccator Cabinets, Export, Taipei, TWN

Lectrodryer, Richmond, KY

Munters Corporation, Air Treatment, Amesbury, MA

Pneumatch, Inc., Rock Hill, SC

SPX Flow Technology, Ocala, FL

## Dryers, drum

Allgaier Process Technology GmbH, Germany

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JLS International, Inc., Charlotte, NC

## Dryers, drum, rotary vacuum

Dipesh Engineering Works, Mumbai, IND

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McGill AirPressure LLC, Columbus, OH

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## Dryers, electric

Cober, Inc., Stratford, CT

COMESSA, Strasbourg

Lectrodryer, Richmond, KY

Wyssmont Co. Inc., Fort Lee, NJ

— See our ad on page 149

## Dryers, flash

Bepex International LLC, Minneapolis, MN

COMESSA, Strasbourg

Dedert Corporation, Homewood, Illinois

GEA Denmark (GEA Process Engineering A/S),

Skanderborg, DNK

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: [sales.northamerica@gea.com](mailto:sales.northamerica@gea.com); web site: [www.gea.com](http://www.gea.com))

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Hosokawa Micron B.V., Mixing, Drying & Agglomeration,

Doetinchem, NLD

Spray Drying Systems, Inc., Eldersburg, MD

Wyssmont Co. Inc., Fort Lee, NJ

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## Dryers, fluidized bed

Allgaier Process Technology GmbH, Germany

Bepex International LLC, Minneapolis, MN

Buhler Inc., Minneapolis, MN

COMESSA, Strasbourg

CPFD-Software, Albuquerque, New Mexico

Dedert Corporation, Homewood, Illinois

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Kason Corp., Millburn, NJ

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Shiv Shakti Process Equipment P. Ltd., International Mar-

keting & Sales, Mumbai

Spray Drying Systems, Inc., Eldersburg, MD

## Dryers, freeze

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## Dryers, gas

Cober, Inc., Stratford, CT

COMESSA, Strasbourg

Lectrodryer, Richmond, KY

Pneumatech, Inc., Rock Hill, SC

SPX Flow Technology, Ocala, FL

## Dryers, infrared

AWT World Trade Inc., Chicago, IL

COMESSA, Strasbour

McGill AirPressure LLC, Columbus, OH

## Dryers, microwave

Cober, Inc., Stratford, CT

Progressive Recovery Inc., Dupo, IL

## Dryers, paddle

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web site: [www.italvacuum.com](http://www.italvacuum.com))

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McGill AirPressure LLC, Columbus, OH

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## Dryers, pan

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JLS International, Inc., Charlotte, NC

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**Wyssmont Co. Inc.**, Fort Lee, NJ

— See our ad on page 149

## Dryers, radiant heat

COMESSA, Strasbourg

Diamond Refractory Services, TX

Wyssmont Co. Inc., Fort Lee, NJ

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## Dryers, refrigerated air

COMESSA, Strasbourg

LA-MAN Corp., Mazeppa, MN

Lectrodryer, Richmond, KY

Pneumatech, Inc., Rock Hill, SC

Wyssmont Co. Inc., Fort Lee, NJ

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## Dryers, ring

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## Dryers, rotary

Bepex International LLC, Minneapolis, MN

COMESSA, Strasbourg

Dipesh Engineering Works, Mumbai, IND

EDWARDS US HEADQUARTERS, Sanborn, NY

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McGill AirPressure LLC, Columbus, OH  
Metsko Minerals Industries, Inc., York, PA

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## Dryers, screw flight

Bepex International LLC, Minneapolis, MN

**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hohe-Flum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: +49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com) — See our ad on page 163

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## Dryers, shelf, vacuum

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Shiv Shakti Process Equipment P. Ltd., International Marketing & Sales, Mumbai

## Dryers, spiral screw

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Bepex International LLC, Minneapolis, MN

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## Dryers, spray

AAAmachine, Inc., Des Plaines, IL

Aaron Process Equipment Co., Bensenville, IL

**CALORIS ENGINEERING**, 8649 Commerce Drive, Easton, MD 21601 (410-822-6900; FAX: 410-822-9002; e-mail: info@caloris.com; web site: www.caloris.com)

Dedert Corporation, Homewood, Illinois

Fujisaki Electric, Des Plaines, IL

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PNR AMERICA, LLC, Poughkeepsie, NY

Spray Drying Systems, Inc., Eldersburg, MD

## Dryers, steam jacketed

Bepex International LLC, Minneapolis, MN

**BUSS-SMS-CANZLER GMBH**, Kaiserstr. 13-15, Butzbach, 0 35510 (49-6033-85-0; FAX: 49-6033-85-249; e-mail: info@sms-vt.com; web site: www.sms-vt.com) — See our ad on page 52

**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com) — See our ad on page 9

COMESSA, Strasbourg

**GEA Denmark (GEA Process Engineering A/S)**, Skanderborg, DNK

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com) — See our ad on page 15

**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: info@komline.com; web site: www.komline.com) — See our ad on page 148

**PAUL O. ABBE**, 735 East Green St., Bensenville, IL 60106 (800-524-2188 US; 630-350-3012; FAX: 630-238-7584; e-mail: sales@pauloabbe.com; web site: www.pauloabbe.com) — See our ad on page 17

## Dryers, steam tube

COMESSA, Strasbourg

**GEA Denmark (GEA Process Engineering A/S)**, Skanderborg, DNK

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com) — See our ad on page 15

McGill AirPressure LLC, Columbus, OH

## Dryers, suspension

Allgaier Process Technology GmbH, Germany

COMESSA, Strasbourg

**Wyssmont Co. Inc.**, Fort Lee, NJ — See our ad on page 149

## Dryers, tray

**JLS International, Inc.**, Charlotte, NC

PSL USA, Boise, ID

Powder Systems Ltd, Liverpool

**Wyssmont Co. Inc.**, Fort Lee, NJ — See our ad on page 149

## Dryers, tray, vacuum

EDWARDS US HEADQUARTERS, Sanborn, NY

**Italvacuum Srl**, Via Stroppiana No. 3, Borgaro T.se, Turin, Italy, 10071 (+39-011-4704651; e-mail: marketing@italvacuum.com; web site: www.italvacuum.com)

**JLS International, Inc.**, Charlotte, NC

McGill AirPressure LLC, Columbus, OH

PSL USA, Boise, ID

Powder Systems Ltd, Liverpool

Shiv Shakti Process Equipment P. Ltd., International Marketing & Sales, Mumbai, IND

**Wyssmont Co. Inc.**, Fort Lee, NJ — See our ad on page 149

## Dryers, tumble

**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com) — See our ad on page 9

EDWARDS US HEADQUARTERS, Sanborn, NY

**Italvacuum Srl**, Via Stroppiana No. 3, Borgaro T.se, Turin, Italy, 10071 (+39-011-4704651; e-mail: marketing@italvacuum.com; web site: www.italvacuum.com)

**JAYGO, INCORPORATED**, 7 Emery Ave., Randolph, NJ 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

**PAUL O. ABBE**, 735 East Green St., Bensenville, IL 60106 (800-524-2188 US; 630-350-3012; FAX: 630-238-7584; e-mail: sales@pauloabbe.com; web site: www.pauloabbe.com) — See our ad on page 17

## Dryers, tunnel

COMESSA, Strasbourg

## Dryers, vacuum

**ANDRITZ GOUDA**, Coenecoop 88, Waddinxveen, 0 2741 PD (+31.182.623.723; FAX: +31.182.619.217; e-mail: gouda@andritz.com; web site: www.andritz.com/gouda)

AVA-Huep GmbH u. Co. KG, Herrsching, Germany

Bepex International LLC, Minneapolis, MN

**BUSS-SMS-CANZLER GMBH**, Kaiserstr. 13-15, Butzbach, 0 35510 (49-6033-85-0; FAX: 49-6033-85-249; e-mail: info@sms-vt.com; web site: www.sms-vt.com) — See our ad on page 52

**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com) — See our ad on page 9

**CROLL-REYNOLDS CO. INC.**, Six Campus Drive, Parsippany, NJ 07054 (908-232-4200; FAX: 908-232-2146; e-mail: info@roll.com; web site: www.roll.com)

Dipesh Engineering Works, Mumbai, IND

EDWARDS US HEADQUARTERS, Sanborn, NY

**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hohe-Flum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: +49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com) — See our ad on page 163

Eureka Dry Tech Desiccator Cabinets, Export, Taipei, TWN  
GIG Karasek GmbH, Gloggnitz-Stuppach

Hosokawa Micron B.V., Mixing, Drying & Agglomeration, Doetinchem, , NLD

**Italvacuum Srl**, Via Stroppiana No. 3, Borgaro T.se, Turin, Italy, 10071 (+39-011-4704651; e-mail: marketing@italvacuum.com; web site: www.italvacuum.com)

**JAYGO, INCORPORATED**, 7 Emery Ave., Randolph, NJ 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: info@komline.com; web site: www.komline.com) — See our ad on page 148

LIST AG, Arisdorf

McGill AirPressure LLC, Columbus, OH

PSL USA, Boise, ID

**PAUL O. ABBE**, 735 East Green St., Bensenville, IL 60106 (800-524-2188 US; 630-350-3012; FAX: 630-238-7584; e-mail: sales@pauloabbe.com; web site: www.pauloabbe.com) — See our ad on page 17

**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com) — See our ad on page 35

Powder Systems Ltd, Liverpool

## Dryers, vertical

AVA-Huep GmbH u. Co. KG, Herrsching, Germany

**BUSS-SMS-CANZLER GMBH**, Kaiserstr. 13-15, Butzbach, 0 35510 (49-6033-85-0; FAX: 49-6033-85-249; e-mail: info@sms-vt.com; web site: www.sms-vt.com) — See our ad on page 52

**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com) — See our ad on page 9

COMESSA, Strasbourg

**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hohe-Flum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: +49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com) — See our ad on page 163

GIG Karasek GmbH, Gloggnitz-Stuppach

**JAYGO, INCORPORATED**, 7 Emery Ave., Randolph, NJ 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

**PAUL O. ABBE**, 735 East Green St., Bensenville, IL 60106 (800-524-2188 US; 630-350-3012; FAX: 630-238-7584; e-mail: sales@pauloabbe.com; web site: www.pauloabbe.com) — See our ad on page 17

Spray Drying Systems, Inc., Eldersburg, MD

**Wyssmont Co. Inc.**, Fort Lee, NJ — See our ad on page 149

## Dryers, vibrating

COMESSA, Strasbourg

Kason Corp., Millburn, NJ

Kinergy Corp., Louisville, KY

## DUST COLLECTORS & SEPARATORS

### Baghouses

Ambient Engineering Inc., Rocky Hill, NJ

American Fabric Filter Co., Wesley Chapel, FL

Buhler Inc., Minneapolis, MN

FISHER-KLOSTERMAN EMTRON, A CECO

ENVIRONMENTAL COMPANY, Louisville, KY

Flex-Kleen, a CECO Environmental Company, Glendale Heights, IL



Scientific Dust Collectors, Alsip, IL

## Dust collector parts & accessories

American Fabric Filter Co., Wesley Chapel, FL  
 Auburn Systems, LLC, Danvers, MA  
 FISHER-KLOSTERMAN EMTROL, A CECO ENVIRONMENTAL COMPANY, Louisville, KY  
 Fike, Blue Springs, MO  
 Flex-Kleen, a CECO Environmental Company, Glendale Heights, IL  
 Hapman, Kalamazoo, MI  
**NOL-TEC SYSTEMS, INC., 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)**  
 — See our ad on page 45  
 Scientific Dust Collectors, Alsip, IL

## Dust collectors, bag filtering

Ambient Engineering Inc., Rocky Hill, NJ  
 American Fabric Filter Co., Wesley Chapel, FL  
 Buhler Inc., Minneapolis, MN  
 Cyclonaire Corp., York, NE  
 FISHER-KLOSTERMAN EMTROL, A CECO ENVIRONMENTAL COMPANY, Louisville, KY  
 Flex-Kleen, a CECO Environmental Company, Glendale Heights, IL  
**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)**  
 — See our ad on page 15  
 Scientific Dust Collectors, Alsip, IL

## Dust collectors, cartridge

AIRLANCO, Falls City, NE  
 Dynamic Air Inc., St. Paul, MN  
 FISHER-KLOSTERMAN EMTROL, A CECO ENVIRONMENTAL COMPANY, Louisville, KY  
 Flex-Kleen, a CECO Environmental Company, Glendale Heights, IL  
 Hapman, Kalamazoo, MI  
**NOL-TEC SYSTEMS, INC., 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)**  
 — See our ad on page 45  
**SCHENCK PROCESS, 7901 NW 107th Terrace, Kansas City, MO 64153 (888-657-3094; FAX: 816-891-8336; e-mail: mktg@schenckprocess.com; web site: www.macprocessinc.com)**  
 Scientific Dust Collectors, Alsip, IL  
 Vector Technologies Ltd., Milwaukee, WI

## Dust collectors, centrifugal

**BIONOMIC INDUSTRIES INC., 777 Corporate Dr., Mahwah, NJ 07430-2008 (800-311-6767; 201-529-1094; FAX: 201-529-0252; e-mail: sales@bionomicind.com; web site: www.bionomicind.com)**  
 FISHER-KLOSTERMAN EMTROL, A CECO ENVIRONMENTAL COMPANY, Louisville, KY  
 Flex-Kleen, a CECO Environmental Company, Glendale Heights, IL  
 Scientific Dust Collectors, Alsip, IL

## Dust collectors, cyclone

AIRLANCO, Falls City, NE  
 Ambient Engineering Inc., Rocky Hill, NJ  
**BIONOMIC INDUSTRIES INC., 777 Corporate Dr., Mahwah, NJ 07430-2008 (800-311-6767; 201-529-1094; FAX: 201-529-0252; e-mail: sales@bionomicind.com; web site: www.bionomicind.com)**  
 Buhler Inc., Minneapolis, MN  
 FISHER-KLOSTERMAN EMTROL, A CECO ENVIRONMENTAL COMPANY, Louisville, KY  
 Flex-Kleen, a CECO Environmental Company, Glendale Heights, IL  
 Scientific Dust Collectors, Alsip, IL

## Dust collectors, electrostatic precipitators

Ambient Engineering Inc., Rocky Hill, NJ  
**BELTRAN TECHNOLOGIES, INC., 1133 East 35 Street, Brooklyn, NY 11210 (718-338-3311; FAX: 718-253-9028; e-mail: info@beltranttechnologies.com; web site: www.beltranttechnologies.com)**  
**BIONOMIC INDUSTRIES INC., 777 Corporate Dr., Mahwah, NJ 07430-2008 (800-311-6767; 201-529-1094; FAX: 201-529-0252; e-mail: sales@bionomicind.com; web site: www.bionomicind.com)**  
**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)**  
 — See our ad on page 15  
**NOL-TEC SYSTEMS, INC., 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)**  
 — See our ad on page 45

## Dust collectors, oil type

FISHER-KLOSTERMAN EMTROL, A CECO ENVIRONMENTAL COMPANY, Louisville, KY

## Dust collectors, other

FISHER-KLOSTERMAN EMTROL, A CECO ENVIRONMENTAL COMPANY, Louisville, KY  
 Flex-Kleen, a CECO Environmental Company, Glendale Heights, IL  
 Martin Engineering, Neponset, IL  
 Scientific Dust Collectors, Alsip, IL  
**SONICAIRE, 3831 Kimwell Drive, Winston Salem, NC 27103 (e-mail: moreinfo@iesclean.com)**

## Dust collectors, pulse jet

AIRLANCO, Falls City, NE  
 Ambient Engineering Inc., Rocky Hill, NJ  
 Buhler Inc., Minneapolis, MN  
 FISHER-KLOSTERMAN EMTROL, A CECO ENVIRONMENTAL COMPANY, Louisville, KY  
 Flex-Kleen, a CECO Environmental Company, Glendale Heights, IL  
**FLEXICON CORP., 2400 Emrick Blvd., Bethlehem, PA 18020-8006 (1 888 FLEXICON; 610-814-2400; FAX: 610-814-0600; e-mail: sales@flexicon.com; web site: www.flexicon.com)**

**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)**  
 — See our ad on page 15

Hapman, Kalamazoo, MI  
**NOL-TEC SYSTEMS, INC., 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)**  
 — See our ad on page 45

**SCHENCK PROCESS, 7901 NW 107th Terrace, Kansas City, MO 64153 (888-657-3094; FAX: 816-891-8336; e-mail: mktg@schenckprocess.com; web site: www.macprocessinc.com)**

Scientific Dust Collectors, Alsip, IL  
 Vector Technologies Ltd., Milwaukee, WI

## Dust collectors, tray type

Advanced Industrial Technology Corp., Paramus, NJ  
 FISHER-KLOSTERMAN EMTROL, A CECO ENVIRONMENTAL COMPANY, Louisville, KY  
 TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA

## Dust collectors, tubular

Aaron Equipment Company, Bensenville, IL

## Dust collectors, wet

AAAmachine, Inc., Des Plaines, IL  
**BIONOMIC INDUSTRIES INC., 777 Corporate Dr., Mahwah, NJ 07430-2008 (800-311-6767; 201-529-1094; FAX: 201-529-0252; e-mail: sales@bionomicind.com; web site: www.bionomicind.com)**  
 FISHER-KLOSTERMAN EMTROL, A CECO ENVIRONMENTAL COMPANY, Louisville, KY  
**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)**  
 — See our ad on page 15  
 HEE-DUALL, A CECO ENVIRONMENTAL COMPANY, Owosso, MI

**KIMRE, INC., 744 SW 1st Street, Homestead, FL 33030 (305 233-4249; FAX: 305 233-8687; e-mail: sales@kimre.com; web site: www.kimre.com)**

## Dust removal equipment

AWT World Trade Inc., Chicago, IL  
 Flex-Kleen, a CECO Environmental Company, Glendale Heights, IL  
 HEE-DUALL, A CECO ENVIRONMENTAL COMPANY, Owosso, MI  
**KIMRE, INC., 744 SW 1st Street, Homestead, FL 33030 (305 233-4249; FAX: 305 233-8687; e-mail: sales@kimre.com; web site: www.kimre.com)**  
**NOL-TEC SYSTEMS, INC., 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)**  
 — See our ad on page 45  
 Scientific Dust Collectors, Alsip, IL  
**SONICAIRE, 3831 Kimwell Drive, Winston Salem, NC 27103 (e-mail: moreinfo@iesclean.com)**

## ELECTROCHEMICAL EQUIPMENT

### Corrosion protection units, anodic

Thermal Spray Coatings - A&A Coatings, South Plainfield, NJ

### Corrosion protection units, cathodic

Thermal Spray Coatings - A&A Coatings, South Plainfield, NJ

### Electrodes: anodes & cathodes

Denver Mineral Engineers, Inc., Littleton, CO  
 Thermal Spray Coatings - A&A Coatings, South Plainfield, NJ

### Electrolytic cells

Denver Mineral Engineers, Inc., Littleton, CO  
 PCA GmbH, Heusweiler  
 Thermal Spray Coatings - A&A Coatings, South Plainfield, NJ  
 ThyssenKrupp Industrial Solutions AG, Business Unit Process Technologies, Dortmund

### Electrophoresis units

Thermal Spray Coatings - A&A Coatings, South Plainfield, NJ

## ENTRAINMENT SEPARATION EQUIPMENT

### Defoamers, physical

Coastal Technologies Inc., Hampton, SC  
**EKATO RUEHR- UND MISCHTECHNIK GMBH, Hohe-Flum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: +49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)**  
 — See our ad on page 163  
**JAYGO, INCORPORATED, 7 Emery Ave., Randolph, NJ 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)**

### Mist eliminators

AMACS, Houston, TX  
 Advanced Industrial Technology Corp., Paramus, NJ  
 Ambient Engineering Inc., Rocky Hill, NJ  
**BIONOMIC INDUSTRIES INC., 777 Corporate Dr., Mahwah, NJ 07430-2008 (800-311-6767; 201-529-1094; FAX: 201-529-0252; e-mail: sales@bionomicind.com; web site: www.bionomicind.com)**  
 CECO Filters, a CECO Environmental Company, Telford, PA  
 Coastal Technologies Inc., Hampton, SC  
 FISHER-KLOSTERMAN EMTROL, A CECO ENVIRONMENTAL COMPANY, Louisville, KY  
 HEE-DUALL, A CECO ENVIRONMENTAL COMPANY, Owosso, MI  
 Hilliard Corp., Elmira, NY



**KIMRE, INC., 744 SW 1st Street, Homestead, FL 33030 (305 233-4249; FAX: 305 233-8687; e-mail: sales@kimre.com; web site: www.kimre.com)**  
 Koch-Glitsch, Wichita, KS  
**SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)**

### Traps, air

TLV CORPORATION, Charlotte, NC  
 — See our ad on page 108

## EVAPORATORS & CRYSTALLIZERS

### Crystallizers, cooling

AVA-Huep GmbH u. Co. KG, Herrsching, Germany  
**ALAQUA, INC., 7004 JFK BOULEVARD EAST, SUITE 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alaquaa@mindspring.com; web site: www.alaquainc.com)**  
 GEA France, FRA  
**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)**  
 — See our ad on page 15  
 GEA Netherlands, 's-Hertogenbosch, NLD

**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK MATERIALS TECHNOLOGY DEUTSCHLAND GMBH**, Saliestr. 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: info.spsde@sandvik.com; web site: www.process-systems.sandvik.com)

— See our ad on page 53  
**SANDVIK PROCESS SYSTEMS, INC.**, 21 Campus Rd., Totowa, NJ 07512 (973-790-1600; FAX: 973-790-3377; e-mail: info@sandvik.com; web site: www.process-systems.sandvik.com)

— See our ad on page 53  
**SULZER CHEMTECH LTD**, Sulzer Allee 48, P.O. Box 65, Winterthur 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

## Crystallizers, evaporative

**ALAUQA, INC.**, 7004 JFK BOULEVARD EAST, SUITE 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alaquainc.com)

Chematur EcoPlanning OY, Pori, FIN  
 Dedert Corporation, Homewood, Illinois  
 Dipesh Engineering Works, Mumbai, IND

GEA France, FRA  
**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

— See our ad on page 15  
 Swenson Technology, Monee, IL

## Crystallizers, freeze

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

— See our ad on page 15  
 GEA Netherlands, 's-Hertogenbosch, NLD

**SULZER CHEMTECH LTD**, Sulzer Allee 48, P.O. Box 65, Winterthur 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

## Crystallizers, melt

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

— See our ad on page 15  
 GEA Netherlands, 's-Hertogenbosch, NLD

**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK MATERIALS TECHNOLOGY DEUTSCHLAND GMBH**, Saliestr. 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: info.spsde@sandvik.com; web site: www.process-systems.sandvik.com)

— See our ad on page 53  
**SANDVIK PROCESS SYSTEMS, INC.**, 21 Campus Rd., Totowa, NJ 07512 (973-790-1600; FAX: 973-790-3377; e-mail: info@sandvik.com; web site: www.processsystems.sandvik.com)

— See our ad on page 53  
**SULZER CHEMTECH LTD**, Sulzer Allee 48, P.O. Box 65, Winterthur 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

## Crystallizers, scraped surface

**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hohe-Flum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: +49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)

— See our ad on page 163  
**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

— See our ad on page 15  
 GEA Netherlands, 's-Hertogenbosch, NLD

**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK MATERIALS TECHNOLOGY DEUTSCHLAND GMBH**, Saliestr. 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: info.spsde@sandvik.com; web site: www.process-systems.sandvik.com)

— See our ad on page 53  
**SULZER CHEMTECH LTD**, Sulzer Allee 48, P.O. Box 65, Winterthur 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

## Crystallizers, vacuum

Chematur EcoPlanning OY, Pori, FIN  
**CROLL-REYNOLDS CO. INC.**, Six Campus Drive, Parsippany, NJ 07054 (908-232-4200; FAX: 908-232-2146; e-mail: info@croll.com; web site: www.croll.com)

Dipesh Engineering Works, Mumbai, IND  
**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hohe-Flum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: +49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)

— See our ad on page 163

GEA France, FRA  
**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

— See our ad on page 15  
**READCO KURIMOTO, LLC**, 460 Grim Lane, York, PA 17406 (e-mail: jboufford@readco.com)

— See our ad on page 131  
 Swenson Technology, Monee, IL

## Evaporative systems, mechanical recompression

**ALAUQA, INC.**, 7004 JFK BOULEVARD EAST, SUITE 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alaquainc.com)

**CALORIS ENGINEERING**, 8649 Commerce Drive, Easton, MD 21601 (410-822-6900; FAX: 410-822-9006; e-mail: info@caloris.com; web site: www.caloris.com)

Chematur EcoPlanning OY, Pori, FIN  
 Dedert Corporation, Homewood, Illinois  
 GEA France, FRA

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

— See our ad on page 15  
 GIG Karasek GmbH, Gloggnitz-Stuppach  
 Swenson Technology, Monee, IL

## Evaporative systems, multiple effect

**ALAUQA, INC.**, 7004 JFK BOULEVARD EAST, SUITE 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alaquainc.com)

**BUSS-SMS-CANZLER GMBH**, Kaiserstr. 13-15, Butzbach, O 35510 (49-6033-85-0; FAX: 49-6033-85-249; e-mail: info@sms-vt.com; web site: www.sms-vt.com)

— See our ad on page 52  
**CALORIS ENGINEERING**, 8649 Commerce Drive, Easton, MD 21601 (410-822-6900; FAX: 410-822-9006; e-mail: info@caloris.com; web site: www.caloris.com)

Chematur EcoPlanning OY, Pori, FIN  
 Dedert Corporation, Homewood, Illinois  
 Dipesh Engineering Works, Mumbai, IND

GEA France, FRA  
**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

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 GIG Karasek GmbH, Gloggnitz-Stuppach  
**KOERTING HANNOVER AG**, Badenstedter Str. 56, 30453 Hannover, Germany (+49 511 2129-0, e-mail: st@koerting.de, web site: www.koerting.de)

— See our ad on page 117  
 LIST AG, Arisdorf  
 Schutte & Koerting, Treviso, PA  
 Swenson Technology, Monee, IL

— See our ad on page 117

## Evaporative systems, thermal recompression

**ALAUQA, INC.**, 7004 JFK BOULEVARD EAST, SUITE 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alaquainc.com)

**CALORIS ENGINEERING**, 8649 Commerce Drive, Easton, MD 21601 (410-822-6900; FAX: 410-822-9006; e-mail: info@caloris.com; web site: www.caloris.com)

Chematur EcoPlanning OY, Pori, FIN  
 Dedert Corporation, Homewood, Illinois  
 GEA France, FRA

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

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 GIG Karasek GmbH, Gloggnitz-Stuppach  
**KOERTING HANNOVER AG**, Badenstedter Str. 56, 30453 Hannover, Germany (+49 511 2129-0, e-mail: st@koerting.de, web site: www.koerting.de)

— See our ad on page 117  
 Schutte & Koerting, Treviso, PA  
 Swenson Technology, Monee, IL

— See our ad on page 117

— See our ad on page 117

— See our ad on page 117

## Evaporators, agitated film

**BUSS-SMS-CANZLER GMBH**, Kaiserstr. 13-15, Butzbach, O 35510 (49-6033-85-0; FAX: 49-6033-85-249; e-mail: info@sms-vt.com; web site: www.sms-vt.com)

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**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

— See our ad on page 15  
 GIG Karasek GmbH, Gloggnitz-Stuppach  
 JLS International, Inc., Charlotte, NC

**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)

— See our ad on page 35

## Evaporators, climbing film

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

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## Evaporators, falling film



**ALAUQA, Inc.**

**ALAUQA, INC.**, 7004 JFK BOULEVARD EAST, SUITE 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alaquainc.com)

**BUSS-SMS-CANZLER GMBH**, Kaiserstr. 13-15, Butzbach, O 35510 (49-6033-85-0; FAX: 49-6033-85-249; e-mail: info@sms-vt.com; web site: www.sms-vt.com)

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**CALORIS ENGINEERING**, 8649 Commerce Drive, Easton, MD 21601 (410-822-6900; FAX: 410-822-9006; e-mail: info@caloris.com; web site: www.caloris.com)

Chematur EcoPlanning OY, Pori, FIN  
 Dipesh Engineering Works, Mumbai, IND  
**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

— See our ad on page 15  
 GEA PHE Systems, York, PA  
 GIG Karasek GmbH, Gloggnitz-Stuppach

**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)

— See our ad on page 35

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## Evaporators, flash

Advanced Industrial Technology Corp., Paramus, NJ  
**CALORIS ENGINEERING**, 8649 Commerce Drive, Easton, MD 21601 (410-822-6900; FAX: 410-822-9006; e-mail: info@caloris.com; web site: www.caloris.com)

Chematur EcoPlanning OY, Pori, FIN  
**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

— See our ad on page 15  
**KOERTING HANNOVER AG**, Badenstedter Str. 56, 30453 Hannover, Germany (+49 511 2129-0, e-mail: st@koerting.de, web site: www.koerting.de)

— See our ad on page 117  
**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)

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## Evaporators, forced circulation

**ALAUQA, INC.**, 7004 JFK BOULEVARD EAST, SUITE 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alaquainc.com)

**BUSS-SMS-CANZLER GMBH**, Kaiserstr. 13-15, Butzbach, O 35510 (49-6033-85-0; FAX: 49-6033-85-249; e-mail: info@sms-vt.com; web site: www.sms-vt.com)

— See our ad on page 52  
**CG Thermal LLC**, Twinsburg, Ohio  
**CALORIS ENGINEERING**, 8649 Commerce Drive, Easton, MD 21601 (410-822-6900; FAX: 410-822-9006; e-mail: info@caloris.com; web site: www.caloris.com)

Chematur EcoPlanning OY, Pori, FIN  
 Dedert Corporation, Homewood, Illinois  
 Dipesh Engineering Works, Mumbai, IND  
**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

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GIG Karasek GmbH, Gloggnitz-Stuppach

## Evaporators, horizontal tube

**ALAUQA, INC.**, 7004 JFK BOULEVARD EAST, SUITE 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: [alauqa@mindspring.com](mailto:alauqa@mindspring.com); web site: [www.alaquainc.com](http://www.alaquainc.com))

**CALORIS ENGINEERING**, 8649 Commerce Drive, Easton, MD 21601 (410-822-6900; FAX: 410-822-9006; e-mail: [info@caloris.com](mailto:info@caloris.com); web site: [www.caloris.com](http://www.caloris.com))

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: [sales.northamerica@gea.com](mailto:sales.northamerica@gea.com); web site: [www.gea.com](http://www.gea.com))  
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LIST AG, Arisdorf

## Evaporators, low temperature

**ALAUQA, INC.**, 7004 JFK BOULEVARD EAST, SUITE 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: [alauqa@mindspring.com](mailto:alauqa@mindspring.com); web site: [www.alaquainc.com](http://www.alaquainc.com))

**CALORIS ENGINEERING**, 8649 Commerce Drive, Easton, MD 21601 (410-822-6900; FAX: 410-822-9006; e-mail: [info@caloris.com](mailto:info@caloris.com); web site: [www.caloris.com](http://www.caloris.com))

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: [sales.northamerica@gea.com](mailto:sales.northamerica@gea.com); web site: [www.gea.com](http://www.gea.com))  
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**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: [info@popeinc.com](mailto:info@popeinc.com); web site: [www.popeinc.com](http://www.popeinc.com))  
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## Evaporators, plate type

**ALAUQA, INC.**, 7004 JFK BOULEVARD EAST, SUITE 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: [alauqa@mindspring.com](mailto:alauqa@mindspring.com); web site: [www.alaquainc.com](http://www.alaquainc.com))

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: [sales.northamerica@gea.com](mailto:sales.northamerica@gea.com); web site: [www.gea.com](http://www.gea.com))  
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GEA PHE Systems, York, PA

## Evaporators, short path

**ALAUQA, INC.**, 7004 JFK BOULEVARD EAST, SUITE 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: [alauqa@mindspring.com](mailto:alauqa@mindspring.com); web site: [www.alaquainc.com](http://www.alaquainc.com))

**BUSS-SMS-CANZLER GMBH**, Kaiserstr. 13-15, Butzbach, O 35510 (49-6033-85-0; FAX: 49-6033-85-249; e-mail: [info@sms-vt.com](mailto:info@sms-vt.com); web site: [www.sms-vt.com](http://www.sms-vt.com))  
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GIG Karasek GmbH, Gloggnitz-Stuppach

**JLS International, Inc.**, Charlotte, NC  
**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: [info@popeinc.com](mailto:info@popeinc.com); web site: [www.popeinc.com](http://www.popeinc.com))  
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## Evaporators, thin film

**ALAUQA, INC.**, 7004 JFK BOULEVARD EAST, SUITE 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: [alauqa@mindspring.com](mailto:alauqa@mindspring.com); web site: [www.alaquainc.com](http://www.alaquainc.com))

**BUSS-SMS-CANZLER GMBH**, Kaiserstr. 13-15, Butzbach, O 35510 (49-6033-85-0; FAX: 49-6033-85-249; e-mail: [info@sms-vt.com](mailto:info@sms-vt.com); web site: [www.sms-vt.com](http://www.sms-vt.com))  
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CTP Corp., Northport, NY

**CALORIS ENGINEERING**, 8649 Commerce Drive, Easton, MD 21601 (410-822-6900; FAX: 410-822-9006; e-mail: [info@caloris.com](mailto:info@caloris.com); web site: [www.caloris.com](http://www.caloris.com))

GIG Karasek GmbH, Gloggnitz-Stuppach

**JLS International, Inc.**, Charlotte, NC  
**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: [info@popeinc.com](mailto:info@popeinc.com); web site: [www.popeinc.com](http://www.popeinc.com))  
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## Evaporators, vertical long tube

**ALAUQA, INC.**, 7004 JFK BOULEVARD EAST, SUITE 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: [alauqa@mindspring.com](mailto:alauqa@mindspring.com); web site: [www.alaquainc.com](http://www.alaquainc.com))

**CALORIS ENGINEERING**, 8649 Commerce Drive, Easton, MD 21601 (410-822-6900; FAX: 410-822-9006; e-mail: [info@caloris.com](mailto:info@caloris.com); web site: [www.caloris.com](http://www.caloris.com))

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: [sales.northamerica@gea.com](mailto:sales.northamerica@gea.com); web site: [www.gea.com](http://www.gea.com))  
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## Evaporators, vertical short tube (calandria)

**ALAUQA, INC.**, 7004 JFK BOULEVARD EAST, SUITE 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: [alauqa@mindspring.com](mailto:alauqa@mindspring.com); web site: [www.alaquainc.com](http://www.alaquainc.com))

**CALORIS ENGINEERING**, 8649 Commerce Drive, Easton, MD 21601 (410-822-6900; FAX: 410-822-9006; e-mail: [info@caloris.com](mailto:info@caloris.com); web site: [www.caloris.com](http://www.caloris.com))

## Evaporators, waste water

**ALAUQA, INC.**, 7004 JFK BOULEVARD EAST, SUITE 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: [alauqa@mindspring.com](mailto:alauqa@mindspring.com); web site: [www.alaquainc.com](http://www.alaquainc.com))

**BUSS-SMS-CANZLER GMBH**, Kaiserstr. 13-15, Butzbach, O 35510 (49-6033-85-0; FAX: 49-6033-85-249; e-mail: [info@sms-vt.com](mailto:info@sms-vt.com); web site: [www.sms-vt.com](http://www.sms-vt.com))  
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GEA France, FRA

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: [sales.northamerica@gea.com](mailto:sales.northamerica@gea.com); web site: [www.gea.com](http://www.gea.com))  
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GIG Karasek GmbH, Gloggnitz-Stuppach

## Evaporators, wiped film

**ALAUQA, INC.**, 7004 JFK BOULEVARD EAST, SUITE 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: [alauqa@mindspring.com](mailto:alauqa@mindspring.com); web site: [www.alaquainc.com](http://www.alaquainc.com))

**BUSS-SMS-CANZLER GMBH**, Kaiserstr. 13-15, Butzbach, O 35510 (49-6033-85-0; FAX: 49-6033-85-249; e-mail: [info@sms-vt.com](mailto:info@sms-vt.com); web site: [www.sms-vt.com](http://www.sms-vt.com))  
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GIG Karasek GmbH, Gloggnitz-Stuppach

**JLS International, Inc.**, Charlotte, NC  
**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: [info@popeinc.com](mailto:info@popeinc.com); web site: [www.popeinc.com](http://www.popeinc.com))  
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## FILTER MEDIA & AIDS

### Felt, filter

**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: [info@komline.com](mailto:info@komline.com); web site: [www.komline.com](http://www.komline.com))  
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### Filter aids, activated carbon

Jacobi Carbons, Inc., Columbus, OH

### Filter aids, diatomaceous earth

Argonide Corporation, Sanford, FL

### Filter aids, zeolite

**BASF Corporation**, Catalysts & Adsorbents, Iselin, NJ  
— See our ad on page 13

### Filter bags, natural fiber

American Fabric Filter Co., Wesley Chapel, FL

### Filter bags, synthetic fiber

American Fabric Filter Co., Wesley Chapel, FL  
Sefar Inc., Buffalo, NY

### Filter cloth, acidproof

**CECO Filters**, a CECO Environmental Company, Telford, PA  
**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: [info@komline.com](mailto:info@komline.com); web site: [www.komline.com](http://www.komline.com))  
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### Filter cloth, alkaliproof

**CECO Filters**, a CECO Environmental Company, Telford, PA  
**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: [info@komline.com](mailto:info@komline.com); web site: [www.komline.com](http://www.komline.com))  
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### Filter cloth, cotton

**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: [info@komline.com](mailto:info@komline.com); web site: [www.komline.com](http://www.komline.com))  
— See our ad on page 148

## Filter cloth, glass

**CECO Filters**, a CECO Environmental Company, Telford, PA

## Filter cloth, metallic

**HAYER & BOECKER**, Wire Weaving, Oelde, Germany  
**MM Industries, Inc.**, Vorti-Siv, Salem, OH  
**Tema Systems, Inc.**, Cincinnati, OH

## Filter cloth, natural fiber

**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: [info@komline.com](mailto:info@komline.com); web site: [www.komline.com](http://www.komline.com))  
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## Filter cloth, synthetic fiber

**CECO Filters**, a CECO Environmental Company, Telford, PA  
**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: [info@komline.com](mailto:info@komline.com); web site: [www.komline.com](http://www.komline.com))  
— See our ad on page 148

**MM Industries, Inc.**, Vorti-Siv, Salem, OH

**Sefar Inc.**, Buffalo, NY

## Filter media, other

**Applied Porous Technologies, Inc.**, Tariffville, CT  
**CECO Filters**, a CECO Environmental Company, Telford, PA  
**Hilliard Corp.**, Elmira, NY

**KDF Fluid Treatment, Inc.**, Three Rivers, MI

**KIMRE, INC.**, 744 SW 1st Street, Homestead, FL 33030 (305 233-4249; FAX: 305 233-8687; e-mail: [sales@kimre.com](mailto:sales@kimre.com); web site: [www.kimre.com](http://www.kimre.com))

**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: [info@komline.com](mailto:info@komline.com); web site: [www.komline.com](http://www.komline.com))  
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**Mefiag**, a CECO Environmental Company, Owosso, MI

**Meissner Filtration Products**, Camarillo, CA

**Mott Corporation**, Farmington, CT

**Sefar Inc.**, Buffalo, NY

**ts-systemfilter gmbh**, Ahorn-Berolzeim

## Pads, filter

**CECO Filters**, a CECO Environmental Company, Telford, PA

## Paper, filter

**Mefiag**, a CECO Environmental Company, Owosso, MI

## Plates, filter

**HAYER & BOECKER**, Wire Weaving, Oelde, Germany

## Tubes, filter

**Mott Corporation**, Farmington, CT

**Sefar Inc.**, Buffalo, NY

**ts-systemfilter gmbh**, Ahorn-Berolzeim

## FILTRATION EQUIPMENT

### Biofilters

**Ambient Engineering Inc.**, Rocky Hill, NJ  
**HEE-DUALL**, a CECO ENVIRONMENTAL COMPANY, Owosso, MI  
**Hepa Corporation**, Anaheim, CA

### Dewatering, mechanical press

**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: [info@komline.com](mailto:info@komline.com); web site: [www.komline.com](http://www.komline.com))  
— See our ad on page 148

**Metso Minerals Industries, Inc.**, York, PA

### Filter housings

**Argonide Corporation**, Sanford, FL  
**Enerquip, LLC**, Medford, WI  
**Filtera-Systems Co.**, Farmington Hills, MI  
**Freudenberg Filtration Technologies SE & Co. KG**, Weinheim, Germany

**HAYWARD FLOW CONTROL**, One Hayward Industrial Drive, Clemmons, NC 27012 (888-429-4635 USA/Canada; 888-429-4635; FAX: 888-778-8410; e-mail: [hflow@hayward.com](mailto:hflow@hayward.com); web site: [www.haywardflow-control.com](http://www.haywardflow-control.com))

**JLS International, Inc.**, Charlotte, NC  
**Keystone Filter**, a CECO Environmental Company, Telford, PA

**Liquid Process Systems, inc.**, INdian Trail, NC

**Meissner Filtration Products**, Camarillo, CA

**SPX Flow Technology**, Ocala, FL

**ts-systemfilter gmbh**, Ahorn-Berolzeim

### Filter parts & accessories

**American Fabric Filter Co.**, Wesley Chapel, FL



CECO Filters, a CECO Environmental Company, Telford, PA  
Hilliard Corp., Elmira, NY

Industrial Magnetics, Inc., Boyne City, MI  
Keystone Filter, a CECO Environmental Company, Telford, PA

**KOMLINE-SANDERSON ENGINEERING CORP., 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: info@komline.com; web site: www.komline.com)**  
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LA-MAN Corp., Mazeppa, MN  
Liquid Filtration Specialist, LLC, TX  
Mefiag, a CECO Environmental Company, Owosso, MI  
**ORIVAL WATER FILTERS, 213 S Van Brunt St., Englewood, NJ 07631-9902 (800-567-9767; 201-568-3311; FAX: 201-568-1916; e-mail: filters@orival.com; web site: www.orival.com)**  
SPX Flow Technology, Ocala, FL

## Filter presses

Filtra-Systems Co., Farmington Hills, MI  
**KOMLINE-SANDERSON ENGINEERING CORP., 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: info@komline.com; web site: www.komline.com)**  
— See our ad on page 148

## Filters, HEPA

Eureka Dry Tech Desiccator Cabinets, Export, Taipei, TWN  
Freudenberg Filtration Technologies SE & Co. KG, Weinheim, Germany

**HEMCO CORPORATION, 711 South Powell Road, Independence, MO 64056 (800-779-4362; 816-796-2900; FAX: 816-796-3333; e-mail: info@hemcocorp.com; web site: www.HEMCOcorp.com)**

Hepa Corporation, Anaheim, CA  
Keystone Filter, a CECO Environmental Company, Telford, PA

Porvair Filtration Group Inc, Ashland, VA  
ts-systemfilter gmbh, Ahorn-Berolzeim

## Filters, activated carbon

Argonide Corporation, Sanford, FL  
Dipesh Engineering Works, Mumbai, IND  
Faudi GmbH, Stadthalendorf  
Keystone Filter, a CECO Environmental Company, Telford, PA  
SPX Flow Technology, Ocala, FL  
Sharpex Filters (I) Pvt. Ltd., Sales, NaviMumbai  
United Manufacturing International 2000 Activated Carbon, Red Bluff, CA

## Filters, air

CECO Filters, a CECO Environmental Company, Telford, PA  
Flex-Kleen, a CECO Environmental Company, Glendale Heights, IL

Freudenberg Filtration Technologies SE & Co. KG, Weinheim, Germany  
Hepa Corporation, Anaheim, CA  
Keystone Filter, a CECO Environmental Company, Telford, PA  
**KIMRE, INC., 744 SW 1st Street, Homestead, FL 33030 (305 233-4249; FAX: 305 233-8687; e-mail: sales@kimre.com; web site: www.kimre.com)**

LA-MAN Corp., Mazeppa, MN  
Lectrodryer, Richmond, KY  
Meissner Filtration Products, Camarillo, CA  
Pneumatech, Inc., Rock Hill, SC  
SPX Flow Technology, Ocala, FL  
Staplex Co., Air Sampler Div., Brooklyn, NY  
ts-systemfilter gmbh, Ahorn-Berolzeim

## Filters, bag

AIRLANCO, Falls City, NE  
Filtra-Systems Co., Farmington Hills, MI  
Filtration & Membrane Technology, Inc., Houston, TX  
Flex-Kleen, a CECO Environmental Company, Glendale Heights, IL

**HAYWARD FLOW CONTROL, One Hayward Industrial Drive, Clemmons, NC 27012 (888-429-4635 USA/Canada; 888-429-4635; FAX: 888-778-8410; e-mail: hflow@hayward.com; web site: www.haywardflow-control.com)**

Hilliard Corp., Elmira, NY  
Keystone Filter, a CECO Environmental Company, Telford, PA

Sharpex Filters (I) Pvt. Ltd., Sales, Navi, Mumbai

## Filters, belt

BHS-Sonthofen GmbH, Sonthofen, Deutschland  
BHS-Sonthofen Inc., Charlotte, NC  
Faudi GmbH, Stadthalendorf  
HAVER & BOECKER, Wire Weaving, Oelde, Germany  
**KOMLINE-SANDERSON ENGINEERING CORP., 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: info@komline.com; web site: www.komline.com)**  
— See our ad on page 148  
Outotec (USA), Inc., Jussup, MD

## Filters, cartridge

AIRLANCO, Falls City, NE  
Applied Porous Technologies, Inc., Tariffville, CT  
Argonide Corporation, Sanford, FL  
Bunting Magnetics Co., Newton, KS  
Faudi GmbH, Stadthalendorf  
Filtra-Systems Co., Farmington Hills, MI  
Filtration & Membrane Technology, Inc., Houston, TX  
Flex-Kleen, a CECO Environmental Company, Glendale Heights, IL

HAVER & BOECKER, Wire Weaving, Oelde, Germany  
**HAYWARD FLOW CONTROL, One Hayward Industrial Drive, Clemmons, NC 27012 (888-429-4635 USA/Canada; 888-429-4635; FAX: 888-778-8410; e-mail: hflow@hayward.com; web site: www.haywardflowcontrol.com)**

Hilliard Corp., Elmira, NY  
Keystone Filter, a CECO Environmental Company, Telford, PA

Liquid Process Systems, inc., Indian Trail, NC  
Mefiag, a CECO Environmental Company, Owosso, MI  
Meissner Filtration Products, Camarillo, CA  
Mott Corporation, Farmington, CT

**MULTITHERM LLC, 11 General Warren Blvd., Malvern, PA 19355 (1-800-225-7440; FAX: 610-408-8365; e-mail: techinfo@multitherm.com; web site: www.multitherm.com)**

Porvair Filtration Group Inc, Ashland, VA  
SPX Flow Technology, Ocala, FL  
**SCHENCK PROCESS, 7901 NW 107th Terrace, Kansas City, MO 64153 (888-657-3094; FAX: 816-891-8336; e-mail: mktg@schenckprocess.com; web site: www.macprocessinc.com)**

Sharpex Filters (I) Pvt. Ltd., Sales, NaviMumbai  
United Filtration Systems, Inc, Sterling Heights, MI  
ts-systemfilter gmbh, Ahorn-Berolzeim

## Filters, centrifugal

HAVER & BOECKER, Wire Weaving, Oelde, Germany  
KINESPIN, Division of Kinefac Corporation, Worcester, MA  
Sharpex Filters (I) Pvt. Ltd., Sales, NaviMumbai  
Tema Systems, Inc., Cincinnati, OH

## Filters, clarifying

Ameridia, Div. of Eurodia Industries, Somerset, NJ  
BHS-Sonthofen GmbH, Sonthofen, Deutschland  
BHS-Sonthofen Inc., Charlotte, NC  
**KOMLINE-SANDERSON ENGINEERING CORP., 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: info@komline.com; web site: www.komline.com)**  
— See our ad on page 148

Meissner Filtration Products, Camarillo, CA

## Filters, crossflow

**ANDRITZ KMPT GmbH, 85256 Vierkirchen, Germany**  
Ameridia, Div. of Eurodia Industries, Somerset, NJ  
Applied Porous Technologies, Inc., Tariffville, CT  
HAVER & BOECKER, Wire Weaving, Oelde, Germany  
HydroTec Systems Co., Inc., Tiskliwa, IL  
**KIMRE, INC., 744 SW 1st Street, Homestead, FL 33030 (305 233-4249; FAX: 305 233-8687; e-mail: sales@kimre.com; web site: www.kimre.com)**  
**MICRODYN-NADIR GMBH, Kasteler Str. 45, Wiesbaden, Germany D-65203 (+49 (0)611-962-6001; FAX: +49 (0)611-962-9237; e-mail: info@microdyn-nadir.de; web site: www.microdyn-nadir.de)**

Microdyn Technologies, Inc., Raleigh, NC  
Mott Corporation, Farmington, CT  
Porvair Filtration Group Inc, Ashland, VA

## Filters, disc, pressure

HAVER & BOECKER, Wire Weaving, Oelde, Germany  
Mefiag, a CECO Environmental Company, Owosso, MI  
Westech Engineering Inc., Salt Lake City, UT

## Filters, disc, vacuum

**ANDRITZ KMPT GmbH, 85256 Vierkirchen, Germany**  
Outotec (USA), Inc., Jussup, MD  
Westech Engineering Inc., Salt Lake City, UT

## Filters, drum, rotary pressure continuous

**ANDRITZ KMPT GmbH, 85256 Vierkirchen, Germany**  
BHS-Sonthofen GmbH, Sonthofen, Deutschland  
BHS-Sonthofen Inc., Charlotte, NC  
CTP Corp., Northport, NY

## Filters, drum, rotary vacuum continuous

**ANDRITZ KMPT GmbH, 85256 Vierkirchen, Germany**  
**KOMLINE-SANDERSON ENGINEERING CORP., 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: info@komline.com; web site: www.komline.com)**  
— See our ad on page 148  
Sharpex Filters (I) Pvt. Ltd., Sales, NaviMumbai

## Filters, gas

CECO Filters, a CECO Environmental Company, Telford, PA  
Faudi GmbH, Stadthalendorf  
Freudenberg Filtration Technologies SE & Co. KG, Weinheim, Germany  
HAVER & BOECKER, Wire Weaving, Oelde, Germany  
**KIMRE, INC., 744 SW 1st Street, Homestead, FL 33030 (305 233-4249; FAX: 305 233-8687; e-mail: sales@kimre.com; web site: www.kimre.com)**  
Lectrodryer, Richmond, KY  
Mott Corporation, Farmington, CT  
Porvair Filtration Group Inc, Ashland, VA  
SPX Flow Technology, Ocala, FL  
United Filtration Systems, Inc, Sterling Heights, MI

## Filters, horizontal belt, vacuum

BHS-Sonthofen GmbH, Sonthofen, Deutschland  
BHS-Sonthofen Inc., Charlotte, NC  
**KOMLINE-SANDERSON ENGINEERING CORP., 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: info@komline.com; web site: www.komline.com)**  
— See our ad on page 148  
Outotec (USA), Inc., Jussup, MD  
Westech Engineering Inc., Salt Lake City, UT

## Filters, jacketed

MM Industries, Inc., Vorti-Siv, Salem, OH  
SULPHURNET, Culemborg, NLD  
**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK MATERIALS TECHNOLOGY DEUTSCHLAND GMBH, Sallerstr. 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: info.spds@sandvik.com; web site: www.process-systems.sandvik.com)**  
— See our ad on page 53

## Filters, leaf, horizontal, pressure

BHS-Sonthofen GmbH, Sonthofen, Deutschland  
BHS-Sonthofen Inc., Charlotte, NC  
SULPHURNET, Culemborg, NLD  
Sharpex Filters (I) Pvt. Ltd., Sales, NaviMumbai

## Filters, leaf, vacuum

Sharpex Filters (I) Pvt. Ltd., Sales, NaviMumbai

## Filters, leaf, vertical, pressure

SULPHURNET, Culemborg, NLD  
Sharpex Filters (I) Pvt. Ltd., Sales, NaviMumbai

## Filters, membrane

**ANDRITZ KMPT GmbH, 85256 Vierkirchen, Germany**  
**CALORIS ENGINEERING, 8649 Commerce Drive, Easton, MD 21601 (410-822-6900; FAX: 410-822-9006; e-mail: info@caloris.com; web site: www.caloris.com)**

Filtration & Membrane Technology, Inc., Houston, TX  
GEA Engineering, P.C., Nanuet, NY  
**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 (800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)**  
— See our ad on page 15

Hepa Corporation, Anaheim, CA  
HydroTec Systems Co., Inc., Tiskliwa, IL  
**MICRODYN-NADIR GMBH, Kasteler Str. 45, Wiesbaden, Germany D-65203 (+49 (0)611-962-6001; FAX: +49 (0)611-962-9237; e-mail: info@microdyn-nadir.de; web site: www.microdyn-nadir.de)**

Meissner Filtration Products, Camarillo, CA  
Microdyn Technologies, Inc., Raleigh, NC  
Porvair Filtration Group Inc, Ashland, VA  
United Filtration Systems, Inc, Sterling Heights, MI

## Filters, microfiltration

Ameridia, Div. of Eurodia Industries, Somerset, NJ  
Argonide Corporation, Sanford, FL  
Filtration & Membrane Technology, Inc., Houston, TX  
GEA Engineering, P.C., Nanuet, NY  
**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 (800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)**  
— See our ad on page 15

Hepa Corporation, Anaheim, CA  
**MICRODYN-NADIR GMBH, Kasteler Str. 45, Wiesbaden, Germany D-65203 (+49 (0)611-962-6001; FAX: +49 (0)611-962-9237; e-mail: info@microdyn-nadir.de; web site: www.microdyn-nadir.de)**

Meissner Filtration Products, Camarillo, CA  
Microdyn Technologies, Inc., Raleigh, NC  
Mott Corporation, Farmington, CT  
**ORIVAL WATER FILTERS, 213 S Van Brunt St., Englewood, NJ 07631-9902 (800-567-9767; 201-568-3311; FAX: 201-568-1916; e-mail: filters@orival.com; web site: www.orival.com)**

Porvair Filtration Group Inc, Ashland, VA  
United Filtration Systems, Inc, Sterling Heights, MI

## Filters, nanofiltration

Ameridia, Div. of Eurodia Industries, Somerset, NJ

Argonide Corporation, Sanford, FL  
GEA Engineering, P.C., Nanuet, NY  
**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045**  
(800) 722-6622; e-mail: [sales.northamerica@gea.com](mailto:sales.northamerica@gea.com);  
web site: [www.gea.com](http://www.gea.com)  
— See our ad on page 15

Keystone Filter, a CECO Environmental Company, Telford, PA  
**MICRODYN-NADIR GMBH, Kasteler Str. 45, Wiesbaden, Germany D-65203 (+49) (0)611-962-6001; FAX: +49 (0)611-962-9237; e-mail: [info@microdyn-nadir.de](mailto:info@microdyn-nadir.de); web site: [www.microdyn-nadir.de](http://www.microdyn-nadir.de)**

Microdyn Technologies, Inc., Raleigh, NC  
beroplan GmbH Membran- und Prozesstechnik, St. Ingbert

## Filters, nutsche

Buchi Pilot Plant & Reactor systems, Headquarter, Uster, New York, CHE

De Dietrich Process Systems GmbH, Mainz  
Dipesh Engineering Works, Mumbai, IND  
HAVER & BOECKER, Wire Weaving, Oelde, Germany  
**JAYGO, INCORPORATED, 7 Emery Ave., Randolph, NJ 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: [sales@jaygoinc.com](mailto:sales@jaygoinc.com); web site: [www.jaygoinc.com](http://www.jaygoinc.com))**

PSL USA, Boise, ID  
**POPE SCIENTIFIC, INC., P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: [info@popeinc.com](mailto:info@popeinc.com); web site: [www.popeinc.com](http://www.popeinc.com))**  
— See our ad on page 35

Powder Systems Ltd, Liverpool  
SULPHURNET, Culemborg, NLD  
Sharpex Filters (I) Pvt. Ltd., Sales, NaviMumbai

## Filters, oil removal

Filtera-Systems Co., Farmington Hills, MI  
Filtration & Membrane Technology, Inc., Houston, TX  
Mefiag, a CECO Environmental Company, Owosso, MI  
SPX Flow Technology, Ocala, FL

## Filters, other

BHS-Sonhofen GmbH, Sonhofen, Deutschland  
BHS-Sonhofen Inc., Charlotte, NC  
HAVER & BOECKER, Wire Weaving, Oelde, Germany  
**KIMRE, INC., 744 SW 1st Street, Homestead, FL 33033 (305) 233-4249; FAX: 305 233-8687; e-mail: [sales@kimre.com](mailto:sales@kimre.com); web site: [www.kimre.com](http://www.kimre.com)**

LA-MAN Corp., Mapezza, MN  
Mefiag, a CECO Environmental Company, Owosso, MI  
SPX Flow Technology, Ocala, FL  
Sahyadri Engineering Corporation, IND

## Filters, pipeline

Hilliard Corp., Elmira, NY  
Lectrodryer, Richmond, KY  
**ORIVAL WATER FILTERS, 213 S Van Brunt St., Englewood, NJ 07631-9902 (800-567-9767; 201-568-3311; FAX: 201-568-1916; e-mail: [filters@orival.com](mailto:filters@orival.com); web site: [www.orival.com](http://www.orival.com))**  
SPX Flow Technology, Ocala, FL  
Tengs Valve International Limited, Wenzhou, CHN

## Filters, plate & frame

Denver Mineral Engineers, Inc., Littleton, CO  
Hilliard Corp., Elmira, NY

## Filters, polymer

Maag Pump Systems AG, Oberrglatt / ZH, CHE  
Meissner Filtration Products, Camarillo, CA

## Filters, porous metal

Applied Porous Technologies, Inc., Tariffville, CT  
**JAYGO, INCORPORATED, 7 Emery Ave., Randolph, NJ 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: [sales@jaygoinc.com](mailto:sales@jaygoinc.com); web site: [www.jaygoinc.com](http://www.jaygoinc.com))**  
Mott Corporation, Farmington, CT  
Porvair Filtration Group Inc, Ashland, VA

## Filters, portable

Hilliard Corp., Elmira, NY  
MM Industries, Inc., Vorti-Siv, Salem, OH

## Filters, precoat

BHS-Sonhofen GmbH, Sonhofen, Deutschland  
BHS-Sonhofen Inc., Charlotte, NC  
**KOMLINE-SANDERSON ENGINEERING CORP., 12 Holland Ave., Peapack, NJ 07977 (800-225-5457; North American; 908-234-1000; FAX: 908-234-9487; e-mail: [info@komline.com](mailto:info@komline.com); web site: [www.komline.com](http://www.komline.com))**  
— See our ad on page 148

Mefiag, a CECO Environmental Company, Owosso, MI  
Mott Corporation, Farmington, CT  
SULPHURNET, Culemborg, NLD  
Sharpex Filters (I) Pvt. Ltd., Sales, Navi, Mumbai

## Filters, pressure

**ANDRITZ KMPT GmbH, 85256 Vierkirchen, Germany**  
BHS-Sonhofen GmbH, Sonhofen, Deutschland  
BHS-Sonhofen Inc., Charlotte, NC  
Dipesh Engineering Works, Mumbai, IND  
Faudi GmbH, Stadthalendorf  
Hilliard Corp., Elmira, NY  
HydroTec Systems Co., Inc., Tiskilwa, IL  
MM Industries, Inc., Vorti-Siv, Salem, OH  
Outotec (USA), Inc., Jussup, MD  
PSL USA, Boise, ID  
Powder Systems Ltd, Liverpool  
United Filtration Systems, Inc, Sterling Heights, MI

## Filters, refrigerated

LA-MAN Corp., Mapezza, MN

## Filters, sand

Dipesh Engineering Works, Mumbai, IND  
HAVER & BOECKER, Wire Weaving, Oelde, Germany  
**HAYWARD FLOW CONTROL, One Hayward Industrial Drive, Clemmons, NC 27012 (888-429-4635 USA/Canada; 888-429-4635; FAX: 888-778-8410; e-mail: [hflow@hayward.com](mailto:hflow@hayward.com); web site: [www.haywardflow-control.com](http://www.haywardflow-control.com))**

**ORIVAL WATER FILTERS, 213 S Van Brunt St., Englewood, NJ 07631-9902 (800-567-9767; 201-568-3311; FAX: 201-568-1916; e-mail: [filters@orival.com](mailto:filters@orival.com); web site: [www.orival.com](http://www.orival.com))**

Pollution Control Systems, Inc., Milford, OH  
United Manufacturing International 2000 Activated Carbon, Red Bluff, CA  
Westech Engineering Inc., Salt Lake City, UT

## Filters, self-cleaning

BHS-Sonhofen GmbH, Sonhofen, Deutschland  
BHS-Sonhofen Inc., Charlotte, NC  
Faudi GmbH, Stadthalendorf  
Forsta Filters Inc., Burbank, CA  
MM Industries, Inc., Vorti-Siv, Salem, OH  
**ORIVAL WATER FILTERS, 213 S Van Brunt St., Englewood, NJ 07631-9902 (800-567-9767; 201-568-3311; FAX: 201-568-1916; e-mail: [filters@orival.com](mailto:filters@orival.com); web site: [www.orival.com](http://www.orival.com))**  
Porvair Filtration Group Inc, Ashland, VA  
Sharpex Filters (I) Pvt. Ltd., Sales, NaviMumbai

## Filters, tray

Outotec (USA), Inc., Jussup, MD

## Filters, tubular

Applied Porous Technologies, Inc., Tariffville, CT  
Faudi GmbH, Stadthalendorf  
Mott Corporation, Farmington, CT

## Filters, ultrafiltration

Ameridia, Div. of Erodia Industries, Somerset, NJ  
Argonide Corporation, Sanford, FL  
GEA Engineering, P.C., Nanuet, NY  
**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 (800) 722-6622; e-mail: [sales.northamerica@gea.com](mailto:sales.northamerica@gea.com); web site: [www.gea.com](http://www.gea.com))**  
— See our ad on page 15

HAVER & BOECKER, Wire Weaving, Oelde, Germany  
**MICRODYN-NADIR GMBH, Kasteler Str. 45, Wiesbaden, Germany D-65203 (+49) (0)611-962-6001; FAX: +49 (0)611-962-9237; e-mail: [info@microdyn-nadir.de](mailto:info@microdyn-nadir.de); web site: [www.microdyn-nadir.de](http://www.microdyn-nadir.de)**

Microdyn Technologies, Inc., Raleigh, NC  
SPX Flow Technology, Ocala, FL

## Filters, vibrating

MM Industries, Inc., Vorti-Siv, Salem, OH

## Filters, water

Argonide Corporation, Sanford, FL  
Entex Technologies Inc, Chapel Hill, NC  
Evoqua Water Technologies, Warendale, PA  
Faudi GmbH, Stadthalendorf  
Filtera-Systems Co., Farmington Hills, MI  
Filtration & Membrane Technology, Inc., Houston, TX  
Keystone Filter, a CECO Environmental Company, Telford, PA

**MICRODYN-NADIR GMBH, Kasteler Str. 45, Wiesbaden, Germany D-65203 (+49) (0)611-962-6001; FAX: +49 (0)611-962-9237; e-mail: [info@microdyn-nadir.de](mailto:info@microdyn-nadir.de); web site: [www.microdyn-nadir.de](http://www.microdyn-nadir.de)**

Microdyn Technologies, Inc., Raleigh, NC  
**ORIVAL WATER FILTERS, 213 S Van Brunt St., Englewood, NJ 07631-9902 (800-567-9767; 201-568-3311; FAX: 201-568-1916; e-mail: [filters@orival.com](mailto:filters@orival.com); web site: [www.orival.com](http://www.orival.com))**

## Filter systems

Argonide Corporation, Sanford, FL  
BHS-Sonhofen GmbH, Sonhofen, Deutschland  
BHS-Sonhofen Inc., Charlotte, NC  
CECO Filters, a CECO Environmental Company, Telford, PA

CTP Corp., Northport, NY  
Coperion GmbH, Weingarten, Wuertt., O  
Filtera-Systems Co., Farmington Hills, MI  
**HAYWARD FLOW CONTROL, One Hayward Industrial Drive, Clemmons, NC 27012 (888-429-4635 USA/Canada; 888-429-4635; FAX: 888-778-8410; e-mail: [hflow@hayward.com](mailto:hflow@hayward.com); web site: [www.haywardflowcontrol.com](http://www.haywardflowcontrol.com))**

Hepa Corporation, Anaheim, CA  
Hilliard Corp., Elmira, NY  
HydroTec Systems Co., Inc., Tiskilwa, IL  
Keystone Filter, a CECO Environmental Company, Telford, PA

**KIMRE, INC., 744 SW 1st Street, Homestead, FL 33033 (305) 233-4249; FAX: 305 233-8687; e-mail: [sales@kimre.com](mailto:sales@kimre.com); web site: [www.kimre.com](http://www.kimre.com))**

**KOMLINE-SANDERSON ENGINEERING CORP., 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: [info@komline.com](mailto:info@komline.com); web site: [www.komline.com](http://www.komline.com))**  
— See our ad on page 148

Liquid Process Systems, Inc., Indian Trail, NC  
**MICRODYN-NADIR GMBH, Kasteler Str. 45, Wiesbaden, Germany D-65203 (+49) (0)611-962-6001; FAX: +49 (0)611-962-9237; e-mail: [info@microdyn-nadir.de](mailto:info@microdyn-nadir.de); web site: [www.microdyn-nadir.de](http://www.microdyn-nadir.de)**

MM Industries, Inc., Vorti-Siv, Salem, OH  
Maag Pump Systems AG, Oberrglatt / ZH, CHE  
Magnetic Products, Inc., Highland, MI  
Mefiag, a CECO Environmental Company, Owosso, MI  
Meissner Filtration Products, Camarillo, CA  
Microdyn Technologies, Inc., Raleigh, NC  
Mott Corporation, Farmington, CT

**MULTITHERM LLC, 11 General Warren Blvd., Malvern, PA 19355 (1-800-225-7440; FAX: 610-408-8365; e-mail: [techinfo@multitherm.com](mailto:techinfo@multitherm.com); web site: [www.multitherm.com](http://www.multitherm.com))**

**ORIVAL WATER FILTERS, 213 S Van Brunt St., Englewood, NJ 07631-9902 (800-567-9767; 201-568-3311; FAX: 201-568-1916; e-mail: [filters@orival.com](mailto:filters@orival.com); web site: [www.orival.com](http://www.orival.com))**

Outotec (USA), Inc., Jussup, MD  
Porvair Filtration Group Inc, Ashland, VA  
SPX Flow Technology, Ocala, FL  
Separation Technologists, Inc., Salem, NH  
ts-systemfilter gmbh, Ahorn-Berolzeim

## Microfiltration equipment

Eureka Dry Tech Desiccator Cabinets, Export, Taipei, TWN  
Filtration & Membrane Technology, Inc., Houston, TX  
**MICRODYN-NADIR GMBH, Kasteler Str. 45, Wiesbaden, Germany D-65203 (+49) (0)611-962-6001; FAX: +49 (0)611-962-9237; e-mail: [info@microdyn-nadir.de](mailto:info@microdyn-nadir.de); web site: [www.microdyn-nadir.de](http://www.microdyn-nadir.de)**

Microdyn Technologies, Inc., Raleigh, NC  
Porvair Filtration Group Inc, Ashland, VA  
beroplan GmbH Membran- und Prozesstechnik, St. Ingbert

## Strainers

Bee Valve Inc., Elyria, OH  
CPI Wirecloth & Screens Inc, Pearlard, TX  
HAVER & BOECKER, Wire Weaving, Oelde, Germany  
**HAYWARD FLOW CONTROL, One Hayward Industrial Drive, Clemmons, NC 27012 (888-429-4635 USA/Canada; 888-429-4635; FAX: 888-778-8410; e-mail: [hflow@hayward.com](mailto:hflow@hayward.com); web site: [www.haywardflow-control.com](http://www.haywardflow-control.com))**

Hilliard Corp., Elmira, NY  
**Kraissl Co. Inc., Hackensack, NJ**  
**ORIVAL WATER FILTERS, 213 S Van Brunt St., Englewood, NJ 07631-9902 (800-567-9767; 201-568-3311; FAX: 201-568-1916; e-mail: [filters@orival.com](mailto:filters@orival.com); web site: [www.orival.com](http://www.orival.com))**  
Tengs Valve International Limited, Wenzhou, CHN

## HEAT EXCHANGERS, CONDENSERS & COOLERS

### Aftercoolers

Dipesh Engineering Works, Mumbai, IND  
Schutte & Koerting, Trevoise, PA  
**XCHANGER, 1401 S. 7th St., Hopkins, MN 55343 (952-933-2559; e-mail: [info@xchanger.com](mailto:info@xchanger.com); web site: [www.xchanger.com](http://www.xchanger.com))**

### Condensate return systems

HRS Process Systems Ltd., Pune  
M&C TechGroup, Ventura, CA  
**ROTH PUMP, P.O. Box 4330, Rock Island, IL 61204 (1-888-444-ROTH; 1-309-787-1791; FAX: 1-309-787-5142; e-mail: [roth.pump@rothpump.com](mailto:roth.pump@rothpump.com); web site: [www.rothpump.com](http://www.rothpump.com))**  
Spirax Sarco, Inc., Blythewood, SC  
**TLV CORPORATION, Charlotte, NC**  
— See our ad on page 108

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)

## Condensers, air cooled

Dipesh Engineering Works, Mumbai, IND  
**Paharpur Cooling Towers Ltd, Kolkata**  
 — See our ad on page 129

SPX Cooling Technologies, Overland Park, KS

## Condensers, barometric

Advanced Industrial Technology Corp., Paramus, NJ  
**CROLL-REYNOLDS CO. INC.**, Six Campus Drive, Parsippany, NJ 07054 (908-232-4200; FAX: 908-232-2146; e-mail: info@croll.com; web site: www.croll.com)

**KOERTING HANNOVER AG**, Badenstedter Str. 56, 30453 Hannover, Germany (+49 511 2129-0, e-mail: st@koerting.de, web site: www.koerting.de)  
 — See our ad on page 117

## Condensers, coil

Dipesh Engineering Works, Mumbai, IND

## Condensers, evaporative refrigerator

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)  
 — See our ad on page 15

GEA Refrigeration North America, York, PA  
 SPX Cooling Technologies, Overland Park, KS

## Condensers, jet ejector

CG Thermal LLC, Twinsburg, Ohio  
**CROLL-REYNOLDS CO. INC.**, Six Campus Drive, Parsippany, NJ 07054 (908-232-4200; FAX: 908-232-2146; e-mail: info@croll.com; web site: www.croll.com)

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)  
 — See our ad on page 15

HRS Process Systems Ltd., Pune  
**JLS International, Inc.**, Charlotte, NC  
**KOERTING HANNOVER AG**, Badenstedter Str. 56, 30453 Hannover, Germany (+49 511 2129-0, e-mail: st@koerting.de, web site: www.koerting.de)  
 — See our ad on page 117

Schutte & Koerting, Trevoise, PA  
 manning&lewis div rubicon industries corp, Brooklyn, New York

## Condensers, plate

GEA PHE Systems, York, PA

## Condensers, reflux

HRS Process Systems Ltd., Pune  
 manning&lewis div rubicon industries corp, Brooklyn, New York

## Condensers, refrigerator

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)  
 — See our ad on page 15

GEA Refrigeration North America, York, PA

## Condensers, shell & tube

APL Apparatebau GmbH, Hopfgarten  
 CG Thermal LLC, Twinsburg, Ohio  
**CROLL-REYNOLDS CO. INC.**, Six Campus Drive, Parsippany, NJ 07054 (908-232-4200; FAX: 908-232-2146; e-mail: info@croll.com; web site: www.croll.com)

Dipesh Engineering Works, Mumbai, IND  
 Enerquip, LLC, Medford, WI  
**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)  
 — See our ad on page 15

GEA Refrigeration North America, York, PA

HRS Process Systems Ltd., Pune

**JLS International, Inc.**, Charlotte, NC

**KOERTING HANNOVER AG**, Badenstedter Str. 56, 30453 Hannover, Germany (+49 511 2129-0, e-mail: st@koerting.de, web site: www.koerting.de)  
 — See our ad on page 117

Schutte & Koerting, Trevoise, PA  
 manning&lewis div rubicon industries corp, Brooklyn, New York

## Condensers, steam

**CROLL-REYNOLDS CO. INC.**, Six Campus Drive, Parsippany, NJ 07054 (908-232-4200; FAX: 908-232-2146; e-mail: info@croll.com; web site: www.croll.com)

HRS Process Systems Ltd., Pune

**KOERTING HANNOVER AG**, Badenstedter Str. 56, 30453 Hannover, Germany (+49 511 2129-0, e-mail: st@koerting.de, web site: www.koerting.de)

— See our ad on page 117

Schutte & Koerting, Trevoise, PA

Tranter Ltd., Wakefield

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

manning&lewis div rubicon industries corp, Brooklyn, New York

## Condensers, surface

**ALAUQA, INC.**, 7004 JFK BOULEVARD EAST, SUITE 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alauqa.com)

CU SERVICES LLC, Elk Grove, IL

**CROLL-REYNOLDS CO. INC.**, Six Campus Drive, Parsippany, NJ 07054 (908-232-4200; FAX: 908-232-2146; e-mail: info@croll.com; web site: www.croll.com)

**JLS International, Inc.**, Charlotte, NC  
**KOERTING HANNOVER AG**, Badenstedter Str. 56, 30453 Hannover, Germany (+49 511 2129-0, e-mail: st@koerting.de, web site: www.koerting.de)  
 — See our ad on page 117

Schutte & Koerting, Trevoise, PA

## Condensers, tubular

HRS Process Systems Ltd., Pune

**JLS International, Inc.**, Charlotte, NC

## Condensers, vapor

CG Thermal LLC, Twinsburg, Ohio  
 Enerquip, LLC, Medford, WI  
 HRS Process Systems Ltd., Pune

**KOERTING HANNOVER AG**, Badenstedter Str. 56, 30453 Hannover, Germany (+49 511 2129-0, e-mail: st@koerting.de, web site: www.koerting.de)  
 — See our ad on page 117

**XCHANGER**, 1401 S. 7th St., Hopkins, MN 55343 (952-933-2559; e-mail: info@xchanger.com; web site: www.xchanger.com)

## Coolers, air cooled

Bepex International LLC, Minneapolis, MN

COMESSA, Strasbourg

Mokon, Buffalo, NY

Pneumatech, Inc., Rock Hill, SC

Tex-Fin, Inc., Houston, TX

**XCHANGER**, 1401 S. 7th St., Hopkins, MN 55343 (952-933-2559; e-mail: info@xchanger.com; web site: www.xchanger.com)

## Coolers, belt

**AMANDUS KAHL GmbH & Co. KG**, Reinbek, 0 BERNDORF BAND GMBH, Leobersdorferstr. 26, Berndorf, AUT 2560 (43-2672-800-0; FAX: 43-2672-84176; e-mail: band@berndorf.at; web site: www.berndorf-band.at)

COMESSA, Strasbourg

**KAISER PROCESS AND BELT TECHNOLOGY GMBH**, Siemensring 54-56, Willich, Germany 47877 (+49 (0) 2154 89107 - 0; FAX: +49 (0) 2154 89107 - 284; e-mail: info@kaiser-pbt.de; web site: www.kaiser-pbt.de)

**SBS STEEL BELT SYSTEMS S.r.l.**, Venegono Inferiore, ITA  
**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK MATERIALS TECHNOLOGY DEUTSCHLAND GMBH**, Salierstr. 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: info.spsde@sandvik.com; web site: www.process-systems.sandvik.com)

— See our ad on page 53  
**SANDVIK PROCESS SYSTEMS, INC.**, 21 Campus Rd., Totowa, NJ 07512 (973-790-1600; FAX: 973-790-3377; e-mail: info@sandvik.com; web site: www.process-systems.sandvik.com)

— See our ad on page 53

## Coolers, brine

HRS Process Systems Ltd., Pune

## Coolers, closed circuit

**AMANDUS KAHL GmbH & Co. KG**, Reinbek, 0

Bepex International LLC, Minneapolis, MN

COMESSA, Strasbourg

HRS Process Systems Ltd., Pune

PolyScience, Niles, IL

Tranter Ltd., Wakefield

## Coolers, coil

**SENTRY EQUIPMENT CORP**, 966 Blue Ribbon Circle North, Oconomowoc, WI 53066 (262-567-7256; FAX: 262-567-4523; e-mail: sales@sentry-equip.com; web site: www.sentry-equip.com)

— See our ad on page 43

## Coolers, drum

Allgaier Process Technology GmbH, Germany

COMESSA, Strasbourg

## Coolers, evaporative

Aaron Equipment Company, Bensenville, IL  
 Advanced Industrial Technology Corp., Paramus, NJ  
 Allgaier Process Technology GmbH, Germany

**CROLL-REYNOLDS CO. INC.**, Six Campus Drive, Parsippany, NJ 07054 (908-232-4200; FAX: 908-232-2146; e-mail: info@croll.com; web site: www.croll.com)

Delta Cooling Towers Inc., Roxbury Township, NJ

SPX Cooling Technologies, Overland Park, KS

Spray Drying Systems, Inc., Eldersburg, MD

## Coolers, finned tube

Dipesh Engineering Works, Mumbai, IND

**FIN TUBE PRODUCTS, INC.**, 188 S Lyman St., Suite 100, Wadsworth, OH 44281 (800-334-3736; 330-334-3736; FAX: 330-334-3848; e-mail: mb@fintube.com; web site: www.fintube.com)

Tex-Fin, Inc., Houston, TX

**XCHANGER**, 1401 S. 7th St., Hopkins, MN 55343 (952-933-2559; e-mail: info@xchanger.com; web site: www.xchanger.com)

## Coolers, flash

Advanced Industrial Technology Corp., Paramus, NJ

Bepex International LLC, Minneapolis, MN

COMESSA, Strasbourg

**CALORIS ENGINEERING**, 8649 Commerce Drive, Easton, MD 21601 (410-822-6900; FAX: 410-822-9006; e-mail: info@caloris.com; web site: www.caloris.com)

**CROLL-REYNOLDS CO. INC.**, Six Campus Drive, Parsippany, NJ 07054 (908-232-4200; FAX: 908-232-2146; e-mail: info@croll.com; web site: www.croll.com)

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)  
 — See our ad on page 15

GEA Refrigeration North America, York, PA

HRS Process Systems Ltd., Pune

**JLS International, Inc.**, Charlotte, NC

**KOERTING HANNOVER AG**, Badenstedter Str. 56, 30453 Hannover, Germany (+49 511 2129-0, e-mail: st@koerting.de, web site: www.koerting.de)

— See our ad on page 117

Schutte & Koerting, Trevoise, PA

manning&lewis div rubicon industries corp, Brooklyn, New York

Tranter Ltd., Wakefield

Wabash Power Equipment Co., Wheeling, IL

Xchanger, Hopkins, MN

Yongling, Beijing, China

Zhejiang, Hangzhou, China

Zhejiang, Ningbo, China

Zhejiang, Shaoxing, China

Zhejiang, Wenzhou, China

Zhejiang, Zhoushan, China

## Coolers, screw

**ANDRITZ GOUDA**, Coenecoop 88, Waddinxveen, 0 2741 PD (+31.182.623.723; FAX: +31.182.619.217; e-mail: gouda@andritz.com; web site: www.andritz.com/gouda)

Bepex International LLC, Minneapolis, MN

**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: info@komline.com; web site: www.komline.com)

— See our ad on page 148

## Coolers, water

Dr. Thiedig GmbH & Co KG, Berlin, Germany

HRS Process Systems Ltd., Pune

Mokon, Buffalo, NY

Pneumatech, Inc., Rock Hill, SC

PolyScience, Niles, IL

**SENTRY EQUIPMENT CORP**, 966 Blue Ribbon Circle North, Oconomowoc, WI 53066 (262-567-7256; FAX: 262-567-4523; e-mail: sales@sentry-equip.com; web site: www.sentry-equip.com)

— See our ad on page 43

## Desuperheaters

CU SERVICES LLC, Elk Grove, IL

**CROLL REYNOLDS**  
 PROCESS VACUUM

**CROLL-REYNOLDS CO. INC.**, Six Campus Drive, Parsippany, NJ 07054 (908-232-4200; FAX: 908-232-2146; e-mail: info@croll.com; web site: www.croll.com)

**JLS International, Inc.**, Charlotte, NC

SAMSON Controls, Inc., Baytown, TX

Schutte & Koerting, Trevoise, PA



**SULZER CHEMTECH USA, INC.**, 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rodney.alario@sulzer.com; web site: www.sulzer.com)

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)

## Economizers

Dipesh Engineering Works, Mumbai, IND  
HRS Process Systems Ltd., Pune

**INDECK POWER EQUIPMENT CO.**, 1111 Willis Ave. (CE), Wheeling, IL 60090 (800-446-3325; 847-541-8300; FAX: 847-541-9984; e-mail: info@indeck-power.com; web site: www.indeck.com)

Tex-Fin, Inc., Houston, TX

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

## Heaters, process liquid

Advanced Heat Recovery, Inc., Division of AQUA Innovations, Inc., Baltimore, MD

Dalton Electric Heating Co., Inc., Ipswich, MA  
HRS Process Systems Ltd., Pune

**KOERTING HANNOVER AG**, Badenstedter Str. 56, 30453 Hannover, Germany (+49 511 2129-0, e-mail: st@koerting.de, web site: www.koerting.de)  
— See our ad on page 117

**PICK HEATERS INC.**, 730 S. Indiana Ave., P.O. Box 516, West Bend, WI 53095 (262-338-1191; FAX: 262-338-8489; e-mail: info1@pickheaters.com; web site: www.pickheaters.com)

ProSonic LLC, Milwaukee, WI

**UNIFLUX / EXOTHERM CORP.**, 888 Wilcrest Drive, Houston, TX 77042 (713-981-9100; FAX: 713-981-7081; e-mail: info@exotherm.com; web site: www.exotherm.com)

— See our ad on page 78

manning&lewis div rubicon industries corp, Brooklyn, NY

## Heaters, process slurry

Advanced Heat Recovery, Inc., Division of AQUA Innovations, Inc., Baltimore, MD

HRS Process Systems Ltd., Pune  
Hydro-Thermal Corp., Waukesha, WI

**PICK HEATERS INC.**, 730 S. Indiana Ave., P.O. Box 516, West Bend, WI 53095 (262-338-1191; FAX: 262-338-8489; e-mail: info1@pickheaters.com; web site: www.pickheaters.com)

ProSonic LLC, Milwaukee, WI

**UNIFLUX / EXOTHERM CORP.**, 888 Wilcrest Drive, Houston, TX 77042 (713-981-9100; FAX: 713-981-7081; e-mail: info@exotherm.com; web site: www.exotherm.com)

— See our ad on page 78

## Heat exchanger parts & accessories

Allgaier Process Technology GmbH, Germany  
DraCool USA, Carlisle, OH

**FIN TUBE PRODUCTS, INC.**, 188 S Lyman St., Suite 100, Wadsworth, OH 44281 (800-334-3736; 330-334-3736; FAX: 330-334-3848; e-mail: mb@fintube.com; web site: www.fintube.com)

GEA PHE Systems, York, PA

HRS Process Systems Ltd., Pune

**SAINT-GOBAIN CERAMICS/STRUCTURAL CERAMICS**, 23 Acheson Dr., Niagara Falls, NY 14303 (716-278-6233; FAX: 716-278-2373; e-mail: scd.sales@saint-gobain.com; web site: www.hexoloy.com)

— See our ad on page 176

**TLV CORPORATION**, Charlotte, NC

— See our ad on page 108

Tranter Ltd., Wakefield

**USA INDUSTRIES, INC.**, 302 State Street, S. Houston, TX 77587 (800-456-8721; 713-941-3797; 713-941-3797; FAX: 713-941-1086; e-mail: info@usaindustries.com; web site: www.usaindustries.com)

W.L. Gore & Associates, Sealant Technologies, Elkton, MD

## Heat exchangers, PTFE tube

**SENTRY EQUIPMENT CORP**, 966 Blue Ribbon Circle North, Oconomowoc, WI 53066 (262-567-7256; FAX: 262-567-4523; e-mail: sales@sentry-equip.com; web site: www.sentry-equip.com)

— See our ad on page 43

Tef Cap Industries, West Chester, PA

## Heat exchangers, U tube

APL Apparatebau GmbH, Hopfgarten  
Bryan Steam LLC, Peru, IN

**CROLL-REYNOLDS CO. INC.**, Six Campus Drive, Parsippany, NJ 07054 (908-232-4200; FAX: 908-232-2146; e-mail: info@croll.com; web site: www.croll.com)

Dipesh Engineering Works, Mumbai, IND

Enerquip, LLC, Medford, WI

HRS Process Systems Ltd., Pune

**JLS International, Inc.**, Charlotte, NC

**MULTITHERM LLC**, 11 General Warren Blvd., Malvern, PA 19355 (1-800-225-7440; FAX: 610-408-8365; e-mail: techinfo@multitherm.com; web site: www.multitherm.com)

PRAJ INDUSTRIES LIMITED, Pune

Spaltech International Inc., Halton Hills

**TITAN Metal Fabricators, Engineered Products, Camarillo, CA**

manning&lewis div rubicon industries corp, Brooklyn, NY

## Heat exchangers, air cooled

Greenwood Engineering Inc., Excelsior, MN

Midwest Steel Company Inc, Houston, TX

Munters Corporation, Buena Vista, VA

**Paharpur Cooling Towers Ltd, Kolkata**

— See our ad on page 129

PolyScience, Niles, IL

SPX Cooling Technologies, Overland Park, KS

Spaltech International Inc., Halton Hills

Tex-Fin, Inc., Houston, TX

**XCHANGER**, 1401 S. 7th St., Hopkins, MN 55343 (952-933-2559; e-mail: info@xchanger.com; web site: www.xchanger.com)

## Heat exchangers, all-welded

APL Apparatebau GmbH, Hopfgarten

GEA PHE Systems, York, PA

Greenwood Engineering Inc., Excelsior, MN

HRS Process Systems Ltd., Pune

**JLS International, Inc.**, Charlotte, NC

Munters Corporation, Buena Vista, VA

Spaltech International Inc., Halton Hills

**TITAN Metal Fabricators, Engineered Products, Camarillo, CA**

Tranter Ltd., Wakefield

## Heat exchangers, bayonet

Enerquip, LLC, Medford, WI

HRS Process Systems Ltd., Pune

## Heat exchangers, cascade

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

— See our ad on page 15

GEA Refrigeration North America, York, PA

HRS Process Systems Ltd., Pune

## Heat exchangers, ceramic

CG Thermal LLC, Twinsburg, Ohio

CTP Corp., Northport, NY

## Heat exchangers, coil

Greenwood Engineering Inc., Excelsior, MN

Linde AG, Engineering Division, Pullach

**MULTITHERM LLC**, 11 General Warren Blvd., Malvern, PA 19355 (1-800-225-7440; FAX: 610-408-8365; e-mail: techinfo@multitherm.com; web site: www.multitherm.com)

**SENTRY EQUIPMENT CORP**, 966 Blue Ribbon Circle North, Oconomowoc, WI 53066 (262-567-7256; FAX: 262-567-4523; e-mail: sales@sentry-equip.com; web site: www.sentry-equip.com)

— See our ad on page 43

## Heat exchangers, direct contact steam

**CROLL-REYNOLDS CO. INC.**, Six Campus Drive, Parsippany, NJ 07054 (908-232-4200; FAX: 908-232-2146; e-mail: info@croll.com; web site: www.croll.com)

Hydro-Thermal Corp., Waukesha, WI

**KOERTING HANNOVER AG**, Badenstedter Str. 56,

30453 Hannover, Germany (+49 511 2129-0, e-mail: st@koerting.de, web site: www.koerting.de)  
— See our ad on page 117

**PICK HEATERS INC.**, 730 S. Indiana Ave., P.O. Box 516, West Bend, WI 53095 (262-338-1191; FAX: 262-338-8489; e-mail: info1@pickheaters.com; web site: www.pickheaters.com)

ProSonic LLC, Milwaukee, WI

Spaltech International Inc., Halton Hills

**SULZER CHEMTECH USA, INC.**, 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rodney.alario@sulzer.com; web site: www.sulzer.com)

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)

## Heat exchangers, double pipe

APL Apparatebau GmbH, Hopfgarten

BORSIG GmbH, Berlin

Dipesh Engineering Works, Mumbai, IND

HRS Process Systems Ltd., Pune

**JLS International, Inc.**, Charlotte, NC

NOV, Dayton, OH

## Heat exchangers, falling film

**ALAUQA, INC.**, 7004 JFK BOULEVARD EAST, SUITE 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alauqa.com)

**CALORIS ENGINEERING**, 8649 Commerce Drive, Easton, MD 21601 (410-822-6900; FAX: 410-822-9006; e-mail: info@caloris.com; web site: www.caloris.com)

Dipesh Engineering Works, Mumbai, IND

GIG Karasek GmbH, Gloggnitz-Stuppach

HRS Process Systems Ltd., Pune

manning&lewis div rubicon industries corp, Brooklyn, NY

## Heat exchangers, finned tube

**FIN TUBE PRODUCTS, INC.**, 188 S Lyman St., Suite 100, Wadsworth, OH 44281 (800-334-3736; 330-334-3736; FAX: 330-334-3848; e-mail: mb@fintube.com; web site: www.fintube.com)

Greenwood Engineering Inc., Excelsior, MN

Munters Corporation, Buena Vista, VA

**XCHANGER**, 1401 S. 7th St., Hopkins, MN 55343 (952-933-2559; e-mail: info@xchanger.com; web site: www.xchanger.com)

## Heat exchangers, glass

CG Thermal LLC, Twinsburg, Ohio

De Dietrich Process Systems GmbH, Mainz

## Heat exchangers, graphite

CG Thermal LLC, Twinsburg, Ohio

## Heat exchangers, jacketed pipe

Dipesh Engineering Works, Mumbai, IND

Dueker GmbH & Co. KGaA, Laufach

HRS Process Systems Ltd., Pune

NOV, Dayton, OH

**TITAN Metal Fabricators, Engineered Products, Camarillo, CA**

## Heat exchangers, plate

DraCool USA, Carlisle, OH

GEA PHE Systems, York, PA

GEA Refrigeration North America, York, PA

**INDECK POWER EQUIPMENT CO.**, 1111 Willis Ave. (CE), Wheeling, IL 60090 (800-446-3325; 847-541-8300; FAX: 847-541-9984; e-mail: info@indeck-power.com; web site: www.indeck.com)

Munters Corporation, Buena Vista, VA

Tranter Ltd., Wakefield

United Performance Metals, Houston, TX

## Heat exchangers, plate coil

Tranter Ltd., Wakefield

## Heat exchangers, plate fin

Greenwood Engineering Inc., Excelsior, MN

Linde AG, Engineering Division, Pullach

**XCHANGER**, 1401 S. 7th St., Hopkins, MN 55343 (952-933-2559; e-mail: info@xchanger.com; web site: www.xchanger.com)

## Heat exchangers, scraped surface

BORSIG GmbH, Berlin

**BUSS-SMS-CANZLER GMBH**, Kaiserstr. 13-15, Butzbach, D 35510 (49-6033-85-0; FAX: 49-6033-85-249; e-mail: info@sms-vt.com; web site: www.sms-vt.com)

— See our ad on page 52

HRS Process Systems Ltd., Pune

Sahyadri Engineering Corporation, IND

**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK MATERIALS TECHNOLOGY DEUTSCHLAND GMBH**, Salienstr. 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: info.spsde@sandvik.com; web site: www.process-systems.sandvik.com)  
— See our ad on page 53

## Heat exchangers, screw flight

Bepex International LLC, Minneapolis, MN

**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: info@komline.com; web site: www.komline.com)  
— See our ad on page 148

Metso Minerals Industries, Inc., York, PA

## Heat exchangers, shell & tube

APL Apparatebau GmbH, Hopfgarten  
Aaron Process Equipment Co., Bensenville, IL  
Advanced Heat Recovery, Inc., Division of AQUA Innovations, Inc., Baltimore, MD

**ALAQUA, INC.**, 7004 JFK BOULEVARD EAST, SUITE 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alaquaa@mindspring.com; web site: www.alaquainc.com)

Anguil Environmental Systems, Inc., Milwaukee, WI  
**CALORIS ENGINEERING**, 8649 Commerce Drive, Easton, MD 21601 (410-822-6900; FAX: 410-822-9006; e-mail: info@caloris.com; web site: www.caloris.com)

Catalytic Products Intl. Inc., Lake Zurich, IL  
Coperion GmbH, Weingarten, Wuertt.

**CROLL-REYNOLDS CO. INC.**, Six Campus Drive, Parsippany, NJ 07054 (908-232-4200; FAX: 908-232-2146; e-mail: info@croll.com; web site: www.croll.com)

Dipesh Engineering Works, Mumbai, IND  
Enerquip, LLC, Medford, WI  
Epcos Industrial Systems, LP, The Woodlands, TX  
**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 (800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com

— See our ad on page 15  
GEA Refrigeration North America, York, PA  
GIG Karasek GmbH, Gloggnitz-Stuppach  
HRS Process Systems Ltd., Pune  
**JLS International, Inc.**, Charlotte, NC  
**MULTITHERM LLC**, 11 General Warren Blvd., Malvern, PA 19355 (1-800-225-7440; FAX: 610-408-8365; e-mail: techinfo@multitherm.com; web site: www.multitherm.com)

Munters Corporation, Buena Vista, VA  
NOV, Dayton, OH  
PRAJ INDUSTRIES LIMITED, Pune  
RAS Process Equipment Inc., Robbinsville, NJ  
Samuel Pressure Vessel Group, Marinette, WI  
Spaltech International Inc., Halton Hills  
**SULZER CHEMTECH USA, INC.**, 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rodney.alarjo@sulzer.com; web site: www.sulzer.com)

**TITAN Metal Fabricators, Engineered Products, Camarillo, CA**  
manning & Lewis, NY  
manning&lewis div rubicon industries corp, Brooklyn, New York

## Heat exchangers, spiral

Dipesh Engineering Works, Mumbai, IND  
Dr. Thiedig GmbH & Co KG, Berlin, Germany  
**FIN TUBE PRODUCTS, INC.**, 188 S Lyman St., Suite 100, Wadsworth, OH 44281 (800-334-3736; 330-334-3736; FAX: 330-334-3848; e-mail: mb@fintube.com; web site: www.fintube.com)

HRS Process Systems Ltd., Pune  
ProSonic LLC, Milwaukee, WI  
**SENTRY EQUIPMENT CORP**, 966 Blue Ribbon Circle North, Oconomowoc, WI 53066 (262-567-7256; FAX: 262-567-4523; e-mail: sales@sentry-equip.com; web site: www.sentry-equip.com)  
— See our ad on page 43

Tranter Ltd., Wakefield

## Heat exchangers, tantalum

CG Thermal LLC, Twinsburg, Ohio  
**TITAN Metal Fabricators, Engineered Products, Camarillo, CA**

## Heat exchangers, titanium

Dipesh Engineering Works, Mumbai, IND  
GEA PHE Systems, York, PA  
HRS Process Systems Ltd., Pune  
**JLS International, Inc.**, Charlotte, NC  
PRAJ INDUSTRIES LIMITED, Pune  
**TITAN Metal Fabricators, Engineered Products, Camarillo, CA**  
Tranter Ltd., Wakefield

## Heat exchangers, zirconium

**JLS International, Inc.**, Charlotte, NC  
**TITAN Metal Fabricators, Engineered Products, Camarillo, CA**

## Heat transfer systems

Advanced Heat Recovery, Inc., Division of AQUA Innovations, Inc., Baltimore, MD  
DraCool USA, Carlisle, OH  
HRS Process Systems Ltd., Pune

HTT Energy GmbH, Herford, Germany  
LAUDA DR. R. WOBSE GMBH & CO. KG, Laudau-Koenigshofen, 0  
Mokon, Buffalo, NY  
Munters Corporation, Buena Vista, VA  
ProSonic LLC, Milwaukee, WI  
Solutia Inc., A subsidiary of Eastman Chemical Co., St. Louis, MO

Spaltech International Inc., Halton Hills  
**THERMAL FLUID SYSTEMS INC.**, 3046 Matlock Drive, Kennesaw, GA 30144 (770-425-5556; FAX: 770-425-9559; e-mail: sales@tfsheat.com; web site: www.tfsheat.com)

**UNIFLUX / EXOTHERM CORP.**, 888 Wilcrest Drive, Houston, TX 77042 (713-981-9100; FAX: 713-981-7081; e-mail: info@exotherm.com; web site: www.exotherm.com)  
— See our ad on page 78

## Inserts, heat-exchanger tube

CTI Industries, Inc., Carlsbad, CA  
Tex-Fin, Inc., Houston, TX

## Preheaters

Advanced Heat Recovery, Inc., Division of AQUA Innovations, Inc., Baltimore, MD  
Enerquip, LLC, Medford, WI  
HRS Process Systems Ltd., Pune  
**JLS International, Inc.**, Charlotte, NC  
**UNIFLUX / EXOTHERM CORP.**, 888 Wilcrest Drive, Houston, TX 77042 (713-981-9100; FAX: 713-981-7081; e-mail: info@exotherm.com; web site: www.exotherm.com)  
— See our ad on page 78

**XCHANGER**, 1401 S. 7th St., Hopkins, MN 55343 (952-933-2559; e-mail: info@xchanger.com; web site: www.xchanger.com)

manning&lewis div rubicon industries corp, Brooklyn, New York

## Reboilers

Dipesh Engineering Works, Mumbai, IND  
Enerquip, LLC, Medford, WI  
HRS Process Systems Ltd., Pune  
Tex-Fin, Inc., Houston, TX  
**UNIFLUX / EXOTHERM CORP.**, 888 Wilcrest Drive, Houston, TX 77042 (713-981-9100; FAX: 713-981-7081; e-mail: info@exotherm.com; web site: www.exotherm.com)  
— See our ad on page 78  
manning&lewis div rubicon industries corp, Brooklyn, New York

## Superheaters

HRS Process Systems Ltd., Pune  
**JLS International, Inc.**, Charlotte, NC  
PRAJ INDUSTRIES LIMITED, Pune  
RAS Process Equipment Inc., Robbinsville, NJ  
**UNIFLUX / EXOTHERM CORP.**, 888 Wilcrest Drive, Houston, TX 77042 (713-981-9100; FAX: 713-981-7081; e-mail: info@exotherm.com; web site: www.exotherm.com)  
— See our ad on page 78  
**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)

## Troughs, cooled or heated

**ANDRITZ GOUDA**, Coenecoop 88, Waddinxveen, 0 2741 PD (+31.182.623.723; FAX: +31.182.619.217; e-mail: gouda@andritz.com; web site: www.andritz.com/gouda)

**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: info@komline.com; web site: www.komline.com)  
— See our ad on page 148

## Waste heat recovery units

Advanced Heat Recovery, Inc., Division of AQUA Innovations, Inc., Baltimore, MD  
BORSIG GmbH, Berlin  
**BIONOMIC INDUSTRIES INC.**, 777 Corporate Dr., Mahwah, NJ 07430-2008 (800-311-6767; 201-529-1094; FAX: 201-529-0252; e-mail: sales@bionomicind.com; web site: www.bionomicind.com)  
HRS Process Systems Ltd., Pune  
HTT Energy GmbH, Herford, Germany  
**INDECK POWER EQUIPMENT CO.**, 1111 Willis Ave. (CE), Wheeling, IL 60090 (800-446-3325; 847-541-8300; FAX: 847-541-9984; e-mail: info@indeck-power.com; web site: www.indeck.com)  
Munters Corporation, Buena Vista, VA  
RAS Process Equipment Inc., Robbinsville, NJ

## HEAT TRANSFER MEDIA

### Heat transfer fluids, cooling fluids

**EASTMAN CHEMICAL COMPANY - THERMINOL HEAT TRANSFER FLUIDS**, 575 Maryville Centre Drive, Saint Louis, MO 63141 (800-433-6997; e-mail: team.therminol@eastman.com; web site: www.therminol.com)

LAUDA DR. R. WOBSE GMBH & CO. KG, Laudau-Koenigshofen, 0  
Liquid Process Systems, inc., Indian Trail, NC  
**Paratherm - Heat Transfer Fluids, King of Prussia, PA**  
— See our ad on page 159

Petron Plus Global, Inc., Hutchinson, Kansas  
Solutia Inc., A subsidiary of Eastman Chemical Co., St. Louis, MO

### Heat transfer fluids, heating fluids

**EASTMAN CHEMICAL COMPANY - THERMINOL HEAT TRANSFER FLUIDS**, 575 Maryville Centre Drive, Saint Louis, MO 63141 (800-433-6997; e-mail: team.therminol@eastman.com; web site: www.therminol.com)

LAUDA DR. R. WOBSE GMBH & CO. KG, Laudau-Koenigshofen, 0  
Liquid Process Systems, inc., Indian Trail, NC  
**MULTITHERM LLC**, 11 General Warren Blvd., Malvern, PA 19355 (1-800-225-7440; FAX: 610-408-8365; e-mail: techinfo@multitherm.com; web site: www.multitherm.com)

**Paratherm - Heat Transfer Fluids, King of Prussia, PA**  
— See our ad on page 159  
Petron Plus Global, Inc., Hutchinson, Kansas  
Solutia Inc., A subsidiary of Eastman Chemical Co., St. Louis, MO

### Heat transfer fluids, other

**EASTMAN CHEMICAL COMPANY - THERMINOL HEAT TRANSFER FLUIDS**, 575 Maryville Centre Drive, Saint Louis, MO 63141 (800-433-6997; e-mail: team.therminol@eastman.com; web site: www.therminol.com)

LAUDA DR. R. WOBSE GMBH & CO. KG, Laudau-Koenigshofen  
Momentive Inc., Waterford, NY  
**MULTITHERM LLC**, 11 General Warren Blvd., Malvern, PA 19355 (1-800-225-7440; FAX: 610-408-8365; e-mail: techinfo@multitherm.com; web site: www.multitherm.com)

**Paratherm - Heat Transfer Fluids, King of Prussia, PA**  
— See our ad on page 159  
Petron Plus Global, Inc., Hutchinson, Kansas  
Solutia Inc., A subsidiary of Eastman Chemical Co., St. Louis, MO

### Hot oils

**EASTMAN CHEMICAL COMPANY - THERMINOL HEAT TRANSFER FLUIDS**, 575 Maryville Centre Drive, Saint Louis, MO 63141 (800-433-6997; e-mail: team.therminol@eastman.com; web site: www.therminol.com)

Liquid Process Systems, inc., Indian Trail, NC  
**MULTITHERM LLC**, 11 General Warren Blvd., Malvern, PA 19355 (1-800-225-7440; FAX: 610-408-8365; e-mail: techinfo@multitherm.com; web site: www.multitherm.com)

**Paratherm - Heat Transfer Fluids, King of Prussia, PA**  
— See our ad on page 159  
Solutia Inc., A subsidiary of Eastman Chemical Co., St. Louis, MO

### Thermal fluids

**EASTMAN CHEMICAL COMPANY - THERMINOL HEAT TRANSFER FLUIDS**, 575 Maryville Centre Drive, Saint Louis, MO 63141 (800-433-6997; e-mail: team.therminol@eastman.com; web site: www.therminol.com)

LAUDA DR. R. WOBSE GMBH & CO. KG, Laudau-Koenigshofen  
Liquid Process Systems, inc., Indian Trail, NC  
**MULTITHERM LLC**, 11 General Warren Blvd., Malvern, PA 19355 (1-800-225-7440; FAX: 610-408-8365; e-mail: techinfo@multitherm.com; web site: www.multitherm.com)

**Paratherm - Heat Transfer Fluids, King of Prussia, PA**  
— See our ad on page 159  
Solutia Inc., A subsidiary of Eastman Chemical Co., St. Louis, MO

## HEATING & COOLING EQUIPMENT, OTHER

### Air preheat systems

Munters Corporation, Buena Vista, VA

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)  
Zeeco, Inc., Broken Arrow, OK

## Baths, constant temperature

**BROOKFIELD AMETEK, INC., INSTRUMENTATION & SPECIALTY CONTROLS DIVISION**, 11 Commerce Blvd., Middleboro, MA 02346 (800-628-8139 (Not MA); 508-946-6200; FAX: 508-946-6262; e-mail: info@brookfieldengineering.com; web site: www.brookfieldengineering.com)

LAUDA DR. R. WOBSEY GMBH & CO. KG, Lauda-Koenigshofen, O  
PolyScience, Niles, IL

## Chillers, recirculating

BARTEC GmbH, Bad Mergentheim, Germany  
LAUDA DR. R. WOBSEY GMBH & CO. KG, Lauda-Koenigshofen  
PolyScience, Niles, IL  
Thermonics Corp, Mansfield, MA

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)

## Coils

**FIN TUBE PRODUCTS, INC.**, 188 S Lyman St., Suite 100, Wadsworth, OH 44281 (800-334-3736; 330-334-3736; FAX: 330-334-3848; e-mail: mb@fintube.com; web site: www.fintube.com)

**MULTITHERM LLC**, 11 General Warren Blvd., Malvern, PA 19355 (1-800-225-7440; FAX: 610-408-8365; e-mail: techinfo@multitherm.com; web site: www.multitherm.com)

## Gaskets, plate heat exchanger

DraCool USA, Carlisle, OH  
GEA PHE Systems, York, PA  
Tranter Ltd., Wakefield  
United Performance Metals, Houston, TX

## Generators, steam

Advanced Heat Recovery, Inc., Division of AQUA Innovations, Inc., Baltimore, MD  
**INDECK POWER EQUIPMENT CO.**, 1111 Willis Ave. (CE), Wheeling, IL 60090 (800-446-3325; 847-541-8300; FAX: 847-541-9984; e-mail: info@indeck-power.com; web site: www.indeck-power.com)

## Heaters, air & gas

Kloepfer-Therm GmbH & Co. KG, Dortmund  
Leister Technologies AG, Kaegiswil  
Sigma Thermal Inc., Marietta, GA  
Tempco Electric Heater Co. IL  
**UNIFLUX / EXOTHERM CORP.**, 888 Wilcrest Drive, Houston, TX 77042 (713-981-9100; FAX: 713-981-7081; e-mail: info@exotherm.com; web site: www.exotherm.com)  
— See our ad on page 78

**XCHANGER**, 1401 S. 7th St., Hopkins, MN 55343 (952-933-2559; e-mail: info@xchanger.com; web site: www.xchanger.com)

Zeeco, Inc., Broken Arrow, OK

## Heaters, bayonet

Dalton Electric Heating Co., Inc., Ipswich, MA  
Tex-Fin, Inc., Houston, TX

## Heaters, cartridge

Dalton Electric Heating Co., Inc., Ipswich, MA  
Tempco Electric Heater Co. IL

## Heaters, direct fired

Diamond Refractory Services, LLC, Houston, TX  
HTT Energy GmbH, Herford, Germany  
Sigma Thermal Inc., Marietta, GA  
Tex-Fin, Inc., Houston, TX  
**UNIFLUX / EXOTHERM CORP.**, 888 Wilcrest Drive, Houston, TX 77042 (713-981-9100; FAX: 713-981-7081; e-mail: info@exotherm.com; web site: www.exotherm.com)  
— See our ad on page 78

## Heaters, feedwater

HRS Process Systems Ltd., Pune  
ProSonic LLC, Milwaukee, WI  
**UNIFLUX / EXOTHERM CORP.**, 888 Wilcrest Drive, Houston, TX 77042 (713-981-9100; FAX: 713-981-7081; e-mail: info@exotherm.com; web site: www.exotherm.com)  
— See our ad on page 78

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)

## Heaters, finned tube

**FIN TUBE PRODUCTS, INC.**, 188 S Lyman St., Suite 100, Wadsworth, OH 44281 (800-334-3736; 330-334-3736; FAX: 330-334-3848; e-mail: mb@fintube.com; web site: www.fintube.com)

Sigma Thermal Inc., Marietta, GA  
Tex-Fin, Inc., Houston, TX

**UNIFLUX / EXOTHERM CORP.**, 888 Wilcrest Drive, Houston, TX 77042 (713-981-9100; FAX: 713-981-7081; e-mail: info@exotherm.com; web site: www.exotherm.com)  
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## Heaters, gas fired

HTT Energy GmbH, Herford, Germany  
Munters Corporation, Buena Vista, VA  
Sigma Thermal Inc., Marietta, GA  
Tex-Fin, Inc., Houston, TX

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— See our ad on page 78

## Heaters, helical coil

**FIN TUBE PRODUCTS, INC.**, 188 S Lyman St., Suite 100, Wadsworth, OH 44281 (800-334-3736; 330-334-3736; FAX: 330-334-3848; e-mail: mb@fintube.com; web site: www.fintube.com)

HRS Process Systems Ltd., Pune  
Sigma Thermal Inc., Marietta, GA

**UNIFLUX / EXOTHERM CORP.**, 888 Wilcrest Drive, Houston, TX 77042 (713-981-9100; FAX: 713-981-7081; e-mail: info@exotherm.com; web site: www.exotherm.com)  
— See our ad on page 78

## Heaters, immersion

Dalton Electric Heating Co., Inc., Ipswich, MA  
LAUDA DR. R. WOBSEER GMBH & CO. KG, Lauda-Koenigshofen, O  
PolyScience, Niles, IL  
Sigma Thermal Inc., Marietta, GA  
Tempco Electric Heater Co., IL

## Heaters, indirect fired (waterbath)

HRS Process Systems Ltd., Pune  
Sigma Thermal Inc., Marietta, GA

**UNIFLUX / EXOTHERM CORP.**, 888 Wilcrest Drive, Houston, TX 77042 (713-981-9100; FAX: 713-981-7081; e-mail: info@exotherm.com; web site: www.exotherm.com)  
— See our ad on page 78

## Heaters, induction

Dalton Electric Heating Co., Inc., Ipswich, MA  
PRÜFTECHNIK Dieter Busch AG, Ismaning, Germany

## Heaters, infrared

Tempco Electric Heater Co., IL

## Heaters, instantaneous

**PICK HEATERS INC.**, 730 S. Indiana Ave., P.O. Box 516, West Bend, WI 53095 (262-338-1191; FAX: 262-338-8489; e-mail: info1@pickheaters.com; web site: www.pickheaters.com)

Schutte & Koerting, Trevoese, PA  
Tempco Electric Heater Co., IL

**UNIFLUX / EXOTHERM CORP.**, 888 Wilcrest Drive, Houston, TX 77042 (713-981-9100; FAX: 713-981-7081; e-mail: info@exotherm.com; web site: www.exotherm.com)  
— See our ad on page 78

## Heaters, jacketed

Dalton Electric Heating Co., Inc., Ipswich, MA  
HRS Process Systems Ltd., Pune  
Hydro-Thermal Corp., Waukesha, WI

**PICK HEATERS INC.**, 730 S. Indiana Ave., P.O. Box 516, West Bend, WI 53095 (262-338-1191; FAX: 262-338-8489; e-mail: info1@pickheaters.com; web site: www.pickheaters.com)

Schutte & Koerting, Trevoese, PA

## Heaters, molten salt

Sigma Thermal Inc., Marietta, GA  
**UNIFLUX / EXOTHERM CORP.**, 888 Wilcrest Drive, Houston, TX 77042 (713-981-9100; FAX: 713-981-7081; e-mail: info@exotherm.com; web site: www.exotherm.com)  
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## Heaters, pipeline

Schutte & Koerting, Trevoese, PA  
Sigma Thermal Inc., Marietta, GA  
**UNIFLUX / EXOTHERM CORP.**, 888 Wilcrest Drive, Houston, TX 77042 (713-981-9100; FAX: 713-981-7081; e-mail: info@exotherm.com; web site: www.exotherm.com)  
— See our ad on page 78

## Heaters, plate

Dalton Electric Heating Co., Inc., Ipswich, MA  
GEA PHE Systems, York, PA

## Heaters, portable

Tempco Electric Heater Co., IL  
**UNIFLUX / EXOTHERM CORP.**, 888 Wilcrest Drive, Houston, TX 77042 (713-981-9100; FAX: 713-981-7081; e-mail: info@exotherm.com; web site: www.exotherm.com)  
— See our ad on page 78

## Heaters, screw flight

**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: info@komline.com; web site: www.komline.com)  
— See our ad on page 148

## Heaters, steam injection

Elmridge Inc., Livonia, MI  
**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)  
— See our ad on page 15

Hydro-Thermal Corp., Waukesha, WI

**KOERTING HANNOVER AG**, Badenstedter Str. 56, 30453 Hannover, Germany (+49 511 2129-0, e-mail: st@koerting.de, web site: www.koerting.de)  
— See our ad on page 117

**PICK HEATERS INC.**, 730 S. Indiana Ave., P.O. Box 516, West Bend, WI 53095 (262-338-1191; FAX: 262-338-8489; e-mail: info1@pickheaters.com; web site: www.pickheaters.com)

ProSonix LLC, Milwaukee, WI  
Schutte & Koerting, Trevoese, PA

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

## Heaters, tank car

Hydro-Thermal Corp., Waukesha, WI

**PICK HEATERS INC.**, 730 S. Indiana Ave., P.O. Box 516, West Bend, WI 53095 (262-338-1191; FAX: 262-338-8489; e-mail: info1@pickheaters.com; web site: www.pickheaters.com)

## Heaters, thermal liquid

HRS Process Systems Ltd., Pune  
HTT Energy GmbH, Herford, Germany  
Mokon, Buffalo, NY  
Spaltech International Inc., Halton Hills  
Tempco Electric Heater Co., IL

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## Heaters, tubular

Dalton Electric Heating Co., Inc., Ipswich, MA  
HRS Process Systems Ltd., Pune  
Tempco Electric Heater Co., IL

**UNIFLUX / EXOTHERM CORP.**, 888 Wilcrest Drive, Houston, TX 77042 (713-981-9100; FAX: 713-981-7081; e-mail: info@exotherm.com; web site: www.exotherm.com)

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## Heaters, unit

Dalton Electric Heating Co., Inc., Ipswich, MA  
HTT Energy GmbH, Herford, Germany

## Recuperators

Advanced Heat Recovery, Inc., Division of AQUA Innovations, Inc., Baltimore, MD  
HRS Process Systems Ltd., Pune

## Sterilizers

AVA-Huep GmbH u. Co. KG, Herrsching, Germany  
HRS Process Systems Ltd., Pune

## Vaporizers

**UNIFLUX / EXOTHERM CORP.**, 888 Wilcrest Drive, Houston, TX 77042 (713-981-9100; FAX: 713-981-7081; e-mail: info@exotherm.com; web site: www.exotherm.com)  
— See our ad on page 78

## KILNS, OVENS & FURNACES

### Burners, combination fuel

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— See our ad on page 3

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Zeeco, Inc., Broken Arrow, OK

### Burners, gas

**JOHN ZINK HAMWORTHY COMBUSTION, GLOBAL HEADQUARTERS: JOHN ZINK COMPANY LLC**, 11920 East Apache Street, Tulsa, OK 74116 (800-225-0085; 918.234.1800; FAX: 918.234.2700; e-mail: info@johnzink.com; web site: johnzinkhamworthy.com)  
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**UNIFLUX / EXOTHERM CORP.**, 888 Wilcrest Drive, Houston, TX 77042 (713-981-9100; FAX: 713-981-7081; e-mail: info@exotherm.com; web site: www.exotherm.com)

— See our ad on page 78

**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Zeeco, Inc., Broken Arrow, OK

### Burners, oil

**JOHN ZINK HAMWORTHY COMBUSTION, GLOBAL HEADQUARTERS: JOHN ZINK COMPANY LLC**, 11920 East Apache Street, Tulsa, OK 74116 (800-225-0085; 918.234.1800; FAX: 918.234.2700; e-mail: info@johnzink.com; web site: johnzinkhamworthy.com)  
— See our ad on page 3

John Zink Hamworthy Combustion, Tulsa, OK  
**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Zeeco, Inc., Broken Arrow, OK

### Calciners, fluidizing

COMESSA, Strasbourg  
CPFD-Software, Albuquerque, New Mexico  
Heyl & Patterson Inc., Renneburg Division, Pittsburg, PA

### Calciners, rotary

COMESSA, Strasbourg  
Denver Mineral Engineers, Inc., Littleton, CO  
Harper International, Buffalo, NY  
Harrop Industries, Inc., Columbus, OH  
Heyl & Patterson Inc., Renneburg Division, Pittsburg, PA

### Furnaces, annealing

Epcon Industrial Systems, LP, The Woodlands, TX  
Harper International, Buffalo, NY  
Harrop Industries, Inc., Columbus, OH  
L&L Special Furnace Co., Inc., Aston, PA  
Lucifer Furnaces Inc., Warrington, PA

## Furnaces, cracking

Diamond Refractory Services, TX

## Furnaces, electric

Harper International, Buffalo, NY  
Harrop Industries, Inc., Columbus, OH  
L&L Special Furnace Co., Inc., Aston, PA  
Lucifer Furnaces Inc., Warrington, PA

## Furnaces, fluid bed

COMESSA, Strasbourg

## Furnaces, gas burning

COMESSA, Strasbourg  
Epcon Industrial Systems, LP, The Woodlands, TX  
Harper International, Buffalo, NY  
Harrop Industries, Inc., Columbus, OH  
L&L Special Furnace Co., Inc., Aston, PA  
**UNIFLUX / EXOTHERM CORP., 888 Wilcrest Drive, Houston, TX 77042 (713-981-9100; FAX: 713-981-7081; e-mail: info@exotherm.com; web site: www.exotherm.com)**  
— See our ad on page 78

## Furnaces, hearth

Harper International, Buffalo, NY  
Harrop Industries, Inc., Columbus, OH  
L&L Special Furnace Co., Inc., Aston, PA  
Lucifer Furnaces Inc., Warrington, PA  
**Wyssmont Co. Inc., Fort Lee, NJ**  
— See our ad on page 149

## Furnaces, high pressure

COMESSA, Strasbourg  
**UNIFLUX / EXOTHERM CORP., 888 Wilcrest Drive, Houston, TX 77042 (713-981-9100; FAX: 713-981-7081; e-mail: info@exotherm.com; web site: www.exotherm.com)**  
— See our ad on page 78

## Furnaces, high temperature

COMESSA, Strasbourg  
Epcon Industrial Systems, LP, The Woodlands, TX  
Harper International, Buffalo, NY  
Harrop Industries, Inc., Columbus, OH  
L&L Special Furnace Co., Inc., Aston, PA  
Lucifer Furnaces Inc., Warrington, PA  
**UNIFLUX / EXOTHERM CORP., 888 Wilcrest Drive, Houston, TX 77042 (713-981-9100; FAX: 713-981-7081; e-mail: info@exotherm.com; web site: www.exotherm.com)**  
— See our ad on page 78

ZIRCAR Refractory Composites, Inc., Florida, NY

## Furnaces, induction

L&L Special Furnace Co., Inc., Aston, PA  
ZIRCAR Refractory Composites, Inc., Florida, NY

## Furnaces, melting

Denver Mineral Engineers, Inc., Littleton, CO  
Harrop Industries, Inc., Columbus, OH

## Furnaces, muffle

Harper International, Buffalo, NY  
Harrop Industries, Inc., Columbus, OH  
L&L Special Furnace Co., Inc., Aston, PA  
Lucifer Furnaces Inc., Warrington, PA

## Furnaces, multiple hearth

Harper International, Buffalo, NY  
**Wyssmont Co. Inc., Fort Lee, NJ**  
— See our ad on page 149

## Furnaces, radiant heating

COMESSA, Strasbourg  
Harper International, Buffalo, NY  
Harrop Industries, Inc., Columbus, OH

## Furnaces, rotary hearth

Harrop Industries, Inc., Columbus, OH  
**Wyssmont Co. Inc., Fort Lee, NJ**  
— See our ad on page 149

## Furnaces, vacuum

ZIRCAR Refractory Composites, Inc., Florida, NY

## Furnaces, vertical

Harper International, Buffalo, NY  
Harrop Industries, Inc., Columbus, OH  
L&L Special Furnace Co., Inc., Aston, PA  
Lucifer Furnaces Inc., Warrington, PA  
**UNIFLUX / EXOTHERM CORP., 888 Wilcrest Drive, Houston, TX 77042 (713-981-9100; FAX: 713-981-7081; e-mail: info@exotherm.com; web site: www.exotherm.com)**  
— See our ad on page 78

**Wyssmont Co. Inc., Fort Lee, NJ**

— See our ad on page 149

## Kiln, oven & furnace accessories

COMESSA, Strasbourg  
Harper International, Buffalo, NY  
Harrop Industries, Inc., Columbus, OH  
Lucifer Furnaces Inc., Warrington, PA

## Kilns, fluidizing

COMESSA, Strasbourg  
CPFD-Software, Albuquerque, New Mexico

## Kilns, rotary

COMESSA, Strasbourg  
FEEOCO International, Inc., Green Bay, WI  
Harper International, Buffalo, NY  
Harrop Industries, Inc., Columbus, OH  
Heyl & Patterson Inc., Renneburg Division, Pittsburgh, PA  
Metso Minerals Industries, Inc., York, PA

## Ovens, drying

AWT World Trade Inc., Chicago, IL  
COMESSA, Strasbourg  
Cober, Inc., Stratford, CT  
Epcon Industrial Systems, LP, The Woodlands, TX  
Harper International, Buffalo, NY  
Harrop Industries, Inc., Columbus, OH  
**Wyssmont Co. Inc., Fort Lee, NJ**  
— See our ad on page 149

## Ovens, electric

COMESSA, Strasbourg  
Epcon Industrial Systems, LP, The Woodlands, TX  
Harrop Industries, Inc., Columbus, OH  
L&L Special Furnace Co., Inc., Aston, PA  
Lucifer Furnaces Inc., Warrington, PA

## Ovens, infrared

AWT World Trade Inc., Chicago, IL  
COMESSA, Strasbourg

## Ovens, microwave

Cober, Inc., Stratford, CT

## Ovens, radiant heating

COMESSA, Strasbourg

## Ovens, vacuum

COMESSA, Strasbourg  
**Wyssmont Co. Inc., Fort Lee, NJ**  
— See our ad on page 149

## Roasters, food products

COMESSA, Strasbourg  
**KOMLINE-SANDERSON ENGINEERING CORP., 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: info@komline.com; web site: www.komline.com)**  
— See our ad on page 148

**NEUHAUS NEOTEC MASCHINEN- UND ANLAGEN-BAU GMBH, Dieselstrasse 5-9, 0 D-21465 Reinbek (+49-40-72771-500; FAX: +49-40-72771-550; e-mail: sales@neuhaus-neotec.de; web site: www.neuhaus-neotec.de)**

**Wyssmont Co. Inc., Fort Lee, NJ**  
— See our ad on page 149

## MIXING EQUIPMENT FOR FLUIDS

### Homogenizers

**ADMIX INC., 144 Harvey Road, Londonderry, NH 03053 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: admixsales@admix.com; web site: www.admix.com)**

Bepex International LLC, Minneapolis, MN  
**CHARLES ROSS & SON CO., 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)**  
— See our ad on page 9

**EKATO RUEHR- UND MISCHTECHNIK GMBH, Hohe-Flum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: + 49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)**  
— See our ad on page 163

**IKA-WERKE GMBH & CO.KG, Janke & Kunkel-Str. 10, Staufen, Germany 79219 (+49 7633 831-0; FAX: +49 7633 831-907; e-mail: marketing@ika.de; web site: www.ikaprocess.com)**

**JAYGO, INCORPORATED, 7 Emery Ave., Randolph, NJ 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)**

**NOV, Dayton, OH**  
Wilhelm Siefert GmbH & Co. KG, Velbert

### Homogenizers, high pressure

**ADMIX INC., 144 Harvey Road, Londonderry, NH 03053 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: admixsales@admix.com; web site: www.admix.com)**

Buchi Pilot Plant & Reactor systems, Headquarter, Uster, New York, CHE

**CHARLES ROSS & SON CO., 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)**

— See our ad on page 9  
**EKATO RUEHR- UND MISCHTECHNIK GMBH, Hohe-Flum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: + 49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)**  
— See our ad on page 163

### Liquid-mixer parts & accessories

**ADMIX INC., 144 Harvey Road, Londonderry, NH 03053 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: admixsales@admix.com; web site: www.admix.com)**

**CHARLES ROSS & SON CO., 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)**

— See our ad on page 9  
**EKATO RUEHR- UND MISCHTECHNIK GMBH, Hohe-Flum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: + 49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)**  
— See our ad on page 163

**IKA-WERKE GMBH & CO.KG, Janke & Kunkel-Str. 10, Staufen, Germany 79219 (+49 7633 831-0; FAX: +49 7633 831-907; e-mail: marketing@ika.de; web site: www.ikaprocess.com)**

**NOV, Dayton, OH**  
Quadro Engineering Corp., WATERLOO

### Mixers, High Viscosity

**ADMIX INC., 144 Harvey Road, Londonderry, NH 03053 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: admixsales@admix.com; web site: www.admix.com)**

Buchi Pilot Plant & Reactor systems, Headquarter, Uster, New York, CHE

**CHARLES ROSS & SON CO., 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)**

— See our ad on page 9  
Dipesh Engineering Works, Mumbai, IND  
Pulsair Systems, Inc., Bellevue, WA

### Mixers, air driven

**ADMIX INC., 144 Harvey Road, Londonderry, NH 03053 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: admixsales@admix.com; web site: www.admix.com)**

Conn and Co., L.L.C., Warren, PA  
NOV, Dayton, OH  
**NOL-TEC SYSTEMS, INC., 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)**  
— See our ad on page 45

Nordson SEALANT EQUIPMENT, Plymouth, MI  
**POPE SCIENTIFIC, INC., P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)**  
— See our ad on page 35

### Mixers, anchor

**CHARLES ROSS & SON CO., 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)**

— See our ad on page 9  
**EKATO RUEHR- UND MISCHTECHNIK GMBH, Hohe-Flum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: + 49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)**  
— See our ad on page 163

LOTUS MIXERS INC., North Venice, FL  
NOV, Dayton, OH

### Mixers: barrel, drum, carboy

Conn and Co., L.L.C., Warren, PA

**PAUL O. ABBE**, 735 East Green St., Bensenville, IL 60106 (800-524-2188 US; 630-350-3012; FAX: 630-238-7584; e-mail: sales@pauloabbe.com; web site: www.pauloabbe.com)  
— See our ad on page 17

## Mixers, batch

AVA-Americas, Herrsching, Germany  
AVA-Huep GmbH u. Co. KG, Herrsching, Germany  
Aaron Process Equipment Co., Bensenville, IL  
**ADMIX INC.**, 144 Harvey Road, Londonderry, NH 03053 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: admixsales@admixon.com; web site: www.admixon.com)

Bematek Systems, Inc., Salem, MA  
Bepex International LLC, Minneapolis, MN  
**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)  
— See our ad on page 9

Clearfield Machine Co., Clearfield, PA  
Conn and Co., L.L.C., Warren, PA  
Dipesh Engineering Works, Mumbai, IND  
**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hoheflum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: + 49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)  
— See our ad on page 163

EquipNet, Inc., Canton, MA  
Gebrüder Loedige Maschinenbau GmbH, Paderborn  
**IKA-WERKE GMBH & CO.KG**, Janke & Kunkel-Str. 10, Staufen, Germany 79219 (+49 7633 831-0; FAX: +49 7633 831-907; e-mail: marketing@ika.de; web site: www.ikaprocess.com)

**JAYGO, INCORPORATED**, 7 Emery Ave., Randolph, NJ 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

**NOV, Dayton, OH**  
**NOL-TEC SYSTEMS, INC.**, 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)  
— See our ad on page 45

**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)  
— See our ad on page 35

Quadro Engineering Corp., WATERLOO  
Shiv Shakti Process Equipment P. Ltd., International Marketing & Sales, Mumbai

## Mixers, bottom entering

**ADMIX INC.**, 144 Harvey Road, Londonderry, NH 03053 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: admixsales@admixon.com; web site: www.admixon.com)

**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hoheflum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: + 49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)  
— See our ad on page 163

**LOTUS MIXERS INC.**, North Venice, FL  
NOV, Dayton, OH

## Mixers, chilled

**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)  
— See our ad on page 9

**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hoheflum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: + 49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)  
— See our ad on page 163

## Mixers, cone

AVA-Americas, Herrsching, Germany  
AVA-Huep GmbH u. Co. KG, Herrsching, Germany  
**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)  
— See our ad on page 9

**JAYGO, INCORPORATED**, 7 Emery Ave., Randolph, NJ 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

## Mixers, continuous

AVA-Americas, Herrsching, Germany  
AVA-Huep GmbH u. Co. KG, Herrsching, Germany  
**ADMIX INC.**, 144 Harvey Road, Londonderry, NH 03053 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: admixsales@admixon.com; web site: www.admixon.com)

**BUSS ChemTech AG**, Pratteln 1  
Bematek Systems, Inc., Salem, MA

Bepex International LLC, Minneapolis, MN  
**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)  
— See our ad on page 9

Clearfield Machine Co., Clearfield, PA  
**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hoheflum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: + 49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)  
— See our ad on page 163

EquipNet, Inc., Canton, MA  
Gebrüder Loedige Maschinenbau GmbH, Paderborn  
**IKA-WERKE GMBH & CO.KG**, Janke & Kunkel-Str. 10, Staufen, Germany 79219 (+49 7633 831-0; FAX: +49 7633 831-907; e-mail: marketing@ika.de; web site: www.ikaprocess.com)

**JLS International, Inc.**, Charlotte, NC  
**JAYGO, INCORPORATED**, 7 Emery Ave., Randolph, NJ 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

Kolfo Corp., Cary, IL  
NOV, Dayton, OH  
Quadro Engineering Corp., WATERLOO  
**SULZER CHEMTECH USA, INC.**, 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rodney.alario@sulzer.com; web site: www.sulzer.com)

Wilhelm Siefert GmbH & Co. KG, Velbert

## Mixers, disc

**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)  
— See our ad on page 9

Conn and Co., L.L.C., Warren, PA  
Dipesh Engineering Works, Mumbai, IND  
NOV, Dayton, OH

## Mixers, gas-liquid, high intensity

**ADMIX INC.**, 144 Harvey Road, Londonderry, NH 03053 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: admixsales@admixon.com; web site: www.admixon.com)

Biazzi SA, Chailly/Montreux  
Dipesh Engineering Works, Mumbai, IND  
**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hoheflum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: + 49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)  
— See our ad on page 163

Gasco, Oldsmar, FL  
**KOERTING HANNOVER AG**, Badenstedter Str. 56, 30453 Hannover, Germany (+49 511 2129-0, e-mail: st@koerting.de, web site: www.koerting.de)  
— See our ad on page 117

Vortab Company, San Marcos, CA

## Mixers, gate

**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)  
— See our ad on page 9

Dipesh Engineering Works, Mumbai, IND

## Mixers, heated

**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)  
— See our ad on page 9

**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hoheflum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: + 49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)  
— See our ad on page 163

**JAYGO, INCORPORATED**, 7 Emery Ave., Randolph, NJ 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

**KOERTING HANNOVER AG**, Badenstedter Str. 56, 30453 Hannover, Germany (+49 511 2129-0, e-mail: st@koerting.de, web site: www.koerting.de)  
— See our ad on page 117

**SULZER CHEMTECH USA, INC.**, 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rodney.alario@sulzer.com; web site: www.sulzer.com)

## Mixers, jet

**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hoheflum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: + 49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)  
— See our ad on page 163

Elmridge Inc., Livonia, MI

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 (800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com  
— See our ad on page 15

Gamajet, part of the Alfa Laval Group, PA  
**KOERTING HANNOVER AG**, Badenstedter Str. 56, 30453 Hannover, Germany (+49 511 2129-0, e-mail: st@koerting.de, web site: www.koerting.de)  
— See our ad on page 117

Quadro Engineering Corp., WATERLOO  
Schutte & Koerting, Treviso, PA

## Mixers, paddle

AWT World Trade Inc., Chicago, IL  
Bepex International LLC, Minneapolis, MN  
**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)  
— See our ad on page 9

Dipesh Engineering Works, Mumbai, IND  
Dynamic Air Inc., St. Paul, MN  
**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hoheflum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: + 49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)  
— See our ad on page 163

FEECO International, Inc., Green Bay, WI  
**JAYGO, INCORPORATED**, 7 Emery Ave., Randolph, NJ 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

**LOTUS MIXERS INC.**, North Venice, FL

## Mixers, pipeline (inline)

**ADMIX INC.**, 144 Harvey Road, Londonderry, NH 03053 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: admixsales@admixon.com; web site: www.admixon.com)

Bematek Systems, Inc., Salem, MA  
**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)  
— See our ad on page 9

**IKA-WERKE GMBH & CO.KG**, Janke & Kunkel-Str. 10, Staufen, Germany 79219 (+49 7633 831-0; FAX: +49 7633 831-907; e-mail: marketing@ika.de; web site: www.ikaprocess.com)

**JLS International, Inc.**, Charlotte, NC  
Kolfo Corp., Cary, IL  
NOV, Dayton, OH  
Quadro Engineering Corp., WATERLOO  
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Wilhelm Siefert GmbH & Co. KG, Velbert

## Mixers, pony

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## Mixers, portable

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**LOTUS MIXERS INC.**, North Venice, FL  
NOV, Dayton, OH

## Mixers, pressure

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Fluitron, Inc., Ivyland, PA  
**JLS International, Inc.**, Charlotte, NC  
NOV, Dayton, OH



**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)  
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## Mixers, propeller

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FLUX-GERAETE GMBH, Maulbronn, Germany

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## Mixers, side entering

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## Mixers, slurry

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Hosokawa Micron B.V., Mixing, Drying & Agglomeration, Doetinchem, NLD

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Schutte & Koerting, Treviso, PA

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Wilhelm Siefert GmbH & Co. KG, Velbert

## Mixers, static

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## Mixers, top entering

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NOV, Dayton, OH

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Quadro Engineering Corp., WATERLOO

## Mixers, turbine

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Shiv Shakti Process Equipment P. Ltd., International Marketing & Sales, Mumbai  
Siemens Process Industries and Drives, Process Instrumentation & Analytics, Spring House, PA  
The Industrial Controls Company, Inc., O

### Blenders, cone

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Shiv Shakti Process Equipment P. Ltd., International Marketing & Sales, Mumbai

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Acron Inc., Moonachie, NJ

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Bepex International LLC, Minneapolis, MN

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Vibra Screw Inc., Totowa, NJ

Wilhelm Siefert GmbH & Co. KG, Velbert

### Blenders, horizontal

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**YOUNG INDUSTRIES, INC.**, 16 Painter St, Muncy, PA 17756 (e-mail: wjmahoney@younginds.com)

### Blenders, inline

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Wilhelm Siefert GmbH & Co. KG, Velbert

### Blenders, liquid feed

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Pulsair Systems, Inc., Bellevue, WA

### Blenders, ribbon

Aaron Process Equipment Co., Bensenville, IL

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### Blenders, spiral

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### Blenders, tumbling V

Bioengineering Inc., Somerville, MA

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AVA-Huep GmbH u. Co. KG, Herrsching, Germany B

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LIST AG, Arisdorf

### Mixers, double arm kneaders

B & P Process Equipment, Saginaw, MI

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 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rod-  
 ney.alario@sulzer.com; web site: www.sulzer.com)

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 7633 831-907; e-mail: marketing@ika.de; web site:  
 www.ikaprocess.com)

JLS International, Inc., Charlotte, NC

**JAYGO, INCORPORATED**, 7 Emery Ave., Randolph, NJ  
 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-  
 688-6060; e-mail: sales@jaygoinc.com; web site:  
 www.jaygoinc.com)

L.B. Bohle Maschinen + Verfahren GmbH, Ennigerloh  
 LIST AG, Arisdorf  
 NOV, Dayton, OH

**PAUL O. ABBE**, 735 East Green St., Bensenville, IL  
 60106 (800-524-2188 US; 630-350-3012; FAX: 630-  
 238-7584; e-mail: sales@pauloabbe.com; web site:  
 www.pauloabbe.com)  
 — See our ad on page 17

PerMix Tec. Co. Ltd, ISR  
 Quadro Engineering Corp., WATERLOO  
 Vortab Company, San Marcos, CA  
 Wilhelm Siefert GmbH & Co. KG, Velbert

## Mixers, magnetically coupled

**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hohe-  
 Flum-Str.37, Schopfheim, Germany D-79650 (+49  
 7622 290; FAX: +49 7622 29 213; e-mail: info@ekato.  
 com; web site: www.ekato.com)  
 — See our ad on page 163

Fluitron, Inc., Iyland, PA

## Mixers, motionless

**ADMIX INC.**, 144 Harvey Road, Londonderry, NH 03053  
 (800-466-2369; 603-627-2340; FAX: 603-627-2019;  
 e-mail: admixsales@admix.com; web site: www.  
 admix.com)

**CHARLES ROSS & SON CO.**, 710 Old Willets Path,  
 P.O. Box 12308, Hauppauge, NY 11788-0615 (800-  
 243-7677; 631-234-0500; FAX: 631-234-0691; e-mail:  
 sales@mixers.com; web site: www.mixers.com)  
 — See our ad on page 9

JLS International, Inc., Charlotte, NC

Koflo Corp., Cary, IL  
 NOV, Dayton, OH

Nordson SEALANT EQUIPMENT, Plymouth, MI  
 Pulsair Systems, Inc., Bellevue, WA

**SULZER CHEMTECH LTD**, Sulzer Allee 48, P.O. Box 65,  
 Winterthur 8404 (+41 52 262 11 22; FAX: +41 52 262  
 00 60; e-mail: chemtech@sulzer.com; web site: www.  
 sulzer.com)

**SULZER CHEMTECH USA, INC.**, 1 Sulzer Way, Tulsa,  
 OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail:  
 rodneym.alario@sulzer.com; web site: www.sulzer.  
 com)

## Mixers, other solid-liquid

AVA-Americas, Hersching, Germany  
 AVA-Huep GmbH u. Co. KG, Hersching, Germany

**ADMIX INC.**, 144 Harvey Road, Londonderry, NH 03053  
 (800-466-2369; 603-627-2340; FAX: 603-627-2019;  
 e-mail: admixsales@admix.com; web site: www.  
 admix.com)

Bepex International LLC, Minneapolis, MN

**CHARLES ROSS & SON CO.**, 710 Old Willets Path,  
 P.O. Box 12308, Hauppauge, NY 11788-0615 (800-  
 243-7677; 631-234-0500; FAX: 631-234-0691; e-mail:  
 sales@mixers.com; web site: www.mixers.com)  
 — See our ad on page 9

**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hohe-  
 Flum-Str.37, Schopfheim, Germany D-79650 (+49  
 7622 290; FAX: +49 7622 29 213; e-mail: info@ekato.  
 com; web site: www.ekato.com)  
 — See our ad on page 163

Elmridge Inc., Livonia, MI

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045  
 ((800) 722-6622; e-mail: sales.northamerica@gea.  
 com; web site: www.gea.com)  
 — See our ad on page 15

Mars Mineral, Mars, PA

**PAUL O. ABBE**, 735 East Green St., Bensenville, IL  
 60106 (800-524-2188 US; 630-350-3012; FAX: 630-  
 238-7584; e-mail: sales@pauloabbe.com; web site:  
 www.pauloabbe.com)  
 — See our ad on page 17

PerMix Tec. Co. Ltd, ISR

Wilhelm Siefert GmbH & Co. KG, Velbert

## Mixers, pan

**CHARLES ROSS & SON CO.**, 710 Old Willets Path,  
 P.O. Box 12308, Hauppauge, NY 11788-0615 (800-  
 243-7677; 631-234-0500; FAX: 631-234-0691; e-mail:  
 sales@mixers.com; web site: www.mixers.com)  
 — See our ad on page 9

Clearfield Machine Co., Clearfield, PA

Mars Mineral, Mars, PA

## Mixers, planetary

B & P Process Equipment, Saginaw, MI

**CHARLES ROSS & SON CO.**, 710 Old Willets Path,  
 P.O. Box 12308, Hauppauge, NY 11788-0615 (800-  
 243-7677; 631-234-0500; FAX: 631-234-0691; e-mail:  
 sales@mixers.com; web site: www.mixers.com)  
 — See our ad on page 9

**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hohe-  
 Flum-Str.37, Schopfheim, Germany D-79650 (+49  
 7622 290; FAX: +49 7622 29 213; e-mail: info@ekato.  
 com; web site: www.ekato.com)  
 — See our ad on page 163

**JAYGO, INCORPORATED**, 7 Emery Ave., Randolph, NJ  
 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-  
 688-6060; e-mail: sales@jaygoinc.com; web site:  
 www.jaygoinc.com)

**PAUL O. ABBE**, 735 East Green St., Bensenville, IL  
 60106 (800-524-2188 US; 630-350-3012; FAX: 630-  
 238-7584; e-mail: sales@pauloabbe.com; web site:  
 www.pauloabbe.com)  
 — See our ad on page 17

PerMix Tec. Co. Ltd, ISR

## Mixers, ribbon

Bepex International LLC, Minneapolis, MN

**CHARLES ROSS & SON CO.**, 710 Old Willets Path,  
 P.O. Box 12308, Hauppauge, NY 11788-0615 (800-  
 243-7677; 631-234-0500; FAX: 631-234-0691; e-mail:  
 sales@mixers.com; web site: www.mixers.com)  
 — See our ad on page 9

Dipesh Engineering Works, Mumbai, IND

**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hohe-  
 Flum-Str.37, Schopfheim, Germany D-79650 (+49  
 7622 290; FAX: +49 7622 29 213; e-mail: info@ekato.  
 com; web site: www.ekato.com)  
 — See our ad on page 163

Hosokawa Micron B.V., Mixing, Drying & Agglomeration,  
 Doetinchem, NLD

**JAYGO, INCORPORATED**, 7 Emery Ave., Randolph, NJ  
 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-  
 688-6060; e-mail: sales@jaygoinc.com; web site:  
 www.jaygoinc.com)

Kemtec Group, Inc., Bristol, PA

**PAUL O. ABBE**, 735 East Green St., Bensenville, IL  
 60106 (800-524-2188 US; 630-350-3012; FAX: 630-  
 238-7584; e-mail: sales@pauloabbe.com; web site:  
 www.pauloabbe.com)  
 — See our ad on page 17

PerMix Tec. Co. Ltd, ISR

## Mixers, roller

**CHARLES ROSS & SON CO.**, 710 Old Willets Path,  
 P.O. Box 12308, Hauppauge, NY 11788-0615 (800-  
 243-7677; 631-234-0500; FAX: 631-234-0691; e-mail:  
 sales@mixers.com; web site: www.mixers.com)  
 — See our ad on page 9

Clearfield Machine Co., Clearfield, PA

Dipesh Engineering Works, Mumbai, IND

## Mixers, rotary blade

Bepex International LLC, Minneapolis, MN

**CHARLES ROSS & SON CO.**, 710 Old Willets Path,  
 P.O. Box 12308, Hauppauge, NY 11788-0615 (800-  
 243-7677; 631-234-0500; FAX: 631-234-0691; e-mail:  
 sales@mixers.com; web site: www.mixers.com)  
 — See our ad on page 9

Dipesh Engineering Works, Mumbai, IND

**JAYGO, INCORPORATED**, 7 Emery Ave., Randolph, NJ  
 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-  
 688-6060; e-mail: sales@jaygoinc.com; web site:  
 www.jaygoinc.com)

Luxme International Ltd., Brossard, QC, CAN

NOV, Dayton, OH

**PAUL O. ABBE**, 735 East Green St., Bensenville, IL  
 60106 (800-524-2188 US; 630-350-3012; FAX: 630-  
 238-7584; e-mail: sales@pauloabbe.com; web site:  
 www.pauloabbe.com)  
 — See our ad on page 17

## Mixers, rotary disc

Conn and Co., L.L.C., Warren, PA

**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hohe-  
 Flum-Str.37, Schopfheim, Germany D-79650 (+49  
 7622 290; FAX: +49 7622 29 213; e-mail: info@ekato.  
 com; web site: www.ekato.com)  
 — See our ad on page 163

Mars Mineral, Mars, PA

## Mixers, rotary drum

Dipesh Engineering Works, Mumbai, IND

FECCO International, Inc., Green Bay, WI

Mars Mineral, Mars, PA

Munson Machinery Company, Inc., Utica, NY

**PAUL O. ABBE**, 735 East Green St., Bensenville, IL  
 60106 (800-524-2188 US; 630-350-3012; FAX: 630-  
 238-7584; e-mail: sales@pauloabbe.com; web site:  
 www.pauloabbe.com)  
 — See our ad on page 17

Mars Mineral, Mars, PA

## Mixers, screw

AVA-Huep GmbH u. Co. KG, Hersching, Germany

Bepex International LLC, Minneapolis, MN

**CHARLES ROSS & SON CO.**, 710 Old Willets Path,  
 P.O. Box 12308, Hauppauge, NY 11788-0615 (800-  
 243-7677; 631-234-0500; FAX: 631-234-0691; e-mail:  
 sales@mixers.com; web site: www.mixers.com)  
 — See our ad on page 9

Dipesh Engineering Works, Mumbai, IND

**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hohe-  
 Flum-Str.37, Schopfheim, Germany D-79650 (+49  
 7622 290; FAX: +49 7622 29 213; e-mail: info@ekato.  
 com; web site: www.ekato.com)  
 — See our ad on page 163

Hosokawa Micron B.V., Mixing, Drying & Agglomeration,  
 Doetinchem, NLD

**JAYGO, INCORPORATED**, 7 Emery Ave., Randolph, NJ  
 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-  
 688-6060; e-mail: sales@jaygoinc.com; web site:  
 www.jaygoinc.com)

**PAUL O. ABBE**, 735 East Green St., Bensenville, IL  
 60106 (800-524-2188 US; 630-350-3012; FAX: 630-  
 238-7584; e-mail: sales@pauloabbe.com; web site:  
 www.pauloabbe.com)  
 — See our ad on page 17

READCO KURIMOTO, LLC, 460 Grim Lane, York, PA  
 17406 (e-mail: jiboufford@readco.com)  
 — See our ad on page 131

PerMix Tec. Co. Ltd, ISR

**PAUL O. ABBE**, 735 East Green St., Bensenville, IL  
 60106 (800-524-2188 US; 630-350-3012; FAX: 630-  
 238-7584; e-mail: sales@pauloabbe.com; web site:  
 www.pauloabbe.com)  
 — See our ad on page 17

READCO KURIMOTO, LLC, 460 Grim Lane, York, PA  
 17406 (e-mail: jiboufford@readco.com)  
 — See our ad on page 131

## Mixers, sealless

Pulsair Systems, Inc., Bellevue, WA

## Mixers, spiral ribbon

Bepex International LLC, Minneapolis, MN

**CHARLES ROSS & SON CO.**, 710 Old Willets Path,  
 P.O. Box 12308, Hauppauge, NY 11788-0615 (800-  
 243-7677; 631-234-0500; FAX: 631-234-0691; e-mail:  
 sales@mixers.com; web site: www.mixers.com)  
 — See our ad on page 9

Dipesh Engineering Works, Mumbai, IND

**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hohe-  
 Flum-Str.37, Schopfheim, Germany D-79650 (+49  
 7622 290; FAX: +49 7622 29 213; e-mail: info@ekato.  
 com; web site: www.ekato.com)  
 — See our ad on page 163

**JAYGO, INCORPORATED**, 7 Emery Ave., Randolph, NJ  
 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-  
 688-6060; e-mail: sales@jaygoinc.com; web site:  
 www.jaygoinc.com)

NOV, Dayton, OH

**PAUL O. ABBE**, 735 East Green St., Bensenville, IL  
 60106 (800-524-2188 US; 630-350-3012; FAX: 630-  
 238-7584; e-mail: sales@pauloabbe.com; web site:  
 www.pauloabbe.com)  
 — See our ad on page 17

Mars Mineral, Mars, PA

Munson Machinery Company, Inc., Utica, NY

Dipesh Engineering Works, Mumbai, IND

## Mixers, spiral screw

Bepex International LLC, Minneapolis, MN

Dipesh Engineering Works, Mumbai, IND



**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hohe-Flum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: + 49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)

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NOV, Dayton, OH

**PAUL O. ABBE**, 735 East Green St., Bensenville, IL 60106 (800-524-2188 US; 630-350-3012; FAX: 630-238-7584; e-mail: sales@pauloabbe.com; web site: www.pauloabbe.com)

— See our ad on page 17

PerMix Tec. Co. Ltd. ISR

**READCO KURIMOTO, LLC**, 460 Grim Lane, York, PA 17406 (e-mail: jboufford@readco.com)

— See our ad on page 131

## Mixers, vacuum tumble

**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)

— See our ad on page 9

**JAYGO, INCORPORATED**, 7 Emery Ave., Randolph, NJ 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

**PAUL O. ABBE**, 735 East Green St., Bensenville, IL 60106 (800-524-2188 US; 630-350-3012; FAX: 630-238-7584; e-mail: sales@pauloabbe.com; web site: www.pauloabbe.com)

— See our ad on page 17

## Mixers, vertical stationary

AVA-Huep GmbH u. Co. KG, Herrsching, Germany

Bepex International LLC, Minneapolis, MN

**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)

— See our ad on page 9

Conn and Co., L.L.C., Warren, PA

**JAYGO, INCORPORATED**, 7 Emery Ave., Randolph, NJ 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

## Mullers

Clearfield Machine Co., Clearfield, PA

**PAUL O. ABBE**, 735 East Green St., Bensenville, IL 60106 (800-524-2188 US; 630-350-3012; FAX: 630-238-7584; e-mail: sales@pauloabbe.com; web site: www.pauloabbe.com)

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## Solid-liquid-mixer parts & accessories

**ADMIX INC.**, 144 Harvey Road, Londonderry, NH 03053 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: admixsales@admix.com; web site: www.admix.com)

Bepex International LLC, Minneapolis, MN

Conn and Co., L.L.C., Warren, PA

**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hohe-Flum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: + 49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)

— See our ad on page 163

**IKA-WERKE GMBH & CO.KG**, Janke & Kunkel-Str. 10, Staufen, Germany 79219 (+49 7633 831-0; FAX: +49 7633 831-907; e-mail: marketing@ika.de; web site: www.ikaprocess.com)

NOV, Dayton, OH

**PAUL O. ABBE**, 735 East Green St., Bensenville, IL 60106 (800-524-2188 US; 630-350-3012; FAX: 630-238-7584; e-mail: sales@pauloabbe.com; web site: www.pauloabbe.com)

— See our ad on page 17

## PACKINGS, TRAYS FOR TOWERS & COLUMNS

### Packings, cooling tower

Delta Cooling Towers Inc., Roxbury Township, NJ

Koch Knight, LLC, East Canton, OH

SPX Cooling Technologies, Overland Park, KS

### Packings, tower & column, ceramic

Koch Knight, LLC, East Canton, OH

RVT Process Equipment, Inc., Knoxville, TN

**SULZER CHEMTECH USA, INC.**, 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rodney.alario@sulzer.com; web site: www.sulzer.com)

### Packings, tower & column, metal

AMACS, Houston, TX

Koch-Glitsch, Wichita, KS

RVT Process Equipment, Inc., Knoxville, TN

**SULZER CHEMTECH LTD**, Sulzer Allee 48, P.O. Box 65, Winterthur 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

**SULZER CHEMTECH USA, INC.**, 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rodney.alario@sulzer.com; web site: www.sulzer.com)

### Packings, tower & column, plastic

AMACS, Houston, TX

Delta Cooling Towers Inc., Roxbury Township, NJ



**KIMRE, INC.**, 744 SW 1st Street, Homestead, FL 33030 (305 233-4249; FAX: 305 233-8687; e-mail: sales@kimre.com; web site: www.kimre.com)

Koch-Glitsch, Wichita, KS

Koch Knight, LLC, East Canton, OH

RVT Process Equipment, Inc., Knoxville, TN

**SULZER CHEMTECH LTD**, Sulzer Allee 48, P.O. Box 65, Winterthur 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

**SULZER CHEMTECH USA, INC.**, 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rodney.alario@sulzer.com; web site: www.sulzer.com)

### Packings, tower & column, random

Koch-Glitsch, Wichita, KS

Koch Knight, LLC, East Canton, OH

RVT Process Equipment, Inc., Knoxville, TN

**SULZER CHEMTECH LTD**, Sulzer Allee 48, P.O. Box 65, Winterthur 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

**SULZER CHEMTECH USA, INC.**, 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rodney.alario@sulzer.com; web site: www.sulzer.com)

### Packings, tower & column, structured

AMACS, Houston, TX

**KIMRE, INC.**, 744 SW 1st Street, Homestead, FL 33030 (305 233-4249; FAX: 305 233-8687; e-mail: sales@kimre.com; web site: www.kimre.com)

Koch-Glitsch, Wichita, KS

Koch Knight, LLC, East Canton, OH

RVT Process Equipment, Inc., Knoxville, TN

**SULZER CHEMTECH LTD**, Sulzer Allee 48, P.O. Box 65, Winterthur 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

**SULZER CHEMTECH USA, INC.**, 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rodney.alario@sulzer.com; web site: www.sulzer.com)

### Packings, trays for towers & columns

AMACS, Houston, TX

Koch-Glitsch, Wichita, KS

RVT Process Equipment, Inc., Knoxville, TN

**SULZER CHEMTECH LTD**, Sulzer Allee 48, P.O. Box 65, Winterthur 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

**SULZER CHEMTECH USA, INC.**, 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rodney.alario@sulzer.com; web site: www.sulzer.com)

### Saddles, polyethylene, tower packings

Koch Knight, LLC, East Canton, OH

RVT Process Equipment, Inc., Knoxville, TN

## Trays & tower internals

AMACS, Houston, TX

Creative Pultrusions, Inc., Alum Bank, PA

Koch-Glitsch, Wichita, KS

Koch Knight, LLC, East Canton, OH

RVT Process Equipment, Inc., Knoxville, TN

**SULZER CHEMTECH LTD**, Sulzer Allee 48, P.O. Box 65, Winterthur 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

**SULZER CHEMTECH USA, INC.**, 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rodney.alario@sulzer.com; web site: www.sulzer.com)

Tiger Tower Services, LLC, Conroe, TX

## PROCESS VESSELS & REACTORS

### Autoclaves

Biazzi SA, Chailly/Montreux, 0

Dipesh Engineering Works, Mumbai, IND

**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hohe-Flum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: + 49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)

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WSF Industries, Buffalo, NY

### Biochemical equipment

Alfa Laval, Inc., Warminster, PA

NOV, Dayton, OH

RAS Process Equipment Inc., Robbinsville, NJ

Radleys, GBR

### Bioreactors

Bioengineering AG, Wald, .CHE

Dipesh Engineering Works, Mumbai, IND

**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hohe-Flum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: + 49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)

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**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)

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Veolia Water Solutions & Technologies, Moon Township, PA

### Coalescers

AMACS, Houston, TX

CECO Filters, a CECO Environmental Company, Telford, PA

Filtration & Membrane Technology, Inc., Houston, TX

Franken Filtertechnik KG, Germany, Huerth, Germany



**KIMRE, INC.**, 744 SW 1st Street, Homestead, FL 33030 (305 233-4249; FAX: 305 233-8687; e-mail: sales@kimre.com; web site: www.kimre.com)

Koch-Glitsch, Wichita, KS

Pollution Control Systems, Inc., Milford, OH

SPX Flow Technology, Ocala, FL

### Deaerators, degasifiers

Advance Boiler & Tank Co., West Allis, WI

**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)

— See our ad on page 9

**ROLL-REYNOLDS CO. INC.**, Six Campus Drive, Parsippany, NJ 07054 (908-232-4200; FAX: 908-232-2146; e-mail: info@roll.com; web site: www.roll.com)

Denver Mineral Engineers, Inc., Littleton, CO

Dipesh Engineering Works, Mumbai, IND

Hilliard Corp., Elmira, NY

**JAYGO, INCORPORATED**, 7 Emery Ave., Randolph, NJ 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)

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## Digesters, cookers

**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)  
— See our ad on page 9  
Radleys, GBR

## Extraction equipment

Alfa Laval, Inc., Warminster, PA  
Bepex International LLC, Minneapolis, MN  
Dipesh Engineering Works, Mumbai, IND  
**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: info@komline.com; web site: www.komline.com)  
— See our ad on page 148  
NOV, Dayton, OH  
**SULZER CHEMTECH LTD**, Sulzer Allee 48, P.O. Box 65, Winterthur 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

## Fermentation equipment & fermentors

Alfa Laval, Inc., Warminster, PA  
Bioengineering AG, Wald, CHE  
Dipesh Engineering Works, Mumbai, IND  
**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hoheflum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: +49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)  
— See our ad on page 163  
NOV, Dayton, OH  
**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)  
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## Generators, hydrogen

**AIR PRODUCTS AND CHEMICALS, INC.**, 7201 Hamilton Blvd., Allentown, PA 18195-1501 (800-345-3148; 610-481-4911; FAX: 610-481-4381; e-mail: cheminfo@airproducts.com; web site: www.airproducts.com/chemprocessing)

## Generators, nitrogen

**AIR PRODUCTS AND CHEMICALS, INC.**, 7201 Hamilton Blvd., Allentown, PA 18195-1501 (800-345-3148; 610-481-4911; FAX: 610-481-4381; e-mail: cheminfo@airproducts.com; web site: www.airproducts.com/chemprocessing)

Pneumatech, Inc., Rock Hill, SC

## Generators, oxygen

**AIR PRODUCTS AND CHEMICALS, INC.**, 7201 Hamilton Blvd., Allentown, PA 18195-1501 (800-345-3148; 610-481-4911; FAX: 610-481-4381; e-mail: cheminfo@airproducts.com; web site: www.airproducts.com/chemprocessing)

AirSep Corp., A Chart Industries Company, Buffalo, NY  
Pneumatech, Inc., Rock Hill, SC

## Generators, ozone

AirSep Corp., A Chart Industries Company, Buffalo, NY

## Heads, process vessel

Dipesh Engineering Works, Mumbai, IND  
Radleys, GBR

## Hydrogen reactors

Biazzi SA, Chailly/Montreux, 0  
Buchi Pilot Plant & Reactor systems, Headquarter, Uster, New York, CHE  
Diamond Refractory Services, TX  
Dipesh Engineering Works, Mumbai, IND

## Kettles, agitated

Buchi Pilot Plant & Reactor systems, Headquarter, Uster, New York, CHE  
**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)  
— See our ad on page 9  
Dipesh Engineering Works, Mumbai, IND  
**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hoheflum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: +49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)  
— See our ad on page 163  
Fluitron, Inc., Iyland, PA

## Kettles, crystallizing

**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)  
— See our ad on page 9  
Dipesh Engineering Works, Mumbai, IND  
**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)  
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## Kettles, electrically heated

**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)  
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**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)  
— See our ad on page 35

## Kettles, jacketed

Aaron Process Equipment Co., Bensenville, IL  
**ADMIX INC.**, 144 Harvey Road, Londonderry, NH 03053 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: admixsales@admix.com; web site: www.admix.com)  
Buchi Pilot Plant & Reactor systems, Headquarter, Uster, New York, CHE  
**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)  
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Dipesh Engineering Works, Mumbai, IND  
**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hoheflum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: +49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)  
— See our ad on page 163  
**JAYGO, INCORPORATED**, 7 Emery Ave., Randolph, NJ 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)  
WSF Industries, Buffalo, NY

## Kettles, melting

**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)  
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## Kettles, special metals

Buchi Pilot Plant & Reactor systems, Headquarter, Uster, New York, CHE  
**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)  
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## Kettles, vacuum

**ADMIX INC.**, 144 Harvey Road, Londonderry, NH 03053 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: admixsales@admix.com; web site: www.admix.com)  
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## Oxidizers, catalytic

ADWEST TECHNOLOGIES, a CECO Environmental Company, Anaheim, CA

Anguil Environmental Systems, Inc., Milwaukee, WI  
Catalytic Products Int. Inc., Lake Zurich, IL

## Polymerizers

Air Liquide Global E&C Solutions Germany GmbH, Frankfurt am Main  
Dipesh Engineering Works, Mumbai, IND  
**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hoheflum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: +49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)  
— See our ad on page 163  
LIST AG, Arisdorf  
NOV, Dayton, OH

## Reactors, continuous

**ALQAUA, INC.**, 7004 JFK BOULEVARD EAST, SUITE 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alaquaa@mindspring.com; web site: www.alaquainc.com)  
AVA-Americas, Hersching, Germany  
AVA-Huep GmbH u. Co. KG, Hersching, Germany  
Biazzi SA, Chailly/Montreux  
COMESSA, Strasbourg  
**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hoheflum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: +49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)  
— See our ad on page 163  
Federal Equipment Co., 8200 Bessemer Ave., Cleveland, OH 44127 United States (216-271-3500; fax: 216-271-5210; e-mail: deals@fedequip.com; web site: www.fedequip.com)  
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Gebrueder Loedige Maschinenbau GmbH, Paderborn  
**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: info@komline.com; web site: www.komline.com)  
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Midwest Steel Company Inc, Houston, TX  
Outotec (USA), Inc., Jussup, MD  
PDC Machines, Inc., Warminster, PA  
PRAJ INDUSTRIES LIMITED, Pune  
**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)  
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**SULZER CHEMTECH LTD**, Sulzer Allee 48, P.O. Box 65, Winterthur 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)  
**SULZER CHEMTECH USA, INC.**, 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rodney.alario@sulzer.com; web site: www.sulzer.com)  
Wyssmont Co. Inc., Fort Lee, NJ  
— See our ad on page 149

## Reactors, cooled, heated

AVA-Americas, Hersching, Germany  
AVA-Huep GmbH u. Co. KG, Hersching, Germany  
Bepex International LLC, Minneapolis, MN  
Biazzi SA, Chailly/Montreux  
**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)  
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COMESSA, Strasbourg  
**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hoheflum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: +49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)  
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Federal Equipment Co., 8200 Bessemer Ave., Cleveland, OH 44127 United States (216-271-3500; fax: 216-271-5210; e-mail: deals@fedequip.com; web site: www.fedequip.com)  
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Fluitron, Inc., Iyland, PA  
Gebrueder Loedige Maschinenbau GmbH, Paderborn  
**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: info@komline.com; web site: www.komline.com)  
— See our ad on page 148  
Outotec (USA), Inc., Jussup, MD  
**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)  
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Radleys, GBR  
Wyssmont Co. Inc., Fort Lee, NJ  
— See our ad on page 149

**Reactors, fluid bed**  
Bepex International LLC, Minneapolis, MN

# PRODUCT DIRECTORY

COMESSA, Strasbourg

Federal Equipment Co., 8200 Bessemer Ave., Cleveland, OH 44127 United States (216-271-3500; fax: 216-271-5210; e-mail: deals@fedequip.com; web site: www.fedequip.com)

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## Reactors, gas-liquid

Biazzi SA, Chailly/Montreux

Dipesh Engineering Works, Mumbai, IND

EKATO RUEHR- UND MISCHTECHNIK GMBH, Hohe-Flum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: + 49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)

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Federal Equipment Co., 8200 Bessemer Ave., Cleveland, OH 44127 United States (216-271-3500; fax: 216-271-5210; e-mail: deals@fedequip.com; web site: www.fedequip.com)

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Fluitron, Inc., Ivyland, PA

PDC Machines, Inc., Warminster, PA

## Reactors, hollow flight

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## Reactors, jacketed

Advance Boiler & Tank Co., West Allis, WI  
AVA-Americas, Herrsching, Germany  
AVA-Huep GmbH u. Co. KG, Herrsching, Germany  
Bepex International LLC, Minneapolis, MN  
Bioengineering AG, Wald, CHE  
Buchi Pilot Plant & Reactor systems, Headquarter, Uster, N. York, CHE

CHARLES ROSS & SON CO., 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)

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Chattanooga Boiler and Tank Co., Chattanooga, TN  
COMESSA, Strasbourg

De Dietrich Process Systems GmbH, Mainz

Dipesh Engineering Works, Mumbai, IND

EquipNet, Inc., Canton, MA

Federal Equipment Co., 8200 Bessemer Ave., Cleveland, OH 44127 United States (216-271-3500; fax: 216-271-5210; e-mail: deals@fedequip.com; web site: www.fedequip.com)

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Qutotec (USA), Inc., Jussup, MD

PDC Machines, Inc., Warminster, PA

POPE SCIENTIFIC, INC., P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)

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Radleys, GBR

Sahyadri Engineering Corporation, IND

WSF Industries, Buffalo, NY

## Reactors, jacketed, dimple

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COMESSA, Strasbourg

Dipesh Engineering Works, Mumbai, IND

Federal Equipment Co., 8200 Bessemer Ave., Cleveland, OH 44127 United States (216-271-3500; fax: 216-271-5210; e-mail: deals@fedequip.com; web site: www.fedequip.com)

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PRAJ INDUSTRIES LIMITED, Pune

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RAS Process Equipment Inc., Robbinsville, NJ

Radleys, GBR

Stainless Fabrication, Inc., Springfield, MO

## Reactors, jacketed, half-pipe

CHARLES ROSS & SON CO., 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)

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Chattanooga Boiler and Tank Co., Chattanooga, TN

COMESSA, Strasbourg

Federal Equipment Co., 8200 Bessemer Ave., Cleveland, OH 44127 United States (216-271-3500; fax: 216-271-5210; e-mail: deals@fedequip.com; web site: www.fedequip.com)

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Dipesh Engineering Works, Mumbai, IND

Stainless Fabrication, Inc., Springfield, MO

## Reactors, lined, glass

Aaron Process Equipment Co., Bensenville, IL

EquipNet, Inc., Canton, MA

Federal Equipment Co., 8200 Bessemer Ave., Cleveland, OH 44127 United States (216-271-3500; fax: 216-271-5210; e-mail: deals@fedequip.com; web site: www.fedequip.com)

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Radleys, GBR

## Reactors, lined, metal

Advance Boiler & Tank Co., West Allis, WI

Dipesh Engineering Works, Mumbai, IND

Federal Equipment Co., 8200 Bessemer Ave., Cleveland, OH 44127 United States (216-271-3500; fax: 216-271-5210; e-mail: deals@fedequip.com; web site: www.fedequip.com)

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## Reactors, loop

**SULZER CHEMTECH LTD**, Sulzer Allee 48, P.O. Box 65, Winterthur 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

**SULZER CHEMTECH USA, INC.**, 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rodney.alario@sulzer.com; web site: www.sulzer.com)

## Reactors, pilot plant

Biazz SA, Chailly/Montreux  
Bioengineering AG, Wald, CHE  
Buchi Pilot Plant & Reactor systems, Headquarter, Uster, New York, CHE

COMESSA, Strasbourg  
Dipesh Engineering Works, Mumbai, IND  
Fluitron, Inc., Ivyland, PA

PDC Machines, Inc., Warminster, PA

**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)  
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Radleys, GBR

**ZETON INC.**, 740 Oval Court, Burlington, 0 L7L 6A9 (877-299-3866; 905-632-3123; FAX: 905-632-0301; e-mail: info@zeton.com; web site: www.zeton.com)

## Reactors, rotary blade

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Dipesh Engineering Works, Mumbai, IND

**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: info@komline.com; web site: www.komline.com)  
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LIST AG, Arisdorf

Radleys, GBR

## Reactors, rotary disc

Dipesh Engineering Works, Mumbai, IND

**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: info@komline.com; web site: www.komline.com)  
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Wyssmont Co. Inc., Fort Lee, NJ

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## Separators

Advanced Industrial Technology Corp., Paramus, NJ

**ALAQUA, INC.**, 7004 JFK BOULEVARD EAST, SUITE 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alaqu@mindspring.com; web site: www.alaquainc.com)

Alfa Laval, Inc., Warminster, PA

Coastal Technologies Inc., Hampton, SC

Gilbert Industries, Sparta, MO

INOX-TECH INC., Ste. Catherine

**KIMRE, INC.**, 744 SW 1st Street, Homestead, FL 33003 (305 233-4249; FAX: 305 233-8687; e-mail: sales@kimre.com; web site: www.kimre.com)

**Koch-Glitsch, Wichita, KS**

SPX Flow Technology, Ocala, FL

**SULZER CHEMTECH LTD**, Sulzer Allee 48, P.O. Box 65, Winterthur 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

Walker Magnetics, Wor, MA

## Vapor collectors

**BIONOMIC INDUSTRIES INC.**, 777 Corporate Dr., Mahwah, NJ 07430-2008 (800-311-6767; 201-529-1094; FAX: 201-529-0252; e-mail: sales@bionomicind.com; web site: www.bionomicind.com)

## Vessel heads

Radleys, GBR

Samuel Pressure Vessel Group, Marinette, WI

## Vessels, plastic lined

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## Vessels, pressure, cryogenic

Dipesh Engineering Works, Mumbai, IND

**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)  
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## Vessels, pressure, custom

Advance Boiler & Tank Co., West Allis, WI  
Buchi Pilot Plant & Reactor systems, Headquarter, Uster, New York, CHE  
CB&I, The Woodlands, TX

**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)  
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EquipNet, Inc., Canton, MA

FISHER-KLOSTERMAN EMTROL, A CECO ENVIRONMENTAL COMPANY, Louisville, KY

Fluitron, Inc., Ivyland, PA

INOX-TECH INC., Ste. Catherine

**JLS International, Inc., Charlotte, NC**

Lectrodryer, Richmond, KY

Liquid Process Systems, Inc., Indian Trail, NC

Niles Steel Tank, Ambler, PA

**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)  
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Powder Systems Ltd, Liverpool

Samuel Pressure Vessel Group, Marinette, WI

Stainless Fabrication, Inc., Springfield, MO

Supercritical Fluid Technologies, Inc., DE

**TITAN Metal Fabricators, Engineered Products, Camarillo, CA**

WSF Industries, Buffalo, NY

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## REACTION & SEPARATION EQUIPMENT, OTHER

### Aerators

Conveyor Components Co., Material Control, Inc., Crosswell, MI

HEE-DUALL, A CECO ENVIRONMENTAL COMPANY, Owosso, MI

**KOERTING HANNOVER AG**, Badenstedter Str. 56, 30453 Hannover, Germany (+49 511 2129-0, e-mail: st@koerting.de, web site: www.koerting.de)  
— See our ad on page 117

Mott Corporation, Farmington, CT

**NOL-TEC SYSTEMS, INC.**, 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)  
— See our ad on page 45

— See our ad on page 45

### Chromatography, production-scale equipment

Ameridia, Div. of Eurodia Industries, Somerset, NJ  
PDR-Separations LLC, Palm Beach Gardens, FL

### Diffusers, spargers

**MICROMOLD PRODUCTS, INC.**, 7 Odell Plaza #133, Yonkers, NY 10701 (914-969-2850)

Mott Corporation, Farmington, CT

Pollution Control Systems, Inc., Milford, OH

Schutte & Koerting, Treviso, PA

### Diversers

**NOL-TEC SYSTEMS, INC.**, 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)  
— See our ad on page 45

### Extractors, centrifugal

B & P Process Equipment, Saginaw, MI

### Membrane systems for gases

**AIR PRODUCTS AND CHEMICALS, INC.**, 7201 Hamilton Blvd., Allentown, PA 18195-1501 (800-345-3148; 610-481-4911; FAX: 610-481-4381; e-mail: cheminfo@airproducts.com; web site: www.airproducts.com/chemprocessing)

BORSIG GmbH, Berlin

**BUSS-SMS-CANZLER GMBH**, Kaiserstr. 13-15, Butzbach, 0 35510 (49-6033-85-0; FAX: 49-6033-85-249; e-mail: info@sms-vt.com; web site: www.sms-vt.com)  
— See our ad on page 52

**SULZER CHEMTECH LTD**, Sulzer Allee 48, P.O. Box 65, Winterthur 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

beroplan GmbH Membran- und Prozesstechnik, St. Ingbert

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## Nozzles, atomizing

BETE Fog Nozzle Inc., Greenfield, MA

## Nozzles, mixing

BETE Fog Nozzle Inc., Greenfield, MA  
**CHARLES ROSS & SON CO.**, 710 Old Willets Path,  
 P.O. Box 12308, Hauppauge, NY 11788-0615 (800-  
 243-7677; 631-234-0500; FAX: 631-234-0691; e-mail:  
 sales@mixers.com; web site: www.mixers.com)  
 — See our ad on page 9

Elmridge Inc., Livonia, MI

**KOERTING HANNOVER AG**, Badenstedter Str. 56,  
 30453 Hannover, Germany (+49 511 2129-0; e-mail:  
 st@koerting.de, web site: www.koerting.de)  
 — See our ad on page 117

**MICROMOLD PRODUCTS, INC.**, 7 Odell Plaza #133,  
 Yonkers, NY 10701 (914-969-2850)

## Nozzles, spray

Alfa Laval Tank Equipment, Exton, PA

BETE Fog Nozzle Inc., Greenfield, MA

**KOERTING HANNOVER AG**, Badenstedter Str. 56,  
 30453 Hannover, Germany (+49 511 2129-0, e-mail:  
 st@koerting.de, web site: www.koerting.de)  
 — See our ad on page 117

Oxford Lasers, Inc., Shirley, MA

PNR AMERICA, LLC, Poughkeepsie, NY  
 Pollution Control Systems, Inc., Milford, OH

## Oil purification equipment

GIG Karasek GmbH, Gloggnitz-Stuppach

## Pervaporation equipment

**BUSS-SMS-CANZLER GMBH**, Kaiserstr. 13-15, Butz-  
 bach, 0 35510 (49-6033-85-0; FAX: 49-6033-85-249; e-  
 mail: info@sms-vt.com; web site: www.sms-vt.com)  
 — See our ad on page 52

**SULZER CHEMTECH LTD**, Sulzer Allee 48, P.O. Box 65,  
 Winterthur 8404 (+41 52 262 11 22; FAX: +41 52 262  
 00 60; e-mail: chemtech@sulzer.com; web site: www.  
 sulzer.com)

beroplan GmbH Membran- und Prozesstechnik, St. Ingbert

## Separators for metals

Alfa Laval, Inc., Warminster, PA

Bunting Magnetics Co., Newton, KS

Denver Mineral Engineers, Inc., Littleton, CO

Industrial Magnetics, Inc., Boyne City, MI

Walker Magnetics, Wor, MA

## Solvent extraction systems

B & P Process Equipment, Saginaw, MI  
 LIST AG, Arisdorf

## Solvent recovery systems

**ALAUQA, INC.**, 7004 JFK BOULEVARD EAST, SUITE  
 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-  
 758-1522; e-mail: alauqa@mindspring.com; web site:  
 www.alauqa.com)

Alfa Laval, Inc., Warminster, PA

beroplan GmbH Membran- und Prozesstechnik, St. Ingbert

**BUSS-SMS-CANZLER GMBH**, Kaiserstr. 13-15,  
 Butzbach, 0 35510 (49-6033-85-0; FAX: 49-6033-  
 85-249; e-mail: info@sms-vt.com; web site: www.  
 sms-vt.com)  
 — See our ad on page 52

**CR CLEANAIR**, Six Campus Drive, Parsippany, NJ  
 07054 (908 232 4200; FAX: 908-232-2146; e-mail:  
 info@roll.com; web site: www.crleanair.com)  
 — See our ad on page 193

**CHARLES ROSS & SON CO.**, 710 Old Willets Path,  
 P.O. Box 12308, Hauppauge, NY 11788-0615 (800-  
 243-7677; 631-234-0500; FAX: 631-234-0691; e-mail:  
 sales@mixers.com; web site: www.mixers.com)  
 — See our ad on page 9

EDWARDS US HEADQUARTERS, Sanborn, NY

Franken Filtertechnik KG, Germany, Huerth, Germany

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045  
 ((800) 722-6622; e-mail: sales.northamerica@gea.  
 com; web site: www.gea.com)  
 — See our ad on page 15

GIG Karasek GmbH, Gloggnitz-Stuppach

Hilliard Corp., Elmira, NY

**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Hol-  
 land Ave., Peapack, NJ 07977 (800-225-5457 North  
 American; 908-234-1000; FAX: 908-234-9487; e-mail:  
 info@konline.com; web site: www.konline.com)  
 — See our ad on page 148

Munters Corporation, Buena Vista, VA

NexGen Enviro Systems Inc., Lindenhurst, NY

PRAJ INDUSTRIES LIMITED, Pune

**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora  
 Woods Blvd., Saukville, WI 53080 (262-268-9300;  
 FAX: 262-268-9400; e-mail: info@popeinc.com; web  
 site: www.popeinc.com)  
 — See our ad on page 35

Progressive Recovery Inc., Duplo, IL

**READCO KURIMOTO, LLC**, 460 Grim Lane, York, PA  
 17406 (e-mail: jboufford@readco.com)

— See our ad on page 131

**Wyssmont Co. Inc.**, Fort Lee, NJ

— See our ad on page 149

## Solvent recycling systems

**ALAUQA, INC.**, 7004 JFK BOULEVARD EAST, SUITE  
 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-  
 758-1522; e-mail: alauqa@mindspring.com; web site:  
 www.alauqa.com)

beroplan GmbH Membran- und Prozesstechnik, St. Ingbert  
 Progressive Recovery Inc., Duplo, IL

## Sprayers

Alfa Laval Tank Equipment, Exton, PA  
 PNR AMERICA, LLC, Poughkeepsie, NY

## Strippers, air

Advanced Industrial Technology Corp., Paramus, NJ  
 CECO Filters, a CECO Environmental Company, Telford, PA  
 HEE-DJALL, A CECO ENVIRONMENTAL COMPANY,  
 Owosso, MI

**KIMRE, INC.**, 744 SW 1st Street, Homestead, FL 33030  
 (305 233-4249; FAX: 305 233-8687; e-mail: sales@  
 kimre.com; web site: www.kimre.com)

## Supercritical fluid extraction processing

Supercritical Fluid Technologies, Inc., DE

## Syngas generation units

Air Liquide Global E&C Solutions Germany GmbH, Frank-  
 furt am Main

Diamond Refractory Services, TX

## SCREENING EQUIPMENT

### Screening

Allgaier Process Technology GmbH, Germany  
 American Fabric Filter Co., Wesley Chapel, FL  
 Great Western Mfg. Co., Leavenworth, KS  
 Kinergy Corp., Louisville, KY  
 Particle Reduction Service, Elk Grove Village, IL  
 Sefar Inc., Buffalo, NY  
 Westech Engineering Inc., Salt Lake City, UT  
 YS Inc., Collinsville, AL

### Screens, air

Great Western Mfg. Co., Leavenworth, KS  
 RKI Instruments, Inc., Union City, CA

### Screens, bar

MM Industries, Inc., Vorti-Siv, Salem, OH  
 Tema Systems, Inc., Cincinnati, OH

### Screens, centrifugal

Kason Corp., Millburn, NJ  
 Kemutec Group, Inc., Bristol, PA  
 Prater-Sterling, Bollingbrook, IL  
 Sefar Inc., Buffalo, NY  
 Tema Systems, Inc., Cincinnati, OH

### Screens, cylindrical

Kason Corp., Millburn, NJ  
 MM Industries, Inc., Vorti-Siv, Salem, OH  
 Sefar Inc., Buffalo, NY

### Screens, grizzly

Cleveland Vibrator Co., Cleveland, OH  
 Kinergy Corp., Louisville, KY

### Screens, gyratory

Allgaier Process Technology GmbH, Germany  
 Great Western Mfg. Co., Leavenworth, KS  
 Kason Corp., Millburn, NJ  
 MM Industries, Inc., Vorti-Siv, Salem, OH

### Screens, perforated plate

Cleveland Vibrator Co., Cleveland, OH  
 Tema Systems, Inc., Cincinnati, OH

### Screens, rotary

Great Western Mfg. Co., Leavenworth, KS  
 MM Industries, Inc., Vorti-Siv, Salem, OH

### Screens, stationary

Schenck Process GmbH, Darmstadt

### Screens, synthetic

Great Western Mfg. Co., Leavenworth, KS  
 Sefar Inc., Buffalo, NY

### Screens, testing

Great Western Mfg. Co., Leavenworth, KS

HAVER & BOECKER, Wire Weaving, Oelde, Germany

## Screens, vibrating

Allgaier Process Technology GmbH, Germany  
 Cleveland Vibrator Co., Cleveland, OH  
 Great Western Mfg. Co., Leavenworth, KS  
 HAVER & BOECKER, Wire Weaving, Oelde, Germany  
 Kason Corp., Millburn, NJ  
 Kinergy Corp., Louisville, KY  
**Schenck Process GmbH**, Darmstadt  
 Sefar Inc., Buffalo, NY  
 Thermotron, Holland, MI

## Screens, wire

American Fabric Filter Co., Wesley Chapel, FL  
 Great Western Mfg. Co., Leavenworth, KS  
 HAVER & BOECKER, Wire Weaving, Oelde, Germany  
 MM Industries, Inc., Vorti-Siv, Salem, OH

## Separators, magnetic

Bunting Magnetics Co., Newton, KS  
 Industrial Magnetics, Inc., Boyne City, MI  
**Kraissl Co. Inc., Hackensack, NJ**  
 Magnetic Products, Inc., Highland, MI  
 Metso Minerals Industries, Inc., York, PA  
 Walker Magnetics, Wor, MA

## Sieves

Allgaier Process Technology GmbH, Germany  
 American Fabric Filter Co., Wesley Chapel, FL  
 Great Western Mfg. Co., Leavenworth, KS  
 Quadro Engineering Corp., WATERLOO  
 Sefar Inc., Buffalo, NY

## Sifters, sifting machines

American Fabric Filter Co., Wesley Chapel, FL  
 Great Western Mfg. Co., Leavenworth, KS  
 Kason Corp., Millburn, NJ  
 Prater-Sterling, Bollingbrook, IL

## Wire cloth

CPI Wirecloth & Screens Inc., Pearlard, TX  
 HAVER & BOECKER, Wire Weaving, Oelde, Germany  
 MM Industries, Inc., Vorti-Siv, Salem, OH

## Wire mesh

AMACS, Houston, TX  
 CPI Wirecloth & Screens Inc., Pearlard, TX  
 Coastal Technologies Inc., Hampton, SC  
 HAVER & BOECKER, Wire Weaving, Oelde, Germany  
**Kraissl Co. Inc., Hackensack, NJ**  
 MM Industries, Inc., Vorti-Siv, Salem, OH

## SCRUBBERS

### Scrubbers, centrifugal

Advanced Industrial Technology Corp., Paramus, NJ  
**BIONOMIC INDUSTRIES INC.**, 777 Corporate Dr., Mah-  
 wah, NJ 07430-2008 (800-311-6767; 201-529-1094;  
 FAX: 201-529-0252; e-mail: sales@bionomicind.com;  
 web site: www.bionomicind.com)

FISHER-KLOSTERMAN EMTROL, A CECO ENVIRONMEN-  
 TAL COMPANY, Louisville, KY  
 HEE-DJALL, A CECO ENVIRONMENTAL COMPANY,  
 Owosso, MI

### Scrubbers, cyclone

Advanced Industrial Technology Corp., Paramus, NJ  
 Ambient Engineering Inc., Rocky Hill, NJ  
**BIONOMIC INDUSTRIES INC.**, 777 Corporate Dr., Mah-  
 wah, NJ 07430-2008 (800-311-6767; 201-529-1094;  
 FAX: 201-529-0252; e-mail: sales@bionomicind.com;  
 web site: www.bionomicind.com)

**CR CLEANAIR**, Six Campus Drive, Parsippany, NJ  
 07054 (908 232 4200; FAX: 908-232-2146; e-mail:  
 info@roll.com; web site: www.crleanair.com)  
 — See our ad on page 193

FISHER-KLOSTERMAN EMTROL, A CECO  
 ENVIRONMENTAL COMPANY, Louisville, KY  
 Turner EnviroLogic, Inc., Deerfield Beach, FL

### Scrubbers, fluidized bed

**BIONOMIC INDUSTRIES INC.**, 777 Corporate Dr.,  
 Mahwah, NJ 07430-2008 (800-311-6767; 201-529-  
 1094; FAX: 201-529-0252; e-mail: sales@bionomicind.  
 com; web site: www.bionomicind.com)

CECO Filters, a CECO Environmental Company, Telford, PA  
 CPPD-Software, Albuquerque, New Mexico  
 Diamond Refractory Services, TX

### Scrubbers, fume, gas

Advanced Industrial Technology Corp., Paramus, NJ  
 Ambient Engineering Inc., Rocky Hill, NJ

**BETE Fog Nozzle Inc.**, Greenfield, MA  
**BIONOMIC INDUSTRIES INC.**, 777 Corporate Dr., Mahwah, NJ 07430-2008 (800-311-6767; 201-529-1094; FAX: 201-529-0252; e-mail: sales@bionomicind.com; web site: www.bionomicind.com)

## CR CleanAir

Leaders in Clean Air Technology

**CR CLEANAIR**, Six Campus Drive, Parsippany, NJ 07054 (908 232 4200; FAX: 908-232-2146; e-mail: info@crroll.com; web site: www.crcleanair.com)  
 — See our ad on page 193

**FABRICATED PLASTICS LIMITED**, MAPLE FISHER-KLOSTERMAN EMTRLO, A CECO ENVIRONMENTAL COMPANY, Louisville, KY

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)  
 — See our ad on page 15

**HEE-DUALL**, A CECO ENVIRONMENTAL COMPANY, Owosso, MI

**HEMCO CORPORATION**, 711 South Powell Road, Independence, MO 64056 (800-779-4362; 816-796-2900; FAX: 816-796-3333; e-mail: info@hemcocorp.com; web site: www.HEMCOcorp.com)



**KIMRE, INC.**, 744 SW 1st Street, Homestead, FL 33030 (305 233-4249; FAX: 305 233-8687; e-mail: sales@kimre.com; web site: www.kimre.com)

McGill AirClean LLC, Columbus, OH  
 Schutte & Koerting, Treviso, PA

### Scrubbers, impingement baffle

Advanced Industrial Technology Corp., Paramus, NJ  
 Ambient Engineering Inc., Rocky Hill, NJ

**BIONOMIC INDUSTRIES INC.**, 777 Corporate Dr., Mahwah, NJ 07430-2008 (800-311-6767; 201-529-1094; FAX: 201-529-0252; e-mail: sales@bionomicind.com; web site: www.bionomicind.com)

**CR CLEANAIR**, Six Campus Drive, Parsippany, NJ 07054 (908 232 4200; FAX: 908-232-2146; e-mail: info@crroll.com; web site: www.crcleanair.com)  
 — See our ad on page 193

**HEE-DUALL**, A CECO ENVIRONMENTAL COMPANY, Owosso, MI

**KIMRE, INC.**, 744 SW 1st Street, Homestead, FL 33030 (305 233-4249; FAX: 305 233-8687; e-mail: sales@kimre.com; web site: www.kimre.com)

### Scrubbers, jet

Advanced Industrial Technology Corp., Paramus, NJ  
 BIONOMIC INDUSTRIES INC., 777 Corporate Dr., Mahwah, NJ 07430-2008 (800-311-6767; 201-529-1094; FAX: 201-529-0252; e-mail: sales@bionomicind.com; web site: www.bionomicind.com)

## CR CleanAir

Leaders in Clean Air Technology

**CR CLEANAIR**, Six Campus Drive, Parsippany, NJ 07054 (908 232 4200; FAX: 908-232-2146; e-mail: info@crroll.com; web site: www.crcleanair.com)  
 — See our ad on page 193

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)  
 — See our ad on page 15

**KOERTING HANNOVER AG**, Badenstedter Str. 56, 30453 Hannover, Germany (+49 511 2129-0, e-mail: st@koerting.de, web site: www.koerting.de)  
 — See our ad on page 117

Schutte & Koerting, Treviso, PA

### Scrubbers, oil mist

Advanced Industrial Technology Corp., Paramus, NJ  
 Ambient Engineering Inc., Rocky Hill, NJ

**BIONOMIC INDUSTRIES INC.**, 777 Corporate Dr., Mahwah, NJ 07430-2008 (800-311-6767; 201-529-1094; FAX: 201-529-0252; e-mail: sales@bionomicind.com; web site: www.bionomicind.com)

**CR CLEANAIR**, Six Campus Drive, Parsippany, NJ 07054 (908 232 4200; FAX: 908-232-2146; e-mail: info@crroll.com; web site: www.crcleanair.com)  
 — See our ad on page 193

**Coastal Technologies Inc.**, Hampton, SC  
**HEE-DUALL**, A CECO ENVIRONMENTAL COMPANY, Owosso, MI

**KIMRE, INC.**, 744 SW 1st Street, Homestead, FL 33030 (305 233-4249; FAX: 305 233-8687; e-mail: sales@kimre.com; web site: www.kimre.com)

Koch-Glitsch, Wichita, KS

### Scrubbers, orifice

Advanced Industrial Technology Corp., Paramus, NJ  
**BIONOMIC INDUSTRIES INC.**, 777 Corporate Dr., Mahwah, NJ 07430-2008 (800-311-6767; 201-529-1094; FAX: 201-529-0252; e-mail: sales@bionomicind.com; web site: www.bionomicind.com)

**CR CLEANAIR**, Six Campus Drive, Parsippany, NJ 07054 (908 232 4200; FAX: 908-232-2146; e-mail: info@crroll.com; web site: www.crcleanair.com)  
 — See our ad on page 193

Turner EnviroLogic, Inc., Deerfield Beach, FL

### Scrubbers, packed column

Advanced Air Technologies, Inc., Corunna, MI  
 Advanced Industrial Technology Corp., Paramus, NJ

**ALAUQA, INC.**, 7004 JFK BOULEVARD EAST, SUITE 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alauqa.com)

Ambient Engineering Inc., Rocky Hill, NJ

**BIONOMIC INDUSTRIES INC.**, 777 Corporate Dr., Mahwah, NJ 07430-2008 (800-311-6767; 201-529-1094; FAX: 201-529-0252; e-mail: sales@bionomicind.com; web site: www.bionomicind.com)

**CR CLEANAIR**, Six Campus Drive, Parsippany, NJ 07054 (908 232 4200; FAX: 908-232-2146; e-mail: info@crroll.com; web site: www.crcleanair.com)  
 — See our ad on page 193

**Delta Cooling Towers Inc.**, Roxbury Township, NJ  
**FABRICATED PLASTICS LIMITED**, MAPLE FISHER-KLOSTERMAN EMTRLO, A CECO ENVIRONMENTAL COMPANY, Louisville, KY

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)  
 — See our ad on page 15

**HEE-DUALL**, A CECO ENVIRONMENTAL COMPANY, Owosso, MI

**KIMRE, INC.**, 744 SW 1st Street, Homestead, FL 33030 (305 233-4249; FAX: 305 233-8687; e-mail: sales@kimre.com; web site: www.kimre.com)

Koch-Glitsch, Wichita, KS

**PRAJ INDUSTRIES LIMITED**, Pune  
 Schutte & Koerting, Treviso, PA  
 Stainless Fabrication, Inc., Springfield, MO

### Scrubbers, plate column

Advanced Industrial Technology Corp., Paramus, NJ  
**BIONOMIC INDUSTRIES INC.**, 777 Corporate Dr., Mahwah, NJ 07430-2008 (800-311-6767; 201-529-1094; FAX: 201-529-0252; e-mail: sales@bionomicind.com; web site: www.bionomicind.com)

**CR CLEANAIR**, Six Campus Drive, Parsippany, NJ 07054 (908 232 4200; FAX: 908-232-2146; e-mail: info@crroll.com; web site: www.crcleanair.com)  
 — See our ad on page 193

**FISHER-KLOSTERMAN EMTRLO**, A CECO ENVIRONMENTAL COMPANY, Louisville, KY  
**HEE-DUALL**, A CECO ENVIRONMENTAL COMPANY, Owosso, MI

**KIMRE, INC.**, 744 SW 1st Street, Homestead, FL 33030 (305 233-4249; FAX: 305 233-8687; e-mail: sales@kimre.com; web site: www.kimre.com)

**CR CLEANAIR**, Six Campus Drive, Parsippany, NJ 07054 (908 232 4200; FAX: 908-232-2146; e-mail: info@crroll.com; web site: www.crcleanair.com)  
 — See our ad on page 193

**FISHER-KLOSTERMAN EMTRLO**, A CECO ENVIRONMENTAL COMPANY, Louisville, KY  
**HEE-DUALL**, A CECO ENVIRONMENTAL COMPANY, Owosso, MI

**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: info@komline.com; web site: www.komline.com)  
 — See our ad on page 148

McGill AirClean LLC, Columbus, OH  
 Westchester Germicide Co., Pittsburgh, PA

### Scrubbers, venturi

Advanced Industrial Technology Corp., Paramus, NJ  
 Ambient Engineering Inc., Rocky Hill, NJ

**BETE Fog Nozzle Inc.**, Greenfield, MA  
**BIONOMIC INDUSTRIES INC.**, 777 Corporate Dr., Mahwah, NJ 07430-2008 (800-311-6767; 201-529-1094; FAX: 201-529-0252; e-mail: sales@bionomicind.com; web site: www.bionomicind.com)

**CR CLEANAIR**, Six Campus Drive, Parsippany, NJ 07054 (908 232 4200; FAX: 908-232-2146; e-mail: info@crroll.com; web site: www.crcleanair.com)  
 — See our ad on page 193

**Elmridge Inc.**, Livonia, MI  
**FISHER-KLOSTERMAN EMTRLO**, A CECO ENVIRONMENTAL COMPANY, Louisville, KY

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)  
 — See our ad on page 15

**HEE-DUALL**, A CECO ENVIRONMENTAL COMPANY, Owosso, MI

**KOERTING HANNOVER AG**, Badenstedter Str. 56, 30453 Hannover, Germany (+49 511 2129-0, e-mail: st@koerting.de, web site: www.koerting.de)  
 — See our ad on page 117

Schutte & Koerting, Treviso, PA  
 Turner EnviroLogic, Inc., Deerfield Beach, FL

### Scrubbers, wire mesh tray

Advanced Industrial Technology Corp., Paramus, NJ  
 Ambient Engineering Inc., Rocky Hill, NJ

**BIONOMIC INDUSTRIES INC.**, 777 Corporate Dr., Mahwah, NJ 07430-2008 (800-311-6767; 201-529-1094; FAX: 201-529-0252; e-mail: sales@bionomicind.com; web site: www.bionomicind.com)

## SIZE REDUCTION EQUIPMENT

### Breakers

**FREWITT MANUFACTURER OF MACHINES LTD.**, WE CARE ABOUT MILLING, P.O. Box 615, Fribourg, 0 1701 (+41/(0) 26 460 74 00; FAX: +41 / 26 460 74 01; e-mail: info@frewitt.com; web site: www.frewitt.com)

**SBS STEEL BELT SYSTEMS S.r.l.**, Venegono Inferiore, ITA  
**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK MATERIALS TECHNOLOGY DEUTSCHLAND GMBH**, Saliester. 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: info.spsde@sandvik.com; web site: www.process-systems.sandvik.com)  
 — See our ad on page 53

**Wyssmont Co. Inc.**, Fort Lee, NJ

— See our ad on page 149

**AAAmachine, Inc.**, Des Plaines, IL  
**FRITTSCH GmbH**, Milling and Sizing, Idar-Oberstein  
 Pollution Control Systems, Inc., Millford, OH  
 The Fitzpatrick Company, Elmhurst, IL  
**Wyssmont Co. Inc.**, Fort Lee, NJ  
 — See our ad on page 149

— See our ad on page 149

### Comminutors

**AAAmachine, Inc.**, Des Plaines, IL  
**FRITTSCH GmbH**, Milling and Sizing, Idar-Oberstein  
 Pollution Control Systems, Inc., Millford, OH  
 The Fitzpatrick Company, Elmhurst, IL  
**Wyssmont Co. Inc.**, Fort Lee, NJ  
 — See our ad on page 149

— See our ad on page 149

### Crushers, fluid energy

**AAAmachine, Inc.**, Des Plaines, IL  
**Sturtevant Inc.**, Hanover, MA

**Crushers, gyratory**  
**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)

**Crushers, impact**  
**American Pulverizer**, St. Louis, MO  
**Stedman**, Aurora, IN  
**Sturtevant Inc.**, Hanover, MA  
**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)  
**Wyssmont Co. Inc.**, Fort Lee, NJ  
 — See our ad on page 149

### Crushers, jaw

**FRITTSCH GmbH**, Milling and Sizing, Idar-Oberstein  
**Sturtevant Inc.**, Hanover, MA  
**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

**Crushers, prebreaker**  
**Alexanderwerk AG**, Remscheid  
**American Pulverizer**, St. Louis, MO  
**Bepex International LLC**, Minneapolis, MN  
**FREWITT MANUFACTURER OF MACHINES LTD.**, WE CARE ABOUT MILLING, P.O. Box 615, Fribourg, 0 1701 (+41/(0) 26 460 74 00; FAX: +41 / 26 460 74 01; e-mail: info@frewitt.com; web site: www.frewitt.com)  
**FRITTSCH GmbH**, Milling and Sizing, Idar-Oberstein

**Crushers, jaw**  
**FRITTSCH GmbH**, Milling and Sizing, Idar-Oberstein  
**Sturtevant Inc.**, Hanover, MA  
**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

**Crushers, jaw**  
**FRITTSCH GmbH**, Milling and Sizing, Idar-Oberstein  
**Sturtevant Inc.**, Hanover, MA  
**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

**Crushers, jaw**  
**FRITTSCH GmbH**, Milling and Sizing, Idar-Oberstein  
**Sturtevant Inc.**, Hanover, MA  
**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

**Crushers, jaw**  
**FRITTSCH GmbH**, Milling and Sizing, Idar-Oberstein  
**Sturtevant Inc.**, Hanover, MA  
**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

**Crushers, jaw**  
**FRITTSCH GmbH**, Milling and Sizing, Idar-Oberstein  
**Sturtevant Inc.**, Hanover, MA  
**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

**Crushers, jaw**  
**FRITTSCH GmbH**, Milling and Sizing, Idar-Oberstein  
**Sturtevant Inc.**, Hanover, MA  
**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

**Crushers, jaw**  
**FRITTSCH GmbH**, Milling and Sizing, Idar-Oberstein  
**Sturtevant Inc.**, Hanover, MA  
**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

**Crushers, jaw**  
**FRITTSCH GmbH**, Milling and Sizing, Idar-Oberstein  
**Sturtevant Inc.**, Hanover, MA  
**WABASH POWER EQUIPMENT CO.**, 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)



Kemutec Group, Inc., Bristol, PA  
 Wyssmont Co. Inc., Fort Lee, NJ  
 — See our ad on page 149

## Crushers, rotary

American Pulverizer, St. Louis, MO  
 Bepex International LLC, Minneapolis, MN  
 Munson Machinery Company, Inc., Utica, NY  
 Sturtevant Inc., Hanover, MA  
**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)**

## Crushers, rotary blade

Wyssmont Co. Inc., Fort Lee, NJ  
 — See our ad on page 149

## Disintegration equipment parts & accessories

Bepex International LLC, Minneapolis, MN  
 Herbold Meckesheim USA, Resource Recycling Systems Inc., Slatersville, RI  
 Security Engineered Machinery, Westboro, MA

## Flakers

Herbold Meckesheim USA, Resource Recycling Systems Inc., Slatersville, RI  
 Ludman Industries, Milwaukee, WI

**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK MATERIALS TECHNOLOGY DEUTSCHLAND GMBH**, Saliestr. 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: info.spsde@sandvik.com; web site: www.process-systems.sandvik.com)  
 — See our ad on page 53  
**SANDVIK PROCESS SYSTEMS, INC., 21 Campus Rd., Totowa, NJ 07512 (973-790-1600; FAX: 973-790-3377; e-mail: info@sandvik.com; web site: www.process-systems.sandvik.com)**  
 — See our ad on page 53

## Hogs

American Pulverizer, St. Louis, MO

## Lumpbreakers

American Pulverizer, St. Louis, MO  
 Bepex International LLC, Minneapolis, MN  
 Dynamic Air Inc., St. Paul, MN  
**FREWITT MANUFACTURER OF MACHINES LTD., WE CARE ABOUT MILLING, P.O. Box 615, Fribourg, 0 1701 (+41/0) 26 460 74 00; FAX: +41 / 26 460 74 01; e-mail: info@frewitt.com; web site: www.frewitt.com)**  
**JAYGO, INCORPORATED, 7 Emery Ave., Randolph, NJ 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)**

Kemutec Group, Inc., Bristol, PA  
 Kinergy Corp., Louisville, KY  
 Material Transfer & Storage Inc., Allegan, MI  
 Munson Machinery Company, Inc., Utica, NY

**PAUL O. ABBE, 735 East Green St., Bensenville, IL 60106 (800-524-2188 US; 630-350-3012; FAX: 630-238-7584; e-mail: sales@pauloabbe.com; web site: www.pauloabbe.com)**  
 — See our ad on page 17  
 Prater-Sterling, Bollingbrook, IL  
 Stedman, Aurora, IN  
**Wyssmont Co. Inc., Fort Lee, NJ**  
 — See our ad on page 149

## Lumpbreakers for solid & liquid systems

**CHARLES ROSS & SON CO., 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)**  
 — See our ad on page 9  
**FREWITT MANUFACTURER OF MACHINES LTD., WE CARE ABOUT MILLING, P.O. Box 615, Fribourg, 0 1701 (+41/0) 26 460 74 00; FAX: +41 / 26 460 74 01; e-mail: info@frewitt.com; web site: www.frewitt.com)**  
**Wyssmont Co. Inc., Fort Lee, NJ**  
 — See our ad on page 149

## Mills, attrition

**AIR PRODUCTS AND CHEMICALS, INC., 7201 Hamilton Blvd., Allentown, PA 18195-1501 (800-345-3148; 610-481-4911; FAX: 610-481-4381; e-mail: cheminfo@airproducts.com; web site: www.airproducts.com/chemprocessing)**  
 Bepex International LLC, Minneapolis, MN  
 Munson Machinery Company, Inc., Utica, NY

**PAUL O. ABBE, 735 East Green St., Bensenville, IL 60106 (800-524-2188 US; 630-350-3012; FAX: 630-238-7584; e-mail: sales@pauloabbe.com; web site: www.pauloabbe.com)**  
 — See our ad on page 17  
**Sturtevant Inc., Hanover, MA**  
**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)**  
**Wyssmont Co. Inc., Fort Lee, NJ**  
 — See our ad on page 149

## Mills, ball

Aaron Process Equipment Co., Bensenville, IL  
 FRITTSCH GmbH, Milling and Sizing, Idar-Oberstein  
**JAYGO, INCORPORATED, 7 Emery Ave., Randolph, NJ 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)**  
 Metso Minerals Industries, Inc., York, PA  
**PAUL O. ABBE, 735 East Green St., Bensenville, IL 60106 (800-524-2188 US; 630-350-3012; FAX: 630-238-7584; e-mail: sales@pauloabbe.com; web site: www.pauloabbe.com)**  
 — See our ad on page 17  
 Tema Systems, Inc., Cincinnati, OH

**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)**

## Mills, cage

Stedman, Aurora, IN  
**Wyssmont Co. Inc., Fort Lee, NJ**  
 — See our ad on page 149

## Mills, colloid

**ADMIX INC., 144 Harvey Road, Londonderry, NH 03053 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: admixsales@admix.com; web site: www.admix.com)**  
 Bematek Systems, Inc., Salem, MA  
**CHARLES ROSS & SON CO., 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)**  
 — See our ad on page 9  
**DEC GROUP - DIETRICH ENGINEERING CONSULTANTS SA, Z.I. Larges Pieces A - Chemin du D'event, Eculen, CHE 1024-CH (+41-21-694 20 40; FAX: +41-21-694 20 59; e-mail: info@dec-group.ch; web site: www.dec-group.net)**  
 NOV, Dayton, OH  
 Wilhelm Siefert GmbH & Co. KG, Velbert

## Mills, cone

F.P.S. Food and Pharma Systems srl, Como, ITA  
**FREWITT MANUFACTURER OF MACHINES LTD., WE CARE ABOUT MILLING, P.O. Box 615, Fribourg, 0 1701 (+41/0) 26 460 74 00; FAX: +41 / 26 460 74 01; e-mail: info@frewitt.com; web site: www.frewitt.com)**  
 Kemutec Group, Inc., Bristol, PA  
 Quadro Engineering Corp., WATERLOO

## Mills, disc

**CHARLES ROSS & SON CO., 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)**  
 — See our ad on page 9  
 FRITTSCH GmbH, Milling and Sizing, Idar-Oberstein  
 Modern Process Equipment, Inc., Chicago, IL  
**Sturtevant Inc., Hanover, MA**  
 Tema Systems, Inc., Cincinnati, OH  
**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)**  
**Wyssmont Co. Inc., Fort Lee, NJ**  
 — See our ad on page 149

## Mills, grinding

**AMANDUS KAHL GmbH & Co. KG, Reinbek AIR PRODUCTS AND CHEMICALS, INC., 7201 Hamilton Blvd., Allentown, PA 18195-1501 (800-345-3148; 610-481-4911; FAX: 610-481-4381; e-mail: cheminfo@airproducts.com; web site: www.airproducts.com/chemprocessing)**  
 American Pulverizer, St. Louis, MO  
 Bepex International LLC, Minneapolis, MN  
**CHARLES ROSS & SON CO., 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)**  
 — See our ad on page 9

**FREWITT MANUFACTURER OF MACHINES LTD., WE CARE ABOUT MILLING, P.O. Box 615, Fribourg, 0 1701 (+41/0) 26 460 74 00; FAX: +41 / 26 460 74 01; e-mail: info@frewitt.com; web site: www.frewitt.com)**  
 FRITTSCH GmbH, Milling and Sizing, Idar-Oberstein  
**JAYGO, INCORPORATED, 7 Emery Ave., Randolph, NJ 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)**

Kemutec Group, Inc., Bristol, PA  
 Metso Minerals Industries, Inc., York, PA  
 Modern Process Equipment, Inc., Chicago, IL  
**NEUHAUS NEOTEC MASCHINEN- UND ANLAGENBAU GMBH, Dieselstrasse 5-9, 0 D-21465 Reinbek (+49-40-72771-500; FAX: +49-40-72771-550; e-mail: sales@neuhaus-neotec.de; web site: www.neuhaus-neotec.de)**  
**PAUL O. ABBE, 735 East Green St., Bensenville, IL 60106 (800-524-2188 US; 630-350-3012; FAX: 630-238-7584; e-mail: sales@pauloabbe.com; web site: www.pauloabbe.com)**  
 — See our ad on page 17

Prater-Sterling, Bollingbrook, IL  
 Quadro Engineering Corp., WATERLOO  
**Sturtevant Inc., Hanover, MA**  
 Tema Systems, Inc., Cincinnati, OH  
 The Fitzpatrick Company, Elmhurst, IL  
**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)**  
 YS Inc., Collinsville, AL

## Mills, hammer

**AMANDUS KAHL GmbH & Co. KG, Reinbek, 0**  
 American Pulverizer, St. Louis, MO  
 Bepex International LLC, Minneapolis, MN  
 F.P.S. Food and Pharma Systems srl, Como, ITA  
**FREWITT MANUFACTURER OF MACHINES LTD., WE CARE ABOUT MILLING, P.O. Box 615, Fribourg, 0 1701 (+41/0) 26 460 74 00; FAX: +41 / 26 460 74 01; e-mail: info@frewitt.com; web site: www.frewitt.com)**  
 Munson Machinery Company, Inc., Utica, NY  
 Prater-Sterling, Bollingbrook, IL  
 Stedman, Aurora, IN

**Sturtevant Inc., Hanover, MA**  
 The Fitzpatrick Company, Elmhurst, IL  
**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)**  
 YS Inc., Collinsville, AL

## Mills, homogenizing

**ADMIX INC., 144 Harvey Road, Londonderry, NH 03053 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: admixsales@admix.com; web site: www.admix.com)**

Bematek Systems, Inc., Salem, MA  
 Bepex International LLC, Minneapolis, MN  
**CHARLES ROSS & SON CO., 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)**  
 — See our ad on page 9  
**FREWITT MANUFACTURER OF MACHINES LTD., WE CARE ABOUT MILLING, P.O. Box 615, Fribourg, 0 1701 (+41/0) 26 460 74 00; FAX: +41 / 26 460 74 01; e-mail: info@frewitt.com; web site: www.frewitt.com)**  
 Modern Process Equipment, Inc., Chicago, IL  
 Quadro Liquids, Waterloo, CAN  
 Wilhelm Siefert GmbH & Co. KG, Velbert

## Mills, impact

American Pulverizer, St. Louis, MO  
 Bepex International LLC, Minneapolis, MN  
**FREWITT MANUFACTURER OF MACHINES LTD., WE CARE ABOUT MILLING, P.O. Box 615, Fribourg, 0 1701 (+41/0) 26 460 74 00; FAX: +41 / 26 460 74 01; e-mail: info@frewitt.com; web site: www.frewitt.com)**  
 FRITTSCH GmbH, Milling and Sizing, Idar-Oberstein  
 Munson Machinery Company, Inc., Utica, NY  
 Quadro Engineering Corp., WATERLOO  
 Stedman, Aurora, IN  
**Sturtevant Inc., Hanover, MA**  
**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)**  
**Wyssmont Co. Inc., Fort Lee, NJ**  
 — See our ad on page 149

## Mills, jacketed ball

JAYGO, INCORPORATED, 7 Emery Ave., Randolph, NJ 07869 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

PAUL O. ABBE, 735 East Green St., Bensenville, IL 60106 (800-524-2188 US; 630-350-3012; FAX: 630-238-7584; e-mail: sales@pauloabbe.com; web site: www.pauloabbe.com)

— See our ad on page 17

Tema Systems, Inc., Cincinnati, OH

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

## Mills, jet

AAAmachine, Inc., Des Plaines, IL  
F.P.S. Food and Pharma Systems srl, Como, ITA  
PSL USA, Boise, ID

Sturtevant Inc., Hanover, MA

## Mills, other

ADMIX INC., 144 Harvey Road, Londonderry, NH 03053 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: admixsales@admix.com; web site: www.admix.com)

FREWITT MANUFACTURER OF MACHINES LTD., WE CARE ABOUT MILLING, P.O. Box 615, Fribourg, O 1701 (+41/0) 26 460 74 00; FAX: +41 / 26 460 74 01; e-mail: info@frewitt.com; web site: www.frewitt.com)

Modern Process Equipment, Inc., Chicago, IL

Sturtevant Inc., Hanover, MA

## Mills, pug

FEECO International, Inc., Green Bay, WI  
Heyl & Patterson Inc., Renneburg Division, Pittsburg, PA

## Mills, ring roll

American Pulverizer, St. Louis, MO

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

## Mills, rod

PAUL O. ABBE, 735 East Green St., Bensenville, IL 60106 (800-524-2188 US; 630-350-3012; FAX: 630-238-7584; e-mail: sales@pauloabbe.com; web site: www.pauloabbe.com)

— See our ad on page 17

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Wyssmont Co. Inc., Fort Lee, NJ

— See our ad on page 149

## Mills, roller

AMANDUS KAHL GmbH & Co. KG, Reinbek, O

Buhler Inc., Minneapolis, MN

CHARLES ROSS & SON CO., 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: sales@mixers.com; web site: www.mixers.com)

— See our ad on page 9

EXAKT Technologies, Inc., Oklahoma City, OK

Ludman Industries, Milwaukee, WI

Modern Process Equipment, Inc., Chicago, IL

NEUHAUS NEOTEC MASCHINEN- UND ANLAGEN-BAU GMBH, Dieselstrasse 5-9, O D-21465 Reinbek (+49-40-72771-500; FAX: +49-40-72771-550; e-mail: sales@neuhaus-neotec.de; web site: www.neuhaus-neotec.de)

Sturtevant Inc., Hanover, MA

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

## Mills, vertical

AAAmachine, Inc., Des Plaines, IL

Bepex International LLC, Minneapolis, MN

Sturtevant Inc., Hanover, MA

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

## Shredders

Alexanderwerk AG, Remscheid

American Pulverizer, St. Louis, MO

Bepex International LLC, Minneapolis, MN

Herbold Mackesheim USA, Resource Recycling Systems

Inc., Slatersville, RI

Munson Machinery Company, Inc., Utica, NY

Security Engineered Machinery, Westboro, MA

Wyssmont Co. Inc., Fort Lee, NJ

— See our ad on page 149

## TOWERS & COLUMNS

### Columns, absorption or adsorption

Advanced Industrial Technology Corp., Paramus, NY  
AirSep Corp., A Chart Industries Company, Buffalo, NY  
BIONOMIC INDUSTRIES INC., 777 Corporate Dr., Mahwah, NJ 07430-2008 (800-311-6767; 201-529-1094; FAX: 201-529-0252; e-mail: sales@bionomicind.com; web site: www.bionomicind.com)

Dipesh Engineering Works, Mumbai, IND

GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 (800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

— See our ad on page 15

HEE-DUALL, A CECO ENVIRONMENTAL COMPANY, Owosso, MI

KIMRE, INC., 744 SW 1st Street, Homestead, FL 33003 (305) 233-4249; FAX: 305 233-8687; e-mail: sales@kimre.com; web site: www.kimre.com)

Midwest Steel Company Inc., Houston, TX

PRAJ INDUSTRIES LIMITED, Pune

SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

SULZER CHEMTECH USA, INC., 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rodney.alario@sulzer.com; web site: www.sulzer.com)

Tiger Tower Services, Conroe, TX

### Columns, bubble cap

Dipesh Engineering Works, Mumbai, IND

Koch-Glitsch, Wichita, KS

RAS Process Equipment Inc., Robbinsville, NJ

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Tiger Tower Services, Conroe, TX

### Columns, contacting or mixing

Dipesh Engineering Works, Mumbai, IND

NOV, Dayton, OH

RAS Process Equipment Inc., Robbinsville, NJ

### Columns, custom fabricated

Dipesh Engineering Works, Mumbai, IND

Enerquip, LLC, Medford, WI

HEE-DUALL, A CECO ENVIRONMENTAL COMPANY, Owosso, MI

JLS International, Inc., Charlotte, NC

POPE SCIENTIFIC, INC., P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)

— See our ad on page 35

RAS Process Equipment Inc., Robbinsville, NJ

TITAN Metal Fabricators, Engineered Products,

Camarillo, CA

Tiger Tower Services, Conroe, TX

### Columns, ion exchange

ALAUQA, INC., 7004 JFK BOULEVARD EAST, SUITE 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alauqa.com)

### Columns, packed

Advanced Industrial Technology Corp., Paramus, NY

ALAUQA, INC., 7004 JFK BOULEVARD EAST, SUITE 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alauqa.com)

BIONOMIC INDUSTRIES INC., 777 Corporate Dr., Mahwah, NJ 07430-2008 (800-311-6767; 201-529-1094; FAX: 201-529-0252; e-mail: sales@bionomicind.com; web site: www.bionomicind.com)

De Dietrich Process Systems GmbH, Mainz

Delta Cooling Towers Inc., Roxbury Township, NJ

Dipesh Engineering Works, Mumbai, IND

FABRICATED PLASTICS LIMITED, MAPLE

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Koch-Glitsch, Wichita, KS

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POPE SCIENTIFIC, INC., P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)

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Dipesh Engineering Works, Mumbai, IND

Koch-Glitsch, Wichita, KS

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### Columns, wire mesh tray

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Tiger Tower Services, Conroe, TX

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POPE SCIENTIFIC, INC., P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)

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Progressive Recovery Inc., Duplo, IL

### Distillation columns, molecular distillation

BUSS-SMS-CANZLER GMBH, Kaiserstr. 13-15, Butzbach, O 35510 (49-6033-85-0; FAX: 49-6033-85-249; e-mail: info@sms-vt.com; web site: www.sms-vt.com)

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Dipesh Engineering Works, Mumbai, IND

GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 (800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

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GiG Karasek GmbH, Gloggnitz-Stuppach

POPE SCIENTIFIC, INC., P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)

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### Distillation columns, sieve tray

AMACS, Houston, TX

Advanced Industrial Technology Corp., Paramus, NY

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GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 (800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)

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Koch-Glitsch, Wichita, KS

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Dipesh Engineering Works, Mumbai, IND  
 GEA France, FRA

**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)**  
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Coastal Technologies Inc., Hampton, SC

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HydroTec Systems Co., Inc., Tiskliwa, IL  
 Hydro-Thermal Corp., Waukesha, WI

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 Veolia Water Solutions & Technologies, Moon Township, PA  
 sera ProDos GmbH, Immenhausen, O

### Desalination units

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GEA Engineering, P.C., Nanuet, NY

**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)**

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HydroTec Systems Co., Inc., Tiskliwa, IL  
 PCA GmbH, Heusweiler

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 PCA GmbH, Heusweiler

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### Ion exchanger equipment

Ameridia, Div. of Eurodia Industries, Somerset, NJ  
 HydroTec Systems Co., Inc., Tiskliwa, IL  
 United Manufacturing International 2000 Activated Carbon, Red Bluff, CA

Veolia Water Solutions & Technologies, Moon Township, PA

### Ozonators

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AirSep Corp., A Chart Industries Company, Buffalo, NY

### Resins, ion exchange

**LANXESS CORPORATION, 111 RIDC Park West Drive, Pittsburgh, PA 15275 (800-526-9377; 412-809-1000; e-mail: info@lanxess.com; web site: www.US.LANXESS.com)**

United Manufacturing International 2000 Activated Carbon, Red Bluff, CA

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Filtration & Membrane Technology, Inc., Houston, TX  
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**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)**

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HydroTec Systems Co., Inc., Tiskliwa, IL

ProSonic LLC, Milwaukee, WI

Veolia Water Solutions & Tec

**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)**

beroplan GmbH Membran- und Prozesstechnik, St. Ingbert

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Veolia Water Solutions & Technologies, Moon Township, PA

Westech Engineering Inc., Salt Lake City, UT

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Newman Regency Group, Stafford, TX

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sera ProDos GmbH, Immenhausen

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Alfa Laval, Inc., Warminster, PA  
 Entex Technologies Inc, Chapel Hill, NC  
 Evoqua Water Technologies, Warrendale, PA  
 GEA Engineering, P.C., Nanuet, NY

**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)**  
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HEE-DUALL, A CECO ENVIRONMENTAL COMPANY,

Owosso, MI

Honeywell, Morristown, NJ

Jacobi Carbons, Inc., Columbus, OH

**KOMLINE-SANDERSON ENGINEERING CORP., 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: info@komline.com; web site: www.komline.com)**

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Veolia Water Solutions & Technologies, Moon Township, PA

### Water treatment control equipment

AquFlow, Irvine, CA

Dr. Thiedig GmbH & Co KG, Berlin, Germany

Entex Technologies Inc, Chapel Hill, NC

Separation Technologists, Inc., Salem, NH

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The Industrial Controls Company, Inc.  
 Veolia Water Solutions & Technologies, Moon Township, PA  
 Walchem, IWAKI America, Inc., Holliston, MA  
 sera ProDos GmbH, Immenhausen



# 6

# ENGINEERING MATERIALS

<b>176</b>	<b>Aluminum &amp; aluminum alloys</b>	<b>177</b>	<b>Metals &amp; alloys, other nonferrous</b>
<b>176</b>	<b>Ceramics, including glass</b>	<b>177</b>	<b>Nickel &amp; nickel alloys</b>
<b>176</b>	<b>Composites</b>	<b>177</b>	<b>Plastics materials</b>
<b>176</b>	<b>Copper &amp; copper alloys</b>	<b>177</b>	<b>Protective coatings &amp; linings</b>
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site: [www.cortecvci.com](http://www.cortecvci.com))

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OR Co, NY

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KAIVAN ENGINEERS, IND

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VDM Metals GmbH, Werdohl, NRW

### Nickel alloys

American Elements, Los Angeles, CA  
Corrosion Materials, Baker, LA  
Regal Industries, Inc., Painesville, OH  
Sandvik Materials Technology, Tubular Products, Scranton, PA  
TW Metals, Exton, PA  
United Performance Metals, Houston, TX  
VDM Metals GmbH, Werdohl, NRW  
Wall Colmonoy Corporation, Madison Heights, MI

## PLASTICS MATERIALS

### Acrylic copolymers

Hexion Inc., Columbus, OH  
The Lubrizol Corporation, Cleveland, OH

### Acrylics

Hexion Inc., Columbus, OH

## Epoxies

Cass Polymers, Inc., Oklahoma City, OK  
Dymax Corp., Torrington, CT  
Epoxies, Etc., RI  
Milamar Coatings L.L.C., Oklahoma City, OK  
Miller-Stephenson Chemical Co., Inc., Danbury, CT

## Fiberglass-polyester

Creative Pultrusions, Inc., Alum Bank, PA

## Fluorocarbons

Arkema Inc., King of Prussia, PA  
Compressor Products International, Stafford, TX

## Foams, plastic

Covestro LLC, Pittsburgh, PA

## Nylon

**LANXESS CORPORATION, 111 RIDC Park West Drive,**  
**Pittsburgh, PA 15275 (800-526-9377; 412-809-**  
**1000; e-mail: [info@lanxess.com](mailto:info@lanxess.com); web site: [www.US.LANXESS.com](http://www.US.LANXESS.com))**

## Plastics, other

Associated Bag Company, Milwaukee, WI  
**CORTEC CORP., 4119 White Bear Pkwy., St. Paul, MN**  
55110 ((800) 4- CORTEC; 651-429-1100; FAX: (651)  
429-1122; e-mail: [productinfo@cortecvci.com](mailto:productinfo@cortecvci.com); web  
site: [www.cortecvci.com](http://www.cortecvci.com))  
Covestro LLC, Pittsburgh, PA  
Creative Pultrusions, Inc., Alum Bank, PA  
**Eastman Chemical Co. Inc., Kingsport, TN**  
**LANXESS CORPORATION, 111 RIDC Park West Drive,**  
**Pittsburgh, PA 15275 (800-526-9377; 412-809-**  
**1000; e-mail: [info@lanxess.com](mailto:info@lanxess.com); web site: [www.US.LANXESS.com](http://www.US.LANXESS.com))**  
The Lubrizol Corporation, Cleveland, OH

## Polycarbonates

Covestro LLC, Pittsburgh, PA

## Polyesters

**Eastman Chemical Co. Inc., Kingsport, TN**  
**LANXESS CORPORATION, 111 RIDC Park West Drive,**  
**Pittsburgh, PA 15275 (800-526-9377; 412-809-**  
**1000; e-mail: [info@lanxess.com](mailto:info@lanxess.com); web site: [www.US.LANXESS.com](http://www.US.LANXESS.com))**

ThyssenKrupp Industrial Solutions AG, Business Unit Process Technologies, Dortmund

## Polyethylenes

Associated Bag Company, Milwaukee, WI  
**CORTEC CORP., 4119 White Bear Pkwy., St. Paul, MN**  
55110 ((800) 4- CORTEC; 651-429-1100; FAX: (651)  
429-1122; e-mail: [productinfo@cortecvci.com](mailto:productinfo@cortecvci.com); web  
site: [www.cortecvci.com](http://www.cortecvci.com))

**Eastman Chemical Co. Inc., Kingsport, TN**  
ThyssenKrupp Industrial Solutions AG, Business Unit Process Technologies, Dortmund

## Polypropylenes

Associated Bag Company, Milwaukee, WI  
ThyssenKrupp Industrial Solutions AG, Business Unit Process Technologies, Dortmund

## Polytetrafluoroethylene

Compressor Products International, Stafford, TX  
W.L. Gore & Associates, Sealant Technologies, Elkton, MD

## Silicones

Epoxies, Etc., RI

## Thermoplastic elastomers

Covestro LLC, Pittsburgh, PA

## PROTECTIVE COATINGS & LININGS

### Adhesives

Dymax Corp., Torrington, CT  
Epoxies, Etc., RI  
Hexion Inc., Columbus, OH  
ITW Polymers Adhesives, North America, Danvers, MA  
Miller-Stephenson Chemical Co., Inc., Danbury, CT  
Synthetic Surfaces Inc., Scotch Plains, NJ

### Coatings, acrylic

**CORTEC CORP., 4119 White Bear Pkwy., St. Paul, MN**  
55110 ((800) 4- CORTEC; 651-429-1100; FAX: (651)  
429-1122; e-mail: [productinfo@cortecvci.com](mailto:productinfo@cortecvci.com); web  
site: [www.cortecvci.com](http://www.cortecvci.com))

Dymax Corp., Torrington, CT  
Hexion Inc., Columbus, OH  
Polyguard Products, Inc., Ennis, TX  
The Lubrizol Corporation, Cleveland, OH



## Coatings, ceramic

ITW Polymers Adhesives, North America, Danvers, MA  
3M Technical Ceramics, Kempten, Germany

## Coatings, diffusion

Wall Colmonoy Corporation, Madison Heights, MI

## Coatings, epoxy

Cass Polymers, Inc., Oklahoma City, OK  
**CORTEC CORP., 4119 White Bear Pkwy., St. Paul, MN 55110 ((800) 4-CORTEC; 651-429-1100; FAX: (651) 429-1122; e-mail: productinfo@corotecvci.com; web site: www.corotecvci.com)**

Diamond Refractory Services, TX  
Epoxies, Etc., RI

ITW Polymers Adhesives, North America, Danvers, MA  
Milamar Coatings L.L.C., Oklahoma City, OK  
Sauereisen, Pittsburgh, PA  
Synthetic Surfaces Inc., Scotch Plains, NJ

## Coatings, fluoropolymer

Arkema Inc., King of Prussia, PA

## Coatings, metallic

Wall Colmonoy Corporation, Madison Heights, MI

## Coatings, powder

Hexion Inc., Columbus, OH

## Coatings, PVC

Synthetic Surfaces Inc., Scotch Plains, NJ

## Coatings, refractory

Sauereisen, Pittsburgh, PA

## Coatings, silicate

Sauereisen, Pittsburgh, PA

## Coatings, urethane

Cass Polymers, Inc., Oklahoma City, OK  
Covestro LLC, Pittsburgh, PA  
Dymax Corp., Torrington, CT  
ITW Polymers Adhesives, North America, Danvers, MA  
Milamar Coatings L.L.C., Oklahoma City, OK  
Miller-Stephenson Chemical Co., Inc., Danbury, CT  
The Lubrizol Corporation, Cleveland, OH

## Coatings, vinyl ester

Sauereisen, Pittsburgh, PA

## Linings, cements & mortars

Abresist Kalenborn Corporation, Urbana, IN  
**CORTEC CORP., 4119 White Bear Pkwy., St. Paul, MN 55110 ((800) 4-CORTEC; 651-429-1100; FAX: (651) 429-1122; e-mail: productinfo@corotecvci.com; web site: www.corotecvci.com)**  
Sauereisen, Pittsburgh, PA

## Linings, ceramic

Abresist Kalenborn Corporation, Urbana, IN  
Koch Knight, LLC, East Canton, OH  
**SAINT-GOBAIN CERAMICS/STRUCTURAL CERAMICS, 23 Acheson Dr., Niagara Falls, NY 14303 (716-278-6233; FAX: 716-278-2373; e-mail: scd.sales@saint-gobain.com; web site: www.hexoloy.com)**  
— See our ad on page 176

## Linings, chlorosulfonated polyethylene

Watersaver Co., a division of CDI, Commerce City, CO

## Linings, epoxy

Cass Polymers, Inc., Oklahoma City, OK  
Sauereisen, Pittsburgh, PA

## Linings, fluoroplastic

Koch Knight, LLC, East Canton, OH

## Linings, glass

Dueker GmbH & Co. KGaA, Laufach

## Linings, polyethylene

Associated Bag Company, Milwaukee, WI  
Nier Systems Inc, Boca Raton, Florida

## Linings, refractory

Sauereisen, Pittsburgh, PA  
ZIRCAR Refractory Composites, Inc., Florida, NY

## Linings, urethane

Covestro LLC, Pittsburgh, PA  
Sauereisen, Pittsburgh, PA

## Linings, vinyl

Watersaver Co., a division of CDI, Commerce City, CO

## Paints

Cass Polymers, Inc., Oklahoma City, OK  
**CORTEC CORP., 4119 White Bear Pkwy., St. Paul, MN 55110 ((800) 4-CORTEC; 651-429-1100; FAX: (651) 429-1122; e-mail: productinfo@corotecvci.com; web site: www.corotecvci.com)**  
Milamar Coatings L.L.C., Oklahoma City, OK

## Sealants

Dymax Corp., Torrington, CT  
ITW Polymers Adhesives, North America, Danvers, MA  
W.L. Gore & Associates, Sealant Technologies, Elkton, MD

## REFRACTORY MATERIALS

### Castables

American Elements, Los Angeles, CA

### Refractories

Advance Boiler & Tank Co., West Allis, WI  
American Elements, Los Angeles, CA  
ZIRCAR Refractory Composites, Inc., Florida, NY

### Refractories, gunning

Diamond Refractory Services, TX  
Sauereisen, Pittsburgh, PA

### Refractory mortars & cements

Advance Boiler & Tank Co., West Allis, WI  
Koch Knight, LLC, East Canton, OH  
Sauereisen, Pittsburgh, PA

## RUBBER & RUBBERLIKE MATERIALS

### Rubber, butyl

**GENERAL RUBBER CO., 861 Washington Ave, Carlstadt, NJ 07072 (800-233-6294; (201) 935-1900; FAX: (201) 935-1915; web site: general-rubber.com)**

# LANXESS

Energizing Chemistry

LANXESS Corporation, 111 RIDC Park West Drive, Pittsburgh, PA 15275 (800-526-9377; 412-809-1000; e-mail: info@lanxess.com; web site: www.US.LANXESS.com)

### Rubber, chlorosulfonated polyethylene

**GENERAL RUBBER CO., 861 Washington Ave, Carlstadt, NJ 07072 (800-233-6294; (201) 935-1900; FAX: (201) 935-1915; web site: general-rubber.com)**

### Rubber, ethylene propylene

**GENERAL RUBBER CO., 861 Washington Ave, Carlstadt, NJ 07072 (800-233-6294; (201) 935-1900; FAX: (201) 935-1915; web site: general-rubber.com)**  
**LANXESS CORPORATION, 111 RIDC Park West Drive, Pittsburgh, PA 15275 (800-526-9377; 412-809-1000; e-mail: info@lanxess.com; web site: www.US.LANXESS.com)**

### Rubber, fluoroelastomers

Apple Rubber Products, Lancaster, NY  
**GENERAL RUBBER CO., 861 Washington Ave, Carlstadt, NJ 07072 (800-233-6294; (201) 935-1900; FAX: (201) 935-1915; web site: general-rubber.com)**

### Rubber, natural

**GENERAL RUBBER CO., 861 Washington Ave, Carlstadt, NJ 07072 (800-233-6294; (201) 935-1900; FAX: (201) 935-1915; web site: general-rubber.com)**

### Rubber, neoprene

Apple Rubber Products, Lancaster, NY  
Conveyor Components Co., Material Control, Inc., Crosswell, MI

**GENERAL RUBBER CO., 861 Washington Ave, Carlstadt, NJ 07072 (800-233-6294; (201) 935-1900; FAX: (201) 935-1915; web site: general-rubber.com)**  
**LANXESS CORPORATION, 111 RIDC Park West Drive, Pittsburgh, PA 15275 (800-526-9377; 412-809-1000; e-mail: info@lanxess.com; web site: www.US.LANXESS.com)**

### Rubber, nitrile

Apple Rubber Products, Lancaster, NY  
**GENERAL RUBBER CO., 861 Washington Ave, Carlstadt, NJ 07072 (800-233-6294; (201) 935-1900; FAX: (201) 935-1915; web site: general-rubber.com)**  
**LANXESS CORPORATION, 111 RIDC Park West Drive, Pittsburgh, PA 15275 (800-526-9377; 412-809-1000; e-mail: info@lanxess.com; web site: www.US.LANXESS.com)**  
Mallard Creek Polymers, Inc., Charlotte, NC

### Rubber, polybutadiene

**GENERAL RUBBER CO., 861 Washington Ave, Carlstadt, NJ 07072 (800-233-6294; (201) 935-1900; FAX: (201) 935-1915; web site: general-rubber.com)**  
**LANXESS CORPORATION, 111 RIDC Park West Drive, Pittsburgh, PA 15275 (800-526-9377; 412-809-1000; e-mail: info@lanxess.com; web site: www.US.LANXESS.com)**  
Mallard Creek Polymers, Inc., Charlotte, NC

### Rubber, silicone

Momentive Inc., Waterford, NY

### Rubber, styrene butadiene

Apple Rubber Products, Lancaster, NY  
**GENERAL RUBBER CO., 861 Washington Ave, Carlstadt, NJ 07072 (800-233-6294; (201) 935-1900; FAX: (201) 935-1915; web site: general-rubber.com)**  
**LANXESS CORPORATION, 111 RIDC Park West Drive, Pittsburgh, PA 15275 (800-526-9377; 412-809-1000; e-mail: info@lanxess.com; web site: www.US.LANXESS.com)**  
Mallard Creek Polymers, Inc., Charlotte, NC

### Rubber, synthetic, other

**LANXESS CORPORATION, 111 RIDC Park West Drive, Pittsburgh, PA 15275 (800-526-9377; 412-809-1000; e-mail: info@lanxess.com; web site: www.US.LANXESS.com)**  
The Lubrizol Corporation, Cleveland, OH

### Rubber, urethane

ITW Polymers Adhesives, North America, Danvers, MA  
**LANXESS CORPORATION, 111 RIDC Park West Drive, Pittsburgh, PA 15275 (800-526-9377; 412-809-1000; e-mail: info@lanxess.com; web site: www.US.LANXESS.com)**  
The Lubrizol Corporation, Cleveland, OH

## STAINLESS STEELS

### Stainless steels, AISI 200 series

KAIVAN ENGINEERS, IND

### Stainless steels, AISI 300 series

Arch City Steel, Fenton, Missouri  
Dockweiler AG, Neustadt-Glewe  
KAIVAN ENGINEERS, IND  
Sandvik Materials Technology, Tubular Products, Scranton, PA  
United Performance Metals, Houston, TX

### Stainless steels, AISI 400 series

KAIVAN ENGINEERS, IND  
Sandvik Materials Technology, Tubular Products, Scranton, PA

### Stainless steels, cast

KAIVAN ENGINEERS, IND

## STEELS

### Carbon steels

American Elements, Los Angeles, CA

### High alloy steels

American Elements, Los Angeles, CA

### Low alloy steels

American Elements, Los Angeles, CA

### Medium alloy steels

American Elements, Los Angeles, CA

# **7**

# **PLANT MAINTENANCE**

- 180** **Cleaning equipment & services**
- 180** **Equipment repair & rebuilding**
- 180** **Fire protection equipment**
- 180** **Maintenance tools & equipment & replacement parts**
- 181** **Noise & vibration suppression equipment**
- 181** **Safety equipment & systems**

## CLEANING EQUIPMENT & SERVICES

### Cleaners & refacers, tube

Clean Harbors, Norwell, MA  
Goodway Technologies Corp., Stamford, CT

### Cleaning chemicals & services

Clean Harbors, Norwell, MA  
**CORTEC CORP., 4119 White Bear Pkwy., St. Paul, MN 55110 ((800) 4-CORTEC; 651-429-1100; FAX: (651) 429-1122; e-mail: productinfo@corcecvi.com; web site: www.corcecvi.com)**

Miller-Stephenson Chemical Co., Inc., Danbury, CT  
Spartan Chemical Services Inc., Jersey City, NJ

### Cleaning equipment, blast

Hammelmann Corp., Miamisburg, OH  
URACA GmbH & Co. KG, Bad Urach  
Veolia Environmental Services, Chicago, IL

### Cleaning equipment, chemical

Advance, Plymouth, MN  
Alfa Laval Tank Equipment, Exton, PA  
Hydro-Thermal Corp., Waukesha, WI  
NexGen Enviro Systems Inc., Lindenhurst, NY  
Petron Plus Global, Inc., Hutchinson, Kansas  
Singleton Corp., Cleveland, OH  
Veolia Environmental Services, Chicago, IL

### Cleaning equipment, high-pressure liquid

Advance, Plymouth, MN  
Alfa Laval Tank Equipment, Exton, PA  
Cat Pumps, Minneapolis, MN  
Goodway Technologies Corp., Stamford, CT  
Hammelmann Corp., Miamisburg, OH  
INOX-TECH INC., Ste. Catherine  
URACA GmbH & Co. KG, Bad Urach  
Veolia Environmental Services, Chicago, IL  
WOMA Corp., Edison, NJ

### Cleaning equipment, mechanical

Advance, Plymouth, MN  
**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)**  
— See our ad on page 15

Goodway Technologies Corp., Stamford, CT

### Cleaning equipment, pharmaceutical

Bioengineering AG, Wald, CHE  
Bioengineering Inc., Somerville, MA  
Gamajet, part of the Alfa Laval Group, PA  
Hydro-Thermal Corp., Waukesha, WI  
**PICK HEATERS INC., 730 S. Indiana Ave., P.O. Box 516, West Bend, WI 53095 (262-338-1191; FAX: 262-338-8489; e-mail: info1@pickheaters.com; web site: www.pickheaters.com)**

### Cleaning equipment, steam

Alfa Laval Tank Equipment, Exton, PA  
Hydro-Thermal Corp., Waukesha, WI  
**PICK HEATERS INC., 730 S. Indiana Ave., P.O. Box 516, West Bend, WI 53095 (262-338-1191; FAX: 262-338-8489; e-mail: info1@pickheaters.com; web site: www.pickheaters.com)**

### Cleaning equipment, tank cleaning

Alfa Laval Tank Equipment, Exton, PA  
Bioengineering Inc., Somerville, MA  
Butterworth Inc., Houston, TX  
**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)**  
— See our ad on page 15

Hammelmann Corp., Miamisburg, OH  
Hydro-Thermal Corp., Waukesha, WI  
Pulsair Systems, Inc., Bellevue, WA  
URACA GmbH & Co. KG, Bad Urach, O  
Veolia Environmental Services, Chicago, IL  
WOMA Corp., Edison, NJ

### Cleaning parts & accessories

Alfa Laval Tank Equipment, Exton, PA  
Butterworth Inc., Houston, TX  
Hammelmann Corp., Miamisburg, OH  
NexGen Enviro Systems Inc., Lindenhurst, NY

### Sweepers

Advance, Plymouth, MN  
Industrial Magnetics, Inc., Boyne City, MI

## Vacuum cleaning systems

Clean Harbors, Norwell, MA  
Goodway Technologies Corp., Stamford, CT  
Vector Technologies Ltd., Milwaukee, WI  
Veolia Environmental Services, Chicago, IL

### Washers

Alfa Laval Tank Equipment, Exton, PA  
Goodway Technologies Corp., Stamford, CT  
NexGen Enviro Systems Inc., Lindenhurst, NY  
Progressive Recovery Inc., Dupo, IL

## EQUIPMENT REPAIR & REBUILDING

### Pipeline rehabilitation processes

**Team Industrial Services, Inc., Alvin, TX**  
— See our ad on back cover

### Pressure vessel repair

Advance Boiler & Tank Co., West Allis, WI  
BORSIG GmbH, Berlin  
Diamond Refractory Services, LLC, Houston, TX  
**SULZER CHEMTECH USA, INC., 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rodney.alario@sulzer.com; web site: www.sulzer.com)**

**Team Industrial Services, Inc., Alvin, TX**  
— See our ad on back cover

Tiger Tower Services, LLC, Conroe, TX

### Pump repair

Wall Colmonoy Corporation, Madison Heights, MI

### Valve repair

BORSIG GmbH, Berlin  
HOERBIGER Kompressortechnik Holding GmbH, Vienna  
**Team Industrial Services, Inc., Alvin, TX**  
— See our ad on back cover  
Wall Colmonoy Corporation, Madison Heights, MI

## FIRE PROTECTION EQUIPMENT

### Fire alarm systems

Fike, Blue Springs, MO

### Fire detection systems

Fike, Blue Springs, MO  
General Monitors, Lake Forest, CA

### Fire extinguishers, portable

Red Dog Services LLC, Allen, TX  
Spill Containment Direct, Buffalo, MN

### Fire extinguishing systems, carbon dioxide

Fike, Blue Springs, MO

### Fire extinguishing systems, foam

Red Dog Services LLC, Allen, TX

### Fire extinguishing systems, halogenated hydrocarbon

Fike, Blue Springs, MO  
**HEMCO CORPORATION, 711 South Powell Road, Independence, MO 64056 (800-779-4362; 816-796-2900; FAX: 816-796-3333; e-mail: info@hemcocorp.com; web site: www.HEMCOcorp.com)**

### Fire pumps

Schutte & Koerting, Treviso, PA

### Smoke detection systems

Fike, Blue Springs, MO

### Sprinkler systems

Fike, Blue Springs, MO

## MAINTENANCE TOOLS & EQUIPMENT & REPLACEMENT PARTS

### Expanders, tube

**USA INDUSTRIES, INC., 302 State Street, S. Houston, TX 77587 (800-456-8721; 713-941-3797; 713-941-3797; FAX: 713-941-1086; e-mail: info@usaindustries.com; web site: www.usaindustries.com)**

### Leak sealing service

**Team Industrial Services, Inc., Alvin, TX**  
— See our ad on back cover

### Lubricating equipment

LA-MAN Corp., Mазeppa, MN

### Machinery-alignment equipment

Elos Fixturlaser AB, Molndal  
LUDECA, INC., Doral, FL

### Plant maintenance services

Diamond Refractory Services, TX  
Elos Fixturlaser AB, Molndal  
PRÜFTECHNIK Dieter Busch AG, Ismaning, Germany  
Quest Integrity, WA  
**REDGUARD, 4340 S. West Street, Wichita, KS 67217 (855.REDGUARD; 855.733.4827; FAX: 316-440-1800; web site: www.redguard.com)**  
— See our ad on page 31  
**SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)**

**Team Industrial Services, Inc., Alvin, TX**  
— See our ad on back cover

TestOil, Strongsville, OH  
Zeppelin Systems GmbH, Roedermark, Germany

### Shaft-alignment equipment

Elos Fixturlaser AB, Molndal  
LUDECA, INC., Doral, FL  
PRÜFTECHNIK Dieter Busch AG, Ismaning, Germany

### Spray equipment, thermal

Wall Colmonoy Corporation, Madison Heights, MI

### Stud tensioners, hydraulic

**Team Industrial Services, Inc., Alvin, TX**  
— See our ad on back cover

### Testing equipment, corrosion

Dacon Inspection Services, Ban Chang, THA  
Quest Integrity, WA  
Singleton Corp., Cleveland, OH

### Testing equipment, high pressure

Beamex, Inc., Marietta, GA  
**TLV CORPORATION, Charlotte, NC**  
— See our ad on page 108

### Testing equipment, nondestructive

ATS RhoSystems, Cannon Instrument Company, Borden-town, NJ  
Dacon Inspection Services, Ban Chang, THA  
PRÜFTECHNIK Dieter Busch AG, Ismaning, Germany  
Quest Integrity, WA  
Raytek Corp., Santa Cruz, CA

### Tools & equipment, other

**BERNDORF BAND GMBH, Leobersdorferstr. 26, Berndorf, AUT 2560 (43-2672-800-0; FAX: 43-2672-84176; e-mail: band@berndorf.at; web site: www.berndorf-band.at)**  
HAVER & BOECKER, Wire Weaving, Oelde, Germany  
**REDGUARD, 4340 S. West Street, Wichita, KS 67217 (855.REDGUARD; 855.733.4827; FAX: 316-440-1800; web site: www.redguard.com)**  
— See our ad on page 31  
SGB GmbH, Siegen

### Tools, hand

CEJN Industrial Corp., Gunee, IL  
**EMERSON, 1100 W. Louis Henna Blvd., Round Rock, TX 78681 (612-834-7039; e-mail: victor.obrien@emerson.com; web site: emerson.com)**  
Leister Technologies AG, Kaegiswil



**USA INDUSTRIES, INC.**, 302 State Street, S. Houston, TX 77587 (800-456-8721; 713-941-3797; 713-941-3797; FAX: 713-941-1086; e-mail: info@usaindustries.com; web site: www.usaindustries.com)

## Welding equipment

AGRU Kunststofftechnik GmbH, Bad Hall  
Leister Technologies AG, Kaegiswil

## NOISE & VIBRATION SUPPRESSION EQUIPMENT

### Absorbers, vibration

**GENERAL RUBBER CO.**, 861 Washington Ave, Carlstadt, NJ 07072 (800-233-6294; (201) 935-1900; FAX: (201) 935-1915; web site: general-rubber.com)

Isotech, Inc, Hatfield, PA  
McGill AirSilence LLC, Columbus, OH

### Analyzers, vibration

**EMERSON**, 1100 W. Louis Henna Blvd., Round Rock, TX 78681 (512-834-7039; e-mail: victor.obrien@emerson.com; web site: emerson.com)

Isotech, Inc, Hatfield, PA  
LUDECA, INC., Doral, FL  
**TLV CORPORATION**, Charlotte, NC  
— See our ad on page 108

### Insulation, acoustical

Isotech, Inc, Hatfield, PA

### Louvers, noise control

McGill AirSilence LLC, Columbus, OH

### Noise enclosures & barriers

**EDWARDS US HEADQUARTERS**, Sanborn, NY  
Isotech, Inc, Hatfield, PA  
McGill AirSilence LLC, Columbus, OH

### Silencers, exhaust

CU SERVICES LLC, Elk Grove, IL  
**EDWARDS US HEADQUARTERS**, Sanborn, NY  
McGill AirSilence LLC, Columbus, OH  
Strobic Air, a CECO Environmental Company, Telford, PA

### Silencers, inline

**EDWARDS US HEADQUARTERS**, Sanborn, NY  
McGill AirSilence LLC, Columbus, OH

### Silencers, intake

**EDWARDS US HEADQUARTERS**, Sanborn, NY  
McGill AirSilence LLC, Columbus, OH

### Testing instruments, vibration

LUDECA, INC., Doral, FL  
**PRÜFTECHNIK Dieter Busch AG**, Ismaning, Germany  
**TLV CORPORATION**, Charlotte, NC  
— See our ad on page 108  
Thermotron, Holland, MI

## SAFETY EQUIPMENT & SYSTEMS

### Air purifiers

SPX Flow Technology, Ocala, FL

### Antiskid materials

Bustin Industrial Products, East Stroudsburg, PA

### Aprons

Associated Bag Company, Milwaukee, WI

### Arresters, flame deflagration or detonation

Fike, Blue Springs, MO  
Oseco, Broken Arrow, OK  
Pentair Valves & Controls, Stafford, TX

### Arresters, flame, tank vent, inline

Fike, Blue Springs, MO  
Oseco, Broken Arrow, OK

### Arresters, surge

Pentair Valves & Controls, Stafford, TX

### Blowout doors & panels

BS & B Safety Systems, Inc., Tulsa, OK  
Fike, Blue Springs, MO  
Oseco, Broken Arrow, OK

### Cardiopulmonary resuscitation (CPR) training and aids

GTS, Mississauga, CAN

### Climbing safety equipment

Sur-Loc Inc., Fremont, IN

### Clothing, chemical resistant

Associated Bag Company, Milwaukee, WI

### Containers, safety

Associated Bag Company, Milwaukee, WI

### Emergency shutdown systems

Fike, Blue Springs, MO  
HIMA Paul Hildebrandt GmbH + Co KG, Bruehl  
**PROCESS SYSTEMS ENGINEERING LLC, INDUSTRIAL AUTOMATION AND PROCESS SAFETY ENGINEERING**, 636 Prospect St., Westfield, NJ 07090 (9089673807; e-mail: pse@prosyseng.com; web site: www.prosyseng.com)

**SIEMENS AG**, Siemensallee 84, Karlsruhe, Germany  
D- 76187 (+49(0)721/595-0; web site: www.siemens.com/chemicals)

### Explosion isolation

Fike, Blue Springs, MO  
Oseco, Broken Arrow, OK  
**REMBE GMBH SAFETY + CONTROL**, Gallbergweg 21, Brilon, Germany 59929 (+49 2961 7405-0; FAX: +49 2961 50714; e-mail: info@rembe.de; web site: www.rembe.de)  
— See our ad on page 23  
**REMBE INC.**, 3809 Beam Road Ste K, Charlotte, NC 28217 (+1 704 716 7022; FAX: +1 704 716 7025; e-mail: info@rembe.us; web site: www.rembe.us)  
— See our ad on page 23

### Explosion suppression systems

Fike, Blue Springs, MO

### Explosion vents

BS & B Safety Systems, Inc., Tulsa, OK  
Fike, Blue Springs, MO  
HOERBIGER Kompressortechnik Holding GmbH, Vienna  
Oseco, Broken Arrow, OK  
**REMBE GMBH SAFETY + CONTROL**, Gallbergweg 21, Brilon, Germany 59929 (+49 2961 7405-0; FAX: +49 2961 50714; e-mail: info@rembe.de; web site: www.rembe.de)  
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**REMBE INC.**, 3809 Beam Road Ste K, Charlotte, NC 28217 (+1 704 716 7022; FAX: +1 704 716 7025; e-mail: info@rembe.us; web site: www.rembe.us)  
— See our ad on page 23  
Scientific Dust Collectors, Alsip, IL

### Face shields

Associated Bag Company, Milwaukee, WI

### Glove boxes

F.P.S. Food and Pharma Systems srl, Como, ITA  
PSL USA, Boise, ID  
Powder Systems Ltd, Liverpool

### Gloves

Associated Bag Company, Milwaukee, WI

### Harnesses

Sur-Loc Inc., Fremont, IN

### Marking & labeling systems

Associated Bag Company, Milwaukee, WI  
K-Sun Corporation, Somerset, WI  
**PROCESS SYSTEMS ENGINEERING LLC, INDUSTRIAL AUTOMATION AND PROCESS SAFETY ENGINEERING**, 636 Prospect St., Westfield, NJ 07090 (9089673807; e-mail: pse@prosyseng.com; web site: www.prosyseng.com)

### Nozzles, fire fog

**BETE Fog Nozzle Inc.**, Greenfield, MA

### Pipe markers

K-Sun Corporation, Somerset, WI

### Railroad safety devices

Oseco, Broken Arrow, OK  
Trans Environmental Systems, Inc., Charlottesville, VA

### Rupture discs

BS & B Safety Systems, Inc., Tulsa, OK  
Donadon SDD Srl, Corbetta, ITA  
Fike, Blue Springs, MO  
Oseco, Broken Arrow, OK

**REMBE GMBH SAFETY + CONTROL**, Gallbergweg 21, Brilon, Germany 59929 (+49 2961 7405-0; FAX: +49 2961 50714; e-mail: info@rembe.de; web site: www.rembe.de)

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**REMBE INC.**, 3809 Beam Road Ste K, Charlotte, NC 28217 (+1 704 716 7022; FAX: +1 704 716 7025; e-mail: info@rembe.us; web site: www.rembe.us)  
— See our ad on page 23

### Rupture panels

Fike, Blue Springs, MO  
Oseco, Broken Arrow, OK

### Safety audits

Dakota Software Corp., Cleveland, OH  
**PROCESS SYSTEMS ENGINEERING LLC, INDUSTRIAL AUTOMATION AND PROCESS SAFETY ENGINEERING**, 636 Prospect St., Westfield, NJ 07090 (9089673807; e-mail: pse@prosyseng.com; web site: www.prosyseng.com)

### Showers, emergency

**HEMCO CORPORATION**, 711 South Powell Road, Independence, MO 64056 (800-779-4362; 816-796-2900; FAX: 816-796-3333; e-mail: info@hemcocorp.com; web site: www.HEMCOcorp.com)  
Hughes Safety Showers North America Inc., CAN

### Sinks, eye or face emergency

**HEMCO CORPORATION**, 711 South Powell Road, Independence, MO 64056 (800-779-4362; 816-796-2900; FAX: 816-796-3333; e-mail: info@hemcocorp.com; web site: www.HEMCOcorp.com)  
Hughes Safety Showers North America Inc., CAN

### Storage cabinets

**HEMCO CORPORATION**, 711 South Powell Road, Independence, MO 64056 (800-779-4362; 816-796-2900; FAX: 816-796-3333; e-mail: info@hemcocorp.com; web site: www.HEMCOcorp.com)  
Spill Containment Direct, Buffalo, MN

### Testing equipment, dust

Fike, Blue Springs, MO

### Testing equipment, gases & vapors

American Gas & Chemical Co Ltd, NJ  
Delphian Corp., Northvale, NJ  
Fike, Blue Springs, MO  
RKI Instruments, Inc., Union City, CA

### Valve & flange covers

Oseco, Broken Arrow, OK

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# DESIGN, ENGINEERING, & CONSTRUCTION

**183**    **Engineering services**  
**185**    **Training**

## ENGINEERING SERVICES

### Arbitration, engineering

**Knighthawk Engineering, Houston, TX**  
TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA

### Consultants, corrosion protection

Applus RTD USA, Houston, TX  
Diamond Refractory Services, TX  
Diamond Refractory Services, LLC, Houston, TX  
**Knighthawk Engineering, Houston, TX**

### Consultants, engineering

AKW Apparate + Verfahren GmbH, Hirschau, Bavaria  
Advanced GeoServices Corp., West Chester, PA  
Advanced Industrial Technology Corp., Paramus, NJ  
Air Liquide Global E&C Solutions Germany GmbH, Frankfurt am Main

Airflow Sciences Corporation, Livonia, MI  
Applus RTD USA, Houston, TX  
Bayer Technology Services GmbH, Leverkusen  
CAI Catalysts, Gwynedd Square, PA  
Clean Air Engineering, Palatine, IL

**DEC GROUP - DIETRICH ENGINEERING CONSULTANTS SA, Z.I. Larges Pieces A - Chemin du Devent, Eculens, CHE 1024-CH (+41-21-694 20 40; FAX: +41-21-694 20 59; e-mail: info@dec-group.ch; web site: www.dec-group.net)**

Dematic Corp., Grand Rapids, MI  
E-Vac Technologies, LLC, McMurray, PA  
GEA Engineering, P.C., Nanuet, NY

**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)**

— See our ad on page 15  
**GABELMAN PROCESS SOLUTIONS, LLC, 6548 Mead-owbrook Court, West Chester, OH 45069 (e-mail: alan.gabelman@gabelmanps.com)**

Gekko Engineering, Carson, CA  
Harrop Industries, Inc., Columbus, OH  
**Jenike & Johanson Inc., Tyngsboro, MA**  
Johnson Matthey Davy Technologies Ltd., London  
**Knighthawk Engineering, Houston, TX**  
Musco Engineering Associates, West Haven, CT

**NOL-TEC SYSTEMS, INC., 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)**

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Oxford Lasers, Inc., Shirley, MA

ProSim SA, LABEGE

ProSys, Inc., Baton Rouge, LA

**PROCESS SYSTEMS ENGINEERING LLC, INDUSTRIAL AUTOMATION AND PROCESS SAFETY ENGINEERING, 636 Prospect St., Westfield, NJ 07090 (9089673807; e-mail: pse@prosyseng.com; web site: www.prosyseng.com)**

Process Systems Enterprise Limited, London

RAS Process Equipment Inc., Robbinsville, NJ

**REDGUARD, 4340 S. West Street, Wichita, KS 67217 (855.REDGUARD; 855.733.4827; FAX: 316-440-1800; web site: www.redguard.com)**

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River Consulting, Pittsburgh, PA

**SULZER CHEMTECH USA, INC., 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rodney.alario@sulzer.com; web site: www.sulzer.com)**

Team Industrial Services, Inc., Alvin, TX

TowerScan, Port Huron, MI

TowerScan, Sarnia

Wall Colmonoy Corporation, Madison Heights, MI

Wood Group, Mustang, TX

### Consultants, ISO compliance

Trinity Consultants, Dallas, TX

### Consultants, materials

**Knighthawk Engineering, Houston, TX**

McWane and Associates, San Jose, CA

Toll Blender, Network, CT

### Consultants, safety & health

Conversion Technology, Inc., Norcross, GA

HIMA Paul Hildebrandt GmbH + Co KG, Bruehl

**PROCESS ENGINEERING ASSOCIATES, LLC, 700 South Illinois Ave., Suite A-202, Oak Ridge, TN 37830 (865-220-8722; FAX: 865-220-8729; e-mail: info@processengr.com; web site: www.processengr.com)**

**PROCESS SYSTEMS ENGINEERING LLC, INDUSTRIAL AUTOMATION AND PROCESS SAFETY ENGINEERING, 636 Prospect St., Westfield, NJ 07090 (9089673807; e-mail: pse@prosyseng.com; web site: www.prosyseng.com)**

**REDGUARD, 4340 S. West Street, Wichita, KS 67217 (855.REDGUARD; 855.733.4827; FAX: 316-440-1800; web site: www.redguard.com)**

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### Consultants, water treatment

**CALORIS ENGINEERING, 8649 Commerce Drive, Easton, MD 21601 (410-822-6900; FAX: 410-822-9006; e-mail: info@caloris.com; web site: www.caloris.com)**

Filteration & Membrane Technology, Inc., Houston, TX

GEA Engineering, P.C., Nanuet, NY

**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)**

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**PROCESS ENGINEERING ASSOCIATES, LLC, 700 South Illinois Ave., Suite A-202, Oak Ridge, TN 37830 (865-220-8722; FAX: 865-220-8729; e-mail: info@processengr.com; web site: www.processengr.com)**

River Consulting, Pittsburgh, PA

United Manufacturing International 2000 Activated Carbon, Red Bluff, CA

### Contract manufacturing systems

Toll Blender, Network, CT

### Custom processing

Harrop Industries, Inc., Columbus, OH  
**Knighthawk Engineering, Houston, TX**  
Particle Reduction Service, Elk Grove Village, IL  
Toll Blender, Network, CT

### Database services

**DECHEMA e.V., Frankfurt am Main, Germany**

### Engineering, biochemical & biotech

Bayer Technology Services GmbH, Leverkusen  
M+W Central Europe GmbH, Germany  
Sias, New Castle, DE  
Xiril AG, Hombrechtikon

### Engineering: clean rooms

Bayer Technology Services GmbH, Leverkusen  
M+W Central Europe GmbH, Germany

### Engineering: construction & field erection

CB&I, The Woodlands, TX  
De Dietrich Process Systems GmbH, Mainz

**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)**

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Harrop Industries, Inc., Columbus, OH

Koch Knight, LLC, East Canton, OH

Martin Engineering, Neponset, IL

Musco Engineering Associates, West Haven, CT

**NEUHAUS NEOTEC MASCHINEN- UND ANLAGENBAU GMBH, Dieselstrasse 5-9, D-21465 Reinbek (+49-40-72771-500; FAX: +49-40-72771-550; e-mail: sales@neuhaus-neotec.de; web site: www.neuhaus-neotec.de)**

**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK MATERIALS TECHNOLOGY DEUTSCHLAND GMBH, Saliestr. 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: info.spsde@sandvik.com; web site: www.process-systems.sandvik.com)**

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**SULZER CHEMTECH USA, INC., 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rodney.alario@sulzer.com; web site: www.sulzer.com)**

ThyssenKrupp Industrial Solutions AG, Business Unit Process Technologies, Dortmund  
Tiger Tower Services, LLC, Conroe, TX

### Engineering: cryogenic equipment

Applied E-Simulators Software, P. O. Box 4032, West Richland, WA 99353 United States (509-967-5730; Fax: 509-967-5730; e-mail: bgplace@bgplace.cnc.net; www.ae-sim.com)

LAUDA DR. R. WOBSEY GMBH & CO. KG, Lauda-Koenigshofen, O

**NEUHAUS NEOTEC MASCHINEN- UND ANLAGENBAU GMBH, Dieselstrasse 5-9, D-21465 Reinbek (+49-40-72771-500; FAX: +49-40-72771-550; e-mail: sales@neuhaus-neotec.de; web site: www.neuhaus-neotec.de)**

V2 Flow Controls, Burr Ridge, IL

### Engineering: equipment inspection & expediting

AKW Apparate + Verfahren GmbH, Hirschau, Bavaria  
Applus RTD USA, Houston, TX  
Bayer Technology Services GmbH, Leverkusen

Dacon Inspection Services, Ban Chang, THA

Fike, Blue Springs, MO

Knighthawk Engineering, Houston, TX

### Engineering: facilities planning

Applus RTD USA, Houston, TX

Gekko Engineering, Carson, CA

Lyntek, Inc., Lakewood, CO

M+W Central Europe GmbH, Germany

Musco Engineering Associates, West Haven, CT

**REDGUARD, 4340 S. West Street, Wichita, KS 67217 (855.REDGUARD; 855.733.4827; FAX: 316-440-1800; web site: www.redguard.com)**

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River Consulting, Pittsburgh, PA

ThyssenKrupp Industrial Solutions AG, Business Unit Process Technologies, Dortmund

Wood Group, Mustang, TX

### Engineering: instrumentation & control systems

CelesTech, Inc., Haddonfield, NJ

Dr. Thiedig GmbH & Co KG, Berlin, Germany

**ENDRESS & HAUSER INC, 2350 Endress Place, Greenwood, IN 46143 (800-428-4344; 317-535-7138; FAX: 317-535-8498; e-mail: info@us.endress.com; web site: www.us.endress.com)**

Flottweg SE, Vilsbiburg

**GABELMAN PROCESS SOLUTIONS, LLC, 6548 Meadowbrook Court, West Chester, OH 45069 (e-mail: alan.gabelman@gabelmanps.com)**

HIMA Paul Hildebrandt GmbH + Co KG, Bruehl

Harrop Industries, Inc., Columbus, OH

Lyntek, Inc., Lakewood, CO

Musco Engineering Associates, West Haven, CT

**NOL-TEC SYSTEMS, INC., 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)**

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**PEPPERL + FUCHS GMBH, Lilienthalstrasse 200, Mannheim, Germany 68307 (0621-776-0; FAX: 0621-776-1000; e-mail: info@de.pepperl-fuchs.com; web site: www.pepperl-fuchs.com)**

Polytec, Inc., Process Analytics, Hopkinton

**PROCESS SYSTEMS ENGINEERING LLC, INDUSTRIAL AUTOMATION AND PROCESS SAFETY ENGINEERING, 636 Prospect St., Westfield, NJ 07090 (9089673807; e-mail: pse@prosyseng.com; web site: www.prosyseng.com)**

River Consulting, Pittsburgh, PA

Rockwell Automation, Inc., Milwaukee, WI

**SIEMENS AG, Siemensallee 84, Karlsruhe, Germany D-76187 (+49(0)721/595-0; web site: www.siemens.com/chemicals)**

Swagelok Co., Solon, OH

The Industrial Controls Company, Inc.

Thermotron, Holland, MI

Yokogawa Corporation of America, Sugar Land, TX

**ZETON INC., 740 Oval Court, Burlington, L7L 6A9 (877-299-3866; 905-632-3123; FAX: 905-632-0301; e-mail: info@zeton.com; web site: www.zeton.com)**

tec5USA, Plainview, NY

### Engineering: modular process systems

AKW Apparate + Verfahren GmbH, Hirschau, Bavaria

Bayer Technology Services GmbH, Leverkusen

Cobey, Buffalo, NY

**EKATO RUEHR- UND MISCHTECHNIK GMBH, Hoheflum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: +49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)**

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GEA Engineering, P.C., Nanuet, NY

**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)**

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Gekko Engineering, Carson, CA

INOX-TECH INC., Ste. Catherine, Canada

Johnson Matthey Davy Technologies Ltd., London

Lyntek, Inc., Lakewood, CO

M+W Central Europe GmbH, Germany

**POPE SCIENTIFIC, INC., P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)**

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**PROCESS ENGINEERING ASSOCIATES, LLC, 700 South Illinois Ave., Suite A-202, Oak Ridge, TN 37830 (865-220-8722; FAX: 865-220-8729; e-mail: info@processengr.com; web site: www.processengr.com)**

**SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)**

Wood Group, Mustang, TX



**ZETON INC.**, 740 Oval Court, Burlington, L7L 6A9 (877-299-3866; 905-632-3123; FAX: 905-632-0301; e-mail: info@zeton.com; web site: www.zeton.com)

## Engineering: packaged pilot plants

Bayer Technology Services GmbH, Leverkusen  
Biazzi SA, Chailly/Montreux

**CALORIS ENGINEERING**, 8649 Commerce Drive, Easton, MD 21601 (410-822-6900; FAX: 410-822-9006; e-mail: info@caloris.com; web site: www.caloris.com)

HydroTec Systems Co., Inc., Tiskilwa, IL  
Johnson Matthey Davy Technologies Ltd., London  
Lyntek, Inc., Lakewood, CO

**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)

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**SULZER CHEMTECH LTD**, Sulzer Allee 48, P.O. Box 65, Winterthur 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

**SULZER CHEMTECH USA, INC.**, 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rodney.alario@sulzer.com; web site: www.sulzer.com)

**ZETON INC.**, 740 Oval Court, Burlington, L7L 6A9 (877-299-3866; 905-632-3123; FAX: 905-632-0301; e-mail: info@zeton.com; web site: www.zeton.com)

## Engineering: pilot plants

Air Liquide Global E&C Solutions Germany GmbH, Frankfurt am Main

GEA Engineering, P.C., Nanuet, NY  
**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 (800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com

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**GABELMAN PROCESS SOLUTIONS, LLC**, 6548 Mead-owbrook Court, West Chester, OH 45069 (e-mail: alan.gabelman@gabelmanps.com)

Harpur Industries, Inc., Columbus, OH  
Johnson Matthey Davy Technologies Ltd., London  
Linde AG, Engineering Division, Pullach

**POPE SCIENTIFIC, INC.**, P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)

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**PROCESS ENGINEERING ASSOCIATES, LLC**, 700 South Illinois Ave., Suite A-202, Oak Ridge, TN 37830 (865-220-8722; FAX: 865-220-8729; e-mail: info@processengr.com; web site: www.processengr.com)

**SULZER CHEMTECH LTD**, Sulzer Allee 48, P.O. Box 65, Winterthur 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

**ZETON INC.**, 740 Oval Court, Burlington, L7L 6A9 (877-299-3866; 905-632-3123; FAX: 905-632-0301; e-mail: info@zeton.com; web site: www.zeton.com)

## Engineering: plant design

**ABZ, INC.**, 4451 Brookfield Corp. Dr., Suite 107, Chantilly, VA 20151 (800-747-7401; 703-631-7401; FAX: 703-631-5282; e-mail: sales@abzinc.com; web site: www.abzinc.com)

AKW Apparate + Verfahren GmbH, Hirschau, Bavaria  
Air Liquide Global E&C Solutions Germany GmbH, Frankfurt am Main

Alexanderwerk AG, Remscheid  
Bayer Technology Services GmbH, Leverkusen  
Biazzi SA, Chailly/Montreux

Chematur Ecoplaning Oy, Pori, FIN  
Coperion GmbH, Weingarten, Wuert  
De Dietrich Process Systems GmbH, Mainz  
Dipesh Engineering Works, Mumbai, IND

GIG Karasek GmbH, Gloggnitz-Stuppach  
Gekko Engineering, Carson, CA  
Haldor Topsoe A/S, Lyngby

Harpur Industries, Inc., Columbus, OH  
Invensys Systems (UK) Ltd, Crawley

Johnson Matthey Davy Technologies Ltd., London  
**KAISER PROCESS AND BELT TECHNOLOGY GMBH**, Siemensring 54-56, Willich, Germany 47877 (+49 (0) 2154 89107 - 0; FAX: +49 (0) 2154 89107 - 284; e-mail: info@kaiser-pbt.de; web site: www.kaiser-pbt.de)

**Knighthawk Engineering**, Houston, TX  
Linde AG, Engineering Division, Pullach  
Lyntek, Inc., Lakewood, CO

Musco Engineering Associates, West Haven, CT

**PROCESS ENGINEERING ASSOCIATES, LLC**, 700

South Illinois Ave., Suite A-202, Oak Ridge, TN 37830 (865-220-8722; FAX: 865-220-8729; e-mail: info@processengr.com; web site: www.processengr.com)

Process Systems Enterprise Limited, London

**REDGUARD**, 4340 S. West Street, Wichita, KS 67217 (855.REDGUARD; 855.733.4827; FAX: 316-440-1800; web site: www.redguard.com)

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River Consulting, Pittsburgh, PA

ThyssenKrupp Industrial Solutions AG, Business Unit Process Technologies, Dortmund  
Wood Group, Mustang, TX

Zeppelin Systems GmbH, Roedermark, Germany

**ZETON INC.**, 740 Oval Court, Burlington, L7L 6A9 (877-299-3866; 905-632-3123; FAX: 905-632-0301; e-mail: info@zeton.com; web site: www.zeton.com)

## Engineering: plant modernization

Air Liquide Global E&C Solutions Germany GmbH, Frankfurt am Main

Gekko Engineering, Carson, CA

Lyntek, Inc., Lakewood, CO

M+W Central Europe GmbH, Germany

**PROCESS ENGINEERING ASSOCIATES, LLC**, 700 South Illinois Ave., Suite A-202, Oak Ridge, TN 37830 (865-220-8722; FAX: 865-220-8729; e-mail: info@processengr.com; web site: www.processengr.com)

**REDGUARD**, 4340 S. West Street, Wichita, KS 67217 (855.REDGUARD; 855.733.4827; FAX: 316-440-1800; web site: www.redguard.com)

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River Consulting, Pittsburgh, PA

**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK**

**MATERIALS TECHNOLOGY DEUTSCHLAND GMBH**, Saliestr. 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: info.spde@sandvik.com; web site: www.process-systems.sandvik.com)

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Wood Group, Mustang, TX

## Engineering: pollution & environmental services

ADI Systems, Frederick, CAN

ADI Systems Inc., Wolfboro, NH

Advanced GeoServices Corp., West Chester, PA

Advanced Industrial Technology Corp., Paramus, NJ

**AIR PRODUCTS AND CHEMICALS, INC.**, 7201 Hamilton Blvd., Allentown, PA 18195-1501 (800-345-3148; 610-481-4911; FAX: 610-481-4381; e-mail: cheminfo@airproducts.com; web site: www.airproducts.com/chemprocessing)

Airflow Sciences Corporation, Livonia, MI

Ambient Engineering Inc., Rocky Hill, NJ

CECO Filters, a CECO Environmental Company, Telford, PA

Catalytic Products Intl. Inc., Lake Zurich, IL

Clean Air Engineering, Palatine, IL

Conversion Technology, Inc., Norcross, GA

Durr Systems, Inc., Clean Technology Systems, Plymouth, MI

Environmental C&C, St. Charles, IL

Epon Industrial Systems, LP, The Woodlands, TX

**FISHER-KLOSTERMAN EMTRON**, A CECO ENVIRONMENTAL COMPANY, Louisville, KY

Flex-Kleen, a CECO Environmental Company, Glendale Heights, IL

GEA Engineering, P.C., Nanuet, NY

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 (800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com

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Genoble Engineering, Greenville, SC

HEE-DUALL, A CECO ENVIRONMENTAL COMPANY, Owosso, MI

**KIMRE, INC.**, 744 SW 1st Street, Homestead, FL 33030 (305 233-4249; FAX: 305 233-8687; e-mail: sales@kimre.com; web site: www.kimre.com)

**NOL-TEC SYSTEMS, INC.**, 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)

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**PROCESS ENGINEERING ASSOCIATES, LLC**, 700 South Illinois Ave., Suite A-202, Oak Ridge, TN 37830 (865-220-8722; FAX: 865-220-8729; e-mail: info@processengr.com; web site: www.processengr.com)

River Consulting, Pittsburgh, PA

TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA

**Team Industrial Services, Inc.**, Alvin, TX

Trinity Consultants, Dallas, TX

## Engineering: process design

**ABZ, INC.**, 4451 Brookfield Corp. Dr., Suite 107, Chantilly, VA 20151 (800-747-7401; 703-631-7401; FAX: 703-631-5282; e-mail: sales@abzinc.com; web site: www.abzinc.com)

ADI Systems, Frederick, CAN

AKW Apparate + Verfahren GmbH, Hirschau, Bavaria  
Advanced Industrial Technology Corp., Paramus, NJ  
Air Liquide Global E&C Solutions Germany GmbH, Frankfurt am Main

**Applied E-Simulators Software**, P. O. Box 4032, West Richland, WA 99353 United States (509-967-5730; Fax: 509-967-5730; e-mail: bgplace@bgplace.cnc.net; www.ae-sim.com)

**BASF Corporation**, Catalysts & Adsorbents, Iselein, NJ — See our ad on page 13

Bayer Technology Services GmbH, Leverkusen

Biazzi SA, Chailly/Montreux  
CA Catalysts, Wynnedd Square, PA  
De Dietrich Process Systems GmbH, Mainz  
Denver Mineral Engineering, Inc., Littleton, CO  
**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hohe-Flum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: +49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)

— See our ad on page 163

GEA Engineering, P.C., Nanuet, NY

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 (800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com

— See our ad on page 15

GIG Karasek GmbH, Gloggnitz-Stuppach

**GABELMAN PROCESS SOLUTIONS, LLC**, 6548 Mead-owbrook Court, West Chester, OH 45069 (e-mail: alan.gabelman@gabelmanps.com)

Gekko Engineering, Carson, CA

Haldor Topsoe A/S, Lyngby

Harpur Industries, Inc., Columbus, OH

Johnson Matthey Davy Technologies Ltd., London

**Knighthawk Engineering**, Houston, TX

Linde AG, Engineering Division, Pullach

Lyntek, Inc., Lakewood, CO

M+W Central Europe GmbH, Germany

Musco Engineering Associates, West Haven, CT

**NOL-TEC SYSTEMS, INC.**, 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com)

— See our ad on page 45

ProSys, Inc., Baton Rouge, LA

**PROCESS ENGINEERING ASSOCIATES, LLC**, 700

South Illinois Ave., Suite A-202, Oak Ridge, TN 37830 (865-220-8722; FAX: 865-220-8729; e-mail: info@processengr.com; web site: www.processengr.com)

Process Systems Enterprise Limited, London

River Consulting, Pittsburgh, PA

**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK**

**MATERIALS TECHNOLOGY DEUTSCHLAND GMBH**, Saliestr. 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: info.spde@sandvik.com; web site: www.process-systems.sandvik.com)

— See our ad on page 53

**SULZER CHEMTECH LTD**, Sulzer Allee 48, P.O. Box 65, Winterthur 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA

Wood Group, Mustang, TX

**ZETON INC.**, 740 Oval Court, Burlington, L7L 6A9 (877-299-3866; 905-632-3123; FAX: 905-632-0301; e-mail: info@zeton.com; web site: www.zeton.com)

## Engineering: process modeling

Airflow Sciences Corporation, Livonia, MI

**Applied E-Simulators Software**, P. O. Box 4032, West Richland, WA 99353 United States (509-967-5730; Fax: 509-967-5730; e-mail: bgplace@bgplace.cnc.net; www.ae-sim.com)

**EKATO RUEHR- UND MISCHTECHNIK GMBH**, Hohe-Flum-Str.37, Schopfheim, Germany D-79650 (+49 7622 290; FAX: +49 7622 29 213; e-mail: info@ekato.com; web site: www.ekato.com)

— See our ad on page 163

**GABELMAN PROCESS SOLUTIONS, LLC**, 6548 Mead-owbrook Court, West Chester, OH 45069 (e-mail: alan.gabelman@gabelmanps.com)

Gekko Engineering, Carson, CA

**Heat Transfer Research, Inc. (HTRI)**, Navasota, TX

Invensys Systems (UK) Ltd, Crawley

Johnson Matthey Davy Technologies Ltd., London

**Knighthawk Engineering**, Houston, TX

ProSys, Inc., Baton Rouge, LA

**PROCESS ENGINEERING ASSOCIATES, LLC**, 700

South Illinois Ave., Suite A-202, Oak Ridge, TN 37830 (865-220-8722; FAX: 865-220-8729; e-mail: info@processengr.com; web site: www.processengr.com)

Process Systems Enterprise Limited, London

Wood Group, Mustang, TX

## Engineering: procurement

Gekko Engineering, Carson, CA  
Lyntek, Inc., Lakewood, CO  
River Consulting, Pittsburgh, PA  
ThyssenKrupp Industrial Solutions AG, Business Unit Process Technologies, Dortmund  
Wood Group, Mustang, TX

## Engineering: project management

Air Liquide Global E&C Solutions Germany GmbH, Frankfurt am Main  
BEST, DZA  
Bayer Technology Services GmbH, Leverkusen  
Coperion GmbH, Weingarten, Wuert.  
Gekko Engineering, Carson, CA  
HIMA Paul Hildebrandt GmbH + Co KG, Bruehl  
INOX-TECH INC., Ste. Catherine  
Johnson Matthey Davy Technologies Ltd., London, O  
**KAISER PROCESS AND BELT TECHNOLOGY GMBH**, Siemensring 54-56, Willich, Germany 47877 (+49 (0) 2154 89107 - 0; FAX: +49 (0) 2154 89107 - 284; e-mail: info@kaiser-pbt.de; web site: www.kaiser-pbt.de)  
Musco Engineering Associates, West Haven, CT  
ProSys, Inc., Baton Rouge, LA  
River Consulting, Pittsburgh, PA  
SBS STEEL BELT SYSTEMS S.r.l., Venegono Inferiore, ITA  
S&C Electric Company, Chicago, IL  
**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK MATERIALS TECHNOLOGY DEUTSCHLAND GMBH**, Saliestr. 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: info.spdsde@sandvik.com; web site: www.processsystems.sandvik.com) — See our ad on page 53  
ThyssenKrupp Industrial Solutions AG, Business Unit Process Technologies, Dortmund  
Wood Group, Mustang, TX

## Engineering: research

CAI Catalysts, Gwynedd Square, PA  
Harrop Industries, Inc., Columbus, OH  
**Heat Transfer Research, Inc. (HTRI), Navasota, TX**  
Johnson Matthey Davy Technologies Ltd., London  
Oxford Lasers, Inc., Shirley, MA  
**PROCESS ENGINEERING ASSOCIATES, LLC, 700 South Illinois Ave., Suite A-202, Oak Ridge, TN 37830 (865-220-8722; FAX: 865-220-8729; e-mail: info@processengr.com; web site: www.processengr.com)**  
Sias, New Castle, DE  
TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA  
Xiril AG, Hombrechtikon

## Equipment testing

Airflow Sciences Corporation, Livonia, MI  
**Heat Transfer Research, Inc. (HTRI), Navasota, TX**  
Jenike & Johanson Inc., Tyngsboro, MA  
Knighthawk Engineering, Houston, TX  
Oxford Lasers, Inc., Shirley, MA  
S&C Electric Company, Chicago, IL  
TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA

## Equipment, used: procurement & supply

**INDECK POWER EQUIPMENT CO., 1111 Willis Ave. (CE), Wheeling, IL 60090 (800-446-3325; 847-541-8300; FAX: 847-541-9984; e-mail: info@indeck-power.com; web site: www.indeck.com)**  
Lyntek, Inc., Lakewood, CO  
TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA

## Inspection

Applus RTD USA, Houston, TX  
Dacon Inspection Services, Ban Chang, THA  
Integrated Corrosion Companies, Houston, TX

## Pilot plant services

**BUSS-SMS-CANZLER GMBH, Kaiserstr. 13-15, Butzbach, 35510 (49-6033-85-0; FAX: 49-6033-85-249; e-mail: info@sms-vt.com; web site: www.sms-vt.com)** — See our ad on page 52  
GEA France, FRA  
**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)** — See our ad on page 15  
GIG Karasek GmbH, Gloggnitz-Stuppach  
Johnson Matthey Davy Technologies Ltd., London  
**POPE SCIENTIFIC, INC., P.O. Box 80018, 351 N. Dekora Woods Blvd., Saukville, WI 53080 (262-268-9300; FAX: 262-268-9400; e-mail: info@popeinc.com; web site: www.popeinc.com)** — See our ad on page 35

**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK MATERIALS TECHNOLOGY DEUTSCHLAND GMBH**, Saliestr. 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: info.spdsde@sandvik.com; web site: www.processsystems.sandvik.com)

— See our ad on page 53  
**ZETON INC., 740 Oval Court, Burlington, L7L 6A9 (877-299-3866; 905-632-3123; FAX: 905-632-0301; e-mail: info@zeton.com; web site: www.zeton.com)**

## Plant decommissioning and dismantling

**ABZ, INC., 4451 Brookfield Corp. Dr., Suite 107, Chantilly, VA 20151 (800-747-7401; 703-631-7401; FAX: 703-631-5282; e-mail: sales@abzinc.com; web site: www.abzinc.com)**

CB&I, The Woodlands, TX  
M+W Central Europe GmbH, Germany

## Plant documentation services

**PROCESS ENGINEERING ASSOCIATES, LLC, 700 South Illinois Ave., Suite A-202, Oak Ridge, TN 37830 (865-220-8722; FAX: 865-220-8729; e-mail: info@processengr.com; web site: www.processengr.com)**

**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK MATERIALS TECHNOLOGY DEUTSCHLAND GMBH**, Saliestr. 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: info.spdsde@sandvik.com; web site: www.processsystems.sandvik.com) — See our ad on page 53

## Plant relocation

M+W Central Europe GmbH, Germany  
**REDGUARD, 4340 S. West Street, Wichita, KS 67217 (855.REDGUARD; 855.733.4827; FAX: 316-440-1800; web site: www.redguard.com)** — See our ad on page 31

## Process safety management services

Conversion Technology, Inc., Norcross, GA  
HIMA Paul Hildebrandt GmbH + Co KG, Bruehl  
**PROCESS ENGINEERING ASSOCIATES, LLC, 700 South Illinois Ave., Suite A-202, Oak Ridge, TN 37830 (865-220-8722; FAX: 865-220-8729; e-mail: info@processengr.com; web site: www.processengr.com)**  
**PROCESS SYSTEMS ENGINEERING LLC, INDUSTRIAL AUTOMATION AND PROCESS SAFETY ENGINEERING, 636 Prospect St., Westfield, NJ 07090 (9089673807; e-mail: pse@prosyseng.com; web site: www.prosyseng.com)**  
Trinity Consultants, Dallas, TX

## Risk analysis

Bayer Technology Services GmbH, Leverkusen  
HIMA Paul Hildebrandt GmbH + Co KG, Bruehl  
**PROCESS ENGINEERING ASSOCIATES, LLC, 700 South Illinois Ave., Suite A-202, Oak Ridge, TN 37830 (865-220-8722; FAX: 865-220-8729; e-mail: info@processengr.com; web site: www.processengr.com)**  
Trinity Consultants, Dallas, TX

## Technology licensing

Air Liquide Global E&C Solutions Germany GmbH, Frankfurt am Main  
Gharpure Consulting Engineers Pvt Ltd, Pune  
Interdevelopment, Inc., Arlington, VA  
Johnson Matthey Davy Technologies Ltd., London

## TRAINING

### Training personnel, maintenance

ATS RheoSystems, Cannon Instrument Company, Bordentown, NJ  
BS & B Safety Systems, Inc., Tulsa, OK  
BUSS ChemTech AG, Pratteln 1  
**BERNDORF BAND GMBH, Leobersdorferstr. 26, Berndorf, AUT 2560 (43-2672-800-0; FAX: 43-2672-84176; e-mail: band@berndorf.at; web site: www.berndorf-band.at)**  
GTS, Mississauga, CAN  
MTS World, LLC, Cypress, TX  
Martin Engineering, Neponset, IL  
PRÜFTECHNIK Dieter Busch AG, Ismaning, Germany  
S&C Electric Company, Chicago, IL  
**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK MATERIALS TECHNOLOGY DEUTSCHLAND GMBH**, Saliestr. 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: info.spdsde@sandvik.com; web site: www.processsystems.sandvik.com) — See our ad on page 53

Swagelok Co., Solon, OH  
V2 Flow Controls, Burr Ridge, IL  
Wall Colmonoy Corporation, Madison Heights, MI

### Training personnel, pollution control

Conversion Technology, Inc., Norcross, GA  
Emergency Film Group, Edgartown, MA  
HEE-DUALL, A CECO ENVIRONMENTAL COMPANY, Owoeso, MI  
MTS World, LLC, Cypress, TX  
TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA

### Training personnel, safety & health

EK USA, Logan, UT  
Emergency Film Group, Edgartown, MA  
GTS, Mississauga, CAN  
MTS World, LLC, Cypress, TX  
Martin Engineering, Neponset, IL  
**PROCESS ENGINEERING ASSOCIATES, LLC, 700 South Illinois Ave., Suite A-202, Oak Ridge, TN 37830 (865-220-8722; FAX: 865-220-8729; e-mail: info@processengr.com; web site: www.processengr.com)**

### Training systems, plant operators

BUSS ChemTech AG, Pratteln 1  
Emergency Film Group, Edgartown, MA  
GTS, Mississauga, CAN  
MTS World, LLC, Cypress, TX  
**PAS, INC., 16055 Space Center Blvd., Suite 600, Houston, TX 77062 ((281) 286-6565; e-mail: sales@pas.com; web site: www.pas.com)**  
PRÜFTECHNIK Dieter Busch AG, Ismaning, Germany  
**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK MATERIALS TECHNOLOGY DEUTSCHLAND GMBH**, Saliestr. 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: info.spdsde@sandvik.com; web site: www.processsystems.sandvik.com) — See our ad on page 53  
Swagelok Co., Solon, OH

# 9

# INFORMATION TECHNOLOGIES

- 187** Computer hardware
- 187** Computer software
- 189** Computers for design & engineering



# PRODUCT DIRECTORY

## COMPUTER HARDWARE

### Computers, mainframe

Psychsoftpc, Quincy, MA

### Computers, monitors & displays

ASDQMS, Chagrin Falls, OH  
Intergraph Benelux BV, Hoofddorp  
PRÜFTECHNIK Dieter Busch AG, Ismaning, Germany  
Psychsoftpc, Quincy, MA

### Computers, personal

Intergraph Benelux BV, Hoofddorp  
Psychsoftpc, Quincy, MA

### Computers, printers & plotters

Intergraph Benelux BV, Hoofddorp

### Digital computers, data processing

Psychsoftpc, Quincy, MA  
Symmetric Research, Las Vegas, NV

### Input & output equipment, data processing

Acromag, Inc., Wixom, MI  
HydroTec Systems Co., Inc., Tiskliwa, IL  
Sierra Monitor Corp., Milpitas, CA  
Symmetric Research, Las Vegas, NV

### Simulators

Psychsoftpc, Quincy, MA

## COMPUTER SOFTWARE

### Advanced process control

CAMO Software, Oslo, NOR  
DataLyzor International, Inc., MI  
Northwest Analytics, Inc., Portland, OR  
PQ Systems, Dayton, OH  
Parsec, Inc., Anaheim, CA  
ProSys, Inc., Baton Rouge, LA  
**SIEMENS AG, Siemensallee 84, Karlsruhe, Germany**  
D- 76187 (+49(0)721/595-0; web site: [www.siemens.com/chemicals](http://www.siemens.com/chemicals))  
Yokogawa Corporation of America, Sugar Land, TX

### Alarm Management

Fike, Blue Springs, MO  
**PAS, INC., 16055 Space Center Blvd., Suite 600, Houston, TX 77062 ((281) 286-6565; e-mail: [sales@pas.com](mailto:sales@pas.com); web site: [www.pas.com](http://www.pas.com))**  
ProSys, Inc., Baton Rouge, LA  
**SIEMENS AG, Siemensallee 84, Karlsruhe, Germany**  
D- 76187 (+49(0)721/595-0; web site: [www.siemens.com/chemicals](http://www.siemens.com/chemicals))  
Vista Control Systems, Inc., Los Alamos, NM  
Yokogawa Corporation of America, Sugar Land, TX

### Asset management

AVEVA, Cambridge, GBR  
AVEVA Inc, Houston, TX  
**PAS, INC., 16055 Space Center Blvd., Suite 600, Houston, TX 77062 ((281) 286-6565; e-mail: [sales@pas.com](mailto:sales@pas.com); web site: [www.pas.com](http://www.pas.com))**  
Parsec, Inc., Anaheim, CA  
**SIEMENS AG, Siemensallee 84, Karlsruhe, Germany**  
D- 76187 (+49(0)721/595-0; web site: [www.siemens.com/chemicals](http://www.siemens.com/chemicals))  
Yokogawa Corporation of America, Sugar Land, TX

### Bar coding

Dematic Corp., Grand Rapids, MI  
Isotech, Inc., Hatfield, PA  
K-Sun Corporation, Somerset, WI  
**PROCESS SYSTEMS ENGINEERING LLC, INDUSTRIAL AUTOMATION AND PROCESS SAFETY ENGINEERING, 636 Prospect St., Westfield, NJ 07090 (908)9673807; e-mail: [pse@prosyseng.com](mailto:pse@prosyseng.com); web site: [www.prosyseng.com](http://www.prosyseng.com))**

### Batch control

CAMO Software, Oslo, NOR  
DataLyzor International, Inc., MI  
Parsec, Inc., Anaheim, CA  
**SIEMENS AG, Siemensallee 84, Karlsruhe, Germany**  
D- 76187 (+49(0)721/595-0; web site: [www.siemens.com/chemicals](http://www.siemens.com/chemicals))  
Yokogawa Corporation of America, Sugar Land, TX

### Calibration management

Beamex, Inc., Marietta, GA  
DataLyzor International, Inc., MI

Intergraph Corporation Corporate Headquarters, Madison, AL  
PQ Systems, Dayton, OH  
Quality America, Inc., Tucson, AZ  
burster praezisionsmesstechnik gmbh & co kg, Gernsbach, Germany

### Chemical equipment design

**Applied E-Simulators Software, P. O. Box 4032, West Richland, WA 99353 United States (509-967-5730; Fax: 509-967-5730; e-mail: [bgplace@bgplace.cnc.net](mailto:bgplace@bgplace.cnc.net); [www.ae-sim.com](http://www.ae-sim.com))**

CPFD-Software, Albuquerque, New Mexico  
**CHEMSTATIONS, INC., 3100 Wilcrest Drive, Suite 300, Houston, TX 77042 (800-243-6223 (Worldwide); 713-978-7700; FAX: 713-978-7727; e-mail: [sales@chemstations.com](mailto:sales@chemstations.com); web site: [www.chemstations.com](http://www.chemstations.com))**  
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Intergraph Benelux BV, Hoofddorp  
Intergraph Corporation Corporate Headquarters, Madison, AL

ProSim SA, LABEGE  
Process Systems Enterprise Limited, London  
**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK MATERIALS TECHNOLOGY DEUTSCHLAND GMBH, Sallierstr. 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: [info.spds@sandvik.com](mailto:info.spds@sandvik.com); web site: [www.process-systems.sandvik.com](http://www.process-systems.sandvik.com))**  
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**TECHNICAL DATABASE SERVICES, INC. (TDS), Planetarium Station, P.O. Box 45, New York, NY 10024-1755 (646-669-8900; FAX: 646-669-7478; e-mail: [info@tds-tds.com](mailto:info@tds-tds.com); web site: [www.tds-tds.com](http://www.tds-tds.com))**

### Chemical plant design & maintenance

**ABZ, INC., 4451 Brookfield Corp. Dr., Suite 107, Chantilly, VA 20151 (800-747-7401; 703-631-7401; FAX: 703-631-5282; e-mail: [sales@abzinc.com](mailto:sales@abzinc.com); web site: [www.abzinc.com](http://www.abzinc.com))**

AVEVA, Cambridge, GBR  
CU SERVICES LLC, Elk Grove, IL  
**CHEMSTATIONS, INC., 3100 Wilcrest Drive, Suite 300, Houston, TX 77042 (800-243-6223 (Worldwide); 713-978-7700; FAX: 713-978-7727; e-mail: [sales@chemstations.com](mailto:sales@chemstations.com); web site: [www.chemstations.com](http://www.chemstations.com))**  
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Intergraph Benelux BV, Hoofddorp  
Intergraph Corporation, Houston, TX  
Intergraph Corporation Corporate Headquarters, Madison, AL

Invensys Systems (UK) Ltd, Crawley  
Process Systems Enterprise, Inc., NJ  
**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK MATERIALS TECHNOLOGY DEUTSCHLAND GMBH, Sallierstr. 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: [info.spds@sandvik.com](mailto:info.spds@sandvik.com); web site: [www.process-systems.sandvik.com](http://www.process-systems.sandvik.com))**  
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**TECHNICAL DATABASE SERVICES, INC. (TDS), Planetarium Station, P.O. Box 45, New York, NY 10024-1755 (646-669-8900; FAX: 646-669-7478; e-mail: [info@tds-tds.com](mailto:info@tds-tds.com); web site: [www.tds-tds.com](http://www.tds-tds.com))**

### Chemical process design



**ABZ, INC., 4451 Brookfield Corp. Dr., Suite 107, Chantilly, VA 20151 (800-747-7401; 703-631-7401; FAX: 703-631-5282; e-mail: [sales@abzinc.com](mailto:sales@abzinc.com); web site: [www.abzinc.com](http://www.abzinc.com))**

**Applied E-Simulators Software, P. O. Box 4032, West Richland, WA 99353 United States (509-967-5730; Fax: 509-967-5730; e-mail: [bgplace@bgplace.cnc.net](mailto:bgplace@bgplace.cnc.net); [www.ae-sim.com](http://www.ae-sim.com))**

Chemstations Europe GmbH, Berlin  
**CHEMSTATIONS, INC., 3100 Wilcrest Drive, Suite 300, Houston, TX 77042 (800-243-6223 (Worldwide); 713-978-7700; FAX: 713-978-7727; e-mail: [sales@chemstations.com](mailto:sales@chemstations.com); web site: [www.chemstations.com](http://www.chemstations.com))**  
— See our ad on page 11

**ENGINEERING SOFTWARE, P.O. Box 2134, Kensington, MD 20891 ((301) 919-9670; FAX: 301-540-3605; e-mail: [info@engineering-4e.com](mailto:info@engineering-4e.com); web site: [www.engineering-4e.com](http://www.engineering-4e.com))**

Intergraph Benelux BV, Hoofddorp  
Intergraph Corporation Corporate Headquarters, Madison, AL

Invensys Systems (UK) Ltd, Crawley  
Neilsoft Ltd., Pune, IND

## Information Technologies

ProSim SA, LABEGE  
Process Systems Enterprise, Inc., NJ  
Process Systems Enterprise Limited, London  
Siemens Process Industries and Drives, Alpharetta, GA  
**TECHNICAL DATABASE SERVICES, INC. (TDS), Planetarium Station, P.O. Box 45, New York, NY 10024-1755 (646-669-8900; FAX: 646-669-7478; e-mail: [info@tds-tds.com](mailto:info@tds-tds.com); web site: [www.tds-tds.com](http://www.tds-tds.com))**

### Computational fluid dynamics

**ABZ, INC., 4451 Brookfield Corp. Dr., Suite 107, Chantilly, VA 20151 (800-747-7401; 703-631-7401; FAX: 703-631-5282; e-mail: [sales@abzinc.com](mailto:sales@abzinc.com); web site: [www.abzinc.com](http://www.abzinc.com))**

Adaptive Research, Honolulu, HI  
Airflow Sciences Corporation, Livonia, MI  
CPFD-Software, Albuquerque, NM  
CU SERVICES LLC, Elk Grove, IL

### Data acquisition & process control

Acromag, Inc., Wixom, MI  
Airflow Sciences Corporation, Livonia, MI  
Auburn Systems, LLC, Danvers, MA  
burster praezisionsmesstechnik gmbh & co kg  
**CHEMSTATIONS, INC., 3100 Wilcrest Drive, Suite 300, Houston, TX 77042 (800-243-6223 (Worldwide); 713-978-7700; FAX: 713-978-7727; e-mail: [sales@chemstations.com](mailto:sales@chemstations.com); web site: [www.chemstations.com](http://www.chemstations.com))**  
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DataLyzor International, Inc., MI  
Davis-Standard, LLC, Pawcatuck, CT  
Digital Applications International, London  
HydroTec Systems Co., Inc., Tiskliwa, IL  
InfoMetrix, Inc., Bothell, WA  
Intergraph Corporation Corporate Headquarters, Madison, AL

Invensys Systems (UK) Ltd, Crawley  
Northwest Analytics, Inc., Portland, OR  
**PAS, INC., 16055 Space Center Blvd., Suite 600, Houston, TX 77062 ((281) 286-6565; e-mail: [sales@pas.com](mailto:sales@pas.com); web site: [www.pas.com](http://www.pas.com))**

PQ Systems, Dayton, OH  
Parsec, Inc., Anaheim, CA  
Polytec, Inc., Process Analytics, Hopkinton  
Quality America, Inc., Tucson, AZ  
Rice Lake Weighing Systems, Rice Lake, WI  
Rockwell Software Brand, Rockwell Automation, Inc., Milwaukee, WI

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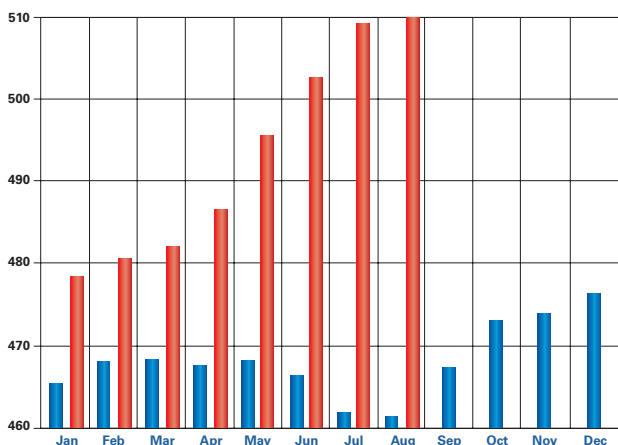


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**BIONOMIC INDUSTRIES INC.**, 777 Corporate Dr., Mahwah, NJ 07430-2008 (800-311-6767; 201-529-1094; FAX: 201-529-0252; e-mail: sales@bionomicind.com; web site: www.bionomicind.com)

CTP Sinto America, LLC, Lansing, MI  
Durr Systems, Inc., Clean Technology Systems, Plymouth, MI

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com) — See our ad on page 15

HEE-DUALL, A CECO ENVIRONMENTAL COMPANY, Owosso, MI

Haldor Topsoe A/S, Lyngby  
Hypercat Advanced Catalyst Products, West Chester, PA  
**John Zink Hamworthy Combustion, Tulsa, OK** — See our ad on page 3

M&C TechGroup, Ventura, CA  
McGill AirClean LLC, Columbus, OH  
**NOL-TEC SYSTEMS, INC.**, 425 Apollo Dr., Lino Lakes, MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail: sales@nol-tec.com; web site: www.nol-tec.com) — See our ad on page 45

TECAM GROUP, ESP  
TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA  
Turner EnviroLogic, Inc., Deerfield Beach, FL

### Odor-control systems

ADI Systems Inc., Wolfeboro, NH  
ADWEST TECHNOLOGIES, a CECO Environmental Company, Anaheim, CA

Advanced Air Technologies, Inc., Corunna, MI  
Advanced Industrial Technology Corp., Paramus, NJ  
Ambient Engineering Inc., Rocky Hill, NJ  
**BIONOMIC INDUSTRIES INC.**, 777 Corporate Dr., Mahwah, NJ 07430-2008 (800-311-6767; 201-529-1094; FAX: 201-529-0252; e-mail: sales@bionomicind.com; web site: www.bionomicind.com)

CECO Filters, a CECO Environmental Company, Telford, PA  
**CR CLEANAIR**, Six Campus Drive, Parsippany, NJ 07054 (908 232 4200; FAX: 908-232-2146; e-mail: info@crroll.com; web site: www.crroll.com) — See our ad on page 193

CTP Sinto America, LLC, Lansing, MI  
Durr Systems, Inc., Clean Technology Systems, Plymouth, MI

Environmental C&C, St. Charles, IL  
HEE-DUALL, A CECO ENVIRONMENTAL COMPANY, Owosso, MI

Hypercat Advanced Catalyst Products, West Chester, PA  
**KIMRE, INC.**, 744 SW 1st Street, Homestead, FL 33030 (305 233-4249; FAX: 305 233-8687; e-mail: sales@kimre.com; web site: www.kimre.com)

Strobic Air, a CECO Environmental Company, Telford, PA  
Turner EnviroLogic, Inc., Deerfield Beach, FL

### Particulate removal systems

**BELTRAN TECHNOLOGIES, INC.**, 1133 East 35 Street, Brooklyn, NY 11210 (718-338-3311; FAX: 718-253-9028; e-mail: info@beltrantechnologies.com; web site: www.beltrantechnologies.com)

**BIONOMIC INDUSTRIES INC.**, 777 Corporate Dr., Mahwah, NJ 07430-2008 (800-311-6767; 201-529-1094; FAX: 201-529-0252; e-mail: sales@bionomicind.com; web site: www.bionomicind.com)

Flex-Kleen, a CECO Environmental Company, Glendale Heights, IL

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com) — See our ad on page 15

HEE-DUALL, A CECO ENVIRONMENTAL COMPANY, Owosso, MI

Hypercat Advanced Catalyst Products, West Chester, PA  
**KIMRE, INC.**, 744 SW 1st Street, Homestead, FL 33030 (305 233-4249; FAX: 305 233-8687; e-mail: sales@kimre.com; web site: www.kimre.com)

McGill AirClean LLC, Columbus, OH

### Sulfur Recovery

**BIONOMIC INDUSTRIES INC.**, 777 Corporate Dr., Mahwah, NJ 07430-2008 (800-311-6767; 201-529-1094; FAX: 201-529-0252; e-mail: sales@bionomicind.com; web site: www.bionomicind.com)

CB&I, The Woodlands, TX  
**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com) — See our ad on page 15

Haldor Topsoe A/S, Lyngby  
**John Zink Hamworthy Combustion, Tulsa, OK** — See our ad on page 3

### Vapor recovery systems

BORSIG GmbH, Berlin  
CECO Filters, a CECO Environmental Company, Telford, PA  
**CR CLEANAIR**, Six Campus Drive, Parsippany, NJ 07054 (908 232 4200; FAX: 908-232-2146; e-mail: info@crroll.com; web site: www.crroll.com) — See our ad on page 193

Durr Systems, Inc., Clean Technology Systems, Plymouth, MI

Environmental C&C, St. Charles, IL  
**John Zink Hamworthy Combustion, Tulsa, OK** — See our ad on page 3

Nash, a Gardner Denver Product, Bentleyville, PA  
**XCHANGER**, 1401 S. 7th St., Hopkins, MN 55343 (952-933-2559; e-mail: info@xchanger.com; web site: www.xchanger.com)

**Zeeco, Inc.**, Broken Arrow, OK

## ENVIRONMENTAL SERVICES

### Air pollution control

ADWEST TECHNOLOGIES, a CECO Environmental Company, Anaheim, CA

Air/Compliance Consultants, Inc., Pittsburgh, PA  
Airflow Sciences Corporation, Livonia, MI  
Ambient Engineering Inc., Rocky Hill, NJ  
Anguil Environmental Systems, Inc., Milwaukee, WI  
Auburn Systems, LLC, Danvers, MA

**BELTRAN TECHNOLOGIES, INC.**, 1133 East 35 Street, Brooklyn, NY 11210 (718-338-3311; FAX: 718-253-9028; e-mail: info@beltrantechnologies.com; web site: www.beltrantechnologies.com)

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**CR CLEANAIR**, Six Campus Drive, Parsippany, NJ 07054 (908 232 4200; FAX: 908-232-2146; e-mail: info@crroll.com; web site: www.crroll.com) — See our ad on page 193

Catalytic Products Intl. Inc., Lake Zurich, IL  
Conversion Technology, Inc., Norcross, GA

Durr Systems, Inc., Clean Technology Systems, Plymouth, MI

Environmental C&C, St. Charles, IL  
FISHER-KLOSTERMAN EMTROL, A CECO ENVIRONMENTAL COMPANY, Louisville, KY

Flex-Kleen, a CECO Environmental Company, Glendale Heights, IL

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com) — See our ad on page 15



# PRODUCT DIRECTORY

HEE-DUALL, A CECO ENVIRONMENTAL COMPANY,

Owosso, MI

Hypercat Advanced Catalyst Products, West Chester, PA

**John Zink Hamworthy Combustion, Tulsa, OK**

— See our ad on page 3

M&C TechGroup, Ventura, CA

Munters Corporation, Zeol, Amesbury, MA

**NOL-TEC SYSTEMS, INC., 425 Apollo Dr., Lino Lakes,**

**MN 55014 (651-780-8600; FAX: 651-780-4400; e-mail:**

**sales@nol-tec.com; web site: www.nol-tec.com)**

— See our ad on page 45

Schütte & Koertling, Treviso, PA

Siemens Process Industries and Drives, Norcross, GA

Strobc Air, a CECO Environmental Company, Telford, PA

TMTS Associates, Inc., Combustion/Air Pollution Control,

Atlanta, GA

Turner EnviroLogic, Inc., Deerfield Beach, FL

United Manufacturing International 2000 Activated Carbon,

Red Bluff, CA

Westchester Germicide Co., Pittsburgh, PA

ts-systemfilterer gmbh, Ahorn-Berolzeim

## Bioremediation services

GEA Engineering, P.C., Nanuet, NY

**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045**

**((800) 722-6622; e-mail: sales.northamerica@gea.**

**com; web site: www.gea.com)**

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## Compliance-information management

Clean Air Engineering, Palatine, IL

Dakota Software Corp., Cleveland, OH

Trinity Consultants, Dallas, TX

## Environmental consulting

Advanced GeoServices Corp., West Chester, PA

Air/Compliance Consultants, Inc., Pittsburgh, PA

Airflow Sciences Corporation, Livonia, MI

Ambient Engineering Inc., Rocky Hill, NJ

CB&I, The Woodlands, TX

Clean Air Engineering, Palatine, IL

Conversion Technology, Inc., Norcross, GA

Durr Systems, Inc., Clean Technology Systems, Plymouth,

MI

GEA Engineering, P.C., Nanuet, NY

**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045**

**((800) 722-6622; e-mail: sales.northamerica@gea.**

**com; web site: www.gea.com)**

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Spartan Chemical Services Inc., Jersey City, NJ

TMTS Associates, Inc., Combustion/Air Pollution Control,

Atlanta, GA

Trinity Consultants, Dallas, TX

## Environmental laboratories

Ambient Engineering Inc., Rocky Hill, NJ

Clean Air Engineering, Palatine, IL

F.P.S. Food and Pharma Systems srl, Como, ITA

## Environmental regulations, interpreting

Advanced GeoServices Corp., West Chester, PA

Air/Compliance Consultants, Inc., Pittsburgh, PA

Dakota Software Corp., Cleveland, OH

TMTS Associates, Inc., Combustion/Air Pollution Control,

Atlanta, GA

Trinity Consultants, Dallas, TX

## Full-service environmental firms

ADI Systems Inc., Wolfboro, NH

Advanced GeoServices Corp., West Chester, PA

Ambient Engineering Inc., Rocky Hill, NJ

Clean Harbors, Norwell, MA

Conversion Technology, Inc., Norcross, GA

GEA Engineering, P.C., Nanuet, NY

**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045**

**((800) 722-6622; e-mail: sales.northamerica@gea.**

**com; web site: www.gea.com)**

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## Geotechnical services

Advanced GeoServices Corp., West Chester, PA

## Groundwater remediation

ABS Materials, Inc., OH

Advanced GeoServices Corp., West Chester, PA

Conversion Technology, Inc., Norcross, GA

GEA Engineering, P.C., Nanuet, NY

**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045**

**((800) 722-6622; e-mail: sales.northamerica@gea.**

**com; web site: www.gea.com)**

— See our ad on page 15

United Manufacturing International 2000 Activated Carbon,

Red Bluff, CA

## Hazard audits

Dakota Software Corp., Cleveland, OH

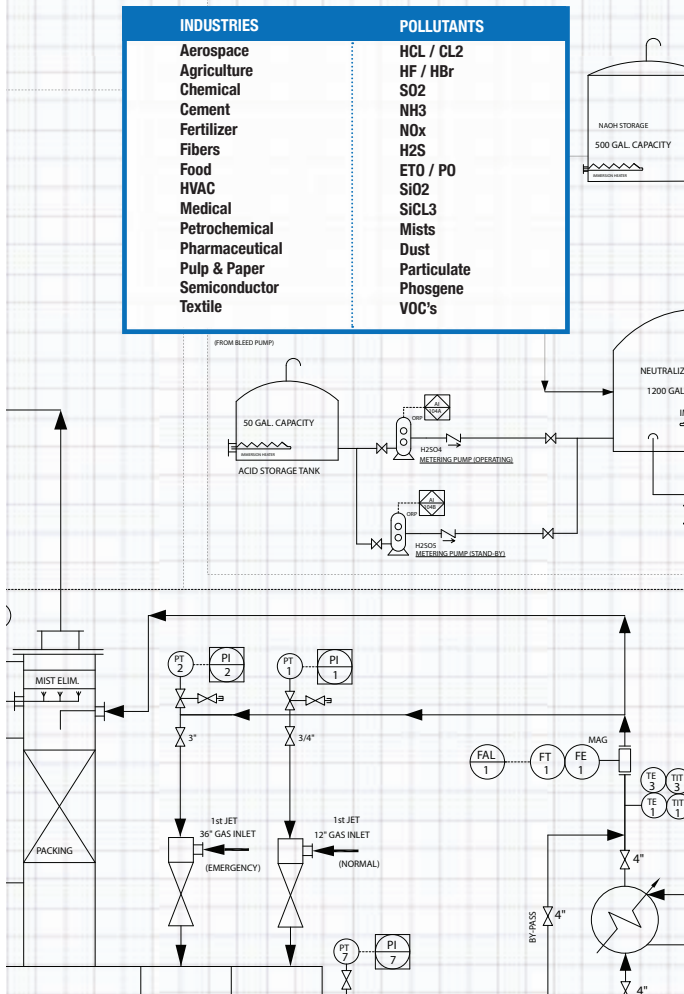
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Medical	SiCL3
Petrochemical	Mists
Pharmaceutical	Dust
Pulp & Paper	Particulate
Semiconductor	Phosgene
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Trinity Consultants, Dallas, TX

## Hazardous waste services

Advanced GeoServices Corp., West Chester, PA  
Clean Harbors, Norwell, MA  
TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA  
Veolia Environmental Services, Chicago, Illinois

## Indoor-air-quality services

Air/Compliance Consultants, Inc., Pittsburgh, PA  
Ambient Engineering Inc., Rocky Hill, NJ  
**BASF Corporation, Catalysts & Adsorbents, Iselin, NJ**  
— See our ad on page 13  
Conversion Technology, Inc., Norcross, GA  
Strobic Air, a CECO Environmental Company, Telford, PA

## Recycling firms

Midwest Steel Company Inc, Houston, TX

## Remote monitoring

M&C TechGroup, Ventura, CA  
Russelectric Inc., Hingham, MA

## Sludge handling

BOERGER PUMPS, 2860 Water Tower Place, Chanhassen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)

**KOMLINE-SANDERSON ENGINEERING CORP., 12 Hol-land Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: info@komline.com; web site: www.komline.com)**  
— See our ad on page 148

Luxme International Ltd., Brossard, QC, CAN  
Markland Specialty Engineering Ltd., Georgetown ProSonic LLC, Milwaukee, WI  
SRS Crisafulli, Inc., Glendive, MT  
TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA  
Vector Technologies Ltd., Milwaukee, WI  
Veolia Environmental Services, Chicago, IL  
Yoshikawa Corporation, Kagoshima, JPN

## Soil remediation

ABS Materials, Inc., OH  
Advanced GeoServices Corp., West Chester, PA  
Anguil Environmental Systems, Inc., Milwaukee, WI  
CHEMetrics Inc., Calverton, VA  
Conversion Technology, Inc., Norcross, GA  
GEA Engineering, P.C., Nanuet, NY  
**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)**  
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**KOMLINE-SANDERSON ENGINEERING CORP., 12 Hol-land Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: info@komline.com; web site: www.komline.com)**  
— See our ad on page 148

TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA

## Spill contingency, emergency response

Turner Designs Hydrocarbon Instruments, Inc., Fresno, CA

## Spill control & emergency response

Clean Harbors, Norwell, MA  
ITW Polymers Adhesives, North America, Danvers, MA  
Spill Containment Direct, Buffalo, MN  
Trans Environmental Systems, Inc., Charlottesville, VA

## Training services

GTS, Mississauga, CAN  
MTS World, LLC, Cypress, TX  
**Team Industrial Services, Inc., Alvin, TX**  
— See our ad on page 17  
Trinity Consultants, Dallas, TX

## VOC control

ABS Materials, Inc., OH  
ADWEST TECHNOLOGIES, a CECO Environmental Company, Anaheim, CA  
Anguil Environmental Systems, Inc., Milwaukee, WI  
BORSIG GmbH, Berlin  
Catalytic Products Intl. Inc., Lake Zurich, IL  
Durr Systems, Inc., Clean Technology Systems, Plymouth, MI  
Environmental C&C, St. Charles, IL  
Hypercat Advanced Catalyst Products, West Chester, PA  
McGill AirClean LLC, Columbus, OH  
Munters Corporation, Air Treatment, Amesbury, MA  
Munters Corporation, Zeol, Amesbury, MA  
TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA  
Turner EnviroLogic, Inc., Deerfield Beach, FL

United Manufacturing International 2000 Activated Carbon, Red Bluff, CA

## Waste minimization & recycling

Clean Harbors, Norwell, MA  
Herbold Meckesheim USA, Resource Recycling Systems Inc., Slattersville, RI  
Progressive Recovery Inc., Duplo, IL  
Veolia Environmental Services, Chicago, Illinois

## Waste testing & analysis

Ambient Engineering Inc., Rocky Hill, NJ  
Turner Designs Hydrocarbon Instruments, Inc., Fresno, CA

## Waste transportation

Clean Harbors, Norwell, MA  
Veolia Environmental Services, Chicago, Illinois

## Waste treatment facilities, other

ADI Systems Inc., Wolfeboro, NH  
Clean Harbors, Norwell, MA  
**GEA GROUP, 9165 Rumsey Road, Columbia, MD 21045 ((800) 722-6622; e-mail: sales.northamerica@gea.com; web site: www.gea.com)**  
— See our ad on page 15

GEA Netherlands A&S-Hertogenbosch, 's-Hertogenbosch, NLD  
Veolia Environmental Services, Chicago, Illinois  
**WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabash-power.com; web site: www.wabashpower.com)**

## Water-pollution control services

ADI Systems Inc., Wolfeboro, NH  
CHEMetrics Inc., Calverton, VA  
Entex Technologies Inc, Chapel Hill, NC  
Evoqua Water Technologies, Warrendale, PA  
HEE-DUALL, A CECO ENVIRONMENTAL COMPANY, Owosso, MI  
Spartan Chemical Services Inc., Jersey City, NJ

## WASTE HANDLING EQUIPMENT & SYSTEMS

### Anaerobic treatment systems

ADI Systems, Frederickton, CAN  
ADI Systems Inc., Wolfeboro, NH  
BOERGER PUMPS, 2860 Water Tower Place, Chanhassen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)  
Newman Regency Group, Stafford, TX  
ProSonic LLC, Milwaukee, WI

### Containers, hazardous waste

**ASSMANN CORP. OF AMERICA, 300 N. Taylor Rd., Garrett, IN 46738 (888-357-3181; 260-357-3181; FAX: 260-357-3738; e-mail: info@assmann-usa.com; web site: www.assmann-usa.com)**

Associated Bag Company, Milwaukee, WI  
Environmental Compliance Products, Inc., Huntington Beach, CA  
Vector Technologies Ltd., Milwaukee, WI

### Disposal units, hazardous waste

Vector Technologies Ltd., Milwaukee, WI

### Disposal units, liquid waste

Vector Technologies Ltd., Milwaukee, WI

### Disposal units, sewage

Vector Technologies Ltd., Milwaukee, WI

### Incinerators

ADWEST TECHNOLOGIES, a CECO Environmental Company, Anaheim, CA  
Anguil Environmental Systems, Inc., Milwaukee, WI  
Catalytic Products Intl. Inc., Lake Zurich, IL  
TECAM GROUP, ESP  
**Zeeco, Inc., Broken Arrow, OK**

### Incinerators, gas & liquid

TECAM GROUP, ESP  
**Zeeco, Inc., Broken Arrow, OK**

### Incinerators, sludge

TECAM GROUP, ESP

### Oxidizers, catalytic

**John Zink Hamworthy Combustion, Tulsa, OK**  
— See our ad on page 3  
Newman Regency Group, Stafford, TX  
TECAM GROUP, ESP  
Turner EnviroLogic, Inc., Deerfield Beach, FL

## Oxidizers, thermal

ADWEST TECHNOLOGIES, a CECO Environmental Company, Anaheim, CA  
Anguil Environmental Systems, Inc., Milwaukee, WI  
Catalytic Products Intl. Inc., Lake Zurich, IL  
Durr Systems, Inc., Clean Technology Systems, Plymouth, MI

**John Zink Hamworthy Combustion, Tulsa, OK**  
— See our ad on page 3

McGill AirClean LLC, Columbus, OH  
TECAM GROUP, ESP  
Turner EnviroLogic, Inc., Deerfield Beach, FL  
**Zeeco, Inc., Broken Arrow, OK**

## Spill collectors, tank car

Trans Environmental Systems, Inc., Charlottesville, VA

## WATER POLLUTION CONTROL EQUIPMENT & SYSTEMS

### Aerators, water pollution

Delta Cooling Towers Inc., Roxbury Township, NJ  
Elmridge Inc., Livonia, MI  
NOV, Dayton, OH  
Newman Regency Group, Stafford, TX

### Biological treatment

ADI Systems, Frederickton, CAN  
ADI Systems Inc., Wolfeboro, NH  
Entex Technologies Inc, Chapel Hill, NC  
Evoqua Water Technologies, Warrendale, PA  
HEE-DUALL, A CECO ENVIRONMENTAL COMPANY, Owosso, MI

### Bio-oxidation units

Ambient Engineering Inc., Rocky Hill, NJ  
Entex Technologies Inc, Chapel Hill, NC  
HEE-DUALL, A CECO ENVIRONMENTAL COMPANY, Owosso, MI  
Honeywell, Morristown, NJ  
NOV, Dayton, OH

### Chlorinators

**FLUID METERING, INC., 5 Aerial Way, Suite 500, Syosset, NY 11791 (800-223-3388; 516-922-6050; FAX: 516-624-8261; e-mail: pumps@fmipump.com; web site: www.fmipump.com)**  
— See our ad on page 115

PCA GmbH, Heusweiler  
Pollution Control Systems, Inc., Milford, OH

### Diffusers, water pollution control

**BETE Fog Nozzle Inc., Greenfield, MA**  
Newman Regency Group, Stafford, TX

### Digesters, sewage sludge

CB&I, The Woodlands, TX  
Pollution Control Systems, Inc., Milford, OH  
Westech Engineering Inc., Salt Lake City, UT

### Filters, bio-oxidation

Honeywell, Morristown, NJ

### Flocculation equipment

NOV, Dayton, OH  
Newman Regency Group, Stafford, TX  
sera ProDos GmbH, Immenhausen

### Liners, pond

Trans Environmental Systems, Inc., Charlottesville, VA  
Watersaver Co., a division of CDI, Commerce City, CO

### Oil skimmers

Alfa Laval, Inc., Warminster, PA  
**SANDVIK PROCESS SYSTEMS, DIV. OF SANDVIK MATERIALS TECHNOLOGY DEUTSCHLAND GMBH, Salierstr. 35, Postfach 4262, Fellbach, Germany 70719 (49-711-5105-0; FAX: 49-711-5105-152; e-mail: info.sp@sandvik.com; web site: www.process-systems.sandvik.com)**  
— See our ad on page 53

### Separators, oil-water

AMACS, Houston, TX  
Alfa Laval, Inc., Warminster, PA  
Evoqua Water Technologies, Warrendale, PA  
Faudi GmbH, Stadtallendorf  
Hilliard Corp., Elмира, NY  
**KIMRE, Inc., 744 SW 1st Street, Homestead, FL 33030 (305 233-4249; FAX: 305 233-8687; e-mail: sales@kimre.com; web site: www.kimre.com)**  
Newman Regency Group, Stafford, TX  
Pollution Control Systems, Inc., Milford, OH

Samuel Pressure Vessel Group, Marinette, WI

## Sewage treating units

**AIR PRODUCTS AND CHEMICALS, INC.**, 7201 Hamilton Blvd., Allentown, PA 18195-1501 (800-345-3148; 610-481-4911; FAX: 610-481-4381; e-mail: [cheminfo@airproducts.com](mailto:cheminfo@airproducts.com); web site: [www.airproducts.com/chemprocessing](http://www.airproducts.com/chemprocessing))

Alfa Laval, Inc., Warminster, PA

Entex Technologies Inc, Chapel Hill, NC

**MICRODYN-NADIR GMBH**, Kasteler Str. 45, Wiesbaden, Germany D-65203 (+49 (0)611-962-6001; FAX: +49 (0)611-962-9237; e-mail: [info@microdyn-nadir.de](mailto:info@microdyn-nadir.de); web site: [www.microdyn-nadir.de](http://www.microdyn-nadir.de))

Microdyn Technologies, Inc., Raleigh, NC

Pollution Control Systems, Inc., Milford, OH

Pulsair Systems, Inc., Bellevue, WA

## Sludge dewaterers

AKW Apparate + Verfahren GmbH, Hirschau, Bavaria

Alfa Laval, Inc., Warminster, PA

**BOERGER PUMPS**, 2860 Water Tower Place, Chanhassen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: [america@boerger.com](mailto:america@boerger.com); web site: [www.boerger.com](http://www.boerger.com))

**GEA GROUP**, 9165 Rumsey Road, Columbia, MD 21045 (800) 722-6622; e-mail: [sales.northamerica@gea.com](mailto:sales.northamerica@gea.com); web site: [www.gea.com](http://www.gea.com))

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GEA Mechanical Equipment US, Inc., GEA Westfalia Separator Division, Northvale, NJ

Hapman, Kalamazoo, MI

**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: [info@komline.com](mailto:info@komline.com); web site: [www.komline.com](http://www.komline.com))

— See our ad on page 148

Wyssmont Co. Inc., Fort Lee, NJ

— See our ad on page 149

Yoshikawa Corporation, Kagoshima, JPN

## Sludge dryers

**BUSS-SMS-CANZLER GMBH**, Kaiserstr. 13-15, Butzbach, 35510 (49-6033-85-0; FAX: 49-6033-85-249; e-mail: [info@sms-vt.com](mailto:info@sms-vt.com); web site: [www.sms-vt.com](http://www.sms-vt.com))

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COMESSA, Strasbourg

GIG Karasek GmbH, Gloggnitz-Stuppach

Heyl & Patterson Inc., Renneburg Division, Pittsburgh, PA

**KOMLINE-SANDERSON ENGINEERING CORP.**, 12 Holland Ave., Peapack, NJ 07977 (800-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: [info@komline.com](mailto:info@komline.com); web site: [www.komline.com](http://www.komline.com))

— See our ad on page 148

## Spill prevention equipment

**ASSMANN CORP. OF AMERICA**, 300 N. Taylor Rd., Garrett, IN 46738 (888-357-3181; 260-357-3181; FAX: 260-357-3738; e-mail: [info@assmann-usa.com](mailto:info@assmann-usa.com); web site: [www.assmann-usa.com](http://www.assmann-usa.com))

Trans Environmental Systems, Inc., Charlottesville, VA

## Strippers, air

Environmental C&C, St. Charles, IL

HEE-DUALL, A CECO ENVIRONMENTAL COMPANY, Owosso, MI

**KIMRE, INC.**, 744 SW 1st Street, Homestead, FL 33003 (305 233-4249; FAX: 305 233-8687; e-mail: [sales@kimre.com](mailto:sales@kimre.com); web site: [www.kimre.com](http://www.kimre.com))

## Tanks, settling

**CHARLES ROSS & SON CO.**, 710 Old Willets Path, P.O. Box 12308, Hauppauge, NY 11788-0615 (800-243-7677; 631-234-0500; FAX: 631-234-0691; e-mail: [sales@mixers.com](mailto:sales@mixers.com); web site: [www.mixers.com](http://www.mixers.com))

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## Waste-recovery treating systems

ADI Systems, Frederickton, CAN

Alfa Laval, Inc., Warminster, PA

Lyntek, Inc., Lakewood, CO

Progressive Recovery Inc., Duplo, IL

## Wastewater neutralization systems

Freudenberg Filtration Technologies SE & Co. KG, Weinheim, Germany

Pulsair Systems, Inc., Bellevue, WA

## Water Pollution Control

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Separation Technologists, Inc., Salem, NH

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# 11 PROCESS CHEMICALS

**197 Process chemicals**

## PROCESS CHEMICALS

### Acids, fatty

Hexion Inc., Epoxy, Phenolic & Coating Resins Division, Columbus, OH

### Acids, inorganic

AIC, Framingham, MA  
Cole Chemical, Houston, TX  
Covestro LLC, Pittsburgh, PA  
De Dietrich Process Systems GmbH, Mainz

### Acids, organic

CellMark Deutschland GmbH, Chemicals, Duesseldorf, 0  
Eastman Chemical Co. Inc., Kingsport, TN  
Pfaltz & Bauer, Inc., Waterbury, CT

### Activated carbon

Arkema Inc., King of Prussia, PA  
Environmental C&C, St. Charles, IL  
Evocqua Water Technologies, Warrendale, PA  
Jacobi Carbons, Inc., Columbus, OH  
United Manufacturing International 2000 Activated Carbon, Red Bluff, CA

### Active pharmaceutical ingredients

AIC, Framingham, MA  
VanDeMark Chemical Inc., Lockport, NY

### Adsorbents, for PCBs

ABS Materials, Inc., OH  
Jacobi Carbons, Inc., Columbus, OH

### Adsorbents, for carbon dioxide

Arkema Inc., King of Prussia, PA  
BASF Corporation, Catalysts & Adsorbents, Iselin, NJ  
— See our ad on page 13  
Jacobi Carbons, Inc., Columbus, OH

### Adsorbents, for hydrocarbons

ABS Materials, Inc., OH  
Environmental C&C, St. Charles, IL  
Jacobi Carbons, Inc., Columbus, OH

### Adsorbents, for oil

ABS Materials, Inc., OH  
Jacobi Carbons, Inc., Columbus, OH

### Adsorbents, nonpolar

ABS Materials, Inc., OH  
TankLink, a wholly-owned subsidiary of Telular Corporation, Chicago, IL

### Adsorbents, spill control

ABS Materials, Inc., OH  
Cole Chemical, Houston, TX

### Adsorbents, zeolites

BASF Corporation, Catalysts & Adsorbents, Iselin, NJ  
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### Alcohols, other

Cole Chemical, Houston, TX  
Pfaltz & Bauer, Inc., Waterbury, CT

### Alcohols, oxo

Eastman Chemical Co. Inc., Kingsport, TN

### Alkalies

Cole Chemical, Houston, TX

### Antioxidants

Cole Chemical, Houston, TX  
Hexion Inc., Epoxy, Phenolic & Coating Resins Division, Columbus, OH  
LANXESS CORPORATION, 111 RIDC Park West Drive, Pittsburgh, PA 15275 (800-526-9377; 412-809-1000; e-mail: info@lanxess.com; web site: www.US.LANXESS.com)

### Biocides, halogenated

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### Biocides, other

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### Biocides, phenolics



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### Catalysts, acid

Haldor Topsoe A/S, Lyngby

### Catalysts, cracking

BASF Corporation, Catalysts & Adsorbents, Iselin, NJ  
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### Catalysts, custom

Applied Catalysts, GA  
BASF Corporation, Catalysts & Adsorbents, Iselin, NJ  
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CAI Catalysts, Gwynedd Square, PA  
YS INC., 4531 County Rd. 458, Collinsville, AL 35961 (256-845-5501; FAX: 205-845-5560; e-mail: ysinc@ys-inc.com; web site: www.ys-inc.com)

### Catalysts, desulfurization

BASF Corporation, Catalysts & Adsorbents, Iselin, NJ  
— See our ad on page 13  
CellMark Deutschland GmbH, Chemicals, Duesseldorf  
Haldor Topsoe A/S, Lyngby

### Catalysts, hydrogenation

BASF Corporation, Catalysts & Adsorbents, Iselin, NJ  
— See our ad on page 13  
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

### Catalysts, hydrotreating

Haldor Topsoe A/S, Lyngby

### Catalysts, organic synthesis

BOC Sciences, Long Island City, NY  
CellMark Deutschland GmbH, Chemicals, Duesseldorf, 0  
Pfaltz & Bauer, Inc., Waterbury, CT

### Catalysts, other

BASF Corporation, Catalysts & Adsorbents, Iselin, NJ  
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CAI Catalysts, Gwynedd Square, PA

### Catalysts, oxidation

BASF Corporation, Catalysts & Adsorbents, Iselin, NJ  
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Catalytic Products Intl. Inc., Lake Zurich, IL  
Haldor Topsoe A/S, Lyngby  
Hypercat Advanced Catalyst Products, West Chester, PA  
KDF Fluid Treatment, Inc., Three Rivers, MI  
YS INC., 4531 County Rd. 458, Collinsville, AL 35961 (256-845-5501; FAX: 205-845-5560; e-mail: ysinc@ys-inc.com; web site: www.ys-inc.com)

### Catalysts, palladium

BASF Corporation, Catalysts & Adsorbents, Iselin, NJ  
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### Catalysts, platinum

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Hypercat Advanced Catalyst Products, West Chester, PA

### Catalysts, polymerization

Arkema Inc., King of Prussia, PA  
BASF Corporation, Catalysts & Adsorbents, Iselin, NJ  
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### Catalysts, polyolefin production

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### Catalysts, precious metal

BASF Corporation, Catalysts & Adsorbents, Iselin, NJ  
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CAI Catalysts, Gwynedd Square, PA

Hypercat Advanced Catalyst Products, West Chester, PA

### Catalysts, reforming

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CAI Catalysts, Gwynedd Square, PA  
Haldor Topsoe A/S, Lyngby

### Catalysts, rhodium

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### Catalysts, ruthenium

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### Catalyst supports & systems

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CAI Catalysts, Gwynedd Square, PA  
CPI Wirecloth & Screens Inc, Pearland, TX

### Catalysts, urethane production

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Hexion Inc., Epoxy, Phenolic & Coating Resins Division, Columbus, OH

### Catalysts, zeolite

BASF Corporation, Catalysts & Adsorbents, Iselin, NJ  
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### Chelating agents

AIC, Framingham, MA  
Cole Chemical, Houston, TX

### Coagulants, aluminum based

Thermal Spray Coatings - A&A Coatings, South Plainfield, NJ

### Defoamers

Arkema Inc., King of Prussia, PA  
Momentive Inc., Waterford, NY

### Defoamers, chemical

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Momentive Inc., Waterford, NY  
Spartan Chemical Services Inc., Jersey City, NJ

### Degreasers

Summit Industrial Products, Tyler, TX

### Desiccants

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BASF Corporation, Catalysts & Adsorbents, Iselin, NJ  
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CORTEC CORP., 4119 White Bear Pkwy., St. Paul, MN 55110 (800) 4- CORTEC; 651-429-1100; FAX: (651) 429-1122; e-mail: productinfo@cortecvc.com; web site: www.cortecvc.com)  
VanDeMark Chemical Inc., Lockport, NY

### Dewatering agents

VanDeMark Chemical Inc., Lockport, NY

### Dispersing agents, leather

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### Dispersing agents, other

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Momentive Inc., Waterford, NY  
Spartan Chemical Services Inc., Jersey City, NJ

### Dispersing agents, rubber

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Momentive Inc., Waterford, NY

## Flame retardants

Arkema Inc., King of Prussia, PA  
CellMark Deutschland GmbH, Chemicals, Duesseldorf, O  
Hexion Inc., Epoxy, Phenolic & Coating Resins Division,  
Columbus, OH

**LANXESS CORPORATION**, 111 RIDC Park West Drive, Pittsburgh, PA 15275 (800-526-9377; 412-809-1000; e-mail: [info@lanxess.com](mailto:info@lanxess.com); web site: [www.US.LANXESS.com](http://www.US.LANXESS.com))

## Hydrogen

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ThyssenKrupp Industrial Solutions AG, Business Unit Process Technologies, Dortmund

## Inhibitors, corrosion

Arkema Inc., King of Prussia, PA  
CellMark Deutschland GmbH, Chemicals, Duesseldorf, O  
**CORTEC CORP.**, 4119 White Bear Pkwy., St. Paul, MN 55110 (800) 4-CORTEC; 651-429-1100; FAX: (651) 429-1122; e-mail: [productinfo@cortecvc.com](mailto:productinfo@cortecvc.com); web site: [www.cortecvc.com](http://www.cortecvc.com))

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Momentive Inc., Waterford, NY

## Nitrogen

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## Odor-control chemicals

ABS Materials, Inc., OH

## Organic intermediates

CellMark Deutschland GmbH, Chemicals, Duesseldorf, O  
Eastman Chemical Co. Inc., Kingsport, TN

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Pfaltz & Bauer, Inc., Waterbury, CT

VanDeMark Chemical Inc., Lockport, NY

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Cristal, Hunt Valley, MD

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## Preservatives

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Covestro LLC, Pittsburgh, PA

Dymax Corp., Torrington, CT

## Solvents, alcohols

Cole Chemical, Houston, TX

## Solvents, drug extracting

CellMark Deutschland GmbH, Chemicals, Duesseldorf, O  
Pfaltz & Bauer, Inc., Waterbury, CT

## Solvents, ethers

CellMark Deutschland GmbH, Chemicals, Duesseldorf, O

## Solvents, glycol ether

Cole Chemical, Houston, TX  
Eastman Chemical Co. Inc., Kingsport, TN

## Solvents, high flash

Spartan Chemical Services Inc., Jersey City, NJ

## Solvents, nonflammable

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Spartan Chemical Services Inc., Jersey City, NJ

## Solvents, odorless

Summit Industrial Products, Tyler, TX

## Solvents, other

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Summit Industrial Products, Tyler, TX

## Solvents, oxygenated

CellMark Deutschland GmbH, Chemicals, Duesseldorf, O

## Surface active agents, nonionic

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## Surface active agents, not further specified

Momentive Inc., Waterford, NY

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## Water treatment chemicals

ABS Materials, Inc., OH

**CORTEC CORP.**, 4119 White Bear Pkwy., St. Paul, MN 55110 (800) 4-CORTEC; 651-429-1100; FAX: (651) 429-1122; e-mail: [productinfo@cortecvc.com](mailto:productinfo@cortecvc.com); web site: [www.cortecvc.com](http://www.cortecvc.com))

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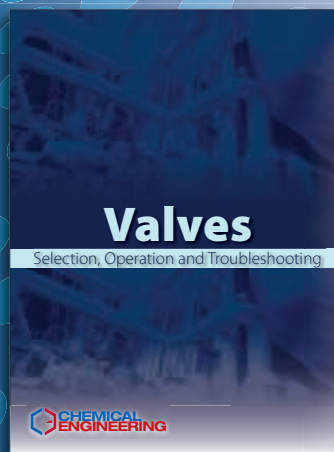
Separation Technologists, Inc., Salem, NH  
Spartan Chemical Services Inc., Jersey City, NJ

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**BASF Corporation, Catalysts & Adsorbents, Iselin, NJ**  
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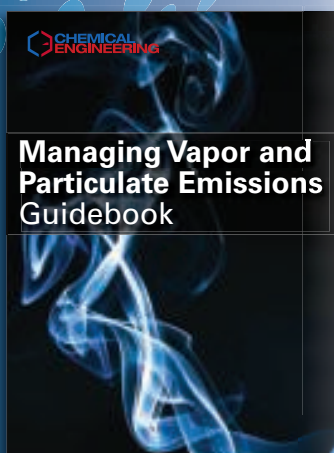
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The tutorial-style articles contained in this volume provide detailed guidance for the selection, installation, operation and troubleshooting of control valves, which are ubiquitous throughout the chemical process industries.

There is focus on pressure-relief valves, in terms of device selection, installation, and overall system design and management. Find additional emphasis on materials selection, safe operation at ultra-low temperature, optimization of valves in pneumatic conveying systems, rational pipeline design, and more.

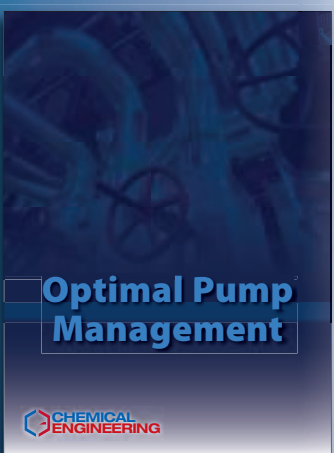


## Optimal Pump Management

The detailed engineering content featured in this volume provides guidance for the selection of many types of commonly used pumps, including positive-displacement pumps, centrifugal pumps, reciprocating pumps, vacuum pumps, sealless magnetic-drive pumps, low-flow pumps, peristaltic pumps and more.

Content also includes tips for implementing variable-frequency drives, sizing pumps, and evaluating sealing options.

This guidebook provides practical, actionable recommendations for proper selection, installation, operation and troubleshooting, with an eye toward minimizing maintenance costs and unexpected downtime while ensuring optimum pump performance.



## Managing Vapor and Particulate Emissions

This collection of tutorial-style engineering articles covers a wide array of topics related to monitoring and managing vapor and particulate emissions during chemical process operations. You will be provided with tips for reducing or eliminating fugitive emissions from tanks, pipes and process equipment. The guidebook also focuses on the proper operation and management of burners, combustion units and flares to minimize their environmental impact.

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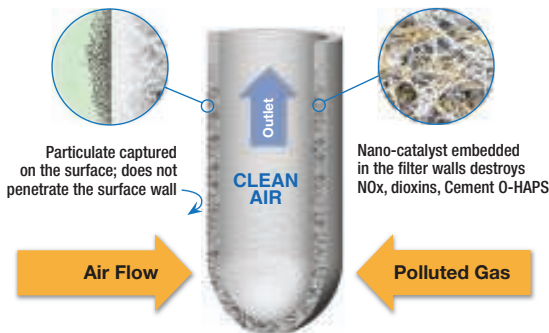
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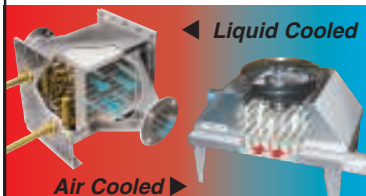
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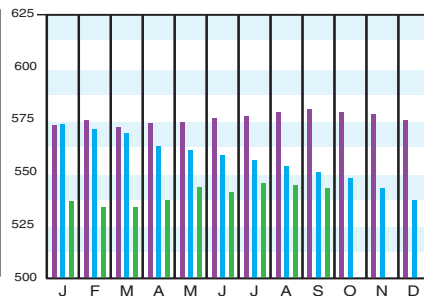
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## CHEMICAL ENGINEERING PLANT COST INDEX (CEPCI)

(1957-59 = 100)	Sept. '16 Prelim.	Aug. '16 Final	Sept. '15 Final
CE Index	542.8	544.0	550.3
Equipment	647.3	649.2	661.3
Heat exchangers & tanks	556.7	558.4	586.2
Process machinery	652.9	653.8	656.4
Pipe, valves & fittings	813.6	817.4	817.0
Process instruments	390.3	391.2	390.4
Pumps & compressors	966.0	966.0	956.4
Electrical equipment	510.9	511.6	510.3
Structural supports & misc	705.9	708.5	728.0
Construction labor	328.2	328.0	320.4
Buildings	547.2	548.5	539.1
Engineering & supervision	314.9	314.3	318.0

Annual Index:  
 2008 = 575.4  
 2009 = 521.9  
 2010 = 550.8  
 2011 = 585.7  
 2012 = 584.6  
 2013 = 567.3  
 2014 = 576.1  
 2015 = 556.8

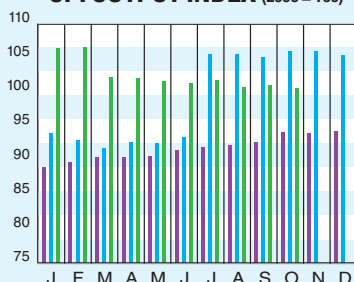


Starting with the April 2007 Final numbers, several of the data series for labor and compressors have been converted to accommodate series IDs that were discontinued by the U.S. Bureau of Labor Statistics

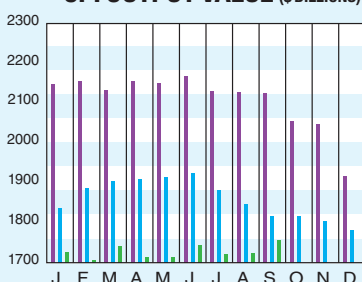
## CURRENT BUSINESS INDICATORS

	LATEST	PREVIOUS	YEAR AGO
CPI output index (2012 = 100)	Oct. '16 = 100.6	Sept. '16 = 100.4	Aug. '16 = 99.9
CPI value of output, \$ billions	Sept. '16 = 1,756.3	Aug. '16 = 1,731.2	Jul. '16 = 1,719.0
CPI operating rate, %	Oct. '16 = 73.9	Sept. '16 = 73.7	Aug. '16 = 73.4
Producer prices, industrial chemicals (1982 = 100)	Oct. '16 = 233.4	Sept. '16 = 230.0	Aug. '16 = 226.6
Industrial Production in Manufacturing (2012=100)*	Oct. '16 = 103.2	Sept. '16 = 103.0	Aug. '16 = 102.8
Hourly earnings index, chemical & allied products (1992 = 100)	Oct. '16 = 171.0	Sept. '16 = 169.5	Aug. '16 = 168.4
Productivity index, chemicals & allied products (1992 = 100)	Oct. '16 = 99.2	Sept. '16 = 100.0	Aug. '16 = 100.1
			Oct. '15 = 101.9
			Sept. '15 = 1,761.2
			Oct. '15 = 75.1
			Oct. '15 = 235.2
			Oct. '15 = 103.4
			Oct. '15 = 159.3
			Oct. '15 = 100.7

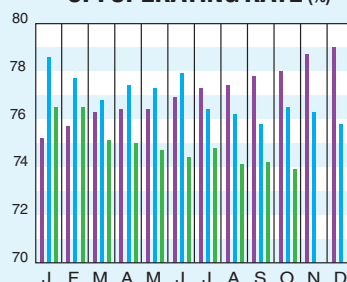
### CPI OUTPUT INDEX (2000 = 100)†



### CPI OUTPUT VALUE (\$ BILLIONS)



### CPI OPERATING RATE (%)



\*Due to discontinuance, the Index of Industrial Activity has been replaced by the Industrial Production in Manufacturing index from the U.S. Federal Reserve Board.  
 †For the current month's CPI output index values, the base year was changed from 2000 to 2012  
 Current business indicators provided by Global Insight, Inc., Lexington, Mass.

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## CURRENT TRENDS

The September 2016 preliminary value for the CE Plant Cost Index (CEPCI; top; the most recent available) was slightly lower than the previous month's value, continuing a modest decline that began in July. Decreases in the Equipment and Buildings sub-indices offset smaller increases in the Construction Labor and Engineering & Supervision subindices. The preliminary September 2016 CEPCI value stands at 1.4% lower than the corresponding value from September of last year. Meanwhile, the latest Current Business Indicators (CBI; middle) for October 2016 showed a slight increase in the CPI Output Index, as well as a gain in the September CPI Value of Output compared to August.





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