

CHEMICAL ENGINEERING

November
2013

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Guide 2014
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Lethal Chemicals**

**Heat Transfer
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**Evolving
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**Selecting the
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**Facts at Your
Fingertips:
Calculating
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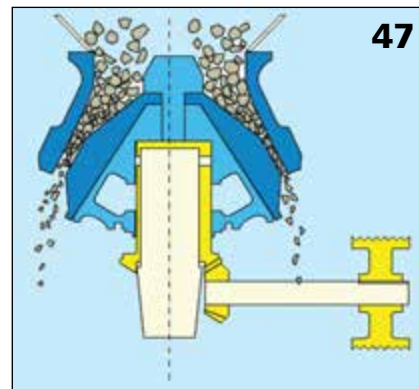
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Editor's Page

What keeps you up at night?

The Plant Management Roundtable at the ChemInnovations Conference and Expo (September 25–26, Galveston, Tex.) offered attendees the opportunity to hear about what is on the minds of leaders of chemical process industries (CPI) plants. On the panel were Jon Manns, plant manager for Axiall Corp.'s Lake Charles facility, Stan Zisman, technical environmental, health and safety manager for Chevron Phillips Chemical Co. and Pete Greco, manager of emergency and security services and fire chief at Lyondell's Houston Refinery. All three panelists focused on safety as being a top priority, as they discussed challenges that their sites are faced with and the methods being used to promote positive changes in safety culture. One of these methods involves encouraging people to "say something when they see something," and empowering employees with "stop work authority," so that any worker can stop a job if a potentially unsafe condition exists. Another method being pursued by a number of sites is to follow OSHA's (U.S. Occupational Safety and Health Admin.) Voluntary Protection Program (VPP), which is a program that promotes effective worksite-based safety and health.

When the panel was asked what issues in addition to safety were on their minds, Manns said that what's been keeping him up at night is anticipating the future challenge of finding qualified personnel to fill positions at his plant. There is currently a lot of industrial expansion in Southwest Louisiana, and throughout the U.S. largely due to the shale gas boom. While this is good news for the CPI, it also brings its share of challenges, such as workforce issues. The panelists concurred that this is an area of concern, and workers skilled in crafts, such as welding and others, are particularly tough to find.

One way to help the needs of the future workforce is to focus on the education system, and a number of CPI companies are doing this. Axiall Corp., for example, holds an Annual Teachers Institute at its Lake Charles facility. This program teaches the teachers, by providing educators first-hand knowledge about the operations of a chemical plant and the products manufactured there. In fact, Axiall won the 2013 ChemInnovations Community Service Award for its efforts with this program.

Getting back to the topic of safety, another award given at ChemInnovations was the Safety Investment Award, which honors a company's commitment to safety. This award went to The Dow Chemical Company for its work on creating a laboratory safety program that reaches beyond the corporate boundaries to benefit the CPI as a whole. This safety program, the Dow Lab Safety Academy, includes a publicly available website (<http://safety.dow.com>), which houses dozens of accessible video tutorials on practical safety best practices.

Dow was also the recipient of the ChemInnovations Best Process Plant Facility Improvement Award. Faced with a problem involving a gage that required troubleshooting, the Texas Operations group took a far more proactive approach than just correcting the problem. A series of pre-turn-around audits for additional units were conducted, and these actions served as a catalyst for raising awareness of gage safety at other plants.

These are just a few examples of the safety programs and community service programs that the CPI is involved in. Many more are underway. Knowing that so many people are working hard to address the challenges facing the CPI should help us all get to sleep just a little bit more easily. ■

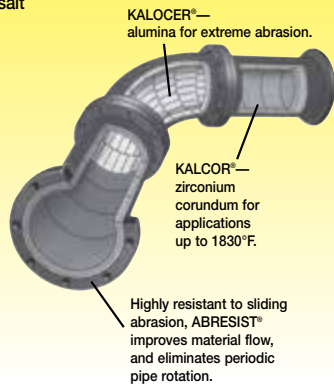
Dorothy Lozowski, Editor in Chief



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Letters

Award for engineering students

Applications are now open for National Engineers Week Foundation's New Faces of Engineering – College Edition. This third annual event honors the best and brightest engineering students in the U.S. and beyond. Applications are available at www.facebook.com/CollegeEdition and the deadline for submissions is Friday, November 15. Nominees will be announced Thursday, February 13 immediately prior to the kick-off of Engineers Week 2014 (February 16–22). Winners, to be announced on April 2, receive scholarships and national recognition in print and online.

The College Edition award recognizes third-, fourth- and fifth-year engineering students for their achievements, and the program's Facebook page is a forum where students can communicate with their engineering peers. The page also provides a source of academic and professional development and volunteer opportunities available from National Engineers Week Foundation and their engineering association, university and corporate partners.

To be eligible, students must be enrolled in a Bachelors of Science Engineering program at an ABET-Accredited college or university or from an equivalent international educational institution and have a grade point average of 3.0 or higher.

Students must also be affiliated with one of the following engineering associations: AIChE (American Institute of Chemical Engineers); AISES (American Indian Science and Engineering Society); ASABE (American Society of Agricultural and Biological Engineers); ASCE (American Society of Civil Engineers); ASHRAE; ASME; CIE-USA (Chinese Institute of Engineers); IEEE-USA; NACME (National Action Council for Minorities in Engineering); NSBE (National Society of Black Engineers); NSPE (National Society of Professional Engineers); NOGLSTP (National Organization of Gay and Lesbian Scientists and Technical Professionals); SHPE (Society of Hispanic Professional Engineers); SME Education Foundation (Society of Manufacturing Engineers); SPE (Society of Petroleum Engineers); SWE (Society of Women Engineers).

Students who do not currently belong to an above society may still join a participating organization.

Funding for New Faces of Engineering – College Edition is provided by NCEES (National Council of Examiners for Engineering and Surveying; Clemson, S.C.; ncees.org). NCEES is a national nonprofit organization composed of engineering and surveying licensing boards representing all U.S. states, the District of Columbia, Guam, Puerto Rico, and the U.S. Virgin Islands.

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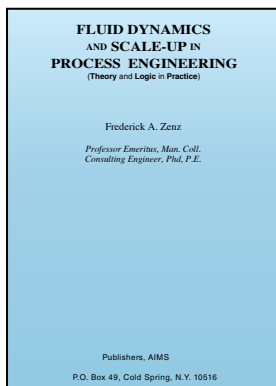
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Fluid Dynamics and Scale-up in Process Engineering: Theory and Logic in Practice. By Frederick A. Zenz. Analogies in Matters of Science (AIMS), P.O. Box 49, Cold Spring, NY 10516. Web: pemmcorp.com. 2014. 560 pages. \$199.99.

Reviewed by Thomas McGowan, TMTS Associates Inc., Atlanta, Ga.

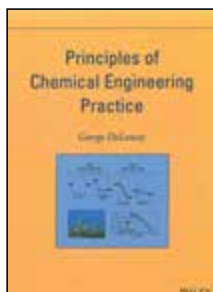


Frederick Zenz, Professor Emeritus of Manhattan College (Riverdale, N.Y.; www.manhattan.com), as well as a consulting engineer, and over many years by turn, my professor, boss, mentor and associate, has authored a third book. It is the definitive work based on a lifetime of research and engineering in two-phase flow and the science of particulate solids. The target audience for this book is design engineers, teachers and researchers involved in fluidized beds, pneumatic transport, two-phase liquid flow and fluid dynamics.

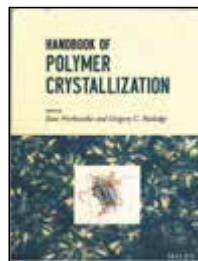
This book covers a significant number of items overlooked in the typical engineering course, such as proper manifold design for proportional flow. It provides both the theory of each of its subjects, as well as the charts, graphs and equations needed to turn the knowledge into practical designs. A sampling of these topics includes stream trajectories, grid pressure drop, troubleshooting cyclone fouling, comparison of theoretical data to actual results (useful to the reader in choosing which of the published calculation methods on which to rely). Other examples of topics covered in the book are the following: maximum particle size versus opening size for solids flow from bins; solid-particle segregation in piles and bins and how to combat it; the effect of moisture on agglomeration; mixing in beds; attrition; scaleup of bubbling beds, injectors, standpipes and risers; and the mathematics of the parabolic curve found in natural systems. The book includes 25 worked-out examples on such items as cyclone pressure drop, entrainment, saltation, riser choking, prilling towers, predicting reaction conversion, viscosity and surface tension of powders, and so on. Also included are heat transfer, gaseous diffusion, and many unpublished correlations that are all based on cited industrial experiences gained over the years from 1942 to the present.

In summary, for those in the field of two-phase flow, this book is a treasure-trove of information, a real page-turner, and a fine resource to add to one's library shelf of important books.

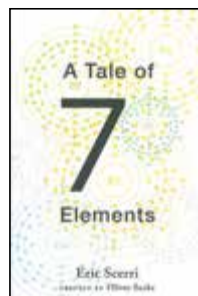
Principles of Chemical Engineering Practice. By George DeLancey. John Wiley & Sons, 111 River Street, Hoboken, NJ 07030. Web: wiley.com. 2013. 456 pages. \$175.00.



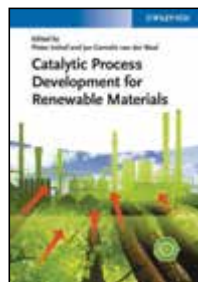
Handbook of Polymer Crystallization. Edited by Ewa Piorkowska and Gregory C. Rutledge. John Wiley & Sons, 111 River Street, Hoboken, NJ 07030. Web: wiley.com. 2013. 498 pages. \$195.00.



A Tale of Seven Elements. By Eric Scerri. Oxford University Press, Great Clarendon Street, Oxford OX2 6DP U.K. Web: oup.com. 2013. 304 pages. \$19.95.



Catalytic Process Development for Renewable Materials. Edited by Pieter Imhof and Jan Cornelis van der Waal. John Wiley & Sons, 111 River Street, Hoboken, NJ 07030. Web: wiley.com. 2013. 420 pages. \$190.00.

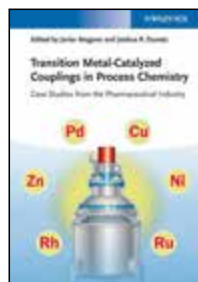


Innovative Graphene Technologies: Evaluation and Application, vol. 2. Edited by Atul Tiwari. Smithers Rapra Publishing, Shawbury, Shrewsbury, Shropshire SY4 4NR, U.K. Web: smithersrapra.com. 2013. 540 pages. \$250.00.



Bio-Based Plastics: Materials and Applications. Edited by Stephen Kabasci. John Wiley & Sons, 111 River Street, Hoboken, NJ 07030. Web: wiley.com. 2014. 408 pages. \$180.00.

Handbook of Food Powders: Processes and Properties. Edited by Bhesh Bhandari, Nidhi Bansal, Min Zhang and Pierre Schuck. Woodhead Publishing Ltd., 80 High Street, Sawston, Cambridge CB22 3HJ, U.K. Web: woodheadpublishing.com. 2013. 688 pages. \$325.00.



Transition Metal-Catalyzed Couplings in Process Chemistry: Case Studies from the Pharmaceutical Industry. Edited by Javier Magano and Joshua Dunetz. John Wiley & Sons, 111 River Street, Hoboken, NJ 07030. Web: wiley.com. 2013. 400 pages. \$190.00.

Sustainable Development in Chemical Engineering. By Vincenzo Piemonte, Marcello De Falco and Angelo Basile. John Wiley & Sons, 111 River Street, Hoboken, NJ 07030. Web: wiley.com. 2013. 384 pages. \$115.00. ■



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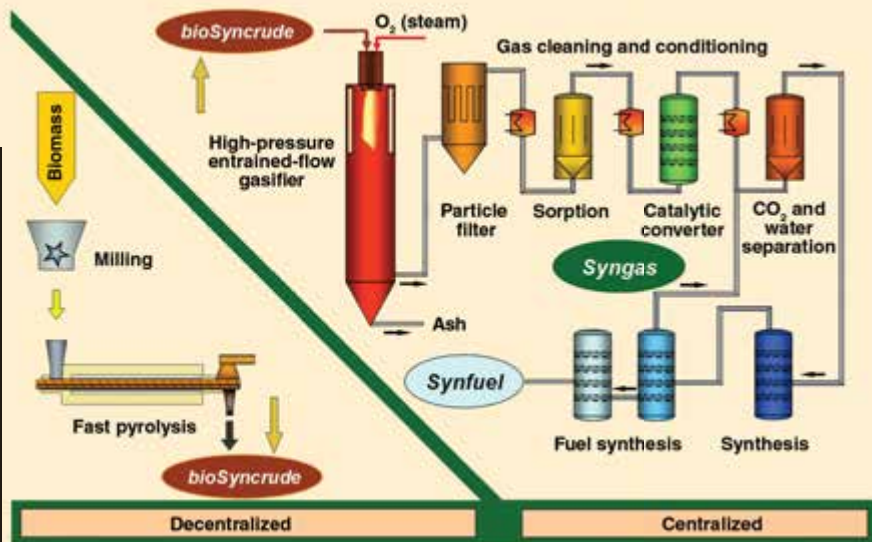
*Patent No. 6,000,840



KIT makes 'gasoline' for the first time

Last month, the synthesis stage of the bioliq (biomass to liquid Karlsruhe) pilot plant produced gasoline for the first time at the Karlsruhe Institute of Technology (KIT; Germany; www.kit.edu). The achievement is a milestone in that all stages of the bioliq process, which is being developed in cooperation with Chemanlagenbau Chemnitz GmbH (Chemnitz, Germany; www.cac-chem.com), have been realized, thus demonstrating the potential for making liquid fuels from residual biomass. By mid-2014, all four stages of the process — flash pyrolysis, high-pressure entrained-flow gasification, syngas conditioning and synthesis — will be linked together to make high-quality fuel from straw.

The complete bioliq process (flowsheet) consists of four stages. First, dry residual biomass, which originates in a widely distributed manner and possesses a low energy content, undergoes a decentralized conversion by flash pyrolysis into so-called bioliqSynCrude — a substance of high energy density (13–15 times higher than that of straw) similar to crude oil — which can be economically transported over long dis-



tances to a centralized processing plant. There, a high-pressure, entrained-flow gasifier converts the bioliqSynCrude into a tar-free synthesis gas (syngas; mainly H₂ and CO) at temperatures above 1,200°C and pressures of up to 80 bars. Downstream hot-gas cleaning then removes impurities, such as particulate matter, chlorine and nitrogen compounds. In the final stage, the cleaned syngas is fed to the synthesis reactor to produce dimethyl ether (DME), which can be used as, or blended with, gasoline.

Reforming catalyst

Haldor Topsøe A/S (Lyngby, Denmark; www.topsoe.com) has introduced a new alkali-promoted steam-reforming catalyst, dubbed RK-400. RK-400 is engineered to protect against unwanted carbon formation while achieving a higher level of catalytic activity than those previously seen in this class, says the company.

RK-400 has a reservoir of potassium promoter integrated within the carrier material. This gives the catalyst the ability to replenish the potassium as it is depleted, which not only eliminates the challenge of maintaining sufficient alkali at the surface, but also allows for an initial surface coverage of only the essential amount of promoter material. As a result, more nickel surface is available for steam reforming catalysis, which results in an increase in catalytic activity.

RK-400 is suitable for all types of reformers, including top-, bottom-, terrace wall- and side-fired combinations. Top-fired operation is especially recommended due to the high heat flux at the upper part of the tubes.

The first commercial charge of RK-400 was installed in 2012 in a North American NH₃ plant.

Plasma-modified CNTs show promise for water purification

An international team of researchers claims to have developed carbon nanotube (CNT) membranes with an ultrahigh specific-adsorption capacity for salt that is two orders of magnitude higher than that found in current activated-carbon-based water-treatment systems. The team includes researchers from Singapore University of Technology and Design (www.sutd.edu.sg), CSIRO's Materials Science and Engineering (Sydney, Australia; www.csiro.au), Hong Kong Polytechnic University (www.polyu.edu.hk), and the Massachusetts Institute of Technology (Cambridge, Mass.; www.mit.edu).

The team says the membranes can be integrated into portable water purification devices that would be rechargeable, inexpensive and more effective than many existing filtration methods. Such portable devices are expected to be more cost effective than large, existing desalination and purification plants, which consume large amounts of energy and

are labor-intensive, and therefore costly to run. Existing small portable devices rely on reverse osmosis (RO) and thermal processes. They are able to remove salt ions but are unable to filter out organic contaminants from the briny waters of some rivers and lakes.

The team has demonstrated that the plasma treatment of CNTs can result in ultrahigh capacity to adsorb salt. They built an adsorptive membrane by depositing a thin layer of ultralong CNTs onto a porous, mixed-cellulose-ester support. By subsequently modifying the CNTs with plasma, the membranes can effectively remove salt, organics and nanoparticles simultaneously from aqueous solutions. Since salt is adsorbed rather than rejected, the required operating pressure is much less than that required for RO.

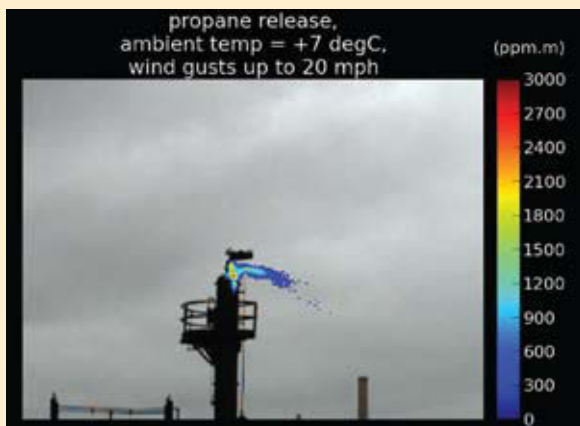
The team now plans to investigate the filtration properties of other nanomaterials, such as graphene.

Capture realtime images of gas leaks with this technology

New gas-cloud imaging technology from Rebellion Photonics (Houston; www.rebellionphotonics.com) monitors facilities for gas leaks and is capable of imaging chemical releases in realtime, identifying and quantifying gas clouds over large sections of a facility (photo). The company's technology aims to improve today's alarmed, point-detector systems, which are limited in coverage area and in their ability to visualize emissions.

Growing out of research at Rice University (Houston; www.rice.edu), Rebellion's Gas-Cloud Imaging camera captures infrared (IR) spectral information about a range of gaseous chemicals from digital video images instantly. The process is known as "snapshot" hyperspectral imaging (HSI). The company has also developed optical hardware to allow the "snapshot" HSI, as well as algorithms that can process the images at video rates, instead of over a much longer period, as had been the case with previous efforts with HSI.

For carrying out HSI, Rebellion has developed the fully automatic Gas-Cloud Imaging camera, which is capable of detecting long-wavelength (7.5–14.5 micron) IR spectra from a variety of gases across a mosaic of fields of view at a chemical facility. The camera detects small temperature differentials between leaked gases and the background scene. To identify the gas, the camera detects an IR absorption spectrum from the



leaked gas that is matched to a database of known spectra.

The camera is mounted on a movable pedestal that can be programmed to move continuously and systematically across a wide area, effectively monitoring entire sections of a facility with a single camera, and providing operators with IR-based visual information about the gas emissions. The system can identify dozens of chemicals across long distances in a variety of weather conditions.

"Operators do not need to monitor the signal, because the system is programmed to automatically notify the appropriate personnel with a visual representation of the leak, should one occur," says Robert Kester, co-founder of Rebellion Photonics.

The first installation of the technology has been performing well, Kester says, at a petroleum refining facility in Ohio. The company is offering its technology to facilities on a subscription basis.

First commercial-scale high-solids anaerobic digester in North America

Harvest Power (Waltham, Mass.; www.harvestpower.com) recently began operation of the first commercial-scale, high-solids anaerobic digester in North America. The facility produces biogas from food waste and yard waste in Richmond, B.C., Canada.

The anaerobic digester employs essentially the same biology that you would see in the stomachs of ruminants, but the process is being applied to a high-solids feedstock," explains Paul Sellew, CEO of Harvest Power.

The process begins in a series of gastight channels equipped with a percolation system where an aqueous solution of hydrolysate is layered down over the feedstock and organic

then fed to naturally occurring anaerobes to make biogas.

After digestion, the feedstock is composted and sold as high-quality soil products, while the biogas is used by a 2.5-MW combined heat and power (CHP) system. The clean energy component of the facility will process about 40,000 ton/yr of food and yard waste from local residences and businesses, in addition to the 200,000 ton/yr processed by the adjacent composting system.

Harvest has established a longterm agreement with the local utility to supply power to the grid, Sellew notes (for more on biogas, see *The Biogas Boom*, *Chem. Eng.*, July

Last month, GE (Fairfield, Conn.; www.ge.com) introduced LEAPprimary, a new primary wastewater-treatment technology for use with the company's ZeeWeed membrane bioreactor (MBR) and LEAPmbr systems. LEAPprimary is said to significantly reduce overall energy consumption, costs and physical space requirements by combining separation, thickening and dewatering of primary wastewater solids into one unit.

With LEAPprimary, total suspended solids are reduced by 50–70%; biochemical oxygen demand is reduced by 25–40%; and the removed solids can be dewatered to 20–30% dry matter, thus minimizing handling costs, says GE. Energy usage for biological treatment is reduced because solids and organic matter are removed prior to secondary biological treatment, adds the company.

Photobioreactor demo

Proterro Inc. (Ewing, N.J.; www.proterro.com) has announced plans for a demonstration-scale facility that incorporates its photobioreactor system for synthesizing sucrose from CO₂, sunlight and water. Intended to lower the cost of sugar production, the technology uses patented microorganisms and an inexpensive and scalable reactor (*Chem. Eng.*, June 2012, p. 11). The company has completed preliminary design and layout for the new facility, which will be located in Florida.

CO₂ capture

Last month, Lanxess AG (Cologne, Germany; www.lanxess.com) commissioned a new CO₂-concentration unit at its Newcastle production site in South Africa. The company invested €40 million in the unit, which is designed to capture 170 metric tons (m.t.) of CO₂ per day from the fluegas generated by burning natural gas. Conventional boilers used to make steam. The captured CO₂ will be used as a feedstock for the site for the production of sodium dichromate, which is

(Continued on p. 10)



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Bacteria engineered to make 'gasoline'

Short-chain hydrocarbons have been produced for the first time by microbial fermentation by a research team from the Dept. of Chemical and Biomolecular Engineering at the Korea Advanced Institute of Science and Technology (KAIST; Daejeon, South Korea, www.kaist.ac.kr), led by Prof Sang Yup Lee.

There have been reports of the production of long-chain hydrocarbons, consisting of 13 to 17 carbon atoms, suitable for replacing diesel fuel, through metabolic engineering of *Escherichia coli*. However, there have been no reports on the microbial production of short-chain hydrocarbons as a possible substitute for gasoline.

The team has developed strains of *E. coli* capable of producing short-chain hydrocarbons suitable for use as gasoline by engineering fatty acid biosynthesis and degradation

pathways. The team engineered the microbe's fatty acid metabolism to provide fatty acid derivatives that are shorter than normal intracellular fatty acid metabolites. The strategies used include the following: screening of enzymes associated with the production of fatty acids; engineering of enzymes and fatty acid biosynthesis pathways to concentrate carbon flux toward short-chain fatty acid production; converting short-chain fatty acids to their corresponding hydrocarbons by introducing a novel synthetic pathway; and optimization of culture conditions.

The new pathway involved a mutant fatty acyl-acyl carrier protein (ACP) thioesterase, fatty acyl-CoA synthetase, fatty acyl-CoA reductase and fatty aldehyde decarbonylase. The team's strategy also allows for the production of short-chain free fatty acids, fatty esters and fatty alcohols.

A new catalyst for low-cost production of biodiesel fuel

Daiki Axis Co. (Matsuyama City, Japan; www.daiki-axis.com) has developed a new solid catalyst for biodiesel fuel production under the support of New Energy and Industrial Technology Development Organization (NEDO) under the authority of the Ministry of Economy, Trade and Industry (METI). The company's new catalyst, trade-named DX-G1, acts as a bi-functional catalyst — simultaneously as both acid catalyst and alkaline catalyst — for the synthesis of fatty acid methyl ester (FAME). DX-G1 is a pellet-type catalyst that is insoluble in water and acidic media, and enables the synthesis of FAME in a single-step reaction whereby fatty oils and methanol flow through a packed-bed reactor.

FAME yields of more than 98% have been observed with DX-G1, compared to 85% yields using conventional homogeneous catalysts. The solid catalyst can be easily recovered and reused, and the product contains

no residual catalyst or soaps, which enables fast separation of the high-purity (95%) by-product, glycerin. Eliminating the washing steps needed to remove homogeneous catalysts also means less wastewater generated. These features combine to reduce production costs by 30%, says the company. The catalyst can be used continuously for more than two years in a fixed bed. In contrast, the homogeneous catalysts used in conventional batch or semi-batch processes are used only once.

Daiki Axis has completed over 1,000 h of operation in a 1.5-ton/d pilot plant in which the catalyst is used for producing FAME that meets the Japanese (JIS K 2390) and European (EN 14214) quality standards for biodiesel fuel. The company plans to start full-stage operation by 2015, in collaboration with major companies, and is also planning commercial FAME production in southeastern Asia.

A new proppant

Last month, Carbo Ceramics Inc. (Houston; www.carboceramics.com) introduced KryptoSphere, an ultra-conductive, high-strength proppant technology designed to maximize and sustain hydrocarbon flow at high closure stresses for the life of the well. Developed in response to a request from a major operator in the U.S. Gulf of Mexico, KryptoSphere is said to deliver twice the baseline conductivity of

bauxite-based, high-strength proppants at 22,000 psi closure stresses, according to the company.

The improved performance is due to the microstructure of the new proppant, which is more spherical, more uniform and smoother than other proppants. This property creates more space in the fracture for hydrocarbon flow as well as a more uniform flow path, says the company.

(Continued from p. 10)

further processed mainly into chrome tanning materials for the global leather industry.

For the new unit, Shell CanSolv (Montreal, Canada; www.cansolv.com) supplied the patented CO₂-capture process, engineering services and its patented CO₂ amine absorbent. The CanSolv CO₂ Capture System captures up to 90% of CO₂ emissions. This is CanSol's first deployment of its post-combustion capture system in the chemicals production industry.

Biobutadiene

Last month, SK Innovation (Seoul, South Korea; www.sk.com) and LanzaTech (Roselle, Ill.; www.lanzatech.com) agreed to develop a new process for making 1,3-butadiene — a building-block for a \$20-million market that includes synthetic rubber (for tires, belts, hoses, seals and so on); molded plastics; nylon 6,6; and chemical intermediates for adhesives and specialty chemicals. The collaboration will accelerate the commercialization of an alternative route to butadiene, which is becoming increasingly scarce due to the move to ethane cracking in the U.S.

The two companies will develop and integrate SK Innovation's petroleum-refining and petrochemical technology with LanzaTech's gas-fermentation process (*Chem. Eng.*, December 2010, p. 12), which converts industrial waste gases and on-purpose syngas into low-carbon fuels and chemicals. The development work will be performed at SK Innovation's research center in Daejeon, Korea.

New gear pump

Last month at the K show (Düsseldorf, Germany; October 16–23), Maag Pump Systems (Oberglatt, Switzerland; www.maag.com) launched its sixth-generation series of gear pumps. The company says it redesigned every single component featured in its pump portfolio, from gears and shafts through to bearings and seals. For example, a "vastly improved" volumetric efficiency makes it possible to operate at reduced speed,

(Continues on p. 14)

Dandelion rubber

Last month saw the start of a five-year joint research project to extract rubber from dandelion plants to make tires. In collaboration with Continental AG (Hannover, Germany; www.continental-tires.com), the Fraunhofer Institute for Molecular Biology and Applied Ecology (IME; Aachen, Germany; www.fraunhofer.de), will build a pilot plant capable of producing natural rubber by the ton in Munster, Germany. In addition, the researchers will cultivate several hectares of a dandelion variety

that is particularly rich in rubber. The first prototype tires made with blends from dandelion rubber are scheduled to be tested on public roads over the next few years.

IME has been focusing on the Russian variety of dandelion because it is the only type that has large quantities of rubber within its white latex sap. Through modern cultivation methods and optimization of systems technology, IME researchers have succeeded in manufacturing high-grade natural rub-

ber from dandelions in the laboratory (*Chem. Eng.*, October 2009, p. 14).

The dandelion has three main advantages over conventional rubber trees: its vegetation period is only one year (not several); it can be harvested immediately, and further optimized by breeding; and it does not require a sub-tropical climate to grow. The dandelion is also less vulnerable to pests, and can be grown on land areas not previously suited for agricultural crops, says IME.

Transporting more H₂ gas

The Linde Group (Munich, Germany; www.linde.com) has developed a new storage technology that will enable a much more efficient transport of larger amounts of hydrogen. The new solution works at a higher pressure of 500 bars (7,250 psi) and uses new, lighter storage materials to more than double the amount of compressed gaseous hydrogen (CGH₂) that can be transported

in a single truck load. Successful field tests with a first reference client have demonstrated the advantages of the 500-bar technology over conventional 200-bar systems.

Linde has opened a 500-bar fueling station at its gases center in Leuna, Germany. The company developed the new 500-bar trailers in collaboration with compressed-gas-storage special-

ist Wystrach GmbH (Weeze, Germany; www.wystrach-gmbh.de). Each trailer features 100 lightweight composite storage elements developed in collaboration with xperion Energy & Environment GmbH (Kassel, Germany; www.xperion-energy.de). A single trailer can transport over 1,100 kg (13,000 Nm³) of H₂ gas. In addition, the trailers can now be filled and emptied in less than 60 minutes.



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A new material for large-scale energy storage devices

Researchers from the Australian National University (ANU; Canberra; www.anu.edu.au), and the University of New South Wales (Sydney, Australia; www.unsw.edu.au) claim to have obtained a temperature- and frequency-independent colossal permittivity (CP) material with a low dielectric loss, making it strikingly superior to typical existing CP materials. "We believe this work breaks through the logjam associated with the practical development of CP materials for use in large capacitors and high-energy-density storage devices, as well as providing important new strategies for the design and development of new classes of such materials," says professor Yun Liu of ANU's Research School of Chemistry.

Of the many methods employed to develop materials with those properties, one approach is to use localized lattice defect states that can also lead to high-dielectric

permittivity, but with acceptable dielectric loss and low frequency and temperature dependence. "The idea is to create local electron-pinned defect-dipoles within a parent metal oxide in such a way that the pinned electron is localized within a few metal-oxygen polyhedra. As these electrons have significantly more space for displacement than atomic electrons, the resultant defect-dipoles are large and behave like lattice defect dipoles rather than free electron hopping."

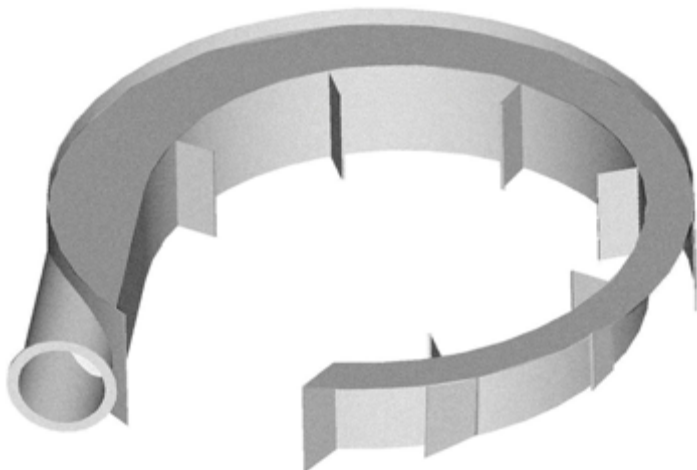
To test those predictions, the researchers selected rutile-type TiO_2 as the host. Both CP and low dielectric loss can be achieved through the simultaneous incorporation of donor (for example, Nb^{+5} ion) and acceptor substitutions (for example, In^{+3} ion) into the TiO_2 host structure. The researchers believe similar CP behavior can be obtained using other trivalent cation dopants. ■

shear rates and temperatures, says the company. This will favorably impact production rate, polymer quality and pump lifetime, while reducing energy consumption by as much as 5–10%, Maag says. The portfolio is comprised of multiple sizes, covering throughput ranges from a few kilograms per hour up to 100 m.t./h.

Greenhouse film

Huntsman Corp. (Wynard, U.K.; www.huntsman.com) is field-testing a new application for its Altiris infrared- (IR) reflecting TiO_2 pigment in greenhouses near Istanbul, Turkey. There, a 50- μm polyethylene (PE) greenhouse film containing 1% of Altiris is being used to demonstrate the pigment's ability to reflect IR radiation in order to keep interior temperatures from becoming too high. Laboratory tests have shown that transmission of 700–2,500 nm IR radiation is reduced when PE film contains the pigment. □

INNOVATION



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42ND KIRKPATRICK AWARD ANNOUNCED

Six companies are honored
for innovation in chemical engineering



Last month at the ChemInnovations Conference and Exhibition (Galveston, Tex.; September 25–26), *Chemical Engineering* (CE) had the pleasure of honoring this year's finalists and the winner of the 2013 Kirkpatrick Chemical Engineering Achievement Award, a biennial prize that the magazine has bestowed continuously since the early 1930s (for more, see CE, January 2013, p. 17). The award recognizes the most noteworthy chemical engineering technology commercialized anywhere in the world during 2011 or 2012.

CE presented the top prize of the 42nd Kirkpatrick Chemical Engineering Achievement Award to Genomatica, Inc. (San Diego, Calif.; www.genomatica.com) for its bio-based 1,4-butanediol (BDO). Honor awards were also presented to: Rive Technology (Princeton, N.J.; www.rivetechology.com) for its Molecular Highway catalyst technology; Braskem S.A. (Sao Paulo, Brazil; www.braskem.com.br) for its sugarcane-based ethylene and polyethylene; Pacific Northwest National Laboratory (PNNL, Richland, Wash.; www.pnl.gov) and Archer Daniels Midland Co. (ADM; Decatur, Ill.; www.adm.com) for their propylene glycol from renewable resources; and to Eastman Chemical Co. (Kingsport, Tenn.; www.eastman.com) for its Perennial Wood.

GENOMATICA'S WINNING ACHIEVEMENT

Bio-based 1,4-butanediol

BDO and its derivatives are widely used for producing plastics, solvents, electronic chemicals and elastic fibers. Conventional production routes to BDO rely on fossil-fuel derived feedstocks, such as natural gas, butane, butadiene and propylene.

In 2012, Genomatica, working with its partner DuPont Tate & Lyle BioProducts LLC (Loudon, Tenn.; www.dupont-tateandlyle.com), delivered a breakthrough in chemical engineering: the successful commercial-scale, biologically based production of 5 million pounds of BDO in just five weeks. This is the first time BDO has been produced at commercial scale from renewable feedstocks, and presents a new paradigm for the multi-trillion-dollar chemical industry — producing the exact same commodity chemical via large-scale fermentation and recovery (Figure 1).

Additionally, Genomatica produced more BDO in just five weeks than its peers did for their bio-based products in all of 2012, equivalent to a ten-fold scale-up. Genomatica's BDO process also has a lower environmental footprint and is designed for better overall economics than conventional BDO made from fossil fuels.

To achieve this breakthrough, Genomatica tackled multiple challenging chemical engineering problems, including the following:

Developing a new 'platform' of chemical engineering tools. These included proprietary metabolic modeling software, strain engineering tools and more. They can be thought of as

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akin to traditional chemical-process modeling tools such as Aspen, but tailored for industrial biotechnology. The novelty and high potential of this platform technology has been recognized with the U.S. Environmental Protection Agency's (EPA; Washington, D.C.) Presidential Green Chemistry Challenge Award.

Engineering novel biological pathways. Genomatica did this by applying metabolic engineering — which uses chemical engineering principles, like material balances, thermodynamics and kinetics to biology — to understand and control cellular metabolism. As BDO is not naturally produced in known organisms, Genomatica had to invent a way for cells to make it. Details of how it overcame this challenge were published in *Nature Chemical Biology*, July 2011, pp. 445–452.

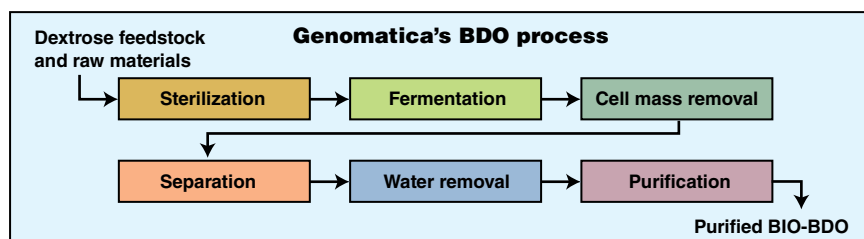


FIGURE 1. Genomatica's process uses engineered *E. coli* to directly make BDO from sugars

Newsfront

Integrating and iterating its new tools with 'traditional' chemical engineering tools. This facilitated overall process design, unit operation analysis and scaleup. In addition, a comprehensive engineering process model was developed to guide not only process design and optimization, but also to provide front-end input to strain engineers on targeting genetic improvements with global process economic benefits and enhanced process robustness.

Successful commercial scaleup. Genomatica went from demonstration scale to initial commercial test run in one year; 50 consecutive runs in five weeks happened just a few months later. This scaleup success — rare in this industry and unique in its speed — came from good chemical engineering discipline and the application of proven scaleup principles. The company piloted what it would run commercially, and it ran commercially what it piloted, notably improving predictability and lessening risk.

Cost reduction. Genomatica's platform technology let it go from laboratory production of BDO to commercial scale in five years — substantially faster than comparable efforts, and resulting in substantially reduced costs. In addition, its BDO process is simpler and designed to operate under "friendlier" conditions than conventional processes, allowing for reduced capital expenditures in production facilities.

Genomatica has been working to apply its same platform technology to the development and commercialization of processes for additional high-volume chemicals, with butadiene as its second announced target.

HONOR AWARD: RIVE TECHNOLOGY, INC. Molecular Highway zeolite technology

For more than three decades, major petroleum companies and catalyst manufacturers have been trying to develop zeolite-based catalysts with wider pores (mesopores). Zeolites, crystalline silica-alumina structures that are used in 90% of all petroleum refining processes have small (less than 1 nm) pores that allow some but not all of the feedstock to be converted into shorter, more valu-

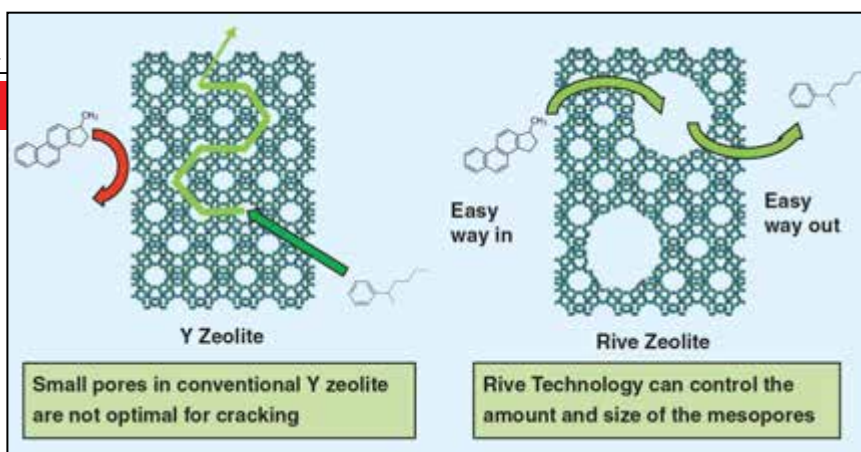


FIGURE 2. Rive Technology's Molecular Highway technology improves yields in fluid catalytic cracking (FCC) applications

able hydrocarbon (HC) molecules, such as those that make up gasoline and other transportation fuels.

During his postdoctoral time at MIT, Javier Garcia Martinez, a founder of Rive Technology, developed a radically new approach to solve this problem. Instead of synthesizing a new, more expensive catalyst, additional mesoporosity is introduced into the catalyst already being used in industry (based on zeolite Y) by using innovative, inexpensive nanotechnology. When zeolite Y is treated in the presence of a surfactant in alkaline media, the zeolite nanostructure reorganizes to accommodate the surfactant (used as a nanotemplate). Subsequent removal of the surfactant opens new, wider pores that dramatically increase the accessibility of the zeolite catalyst to the HC molecules (Figure 2).

The nanostructured version of zeolite Y shows an impressive boost in conversion and transportation fuel yields when applied to the FCC (fluid catalytic cracking) process in petroleum refining, says the company. The zeolite's enhanced accessibility allows refiners to dramatically increase the amount of gasoline and diesel fuel obtained from a barrel of crude oil, while decreasing the production of undesirable products, such as gases, heavy cycle oil and coke. In economic terms, the technology increases refinery profitability by \$50 million/yr for an average U.S. Gulf Coast refinery, says Rive Technology. Molecular Highway technology also enables refiners to process cheaper crudes.

After a successful commercial trial in 2011 at CountryMark Cooperative LLP, Rive began licensing its technology to petroleum refiners. At the same time, the company partnered with existing FCC catalyst manufacturers to

manufacture Molecular Highway catalysts and supply refiners who have been licensed by Rive. In July 2010, Rive and W.R. Grace & Co. entered into an agreement to jointly develop and commercialize Rive's Molecular Highway technology for use in catalysts for FCC processes.

In July 2012, a subsequent trial at Alon's refinery in Big Springs, Tex. demonstrated even stronger results, and led to Alon becoming Rive's first commercial user. FCC catalyst combining Rive's Molecular Highway and Grace matrix technology delivered significant economic value in mild resid operation. Performance benefits resulting from Rive's unique zeolites were: substantially improved coke selectivity, improved bottoms upgrading and increased olefinicity of the cracked products. No capital investment was needed to realize this value, and operational changes were within the normal range of practice, says the company.

Based on pilot data and commercial data from the CountryMark and Alon trials, Rive's Molecular Highway technology delivers increased profits of \$35–45 million annually to a medium-sized benchmark refinery, representing a 10–17% increase in annual profit, says Rive. The company says industry-wide deployment of Molecular Highway technology to the 240 target refineries can create over \$10 billion of economic value per year.

In addition to FCC applications, Rive's technology also has applications in other catalytic processes in the refinery (for instance, hydrocracking), in petrochemicals and biofuels, and in making gas separations more efficient. Although the company has initially focused on petroleum refining, the technology platform can be used with many other applications.

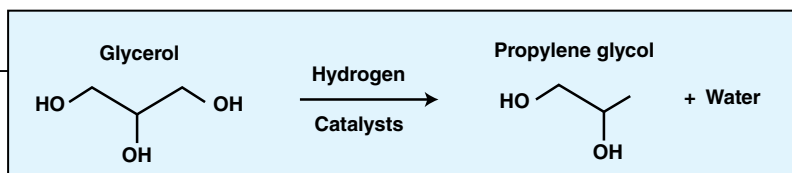


FIGURE 3. PNNL's catalyst enables the dehydration and hydrogenation of glycerol to occur in a single reactor

**HONOR AWARD:
PNNL AND ADM
Propylene glycol from
renewable resources**

Propylene glycol (PG) is used in liquid detergents, antifreeze, de-icers, paints, polyesters, cosmetics, personal care products, pharmaceuticals and some food additives. Traditionally, PG has been made from chemicals derived from petroleum. With the propylene glycol from renewable sources (PGRS) process developed by PNNL and scaled up by ADM, the wide array of products mentioned above can now be made cost effectively from renewable sources: PGRS is said to be the first bio-based process deployed at industrial scale that produces PG and meets all the same specifications as PG produced from petroleum.

The PGRS process relies on a carbon-supported, bi-functional metal catalyst used in combination with a soluble base co-catalyst. The reaction

is conducted using an aqueous feed solution in a trickle-bed reactor under moderate temperature and hydrogen pressure. The overall reaction required to convert glycerol into PG can be represented by a simple dehydration reaction (Figure 3), that removes a primary hydroxyl group and a proton, with the formation of a carbon-carbon double bond, followed by hydrogenation of the C-C double bond.

What is unique about the PGRS process, compared to other previously reported processes, is that PNNL researchers have discovered catalysts and process conditions that allow this multiple-step process to proceed in a single reactor that produces PG with both high selectivity and at high conversion. When combined with the process technology advancements and separations engineering at ADM, the process became economically competitive versus petroleum-based routes.

When using glycerol as a feedstock, the PGRS catalysts are well over 90% selective, converting the majority of the glycerol into PG. The small amounts of byproducts formed are useful compounds, such as bio-based methanol and ethylene glycol that are separated and sold; the water product in the reaction is also recovered and reused.

The catalyst is broadly applicable to other feeds to produce PG and other polyols from larger sugar alcohols, such as sorbitol and xylitol, both of which can come from various renewable biomass sources.

The PGRS process made its commercial debut in early 2011, when licensee ADM started up its new 100,000 metric ton per year (m.t./yr) PG manufacturing facility in Decatur, Ill. Since November 2011, ADM has been marketing bio-based PG that meets U.S. Pharmacopeia (USP) and USDA-certified (U.S. Dept. of Agriculture) Biobased Product Label standards.

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HONOR AWARD: BRASKEM

Sugarcane-based ethylene and polyethylene

Polyethylene (PE) is the most commercialized plastic in the world, with annual production of approximately 70 million m.t., most of which is produced from petroleum-based ethylene. With the delivery of first lots of Braskem's sugarcane-based PE in early 2011, the company set a new milestone for the CPI by producing this commodity material from 100% renewable resources. The achievement was the culmination of years of scientific and engineering teamwork.

Leveraging on Brazil's existing bioethanol industry, which has been supplying nearly 20% of the country's fuel demands, Braskem developed a process to utilize the 92.5 wt.% bioethanol — that is used directly as fuel for cars — to make ethylene, which is then polymerized into various grades of PE.

In Braskem's process (Figure 4), the ethanol dehydration reaction is performed in the vapor phase in randomly packed, fixed-bed reactors with a heterogeneous catalyst, such as alumina, silica-alumina or zeolites. Fixed-bed reactors are operated adiabatically. The temperature drop, caused by the endothermic reaction, is minimized by adding an inert heat-carrying fluid along with ethanol feedstock. A single reactor or, preferably, multiple reactors in series are typically used, with intermediate furnaces to reheat the streams that feed the next reactor.

After the dehydration reaction, the raw ethylene product is quickly cooled by a water quench to remove the product water and condensable polar substances, such as unreacted ethanol and small amounts of acetaldehyde and acetic acid. The crude ethylene is then scrubbed with caustic to remove traces of CO₂. The ethylene stream is then compressed, and dried to produce a chemical-grade ethylene with purity greater than 99%. When polymer-grade ethylene is required, the chemical-grade ethylene is further purified to remove heavy and light contaminants.

Effluents from the quench and scrubbing towers contain mostly acet-

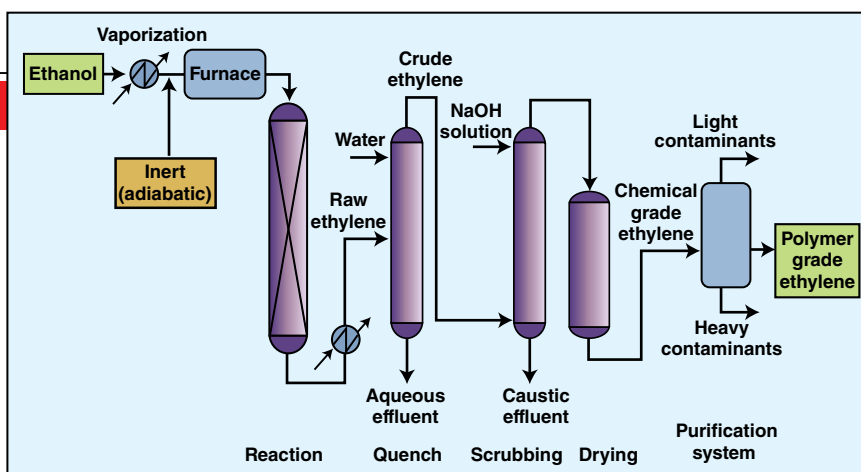


FIGURE 4. In Braskem's process, sugarcane-based ethanol is dehydrated to form ethylene, which is then used to make polyethylene

aldehyde, diethyl ether and unreacted ethanol. These components are removed in a specially designed separation system, which achieves a chemical oxygen demand (COD) lower than 100 parts per million (ppm) and the oxygenates are recovered for either recycling in the plant, or used as fuel.

The proprietary dehydration technology produces ethylene monomer from ethanol in a very efficient way. The carbon yield of the process is higher than 98% and the small amount of by-products is recovered, supplying part of the energy required by the process. The process generates a final liquid effluent consisting of water with less than 10 ppm oxygenated compounds permitting the aqueous effluent to be easily treated or reused.

This bioethylene is used to produce many grades of biopolyethylene in two different polymer plants. The polymers can be transformed in a variety of products for a wide range of applications including blow molding, injection molding and films using the current machinery that exists in plastics processing industries.

Depending on the grade, the biopolyethylene life cycle assessment indicates the capture of 2.0–2.5 tons of CO₂ per ton of polymer from cradle-to-gate, instead of the 1.9 tons of CO₂ per ton released by fossil-based PEs.

Today, bio-based ethylene and PE are being produced in an industrial unit with a 200,000-ton/yr bio-based-ethylene capacity that started up its pre-operation in September 2010 in Triunfo, Brazil. The commercialization of biopolyethylene started in early 2011 using the "I'm Green" tradename, supplying biopolyethylene resins to global companies such as Toyota, Danone, Shiseido, Tetra-pak, Chanel, Coca-Cola, Johnson & Johnson and

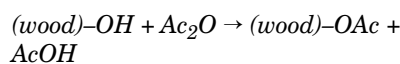
Natura. The bioethylene has also been commercially supplied to Lanxess for EPDM production since 2012.

HONOR AWARD: EASTMAN CHEMICAL CO. Perennial Wood

Wood is a preferred building material because of its beauty, character, workability and renewable nature. Unprotected in outdoor applications, however, it rots, decays, shrinks and swells limiting its use. In February 2012, Eastman Chemical Co. commercialized Perennial Wood — pine that is chemically modified through acetylation to change this paradigm and offer builders, contractors and homeowners real wood that lasts longer than unmodified wood, has greater dimensional stability and has greater surface hardness.

This modified — not treated — wood has a physical barrier against rot with improved dimensional stability over unmodified wood. Eastman introduced Perennial Wood decking in February 2012 and Perennial Wood porch flooring later in the year. Both products come with a 25-year limited warranty against rot, decay and movement.

Wood has a natural affinity for water, stemming from a tree's need to transport moisture through its vascular system when alive. Part of this affinity comes from hydroxyl groups located throughout the lignin, cellulose and hemicellulose structures. Acetic anhydride (Ac₂O) reacts with these OH groups on components of the cell wall, changing the hydrophilic OH groups into more hydrophobic acetyl groups, and making a permanent alteration to the wood chemistry.



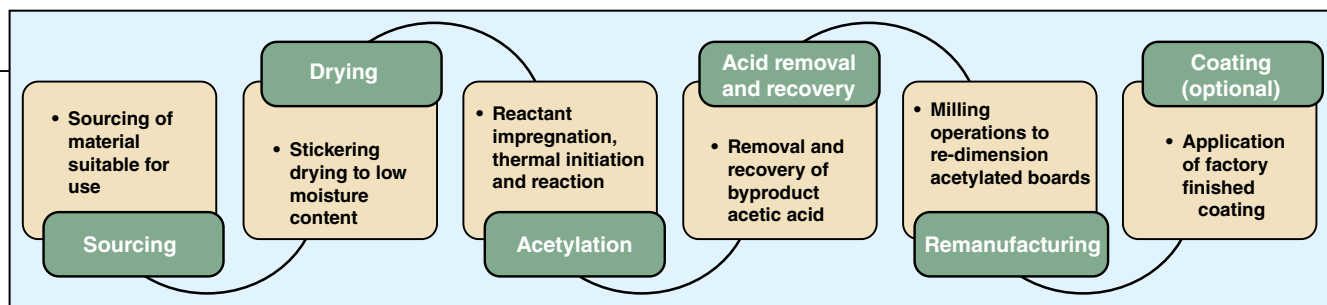


FIGURE 5. Shown here are the typical operations for acetylated wood production

Eastman Chemical

The reaction can be conducted without a catalyst following impregnation of the wood with acetic anhydride and raising the temperature to initiate the reaction. The removal of some fraction of water prior to reaction improves the degree of acetylation as water is more reactive and competes for Ac_2O .

Eastman's application of acetylation technology to solid wood began in the mid 1980s with bench exploration. Higher-level exploration began in 2003 targeting a commercial scale process. In 2004, Eastman started a pilot-scale reactor capable of acetylation 3–5 pieces of lumber. Following several years of pilot operation and development, first material for dem-

onstrations projects were produced in 2011. Mechanical completion of a production facility and supporting unit operations occurred in late 2011, with product launch in 2012.

The process involves several unit operations (Figure 5), each of which had to be developed to handle wood. Because of wood's inherently inhomogeneous and anisotropic nature, the acetylation process had to be developed with a "robust processing window" to accommodate the variants in wood density, which causes large variations in the level of impregnation into the wood and the amount of woody mass to acetylate.

After acetylation, the wood contains about an equal weight of wood

mass and acetic acid. The acid has to be quickly and thoroughly removed both to recover the acid for future use and to reduce the odor in the final product. Reducing the cycle time for acid removal was key to the development of an economically viable, overall process for acetylation. A microwave dryer was developed to expedite the removal of acid. Wood is fairly transparent to microwave energy, which offers a rapid means to introduce thermal energy throughout a relatively poor thermal conductor. Means of dispersing, monitoring and controlling the energy were developed to drive the removal of acid without damaging the wood. ■

Gerald Ondrey

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THE NEW FACE OF HEAT EXCHANGERS

Evolving heat-exchanger technology allows different types and designs to find use in the CPI

When it comes to heat exchangers, chemical processors have a lot to consider. The most common concerns include fouling, heat-transfer efficiency, and the ability of the equipment to handle the high temperatures, high pressures and corrosive materials associated with the manufacturing of chemicals. And heat-exchanger manufacturers are continuously tweaking existing technologies to better suit the unique needs of the users in the chemical process industries (CPI).

Many processes in the CPI require heating or cooling, or both at certain points, which can consume a lot of energy. Heat exchangers play an important role in maximizing the use of energy in many of these heating and cooling applications by transferring heat efficiently and recovering heat for reduced energy use and environmental impact. Heat exchangers are used for heating, cooling, condensing and evaporation duties in many processes.

"The challenge," says Carl T. Kozacki, APV industrial sales director with SPX Flow Technology (Charlotte, N.C.; www.spx.com), "is to find the best heat transfer technology for the specific application. This will depend upon process parameters, such as operating temperatures and pressures, cleanliness of the fluids being handled, and concerns over fouling, to name a few. The right balance needs to be found to cover process performance, thermal efficiency, accessibil-

ity, cleanability and productivity, all while keeping lifecycle costs and initial capital investment low."

Read on to learn about how the technology is evolving to include new twists on existing designs that make the latest generation of heat exchangers suitable for the toughest applications the CPI can dish out.

Fighting fouling

"Fouling is by far the toughest problem for any heat exchanger, but it is especially so in the high-temperature, corrosive environment associated with the chemical processing industry," says Klas Abrahamsson, regional product manager with Alfa Laval (Richmond, Va.; www.alfalaval.com). "The nature of any heat exchanger is that there will be fouling, so the question becomes, What type of heat exchanger and what design can withstand high temperatures and pressures and retain energy efficiency even when fouled?"

Abrahamsson says that although they have been around for many years, spiral heat exchangers were not considered for use in chemical processing applications until recently. A spiral heat exchanger is a circular heat exchanger with two concentric spiral channels, one for each fluid. The curved channels provide optimum heat transfer and flow conditions for a wide variety of fluids, while keeping the overall size of the unit to a minimum (Figure 1).



FIGURE 1. A compact and self-cleaning design make Alfa Laval's spiral heat exchanger a good choice for the CPI, as these exchangers can handle everything from dirty fluids to high-vacuum condensation

"Spiral heat exchangers were introduced decades ago for use in the pulp-and-paper industry, which couldn't use shell-and-tube exchangers because they became fouled too easily and often. While they are finding more use in chemical processing and petroleum refining, there are still many process engineers that haven't come across or considered using them," Abrahamsson continues.

"They are not low cost, but we consider them problem solvers in these heavy-duty applications because they solve the fouling problem, which prevents downtime, saves money and easily provides a return on investment. Spiral heat exchangers are easy to maintain and are workhorses."

Abrahamsson says spiral heat exchangers are versatile and can handle everything from dirty fluids to high-vacuum condensation. A self-cleaning design reduces operating and maintenance costs. The design offers high heat-transfer efficiency and the ability to handle two highly fouling fluids.

Modern plate-heat-exchanger designs, including gasketed, semi-welded pairs, and fully welded units, provide yet another solution to conquering fouling on the heat-transfer surface and provide end users with a variety of options to better meet applications requirements, according to APV's Kozacki.

For example, Kozacki explains, an all-welded hybrid unit is a cross between shell-and-tube and plate tech-

SPX



FIGURE 2. Based on a multi-flexible configuration platform, SPX's hybrid heat exchanger is designed to operate under harsh conditions where other heat exchanger technologies can fail, have a shorter operating lifetime, or reduce operational efficiency

nology (Figure 2). On one side, the plate is pressed into a tube-like form so it can handle contaminants, and on the clean side, a plate channel is used to increase thermal efficiency. The unit covers can easily be removed and the "tube-side" plate can be high-pressure cleaned. "This marrying of technologies gives the benefit of the increased thermal efficiency of plate technology along with the 'tube' capability to handle contaminants or solids," he says.

And no matter the heat exchanger type or design, Emerson Process Management (Austin, Tex.; www.emerson-process.com) recently launched the pre-engineered Heat Exchanger Monitoring Solution that detects accelerated fouling and identifies the best cleaning time to optimize a facility's energy usage, capacity and maintenance costs. As part of Emerson's new suite of Essential Asset Monitoring applications, the heat exchanger solution embeds process and exchanger best practices into software that provides automated, 24/7 monitoring and allows maintenance personnel to schedule an optimal time to clean exchangers. As a result, optimal heat transfer can be achieved, and facilities can reduce energy and capacity loss due to fouling by up to 10%.

"Fouling is the number one issue associated with heat exchangers," says Nikki Bishop, senior application consultant, R&D/engineering with Emerson Process Management. "And associated with fouling is knowing when to clean exchangers and which ones need to be cleaned. A facility may have a schedule that cleans all the ex-

changers every six months or all of them every two years or some of them now and some of them later. It may end up that they are cleaning exchangers that don't need it and neglecting ones that do, which leads to exchangers that fail or lose ef-

iciency and slow the plant down."

To combat this loss of productivity and efficiency due to fouling, Emerson developed a method of intelligent interpretation of data that allows temperature, pressure, and flow around the heat exchangers to be checked, and based upon that, a fouling rate and fouling percentage can be calculated. This

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provides realtime information based on the actual performance of the heat exchanger so that the processor can make informed decisions about which heat exchangers to clean and when.

"This provides a lot of benefits. First, it has a great impact on turnaround because you know which exchangers to target and when," says Emerson's Bishop. "You may end up cleaning some exchangers every six months and others every four years, but you know that is what you should be doing based upon the analysis. It also saves time and money spent on unnecessary cleaning and maintenance and increases uptime and productivity, because neglected heat exchangers are receiving maintenance when needed."

Improved designs

As with fouling, there are designs in existence that can be applied in CPI applications to help improve heat transfer efficiency and new materials applied for use in higher temperatures and corrosive environments.

"Another difficult issue is the efficiency of the heat recovery in the very large process flows associated with the chemical industry," says Alfa Laval's Abrahamsson. "In the past, process engineers might have used banks of multiple shell-and-tube units because of the low cost and the ability to handle high temperatures, but today's compact technologies can do the same job, more efficiently and in a smaller footprint."

Abrahamsson says gasketed- or welded-plate heat exchangers are now being made suitable for such applications. Previously, he says, this type of exchanger might not have found use in the CPI because it couldn't withstand the high pressures and temperatures, but today's technologies are pushing the envelope of temperature and pressure capabilities. "The gasket material can withstand many hundreds of degrees higher than years ago. Pressures that were not previously possible in gasketed heat exchangers are now being achieved. It's not just new materials, but also how the gaskets fit in the heat exchangers and the design of the actual gasket profile that are allowing these efficient and compact heat exchang-

ers to find use in high temperature and high pressure chemical applications today," says Abrahamsson.

New materials provide other benefits, as well. "There are some developments that allow higher design pressures and temperatures to be available for special geometries than what was available in the past," agrees Bennant J. Drazner, EPC sales manager with PHE Systems/GEA Heat Exchangers, Inc. (York, Pa.; www.gea.com). "And in addition to these benefits, the overall result

is better usage of materials, creating longer successful operating run times between required shutdowns for maintenance, as well as more compact, smaller-footprint solutions that lead, in some cases, to higher yields, faster reaction times through lower hold up volumes, and reduced surfaces to maintain."

In addition, although many processes in the chemical industry require highly corrosion-resistant materials, the use of these materials was often cost prohibitive in traditional heat-exchanger solutions, such as shell and tubes. But the new compact heat exchangers, such as welded- (Figure 3) and gasketed-plate products can be significantly less expensive in these advanced materials [because they require less of the material than shell-and-tube heat exchangers would] and provide a higher degree of heat recovery, says Drazner.

However, Ron Herman, director of sales and marketing with Enerquip (Medford, Wisc.; www.enerquip.com) says that as the number of options for corrosion-resistant materials continues to grow every year, the pricing for alternative materials used in shell-and-tube exchangers, relative to traditional carbon- and stainless-steel, has been declining. He adds that improvements in the technology behind exchanger tubing are helping as well.

"Tubing suppliers are developing varieties of tubing that enhance the flow and turbulence of fluids flowing through the exchanger, improving



FIGURE 3. The fully welded construction makes the GEABloc heat exchanger well suited for applications that require the high efficiency and compact size of plate heat exchangers, but where conditions exceed the capabilities of gasketed-plate heat exchangers

heat transfer by as much as 20 to 40%. Corrugated tubing and twisted tape turbulators (static mixers) are both examples of these technologies," he explains. "Although these can increase pressure drop through the tubes, the result is improved throughput for plants, and can often reduce the size of an exchanger compared to a more traditional design. Tests are being performed to validate the cleanability of these tubing surfaces, since opponents of these technologies claim that they can create possible areas where product buildup can occur, while proponents claim the increased turbulence actually cleans the tube naturally compared to smooth wall tubing."

Additionally, the use of enhanced surfaces, be it in tubular, plate or other geometries, allows for the more efficient and effective use of materials and possible economic advantages of metallurgy upgrades, says Drazner. "There is also an increase in the possible use of reduced surface-energy materials, such as coatings (both polymer and nanoparticles) or by surface treatment (ion implantation and nitriding) to minimize fouling deposition on heat-transfer surfaces and corrosion of the heat-transfer wall."

Obviously there are a lot of choices when it comes to heat-exchanger type, design, and material selection. Each heat-transfer technology offers certain advantages, and the key is to understand the need, then match the right technology to the application. ■

Joy LePree

FOCUS ON

Analyzers

This handheld combustion analyzer comes pre-calibrated

The new E1100 handheld industrial combustion gas analyzer (photo) features sensors for oxygen and carbon dioxide that are capable of detecting a large range of concentrations for these components. These pre-calibrated and field-replaceable sensors allow for simple diagnostics and replacements to reduce downtime and repairs. This rugged unit performs stack-gas and ambient-air measurement, as well as draft and differential-pressure measurements, in many combustion applications, including boilers, burners, engines, turbines and furnaces. The E1100 comes equipped with a built-in non-thermal printer, a 12-in. probe with 10-ft dual hose, rechargeable battery and a vinyl carrying case. — *E Instruments International, Langhorne, Pa.*

www.e-inst.com

Use this mobile X-ray analyzer to detect trace elements in the field

The Niton Field X-ray Lab (FXL) analyzer (photo), equipped with the new z-Cal calibration and operation functionality, can generate light-elemental composition information for accurate detection of trace elements, including aluminum and magnesium, in oil-and-gas exploration applications. With a new custom pellet holder, the portable and rugged Niton FXL analyzer can now easily accommodate prepared samples right in the field, making it useful in mobile laboratories to generate rapid sample analyses. — *ThermoFisher Scientific Inc., Waltham, Mass.*

www.thermoscientific.com

This analyzer series monitors sensor electrode wear

The new T80 Universal Transmitter (photo), featuring this company's S80 Intelligent Sensor, minimizes maintenance time and labor by alerting technicians of equipment wear so that sensor electrodes are replaced only as necessary. The T80 is a single-channel trans-

E Instruments International



Ametek

mitter that can analyze up to seven process parameters. The intelligent sensors store calibration data, have a common configuration for all measurements and have easily replaceable, application-specific electrode cartridges. Offering membrane-switch navigation and an easy-to-read menu and display screen, the T80 automatically uploads the sensor's calibration data and can configure the transmitter's menus and display screens to a particular parameter. — *Electro-Chemical Devices, Inc., Irvine, Calif.*

www.ecdi.com

This extractive sensor is an alternative to in-situ probes

The ThermoMox WDG-V (photo) is a close-coupled extractive combustion analyzer for measuring oxygen, combustibles and methane levels in hot,

wet fluegas. The WDG-V not only monitors combustion, but also lowers emissions of NO_x, CO and CO₂. The WDG-V provides a layer of control and safety to a basic process control system, while significantly reducing the risk of an uncontrolled combustion event. The instrument can enable control and safety permissives, interlock and shutdown functions for burner management and safety-instrumented systems. Designed for fast response, the analyzer's close-coupled extractive sensor style offers an alternative to in-situ probes, even in heavy-particulate-matter and high-temperature fluegas streams. The WDG-V mounts directly to the process flange and is suitable for process streams up to 3,200°F. — *Ametek Inc., Berwyn, Pa.*

www.ametek.com

Mary Page Bailey

NOVEMBER New Products

Achieve rapid heating with this furnace's ionic flame

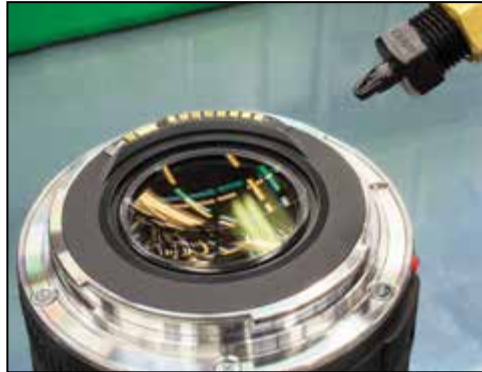
The e-Ion Zapper furnace (photo) provides non-contact, continuous heating with accurate temperature control in a compact package. The furnace features a non-combustion flame that is comprised of ions in a controlled atmosphere. Capable of delivering the high heating rates required for melting, brazing and heat-treating, this furnace requires a lower residence time than traditional heating methods, such as induction, allowing for rapid processing in air and a number of other gases. — *Micropyretics Heaters International, Inc. (MHI), Cincinnati, Ohio*
www.mhi-inc.com



MHI

This tiny plastic air nozzle resists harsh chemicals

The PEEK Atto Super Air Nozzle (photo) delivers a small, precise blow-off with an efficient, high-volume, high-velocity airflow. The overall length of the air nozzle measures only 1/2 in. (12.7 mm) with a diameter of only 0.16 in. (4 mm), permitting installation in tight spaces. Its plastic construction does not mar production items and is resistant to damage from harsh chemicals. Safe operation is assured, since the airflow of the Atto Super Air Nozzle cannot be blocked, which meets the OSHA standard for dead-end pressure. — *Exair Corp., Cincinnati, Ohio*
www.exair.com



Exair

This respirator routes exhaled air downward to prevent fogging

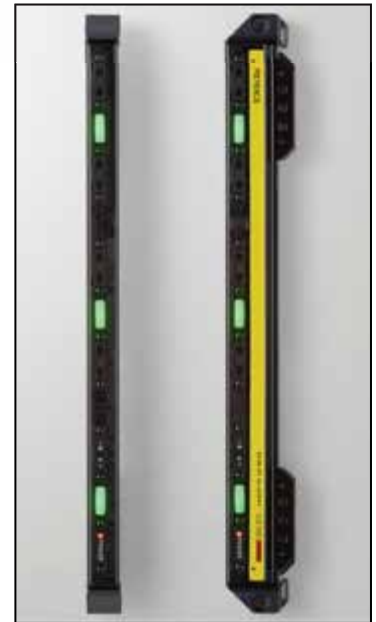
The Series 6500 Rugged Comfort half-facepiece reusable respirator (photo) can withstand long hours and extreme conditions, while maintaining comfort of wear. The over-molded design also offers users simplified cleaning and maintenance, while protecting them from harmful dusts, gases, vapors and sprays. The respirator's soft, but firm silicone face seal holds up in high heat and is equipped with polyester straps. The low-profile design allows for compatibility with other personal protective equipment and includes a valve



cover that directs exhaled breath and moisture downward to reduce fogging. — *3M, St. Paul, Minn.*
www.3m.com

A safety light curtain with a very small footprint

The GL-S safety light curtain (photo) provides simplified installation in applications where space constraints are a major concern. Available in both front- and side-view models, these two designs allow the GL-S to be seamlessly installed into areas with tight dimension restrictions. The small-footprint design features highly visible three-color indicator lights that show the curtain's operational status. Illuminating red, green or orange, the indicators can be controlled externally to indicate work steps, reducing the need for additional equipment. The GL-S also offers a built-in muting function, external device monitoring and an interlock function. Ease of in-



Keyence

stallation is key, as the GL-S comes with built-in brackets and selectable wiring options. — *Keyence Corp. of America, Itasca, Ill.*
www.keyence.com/usa

This self-lubricating material is approved for potable water use

This company's Hilube self-lubricating bearing material has recently been NSF/ANSI approved for potable water applications. Used for bushings in pumps, dam gates, valves and aerators, this material allows for lower friction than rubber materials even when running dry at startup. Hilube materials require no greasing and have no water swell, allowing them to achieve close-running clearances. Many stock shapes are available and extra-large bushings (greater than one meter) can be specially made. — *VescoPlastics Sales, Pty Ltd., Johannesburg, South Africa*
www.vesconite.com

Mary Page Bailey

Calculating volumes of solids in piles as they are poured into various shaped containers can be important information for solids-handling applications. The following set of equations represents guidance to help determine solids volume in these cases.

Solids in containers

Solids fed through a nozzle into a cylindrical or rectangular silo normally form a partial cone of a complex shape when the material is loaded off-center (eccentrically). Few articles have been published to estimate the volume of material in such cones, and those that have are limited [1,2]. In Ref. 1, a graph is given to find the volume in a cylindrical silo. The article in Ref. 2 mentions shortcut methods for various types of containers to calculate the volume ratio with imaginary reference cones. These equations aim to provide more exact analytical methods to calculate the volume of material of solids heaps, characterized by their angles of repose α .

Cylindrical silo

To find the effective volume of the silo, first the remaining cylindrical volume of the silo should be calculated and the total added to the volume of the bottom cone and of the heap.

In the case of concentric loading in a cylindrical silo with radius R_s , the height of the heap, h , is equal to $R_s \times \tan(\alpha)$ and its volume, V , is $\pi/3 \times R_s^3 \times \tan(\alpha)$.

If the filling nozzle is located at the circumference of the silo roof, h equals $2R_s \times \tan(\alpha)$ and its $V = (2\pi - 32/9) \times R_s^3 \times \tan(\alpha)$.

In case of eccentric loading at a distance ϵR_s (dimensionless eccentricity ϵ) from the center, the height of the heap is $R_s(1+\epsilon) \times \tan(\alpha)$.

The exact solution of the volume calculation is rather complex, containing both complete and incomplete elliptic integrals of the first and second kind.

The final equation for the total volume of such a heap is given by:

$$V_{total} = R_s^3 \times \tan(\alpha) \times \left[(1+\epsilon)\Pi + 2i \frac{(1-\epsilon)(7+\epsilon^2)}{9} E - 4i \frac{(1-\epsilon)(3-\epsilon)}{9} F \right] \quad (1)$$

where E and F are the differences between the complete and incomplete elliptical integral of the second and first kind, respectively with

$$\text{modulus } m = \frac{1+\epsilon}{1-\epsilon} \quad \text{and parameter } z = \frac{1-\epsilon}{1+\epsilon}$$

Equation (2) and (3) are:

$$E = \text{EllipticE}\left(\frac{1+\epsilon}{1-\epsilon}\right) - \text{EllipticE}\left(\frac{1-\epsilon}{1+\epsilon}, \frac{1+\epsilon}{1-\epsilon}\right) \quad (2)$$

$$F = \text{EllipticK}\left(\frac{1+\epsilon}{1-\epsilon}\right) - \text{EllipticF}\left(\frac{1-\epsilon}{1+\epsilon}, \frac{1+\epsilon}{1-\epsilon}\right) \quad (3)$$

The practical approximate solution to calculate the volume of a heap in a silo, formed due to eccentric feeding from the top is:

$$V = R_s^3 \times \tan(\alpha) \times \left[(1+\epsilon)\Pi - \frac{1}{9}(6\Pi - (32 - 6\Pi)\epsilon^2) \right] \quad (4)$$

or

$$V = R_s^3 \times \tan(\alpha) \times \left[\frac{\Pi}{3} + \Pi\epsilon + \frac{6\Pi - 32}{9}\epsilon^2 \right] = R_s^3 \times \tan(\alpha) \times \left[(1+3\epsilon+2\epsilon^2)\frac{\Pi}{3} - \frac{32}{9}\epsilon^2 \right] \quad (5)$$

This polynomial is not the best regression function because it overestimates the volume of the heap over the whole range $0 < \epsilon < 1$, with a maximum error of about 1.15% at $\epsilon=0.7$. However, the result is identical at the beginning and endpoint. Referring to the exact solution for $\epsilon=0$ and $\epsilon=1$, the coefficients of the polynomial are easy to remember.

Storage against vertical wall

First, the exact formula will be presented to calculate the volume cut off by a vertical wall if solids are dumped at close distance.

The angle of repose is α , the height of the heap is H , the cone of solids without wall will form a circle at its base with radius R , where $H = R \times \tan \alpha$. This will correspond to a volume $V_0 = \pi R^2 \times H/3$ or $V_0 = \pi R^3/3 \times \tan \alpha$.

In the case of a vertical wall at a distance d from the center of the cone, assume solids are fed to form a heap with the same height H . The volume, V_{lost} , lost due to the presence of the wall can be calculated:

$$V_{lost} = \frac{1}{3} H/R * d^3 * \left[\left(\frac{R}{d}\right)^3 * \arccos\left(\frac{d}{R}\right) - \frac{2R}{d} * \sqrt{\left(\frac{R}{d}\right)^2 - 1} + \ln\left[\frac{R}{d} + \sqrt{\left(\frac{R}{d}\right)^2 - 1}\right] \right] \quad (6)$$

$$V_{lost} = \frac{d^3}{3} * \tan \alpha * \left[\left(\frac{R}{d}\right)^3 * \arccos\left(\frac{d}{R}\right) - \frac{2R}{d} * \sqrt{\left(\frac{R}{d}\right)^2 - 1} + \ln\left[\frac{R}{d} + \sqrt{\left(\frac{R}{d}\right)^2 - 1}\right] \right] \quad (7)$$

The volume of the heap therefore will be

$$V = \frac{R^3}{3} * \tan \alpha * \left[\pi - \arccos\left(\frac{d}{R}\right) + \frac{d^3}{3} * \tan \alpha * \left[\frac{2R}{d} * \sqrt{\left(\frac{R}{d}\right)^2 - 1} - \ln\left[\frac{R}{d} + \sqrt{\left(\frac{R}{d}\right)^2 - 1}\right] \right] \right] \quad (8)$$

Rectangular container

Now the volume of a heap will be calculated in a rectangular container where the solids are fed from one of the top corners. The dimensions of the container are a length of a , width b and height of the heap is H .

The volume of the complete conical heap segment is only

$1/4$ of a cone with radius $R = \sqrt{a^2 + b^2}$ and $H = R \times \tan \alpha$, so

$$V_0 = \frac{\pi R^3}{12} * \tan \alpha$$

Note that radius R is the diagonal length of the rectangular base plane of the heap segment. Now the volume lost is the sum of two half segments, as calculated in the volume calculation of a heap against a vertical wall with walls at a distance $d = a$ and $d = b$, respectively. So

$$V_{lost} = V_{lost}^a + V_{lost}^b \quad \text{with}$$

$$V_{lost}^a = \frac{a^3}{6} * \tan \alpha * \left[\left(\frac{R}{a}\right)^3 * \arccos\left(\frac{a}{R}\right) - \frac{2bR}{a^2} + \ln\left(\frac{R+b}{a}\right) \right] \quad (9)$$

and

$$V_{lost}^b = \frac{b^3}{6} * \tan \alpha * \left[\left(\frac{R}{b}\right)^3 * \arccos\left(\frac{b}{R}\right) - \frac{2aR}{b^2} + \ln\left(\frac{R+a}{b}\right) \right] \quad (10)$$

The volume of the heap in that container will be $V = V_0 - V_{lost}^a - V_{lost}^b$. After manipulation, you get the exact volume of a heap formed in a rectangular storage bin with a solids-feeding nozzle in one of the top corners:

$$V = \frac{\tan \alpha}{6} * \left[4abR - a^3 \ln\left(\frac{R+b}{a}\right) - b^3 \ln\left(\frac{R+a}{b}\right) \right] \quad (11)$$

Introducing $s = \frac{b}{a}$ (with $s \geq 1$) gives

$$V/V_0 = \frac{1}{6} * \left[4 - \frac{\ln(s + \sqrt{1+s^2})}{s\sqrt{1+s^2}} - \frac{s^2 \ln(1 + \sqrt{1+s^2})}{\sqrt{1+s^2}} + \frac{s^2 \ln(s)}{\sqrt{1+s^2}} \right] \quad (12)$$

This implies that that upper part of a square silo has a minimum filling degree of $\frac{2}{3} - \frac{\ln(1 + \sqrt{2})}{3} = 45.89\%$. Rectangular silos will have a higher

minimum filling degree — up to a maximum of 50% in case of a slit. For

aspect ratios $s = \frac{b}{a} \leq 5$, the filling degree of a rectangular section fed from one corner is expressed by:

$$V/V_0 = 0.4448 + 0.0151 * s - 0.0012 * s^2$$

Where, in this case, $V_0 = a \times b \times H$, the volume of a rectangular section.

A rectangular container will be treated as four segments, where the feed point is located in one of the corners. It can be thought of as an orthogonal coordinate system, where this feed point is on the vertical axis and the x - and y -axes are parallel to the container walls.

Each segment is the remaining part of a cone, each with a different base plane radius per segment. These radii are equal to the length of the diagonal in its rectangular base (projection of feed point in one corner to opposite corner).

The segmental part of the heap with the longest radius in the base plane will determine the height of the heap. The other three conical segments will have lower (or equal) cone heights.

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Editor's Note: Material for this edition of "Facts at Your Fingertips" was supplied by Henk van Hulsel, a retired engineer from the Netherlands who, during his career, worked for Aker Kvaerner. He can be reached at the following Email address: henk.v.hulsel@zonnet.nl.

Technology Profile

Ethanol is widely produced by fermentation of sugars from agriculture feedstocks, such as corn and sugarcane. In order to meet growing energy requirements, several lines of research have focused on cellulosic ethanol production, where some type of lignocellulosic biomass, such as woodchips, sugarcane bagasse, corn stover and others, serve as the feedstock for the process.

Use of these raw materials is justified by their low cost, ready availability and status as generally unused residues. Also, such waste biomass feedstocks do not interfere or compete with the production of food from crop feedstocks.

The process

The production process for ethanol from woodchips shown in Figure 1 is similar to the Green Power+ process described in the U.S. patent published by American Process Inc. (Atlanta, Ga.; www.americanprocess.com; U.S. Patent 195,468; 2011). The major process steps are described in the diagram below.

Pretreatment. Wood chips are pumped with hot water into the pretreatment reactor, where hemicelluloses are separated from lignin and cellulose. The treated mixture is washed with recycled filtrate. The hemicellulose extract is sent to the first evaporation step, where water is evaporated. Lignin and cellulose are burned to generate steam and electricity to supply plant demands.

Hydrolysis. The hemicelluloses undergo acid hydrolysis and are converted to monomer sugars, such as xylose, using dilute sulfuric acid. Then, lime is used to increase pH. The diluted sugar mixture passes through the second evaporation step.

Potassium acetate production. Acetic acid is released with water in both evaporation steps. Potassium hydroxide is added to the evaporation condensate to form potassium acetate. The salt is separated in a membrane unit and concentrated to 50% to be sold as a de-icer.

Fermentation. The monomer sugars are fermented to ethanol, and gases released from fermentation are washed with recycle water in

a gas washing column.

Distillation. In the concentration column, the broth is concentrated to about 50% ethanol in a vapor sidestream, and gases are released in the overhead to the gas-washing column. In the rectifying column, a 90% ethanol vapor stream is generated and the bottoms' recycle water stream is used in the gas-washing column. The ethanol is dehydrated in a molecular sieve unit, leading to an ethanol product with 99.5% purity.

Key research features

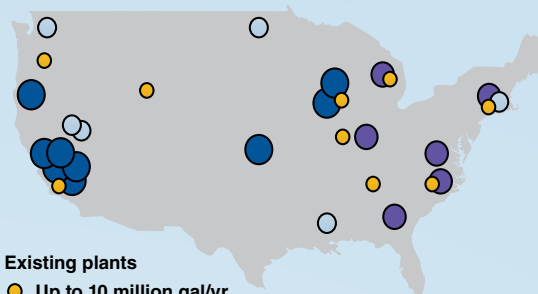
- According to American Process, the approach of selectively converting hemicelluloses to monomer sugars leads to a greater effective ethanol yield when compared to processes converting both cellulose and hemicelluloses
- It is possible to obtain valuable co-products, including potassium acetate de-icer, from acetic acid released from hemicelluloses during the pretreatment and hydrolysis steps

Economic performance

An economic evaluation of the process was conducted based on data from the fourth quarter of 2012. The following assumptions were taken into consideration:

- A wood processing unit producing 40 million gal of anhydrous ethanol and 40 million gal of potassium acetate de-icer per year built on the U.S. Gulf Coast (process equipment are represented in the simplified flowsheet in Figure 1)
- The unit operates 300 days per year
- Storage of products is equal to 30 days of operation, and there is no storage for feedstock
- Surplus electricity generated in the plant is sold to the electric power grid

The estimated total fixed investment for the



- Existing plants**
- Up to 10 million gal/yr
- Proposed plants**
- Up to 10 million gal/yr
 - From 11 to 20 million gal/yr
 - At least 21 million gal/yr

FIGURE 2. Each mark in the map corresponds to an existing or proposed cellulosic ethanol plant. The nominal capacity of each plant follows the legend to the left:

construction of this plant would be between \$350 and \$450 million.

Research perspective

Currently, there is great interest in developing cellulosic ethanol production processes. Several configurations are being studied. The main differences among them are the pretreatment and hydrolysis steps. The aim is to maximize fermentable sugar yield in order to enhance process economic competitiveness. Figure 2 shows the distribution of some cellulosic ethanol plants in U.S. that use diverse ethanol production technologies.

Other signs of the attention directed to cellulosic ethanol are the loan guarantees recently provided by the U.S. government, for the construction of commercial-scale facilities. ■

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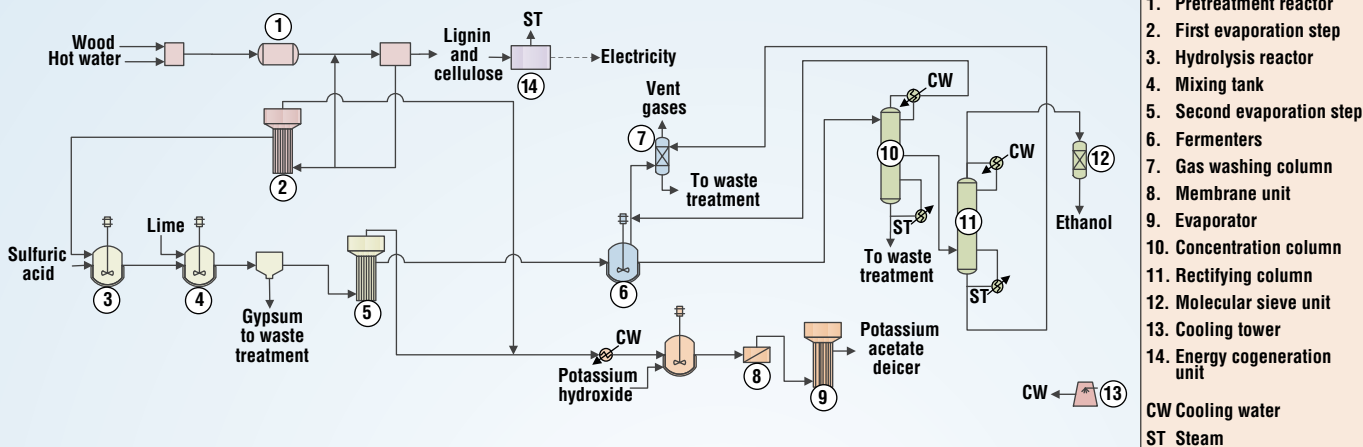


FIGURE 1. Cellulosic ethanol production process similar to American Process' Green Power+



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Troubleshooting and Solving a Sour-Water Stripper Problem

A systematic approach identifies problems that prevented a stripper column from achieving trouble-free operation

Jeremy Ponting
Fluor Ltd.

Henry Z. Kister
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Fluor Corp.

A recent book by Lieberman [1] stresses that to combat the environmental crisis that our planet is facing, it is essential to make existing units work adequately and efficiently. Equipment that malfunctions or limps along limits production and does not permit good energy and equipment utilization. This, in turn, leads to higher environmental degradation, not to mention plant downtime and lost production costs. Lieberman concludes that good troubleshooting and adequate repair of malfunctioning units is central for efficiently utilizing our resources.

Towers that strip components out of water (so this water can be re-utilized or disposed of) are common in the process industries. In petroleum refineries and gas plants, the main components stripped out are hydrogen sulfide and ammonia, and the tower is referred to as a "sour water stripper." The technology for stripping sour water has been established for decades. It was an engineer, Beychok [2], who wrote the leading text on the subject as far back as 1967. Yet almost five decades later, there are many sour-water strippers that do not operate adequately and efficiently. Many "war stories" of sour water strippers that failed to achieve their design objectives are presented

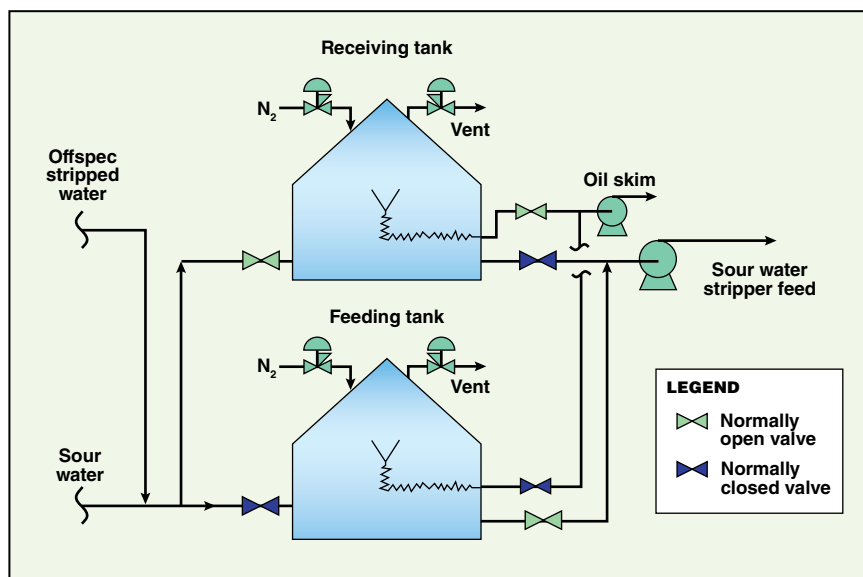


FIGURE 1. The sour-water stripping column described in the text is fed from two sour water storage tanks with an oil skimming facility

in Kister's "Distillation Troubleshooting" book [3].

Here we present another experience with a sour water stripper that initially failed to achieve its design goal due to startup damage. The problem was correctly identified in a short, systematic and effective investigation that combined field measurements and testing with good hydraulic analysis. The unit was subsequently successfully fixed. This article presents the experience and the lessons learned.

Process description

A sour-water stripper unit in a gas processing plant was designed to process 35 m³/h of sour water containing approximately 650 ppmw H₂S. The column was fed from two sour-water storage tanks with an oil skimming facility (Figure 1). The tanks were lined up such that while one tank was receiving sour water from upstream separation units, the other tank was feeding the sour water stripper column.

The column used heat integration in the form of 2 × 100% plate-and-frame exchangers (Figure 2) to ex-

change heat between the column feed and bottoms (stripped water). The exchanger was designed to preheat the sour water from 55°C to about 110°C. At 110°C and at the normal tower inlet pressure, the sour water was calculated to be all liquid close to its boiling point.

The column (Figure 3) was equipped with 20 single-pass fixed-valve trays numbered from the bottom tray up. Feed entered at the top tray. The column was designed to operate with an overhead pressure of 1.4 barg, corresponding to a top temperature of 126°C. These conditions were sufficient to achieve a bottoms specification of less than 5 ppmw H₂S. The bottoms product was routed to the wastewater treatment plant.

Reflux was produced by the tower air condenser, and entered a small reflux drum from which it was pumped back to the tower on drum level control. Uncondensed sour gas was vented from the reflux drum via the tower pressure controller (mounted on the vent line) to the acid-gas header. There was no liquid product. A temperature controller

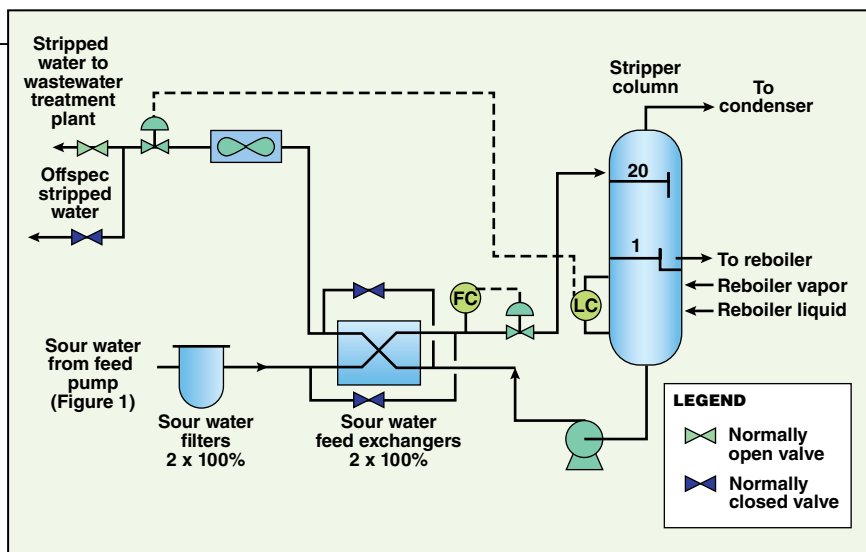


FIGURE 2. The stripper feed system is presented here, showing heat integration with the stripper bottoms stream

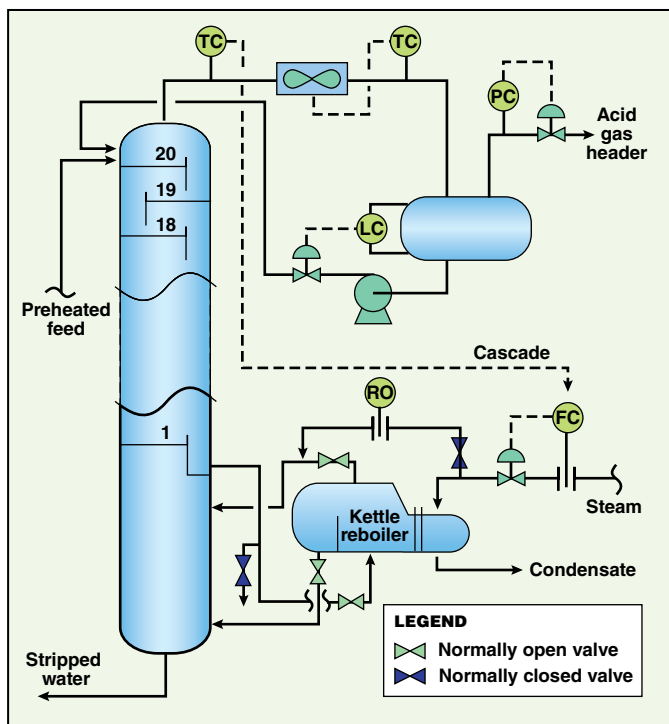


FIGURE 3. Shown here is the stripper column with its reboiler, condenser reflux and products

at the condenser outlet adjusted the speed of the condenser fan motor to set the split between the gas and reflux.

Reboil to the tower was supplied by a kettle reboiler that was gravity-fed by liquid drawn from a trap-out pan just beneath the bottom tray. Liquid from the kettle overflowed a weir into the kettle draw compartment, from where it gravity-flowed to the column bottom sump. Stripped sour water from the column bottom sump was cooled in the plate-and-frame feed-bottom exchangers and an air cooler (Figure 2) and then flowed to the waste treatment plant.

There was a bypass that permitted bypassing tower feed around the

plate-and-frame exchangers. If the exchangers were bypassed, the column feed temperature was close to ambient temperature. This no-feed-preheat case set the design surface area of the tower kettle reboiler. In case of reboiler fouling, the column was also equipped with a live steam injection line.

During startup, column feed preheat was essential to minimize the temperature difference between the incoming feed and the column top temperature. Column feed preheat minimizes the chance of sudden condensation in the top section of the column, which could lead to tray damage, similar to two water-stripper-troubleshooting cases described in detail in Ref. 3.

Initial operation

During startup, the column feed flowrate was gradually increased toward the 35-m³/h design rate with the feed preheat exchangers lined up. At approximately 60% of design feedrate the reflux drum flooded. The reflux-level control valve was subsequently driven wide open, increasing the reflux to the column. The top temperature fell dramatically and the column pressure fell from its setpoint of 1.4 barg. The only way of bringing the tower back under control was by reducing the column feedrate. The reflux was then brought back into line and the column gradually brought back up to design temperature and pressure.

There were several attempts (with small variations) at increasing the feed to the design flowrate. Each attempt resulted in the same scenario as described above. It made no difference whether the column was operating with the kettle reboiler or with live steam injection.

The operating behavior and DCS (distributed control system) data were closely reviewed in order to establish the root cause of the problem. At feed flowrates below 16 m³/h the column ran without problems with all parameters within their correct operating range. As the column feedrate approached 20 m³/h, there was a sudden increase in the pressure drop across the trays. Initially the operators observed a rapid increase in pressure drop followed by an equally rapid fall (Figure 4). These peaks became more dramatic as the column feed increased until the reflux drum flooded.

The sudden rise in column pressure drop is a primary symptom of flood. Entrainment from the top of the tower, as evidenced from the overflowing of the reflux drum and the full opening of the reflux control valve, is also a primary symptom of flood. Pressure fluctuations and drop of the overhead temperature are also symptoms of flood. Fluctuations in the column sump level, which followed the pressure drop fluctuations, were also noticed, and provide one additional symptom of flood. It was concluded that above a certain feed flowrate, the column became flooded.

At this stage the cause of flooding

was unknown since the column was designed to operate under a much higher feed flowrate.

The tray vendor was consulted by communicating the symptoms, described as follows:

- i) Rapid increase in tray differential pressure
- ii) Fluctuating overhead pressure
- iii) Fluctuating column sump level
- iv) Reflux drum flooding

The vendor concurred that the cause of these symptoms was flooding. They concluded that it was downcomer flooding.

Theories

As in a typical troubleshooting investigation, many theories were proposed by various members of the startup team (including the vendor and outsiders) to explain the premature flood. Some could be quickly eliminated, others took more testing.

1. Tray plugging. Tray plugging is a common experience in refinery sour-water strippers [4]. However, in this tower there was little presence of fouling compounds, such as heavy hydrocarbons and asphaltenes. The feed was filtered down to 2,000 micron particles to protect the feed/bottoms exchanger (plate-and-frame type). If fouling was an issue, the filters would have needed frequent cleaning and this was not the case. In an endeavor to address fouling, the filter screen was changed from 2,000 micron to 250 micron. Even after changing, the filters blocked only once, indicating little solids in the feed. Further, the exchanger should have fouled before the trays and this was not observed. Also, the problem was first observed after a short run, much shorter than it takes to plug the trays of a typical sour-water stripper even under heavy fouling conditions (see, for instance, Ref. 4). Based on these observations, plugging was branded a highly unlikely root cause for flooding in this column.

2. Troublesome reboiler. Trap-out kettle reboilers are notoriously troublesome, usually due to poor hydraulic design of the lines leading to or from the kettle, incorrect force balance on the kettle, or liquid weep from the tray feeding the kettle [5].

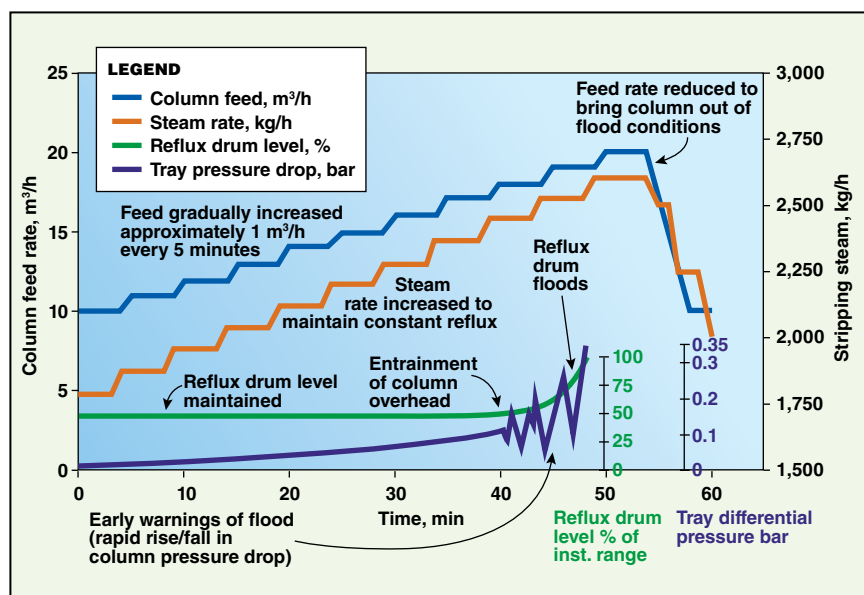


FIGURE 4. An event timing analysis of the DCS data showing the variation of reflux drum level and stripper differential pressure as feed and steam rate were gradually increased

In this column, an issue with the kettle was easily ruled out by operating the column with direct injection of stripping steam instead of the kettle reboiler. The flood occurred at the same rates irrespective of whether the reboiler or the stripping steam injection was used.

3. Incorrect inlet/outlet nozzle designs and velocities were closely checked. The possibility of flashing at the feed inlet was addressed by reviewing operating data. The preheater was designed to preheat the feed from 55°C to 110°C, but during the initial runs the feed was colder, coming in at 40°C, and the preheat temperature was consequently lower at 90–95°C, so flashing would have been highly unlikely.

4. Incorrect tray design. One concern was that the tray open slot area was low, about 7.3% of the active area, and this could result in premature jet flood or excessive downcomer backup. This is addressed further in the next section.

5. Foaming. Sour water strippers are generally considered foaming systems. The industry's practice for system factors, reflected by the factors listed in Table 14-9 in Perry's Handbook (pp. 14-41 [6]), lists sour water strippers as "Heavy Foaming" and assigns them a system factor of 0.5 to 0.7.

Further support for possible foaming came from the observation that there was a higher than anticipated hydrocarbon content (about 20,000 ppm oil) in the feed to the sour-water feed tanks (Figure 1) and an increased quantity of particulate matter in the feed compared to the very original design. The filtration specification on the sour-water-stripper feed filter was relaxed after the vendor of the feed/bottoms plate-and-frame exchanger stated that a 2,000-micron filtration level was sufficient to prevent excessive fouling without the requirement for the operator to clean this filter frequently. The original specification on the filter of 5 microns was expected to result in frequent cleaning of this filter. Particulate matter and heavy hydrocarbons are well-known to promote foaming [3, 7].

Our experience in general has been that most sour-water strippers do not foam. The times we experienced foaming in sour water strippers were when significant oil entered the system. Solids may also catalyze foams, but we are not aware of cause-and-effect experiences in which solids by themselves catalyzed foams in sour water strippers. Among more than 60 case studies of foaming experiences surveyed from the open literature and abstracted in Kister's "Distillation

Troubleshooting” book [3], not one came from a sour water stripper.

The theory of foaming emerged as a front-runner, having significant support, which was by no means conclusive.

6. An installation error. There was not much evidence supporting that an installation error was responsible for flooding. The tower was well-inspected prior to startup and no problems were found. Nonetheless, there were some concerns and we therefore kept installation errors on the troubleshooting list. Specifically, there was a suspicion of incorrect downcomer clearance [which could be manually adjusted (with a tolerance of ± 2 mm)]. The inspection records were checked and the inspection report only indicated that the recommended clearances had been met, but with no values recorded.

7. Tray damage. Damage is not uncommon in steam-water operations [8], such as in sour water strippers. Steam rapidly condenses when it comes into contact with a large quantity of cold water. The pressure in the contact zone plunges and induces a rush of steam from above and from below into the contact zone. This rush imposes a large downward-acting differential pressure across the upper trays, and a large upward-acting differential pressure across the lower trays. Tray damage may result if any of these differential pressures exceeds the allowable stress of the trays. Trays above the contact zone will be deformed downwards, and those below the contact zone will be deformed upwards. This damage has been previously reported in sour water strippers [3].

The above tray damage theories hinge on cold water entering the stripper. In this column, the cold water damage incident needed to have occurred during startup because the column never reached the design feedrates. During normal operation, the feed to the tower was hot, 90 to 95°C. At these feed temperatures, damage is unlikely. At start-up, live steam was first brought in at a slow rate, the reflux and condenser were commissioned, and then the tower bottom was circulated through the preheater back to storage. When feed eventually entered the tower, it was hot.

Nonetheless, there were short periods in which the preheater was bypassed, dropping the tower feed temperature from 90 to 40°C within a few minutes. Stepping up the feedrate at the lower temperature, or a sudden drop of the feed temperature (for example, by opening the bypass valve too fast), or a sudden drop in steam flowrate while the feed was cold, could have led to tray damage. Also, there were some “teething problems” with the stripping steam piping and with leaking gaskets on the plate-and-frame exchangers, and the column went through a number of startup/shutdown cycles, as well as some feed-bottom exchanger switches. Each of these could have led to feed changes and dropping of feed temperature over short periods, possibly resulting in the type of damage described above. So while there was no reason to suspect damage, it would have been very conceivable.

With the first three theories above ruled out or considered highly unlikely, four theories remained, with foaming being a slight front-runner, and the installation error bottoming the list. Further work on narrowing-in on the root cause, the most likely explanation, and the path forward are described below.

Hydraulic analysis

Our hydraulic analysis looked at the design case as well as the operation bottleneck, and considered the possibility of foaming. Our calculations were based on methods by Fractionation Research, Inc. (FRI; Stillwater, Okla.; www.fri.org) and Perry’s Handbook [6]. We compared our findings to values from the vendor rating sheets.

A. At design loads. At design loads, the vendor calculated 76% of jet flood, while we calculated 70 to 76% of jet flood from the FRI valve tray and equivalent sieve tray correlations as well as from published methods [6]. The numbers are the same, but there was a huge difference: the vendor’s calculation applies the 0.7 system factor specified in the column data sheet. Our calculations did not apply a system factor. If we applied the specified system factor to our calculations, the trays would rate at 100% to 109% of jet flood.

The FRI jet-flood correlation is known as the best in the field, gives predictions within 10–15% accuracy, and concurs with published methods with which we have had excellent experience. Also, the FRI calculations, as well as the published method, reflect the industry’s experience that sieve and valve trays of equivalent open area give much the same jet flood capacity. We concluded that our calculations are closer to reality than the vendor’s.

The practical implication of this discrepancy is that the current design is suitable for a non-foaming system, but does not follow the industry’s practice of using a system factor of 0.5 to 0.7 for sour water strippers [6].

The downcomer backup we calculated is 264 mm compared to the 199 mm calculated by the vendor. With a total height of the downcomer plus outlet weir of 660 mm, both numbers are adequate for a non-foaming system. The larger of the two numbers (264 mm) is too tall for a foaming system for which an aeration factor of 0.4 (or even less) has been recommended [6].

The downcomer inlet velocity is simply the downcomer inlet clear-liquid flowrate divided by the downcomer inlet (top) area. Our calculation gave a downcomer inlet velocity of 0.122 m/s. This velocity is adequate for a non-foaming system. For a foaming system, the maximum recommended downcomer inlet velocity is 0.061–0.076 m/s [6]. It can be concluded that the downcomer design is adequate for a non-foaming system, but grossly inadequate for a foaming system. The downcomer inlet areas are too small to accommodate the liquid rate.

Our design case evaluation therefore confirmed that the trays/downcomers were not adequately designed for foaming conditions. The downcomer velocities are far too high and the system factor application in the design is questionable.

B. At operating loads. We also hydraulically rated the column based on operating data at the loads just before flooding was observed. It is important to recognize that this occurred at about half the design loads. Our calculations show that for these

conditions, the trays operated at 37% of jet flood, and at 170 mm downcomer backup, both of which are very far from the limit even for a foaming system. The only parameter close to a limit for a foaming system was the downcomer inlet velocity, which was 0.075 m/s, right at the upper end of the recommended range for foaming systems. So based on this calculation, it is possible that foaming bottlenecked the column and caused the premature flood.

This finding kept the foaming theory alive, possibly providing slight additional support. Based on the hydraulic analysis, if foaming were the bottleneck, it would limit the tower by a downcomer choke (“downcomer velocity flood”) mechanism. At the operating conditions where the column flooded, no other flood mechanism was near a limit, even under foaming conditions.

The operating load analysis also ruled out the possibility of an incorrect tray design (in the absence of foaming) causing the premature flood.

Foaming or no foaming?

We were left with the following three theories:

- Foaming
- Installation error (less likely)
- Damage

The solution for an installation error and damage would have been much the same: shutting down the tower and fixing the problem. The solution for foaming would have been redesign and reinstallation of all (or at least some) of the 20 trays. So there was a need for further differentiation between foaming and the other theories.

One technique invaluable for testing theories is the vapor/liquid sensitivity test. A limitation can be sensitive to vapor load, liquid load, or both. In a flood test, feed (or reflux) flowrate is often raised while the column products are kept on-specification until flood occurs. Raising the feed liquid or reflux flow raises the column liquid load, but keeping the products on-specification increases reboil or stripping steam rate. When flood occurs, there is no telling whether the flood is due to the initial increase

in liquid load or the subsequent increase in vapor load due to the higher reboil. This test therefore cannot tell whether a limit is due to excessive vapor load or excessive liquid load.

In a liquid-sensitivity test, liquid feed or reflux flowrate is raised at constant boilup. If flood occurs, it is liquid-sensitive, since the vapor load is unchanged. During such a test the bottom product usually goes off specification on lights, as the increases in feed or reflux flowrate are unmatched by increases in boilup. In a vapor sensitivity test, boilup is raised at a constant liquid load. If flood occurs, it is vapor-sensitive. During a vapor-sensitivity test, the top product usually goes off-specification on heavies because the increase in vapor load is unmatched by higher reflux. So such tests can be performed only if off-specification operation can be tolerated for the duration of the test, typically 2–3 h.

To test the validity of the remaining three theories, we decided to proceed with a “high liquid test” in which we raised the stripper feed flowrate to near the design rate (35 m³/h) without largely increasing the steam flowrate. The test was accompanied by a hydraulic evaluation based on the field measurements. A comparison of the test with the operation is provided in Table 1.

Compared to the operating case, the tower internal liquid load in the high liquid test was 53% higher, and the internal vapor load was 13% higher. During the test, the tower operated under non-flooded conditions for 10 h. The tower then flooded. The tower was taken out of flood by a large reduction in steam flowrate and only a 14% reduction in feed flowrate. This verifies that the flood was insensitive to an increase in liquid rate, but sensitive to an increase in vapor rate. This strongly argues against a flood by excessive downcomer velocity, which is always primarily a liquid flood.

Our hydraulic evaluation shows that at the high liquid test, the trays operated at 48% of jet flood, and at 210 mm downcomer backup, both of which are far from the limit even for a foaming system. The only parameter that exceeded the limit for a foam-

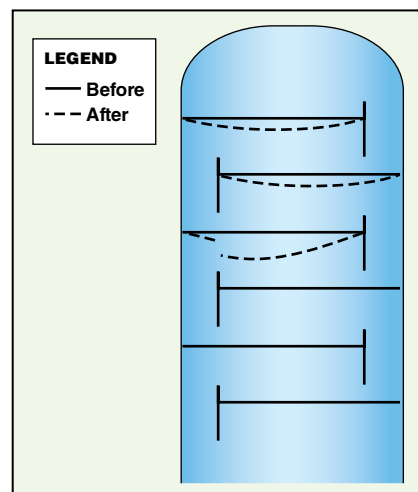


FIGURE 5. The inspection found that tray 18 (two trays beneath the top tray and column feed) was badly damaged

ing system was the downcomer inlet velocity. The velocity of 0.115 m/s was well in excess of the maximum recommended 0.061–0.076 m/s for a foaming system (above).

The hydraulic evaluation above suggests that at the operating case, the only hydraulic limit that was approached under foaming conditions is an excessive downcomer velocity. The fact that in the test the liquid rate could have been increased by 53% beyond this limit without flooding strongly argues against a foaming bottleneck.

So the high liquid test produced key evidence denying the likelihood that foaming caused the bottleneck in the stripper. Foam-floods due to excessive downcomer velocities are liquid floods, not vapor floods. And the trial produced strong evidence to argue against a liquid flood.

Mysteries explained

This left us with the damage theory in the forefront, with an installation issue as a second possibility. Both were addressed by shutting down the column and performing a full inspection.

The inspection found that tray 18 (two trays beneath the top tray and column feed) was badly damaged (Figure 5). The tray was bowed downwards and had become detached from its support clips on all three sides. Other trays in the tower top section were also bowed but remained in place.

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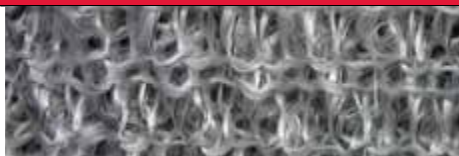
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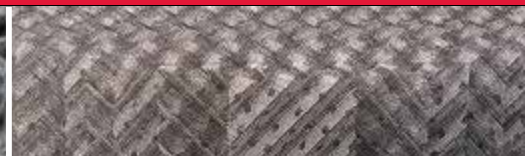
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TABLE 1. COMPARISON OF HIGH-LIQUID-RATE TEST WITH OPERATION

Variables	Operation	High-liquid Test
Feed flowrate, m ³ /h	20	35
Reflux flowrate, m ³ /h	1.5	0
Steam flowrate, ton/h	2.8	3.1
Feed temperature, °C	90-95	70
Bottom temperature, °C	128	115
H ₂ S in bottom, ppm	<10	100-200
Calculated Variables		
Internal liquid load, m ³ /h	27	41
Internal vapor load, m ³ /s	0.54	0.60
Percent jet flood, %	37	48
Downcomer backup, mm	170	210
Downcomer inlet velocity, m/s	0.075	0.115

All downcomer clearances were checked and recorded. Without exception, all the clearances were within the manufacturer's tolerance.

It was observed that the seal from the Tray 19 downcomer had been lost as the side section of tray 18 (underneath the tray 19 downcomer) was also bent downwards. This loss of seal offered an explanation to the observed flood. It was postulated that the steam flow from tray 17 in the top section was routed preferentially through the tray 19 downcomer rather than through the fixed valves of tray 19. This explained why the top section of the column quickly flooded (evident from a sudden increase in tray differential pressure) and flooded the reflux drum.

The observation that the flood was vapor-sensitive and liquid-insensitive is very consistent with a sealing-loss flood theory. When the vapor rate is high enough, it will break through the downcomer's broken seal and severely interfere with liquid drainage, inducing flood on the tray above. In this

case, the small hole area (7.3% of the active area) will aggravate the sealing problem by resisting flow through the tray holes and acting to divert vapor to the downcomer. Sealing loss leads to a vapor flood, just as observed in the high liquid test.

The damage was repaired and the column returned to service. During a performance test, it has had no problem handling the feed flowrate of 35 m³/h at the corresponding steam flowrate with the reboiler online and is producing a water bottom stream of <5 ppmw, as per design.

Lessons learned

The key for avoiding damage in water strippers is to keep the feed hot. This lesson was also advocated in two other cases of column internals damage in water strippers reported in Ref. 3. Awareness of and understanding the mechanism of damage when cold feed enters a column containing a steam-water system may lead to many additional means of minimizing its inci-

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dence, as advocated in one of the two case studies reported in Ref. 3.

The case confirms our experiences that sour water strippers generally do not foam. As stated earlier, our design case evaluation concluded that the trays/downcomers were not adequately designed for foaming conditions. The downcomer velocities are far too high and the system factor application in the design is questionable. Yet, now that the damage has been fixed, the tower has been operating well above design rates, suggesting the absence of significant foaming in this column. ■

Edited by Gerald Ondrey

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Piping Design for Potentially Lethal Chemicals

Integrity and reliability are critical for piping and equipment that handle chemicals with extreme health hazards

Bill Huitt
W.M. Huitt Co.

Working in close proximity to the high pressures and temperatures commonly found in the chemical process industries (CPI) is cause enough for concern over a person's wellbeing; but working in close proximity to chemicals that are considered toxic, hazardous or reactive escalates that concern to a higher degree (Figures 1 and 2). The dangers of such chemicals underline the paramount importance of integrity and reliability in the design of equipment and piping systems.

From a regulatory standpoint, the requirements to which each chemical processing facility in the U.S. must adhere when manufacturing, handling or storing chemicals are set forth within the regulations of the U.S. Occupational Safety and Health Administration's (OSHA; Washington, D.C.; www.osha.gov) "Process safety management of highly hazardous chemicals" regulation (part of 29 CFR 1910.119). OSHA also provides guidance for the required "Process Hazard Analysis" procedure.

From a piping engineering standpoint, requirements for the design, fabrication, inspection, examination, testing and installation of piping used to handle potentially lethal fluids are stipulated in the American Society of Mechanical Engineers (ASME; New York; www.asme.org) B31.3 Process Piping Code, Piping for Category M

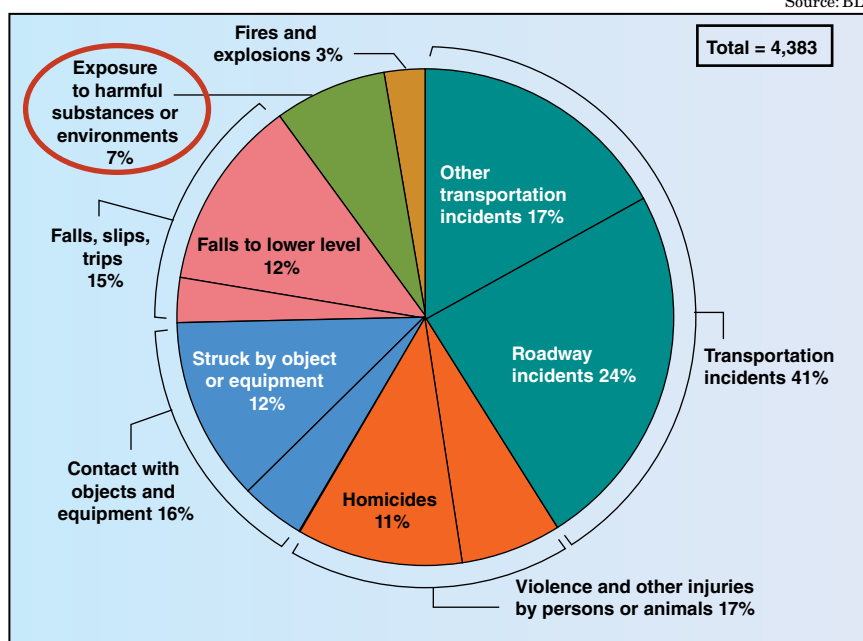


FIGURE 1. Of the 4,383 work-related deaths overall for 2012, 7% were attributed to exposure to harmful substances in the workplace

Fluid Service (Chapter VIII). This article provides a deeper understanding of existing regulations and code standards, and guides engineers in determining when a fluid should be considered potentially lethal. And for those cases involving lethal fluids, the article provides information on what attributes need to be considered in the design of piping systems to handle them.

People working in CPI facilities have every right to expect that they will return home safely after completing their shift. It is the job and responsibility of every designer and engineer of CPI facilities to ensure that this expectation is achieved.

Piping integrity

When it comes to piping systems, integrity is a relative term. In pursuit of practicality, engineers should not expect the same level of integrity to be designed into a piping system for cooling-tower water as that for a piping system containing 30% sulfuric

acid. Nor should they expect the same level of integrity to be designed into a system containing 30% sulfuric acid as that for a piping system containing the potentially deadly cyanogen bromide. The degree of integrity assigned to the design elements and components of a piping system is therefore related not only to the pressure and temperature requirements, but also to the degree of potential hazard (that is, volatility or toxicity) that can be attributed to the fluid itself.

Perceptions of chemicals and integrity can be influenced by catastrophic incidents that draw the attention of the public and lawmakers (Figure 3). Examples of such disasters include the following: the 1984 Bhopal, India incident that resulted in deaths in the several thousands and injuries in excess of 500,000; the October 1989 Phillips Petroleum Co., Pasadena, Tex., incident that resulted in 23 deaths and 132 injuries; the May 1991 IMC, Sterlington, La., incident

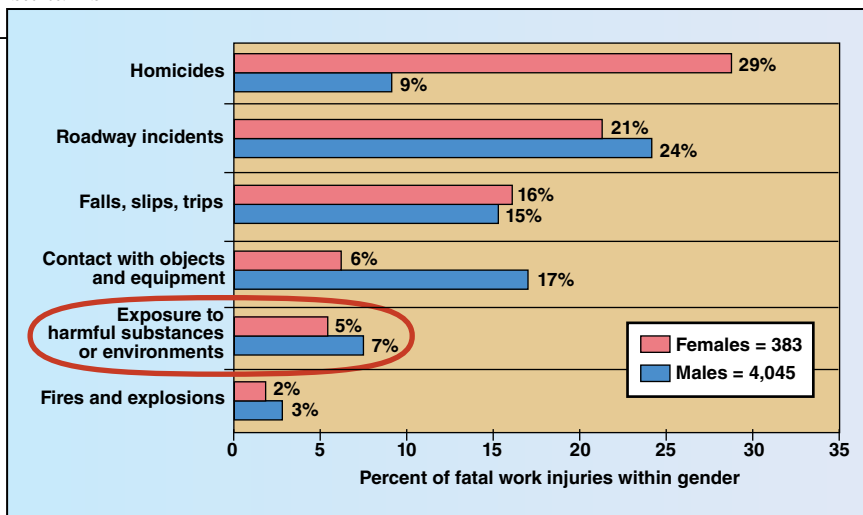


FIGURE 2. Statistics tell a similar story, regardless of gender. For those exposed to harmful substances, there is only a 2% differential between men and women

that resulted in 8 deaths and 128 injuries; the September 2005 explosion at the Texas City, BP refinery where 15 were killed and 180 injured; and the February 2010 explosion at the Kleen Energy Power Plant in Middletown, Conn. that killed 6 and injured more than 50 personnel.

Not only do such incidents capture the attention of the public and lawmakers alike, they also capture the attention of organizations such as the NFPA (National Fire Protection Association) and ASME. These and other organizations will quite often modify or introduce content into their codes and standards in response to the causal effects of such incidents.

While many relevant factors are required for a safe operating facility, including a well-thought-out preventive maintenance program and operating procedures, this article will concentrate on piping.

LETHAL CHEMICALS DEFINED

Information on chemical substances comes from many sources. To put the discussion of potentially lethal chemicals into context, we can consider such resources as the NFPA, OSHA (29CFR), the U.S. Environmental Protection Agency (EPA) (40CFR), and REACH (Registration, Evaluation, Authorization and Restriction of Chemicals), a European Union Regulation, as well as the U.S. Dept. of Transportation (DOT; 49 CFR).

OSHA currently addresses 400 substances within their regulations and the OSHA Chemical Sampling Information database contains data on approximately 1,500 chemical substances. The EPA's TSCA (Toxic Sub-

stance Control Act — currently under legislative review in the U.S.) Chemical Substance Inventory contains over 62,000 chemical substances. There are currently more than 100,000 Material Safety Data Sheets (MSDS) on file. The present discussion is acutely focused on the 140 chemicals found in OSHA's "List of Highly Hazardous Chemicals, Toxics, and Reactives (Mandatory)" found within 29 CFR 1926.64 Appendix A.

Focusing even further, this article considers only those chemicals that are considered lethal from a toxic standpoint. This set of chemicals meets the criteria for ASME B31.3 Category M Fluid Service.

The 2012 edition of the ASME B31.3 Process Piping Code defines Category M fluid service as: "a fluid service in which the potential for personnel exposure is judged to be significant, and in which a single exposure to a very small quantity of a toxic fluid, caused by leakage, can produce serious irreversible harm to persons on breathing or bodily contact, even when prompt restorative measures are taken."

The OSHA Hazard Communication Standard, Subpart Z, Toxic and Hazardous Substances 29 CFR 1910.1200, defines hazardous chemicals as those that present "a physical hazard or a health hazard." The standard goes on to define physical hazard as "a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, an oxidizer, pyrophoric, unstable (reactive) or water-reactive."

It also defines a health hazard as

"a chemical for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term 'health hazard' includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes."

When defining the term "toxic" in Appendix A of 29 CFR 1910.1200, OSHA separates the criteria according to three forms of human exposure.

- **Toxic by ingestion.** A chemical that has a median lethal dose (LD₅₀)¹ of more than 50 milligrams per kilogram (mg/kg) of body weight but not more than 500 mg/kg of body weight when administered orally to albino rats weighing between 200 and 300 grams each.
- **Toxic by contact.** A chemical that has a median lethal dose (LD₅₀) of more than 200 mg/kg but not more than 1,000 mg/kg of body weight when administered by continuous contact for 24 h (or less if death occurs within 24 h) with the bare skin of albino rabbits weighing between two and three kilograms each.
- **Toxic by inhalation.** A chemical that has a median lethal concentration (LC₅₀) in air of more than 200 parts per million (ppm) but not more than 2,000 ppm by volume of gas or vapor, or more than 2 mg/L, but not more than 20 mg/L of mist, fume or dust, when administered by continuous inhalation for one hour (or less, if death occurs within 1 h) to albino rats weighing between 200 and 300 grams each.

The same Appendix A also defines a category of chemicals that are "highly

1. LD₅₀, in which LD stands for "lethal dose," is the amount of a material, given all at once, which causes the death of 50% of a group of test animals. The LD₅₀ is one way to measure the short-term poisoning potential (acute toxicity) of a material. LC₅₀, in which LC stands for "lethal concentration" is, in inhalation experiments, the concentration of an airborne chemical that kills 50% of the test animals in a given time (usually 4 h). In environmental studies, LC values can also mean the concentration of a chemical in water.

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toxic” in three forms of human interaction as well:

- **Highly toxic by ingestion.** A chemical that has an LD₅₀ of 50 mg or less per kg of body weight when administered orally to albino rats weighing between 200 and 300 grams each.
- **Highly toxic by contact.** A chemical with an LD₅₀ of 200 mg or less per kg of body weight when administered by continuous contact for 24 h (or less if death occurs within 24 h) with the bare skin of albino rabbits weighing between two and three kilograms each.
- **Highly toxic by inhalation.** A chemical that has an LC₅₀ in air of 200 ppm by volume or less of gas or vapor, or 2 mg/L or less of mist, fume or dust, when administered by continuous inhalation for 1 h (or less if death occurs within 1 h) to albino rats weighing between 200 and 300 grams each.

Also found in this discussion is the term “highly hazardous chemicals.” OSHA defines this as “...a substance possessing toxic, reactive, flammable or explosive properties...” While this definition reaches beyond the scope of this discussion, it nevertheless captures the essence of and remains within the realm of potentially lethal chemicals.

Category M fluid² service

Most CPI facilities must comply with the ASME B31.3 Process Piping Code, whether by state regulatory requirements, by contractual obligation or by self-stipulation. The code requires all fluid services used for processing to be categorized in accordance with B31.3. One such category to be considered will be the aforementioned Category M fluid service.

The definition, as stated previ-

2. With regard to any discussion within this article pertaining to B31.3 Process Piping Code, allow me to provide something of a disclaimer. Even though I hold membership on various ASME committees, subcommittees, and subgroups, including that of B31.3, any clarification I make of statements contained within B31.3, or any design concepts I put forth in the writing of this article are mine and not those of ASME. The process and procedures by which ASME publishes clarifications and responses to inquiries are based on a thorough, multi-tiered consensus process established and audited by ANSI (American Nations Standards Institute). That process encompasses the thinking of many respected individuals who are experts in their field and giving of their time and expertise in both maintaining the code and responding officially to inquiries about the code.

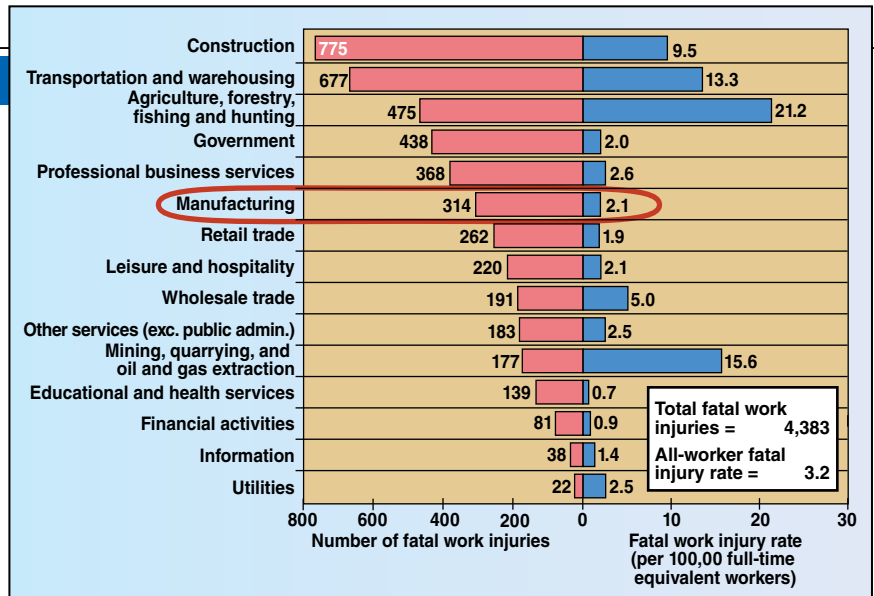


FIGURE 3. Even though the fatality count for the manufacturing sector at 314 is moderate, making the per capita rate of 2.2/100,000 a relatively low ratio, it by no means negates the fact that even one fatality is one too many

ously, suggests that such fluids can be lethal or at the very least debilitating to humans upon exposure. While ASME does not extend its definition to a list of possible Category M chemical candidates, other resources do, although in a different manner. Various agencies consider these types of chemicals as hazardous or poisonous to personnel. OSHA, DOT, EPA and NFPA each provide their own listing of what they consider to be hazardous or poisonous chemicals based on their own set of criteria.

By adopting the consensus of one or more of these resources for determining whether a chemical is hazardous or poisonous, and therefore under consideration as a Category M Fluid, an owner can use such lists as a resource in determining which chemicals within their facility may be considered Category M Fluid service candidates.

OSHA. Under 29 CFR, OSHA provides a listing of Highly Hazardous Chemicals, Toxics, and Reactives. However, their list is broad in its interpretation and provides a “threshold quantity” (TQ) for each chemical, which requires further consideration on the part of the owner. This is a good resource, but not without the need for additional analysis.

EPA. The EPA, under 40 CFR, provides a listing of hazardous substances as defined by the EPA under the TSCA’s Chemical Substance Inventory list (<http://www.epa.gov/oppt/existingchemicals/pubs/tscainventory/howto.html>). This is justifiably a broad interpretation of hazardous chemicals

that does not define or categorize the various chemicals to the extent that it would assist the owner in making a Category M determination.

DOT. The Hazardous Material Table in 49 CFR has 23 Class and Division Numbers that categorize chemicals according to their degree of hazard, or nonhazard, for the purpose of transportation. Of those 23 classes and divisions, three would be classified as Category M Fluids as follows:

- **Forbidden materials** (no class number) — (The definition in 49 CFR is too elaborate and lengthy for this venue. Refer to 49 CFR 173.21 for clarification)
- **Poisonous gas** (Division 2.3) — A gas poisonous by inhalation, means a material which is a gas at 68°F in accordance with ASTM standard E681 (Standard Test Method for Concentration Limits of Flammability of Chemicals) or other equivalent method approved by the associate administrator for Hazardous Materials Safety. The flammability of aerosols is determined by the tests specified in 49 CFR 173.306(i) of this part.
- **Poisonous materials** (Division 6.1) — A material, other than a gas, which is known to be so toxic to humans as to afford a hazard to health during transportation, or which, in the absence of adequate data on human toxicity: (A) Is presumed to be toxic to humans because it falls within any one of the following categories when tested on laboratory animals (when- ever possible, animal test data that

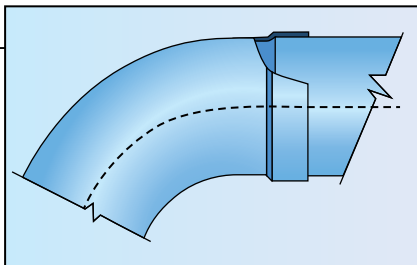


FIGURE 4. Bell-end socket-welded elbows are not compatible with Category M fluids

have been reported in the chemical literature should be used):

(i) *Oral toxicity.* A liquid with an LD_{50} for acute oral toxicity of not more than 500 mg/kg or a solid with an LD_{50} for acute oral toxicity of not more than 200 mg/kg

(ii) *Dermal toxicity.* A material with an LD_{50} for acute dermal toxicity of not more than 1,000 mg/kg

(iii) *Inhalation toxicity.* Either a dust or mist with an LC_{50} for acute toxicity on inhalation of not more than 10 mg/L; or a material with a saturated vapor concentration in air at 68°F greater than or equal to one-fifth of the LC_{50} for acute toxicity on inhalation of vapors and with an LC_{50} for acute toxicity on inhalation of vapors of not more than 5,000 mL/mm³

Or (B), the substance is an irritating material, with properties similar to tear gas, which causes extreme irritation, especially in confined spaces.

NFPA. The NFPA's Chemical Hazardous Rating System places chemicals into three groups: health, flammability and reactivity. Within those groups are twelve classes. The only group identifying potential Category M Fluids is the health group. Within the health group, there are four classifications. The classification identifying possible Category M Fluids is number 4 — Danger: May be fatal on short exposure. Specialized protective equipment is required.

DOT and NFPA. Using both the Hazardous Material Table in 49 CFR and NFPA's Table of Chemical Ratings a determination of possible Category M Fluids can readily be made. Any chemical flowing through pipe or tubing listed as either a "4" in the Health column of NFPA's Table of Chemical Ratings, or as a "Forbidden", "2.3," or "6.1" in the "Hazard Class or Division" column of the Hazardous Materials Table in 49 CFR could be considered a Category M Fluid.

While these two resources provide essentially the same information, they

do so with two different objectives, and therefore do not always agree. For example, NFPA considers bromine a Class 3 (Warning: corrosive or toxic, avoid skin contact or inhalation). While the DOT, under 49 CFR, considers bromine a Class 6.1 (Poisonous materials). NFPA considers chloroform a Class 2 (Warning: May be harmful if inhaled or absorbed), while the DOT considers chloroform a Class 6.1.

Regardless of whether or not they agree on the hazard level of a chemical, if a chemical is indicated as a 4 by NFPA, or "Forbidden" 2.3, or 6.1 by the DOT, it should be considered a potential Category M Fluid.

Declaring a fluid service to be classified as Category M places added requirements on the design, fabrication, construction, and examination of the piping. These additional requirements are identified in ASME B31.3 Chapter VIII — Piping for Category M Fluid Service. The added requirements themselves are not significant; however B31.3 Chapter VIII, like the rest of the code, does not go into the details for piping layout requirements and other detailed design considerations.

There are various aspects of piping design that go beyond the scope and dictates of a code. And therein lies the point at which good design and engineering practice supplement the sound basis of code requirements and blends with the owner's particular needs and a facility's proprietary specifications.

The B31 series of codes address the requirements necessary to assure system safety and integrity by specifying material limits, stipulating fabrication requirements, providing minimal examination requirements, and so on. They do include some essential design guidelines when needed to achieve that assurance. They cannot specify routing requirements or when to use double-containment piping systems, determine accessibility, or whether this type of piping can or cannot run underground, in addition to other proprietary design elements. This degree of detail is owner- or site-specific. Even within a large, multi-facility corporation, these requirements may vary from plant to plant.

Whenever a chemical, designated as a Category M Fluid, is made part of a

project, there should be a well-defined basis of design established by the owner or engineer in order to convey to the designer a predetermined set of design parameters.

Code requirements

The introduction to the ASME-B31.3 piping code states that "The designer is cautioned that the code is not a design handbook..." In stating this, ASME is explaining to the reader in very few words that this code will not provide pointers on the best way to route a piping system, how to support piping, or the amount of slope a pipeline might require. It will instead provide criteria, methods and formulas for such things as how to determine maximum loads on piping and ways to test installed piping for leak integrity. Just as the piping code provides the criteria for welding, but does not explain how to weld, it also provides the minimum requirements necessary for a safe piping system, but does not tell engineers how to design it.

The 2012 ASME B31.3 Piping Code is composed mainly of ten chapters and nineteen appendices. The first six chapters are considered the base code. Supplementary to the base code are four additional chapters that pertain to the specific needs of piping systems with conditional requirements that vary from the content of the base code.

The supplemental chapters, VII through X, use the same paragraph numbers as the base code, along with a prefix that identifies the particular chapter with which it is associated.

In the case of Chapter VIII, for Category M Fluid Service, the paragraph prefix is "M." For example, the base code paragraph 302.2.4 would be M302.2.4 in Chapter VIII. If there are no additional requirements in a paragraph beyond that of the base code, then there is a statement that clarifies that. For instance, there are no additional requirements in paragraph M302.4 beyond what is required in the base code. The statement under M302.4 in Chapter VIII is therefore "Paragraph 302.4 applies in its entirety," meaning that the requirements stated in paragraph 302.4 (of the base code) are sufficient for the supplemental requirements in Chapter VIII.

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DESIGN CONSIDERATIONS

With that said, we will take a look at just a few of the variances required by ASME B31.3 for piping systems containing a fluid service that may be considered lethal with human contact. This portion of the article is intended to provide examples of the types of variances that are required for Category M type fluid services beyond what is stated in the base code.

Pipe fittings — M306.1

According to section M306.1.3 of the ASME piping code, the following equipment shall not be used for potentially lethal fluids:

- (a) fittings conforming to MSS SP-43 and MSS SP-119
- (b) proprietary "Type C" lap-joint stub-end butt-welding fittings

Under M306.1.3(a), fittings manufactured to MSS SP-43 (Wrought and Fabricated Butt-Welding Fittings for Low Pressure, Corrosion Resistant Applications) do not qualify for use in Category M Fluid Service due to the low-integrity design of the fittings. Mentioned also, under paragraph M306.1.3(a), are fittings manufactured under MSS SP-119 (Factory-Made Wrought Belled End Socket-Welding Fittings; see Figure 4). These fittings also do not comply due to the low integrity design of the bell-and-socket joint.

With regard to section M307 on Metallic Valves and Specialty Components, Paragraph 307.1 applies, subject to the requirements in Paragraph M307.2. Paragraph M307.2 (Specific Requirements) states: "Valves having threaded bonnet joints (other than union joints) shall not be used." Threaded joints, in accordance with paragraph 314, are to be used for normal fluid service and Category D fluid conditions only, but can be used in severe cyclic-fluid service conditions only when not subjected to external moment loading, such as with thermowells.

Section M307.2(b) states, "Only metallic valves conforming to the following requirements may be used:

- (1) Special consideration shall be given to valve design to prevent stem leakage to the environment." What is implied by this is the suggested use of a bellows-sealed valve to prevent

leakage of vapor or liquid to the atmosphere by way of the valve-stem gland packing.

"(2) Bonnet or cover-plate closures shall be flanged, secured by at least four bolts, with gasketing conforming to paragraph 308.4; or proprietary, attached by bolts, lugs, or other substantial means, and having a gasket design that *increases gasket compression as fluid pressure increases*; or secured with a full penetration weld made in accordance with Paragraph M311; or secured by a straight thread sufficient for mechanical strength, a metal-to-metal seat and a seal weld made in accordance with paragraph M311, all acting in series."

The italicized phrase above refers to a pressure-seal bonnet design (Figure 5). Such a design, which will vary between valve manufacturers, uses the internal operating pressure of the fluid as a sealing force; as the internal pressure increases the sealing load on the pressure-seal gasket increases. This provides an increase in the sealing integrity of the bonnet joints.

The above are just a few examples of the added requirements stipulated for Category M Fluid Service piping. There are many other instances in which the requirements for the construction of potentially lethal piping systems go beyond that of the base code. And one more example of that lies in the examination requirements.

Required examination — M341.4

For the degree of examination of equipment required, Paragraph 341.4.1 applies with the following exceptions:

- (a) **Visual examination:** All fabrication shall be examined (instead of 5%); and all threaded, bolted and other mechanical joints shall be examined (Instead of random checks)
- (b) **Other examination**

- The random radiography/ultrasonic examination requirements of Paragraph 341.4.1(b)(1) apply, except that at least 20% of circumferential butt

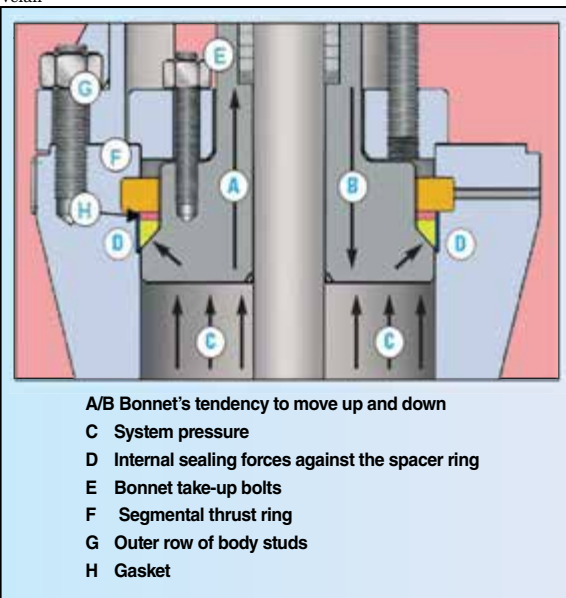


FIGURE 5. The pressure-seal bonnet is designed to utilize internal pressure to increase its sealing capability in direct response to an increase in internal pressure

and miter welds, and of fabricated lap- and branch-connection welds comparable to those shown in figures 328.5.4E and 328.5.5 sketches (d) and (e) shall be examined

- All connections are examined (instead of 5% of them)
- The in-process examination alternative permitted in Paragraph 341.4.1(b)(1) may be specified on a weld-for-weld basis in the engineering design or by the inspector. It shall be supplemented by appropriate nondestructive examination.

This sheds light on the fact that these types of piping systems demand a much higher level of scrutiny when being evaluated and are examined to a much higher degree than required for normal fluid services.

Designing for Category M

The need to integrate and instill personnel safety and well-being into the operation and maintenance of a CPI facility is a basic essential. Such a core philosophy extends from the conceptual design of a facility to its ultimate operation. But this, too, is applied in degrees. The design and material specifications for a chilled-water system certainly would not apply to a system containing a hazardous or potentially lethal chemical. The added cost necessary to attain the integrity required for the more hazardous chemical service would be money poorly spent on a chilled-water system.

In designing a piping system for a highly hazardous chemical, engineers

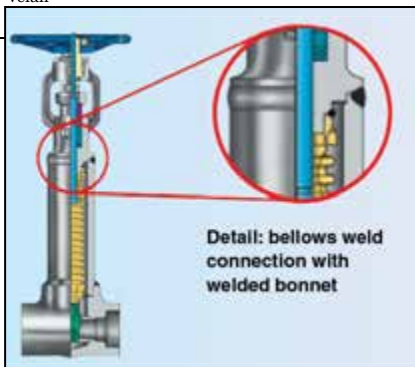


FIGURE 6. The welded bonnet design can help alleviate potential leak points

need to give added consideration to the following key design elements:

- Component joint type
- Valve design attributes
- System drainability
- Emergency valve shut-off, isolation and shutdown
- Protruding instruments and valves
- Isolated and controlled access room

Component joint type

One of the key aspects of piping-system integrity is based on the type of component joint type used in constructing the system. Giving serious consideration to the selection of the type of joints used in the design of a system should include, in order of priority:

- Buttweld joint
- Socketweld joint
- Flanged joint

The buttweld, or circumferential-weld joint is fully rated to the strength of the pipe. This should be of primary consideration. As stated in a previous article in this magazine [9], "... the full-penetration buttweld is considered to be as strong as the pipe, with an SIF [stress intensification factor] = 1.0." It goes on to state that, "The socketweld joint has an SIF = 2.1. Any value in excess of 1.0 will de-rate the strength of the joint below that of the pipe."

Where flanges are specified for equipment connections and breakout joints, the weak point in the flange joint assembly is the gasket. Should a fire occur, temperatures could reach into the 2,700 to 3,000°F range, and the gasket material would be compromised. This would cause the joint to lose its seal and leak deadly toxins.

Valve design attributes

The shortlist of requirements for a valve that is intended to handle highly hazardous fluids would include the following items:

- No quarter-turn on/off operation

- Buttweld end connections
- Pressure seal
- Bellows seal

Quarter-turn valves, such as ball, plug and butterfly valves are great for ease of operation and quick on/off requirements. Those attributes are not necessarily what is needed for highly hazardous fluids. What is needed, particularly for manually operated valves, are valve types that offer control over response time. Multi-turn valves, such as gate and globe valves are a safer valve option from the standpoint of control. A valve handle that extends out away from the valve body risks being inadvertently bumped and unknowingly opened.

It is suggested that a valve have either buttweld (preferred) or socketweld ends. If there is a need to remove the valve periodically, then a valve with flanged ends could be a consideration, but any type of mechanical joint should be used sparingly and with due consideration.

The valve bonnet is a mechanical joint, and is therefore a potential leak point. Two bonnet designs help alleviate this possibility: the welded bonnet (Figure 6) and the pressure-seal bonnet. If access to the valve's internals is not a concern, then the welded bonnet would be a consideration. If access to the valve internals is needed, the pressure-seal bonnet would be an option.

The pressure-seal bonnet is designed to utilize internal pressure to increase its sealing capability in direct response to an increase in internal pressure (Figure 5). As internal pressure increases, so too does the load on the gasket (H in Figure 5), creating a seal that exceeds that of the initial gasket pre-load. The bonnet take-up bolts (E) establish the initial load on the bonnet gasket. The segmental thrust ring (F) provides the sealing surface against which the gasket load is applied. This design provides a high degree of sealing integrity.

The part of a valve that is most prone to leak is at the interface of the valve stem and the packing used to prevent leakage. The addition of the bellows seal design prevents fluids or vapors from escaping to the atmosphere should a leak occur in the stem packing. The bellows creates a hermetically sealed barrier between

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the service fluid and the stem. This significantly alleviates the possibility of stem leakage.

System drainability

An essential to designing a piping system handling a highly hazardous fluid is the ability to safely and completely drain the system. Piping should be sloped at a degree that will allow free draining of all liquids to a point where it can be captured for containment and removal. The design and layout should be done in such a way as to provide for the following:

- No entrapment of fluids
- Sufficient room and reasonable access³ to: valving, drains, vents and hose connections

3. "Reasonable access", as mentioned above, should include consideration to not having to climb a ladder or the use of other means of gaining access to a valve or hose connection. Consideration should also be given to the fact that workers will most likely be wearing hazmat suits while working on such highly hazardous fluid piping.

- Appropriately located⁴ pressure gages
- All piping should be drainable to a pressure vessel for pump-out to a safe location

Emergency valve shut-off

At the onset of a fire, explosion or major rupture and leakage in a processing unit, any system containing a highly hazardous fluid or any fluid that can be considered flammable should have a means to isolate and halt its flow at a point outside the battery limits of the facility in distress. If there are fluid supply lines in which flow cannot be halted, there should be a means of diverting the fluid to a safe secondary location, away from the location of the emergency.

4. "Appropriately located", as mentioned above, implies that all local read-out gages should be located in such a manner as to allow for good line of sight viewing of the gage's dial face without the need for visual enhancements (magnification) or a temporary means of access, such as a ladder.

Shutting down these pipelines should be done with automated valving from a remote location. Manual valve isolation, while sufficient for isolating systems for maintenance work and planned turnarounds, is not practical when an event calls for the evacuation of all non-essential personnel.

In the event of an emergency, the plan should be to give the first responders the best opportunity to get the situation under control. This means stopping the flow of all flammable and otherwise hazardous fluids from entering the area where the event has occurred. And, as mentioned under "System drainability," design the system so that once all of the fluids are stopped from entering the area, any residuals in the area are drained to a pressure vessel so they can then be pumped out of the area to a secondary location, such as a flare stack or secondary containment. Stopping flow and removing all of the hazardous fluids from the area is a key element in preventing escalation and perpetuation of an already bad situation.

Protruding instruments, valves

It is necessary to have instruments, gages and valves extending at various angles from piping. But while there is a need for such things as pressure and temperature gages, drain and vent valves, Y-strainer drains and hose connections, added consideration needs to be given to the branch design of these types of protruding components.

These types of components protruding from a pipeline should be kept in a vertical plane. Extending these branches horizontally from the pipeline adds the risk that such an extension opens the opportunity for the gage or valve to be struck by a maintenance cart (refer to Incident 2 in Ref. [9]) or by some other means with enough force to rupture the piping and cause a catastrophic rupture.

Controlled-access room

Another major holistic-type approach in the handling of highly hazardous fluids is the possibility of placing all related piping and equipment for a highly hazardous fluid service in a controlled environment. This would



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be a room under negative pressure in relation to any surrounding rooms in a facility. The room would require controlled access by only those employees trained to handle the highly hazardous fluids contained in the room.

Unless these highly hazardous chemicals are used throughout a plant site, injection of these fluids into a process stream would be accomplished inside the room. This would be done by routing the process piping into and out of the controlled-access room, where the addition of these fluids into the process stream would take place. This keeps the raw hazardous chemicals contained and better controlled.

Alarmed and redundant atmosphere-sampling and leak-detection devices would be put in place to notify the control room, first responders and all plant personnel that leakage has been detected, followed by a scripted announcement regarding any action to be taken.

Closing remarks

Designing a facility to accommodate the storage and handling of highly hazardous chemicals does not end with proper design and construction. It is an ongoing effort of developing procedures and a training program such as that described in OSHA's "Process Safety Management Guidelines for Compliance" (<https://www.osha.gov/Publications/osha3133.html>).

Developing procedures and a training program for those that have to work on or around piping and equipment that contain highly hazardous chemicals is essential. And in so doing, the process helps identify possible areas that could be improved upon, either from a security standpoint or from the standpoint of making improvements to the design of the piping system itself.

Proportionally, there are few catastrophic events that occur in chemical processing facilities. The majority of incidents originate from small leaks that were discovered in time to evacuate personnel, shut down the system and rectify the situation. And most catastrophic events stem from a series of indicators that were largely ignored until the unthinkable finally happened. Such events did happen in

Bhopal, India; Pasadena, Tex.; Sterling, La.; Texas City, Tex.; and Middletown, Conn. In each case, protocol was pushed aside, specific concerns were ignored, and in some cases, the cost-to-risk evaluation was tilted to the side of cost over risk. Meaning that even though the risk was high, the cost of remediation was more than the company wished to incur. ■

Edited by Scott Jenkins

Additional information

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Heat Transfer for Huge-Scale Fermentation

The impact of ten-fold scaleup is explored here

Jim Gregory and Bob Green
Fluor

Industrial microbiology continues to hold the promise of producing an increasingly large array of commercially important chemicals because an ever-wider number of useful microbes is being developed and successfully deployed at commercially viable scales. Today, many of these bio-based chemicals are needed in quantities so large that existing fermentation technology is inadequate, and this is pushing the envelope in terms of the size of today's largest-scale fermenters.

Currently, aerobic fermenters exist up to about 100,000 gal. Fermenters ten times bigger are needed. This challenge raises a number of important engineering questions: How big can a fermenter get? Is there a limit, in terms of economies of scale, above which the use of additional units is the preferred option for gaining additional capacity? What does a "huge-scale" fermenter look like? How big do demonstration-plant fermenters need to be to justify building the full-scale plant? What testing is required at small scale to support the full-scale design? This article on heat transfer in huge fermenters is intended to offer answers to these questions. Huge-scale projects also face issues related to mass transfer, momentum transfer, cleaning and sterilization, and piping specifications, but these are beyond the scope of this article.

The impact of scaleup

As reaction vessels get larger, their liquid volume (and thus heat load) grows by the cube, while the jacket surface area grows by the square (Figure 1). Therefore, with scaleup, heat-transfer capability is reduced. As a

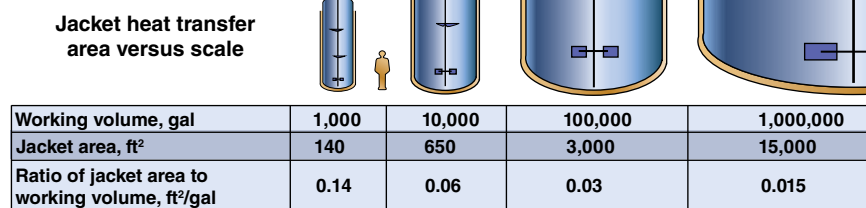


FIGURE 1. The amount of jacket surface area required for a given reactor is a function of both area and scale and grows by the square, while the liquid volume (and thus heat load) grows by the cube. As a result, heat transfer capability falls with progressive scaleup and steps must be taken to address this issue

result, larger fermenters need colder coolants or additional modifications to increase surface area, or both.

Figure 1 shows how fermenter attributes scale up geometrically. This is intended for illustrative purposes only, to show how heat-transfer capacity drops significantly even when fermenters look similar. The authors understand that 100,000-gal and larger fermenters will not look anything like this. They may not have cooling jackets, they can't be so tall, or be agitated in this way; they may not even be pressure vessels.

Since chilled water (~35°F) is the coldest practical coolant for this application, large fermenters typically use a combination of jacket, coil and baffle-type heat-transfer methods to increase the amount of surface area available for heat transfer. For a highly aerobic fermentation system, a jacket alone is not sufficient for tanks above about 30,000 gallons.

Coil and baffle-type heat-transfer surfaces can greatly increase the available fermenter heat-transfer area. However, the effectiveness of these supplemental heat-transfer surfaces decreases with increasing scale, just as in the case for the jacket.

In addition, jacket, coil, and baffle-

type heat exchangers require multiple, parallel paths in order to meet the design flow velocity and outlet temperature parameters. A jacket made of 4-in. half pipe, or an internal cooling coil made of 3-in. tubing, both would be designed for about 5 ft/s velocity, which accommodates a flow of about 100 gal/min. Thus, for a huge fermenter that needs tens of thousands of gal/min of coolant, hundreds of parallel coolant paths would be required. This would engender significant costs.

By comparison, an external-type heat exchanger would allow for many fewer parallel paths by utilizing much larger pipe. Therefore, huge fermenters are able to benefit from external heat exchangers to reject heat, at least for aerobic processes.

Similarly, external heat exchangers have the advantage of unlimited heat-transfer area and do not require the internal structure and piping that are necessary to support the coils and baffles (which displace product and make the fermenter difficult to keep clean). Additionally, external heat-transfer can be proven at small scale in a way that helps to reduce the risk during scaleup, and thus potentially reduce the need for demonstration-scale plants.

The impact of vessel size and geometry on heat-transfer capacity can be calculated. But how will the heat-transfer coefficient change with increasing scale? The overall heat-transfer coefficient will be a function of the sum of the resistance to heat transfer for the cooling water, the vessel wall, and the process liquid in the tank. The coolant-side resistance does not vary as a function of scaleup since the physical dimension of the jacket, the coolant flowrates, and the coolant's physical properties are independent of scale.

No matter how big the tank size gets, multiple parallel circuits would be required to maintain the coolant-return temperature, because the log-mean temperature difference (LMTD) is not a function of scale. The vessel wall provides resistance to heat transfer and the wall thickness typically grows significantly with vessel size. However, steel is a relatively good conductor of heat, so a thicker wall on a steel fermentation reactor would not have a significant negative impact on overall heat transfer. And, in any case, the impact of thicker metal on heat transfer can be accurately calculated.

The thermal resistance of the process side can vary greatly as a function of vessel size. For instance, larger vessels will have different process-side thermal resistance compared to smaller vessels. At larger scales, the vessel wall tends to be a greater distance from any agitator blade — thus the turbulence and flowrate across internal heat-transfer surfaces are both expected to decrease for larger vessels. External heat exchangers have the advantage of allowing controlled conditions to be maintained on both sides of the heat-transfer surface, and thus can eliminate the uncertainty of heat-transfer coefficients at huge scale.

If huge fermenters employ one or more external heat exchangers, there is no longer a need to provide a jacket, baffle or coil. This reduces some of the business risk associated with scaleup, because the heat-transfer coefficients are known and not dependent on vessel agitation. Some of the risks associated with external heat exchange include the following: Can the microbe tolerate the time spent outside of the vessel, the temperature excursion, and the much

colder wall temperature? Resolving these questions will be one of the primary goals of pilot-plant testing.

The external heat exchanger will require a pump to extract a stream of fermentation broth from the fermenter. The stream will be exposed to shear in the pump, as well as relatively cold surfaces inside the heat exchanger, and the resultant temperature change of the slipstream liquid. An investigation of the impact of all of these factors needs to be carried out at the pilot scale.

Using roughly estimated parameters for a hypothetical case that are within the authors' industrial experience, a highly aerobic fermenter could consume 100 mmol O₂/L/h. If the fermenter is operating at 50% dissolved oxygen (DO) saturation and has no back pressure, the DO could be 0.25 mmol O₂/L. That means that the DO of the stream would go to zero within 10 s. If the cooling stream is designed for 5 ft/s velocity then the DO would go to zero in the first 50 ft. Productivity at the large scale will depend in part on how well the microbes can tolerate that dissolved oxygen excursion.

A hypothetical case

In order to understand the implications of the scaleup principles, the following hypothetical case is considered:

- Fermenter with 1,000,000-gal working volume
- Fermentation broth with physical properties similar to water
- Batch temperature of 30°C (86°F)
- 100-mmol O₂/L/h uptake rate with metabolic heat load of 500 Btu/mol O₂
- Chilled water at 2°C (36°F), rising by 6°C (11°F) to 8°C (47°F)
- Power input of 10 hp agitation per 1,000 gal

$$\text{Heat load} = Q_{\text{agitation}} + Q_{\text{metabolic}} = [(10,000 \text{ hp})(2,544 \text{ Btu/hp}\cdot\text{h})] + [(0.1 \text{ mole O}_2\text{/L/h})(1,000,000 \text{ gal})(3.785 \text{ L/gal})(500 \text{ Btu/mol O}_2)]$$

$$= 25 \times 10^6 + 190 \times 10^6 = 215 \times 10^6 \text{ Btu/h}$$

Where:

$$Q = \text{Heat flow, Btu/h}$$

This heat load could be provided by three 6,000-ton (24 million Btu/h) chillers. The fact that the heat load is

too big for a single chiller shows that this process is beyond the range of economy of scale from a chiller point of view. Using multiple chillers is not a problem; they would be necessary for any 1,000,000-gal process, no matter how many fermenters are involved. Also, the use of multiple units provides a more fault-tolerant process.

$$W_{\text{coolant}} = (215 \times 10^6 \text{ Btu/h}) / (7.48 \text{ gal/ft}^3) / (0.8 \text{ Btu/lb}\cdot\text{F})(11^\circ\text{F})(66 \text{ lb/ft}^3)(60 \text{ m/h})$$

$$= 46,000 \text{ gal/min}$$

Where:

$$W = \text{Volume flow, gal/min}$$

This may seem like a very high flowrate, but a single pump could provide even much more. And, multiple pumps should be used to provide for redundancy and better temperature distribution inside the tank. The biggest commercial plate-and-frame type heat exchanger tops out at about 18,000 gal/min for this application. Therefore, three heat exchangers would be required. Larger exchangers could be built, but the special tools and dies, engineering and labor needed would cause them to far exceed the cost per Btu/h of multiple commercial units.

Assume that each chiller supplies chilled water to one pump, and each pump delivers chilled water to one heat exchanger that cools the fermenter broth. Each fermenter has three cooling circuits, and each consists of one of the above-mentioned exchangers and a fermentation broth cooling-circuit pump running at 16,000 gal/min. They are connected by 36-in. pipe.

Since the pumps are not at a size greater than their economy of scale, the overall heat-transfer system can grow without adding pumps. Therefore, the overall system does not yet exceed overall economy of scale range.

Demonstration scale. Scaleup efforts are about managing business risk. In order to evaluate the risk involved, it is important to determine what elements of the design involve performance uncertainty. An intermediate-scale demonstration plant might be required to prove that scaleup considerations are well understood.

Thanks to the use of external heat

exchangers, the heat-transfer coefficients, the effective heat-transfer area, and the temperature driving forces are all known.

$$Q = (U)(A)(LMTD)$$

Where:

U = Overall heat-transfer coefficient, Btu/h/°F/ft²

A = Area, ft²

Each component is known. The above analysis shows that, for heat transfer, the design factors are already well understood and predictable, and thus present a low risk to the project.

Scale down. Scale down refers to the need to carry out certain tests at small scale to replicate the conditions that will exist for the large-scale units. For example, small-scale units do not need to use very cold coolant because the ratio of heat-transfer surface area to liquid volume is relatively high at small scale. Therefore, small-scale testing should use greatly reduced heat-transfer area — such as might be provided by a cold-finger-type heat exchanger. Even better, the pilot plant should include an external heat exchanger to simulate both the cold surfaces and other effects of the side-stream heat-exchange design, which is being pursued for full scale. The smallest heat exchanger of the type that will be used for the production plant will determine the size of the pilot plant.

For instance, in the current hypothetical 100,000-gal process, the smallest plate-and-frame heat exchanger providing similar temperatures and liquid velocity would run at about 10 gal/min, 0.02% of full scale, suggesting that a pilot plant with a 200-gal capacity could support the design. Keep in mind that mass and momentum transfer considerations may require other demonstration-plant sizes.

Other considerations

The desire to employ huge fermenters should not be interpreted as the desire to have just one production fermenter serving the process. Having one production fermenter may offer the minimum cost at first, but it may make it difficult to operate the plant. For instance, with only one fermenter, process problems are much more difficult

to troubleshoot and it is impossible to run a controlled experiment to test revised media formulations or process conditions.

If the application uses multiple fermenters to produce the needed capacity, then when a process problem occurs, many potential causes can be ruled out immediately, based on which fermenter(s) was (were) affected. In a single-fermenter production plant, all variables must be considered for every process problem.

The more fermenters you use, the more insight you can gain into the process. The 1-million-gal fermenter in the current example is just one unit in a multi-million-gal production facility. The number of units ultimately required would be dependent on the fermenter cycle time, and the plant production rate, but as a rule of thumb, should not be less than about six.

In the case of a large fermenter, if batch sterilization is required, the sterilization of the media should be performed prior to charging the fermenter. The reason is that the time to reach sterilization temperature of the media and the subsequent cool down can take a significant amount of time, and designing for the cool down will require a substantial amount of chilling capacity or a large reservoir of chilled water. Huge-scale fermenters should be designed for process cooling only, not for batch sterilization, pasteurization or bio-inactivation.

The discussion provided above deliberately ignores the issue of maintaining temperature uniformity within the tank, because that topic is more a function of momentum transfer rather than heat transfer. Momentum transfer in huge-scale fermentation units is another important issue, which is behind the scope of this article. It is interesting to note that the use of external heat exchange removes tank dimensions and shape as variables affecting heat transfer, so that those

variables can be optimized independently of heat transfer.

Cooling is a big expense. A process that is micro-aerobic or anaerobic has a clear economic advantage because those processes generate much less heat. A process that is warm enough to be cooled with 85°F cooling tower water would also be advantageous.

Closing thoughts

The use of external heat exchangers has distinct operational advantages, because fermenter heat-transfer capacity becomes independent of tank size, shape and material of construction. From a heat-transfer point of view, fermenter size can grow without bound but the economy of scale ends at about 24 million Btu/h. Pilot-scale testing with a fermenter above 200-gal working volume would prove heat-transfer coefficients and validate that the microbe can tolerate the conditions brought by external heat exchange. ■

Edited by Suzanne Shelley

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Authors



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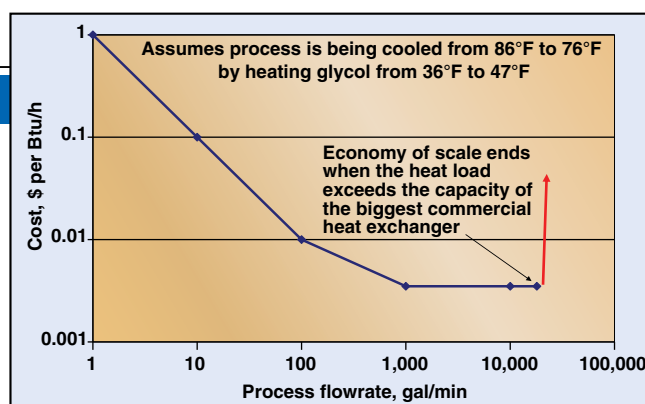


FIGURE 2. As shown, the economy of scale for a plate-and-frame heat exchanger ends when the heat load exceeds the capacity of the biggest commercial heat exchanger

Selecting the Proper Mill for Your Product

Understanding breakage behavior is crucial in mills

Kerry Johanson
Material Flow Solutions, Inc.

Milling is a mechanically driven process that breaks solid material into smaller pieces. Selection of the optimal mill is a daunting task that often leaves engineers relying on vendor suggestions to decide which mill is right for their job. This article addresses a methodology to score and rank the various mills for use with a particular material.

In milling, materials are broken up due to a few basic breakage mechanisms. Some particles tend to split, creating smaller particles that are one-half to one-third the size of the original particles. This type of breakage is termed fracture. In some cases, particles break as corners are knocked off or subsurface cracks form particles that are considerably smaller than the original particles. This type of breakage is termed abrasion. Some materials require many impacts or stress-strain events to induce breakage. This is termed fatigue and can result in the formation of both small and large particles. The rate of breakage always changes during a fatigue-driven event. Some particles require large strains before breakage occurs. These large strains may be due to plastic deformations, such as in the case of plastic, rubber and ductile metals, separation of fibers and internal structures as in biomass, or due to non-linear elastic effects, such as with tissues and complex polymers.

The premise for this article's mill ranking comes from the fact that each mill induces a unique set of impact or stress-strain events, or both. If a particular material is sensitive to breakage due to stress-strain events, then

mills exploiting stress-strain events will be the most efficient choice for particle breakage unit operations. Likewise, if the material is sensitive to breakage due to impact, then mills that exploit impact events are the best choice for this material. Materials sensitive to fatigue require mills that have repeated stress-strain events or repeated impact events to break particles. Thus, an analysis of the number of breakage events in a particular mill has some merit in choosing the best mill. Finally, materials that require large strains to break must be coupled with mills that can induce large strains to effectively break particles. For the purpose of this article, this will be described as breakage due to shear. We will start by describing typical breakage events in various mill types and assign each mill a score on a scale of 1 to 10 based on breakage due to impact, stress-strain, fatigue, or shear. A score of 1 indicates a low propensity of breakage due to this event. A score of 10 indicates a high probability of breakage due to this type of event.

Following this scoring and ranking system, the article will present some tests that can be used to quantify a particular material's propensity to break due to a particular mechanism, and then suggest which mills would be best for use with these materials. It should be noted that general classes of mills will be considered for this article. The breakage in a specific mill will be due to the details of operation for that particular mill. This article simply provides a guide, and the engineer may need to adjust these rankings based on a unique mill of a given type. Likewise, some materials are anisotro-

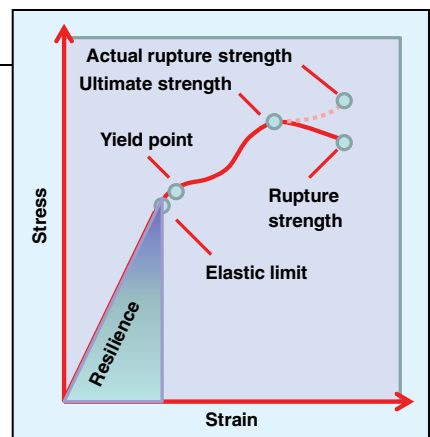


FIGURE 1. Resilience equals the area under the stress-strain curve up to the elastic limit

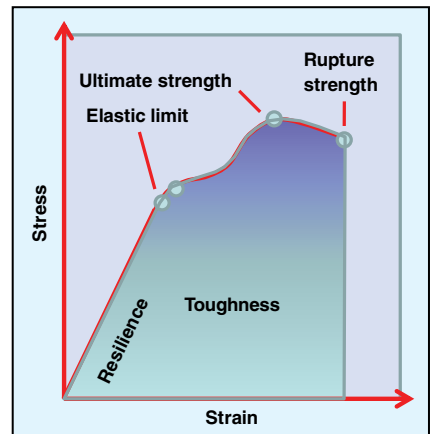


FIGURE 2. Toughness equals the area under the stress-strain curve up to the rupture strength

pic and have different breakage tendencies in different directions, making them subject to breakage events due to several mechanisms depending on how the particles are introduced to the mill. Again, this article is to be used as a guide, and the exact behavior will depend on the material of interest. In any case, much of the breakage behavior depends on the detailed structure of the particle. Some of these effects will be discussed, but this article is not intended to be a comprehensive analysis on the subject.

Material properties

For the purpose of this discussion, it is useful to define some engineering terms common to the study of material mechanics. For a material to break, it must pass through all of the stages on a stress-strain diagram. When material is either compressed or stretched, it undergoes an elastic transition. Relieving stresses under this condition causes a complete rebound in the strain imposed on the material. At some point, the stress becomes great enough that the material cannot sup-

port elastic behavior and must deform plastically, resulting in a permanent deformation of the material. The energy corresponding to the onset of plastic deformation equals the area under the stress-strain curve up to the elastic limit and is called the resilience (R), as seen in Figure 1. Straining the material far enough will result in the failure of the material and cause breakage. The energy associated with this breakage equals the area under the stress-strain curve up to the rupture strength and is called toughness (T) (Figure 2). We can define a brittleness number (BR) based on the ratio of the resilience to the toughness as described in Equation (1).

$$BR = \frac{R}{T} \quad (1)$$

A brittleness number close to 1 suggests that the material will break at strain conditions very near the elastic limit. This denotes a brittle failure, suggesting that the material may be subject to breakage by impact conditions. If the brittleness number is much less than 1, then particles break after significant plastic deformations and require significant shear to induce breakage. These particles will likely be insensitive to breakage by fracture. Particles with a low brittleness number may experience fatigue and can break after repeated stress-strain or impact events. Material can experience repeated stress events and these tend to open or close cracks in the particle, depending on the orientation of the crack relative to the direction of impact or application of stress. Figure 3 illustrates this phenomenon. If the impact is perpendicular to the crack, then the crack closes during impact. Conversely, the crack opens if the impact is in line with the crack.

During every cycle, the region near the tip of the crack experiences stress values in excess of the elastic limit, causing the crack to grow incrementally. There is typically little to no control over the direction of the impact or stress application relative to the direction of the crack, so only a portion of the impacts or stress-loadings actually lead to crack growth

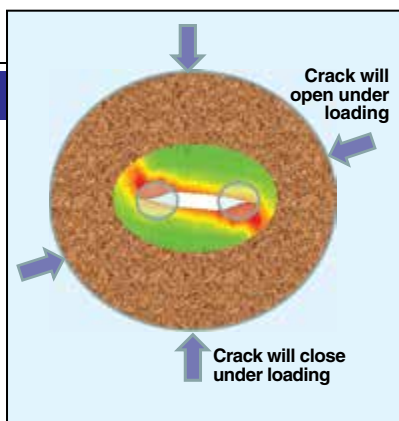


FIGURE 3. The orientation of a crack is important in determining material breakage behavior

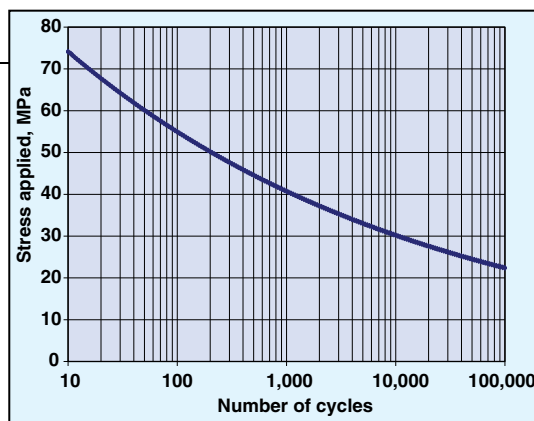


FIGURE 4. S-N fatigue curves are used to determine the stress a pure material can withstand

TABLE 1. SCORING FOR JAW CRUSHER	
Jaw crusher	
Rank for different types of materials	
Fracture	9
Fatigue	3
Abrasion	1
Shear	1
Score on a scale from 1 to 10 (10 best)	

and breakage events. As long as the stress local to the crack tip exceeds the elastic limit, then breakage over time can occur. This suggests that repeated stress applications that do not exceed the ultimate strength, but are above the elastic limit, can cause particle breakage.

Traditionally, charts showing stress applied versus number of repeated cycles (called S-N stress fatigue curves) have been used to determine the number of life cycles at a given stress a pure material can withstand. Figure 4 shows an example of an S-N fatigue curve. If the maximum yield-stress value is applied, then one cycle would suffice to break the material. However, if the stress is lower, then many load cycles are required before the material would break. The measurement of S-N curves is relatively simple for pure materials, but is much more difficult for particles. For this reason, fatigue characteristics are usually determined using a population-balance model, which will be explained later in this article. Although some experimental work does exist for being able to measure particle-breakage and stress-strain behavior on the particle level, the more common method of dealing with fatigue events is through a population-balance model.

Ranking the mills

Mills can be evaluated based on their

TABLE 2. SCORING FOR CONE CRUSHER	
Cone crusher	
Rank for different types of materials	
Fracture	9
Fatigue	3
Abrasion	2
Shear	1
Score on a scale from 1 to 10 (10 best)	

usefulness to induce fracture, fatigue, abrasion or shear-based breakage. The remainder of this article will deal with ranking and scoring various mill types. A method to measure a particular material's sensitivity to key breakage mechanisms is also presented. Combining the knowledge of milling action with the material's sensitivity will help engineers select the proper mill for their process. Below are some general mill categories, along with each mill's evaluation.

Jaw crusher. A jaw crusher is a type of mill unit that is used as a primary crusher. It works by receiving particles from a feeder and pinching them between two jaw-plates positioned to form a converging-plane flow hopper. One jaw-plate is fixed and the other jaw-plate pivots about a fixed point, moving in a circular cam-like motion about an eccentric bearing (Figure 5). Generally, a drive-wheel attached to the fly-wheel aids crushing. The jaw breaks the particle into two or three smaller particles. These particles dislodge from the jaw and fall until they are caught by the converging set of jaws and the pinching process is repeated. The pinching process continues until particle fragments are small enough to exit the gap between the jaws. The final particle size produced by the jaw crusher is controlled by this gap. Typically, this type of crusher can handle particles as large as 1,000 mm

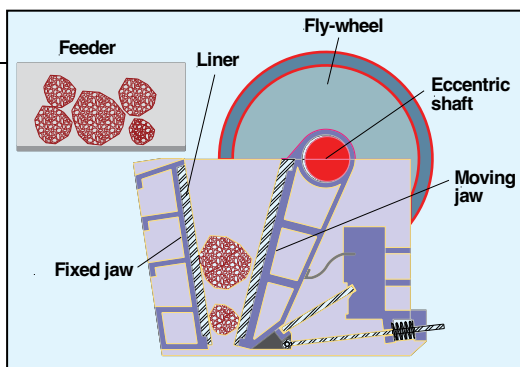


FIGURE 5. A jaw crusher induces breakage based on primarily fracture and fatigue

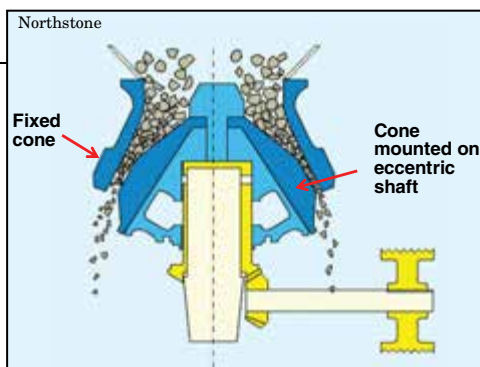


FIGURE 6. A cone crusher rotates, forcing material into a closing gap, thus causing the particles to break

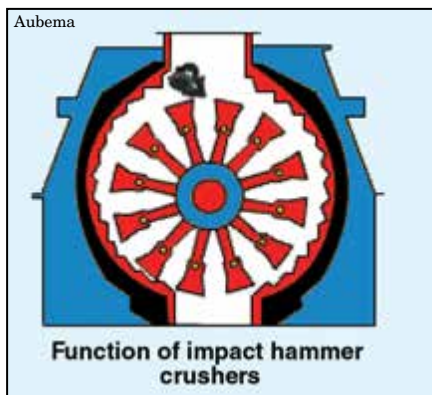


FIGURE 7. A hammer mill features a freely rotating hammer-shaft arrangement

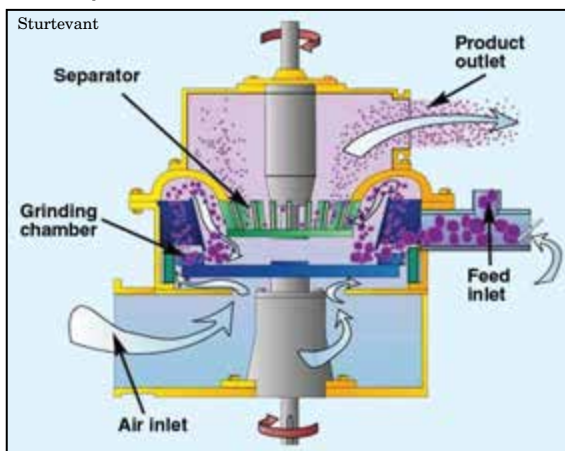


FIGURE 8. In an impact mill, pins or plates cause material to fracture

TABLE 3. SCORING FOR HAMMER MILL	
Hammer mill (with screen)	
Rank for different types of materials	
Fracture	8
Fatigue	4
Abrasion	3
Shear	2
Score on a scale from 1 to 10 (10 best)	

in diameter and generate particles as small as about 13 mm. The number of breakage events for any brittle particle entering the crusher can be found using Equation (2).

$$n = \frac{\ln\left(\frac{Dp_{max}}{Gap}\right)}{\ln(2)} + 1 \quad (2)$$

This equation relates the maximum particle size (Dp), the gap spacing (Gap) and the number of breakage events (n). In general, the number of breakage events for this type of mill is between four and seven. Jaw motion is relatively slow so that only one breakage event is generated every few seconds. This suggests that particle breakage in this type of mill unit will not experience fatigue effects. Because of the rotary cam operation, there is some shear as the movable jaw trans-

lates material in the downward direction. However, this shear effect is very small and the major mode of breakage is a direct compression, leading to fracture of the material. The actual strain imposed by the motion of the jaw is about 5 to 10%. Thus, a material with an elastic limit at strains greater than this 5 to 10% will not break in this type of mill. Materials that have rupture strength at strains greater than 5 to 10% will require many cycles of the jaw to break, making jaw crushing impractical as a milling operation. This leads to the scores in Table 1. For materials that are sensitive to fracture, a jaw crusher is an acceptable mill, hence its score of 9.

Cone crusher. The cone crusher works on a principle similar to the jaw crusher. It can handle material up to 300 mm in diameter and produce particles around 13 mm in diameter. It is typically used as a primary milling unit.

In a cone crusher, the inner cone rotates on an eccentric shaft causing the gap between the outer fixed cone and the interior moving cone to change as the cone rotates (Figure 6). During rotation, material is pinched between the closing gap, causing the particles

to break into two or three pieces. Most of the action in this type of mill is direct compression resulting in fracture, but some of the action can induce a shear force since the gap closes slowly. This shear force can induce some shear and, as a result, this mill has a slightly higher abrasion score (2) than the jaw crusher's score of 1 for abrasion, as seen in Table 2. Like the jaw crusher, the cone crusher also has an excellent score for fracture-based breakage.

Hammer mill. The hammer mill consists of a rotating shaft with rods or hammers that rotate at high speeds. These hammers are either free to swing or firmly attached to the rotating shaft (Figure 7). The hammer shaft arrangement freely rotates within a housing. An inlet at the top of this housing allows particles to enter the mill. The particles undergo a series of hammer impacts as they travel through the mill. An outlet at the bottom of the housing allows milled particles to leave the system. Normally, a screen just above the outlet retains large particles in the hammer-mill system, where they continue to be impacted by hammers until the particle size is sufficient to pass through the screen, but in other cases, there is no screen and material entering the system is exposed to hammer impacts only during the time it takes to fall from the inlet to the outlet. Sometimes particles are retained in the screen holes while hammers pass by. In this case, some particles in the mill will be subject to shear. Particles caught between the hammer and the housing will also be subject to shear during milling. Sometimes, particles are trapped between the hammer and the housing and are dragged along the surface of the housing, causing abrasion. Some mill designs create a closer tolerance between the hammers and housing near the exit. This causes additional shear

in diameter and generate particles as small as about 13 mm. The number of breakage events for any brittle particle entering the crusher can be found using Equation (2).

and abrasion. This type of mill typically handles particles about 400 μm in diameter and will create particles around 13 μm in diameter. This mill's breakage-inducing behavior is ranked in Table 3, showing that it is a good choice for products that are sensitive to fracture.

Impact mill. An impact mill consists of three zones, as seen in Figure 8. In the first zone, air enters the mill. This air is used to classify the milled material after the milling process.

The second zone is the milling zone. Impact mills have either plates or pins that rotate at high speed while particles are fed into the milling stage through an external feeder. The impact of the pins or plates causes some of the material to fracture, creating smaller particles. If pins are used, then the angle of the trajectory during impact can be variable, as some of the impacts will be glancing blows and some will be direct-contact blows. Glancing blows tend to induce abrasion effects while direct-contact impacts induce fracture events. There is very little opportunity for shear in impact mills.

The third zone in the mill is a classifier stage. In this stage, gas is pushed or drawn out of the mill at a controlled velocity, entraining particles of the appropriate size with the gas stream. If particles are not small enough to exit with the carrier gas, they fall back into the grinding stage and are subject to repeated impacts until they are small enough to be carried by the induced currents created by the gas stream.

These units typically handle particles around 1 to 2 mm in diameter and can produce particles as small as 5 micrometers (μm). Depending on the type of impact mill, glancing blows can comprise 30% of the total impacts, resulting in abrasion events. The other impacts are nearly all fracture-inducing events. Because of the classification section, this mill can induce many repeated-impact events. Thus, materials that are sensitive to fatigue can be used in this type of mill. These observations are summarized in the rankings in Table 4.

Horizontal air-jet mill. A horizontal air-jet mill uses high-velocity air in a lined, cylindrical chamber to induce

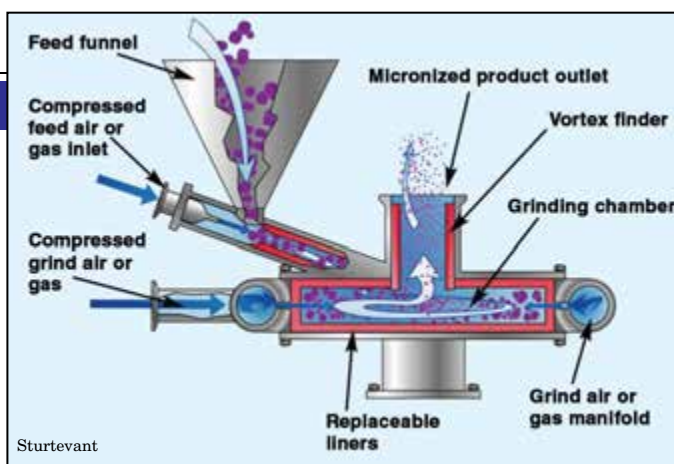


FIGURE 9. In a horizontal air-jet mill, a high-velocity air stream is used to break apart materials

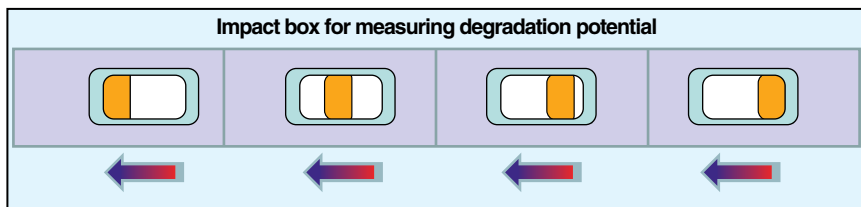


FIGURE 10. This schematic of an impact degradation box shows $\frac{1}{2}$ of an impact cycle. As the box moves left, the material moves relative to the box and eventually impacts on the opposite side of the box

TABLE 4. SCORING FOR IMPACT MILL

Impact mill	
Rank for different types of materials	
Fracture	7
Fatigue	8
Abrasion	4
Shear	1
Score on a scale from 1 to 10 (10 best)	

TABLE 5. SCORING FOR HORIZONTAL AIR-JET MILL

Horizontal air-jet mill	
Rank for different types of materials	
Fracture	3
Fatigue	8
Abrasion	7
Shear	1
Score on a scale from 1 to 10 (10 best)	

milling of granular materials. The material is fed into the mill with a high-velocity gas stream. This inlet is located with a tangential entry to the mill so that the flow of gas is directed around the circumference of the mill. The circular motion keeps the particles with the highest mass pinned against the mill's circumference. Periodic gas-injection nozzles that direct the pinned particles toward the center of the mill are spaced evenly around the mill perimeter, creating a series of impacts around the perimeter during the milling operation (Figure 9). Gas entering the mill exits through the center of the milling cylinder. Thus, centrifugal forces throw particles against the wall and drag forces pull particles toward the center of the cylinder. This resulting classification allows only the finest particles to leave the system. The majority of impacts in air-jet mills are glancing blows against the cylinder wall and collisions with other particles.

Air-jet mills can handle particles about 1 mm in diameter and can cre-

ate particles as fines as 0.5 μm . Glancing blows result in abrasion events and the collision with other particles results in fracture events. Because of the classification, this mill can induce repeated breakage events and materials sensitive to fatigue can be used in this mill, leading to its score of 8 for fatigue in Table 5. No shear is possible in this style of mill, hence its low score for shear.

Tests and models

There are many other mills that could be ranked, including vertical air-jet mills, ball mills, roller mills, stirred-media mills and impact-jet mills, but these are not discussed in this article. The next piece of information required to select the proper mill is to determine to which milling mechanisms a particular material is sensitive. This can be done by using the aforementioned population-balance model.

Ideally, one would like to expose material to pure impact events, pure stress-strain events and pure shear or cutting events. The main goal is to de-

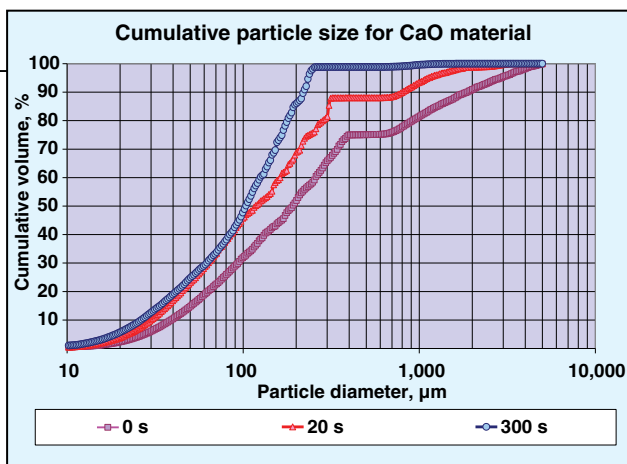


FIGURE 11. With an impact velocity of 5.4 m/s, the cumulative particle size changes over time

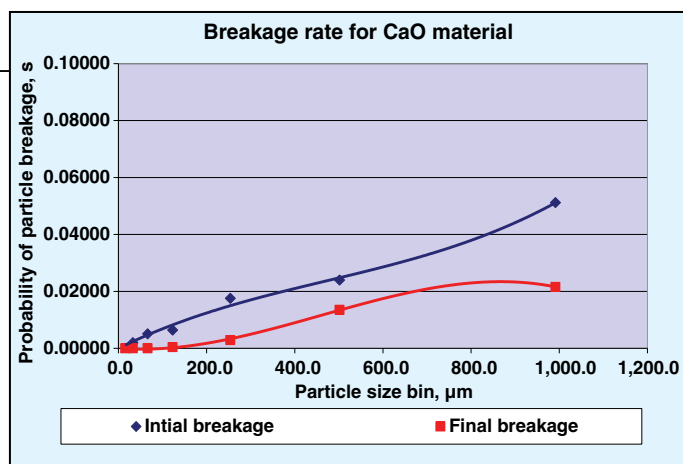


FIGURE 13. The breakage rates (S) are much different after 60 seconds of repeated impacts

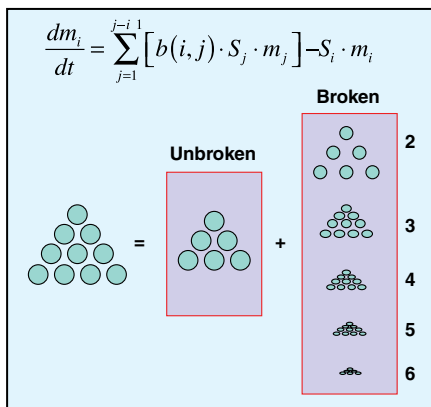


FIGURE 12. The breakage-distribution function serves to track particle-breakage events

termine what the dominant breakage mode is for a particular material when exposed to these events. For brevity, only the response to impact events will be considered.

Impact breakage test. As a case study, this article will consider calcium oxide (lime; CaO) particles with a maximum particle diameter of approximately 2,500 μm . Several impact breakage tests could be performed on this material. For this study, the lime particles were placed in an impact box, which was shaken at a controlled velocity. In such a test, the material within the box moves freely relative to the box and eventually the material impacts on the opposite end of the container, creating an impact condition, displayed in the schematic in Figure 10.

Each oscillation cycle creates two impacts on either end as material is thrown against the ends of the box. During these impacts, the particles react with the box wall and with other particles inside the box. These repeated impacts further break the particles. The frequency of the oscillation governs the impact velocity and the time dictates the number of repeated impacts.

Size Bin #	Minimum Size (μm)	Maximum Size (μm)
1	991	2584
2	501	991
3	253	501
4	123	253
5	66	123
6	32	66
7	3	32

Material was placed in this impact box and shaken for extended periods of time up to 5 min at a velocity of 5.4 m/s. Analysis times were selected to correspond to 0, 10, 20, 60, 120 and 300 seconds. After each analysis time, a particle-size distribution was measured on the material within the impact box. This generated a time-sequence set of particle-size distributions, as seen in Figure 11. Note the general shift to finer particles at larger impact times.

Population-balance model. Population-balance modeling provides a means of identifying critical particle-breakage mechanisms through the computation of breakage-selection coefficients [7]. The first step in using this population-balance model is to divide the particle-size-distribution function into regions called particle-size bins. These bins are chosen so that an adjacent bin contains particles that are roughly half the size of the next larger bin, as shown in Table 6. The modeling method monitors the rate of transfer between different particle-size bins. Since the population-balance model is at the heart of understanding breakage rates, it is useful to define some parameters and functions that describe breakage [2].

- Mass density: $m(x, t)$

- Cumulative density: $R(x, t)$
- Breakage distribution: $B(x, y)$
- Specific breakage rate: $S(x)$

The breakage-distribution function (B) is an indication of which particle-size bin the particle fragments will end up in during breakage. $B(x, y)$ describes the fraction of mass transported from y to x upon breakage of y . B is often described as a matrix of numbers indicating the fractional distribution of transfer to smaller bin sizes than the original. The numbers in this matrix represent the fraction of material transferred to adjacent particle-size bins during processing. The $B(x, y)$ function plays the role of a weighting function or stoichiometric constant in a reaction. This breakage behavior is portrayed schematically in Figure 12.

The $S(x)$ function represents the probability that a given particle impact or contact will result in particle breakage. It represents an overall rate of one particle size breaking into any adjacent particle-size bins. S functions are the rate constants for degradation from one particle size to all others [3]. Equations governing the rate of transfer between particle size bins can be written for both the mass and cumulative density distributions, shown in Equations (3) and (4) respectively.

$$\frac{dm_i(t)}{dt} = -S_i m_i(t) + \sum_{j=1}^{i-1} b_{ij} S_j m_j(t), \quad m_i(0) = m_{i0} \quad (3)$$

$$\frac{dR_i(t)}{dt} = -S_i R_i(t) + \sum_{j=1}^{i-1} (S_{j+1} B_{ij+1} - S_j B_{ij}) R_j(t), \quad R_i(0) = R_{i0} \quad (4)$$

For the purposes of this article, it is

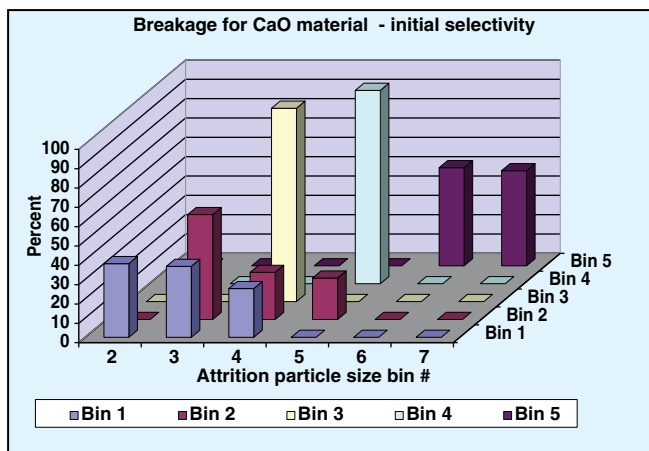


FIGURE 14. Breakage selectivity functions (B) for breakage before 60 seconds

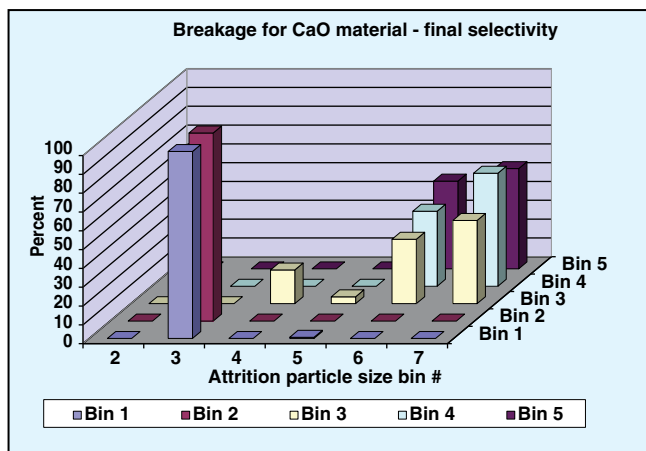


FIGURE 15. Breakage selectivity functions (B) for breakage after 60 seconds

assumed that the rate constants are not a function of time (t , in seconds) and will remain constant. This simplifies the analysis somewhat. However, many other assumptions are also possible [4].

The S and B functions are found simultaneously from the solution of Equations (3) and (4). Since mass cannot be destroyed, the sum of the B functions for any particle-size bin must equal one. This solution of the above equations is not a trivial task, but it provides a great deal more information concerning the breakage phenomena experienced by bulk materials. Choosing the particle-size bins such that each adjacent bin size consists of particles one-half the size of the original bin suggests that movement of material to an adjacent bin would be interpreted as splitting the original particles in half. If the B values indicate a large fraction for the next adjacent bin size, then fracture of primary particles is occurring. However, if the B values indicate that one or more size bins adjacent to the original size have low fractions followed by large fractions distributed in the finer size bins, then abrasion is likely occurring, as abrasion creates fine particles directly from larger-sized particles.

The probability S function is a value that identifies the likelihood that a collision will result in a breakage of particles. This probability is a function of the size of the particles, and typically shows an increasing functional-ity between the particle size and the

probability that a given size of particle will break. The solution of Equations (3) and (4) can be calculated numerically, but can also be approximated by Equation (5) if the rate constants are assumed time invariant [3].

$$R_i(t) = R_i(0) \exp(G_i t + H_i t^2 / 2)$$

$$G_i = -S_i + \sum_{j=1}^{i-1} \lambda_{ij} \frac{R_j(0)}{R_i(0)}$$

$$H_i = \sum_{j=1}^{i-1} \lambda_{ij} (G_j - G_i) \frac{R_j(0)}{R_i(0)}, \quad \lambda_{ij} = S_{j+1} B_{ij+1} - S_j B_{ij} \quad (5)$$

Time sequence particle-size data for CaO were used with Equation (5) to determine the $B(x,y)$ distribution matrix and the $S(x)$ breakage-rate function, shown in Figures 13–15. For the purposes of this article, B values are most relevant, since they reveal how much fracture or abrasion may occur with the material. However, S values can give an indication of fatigue. If the breakage rates (S values) at the beginning of the testing are low and then increase, then the material is very sensitive to fatigue events.

The CaO breakage analysis suggests that lime material is best described by a dual-rate breakage. Equation (5) still applies, but must be implemented in a piecewise linear fashion to combine the solution of two constant-rate equations. One equation set will consider the first 60 s of breakage and use the initial conditions at zero seconds. The other rate equation will consider breakage after 60 s and use as initial conditions the particle-size informa-

tion after 60 s of breakage. The initial breakage rate is much higher than the final breakage rate, as seen in Figure 13. This suggests that lime may not be sensitive to fatigue.

B values were also computed for both of these breakage rates, shown in Figures 14 and 15. These data show that about 38% of Bin Size 1 will initially break in half to create Bin Size 2 particles; 54% of Bin Size 2 particles will initially break in half to form Bin Size 3 particles and 100% of Bin Size 3 and Bin Size 4 materials will break in half to the next lowest bin size, indicating that initial breakage of CaO is due to significant fracture events.

However, the story changes after breakage has occurred for a period of time. Figure 15 shows the breakage selectivity after 60 s of impact milling. In this case, with the exception of Bin Size 2, there is a shift to create particles more by abrasion events. From the Bin Size 1 material, 99% splits into particles that are one fourth the size of the original particles. All of the Bin Size 2 material becomes Bin Size 3 material. However, only 18% of Bin Size 3 material shifts to become Bin Size 4 material and 44% of Bin Size 3 material becomes fine Bin Size 7 material. The shift to abrasion is also very evident in the Bin Size 4 and 5 particles.

It is possible to average the fractional B values that shift one particle-size bin to determine an overall fraction that is sensitive to fracture. Likewise, the overall fraction of material breaking into particles one fourth the size or less can

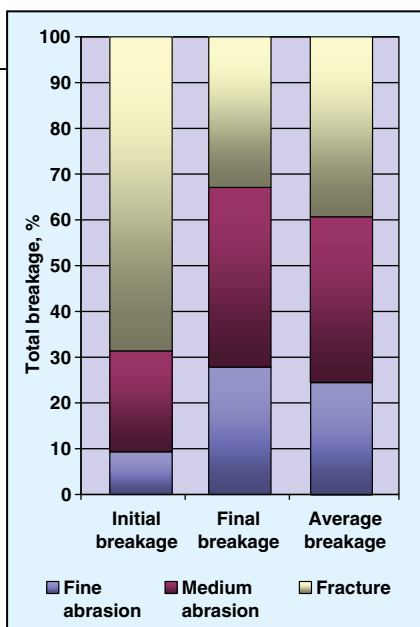


FIGURE 16. Abrasion and fracture are the dominant breakage mechanisms for lime (CaO)

be determined by averaging the respective *B* values. In addition, the average fraction that shifts to create the finest material can also be computed from the *B* value data. This gives an indication of the amount of fracture and abrasion the material may be sensitive to (Figure 16).

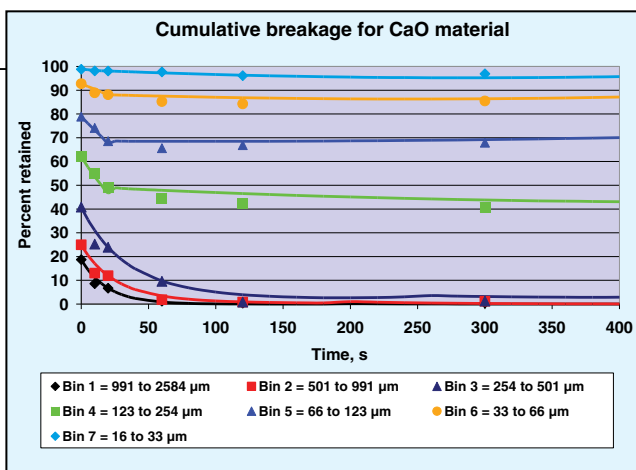


FIGURE 17. Cumulative particle-size distributions as a function of time for lime (CaO) subjected to repeated impacts at 5.4 ft/s impact velocities

Initially, almost 70% of the lime breakage is due to fracture with only 10% due to true abrasion events. However, after 60 s of milling, 33% is due to fracture and 28% is due to abrasion. Lime is sensitive to both fracture and abrasion, but its sensitivity is much greater for fracture events. Now that the modes of breakage have been quantitatively determined, the optimal mill can be selected. In this case, the optimal mill will be the one where the fracture events induced in the mill are occurring at about 1.5 times the frequency of the abrasion events. Of the mills considered in this article, the

impact mill rankings most closely match the propensity for lime to break. Thus, an impact-style mill is a good choice for milling this material. It should be pointed out that this is a major consideration in the selection of a mill, but not the only consideration. The tendency of material to adhere to mill surfaces should also factor in mill selection. The exact impact mill presented above has many moving parts that may be covered with fine adhesive material. If lime material is adhesive, then another impact-style mill, such as the air-jet impact mill, may be a better choice.



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As a check of the population-balance model analysis, the cumulative breakage data points were plotted along with the computed cumulative breakage functions from the population-balance model (Figure 17). This plot indicates a good agreement between the breakage data and the values computed from the population-balance analysis.

Summary

Mills can be qualitatively ranked based on their tendency to induce fracture, fatigue, abrasion or shear by examining the milling action. Mills where classification is part of the milling operation can induce fatigue events. Mills where

glancing blows of particles against surfaces are dominant cause abrasion events. Mills where impacts or stress application are more direct result in induced-fracture events. Particles or materials where toughness is much larger than resilience require mills with a lot of shear to induce particle breakage. The population-balance model can be used with mill tests to deduce the dominant breakage mechanisms for a given material. The optimal mill is then selected by matching the dominant mechanisms with qualitative ranks based on the tendency to induce fracture, fatigue, abrasion or shear. This simple analysis can aid engineers in selecting the right mill

for the job the first time. These criteria for mill selection can be combined with other information about the bulk material, such as adhesive tendencies and particle size, to help select a mill that is free from troublesome operation. ■

Edited by Mary Page Bailey

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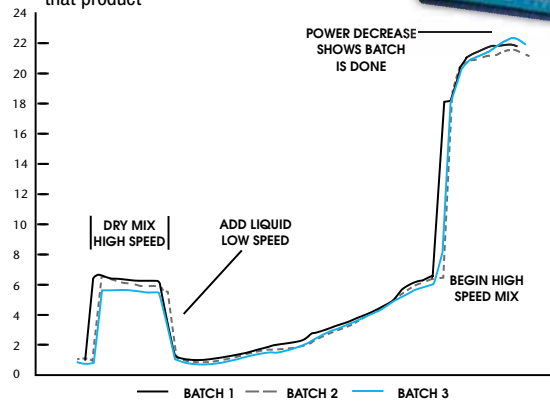
CONVENIENT OUTPUTS

- For meters, controllers, computers 4-20 milliamps 0-10 volts

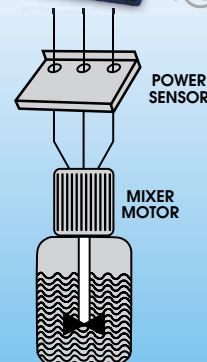
 ALL PRODUCTS MADE IN USA

PROFILING A PROCESS

- Power changes reflect viscosity changes
- Good batches will fit the normal "profile" for that product



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H	He												
Li	Ne												
Na	Ar												
K	Kr												
Rb	Xe												
Cs	Rn												
Be	F	O	N	C	B								
Mg	Cl	S	P	Si	Al								
Ca	Br	Se	As	Ge	Ga								
Sr	I	Te	Sb	Sn	In								
Ba	At	Po	Bi	Pb	Tl								
Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn				
Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd				
La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg				
Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

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- Crude Oil
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- Temperatures to 1,500 F
- Carbon Steel, Stainless Steel & High Alloy Heat Transfer Coils
- Natural gas or light oil fuels



PRODUCT & SERVICE INDEX

HOW TO USE THIS GUIDE

Using CEBG is simple and straightforward:

1. Look up the product or service under the main noun that describes it in the Product & Service Index; for example, Pumps, rotary, or Analyzers, infrared. Ample cross-referencing is provided for products with several names. Boldface items are general product categories.
2. Turn to the indicated page in the Product & Service Directory, where you will find the names of manufacturers of that product. Companies in boldface and capital letters are display advertisers; page numbers direct you to their product inserts or advertisements.
3. Refer to the Company Directory to find the manufacturers nearest you—your local sources. Call the sources for data, delivery and price. Please be sure to tell them how quickly you found them in CEBG.

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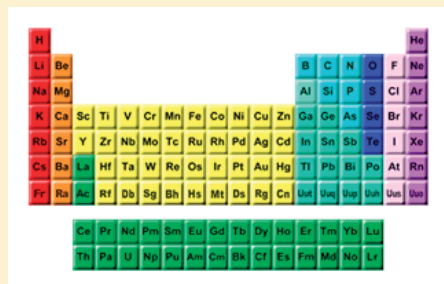
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American Elements' Academics & Periodicals Department supports materials science education at the high school, college and graduate school levels. This year the company co-sponsored a four-part PBS series on NOVA titled "Making Stuff" examining the world of materials science. Over the last twelve months alone, American Elements has co-sponsored 74 industry and academic conferences in 25 countries in fields such as electronics, aerospace, medical/pharmaceutical, optics and advanced military technology.

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.



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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



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KEY TECHNOLOGIES FOR RECIPROCATING COMPRESSORS

For more than a century, HOERBIGER has been offering a wide range of reliable and efficient products as well as partnership-like services to meet the demands of all applications in the reciprocating compressor industry. HOERBIGER develops design solutions and materials improving the efficiency, operating time and environmental soundness of reciprocating compressors.

Its portfolio includes a wide range of key components and solutions, such as:

- Very low-emission, durable BCD packing rings
- OFD oil wiper rings for increased oil savings and reliability
- Highly energy-efficient CE ring valves
- Modular RecipCOM monitoring, protection and diagnostic systems
- Stepless HydroCOM capacity control systems
- Upgrade and revamp of reciprocating compressors



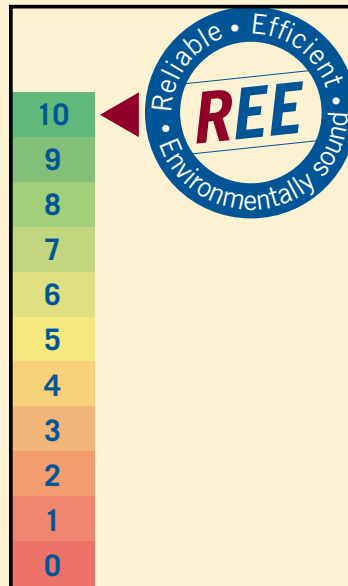
REE ASSESSMENT: THE BASIS FOR UPGRADE AND REVAMP OF RECIPROCATING COMPRESSORS

HOERBIGER also offers customer-specific solutions, analysis and optimum adjustment to production requirements.

To meet today's plant demands in terms of run cycle, energy efficiency and legal compliance, compressors have to be continuously improved.

For this reason HOERBIGER performs REE Assessment for compressor fleets. Available worldwide for any reciprocating compressor, the REE Assessment helps operators to choose the right technology and to make the right business decisions.

The result is a proactive gain for the whole plant in terms of



- Reliability
- Efficiency
- Environmental Soundness

Compressor experts from HOERBIGER carry out a REE audit on site to build up a picture of each compressor's design, operating conditions, maintenance and failure records. The detailed compliance report pinpoints then the performance of each compressor, with a REE index ranking equipment in terms of its potential for improvement and savings.

STEPLESS CAPACITY CONTROL AND REAL-TIME MONITORING

HydroCOM is an efficient, stepless, dynamic and fully-automated control system. Several different methods are available for capacity control for reciprocating compressors. Only HydroCOM, however, achieves best results in terms of energy savings, speed and accuracy. It improves process control, optimizes performance and pays for itself within a short period of time.

When reciprocating compressors are critical to the process, inefficient operation or breakdowns put the profitability and safety of the entire plant at risk. A monitoring and protection system is the best investment to ensure safe and reliable operation and cut maintenance costs. On every revolution, RecipCOM's continuous monitoring of critical equipment parameters gives early warning of potentially catastrophic failures, in real time and with SIL certified reliability.



For more information:
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The Lubrizol Corporation

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THE LUBRIZOL ADVANTAGE

Through product innovation, technical expertise and the many value-added services it offers customers, Lubrizol continues to advance CPVC solutions for the building and construction market. From design of the base materials, to the production of resins and compounds, Lubrizol has established world-class research and development capabilities, differentiating it from its competitors and setting a higher standard for product quality.

Corzan® Industrial Systems are backed by Lubrizol's more than 50 years of CPVC experience, providing engineers, mechanical contractors and facility owners a comprehensive pipe and fitting solution with More Inside™— meaning access to Lubrizol's unmatched R&D, technical expertise, global capabilities and a network of customers who are industry-leading manufacturers.

Industries Served:

- Chemical Processing
- Semiconductor & Electronics
- Water Treatment
- Marine Applications
- Industrial Manufacturing
- Mining
- Power Generation



MEET MECHANICAL STRENGTH REQUIREMENTS

While many non-metals do not have the tensile strength to meet pressure requirements of process applications, especially at elevated temperatures, Corzan Industrial Systems deliver pressure-rated operation up to 200°F (93°C). In addition to pressure requirements, Corzan systems provide the mechanical strength needed to meet all of the following non-metal design criteria:

- Maximum operating pressure
- Strength at elevated temperatures
- Service life
- Structural integrity

MINIMIZE LIFE-CYCLE COSTS

To provide the mechanical strength and corrosion resistance for demanding industrial applications, most materials are altered to compensate for inherent weaknesses, which can significantly increase the installed cost of the project.



Alternatively, Corzan Industrial Systems naturally provide both the mechanical strength and corrosion resistance required for many process applications—at a total installed cost that is lower than steel. And, when other life-cycle factors are considered, Corzan Industrial Systems are the obvious choice for performance and long-term value.

ELIMINATE CORROSION

Corzan Industrial Systems have superior resistance to most acids, bases and salts, and aliphatic hydrocarbons, removing the threat of corrosion faced by metal equipment. Corrosion-resistant Corzan systems often replace traditional materials in new construction and maintenance or repipe applications.



To guarantee material performance in common process applications, Lubrizol has tested CPVC with hundreds of chemicals at various temperatures, stress levels and other process conditions. Chemical-resistance testing services are also available for less common applications by contacting Lubrizol engineering services.

For more information about Corzan Industrial Systems visit corzancpvc.com or call +1.855.735.1431.

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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.

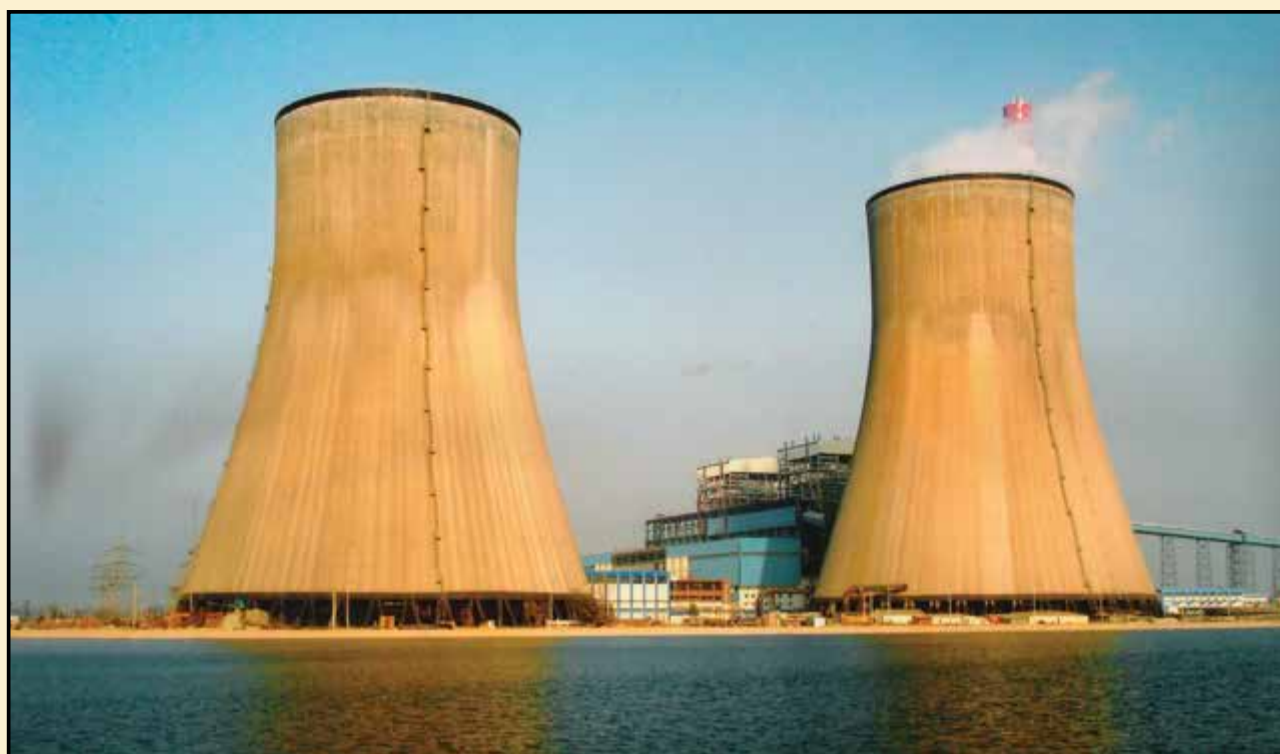
There are few problems Paharpur cannot solve related to the cooling of water or other liquids. We have a first class Research and Development centre which has consistently produced innovative concepts that have now become industry standards. All components or materials are carefully selected and tested 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.

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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® 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® and PowerDyne® traps.

TLV introduced the **Free Float®** 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®** 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® and PowerDyne® 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® Steam Trap Management System includes the TM5N portable data collection and measurement unit and Windows®-based TrapManager® 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® analyzes the data and makes an automatic judgment of the trap's condition, highlighting steam traps that require attention. TrapManager® 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.

A

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Biazzi SA, 25 ch de la Tavallaz, P.O. Box 84, Chailly/Montreux, Switzerland 1816 (41-21-989-2121; FAX: 41-21-989-2120; e-mail: marketing@biazzi.com; web site: www.biazzi.com)

BIC Alliance, 381 Columbia Memorial Parkway, Kemah, TX 77565 (800) 460-4242; (281) 538-9996; FAX: (281) 538-9991; e-mail: tbrooke@bicalliance.com; web site: www.bicalliance.com)

Bioengineering AG, Sagenrainstrasse 7, Wald, Switzerland 8636 (41-55-256-81-11; FAX: 41-55-256-82-56; e-mail: info@bioengineering.ch; web site: www.bioengineering.ch)

Bioengineering Inc., Two Canal Park, 5th Floor, Cambridge, Massachusetts 02141 (001 781 672 2620; FAX: 001 781 672 2626; e-mail: info@bioengineering-inc.com; web site: www.bioengineering-inc.com/www.bioengineering.ch)



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)

Biowater Technology, 2145 Diamond Hill Road, Suite 4B, Cumberland, Rhode Island 02864 (401-305-3622; FAX: 401-305-3677; e-mail: sales@biowatertechnology.com; web site: www.biowatertechnology.com)

BJM Pumps, LLC, 123 Spencer Plain Rd., PO Box 1138, Old Saybrook, CT 06475 (800-442-2562 877-BJM-PUMP; 860-399-5937; FAX: 860-399-7784; e-mail: sales@bjmpumps.com; web site: www.bjmpumps.com)

Boerger GmbH, Benningsweg 24, Borken-Wesek, Germany 46325 (49-2862-91030; FAX: 49-2862-910346; e-mail: info@boerger.com; web site: www.boerger.com)

BOERGER PUMPS, 2860 Water Tower Place, Chanhasen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)

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B & P Process Equipment, 1000 Hess Ave., Saginaw, MI 48601 (989-757-1300; FAX: 989-757-1301; e-mail: sales@bpprocess.com; web site: www.bpprocess.com)

Branch Environmental Corp., P.O. Box 5265, 3461 Route 22 East, Somerville, NJ 08876-1303 (908-526-1114; FAX: 908-526-2881; e-mail: sales@branchenv.com; web site: www.branchenv.com)

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Brooks Instruments, 407 W. Vine St., Hatfield, PA 19440 (888-554-FLOW; 215-362-3500; FAX: 215-362-3745; e-mail: info@brooksinstrument.com; web site: www.brooksinstrument.com)

Bryan Steam LLC, 783 North Chili Avenue, Peru, IN 46970 (765-473-6651; FAX: 765-473-3074; e-mail: inquiry@bryan-steam.com; web site: www.bryanboilers.com)

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Bulk-Pack Inc., 1025 North 9th, Monroe, LA 71201 (800-498-4215; FAX: 318-387-6362; e-mail: pete@bulk-pack.com; web site: www.bulk-pack.com)

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)

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)

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Cardinal Scale Manufacturing Co., 203 E. Daugherty, PO Box 151, Webb City, MO 64870 (800-441-4237; 417-673-4631; FAX: 417-673-5001; e-mail: cardinal@cardet.com; web site: www.cardet.com)

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Chilworth Global, 250 Plainsboro Rd, Bldg #7, Plainsboro, NJ 08536 (609-799-4449; FAX: 609-799-5559; e-mail: safety@chilworth.com; web site: www.chilworth.com)

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Clark-Cooper Division, of Magnatrol Valve Corporation, 855 Industrial Highway # 4, Cinnaminson, NJ 08077 (856-829-4580; FAX: 856-829-7300; e-mail: techsupport@clarkcooper.com; web site: www.clarkcooper.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)

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Coastal Specialty Gas, 55 N Fourth St, Beaumont, TX 77701

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)

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Combustion Controls Solutions Environmental Services, 3132 Wilford Drive, Toledo, OH 43617 (877-OXIDIZER; 419-841-9984; FAX: 419-841-9535; e-mail: michael@oxidizerservice.com; web site: www.oxidizerservice.com)



COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 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 Greenbrier Drive, Stafford, TX 77777 (281) 207-4619; FAX: (281) 207-4612; e-mail: info@c-p-i.com; web site: www.c-p-i.com)

Compur Monitors GmbH & Co. KG, Weissenseest. 101, Munich, Germany 81539 (49-89-620-38268; 49-89-620-380; FAX: 49-89-620-38184; e-mail: compur@compur.de; web site: www.compur.com)

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Conco Industrial Systems, 818 West 13th St, Deer Park, TX (web site: www.concosystems.net)

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Conval, Inc., 265 Field Rd., Somers, CT 06071 (860-749-0761; FAX: 860-763-3557; e-mail: mhendrick@conval.com; web site: www.conval.com)

Coperion GmbH, Niederbieger Str. 9, Weingarten, Wuertt., Germany 88250 (49 751 408-0; FAX: 49 751 408-200; e-mail: info.cc-mh@coperion.com; web site: www.coperion.com)

Corrosion Materials, 2262 Groom Rd., Baker, LA 70714 (800-535-8032; 225-775-3675; FAX: 225-774-0514; e-mail: sales@corrosionmaterials.com; web site: www.corrosionmaterials.com)

CORZAN INDUSTRIAL SYSTEMS, 9911 Brecksville Road, Cleveland, OH 44141 (888-234-2436; 216-447-5000; FAX: 216-447-6211; e-mail: corzancpvc@corzancpvc.com; web site: www.corzancpvc.com)

CP Pumpen AG, Im Bruehl, Zofingen, Switzerland 4800 (+41 62 746 85 85; FAX: +41 62 746 85 86; e-mail: info@cp-pumps.com; web site: www.cp-pumps.com)

CPI Wirecloth & Screens Inc., P.O. Box 1710, Pearlard, TX 77588 (800-255-6374; 281-485-2300; FAX: 281-485-8837; e-mail: Sales@cpwirecloth.com; web site: Www.cpwirecloth.com)

Creative Pultrusions, Inc., 214 Industrial Lane, Alum Bank, PA 15521 (888-CPI-PULL (274-7855); 814-839-4186; FAX: 814-839-4276; e-mail: crpul@pultrude.com; web site: www.creativepultrusions.com)

Cristal, 20 Wight Avenue, Suite 100, Hunt Valley, MD 21030 (800.638.3234; 410.229.4400; FAX: 410.229.4415; web site: www.cristal.com)

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Dec Group, 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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Diamond America Corp., 520 South Main Street, Ste 2456B, Akron, OH 44311

Dickow Pump Co., 1738 Sands Pl., S.E., #200, Marietta, GA 30067 (770-952-7903; FAX: 770-933-8846; e-mail: info@dickow.com; web site: www.dickow.com)

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Epcon Industrial Systems, LP, P.O. Box 7060, The Woodlands, TX 77387 (800-447-7872; 936-273-3300; FAX: 936-273-4600; e-mail: epcon@epconlp.com; web site: www.epconlp.com)

EquipNet, Inc., 5 Dan Road, Canton, MA 02021 (888-371-6555; 781-821-3482; FAX: 781-849-7668; e-mail: sales@equipnet.com; web site: www.EquipNet.com)

Ernst Flow Industries, 116 Main St., Farmingdale, NJ 07727-1495 (800-992-2843; FAX: 732-938-9463; 888-992-2843; e-mail: info@ernstflow.com; web site: www.ernstflow.com)

Escitex, 6040 E Main St, Mesa, AZ 85205 (480)232685; e-mail: sales@escitex.com; web site: www.escitex.com)

EUROINOX GROUP S.r.l., Via E. Fermi /4, Via E. Fermi, 29, Mortara, Italy (0039038490455; FAX: 0039038491426; web site: www.euroinoxgroup.com)

E-Vac Technologies, LLC, 455 Valleybrook Rd., McMurray, PA 15317 (877)3822382; 8773822382; FAX: 8665512352; e-mail: SALES@EVACTECHNOLOGIES.COM; web site: www.evactechnologies.com)

Evaporator Dryer Technologies, 1805 Ridgeway Street, Hammond, WI 54015 (715-796-2313; FAX: 715-796-2378; e-mail: info@evapdryertech.com; web site: www.evapdryertech.com)

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FABRICATED PLASTICS LIMITED, 2175 TESTON ROAD, MAPLE, Canada L6A 1T3 (905-832-8161; FAX: 905-832-2111; e-mail: info@fabricatedplastics.com; web site: www.fabricatedplastics.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: FCLmarcom@fluidcomponents.com; web site: www.fluidcomponents.com)

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Filtera-Systems Co., 23900 Haggerty Rd., Farmington Hills, MI 48335 (248-427-9090; FAX: 248-427-9892; e-mail: sales@filtrasystems.com; web site: www.filtrasystems.com)

Filtration & Membrane Technology, Inc., 8342 Silvan Wind, Houston, TX 77040 (713-870-1120; FAX: 713-422-2533; e-mail: fnt-houston@att.net; web site: www.fnt-houston.com)



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Fisher Tank Co., 3131 W. Fourth St., Chester, PA 19013 (610-494-7200; FAX: 610-485-0157; e-mail: sales@fishertank.com; web site: www.fishertank.com)

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)

Flodyne Controls Inc., 48 Commerce Dr., Murray Hill, NJ 07974 (908-464-6200; FAX: 908-464-1553; e-mail: sales@flodynecontrols.com; web site: www.flodynecontrols.com)

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Flowserve Corp., 1900 S. Saunders St., Raleigh, North Carolina 27601 (919-831-3200; web site: www.flowserve.com)

Fluid Line Products Inc., 38273 Western Pkwy., P.O. Box 1000, Willoughby, OH 44096 (440-946-9470; FAX: 440-946-9472; e-mail: flp@fluidline.com; web site: www.fluidline.com)

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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Forum - Valve Solutions, 12735 Dairy Ashford Rd., Stafford, TX 77477 (800-256-6193; 281-637-2000; FAX: 281-340-5499; e-mail: sales@f-e-t.com; web site: www.f-e-t.com)

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Goel Scientific Glass Works, C-31, Sarder Estate, Ajwa Rd., Baroda, India 390019 (0091-265-2561595; 0091-9825318944; FAX: 0091-265-2561124; e-mail: info@goelscientific.com; web site: www.goelscientific.com)

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Gore / W. L. Gore & Associates GmbH, Werner-von-Braun Str. 18, Putzbrunn, Bavaria, Germany 85640 (49-0-89-46-12-22-11; FAX: 49-0-89-46-12-23-00; e-mail: ipd-deutschland@wlgore.com; web site: www.gore.com)



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GOW-MAC Instrument Co., 277 Brodhead Road, Bethlehem, PA 18017 (610-954-9000; FAX: 610-954-0599; e-mail: sales@gow-mac.com; web site: www.gow-mac.com)

Great Western Mfg. Co., 2017 S. Fourth St., P.O. Box 149, Leavenworth, KS 66048 (800-682-3121; 913-682-2291; FAX: 913-682-1431; e-mail: sifter@gwmfg.com; web site: www.gwmfg.com)

Green Leaf, Inc., 9490 North Baldwin Street, P.O. Box 88, Fontanet, IN 47851 (800-654-9808; 812-877-1546; FAX: 812-877-4278; e-mail: sales@grleafinc.com; web site: www.grleafinc.com)

Greene, Tweed & Co., P.O. Box 305, 2075 Detwiler Rd., Kulpsville, PA 19443 (1-800-220-4733; 215-256-9521; FAX: 215-256-0189; web site: www.gtweed.com)

Greene, Tweed & Co. Ltd., Ruddington Fields, Nottingham, Notts, United Kingdom NG11 6JS (0-115-99315-777; web site: www.gtweed.com)

GRI Pumps, 180 Hines Ave., Bellville, OH 44813 (419-886-3001; FAX: 419-886-2338; e-mail: gsales@gripumps.com; web site: www.gripumps.com)

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Hannay Reels Inc., 553 State Rte. 143, Westerlo, NY 12193-0159 (877-GO-REELS; 518-797-3791; FAX: 800-733-5464; e-mail: reels@hannay.com; web site: www.hannay.com)

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Heat Transfer Research, Inc. (HTRI), 150 Venture Dr., College Station, TX 77845 (+1.979.690.5050; FAX: +1.979.690.3250; e-mail: htri@htri.net; web site: www.htri.net)

Heinkel Filtering Systems Inc., 520 Sharpstown Rd., Swedesboro, NJ 08085 (856-467-3399; FAX: 856-467-1010; e-mail: info@heinkelusa.com; web site: www.heinkelusa.com)

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Hypercat Advanced Catalyst Products, 1075 Andrew Drive, Suite C, West Chester, PA 19380 (610-692-3490; FAX: 610-692-3971; e-mail: info@hypercat-acp.com; web site: www.hypercat-acp.com)

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Omni-Lift, Inc., 1485 S. 300 W., Salt Lake City, UT 84115-5137 (801-486-3776; FAX: 801-486-3780; e-mail: omni-belt@aol.com; web site: www.omni-lift.com)

ONLY Technology LTD, wuhan,China, Chife (e-mail: info@onlywhd.com; web site: www.onlywhd.com)

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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)

OSNA-Pumpen GmbH, Brueckenstr. 3, Osnabrueck 49090 (e-mail: info@osna.de; web site: www.osna.de/englisch/fr_ueber.html)

Osram Sylvania, 100 Endicott St., Danvers, MA 01923-3623 (800-544-4828; 978-777-1900; FAX: 978-750-2152; web site: www.sylvania.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)

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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)

Patterson Ind. Canada, of All-Weld Company Limited, 49 Passmore Ave., Scarborough, Ontario, Canada M1V 4T1 (800-336-1110; 416-694-3381; FAX: 416-691-2768; e-mail: process@pattersonindustries.com; web site: www.pattersonindustries.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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Plasticon Composites, 1395 Montee Chenier, Les Cedres, Quebec, Canada J5T 1L9 (web site: www.acpastiques.com/)

Plate Concepts, Inc., 1221 Rte. 22 East, Lebanon, NJ 08833 (908-236-9570; FAX: 908-236-9575; e-mail: info@plateconcepts.com; web site: www.plateconcepts.com)

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Process Combustion Corp., 5460 Horning Rd., Pittsburgh, PA 15236 (412-655-0955; FAX: 412-655-0961; e-mail: pcc@pcc-sterling.com; web site: www.pcc-sterling.com)

Process Solutions, 6701 Garden Rd #1, Riviera Beach, FL 33404 (561-840-0050; FAX: 561-840-0070; e-mail: sales@processsolutions.net; web site: www.process-solutions.net)

ProcessPro Software, 3290 33rd St. S., St. Cloud, MN 56301 (800-457-3548; 320-252-0234; FAX: 320-252-1144; e-mail: info@processproerp.com; web site: www.processproerp.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., Duplo, 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)

ProQuip Inc., 850 E. Highland Rd., P.O. Box 165, Macedonia, OH 44056 (330-468-1850; FAX: 330-467-3724; e-mail: application@proquipinc.com; web site: www.proquipinc.com)

ProSonic LLC, P.O. Box 26676, Milwaukee, WI 53226 (800-849-1130 North America; 800-849-1130; FAX: 414-755-7177; e-mail: info@pro-sonix.com; web site: www.pro-sonix.com)

PROTECT CONTROLS, INC., 303 Little York Road, Houston, TX 77076 (713-691-5183; FAX: 713-691-0159; e-mail: info@protectcontrols.com; web site: www.protectcontrols.com)

Protectoseal Company, 225 West Foster Avenue, Bensenville, IL 60106 (web site: www.protectoseal.com)

PRUEFTECHNIK, Oskar-Messter-Str. 19-21, Postfach 1263, Ismaning, Germany 85730 (89-99616-0; FAX: 89-99616-200; e-mail: info@prueftechnik.com; web site: www.prueftechnik.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)

Pump Solutions Group, 22069 Van Buren Street, Grand Terrace, California 92313 (909) 422-1739; FAX: (909) 512-1209; e-mail: info@psgdover.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@pureaire.net; web site: www.pureairemonitoring.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)

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)

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S & G Enterprises, N115 W19000 Edison Dr., Germantown, WI 53022 (800-233-3721; 262-251-8300; FAX: 262-251-1616; e-mail: info@ramflat.com; web site: www.ramflat.com)

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Siemens AG, A&D GC 3, Siemensallee 84, Karlsruhe, Germany 76187 (+49(0)721/595-4706; web site: www.siemens.com)

Siemens Industry, Inc., Applied Automation, 408 U.S. Highway 60, Bartlesville, OK 74003 (800-241-4453; 918-662-7000; FAX: 918-662-7052; e-mail: helpline.sii@sea.siemens.com; web site: www.usa.siemens.com/industry)

Siemens Industry, Inc., Solutions, Automation and Drive Technologies, 5300 Triangle Pkwy., Norcross, GA 30092 (770-871-3800 800-241-4453; 770-871-3968; FAX: 770-871-3999; e-mail: helpline.sii@siemens.com; web site: www.usa.siemens.com/industry)

Siemens Industry, Inc., Solutions, Automation and Drive Technologies, 1201 Summeytown Pike, Spring House, PA 19477 (800-241-4453; 215-646-7400; e-mail: helpline.sii@siemens.com; web site: www.usa.siemens.com/industry)

Siemens Industry, Inc. - Water Technologies, 4800 North Point Parkway, Suite 250, Alpharetta, GA 30022 (866.926.8420 USA; 978.614.7111; FAX: 978-970-2465; e-mail: information_water@siemens.com; web site: www.siemens.com/water)

Siemens, Industry USA, Solutions, Automation and Drives Technologies, 3333 Old Milton Parkway, Alpharetta, GA 30005-4437 (800-241-4453; 770-751-2000; 770-751-2000; FAX: 678-297-8316; 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)

Sigrist Photometer AG, Hofurlistr. 1, Ennetbuergen, Switzerland 6373 (41-41-624-5454; FAX: 41-41-624-5455; e-mail: info@photometer.com; web site: www.photometer.com)

SilicCycle Inc., 2500 Parc Technologique Blvd., Quebec City, Quebec, Canada G1P 4S6 (1 877 745 4292; 418 874 0054; FAX: 418 874 0355; e-mail: info@silicycle.com; web site: www.silicycle.com)

Sopheon, 3001 Metro Drive, Suite 460, Minneapolis, MN 55425-1554 (866-223-3696; 952-851-7585; FAX: 952-851-7599; e-mail: info@sopheon.com; web site: www.sopheon.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)

Spaltech International Inc., 37 Charles Street, Halton Hills, Ontario, Canada 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: spartancs@aol.com)

Spencer Strainer Systems, 6205 Gheens Mill Rd., Jeffersonville, IN 47130 (800-801-4977; 812-282-6300; FAX: 812-282-7272; e-mail: spencer256@aol.com; web site: www.spencerstrainer.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)

Spraying Systems Co., North Ave. at Schmale Rd., Wheaton, IL 60187-7901 (800-957-7729; 630-665-5000; FAX: 630-260-9727; e-mail: info@spray.com; web site: www.spray.com)

SPX Flow Technology, 4647 S.W. 40th Ave., Ocala, FL 34474 (352-237-1220; FAX: 352-873-5770; e-mail: pneumatic.sales.com; web site: www.pneumaticproducts.com)

StataCorp LP, 4905 Lakeway Drive, College Station, TX 77845 (800-782-8272 USA; 979-696-4600; FAX: 979-696-4601; e-mail: info@stata.com; web site: www.stata.com)

StatPoint Technologies Inc., 560 Broadview Avenue, Suite 201, Warrenton, VA 20186 (800-232-7828; 540-428-0084; FAX: 540-428-0089; e-mail: info@statpoint.com; web site: www.statgraphics.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)

Steri Technologies Inc., 857 Lincoln Ave., Bohemia, NY 11716 (800-253-7140; 631-563-8300; FAX: 631-563-8378; e-mail: sti@steri.com; web site: www.steri.com)

Strobic Air Corporation, a subsidiary of Met-Pro Corp., P.O. Box 144, Harleysville, PA 19438 (800-722-3267; 215-723-4700; FAX: 215-723-7401; e-mail: tristack@strobic-air.com; web site: www.strobicair.com)

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, Sulzer Chemtech, 5218 - 68 Avenue, Edmonton, Canada T6B 2X7 (780 577 7979; FAX: 780 577 7980)

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OK, Sulzer Chemtech USA, Inc., 1 Sulzer Way, Tulsa 74107 (918 446 6672; FAX: 918 446 5321)

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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)

Sumter Transport Company, 170 S Lafayette Dr, Sumter, SC 29150 (803-775-1002; FAX: (803) 778-0118; e-mail: rfamilia@sumtertransport.com; web site: www.sumtertransport.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)

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)

Sweet Manufacturing Company, P.O. Box 1086, 2000 E. Leffel Lane, Springfield, OH 45501 (800-334-7254; 937-325-1511; FAX: 937-322-1963; e-mail: sales@sweetmfg.com; web site: www.sweetmfg.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)

SYN-TEX, 102 E Peck Blvd, Lafayette, LA

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)

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Tahoe Design Software, P.O. Box 187, Nevada City, CA 95959 (e-mail: staff@tahoesoft.com; web site: www.taхоesoft.com)

TankLink, a wholly-owned subsidiary of Telular Corporation, 311 S Wacker Drive #4300, Chicago, IL 60606 (800) 835-8527; FAX: (312) 379-8310; e-mail: pbarron@telular.com; web site: www.TankLink.com)

TankScan, 210 N.E. 10th Ave, Brainerd, MN 56401 (877-847-7226; 218-827-4719; FAX: 218-828-0139; e-mail: sales@tankscan.com; web site: www.tankscan.com)

TCPI Inc., Dr. Diesel, Diesel Fuel Additive, 3525 Sage Rd Apt 1604, Houston, TX 77056 (713-443-4373; e-mail: info@aicservices.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)

Team Industries, Inc., 1200 Maloney Rd., P.O. Box 350, Kaukauna, WI 54130 (800-819-9353 (Nationwide); 920-766-7977; FAX: 920-766-0486; e-mail: jkreisle@teamind.com; web site: www.teamind.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 Callendar Blvd, Painesville Twp, OH 44077 (440-639-6399; 440-639-1292; FAX: technical@tg.com; web site: tgp@tgpolio.com)

Technip Benelux B.V., 31 Boerhaavelaan, P.O. Box 86, Zoetermeer, Netherlands 2700 AB (31-79-3293-600; FAX: 31-79-3293-700; e-mail: tpbenelux@technip.com; web site: www.technip.nl)

TECO-Westinghouse Motor Co., 5100 N. IH-35, Round Rock, TX 78681 (800-451-8798; 512-255-4141; FAX: 512-244-5500; e-mail: sales@tecowestinghouse.com; web site: www.tecowestinghouse.com)

tecUSA, 80 Skyline Dr., Plainville, NY 11803 (516-653-2000; FAX: 516-939-0555; e-mail: info@tecusa.com; web site: www.tecusa.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)

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)

The Chemical Company, 19 Narragansett Ave., Jamestown, Rhode Island 02835 (401-423-3100; FAX: 401-423-3102)

Thermalcal, Inc., 30325 Bainbridge Rd., Solon, OH 44139-2288 (440-498-1005; FAX: 440-498-1062; e-mail: thermalcal@ameritech.net; web site: www.thermalcal.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/)

Thompson Dayton Steel Service, 120 Royall Street, Canton, MA 02021 (781-828-8800; FAX: 781-828-5082; e-mail: erylant@thompsondayton.com; web site: www.thompsondayton.com)

ThyssenKrupp Uhde GmbH, Friedrich-Uhde-Str. 15, Dortmund, Germany 44141 (49-231-547-0; FAX: 49-231-547-3032; e-mail: Info.uhde@thyssenkrupp.com; web site: www.thyssenkrupp-uhde.de)

TIGG Corporation, 1 Willow Avenue, Oakdale, PA 15071 (800-925-0011 USA; 724-703-3020; FAX: 724-703-3020; e-mail: info@tigg.com; web site: www.tigg.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)

TMTS Associates, Inc., Combustion/Air Pollution Control, 399 Pavilion St., Atlanta, GA 30315-1452 (404-627-4722; e-mail: tfmcgowan@mindspring.com; web site: www.tmtsassociates.com)

Toadfly Technologies, 3512 Fairmont Parkway, Pasadena, TX 77054 (web site: www.toadfly.com)

Topog-E Gasket Co., 1224 North Ulca, Tulsa, OK 74110 (800-587-7123; 918-587-6649; FAX: 918-587-6961; e-mail: sales@topog-e.com; web site: www.topog-e.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)

Total Energy, 2 Hardscrabble Road, North Salem, NY 10560 (1.800.682.0181; 914.276.0490; FAX: 914.276.0229; e-mail: info@totalenergy.com; web site: www.totalenergy.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, Ontario, Canada N7W1A4 (888 724-1798; 519 344-7132; FAX: 519 336-8340; e-mail: info@towerscan.com; web site: www.towerscan.com)

Transene Co. Inc., 10 Electronics Ave., Danvers, MA 01923-1011 (978-777-7860; FAX: 978-739-5640; e-mail: sales@transene.com; web site: www.transene.com)

TRINITY CONSULTANTS, 12770 Merit Drive, Suite 900, Dallas, TX 75251 (800-229-6655; 972-661-8100; FAX: 972-385-9203; e-mail: redmond@trinityconsultants.com; web site: www.trinityconsultants.com)

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)

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: vacuum.tuthill.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)

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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: uicsales@uicinc.com; web site: www.uicinc.com)

Ultramax Corporation, 35 Oliver Rd., Cincinnati, OH 45215 (513-469-8629; FAX: 513-469-8628; e-mail: ultramax@ultramax.com; web site: www.ultramax.com)

UNIBLOC-PUMP, Inc, Flowtech Div., 1701 Spinks Dr., SE, Marietta, GA 30067-8925 (770-218-8900; FAX: 770-218-8442; e-mail: info@uniblocpump.com; web site: www.uniblocpump.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)

Union Special Corp., One Union Special Plaza, Huntley, IL 60142 (800-344-9698; 847-669-4200; FAX: 847-669-4355; e-mail: sales@unionspecial.com; web site: www.unionspecial.com)

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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; web site: www.flowmeters.com)

Uracia GmbH & Co. KG, Sirchinger Str. 15, Bad Urach, Germany 72574 (07125-133-0; FAX: 07125-133-202; e-mail: info@uracia.de; web site: www.uracia.com)



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US Underwater Services, 101 Northeast Haskew, Burleson, Texas 76028 (800) 860-2178; 817-447-7321; FAX: (817) 447-0021; web site: www.usunderwaterservices.com)

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Valuation and Assets Services, 2108 Carroll Creek View, Frederick, MD 21702 (13016464119; e-mail: projects@valuationandassets.com; web site: www.valuationandassets.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; web site: 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; web site: www.VL-PC.com)

VDMA, Process Plant and Equipment Association, Lyoner Str. 18, Frankfurt am Main, Germany 60528 (+49 69 6603-1432; FAX: +49 69 6603-1421; e-mail: vtma@vdma.org; web site: www.vdma.org)

VEGA Grieshaber KG, Arn Hohenstein 113, Schiltach, Germany 77761 (49-78-36-50-0; FAX: 49-78-36-50-201; e-mail: info.de@vega.com; web site: www.vega.com)

VEGA Americas, Inc., 4170 Rosslyn Drive, Cincinnati, OH 45209 (513 2720131; FAX: 513 2720133; e-mail: americas@vega.com; web site: www.vega-americas.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; web site: 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)

Veolia Water Solutions & Technologies, 250 Airside Drive, Airside Business Park, Moon Township, PA 15108 (412-809-6000; FAX: 412-809-6512; e-mail: water.info@veoliawater.com; web site: www.veoliawater.com)

Viega, 301 N. Main, 9th Floor, Wichita, Kansas 67202 ((316) 425-7400; FAX: (316) 425-7618; e-mail: inside-sales@viega.com; web site: www.viega.com)

Voith Turbo GmbH & Co. KG, Voithstr./ue 1, Crailsheim, Germany 74564 (49-7951-32-0; FAX: 49-7951-32-500; e-mail: industry@voith.com; web site: www.voith.com)

Volian Enterprises, P.O. Box 410, Murrysville, PA 15668 (724-335-3744; FAX: 724-337-9752; e-mail: volianenterprises@volian.com; web site: www.volian.com)

Vortab Company, 1755 La Costa Meadows Drive, San Marcos, CA 92078 (800) 854-9959; (760) 736-6114; FAX: (760) 736-6250; e-mail: FClmarcom@fluidcomponents.com; web site: www.vortab.com)

Vortex, 1725 Vortex Avenue, Salina, KS 67401-1768 (785-825-7177; FAX: 785-825-7194; e-mail: vortex@vortexvalves.com; web site: www.vortexvalves.com)

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WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Walker Magnetics, P.O. Box 20911, Milwaukee, WI 53228 (414-321-9739; FAX: 414-321-9756; e-mail: mormag@earthlink.net; web site: www.walkermagnet.com)

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Watersaver Co., a division of CDI, 5870 E 56th Avenue, Commerce City, CO 80022-3932 (800-525-2424; 303-289-1818; FAX: 303-287-3136; e-mail: sales@watersaver.com; web site: www.watersaver.com)

Watlow, 12001 Lackland Rd., St. Louis, MO 63146 (1-800-928-5692; 314-878-4600; FAX: 314-878-6814; e-mail: inquiry@watlow.com; web site: www.watlow.com)

Werum Software & Systems AG, Wulf-Werum Strasse 3, Lueneburg, Germany 21337 (49-4131-8900-0; FAX: 49-4131-8900-20; e-mail: info@werum.com; web site: www.werum.com)

Werum Software & Systems America, Inc., 5 Sylvan Way, Parsippany, NJ 07054 (973-644-4000; FAX: 973-644-4600; e-mail: info@werum-america.com; web site: www.werum-america.com)

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Western States Machine Co., P.O. Box 327, Hamilton, OH 45012-0327 (513-863-4758; FAX: 513-863-3846; e-mail: sales@westernstates.com; web site: www.westernstates.com)

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Wilhelm Siefert GmbH & Co. KG, Bahnhofstr. 114, Velbert, Germany 42551 (02051/9575-0; FAX: 02051/9575-16; e-mail: info@siefert-trigonal.de; web site: www.siefert-trigonal.de)

Willbros Tank Company, 411 Bayou Dr., Channelview, TX 77530 (713-403-6880; FAX: 281-457-1063; e-mail: david.murchie@willbros.com; web site: www.willbros.com)

William Grant Tank & Vessel, Inc., P O Box 1191, Henderson, Texas 75653 (903) 657-6100; FAX: (903) 657-6200; e-mail: sales@wgtandv.com; web site: www.wgtandv.com)

Williamson Corporation, 70 Domino Dr., Concord, MA 01742 (800-300-8367; 978-369-9607; FAX: 978-369-5485; e-mail: sales@williamsonir.com; web site: www.williamsonir.com)

WinSim Inc., 8653 FM 2759 Rd, Richmond, TX 77469 (281-545-9200; FAX: 281-545-8820; e-mail: sales@winsim.com; web site: www.winsim.com)

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LA, Mark I Equipment, P.O. Box 45121, Baton Rouge 70895 (504-291-5234; FAX: 504-291-5258)

MA, Chamberland Engineering, P.O. Box 310, Sheltonville 02070 (800-687-1136; FAX: 508-883-9978)

MO, Pro-Mark Systems, Inc., 16149 Westwood Business Park, Ellisville 63021 (636-394-8161; FAX: 636-920-1911)

NC, Alternate Systems, 121 Glencurry Dr., Charlotte 28214 (704-399-3000; FAX: 704-399-8896)

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Zeton Inc., 740 Oval Court, Burlington, Ontario, Canada L7L 6A9 (877-299-3866; 905-632-3123; FAX: 905-632-0301; e-mail: pilotplants@zeton.com; web site: www.zeton.com)

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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.



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Tel: 704-597-9070 Fax: 704-583-1610
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Fans, centrifugal

AIRLANCO, Falls City, NE

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Fans, cooling tower

Hudson Products Corp., Houston, TX

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Fans, exhaust or ventilating, general use

Berner International Corp., New Castle, PA

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)

Met-Pro Environmental Air Solutions, Owosso, MI

Nederman USA, Westland, MI

Strobic Air Corporation, a subsidiary of Met-Pro Corp., Harleysville, PA

Fans, explosion resistant

Strobic Air Corporation, a subsidiary of Met-Pro Corp., Harleysville, PA

Fans, heavy duty

Chicago Blower Corp., Glendale Heights, IL

FPZ Inc., Saukville, WI

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)

Luma Comfort, Orange, CA

Strobic Air Corporation, a subsidiary of Met-Pro Corp., Harleysville, PA

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Fans, high temperature

Chicago Blower Corp., Glendale Heights, IL

Strobic Air Corporation, a subsidiary of Met-Pro Corp., Harleysville, PA

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Fans, other

Luma Comfort, Orange, CA

Strobic Air Corporation, a subsidiary of Met-Pro Corp., Harleysville, PA

Fans, portable

Vent-A-Fume, Buffalo, NY

Fans, vane, axial

Strobic Air Corporation, a subsidiary of Met-Pro Corp., Harleysville, PA

FLEXIBLE HOSE, METALLIC & NONMETALLIC

Hose, air

Aflex Hose USA, LLC, Pipersville, PA

NewAge Industries, Inc., Southampton, PA

Swagelok Co., Solon, OH

Hose, chemically resistant

AdvantaPure, Southampton, PA

Aflex Hose USA, LLC, Pipersville, PA

ELAFLEX - Gummi Ehlers GmbH, Hamburg, Germany

NewAge Industries, Inc., Southampton, PA

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Hose, electrically heated

Aflex Hose USA, LLC, Pipersville, PA

Clean Air Express Equipment, Palatine, IL

Clean Air Instrument Rental, Palatine, IL

Hose fittings

AdvantaPure, Southampton, PA

Aflex Hose USA, LLC, Pipersville, PA

ELAFLEX - Gummi Ehlers GmbH, Hamburg, Germany

Green Leaf, Inc., Fontanet, IN

NewAge Industries, Inc., Southampton, PA

Oetiker, Inc., Marlette, MI

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Swagelok Co., Solon, OH

Hose, high pressure

ELAFLEX - Gummi Ehlers GmbH, Hamburg, Germany
Swagelok Co., Solon, OH

Hose, jacketed

AdvantaPure, Southampton, PA

Aflex Hose USA, LLC, Pipersville, PA

Hose, metallic

Proco Products, Inc., Stockton, CA

Swagelok Co., Solon, OH

Hose, nonmetallic, fluoroplastic

Aflex Hose USA, LLC, Pipersville, PA

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Proco Products, Inc., Stockton, CA

Swagelok Co., Solon, OH

Hose, nonmetallic, neoprene

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Hose, nonmetallic, PVC

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Hose, sanitary

AdvantaPure, Southampton, PA

Aflex Hose USA, LLC, Pipersville, PA

Hose, steam

Aflex Hose USA, LLC, Pipersville, PA

Hose, vacuum

AdvantaPure, Southampton, PA

Escitec, Mesa, AZ

NewAge Industries, Inc., Southampton, PA

Hose, water

AdvantaPure, Southampton, PA

NewAge Industries, Inc., Southampton, PA

PIPE FITTINGS & COUPLINGS, METALLIC & NONMETALLIC

Bends, pipe

Bestweld Inc., Socket/ButtWelding Fitting Division, Pottstown, PA

Fr. Jacob Soehne GmbH & Co. KG, Porta Westfalica, NRW, Germany

Viega, Wichita, Kansas

Blinds, pipeline

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)

Caps, pipe

Bestweld Inc., Socket/ButtWelding Fitting Division, Pottstown, PA

Couplings, dry-disconnect

ELAFLEX - Gummi Ehlers GmbH, Hamburg, Germany

Couplings, flexible

Voith Turbo GmbH & Co. KG, Crailsheim, Germany

Couplings, quick connect

CEJN Industrial Corp., Gurnee, Illinois

ELAFLEX - Gummi Ehlers GmbH, Hamburg, Germany

Green Leaf, Inc., Fontanet, IN

Swagelok Co., Solon, OH

Tuf-Lok International, Madison, WI

Couplings, rigid

Bestweld Inc., Socket/ButtWelding Fitting Division, Pottstown, PA

Tuf-Lok International, Madison, WI

Couplings, self aligning

Tuf-Lok International, Madison, WI

Elbows, pipe

Bestweld Inc., Socket/ButtWelding Fitting Division, Pottstown, PA

Green Leaf, Inc., Fontanet, IN

Swagelok Co., Solon, OH

Viega, Wichita, Kansas

Expansion bellows

Croll-Reynolds Engineering Co., Inc., Trumbull, CT
ELAFLEX - Gummi Ehlers GmbH, Hamburg, Germany

Expansion joints, flexible

Croll-Reynolds Engineering Co., Inc., Trumbull, CT
ELAFLEX - Gummi Ehlers GmbH, Hamburg, Germany
EUROINOX GROUP S.r.L., Mortara, Italy
Henderson Industrial Specialties, Waterdown, Ontario, Canada
Proco Products, Inc., Stockton, CA

Expansion joints, swivel

ELAFLEX - Gummi Ehlers GmbH, Hamburg, Germany

Flanges

Chemie Impex Trading, BRAMPTON, Ontario, Canada
ELAFLEX - Gummi Ehlers GmbH, Hamburg, Germany
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)

Viega, Wichita, Kansas

Flow conditioners

Vortab Company, San Marcos, CA

Hangers, pipe & tube

Tuf-Lok International, Madison, WI

Jacketing, pipe

Bestweld Inc., Socket/ButtWelding Fitting Division, Pottstown, PA

Joints, swivel

ELAFLEX - Gummi Ehlers GmbH, Hamburg, Germany

Pipe adapters

Aflex Hose USA, LLC, Pipersville, PA
Fr. Jacob Soehne GmbH & Co. KG, Porta Westfalica, NRW, Germany
Swagelok Co., Solon, OH
Viega, Wichita, Kansas

Pipe fittings, belled end

Bestweld Inc., Socket/ButtWelding Fitting Division, Pottstown, PA

Pipe fittings, emergency repair

Team Industrial Services, Inc., Alvin, TX
Viega, Wichita, Kansas

Pipe fittings, extra length

Bestweld Inc., Socket/ButtWelding Fitting Division, Pottstown, PA

Pipe fittings, graphite

Nantong Fareast Chemical Equipment Co. LTD, International Trading, Nantong, Peoples Rep. of China

Pipe fittings, high pressure

Bestweld Inc., Socket/ButtWelding Fitting Division, Pottstown, PA

KRAISSL CO. INC., 299 Williams Ave., Hackensack, NJ 07601-5225 (800-572-4775; 201-342-0008; FAX: 201-342-0025; e-mail: kraissl@aol.com; web site: www.strainers.com)

Swagelok Co., Solon, OH
Tuf-Lok International, Madison, WI

Pipe fittings, jacketed

Bestweld Inc., Socket/ButtWelding Fitting Division, Pottstown, PA

KRAISSL CO. INC., 299 Williams Ave., Hackensack, NJ 07601-5225 (800-572-4775; 201-342-0008; FAX: 201-342-0025; e-mail: kraissl@aol.com; web site: www.strainers.com)

Pipe fittings, lined

Abresist Kalenborn Corporation, Urbana, IN
Aflex Hose USA, LLC, Pipersville, PA
ZCL Dualam, Inc., Edmonton, Alberta, Canada

Pipe fittings, metallic

Bestweld Inc., Socket/ButtWelding Fitting Division, Pottstown, PA
Chemie Impex Trading, BRAMPTON, Ontario, Canada
Swagelok Co., Solon, OH

Pipe fittings, nonmetallic

CORZAN INDUSTRIAL SYSTEMS, 9911 Brecksville Road, Cleveland, OH 44141 (888-234-2436; 216-447-5000; FAX: 216-447-6211; e-mail: corzancpvc@corzancpvc.com; web site: www.corzancpvc.com)

Green Leaf, Inc., Fontanet, IN
Proco Products, Inc., Stockton, CA

Pipe strainers

Armstrong International, Three Rivers, MI
Croll-Reynolds Engineering Co., Inc., Trumbull, CT
KRAISSL CO. INC., 299 Williams Ave., Hackensack, NJ 07601-5225 (800-572-4775; 201-342-0008; FAX: 201-342-0025; e-mail: kraissl@aol.com; web site: www.strainers.com)

Plugs, pipe

Green Leaf, Inc., Fontanet, IN
Swagelok Co., Solon, OH

Sleeves, pipe

Bestweld Inc., Socket/ButtWelding Fitting Division, Pottstown, PA

Snubbers, pressure

Omega Engineering Inc., An Omega Group Co., Stamford, CT
Swagelok Co., Solon, OH

Surge suppressors

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Unions, pipe

Bestweld Inc., Socket/ButtWelding Fitting Division, Pottstown, PA
Swagelok Co., Solon, OH
Viega, Wichita, Kansas

PIPE, ALLOY STEEL

Pipe, high-alloy steel

TW Metals, Exton, PA

Pipe, nickel & nickel alloy

Corrosion Materials, Baker, LA
TW Metals, Exton, PA
Viega, Wichita, Kansas

Pipe, stainless steel

Fr. Jacob Soehne GmbH & Co. KG, Porta Westfalica, NRW, Germany
TW Metals, Exton, PA
Viega, Wichita, Kansas
Wolseley Industrial Group, Newport News, VA

PIPE, ALUMINUM & ALUMINUM ALLOYS

Pipe, aluminum

TW Metals, Exton, PA

Pipe, aluminum alloy

TW Metals, Exton, PA

PIPE, CARBON STEEL

Pipe, carbon steel, seamless

Wolseley Industrial Group, Newport News, VA

PIPE, LINED

Pipe, ceramic lined

Abresist Kalenborn Corporation, Urbana, IN

Pipe, plastic lined

FABRICATED PLASTICS LIMITED, 2175 TESTON ROAD, MAPLE, Canada L6A 1T3 (905-832-8161; FAX: 905-832-2111; e-mail: info@fabricatedplastics.com; web site: www.fabricatedplastics.com)
Wolseley Industrial Group, Newport News, VA

PIPE, NONMETALLIC

Pipe, graphite

CG Thermal LLC, Twinsburg, Ohio
Nantong Fareast Chemical Equipment Co. LTD, International Trading, Nantong, Peoples Rep. of China

Pipe, hard rubber

Proco Products, Inc., Stockton, CA

Pipe, rubber

Proco Products, Inc., Stockton, CA

PIPE, OTHER

Pipe, ceramic-metal

Abresist Kalenborn Corporation, Urbana, IN

Pipe, containment

Team Industries, Inc., Kaukauna, WI

Pipe, custom fabricated

Abresist Kalenborn Corporation, Urbana, IN
FABRICATED PLASTICS LIMITED, 2175 TESTON ROAD, MAPLE, Canada L6A 1T3 (905-832-8161; FAX: 905-832-2111; e-mail: info@fabricatedplastics.com; web site: www.fabricatedplastics.com)
Team Industries, Inc., Kaukauna, WI
ZCL Dualam, Inc., Edmonton, Alberta, Canada

Pipe, finned

Armstrong Engineering Associates, Inc., West Chester, PA
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)

Pipe, flanged

Abresist Kalenborn Corporation, Urbana, IN
Fr. Jacob Soehne GmbH & Co. KG, Porta Westfalica, NRW, Germany
Team Industries, Inc., Kaukauna, WI

Pipe, jacketed

Team Industries, Inc., Kaukauna, WI

Pipe, prefabricated

Team Industries, Inc., Kaukauna, WI

PIPE, OTHER NONFERROUS METALS

Pipe, sanitary

Team Industries, Inc., Kaukauna, WI

PIPE, PLASTIC

Pipe, chlorinated PVC

CORZAN INDUSTRIAL SYSTEMS, 9911 Brecksville Road, Cleveland, OH 44141 (888-234-2436; 216-447-5000; FAX: 216-447-6211; e-mail: corzancpvc@corzancpvc.com; web site: www.corzancpvc.com)
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Pipe, PTFE

Proco Products, Inc., Stockton, CA

Pipe, vinyl ester - glass

ZCL Dualam, Inc., Edmonton, Alberta, Canada

PUMP PARTS & FITTINGS

Bushings, pump

Scenic Precise Element Inc., Kaohsiung City, Taiwan

Couplings, magnetic

Maag Pump Systems AG, Oberglatt / ZH, Switzerland

Sleeves, pump

Bestweld Inc., Socket/ButtWelding Fitting Division, Pottstown, PA
Thermal Spray Solutions, Inc., Chesapeake, Virginia

PUMPS, CENTRIFUGAL

Pumps, centrifugal, ANSI

CP Pumpen AG, Zofingen, Switzerland
Flowsolve Corp., Irving, TX
GORMAN-RUPP CO., 600 S. Airport Rd., Mansfield, OH 44903 (419-755-1011; FAX: 419-755-1251; e-mail: grsaes@gormanrupp.com; web site: www.gormanrupp.com)
GRI Pumps, Bellville, OH
Hermetic-Pumpen GmbH, Gundelfingen, 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)
Met-Pro Global Pump Solutions, Telford, PA
National Pump Company, Glendale, AZ
Richter Chemie-Technik GmbH, Kempen, Germany

Pumps, centrifugal, double suction

Flowserve Corp., Irving, TX
WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Pumps, centrifugal, dry running

CP Pumpen AG, Zofingen, Switzerland
 Met-Pro Global Pump Solutions, Telford, PA

Pumps, centrifugal, inline

CP Pumpen AG, Zofingen, Switzerland
 Flowserve Corp., Irving, TX
 Met-Pro Global Pump Solutions, Telford, PA
 Omega Engineering Inc., An Omega Group Co., Stamford, CT
 Pacer Pumps, Div. of ASM Industries Inc., Lancaster, PA

Pumps, centrifugal, multistage

CP Pumpen AG, Zofingen, Switzerland
 Dickow Pump Co., Marietta, GA
 Flowserve Corp., Irving, TX
 Omega Engineering Inc., An Omega Group Co., Stamford, CT
 OSNA-Pumpen GmbH, Osnabrueck

Pumps, centrifugal, process, medium duty

CP Pumpen AG, Zofingen, Switzerland
 Flowserve Corp., Irving, TX
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.gormanrupp.com)
 Met-Pro Global Pump Solutions, Telford, PA
 Omega Engineering Inc., An Omega Group Co., Stamford, CT

Pumps, centrifugal, self-priming

CP Pumpen AG, Zofingen, Switzerland
 Dickow Pump Co., Marietta, GA
 Flowserve Corp., Irving, TX
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.gormanrupp.com)
 Hermetic-Pumpen GmbH, Gundelfingen, Germany
 Mefiag, Met-Pro Corp., Owosso, MI
 Met-Pro Global Pump Solutions, Telford, PA
 National Pump Company, Glendale, AZ
 Omega Engineering Inc., An Omega Group Co., Stamford, CT
 OSNA-Pumpen GmbH, Osnabrueck
 Pacer Pumps, Div. of ASM Industries Inc., Lancaster, PA

Pumps, centrifugal, single stage

CP Pumpen AG, Zofingen, Switzerland
 Dickow Pump Co., Marietta, GA
 Flowserve Corp., Irving, TX
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.gormanrupp.com)
 GRI Pumps, Bellville, OH
 Mefiag, Met-Pro Corp., Owosso, MI
 Met-Pro Global Pump Solutions, Telford, PA
 Omega Engineering Inc., An Omega Group Co., Stamford, CT
 OSNA-Pumpen GmbH, Osnabrueck

Pumps, leakproof

CP Pumpen AG, Zofingen, Switzerland
 Dickow Pump Co., Marietta, GA
 FELUWA Pumpen GmbH, Muerlenbach, Germany
 Flowserve Corp., Irving, TX
 Hermetic-Pumpen GmbH, Gundelfingen, Germany
 Met-Pro Global Pump Solutions, Telford, PA
 Omega Engineering Inc., An Omega Group Co., Stamford, CT

Pumps, propeller

Flowserve Corp., Irving, TX
 Friatec AG, Äi Division Rheinhtte Pumpen, Wiesbaden, Germany
 National Pump Company, Glendale, AZ
 Omega Engineering Inc., An Omega Group Co., Stamford, CT

Pumps, screw centrifugal

Busch LLC, Virginia Beach, VA

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Pumps, turbine

Flowserve Corp., Irving, TX
 Met-Pro Global Pump Solutions, Telford, PA
 National Pump Company, Glendale, AZ
 Omega Engineering Inc., An Omega Group Co., Stamford, CT
WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

PUMPS, LINED

Pumps, ceramic lined

Abresist Kalenborn Corporation, Urbana, IN
 CP Pumpen AG, Zofingen, Switzerland
 Fluid Metering, Inc., Syosset, NY

Pumps, other lined

BOERGER PUMPS, 2860 Water Tower Place, Chanhasen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)

Pumps, plastic lined

CP Pumpen AG, Zofingen, Switzerland
 Flowserve Corp., Irving, TX
 Fluid Metering, Inc., Syosset, NY
 Friatec AG, Äi Division Rheinhtte Pumpen, Wiesbaden, Germany
 Richter Chemie-Technik GmbH, Kempen, Germany

Pumps, rubber lined

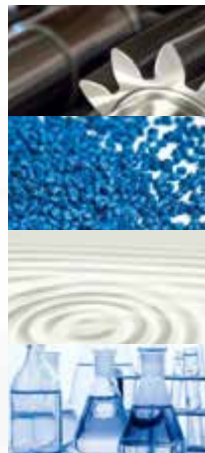
NETZSCH Pumpen & Systeme GmbH, Waldkraiburg, Germany

PUMPS, OTHER

Pumps, acid, corrosive

BJM Pumps, LLC, Old Saybrook, CT
BOERGER PUMPS, 2860 Water Tower Place, Chanhasen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)
 CP Pumpen AG, Zofingen, Switzerland
 Dickow Pump Co., Marietta, GA
 Flowserve Corp., Irving, TX
 Fluid Metering, Inc., Syosset, NY
 Friatec AG, Äi Division Rheinhtte Pumpen, Wiesbaden, Germany
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.gormanrupp.com)
 GRI Pumps, Bellville, OH
 Hermetic-Pumpen GmbH, Gundelfingen, Germany
 JLS International, Inc., Charlotte, NC
 Maag Pump Systems AG, Oberglatt / ZH, Switzerland
 Met-Pro Global Pump Solutions, Telford, PA
 NETZSCH Pumpen & Systeme GmbH, Waldkraiburg, Germany
 Omega Engineering Inc., An Omega Group Co., Stamford, CT
 Pacer Pumps, Div. of ASM Industries Inc., Lancaster, PA
 Plast-O-Matic Valves Inc., Cedar Grove, NJ
 Richter Chemie-Technik GmbH, Kempen, Germany
 seepex GmbH, Bottrop, Germany
 sera ProDos GmbH, Immenhausen, Germany
 Uraca GmbH & Co. KG, Bad Urach, Germany

High precision gear pumps for the chemical and polymer industry.



The **CHEM** gear pump can be used for a wide range applications from low to high viscosity. It is well suited for high temperature, vacuum inlet conditions and high discharge pressure. Applications can range from liquid metering to basic transfer tasks.

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info@witte-pumps.de
 www.witte-pumps.de



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Steinweg 44a, D-25436 Uetersen, Georgia, Germany
(49-4122-92870; FAX: 49-4122-928749; e-mail: info@witte-pumps.de; web site: www.witte-pumps.de)

Pumps, air driven

BOERGER PUMPS, 2860 Water Tower Place, Chanhasen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.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)

GORMAN-RUPP CO., 600 S. Airport Rd., Mansfield, OH 44903 (419-755-1011; FAX: 419-755-1251; e-mail: gsales@gormanrupp.com; web site: www.gormanrupp.com)

Met-Pro Global Pump Solutions, Telford, PA
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Pacer Pumps, Div. of ASM Industries Inc., Lancaster, PA
Plast-O-Matic Valves Inc., Cedar Grove, NJ

Pumps, axial flow

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Pumps, battery-powered

Fluid Metering, Inc., Syosset, NY

Pumps, carboy or drum

Met-Pro Global Pump Solutions, Telford, PA
NETZSCH Pumpen & Systeme GmbH, Waldkraiburg, Germany
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Pacer Pumps, Div. of ASM Industries Inc., Lancaster, PA

Pumps, channel impeller

BJM Pumps, LLC, Old Saybrook, CT

Pumps, condensate return

Armstrong International, Three Rivers, MI
Flowserve Corp., Irving, TX

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)

Omega Engineering Inc., An Omega Group Co., Stamford, CT

OSNA-Pumpen GmbH, Osnabrueck

TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Pumps, cryogenic

Busch LLC, Virginia Beach, VA
Flowserve Corp., Irving, TX

Pumps, disc

BOERGER PUMPS, 2860 Water Tower Place, Chanhasen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)

Pumps, dry vacuum

EDWARDS US HEADQUARTERS, 6416 Inducon Drive West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)

E-Vac Technologies, LLC, McMurray, PA
GEA Process Engineering, Columbia, MD
Northey Technologies Ltd., Poole, Dorset
Pfeiffer Vacuum, Inc., Nashua, NH
Pfeiffer Vacuum GmbH, Asslar, Germany
Tuthill Vacuum & Blower Systems, Springfield, MO

Pumps, explosion proof

BJM Pumps, LLC, Old Saybrook, CT
Boerger GmbH, Borken-Weseke, Germany

BOERGER PUMPS, 2860 Water Tower Place, Chanhasen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)

CP Pumpen AG, Zofingen, Switzerland

EDWARDS US HEADQUARTERS, 6416 Inducon Drive West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)

Fluid Metering, Inc., Syosset, NY

Met-Pro Global Pump Solutions, Telford, PA

Nash, a Gardner Denver Product, Bentleyville, PA

WITTE PUMPEN & TECHNOLOGY GMBH, Esinger
Steinweg 44a, D-25436 Uetersen, Georgia, Germany
(49-4122-92870; FAX: 49-4122-928749; e-mail: info@witte-pumps.de; web site: www.witte-pumps.de)

Pumps, flexible impeller

Cole-Parmer, Vernon Hills, IL
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Pumps, gas mixing

GEA Process Engineering, Columbia, MD
Schutte & Koerting, Trevese, PA

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: gsales@gormanrupp.com; web site: www.gormanrupp.com)

Grosvenor Pumps Limited, Camborne, Cornwall
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Pacer Pumps, Div. of ASM Industries Inc., Lancaster, PA

Pumps, high pressure

Beamex, Inc., Marietta, GA
Compressor Products International, Stafford, TX
Dickow Pump Co., Marietta, GA

FELUWA Pumpen GmbH, Muerlenbach, Germany

Flowserve Corp., Irving, TX

Grosvenor Pumps Limited, Camborne, Cornwall

Hammelmann Corp., Dayton, OH

JLS International, Inc., Charlotte, NC

Maag Pump Systems AG, Oberglatt / ZH, Switzerland

NETZSCH Pumpen & Systeme GmbH, Waldkraiburg, Germany

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Uracca GmbH & Co. KG, Bad Urach, Germany

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

WITTE PUMPEN & TECHNOLOGY GMBH, Esinger
Steinweg 44a, D-25436 Uetersen, Georgia, Germany
(49-4122-92870; FAX: 49-4122-928749; e-mail: info@witte-pumps.de; web site: www.witte-pumps.de)

Pumps, jacketed

BOERGER PUMPS, 2860 Water Tower Place, Chanhasen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)

CP Pumpen AG, Zofingen, Switzerland

Dickow Pump Co., Marietta, GA

Flowserve Corp., Irving, TX

Hermetic-Pumpen GmbH, Gundelfingen, Germany

Maag Pump Systems AG, Oberglatt / ZH, Switzerland

NETZSCH Pumpen & Systeme GmbH, Waldkraiburg, Germany

UNIBLOC-PUMP, Inc, Flowtech Div., Marietta, GA

WITTE PUMPEN & TECHNOLOGY GMBH, Esinger
Steinweg 44a, D-25436 Uetersen, Georgia, Germany
(49-4122-92870; FAX: 49-4122-928749; e-mail: info@witte-pumps.de; web site: www.witte-pumps.de)

Pumps, magnetically driven

CP Pumpen AG, Zofingen, Switzerland

Dickow Pump Co., Marietta, GA

Flowserve Corp., Irving, TX

Friatec AG, Äi Division Rheinhytite Pumpen, Wiesbaden, Germany

GORMAN-RUPP CO., 600 S. Airport Rd., Mansfield, OH 44903 (419-755-1011; FAX: 419-755-1251; e-mail: gsales@gormanrupp.com; web site: www.gormanrupp.com)

GRI Pumps, Bellville, OH

JLS International, Inc., Charlotte, NC

Maag Pump Systems AG, Oberglatt / ZH, Switzerland

Mefiag, Met-Pro Corp., Owosso, MI

Met-Pro Global Pump Solutions, Telford, PA

NETZSCH Pumpen & Systeme GmbH, Waldkraiburg, Germany

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Pfeiffer Vacuum GmbH, Asslar, Germany
sera ProDos GmbH, Immenhausen, Germany

WITTE PUMPEN & TECHNOLOGY GMBH, Esinger
Steinweg 44a, D-25436 Uetersen, Georgia, Germany
(49-4122-92870; FAX: 49-4122-928749; e-mail: info@witte-pumps.de; web site: www.witte-pumps.de)

Pumps, mixed flow

BOERGER PUMPS, 2860 Water Tower Place, Chanhasen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)

Fluid Metering, Inc., Syosset, NY
GEA Process Engineering, Columbia, MD
National Pump Company, Glendale, AZ
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Pumps, oil free

Busch LLC, Virginia Beach, VA
CP Pumpen AG, Zofingen, Switzerland
EDWARDS US HEADQUARTERS, 6416 Inducon Drive West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)

Nash, a Gardner Denver Product, Bentleyville, PA
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Pfeiffer Vacuum, Inc., Nashua, NH
Pfeiffer Vacuum GmbH, Asslar, Germany
Siemens, Industry USA, Solutions, Automation and Drives Technologies, Alpharetta, GA
Tuthill Vacuum & Blower Systems, Springfield, MO

Pumps, open impeller

CP Pumpen AG, Zofingen, Switzerland
Flowserve Corp., Irving, TX
GRI Pumps, Bellville, OH
Met-Pro Global Pump Solutions, Telford, PA
Pacer Pumps, Div. of ASM Industries Inc., Lancaster, PA

Pumps, other

BOERGER PUMPS, 2860 Water Tower Place, Chanhasen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)

CP Pumpen AG, Zofingen, Switzerland

Elmridge Inc., Livonia, MI

GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen, Germany 76275 (49-7243-7050; FAX: 49-7243-705330; e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)

Hermetic-Pumpen GmbH, Gundelfingen, Germany

Met-Pro Global Pump Solutions, Telford, PA

Nash, a Gardner Denver Product, Bentleyville, PA

UNIBLOC-PUMP, Inc, Flowtech Div., Marietta, GA

Pumps, peristaltic

BIOENGINEERING INC., Two Canal Park, 5th Floor, Cambridge, Massachusetts 02141 (001 781 672 2620; FAX: 001 781 672 2626; e-mail: info@bioengineering-inc.com; web site: www.bioengineering-inc.com/www.bioengineering.ch)

Cole-Parmer, Vernon Hills, IL

GRI Pumps, Bellville, OH

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Xiril AG, Hombrechtikon, Switzerland

Pumps, pressure powered

TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

Pumps, recessed impeller

Flowserve Corp., Irving, TX

GORMAN-RUPP CO., 600 S. Airport Rd., Mansfield, OH 44903 (419-755-1011; FAX: 419-755-1251; e-mail: gsales@gormanrupp.com; web site: www.gormanrupp.com)

GRI Pumps, Bellville, OH

Met-Pro Global Pump Solutions, Telford, PA

Pumps, sealless

CP Pumpen AG, Zofingen, Switzerland

Flowserve Corp., Irving, TX

Friatec AG, Äi Division Rheinhytite Pumpen, Wiesbaden, Germany

GRI Pumps, Bellville, OH

JLS International, Inc., Charlotte, NC

Mefiag, Met-Pro Corp., Owosso, MI

Met-Pro Global Pump Solutions, Telford, PA

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Richter Chemie-Technik GmbH, Kempen, Germany

Pumps, sludge

Boerger GmbH, Borken-Weseke, Germany

BOERGER PUMPS, 2860 Water Tower Place, Chanhasen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)

FELUWA Pumpen GmbH, Muerlenbach, Germany
Flowsolve Corp., Irving, TX

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.gorman-rupp.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)

Met-Pro Global Pump Solutions, Telford, PA

NETZSCH Pumpen & Systeme GmbH, Waldkraiburg, Germany

Newman Regency Group, Stafford, TX

seepex GmbH, Bottrop, Germany

seepex Inc., Enon, OH

Pumps, slurry

BJM Pumps, LLC, Old Saybrook, CT

Boerger GmbH, Borken-Weseke, Germany

BOERGER PUMPS, 2860 Water Tower Place, Chanhasen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)

CP Pumpen AG, Zofingen, Switzerland

FELUWA Pumpen GmbH, Muerlenbach, Germany

Flowsolve Corp., Irving, TX

Fluid Metering, Inc., Syosset, NY

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.gorman-rupp.com)

GRI Pumps, Bellville, 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)

Met-Pro Global Pump Solutions, Telford, PA

Metso Minerals Industries, Inc., York, PA

NETZSCH Pumpen & Systeme GmbH, Waldkraiburg, Germany

seepex GmbH, Bottrop, Germany

seepex Inc., Enon, OH

Uracca GmbH & Co. KG, Bad Urach, Germany

Pumps, spiral-vane impeller

BOERGER PUMPS, 2860 Water Tower Place, Chanhasen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)

Pumps, transfer

GRI Pumps, Bellville, OH

Hermetic-Pumpen GmbH, Gundelfingen, Germany

JLS International, 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)

Maag Pump Systems AG, Oberglatt / ZH, Switzerland

Met-Pro Global Pump Solutions, Telford, PA

Pumps, water

BOERGER PUMPS, 2860 Water Tower Place, Chanhasen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)

Dickow Pump Co., Marietta, GA

Fluid Metering, Inc., Syosset, NY

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.gorman-rupp.com)

GRI Pumps, Bellville, OH

Hammelmann Corp., Dayton, OH

Hermetic-Pumpen GmbH, Gundelfingen, Germany

Met-Pro Global Pump Solutions, Telford, PA

National Pump Company, Glendale, AZ

NETZSCH Pumpen & Systeme GmbH, Waldkraiburg, Germany

Omega Engineering Inc., An Omega Group Co., Stamford, CT

OSNA-Pumpen GmbH, Osnabrueck

Pacer Pumps, Div. of ASM Industries Inc., Lancaster, PA

seepex Inc., Enon, OH

Uracca GmbH & Co. KG, Bad Urach, Germany

PUMPS, PROPORTIONING

Pumps, diaphragm (proportioning)

GRI Pumps, Bellville, OH

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Pumps, metering

Analytical Measurements, Chester, NJ

Cole-Parmer, Vernon Hills, IL

Fluid Metering, Inc., Syosset, NY

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.gorman-rupp.com)

GRI Pumps, Bellville, OH

JLS International, Inc., Charlotte, NC

Maag Pump Systems AG, Oberglatt / ZH, Switzerland

Nordson SEALANT EQUIPMENT, Plymouth, MI

Omega Engineering Inc., An Omega Group Co., Stamford, CT

PDC Machines, Inc., Warminster, PA

Plast-O-Matic Valves Inc., Cedar Grove, NJ

seepex GmbH, Bottrop, Germany

seepex Inc., Enon, OH

WITTE PUMPEN & TECHNOLOGY GMBH, Esinger Steinweg 44a, D-25436 Uetersen, Georgia, Germany (49-4122-92870; FAX: 49-4122-928749; e-mail: info@witte-pumps.de; web site: www.witte-pumps.de)

Pumps, plunger

Fluid Metering, Inc., Syosset, NY

Omega Engineering Inc., An Omega Group Co., Stamford, CT

PUMPS, RECIPROCATING

Pumps, diaphragm (reciprocating)

Cole-Parmer, Vernon Hills, IL

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.gorman-rupp.com)

GRI Pumps, Bellville, OH

Grosvenor Pumps Limited, Camborne, Cornwall

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Pfeiffer Vacuum GmbH, Asslar, Germany

sera ProDos GmbH, Immenhausen, Germany

Pumps, piston

Compressor Products International, Stafford, TX

EDWARDS US HEADQUARTERS, 6416 Inducon Drive West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)

Fluid Metering, Inc., Syosset, NY

Grosvenor Pumps Limited, Camborne, Cornwall

Nordson SEALANT EQUIPMENT, Plymouth, MI

OSNA-Pumpen GmbH, Osnabrueck

Plast-O-Matic Valves Inc., Cedar Grove, NJ

sera ProDos GmbH, Immenhausen, Germany

Uracca GmbH & Co. KG, Bad Urach, Germany

Pumps, piston-diaphragm

FELUWA Pumpen GmbH, Muerlenbach, Germany

Omega Engineering Inc., An Omega Group Co., Stamford, CT

sera ProDos GmbH, Immenhausen, Germany

Pumps, plunger

Grosvenor Pumps Limited, Camborne, Cornwall

Hammelmann Corp., Dayton, 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)

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Uracca GmbH & Co. KG, Bad Urach, Germany

PUMPS, ROTARY

Pumps, gear

BOERGER PUMPS, 2860 Water Tower Place, Chanhasen, 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: grsales@gormanrupp.com; web site: www.gorman-rupp.com)

GRI Pumps, Bellville, OH

JLS International, Inc., Charlotte, NC

Maag Pump Systems AG, Oberglatt / ZH, Switzerland

Nordson SEALANT EQUIPMENT, Plymouth, MI

Omega Engineering Inc., An Omega Group Co., Stamford, CT

UNIBLOC-PUMP, Inc, Flowtech Div., Marietta, GA

WITTE PUMPEN & TECHNOLOGY GMBH, Esinger Steinweg 44a, D-25436 Uetersen, Georgia, Germany (49-4122-92870; FAX: 49-4122-928749; e-mail: info@witte-pumps.de; web site: www.witte-pumps.de)

Pumps, helical

BOERGER PUMPS, 2860 Water Tower Place, Chanhasen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)

WITTE PUMPEN & TECHNOLOGY GMBH, Esinger Steinweg 44a, D-25436 Uetersen, Georgia, Germany (49-4122-92870; FAX: 49-4122-928749; e-mail: info@witte-pumps.de; web site: www.witte-pumps.de)

Pumps, lobe

Boerger GmbH, Borken-Weseke, Germany



Rotary Lobe Pumps in the
Global Chemical Industry!



MIP = Maintenance In Place
www.boerger.com

BOERGER PUMPS, 2860 Water Tower Place, Chanhasen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)

EDWARDS US HEADQUARTERS, 6416 Inducon Drive West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)

E-Vac Technologies, LLC, McMurray, PA

UNIBLOC-PUMP, Inc, Flowtech Div., Marietta, GA

Pumps, progressing cavity

BOERGER PUMPS, 2860 Water Tower Place, Chanhasen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)

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NETZSCH Pumpen & Systeme GmbH, Waldkraiburg, Germany

seepex GmbH, Bottrop, Germany

seepex Inc., Enon, OH

Pumps, rotary helical gear

Boerger GmbH, Borken-Weseke, Germany

BOERGER PUMPS, 2860 Water Tower Place, Chanhasen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)

JLS International, Inc., Charlotte, NC

Maag Pump Systems AG, Oberglatt / ZH, Switzerland

Omega Engineering Inc., An Omega Group Co., Stamford, CT

WITTE PUMPEN & TECHNOLOGY GMBH, Esinger Steinweg 44a, D-25436 Uetersen, Georgia, Germany (49-4122-92870; FAX: 49-4122-928749; e-mail: info@witte-pumps.de; web site: www.witte-pumps.de)

Pumps, rotary herringbone

JLS International, Inc., Charlotte, NC

Maag Pump Systems AG, Oberglatt / ZH, Switzerland

WITTE PUMPEN & TECHNOLOGY GMBH, Esinger Steinweg 44a, D-25436 Uetersen, Georgia, Germany (49-4122-92870; FAX: 49-4122-928749; e-mail: info@witte-pumps.de; web site: www.witte-pumps.de)

Pumps, rotary liquid ring

EDWARDS US HEADQUARTERS, 6416 Inducon Drive West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)

Nash, a Gardner Denver Product, Bentleyville, PA

Pumps, rotary piston

Boerger GmbH, Borken-Weseke, Germany

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)

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E-Vac Technologies, LLC, McMurray, PA

Pumps, rotary positive displacement

Boerger GmbH, Borken-Weseke, Germany

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)

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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.gormanrupp.com)

KRAISSL CO. INC., 299 Williams Ave., Hackensack, NJ 07601-5225 (800-572-4775; 201-342-0008; FAX: 201-342-0025; e-mail: kraissl@aol.com; web site: www.strainers.com)

Maag Pump Systems AG, Oberglatt / ZH, Switzerland
Nordson SEALANT EQUIPMENT, Plymouth, MI
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Pfeiffer Vacuum, Inc., Nashua, NH

Pfeiffer Vacuum GmbH, Asslar, Germany

seepex GmbH, Bottrop, Germany

UNIBLOC-PUMP, Inc., Flowtech Div., Marietta, GA

WITTE PUMPEN & TECHNOLOGY GMBH, Esinger

Steinweg 44a, D-25436 Uetersen, Georgia, Germany (49-4122-92870; FAX: 49-4122-928749; e-mail: info@witte-pumps.de; web site: www.witte-pumps.de)

Pumps, rotary sliding vane

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)

EDWARDS US HEADQUARTERS, 6416 Inducon Drive West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)

Pumps, screw

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)

EDWARDS US HEADQUARTERS, 6416 Inducon Drive West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)

E-Vac Technologies, LLC, McMurray, PA

Newman Regency Group, Stafford, TX

PUMPS, SPECIAL MATERIALS

Pumps, ceramic

CP Pumpen AG, Zofingen, Switzerland

Fluid Metering, Inc., Syosset, NY

Friatec AG, Äi Division Rheinw^ätte Pumpen, Wiesbaden, Germany

WITTE PUMPEN & TECHNOLOGY GMBH, Esinger

Steinweg 44a, D-25436 Uetersen, Georgia, Germany (49-4122-92870; FAX: 49-4122-928749; e-mail: info@witte-pumps.de; web site: www.witte-pumps.de)

Pumps, fiberglass-reinforced plastic

BJM Pumps, LLC, Old Saybrook, CT

Met-Pro Global Pump Solutions, Telford, PA

Pumps, graphite

Nantong Fareast Chemical Equipment Co. LTD, International Trading, Nantong, Peoples Rep. of China

Pumps, nickel-based alloy

CP Pumpen AG, Zofingen, Switzerland

Dickow Pump Co., Marietta, GA

Flowserve Corp., Irving, TX

JLS International, Inc., Charlotte, NC

NETZSCH Pumpen & Systeme GmbH, Waldkraiburg, Germany

seepex Inc., Enon, OH

WITTE PUMPEN & TECHNOLOGY GMBH, Esinger

Steinweg 44a, D-25436 Uetersen, Georgia, Germany (49-4122-92870; FAX: 49-4122-928749; e-mail: info@witte-pumps.de; web site: www.witte-pumps.de)

Pumps, nonmetallic

CP Pumpen AG, Zofingen, Switzerland

Flowserve Corp., Irving, TX

Met-Pro Global Pump Solutions, Telford, PA

Pumps, other special materials

Boerger GmbH, Borken-Weseke, Germany

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)

CP Pumpen AG, Zofingen, Switzerland

Friatec AG, Äi Division Rheinw^ätte Pumpen, Wiesbaden, Germany

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.gormanrupp.com)

GRI Pumps, Bellville, OH

Hermetic-Pumpen GmbH, Gundelfingen, Germany

JLS International, Inc., Charlotte, NC

Maag Pump Systems AG, Oberglatt / ZH, Switzerland

Met-Pro Global Pump Solutions, Telford, PA

NETZSCH Pumpen & Systeme GmbH, Waldkraiburg, Germany

Omega Engineering Inc., An Omega Group Co., Stamford, CT

OSNA-Pumpen GmbH, Osnabrueck

seepex Inc., Enon, OH

WITTE PUMPEN & TECHNOLOGY GMBH, Esinger

Steinweg 44a, D-25436 Uetersen, Georgia, Germany (49-4122-92870; FAX: 49-4122-928749; e-mail: info@witte-pumps.de; web site: www.witte-pumps.de)

Pumps, plastic

BJM Pumps, LLC, Old Saybrook, CT

CP Pumpen AG, Zofingen, Switzerland

Flowserve Corp., Irving, TX

Fluid Metering, Inc., Syosset, NY

Friatec AG, Äi Division Rheinw^ätte Pumpen, Wiesbaden, Germany

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.gormanrupp.com)

GRI Pumps, Bellville, OH

Mefiag, Met-Pro Corp., Owosso, MI

Met-Pro Global Pump Solutions, Telford, PA

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Pacer Pumps, Div. of ASM Industries Inc., Lancaster, PA

Plast-O-Matic Valves Inc., Cedar Grove, NJ

Pumps, stainless steel

BJM Pumps, LLC, Old Saybrook, CT

Boerger GmbH, Borken-Weseke, Germany

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)

CP Pumpen AG, Zofingen, Switzerland

Dickow Pump Co., Marietta, GA

Flowserve Corp., Irving, TX

Fluid Metering, Inc., Syosset, NY

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.gormanrupp.com)

GRI Pumps, Bellville, OH

Hermetic-Pumpen GmbH, Gundelfingen, Germany

JLS International, Inc., Charlotte, NC

Maag Pump Systems AG, Oberglatt / ZH, Switzerland

Nash, a Gardner Denver Product, Bentleyville, PA

National Pump Company, Glendale, AZ

NETZSCH Pumpen & Systeme GmbH, Waldkraiburg, Germany

Nordson SEALANT EQUIPMENT, Plymouth, MI

Omega Engineering Inc., An Omega Group Co., Stamford, CT

OSNA-Pumpen GmbH, Osnabrueck

Pacer Pumps, Div. of ASM Industries Inc., Lancaster, PA

seepex Inc., Enon, OH

UNIBLOC-PUMP, Inc., Flowtech Div., Marietta, GA

Uracca GmbH & Co. KG, Bad Urach, Germany

WITTE PUMPEN & TECHNOLOGY GMBH, Esinger

Steinweg 44a, D-25436 Uetersen, Georgia, Germany (49-4122-92870; FAX: 49-4122-928749; e-mail: info@witte-pumps.de; web site: www.witte-pumps.de)

Pumps, tantalum

JLS International, Inc., Charlotte, NC

WITTE PUMPEN & TECHNOLOGY GMBH, Esinger

Steinweg 44a, D-25436 Uetersen, Georgia, Germany (49-4122-92870; FAX: 49-4122-928749; e-mail: info@witte-pumps.de; web site: www.witte-pumps.de)

Pumps, titanium

CP Pumpen AG, Zofingen, Switzerland

Flowserve Corp., Irving, TX

Hermetic-Pumpen GmbH, Gundelfingen, Germany

JLS International, Inc., Charlotte, NC

Met-Pro Global Pump Solutions, Telford, PA

NETZSCH Pumpen & Systeme GmbH, Waldkraiburg, Germany

seepex Inc., Enon, OH

WITTE PUMPEN & TECHNOLOGY GMBH, Esinger

Steinweg 44a, D-25436 Uetersen, Georgia, Germany (49-4122-92870; FAX: 49-4122-928749; e-mail: info@witte-pumps.de; web site: www.witte-pumps.de)

Pumps, zirconium

JLS International, Inc., Charlotte, NC

WITTE PUMPEN & TECHNOLOGY GMBH, Esinger

Steinweg 44a, D-25436 Uetersen, Georgia, Germany (49-4122-92870; FAX: 49-4122-928749; e-mail: info@witte-pumps.de; web site: www.witte-pumps.de)

PUMPS, VACUUM & EJECTOR

Aspiration systems

Advanced Cyclone Systems, S. A., Porto, Portugal

CP Pumpen AG, Zofingen, Switzerland

Pumps, jet, sanitary

Fox Valve Development Corp., Dover, NJ

GEA Process Engineering, Columbia, MD

Pumps, vacuum, dry

Busch LLC, Virginia Beach, VA

EDWARDS US HEADQUARTERS, 6416 Inducon Drive West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)

EquipNet, Inc., Canton, MA

Escitec, Mesa, AZ

E-Vac Technologies, LLC, McMurray, PA

GEA Process Engineering, Columbia, MD

Northey Technologies Ltd., Poole, Dorset

Pfeiffer Vacuum GmbH, Asslar, Germany

Schutte & Koerting, Trevose, PA

Tuthill Vacuum & Blower Systems, Springfield, MO

Pumps, vacuum, liquid ring

Busch LLC, Virginia Beach, VA

EDWARDS US HEADQUARTERS, 6416 Inducon Drive West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)

E-Vac Technologies, LLC, McMurray, PA

Nash, a Gardner Denver Product, Bentleyville, PA

Tuthill Vacuum & Blower Systems, Springfield, MO

Pumps, vacuum, once-through-oil

Busch LLC, Virginia Beach, VA

Pumps, vacuum, other

Busch LLC, Virginia Beach, VA

Compressor Products International, Stafford, TX

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)

EDWARDS US HEADQUARTERS, 6416 Inducon Drive West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)

E-Vac Technologies, LLC, McMurray, PA

FPZ Inc., Saukville, WI

Friatec AG, Äi Division Rheinw^ätte Pumpen, Wiesbaden, Germany

GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen, Germany 76275 (49-7243-7050; FAX: 49-7243-705330; e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)

KOERTING HANNOVER AG, Badenstedter Str. 56, Hannover, Germany 30453 (0511-2129-0; FAX: 0511-2129-223; e-mail: st@koerting.de; web site: www.koerting.de)

Northey Technologies Ltd., Poole, Dorset

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Pfeiffer Vacuum, Inc., Nashua, NH

Pfeiffer Vacuum GmbH, Asslar, Germany

TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

Tuthill Vacuum & Blower Systems, Springfield, MO

Pumps, vacuum, rotary piston

EDWARDS US HEADQUARTERS, 6416 Inducon Drive West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)

E-Vac Technologies, LLC, McMurray, PA
Tuthill Vacuum & Blower Systems, Springfield, MO

Steam jet ejectors

CROLL REYNOLDS
Process Vacuum | Air Pollution Control

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, 6416 Inducon Drive West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)

Elmridge Inc., Livonia, MI

Fox Valve Development Corp., Dover, NJ

GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen, Germany 76275 (49-7243-7050; FAX: 49-7243-705330; e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)

GEA Process Engineering, Columbia, MD

KOERTING HANNOVER AG, Badenstedter Str. 56, Hannover, Germany 30453 (0511-2129-0; FAX: 0511-2129-223; e-mail: st@koerting.de; web site: www.koerting.de)

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, 6416 Inducon Drive West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)

E-Vac Technologies, LLC, McMurray, PA

GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen, Germany 76275 (49-7243-7050; FAX: 49-7243-705330; e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)

GEA Process Engineering, Columbia, MD

KOERTING HANNOVER AG, Badenstedter Str. 56, Hannover, Germany 30453 (0511-2129-0; FAX: 0511-2129-223; e-mail: st@koerting.de; web site: www.koerting.de)

Pfeiffer Vacuum, Inc., Nashua, NH

Schutte & Koerting, Treviso, PA

Tuthill Vacuum & Blower Systems, Springfield, MO

PUMPS, VERTICAL & DEEP WELL

Pumps, dewatering, submersible

BJM Pumps, LLC, Old Saybrook, CT

Pumps, packless

Flowserve Corp., Irving, TX

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Pumps, submersible

BJM Pumps, LLC, Old Saybrook, CT

Boerger GmbH, Borken-Weseke, Germany

BOERGER PUMPS, 2860 Water Tower Place, Chanhasen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)

Flowserve Corp., Irving, TX

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.gormanrupp.com)

National Pump Company, Glendale, AZ

NETZSCH Pumpen & Systeme GmbH, Waldkraiburg, Germany

seepex GmbH, Bottrop, Germany

Pumps, sump

BJM Pumps, LLC, Old Saybrook, CT

CP Pumpen AG, Zofingen, Switzerland

Flowserve Corp., Irving, TX

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.gormanrupp.com)

Met-Pro Global Pump Solutions, Telford, PA

NETZSCH Pumpen & Systeme GmbH, Waldkraiburg,

Germany

Omega Engineering Inc., An Omega Group Co., Stamford, CT

OSNA-Pumpen GmbH, Osnabrueck

Pumps, vertical centrifugal

CP Pumpen AG, Zofingen, Switzerland

Flowserve Corp., Irving, TX

Friatec AG, Äi Division Rheinhytite Pumpen, Wiesbaden, Germany

GRI Pumps, Bellville, OH

Met-Pro Global Pump Solutions, Telford, PA

Pumps, vertical inline

BOERGER PUMPS, 2860 Water Tower Place, Chanhasen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)

CP Pumpen AG, Zofingen, Switzerland

Greene, Tweed & Co. Ltd., Nottingham, Notts

National Pump Company, Glendale, AZ

seepex Inc., Enon, OH

Pumps, vertical turbine

National Pump Company, Glendale, AZ

SEALS, GASKETS & PACKING MATERIALS

Gaskets, fluoroplastic

Proco Products, Inc., Stockton, CA

Gaskets, molded

Apple Rubber Products, Lancaster, NY

Topog-E Gasket Co., Tulsa, OK

Gaskets, O-ring

Apple Rubber Products, Lancaster, NY

Gaskets, ring

Gore / W. L. Gore & Associates GmbH, Putzbrunn, Bavaria, Germany

Gaskets, rubber

Apple Rubber Products, Lancaster, NY

Proco Products, Inc., Stockton, CA

Topog-E Gasket Co., Tulsa, OK

Gaskets, sheet

Gore / W. L. Gore & Associates GmbH, Putzbrunn, Bavaria, Germany

Topog-E Gasket Co., Tulsa, OK

Gaskets, silicone

Apple Rubber Products, Lancaster, NY

Dow Corning Corporation, Midland, MI

Mechanical Seals and Sealing Material

Scenic Precise Element Inc., Kaohsiung City, Taiwan

Packings, carbon

HOERBIGER KOMPRESSORTECHNIK HOLDING GMBH, Donau-City-Str./ue 1, Vienna, Austria A-1220 (+43 1 22 440-0; FAX: +43 1 22 440 990; e-mail: info-hkth@hoerbiger.com; web site: www.hoerbiger.com)

Packings, fluoroplastic

HOERBIGER KOMPRESSORTECHNIK HOLDING GMBH, Donau-City-Str./ue 1, Vienna, Austria A-1220 (+43 1 22 440-0; FAX: +43 1 22 440 990; e-mail: info-hkth@hoerbiger.com; web site: www.hoerbiger.com)

Packings, molded

Compressor Products International, Stafford, TX

Packings, plastic

HOERBIGER KOMPRESSORTECHNIK HOLDING GMBH, Donau-City-Str./ue 1, Vienna, Austria A-1220 (+43 1 22 440-0; FAX: +43 1 22 440 990; e-mail: info-hkth@hoerbiger.com; web site: www.hoerbiger.com)

Packings, pump

Gore / W. L. Gore & Associates GmbH, Putzbrunn, Bavaria, Germany

ZCL Dualam, Inc., Edmonton, Alberta, Canada

Packings, random

HOERBIGER KOMPRESSORTECHNIK HOLDING GMBH, Donau-City-Str./ue 1, Vienna, Austria A-1220 (+43 1 22 440-0; FAX: +43 1 22 440 990; e-mail: info-hkth@hoerbiger.com; web site: www.hoerbiger.com)

Packings, ring

Compressor Products International, Stafford, TX

HOERBIGER KOMPRESSORTECHNIK HOLDING GMBH, Donau-City-Str./ue 1, Vienna, Austria A-1220 (+43 1 22 440-0; FAX: +43 1 22 440 990; e-mail: info-hkth@hoerbiger.com; web site: www.hoerbiger.com)

Packings, shaft

Gore / W. L. Gore & Associates GmbH, Putzbrunn, Bavaria, Germany

Packings, structured

SULZER CHEMTECH USA, INC., 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rodneymarlio@sulzer.com; web site: www.sulzer.com)

Packings, valve stem

Gore / W. L. Gore & Associates GmbH, Putzbrunn, Bavaria, Germany

Seals, balanced pressure

Scenic Precise Element Inc., Kaohsiung City, Taiwan

Seals, bearing

AEGIS Bearing Protection Rings, Mechanic Falls, ME

Greene, Tweed & Co., Kulpville, PA

Greene, Tweed & Co. Ltd., Nottingham, Notts

Scenic Precise Element Inc., Kaohsiung City, Taiwan

Seals, bellows

Scenic Precise Element Inc., Kaohsiung City, Taiwan

Seals, diaphragm

WIKI Instrument, LP, Lawrenceville, GA

Körting
The Ejector Company

Production Program

- Jet ejectors
- Condensers
- Vacuum pump sets
- Vacuum cooling systems
- Low temperature condensation systems
- Venturi- and jet scrubbers



Körting Hannover AG
www.koerting.de
st@koerting.de



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Seals, mechanical

Compressor Products International, Stafford, TX
Dalau Inc, Merrimack, NH

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)

EUROINOX GROUP S.r.L, Mortara, Italy
OSNA-Pumpen GmbH, Osnabrueck
Scenic Precise Element Inc., Kaohsiung City, Taiwan

Seals, noncontacting

Scenic Precise Element Inc., Kaohsiung City, Taiwan

Seals, shaft

Dresser-Rand, Corporate Headquarters, Houston, TX
Greene, Tweed & Co., Kulpville, PA
Greene, Tweed & Co. Ltd., Nottingham, Notts
Scenic Precise Element Inc., Kaohsiung City, Taiwan

Seals, spring

Greene, Tweed & Co., Kulpville, PA
Greene, Tweed & Co. Ltd., Nottingham, Notts

STEAM TRAPS

Steam traps, disc

Armstrong International, Three Rivers, MI
TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

Steam traps, float

Armstrong International, Three Rivers, MI
TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

Steam traps, float & thermostatic

Armstrong International, Three Rivers, MI
TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

Steam traps, inverted bucket

Armstrong International, Three Rivers, MI
TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

Steam traps, orifice devices

CU Services LLC, Elk Grove Village, IL

Steam traps, thermostatic

Armstrong International, Three Rivers, MI
TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

TANKS & OTHER LIQUID STORAGE VESSELS

Bulk liquid storage services

Chattanooga Boiler and Tank Co., Chattanooga, TN
Gilbert Industries, Sparta, MO
Imperial Industries Inc., Wausau, WI
TankLink, a wholly-owned subsidiary of Tetular Corporation, Chicago, IL
ThyssenKrupp Uhde GmbH, Dortmund, Germany
Total Energy, North Salem, NY

Spheres, high-pressure gas

ThyssenKrupp Uhde GmbH, Dortmund, Germany

Tank cleaning & removal

Total Energy, North Salem, NY

Tank fittings & accessories

Assmann Corp. of America, Garrett, IN
BS & B Safety Systems, Inc., Tulsa, OK
Fisher Tank Co., Chester, PA
Green Leaf, Inc., Fontanet, IN
TankScan, Brainerd, MN
ZCL Dualam, Inc., Edmonton, Alberta, Canada

Tanks, air

Advance Boiler & Tank Co., West Allis, WI
EUROINOX GROUP S.r.L, Mortara, Italy
Team Industries, Inc., Kaukauna, WI

Tanks, aluminum

Chattanooga Boiler and Tank Co., Chattanooga, TN

Imperial Industries Inc., Wausau, WI

Tanks, bladder

Nier Systems Inc, Boca Raton, Florida

Tanks, carbon steel

Advance Boiler & Tank Co., West Allis, WI
Bascale Company, Inc., Houston, TX
Charles Ross & Son Co., Hauppauge, NY
Chattanooga Boiler and Tank Co., Chattanooga, TN
Fisher Tank Co., Chester, PA
Gilbert Industries, Sparta, MO
Imperial Industries Inc., Wausau, WI
Metano IBC Services, Inc., Perrineville, NJ
Midwest Steel Company Inc, Houston, Texas
Myers Engineering, Bell, CA
Niles Steel Tank, Ambler, PA
Team Industries, Inc., Kaukauna, WI
ThyssenKrupp Uhde GmbH, Dortmund, Germany
Willbros Tank Company, Channelview, TX

Tanks, cryogenic

Gilbert Industries, Sparta, MO
Pope Scientific, Inc., Saukville, WI
SIAD Macchine Impianti, Bergamo, Italy
ThyssenKrupp Uhde GmbH, Dortmund, Germany
Total Energy, North Salem, NY

Tanks, cryogenic, vacuum jacketed

Charles Ross & Son Co., Hauppauge, NY
Pope Scientific, Inc., Saukville, WI
SIAD Macchine Impianti, Bergamo, Italy

Tanks, custom fabricated

Advance Boiler & Tank Co., West Allis, WI
Assmann Corp. of America, Garrett, IN
Bascale Company, Inc., Houston, TX
Charles Ross & Son Co., Hauppauge, NY
Chattanooga Boiler and Tank Co., Chattanooga, TN
EquipNet, Inc., Canton, MA
FABRICATED PLASTICS LIMITED, 2175 TESTON ROAD, MAPLE, Canada L6A 1T3 (905-832-8161; FAX: 905-832-2111; e-mail: info@fabricatedplastics.com; web site: www.fabricatedplastics.com)

Fisher Tank Co., Chester, PA
Gilbert Industries, Sparta, MO
Imperial Industries Inc., Wausau, WI
INOX-TECH INC., 6705 Route 132, Ste. Catherine, Canada J5C1B6 (800-361-0319 North America; 450-638-5441; FAX: 450-638-2865; e-mail: info@inox-tech.com; web site: www.inox-tech.com)

Met-Pro Environmental Air Solutions, Owosso, MI
Niles Steel Tank, Ambler, PA
Pope Scientific, Inc., Saukville, WI
Team Industries, Inc., Kaukauna, WI
Willbros Tank Company, Channelview, TX
ZCL Dualam, Inc., Edmonton, Alberta, Canada

Tanks, dimple jacketed

Charles Ross & Son Co., Hauppauge, NY
Chattanooga Boiler and Tank Co., Chattanooga, TN
Myers Engineering, Bell, CA
Pope Scientific, Inc., Saukville, WI
Team Industries, Inc., Kaukauna, WI

Tanks, dome roof

Fisher Tank Co., Chester, PA
Met-Pro Environmental Air Solutions, Owosso, MI
Willbros Tank Company, Channelview, TX

Tanks, double containment

Assmann Corp. of America, Garrett, IN
Chattanooga Boiler and Tank Co., Chattanooga, TN
Fisher Tank Co., Chester, PA
Team Industries, Inc., Kaukauna, WI
ThyssenKrupp Uhde GmbH, Dortmund, Germany
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
Dudrick Inc., Streetsboro, OH
Imperial Industries Inc., Wausau, WI

Tanks, field-erected

Assmann Corp. of America, Garrett, IN
Fisher Tank Co., Chester, PA
Gilbert Industries, Sparta, MO
INOX-TECH INC., 6705 Route 132, Ste. Catherine, Canada J5C1B6 (800-361-0319 North America; 450-638-5441; FAX: 450-638-2865; e-mail: info@inox-tech.com; web site: www.inox-tech.com)
Topp Industries, Inc., Rochester, IN
Willbros Tank Company, Channelview, TX

Tanks, floating roof

Fisher Tank Co., Chester, PA

Tanks, galvanized

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, Garrett, IN
INOX-TECH INC., 6705 Route 132, Ste. Catherine, Canada J5C1B6 (800-361-0319 North America; 450-638-5441; FAX: 450-638-2865; e-mail: info@inox-tech.com; web site: www.inox-tech.com)
Pope Scientific, Inc., Saukville, WI
Willbros Tank Company, Channelview, TX

Tanks, internal floating deck

Willbros Tank Company, Channelview, TX

Tanks, mixing

Assmann Corp. of America, Garrett, IN
Bascale Company, Inc., Houston, TX
Charles Ross & Son Co., Hauppauge, NY
Chattanooga Boiler and Tank Co., Chattanooga, TN
EquipNet, Inc., Canton, MA
Gilbert Industries, Sparta, MO
LOTUS MIXERS INC., Osprey, FL
Metano IBC Services, Inc., Perrineville, NJ
Myers Engineering, Bell, CA
Pope Scientific, Inc., Saukville, WI

Tanks, nickel or nickel alloys

Chattanooga Boiler and Tank Co., Chattanooga, TN
CHRG Metals, Houston, TX
EUROINOX GROUP S.r.L, Mortara, Italy
Team Industries, Inc., Kaukauna, WI
Willbros Tank Company, Channelview, TX

Tanks, other

Fisher Tank Co., Chester, PA
ThyssenKrupp Uhde GmbH, Dortmund, Germany
Total Energy, North Salem, NY

Tanks, phenolic lined

Advance Boiler & Tank Co., West Allis, WI
Chattanooga Boiler and Tank Co., Chattanooga, TN

Tanks, polyester-fiberglass

ZCL Dualam, Inc., Edmonton, Alberta, Canada

Tanks, polyethylene

Assmann Corp. of America, Garrett, IN
Metano IBC Services, Inc., Perrineville, NJ
Nier Systems Inc, Boca Raton, Florida
Process Solutions, Riviera Beach, FL

Tanks, polypropylene

Met-Pro Environmental Air Solutions, Owosso, MI
Nier Systems Inc, Boca Raton, Florida

Tanks, pressurized storage

Advance Boiler & Tank Co., West Allis, WI
Charles Ross & Son Co., Hauppauge, NY
Chattanooga Boiler and Tank Co., Chattanooga, TN
Gilbert Industries, Sparta, MO
Imperial Industries Inc., Wausau, WI
Pope Scientific, Inc., Saukville, WI

Tanks, PVC

Met-Pro Environmental Air Solutions, Owosso, MI

Tanks, refrigerated

ThyssenKrupp Uhde GmbH, Dortmund, Germany

Tanks, rubber lined

Advance Boiler & Tank Co., West Allis, WI
Chattanooga Boiler and Tank Co., Chattanooga, TN

Tanks, stainless steel

Advance Boiler & Tank Co., West Allis, WI
Bascale Company, Inc., Houston, TX
Charles Ross & Son Co., Hauppauge, NY
Chattanooga Boiler and Tank Co., Chattanooga, TN
CHRG Metals, Houston, TX
Enerquip, LLC, Medford, WI
EquipNet, Inc., Canton, MA
EUROINOX GROUP S.r.L, Mortara, Italy
Fisher Tank Co., Chester, PA
Gilbert Industries, Sparta, MO
Imperial Industries Inc., Wausau, WI
Metano IBC Services, Inc., Perrineville, NJ
Midwest Steel Company Inc, Houston, Texas

Mueller GmbH, Rheinfelden, Germany
Myers Engineering, Bell, CA
Niles Steel Tank, Ambler, PA
Pope Scientific, Inc., Saukville, WI
Process Solutions, Riviera Beach, FL
Team Industries, Inc., Kaukauna, WI

Tanks, stainless steel, lined

Chattanooga Boiler and Tank Co., Chattanooga, TN
Pope Scientific, Inc., Saukville, WI
Team Industries, Inc., Kaukauna, WI

Tanks, tapered wall

Charles Ross & Son Co., Hauppauge, NY

Tanks, vinyl ester - fiberglass

FABRICATED PLASTICS LIMITED, 2175 TESTON ROAD, MAPLE, Canada L6A 1T3 (905-832-8161; FAX: 905-832-2111; e-mail: info@fabricatedplastics.com; web site: www.fabricatedplastics.com)

Topp Industries, Inc., Rochester, IN

Tanks, water

Assmann Corp. of America, Garrett, IN
Bascale Company, Inc., Houston, TX
Fisher Tank Co., Chester, PA
Nier Systems Inc, Boca Raton, Florida

TUBING & TUBE FITTINGS, METALLIC & NONMETALLIC

Coils, tubing

Qosina, Edgewood, NY

Tube fittings

CPI Wirecloth & Screens Inc, Pearland, TX
Fluid Line Products Inc., Willoughby, OH
Fr. Jacob Soehne GmbH & Co. KG, Porta Westfalica, NRW, Germany

Green Leaf, Inc., Fontanet, IN
NewAge Industries, Inc., Southampton, PA
Oetiker, Inc., Marlette, MI
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Qosina, Edgewood, NY
Swagelok Co., Solon, OH

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)

Viega, Wichita, Kansas

Tube sheets

CHRG Metals, Houston, TX

Tubing, condenser

Hudson Products Corp., Houston, TX

Tubing, ferrous

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Tubing, finned

Armstrong Engineering Associates, Inc., West Chester, PA
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)

Hudson Products Corp., Houston, TX

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)

Hudson Products Corp., Houston, TX

SAINT-GOBAIN CERAMICS/STRUCTURAL CERAMICS, 23 Acheson Dr., Niagra Falls, NY 14303 (716-278-6233; FAX: 716-278-2373; e-mail: scd.sales@saint-gobain.com; web site: www.hexoloy.com)

Tubing, high pressure

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Tubing, high temperature

NewAge Industries, Inc., Southampton, PA
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Tubing, instrument

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Tubing, nonferrous

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Tubing, nonmetallic

Creative Pultrusions, Inc., Alum Bank, PA
Omega Engineering Inc., An Omega Group Co., Stamford, CT

SAINT-GOBAIN CERAMICS/STRUCTURAL CERAMICS, 23 Acheson Dr., Niagra Falls, NY 14303 (716-278-6233; FAX: 716-278-2373; e-mail: scd.sales@saint-gobain.com; web site: www.hexoloy.com)

Tubing, plastic

AdvantaPure, Southampton, PA
Associated Bag Company, Milwaukee, WI
NewAge Industries, Inc., Southampton, PA
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Qosina, Edgewood, NY
Swagelok Co., Solon, OH

Tubing, pneumatic

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Tubing, refractory

SAINT-GOBAIN CERAMICS/STRUCTURAL CERAMICS, 23 Acheson Dr., Niagra Falls, NY 14303 (716-278-6233; FAX: 716-278-2373; e-mail: scd.sales@saint-gobain.com; web site: www.hexoloy.com)

Tubing, rubber

AdvantaPure, Southampton, PA
NewAge Industries, Inc., Southampton, PA
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Tubing, seamless

Omega Engineering Inc., An Omega Group Co., Stamford, CT
Swagelok Co., Solon, OH
TW Metals, Exton, PA

Tubing, silicone

AdvantaPure, Southampton, PA
NewAge Industries, Inc., Southampton, PA
Qosina, Edgewood, NY

Tubing, vacuum

AdvantaPure, Southampton, PA
Escittec, Mesa, AZ
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Tubing, welded

Fr. Jacob Soehne GmbH & Co. KG, Porta Westfalica, NRW, Germany
TW Metals, Exton, PA

U-bends, tube

Fr. Jacob Soehne GmbH & Co. KG, Porta Westfalica, NRW, Germany

VALVES

Valve-locking devices

Apollo Valves, Matthews, North Carolina
Conbraco Industries, Inc., Matthews, NC

Valve parts & fittings

Chemie Impex Trading, BRAMPTON, Ontario, Canada
Flowserve Corp., Irving, TX
Green Leaf, Inc., Fontanet, IN
HOERBIGER KOMPRESSORTECHNIK HOLDING GMBH, Donau-City-Strasse 1, Vienna, Austria A-1220 (+43 1 22 440-0; FAX: +43 1 22 440 990; e-mail: info-hkh@hoerbiger.com; web site: www.hoerbiger.com)

PBM Valves Inc., Irwin, PA

Valves, air

Apollo Valves, Matthews, North Carolina
Clark-Cooper Division, of Magnatrol Valve Corporation, Cinnaminson, NJ
Conbraco Industries, Inc., Matthews, NC
Magnatrol Valve Corp., Hawthorne, NJ
Parker Hannifin Corp., Parker Fluid Control Division, New Britain, CT
Plast-O-Matic Valves Inc., Cedar Grove, NJ
SAMSON Controls, Inc., Baytown, TX

Valves, airlock flap-gate

GEA Process Engineering, Columbia, MD

Valves, airlock rotary

AIRLANCO, Falls City, NE
Coperion GmbH, Weingarten, Wuertt., Germany
GEA Process Engineering, Columbia, MD
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)
Prater-Sterling, Bollingbrook, IL

Valves, angle

Arca-Regler GmbH, Toenisvorst, Germany
Buerkert Fluid Control Systems, Ingelfingen
Burkert Fluid Control Systems, Charlotte, NC
Cashco, Inc., Ellsworth, KS
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)

OHL Guterath Industrial Valves GmbH, Altenstadt, Germany
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Parker Hannifin Corp., Parker Fluid Control Division, New Britain, CT

Plast-O-Matic Valves Inc., Cedar Grove, NJ
SAMSON Controls, Inc., Baytown, TX
Swagelok Co., Solon, OH

Valves, backflow

Apollo Valves, Matthews, North Carolina
Conbraco Industries, Inc., Matthews, NC

Valves, ball

A-T Controls Inc., Cincinnati, OH
Apollo Valves, Matthews, North Carolina
Conbraco Industries, Inc., Matthews, NC
EDWARDS US HEADQUARTERS, 6416 Inducon Drive West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)

Ernst Flow Industries, Farmingdale, NJ
Flodyne Controls Inc., Murray Hill, NJ
Flowsolve Corp., Flow Control Div., Cookeville, TN
Flowsolve Corp., Irving, TX
Fluid Line Products Inc., Willoughby, OH
Forum - Valve Solutions, Stafford, TX
Green Leaf, Inc., Fontanet, 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)

Lumaco Sanitary Valves, Hackensack, NJ
Omega Engineering Inc., An Omega Group Co., Stamford, CT

PBM Valves Inc., Irwin, PA
Plast-O-Matic Valves Inc., Cedar Grove, NJ
Richter Chemie-Technik GmbH, Kempen, Germany
SAMSON Controls, Inc., Baytown, TX
Swagelok Co., Solon, OH
Viega, Wichita, Kansas
Walseley Industrial Group, Newport News, VA

Valves, bellows sealed

Arca-Regler GmbH, Toenisvorst, Germany
BIAR Sampling Systems, Gonzales, LA
Cashco, Inc., Ellsworth, KS
Conval, Inc., Somers, CT
Plast-O-Matic Valves Inc., Cedar Grove, NJ
Richter Chemie-Technik GmbH, Kempen, Germany
SAMSON Controls, Inc., Baytown, TX
Steri Technologies Inc., Bohemia, NY
Swagelok Co., Solon, OH

Valves, butterfly

Apollo Valves, Matthews, North Carolina
Cashco, Inc., Ellsworth, KS
Conbraco Industries, Inc., Matthews, NC
EDWARDS US HEADQUARTERS, 6416 Inducon Drive West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)

Flowsolve Corp., Flow Control Div., Cookeville, TN
Flowsolve Corp., Irving, TX
Forum - Valve Solutions, Stafford, TX
Henderson Industrial Specialties, Waterdown, Ontario, Canada

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)

Lumaco Sanitary Valves, Hackensack, NJ
Met-Pro Global Pump Solutions, Telford, PA
M. O. Industries, Whippany, NJ

Mueller GmbH, Rheinfelden, Germany
OHL Guterath Industrial Valves GmbH, Altenstadt, Germany

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Posi-flate, St. Paul, MN

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Richter Chemie-Technik GmbH, Kempen, Germany
SAMSON Controls, Inc., Baytown, TX
UNIBLOC-PUMP, Inc, Flowtech Div., Marietta, GA
Vortex, Salina, KS
Wolsley Industrial Group, Newport News, VA

Valves, cage

Cashco, Inc., Ellsworth, KS
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)

Valves, ceramic lined

Flowserve Corp., Irving, TX
SAMSON Controls, Inc., Baytown, TX

Valves, check

Conval, Inc., Somers, CT
CPI Wirecloth & Screens Inc, Pearland, TX
Flowserve Corp., Irving, TX
Fluid Line Products Inc., Willoughby, OH
Forum - Valve Solutions, Stafford, TX
GRI Pumps, Bellville, OH
Henderson Industrial Specialties, Waterdown, Ontario, Canada

HOERBIGER KOMPRESSORTECHNIK HOLDING GMBH, Donau-City-StraÙe 1, Vienna, Austria A-1220 (+43 1 22 440-0; FAX: +43 1 22 440 990; e-mail: info-hkth@hoerbiger.com; web site: www.hoerbiger.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)

KRAISSEL CO. INC., 299 Williams Ave., Hackensack, NJ 07601-5225 (800-572-4775; 201-342-0008; FAX: 201-342-0025; e-mail: kraissel@aol.com; web site: www.strainers.com)

Lumaco Sanitary Valves, Hackensack, NJ
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Plast-O-Matic Valves Inc., Cedar Grove, NJ
Qosina, Edgewood, NY
Schutte & Koerting, Trevoise, PA
Swagelok Co., Solon, OH

TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

UNIBLOC-PUMP, Inc, Flowtech Div., Marietta, GA
Wolsley Industrial Group, Newport News, VA

Valves, control, electric

A-T Controls Inc., Cincinnati, OH
Auma Actuators Inc., Pittsburgh, PA
AUMA Riester GmbH & Co. KG, Muellheim, Germany
Cashco, Inc., Ellsworth, KS
Clark-Cooper Division, of Magnatrol Valve Corporation, Cinnaminson, NJ
Flowserve Corp., Irving, TX
Henderson Industrial Specialties, Waterdown, Ontario, Canada
Indelac Controls, Inc., Florence, KY
Magnatrol Valve Corp., Hawthorne, NJ
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Plast-O-Matic Valves Inc., Cedar Grove, NJ
SAMSON Controls, Inc., Baytown, TX

Valves, control, hydraulic

Parker Hannifin Corp., Parker Fluid Control Division, New Britain, CT
Plast-O-Matic Valves Inc., Cedar Grove, NJ
SAMSON Controls, Inc., Baytown, TX

Valves, control, pneumatic

Arca-Regler GmbH, Toenisvorst, Germany
Armstrong International, Three Rivers, MI
Buerkert Fluid Control Systems, Ingelfingen
Buerkert Fluid Control Systems, Charlotte, NC
Cashco, Inc., Ellsworth, KS
Flowserve Corp., Irving, TX
GE Energy, Houston, TX
Henderson Industrial Specialties, Waterdown, Ontario, Canada

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)

Indelac Controls, Inc., Florence, KY
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Parker Hannifin Corp., Parker Fluid Control Division, New Britain, CT
Plast-O-Matic Valves Inc., Cedar Grove, NJ
Posi-flate, St. Paul, MN
SAMSON Controls, Inc., Baytown, TX
Wolsley Industrial Group, Newport News, VA

Valves, control, regulator

Cashco, Inc., Ellsworth, KS
CPI Wirecloth & Screens Inc, Pearland, TX
Flowserve Corp., Irving, TX
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Plast-O-Matic Valves Inc., Cedar Grove, NJ
SAMSON Controls, Inc., Baytown, TX
TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

Valves, control, solenoid

ASCO Numatics, Scherpenzeel, Netherlands
Buerkert Fluid Control Systems, Ingelfingen
Buerkert Fluid Control Systems, Charlotte, NC
Clark-Cooper Division, of Magnatrol Valve Corporation, Cinnaminson, NJ
Flowserve Corp., Irving, TX
Magnatrol Valve Corp., Hawthorne, NJ
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Parker Hannifin Corp., Parker Fluid Control Division, New Britain, CT
Plast-O-Matic Valves Inc., Cedar Grove, NJ
SAMSON Controls, Inc., Baytown, TX

Valves, cryogenic

Badger Meter Europa GmbH, Neuffen, Germany
Cashco, Inc., Ellsworth, KS
Clark-Cooper Division, of Magnatrol Valve Corporation, Cinnaminson, NJ
Conval, Inc., Somers, CT
Flodyne Controls Inc., Murray Hill, NJ
Flowserve Corp., Irving, TX
Forum - Valve Solutions, Stafford, TX
Magnatrol Valve Corp., Hawthorne, NJ
SAMSON Controls, Inc., Baytown, TX

Valves, deluge

Clark-Cooper Division, of Magnatrol Valve Corporation, Cinnaminson, NJ

Valves, diaphragm

ASCO Numatics, Scherpenzeel, Netherlands
Buerkert Fluid Control Systems, Ingelfingen
Buerkert Fluid Control Systems, Charlotte, NC
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)

Kemutec Group, Inc., Bristol, PA
Midwesco Filter Resources, Inc., Winchester, VA
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Plast-O-Matic Valves Inc., Cedar Grove, NJ
Richter Chemie-Technik GmbH, Kempen, Germany
SAMSON Controls, Inc., Baytown, TX
Swagelok Co., Solon, OH
UNIBLOC-PUMP, Inc, Flowtech Div., Marietta, GA

Valves, diverter

Arca-Regler GmbH, Toenisvorst, Germany
Bascale Company, Inc., Houston, TX
Flodyne Controls Inc., Murray Hill, NJ
Flowserve Corp., Irving, TX
GEA Process Engineering, Columbia, MD
JLS International, Inc., Charlotte, NC
Lumaco Sanitary Valves, Hackensack, NJ
Maag Pump Systems AG, Oberglatt / ZH, Switzerland
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)
OHL Gutermuth Industrial Valves GmbH, Altenstadt, Germany
Plast-O-Matic Valves Inc., Cedar Grove, NJ
SAMSON Controls, Inc., Baytown, TX
Vortex, Salina, KS

Valves, double block & bleed

Flowserve Corp., Irving, TX
OHL Gutermuth Industrial Valves GmbH, Altenstadt, Germany
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; FAX: 713-941-1086; e-mail: info@usaindustries.com; web site: www.usaindustries.com)
Wolsley Industrial Group, Newport News, VA

Valves, flush-bottom tank

Flowserve Corp., Irving, TX
JLS International, Inc., Charlotte, NC
PBM Valves Inc., Irwin, PA

Valves, gate

Bascale Company, Inc., Houston, TX
Conval, Inc., Somers, CT

Coperion GmbH, Weingarten, Wuertt., Germany
 Flowsolve Corp., Raleigh, North Carolina
 Forum - Valve Solutions, Stafford, TX
 GEA Process Engineering, Columbia, 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.com)

Omega Engineering Inc., An Omega Group Co., Stamford, CT
 Vortex, Salina, KS
 Wolseley Industrial Group, Newport News, VA

Valves, glass

De Dietrich Process Systems GmbH, Mainz, 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)

Valves, glass lined

Glasslined Technology, Inc., Greensboro, Georgia

Valves, globe

Arca-Regler GmbH, Toenisvorst, Germany
 Cashco, Inc., Ellsworth, KS
 Clark-Cooper Division, of Magnatrol Valve Corporation, Cinnaminson, NJ
 Conval, Inc., Somers, CT
 Flowsolve Corp., Raleigh, North Carolina
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)
 Magnatrol Valve Corp., Hawthorne, NJ
 Omega Engineering Inc., An Omega Group Co., Stamford, CT
 Plast-O-Matic Valves Inc., Cedar Grove, NJ
 SAMSON Controls, Inc., Baytown, TX
 Swagelok Co., Solon, OH

Valves, heat actuated, fail safe

OHL Gutermuth Industrial Valves GmbH, Altenstadt, Germany
 Omega Engineering Inc., An Omega Group Co., Stamford, CT

Valves, high pressure

Arca-Regler GmbH, Toenisvorst, Germany
 ASCO Numatics, Scherpenzeel, Netherlands
 Badger Meter Europa GmbH, Neuffen, Germany
 Clark-Cooper Division, of Magnatrol Valve Corporation, Cinnaminson, NJ
 Conval, Inc., Somers, CT
 Coperion GmbH, Weingarten, Wuertt., Germany
 CPI Wirecloth & Screens Inc., Pearland, TX
FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)

Flodyne Controls Inc., Murray Hill, NJ
 Flowsolve Corp., Irving, TX
 Fluid Line Products Inc., Willoughby, OH
 Forum - Valve Solutions, Stafford, TX
HOERBIGER KOMPRESSORTECHNIK HOLDING GMBH, Donau-City-Strasse 1, Vienna, Austria A-1220 (+43 1 22 440-0; FAX: +43 1 22 440 990; e-mail: info-hkth@hoerbiger.com; web site: www.hoerbiger.com)
 JLS International, Inc., Charlotte, NC
 Nordson SEALANT EQUIPMENT, Plymouth, MI
 Omega Engineering Inc., An Omega Group Co., Stamford, CT

Posi-flate, St. Paul, MN
 SAMSON Controls, Inc., Baytown, TX
 Schutte & Koerting, Treviso, PA
 Sentry Equipment Corp., Oconomowoc, WI
 Swagelok Co., Solon, OH
TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

Vortex, Salina, KS
WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, 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, high temperature

Arca-Regler GmbH, Toenisvorst, Germany
 ASCO Numatics, Scherpenzeel, Netherlands
 Clark-Cooper Division, of Magnatrol Valve Corporation, Cinnaminson, NJ
 Conval, Inc., Somers, CT
 Flowsolve Corp., Irving, TX
 Forum - Valve Solutions, Stafford, TX

HOERBIGER KOMPRESSORTECHNIK HOLDING GMBH, Donau-City-Strasse 1, Vienna, Austria A-1220 (+43 1 22 440-0; FAX: +43 1 22 440 990; e-mail: info-hkth@hoerbiger.com; web site: www.hoerbiger.com)

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JLS International, Inc., Charlotte, NC
 Omega Engineering Inc., An Omega Group Co., Stamford, CT
 Parker Hannifin Corp., Parker Fluid Control Division, New Britain, CT

SAMSON Controls, Inc., Baytown, TX
 Swagelok Co., Solon, OH
TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)
 Vortex, Salina, KS

Valves, hopper

Bascale Company, Inc., Houston, TX
 Posi-flate, St. Paul, MN

Valves, iris

Kemutec Group, Inc., Bristol, PA
 Vortex, Salina, KS

Valves, jacketed

Apollo Valves, Matthews, North Carolina
 Conbraco Industries, Inc., Matthews, NC
 Flowsolve Corp., Irving, TX
 JLS International, Inc., Charlotte, NC
 OHL Gutermuth Industrial Valves GmbH, Altenstadt, Germany
 SAMSON Controls, Inc., Baytown, TX

Valves, knife-gate

Bascale Company, Inc., Houston, TX
 Vortex, Salina, KS

Valves, metal seated

Cashco, Inc., Ellsworth, KS
 Conval, Inc., Somers, CT
 Flowsolve Corp., Flow Control Div., Cookeville, TN
 Flowsolve Corp., Irving, TX
 Forum - Valve Solutions, Stafford, TX
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)
 JLS International, Inc., Charlotte, NC
 OHL Gutermuth Industrial Valves GmbH, Altenstadt, Germany
 Omega Engineering Inc., An Omega Group Co., Stamford, CT
 Posi-flate, St. Paul, MN
 SAMSON Controls, Inc., Baytown, TX
 Wolseley Industrial Group, Newport News, VA

Valves, mixing

Arca-Regler GmbH, Toenisvorst, Germany
 Flowsolve Corp., Irving, TX
 Nordson SEALANT EQUIPMENT, Plymouth, MI
 OHL Gutermuth Industrial Valves GmbH, Altenstadt, Germany
 Omega Engineering Inc., An Omega Group Co., Stamford, CT
 PBM Valves Inc., Irwin, PA
 SAMSON Controls, Inc., Baytown, TX

Valves, motor operated

Conval, Inc., Somers, CT
 Flodyne Controls Inc., Murray Hill, NJ
 Flowsolve Corp., Raleigh, North Carolina
 Omega Engineering Inc., An Omega Group Co., Stamford, CT
 PBM Valves Inc., Irwin, PA
 SAMSON Controls, Inc., Baytown, TX
TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

Valves, multiport

Flodyne Controls Inc., Murray Hill, NJ
 Flowsolve Corp., Flow Control Div., Cookeville, TN
 Flowsolve Corp., Irving, TX
 Fluid Line Products Inc., Willoughby, OH
 Hilliard Corp., Elmira, NY
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)
 JLS International, Inc., Charlotte, NC

KRAISSL CO. INC., 299 Williams Ave., Hackensack, NJ 07601-5225 (800-572-4775; 201-342-0008; FAX: 201-342-0025; e-mail: kraissl@aol.com; web site: www.strainers.com)

Lumaco Sanitary Valves, Hackensack, NJ
 Omega Engineering Inc., An Omega Group Co., Stamford, CT
 PBM Valves Inc., Irwin, PA
 Plast-O-Matic Valves Inc., Cedar Grove, NJ
 SAMSON Controls, Inc., Baytown, TX
 Swagelok Co., Solon, OH
 Vortex, Salina, KS

Valves, needle

Chemie Impex Trading, BRAMPTON, Ontario, Canada
 CPI Wirecloth & Screens Inc., Pearland, TX
 Fluid Line Products Inc., Willoughby, OH
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)

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Qosina, Edgewood, NY
 SAMSON Controls, Inc., Baytown, TX
 Swagelok Co., Solon, OH

Valves, nuclear

Flowsolve Corp., Raleigh, North Carolina

Valves, other

BIAR Sampling Systems, Gonzales, LA
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)
 Magnatrol Valve Corp., Hawthorne, NJ
 SAMSON Controls, Inc., Baytown, TX

Valves, packless

Cashco, Inc., Ellsworth, KS
 Clark-Cooper Division, of Magnatrol Valve Corporation, Cinnaminson, NJ
 Flowsolve Corp., Flow Control Div., Cookeville, TN
 Flowsolve Corp., Irving, TX
 Magnatrol Valve Corp., Hawthorne, NJ
 SAMSON Controls, Inc., Baytown, TX
 Swagelok Co., Solon, OH

Valves, pilot operated

ASCO Numatics, Scherpenzeel, Netherlands
 Cashco, Inc., Ellsworth, KS
 Clark-Cooper Division, of Magnatrol Valve Corporation, Cinnaminson, NJ
 Flodyne Controls Inc., Murray Hill, NJ
 Fluid Line Products Inc., Willoughby, OH
 GE Energy, Houston, TX
 Magnatrol Valve Corp., Hawthorne, NJ
 Parker Hannifin Corp., Parker Fluid Control Division, New Britain, CT
 Plast-O-Matic Valves Inc., Cedar Grove, NJ
 SAMSON Controls, Inc., Baytown, TX

Valves, pinch

ASCO Numatics, Scherpenzeel, Netherlands
 Plast-O-Matic Valves Inc., Cedar Grove, NJ
 Qosina, Edgewood, NY
 SAMSON Controls, Inc., Baytown, TX
 Swagelok Co., Solon, OH

Valves, plastic

CORZAN INDUSTRIAL SYSTEMS, 9911 Brecksville Road, Cleveland, OH 44141 (888-234-2436; 216-447-5000; FAX: 216-447-6211; e-mail: corzancpvc@corzancpvc.com; web site: www.corzancpvc.com)
 Green Leaf, Inc., Fontanet, IN
 Met-Pro Global Pump Solutions, Telford, PA
 Omega Engineering Inc., An Omega Group Co., Stamford, CT
 Plast-O-Matic Valves Inc., Cedar Grove, NJ
 Swagelok Co., Solon, OH

Valves, plastic lined

Flowsolve Corp., Flow Control Div., Cookeville, TN
 Flowsolve Corp., Irving, TX
 Omega Engineering Inc., An Omega Group Co., Stamford, CT
 Richter Chemie-Technik GmbH, Kempen, Germany
 SAMSON Controls, Inc., Baytown, TX

Valves, plug

Flowsolve Corp., Flow Control Div., Cookeville, TN
 Flowsolve Corp., Irving, TX
 Hilliard Corp., Elmira, NY
 JLS International, Inc., Charlotte, NC

KRAISSL CO. INC., 299 Williams Ave., Hackensack, NJ 07601-5225 (800-572-4775; 201-342-0008; FAX: 201-342-0025; e-mail: kraissl@aol.com; web site: www.strainers.com)

Omega Engineering Inc., An Omega Group Co., Stamford, CT
SAMSON Controls, Inc., Baytown, TX
Schutte & Koerting, Treviso, PA
Swagelok Co., Solon, OH

Valves, pneumatic

Buerkert Fluid Control Systems, Ingelfingen
Burkert Fluid Control Systems, Charlotte, NC
Cashco, Inc., Ellsworth, KS
Conval, Inc., Somers, CT

EDWARDS US HEADQUARTERS, 6416 Inducon Drive
West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)

Flodyne Controls Inc., Murray Hill, NJ
Lumaco Sanitary Valves, Hackensack, NJ
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Parker Hannifin Corp., Parker Fluid Control Division, New Britain, CT

PBM Valves Inc., Irwin, PA
Plast-O-Matic Valves Inc., Cedar Grove, NJ
SAMSON Controls, Inc., Baytown, TX
Swagelok Co., Solon, OH

Valves, pressure reducing

Armstrong International, Three Rivers, MI
Cashco, Inc., Ellsworth, KS

FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)

Fluid Line Products Inc., Willoughby, OH

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)

Lumaco Sanitary Valves, Hackensack, NJ
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Oseco, Broken Arrow, OK

Plast-O-Matic Valves Inc., Cedar Grove, NJ
SAMSON Controls, Inc., Baytown, TX

Sentry Equipment Corp., Oconomowoc, WI
TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC
28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave.
P.O. Box C, 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

ASCO Numatics, Scherpenzeel, Netherlands
Indelac Controls, Inc., Florence, KY
SAMSON Controls, Inc., Baytown, TX

Valves, pump protection

EDWARDS US HEADQUARTERS, 6416 Inducon Drive
West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)

Plast-O-Matic Valves Inc., Cedar Grove, NJ

Valves, quick closing

Flodyne Controls Inc., Murray Hill, NJ
Flowserve Corp., Irving, TX
Magnatrol Valve Corp., Hawthorne, NJ
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Plast-O-Matic Valves Inc., Cedar Grove, NJ
SAMSON Controls, Inc., Baytown, TX

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave.
P.O. Box C, 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, ram

JLS International, Inc., Charlotte, NC

Valves, relief

Cashco, Inc., Ellsworth, KS

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West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)

Fluid Line Products Inc., Willoughby, OH
GE Energy, Houston, TX

Grosvenor Pumps Limited, Camborne, Cornwall
Lumaco Sanitary Valves, Hackensack, NJ

Omega Engineering Inc., An Omega Group Co., Stamford, CT
Parker Hannifin Corp., Parker Fluid Control Division, New Britain, CT

Plast-O-Matic Valves Inc., Cedar Grove, NJ
REMBE GMBH, SAFETY+CONTROL, Gallbergweg

21, Brilon, Germany 59929 (49-2961-7405-0; FAX: 49-2961-50-714; e-mail: sales@rembe.de; web site: www.rembe.com)

REMBE, INC., 3809 Beam Road Ste K, Charlotte, NC
28217 (704.716.7022; FAX: 704.716.7025; e-mail: info@rembe.us; web site: www.rembe.us)

Swagelok Co., Solon, OH
Total Energy, North Salem, NY
UNIBLOC-PUMP, Inc, Flowtech Div., Marietta, GA

Valves, rubber lined

SAMSON Controls, Inc., Baytown, TX

Valves, safety

Apollo Valves, Matthews, North Carolina
Conbraco Industries, Inc., Matthews, NC
GE Energy, Houston, TX

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)

Omega Engineering Inc., An Omega Group Co., Stamford, CT
Oseco, Broken Arrow, OK

Parker Hannifin Corp., Parker Fluid Control Division, New Britain, CT

Richter Chemie-Technik GmbH, Kempen, Germany

Valves, sampling

BIAR Sampling Systems, Gonzales, LA
Flowserve Corp., Irving, TX
Fluid Line Products Inc., Willoughby, OH
SAMSON Controls, Inc., Baytown, TX
Sentry Equipment Corp., Oconomowoc, WI
Swagelok Co., Solon, OH

Valves, slide

Bascale Company, Inc., Houston, TX
Vortex, Salina, KS

Valves, slurry

Apollo Valves, Matthews, North Carolina
Conbraco Industries, Inc., Matthews, NC
Posi-flate, St. Paul, MN
SAMSON Controls, Inc., Baytown, TX

Valves, tank blanketing

SAMSON Controls, Inc., Baytown, TX

Valves, tank venting

Cashco, Inc., Ellsworth, KS
JLS International, Inc., Charlotte, NC
Oseco, Broken Arrow, OK

Valves, titanium

Apollo Valves, Matthews, North Carolina
Conbraco Industries, Inc., Matthews, NC
Flodyne Controls Inc., Murray Hill, NJ
Flowserve Corp., Flow Control Div., Cookeville, TN
Flowserve Corp., Irving, TX
OHL Gutermuth Industrial Valves GmbH, Altenstadt, Germany
PBM Valves Inc., Irwin, PA
SAMSON Controls, Inc., Baytown, TX

Valves, vacuum

EDWARDS US HEADQUARTERS, 6416 Inducon Drive
West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)

Magnatrol Valve Corp., Hawthorne, NJ
Pfeiffer Vacuum, Inc., Nashua, NH
Pfeiffer Vacuum GmbH, Asslar, Germany
Plast-O-Matic Valves Inc., Cedar Grove, NJ
Posi-flate, St. Paul, MN
SAMSON Controls, Inc., Baytown, TX

Valves, vacuum relief

EDWARDS US HEADQUARTERS, 6416 Inducon Drive
West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)

Oseco, Broken Arrow, OK
Plast-O-Matic Valves Inc., Cedar Grove, NJ

REMBE GMBH, SAFETY+CONTROL, Gallbergweg
21, Brilon, Germany 59929 (49-2961-7405-0; FAX: 49-2961-50-714; e-mail: sales@rembe.de; web site: www.rembe.com)

REMBE, INC., 3809 Beam Road Ste K, Charlotte, NC
28217 (704.716.7022; FAX: 704.716.7025; e-mail: info@rembe.us; web site: www.rembe.us)

Valves, vent, low pressure

Cashco, Inc., Ellsworth, KS
JLS International, Inc., Charlotte, NC
Oseco, Broken Arrow, OK

Valves, zirconium

Flowserve Corp., Flow Control Div., Cookeville, TN
Flowserve Corp., Irving, TX
OHL Gutermuth Industrial Valves GmbH, Altenstadt, Germany
SAMSON Controls, Inc., Baytown, TX



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SOLIDS HANDLING

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- 106 Bulk carriers, loading & unloading equipment**
- 106 Coating, forming & agglomeration equipment**
- 106 Conveyors & elevators for bulk materials**
- 108 Lifting equipment**
- 108 Packaging containers**
- 108 Packaging equipment**
- 108 Solids handling equipment & systems, other**
- 109 Weighing, feeding & proportioning equipment**

BINS & OTHER DRY STORAGE EQUIPMENT

Bin activators

Acrison Inc., Moonachie, NJ
 Bascalc Company, Inc., Houston, TX
 Dynamic Air Inc., St. Paul, MN
 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)

Bins

Acrison Inc., Moonachie, NJ
 Bascalc Company, Inc., Houston, TX
 Bulk-Pack Inc., Monroe, LA
 Charles Ross & Son Co., Hauppauge, NY
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)
 Flexicon Corp., Bethlehem, PA
 Mueller GmbH, Rheinfelden, Germany
 Process Solutions, Riviera Beach, FL

Bins, weighing

Bascalc Company, Inc., Houston, TX
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)
 Flexicon Corp., Bethlehem, PA
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)
 Schenck Process GmbH, Darmstadt, Germany

Gates, hopper

Bascalc Company, Inc., Houston, TX

Hoppers

Acrison Inc., Moonachie, NJ
 Bascalc Company, Inc., Houston, TX
 Charles Ross & Son Co., Hauppauge, NY
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)
 Filtra-Systems Co., Farmington Hills, MI
 Flexicon Corp., Bethlehem, PA
 Imperial Industries Inc., Wausau, WI
 Martin Vibration Systems, Marine City, MI
 M. O. Industries, Whippany, NJ
 Mueller GmbH, Rheinfelden, Germany
 Premier Tech Systems, Riviere-du-Loup, Quebec, Canada
 Process Solutions, Riviera Beach, FL
 Puritan Magnetics, Inc., Oxford, MI

Hoppers, weighing

Acrison Inc., Moonachie, NJ
 Bascalc Company, Inc., Houston, TX
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)
 Flexicon Corp., Bethlehem, PA
 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)
 Premier Tech Systems, Riviere-du-Loup, Quebec, Canada
 Schenck Process GmbH, Darmstadt, Germany

Silos

Aumund Fordertechnik GmbH, Rheinberg, Germany
 Bascalc Company, Inc., Houston, TX
 Gilbert Industries, Sparta, MO
 Imperial Industries Inc., Wausau, WI
INOX-TECH INC., 6705 Route 132, Ste. Catherine, Canada J5C1B6 (800-361-0319 North America; 450-638-5441; FAX: 450-638-2865; e-mail: info@inox-tech.com; web site: www.inox-tech.com)
 Mueller GmbH, Rheinfelden, Germany

BULK CARRIERS, LOADING & UNLOADING EQUIPMENT

Dumpers

Bascalc Company, Inc., Houston, TX
 Flexicon Corp., Bethlehem, PA
 M. O. Industries, Whippany, NJ
 Process Solutions, Riviera Beach, FL

Lift tables

Presto Lifts Inc., Norton, MA
 Process Solutions, Riviera Beach, FL
 Southworth Products Corp., Portland, ME

Lift trucks

EquipNet, Inc., Canton, MA
 M. O. Industries, Whippany, NJ
 Presto Lifts Inc., Norton, MA
 Sellick Equipment Ltd., Harrow, Ontario, Canada
 Southworth Products Corp., Portland, ME

Lift trucks, all-terrain

Sellick Equipment Ltd., Harrow, Ontario, Canada

Lift trucks, explosion proof

M. O. Industries, Whippany, NJ

Loaders, car

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)

Pallet trucks

M. O. Industries, Whippany, NJ
 Presto Lifts Inc., Norton, MA
 Southworth Products Corp., Portland, ME

Railroad car spotter, indexer, or positioner

HEYL & PATTERSON INC., RENNEBURG DIVISION, PO Box 36, Pittsburgh, PA 15230 (412-788-9810; FAX: 412-788-9822; e-mail: info@heypatterson.com; web site: www.heypatterson.com)

Unloaders, barge

HEYL & PATTERSON INC., RENNEBURG DIVISION, PO Box 36, Pittsburgh, PA 15230 (412-788-9810; FAX: 412-788-9822; e-mail: info@heypatterson.com; web site: www.heypatterson.com)

Unloaders, bulk bag

AIRLANCO, Falls City, NE
 Bascalc Company, Inc., Houston, TX
 BEUMER Group GmbH & Co. KG, Beckum, Germany
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)
 Dec USA Inc, Brick, NJ
 Dynamic Air Inc., St. Paul, MN
 Flexicon Corp., Bethlehem, PA
 NEUHAUS NEOTEC Maschinen- und Anlagenbau GmbH, 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)

Unloaders, hopper car

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 Flexicon Corp., Bethlehem, PA
 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)

Unloaders, other

Aumund Fordertechnik GmbH, Rheinberg, Germany
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)
 Flexicon Corp., Bethlehem, PA
 Omni-Lift, Inc., Salt Lake City, UT

Unloaders, tank truck

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)

COATING, FORMING & AGGLOMERATION EQUIPMENT

Agglomerators

Alexanderwerk AG, Remscheid, Germany
 AMANDUS KAHL GmbH & Co. KG, Reinbek, Germany
 Bepex International LLC, Minneapolis, MN

GEA Process Engineering, Columbia, MD
HEYL & PATTERSON INC., RENNEBURG DIVISION, PO Box 36, Pittsburgh, PA 15230 (412-788-9810; FAX: 412-788-9822; e-mail: info@heypatterson.com; web site: www.heypatterson.com)
 Ludman Industries, Milwaukee, WI
 Prater-Sterling, Bollingbrook, IL
 Sandvik Process Systems, Inc., Totowa, NJ
WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Briquetting systems

Bepex International LLC, Minneapolis, MN
 Ludman Industries, Milwaukee, WI
 Security Engineered Machinery, Westboro, MA

Calenders

Thermal Spray Solutions, Inc., Chesapeake, Virginia

Coaters & coating machinery

Bepex International LLC, Minneapolis, MN
 GEA Process Engineering, Columbia, MD
 Thermal Spray Solutions, Inc., Chesapeake, Virginia

Compactors

Alexanderwerk AG, Remscheid, Germany
 AMANDUS KAHL GmbH & Co. KG, Reinbek, Germany
 Bepex International LLC, Minneapolis, MN
 GEA Process Engineering, Columbia, MD
 Ludman Industries, Milwaukee, WI
 Prater-Sterling, Bollingbrook, IL
 S & G Enterprises, Germantown, WI

Densifiers

Bascalc Company, Inc., Houston, TX
 Bepex International LLC, Minneapolis, MN
 Prater-Sterling, Bollingbrook, IL

Extruders

Bepex International LLC, Minneapolis, MN
 B & P Process Equipment, Saginaw, MI
 Buss ChemTech AG, Pratteln, Switzerland
 Maag Pump Systems AG, Oberglatt / ZH, Switzerland
 Paul O. Abbe, Bensenville, IL

Granulators & granulating mills

Alexanderwerk AG, Remscheid, Germany
 AMANDUS KAHL GmbH & Co. KG, Reinbek, Germany
 Bepex International LLC, Minneapolis, MN
 GEA Process Engineering, Columbia, MD
 Herbold Meckesheim USA, Resource Recycling Systems Inc., Slattersville, RI
 Kemutec Group, Inc., Bristol, PA
 Ludman Industries, Milwaukee, WI
 NEUHAUS NEOTEC Maschinen- und Anlagenbau GmbH, Germany
 Prater-Sterling, Bollingbrook, IL
 Sandvik Process Systems, Inc., Totowa, NJ
WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Pelletizers

AMANDUS KAHL GmbH & Co. KG, Reinbek, Germany
 Bepex International LLC, Minneapolis, MN
 Buss ChemTech AG, Pratteln, Switzerland
 GEA Process Engineering, Columbia, MD
 Maag Pump Systems AG, Oberglatt / ZH, Switzerland
 Sandvik Process Systems, Inc., Totowa, NJ

Prillers

GEA Process Engineering, Columbia, MD

CONVEYORS & ELEVATORS FOR BULK MATERIALS

Chutes

Bascalc Company, Inc., Houston, TX
 Flexicon Corp., Bethlehem, PA
 Puritan Magnetics, Inc., Oxford, MI

Conveyor accessories

Bascalc Company, Inc., Houston, TX
 Flexicon Corp., Bethlehem, PA
 LEWCO, Inc., Sandusky, OH
 Martin Engineering, Neponset, IL
 Puritan Magnetics, Inc., Oxford, MI
 RPS Engineering, Inc., Elgin, IL
 Sweet Manufacturing Company, Springfield, OH

Conveyor belting

AWT World Trade Inc., Chicago, IL
 Bascalc Company, Inc., Houston, TX

Berndorf Band GmbH, Berndorf, Austria
LEWCO, Inc., Sandusky, OH
OCS Checkweighers, Inc., Snellville, GA
Omni-Lift, Inc., Salt Lake City, UT

Conveyors, apron

Aumund Fordertechnik GmbH, Rheinberg, Germany
Dematic Corp., Grand Rapids, MI
Stedman, Aurora, IN

Conveyors, belt

ABI LTD., Concord, Ontario, Canada
Aumund Fordertechnik GmbH, Rheinberg, Germany
AWT World Trade Inc., Chicago, IL
Bascale Company, Inc., Houston, TX
Berndorf Band GmbH, Berndorf, Austria
BEUMER Group GmbH & Co. KG, Beckum, Germany
Industrial Magnetics, Inc., Boyne City, MI
Magnetic Products, Inc., Highland, MI
Martin Engineering, Neponset, IL
Omni-Lift, Inc., Salt Lake City, UT
Sandvik Process Systems, Inc., Totowa, NJ
Stedman, Aurora, IN
Sweet Manufacturing Company, Springfield, OH
Union Special Corp., Huntley, IL

Conveyors, bucket

Aumund Fordertechnik GmbH, Rheinberg, Germany
Bascale Company, Inc., Houston, TX
Flexicon Corp., Bethlehem, PA
Omni-Lift, Inc., Salt Lake City, UT

Conveyors, cooling

ABI LTD., Concord, Ontario, Canada
Sandvik Process Systems, Inc., Totowa, NJ
Witte Co. Inc., Washington, NJ

Conveyors, drag

Aerocon, Belleville, NJ
Aumund Fordertechnik GmbH, Rheinberg, Germany
Bascale Company, Inc., Houston, TX
Filtra-Systems Co., Farmington Hills, MI
Flexicon Corp., Bethlehem, PA
Sweet Manufacturing Company, Springfield, OH

Conveyors, flexible

Aerocon, Belleville, NJ
Flexicon Corp., Bethlehem, PA

Conveyors, flight

Aerocon, Belleville, NJ
Flexicon Corp., Bethlehem, PA

Conveyors, fluidizing

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(800-445-0730; 402-362-2000; FAX: 402-362-2001;
e-mail: sales@cyclonaire.com; web site: www.cyclonaire.com)

Witte Co. Inc., Washington, NJ

Conveyors, gravity

Bascale Company, Inc., Houston, TX
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e-mail: sales@cyclonaire.com; web site: www.cyclonaire.com)

Flexicon Corp., Bethlehem, PA

Fr. Jacob Soehne GmbH & Co. KG, Porta Westfalica, NRW, Germany

Conveyors, magnetic

Industrial Magnetics, Inc., Boyne City, MI
Magnetic Products, Inc., Highland, MI
Puritan Magnetics, Inc., Oxford, MI

Conveyors, other

ABI LTD., Concord, Ontario, Canada
Aerocon, Belleville, NJ
Aumund Fordertechnik GmbH, Rheinberg, Germany
Flexicon Corp., Bethlehem, PA
GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen, Germany 76275 (49-7243-7050; FAX: 49-7243-705330;
e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)

Conveyors, pneumatic

AIRLANCO, Falls City, NE
Coperion GmbH, Weingarten, Wuerth., Germany



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e-mail: sales@cyclonaire.com; web site: www.cyclonaire.com)

Dec USA Inc, Brick, NJ
Dematic Corp., Grand Rapids, MI
Dynamic Air Inc., St. Paul, MN
Elmridge Inc., Livonia, MI
Filtra-Systems Co., Farmington Hills, MI
Flexicon Corp., Bethlehem, PA
Fox Valve Development Corp., Dover, NJ
GEA Process Engineering, Columbia, MD
NEUHAUS NEOTECH Maschinen- und Anlagenbau GmbH, 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)

Conveyors, portable

Aerocon, Belleville, NJ
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)

Flexicon Corp., Bethlehem, PA
Omni-Lift, Inc., Salt Lake City, UT
Witte Co. Inc., Washington, NJ

Conveyors, roller

Bascale Company, Inc., Houston, TX
LEWCO, Inc., Sandusky, OH

Conveyors, rotary table

Bascale Company, Inc., Houston, TX

Conveyors, rotary tubular

Aerocon, Belleville, NJ
Flexicon Corp., Bethlehem, PA

Conveyors, screen

Kinergy Corp., Louisville, KY
Witte Co. Inc., Washington, NJ

Conveyors, screw

Aerocon, Belleville, NJ
Bascale Company, Inc., Houston, TX
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)

Flexicon Corp., Bethlehem, PA

INOX-TECH INC., 6705 Route 132, Ste. Catherine, Canada J5C1B6 (800-361-0319 North America; 450-638-5441; FAX: 450-638-2865; e-mail: info@inox-tech.com; web site: www.inox-tech.com)

Stedman, Aurora, IN
WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Conveyors, size separation

Witte Co. Inc., Washington, NJ

Conveyors, slat

LEWCO, Inc., Sandusky, OH

Conveyors, tray

ABI LTD., Concord, Ontario, Canada
Bascale Company, Inc., Houston, TX

Conveyors, 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)
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)

Dec Group, Ecublens, Switzerland
Dec USA Inc, Brick, NJ
Flexicon Corp., Bethlehem, PA
GEA Process Engineering, Columbia, MD
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)
Quadro Engineering Corp., WATERLOO, Ontario, Canada
Schutte & Koerting, Treviso, PA

Conveyors, vertical

Flexicon Corp., Bethlehem, PA
Omni-Lift, Inc., Salt Lake City, UT

Conveyors, vibrating

Bascale Company, Inc., Houston, TX
GEA Process Engineering, Columbia, MD
Kinergy Corp., Louisville, KY
Magnetic Products, Inc., Highland, MI
Schenck Process GmbH, Darmstadt, Germany
Stedman, Aurora, IN
Witte Co. Inc., Washington, NJ

Conveyors, weighing

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)

Flexicon Corp., Bethlehem, PA
OCS Checkweighers, Inc., Snellville, GA
REMBE GMBH, SAFETY+CONTROL, Gallbergweg 21, Brilon, Germany 59929 (49-2961-7405-0; FAX: 49-2961-50-714; e-mail: sales@rembe.de; web site: www.rembe.com)

REMBE, INC., 3809 Beam Road Ste K, Charlotte, NC 28217 (704.716.7022; FAX: 704.716.7025; e-mail: info@rembe.us; web site: www.rembe.us)

Siemens Industry, Inc., Solutions, Automation and Drive Technologies, Spring House, PA

Couplings, pneumatic conveyors

Bascale Company, Inc., Houston, TX
Flexicon Corp., Bethlehem, PA
Tuf-Lok International, Madison, WI

Elevators, belt

Aumund Fordertechnik GmbH, Rheinberg, Germany
Bascale Company, Inc., Houston, TX
Omni-Lift, Inc., Salt Lake City, UT
Sweet Manufacturing Company, Springfield, OH

Elevators, belt, vertical

Bascale Company, Inc., Houston, TX

Elevators, bucket

Aumund Fordertechnik GmbH, Rheinberg, Germany
Bascale Company, Inc., Houston, TX
BEUMER Group GmbH & Co. KG, Beckum, Germany
Flexicon Corp., Bethlehem, PA
Sweet Manufacturing Company, Springfield, OH

Elevators, screw

Flexicon Corp., Bethlehem, PA

Solids feeders, airlock

GEA Process Engineering, Columbia, MD
Prater-Sterling, Bollingbrook, IL
WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Solids feeders, batch

Acrison Inc., Moonachie, NJ
Bascale Company, Inc., Houston, TX
BIOENGINEERING INC., Two Canal Park, 5th Floor, Cambridge, Massachusetts 02141 (001 781 672 2620; FAX: 001 781 672 2626; e-mail: info@bioengineering-inc.com; web site: www.bioengineering-inc.com/www.bioengineering.ch)

Flexicon Corp., Bethlehem, PA
Kubota Corporation, Singapore, 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)
Siemens Industry, Inc., Solutions, Automation and Drive Technologies, Spring House, PA

Solids feeders, constant weight

Kubota Corporation, Singapore, 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)

Solids feeders, continuous flow

Bascale Company, Inc., Houston, TX
Kubota Corporation, Singapore, Singapore
REMBE GMBH, SAFETY+CONTROL, Gallbergweg 21, Brilon, Germany 59929 (49-2961-7405-0; FAX: 49-2961-50-714; e-mail: sales@rembe.de; web site: www.rembe.com)
REMBE, INC., 3809 Beam Road Ste K, Charlotte, NC 28217 (704.716.7022; FAX: 704.716.7025; e-mail: info@rembe.us; web site: www.rembe.us)
Siemens Industry, Inc., Solutions, Automation and Drive Technologies, Spring House, PA

WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Solids feeders, gravimetric

Acrison Inc., Moonachie, NJ
 Bascale Company, Inc., Houston, TX
 Dec Group, Ecublens, Switzerland
 Dec USA Inc, Brick, NJ
 Kubota Corporation, Singapore, 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)
 OCS Checkweighers, Inc., Snellville, GA
 Premier Tech Systems, Riviere-du-Loup, Quebec, Canada

Solids feeders, high-pressure

Acrison Inc., Moonachie, NJ

Solids feeders, natural frequency

Bascale Company, Inc., Houston, TX

Solids feeders, proportioning

Acrison Inc., Moonachie, NJ
 Bascale Company, Inc., Houston, TX
 Kubota Corporation, Singapore, Singapore

Solids feeders, rotary

GEA Process Engineering, Columbia, MD
 Prater-Sterling, Bollingbrook, IL

WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Solids feeders, vibrating or oscillating

Aerocon, Belleville, NJ
 Bascale Company, Inc., Houston, TX
 Dec Group, Ecublens, Switzerland
 Dec USA Inc, Brick, NJ
 Kubota Corporation, Singapore, 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
 Bascale Company, Inc., Houston, TX
 Dec Group, Ecublens, Switzerland
 Dec USA Inc, Brick, NJ
 Flexicon Corp., Bethlehem, PA
 Kubota Corporation, Singapore, Singapore
 Premier Tech Systems, Riviere-du-Loup, Quebec, Canada
WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

LIFTING EQUIPMENT

Hoists

M. O. Industries, Whippany, NJ
 Mueller GmbH, Rheinfelden, Germany
 Process Solutions, Riviera Beach, FL

PACKAGING CONTAINERS

Bags

Associated Bag Company, Milwaukee, WI
 Bulk-Pack Inc., Monroe, LA
 HAVER & BOECKER, Wire Weaving and Machinery Division, OELDE, Germany
 Nier Systems Inc, Boca Raton, Florida
 Union Special Corp., Huntley, IL

Barrels & drums

HAVER & BOECKER, Wire Weaving and Machinery Division, OELDE, Germany
 M. O. Industries, Whippany, NJ
 Mueller GmbH, Rheinfelden, Germany
 Process Solutions, Riviera Beach, FL

Cartons

Associated Bag Company, Milwaukee, WI

Drums & drum liners, corrosion resistant

Associated Bag Company, Milwaukee, WI

Intermediate bulk containers

Bulk-Pack Inc., Monroe, LA

GEA Process Engineering, Columbia, MD
 Metano IBC Services, Inc., Perrineville, NJ
 Nier Systems Inc, Boca Raton, Florida
 Process Solutions, Riviera Beach, FL

Intermodal bulk containers

Nier Systems Inc, Boca Raton, Florida

Pails & cans

HAVER & BOECKER, Wire Weaving and Machinery Division, OELDE, Germany

PACKAGING EQUIPMENT

Bag closing machines

Associated Bag Company, Milwaukee, WI
 Bascale Company, Inc., Houston, TX
 GEA Process Engineering, Columbia, MD
 HAVER & BOECKER, Wire Weaving and Machinery Division, OELDE, Germany
 Premier Tech Systems, Riviere-du-Loup, Quebec, Canada
 Union Special Corp., Huntley, IL

Bag, empty, handling systems

BEUMER Group GmbH & Co. KG, Beckum, Germany
 Dec Group, Ecublens, Switzerland
 Dec USA Inc, Brick, NJ
 Flexicon Corp., Bethlehem, PA
 GEA Process Engineering, Columbia, MD

Bag filling machines

Bascale Company, Inc., Houston, TX
 BEUMER Group GmbH & Co. KG, Beckum, Germany
 Coperton GmbH, Weingarten, Wuertt., Germany
 Flexicon Corp., Bethlehem, PA
 GEA Process Engineering, Columbia, MD
 HAVER & BOECKER, Wire Weaving and Machinery Division, OELDE, Germany
 Premier Tech Chronos, Industrial Equipment Group, Riviere-du-Loup, Quebec, Canada
 Premier Tech Systems, Riviere-du-Loup, Quebec, Canada

Bag filling machines, vacuum

Dec Group, Ecublens, Switzerland
 Premier Tech Chronos, Industrial Equipment Group, Riviere-du-Loup, Quebec, Canada

Drum filling equipment

Aerocon, Belleville, NJ
 Bascale Company, Inc., Houston, TX
 Dec Group, Ecublens, Switzerland
 Dec USA Inc, Brick, NJ
 Flexicon Corp., Bethlehem, PA
 GEA Process Engineering, Columbia, MD
 HAVER & BOECKER, Wire Weaving and Machinery Division, OELDE, Germany
 Mueller GmbH, Rheinfelden, Germany
 Powder Systems Ltd, Liverpool
 PSL USA, Boise, ID

Packaging equipment, liquids

Bascale Company, Inc., Houston, TX
 EquipNet, Inc., Canton, MA
 HAVER & BOECKER, Wire Weaving and Machinery Division, OELDE, Germany

Packaging equipment, solids

Bascale Company, Inc., Houston, TX
 EquipNet, Inc., Canton, MA
 Flexicon Corp., Bethlehem, PA
 GEA Process Engineering, Columbia, MD
 HAVER & BOECKER, Wire Weaving and Machinery Division, OELDE, Germany
 Premier Tech Chronos, Industrial Equipment Group, Riviere-du-Loup, Quebec, Canada
 Premier Tech Systems, Riviere-du-Loup, Quebec, Canada
 Union Special Corp., Huntley, IL

Packers, bag

Bascale Company, Inc., Houston, TX
 BEUMER Group GmbH & Co. KG, Beckum, Germany
 GEA Process Engineering, Columbia, MD
 HAVER & BOECKER, Wire Weaving and Machinery Division, OELDE, Germany
 Premier Tech Chronos, Industrial Equipment Group, Riviere-du-Loup, Quebec, Canada
 Premier Tech Systems, Riviere-du-Loup, Quebec, Canada

Packers, drum

Bascale Company, Inc., Houston, TX
 GEA Process Engineering, Columbia, MD
 HAVER & BOECKER, Wire Weaving and Machinery Division, OELDE, Germany

Packers, vibrating

Bascale Company, Inc., Houston, TX
 Martin Engineering, Neponset, IL

SOLIDS HANDLING EQUIPMENT & SYSTEMS, OTHER

Balers

Security Engineered Machinery, Westboro, MA

Barrel handling equipment

Bascale Company, Inc., Houston, TX
 Dematic Corp., Grand Rapids, MI
 Flexicon Corp., Bethlehem, PA
 HAVER & BOECKER, Wire Weaving and Machinery Division, OELDE, Germany
 Process Solutions, Riviera Beach, FL

Drum handling equipment

Bascale Company, Inc., Houston, TX
 Dec Group, Ecublens, Switzerland
 Dec USA Inc, Brick, NJ
 Dematic Corp., Grand Rapids, MI
 Flexicon Corp., Bethlehem, PA
 HAVER & BOECKER, Wire Weaving and Machinery Division, OELDE, Germany
 M. O. Industries, Whippany, NJ
 Mueller GmbH, Rheinfelden, Germany
 Process Solutions, Riviera Beach, FL
 S & G Enterprises, Germantown, WI

Materials handling systems

Acrison Inc., Moonachie, NJ
 Aerocon, Belleville, NJ
 Aumund Fordertechnik GmbH, Rheinberg, Germany
 Bascale Company, Inc., Houston, TX
 BEUMER Group GmbH & Co. KG, Beckum, Germany
 Coperton GmbH, Weingarten, Wuertt., Germany
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)
 Dematic Corp., Grand Rapids, MI
 Dynamic Air Inc., St. Paul, MN
 Ehcolo A/S, Foelving, Denmark
 EquipNet, Inc., Canton, MA
 Flexicon Corp., Bethlehem, PA
 LEWCO, Inc., Sandusky, OH
 Magnetic Products, Inc., Highland, MI
 Martin Engineering, Neponset, IL
 M. O. Industries, Whippany, NJ

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 OCS Checkweighers, Inc., Snellville, GA
 Omni-Lift, Inc., Salt Lake City, UT
 Powder Systems Ltd, Liverpool
 Prater-Sterling, Bollingbrook, IL
 Premier Tech Chronos, Industrial Equipment Group, Riviere-du-Loup, Quebec, Canada
 Premier Tech Systems, Riviere-du-Loup, Quebec, Canada
 Process Solutions, Riviera Beach, FL
 PSL USA, Boise, ID

REMBE GMBH, SAFETY+CONTROL, Gallbergweg 21, Brilon, Germany 59929 (49-2961-7405-0; FAX: 49-2961-50-714; e-mail: sales@rembe.de; web site: www.rembe.com)

Southworth Products Corp., Portland, ME
 Sweet Manufacturing Company, Springfield, OH

REMBE GMBH, SAFETY+CONTROL, Gallbergweg 21, Brilon, Germany 59929 (49-2961-7405-0; FAX: 49-2961-50-714; e-mail: sales@rembe.de; web site: www.rembe.com)

Southworth Products Corp., Portland, ME
 Sweet Manufacturing Company, Springfield, OH

Palletizers

Bascale Company, Inc., Houston, TX
 BEUMER Group GmbH & Co. KG, Beckum, Germany
 Ehcolo A/S, Foelving, Denmark
 HAVER & BOECKER, Wire Weaving and Machinery Division, OELDE, Germany
 Industrial Magnetics, Inc., Boyne City, MI
 Mueller GmbH, Rheinfelden, Germany
 Premier Tech Chronos, Industrial Equipment Group, Riviere-du-Loup, Quebec, Canada
 Premier Tech Systems, Riviere-du-Loup, Quebec, Canada
 Southworth Products Corp., Portland, ME

Robotic components

BEUMER Group GmbH & Co. KG, Beckum, Germany
 Premier Tech Chronos, Industrial Equipment Group, Riviere-du-Loup, Quebec, Canada

Storage systems

BEUMER Group GmbH & Co. KG, Beckum, Germany
 Dematic Corp., Grand Rapids, MI
 HAVER & BOECKER, Wire Weaving and Machinery Division, OELDE, Germany

Valves, diverter conveyor

Bascale Company, Inc., Houston, TX

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)

Valves, powder

Bascale Company, Inc., Houston, TX
GEA Process Engineering, Columbia, MD
Mueller GmbH, Rheinfelden, Germany
Posi-flate, St. Paul, MN
Process Solutions, Riviera Beach, FL
SAMSON Controls, Inc., Baytown, TX
Vortex, Salina, KS

WEIGHING, FEEDING & PROPORTIONING EQUIPMENT

Batching & blending systems

Acrison Inc., Moonachie, NJ
Bascale Company, Inc., Houston, TX
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)

Eastern Instruments, Wilmington, NC
EquipNet, Inc., Canton, MA
Flexicon Corp., Bethlehem, PA
GEA Process Engineering, Columbia, MD
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)
Siemens Industry, Inc., Solutions, Automation and Drive Technologies, Spring House, PA

Proportioners

Acrison Inc., Moonachie, NJ
Bascale Company, Inc., Houston, TX
Fluid Metering, Inc., Syosset, NY
Nordson SEALANT EQUIPMENT, Plymouth, MI

Scales, automatic weighing

Acrison Inc., Moonachie, NJ

Bascale Company, Inc., Houston, TX
Cardinal Scale Manufacturing Co., Webb City, MO
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)
OCS Checkweighers, Inc., Snellville, GA
Premier Tech Chronos, Industrial Equipment Group, Riviere-du-Loup, Quebec, Canada

Scales, bagging, filling

Bascale Company, Inc., Houston, TX
Eastern Instruments, Wilmington, NC
Flexicon Corp., Bethlehem, PA
GEA Process Engineering, Columbia, MD
HAVER & BOECKER, Wire Weaving and Machinery Division, OELDE, Germany
OCS Checkweighers, Inc., Snellville, GA
Premier Tech Chronos, Industrial Equipment Group, Riviere-du-Loup, Quebec, Canada

Scales, checkweight

Bascale Company, Inc., Houston, TX
Eastern Instruments, Wilmington, NC
HAVER & BOECKER, Wire Weaving and Machinery Division, OELDE, Germany
OCS Checkweighers, Inc., Snellville, GA
Premier Tech Chronos, Industrial Equipment Group, Riviere-du-Loup, Quebec, Canada

Scales, continuous weighing

Acrison Inc., Moonachie, NJ
Eastern Instruments, Wilmington, NC
Kubota Corporation, Singapore, 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)
OCS Checkweighers, Inc., Snellville, GA
Schenck Process GmbH, Darmstadt, Germany

Scales, conveying

Siemens Industry, Inc., Solutions, Automation and Drive Technologies, Spring House, PA

Scales, counting

Cardinal Scale Manufacturing Co., Webb City, MO

PCE Instruments, Units 12/13 Southpoint Business Park, Southampton

Scales, floor, platform

Bascale Company, Inc., Houston, TX
Cardinal Scale Manufacturing Co., Webb City, MO
Kubota Corporation, Singapore, Singapore

Scales, gas cylinder filling

Bascale Company, Inc., Houston, TX

Scales, hopper

Bascale Company, Inc., Houston, TX
Cardinal Scale Manufacturing Co., Webb City, MO
Flexicon Corp., Bethlehem, PA
PCE Instruments, Units 12/13 Southpoint Business Park, Southampton

Scales, portable

Cardinal Scale Manufacturing Co., Webb City, MO
PCE Instruments, Units 12/13 Southpoint Business Park, Southampton

Scales, railroad car

Bascale Company, Inc., Houston, TX
Cardinal Scale Manufacturing Co., Webb City, MO
Schenck Process GmbH, Darmstadt, Germany

Scales, remote indicating

Bascale Company, Inc., Houston, TX
Cardinal Scale Manufacturing Co., Webb City, MO
OCS Checkweighers, Inc., Snellville, GA

Scales, tank

Bascale Company, Inc., Houston, TX
Cardinal Scale Manufacturing Co., Webb City, MO

Scales, totalizing

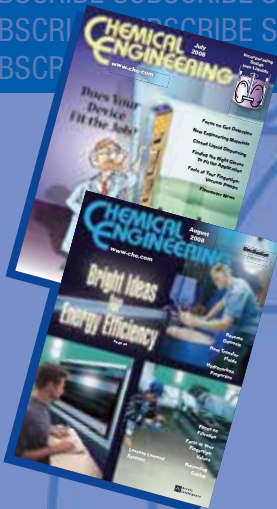
Eastern Instruments, Wilmington, NC

Scales, truck

Bascale Company, Inc., Houston, TX
Cardinal Scale Manufacturing Co., Webb City, MO
Schenck Process GmbH, Darmstadt, Germany

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BEARINGS & BUSHINGS

Bearing isolators

AEGIS Bearing Protection Rings, Mechanic Falls, ME

Bearings

Greene, Tweed & Co., Kulpville, PA
Greene, Tweed & Co. Ltd., Nottingham, Notts
Isotech, Inc, Hatfield, PA

Bushings

Isotech, Inc, Hatfield, PA

BOILERS, INDUSTRIAL

Boiler accessories

Bryan Steam LLC, Peru, IN
Ernst Flow Industries, Farmingdale, NJ
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)

Topog-E Gasket Co., Tulsa, OK
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)

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, 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, automatic, packaged

Acme Engineering Prod. Inc., Mooers, NY
Fulton Companies, The, Fulton Thermal Corporation, Pulaski, NY

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)

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Boilers, carbon monoxide fired

Alstom Power Energy Recovery, Wexford, PA
WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, 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., P.O. Box C, 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

Alstom Power Energy Recovery, Wexford, PA
Fulton Companies, The, Fulton Thermal Corporation, Pulaski, NY
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., P.O. Box C, 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

Alstom Power Energy Recovery, Wexford, 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)

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, 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., P.O. Box C, 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
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)

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Boilers, oil fired

Bryan Steam LLC, Peru, IN
EquipNet, Inc., Canton, MA
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)

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Boilers, waste heat recovery

Advanced Heat Recovery, Inc., Division of AQUA Innovations, Inc., Baltimore, MD
Alstom Power Energy Recovery, Wexford, PA
EquipNet, Inc., Canton, MA

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)

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Boilers, water tube

Alstom Power Energy Recovery, Wexford, PA
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)

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

DRIVES, OTHER

Couplings, shaft

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., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Drives, gear

MICROMO, Clearwater, FL
Voith Turbo GmbH & Co. KG, Crailsheim, Germany

Drives, magnetic

PDC Machines, Inc., Warminster, PA

Drives, mixer

ProQuip Inc., Macedonia, OH

Drives, pump

Omega Engineering Inc., An Omega Group Co., Stamford, CT
Rockwell Automation, Inc., Milwaukee, WI
Voith Turbo GmbH & Co. KG, Crailsheim, Germany

Drives, variable speed, centrifuge

Rockwell Automation, Inc., Milwaukee, WI

Drives, variable speed, electrical

MICROMO, Clearwater, FL
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Rockwell Automation, Inc., Milwaukee, WI
Siemens, Industry USA, Solutions, Automation and Drives Technologies, Alpharetta, GA

Drives, variable speed, hydraulic

Voith Turbo GmbH & Co. KG, Crailsheim, Germany

Drives, variable speed, mechanical

Voith Turbo GmbH & Co. KG, Crailsheim, Germany

Drives, variable speed, mixer

Rockwell Automation, Inc., Milwaukee, WI

Joints, universal

Voith Turbo GmbH & Co. KG, Crailsheim, Germany

Speed reducers

MICROMO, Clearwater, FL
WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

DRIVES, TURBINE

Generator drives, steam

Dresser-Rand, Corporate Headquarters, Houston, TX
WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Turbines, combined steam-gas

Dresser-Rand, Corporate Headquarters, Houston, TX
EquipNet, Inc., Canton, MA
MAN Diesel & Turbo SE, Augsburg, Germany
WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Turbines, mechanical drive, gas

Dresser-Rand, Corporate Headquarters, Houston, TX
EquipNet, Inc., Canton, MA
MAN Diesel & Turbo SE, Augsburg, Germany
WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Turbines, mechanical drive, steam

Dresser-Rand, Corporate Headquarters, Houston, TX
EquipNet, Inc., Canton, MA
MAN Diesel & Turbo SE, Augsburg, Germany
WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

ELECTRICAL & POWER GENERATION EQUIPMENT

Batteries & electrical storage equipment

Lectrus, Chattanooga, TN

Cogeneration systems & equipment

Air Products and Chemicals, Inc., Allentown, PA
Russelectric Inc., Hingham, MA

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Engine-generator sets

Lectrus, Chattanooga, TN

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Engines, diesel

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Engines, gasoline

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Engines, LPG

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Engines, natural gas

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Expanders

MAN Diesel & Turbo SE, Augsburg, Germany

Generator-turbine sets

Dresser-Rand, Corporate Headquarters, Houston, TX
MAN Diesel & Turbo SE, Augsburg, Germany

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

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., P.O. Box C, 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

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)

Russelectric Inc., Hingham, MA

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

ELECTRICAL HEATING EQUIPMENT

Bands, electric heating

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Watlow, St. Louis, MO

Heaters, electric immersion

Acme Engineering Prod. Inc., Mooers, NY
Armstrong Engineering Associates, Inc., West Chester, PA
Dalton Electric Heating Co., Inc., Ipswich, MA
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Watlow, St. Louis, MO

Heaters, thermal fluid electric

Acme Engineering Prod. Inc., Mooers, NY
Armstrong Engineering Associates, Inc., West Chester, PA
Fulton Companies, The, Fulton Thermal Corporation, Pulaski, NY

Spaltech International Inc., Halton Hills, Ontario, Canada

Jackets, electric heating

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Panels, infrared radiant

Armstrong Engineering Associates, Inc., West Chester, PA
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Strips, electric heating

Armstrong Engineering Associates, Inc., West Chester, PA
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Watlow, St. Louis, MO

Tape, electric heating

Armstrong Engineering Associates, Inc., West Chester, PA
BARTEC GmbH, Bad Mergentheim, Germany
Omega Engineering Inc., An Omega Group Co., Stamford, CT

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, sodium vapor

Osram Sylvania, Danvers, MA

Lamps, ultraviolet

Osram Sylvania, Danvers, MA

Lighting equipment, emergency

Osram Sylvania, Danvers, MA

Lighting, explosion proof

Osram Sylvania, Danvers, MA
R. STAHL, Waldenburg, Germany

Lighting: panelboards, instruments & gages

Osram Sylvania, Danvers, MA

MOTOR CONTROLS

Actuators or starters, motor

Bascale Company, Inc., Houston, TX
Berner International Corp., New Castle, PA
Hilliard Corp., Elmira, NY

MOTORS, ELECTRIC

Motors, A.C.

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Siemens, Industry USA, Solutions, Automation and Drives Technologies, Alpharetta, GA

TECO-Westinghouse Motor Co., Round Rock, TX

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Motors, D.C.

MICROMO, Clearwater, FL

Omega Engineering Inc., An Omega Group Co., Stamford, CT

TECO-Westinghouse Motor Co., Round Rock, TX

Motors, enclosed, fan cooled

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Motors, explosion proof

BARTEC GmbH, Bad Mergentheim, Germany
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Motors, induction

TECO-Westinghouse Motor Co., Round Rock, TX

Motors, submersible

MM Industries, Inc., Vorti-Siv, Salem, OH

Motors, synchronous

TECO-Westinghouse Motor Co., Round Rock, TX

Motors, variable speed

MICROMO, Clearwater, FL

TECO-Westinghouse Motor Co., Round Rock, TX

Motors, vertical

MICROMO, Clearwater, FL

TECO-Westinghouse Motor Co., Round Rock, TX

OTHER ELECTRICAL EQUIPMENT

Circuit breakers

Phoenix Contact, Middletown, PA

Phoenix Contact GmbH & Co.KG, Blomberg, Germany

Schurter, Inc., Santa Rosa, CA

Electrical equipment, other

Electroswitch, Weymouth, MA

Lightning Eliminators & Consultants, Inc., Boulder, CO

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Phoenix Contact, Middletown, PA

Phoenix Contact GmbH & Co.KG, Blomberg, Germany

Rockwell Automation, Inc., Milwaukee, WI

Russelectric Inc., Hingham, MA

Schurter, Inc., Santa Rosa, CA

Solenoids

ASCO Numatics, Scherpenzeel, Netherlands

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Switches, electrical

Electroswitch, Weymouth, MA

Lectrus, Chattanooga, TN

Madison Co., Branford, CT

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Rockwell Automation, Inc., Milwaukee, WI

Schurter, Inc., Santa Rosa, CA

Siemens, Industry USA, Solutions, Automation and Drives Technologies, Alpharetta, GA

Switchgear & other power distribution equipment

Lectrus, Chattanooga, TN

Madison Co., Branford, CT

Russelectric Inc., Hingham, MA

Schurter, Inc., Santa Rosa, CA

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Transformers

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., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

RECTIFIERS

Rectifiers, germanium controlled

Denver Mineral Engineers, Inc., Littleton, CO

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INSTRUMENTATION & CONTROLS

- 114 Actuators, operators
- 114 Analyzers, offstream
- 115 Analyzers, onstream
- 116 Computers, process control
- 116 Controllers
- 117 Data presentation equipment
- 117 Indicators
- 119 Measurement & testing equipment
- 121 Recorders
- 121 Transmitters & data transmission equipment

ACTUATORS, OPERATORS

Actuators

A-T Controls Inc., Cincinnati, OH
Arca-Regler GmbH, Toenisvorst, Germany
Auma Actuators Inc., Pittsburgh, PA
AUMA Riestler GmbH & Co. KG, Muellheim, Germany
Buerkert Fluid Control Systems, Ingelfingen
Burkert Fluid Control Systems, Charlotte, NC
HOERBIGER KOMPRESSORTECHNIK HOLDING GMBH, Donau-City-Str./ue 1, Vienna, Austria A-1220 (+43 1 22 440-0; FAX: +43 1 22 440 990; e-mail: info-hkth@hoerbiger.com; web site: www.hoerbiger.com)
Indelac Controls, Inc., Florence, KY
Isotech, Inc, Hatfield, PA
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Plast-O-Matic Valves Inc., Cedar Grove, NJ
Posi-flate, St. Paul, MN
Rockwell Automation, Inc., Milwaukee, WI
SAMSON Controls, Inc., Baytown, TX
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

Flowserve Corp., Irving, TX
SAMSON Controls, Inc., Baytown, TX

Valve operators, motor operated

Indelac Controls, Inc., Florence, KY
Omega Engineering Inc., An Omega Group Co., Stamford, CT
SAMSON Controls, Inc., Baytown, TX

Valve operators, piston

Auma Actuators Inc., Pittsburgh, PA
AUMA Riestler GmbH & Co. KG, Muellheim, Germany
Flowserve Corp., Irving, TX
SAMSON Controls, Inc., Baytown, TX

Valve operators, pneumatic

Buerkert Fluid Control Systems, Ingelfingen
Burkert Fluid Control Systems, Charlotte, NC
Flowserve Corp., Flow Control Div., Cookeville, TN
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Posi-flate, St. Paul, MN
SAMSON Controls, Inc., Baytown, TX

Valve operators, solenoid

A-T Controls Inc., Cincinnati, OH
ASCO Numatics, Scherpenzeel, Netherlands
Flowserve Corp., Irving, TX
Omega Engineering Inc., An Omega Group Co., Stamford, CT
SAMSON Controls, Inc., Baytown, TX

Valve, position indicators

Flowserve Corp., Irving, TX
SAMSON Controls, Inc., Baytown, TX

Valve positioners, microprocessor equipped

Arca-Regler GmbH, Toenisvorst, Germany
Flowserve Corp., Irving, TX
SAMSON Controls, Inc., Baytown, TX
Siemens Industry, Inc., Solutions, Automation and Drive Technologies, Norcross, GA

Valve positioners, other

A-T Controls Inc., Cincinnati, OH
SAMSON Controls, Inc., Baytown, TX

ANALYZERS, OFFSTREAM

Analyzers, air quality

Clean Air Engineering, Palatine, IL
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Sierra Monitor Corp., Milpitas, CA

Analyzers, ammonia

Krohne, Inc., Peabody, MA

Servomex Group Ltd., Sugar Land, TX

Analyzers, atomic absorption

Shimadzu Scientific Instruments, Columbia, MD

Analyzers, BOD

LAR Process Analysers AG, Berlin, Germany

Analyzers, carbon dioxide or monoxide

Analytical Systems Int'l / KECO R&D, Houston, TX
GOW-MAC Instrument Co., Bethlehem, PA
PCE Instruments, Units 12/13 Southpoint Business Park, Southampton
Servomex Group Ltd., Sugar Land, TX
Siemens Industry, Inc., Applied Automation, Bartlesville, OK
Sierra Monitor Corp., Milpitas, CA
UIC Inc., Joliet, IL

Analyzers, chlorine

Krohne, Inc., Peabody, MA
Servomex Group Ltd., Sugar Land, TX
Sierra Monitor Corp., Milpitas, CA

Analyzers, chlorine, total

PANalytical BV, Almelo, Netherlands

Analyzers, chromatographic

BARTEC GmbH, Bad Mergentheim, Germany
GOW-MAC Instrument Co., Bethlehem, PA
Richard Scientific Inc., Novato, CA
Shimadzu Scientific Instruments, Columbia, MD
Siemens Industry, Inc., Applied Automation, Bartlesville, OK

Analyzers, combustible gases

Control Instruments Corp., Fairfield, NJ
Sensor Electronics Corporation, Minneapolis, MN
Servomex Group Ltd., Sugar Land, TX
Sierra Monitor Corp., Milpitas, CA

Analyzers, combustion

Clean Air Instrument Rental, Palatine, IL
LAR Process Analysers AG, Berlin, Germany
LECO Corporation, St. Joseph, MI
Servomex Group Ltd., Sugar Land, TX

Analyzers, concentration

Anton PAAR USA, Ashland, VA
AUTOMATION PRODUCTS INC. (DYNATROL DIV.), 3030 Maxroy St., Houston, TX 77008 (800-231-2062 USA & Canada; 713-869-0361; FAX: 713-869-7332; e-mail: sales@dynatrolusa.com; web site: www.Dynatrol-USA.com)
K-Patents, Inc., Naperville, IL
Sierra Monitor Corp., Milpitas, CA
tec5USA, Plainview, NY

Analyzers, conductivity

JUMO GmbH & Co. KG, Fulda, Germany
Krohne, Inc., Peabody, MA
Myron L Company, Carlsbad, CA
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Van London-pHoenix Co., Houston, TX

Analyzers, emission

Control Instruments Corp., Fairfield, NJ
M&C TechGroup, Ventura, CA
Servomex Group Ltd., Sugar Land, TX
Siemens Industry, Inc., Applied Automation, Bartlesville, OK

Analyzers, environmental conditions

Campbell Scientific Inc., Logan, UT
Idealab Inc., Franklin, MA
Sierra Monitor Corp., Milpitas, CA

Analyzers, fats & oils

Richard Scientific Inc., Novato, CA

Analyzers, gas density

PCE Instruments, Units 12/13 Southpoint Business Park, Southampton
Pfeiffer Vacuum, Inc., Nashua, NH
Pfeiffer Vacuum GmbH, Asslar, Germany

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
PANalytical BV, Almelo, Netherlands
Sensor Electronics Corporation, Minneapolis, MN
Servomex Group Ltd., Sugar Land, TX

Siemens Industry, Inc., Applied Automation, Bartlesville, OK
Sierra Monitor Corp., Milpitas, CA

Analyzers, hydrogen

Control Instruments Corp., Fairfield, NJ
LECO Corporation, St. Joseph, MI
Servomex Group Ltd., Sugar Land, TX
Sierra Monitor Corp., Milpitas, CA

Analyzers, infrared

Analytical Systems Int'l / KECO R&D, Houston, TX
Idealab Inc., Franklin, MA
Servomex Group Ltd., Sugar Land, TX
Siemens Industry, Inc., Applied Automation, Bartlesville, OK
Sierra Monitor Corp., Milpitas, CA

Analyzers, mass spectrometer

LECO Corporation, St. Joseph, MI
Pfeiffer Vacuum, Inc., Nashua, NH
Pfeiffer Vacuum GmbH, Asslar, Germany
Siemens Industry, Inc., Applied Automation, Bartlesville, OK

Analyzers, moisture content

BARTEC GmbH, Bad Mergentheim, Germany
FOSS NIRSystems, Inc., Laurel, MD
LECO Corporation, St. Joseph, MI
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Siemens Industry, Inc., Solutions, Automation and Drive Technologies, Norcross, GA

Analyzers, near infrared

BARTEC GmbH, Bad Mergentheim, Germany
FOSS NIRSystems, Inc., Laurel, MD
Idealab Inc., Franklin, MA
Ocean Optics, Inc., Dunedin, FL
PANalytical BV, Almelo, Netherlands
Servomex Group Ltd., Sugar Land, TX
tec5USA, Plainview, NY

Analyzers, neutron activation

PANalytical BV, Almelo, Netherlands

Analyzers, nitrogen

LECO Corporation, St. Joseph, MI
Servomex Group Ltd., Sugar Land, TX

Analyzers, nitrogen oxide

Servomex Group Ltd., Sugar Land, TX
Sierra Monitor Corp., Milpitas, CA

Analyzers, nitrogen, total

LAR Process Analysers AG, Berlin, Germany
LECO Corporation, St. Joseph, MI
PANalytical BV, Almelo, Netherlands
Shimadzu Scientific Instruments, Columbia, MD

Analyzers, oil content

Sigrist Photometer AG, Ennetbuergen, Switzerland

Analyzers, organic carbon

Analytical Systems Int'l / KECO R&D, Houston, TX
LAR Process Analysers AG, Berlin, Germany
LECO Corporation, St. Joseph, MI
Sigrist Photometer AG, Ennetbuergen, Switzerland
UIC Inc., Joliet, IL

Analyzers, organic carbon, total

LAR Process Analysers AG, Berlin, Germany
PANalytical BV, Almelo, Netherlands
Shimadzu Scientific Instruments, Columbia, MD
UIC Inc., Joliet, IL

Analyzers, organic halogen, total

PANalytical BV, Almelo, Netherlands

Analyzers, oxygen content

AirSep Corporation, A Chart Industries Company, Buffalo, NY
Ocean Optics, Inc., Dunedin, FL
Servomex Group Ltd., Sugar Land, TX
Sierra Monitor Corp., Milpitas, CA

Analyzers, oxygen demand

LAR Process Analysers AG, Berlin, Germany

Analyzers, oxygen, dissolved

Van London-pHoenix Co., Houston, TX

Analyzers, ozone content

In USA, Inc., Norwood, MA
Sigrist Photometer AG, Ennetbuergen, Switzerland

Analyzers, particle size

Brookhaven Instruments Corp., Holtsville, NY
 FRITTSCH GmbH, Milling and Sizing, Idar-Oberstein, Germany
 Shimadzu Scientific Instruments, Columbia, MD
 Sympatec GmbH, System | Partikel | Technik, Clausthal-Zellerfeld, Germany
 Sympatec, Inc., System | Partikel | Technik, Pennington, NJ

Analyzers, pH

Analytical Measurements, Chester, NJ
 JUMO GmbH & Co. KG, Fulda, Germany
 Krohne, Inc., Peabody, MA
 Myron L Company, Carlsbad, CA
 Ocean Optics, Inc., Dunedin, FL
 PCE Instruments, Units 12/13 Southpoint Business Park, Southampton
 Van London-pHoenix Co., Houston, TX

Analyzers, phosphorus

PANalytical BV, Almelo, Netherlands

Analyzers, photometric

Servomex Group Ltd., Sugar Land, TX

Analyzers, sound

PCE Instruments, Units 12/13 Southpoint Business Park, Southampton

Analyzers, spectrometer

FOSS NIRSystems, Inc., Laurel, MD
 Idealab Inc., Franklin, MA
 LECO Corporation, St. Joseph, MI
 MIDAC Corp., Westfield, MA
 Ocean Optics, Inc., Dunedin, FL
 Pfeiffer Vacuum, Inc., Nashua, NH
 Shimadzu Scientific Instruments, Columbia, MD

Analyzers, spectrophotometer

FOSS NIRSystems, Inc., Laurel, MD
 Idealab Inc., Franklin, MA
 Shimadzu Scientific Instruments, Columbia, MD
 tec5USA, Plainview, NY

Analyzers, stack gases

In USA, Inc., Norwood, MA
 MIDAC Corp., Westfield, MA
 Servomex Group Ltd., Sugar Land, TX
 Siemens Industry, Inc., Applied Automation, Bartlesville, OK

Analyzers, sulfur dioxide

Control Instruments Corp., Fairfield, NJ
 Servomex Group Ltd., Sugar Land, TX
 Siemens Industry, Inc., Applied Automation, Bartlesville, OK
 Sierra Monitor Corp., Milpitas, CA

Analyzers, sulfur, total

LECO Corporation, St. Joseph, MI
 PANalytical BV, Almelo, Netherlands
 Siemens Industry, Inc., Applied Automation, Bartlesville, OK

Analyzers, suspended solids

AUTOMATION PRODUCTS INC. (DYNATROL DIV.), 3030 Maxroy St., Houston, TX 77008 (800-231-2062 USA & Canada; 713-869-0361; FAX: 713-869-7332; e-mail: sales@dynatrolusa.com; web site: www.Dynatrol-USA.com)

Sigrist Photometer AG, Ennetbuergen, Switzerland

Analyzers, thermal

ATS RheoSystems, Cannon Instrument Company, Bordentown, NJ
 SAT Infrared Technology Co. Ltd, Guangzhou
 Shimadzu Scientific Instruments, Columbia, MD

Analyzers, thin film

Ocean Optics, Inc., Dunedin, FL
 PANalytical BV, Almelo, Netherlands
 tec5USA, Plainview, NY

Analyzers, total solids

K-Patents, Inc., Naperville, IL

Analyzers, ultraviolet

In USA, Inc., Norwood, MA
 tec5USA, Plainview, NY

Analyzers, vapor pressure

BARTEC GmbH, Bad Mergentheim, Germany

Analyzers, VOCs

Analytical Systems Int'l / KECO R&D, Houston, TX
 Idealab Inc., Franklin, MA

Analyzers, water quality

Analytical Systems Int'l / KECO R&D, Houston, TX
 Campbell Scientific Inc., Logan, UT
 LAR Process Analysers AG, Berlin, Germany
 Myron L Company, Carlsbad, CA
 Van London-pHoenix Co., Houston, TX

Analyzers, flame photometers

BWB Technologies UK Ltd, Newbury

Detectors, dust

Auburn Systems, LLC, Danvers, MA
AUTOMATION PRODUCTS INC. (DYNATROL DIV.), 3030 Maxroy St., Houston, TX 77008 (800-231-2062 USA & Canada; 713-869-0361; FAX: 713-869-7332; e-mail: sales@dynatrolusa.com; web site: www.Dynatrol-USA.com)

Detectors, explosion

Compur Monitors GmbH & Co. KG, Munich, Germany
FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)

Detectors, flame

FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)
 Sensor Electronics Corp., Minneapolis, MN

Detectors, gases

Acme Engineering Prod. Inc., Mooers, NY
 Analytical Systems Int'l / KECO R&D, Houston, TX
 Compur Monitors GmbH & Co. KG, Munich, Germany
 Control Instruments Corp., Fairfield, NJ
 Enmet Corp., Ann Arbor, MI
 GOW-MAC Instrument Co., Bethlehem, PA
 In USA, Inc., Norwood, MA
 Mil-Ram Technology, Inc., Fremont, CA
 PCE Instruments, Units 12/13 Southpoint Business Park, Southampton
 Sensor Electronics Corp., Minneapolis, MN
 Sensor Electronics Corporation, Minneapolis, 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

Detectors, gases, combustible

Control Instruments Corp., Fairfield, NJ
 Enmet Corp., Ann Arbor, MI
 Mil-Ram Technology, Inc., Fremont, CA
 PureAire Monitoring Systems, Inc., Lake Zurich, IL
 Sensor Electronics Corp., Minneapolis, MN
 Sensor Electronics Corporation, Minneapolis, MN
 Sierra Monitor Corp., Milpitas, CA

Detectors, gases, toxic

Acme Engineering Prod. Inc., Mooers, NY
 Analytical Systems Int'l / KECO R&D, Houston, TX
 Control Instruments Corp., Fairfield, NJ
 Enmet Corp., Ann Arbor, MI
 Mil-Ram Technology, Inc., Fremont, CA
 PureAire Monitoring Systems, Inc., Lake Zurich, IL
 Sensor Electronics Corp., Minneapolis, MN
 Sensor Electronics Corporation, Minneapolis, MN
 Sierra Monitor Corp., Milpitas, CA

Detectors, liquid-leak

Analytical Systems Int'l / KECO R&D, Houston, TX

Detectors, other

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

TowerScan, Sarnia, Ontario, Canada
 TowerScan, Port Huron, MI

Detectors, sludge blanket level

Madison Co., Branford, CT

Detectors, vibration

PCE Instruments, Units 12/13 Southpoint Business Park, Southampton
 PRUEFTECHNIK, Ismaning, Germany
TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

Samplers, automatic

BIAR Sampling Systems, Gonzales, LA
 Fluid Metering, Inc., Syosset, NY
 Tema Systems, Inc., Cincinnati, OH

Samplers, gas, air

BIAR Sampling Systems, Gonzales, LA
 Clean Air Express Equipment, Palatine, IL
 Clean Air Instrument Rental, Palatine, IL
 Fox Valve Development Corp., Dover, NJ
 M&C TechGroup, Ventura, CA

Samplers, liquid

BIAR Sampling Systems, Gonzales, LA
 Fluid Metering, Inc., Syosset, NY
 Sentry Equipment Corp., Oconomowoc, WI
 Xiril AG, Hombrechtikon, Switzerland

Samplers, solids

Sympatec GmbH, System | Partikel | Technik, Clausthal-Zellerfeld, Germany
 Sympatec, Inc., System | Partikel | Technik, Pennington, NJ

ANALYZERS, ONSTREAM

Chromatographs, onstream

Siemens Industry, Inc., Applied Automation, Bartlesville, OK

Monitors, air quality

Enmet Corp., Ann Arbor, MI
 In USA, Inc., Norwood, MA
 MIDAC Corp., Westfield, MA
 Sensor Electronics Corp., Minneapolis, MN
 Siemens Industry, Inc., Solutions, Automation and Drive Technologies, Norcross, GA
 Sierra Monitor Corp., Milpitas, CA

Monitors, ammonia

MIDAC Corp., Westfield, MA
 Mil-Ram Technology, Inc., Fremont, CA
 PureAire Monitoring Systems, Inc., Lake Zurich, IL
 Servomex Group Ltd., Sugar Land, TX

Monitors, carbon dioxide or monoxide

Enmet Corp., Ann Arbor, MI
 GOW-MAC Instrument Co., Bethlehem, PA
 Mil-Ram Technology, Inc., Fremont, CA
 PureAire Monitoring Systems, Inc., Lake Zurich, IL
 Sensor Electronics Corp., Minneapolis, MN
 Servomex Group Ltd., Sugar Land, TX
 Sierra Monitor Corp., Milpitas, CA

Monitors, chlorine

Enmet Corp., Ann Arbor, MI
 Mil-Ram Technology, Inc., Fremont, CA
 Omega Engineering Inc., An Omega Group Co., Stamford, CT
 optek-Danulat, Inc., Germantown, WI
 PureAire Monitoring Systems, Inc., Lake Zurich, IL
 Sensor Electronics Corp., Minneapolis, MN
 Servomex Group Ltd., Sugar Land, TX
 Sierra Monitor Corp., Milpitas, CA

Monitors, colorimetric

Ocean Optics, Inc., Dunedin, FL
 optek-Danulat, Inc., Germantown, WI

Monitors, combustible gases, or vapors

Control Instruments Corp., Fairfield, NJ
 Enmet Corp., Ann Arbor, MI
 Mil-Ram Technology, Inc., Fremont, CA
 PureAire Monitoring Systems, Inc., Lake Zurich, IL
 Sensor Electronics Corp., Minneapolis, MN
 Servomex Group Ltd., Sugar Land, TX
 Sierra Monitor Corp., Milpitas, CA

Monitors, conductivity

Myron L Company, Carlsbad, CA
 Omega Engineering Inc., An Omega Group Co., Stamford, CT
 optek-Danulat, Inc., Germantown, WI

Monitors, dispersion

FCI-Fluid Components International, San Marcos, CA

Monitors, dust

Auburn Systems, LLC, Danvers, MA
 Clean Air Instrument Rental, Palatine, IL
 Midwesco Filter Resources, Inc., Winchester, VA
 Monitor Technologies LLC, Elburn, IL
 Sigrist Photometer AG, Ennetbuergen, Switzerland

Monitors, emissions, continuous

Auburn Systems, LLC, Danvers, MA
 Clean Air Engineering, Palatine, IL
 FCI-Fluid Components International, San Marcos, CA
 MIDAC Corp., Westfield, MA

PRODUCT DIRECTORY

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

Campbell Scientific Inc., Logan, UT
Omega Engineering Inc., An Omega Group Co., Stamford,
CT
PCE Instruments, Units 12/13 Southpoint Business Park,
Southampton

Monitors, hydrocarbon content

Analytical Systems Int'l / KECO R&D, Houston, TX
Clean Air Express Equipment, Palatine, IL
Enmet Corp., Ann Arbor, MI
PureAire Monitoring Systems, Inc., Lake Zurich, IL
Sensor Electronics Corp., Minneapolis, MN
Sierra Monitor Corp., Milpitas, CA

Monitors, hydrogen cyanide content

PureAire Monitoring Systems, Inc., Lake Zurich, IL
Sensor Electronics Corp., Minneapolis, MN
Sierra Monitor Corp., Milpitas, CA

Monitors, hydrogen sulfide content

Analytical Systems Int'l / KECO R&D, Houston, TX
Enmet Corp., Ann Arbor, MI
PureAire Monitoring Systems, Inc., Lake Zurich, IL
Sensor Electronics Corp., Minneapolis, MN
Sierra Monitor Corp., Milpitas, CA

Monitors, octane

FOSS NIRSystems, Inc., Laurel, MD

Monitors, oil content

optek-Danulat, Inc., Germantown, WI
Sigrist Photometer AG, Ennetbuergen, Switzerland

Monitors, organic carbon, total

LAR Process Analysers AG, Berlin, Germany
Sigrist Photometer AG, Ennetbuergen, Switzerland

Monitors, oxygen content

Enmet Corp., Ann Arbor, MI
Ocean Optics, Inc., Dunedin, FL
PureAire Monitoring Systems, Inc., Lake Zurich, IL
Sensor Electronics Corp., Minneapolis, MN
Servomex Group Ltd., Sugar Land, TX
Sierra Monitor Corp., Milpitas, CA

Monitors, particle size

Sympatec GmbH, System | Partikel | Technik | Clausthal-
Zellerfeld, Germany
Sympatec, Inc., System | Partikel | Technik, Pennington, NJ

Monitors, pH

Analytical Measurements, Chester, NJ
Campbell Scientific Inc., Logan, UT
Omega Engineering Inc., An Omega Group Co., Stamford,
CT
Van London-pHoenix Co., Houston, TX

Monitors, sodium ion concentration

Omega Engineering Inc., An Omega Group Co., Stamford,
CT

Monitors, stack gases

Clean Air Engineering, Palatine, IL
FCI-Fluid Components International, San Marcos, CA
In USA, Inc., Norwood, MA
M&C TechGroup, Ventura, CA
MIDAC Corp., Westfield, MA
Mil-Ram Technology, Inc., Fremont, CA
Servomex Group Ltd., Sugar Land, TX
Sigrist Photometer AG, Ennetbuergen, Switzerland

Monitors, viscosity

**AUTOMATION PRODUCTS INC. (DYNATROL DIV.), 3030
Maxroy St., Houston, TX 77008 (800-231-2062 USA
& Canada; 713-869-0361; FAX: 713-869-7332; e-mail:
sales@dynamtrolusa.com; web site: www.Dynatro-
IUSA.com)**

BARTEC GmbH, Bad Mergentheim, Germany
Brookfield Engineering Laboratories, Inc., Middleboro, MA
Hydramotion Ltd, Malton
Lenterra, Inc., Newark, NJ

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

Monitors, water quality

Analytical Systems Int'l / KECO R&D, Houston, TX
**AUTOMATION PRODUCTS INC. (DYNATROL DIV.), 3030
Maxroy St., Houston, TX 77008 (800-231-2062 USA
& Canada; 713-869-0361; FAX: 713-869-7332; e-mail:
sales@dynamtrolusa.com; web site: www.Dynatro-
IUSA.com)**

Campbell Scientific Inc., Logan, UT
In USA, Inc., Norwood, MA
LAR Process Analysers AG, Berlin, Germany
Myron L Company, Carlsbad, CA
Omega Engineering Inc., An Omega Group Co., Stamford,
CT
optek-Danulat, Inc., Germantown, WI
Sigrist Photometer AG, Ennetbuergen, Switzerland
Van London-pHoenix Co., Houston, TX

Spectrometer accessories or services

FOSS NIRSystems, Inc., Laurel, MD
Ocean Optics, Inc., Dunedin, FL
tec5USA, Plainview, NY

Spectrometers

FOSS NIRSystems, Inc., Laurel, MD
MIDAC Corp., Westfield, MA
Ocean Optics, Inc., Dunedin, FL
optek-Danulat, Inc., Germantown, WI
Pfeiffer Vacuum, Inc., Nashua, NH
tec5USA, Plainview, NY

COMPUTERS, PROCESS CONTROL

Analog process control computers

Acromag, Inc., Wixom, MI

Direct digital process control computers

Acromag, Inc., Wixom, MI
Siemens, Industry USA, Solutions, Automation and Drives
Technologies, Alpharetta, GA
Sierra Monitor Corp., Milpitas, CA

Input-output equipment

Acromag, Inc., Wixom, MI
Omega Engineering Inc., An Omega Group Co., Stamford,
CT
R. STAHL, Waldenburg, Germany
Sierra Monitor Corp., Milpitas, CA

Supervisory process control computers

Acromag, Inc., Wixom, MI
Sierra Monitor Corp., Milpitas, CA

Surge suppression systems

Phoenix Contact, Middletown, PA

CONTROLLERS

Controllers, air conditioning

Omega Engineering Inc., An Omega Group Co., Stamford,
CT
SAMSON Controls, Inc., Baytown, TX

Controllers, batching or weighing

Acrison Inc., Moonachie, NJ
Bascale Company, Inc., Houston, TX
**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)**
CCS Checkweighers, Inc., Snellville, GA
Red Seal Measurement, Greenwood, SC

Controllers, bin level

**AUTOMATION PRODUCTS INC. (DYNATROL DIV.), 3030
Maxroy St., Houston, TX 77008 (800-231-2062 USA
& Canada; 713-869-0361; FAX: 713-869-7332; e-mail:
sales@dynamtrolusa.com; web site: www.Dynatro-
IUSA.com)**

Bascale Company, Inc., Houston, TX
Inventron Inc., West Bloomfield, MI
Krohne, Inc., Peabody, MA
Monitor Technologies LLC, Elburn, 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)**
Omega Engineering Inc., An Omega Group Co., Stamford,
CT

Instrumentation & controls

Controllers, boiler

HIMA Paul Hildebrandt GmbH + Co KG, Bruehl, 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)**
SAMSON Controls, Inc., Baytown, TX
**WABASH POWER EQUIPMENT CO., 444 Carpenter
Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-
2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@
wabashpower.com; web site: www.wabashpower.
com)**

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., P.O. Box C, Wheeling, IL 60090-0427 (800-704-
2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@
wabashpower.com; web site: www.wabashpower.
com)**

Controllers, electric

Omega Engineering Inc., An Omega Group Co., Stamford,
CT
SAMSON Controls, Inc., Baytown, TX
Sierra Monitor Corp., Milpitas, CA
**WABASH POWER EQUIPMENT CO., 444 Carpenter
Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-
2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@
wabashpower.com; web site: www.wabashpower.
com)**

Controllers, flow & flow ratio

Bronkhorst High-Tech BV, Ruurlo, Netherlands
Brooks Instruments, Hatfield, PA
Buerkert Fluid Control Systems, Ingelfingen
Burkert Fluid Control Systems, Charlotte, NC
Delta M Corp., Oak Ridge, TN
FCI-Fluid Components International, San Marcos, CA
Krohne, Inc., Peabody, MA
Omega Engineering Inc., An Omega Group Co., Stamford,
CT
Plast-O-Matic Valves Inc., Cedar Grove, NJ
Red Seal Measurement, Greenwood, SC
SAMSON Controls, Inc., Baytown, TX
Siemens Industry, Inc., Solutions, Automation and Drive
Technologies, 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)**

Controllers, humidity

Omega Engineering Inc., An Omega Group Co., Stamford,
CT

Controllers, hydraulic

Omega Engineering Inc., An Omega Group Co., Stamford,
CT

Controllers, liquid level

**AUTOMATION PRODUCTS INC. (DYNATROL DIV.), 3030
Maxroy St., Houston, TX 77008 (800-231-2062 USA
& Canada; 713-869-0361; FAX: 713-869-7332; e-mail:
sales@dynamtrolusa.com; web site: www.Dynatro-
IUSA.com)**

Bascale Company, Inc., Houston, TX
Delta M Corp., Oak Ridge, TN
FCI-Fluid Components International, San Marcos, CA
Inventron Inc., West Bloomfield, MI
Krohne, Inc., Peabody, MA
Madison Co., Branford, CT
Met-Pro Global Pump Solutions, Telford, PA
Monitor Technologies LLC, Elburn, IL
Omega Engineering Inc., An Omega Group Co., Stamford,
CT
Siemens Industry, Inc., Solutions, Automation and Drive
Technologies, 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)**

Controllers, oxidation-reduction potential

Analytical Measurements, Chester, NJ

Controllers, pH

Analytical Measurements, Chester, NJ
Omega Engineering Inc., An Omega Group Co., Stamford,
CT

PRODUCT DIRECTORY

Siemens Industry, Inc., Solutions, Automation and Drive Technologies, Spring House, PA
Van London-pHoenix Co., Houston, TX

Controllers, pneumatic

Cashco, Inc., Ellsworth, KS
Omega Engineering Inc., An Omega Group Co., Stamford, CT
SAMSON Controls, Inc., Baytown, TX

Controllers, pressure

Brooks Instruments, Hatfield, PA
Cashco, Inc., Ellsworth, KS
HIMA Paul Hildebrandt GmbH + Co KG, Bruehl, Germany
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Plast-O-Matic Valves Inc., Cedar Grove, NJ
SAMSON Controls, Inc., Baytown, TX
Strobic Air Corporation, a subsidiary of Met-Pro Corp., Harleysville, PA
TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

Controllers, process

AUTOMATION PRODUCTS INC. (DYNATROL DIV.), 3030 Maxroy St., Houston, TX 77008 (800-231-2062 USA & Canada; 713-869-0361; FAX: 713-869-7332; e-mail: sales@dynatrolusa.com; web site: www.Dynatrol-USA.com)
GE Energy, Houston, TX
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)
Rockwell Automation, Inc., Milwaukee, WI
Siemens Industry, Inc., Solutions, Automation and Drive Technologies, 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
Watlow, St. Louis, MO

Controllers, product

Omega Engineering Inc., An Omega Group Co., Stamford, CT
Strobic Air Corporation, a subsidiary of Met-Pro Corp., Harleysville, PA

Controllers, programmable

Bascale Company, Inc., Houston, TX
HIMA Paul Hildebrandt GmbH + Co KG, Bruehl, Germany
Inventron Inc., West Bloomfield, MI
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)
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Phoenix Contact, Middletown, PA
Phoenix Contact GmbH & Co. KG, Blomberg, Germany
Rockwell Automation, Inc., Milwaukee, WI
Siemens, Industry USA, Solutions, Automation and Drives Technologies, Alpharetta, GA
Sierra Monitor Corp., Milpitas, CA
Strobic Air Corporation, a subsidiary of Met-Pro Corp., Harleysville, PA

Controllers, pump

Fluid Metering, Inc., Syosset, NY
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Pfeiffer Vacuum, Inc., Nashua, NH

Controllers, SCR power

Omega Engineering Inc., An Omega Group Co., Stamford, CT
Watlow, St. Louis, MO

Controllers, sludge level

AUTOMATION PRODUCTS INC. (DYNATROL DIV.), 3030 Maxroy St., Houston, TX 77008 (800-231-2062 USA & Canada; 713-869-0361; FAX: 713-869-7332; e-mail: sales@dynatrolusa.com; web site: www.Dynatrol-USA.com)
Madison Co., Branford, CT

Controllers, temperature

Cashco, Inc., Ellsworth, KS
CTP Corp., Northport, NY
Delta M Corp., Oak Ridge, TN
Electronic Development Labs, Danville, VA
HIMA Paul Hildebrandt GmbH + Co KG, Bruehl, Germany
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Phoenix Contact, Middletown, PA
Raytek Corp., Santa Cruz, CA

Rockwell Automation, Inc., Milwaukee, WI
SAMSON Controls, Inc., Baytown, TX
Watlow, St. Louis, MO

Controllers, time cycle

Bascale Company, Inc., Houston, TX
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Controllers, vacuum

Omega Engineering Inc., An Omega Group Co., Stamford, CT
Plast-O-Matic Valves Inc., Cedar Grove, NJ

Controllers, viscosity

AUTOMATION PRODUCTS INC. (DYNATROL DIV.), 3030 Maxroy St., Houston, TX 77008 (800-231-2062 USA & Canada; 713-869-0361; FAX: 713-869-7332; e-mail: sales@dynatrolusa.com; web site: www.Dynatrol-USA.com)
Brookfield Engineering Laboratories, Inc., Middleboro, MA

Regulators, air

SAMSON Controls, Inc., Baytown, TX
TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

Regulators, back pressure

Cashco, Inc., Ellsworth, KS
Plast-O-Matic Valves Inc., Cedar Grove, NJ
SAMSON Controls, Inc., Baytown, TX
TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

Regulators, feedwater

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Regulators, flow

Bronkhorst High-Tech BV, Ruurlo, Netherlands
Brooks Instruments, Hatfield, PA
Fox Valve Development Corp., Dover, NJ
Krohne, Inc., Peabody, MA
Met-Pro Global Pump Solutions, Telford, PA
Plast-O-Matic Valves Inc., Cedar Grove, NJ
SAMSON Controls, Inc., Baytown, TX

Regulators, gas

SAMSON Controls, Inc., Baytown, TX

Regulators, pressure

Air Products and Chemicals, Inc., Allentown, PA
Brooks Instruments, Hatfield, PA
Cashco, Inc., Ellsworth, KS
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Plast-O-Matic Valves Inc., Cedar Grove, NJ
SAMSON Controls, Inc., Baytown, TX
Strobic Air Corporation, a subsidiary of Met-Pro Corp., Harleysville, PA
TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

Regulators, temperature

Omega Engineering Inc., An Omega Group Co., Stamford, CT
SAMSON Controls, Inc., Baytown, TX
TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

Regulators, vacuum

TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

DATA PRESENTATION EQUIPMENT

Counters

Acromag, Inc., Wixom, MI
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Data logging systems

Acromag, Inc., Wixom, MI
Campbell Scientific Inc., Logan, UT
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Instrumentation & controls

PRUEFTECHNIK, Ismaning, Germany
Sierra Monitor Corp., Milpitas, CA

Displays, liquid-crystal

R. STAHL, Waldenburg, Germany

Panelboards

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Totalizers

Acromag, Inc., Wixom, MI
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Sierra Monitor Corp., Milpitas, CA

INDICATORS

Alarms, annunciator

Acromag, Inc., Wixom, MI
FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)
Industrial Automation Technology, Inc., Vernon, British Columbia, Canada
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Alarms, carbon monoxide

FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)
Sierra Monitor Corp., Milpitas, CA

Alarms, combustible gases

Control Instruments Corp., Fairfield, NJ
Sierra Monitor Corp., Milpitas, CA

Alarms, combustion

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Alarms, flame

FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)

Alarms, flow

AW-Lake Company, Lake Monitors & AW Gear Meters, Franksville, WI
Delta M Corp., Oak Ridge, TN
FCI-Fluid Components International, San Marcos, CA
Inventron Inc., West Bloomfield, MI
Krohne, Inc., Peabody, MA
Madison Co., Branford, CT
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Oseco, Broken Arrow, OK
Universal Flow Monitors, Inc., Hazel Park, MI

Alarms, humidity

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Alarms, liquid level

AUTOMATION PRODUCTS INC. (DYNATROL DIV.), 3030 Maxroy St., Houston, TX 77008 (800-231-2062 USA & Canada; 713-869-0361; FAX: 713-869-7332; e-mail: sales@dynatrolusa.com; web site: www.Dynatrol-USA.com)
Delta M Corp., Oak Ridge, TN
FCI-Fluid Components International, San Marcos, CA
Inventron Inc., West Bloomfield, MI
Jogler Inc., Houston, TX
Krohne, Inc., Peabody, MA
Madison Co., Branford, CT
Omega Engineering Inc., An Omega Group Co., Stamford, CT
TankLink, a wholly-owned subsidiary of Telular Corporation, Chicago, IL

Alarms, motion

FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)

Alarms, other

Acromag, Inc., Wixom, MI
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Alarms, portable (gas, vapor)

Sierra Monitor Corp., Milpitas, CA

Alarms, pressure

FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Oseco, Broken Arrow, OK

Alarms, solids level

AUTOMATION PRODUCTS INC. (DYNATROL DIV.), 3030 Maxroy St., Houston, TX 77008 (800-231-2062 USA & Canada; 713-869-0361; FAX: 713-869-7332; e-mail: sales@dynatrolusa.com; web site: www.Dynatrol-USA.com)

Monitor Technologies LLC, Elburn, IL

Omega Engineering Inc., An Omega Group Co., Stamford, CT

TankLink, a wholly-owned subsidiary of Telular Corporation, Chicago, IL

Alarms, temperature

Acromag, Inc., Wixom, MI

FCI-Fluid Components International, San Marcos, CA

Omega Engineering Inc., An Omega Group Co., Stamford, CT

SAT Infrared Technology Co. Ltd, Guangzhou

TankLink, a wholly-owned subsidiary of Telular Corporation, Chicago, IL

Flowmeters, coriolis

Bronkhorst High-Tech BV, Ruurlo, Netherlands

Flowmeters, differential pressure

AW-Lake Company, Lake Monitors & AW Gear Meters, Franksville, WI

Badger Meter Europa GmbH, Neuffen, Germany

Eastern Instruments, Wilmington, NC

JUMO GmbH & Co. KG, Fulda, Germany

Omega Engineering Inc., An Omega Group Co., Stamford, CT

SAMSON Controls, Inc., Baytown, TX

Universal Flow Monitors, Inc., Hazel Park, MI

Flowmeters, electromagnetic

Badger Meter Europa GmbH, Neuffen, Germany

Krohne, Inc., Peabody, MA

Flowmeters, hot wire

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Flowmeters, magnetic

Buerkert Fluid Control Systems, Ingelfingen

Burkert Fluid Control Systems, Charlotte, NC

Ernst Flow Industries, Farmingdale, NJ

GEA Process Engineering, Columbia, MD

Krohne, Inc., Peabody, MA

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Flowmeters, mass

AW-Lake Company, Lake Monitors & AW Gear Meters, Franksville, WI

Bronkhorst High-Tech BV, Ruurlo, Netherlands

Brooks Instruments, Hatfield, PA

Delta M Corp., Oak Ridge, TN

Eastern Instruments, Wilmington, NC

FCI-Fluid Components International, San Marcos, CA

Krohne, Inc., Peabody, MA

Kurz Instruments Inc., Monterey, CA

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Red Seal Measurement, Greenwood, SC

REMBE GMBH, SAFETY+CONTROL, Gallbergweg

21, Brilon, Germany 59929 (49-2961-7405-0; FAX: 49-2961-50-714; e-mail: sales@rembe.de; web site: www.rembe.com)

REMBE, INC., 3809 Beam Road Ste K, Charlotte, NC

28217 (704.716.7022; FAX: 704.716.7025; e-mail: info@rembe.us; web site: www.rembe.us)



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, orifice plate

SAMSON Controls, Inc., Baytown, TX

Flowmeters, positive displacement

AW-Lake Company, Lake Monitors & AW Gear Meters, Franksville, WI

Badger Meter Europa GmbH, Neuffen, Germany

Brooks Instruments, Hatfield, PA

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Red Seal Measurement, Greenwood, SC

Flowmeters, propeller

AW-Lake Company, Lake Monitors & AW Gear Meters, Franksville, WI

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Flowmeters, rotameters

AW-Lake Company, Lake Monitors & AW Gear Meters, Franksville, WI

Brooks Instruments, Hatfield, PA

Cole-Parmer, Vernon Hills, IL

Krohne, Inc., Peabody, MA

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Universal Flow Monitors, Inc., Hazel Park, MI

Flowmeters, sonic

Fox Valve Development Corp., Dover, NJ

Krohne, Inc., Peabody, MA

Flowmeters, turbine

AW-Lake Company, Lake Monitors & AW Gear Meters, Franksville, WI

Badger Meter Europa GmbH, Neuffen, Germany

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Flowmeters, ultrasonic

Accusonic Technologies, Inc., West Wareham, MA

Badger Meter Europa GmbH, Neuffen, Germany

Inventron Inc., West Bloomfield, MI

Krohne, Inc., Peabody, MA

Siemens Industry, Inc., Solutions, Automation and Drive Technologies, 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

AW-Lake Company, Lake Monitors & AW Gear Meters, Franksville, WI

Badger Meter Europa GmbH, Neuffen, Germany

Brooks Instruments, Hatfield, PA

Krohne, Inc., Peabody, MA

Universal Flow Monitors, Inc., Hazel Park, MI

Flowmeters, vortex shedding

Badger Meter Europa GmbH, Neuffen, Germany

Krohne, Inc., Peabody, MA

Omega Engineering Inc., An Omega Group Co., Stamford, CT

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

Flowmeters, weirs & flumes

Badger Meter Europa GmbH, Neuffen, Germany

Gages, density

AUTOMATION PRODUCTS INC. (DYNATROL DIV.), 3030

Maxroy St., Houston, TX 77008 (800-231-2062 USA & Canada; 713-869-0361; FAX: 713-869-7332; e-mail: sales@dynatrolusa.com; web site: www.Dynatrol-USA.com)

Krohne, Inc., Peabody, MA

Gages, filter

Midwesco Filter Resources, Inc., Winchester, VA

Gages, liquid level

AUTOMATION PRODUCTS INC. (DYNATROL DIV.), 3030

Maxroy St., Houston, TX 77008 (800-231-2062 USA & Canada; 713-869-0361; FAX: 713-869-7332; e-mail: sales@dynatrolusa.com; web site: www.Dynatrol-USA.com)

Delta M Corp., Oak Ridge, TN

Ernst Flow Industries, Farmingdale, NJ

FCI-Fluid Components International, San Marcos, CA

Jogler Inc., Houston, TX

Krohne, Inc., Peabody, MA

MTS Sensors, Cary, NC

Omega Engineering Inc., An Omega Group Co., Stamford, CT

TankLink, a wholly-owned subsidiary of Telular Corporation, Chicago, IL

Instrumentation & controls

TowerScan, Sarnia, Ontario, Canada

TowerScan, Port Huron, MI

VEGA Grieshaber KG, Schiltach, Germany

VEGA Americas, Inc., Cincinnati, OH

Gages, liquid level, sanitary

Madison Co., Branford, CT

Gages, mechanical force

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Gages, nuclear radiation

TowerScan, Sarnia, Ontario, Canada

TowerScan, Port Huron, MI

Gages, pressure

Ashcroft Inc., Stratford, CT

Ernst Flow Industries, Farmingdale, NJ

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Palmer Wahl Temperature Instruments, Asheville, NC

Plast-O-Matic Valves Inc., Cedar Grove, NJ

Senso-Metrics Inc., Simi Valley, CA

Tel-Tru Manufacturing Co., Rochester, NY

VEGA Grieshaber KG, Schiltach, Germany

VEGA Americas, Inc., Cincinnati, OH

WIKA Instrument, LP, Lawrenceville, GA

Gages, strain

Omega Engineering Inc., An Omega Group Co., Stamford, CT

REMBE GMBH, SAFETY+CONTROL, Gallbergweg

21, Brilon, Germany 59929 (49-2961-7405-0; FAX: 49-2961-50-714; e-mail: sales@rembe.de; web site: www.rembe.com)

Gages, tank

Ernst Flow Industries, Farmingdale, NJ

Jogler Inc., Houston, TX

Krohne, Inc., Peabody, MA

MTS Sensors, Cary, NC

Omega Engineering Inc., An Omega Group Co., Stamford, CT

TankLink, a wholly-owned subsidiary of Telular Corporation, Chicago, IL

VEGA Grieshaber KG, Schiltach, Germany

VEGA Americas, Inc., Cincinnati, OH

WIKA Instrument, LP, Lawrenceville, GA

Gages, temperature

Ashcroft Inc., Stratford, CT

MTS Sensors, Cary, NC

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Palmer Wahl Temperature Instruments, Asheville, NC

Senso-Metrics Inc., Simi Valley, CA

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

Ashcroft Inc., Stratford, CT

Omega Engineering Inc., An Omega Group Co., Stamford, CT

TankLink, a wholly-owned subsidiary of Telular Corporation, Chicago, IL

VEGA Grieshaber KG, Schiltach, Germany

VEGA Americas, Inc., Cincinnati, OH

WIKA Instrument, LP, Lawrenceville, GA

Gages, water

VEGA Grieshaber KG, Schiltach, Germany

VEGA Americas, Inc., Cincinnati, OH

Glasses, gage

Ernst Flow Industries, Farmingdale, NJ

Jogler Inc., Houston, TX

Glasses, sight flow

Jogler Inc., Houston, TX

Plast-O-Matic Valves Inc., Cedar Grove, NJ

WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Indicators, bin level

AUTOMATION PRODUCTS INC. (DYNATROL DIV.), 3030

Maxroy St., Houston, TX 77008 (800-231-2062 USA & Canada; 713-869-0361; FAX: 713-869-7332; e-mail: sales@dynatrolusa.com; web site: www.Dynatrol-USA.com)

Bascale Company, Inc., Houston, TX

Inventron Inc., West Bloomfield, MI

Krohne, Inc., Peabody, MA

PRODUCT DIRECTORY

Monitor Technologies LLC, Elburn, IL
VEGA Grieshaber KG, Schiltach, Germany
VEGA Americas, Inc., Cincinnati, OH

Indicators, carbon monoxide

Sierra Monitor Corp., Milpitas, CA

Indicators, combustible gases

Clean Air Express Equipment, Palatine, IL
Sierra Monitor Corp., Milpitas, CA

Indicators, dewpoint or humidity

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Indicators, flow

Auburn Systems, LLC, Danvers, MA
AW-Lake Company, Lake Monitors & AW Gear Meters, Franksville, WI
Brooks Instruments, Hatfield, PA
Delta M Corp., Oak Ridge, TN
Ernst Flow Industries, Farmingdale, NJ
FCI-Fluid Components International, San Marcos, CA
Inventron Inc., West Bloomfield, MI
Jogler Inc., Houston, TX
Krohne, Inc., Peabody, MA
Monitor Technologies LLC, Elburn, IL
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Plast-O-Matic Valves Inc., Cedar Grove, NJ
Red Seal Measurement, Greenwood, SC
Siemens Industry, Inc., Solutions, Automation and Drive Technologies, 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)
Universal Flow Monitors, Inc., Hazel Park, MI

Indicators, liquid level

AUTOMATION PRODUCTS INC. (DYNATROL DIV.), 3030 Maxroy St., Houston, TX 77008 (800-231-2062 USA & Canada; 713-869-0361; FAX: 713-869-7332; e-mail: sales@dynamtrolusa.com; web site: www.Dynatrol-USA.com)
Bascale Company, Inc., Houston, TX
Delta M Corp., Oak Ridge, TN
Ernst Flow Industries, Farmingdale, NJ
FCI-Fluid Components International, San Marcos, CA
Inventron Inc., West Bloomfield, MI
Jogler Inc., Houston, TX
Krohne, Inc., Peabody, MA
Madison Co., Branford, CT
Monitor Technologies LLC, Elburn, IL
MTS Sensors, Cary, NC
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Plast-O-Matic Valves Inc., Cedar Grove, NJ
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
TankScan, Brainerd, MN
VEGA Grieshaber KG, Schiltach, Germany
VEGA Americas, Inc., Cincinnati, OH

Indicators, mass flow

Brooks Instruments, Hatfield, PA
Clean Air Express Equipment, Palatine, IL
Delta M Corp., Oak Ridge, TN
FCI-Fluid Components International, San Marcos, CA
Omega Engineering Inc., An Omega Group Co., Stamford, CT
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)

Indicators, moisture

Omega Engineering Inc., An Omega Group Co., Stamford, CT
Siemens Industry, Inc., Solutions, Automation and Drive Technologies, Norcross, GA

Indicators, other

Omega Engineering Inc., An Omega Group Co., Stamford, CT
Schurter, Inc., Santa Rosa, CA
Sierra Monitor Corp., Milpitas, CA

Indicators, pressure

Ashcroft Inc., Stratford, CT
Brooks Instruments, Hatfield, PA
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Senso-Metrics Inc., Simi Valley, CA

Tel-Tru Manufacturing Co., Rochester, NY

Indicators, solids level

AUTOMATION PRODUCTS INC. (DYNATROL DIV.), 3030 Maxroy St., Houston, TX 77008 (800-231-2062 USA & Canada; 713-869-0361; FAX: 713-869-7332; e-mail: sales@dynamtrolusa.com; web site: www.Dynatrol-USA.com)
Inventron Inc., West Bloomfield, MI
Monitor Technologies LLC, Elburn, IL
Omega Engineering Inc., An Omega Group Co., Stamford, CT
VEGA Grieshaber KG, Schiltach, Germany
VEGA Americas, Inc., Cincinnati, OH

Indicators, specific gravity

Anton PAAR USA, Ashland, VA
AUTOMATION PRODUCTS INC. (DYNATROL DIV.), 3030 Maxroy St., Houston, TX 77008 (800-231-2062 USA & Canada; 713-869-0361; FAX: 713-869-7332; e-mail: sales@dynamtrolusa.com; web site: www.Dynatrol-USA.com)
Red Seal Measurement, Greenwood, SC

Indicators, temperature

Acromag, Inc., Wixom, MI
Ashcroft Inc., Stratford, CT
Bascale Company, Inc., Houston, TX
Electronic Development Labs, Danville, VA
FCI-Fluid Components International, San Marcos, CA
MTS Sensors, Cary, NC
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Palmer Wahl Temperature Instruments, Asheville, NC
Raytek Corp., Santa Cruz, CA
Senso-Metrics Inc., Simi Valley, CA
Tel-Tru Manufacturing Co., Rochester, NY
Williamson Corporation, Concord, MA

Indicators, turbidity

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Indicators, vacuum

Ashcroft Inc., Stratford, CT
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Indicators, viscosity

AUTOMATION PRODUCTS INC. (DYNATROL DIV.), 3030 Maxroy St., Houston, TX 77008 (800-231-2062 USA & Canada; 713-869-0361; FAX: 713-869-7332; e-mail: sales@dynamtrolusa.com; web site: www.Dynatrol-USA.com)
Brookfield Engineering Laboratories, Inc., Middleboro, MA
Hydramotion Ltd, Malton

Indicators, weight

Bascale Company, Inc., Houston, TX
Cardinal Scale Manufacturing Co., Webb City, MO
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Thermistors

Electronic Development Labs, Danville, VA
GIC Thermodynamics, Charlevoix, MI
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Temp-Pro Inc., Northampton, MA

Thermocouples

BASF Corporation, Catalysts & Adsorbents, Iselin, NJ
Clean Air Express Equipment, Palatine, IL
Cole-Parmer, Vernon Hills, IL
Electronic Development Labs, Danville, VA
GIC Thermodynamics, Charlevoix, MI
JUMO GmbH & Co. KG, Fulda, Germany
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Temp-Pro Inc., Northampton, MA
Watlow, St. Louis, MO

Thermometers, bimetallic

Ernst Flow Industries, Farmingdale, NJ
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Tel-Tru Manufacturing Co., Rochester, NY
Temp-Pro Inc., Northampton, MA
WIKA Instrument, LP, Lawrenceville, GA

Thermometers, dial

Omega Engineering Inc., An Omega Group Co., Stamford, CT
Tel-Tru Manufacturing Co., Rochester, NY
Temp-Pro Inc., Northampton, MA
WIKA Instrument, LP, Lawrenceville, GA

Instrumentation & controls

Thermometers, differential

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Thermometers, digital

Palmer Wahl Temperature Instruments, Asheville, NC
Tel-Tru Manufacturing Co., Rochester, NY

Thermometers, electrical

Omega Engineering Inc., An Omega Group Co., Stamford, CT
Raytek Corp., Santa Cruz, CA
Temp-Pro Inc., Northampton, MA

Thermometers, infrared

Omega Engineering Inc., An Omega Group Co., Stamford, CT
Palmer Wahl Temperature Instruments, Asheville, NC
Williamson Corporation, Concord, MA

Thermometers, mercury

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Thermometers, precision

Anton PAAR USA, Ashland, VA
CTP Corp., Northport, NY
Palmer Wahl Temperature Instruments, Asheville, NC

Thermometers, recording

Campbell Scientific Inc., Logan, UT
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Raytek Corp., Santa Cruz, CA

Thermometers, resistance temperature detectors

Electronic Development Labs, Danville, VA
GIC Thermodynamics, Charlevoix, MI
JUMO GmbH & Co. KG, Fulda, Germany
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Palmer Wahl Temperature Instruments, Asheville, NC
Temp-Pro Inc., Northampton, MA

Thermometers, surface

Electronic Development Labs, Danville, VA
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Raytek Corp., Santa Cruz, CA
Temp-Pro Inc., Northampton, MA

Thermostats

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Thermowells

Electronic Development Labs, Danville, VA
GIC Thermodynamics, Charlevoix, MI
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Palmer Wahl Temperature Instruments, Asheville, NC
Tel-Tru Manufacturing Co., Rochester, NY
Temp-Pro Inc., Northampton, MA
WIKA 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
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

Ashcroft Inc., Stratford, CT
ATS RheoSystems, Cannon Instrument Company, Borden-town, NJ
Beamex, Inc., Marietta, GA
Brookfield Engineering Laboratories, Inc., Middleboro, MA
Clean Air Engineering, Palatine, IL
Clean Air Express Equipment, Palatine, IL
Cole-Parmer, Vernon Hills, IL
Electronic Development Labs, Danville, VA
FRITSCH GmbH, Milling and Sizing, Idar-Oberstein, Germany
Koflo Corp., Cary, IL
Konica Minolta Sensing Americas, Ramsey, NJ

PRODUCT DIRECTORY

Omega Engineering Inc., An Omega Group Co., Stamford, CT
Palmer Wahl Temperature Instruments, Asheville, NC
PRUEFTECHNIK, Ismaning, Germany
Raytek Corp., Santa Cruz, CA
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
Thermalac, Inc., Solon, OH
WIKA Instrument, LP, Lawrenceville, GA

Calorimeters

LECO Corporation, St. Joseph, MI

Chambers, test

HEMCO CORPORATION, 711 South Powell Rd., Independence, MO 64056 (800-779-4362; 816-796-2900; FAX: 816-796-3333; e-mail: info@hemcocorp.com; web site: www.HEMCOcorp.com)

Koflo Corp., Cary, IL

Q-Lab Corporation, Westlake, OH

Colorimeters

Konica Minolta Sensing Americas, Ramsey, NJ
Ocean Optics, Inc., Dunedin, FL
Omega Engineering Inc., An Omega Group Co., Stamford, CT
optek-Danulat, Inc., Germantown, WI

Corrosion measurement equipment

Applus RTD USA, Houston, TX

Norman N. Axelrod Associates, Optical/Laser /Imaging: Instrumentation & Control Div., New York, NY

Density-measuring equipment

Anton PAAR USA, Ashland, VA

AUTOMATION PRODUCTS INC. (DYNATROL DIV.), 3030 Maxroy St., Houston, TX 77008 (800-231-2062 USA & Canada; 713-869-0361; FAX: 713-869-7332; e-mail: sales@dynatrolusa.com; web site: www.Dynatrol-USA.com)

K-Patents, Inc., Naperville, IL

Konica Minolta Sensing Americas, Ramsey, NJ
Red Seal Measurement, Greenwood, SC
TowerScan, Sarnia, Ontario, Canada
TowerScan, Port Huron, MI

Detectors, interface

AUTOMATION PRODUCTS INC. (DYNATROL DIV.), 3030 Maxroy St., Houston, TX 77008 (800-231-2062 USA & Canada; 713-869-0361; FAX: 713-869-7332; e-mail: sales@dynatrolusa.com; web site: www.Dynatrol-USA.com)

FCI-Fluid Components International, San Marcos, CA
Krohne, Inc., Peabody, MA
TowerScan, Sarnia, Ontario, Canada
TowerScan, Port Huron, MI

Detectors, leak

Auburn Systems, LLC, Danvers, MA
BS & B Safety Systems, Inc., Tulsa, OK
FCI-Fluid Components International, San Marcos, CA
GOW-MAC Instrument Co., Bethlehem, PA
In USA, Inc., Norwood, MA
Mil-Ram Technology, Inc., Fremont, CA
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Pfeiffer Vacuum, Inc., Nashua, NH

RKI Instruments, Inc., Union City, CA

Sensor Electronics Corp., Minneapolis, 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

TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

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, metal

Acromag, Inc., Wixom, MI

Magnetic Products, Inc., Highland, MI

Electrodes, ion-sensitive

Analytical Measurements, Chester, NJ
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Electrodes, pH

Analytical Measurements, Chester, NJ

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Van London-pHoenix Co., Houston, TX

Enclosures, instrument

A Box 4 U, Wichita, Kansas

Galvanometers

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Gas dilution systems

Clean Air Instrument Rental, Palatine, IL

Gas sampling bags

Clean Air Express Equipment, Palatine, IL

Clean Air Instrument Rental, Palatine, IL

Humidistats

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Hydrometers

AUTOMATION PRODUCTS INC. (DYNATROL DIV.), 3030 Maxroy St., Houston, TX 77008 (800-231-2062 USA & Canada; 713-869-0361; FAX: 713-869-7332; e-mail: sales@dynatrolusa.com; web site: www.Dynatrol-USA.com)

Jogler Inc., Houston, TX

Hygrometers

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Infrared Thermometer

Williamson Corporation, Concord, MA

Ion measurement or selection

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Pfeiffer Vacuum, Inc., Nashua, NH

Van London-pHoenix Co., Houston, TX

Laser systems

Norman N. Axelrod Associates, Optical/Laser /Imaging: Instrumentation & Control Div., New York, NY
PRUEFTECHNIK, Ismaning, Germany

Load cells

Bascale Company, Inc., Houston, TX
Kubota Corporation, Singapore, Singapore
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Schenck Process GmbH, Darmstadt, Germany

Manometers

Omega Engineering Inc., An Omega Group Co., Stamford, CT
VEGA Grieshaber KG, Schiltach, Germany
VEGA Americas, Inc., Cincinnati, OH

Meters, air

Clean Air Express Equipment, Palatine, IL
Eastern Instruments, Wilmington, NC
FCI-Fluid Components International, San Marcos, CA
Krohne, Inc., Peabody, MA
Omega Engineering Inc., An Omega Group Co., Stamford, CT

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

Meters, chlorine

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Meters, conductivity

Amstat Industries Inc., Glenview, IL
Anton PAAR USA, Ashland, VA
Chilworth Global, Plainsboro, NJ

Meters, displacement

MTS Sensors, Cary, NC
Omega Engineering Inc., An Omega Group Co., Stamford, CT
PRUEFTECHNIK, Ismaning, Germany
Red Seal Measurement, Greenwood, SC

Meters, electrical

Escitec, Mesa, AZ

Meters, gas

FCI-Fluid Components International, San Marcos, CA
Krohne, Inc., Peabody, MA

Instrumentation & controls

Omega Engineering Inc., An Omega Group Co., Stamford, CT

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)

Meters, heat flow

FCI-Fluid Components International, San Marcos, CA
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Meters, oxygen

Krohne, Inc., Peabody, MA
Omega Engineering Inc., An Omega Group Co., Stamford, CT
RKI Instruments, Inc., Union City, CA

Meters, ozone

In USA, Inc., Norwood, MA
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Meters, pH

Cole-Parmer, Vernon Hills, IL
Myron L Company, Carlsbad, CA
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Van London-pHoenix Co., Houston, TX

Meters, recording

Analytical Measurements, Chester, NJ
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Meters, sludge

Krohne, Inc., Peabody, MA

Meters, telemetering

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Meters, turbidity

Krohne, Inc., Peabody, MA
Omega Engineering Inc., An Omega Group Co., Stamford, CT
optek-Danulat, Inc., Germantown, WI
Sigrist Photometer AG, Ennetbürgen, Switzerland

Meters, ultrasonic

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Siemens Industry, Inc., Solutions, Automation and Drive Technologies, 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)

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Meters, ultraviolet

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Meters, vibration

Omega Engineering Inc., An Omega Group Co., Stamford, CT
PRUEFTECHNIK, Ismaning, Germany

Meters, water

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Red Seal Measurement, Greenwood, SC
Universal Flow Monitors, Inc., Hazel Park, MI

Meters, zeta potential

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Brookhaven Instruments Corp., Holtsville, NY

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Clean Air Instrument Rental, Palatine, IL

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K-Patents, Inc., Naperville, IL
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Rheometers

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Shimadzu Scientific Instruments, Columbia, MD

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Q-Lab Corporation, Westlake, OH
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Hydramotion Ltd, Malton
Lenterra, Inc., Newark, NJ
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TowerScan, Sarnia, Ontario, Canada
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Recorders, moisture

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Recorders, other

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Recorders, pressure

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Recorders, temperature

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JUMO GmbH & Co. KG, Fulda, Germany
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Raytek Corp., Santa Cruz, CA
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Recorders, turbidity

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Recorders, viscosity

Brookfield Engineering Laboratories, Inc., Middleboro, MA
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Phoenix Contact, Middletown, PA
Phoenix Contact GmbH & Co. KG, Blomberg, Germany
R. STAHL, Waldenburg, Germany

Instrumentation & controls

Data Transmission, Wireless

Phoenix Contact GmbH & Co. KG, Blomberg, Germany
R. STAHL, Waldenburg, Germany

Electrical equipment, intrinsic safety

HIMA Paul Hildebrandt GmbH + Co KG, Bruehl, Germany
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Phoenix Contact, Middletown, PA
Phoenix Contact GmbH & Co. KG, Blomberg, Germany
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Radio remote control systems

Phoenix Contact, Middletown, PA
Phoenix Contact GmbH & Co. KG, Blomberg, Germany

Relays, time delay

Bascale Company, Inc., Houston, TX
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Phoenix Contact GmbH & Co. KG, Blomberg, Germany

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Phoenix Contact GmbH & Co. KG, Blomberg, Germany
R. STAHL, Waldenburg, Germany
Senso-Metrics Inc., Simi Valley, CA
Sensortech, Inc., Mansfield, MA

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Burkert Fluid Control Systems, Charlotte, NC
FCI-Fluid Components International, San Marcos, CA
Jogler Inc., Houston, TX
Krohne, Inc., Peabody, MA
Monitor Technologies LLC, Elburn, IL
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Sensortech, Inc., Mansfield, MA
VEGA Grieshaber KG, Schiltach, Germany
VEGA Americas, Inc., Cincinnati, OH
WIKA Instrument, LP, Lawrenceville, GA

Transmitters, mass flow

AW-Lake Company, Lake Monitors & AW Gear Meters, Franksville, WI
Bronkhorst High-Tech BV, Ruurlo, Netherlands
FCI-Fluid Components International, San Marcos, CA
Krohne, Inc., Peabody, MA
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Sensortech, Inc., Mansfield, MA

Transmitters, pressure

Ashcroft Inc., Stratford, CT
JUMO GmbH & Co. KG, Fulda, Germany
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Senso-Metrics Inc., Simi Valley, CA
Sensortech, Inc., Mansfield, MA
Siemens Industry, Inc., Solutions, Automation and Drive Technologies, Norcross, GA
Tel-Tru Manufacturing Co., Rochester, NY
VEGA Grieshaber KG, Schiltach, Germany
VEGA Americas, Inc., Cincinnati, OH
WIKA Instrument, LP, Lawrenceville, GA

Transmitters, pressure-critical

Ashcroft Inc., Stratford, CT

Transmitters, temperature

FCI-Fluid Components International, San Marcos, CA
GIC Thermodynamics, Charlevoix, MI
JUMO GmbH & Co. KG, Fulda, Germany
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Phoenix Contact, Middletown, PA
Phoenix Contact GmbH & Co. KG, Blomberg, Germany
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5

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Membrana, Charlotte, NC

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CTP Corp., Northport, NY
Lectrodryer, Richmond, KY

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GEA Westfalia Separator GmbH, Oelde, Germany
Tema Systems, Inc., Cincinnati, OH
Western States Machine Co., Hamilton, OH

Centrifuges, batch, automatic basket

EquipNet, Inc., Canton, MA
Ferrum Inc., Centrifuge Technology, Houston, TX
Heinkel Filtering Systems Inc., Swedesboro, NJ
Shiv Shakti Process Equipment P. Ltd., International Marketing & Sales, 407, Shivam Chambers., S V Road, Goregaon West., Mumbai, India 400104 (9870646500; 9821633589; FAX: 912226798284; e-mail: sales@shivshaktiequipments.com; web site: www.shivshaktiequipments.com)

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Western States Machine Co., Hamilton, OH

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Ferrum Inc., Centrifuge Technology, Houston, TX
Heinkel Filtering Systems Inc., Swedesboro, NJ
Midwest Steel Company Inc, Houston, Texas
Shiv Shakti Process Equipment P. Ltd., International Marketing & Sales, 407, Shivam Chambers., S V Road, Goregaon West., Mumbai, India 400104 (9870646500; 9821633589; FAX: 912226798284; e-mail: sales@shivshaktiequipments.com; web site: www.shivshaktiequipments.com)

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Centrifuges, disc, nozzle discharge

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Centrifuges, disc, solid bowl

Andritz Separation GmbH, Selb, Germany
Ferrum Inc., Centrifuge Technology, Houston, TX
GEA Westfalia Separator GmbH, Oelde, Germany
Tema Systems, Inc., Cincinnati, OH

Centrifuges, disc, valve discharge

Ferrum Inc., Centrifuge Technology, Houston, TX
GEA Westfalia Separator GmbH, Oelde, Germany

Centrifuges, filter, continuous, screen bowl, scroll discharge

Andritz Separation GmbH, Selb, Germany
Ferrum Inc., Centrifuge Technology, Houston, TX
Tema Systems, Inc., Cincinnati, OH

Centrifuges, filter, inverting

Ferrum Inc., Centrifuge Technology, Houston, TX
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Western States Machine Co., Hamilton, OH

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B & P Process Equipment, Saginaw, MI
EquipNet, Inc., Canton, MA
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GEA Westfalia Separator GmbH, Oelde, Germany
Heinkel Filtering Systems Inc., Swedesboro, NJ
New Brunswick Scientific Co., Inc., Edison, NJ
Tema Systems, Inc., Cincinnati, OH
Western States Machine Co., Hamilton, OH

Centrifuges, liquid-liquid

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GEA Westfalia Separator GmbH, Oelde, Germany
New Brunswick Scientific Co., Inc., Edison, NJ

Centrifuges, other

Ferrum Inc., Centrifuge Technology, Houston, TX
Western States Machine Co., Hamilton, OH

Centrifuges, solid basket

Andritz Separation GmbH, Selb, Germany
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site: www.sulzer.com)

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Bustin Industrial Products, East Stroudsburg, PA

Creative Pultrusions, Inc., Alum Bank, PA

FABRICATED PLASTICS LIMITED, 2175 TESTON ROAD, MAPLE, Canada L6A 1T3 (905-832-8161; FAX: 905-832-2111; e-mail: info@fabricatedplastics.com; web site: www.fabricatedplastics.com)

HEMCO CORPORATION, 711 South Powell Rd., Independence, MO 64056 (800-779-4362; 816-796-2900; FAX: 816-796-3333; e-mail: info@hemcocorp.com; web site: www.HEMCOcorp.com)

MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI
ZCL Dualam, Inc., Edmonton, Alberta, Canada

DRYERS

Dryer parts & accessories

Alstom Power, Inc., Raymond & Bartlett-Snow Products, Warrenville, IL

AMANDUS KAHL GmbH & Co. KG, Reinbek, Germany
Bepex International LLC, Minneapolis, MN

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

Lectrodryer, Richmond, KY

PAUL O. ABBE, BENSENVILLE, IL

Dryers, air

Alstom Power, Inc., Raymond & Bartlett-Snow Products, Warrenville, IL

Bepex International LLC, Minneapolis, MN

EquipNet, Inc., Canton, MA
Lectrodryer, Richmond, KY
Omega Engineering Inc., An Omega Group Co., Stamford, CT
SIAD Macchine Impianti, Bergamo, Italy
SPX Flow Technology, Ocala, FL
Sweet Manufacturing Company, Springfield, OH
Witte Co. Inc., Washington, NJ

Dryers, apron

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

Dryers, batch

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

EquipNet, Inc., Canton, MA

GEA PROCESS ENGINEERING, COLUMBIA, MD
JAYGO, INCORPORATED, 675 Rahway Ave, Union, NJ 07083 (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)

PAUL O. ABBE, BENSENVILLE, IL

Procedyne Corp., New Brunswick, NJ

Shiv Shakti Process Equipment P. Ltd., International Marketing & Sales, 407, Shivam Chambers, S V Road, Goregaon West., Mumbai, India 400104 (9870646500; 9821633589; FAX: 912226798284; e-mail: sales@shivshaktiequipments.com; web site: www.shivshaktiequipments.com)

Spray Drying Systems, Inc., Eldersburg, MD

Dryers, belt

AKW Apparate + Verfahren GmbH, Hirschau, Bavaria, Germany

AMANDUS KAHL GmbH & Co. KG, Reinbek, Germany

AWT World Trade Inc., Chicago, IL

Berndorf Band GmbH, Berndorf, Austria

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PRODUCT DIRECTORY

Processing equipment

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France
67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail:
comessa@comessa.fr; web site: www.comessa.com)
EquipNet, Inc., Canton, MA
Steri Technologies Inc., Bohemia, NY

Dryers, centrifugal

Bepex International LLC, Minneapolis, MN
EquipNet, Inc., Canton, MA
Heinkel Filtering Systems Inc., Swedesboro, NJ
Maag Pump Systems AG, Oberglatt / ZH, Switzerland
Metso Minerals Industries, Inc., York, PA
Spray Drying Systems, Inc., Eldersburg, MD
Tema Systems, Inc., Cincinnati, OH
Western States Machine Co., Hamilton, OH

Dryers, chamber

EDWARDS US HEADQUARTERS, 6416 Inducon Drive
West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866
484 5218; e-mail: info@edwardsvacuum.com; web
site: www.edwardsvacuum.com)
McGill AirPressure LLC, Columbus, OH
WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee,
NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail:
sales@wyssmont.com; web site: www.wyssmont.com)

Dryers, closed circuit

Alstom Power, Inc., Raymond & Bartlett-Snow Products,
Warrenville, IL
Bepex International LLC, Minneapolis, MN
Buss-SMS-Canzler GmbH, Butzbach, Germany
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France
67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail:
comessa@comessa.fr; web site: www.comessa.com)
GEA PROCESS ENGINEERING, COLUMBIA, MD
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)
Lectrodryer, Richmond, KY
Procedyne Corp., New Brunswick, NJ
Spray Drying Systems, Inc., Eldersburg, MD
WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee,
NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail:
sales@wyssmont.com; web site: www.wyssmont.com)

Dryers, conical, vacuum

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)
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France
67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail:
comessa@comessa.fr; web site: www.comessa.com)
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West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866
484 5218; e-mail: info@edwardsvacuum.com; web
site: www.edwardsvacuum.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)
JAYGO, INCORPORATED, 675 Rahway Ave, Union, NJ
07083 (1-888-81-JAYGO; 908-688-3600; FAX: 908-
688-6060; e-mail: sales@jaygoinc.com; web site:
www.jaygoinc.com)

McGill AirPressure LLC, Columbus, OH
Patterson Ind. Canada, of All-Weld Company Limited,
Scarborough, Ontario, Canada
PAUL O. ABBE, Bensenville, IL
Shiv Shakti Process Equipment P. Ltd., International
Marketing & Sales, 407, Shivam Chambers., S V Road,
Goregaon West., Mumbai, India 400104 (9870646500;
9821633589; FAX: 912226798284; e-mail: sales@
shivshaktiequipments.com; web site: www.shivshakti-
equipments.com)

Dryers, continuous

Alstom Power, Inc., Raymond & Bartlett-Snow Products,
Warrenville, IL
AMANDUS KAHLE GmbH & Co. KG, Reinbek, Germany
ANDRITZ Gouda, Waddinxveen, Netherlands
Bepex International LLC, Minneapolis, MN
Buss-SMS-Canzler GmbH, Butzbach, Germany
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France
67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail:
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West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866
484 5218; e-mail: info@edwardsvacuum.com; web
site: www.edwardsvacuum.com)
Econ Industrial Systems, LP, The Woodlands, TX
GIG KARASEK GMBH GmbH, Gloggnitz-Stuppach,
Austria
HEYL & PATTERSON INC., RENNEBURG DIVISION, PO
Box 36, Pittsburgh, PA 15230 (412-788-9810; FAX:
412-788-9822; e-mail: info@heypatterson.com; web
site: www.heypatterson.com)
Kason Corp., Millburn, NJ

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)

Lectrodryer, Richmond, KY
LIST AG, Arisdorf, Switzerland
PAUL O. ABBE, Bensenville, IL
Procedyne Corp., New Brunswick, NJ
Sandvik Process Systems, Inc., Totowa, NJ
Spray Drying Systems, Inc., Eldersburg, MD
Steri Technologies Inc., Bohemia, NY
Witte Co. Inc., Washington, NJ
WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee,
NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail:
sales@wyssmont.com; web site: www.wyssmont.com)

Dryers, conveyor

AWT World Trade Inc., Chicago, IL
Bepex International LLC, Minneapolis, MN
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg,
France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-
02-04; e-mail: comessa@comessa.fr; web site: www.
comessa.com)
Sandvik Process Systems, Inc., Totowa, NJ
Witte Co. Inc., Washington, NJ

Dryers, desiccant, disposable cartridge

SPX Flow Technology, Ocala, FL

Dryers, desiccant, package unit

AAAmachine, Inc., Des Plaines, IL
Lectrodryer, Richmond, KY
Munters Corporation, Air Treatment, Amesbury, MA
SPX Flow Technology, Ocala, FL

Dryers, drum

ANDRITZ Gouda, Waddinxveen, Netherlands
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France
67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail:
comessa@comessa.fr; web site: www.comessa.com)
Encon Evaporators, Hooksett, NH
GEA Barr-Rosin, Boisbriand, Quebec, Canada

Dryers, drum, rotary vacuum

Alstom Power, Inc., Raymond & Bartlett-Snow Products,
Warrenville, IL
AP-Miniplant GmbH & Co. KG, Lindewerra, Germany
PAUL O. ABBE, Bensenville, IL

Dryers, electric

Alstom Power, Inc., Raymond & Bartlett-Snow Products,
Warrenville, IL
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France
67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail:
comessa@comessa.fr; web site: www.comessa.com)
Encon Evaporators, Hooksett, NH
Lectrodryer, Richmond, KY
Omega Engineering Inc., An Omega Group Co., Stamford, CT
WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee,
NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail:
sales@wyssmont.com; web site: www.wyssmont.com)

Dryers, flash

Alstom Power, Inc., Raymond & Bartlett-Snow Products,
Warrenville, IL
Bepex International LLC, Minneapolis, MN
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg,
France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-
02-04; e-mail: comessa@comessa.fr; web site: www.
comessa.com)
GEA Barr-Rosin, Boisbriand, Quebec, Canada
GEA Process Engineering, Columbia, MD
HEYL & PATTERSON INC., RENNEBURG DIVISION, PO
Box 36, Pittsburgh, PA 15230 (412-788-9810; FAX:
412-788-9822; e-mail: info@heypatterson.com; web
site: www.heypatterson.com)
Spray Drying Systems, Inc., Eldersburg, MD
WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee,
NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail:
sales@wyssmont.com; web site: www.wyssmont.
com)

Dryers, fluidized bed

ANDRITZ Gouda, Waddinxveen, Netherlands
Bepex International LLC, Minneapolis, MN
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France
67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail:
comessa@comessa.fr; web site: www.comessa.com)
Dynamic Air Inc., St. Paul, MN
EquipNet, Inc., Canton, MA
Evaporator Dryer Technologies, Hammond, WI
GEA Barr-Rosin, Boisbriand, Quebec, Canada
GEA Process Engineering, Columbia, MD
HEYL & PATTERSON INC., RENNEBURG DIVISION, PO
Box 36, Pittsburgh, PA 15230 (412-788-9810; FAX:
412-788-9822; e-mail: info@heypatterson.com; web
site: www.heypatterson.com)
Kason Corp., Millburn, NJ

Kinergy Corp., Louisville, KY
NEUHAUS NEOTEC Maschinen- und Anlagenbau GmbH,
Germany
PAUL O. ABBE, Bensenville, IL
Procedyne Corp., New Brunswick, NJ
Shiv Shakti Process Equipment P. Ltd., International Market-
ing & Sales, 407, Shivam Chambers., S V Road, Goregaon
West., Mumbai, India 400104 (9870646500; 9821633589;
FAX: 912226798284; e-mail: sales@shivshaktiequipments.
com; web site: www.shivshaktiequipments.com)
Spray Drying Systems, Inc., Eldersburg, MD
Sweet Manufacturing Company, Springfield, OH
Witte Co. Inc., Washington, NJ

Dryers, freeze

EDWARDS US HEADQUARTERS, 6416 Inducon Drive
West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866
484 5218; e-mail: info@edwardsvacuum.com; web
site: www.edwardsvacuum.com)
GEA Process Engineering, Columbia, MD

Dryers, gas

Alstom Power, Inc., Raymond & Bartlett-Snow Products,
Warrenville, IL
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France
67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail:
comessa@comessa.fr; web site: www.comessa.com)
Lectrodryer, Richmond, KY
SPX Flow Technology, Ocala, FL

Dryers, infrared

AWT World Trade Inc., Chicago, IL
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France
67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail:
comessa@comessa.fr; web site: www.comessa.com)
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Dryers, microwave

Linn High Therm GmbH, Eschenfelden, Bavaria, Germany
Progressive Recovery Inc., Duplo, IL

Dryers, oxygen-enriched air

AirSep Corporation, A Chart Industries Company, Buffalo, NY

Dryers, paddle

ANDRITZ Gouda, Waddinxveen, Netherlands
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)
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France
67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail:
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Encon Evaporators, Hooksett, NH
GEA Barr-Rosin, Boisbriand, Quebec, Canada

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American; 908-234-1000; FAX: 908-234-9487; e-mail:
info@komline.com; web site: www.komline.com)
PAUL O. ABBE, Bensenville, IL

Dryers, pan

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West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866
484 5218; e-mail: info@edwardsvacuum.com; web
site: www.edwardsvacuum.com)
Witte Co. Inc., Washington, NJ
WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee,
NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail:
sales@wyssmont.com; web site: www.wyssmont.com)

Dryers, radiant heat

Alstom Power, Inc., Raymond & Bartlett-Snow Products,
Warrenville, IL
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France
67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail:
comessa@comessa.fr; web site: www.comessa.com)
Omega Engineering Inc., An Omega Group Co., Stamford, CT
WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee,
NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail:
sales@wyssmont.com; web site: www.wyssmont.com)

Dryers, refrigerated air

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France
67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail:
comessa@comessa.fr; web site: www.comessa.com)
Lectrodryer, Richmond, KY
WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee,
NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail:
sales@wyssmont.com; web site: www.wyssmont.com)

Dryers, rotary

Alstom Power, Inc., Raymond & Bartlett-Snow Products,
Warrenville, IL
Bepex International LLC, Minneapolis, MN

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)
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EquipNet, Inc., Canton, MA
 GEA Barr-Rosin, Boisbriand, Quebec, Canada

HEYL & PATTERSON INC., RENNEBURG DIVISION, PO Box 36, Pittsburgh, PA 15230 (412-788-9810; FAX: 412-788-9822; e-mail: info@heylpatterson.com; web site: www.heylopatterson.com)

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Metso Minerals Industries, Inc., York, PA
 Patterson Ind. Canada, of All-Weld Company Limited, Scarborough, Ontario, Canada

PAUL O. ABBE, Bensenville, IL

Dryers, screw flight

Bepex International LLC, Minneapolis, MN
 Buss-SMS-Canzler GmbH, Butzbach, Germany
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)

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)

Dryers, shelf, vacuum

EDWARDS US HEADQUARTERS, 6416 Inducon Drive West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)

McGill AirPressure LLC, Columbus, OH
PAUL O. ABBE, Bensenville, IL

Shiv Shakti Process Equipment P. Ltd., International Marketing & Sales, 407, Shivam Chambers, S V Road, Goregaon West., Mumbai, India 400104 (9870646500; 9821633589; FAX: 912226798284; e-mail: sales@shivshaktiequipments.com; web site: www.shivshaktiequipments.com)

Steri Technologies Inc., Bohemia, NY

Dryers, spin flash

Buss-SMS-Canzler GmbH, Butzbach, Germany
 GEA Process Engineering, Columbia, MD

Dryers, spiral screw

ANDRITZ Gouda, Waddinxveen, Netherlands
 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)

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)

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)

PAUL O. ABBE, Bensenville, IL

Dryers, spray

AAAmachine, Inc., Des Plaines, IL
 EquipNet, Inc., Canton, MA
 Evaporator Dryer Technologies, Hammond, WI
 GEA Process Engineering, Columbia, MD

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)

Spray Drying Systems, Inc., Eldersburg, MD
 Spraying Systems Co., Wheaton, IL

Dryers, steam jacketed

Bepex International LLC, Minneapolis, MN
 Buss-SMS-Canzler GmbH, Butzbach, Germany
 Charles Ross & Son Co., Hauppauge, NY
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

EquipNet, Inc., Canton, MA
 GEA Barr-Rosin, Boisbriand, Quebec, Canada

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PAUL O. ABBE, Bensenville, IL
 Procedyne Corp., New Brunswick, NJ
 Witte Co. Inc., Washington, NJ

Dryers, steam tube

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

GEA Barr-Rosin, Boisbriand, Quebec, Canada

Dryers, suspension

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

GEA Process Engineering, Columbia, MD

WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Dryers, tray

Powder Systems Ltd, Liverpool
 PSL USA, Boise, ID

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 web: www.komline.com



Komline-Sanderson

WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Dryers, tray, vacuum

EDWARDS US HEADQUARTERS, 6416 Inducon Drive West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)

McGill AirPressure LLC, Columbus, OH
Powder Systems Ltd, Liverpool
PSL USA, Boise, ID

Shiv Shakti Process Equipment P. Ltd., International Marketing & Sales, 407, Shivam Chambers., S V Road, Goregaon West., Mumbai, India 400104 (9870646500; 9821633589; FAX: 912226798284; e-mail: sales@shivshaktiequipments.com; web site: www.shivshaktiequipments.com)

Steri Technologies Inc., Bohemia, NY

WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Dryers, tumble

Alstom Power, Inc., Raymond & Bartlett-Snow Products, Warrenville, IL

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)

EDWARDS US HEADQUARTERS, 6416 Inducon Drive West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)

JAYGO, INCORPORATED, 675 Rahway Ave, Union, NJ 07083 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

PAUL O. ABBE, Bensenville, IL

Dryers, tunnel

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

Dryers, V cone

JAYGO, INCORPORATED, 675 Rahway Ave, Union, NJ 07083 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

PAUL O. ABBE, Bensenville, IL

Dryers, vacuum

ANDRITZ Gouda, Waddinxveen, Netherlands

Bepex International LLC, Minneapolis, MN

Buss-SMS-Canzler GmbH, Butzbach, 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)

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, 6416 Inducon Drive West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.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)

GIG KARASEK GMBH GmbH, Gloggnitz-Stuppach, Austria

JAYGO, INCORPORATED, 675 Rahway Ave, Union, NJ 07083 (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)

LIST AG, Arisdorf, Switzerland

McGill AirPressure LLC, Columbus, OH

PAUL O. ABBE, Bensenville, IL

POPE SCIENTIFIC, INC, INC., Saukville, WI

Powder Systems Ltd, Liverpool

PSL USA, Boise, ID

Steri Technologies Inc., Bohemia, NY

Dryers, vacuum pan

PAUL O. ABBE, Bensenville, IL

Dryers, vertical

Buss-SMS-Canzler GmbH, Butzbach, 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)

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.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)

GIG KARASEK GMBH GmbH, Gloggnitz-Stuppach, Austria

PAUL O. ABBE, Bensenville, IL

Spray Drying Systems, Inc., Eldersburg, MD

WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Dryers, vibrating

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

GEA Process Engineering, Columbia, MD

Kason Corp., Millburn, NJ

Kinergy Corp., Louisville, KY

Witte Co. Inc., Washington, NJ

DUST COLLECTORS & SEPARATORS

Baghouses

Ambient Engineering Inc., Rocky Hill, NJ

American Fabric Filter Co., Wesley Chapel, FL

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)

Donaldson Co., Inc., Donaldson Torit Dust Collectors, Minneapolis, MN

Evaporator Dryer Technologies, Hammond, WI

GEA Process Engineering, Columbia, MD

MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI

Scientific Dust Collectors, Alsip, IL

Dust collector parts & accessories

American Fabric Filter Co., Wesley Chapel, FL

ASCO Numatics, Scherpenzeel, Netherlands

Auburn Systems, LLC, Danvers, MA

AUTOMATION PRODUCTS INC. (DYNATROL DIV.), 3030 Maxroy St., Houston, TX 77008 (800-231-2062 USA & Canada; 713-869-0361; FAX: 713-869-7332; e-mail: sales@dynatrolusa.com; web site: www.Dynatrol-USA.com)

Bascale Company, Inc., Houston, TX

Donaldson Co., Inc., Donaldson Torit Dust Collectors, Minneapolis, MN

FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)

Flexicon Corp., Bethlehem, PA

MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI

Midwesco Filter Resources, Inc., Winchester, VA

Nederman USA, Westland, 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)

Scientific Dust Collectors, Alsip, IL

Dust collectors, bag filtering

Ambient Engineering Inc., Rocky Hill, NJ

American Fabric Filter Co., Wesley Chapel, FL

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)

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)

Donaldson Co., Inc., Donaldson Torit Dust Collectors, Minneapolis, MN

Flexicon Corp., Bethlehem, PA

GEA Process Engineering, Columbia, MD

MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI

Midwesco Filter Resources, Inc., Winchester, VA

Nederman USA, Westland, MI

Scientific Dust Collectors, Alsip, IL

Dust collectors, cartridge

AIRLANCO, Falls City, NE

Donaldson Co., Inc., Donaldson Torit Dust Collectors, Minneapolis, MN

Dynamic Air Inc., St. Paul, MN

Flexicon Corp., Bethlehem, PA

MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI

Nederman USA, Westland, 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)

Scientific Dust Collectors, Alsip, IL

Dust collectors, centrifugal

Advanced Cyclone Systems, S. A., Porto, Portugal

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)

Donaldson Co., Inc., Donaldson Torit Dust Collectors, Minneapolis, MN

MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI

Scientific Dust Collectors, Alsip, IL

Dust collectors, cyclone

Advanced Cyclone Systems, S. A., Porto, Portugal

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)

Donaldson Co., Inc., Donaldson Torit Dust Collectors, Minneapolis, MN

GEA Process Engineering, Columbia, MD

KIRK Process Solutions Ltd, Walton-on-Thames

MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI

Scientific Dust Collectors, Alsip, IL

Dust collectors, electrostatic precipitators

Advanced Cyclone Systems, S. A., Porto, Portugal

Ambient Engineering Inc., Rocky Hill, NJ

Beltran Technologies, Inc, Brooklyn, New York

GEA Process Engineering, Columbia, MD

Nederman USA, Westland, 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)

Dust collectors, oil type

Nederman USA, Westland, MI

Dust collectors, other

International Portland Corp., Gaston, OR

Martin Engineering, Neponset, IL

MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI

Dust collectors, pulse jet

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)

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)

Donaldson Co., Inc., Donaldson Torit Dust Collectors, Minneapolis, MN

Evaporator Dryer Technologies, Hammond, WI

Flexicon Corp., Bethlehem, PA

GEA Process Engineering, Columbia, MD

MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, 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)

Scientific Dust Collectors, Alsip, IL

Dust collectors, tray type

Advanced Industrial Technology Corp., Paramus, NJ

TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA

Dust collectors, tubular

Donaldson Co., Inc., Donaldson Torit Dust Collectors, Minneapolis, MN

Dust collectors, wet

AAAmachine, Inc., Des Plaines, 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)

MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI

Dust removal equipment

AAAmachine, Inc., Des Plaines, 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)

MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI

Dust removal equipment

AWT World Trade Inc., Chicago, IL

GEA Process Engineering, Columbia, MD

PRODUCT DIRECTORY

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)

MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI
Nederman USA, Westland, 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)

Scientific Dust Collectors, Alsip, IL

Wet Electrostatic precipitators

Beltran Technologies, Inc, Brooklyn, New York

ELECTROCHEMICAL EQUIPMENT

Electrodes: anodes & cathodes

Denver Mineral Engineers, Inc., Littleton, CO
Lightning Eliminators & Consultants, Inc., Boulder, CO

Electrolytic cells

Denver Mineral Engineers, Inc., Littleton, CO
PCA GmbH, Heusweiler, Germany
ThyssenKrupp Uhde GmbH, Dortmund, Germany

ENTRAINMENT SEPARATION EQUIPMENT

Defoamers, physical

COASTAL TECHNOLOGIES INC., P.O. Box 624, Hamp-
ton, SC 29924 (803-943-4822; FAX: 803-943-4744;
e-mail: sales@cti-sc.com; web site: www.coastalt-
echnologiesinc.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)

Fenix Process Technologies Pvt. Ltd., Pune, India

Mist eliminators

Advanced Industrial Technology Corp., Paramus, NJ
AMACS, Houston, TX
Ambient Engineering Inc., Rocky Hill, NJ



COASTAL TECHNOLOGIES INC., P.O. Box 624, Hamp-
ton, SC 29924 (803-943-4822; FAX: 803-943-4744;
e-mail: sales@cti-sc.com; web site: www.coastalt-
echnologiesinc.com)

Fenix Process Technologies Pvt. Ltd., Pune, India
Hilliard Corp., Elmira, NY
Hudson Products Corp., 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)

KIRK Process Solutions Ltd, Walton-on-Thames

MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI
Rhine Ruhr Pty. Ltd., Sunshine West., Australia
Spraying Systems Co., Wheaton, IL

SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65,
Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX:
+41 52 262 00 60; e-mail: chemtech@sulzer.com; web
site: www.sulzer.com)

Traps, air

Armstrong International, Three Rivers, MI

TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC
28273 (800-858-8727; 704-597-9070; FAX: 704-583-
1610; web site: www.tlv.com)

EVAPORATORS & CRYSTALLIZERS

Crystallizers, cooling

ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg,
NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail:
alauqa@mindspring.com; web site: www.alaquainc.
com)

Armstrong Engineering Associates, Inc., West Chester, PA
Sandvik Process Systems, Inc., Totowa, NJ
SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65,
Winterthur, Switzerland 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 Blvd. 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, Finland
GEA Process Engineering, Columbia, MD

Crystallizers, freeze

Armstrong Engineering Associates, Inc., West Chester, PA
GEA Niro PT B.V., 's-Hertogenbosch, Netherlands
GEA Process Engineering, Columbia, MD
SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65,
Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX:
+41 52 262 00 60; e-mail: chemtech@sulzer.com; web
site: www.sulzer.com)

Crystallizers, melt

Armstrong Engineering Associates, Inc., West Chester, PA
GEA Niro PT B.V., 's-Hertogenbosch, Netherlands
GEA Process Engineering, Columbia, MD
Sandvik Process Systems, Inc., Totowa, NJ
SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65,
Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX:
+41 52 262 00 60; e-mail: chemtech@sulzer.com; web
site: www.sulzer.com)

Crystallizers, Oslo Krystal

ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg,
NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail:
alauqa@mindspring.com; web site: www.alaquainc.
com)

GEA Process Engineering, Columbia, MD

Crystallizers, scraped surface

Armstrong Engineering Associates, Inc., West Chester, PA
GEA Niro PT B.V., 's-Hertogenbosch, Netherlands
SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65,
Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX:
+41 52 262 00 60; e-mail: chemtech@sulzer.com; web
site: www.sulzer.com)

Crystallizers, trough

Armstrong Engineering Associates, Inc., West Chester, PA
Witte Co. Inc., Washington, NJ

Crystallizers, vacuum

ALAUQA, INC., 7004 Blvd. 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, Finland
CROLL-REYNOLDS CO. INC., Six Campus Drive, Par-
sippany, NJ 07054 (908-232-4200; FAX: 908-232-2146;
e-mail: info@croll.com; web site: www.croll.com)

GEA Process Engineering, Columbia, MD

Evaporative systems, mechanical recompression

ALAUQA, INC., 7004 Blvd. 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, Finland
Encon Evaporators, Hooksett, NH
GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen,
Germany 76275 (49-7243-7050; FAX: 49-7243-705330;
e-mail: gea-wiegand.info@gea.com; web site: www.
gea-wiegand.com)

GEA Process Engineering, Columbia, MD
GIG KARASEK GMBH GmbH, Gloggnitz-Stuppach,
Austria

LIST AG, Arisdorf, Switzerland

Processing equipment

Evaporative systems, multiple effect

ALAUQA, INC., 7004 Blvd. 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, Butzbach, Germany
Chematur Ecoplanning OY, Pori, Finland
Evaporator Dryer Technologies, Hammond, WI
GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen,
Germany 76275 (49-7243-7050; FAX: 49-7243-705330;
e-mail: gea-wiegand.info@gea.com; web site: www.
gea-wiegand.com)

GEA Process Engineering, Columbia, MD

GIG KARASEK GMBH GmbH, Gloggnitz-Stuppach,
Austria

KOERTING HANNOVER AG, Badenstedter Str. 56,
Hannover, Germany 30453 (0511-2129-0; FAX: 0511-
2129-223; e-mail: st@koerting.de; web site: www.
koerting.de)

LIST AG, Arisdorf, Switzerland
Schutte & Koerting, Treviso, PA

Evaporative systems, thermal recompression

ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg,
NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail:
alauqa@mindspring.com; web site: www.alaquainc.
com)



CROLL-REYNOLDS CO. INC., Six Campus Drive, Par-
sippany, NJ 07054 (908-232-4200; FAX: 908-232-2146;
e-mail: info@croll.com; web site: www.croll.com)

Encon Evaporators, Hooksett, NH

GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen,
Germany 76275 (49-7243-7050; FAX: 49-7243-705330;
e-mail: gea-wiegand.info@gea.com; web site: www.
gea-wiegand.com)

GEA Process Engineering, Columbia, MD

GIG KARASEK GMBH GmbH, Gloggnitz-Stuppach,
Austria

KOERTING HANNOVER AG, Badenstedter Str. 56,
Hannover, Germany 30453 (0511-2129-0; FAX: 0511-
2129-223; e-mail: st@koerting.de; web site: www.
koerting.de)

LIST AG, Arisdorf, Switzerland
Schutte & Koerting, Treviso, PA

Evaporators, agitated film

ALAUQA, INC., 7004 Blvd. 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, Butzbach, Germany
GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen,
Germany 76275 (49-7243-7050; FAX: 49-7243-705330;
e-mail: gea-wiegand.info@gea.com; web site: www.
gea-wiegand.com)

GIG KARASEK GMBH GmbH, Gloggnitz-Stuppach,
Austria

POPE SCIENTIFIC, INC, Inc., Saukville, WI

Evaporators, climbing film

ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg,
NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail:
alauqa@mindspring.com; web site: www.alaquainc.
com)

GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen,
Germany 76275 (49-7243-7050; FAX: 49-7243-705330;
e-mail: gea-wiegand.info@gea.com; web site: www.
gea-wiegand.com)

GEA Process Engineering, Columbia, MD

Evaporators, coil

ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg,
NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail:
alauqa@mindspring.com; web site: www.alaquainc.
com)

Evaporators, falling film



ALAUQA, Inc.

ALAUQA, INC., 7004 Blvd. 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, Butzbach, Germany
Chematur Ecoplanning OY, Pori, Finland

Doyle & Roth Mfg. Co. Inc., New York, NY
 Evaporator Dryer Technologies, Hammond, WI
GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen,
 Germany 76275 (49-7243-7050; FAX: 49-7243-705330;
 e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)

GEA PHE Systems, York, PA
 GEA Process Engineering, Columbia, MD

GIG KARASEK GMBH GmbH, Gloggnitz-Stuppach,
 Austria

POPE SCIENTIFIC, INC, Inc., Saukville, WI

Evaporators, flash

Advanced Industrial Technology Corp., Paramus, NJ
ALAUQA, INC., 7004 Blvd. 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, Finland

GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen,
 Germany 76275 (49-7243-7050; FAX: 49-7243-705330;
 e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)

GEA Process Engineering, Columbia, MD

KOERTING HANNOVER AG, Badenstedter Str. 56,
 Hannover, Germany 30453 (0511-2129-0; FAX: 0511-
 2129-223; e-mail: st@koerting.de; web site: www.koerting.de)

POPE SCIENTIFIC, INC, Inc., Saukville, WI

Evaporators, forced circulation

ALAUQA, INC., 7004 Blvd. 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, Butzbach, Germany

CG Thermal LLC, Twinsburg, Ohio

Chematur Ecoplanning OY, Pori, Finland

GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen,
 Germany 76275 (49-7243-7050; FAX: 49-7243-705330;
 e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)

GEA Process Engineering, Columbia, MD

GIG KARASEK GMBH GmbH, Gloggnitz-Stuppach,
 Austria

Evaporators, horizontal tube

ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg,
 NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail:
alauqa@mindspring.com)

Doyle & Roth Mfg. Co. Inc., New York, NY

GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen,
 Germany 76275 (49-7243-7050; FAX: 49-7243-705330;
 e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)

GEA Process Engineering, Columbia, MD

LIST AG, Arisdorf, Switzerland

Evaporators, low temperature

ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg,
 NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail:
alauqa@mindspring.com; web site: www.alaquainc.com)

GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen,
 Germany 76275 (49-7243-7050; FAX: 49-7243-705330;
 e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)

GEA Process Engineering, Columbia, MD

POPE SCIENTIFIC, INC, Inc., Saukville, WI

Evaporators, plate type

ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg,
 NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail:
alauqa@mindspring.com; web site: www.alaquainc.com)

API Heat Transfer, Buffalo, NY

GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen,
 Germany 76275 (49-7243-7050; FAX: 49-7243-705330;
 e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)

GEA PHE Systems, York, PA

GEA Process Engineering, Columbia, MD

Evaporators, short path

ALAUQA, INC., 7004 Blvd. 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, Butzbach, Germany

GEA Process Engineering, Columbia, MD

GIG KARASEK GMBH GmbH, Gloggnitz-Stuppach,
 Austria

POPE SCIENTIFIC, INC, Inc., Saukville, WI

Evaporators, thin film

ALAUQA, INC., 7004 Blvd. 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, Butzbach, Germany

CTP Corp., Northport, NY

GEA Process Engineering, Columbia, MD

GIG KARASEK GMBH GmbH, Gloggnitz-Stuppach,
 Austria

POPE SCIENTIFIC, INC, Inc., Saukville, WI

Evaporators, vertical long tube

ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg,
 NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail:
alauqa@mindspring.com; web site: www.alaquainc.com)

Doyle & Roth Mfg. Co. Inc., New York, NY

GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen,
 Germany 76275 (49-7243-7050; FAX: 49-7243-705330;
 e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)

Evaporators, vertical short tube (calandria)

ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg,
 NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail:
alauqa@mindspring.com; web site: www.alaquainc.com)

Doyle & Roth Mfg. Co. Inc., New York, NY

Evaporators, waste gas

ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg,
 NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail:
alauqa@mindspring.com; web site: www.alaquainc.com)

Evaporators, waste water

ALAUQA, INC., 7004 Blvd. 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, Butzbach, Germany

Encon Evaporators, Hooksett, NH

GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen,
 Germany 76275 (49-7243-7050; FAX: 49-7243-705330;
 e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)

GEA Process Engineering, Columbia, MD

GIG KARASEK GMBH GmbH, Gloggnitz-Stuppach,
 Austria

Evaporators, wiped film

ALAUQA, INC., 7004 Blvd. 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, Butzbach, Germany

GIG KARASEK GMBH GmbH, Gloggnitz-Stuppach,
 Austria

POPE SCIENTIFIC, INC, Inc., Saukville, WI

Flakers, drum

ANDRITZ Gouda, Waddinxveen, Netherlands

FILTER MEDIA & AIDS

Felt, filter

Gore / W. L. Gore & Associates GmbH, Putzbrunn, Bavaria,
 Germany

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)

MAST Carbon International Ltd, Guildford

Filter aids, activated carbon

MAST Carbon International Ltd, Guildford
 TIGG Corporation, Oakdale, PA

Filter aids, diatomaceous earth

Argonide Corporation, Sanford, FL

Filter aids, zeolite

BASF CORPORATION, Catalysts & Adsorbents, Iselin, NJ
 TIGG Corporation, Oakdale, PA

Filter bags, acidproof

Gore / W. L. Gore & Associates GmbH, Putzbrunn, Bavaria,
 Germany
 Sefar AG, Heiden, Switzerland

Filter bags, alkaliproof

Gore / W. L. Gore & Associates GmbH, Putzbrunn, Bavaria,
 Germany
 Sefar AG, Heiden, Switzerland

Filter bags, glass

Gore / W. L. Gore & Associates GmbH, Putzbrunn, Bavaria,
 Germany

Filter bags, natural fiber

American Fabric Filter Co., Wesley Chapel, FL

Filter bags, synthetic fiber

American Fabric Filter Co., Wesley Chapel, FL

Gore / W. L. Gore & Associates GmbH, Putzbrunn, Bavaria,
 Germany

KEYSTONE FILTER, Met-Pro Corp., Hatfield, PA

Sefar AG, Heiden, Switzerland

Filter cloth, acidproof

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)

Sefar AG, Heiden, Switzerland

Filter cloth, alkaliproof

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)

Sefar AG, Heiden, Switzerland

Filter cloth, cotton

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)

Filter cloth, metallic

G Bopp USA Inc., Wappingers Falls, NY
 MM Industries, Inc., Vorti-Siv, Salem, OH
 Tema Systems, Inc., Cincinnati, OH

Filter cloth, natural fiber

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)

Filter cloth, synthetic fiber

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)

MM Industries, Inc., Vorti-Siv, Salem, OH

Sefar AG, Heiden, Switzerland

Filter media, other

Applied Porous Technologies, Inc., Tariffville, CT
 Gore / W. L. Gore & Associates GmbH, Putzbrunn, Bavaria,
 Germany

Hilliard Corp., Elmira, NY

KDF Fluid Treatment, Inc., Three Rivers, 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)

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)

MEFIAG, MET-PRO CORP, Met-Pro Corp., Owosso, MI

Mott Corporation, Farmington, CT

Sefar AG, Heiden, Switzerland

TIGG Corporation, Oakdale, PA

Paper, filter

MEFIAG, MET-PRO CORP, Met-Pro Corp., Owosso, MI

Plates, filter

G Bopp USA Inc., Wappingers Falls, NY

Tubes, filter

Croll-Reynolds Engineering Co., Inc., Trumbull, CT

KEYSTONE FILTER, Met-Pro Corp., Hatfield, PA

Mott Corporation, Farmington, CT

Sefar AG, Heiden, Switzerland

FILTRATION EQUIPMENT

Biofilters

Ambient Engineering Inc., Rocky Hill, NJ

MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI

Dewatering, mechanical press

Andritz Separation GmbH, Selb, Germany
 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)

Metso Minerals Industries, Inc., York, PA
 Steri Technologies Inc., Bohemia, NY

Filter housings

Argonide Corporation, Sanford, FL
 Enerquip, LLC, Medford, WI
 Freudenberg Filtration Technologies SE & Co. KG, Weinheim, Germany

JLS INTERNATIONAL, INC., Charlotte, NC
KEYSTONE FILTER, Met-Pro Corp., Hatfield, PA
 Liquid Process Systems, inc., Indian Trail, NC
 SPX Flow Technology, Ocala, FL

Filter parts & accessories

American Fabric Filter Co., Wesley Chapel, FL
 G Bopp USA Inc., Wappingers Falls, NY
 Hilliard Corp., Elmira, NY

Industrial Magnetics, Inc., Boyne City, MI
KEYSTONE FILTER, Met-Pro Corp., Hatfield, 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)

MEFIAG, MET-PRO CORP, MET-PRO CORP., Owosso, MI

Midwesco Filter Resources, Inc., Winchester, VA
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

Andritz Separation GmbH, Selb, Germany
 EquipNet, Inc., Canton, MA
 Filtra-Systems Co., Farmington Hills, MI

Filter systems

Advanced Cyclone Systems, S. A., Porto, Portugal
 Andritz Separation GmbH, Selb, Germany
 Argonide Corporation, Sanford, FL
 Coperion GmbH, Weingarten, Wuert., Germany
 Croll-Reynolds Engineering Co., Inc., Trumbull, CT
 CTP Corp., Northport, NY
 Donaldson Co., Inc., Donaldson Torit Dust Collectors, Minneapolis, MN
 EquipNet, Inc., Canton, MA
 Freudenberg Filtration Technologies SE & Co. KG, Weinheim, Germany
 Gore / W. L. Gore & Associates GmbH, Putzbrunn, Bavaria, Germany

Hilliard Corp., Elmira, NY
KEYSTONE FILTER, Met-Pro Corp., Hatfield, 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)

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)

Liquid Process Systems, inc., Indian Trail, NC
 Maag Pump Systems AG, Oberglatt / ZH, Switzerland
 Magnetic Products, Inc., Highland, MI

MEFIAG, MET-PRO CORP, MET-PRO CORP, Met-Pro Corp., Owosso, MI

Microdyn Technologies, Inc., Raleigh, NC
 MICRODYN-NADIR GmbH, Wiesbaden, Germany
 MM Industries, Inc., Vorti-Siv, Salem, OH
 Mott Corporation, Farmington, CT
 Nederman USA, Westland, 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
 Steri Technologies Inc., Bohemia, NY

Filters, activated carbon

Argonide Corporation, Sanford, FL
 Freudenberg Filtration Technologies SE & Co. KG, Weinheim, Germany

KEYSTONE FILTER, Met-Pro Corp., Hatfield, PA
 Mario Incorporated, Commercial & Industrial Division, Racine, WI

MAST Carbon International Ltd, Guildford
 SPX Flow Technology, Ocala, FL
 TIGG Corporation, Oakdale, PA
 United Manufacturing International 2000, Red Bluff, CA

Filters, air

Advanced Cyclone Systems, S. A., Porto, Portugal

Freudenberg Filtration Technologies SE & Co. KG, Weinheim, Germany
 Gore / W. L. Gore & Associates GmbH, Putzbrunn, Bavaria, Germany

KEYSTONE FILTER, Met-Pro Corp., Hatfield, 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)

Lectrodryer, Richmond, KY
 MAST Carbon International Ltd, Guildford
MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI
 SPX Flow Technology, Ocala, FL

Filters, bag

AIRLANCO, Falls City, NE
 Filtra-Systems Co., Farmington Hills, MI
 Filtration & Membrane Technology, Inc., Houston, TX
 Freudenberg Filtration Technologies SE & Co. KG, Weinheim, Germany

Gore / W. L. Gore & Associates GmbH, Putzbrunn, Bavaria, Germany

Hilliard Corp., Elmira, NY
KEYSTONE FILTER, Met-Pro Corp., Hatfield, PA
MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI
 Midwesco Filter Resources, Inc., Winchester, VA

Filters, belt

Freudenberg Filtration Technologies SE & Co. KG, Weinheim, Germany
 G Bopp USA Inc., Wappingers Falls, NY

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)

Filters, cartridge

AIRLANCO, Falls City, NE
 Applied Porous Technologies, Inc., Tariffville, CT
 Argonide Corporation, Sanford, FL
 Donaldson Co., Inc., Donaldson Torit Dust Collectors, Minneapolis, MN

Filtration & Membrane Technology, Inc., Houston, TX
 Freudenberg Filtration Technologies SE & Co. KG, Weinheim, Germany
 G Bopp USA Inc., Wappingers Falls, NY
 Gore / W. L. Gore & Associates GmbH, Putzbrunn, Bavaria, Germany

Hilliard Corp., Elmira, NY
KEYSTONE FILTER, Met-Pro Corp., Hatfield, PA
 Liquid Process Systems, inc., Indian Trail, NC
 Maag Pump Systems AG, Oberglatt / ZH, Switzerland
MEFIAG, MET-PRO CORP, Met-Pro Corp., Owosso, MI
MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI
 Mott Corporation, Farmington, CT
 SPX Flow Technology, Ocala, FL
 Steri Technologies Inc., Bohemia, NY

Filters, centrifugal

G Bopp USA Inc., Wappingers Falls, NY
 KIRK Process Solutions Ltd, Walton-on-Thames
 Tema Systems, Inc., Cincinnati, OH
 Western States Machine Co., Hamilton, OH

Filters, clarifying

Ameridia, Div. of Eurodia Industries, Somerset, NJ
 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)

Filters, crossflow

Ameridia, Div. of Eurodia Industries, Somerset, NJ
 Applied Porous Technologies, Inc., Tariffville, CT
 G Bopp USA Inc., Wappingers Falls, NY
 GEA Process Engineering, Columbia, MD
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)

Membrana, Charlotte, NC
 Microdyn Technologies, Inc., Raleigh, NC
 MICRODYN-NADIR GmbH, Wiesbaden, Germany
 Mott Corporation, Farmington, CT

Filters, disc, pressure

G Bopp USA Inc., Wappingers Falls, NY
MEFIAG, MET-PRO CORP, MET-PRO CORP., Owosso, MI
 Westech Engineering Inc., Salt Lake City, UT

Filters, disc, vacuum

Westech Engineering Inc., Salt Lake City, UT

Filters, drum, rotary gravity

Puritan Magnetics, Inc., Oxford, MI

Filters, drum, rotary pressure continuous

CTP Corp., Northport, NY

Filters, drum, rotary vacuum continuous

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)

Filters, electromagnetic

Puritan Magnetics, Inc., Oxford, MI

Filters, gas

Freudenberg Filtration Technologies SE & Co. KG, Weinheim, Germany
 G Bopp USA Inc., Wappingers Falls, 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)

Lectrodryer, Richmond, KY
 Mott Corporation, Farmington, CT
 SPX Flow Technology, Ocala, FL

Filters, gravity, porous bed

Freudenberg Filtration Technologies SE & Co. KG, Weinheim, Germany

Filters, HEPA

Donaldson Co., Inc., Donaldson Torit Dust Collectors, Minneapolis, MN

Freudenberg Filtration Technologies SE & Co. KG, Weinheim, Germany
HEMCO CORPORATION, 711 South Powell Rd., Independence, MO 64056 (800-779-4362; 816-796-2900; FAX: 816-796-3333; e-mail: info@hemcocorp.com; web site: www.HEMCOcorp.com)

KEYSTONE FILTER, Met-Pro Corp., Hatfield, PA

Filters, horizontal belt, vacuum

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)
 Westech Engineering Inc., Salt Lake City, UT

Filters, hydraulic

Fluid Line Products Inc., Willoughby, OH

Filters, jacketed

MM Industries, Inc., Vorti-Siv, Salem, OH

Filters, leaf, horizontal, pressure

Steri Technologies Inc., Bohemia, NY

Filters, magnetic

Magnetic Products, Inc., Highland, MI
 Puritan Magnetics, Inc., Oxford, MI

Filters, membrane

Andritz Separation GmbH, Selb, Germany
 Buss-SMS-Canzler GmbH, Butzbach, Germany
 Donaldson Co., Inc., Donaldson Torit Dust Collectors, Minneapolis, MN

Filtration & Membrane Technology, Inc., Houston, TX
GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen, Germany 76275 (49-7243-7050; FAX: 49-7243-705330; e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)

GEA Process Engineering, Columbia, MD
 Gore / W. L. Gore & Associates GmbH, Putzbrunn, Bavaria, Germany

Microdyn Technologies, Inc., Raleigh, NC
 MICRODYN-NADIR GmbH, Wiesbaden, Germany
 Midwesco Filter Resources, Inc., Winchester, VA

Filters, microfiltration

Ameridia, Div. of Eurodia Industries, Somerset, NJ
 Argonide Corporation, Sanford, FL
 Donaldson Co., Inc., Donaldson Torit Dust Collectors, Minneapolis, MN

Filtration & Membrane Technology, Inc., Houston, TX
 G Bopp USA Inc., Wappingers Falls, NY
GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen, Germany 76275 (49-7243-7050; FAX: 49-7243-705330; e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)

GEA Process Engineering, Columbia, MD
 Microdyn Technologies, Inc., Raleigh, NC
 MICRODYN-NADIR GmbH, Wiesbaden, Germany
 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)

Steri Technologies Inc., Bohemia, NY

Filters, nanofiltration

Ameridia, Div. of Eurodia Industries, Somerset, NJ
 Argonide Corporation, Sanford, FL

GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen, Germany 76275 (49-7243-7050; FAX: 49-7243-705330; e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)

GEA Process Engineering, Columbia, MD
Gore / W. L. Gore & Associates GmbH, Putzbrunn, Bavaria, Germany

KEystone FILTER, Met-Pro Corp., Hatfield, PA
MAST Carbon International Ltd, Guildford
Microdyn Technologies, Inc., Raleigh, NC
MICRODYN-NADIR GmbH, Wiesbaden, Germany

Filters, nutsche

AP-Miniplant GmbH & Co. KG, Lindewerra, Germany
De Dietrich Process Systems GmbH, Mainz, Germany
G Bopp USA Inc., Wappingers Falls, NY

POPE SCIENTIFIC, INC, INC., Saukville, WI

Powder Systems Ltd, Liverpool
PSL USA, Boise, ID
Steri Technologies Inc., Bohemia, NY

Filters, oil removal

Filtra-Systems Co., Farmington Hills, MI
Filtration & Membrane Technology, Inc., Houston, TX
G Bopp USA Inc., Wappingers Falls, NY
MEFIAG, MET-PRO CORP, Met-Pro Corp., Owosso, MI
SPX Flow Technology, Ocala, FL

Filters, other

G Bopp USA Inc., Wappingers Falls, 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)

MEFIAG, MET-PRO CORP, Met-Pro Corp., Owosso, MI
Membrana, Charlotte, NC
SPX Flow Technology, Ocala, FL

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; web site: www.orival.com)

SPX Flow Technology, Ocala, FL

Filters, plate & frame

Andritz Separation GmbH, Selb, Germany
Denver Mineral Engineers, Inc., Littleton, CO
GEA Process Engineering, Columbia, MD
Heinkel Filtering Systems Inc., Swedesboro, NJ
Hilliard Corp., Elmira, NY

Filters, polymer

Maag Pump Systems AG, Oberglatt / ZH, Switzerland

Filters, porous metal

Applied Porous Technologies, Inc., Tariffville, CT
Mott Corporation, Farmington, CT
Steri Technologies Inc., Bohemia, NY

Filters, portable

Hilliard Corp., Elmira, NY
MM Industries, Inc., Vorti-Siv, Salem, OH

Filters, precoat

Andritz Separation GmbH, Selb, Germany
Croll-Reynolds Engineering Co., Inc., Trumbull, CT
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)
MEFIAG, MET-PRO CORP, Met-Pro Corp., Owosso, MI
Mott Corporation, Farmington, CT
Steri Technologies Inc., Bohemia, NY

Filters, pressure

Andritz Separation GmbH, Selb, Germany
Croll-Reynolds Engineering Co., Inc., Trumbull, CT
Heinkel Filtering Systems Inc., Swedesboro, NJ
Hilliard Corp., Elmira, NY
KEystone FILTER, Met-Pro Corp., Hatfield, PA
Mario Incorporated, Commercial & Industrial Division, Racine, WI
MM Industries, Inc., Vorti-Siv, Salem, OH
Powder Systems Ltd, Liverpool
PSL USA, Boise, ID
Steri Technologies Inc., Bohemia, NY

Filters, sand

G Bopp USA Inc., Wappingers Falls, NY
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)

United Manufacturing International 2000, Red Bluff, CA
Westech Engineering Inc., Salt Lake City, UT

Filters, self-cleaning

Filtra-Systems Co., Farmington Hills, MI
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; web site: www.orival.com)

Spencer Strainer Systems, Jeffersonville, IN
Steri Technologies Inc., Bohemia, NY

Filters, tubular

Applied Porous Technologies, Inc., Tariffville, CT
Croll-Reynolds Engineering Co., Inc., Trumbull, CT
KEystone FILTER, Met-Pro Corp., Hatfield, PA
Mott Corporation, Farmington, CT

Filters, ultrafiltration

Ameridia, Div. of Eurodia Industries, Somerset, NJ
Argonide Corporation, Sanford, FL
G Bopp USA Inc., Wappingers Falls, NY
GEA Process Engineering, Columbia, MD
Membrana, Charlotte, NC
Microdyn Technologies, Inc., Raleigh, NC
MICRODYN-NADIR GmbH, Wiesbaden, Germany
SPX Flow Technology, Ocala, FL
Steri Technologies Inc., Bohemia, NY

Filters, vibrating

MM Industries, Inc., Vorti-Siv, Salem, OH

Filters, water

Argonide Corporation, Sanford, FL
Croll-Reynolds Engineering Co., Inc., Trumbull, CT
Entex Technologies Inc, Chapel Hill, NC
Filtra-Systems Co., Farmington Hills, MI
Filtration & Membrane Technology, Inc., Houston, TX
KEystone FILTER, Met-Pro Corp., Hatfield, PA
Microdyn Technologies, Inc., Raleigh, NC
MICRODYN-NADIR GmbH, Wiesbaden, Germany



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)

Siemens Industry, Inc. - Water Technologies, Alpharetta, GA

Microfiltration equipment

Filtration & Membrane Technology, Inc., Houston, TX
GEA Process Engineering, Columbia, MD
Membrana, Charlotte, NC
Microdyn Technologies, Inc., Raleigh, NC
MICRODYN-NADIR GmbH, Wiesbaden, Germany

Screw presses

HEYL & PATTERSON INC., RENNEBURG DIVISION, PO Box 36, Pittsburgh, PA 15230 (412-788-9810; FAX: 412-788-9822; e-mail: info@heylpatterson.com; web site: www.heylpatterson.com)

Strainers

Acme Engineering Prod. Inc., Mooers, NY
Armstrong International, Three Rivers, MI
CPI Wirecloth & Screens Inc, Pearland, TX
Croll-Reynolds Engineering Co., Inc., Trumbull, CT
Fluid Line Products Inc., Willoughby, OH
Hilliard Corp., Elmira, NY
JLS INTERNATIONAL, INC., Charlotte, NC
KRAISSL CO. INC., 299 Williams Ave., Hackensack, NJ 07601-5225 (800-572-4775; 201-342-0008; FAX: 201-342-0025; e-mail: kraissl@aol.com; web site: www.strainers.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)
Spraying Systems Co., Wheaton, IL
Steri Technologies Inc., Bohemia, NY

HEAT EXCHANGERS, CONDENSERS & COOLERS

Aftercoolers

API Heat Transfer, Buffalo, NY
Armstrong Engineering Associates, Inc., West Chester, PA
Doyle & Roth Mfg. Co. Inc., New York, NY
Schutte & Koerting, Trevese, PA

Condensate return systems

Fulton Companies, The, Fulton Thermal Corporation, Pulaski, NY
M&C TechGroup, Ventura, CA
TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)
WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Condensers, air cooled

Hudson Products Corp., Houston, TX

Condensers, barometric

Advanced Industrial Technology Corp., Paramus, NJ
ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alaquainc.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)
KOERTING HANNOVER AG, Badenstedter Str. 56, Hannover, Germany 30453 (0511-2129-0; FAX: 0511-2129-223; e-mail: st@koerting.de; web site: www.koerting.de)

Condensers, evaporative refrigerant

Armstrong Engineering Associates, Inc., West Chester, PA
Doyle & Roth Mfg. Co. Inc., New York, NY
Plate Concepts, Inc., Lebanon, NJ

Condensers, fractional

Armstrong Engineering Associates, Inc., West Chester, PA

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)
Elmridge Inc., Livonia, MI
Fox Valve Development Corp., Dover, NJ
GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen, Germany 76275 (49-7243-7050; FAX: 49-7243-705330; e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)
KOERTING HANNOVER AG, Badenstedter Str. 56, Hannover, Germany 30453 (0511-2129-0; FAX: 0511-2129-223; e-mail: st@koerting.de; web site: www.koerting.de)
Schutte & Koerting, Trevese, PA

Condensers, plate

API Heat Transfer, Buffalo, NY
GEA PHE Systems, York, PA
Plate Concepts, Inc., Lebanon, NJ

Condensers, reflux

ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alaquainc.com)
Doyle & Roth Mfg. Co. Inc., New York, NY
Hudson Products Corp., Houston, TX

Condensers, refrigerant

Doyle & Roth Mfg. Co. Inc., New York, NY
Hudson Products Corp., Houston, TX

Condensers, shell & tube

ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alaquainc.com)
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)
Doyle & Roth Mfg. Co. Inc., New York, NY
Enerquip, LLC, Medford, WI
KOERTING HANNOVER AG, Badenstedter Str. 56, Hannover, Germany 30453 (0511-2129-0; FAX: 0511-2129-223; e-mail: st@koerting.de; web site: www.koerting.de)
Schutte & Koerting, Trevese, PA

Condensers, steam

ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alaquainc.com)
API Heat Transfer, Buffalo, NY



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)

Doyle & Roth Mfg. Co. Inc., New York, NY

Elmridge Inc., Livonia, MI

Hudson Products Corp., Houston, TX

KOERTING HANNOVER AG, Badenstedter Str. 56, Hannover, Germany 30453 (0511-2129-0; FAX: 0511-2129-223; e-mail: st@koerting.de; web site: www.koerting.de)

Plate Concepts, Inc., Lebanon, NJ

Schutte & Koerting, Treviso, PA

Topog-E Gasket Co., Tulsa, OK

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Condensers, surface

ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alauqa.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)

KOERTING HANNOVER AG, Badenstedter Str. 56, Hannover, Germany 30453 (0511-2129-0; FAX: 0511-2129-223; e-mail: st@koerting.de; web site: www.koerting.de)

Schutte & Koerting, Treviso, PA

Condensers, tubular

ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alauqa.com)

Doyle & Roth Mfg. Co. Inc., New York, NY

Condensers, vapor

ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alauqa.com)

API Heat Transfer, Buffalo, NY

CG Thermal LLC, Twinsburg, Ohio

Doyle & Roth Mfg. Co. Inc., New York, NY

Enerquip, LLC, Medford, WI

Hudson Products Corp., Houston, TX

KOERTING HANNOVER AG, Badenstedter Str. 56, Hannover, Germany 30453 (0511-2129-0; FAX: 0511-2129-223; e-mail: st@koerting.de; web site: www.koerting.de)

Coolers, air cooled

API Heat Transfer, Buffalo, NY

Bepex International LLC, Minneapolis, MN

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

Hudson Products Corp., Houston, TX

Tex-Fin, Inc., Houston, Texas

Witte Co. Inc., Washington, NJ

Coolers, belt

AMANDUS KAHL GmbH & Co. KG, Reinbek, Germany

Berndorf Band GmbH, Berndorf, Austria

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

Sandvik Process Systems, Inc., Totowa, NJ

Coolers, brine

API Heat Transfer, Buffalo, NY

Armstrong Engineering Associates, Inc., West Chester, PA

Doyle & Roth Mfg. Co. Inc., New York, NY

Plate Concepts, Inc., Lebanon, NJ

Coolers, closed circuit

AMANDUS KAHL GmbH & Co. KG, Reinbek, Germany

API Heat Transfer, Buffalo, NY

Bepex International LLC, Minneapolis, MN

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

Plate Concepts, Inc., Lebanon, NJ

Coolers, coil

Sentry Equipment Corp, Oconomowoc, WI

Coolers, drum

Alstom Power, Inc., Raymond & Bartlett-Snow Products, Warrenville, IL

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

HEYL & PATTERSON INC., RENNEBURG DIVISION, PO Box 36, Pittsburgh, PA 15230 (412-788-9810; FAX: 412-788-9822; e-mail: info@heylpatterson.com; web site: www.heylopatterson.com)

Coolers, evaporative

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)

Luma Comfort, Orange, CA

Plate Concepts, Inc., Lebanon, NJ

Spray Drying Systems, Inc., Eldersburg, MD

Steri Technologies Inc., Bohemia, NY

Coolers, finned tube

Armstrong Engineering Associates, Inc., West Chester, PA

Doyle & Roth Mfg. Co. Inc., New York, NY

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)

Hudson Products Corp., Houston, TX

Tex-Fin, Inc., Houston, Texas

Coolers, flash

Advanced Industrial Technology Corp., Paramus, NJ

Bepex International LLC, Minneapolis, MN

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.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 WIEGAND GMBH, Am Hardtwald 1, Ettlingen, Germany 76275 (49-7243-7050; FAX: 49-7243-705330; e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)

HEYL & PATTERSON INC., RENNEBURG DIVISION, PO Box 36, Pittsburgh, PA 15230 (412-788-9810; FAX: 412-788-9822; e-mail: info@heylpatterson.com; web site: www.heylopatterson.com)

Coolers, plate

API Heat Transfer, Buffalo, NY

GEA PHE Systems, York, PA

Plate Concepts, Inc., Lebanon, NJ

Steri Technologies Inc., Bohemia, NY

Coolers, rotary

Alstom Power, Inc., Raymond & Bartlett-Snow Products, Warrenville, IL

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

HEYL & PATTERSON INC., RENNEBURG DIVISION, PO Box 36, Pittsburgh, PA 15230 (412-788-9810; FAX: 412-788-9822; e-mail: info@heylpatterson.com; web site: www.heylopatterson.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)

Coolers, screw

ANDRITZ Gouda, Waddinxveen, Netherlands

Armstrong Engineering Associates, Inc., West Chester, PA

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)

Coolers, spray

Spray Drying Systems, Inc., Eldersburg, MD

Coolers, water

API Heat Transfer, Buffalo, NY

Doyle & Roth Mfg. Co. Inc., New York, NY

Hudson Products Corp., Houston, TX

Sentry Equipment Corp, Oconomowoc, WI

Witte Co. Inc., Washington, NJ

Desuperheaters

Acme Engineering Prod. Inc., Mooers, NY

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)

Doyle & Roth Mfg. Co. Inc., New York, NY

Elmridge Inc., Livonia, MI

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

Schutte & Koerting, Treviso, PA

SULZER CHEMTECH USA, INC., 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rodneymarino@sulzer.com; web site: www.sulzer.com)

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Economizers

Armstrong Engineering Associates, Inc., West Chester, PA

Doyle & Roth Mfg. Co. Inc., New York, NY

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, Texas

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Heat exchanger parts & accessories

API Heat Transfer, Buffalo, NY

Doyle & Roth Mfg. Co. Inc., New York, NY

EUROINOX GROUP S.R.L., Mortara, Italy

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)

Fulton Companies, The, Fulton Thermal Corporation, Pu-laski, NY

GEA PHE Systems, York, PA

Hudson Products Corp., Houston, TX

Plate Concepts, Inc., Lebanon, NJ

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)

TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

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)

Heat exchangers, air cooled

Alstom Power Energy Recovery, Wexford, PA

API Heat Transfer, Buffalo, NY

EquipNet, Inc., Canton, MA

Hudson Products Corp., Houston, TX

Midwest Steel Company Inc, Houston, Texas

Munters Corporation, Buena Vista, VA

PAHARPUR COOLING TOWERS LTD, Paharpur House, 8/1/B Diamond Harbour Road, Kolkata, Ontario, India 700027 (+913324792958; +913324792050; FAX: +913324792188; e-mail: pctccu@paharpur.com; web site: www.paharpur.com)

Spaltech International Inc., Halton Hills, Ontario, Canada

Tex-Fin, Inc., Houston, Texas

Heat exchangers, all-welded

API Heat Transfer, Buffalo, NY

GEA PHE Systems, York, PA

JLS INTERNATIONAL, INC., Charlotte, NC

Munters Corporation, Buena Vista, VA

Spaltech International Inc., Halton Hills, Ontario, Canada

Heat exchangers, bayonet

Armstrong Engineering Associates, Inc., West Chester, PA

Enerquip, LLC, Medford, WI

Heat exchangers, ceramic

CG Thermal LLC, Twinsburg, Ohio

Combustion Controls Solutions Environmental Services,

Toledo, OH

CTP Corp., Northport, NY

EquipNet, Inc., Canton, MA

Procedyne Corp., New Brunswick, NJ

Heat exchangers, coil

Armstrong International, Three Rivers, MI
Sentry Equipment Corp, Oconomowoc, WI

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)
Elmridge Inc., Livonia, MI

KOERTING HANNOVER AG, Badenstedter Str. 56, Hannover, Germany 30453 (0511-2129-0; FAX: 0511-2129-223; e-mail: st@koerting.de; web site: www.koerting.de)

Pick Heaters Inc., West Bend, WI
ProSonic LLC, Milwaukee, WI

Spaltech International Inc., Halton Hills, Ontario, Canada
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., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Heat exchangers, double pipe

Armstrong Engineering Associates, Inc., West Chester, PA
Team Industries, Inc., Kaukauna, WI

Heat exchangers, falling film

ALAQUA, INC., 7004 Blvd. East, Suite 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alaquam@mindspring.com; web site: www.alaquainc.com)

Doyle & Roth Mfg. Co. Inc., New York, NY

GIG KARASEK GMBH GMBH, Gloggnitz-Stuppach, Austria

Heat exchangers, finned tube

API Heat Transfer, Buffalo, NY

Armstrong Engineering Associates, Inc., West Chester, PA

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)

Hudson Products Corp., Houston, TX

MULTITHERM LLC, Devault, PA

Munters Corporation, Buena Vista, VA

Heat exchangers, glass

CG Thermal LLC, Twinsburg, Ohio

De Dietrich Process Systems GmbH, Mainz, Germany
EquipNet, Inc., Canton, MA

Heat exchangers, graphite

CG Thermal LLC, Twinsburg, Ohio

Nantong Fareast Chemical Equipment Co. LTD, International Trading, Nantong, Peoples Rep. of China

Heat exchangers, jacketed pipe

Armstrong Engineering Associates, Inc., West Chester, PA

Heat exchangers, plate

API Heat Transfer, Buffalo, NY

CHRG Metals, Houston, TX

GEA PHE Systems, 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

Plate Concepts, Inc., Lebanon, NJ

Heat exchangers, plate fin

API Heat Transfer, Buffalo, NY

Armstrong International, Three Rivers, MI

Heat exchangers, PTFE tube

Sentry Equipment Corp, Oconomowoc, WI

Heat exchangers, scraped surface

Armstrong Engineering Associates, Inc., West Chester, PA
Buss-SMS-Canzler GmbH, Butzbach, Germany

Heat exchangers, screw flight

Armstrong Engineering Associates, Inc., West Chester, PA
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)

Metso Minerals Industries, Inc., York, PA

Heat exchangers, shell & tube

Advanced Heat Recovery, Inc., Division of AQUA Innovations, Inc., Baltimore, MD

ALAQUA, INC., 7004 Blvd. East, Suite 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alaquam@mindspring.com; web site: www.alaquainc.com)

Anguil Environmental Systems, Inc., Milwaukee, WI

API Heat Transfer, Buffalo, NY

Coperion GmbH, Weingarten, Wuertt., 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)

Doyle & Roth Mfg. Co. Inc., New York, NY

Enerquip, LLC, Medford, WI

Epcos Industrial Systems, LP, The Woodlands, TX

EquipNet, Inc., Canton, MA

Fenix Process Technologies Pvt. Ltd., Pune, India

GIG KARASEK GMBH GMBH, Gloggnitz-Stuppach, Austria

MULTITHERM LLC, Devault, PA

Munters Corporation, Buena Vista, VA

Nantong Fareast Chemical Equipment Co. LTD, International Trading, Nantong, Peoples Rep. of China

RAS Process Equipment Inc., Robbinsville, NJ

Spaltech International Inc., Halton Hills, Ontario, Canada

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)

Heat exchangers, spiral

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)

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)

ProSonic LLC, Milwaukee, WI

Sentry Equipment Corp, Oconomowoc, WI

Heat exchangers, tantalum

CG Thermal LLC, Twinsburg, Ohio

Heat exchangers, titanium

ALAQUA, INC., 7004 Blvd. East, Suite 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alaquam@mindspring.com; web site: www.alaquainc.com)

API Heat Transfer, Buffalo, NY

GEA PHE Systems, York, PA

JLS INTERNATIONAL, INC., Charlotte, NC

Plate Concepts, Inc., Lebanon, NJ

Heat exchangers, U tube

Alstom Power Energy Recovery, Wexford, PA

API Heat Transfer, Buffalo, NY

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)

Doyle & Roth Mfg. Co. Inc., New York, NY

Enerquip, LLC, Medford, WI

MULTITHERM LLC, Devault, PA

Spaltech International Inc., Halton Hills, Ontario, Canada

Heat transfer systems

Advanced Heat Recovery, Inc., Division of AQUA Innovations, Inc., Baltimore, MD

Alstom Power Energy Recovery, Wexford, PA

API Heat Transfer, Buffalo, NY

EquipNet, Inc., Canton, MA

Fulton Companies, The, Fulton Thermal Corporation, Pulaski, NY

Hudson Products Corp., Houston, TX

MULTITHERM LLC, Devault, PA

Munters Corporation, Buena Vista, VA

ProSonic LLC, Milwaukee, WI

Spaltech International Inc., Halton Hills, Ontario, Canada

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, process liquid

Acme Engineering Prod. Inc., Mooers, NY

Advanced Heat Recovery, Inc., Division of AQUA Innovations, Inc., Baltimore, MD

API Heat Transfer, Buffalo, NY

Dalton Electric Heating Co., Inc., Ipswich, MA

EquipNet, Inc., Canton, MA

KOERTING HANNOVER AG, Badenstedter Str. 56, Hannover, Germany 30453 (0511-2129-0; FAX: 0511-2129-223; e-mail: st@koerting.de; web site: www.koerting.de)

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Pick Heaters Inc., West Bend, WI

Plate Concepts, Inc., Lebanon, NJ

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)

Heaters, process slurry

Advanced Heat Recovery, Inc., Division of AQUA Innovations, Inc., Baltimore, MD

EquipNet, Inc., Canton, MA

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Pick Heaters Inc., West Bend, WI

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)

Heaters, Water

Pick Heaters Inc., West Bend, WI

Inserts, heat-exchange tube

CTI Industries, Inc., Carlsbad, CA

Tex-Fin, Inc., Houston, Texas

Preheaters

Advanced Heat Recovery, Inc., Division of AQUA Innovations, Inc., Baltimore, MD

Alstom Power Energy Recovery, Wexford, PA

API Heat Transfer, Buffalo, NY

Armstrong Engineering Associates, Inc., West Chester, PA

Doyle & Roth Mfg. Co. Inc., New York, NY

Enerquip, LLC, Medford, WI

Hudson Products Corp., Houston, TX

JLS INTERNATIONAL, INC., Charlotte, NC

Plate Concepts, Inc., Lebanon, NJ

Process Combustion Corp., Pittsburgh, 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)

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Reboilers

Doyle & Roth Mfg. Co. Inc., New York, NY

Enerquip, LLC, Medford, WI

Tex-Fin, Inc., Houston, Texas

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)

Superheaters

Acme Engineering Prod. Inc., Mooers, NY

Armstrong Engineering Associates, Inc., West Chester, PA

Doyle & Roth Mfg. Co. Inc., New York, NY

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)

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)

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)

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Troughs, cooled or heated

ANDRITZ Gouda, Waddinxveen, Netherlands

Armstrong Engineering Associates, Inc., West Chester, 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)

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)

Team Industries, Inc., Kaukauna, WI

Waste heat recovery units

Advanced Heat Recovery, Inc., Division of AQUA Innovations, Inc., Baltimore, MD

Alstom Power Energy Recovery, Wexford, PA

Armstrong Engineering Associates, Inc., West Chester, PA

Hudson Products Corp., Houston, TX

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

Plate Concepts, Inc., Lebanon, NJ

RAS Process Equipment Inc., Robbinsville, NJ

HEAT TRANSFER MEDIA

Heat transfer fluids, cooling fluids

Huntsman LLC, The Woodlands, TX
Liquid Process Systems, inc., Indian Trail, NC

Heat transfer fluids, heating fluids

Huntsman LLC, The Woodlands, TX
Liquid Process Systems, inc., Indian Trail, NC
MULTITHERM LLC, Devault, PA

Heat transfer fluids, other

Huntsman LLC, The Woodlands, TX
Momentive Performance Materials Inc., Waterford, NY
MULTITHERM LLC, Devault, PA

Hot oils

Liquid Process Systems, inc., Indian Trail, NC

Thermal fluids

Liquid Process Systems, inc., Indian Trail, NC
MULTITHERM LLC, Devault, PA

HEATING & COOLING EQUIPMENT, OTHER

Air preheat systems

Berner International Corp., New Castle, PA
Combustion Controls Solutions Environmental Services, Toledo, OH

Hudson Products Corp., Houston, TX
Munters Corporation, Buena Vista, VA
Process Combustion Corp., Pittsburgh, PA

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Baths, constant temperature

Omega Engineering Inc., An Omega Group Co., Stamford, CT
Thermacal, Inc., Solon, OH

Chillers, recirculating

BARTEC GmbH, Bad Mergentheim, 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)

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Coils

Armstrong International, Three Rivers, MI
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)

Gaskets, plate heat exchanger

API Heat Transfer, Buffalo, NY
CHRG Metals, Houston, TX
GEA PHE Systems, York, PA
Plate Concepts, Inc., Lebanon, NJ
Topog-E Gasket Co., Tulsa, OK

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.com)

Heat pumps

Plate Concepts, Inc., Lebanon, NJ

Heaters, air & gas

Armstrong Engineering Associates, Inc., West Chester, PA
Berner International Corp., New Castle, 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)
Process Combustion Corp., Pittsburgh, PA

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Watlow, St. Louis, MO

Heaters, cartridge

Dalton Electric Heating Co., Inc., Ipswich, MA
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Watlow, St. Louis, MO

Heaters, direct fired

Combustion Controls Solutions Environmental Services, Toledo, OH
Hudson Products Corp., Houston, TX
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)
Process Combustion Corp., Pittsburgh, PA
Tex-Fin, Inc., Houston, Texas

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)

Heaters, drum

LEWCO, Inc., Sandusky, OH
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Heaters, feedwater

API Heat Transfer, Buffalo, NY
Doyle & Roth Mfg. Co. Inc., New York, NY
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)
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Plate Concepts, Inc., Lebanon, NJ
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)

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Heaters, finned tube

Armstrong Engineering Associates, Inc., West Chester, PA
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)
Hudson Products Corp., Houston, TX
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Tex-Fin, Inc., Houston, Texas

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)

Heaters, gas fired

Berner International Corp., New Castle, PA
Fulton Companies, The, Fulton Thermal Corporation, Pulaski, NY
Munters Corporation, Buena Vista, VA
Process Combustion Corp., Pittsburgh, PA
Tex-Fin, Inc., Houston, Texas

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Heaters, helical coil

Combustion Controls Solutions Environmental Services, Toledo, 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)
Fulton Companies, The, Fulton Thermal Corporation, Pulaski, NY

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)

Heaters, immersion

Acme Engineering Prod. Inc., Mooers, NY
Armstrong Engineering Associates, Inc., West Chester, PA
Combustion Controls Solutions Environmental Services, Toledo, OH
Dalton Electric Heating Co., Inc., Ipswich, MA
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Heaters, indirect fired (waterbath)

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)

Heaters, induction

Dalton Electric Heating Co., Inc., Ipswich, MA
PRUEFTTECHNIK, Ismaning, Germany

Heaters, infrared

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)
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Heaters, instantaneous

Omega Engineering Inc., An Omega Group Co., Stamford, CT
Pick Heaters Inc., West Bend, WI
Schutte & Koerting, Treviso, 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)

Heaters, jacketed

Dalton Electric Heating Co., Inc., Ipswich, MA
Pick Heaters Inc., West Bend, WI
Schutte & Koerting, Treviso, PA

Heaters, molten salt

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)

Heaters, panel

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Heaters, pipeline

Armstrong Engineering Associates, Inc., West Chester, PA
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Schutte & Koerting, Treviso, PA

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Heaters, plate

Dalton Electric Heating Co., Inc., Ipswich, MA
GEA PHE Systems, York, PA
Plate Concepts, Inc., Lebanon, NJ

Heaters, portable

Omega Engineering Inc., An Omega Group Co., Stamford, CT

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)

Heaters, ring

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Heaters, screw flight

Armstrong Engineering Associates, Inc., West Chester, 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@konline.com; web site: www.konline.com)

Heaters, steam injection

Elmridge Inc., Livonia, MI
Fox Valve Development Corp., Dover, NJ
GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen, Germany 76275 (49-7243-7050; FAX: 49-7243-705330; e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)
KOERTING HANNOVER AG, Badenstedter Str. 56, Hannover, Germany 30453 (0511-2129-0; FAX: 0511-2129-223; e-mail: st@koerting.de; web site: www.koerting.de)

Pick Heaters Inc., West Bend, WI
ProSonic LLC, Milwaukee, WI
Schutte & Koerting, Treviso, PA

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, 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

Armstrong Engineering Associates, Inc., West Chester, PA
Armstrong International, Three Rivers, MI
Pick Heaters Inc., West Bend, WI

Heaters, thermal liquid

Acme Engineering Prod. Inc., Moores, NY
Fulton Companies, The, Fulton Thermal Corporation, Pualaski, NY
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)

MULTITHERM LLC, Devault, PA
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Heaters, tubular

Armstrong Engineering Associates, Inc., West Chester, PA
Dalton Electric Heating Co., Inc., Ipswich, MA
Doyle & Roth Mfg. Co. Inc., New York, NY
Omega Engineering Inc., An Omega Group Co., Stamford, CT

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Watlow, St. Louis, MO

Heaters, unit

Armstrong International, Three Rivers, MI
Dalton Electric Heating Co., Inc., Ipswich, MA
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Plate Concepts, Inc., Lebanon, NJ

Heaters, bayonet

Armstrong Engineering Associates, Inc., West Chester, PA
Dalton Electric Heating Co., Inc., Ipswich, MA
Tex-Fin, Inc., Houston, Texas

Heaters, space

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Recuperators

Advanced Heat Recovery, Inc., Division of AQUA Innovations, Inc., Baltimore, MD

Tracing, pipe

Spaltech International Inc., Halton Hills, Ontario, Canada

Vaporizers

Armstrong Engineering Associates, Inc., West Chester, 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)

KILNS, OVENS & FURNACES

Burners, coal

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Burners, combination fuel

Combustion Controls Solutions Environmental Services, Toledo, OH
Process Combustion Corp., Pittsburgh, PA
WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Burners, gas

Combustion Controls Solutions Environmental Services, Toledo, OH

Process Combustion Corp., Pittsburgh, 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)
WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Burners, oil

Combustion Controls Solutions Environmental Services, Toledo, OH
Process Combustion Corp., Pittsburgh, PA
WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Calciners, fluidizing

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

GEA Process Engineering, Columbia, MD
HEYL & PATTERSON INC., RENNEBURG DIVISION, PO Box 36, Pittsburgh, PA 15230 (412-788-9810; FAX: 412-788-9822; e-mail: info@heylpatterson.com; web site: www.heylpatterson.com)
Procedyne Corp., New Brunswick, NJ

Calciners, rotary

Alstom Power, Inc., Raymond & Bartlett-Snow Products, Warrenville, IL
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)
Denver Mineral Engineers, Inc., Littleton, CO
HEYL & PATTERSON INC., RENNEBURG DIVISION, PO Box 36, Pittsburgh, PA 15230 (412-788-9810; FAX: 412-788-9822; e-mail: info@heylpatterson.com; web site: www.heylpatterson.com)

Furnaces, annealing

Epcon Industrial Systems, LP, The Woodlands, TX
L&L Special Furnace Co., Inc., Aston, PA
Lucifer Furnaces Inc., Warrington, PA
Procedyne Corp., New Brunswick, NJ

Furnaces, cracking

Technip Benelux B.V., Zoetermeer, Netherlands
ThyssenKrupp Uhde GmbH, Dortmund, Germany

Furnaces, electric

Armstrong Engineering Associates, Inc., West Chester, PA
LEWCO, Inc., Sandusky, OH
Linn High Therm GmbH, Eschenfelden, Bavaria, Germany
L&L Special Furnace Co., Inc., Aston, PA
Lucifer Furnaces Inc., Warrington, PA
Procedyne Corp., New Brunswick, NJ

Furnaces, fluid bed

AP-Miniplant GmbH & Co. KG, Lindewerra, Germany
Armstrong Engineering Associates, Inc., West Chester, PA
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)
Procedyne Corp., New Brunswick, NJ
ThyssenKrupp Uhde GmbH, Dortmund, Germany

Furnaces, gas burning

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)
Epcon Industrial Systems, LP, The Woodlands, TX
EquipNet, Inc., Canton, MA
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)
LEWCO, Inc., Sandusky, 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)

Furnaces, hearth

L&L Special Furnace Co., Inc., Aston, PA
Lucifer Furnaces Inc., Warrington, PA

WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Furnaces, high pressure

Armstrong Engineering Associates, Inc., West Chester, PA
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

EquipNet, Inc., Canton, MA
 Linn High Therm GmbH, Eschenfelden, Bavaria, Germany
 Technip Benelux B.V., Zoetermeer, Netherlands
 ThyssenKrupp Uhde GmbH, Dortmund, Germany
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)

Furnaces, high temperature

Armstrong Engineering Associates, Inc., West Chester, PA
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

Epcon Industrial Systems, LP, The Woodlands, TX
 Linn High Therm GmbH, Eschenfelden, Bavaria, Germany
 L&L Special Furnace Co., Inc., Aston, PA
 Lucifer Furnaces Inc., Warrington, PA
 Procedyne Corp., New Brunswick, NJ
 Technip Benelux B.V., Zoetermeer, Netherlands
 ThyssenKrupp Uhde GmbH, Dortmund, Germany
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)

ZIRCAR Refractory Composites, Inc., Florida, NY

Furnaces, induction

Linn High Therm GmbH, Eschenfelden, Bavaria, Germany
 L&L Special Furnace Co., Inc., Aston, PA
 ZIRCAR Refractory Composites, Inc., Florida, NY

Furnaces, melting

Denver Mineral Engineers, Inc., Littleton, CO
 Linn High Therm GmbH, Eschenfelden, Bavaria, Germany

Furnaces, muffle

Linn High Therm GmbH, Eschenfelden, Bavaria, Germany
 L&L Special Furnace Co., Inc., Aston, PA
 Lucifer Furnaces Inc., Warrington, PA

Furnaces, multiple hearth

WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Furnaces, radiant heating

Armstrong Engineering Associates, Inc., West Chester, PA
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

Furnaces, rotary hearth

Linn High Therm GmbH, Eschenfelden, Bavaria, Germany
WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Furnaces, vacuum

LEWCO, Inc., Sandusky, OH
 Linn High Therm GmbH, Eschenfelden, Bavaria, Germany
 ZIRCAR Refractory Composites, Inc., Florida, NY

Furnaces, vertical

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)
WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Kiln, oven & furnace accessories

Berner International Corp., New Castle, PA
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)
 Lucifer Furnaces Inc., Warrington, PA
 ZIRCAR Refractory Composites, Inc., Florida, NY

Kilns, fluidizing

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)
 Procedyne Corp., New Brunswick, NJ

Kilns, rotary

Alstom Power, Inc., Raymond & Bartlett-Snow Products, Warrenville, IL

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

HEYL & PATTERSON INC., RENNEBURG DIVISION, PO Box 36, Pittsburgh, PA 15230 (412-788-9810; FAX: 412-788-9822; e-mail: info@heylpatterson.com; web site: www.heylopatterson.com)

Linn High Therm GmbH, Eschenfelden, Bavaria, Germany
 Metso Minerals Industries, Inc., York, PA

Kilns, vertical transfer

WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Ovens, drying

AWT World Trade Inc., Chicago, IL
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

Epcon Industrial Systems, LP, The Woodlands, TX
 Omega Engineering Inc., An Omega Group Co., Stamford, CT

WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Ovens, electric

Armstrong Engineering Associates, Inc., West Chester, PA
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

Epcon Industrial Systems, LP, The Woodlands, TX
 LEWCO, Inc., Sandusky, OH
 L&L Special Furnace Co., Inc., Aston, PA
 Lucifer Furnaces Inc., Warrington, PA
 Omega Engineering Inc., An Omega Group Co., Stamford, CT

Ovens, infrared

AWT World Trade Inc., Chicago, IL
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Ovens, radiant heating

Armstrong Engineering Associates, Inc., West Chester, PA
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Ovens, vacuum

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Roasters, food products

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

KOMLINE-SANDERSON ENGINEERING CORP., 12 Holaday Ave., Peapack, NJ 07977 (908-225-5457 North American; 908-234-1000; FAX: 908-234-9487; e-mail: info@komline.com; web site: www.komline.com)

NEUHAUS NEOTECH Maschinen- und Anlagenbau GmbH, Germany

Sweet Manufacturing Company, Springfield, OH

WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

MIXING EQUIPMENT FOR FLUIDS

Homogenizers

ADMIX INC., 234 Abby Rd., Manchester, NH 03103 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: mixing@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)

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)

IKA-Werke GmbH & Co.KG, Staufen, Germany
JAYGO, INCORPORATED, 675 Rahway Ave, Union, NJ 07083 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

Microfluidics, Newton, MA
 Myers Engineering, Bell, CA
 Wilhelm Siefert GmbH & Co. KG, Velbert, Germany

Homogenizers, high pressure

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)

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)

Microfluidics, Newton, MA

Liquid-mixer parts & accessories

ADMIX INC., 234 Abby Rd., Manchester, NH 03103 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: mixing@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)

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)

IKA-Werke GmbH & Co.KG, Staufen, Germany
 ProQuip Inc., Macedonia, OH

Mixers, air driven

ADMIX INC., 234 Abby Rd., Manchester, NH 03103 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: mixing@admix.com; web site: www.admix.com)

Conn and Co., L.L.C., Warren, PA
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)

Nordson SEALANT EQUIPMENT, Plymouth, MI
POPE SCIENTIFIC, INC, INC, INC., Saukville, WI

ProQuip Inc., Macedonia, OH

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)

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)

LOTUS MIXERS INC., Osprey, FL

Myers Engineering, Bell, CA
 ProQuip Inc., Macedonia, OH

Mixers, batch

ADMIX INC., 234 Abby Rd., Manchester, NH 03103 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: mixing@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)

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)

EquipNet, Inc., Canton, MA

GEA Process Engineering, Columbia, MD
 IKA-Werke GmbH & Co.KG, Staufen, Germany
JAYGO, INCORPORATED, 675 Rahway Ave, Union, NJ
 07083 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

Lenterra, Inc., Newark, NJ
 Microfluidics, Newton, MA
 Myers Engineering, Bell, 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)

POPE SCIENTIFIC, INC, Inc., Saukville, WI
 ProQuip Inc., Macedonia, OH

Quadro Engineering Corp., WATERLOO, Ontario, Canada
 Shiv Shakti Process Equipment P. Ltd., International Marketing & Sales, 407, Shivam Chambers., S V Road, Goregaon West., Mumbai, India 400104 (9870646500; 9821633589; FAX: 912226798284; e-mail: sales@shivshaktiequipments.com; web site: www.shivshaktiequipments.com)

Mixers, bottom entering

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)

LOTUS MIXERS INC., Osprey, FL
 ProQuip Inc., Macedonia, 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)

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)

Mixers, cone

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)

EUROINOX GROUP S.r.l., Mortara, Italy

JAYGO, INCORPORATED, 675 Rahway Ave, Union, NJ 07083 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

ProQuip Inc., Macedonia, OH

Mixers, continuous

ADMIX INC., 234 Abby Rd., Manchester, NH 03103 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: mixing@admix.com; web site: www.admix.com)

Bematek Systems, Inc., Salem, MA
 Bepex International LLC, Minneapolis, MN
 Buss ChemTech AG, Pratteln, Switzerland

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)

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)

EquipNet, Inc., Canton, MA

GEA Process Engineering, Columbia, MD
 IKA-Werke GmbH & Co.KG, Staufen, Germany
JLS INTERNATIONAL, INC., Charlotte, NC

Koflo Corp., Cary, IL
 Microfluidics, Newton, MA

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, Germany

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)

Conn and Co., L.L.C., Warren, PA
 Myers Engineering, Bell, CA
 ProQuip Inc., Macedonia, OH

Mixers, gas-liquid, high intensity

ADMIX INC., 234 Abby Rd., Manchester, NH 03103 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: mixing@admix.com; web site: www.admix.com)

Biazzini SA, Chailly/Montreux, Switzerland

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)

GEA Process Engineering, Columbia, MD

KOERTING HANNOVER AG, Badenstedter Str. 56, Hannover, Germany 30453 (0511-2129-0; FAX: 0511-2129-223; e-mail: st@koerting.de; web site: www.koerting.de)

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)

Myers Engineering, Bell, CA
 ProQuip Inc., Macedonia, OH

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)

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)

EquipNet, Inc., Canton, MA

KOERTING HANNOVER AG, Badenstedter Str. 56, Hannover, Germany 30453 (0511-2129-0; FAX: 0511-2129-223; e-mail: st@koerting.de; web site: www.koerting.de)

Myers Engineering, Bell, CA
 ProQuip Inc., Macedonia, OH

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, 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)

Elmridge Inc., Livonia, MI

GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen, Germany 76275 (49-7243-7050; FAX: 49-7243-705330; e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)

GEA Process Engineering, Columbia, MD

KOERTING HANNOVER AG, Badenstedter Str. 56, Hannover, Germany 30453 (0511-2129-0; FAX: 0511-2129-223; e-mail: st@koerting.de; web site: www.koerting.de)

Quadro Engineering Corp., WATERLOO, Ontario, Canada
 Schutte & Koerting, Trevose, 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)

Dynamic Air Inc., St. Paul, 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)

HEYL & PATTERSON INC., RENNEBURG DIVISION, PO Box 36, Pittsburgh, PA 15230 (412-788-9810; FAX: 412-788-9822; e-mail: info@heylpatterson.com; web site: www.heylopatterson.com)

JAYGO, INCORPORATED, 675 Rahway Ave, Union, NJ 07083 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

LOTUS MIXERS INC., Osprey, FL
 ProQuip Inc., Macedonia, OH

Mixers, pipeline (inline)

ADMIX INC., 234 Abby Rd., Manchester, NH 03103 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: mixing@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)

IKA-Werke GmbH & Co.KG, Staufen, Germany



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JLS INTERNATIONAL, INC., Charlotte, NC

Koflo Corp., Cary, IL
Lenterra, Inc., Newark, NJ
ProQuip Inc., Macedonia, OH
Quadro Engineering Corp., WATERLOO, Ontario, Canada
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, Germany

Mixers, pony

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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Mixers, portable

ADMIX INC., 234 Abby Rd., Manchester, NH 03103 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: mixing@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)

Conn and Co., L.L.C., Warren, PA
LOTUS MIXERS INC., Osprey, FL
Microfluidics, Newton, MA
ProQuip Inc., Macedonia, OH

Mixers, pressure

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
EUROINOX GROUP S.r.L., Mortara, Italy
JLS INTERNATIONAL, INC., Charlotte, NC
Microfluidics, Newton, MA

POPE SCIENTIFIC, INC, Inc., Saukville, WI
ProQuip Inc., Macedonia, OH

Mixers, propeller

ADMIX INC., 234 Abby Rd., Manchester, NH 03103 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: mixing@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)

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)

IKA-Werke GmbH & Co.KG, Staufen, Germany
Myers Engineering, Bell, CA
POPE SCIENTIFIC, INC, Inc., Saukville, WI
ProQuip Inc., Macedonia, OH

Mixers, side entering

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)

LOTUS MIXERS INC., Osprey, FL
ProQuip Inc., Macedonia, OH

Mixers, slurry

ADMIX INC., 234 Abby Rd., Manchester, NH 03103 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: mixing@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)

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Myers Engineering, Bell, CA

POPE SCIENTIFIC, INC, Inc., Saukville, WI
ProQuip Inc., Macedonia, OH

Schutte & Koerting, Treviso, 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)

Wilhelm Siefert GmbH & Co. KG, Velbert, Germany

Mixers, static

ADMIX INC., 234 Abby Rd., Manchester, NH 03103 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: mixing@admix.com; web site: www.admix.com)

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Fenix Process Technologies Pvt. Ltd., Pune, India
JLS INTERNATIONAL, INC., Charlotte, NC

Koflo Corp., Cary, IL
LOTUS MIXERS INC., Osprey, FL
Maag Pump Systems AG, Oberglatt / ZH, Switzerland
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)
SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 00; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

Mixers, tank car

ProQuip Inc., Macedonia, OH

Mixers, top entering

ADMIX INC., 234 Abby Rd., Manchester, NH 03103 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: mixing@admix.com; web site: www.admix.com)

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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)

IKA-Werke GmbH & Co.KG, Staufen, Germany
LOTUS MIXERS INC., Osprey, FL

Myers Engineering, Bell, CA
POPE SCIENTIFIC, INC, Inc., Saukville, WI
ProQuip Inc., Macedonia, OH
Quadro Engineering Corp., WATERLOO, Ontario, Canada

Mixers, turbine

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
LOTUS MIXERS INC., Osprey, FL
Myers Engineering, Bell, CA
ProQuip Inc., Macedonia, OH

Mixers, vacuum

ADMIX INC., 234 Abby Rd., Manchester, NH 03103 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: mixing@admix.com; web site: www.admix.com)

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EquipNet, Inc., Canton, MA
GEA Process Engineering, Columbia, MD
JAYGO, INCORPORATED, 675 Rahway Ave, Union, NJ 07083 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

Myers Engineering, Bell, CA
POPE SCIENTIFIC, INC, Inc., Saukville, WI
Schutte & Koerting, Treviso, PA

Mixers: barrel, drum, carboy

Conn and Co., L.L.C., Warren, PA
Omega Engineering Inc., An Omega Group Co., Stamford, CT
PAUL O. ABBE, Bensenville, IL
ProQuip Inc., Macedonia, OH

Mixing equipment for gas, air

Koflo Corp., Cary, IL

MIXING EQUIPMENT FOR SOLIDS & FLUIDS

Batching & blending systems

Acricon Inc., Moonachie, NJ

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)

POPE SCIENTIFIC, INC, Inc., Saukville, WI
Shiv Shakti Process Equipment P. Ltd., International Marketing & Sales, 407, Shivam Chambers, S V Road, Goregaon West., Mumbai, India 400104 (9870646500; 9821633589; FAX: 912226798284; e-mail: sales@shivshaktiequipments.com; web site: www.shivshaktiequipments.com)

Siemens Industry, Inc., Solutions, Automation and Drive Technologies, Spring House, PA

Blenders, cone

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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Munson Machinery Company, Inc., Utica, NY

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)

PAUL O. ABBE, Bensenville, IL

ProQuip Inc., Macedonia, OH
Shiv Shakti Process Equipment P. Ltd., International Marketing & Sales, 407, Shivam Chambers, S V Road, Goregaon West., Mumbai, India 400104 (9870646500; 9821633589; FAX: 912226798284; e-mail: sales@shivshaktiequipments.com; web site: www.shivshaktiequipments.com)

Blenders, continuous

Acricon Inc., Moonachie, NJ

ADMIX INC., 234 Abby Rd., Manchester, NH 03103 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: mixing@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)

GEA Process Engineering, Columbia, MD
Koflo Corp., Cary, IL
LIST AG, Arisdorf, Switzerland

PAUL O. ABBE, Bensenville, IL
ProQuip Inc., Macedonia, OH
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, Germany

Blenders, horizontal

Acricon Inc., Moonachie, NJ

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)

JAYGO, INCORPORATED, 675 Rahway Ave, Union, NJ 07083 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

PAUL O. ABBE, Bensenville, IL
ProQuip Inc., Macedonia, OH

ADMIX INC., 234 Abby Rd., Manchester, NH 03103 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: mixing@admix.com; web site: www.admix.com)

Bematek Systems, Inc., Salem, MA
Bepex International LLC, Minneapolis, MN

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GEA Process Engineering, Columbia, MD
Koflo Corp., Cary, IL
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, Germany

Blenders, liquid feed

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)

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GEA Process Engineering, Columbia, MD
PAUL O. ABBE, Bensenville, IL

Blenders, pneumatic

Dec USA Inc, Brick, NJ

Dynamic Air Inc., St. Paul, 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)

Blenders, ribbon

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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Midwest Steel Company Inc, Houston, Texas

Munson Machinery Company, Inc., Utica, NY

PAUL O. ABBE, Bensenville, IL

ProQuip Inc., Macedonia, OH

Blenders, spiral

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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PAUL O. ABBE, Bensenville, IL

ProQuip Inc., Macedonia, OH

Blenders, tumbling V

Bascale Company, Inc., Houston, TX

Bioengineering Inc., Cambridge, 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)

Munson Machinery Company, Inc., Utica, NY

PAUL O. ABBE, Bensenville, IL

Mixers, continuous kneaders

AMANDUS KAHL GmbH & Co. KG, Reinbek, Germany

Bepex International LLC, Minneapolis, MN

B & P Process Equipment, Saginaw, MI

Buss ChemTech AG, Pratteln, Switzerland

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)

IKA-Werke GmbH & Co.KG, Staufen, Germany

LIST AG, Arisdorf, Switzerland

Mixers, double arm kneaders

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)

IKA-Werke GmbH & Co.KG, Staufen, Germany

JAYGO, INCORPORATED, 675 Rahway Ave, Union, NJ 07083 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

LIST AG, Arisdorf, Switzerland

PAUL O. ABBE, Bensenville, IL

Mixers, gravity flow

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)

LIST AG, Arisdorf, Switzerland

SULZER CHEMTECH USA, INC., 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rodneymaralio@sulzer.com; web site: www.sulzer.com)

Mixers, high shear



Advanced Mixing Technologies

ADMIX INC., 234 Abby Rd., Manchester, NH 03103 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: mixing@admix.com; web site: www.admix.com)

Bematek Systems, Inc., Salem, MA

Bepex International LLC, Minneapolis, MN

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Conn and Co., L.L.C., Warren, PA

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EquipNet, Inc., Canton, MA

GEA Process Engineering, Columbia, MD

IKA-Werke GmbH & Co.KG, Staufen, Germany

JAYGO, INCORPORATED, 675 Rahway Ave, Union, NJ 07083 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

Lenterra, Inc., Newark, NJ

LIST AG, Arisdorf, Switzerland

Myers Engineering, Bell, CA

PAUL O. ABBE, Bensenville, IL

ProQuip Inc., Macedonia, OH

Quadro Engineering Corp., WATERLOO, Ontario, Canada

Vortab Company, San Marcos, CA

Wilhelm Siefel GmbH & Co. KG, Velbert, Germany

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)

Mixers, motionless

ADMIX INC., 234 Abby Rd., Manchester, NH 03103 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: mixing@admix.com; web site: www.admix.com)

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EquipNet, Inc., Canton, MA

JLS INTERNATIONAL, INC., Charlotte, NC

Koflo Corp., Cary, IL

Nordson SEALANT EQUIPMENT, Plymouth, MI

SULZER CHEMTECH USA, INC., 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rodneymaralio@sulzer.com; web site: www.sulzer.com)

SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

Mixers, other solid-liquid

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)

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Elmridge Inc., Livonia, MI

GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen, Germany 76275 (49-7243-7050; FAX: 49-7243-705330; e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)

GEA Process Engineering, Columbia, MD

Myers Engineering, Bell, CA

PAUL O. ABBE, Bensenville, IL

ProQuip Inc., Macedonia, OH

Wilhelm Siefel GmbH & Co. KG, Velbert, Germany

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)

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)

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PAUL O. ABBE, Bensenville, IL

Mixers, ribbon

Bepex International LLC, Minneapolis, MN

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Kemutec Group, Inc., Bristol, PA

PAUL O. ABBE, Bensenville, IL

ProQuip Inc., Macedonia, OH

Mixers, roller

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Mixers, rotary blade

Bepex International LLC, Minneapolis, MN

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)

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EquipNet, Inc., Canton, MA

PAUL O. ABBE, Bensenville, IL

ProQuip Inc., Macedonia, OH

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)

EquipNet, Inc., Canton, MA

Mixers, rotary drum

Bascale Company, Inc., Houston, TX

EquipNet, Inc., Canton, MA

Munson Machinery Company, Inc., Utica, NY

PAUL O. ABBE, Bensenville, IL

Mixers, screw

Bepex International LLC, Minneapolis, MN

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EquipNet, Inc., Canton, MA

JAYGO, INCORPORATED, 675 Rahway Ave, Union, NJ 07083 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

PAUL O. ABBE, Bensenville, IL

ProQuip Inc., Macedonia, OH

Mixers, spiral ribbon

Bepex International LLC, Minneapolis, MN

PRODUCT DIRECTORY

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PAUL O. ABBE, Bensenville, IL
ProQuip Inc., Macedonia, OH

Mixers, spiral screw

Bepex International LLC, Minneapolis, MN

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PAUL O. ABBE, Bensenville, IL

Mixers, vacuum tumble

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PAUL O. ABBE, Bensenville, IL

Mixers, vertical stationary

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)

Conn and Co., L.L.C., Warren, PA

JAYGO, INCORPORATED, 675 Rahway Ave, Union, NJ 07083 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

Myers Engineering, Bell, CA
ProQuip Inc., Macedonia, OH

Mixers, vibrating

EquipNet, Inc., Canton, MA

Mullers

PAUL O. ABBE, Bensenville, IL

Solid-liquid-mixer parts & accessories

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)

EquipNet, Inc., Canton, MA
IKA-Werke GmbH & Co.KG, Staufen, Germany

PAUL O. ABBE, Bensenville, IL
ProQuip Inc., Macedonia, OH

PACKINGS, TRAYS FOR TOWERS & COLUMNS

Packings, tower & column, ceramic

Christy Catalytics LLC, St. Louis, MO

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

Christy Catalytics LLC, St. Louis, MO

Rhine Ruhr Pty. Ltd., Sunshine West., Australia

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)

SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

Packings, tower & column, plastic

AMACS, Houston, TX

Christy Catalytics LLC, St. Louis, MO

FABRICATED PLASTICS LIMITED, 2175 TESTON ROAD, MAPLE, Canada L6A 1T3 (905-832-8161; FAX: 905-832-2111; e-mail: info@fabricatedplastics.com; web site: www.fabricatedplastics.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)

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)

SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

Packings, tower & column, random

Christy Catalytics LLC, St. Louis, MO

Rhine Ruhr Pty. Ltd., Sunshine West., Australia

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)

SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

Packings, tower & column, structured

AMACS, Houston, TX

Christy Catalytics LLC, St. Louis, MO

Fenix Process Technologies Pvt. Ltd., Pune, India

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)

Rhine Ruhr Pty. Ltd., Sunshine West., Australia

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)

SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

Packings, trays for towers & columns

AMACS, Houston, TX

Christy Catalytics LLC, St. Louis, MO

KIRK Process Solutions Ltd, Walton-on-Thames

Rhine Ruhr Pty. Ltd., Sunshine West., Australia

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)

SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

Saddles, polyethylene, tower packings

Christy Catalytics LLC, St. Louis, MO

RVT Process Equipment, Inc., Knoxville, TN

Trays & tower internals

AMACS, Houston, TX

Creative Pultrusions, Inc., Alum Bank, PA

KIRK Process Solutions Ltd, Walton-on-Thames

Rhine Ruhr Pty. Ltd., Sunshine West., Australia

RVT Process Equipment, Inc., Knoxville, TN

Processing equipment

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)

SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

PROCESS VESSELS & REACTORS

Autoclaves

Biazzi SA, Chailly/Montreux, Switzerland

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)

Patterson Ind. Canada, of All-Weld Company Limited, Scarborough, Ontario, Canada
WSF Industries, Buffalo, NY

Biochemical equipment

EquipNet, Inc., Canton, MA

RAS Process Equipment Inc., Robbinsville, NJ

Bioreactors

Bioengineering AG, Wald, Switzerland

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)

GEA Process Engineering, Columbia, MD

New Brunswick Scientific Co., Inc., Edison, NJ

POPE SCIENTIFIC, INC, Inc., Saukville, WI

Veolia Water Solutions & Technologies, Moon Township, PA

Carbonylation reactors

Biazzi SA, Chailly/Montreux, Switzerland

Coalescers

AMACS, Houston, TX

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)

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)

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)

Denver Mineral Engineers, Inc., Littleton, CO

Fulton Companies, The, Fulton Thermal Corporation, Pu-laski, NY

Hilliard Corp., Elmira, NY

JAYGO, INCORPORATED, 675 Rahway Ave, Union, NJ 07083 (1-888-81-JAYGO; 908-688-3600; FAX: 908-688-6060; e-mail: sales@jaygoinc.com; web site: www.jaygoinc.com)

Membrana, Charlotte, NC

POPE SCIENTIFIC, INC, Inc., Saukville, WI

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)

Extraction equipment

Bepex International LLC, Minneapolis, MN

GEA Process Engineering, Columbia, MD

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)

Membrana, Charlotte, NC

SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 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

Bioengineering AG, Wald, Switzerland
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)

EquipNet, Inc., Canton, MA
 GEA Process Engineering, Columbia, MD
 New Brunswick Scientific Co., Inc., Edison, NJ
POPE SCIENTIFIC, INC, Inc., Saukville, WI

Generators, hydrogen

Air Products and Chemicals, Inc., Allentown, PA
 ThyssenKrupp Uhde GmbH, Dortmund, Germany

Generators, nitrogen

Air Products and Chemicals, Inc., Allentown, PA

Generators, oxygen

Air Products and Chemicals, Inc., Allentown, PA
 AirSep Corporation, A Chart Industries Company, Buffalo, NY

Generators, ozone

AirSep Corporation, A Chart Industries Company, Buffalo, NY
 In USA, Inc., Norwood, MA

Generators, synthesis gas

ThyssenKrupp Uhde GmbH, Dortmund, Germany

Hydrogenation plants

Biazzi SA, Chailly/Montreux, Switzerland

Hydrogenation reactors

Biazzi SA, Chailly/Montreux, Switzerland

Kettles, agitated

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)

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)

Patterson Ind. Canada, of All-Weld Company Limited, Scarborough, Ontario, Canada
 ProQuip Inc., Macedonia, OH

Kettles, caustic

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)

Kettles, crystallizing

Armstrong Engineering Associates, Inc., West Chester, PA
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)

POPE SCIENTIFIC, INC, Inc., Saukville, WI

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)

POPE SCIENTIFIC, INC, Inc., Saukville, WI

Kettles, jacketed

ADMIX INC., 234 Abby Rd., Manchester, NH 03103 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: mixing@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)

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)

Patterson Ind. Canada, of All-Weld Company Limited, Scarborough, Ontario, Canada
 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)

Kettles, special metals

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)

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)

Patterson Ind. Canada, of All-Weld Company Limited, Scarborough, Ontario, Canada

Kettles, vacuum

ADMIX INC., 234 Abby Rd., Manchester, NH 03103 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: mixing@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)

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)

POPE SCIENTIFIC, INC, Inc., Saukville, WI

Oxidation plants

Biazzi SA, Chailly/Montreux, Switzerland

Oxidation reactors

Biazzi SA, Chailly/Montreux, Switzerland

Oxidizers, catalytic

Anguil Environmental Systems, Inc., Milwaukee, WI
MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI

Oxidizers, regenerative

Anguil Environmental Systems, Inc., Milwaukee, WI
MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI

Polymerizers

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)

ProQuip Inc., Macedonia, OH

Reactors, continuous

ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alauqa.com)

Biazzi SA, Chailly/Montreux, Switzerland

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.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)

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)

Midwest Steel Company Inc, Houston, Texas

PDC Machines, Inc., Warminster, PA

POPE SCIENTIFIC, INC, Inc., Saukville, WI

Procedyne Corp., New Brunswick, NJ

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)

SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Reactors, cooled, heated

Bepex International LLC, Minneapolis, MN
 Biazzi SA, Chailly/Montreux, Switzerland

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)

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.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)

EUROINOX GROUP S.r.l., Mortara, Italy

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)

Patterson Ind. Canada, of All-Weld Company Limited, Scarborough, Ontario, Canada

POPE SCIENTIFIC, INC, Inc., Saukville, WI

PROCEDYNE CORP., 11 Industrial Dr., New Brunswick, NJ 08901; (732-249-8347; FAX: 732-249-7220; e-mail: mail@procedyne.com; web site: www.procedyne.com)

WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Reactors, fluid bed

Bepex International LLC, Minneapolis, MN
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)



PROCEDYNE CORP., 11 Industrial Dr., New Brunswick, NJ 08901; (732-249-8347; FAX: 732-249-7220; e-mail: mail@procedyne.com; web site: www.procedyne.com)
 ThyssenKrupp Uhde GmbH, Dortmund, Germany

Reactors, gas-liquid

Biazzi SA, Chailly/Montreux, Switzerland

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)

PDC Machines, Inc., Warminster, PA

Reactors, hollow flight

Armstrong Engineering Associates, Inc., West Chester, 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)

Reactors, jacketed

Advance Boiler & Tank Co., West Allis, WI
 Bepex International LLC, Minneapolis, MN
 Bioengineering AG, Wald, Switzerland
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)
 Chattanooga Boiler and Tank Co., Chattanooga, TN
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

De Dietrich Process Systems GmbH, Mainz, Germany

EquipNet, Inc., Canton, MA

Myers Engineering, Bell, CA

PDC Machines, Inc., Warminster, PA

POPE SCIENTIFIC, INC, Inc., Saukville, WI

Procedyne Corp., New Brunswick, NJ

ProQuip Inc., Macedonia, OH

WSF Industries, Buffalo, NY

Reactors, jacketed, dimple

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)

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

Myers Engineering, Bell, CA

POPE SCIENTIFIC, INC, Inc., Saukville, WI

Procedyne Corp., New Brunswick, NJ

ProQuip Inc., Macedonia, OH

RAS Process Equipment Inc., Robbinsville, NJ

Reactors, jacketed, half-pipe

Chattanooga Boiler and Tank Co., Chattanooga, TN

COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

Reactors, lined, glass

EquipNet, Inc., Canton, MA

Reactors, lined, metal

Advance Boiler & Tank Co., West Allis, WI
POPE SCIENTIFIC, INC, Inc., Saukville, WI

Reactors, loop

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)
SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

Reactors, pilot plant

AP-Miniplant GmbH & Co. KG, Lindewerra, Germany
 Biazzi SA, Chailly/Montreux, Switzerland
 Bioengineering AG, Wald, Switzerland
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)
 EquipNet, Inc., Canton, MA
 New Brunswick Scientific Co., Inc., Edison, NJ
 PDC Machines, Inc., Warminster, PA
POPE SCIENTIFIC, INC, Inc., Saukville, WI
 Procedyne Corp., New Brunswick, NJ
 Zeton Inc., Burlington, Ontario, Canada

Reactors, plastic lined

POPE SCIENTIFIC, INC, Inc., Saukville, WI

Reactors, rotary blade

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)
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)

Reactors, rotary disc

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)

LIST AG, Arisdorf, Switzerland

WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Reactors, scraped surface

Armstrong Engineering Associates, Inc., West Chester, PA
 Myers Engineering, Bell, CA

Separators

Advanced Industrial Technology Corp., Paramus, NJ
ALAUQUA, INC., 7004 Blvd. East, Suite 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqua@mindspring.com; web site: www.alauqa.com)

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.coastal-technologiesinc.com)

EquipNet, Inc., Canton, MA

Gilbert Industries, Sparta, MO

Hudson Products Corp., Houston, TX

INOX-TECH INC., 6705 Route 132, Ste. Catherine, Canada J5C1B6 (800-361-0319 North America; 450-638-5441; FAX: 450-638-2865; e-mail: info@inox-tech.com; web site: www.inox-tech.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)

SPX Flow Technology, Ocala, FL

SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

Walker Magnetics, Milwaukee, WI

Sublimers

WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Vessels, plastic lined

FABRICATED PLASTICS LIMITED, 2175 TESTON ROAD, MAPLE, Canada L6A 1T3 (905-832-8161; FAX: 905-832-2111; e-mail: info@fabricatedplastics.com; web site: www.fabricatedplastics.com)

MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI
POPE SCIENTIFIC, INC, Inc., Saukville, WI
 TIGG Corporation, Oakdale, PA

Vessels, pressure, cryogenic

POPE SCIENTIFIC, INC, Inc., Saukville, WI
 ThyssenKrupp Uhde GmbH, Dortmund, Germany

Vessels, pressure, custom

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)
 Chattanooga Boiler and Tank Co., Chattanooga, TN
 EquipNet, Inc., Canton, MA
 Imperial Industries Inc., Wausau, WI
INOX-TECH INC., 6705 Route 132, Ste. Catherine, Canada J5C1B6 (800-361-0319 North America; 450-638-5441; FAX: 450-638-2865; e-mail: info@inox-tech.com; web site: www.inox-tech.com)

Lectrodryer, Richmond, KY

Liquid Process Systems, inc., Indian Trail, NC

Niles Steel Tank, Ambler, PA

Patterson Ind. Canada, of All-Weld Company Limited,

Scarborough, Ontario, Canada

POPE SCIENTIFIC, INC, Inc., Saukville, WI

Powder Systems Ltd, Liverpool

ProQuip Inc., Macedonia, OH

Team Industries, Inc., Kaukauna, WI

TIGG Corporation, Oakdale, PA

WSF Industries, Buffalo, NY

Vessels, pressure, jacketed, dimple

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)

EquipNet, Inc., Canton, MA

POPE SCIENTIFIC, INC, Inc., Saukville, WI

Washers, continuous belt

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)

Washers, horizontal vacuum 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; web site: www.komline.com)

Washers, spray

Progressive Recovery Inc., Dupo, IL

REACTION & SEPARATION EQUIPMENT, OTHER

Acid gas removal systems

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)

Adsorption systems, temperature swing

SIAD Macchine Impianti, Bergamo, Italy

Aerators

KOERTING HANNOVER AG, Badenstedter Str. 56, Hannover, Germany 30453 (0511-2129-0; FAX: 0511-2129-223; e-mail: st@koerting.de; web site: www.koerting.de)

Membrana, Charlotte, NC

MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI
 Monitor Technologies LLC, Elburn, IL
 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)

ProQuip Inc., Macedonia, OH

Atomizers

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)

Chromatography, production-scale equipment

Ameridia, Div. of Eurodia Industries, Somerset, NJ
 Richard Scientific Inc., Novato, CA

CIP Spray Nozzles

Evaporator Dryer Technologies, Hammond, WI

Cleanroom equipment and supplies

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Diffusers, spargers

Mott Corporation, Farmington, CT
 Schutte & Koerting, Treviso, PA

Diverterers

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)

Extractors, centrifugal

B & P Process Equipment, Saginaw, MI
 Richard Scientific Inc., Novato, CA

Hydrogen generation units

SPX Flow Technology, Ocala, FL

Manways

Evaporator Dryer Technologies, Hammond, WI

Membrane systems for gases

Air Products and Chemicals, Inc., Allentown, PA
 Buss-SMS-Canzler GmbH, Butzbach, 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)
SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

Membrane systems for liquids

Ameridia, Div. of Eurodia Industries, Somerset, NJ
 Buss-SMS-Canzler GmbH, Butzbach, Germany
 GEA Process Engineering, Columbia, 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.com)

Membrana, Charlotte, NC

Microdyn Technologies, Inc., Raleigh, NC

MICRODYN-NADIR GmbH, Wiesbaden, Germany

Progressive Recovery Inc., Dupo, IL

SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

Mixer-settlers

Denver Mineral Engineers, Inc., Littleton, CO
 Franken Filtertechnik KG, Germany, Huerth, Germany

Monomer-recovery systems

Buss-SMS-Canzler GmbH, Butzbach, Germany
GIG KARASEK GMBH GmbH, Gloggnitz-Stuppach, Austria
POPE SCIENTIFIC, INC, Inc., Saukville, WI

Nozzles, atomizing

Spraying Systems Co., Wheaton, IL

Nozzles, mixing

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)

Elmridge Inc., Livonia, MI

KOERTING HANNOVER AG, Badenstedter Str. 56, Hannover, Germany 30453 (0511-2129-0; FAX: 0511-2129-223; e-mail: st@koerting.de; web site: www.koerting.de)

Nozzles, spray

Evaporator Dryer Technologies, Hammond, WI

KOERTING HANNOVER AG, Badenstedter Str. 56, Hannover, Germany 30453 (0511-2129-0; FAX: 0511-2129-223; e-mail: st@koerting.de; web site: www.koerting.de)

Spraying Systems Co., Wheaton, IL

Oil purification equipment

GIG KARASEK GMBH GmbH, Gloggnitz-Stuppach, Austria

Pervaporation equipment

Buss-SMS-Canzler GmbH, Butzbach, Germany
SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

Separators for metals

Denver Mineral Engineers, Inc., Littleton, CO
Industrial Magnetics, Inc., Boyne City, MI
Walker Magnetics, Milwaukee, WI

Solvent extraction systems

B & P Process Equipment, Saginaw, MI
Richard Scientific Inc., Novato, CA

Solvent recovery systems

ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alauqa.com)

Buss-SMS-Canzler GmbH, Butzbach, Germany
EDWARDS US HEADQUARTERS, 6416 Inducon Drive West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)

Franken Filtertechnik KG, Germany, Huerth, Germany
GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen, Germany 76275 (49-7243-7050; FAX: 49-7243-705330; e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)

GEA Process Engineering, Columbia, MD

GIG KARASEK GMBH GmbH, Gloggnitz-Stuppach, Austria

Hilliard Corp., Elmira, NY

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)

Munters Corporation, Buena Vista, VA

NexGen Enviro Systems Inc., Lindenhurst, NY

POPE SCIENTIFIC, INC., Saukville, WI

Progressive Recovery Inc., Duplo, IL

Richard Scientific Inc., Novato, CA

WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Solvent recycling systems

ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alauqa.com)

Progressive Recovery Inc., Duplo, IL

Richard Scientific Inc., Novato, CA

Strippers, air

Advanced Industrial Technology Corp., Paramus, 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)
MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI

SCREENING EQUIPMENT

Screening

American Fabric Filter Co., Wesley Chapel, FL
Great Western Mfg. Co., Leavenworth, KS
Kinergy Corp., Louisville, KY
Prater-Sterling, Bollingbrook, IL
Westech Engineering Inc., Salt Lake City, UT

Screens, air

Berner International Corp., New Castle, PA
Great Western Mfg. Co., Leavenworth, KS
RKI Instruments, Inc., Union City, CA
Witte Co. Inc., Washington, NJ

Screens, bar

MM Industries, Inc., Vorti-Siv, Salem, OH
Tema Systems, Inc., Cincinnati, OH
Witte Co. Inc., Washington, NJ

Screens, centrifugal

Kason Corp., Millburn, NJ
Kemutec Group, Inc., Bristol, PA

Prater-Sterling, Bollingbrook, IL
Tema Systems, Inc., Cincinnati, OH
Western States Machine Co., Hamilton, OH

Screens, cylindrical

Kason Corp., Millburn, NJ
MM Industries, Inc., Vorti-Siv, Salem, OH

Screens, grizzly

Kinergy Corp., Louisville, KY
Witte Co. Inc., Washington, NJ

Screens, gyratory

Great Western Mfg. Co., Leavenworth, KS
Kason Corp., Millburn, NJ
MM Industries, Inc., Vorti-Siv, Salem, OH
Witte Co. Inc., Washington, NJ

Screens, milled slot

MM Industries, Inc., Vorti-Siv, Salem, OH

Screens, perforated plate

Tema Systems, Inc., Cincinnati, OH
Witte Co. Inc., Washington, NJ

Screens, rotary

Great Western Mfg. Co., Leavenworth, KS
MM Industries, Inc., Vorti-Siv, Salem, OH

Screens, stationary

Schenck Process GmbH, Darmstadt, Germany

Screens, synthetic

Great Western Mfg. Co., Leavenworth, KS
Sefar AG, Heiden, Switzerland

Screens, testing

Great Western Mfg. Co., Leavenworth, KS

Screens, vibrating

Great Western Mfg. Co., Leavenworth, KS
Kason Corp., Millburn, NJ
Kinergy Corp., Louisville, KY
Prater-Sterling, Bollingbrook, IL
Schenck Process GmbH, Darmstadt, Germany
Witte Co. Inc., Washington, NJ

Screens, wire

American Fabric Filter Co., Wesley Chapel, FL
G Bopp USA Inc., Wappingers Falls, NY
Great Western Mfg. Co., Leavenworth, KS
MM Industries, Inc., Vorti-Siv, Salem, OH

Separators, magnetic

Industrial Magnetics, Inc., Boyne City, MI
KRAISSL CO. INC., 299 Williams Ave., Hackensack, NJ 07601-5225 (800-572-4775; 201-342-0008; FAX: 201-342-0025; e-mail: kraissl@aol.com; web site: www.strainers.com)

Magnetic Products, Inc., Highland, MI
Metso Minerals Industries, Inc., York, PA
Puritan Magnetics, Inc., Oxford, MI
Walker Magnetics, Milwaukee, WI

Sieves

American Fabric Filter Co., Wesley Chapel, FL
Great Western Mfg. Co., Leavenworth, KS
Prater-Sterling, Bollingbrook, IL
Quadro Engineering Corp., WATERLOO, Ontario, Canada
Sefar AG, Heiden, Switzerland

Sifters, sifting machines

American Fabric Filter Co., Wesley Chapel, FL
Great Western Mfg. Co., Leavenworth, KS
Kason Corp., Millburn, NJ
Prater-Sterling, Bollingbrook, IL
Witte Co. Inc., Washington, NJ

Wire cloth

CPI Wirecloth & Screens Inc., Pearland, TX
G Bopp USA Inc., Wappingers Falls, NY
MM Industries, Inc., Vorti-Siv, Salem, OH

Wire mesh

AMACS, Houston, TX
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.coastal-technologiesinc.com)
CPI Wirecloth & Screens Inc., Pearland, TX
G Bopp USA Inc., Wappingers Falls, NY
KRAISSL CO. INC., 299 Williams Ave., Hackensack, NJ 07601-5225 (800-572-4775; 201-342-0008; FAX: 201-342-0025; e-mail: kraissl@aol.com; web site: www.strainers.com)
MM Industries, Inc., Vorti-Siv, Salem, OH

SCRUBBERS

Scrubbers, centrifugal

Advanced Industrial Technology Corp., Paramus, NJ
Advanced Air Technologies, Inc., Corunna, MI
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)
Hudson Products Corp., Houston, TX
KIRK Process Solutions Ltd, Walton-on-Thames
MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI

Scrubbers, cyclone

Advanced Industrial Technology Corp., Paramus, NJ
Advanced Cyclone Systems, S. A., Porto, Portugal
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)
EUROINOX GROUP S.r.L., Mortara, Italy
GEA Process Engineering, Columbia, MD
KIRK Process Solutions Ltd, Walton-on-Thames

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)

Scrubbers, fume, gas

Advanced Industrial Technology Corp., Paramus, NJ
Advanced Air Technologies, Inc., Corunna, MI
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)
Branch Environmental Corp., Somerville, NJ

CROLL REYNOLDS
Process Vacuum | Air Pollution Control

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)
Elmridge Inc., Livonia, MI

FABRICATED PLASTICS LIMITED, 2175 TESTON ROAD, MAPLE, Canada L6A 1T3 (905-832-8161; FAX: 905-832-2111; e-mail: info@fabricatedplastics.com; web site: www.fabricatedplastics.com)

GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen, Germany 76275 (49-7243-7050; FAX: 49-7243-705330; e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)

GEA Process Engineering, Columbia, MD



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)
MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI
Schutte & Koerting, Trevoze, 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)
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)
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)
MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI

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)
Branch Environmental Corp., Somerville, NJ

CROLL REYNOLDS

Process Vacuum | Air Pollution Control

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)

Elmridge Inc., Livonia, MI

GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen, Germany 76275 (49-7243-7050; FAX: 49-7243-705330; e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)

Hannover, Germany 30453 (0511-2129-0; FAX: 0511-2129-223; e-mail: st@koerting.de; web site: www.koerting.de)

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)

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)

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)

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)

MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI

Scrubbers, orifice

Advanced Industrial Technology Corp., Paramus, NJ

Praisa, Monterey, Nuevo Leon, Mexico

Scrubbers, packed column

Advanced Industrial Technology Corp., Paramus, NJ

Advanced Air Technologies, Inc., Corunna, MI

ALAUQA, INC., 7004 Blvd. 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)

Branch Environmental Corp., Somerville, 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)

FABRICATED PLASTICS LIMITED, 2175 TESTON ROAD, MAPLE, Canada L6A 1T3 (905-832-8161; FAX: 905-832-2111; e-mail: info@fabricatedplastics.com; web site: www.fabricatedplastics.com)

GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen, Germany 76275 (49-7243-7050; FAX: 49-7243-705330; e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.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)

MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI
Schutte & Koerting, Treviso, PA

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)

Scrubbers, spray

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)

Branch Environmental Corp., Somerville, 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)

Elmridge Inc., Livonia, MI

Evaporator Dryer Technologies, Hammond, WI

GEA Process Engineering, Columbia, MD

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)

MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI
Spraying Systems Co., Wheaton, IL

Scrubbers, venturi

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)

Branch Environmental Corp., Somerville, NJ

CROLL REYNOLDS

Process Vacuum | Air Pollution Control

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)

Elmridge Inc., Livonia, MI

GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen, Germany 76275 (49-7243-7050; FAX: 49-7243-705330; e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)

KOERTING HANNOVER AG, Badenstedter Str. 56, Hannover, Germany 30453 (0511-2129-0; FAX: 0511-2129-223; e-mail: st@koerting.de; web site: www.koerting.de)

MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI
Schutte & Koerting, Treviso, PA

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., Excellence in Milling and Handling of Powders, Fribourg, Switzerland
Prater-Sterling, Bollingbrook, IL

WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Chippers

WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Comminutors

AAAmachine, Inc., Des Plaines, IL

FRITSCH GmbH, Milling and Sizing, Idar-Oberstein, Germany

WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Crushers, cone

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, 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, fluid energy

AAAmachine, Inc., Des Plaines, IL

Crushers, gyratory

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, 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, impact

Stedman, Aurora, IN

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, 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., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Crushers, jaw

FRITSCH GmbH, Milling and Sizing, Idar-Oberstein, Germany

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, 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, Germany

Bepex International LLC, Minneapolis, MN

FREWITT Manufacturer of Machines Ltd., Excellence in Milling and Handling of Powders, Fribourg, Switzerland
FRITSCH GmbH, Milling and Sizing, Idar-Oberstein, Germany

Kemutec Group, Inc., Bristol, PA

WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Crushers, rotary

Bepex International LLC, Minneapolis, MN

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)

Munson Machinery Company, Inc., Utica, NY

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, 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

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)

WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Disintegration equipment parts & accessories

Alstom Power, Inc., Raymond & Bartlett-Snow Products, Warrenville, IL

Bepex International LLC, Minneapolis, MN

Herbold Meckesheim USA, Resource Recycling Systems Inc., Statersville, RI

Security Engineered Machinery, Westboro, MA

Flakers

Herbold Meckesheim USA, Resource Recycling Systems Inc., Statersville, RI

Ludman Industries, Milwaukee, WI

Prater-Sterling, Bollingbrook, IL

Sandvik Process Systems, Inc., Totowa, NJ

Lumpbreakers

Bepex International LLC, Minneapolis, MN

Dynamic Air Inc., St. Paul, MN

FREWITT Manufacturer of Machines Ltd., Excellence in Milling and Handling of Powders, Fribourg, Switzerland
HEYL & PATTERSON INC., RENNEBURG DIVISION, PO Box 36, Pittsburgh, PA 15230 (412-788-9810; FAX: 412-788-9822; e-mail: info@heylpatterson.com; web site: www.heylpatterson.com)

Kemutec Group, Inc., Bristol, PA

Kinergy Corp., Louisville, KY

Munson Machinery Company, Inc., Utica, NY

PAUL O. ABBE, Bensenville, IL

Prater-Sterling, Bollingbrook, IL

Stedman, Aurora, IN

Witte Co. Inc., Washington, NJ

WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

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)

FREWITT Manufacturer of Machines Ltd., Excellence in Milling and Handling of Powders, Fribourg, Switzerland
WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Mills, attrition

Air Products and Chemicals, Inc., Allentown, PA

Bepex International LLC, Minneapolis, MN

Munson Machinery Company, Inc., Utica, NY

PAUL O. ABBE, Bensenville, IL

Prater-Sterling, Bollingbrook, IL

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, 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., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Mills, ball

FRITSCH GmbH, Milling and Sizing, Idar-Oberstein, Germany
 Metso Minerals Industries, Inc., York, PA
PAUL O. ABBE, Bensenville, IL
 Tema Systems, Inc., Cincinnati, OH

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, 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

Alstom Power, Inc., Raymond & Bartlett-Snow Products, Warrenville, IL
 Stedman, Aurora, IN
WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Mills, colloid

Bematek Systems, Inc., Salem, MA
 Wilhelm Siefer GmbH & Co. KG, Velbert, Germany

Mills, cone

FREWITT Manufacturer of Machines Ltd., Excellence in Milling and Handling of Powders, Fribourg, Switzerland
 Kemutec Group, Inc., Bristol, PA
 Quadro Engineering Corp., WATERLOO, Ontario, Canada

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)
 FRITSCH GmbH, Milling and Sizing, Idar-Oberstein, Germany
 Tema Systems, Inc., Cincinnati, OH
WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, 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., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Mills, grinding

Air Products and Chemicals, Inc., Allentown, PA
 Alstom Power, Inc., Raymond & Bartlett-Snow Products, Warrenville, IL
 AMANDUS KAHL GmbH & Co. KG, Reinbek, 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)
 FREWITT Manufacturer of Machines Ltd., Excellence in Milling and Handling of Powders, Fribourg, Switzerland
 FRITSCH GmbH, Milling and Sizing, Idar-Oberstein, Germany
 Kemutec Group, Inc., Bristol, PA
 Metso Minerals Industries, Inc., York, PA
 NEUHAUS NEOTEC Maschinen- und Anlagenbau GmbH, Germany
PAUL O. ABBE, Bensenville, IL
 Prater-Sterling, Bollingbrook, IL
 Quadro Engineering Corp., WATERLOO, Ontario, Canada
 Tema Systems, Inc., Cincinnati, OH
WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, 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, hammer

Alstom Power, Inc., Raymond & Bartlett-Snow Products, Warrenville, IL
 AMANDUS KAHL GmbH & Co. KG, Reinbek, Germany
 Bepex International LLC, Minneapolis, MN
 FREWITT Manufacturer of Machines Ltd., Excellence in Milling and Handling of Powders, Fribourg, Switzerland
 Munson Machinery Company, Inc., Utica, NY
 Prater-Sterling, Bollingbrook, IL
 Stedman, Aurora, IN
WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, 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, homogenizing

ADMIX INC., 234 Abby Rd., Manchester, NH 03103 (800-466-2369; 603-627-2340; FAX: 603-627-2019; e-mail: mixing@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)
 FREWITT Manufacturer of Machines Ltd., Excellence in Milling and Handling of Powders, Fribourg, Switzerland
 Wilhelm Siefer GmbH & Co. KG, Velbert, Germany

Mills, impact

Alstom Power, Inc., Raymond & Bartlett-Snow Products, Warrenville, IL
 Bepex International LLC, Minneapolis, MN
 FREWITT Manufacturer of Machines Ltd., Excellence in Milling and Handling of Powders, Fribourg, Switzerland
 FRITSCH GmbH, Milling and Sizing, Idar-Oberstein, Germany
 Munson Machinery Company, Inc., Utica, NY
 Prater-Sterling, Bollingbrook, IL
 Quadro Engineering Corp., WATERLOO, Ontario, Canada
 Stedman, Aurora, IN

WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, 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., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Mills, jacketed ball

PAUL O. ABBE, Bensenville, IL
 Tema Systems, Inc., Cincinnati, OH
WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, 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
 PSL USA, Boise, ID

Mills, other

FREWITT Manufacturer of Machines Ltd., Excellence in Milling and Handling of Powders, Fribourg, Switzerland

Mills, pebble

PAUL O. ABBE, Bensenville, IL

Mills, pug

HEYL & PATTERSON INC., RENNEBURG DIVISION, PO Box 36, Pittsburgh, PA 15230 (412-788-9810; FAX: 412-788-9822; e-mail: info@heylpatterson.com; web site: www.heylpatterson.com)

Mills, ring roll

Alstom Power, Inc., Raymond & Bartlett-Snow Products, Warrenville, IL
WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, 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, Bensenville, IL
WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, 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., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Mills, roller

Alstom Power, Inc., Raymond & Bartlett-Snow Products, Warrenville, IL
 AMANDUS KAHL GmbH & Co. KG, Reinbek, 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)
 Ludman Industries, Milwaukee, WI
 NEUHAUS NEOTEC Maschinen- und Anlagenbau GmbH, Germany
WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, 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, tube

PAUL O. ABBE, Bensenville, IL

Mills, tumbling

PAUL O. ABBE, Bensenville, IL

Mills, vertical

AAAmachine, Inc., Des Plaines, IL

Alstom Power, Inc., Raymond & Bartlett-Snow Products, Warrenville, IL
 Bepex International LLC, Minneapolis, MN
WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, 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, Germany
 Bepex International LLC, Minneapolis, MN
BOERGER PUMPS, 2860 Water Tower Place, Chanhasen, MN 55317 (877-756-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)
 Herbold Meckesheim USA, Resource Recycling Systems Inc., Slattersville, RI
 Munson Machinery Company, Inc., Utica, NY
 Security Engineered Machinery, Westboro, MA
WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

TOWERS & COLUMNS

Columns, absorption or adsorption

Advanced Industrial Technology Corp., Paramus, NJ
 AirSep Corporation, A Chart Industries Company, Buffalo, NY
ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alaquainc.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)

FABRICATED PLASTICS LIMITED, 2175 TESTON ROAD, MAPLE, Canada L6A 1T3 (905-832-8161; FAX: 905-832-2111; e-mail: info@fabricatedplastics.com; web site: www.fabricatedplastics.com)

GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen, Germany 76275 (49-7243-7050; FAX: 49-7243-705330; e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.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)

MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI Midwest Steel Company Inc, Houston, Texas

SULZER CHEMTECH USA, INC., 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rodneymarlar@sulzer.com; web site: www.sulzer.com)

SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

Columns, bubble cap

RAS Process Equipment Inc., Robbinsville, NJ
SULZER CHEMTECH USA, INC., 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rodneymarlar@sulzer.com; web site: www.sulzer.com)

SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

Columns, contacting or mixing

RAS Process Equipment Inc., Robbinsville, NJ

Columns, custom fabricated

Enerquip, LLC, Medford, WI
FABRICATED PLASTICS LIMITED, 2175 TESTON ROAD, MAPLE, Canada L6A 1T3 (905-832-8161; FAX: 905-832-2111; e-mail: info@fabricatedplastics.com; web site: www.fabricatedplastics.com)

Finix Process Technologies Pvt. Ltd., Pune, India
MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI Patterson Ind. Canada, of All-Weld Company Limited,

Scarborough, Ontario, Canada
POPE SCIENTIFIC, INC., Inc., Saukville, WI
 RAS Process Equipment Inc., Robbinsville, NJ
 Team Industries, Inc., Kaukauna, WI

Columns, fluidized bed

GEA Process Engineering, Columbia, MD

Columns, graphite

Nantong Fareast Chemical Equipment Co. LTD, International Trading, Nantong, Peoples Rep. of China

Columns, packed

Advanced Industrial Technology Corp., Paramus, NJ

ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alaquainc.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, Germany
 Doyle & Roth Mfg. Co. Inc., New York, NY
 EquipNet, Inc., Canton, MA

FABRICATED PLASTICS LIMITED, 2175 TESTON ROAD, MAPLE, Canada L6A 1T3 (905-832-8161; FAX: 905-832-2111; e-mail: info@fabricatedplastics.com; web site: www.fabricatedplastics.com)

MET-PRO ENVIRONMENTAL AIR SOLUTIONS, Owosso, MI
POPE SCIENTIFIC, INC., Saukville, WI
 Rhine Ruhr Pty. Ltd., Sunshine West, Australia
 Richard Scientific Inc., Novato, CA

SULZER CHEMTECH USA, INC., 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rod-ney.alario@sulzer.com; web site: www.sulzer.com)
SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

Columns, thin film

POPE SCIENTIFIC, INC., Saukville, WI

Columns, vacuum

EquipNet, Inc., Canton, MA
POPE SCIENTIFIC, INC., Saukville, WI
SULZER CHEMTECH USA, INC., 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rod-ney.alario@sulzer.com; web site: www.sulzer.com)
SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

Columns, valve tray

Fenix Process Technologies Pvt. Ltd., Pune, India
SULZER CHEMTECH USA, INC., 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rod-ney.alario@sulzer.com; web site: www.sulzer.com)
SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

Distillation columns, automatic packaged unit

ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alaquainc.com)
 CTP Corp., Northport, NY
POPE SCIENTIFIC, INC., Saukville, WI
 Progressive Recovery Inc., Duplo, IL

Distillation columns, molecular distillation

Buss-SMS-Canzler GmbH, Butzbach, Germany
 GEA Process Engineering, Columbia, MD
GIG KARASEK GMBH GmbH, Gloggnitz-Stuppach, Austria
POPE SCIENTIFIC, INC., Saukville, WI

Distillation columns, sieve tray

Advanced Industrial Technology Corp., Paramus, NJ
ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alaquainc.com)

AMACS, Houston, TX
 Fenix Process Technologies Pvt. Ltd., Pune, India
GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen, Germany 76275 (49-7243-7050; FAX: 49-7243-705330; e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)

GEA Process Engineering, Columbia, MD
SULZER CHEMTECH USA, INC., 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rod-ney.alario@sulzer.com; web site: www.sulzer.com)
SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

Distillation columns, steam stripping

Advanced Industrial Technology Corp., Paramus, NJ
ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alaquainc.com)
GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen, Germany 76275 (49-7243-7050; FAX: 49-7243-705330; e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)
 GEA Process Engineering, Columbia, MD

SULZER CHEMTECH USA, INC., 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rod-ney.alario@sulzer.com; web site: www.sulzer.com)
SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

Distillation columns, vapor compression

GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen, Germany 76275 (49-7243-7050; FAX: 49-7243-705330; e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)

GEA Process Engineering, Columbia, MD
SULZER CHEMTECH USA, INC., 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rod-ney.alario@sulzer.com; web site: www.sulzer.com)
SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

Online diagnostics of columns

TowerScan, Sarnia, Ontario, Canada
 TowerScan, Port Huron, MI

Tower parts & accessories

AMACS, Houston, TX
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)
 Fenix Process Technologies Pvt. Ltd., Pune, India
SULZER CHEMTECH USA, INC., 1 Sulzer Way, Tulsa, OK 74107 (918 446 6672; FAX: 918 446 5321; e-mail: rod-ney.alario@sulzer.com; web site: www.sulzer.com)
SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)
 Swager Communications, Fremont, IN

WATER TREATMENT EQUIPMENT

Boiler feedwater systems

Bryan Steam LLC, Peru, IN
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 Marlo Incorporated, Commercial & Industrial Division, Racine, WI
 Siemens Industry, Inc. - Water Technologies, Alpharetta, GA
 ThyssenKrupp Uhde GmbH, Dortmund, Germany
 Topog-E Gasket Co., Tulsa, OK
 Veolia Water Solutions & Technologies, Moon Township, PA
WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Cooling-water treatment, chemical

Pristine Water Solutions Inc., Subsidiary of Met-Pro Corp., Waukegan, IL
 sera ProDos GmbH, Immenhausen, Germany
 Veolia Water Solutions & Technologies, Moon Township, PA

Cooling-water treatment, non-chemical

Marlo Incorporated, Commercial & Industrial Division, Racine, WI

Desalination units

ALAUQA, INC., 7004 Blvd. East, Suite 28A, Guttenberg, NJ 07093 (201-758-1577; FAX: 201-758-1522; e-mail: alauqa@mindspring.com; web site: www.alaquainc.com)

Ameridia, Div. of Eurodia Industries, Somerset, NJ
 PCA GmbH, Heusweiler, Germany
 ThyssenKrupp Uhde GmbH, Dortmund, Germany

Electrodialysis units

Ameridia, Div. of Eurodia Industries, Somerset, NJ
 PCA GmbH, Heusweiler, Germany

Hydrochlorinators

FLUID METERING, Inc., Syosset, NY

Ion exchanger equipment

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 Marlo Incorporated, Commercial & Industrial Division, Racine, WI

TIGG Corporation, Oakdale, PA
 United Manufacturing International 2000, Red Bluff, CA
 Veolia Water Solutions & Technologies, Moon Township, PA

Ozonators

Air Products and Chemicals, Inc., Allentown, PA
 AirSep Corporation, A Chart Industries Company, Buffalo, NY
 Elmridge Inc., Livonia, MI

Precipitators, water treating

MEFIAG, MET-PRO CORP, Met-Pro Corp., Owosso, MI
 Veolia Water Solutions & Technologies, Moon Township, PA

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)
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 Purolite Co., Bala Cynwyd, PA
 United Manufacturing International 2000, Red Bluff, CA

Reverse osmosis systems

Filtration & Membrane Technology, Inc., Houston, TX
GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen, Germany 76275 (49-7243-7050; FAX: 49-7243-705330; e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)
 GEA Process Engineering, Columbia, 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.com)
 Marlo Incorporated, Commercial & Industrial Division, Racine, WI
 ProSonic LLC, Milwaukee, WI
 Siemens Industry, Inc. - Water Technologies, Alpharetta, GA
 Veolia Water Solutions & Technologies, Moon Township, PA
WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Ultrafiltration systems

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GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen, Germany 76275 (49-7243-7050; FAX: 49-7243-705330; e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)
 GEA Process Engineering, Columbia, MD
 Marlo Incorporated, Commercial & Industrial Division, Racine, WI
 Membrana, Charlotte, NC
 Veolia Water Solutions & Technologies, Moon Township, PA
 Westech Engineering Inc., Salt Lake City, UT

Ultraviolet disinfection systems

Newman Regency Group, Stafford, TX

Water-conditioning package systems

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 Marlo Incorporated, Commercial & Industrial Division, Racine, WI
 sera ProDos GmbH, Immenhausen, Germany
 Veolia Water Solutions & Technologies, Moon Township, PA

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 Entex Technologies Inc, Chapel Hill, NC
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 Siemens Industry, Inc. - Water Technologies, Alpharetta, GA
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 Encon Evaporators, Hooksett, NH
 Entex Technologies Inc, Chapel Hill, NC
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 Pristine Water Solutions Inc., Subsidiary of Met-Pro Corp., Waukegan, IL
 sera ProDos GmbH, Immenhausen, Germany
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)
 Veolia Water Solutions & Technologies, Moon Township, PA

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Scenic Precise Element Inc., Kaohsiung City, Taiwan

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Abresist Kalenborn Corporation, Urbana, IN
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Sauerisen, Pittsburgh, PA

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Nylon

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Polyesters

Dudick Inc., Streetsboro, OH
HOERBIGER KOMPRESSORTECHNIK HOLDING GMBH, Donau-City-Strasse 1, Vienna, Austria A-1220 (+43 1 22 440-0; FAX: +43 1 22 440 990; e-mail: info-hkth@hoerbiger.com; web site: www.hoerbiger.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)
ThyssenKrupp Uhde GmbH, Dortmund, Germany

Polyethylenes

Associated Bag Company, Milwaukee, WI
HOERBIGER KOMPRESSORTECHNIK HOLDING GMBH, Donau-City-Strasse 1, Vienna, Austria A-1220 (+43 1 22 440-0; FAX: +43 1 22 440 990; e-mail: info-hkth@hoerbiger.com; web site: www.hoerbiger.com)
The Chemical Company, Jamestown, Rhode Island
ThyssenKrupp Uhde GmbH, Dortmund, Germany

Polymers, ABS

The Chemical Company, Jamestown, Rhode Island

Polyphenylene sulfide

HOERBIGER KOMPRESSORTECHNIK HOLDING GMBH, Donau-City-Strasse 1, Vienna, Austria A-1220 (+43 1 22 440-0; FAX: +43 1 22 440 990; e-mail: info-hkth@hoerbiger.com; web site: www.hoerbiger.com)
The Chemical Company, Jamestown, Rhode Island

Polypropylenes

Associated Bag Company, Milwaukee, WI
The Chemical Company, Jamestown, Rhode Island
ThyssenKrupp Uhde GmbH, Dortmund, Germany

Polytetrafluoroethylene

Compressor Products International, Stafford, TX
Dalau Inc, Merrimack, NH
HOERBIGER KOMPRESSORTECHNIK HOLDING GMBH, Donau-City-Strasse 1, Vienna, Austria A-1220 (+43 1 22 440-0; FAX: +43 1 22 440 990; e-mail: info-hkth@hoerbiger.com; web site: www.hoerbiger.com)
The Chemical Company, Jamestown, Rhode Island

Polyvinylidene chlorides

The Chemical Company, Jamestown, Rhode Island

PVCs

Omega Engineering Inc., An Omega Group Co., Stamford, CT
ThyssenKrupp Uhde GmbH, Dortmund, Germany

Silicones

ALFA International Corporation, Woonsocket, RI
Dow Corning Corporation, Midland, MI
Transene Co. Inc., Danvers, MA

Thermoplastic elastomers

Bayer MaterialScience LLC, Pittsburgh, PA
HOERBIGER KOMPRESSORTECHNIK HOLDING GMBH, Donau-City-Strasse 1, Vienna, Austria A-1220 (+43 1 22 440-0; FAX: +43 1 22 440 990; e-mail: info-hkth@hoerbiger.com; web site: www.hoerbiger.com)

PROTECTIVE COATINGS & LININGS

Adhesives

ALFA International Corporation, Woonsocket, RI
ITW Polymers Adhesives, North America, Danvers, MA
Momentive Specialty Chemicals, Epoxy, Phenolic & Coating Resins Division, Columbus, OH
Synthetic Surfaces Inc., Scotch Plains, NJ
The Chemical Company, Jamestown, Rhode Island
Transene Co. Inc., Danvers, MA

Cargo Protection

Nier Systems Inc, Boca Raton, Florida

Coatings, acrylic

Momentive Specialty Chemicals, Epoxy, Phenolic & Coating Resins Division, Columbus, OH

Coatings, ceramic

GfE Metalle und Materialien GmbH, Nuernberg, Germany
ITW Polymers Adhesives, North America, Danvers, MA
P-Ker Engineering, Waterport, NY

Coatings, diffusion

Transene Co. Inc., Danvers, MA
Wall Colmonoy Corporation, Madison Heights, MI

Coatings, epoxy

Dudick Inc., Streetsboro, OH
ITW Polymers Adhesives, North America, Danvers, MA
Midwesco Filter Resources, Inc., Winchester, VA
Sauerreisen, Pittsburgh, PA
Synthetic Surfaces Inc., Scotch Plains, NJ
Transene Co. Inc., Danvers, MA

Coatings, fluoropolymer

Arkema Inc., King of Prussia, PA

Coatings, metallic

GfE Metalle und Materialien GmbH, Nuernberg, Germany
Wall Colmonoy Corporation, Madison Heights, MI

Coatings, nonstick

Fr. Jacob Soehne GmbH & Co. KG, Porta Westfalica, NRW, Germany

Coatings, plastic

Arkema Inc., King of Prussia, PA
Dudick Inc., Streetsboro, OH

Coatings, powder

Momentive Specialty Chemicals, Epoxy, Phenolic & Coating Resins Division, Columbus, OH

Coatings, PVC

Synthetic Surfaces Inc., Scotch Plains, NJ

Coatings, refractory

P-Ker Engineering, Waterport, NY
Sauereisen, Pittsburgh, PA

Coatings, rubber

Dow Corning Corporation, Midland, MI

Coatings, silicate

Sauereisen, Pittsburgh, PA

Coatings, urethane

Bayer MaterialScience LLC, Pittsburgh, PA
ITW Polymers Adhesives, North America, Danvers, MA

Coatings, vinyl ester

Sauereisen, Pittsburgh, PA

Freight & Cargo Protection

Nier Systems Inc, Boca Raton, Florida

Linings, basalt

Abresist Kalenborn Corporation, Urbana, IN

Linings, cements & mortars

Abresist Kalenborn Corporation, Urbana, IN
Dudick Inc., Streetsboro, OH
Sauereisen, Pittsburgh, PA

Linings, ceramic

Abresist Kalenborn Corporation, Urbana, IN
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)

Linings, chlorosulfonated polyethylene

Watersaver Co., a division of CDI, Commerce City, CO

Linings, epoxy

Dudick Inc., Streetsboro, OH
Sauereisen, Pittsburgh, PA

Linings, fluoroplastic

Dalau Inc, Merrimack, NH

Linings, glass-reinforced plastic

Dudick Inc., Streetsboro, OH
ZCL Dualam, Inc., Edmonton, Alberta, Canada

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

Bayer MaterialScience LLC, Pittsburgh, PA
Sauereisen, Pittsburgh, PA

Linings, vinyl

Watersaver Co., a division of CDI, Commerce City, CO

Sealants

ALFA International Corporation, Woonsocket, RI
IMPCCO, Inc., East Providence, RI
ITW Polymers Adhesives, North America, Danvers, MA
The Chemical Company, Jamestown, Rhode Island

REFRACTORY MATERIALS

Anchors, refractory

Combustion Controls Solutions Environmental Services, Toledo, OH

Castables

AMERICAN ELEMENTS, 1093 Broxton Avenue, Suite 2000, Los Angeles, California 90024 (310-208-0551; FAX: 310-208-0351; e-mail: customerservice@americanelements.com; web site: www.americanelements.com)

Combustion Controls Solutions Environmental Services, Toledo, OH

Firebrick

Combustion Controls Solutions Environmental Services, Toledo, OH

Foams, refractory

AMERICAN ELEMENTS, 1093 Broxton Avenue, Suite 2000, Los Angeles, California 90024 (310-208-0551; FAX: 310-208-0351; e-mail: customerservice@americanelements.com; web site: www.americanelements.com)

Combustion Controls Solutions Environmental Services, Toledo, OH

Ramming mixes

Combustion Controls Solutions Environmental Services, Toledo, OH

Refractories

Advance Boiler & Tank Co., West Allis, WI
AMERICAN ELEMENTS, 1093 Broxton Avenue, Suite 2000, Los Angeles, California 90024 (310-208-0551; FAX: 310-208-0351; e-mail: customerservice@americanelements.com; web site: www.americanelements.com)

Christy Catalytics LLC, St. Louis, MO
Combustion Controls Solutions Environmental Services, Toledo, OH

ZIRCAR Refractory Composites, Inc., Florida, NY

Refractories, gunning

Combustion Controls Solutions Environmental Services, Toledo, OH
Sauereisen, Pittsburgh, PA

Refractory mortars & cements

Advance Boiler & Tank Co., West Allis, WI
Combustion Controls Solutions Environmental Services, Toledo, OH
Sauereisen, Pittsburgh, PA

RUBBER & RUBBERLIKE MATERIALS

Rubber, butyl

Apple Rubber Products, Lancaster, NY



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)

LIST AG, Arisdorf, Switzerland

Rubber, chlorinated polyethylene

Cachat, M. F., Co., Headquarters, Lakewood, OH

Rubber, chlorosulfonated polyethylene

Cachat, M. F., Co., Headquarters, Lakewood, OH

Rubber, ethylene propylene

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
Cachat, M. F., Co., Headquarters, Lakewood, OH
Dow Corning Corporation, Midland, MI

Rubber, neoprene

Apple Rubber Products, Lancaster, NY
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
Cachat, M. F., Co., Headquarters, Lakewood, 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)

Rubber, polybutadiene

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, silicone

Apple Rubber Products, Lancaster, NY
Dow Corning Corporation, Midland, MI
Momentive Performance Materials Inc., Waterford, NY

Rubber, styrene butadiene

Apple Rubber Products, Lancaster, NY
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, synthetic, other

Cachat, M. F., Co., Headquarters, Lakewood, 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)

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)

STAINLESS STEELS

Stainless steels, AISI 200 series

Thompson Dayton Steel Service, Canton, MA

Stainless steels, AISI 300 series

Bestweld Inc., Socket/ButtWelding Fitting Division, Pottstown, PA
Chemie Impex Trading, BRAMPTON, Ontario, Canada
CHRG Metals, Houston, TX
Thompson Dayton Steel Service, Canton, MA

Stainless steels, AISI 400 series

Thompson Dayton Steel Service, Canton, MA

Stainless steels, AISI 500 series

Thompson Dayton Steel Service, Canton, MA

STEELS

Carbon steels

AMERICAN ELEMENTS, 1093 Broxton Avenue, Suite 2000, Los Angeles, California 90024 (310-208-0551; FAX: 310-208-0351; e-mail: customerservice@americanelements.com; web site: www.americanelements.com)
Thompson Dayton Steel Service, Canton, MA

High alloy steels

AMERICAN ELEMENTS, 1093 Broxton Avenue, Suite 2000, Los Angeles, California 90024 (310-208-0551; FAX: 310-208-0351; e-mail: customerservice@americanelements.com; web site: www.americanelements.com)
Thompson Dayton Steel Service, Canton, MA

Low alloy steels

AMERICAN ELEMENTS, 1093 Broxton Avenue, Suite 2000, Los Angeles, California 90024 (310-208-0551; FAX: 310-208-0351; e-mail: customerservice@americanelements.com; web site: www.americanelements.com)
Thompson Dayton Steel Service, Canton, MA

Medium alloy steels

AMERICAN ELEMENTS, 1093 Broxton Avenue, Suite 2000, Los Angeles, California 90024 (310-208-0551; FAX: 310-208-0351; e-mail: customerservice@americanelements.com; web site: www.americanelements.com)
Thompson Dayton Steel Service, Canton, MA

7 PLANT MAINTENANCE

- 153** Cleaning equipment & services
- 154** Equipment repair & rebuilding
- 154** Fire protection equipment
- 154** Maintenance tools & equipment
& replacement parts
- 154** Noise & vibration suppression equipment
- 155** Safety equipment & systems

CLEANING EQUIPMENT & SERVICES

Acid mist/Gas cleaning

Beltran Technologies, Inc., Brooklyn, New York

Cleaners & refacers, tube

Clean Harbors, Norwell, MA
"Florakim Kimya", Istanbul, Turkey

Goodway Technologies Corp., Stamford, CT

Cleaning chemicals & services

Clean Harbors, Norwell, MA
"Florakim Kimya", Istanbul, Turkey
Spartan Chemical Services Inc., Jersey City, NJ
Transene Co. Inc., Danvers, MA

Cleaning equipment, blast

"Florakim Kimya", Istanbul, Turkey
Hammelmann Corp., Dayton, OH

Uraca GmbH & Co. KG, Bad Urach, Germany
Veolia Environmental Services, Chicago, Illinois

Cleaning equipment, chemical

Advance, Plymouth, MN
"Florakim Kimya", Istanbul, Turkey
GEA Process Engineering, Columbia, MD
NexGen Enviro Systems Inc., Lindenhurst, NY
Veolia Environmental Services, Chicago, Illinois

Cleaning equipment, high-pressure liquid

Advance, Plymouth, MN
 "Florakim Kimya", Istanbul, Turkey
 GEA Process Engineering, Columbia, MD
 Goodway Technologies Corp., Stamford, CT
 Hammelmann Corp., Dayton, OH
 Hannay Reels Inc., Westerlo, NY
INOX-TECH INC., 6705 Route 132, Ste. Catherine, Canada J5C1B6 (800-361-0319 North America; 450-638-5441; FAX: 450-638-2865; e-mail: info@inox-tech.com; web site: www.inox-tech.com)

Spraying Systems Co., Wheaton, IL
 Uraca GmbH & Co. KG, Bad Urach, Germany
 Veolia Environmental Services, Chicago, Illinois

Cleaning equipment, mechanical

Advance, Plymouth, MN
 "Florakim Kimya", Istanbul, Turkey
 GEA Process Engineering, Columbia, MD
 Goodway Technologies Corp., Stamford, CT

Cleaning equipment, pharmaceutical

Bioengineering AG, Wald, Switzerland
BIOENGINEERING INC., Two Canal Park, 5th Floor, Cambridge, Massachusetts 02141 (001 781 672 2620; FAX: 001 781 672 2626; e-mail: info@bioengineering-inc.com; web site: www.bioengineering-inc.com/www.bioengineering.ch)

GEA Process Engineering, Columbia, MD
 Pick Heaters Inc., West Bend, WI

Cleaning equipment, steam

Pick Heaters Inc., West Bend, WI
 Topog-E Gasket Co., Tulsa, OK

Cleaning equipment, tank cleaning

BIOENGINEERING INC., Two Canal Park, 5th Floor, Cambridge, Massachusetts 02141 (001 781 672 2620; FAX: 001 781 672 2626; e-mail: info@bioengineering-inc.com; web site: www.bioengineering-inc.com/www.bioengineering.ch)

Hammelmann Corp., Dayton, OH
 Spraying Systems Co., Wheaton, IL
 Uraca GmbH & Co. KG, Bad Urach, Germany
 Veolia Environmental Services, Chicago, Illinois

Cleaning parts & accessories

Hammelmann Corp., Dayton, 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
 Veolia Environmental Services, Chicago, Illinois

Washers

Goodway Technologies Corp., Stamford, CT
 NexGen Enviro Systems Inc., Lindenhurst, NY
 Progressive Recovery Inc., Duplo, IL

EQUIPMENT REPAIR & REBUILDING

Pipeline rehabilitation processes

Team Industrial Services, Inc., Alvin, TX

Pressure vessel repair

Advance Boiler & Tank Co., West Allis, WI
 HydroPro Inc., Engineering & Manufacturing, Bourbon
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

Pump repair

Maag Pump Systems AG, Oberglatt / ZH, Switzerland
 Wall Colmonoy Corporation, Madison Heights, MI

Valve repair

HOERBIGER KOMPRESSORTECHNIK HOLDING GMBH, Donau-City-Str.äue 1, Vienna, Austria A-1220 (+43 1 22 440-0; FAX: +43 1 22 440 990; e-mail: info-hkth@hoerbiger.com; web site: www.hoerbiger.com)

Team Industrial Services, Inc., Alvin, TX
 Wall Colmonoy Corporation, Madison Heights, MI

Weld heat-treating

Wall Colmonoy Corporation, Madison Heights, MI

FIRE PROTECTION EQUIPMENT

Deluge systems

FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)

Fire alarm systems

FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)

HIMA Paul Hildebrandt GmbH + Co KG, Bruehl, Germany
 Omega Engineering Inc., An Omega Group Co., Stamford, CT

Fire detection systems

FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)

Omega Engineering Inc., An Omega Group Co., Stamford, CT

Red Dog Services LLC, Allen, TX
 Sensor Electronics Corp., Minneapolis, MN

Fire extinguishers, portable

Red Dog Services LLC, Allen, TX
 Sensor Electronics Corp., Minneapolis, MN

Fire extinguishing systems, carbon dioxide

FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)

Sensor Electronics Corp., Minneapolis, MN

Fire extinguishing systems, dry chemical

Sensor Electronics Corp., Minneapolis, MN

Fire extinguishing systems, foam

Red Dog Services LLC, Allen, TX
 Sensor Electronics Corp., Minneapolis, MN

Fire extinguishing systems, halogenated hydrocarbon

FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)

Sensor Electronics Corp., Minneapolis, MN

Fire pumps

Schutte & Koerting, Treviso, PA

Hose reels

Hannay Reels Inc., Westerlo, NY

Smoke detection systems

FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)

Spill response kits

Red Dog Services LLC, Allen, TX

Sprinkler systems

FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)

MAINTENANCE TOOLS & EQUIPMENT & REPLACEMENT PARTS

Alloys, brazing

Wall Colmonoy Corporation, Madison Heights, MI

Expanders, tube

HydroPro Inc., Engineering & Manufacturing, Bourbon
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)

Fasteners

Oetiker, Inc., Marlette, MI

Leak sealing service

HydroPro Inc., Engineering & Manufacturing, Bourbon
 Team Industrial Services, Inc., Alvin, TX

Lubricating equipment

Hannay Reels Inc., Westerlo, NY

Machinery-alignment equipment

LUDECA, INC., Doral, FL

Patching compounds

ITW Polymers Adhesives, North America, Danvers, MA

Plant maintenance services

A Box 4 U, Wichita, Kansas
SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 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

Rods, welding

Air Products and Chemicals, Inc., Allentown, PA

Shaft-alignment equipment

LUDECA, INC., Doral, FL

Spray equipment, thermal

Wall Colmonoy Corporation, Madison Heights, MI

Stud tensioners, hydraulic

Team Industrial Services, Inc., Alvin, TX

Testing equipment, corrosion

Iris Inspection Services, Inc., Baytown, Texas

Testing equipment, high pressure

Beamex, Inc., Marietta, GA
TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

Testing equipment, nondestructive

ATS RheoSystems, Cannon Instrument Company, Borden-town, NJ

PRUEFTECHNIK, Ismaning, Germany

Raytek Corp., Santa Cruz, CA

SAT Infrared Technology Co. Ltd, Guangzhou

Tools & equipment, other

A Box 4 U, Wichita, Kansas
 Berndorf Band GmbH, Berndorf, Austria
 HydroPro Inc., Engineering & Manufacturing, Bourbon

Tools, hand

CEJN Industrial Corp., Gurnee, Illinois

Oetiker, Inc., Marlette, MI

Omega Engineering Inc., An Omega Group Co., Stamford, CT

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)

Tools, power

Oetiker, Inc., Marlette, MI

Welding equipment

Arc Machines, Inc., Pacoima, CA

Hannay Reels Inc., Westerlo, NY

Swagelok Co., Solon, OH

NOISE & VIBRATION SUPPRESSION EQUIPMENT

Absorbers, vibration

Bascale Company, Inc., Houston, TX
 Isotech, Inc, Hatfield, PA

Analyzers, vibration

Isotech, Inc, Hatfield, PA

LUDECA, INC., Doral, FL

TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

Insulation, acoustical

Isotech, Inc, Hatfield, PA

Louvers, noise control

McGill AirSilence LLC, Columbus, OH

Noise enclosures & barriers

EDWARDS US HEADQUARTERS, 6416 Inducon Drive West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)
Isotech, Inc., Hatfield, PA
McGill AirSilence LLC, Columbus, OH

Silencers, exhaust

CU Services LLC, Elk Grove Village, IL
EDWARDS US HEADQUARTERS, 6416 Inducon Drive West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)
McGill AirSilence LLC, Columbus, OH

Silencers, inline

CU Services LLC, Elk Grove Village, IL
EDWARDS US HEADQUARTERS, 6416 Inducon Drive West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)
McGill AirSilence LLC, Columbus, OH

Silencers, intake

EDWARDS US HEADQUARTERS, 6416 Inducon Drive West, Sanborn, NY 14132 (1 800 848 9800; FAX: 1 866 484 5218; e-mail: info@edwardsvacuum.com; web site: www.edwardsvacuum.com)
McGill AirSilence LLC, Columbus, OH

Testing instruments, vibration

LUDECA, INC., Doral, FL
PRUEFTECHNIK, Ismaning, Germany
TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

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, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)
Oseco, Broken Arrow, OK
REMBE, INC., 3809 Beam Road Ste K, Charlotte, NC 28217 (704.716.7022; FAX: 704.716.7025; e-mail: info@rembe.us; web site: www.rembe.us)

Arresters, flame, tank vent, inline

FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)
Oseco, Broken Arrow, OK

Arresters, surge

Lightning Eliminators & Consultants, Inc., Boulder, CO

Blowout doors & panels

BS & B Safety Systems, Inc., Tulsa, OK
FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)
Henderson Industrial Specialties, Waterdown, Ontario, Canada
Oseco, Broken Arrow, OK

Climbing safety equipment

Sur-Loc Inc., Fremont, IN

Clothing, chemical resistant

Associated Bag Company, Milwaukee, WI

Containers, safety

Associated Bag Company, Milwaukee, WI
Qosina, Edgewood, NY

Coveralls

Qosina, Edgewood, NY

Emergency shutdown systems

FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)
HIMA Paul Hildebrandt GmbH + Co KG, Bruehl, Germany
Siemens AG, Karlsruhe, Germany

Explosion isolation

FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)
Henderson Industrial Specialties, Waterdown, Ontario, Canada
HIMA Paul Hildebrandt GmbH + Co KG, Bruehl, Germany
Oseco, Broken Arrow, OK
REMBE GMBH, SAFETY+CONTROL, Gallbergweg 21, Brilon, Germany 59929 (49-2961-7405-0; FAX: 49-2961-50-714; e-mail: sales@rembe.de; web site: www.rembe.com)
REMBE, INC., 3809 Beam Road Ste K, Charlotte, NC 28217 (704.716.7022; FAX: 704.716.7025; e-mail: info@rembe.us; web site: www.rembe.us)

Explosion suppression systems

FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)
Henderson Industrial Specialties, Waterdown, Ontario, Canada
REMBE, INC., 3809 Beam Road Ste K, Charlotte, NC 28217 (704.716.7022; FAX: 704.716.7025; e-mail: info@rembe.us; web site: www.rembe.us)

Explosion vents

BS & B Safety Systems, Inc., Tulsa, OK
FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)
Henderson Industrial Specialties, Waterdown, Ontario, Canada
HOERBIGER KOMPRESSORTECHNIK HOLDING GMBH, Donau-City-Strasse 1, Vienna, Austria A-1220 (+43 1 22 440-0; FAX: +43 1 22 440 990; e-mail: info-hkth@hoerbiger.com; web site: www.hoerbiger.com)
Oseco, Broken Arrow, OK
REMBE GMBH, SAFETY+CONTROL, Gallbergweg 21, Brilon, Germany 59929 (49-2961-7405-0; FAX: 49-2961-50-714; e-mail: sales@rembe.de; web site: www.rembe.com)
REMBE, INC., 3809 Beam Road Ste K, Charlotte, NC 28217 (704.716.7022; FAX: 704.716.7025; e-mail: info@rembe.us; web site: www.rembe.us)
Scientific Dust Collectors, Alsip, IL

Explosion Testing



FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)

Face shields

Associated Bag Company, Milwaukee, WI

Glove boxes

HEMCO CORPORATION, 711 South Powell Rd., Independence, MO 64056 (800-779-4362; 816-796-2900; FAX: 816-796-3333; e-mail: info@hemcocorp.com; web site: www.HEMCOcorp.com)
Powder Systems Ltd, Liverpool
PSL USA, Boise, ID

Gloves

Associated Bag Company, Milwaukee, WI
Qosina, Edgewood, NY

Harnesses

Sur-Loc Inc., Fremont, IN

Marking & labeling systems

Associated Bag Company, Milwaukee, WI
K-Sun Corporation, Somerset, WI

Nozzles, fire fog

Spraying Systems Co., Wheaton, IL

Pipe markers

K-Sun Corporation, Somerset, WI

Pressure Relief

BS & B Safety Systems, Inc., Tulsa, OK

Railroad safety devices

Oseco, Broken Arrow, OK

Rupture discs

BS & B Safety Systems, Inc., Tulsa, OK
FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)
Oseco, Broken Arrow, OK
REMBE GMBH, SAFETY+CONTROL, Gallbergweg 21, Brilon, Germany 59929 (49-2961-7405-0; FAX: 49-2961-50-714; e-mail: sales@rembe.de; web site: www.rembe.com)
REMBE, INC., 3809 Beam Road Ste K, Charlotte, NC 28217 (704.716.7022; FAX: 704.716.7025; e-mail: info@rembe.us; web site: www.rembe.us)

Rupture panels

FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)
Oseco, Broken Arrow, OK
REMBE, INC., 3809 Beam Road Ste K, Charlotte, NC 28217 (704.716.7022; FAX: 704.716.7025; e-mail: info@rembe.us; web site: www.rembe.us)

Safety audits

Chilworth Global, Plainsboro, NJ
Dakota Software Corp., Cleveland, OH

Shoes, safety

Winter Walking (a JORDAN DAVID company), Horsham, PA

Showers, emergency

HEMCO CORPORATION, 711 South Powell Rd., Independence, MO 64056 (800-779-4362; 816-796-2900; FAX: 816-796-3333; e-mail: info@hemcocorp.com; web site: www.HEMCOcorp.com)

Static detection & elimination systems

Amstat Industries Inc., Glenview, IL
Newson Gale Ltd, Nottingham

Storage cabinets

HEMCO CORPORATION, 711 South Powell Rd., Independence, MO 64056 (800-779-4362; 816-796-2900; FAX: 816-796-3333; e-mail: info@hemcocorp.com; web site: www.HEMCOcorp.com)

Testing equipment, dust

Chilworth Global, Plainsboro, NJ
FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)

Testing equipment, gases & vapors

AP-Miniplant GmbH & Co. KG, Lindewerra, Germany
Chilworth Global, Plainsboro, NJ
FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)
Omega Engineering Inc., An Omega Group Co., Stamford, CT
RKI Instruments, Inc., Union City, CA

Valve & flange covers

Oseco, Broken Arrow, OK

Testing equipment, emergency valves

Beamex, Inc., Marietta, GA

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DESIGN, ENGINEERING, & CONSTRUCTIONS

157 Engineering services

158 Training

ENGINEERING SERVICES

Arbitration, engineering

Knighthawk Engineering, Houston, TX
TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA

Engineering: blast resistant modules

A Box 4 U, Wichita, Kansas

Consultants, corrosion protection

Applus RTD USA, Houston, TX
Knighthawk Engineering, Houston, TX

Consultants, engineering

A Box 4 U, Wichita, Kansas
Advanced GeoServices Corp., West Chester, PA
Advanced Industrial Technology Corp., Paramus, NJ
Airflow Sciences Corporation, Livonia, MI
AKW Apparate + Verfahren GmbH, Hirschau, Bavaria, Germany

Applus RTD USA, Houston, TX
Bayer Technology Services GmbH, Leverkusen, Germany
CAI Catalysts, Gwynedd Square, PA
Clean Air Engineering, Palatine, IL
Dec Group, Ecublens, Switzerland
Dematic Corp., Grand Rapids, MI
E-Vac Technologies, LLC, McMurray, PA
Gekko Engineering, Carson, CA

Gharpure Associates, Mumbai, Indiana, India
GHARPURE LABORATORIES PVT. LTD., Mumbai, India
HOERBIGER KOMPRESSORTECHNIK HOLDING GMBH, Donau-City-Strasse 1, Vienna, Austria A-1220 (+43 1 22 440-0; FAX: +43 1 22 440 990; e-mail: info-hkth@hoerbiger.com; web site: www.hoerbiger.com)

Knighthawk Engineering, Houston, TX
Lightning Eliminators & Consultants, Inc., Boulder, CO
Mixtech Inc., 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)

OILTECH srl, Milan (MI), Italy
PENTA Engineering, P.A., Charlotte, NC
RAS Process Equipment Inc., Robbinsville, NJ
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
Technip Benelux B.V., Zoetermeer, Netherlands
ThyssenKrupp Uhde GmbH, Dortmund, Germany
TowerScan, Port Huron, MI
TowerScan, Sarnia, Ontario, Canada
Volian Enterprises, Murrysville, PA
Wall Colmonoy Corporation, Madison Heights, MI

Consultants, ISO compliance

TRINITY CONSULTANTS, 12770 Merit Drive, Suite 900, Dallas, TX 75251 (800-229-6655; 972-661-8100; FAX: 972-385-9203; e-mail: ireddon@trinityconsultants.com; web site: www.trinityconsultants.com)

Consultants, materials

Chemir, A Division of Evans Analytical Group, Maryland Heights, MO

HOERBIGER KOMPRESSORTECHNIK HOLDING GMBH, Donau-City-Strasse 1, Vienna, Austria A-1220 (+43 1 22 440-0; FAX: +43 1 22 440 990; e-mail: info-hkth@hoerbiger.com; web site: www.hoerbiger.com)

Knighthawk Engineering, Houston, TX
M+P Labs, Schenectady, NY

Consultants, safety & health

A Box 4 U, Wichita, Kansas
Industrial Training Consultants, Inc., Pelham, AL

Consultants, water treatment

Filtration & Membrane Technology, Inc., Houston, TX
United Manufacturing International 2000, Red Bluff, CA

Contract manufacturing systems

Gharpure Associates, Mumbai, Indiana, India
GHARPURE LABORATORIES PVT. LTD., Mumbai, India

Custom processing

Innovative Processing Solutions, Aurora, IN
Knighthawk Engineering, Houston, TX

Database services

DECHEMA e.V., Frankfurt am Main, Germany
Gharpure Associates, Mumbai, Indiana, India
GHARPURE LABORATORIES PVT. LTD., Mumbai, India

Demolition

Midwest Steel Company Inc, Houston, Texas

Engineering, biochemical & biotech

Bayer Technology Services GmbH, Leverkusen, Germany
Technip Benelux B.V., Zoetermeer, Netherlands
Xiril AG, Hombrechtikon, Switzerland

Engineering: equipment inspection & expediting

AKW Apparate + Verfahren GmbH, Hirschau, Bavaria, Germany
Applus RTD USA, Houston, TX
Bayer Technology Services GmbH, Leverkusen, Germany
Chilworth Global, Plainsboro, NJ
FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)
Knighthawk Engineering, Houston, TX

Engineering: clean rooms

Bayer Technology Services GmbH, Leverkusen, Germany

Engineering: construction & field erection

De Dietrich Process Systems GmbH, Mainz, Germany
Martin Engineering, Neponset, IL
NEUHAUS NEOTECH Maschinen- und Anlagenbau GmbH, Germany
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)

Technip Benelux B.V., Zoetermeer, Netherlands
ThyssenKrupp Uhde GmbH, Dortmund, Germany
Total Energy, North Salem, NY

Engineering: cryogenic equipment

NEUHAUS NEOTECH Maschinen- und Anlagenbau GmbH, Germany
Technip Benelux B.V., Zoetermeer, Netherlands

Engineering: facilities planning

A Box 4 U, Wichita, Kansas
Applus RTD USA, Houston, TX
Gekko Engineering, Carson, CA
Lyntek, Inc., Lakewood, CO
PENTA Engineering, P.A., Charlotte, NC
ThyssenKrupp Uhde GmbH, Dortmund, Germany

Engineering: instrumentation & control systems

AP-Miniplant GmbH & Co. KG, Lindewerra, Germany
Dresser-Rand, Corporate Headquarters, Houston, TX
Eastern Instruments, Wilmington, NC
Electronic Development Labs, Danville, VA
HOERBIGER KOMPRESSORTECHNIK HOLDING GMBH, Donau-City-Strasse 1, Vienna, Austria A-1220 (+43 1 22 440-0; FAX: +43 1 22 440 990; e-mail: info-hkth@hoerbiger.com; web site: www.hoerbiger.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)

Industrial Automation Technology, Inc., Vernon, British Columbia, Canada
Lectrus, Chattanooga, TN
Lyntek, Inc., Lakewood, CO

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)

Norman N. Axelrod Associates, Optical/Laser Imaging: Instrumentation & Control Div., New York, NY
Pedro Panzardi & Associates, CAGUAS, PR
PENTA Engineering, P.A., Charlotte, NC
Rockwell Automation, Inc., Milwaukee, WI
Siemens AG, Karlsruhe, Germany
testUSA, Plainview, NY
Zeton Inc., Burlington, Ontario, Canada

Engineering: modular process systems

AKW Apparate + Verfahren GmbH, Hirschau, Bavaria, Germany
AP-Miniplant GmbH & Co. KG, Lindewerra, Germany
Bayer Technology Services GmbH, Leverkusen, Germany
Gekko Engineering, Carson, CA
Innovative Processing Solutions, Aurora, IN
INOX-TECH INC., 6705 Route 132, Ste. Catherine, Canada J5C1B6 (800-361-0319 North America; 450-638-5441; FAX: 450-638-2865; e-mail: info@inox-tech.com; web site: www.inox-tech.com)
Lyntek, Inc., Lakewood, CO

OILTECH srl, Milan (MI), Italy
Pope Scientific, Inc., Saukville, WI
SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

Technip Benelux B.V., Zoetermeer, Netherlands
Zeton Inc., Burlington, Ontario, Canada

Engineering: packaged pilot plants

Bayer Technology Services GmbH, Leverkusen, Germany
Biazzi SA, Chailly/Montreux, Switzerland
ChemengCo (Pty) Ltd., Grahamstown, Rep. of South Africa
Lyntek, Inc., Lakewood, CO
Pope Scientific, Inc., Saukville, WI
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)
SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

Technip Benelux B.V., Zoetermeer, Netherlands
Zeton Inc., Burlington, Ontario, Canada

Engineering: pilot plants

AP-Miniplant GmbH & Co. KG, Lindewerra, Germany
ChemengCo (Pty) Ltd., Grahamstown, Rep. of South Africa
Mixtech Inc., Dayton, OH
Pope Scientific, Inc., Saukville, WI
SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)
Zeton Inc., Burlington, Ontario, Canada

Engineering: plant design

A Box 4 U, Wichita, Kansas
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, Germany
Alexanderwerk AG, Remscheid, Germany
Bayer Technology Services GmbH, Leverkusen, Germany
Biazzi SA, Chailly/Montreux, Switzerland
Buss-SMS-Canzler GmbH, Butzbach, Germany
Chematur Ecoplaning OY, Pori, Finland
ChemengCo (Pty) Ltd., Grahamstown, Rep. of South Africa
Coperion GmbH, Weingarten, Wuertt., Germany
Dec Group, Ecublens, Switzerland
De Dietrich Process Systems GmbH, Mainz, Germany
Gekko Engineering, Carson, CA
Gharpure Associates, Mumbai, Indiana, India
GHARPURE LABORATORIES PVT. LTD., Mumbai, India
GIG Karasek GmbH, Gloggnitz-Stuppach, Austria
Innovative Processing Solutions, Aurora, IN
Knighthawk Engineering, Houston, TX
Lyntek, Inc., Lakewood, CO
OILTECH srl, Milan (MI), Italy
PENTA Engineering, P.A., Charlotte, NC
Technip Benelux B.V., Zoetermeer, Netherlands
ThyssenKrupp Uhde GmbH, Dortmund, Germany

Total Energy, North Salem, NY

Engineering: plant modernization

A Box 4 U, Wichita, Kansas
Gekko Engineering, Carson, CA
Gharpure Associates, Mumbai, Indiana, India
GHARPURE LABORATORIES PVT. LTD., Mumbai, India
Lyntek, Inc., Lakewood, CO
Mixtech Inc., Dayton, OH
PENTA Engineering, P.A., Charlotte, NC
Technip Benelux B.V., Zoetermeer, Netherlands
ThyssenKrupp Uhde GmbH, Dortmund, Germany
Total Energy, North Salem, NY

Engineering: pollution & environmental services

ADI Systems Inc., Fredericton, New Brunswick, Canada
ADI Systems Inc., Wolfeboro, NH
Advanced GeoServices Corp., West Chester, PA
Advanced Industrial Technology Corp., Paramus, NJ
Advanced Cyclone Systems, S. A., Porto, Portugal
Air Products and Chemicals, Inc., Allentown, PA
Airflow Sciences Corporation, Livonia, MI
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)
Clean Air Engineering, Palatine, IL
Combustion Controls Solutions Environmental Services, Toledo, OH
Durr Systems, Inc., Clean Technology Systems, Plymouth, MI
Environmental C&C, St. Charles, IL

Epcor Industrial Systems, LP, The Woodlands, 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)

Met-Pro Environmental Air Solutions, Owosso, MI
 Pedro Panzardi & Associates, CAGUAS, PR
 Team Industrial Services, Inc., Alvin, TX
 Technip Benelux B.V., Zoetermeer, Netherlands
 TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA

TRINITY CONSULTANTS, 12770 Merit Drive, Suite 900, Dallas, TX 75251 (800-229-6655; 972-661-8100; FAX: 972-385-9203; e-mail: tredmon@trinityconsultants.com; web site: www.trinityconsultants.com)

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)

Advanced Industrial Technology Corp., Paramus, NJ
 AKW Apparate + Verfahren GmbH, Hirschau, Bavaria, Germany
 Bascale Company, Inc., Houston, TX
 BASF Corporation, Catalysts & Adsorbents, Iselin, NJ
 Bayer Technology Services GmbH, Leverkusen, Germany
 Biazzi SA, Chailly/Montreux, Switzerland
 Buss-SMS-Canzler GmbH, Butzbach, Germany
 CAI Catalysts, Gwynedd Square, PA
 ChemengCo (Pty) Ltd., Grahamstown, Rep. of South Africa
 De Dietrich Process Systems GmbH, Mainz, Germany
 Denver Mineral Engineers, Inc., Littleton, CO
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)

GEA Process Engineering, Columbia, MD
 Gekko Engineering, Carson, CA
 Gharpure Associates, Mumbai, Indiana, India
 GHARPURE LABORATORIES PVT. LTD., Mumbai, India
 GiG Karasek GmbH, Gloggnitz-Stuppach, Austria
 Innovative Processing Solutions, Aurora, IN
 KIRK Process Solutions Ltd, Walton-on-Thames
 Knighthawk Engineering, Houston, TX
 Lyntek, Inc., Lakewood, CO
 Mixtech Inc., 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)

OILTECH srl, Milan (MI), Italy
 Pedro Panzardi & Associates, CAGUAS, PR
 PENTA Engineering, P.A., Charlotte, NC
 Rhine Ruhr Pty. Ltd., Sunshine West., Australia
SULZER CHEMTECH LTD, Sulzer Allee 48, P.O. Box 65, Winterthur, Switzerland 8404 (+41 52 262 11 22; FAX: +41 52 262 00 60; e-mail: chemtech@sulzer.com; web site: www.sulzer.com)

Technip Benelux B.V., Zoetermeer, Netherlands
 ThyssenKrupp Uhde GmbH, Dortmund, Germany
 TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA

Engineering: process modeling

Airflow Sciences Corporation, Livonia, MI
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)

Gekko Engineering, Carson, CA
 Heat Transfer Research, Inc. (HTRI), College Station, TX
 Knighthawk Engineering, Houston, TX
 OILTECH srl, Milan (MI), Italy
 Technip Benelux B.V., Zoetermeer, Netherlands

Engineering: procurement

Gekko Engineering, Carson, CA
 Lyntek, Inc., Lakewood, CO
 Mixtech Inc., Dayton, OH
 PENTA Engineering, P.A., Charlotte, NC
 Technip Benelux B.V., Zoetermeer, Netherlands
 ThyssenKrupp Uhde GmbH, Dortmund, Germany

Engineering: project management

Bayer Technology Services GmbH, Leverkusen, Germany
 Combustion Controls Solutions Environmental Services, Toledo, OH
 Coperion GmbH, Weingarten, Wuertt., Germany
 GEA Process Engineering, Columbia, MD
 Gekko Engineering, Carson, CA
 Gharpure Associates, Mumbai, Indiana, India
 GHARPURE LABORATORIES PVT. LTD., Mumbai, India
 Innovative Processing Solutions, Aurora, IN
INOX-TECH INC., 6705 Route 132, Ste. Catherine, Canada J5C1B6 (800-361-0319 North America; 450-638-5441; FAX: 450-638-2865; e-mail: info@inox-tech.com; web site: www.inox-tech.com)

Pedro Panzardi & Associates, CAGUAS, PR
 PENTA Engineering, P.A., Charlotte, NC
 Technip Benelux B.V., Zoetermeer, Netherlands

ThyssenKrupp Uhde GmbH, Dortmund, Germany

Engineering: research

CAI Catalysts, Gwynedd Square, PA
 DECHEMA e.V., Frankfurt am Main, Germany
 Heat Transfer Research, Inc. (HTRI), College Station, TX
 Norman N. Axelrod Associates, Optical/Laser /Imaging: Instrumentation & Control Div., New York, NY
 TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA
 Xiril AG, Hombrechtikon, Switzerland

Equipment testing

Airflow Sciences Corporation, Livonia, MI
 Chilworth Global, Plainsboro, NJ
 Combustion Controls Solutions Environmental Services, Toledo, OH
 Heat Transfer Research, Inc. (HTRI), College Station, TX
 Knighthawk Engineering, Houston, TX
 Newson Gale Ltd, Nottingham
 Omega Engineering Inc., An Omega Group Co., Stamford, CT
 TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA

Equipment, used: procurement & supply

Combustion Controls Solutions Environmental Services, Toledo, OH
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
 Total Energy, North Salem, NY
 Valuation and Assets Services, Frederick, MD

Inspection

Applus RTD USA, Houston, TX

ISO certification

Dalau Inc, Merrimack, NH
 Gharpure Associates, Mumbai, Indiana, India
 GHARPURE LABORATORIES PVT. LTD., Mumbai, India
 Lloyd's Register Quality Assurance Ltd., Houston, TX
 Pedro Panzardi & Associates, CAGUAS, PR

Pilot plant services

AP-Miniplant GmbH & Co. KG, Lindewerra, Germany
 Buss-SMS-Canzler GmbH, Butzbach, Germany
 GEA Process Engineering, Columbia, MD
 GiG Karasek GmbH, Gloggnitz-Stuppach, Austria
 Pope Scientific, Inc., Saukville, WI
 Proceodyne Corp., New Brunswick, NJ
 Zeton Inc., Burlington, Ontario, Canada

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)

Gharpure Associates, Mumbai, Indiana, India
 GHARPURE LABORATORIES PVT. LTD., Mumbai, India
 Technip Benelux B.V., Zoetermeer, Netherlands
 Total Energy, North Salem, NY
 Valuation and Assets Services, Frederick, MD

Plant documentation services

Industrial Training Consultants, Inc., Pelham, AL
 PENTA Engineering, P.A., Charlotte, NC
 Valuation and Assets Services, Frederick, MD

Plant relocation

A Box 4 U, Wichita, Kansas
 Technip Benelux B.V., Zoetermeer, Netherlands
 ThyssenKrupp Uhde GmbH, Dortmund, Germany

Process safety management services

Chilworth Global, Plainsboro, NJ
 HIMA Paul Hildebrandt GmbH + Co KG, Bruehl, Germany
 Industrial Training Consultants, Inc., Pelham, AL
 OILTECH srl, Milan (MI), Italy
 Pedro Panzardi & Associates, CAGUAS, PR
 PENTA Engineering, P.A., Charlotte, NC
 Technip Benelux B.V., Zoetermeer, Netherlands
TRINITY CONSULTANTS, 12770 Merit Drive, Suite 900, Dallas, TX 75251 (800-229-6655; 972-661-8100; FAX: 972-385-9203; e-mail: tredmon@trinityconsultants.com; web site: www.trinityconsultants.com)

Risk analysis

Bayer Technology Services GmbH, Leverkusen, Germany
 Chilworth Global, Plainsboro, NJ

OILTECH srl, Milan (MI), Italy

TRINITY CONSULTANTS, 12770 Merit Drive, Suite 900, Dallas, TX 75251 (800-229-6655; 972-661-8100; FAX: 972-385-9203; e-mail: tredmon@trinityconsultants.com; web site: www.trinityconsultants.com)

Valuation and Assets Services, Frederick, MD

Technology licensing

Gharpure Associates, Mumbai, Indiana, India
 GHARPURE LABORATORIES PVT. LTD., Mumbai, India
 Interdevelopment, Inc., Arlington, VA
 ThyssenKrupp Uhde GmbH, Dortmund, Germany

TRAINING

Information Services

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)

Publishing

BIC Alliance, Kemah, TX

Training personnel, maintenance

ATS RheoSystems, Cannon Instrument Company, Borden-town, NJ

Berndorf Band GmbH, Berndorf, Austria

BS & B Safety Systems, Inc., Tulsa, OK

Buss ChemTech AG, Pratteln, Switzerland

Dresser-Rand, Corporate Headquarters, Houston, TX

HOERBIGER COMPRESSORTECHNIK HOLDING

GMBH, Donau-City-Str./ue 1, Vienna, Austria

A-1220 (+43 1 22 440-0; FAX: +43 1 22 440 990;

e-mail: info-hkth@hoerbiger.com; web site: www.

hoerbiger.com)

Industrial Training Consultants, Inc., Pelham, AL

Lloyd's Register Quality Assurance Ltd., Houston, TX

Martin Engineering, Neponset, IL

Wall Colmonoy Corporation, Madison Heights, MI

Training personnel, pollution

control

ADWEST TECHNOLOGIES, INC, VOC Control Division,

Wellsville, NY

Industrial Training Consultants, Inc., Pelham, AL

Met-Pro Environmental Air Solutions, Owosso, MI

Pedro Panzardi & Associates, CAGUAS, PR

TMTS Associates, Inc., Combustion/Air Pollution Control,

Atlanta, GA

Training personnel, safety & health

control

Chilworth Global, Plainsboro, NJ

HIMA Paul Hildebrandt GmbH + Co KG, Bruehl, Germany

Industrial Training Consultants, Inc., Pelham, AL

Martin Engineering, Neponset, IL

TRINITY CONSULTANTS, 12770 Merit Drive, Suite 900,

Dallas, TX 75251 (800-229-6655; 972-661-8100; FAX:

972-385-9203; e-mail: tredmon@trinityconsultants.

com; web site: www.trinityconsultants.com)

Training systems, plant operators

Buss ChemTech AG, Pratteln, Switzerland

Industrial Training Consultants, Inc., Pelham, AL

LUDECA, INC., Doral, FL

OILTECH srl, Milan (MI), Italy

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INFORMATION TECHNOLOGIES

- 160** Computer hardware
- 160** Computer software
- 161** Computers for design & engineering

PRODUCT DIRECTORY

COMPUTER HARDWARE

Computers, monitors & displays

Intergraph European Headquarters, Hoofddorp, Netherlands
PRUEFTECHNIK, Ismaning, Germany

Computers, personal

Intergraph European Headquarters, Hoofddorp, Netherlands

Computers, printers & plotters

Industrial Automation Technology, Inc., Vernon, British Columbia, Canada
Intergraph European Headquarters, Hoofddorp, Netherlands
Omega Engineering Inc., An Omega Group Co., Stamford, CT

Input & output equipment, data processing

Acromag, Inc., Wixom, MI
Industrial Automation Technology, Inc., Vernon, British Columbia, Canada
Norman N. Axelrod Associates, Optical/Laser /Imaging: Instrumentation & Control Div., New York, NY
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Sierra Monitor Corp., Milpitas, CA

Manufacturing execution systems

Werum Software & Systems AG, Lueneburg, Germany

Simulators

Omega Engineering Inc., An Omega Group Co., Stamford, CT

COMPUTER SOFTWARE

Advanced process control

CAMO Software, Oslo, Norway
GEA Process Engineering, Columbia, MD
Siemens AG, Karlsruhe, Germany
Ultramax Corporation, Cincinnati, OH

Alarm Management

FIKE, 704 S. 10th St., Blue Springs, MO 64015 (1-866-758-6004; 816-229-3405; FAX: 816-229-4615; e-mail: fmpsales@fike.com; web site: www.fike.com)

Siemens AG, Karlsruhe, Germany

Asset management

AVEVA Inc, Houston, TX
MicroWest Software Systems Inc., San Diego, CA
Siemens AG, Karlsruhe, Germany
Ultramax Corporation, Cincinnati, OH

Bar coding

Dematic Corp., Grand Rapids, MI
Isotech, Inc, Hatfield, PA
K-Sun Corporation, Somerset, WI
MicroWest Software Systems Inc., San Diego, CA
ProcessPro Software, St. Cloud, MN

Batch control

CAMO Software, Oslo, Norway
ProcessPro Software, St. Cloud, MN
Siemens AG, Karlsruhe, Germany
Werum Software & Systems AG, Lueneburg, Germany
Werum Software & Systems America, Inc., Parsippany, NJ

Calibration management

Beamex, Inc., Marietta, GA
Intergraph Corporation Corporate Headquarters, Madison, AL
MicroWest Software Systems Inc., San Diego, CA
Quality America, Inc., Tucson, AZ

Chemical equipment design

Heat Transfer Research, Inc. (HTRI), College Station, TX
Intergraph Corporation Corporate Headquarters, Madison, AL
Intergraph European Headquarters, Hoofddorp, Netherlands
Technical Database Services, Inc. (TDS), New York, NY

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; web site: www.abzinc.com)
Intergraph Corporation, Houston, Texas
Intergraph Corporation Corporate Headquarters, Madison, AL
Intergraph European Headquarters, Hoofddorp, Netherlands
Technical Database Services, Inc. (TDS), New York, NY

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; web site: www.abzinc.com)

Intergraph Corporation Corporate Headquarters, Madison, AL
Intergraph European Headquarters, Hoofddorp, Netherlands
Siemens, Industry USA, Solutions, Automation and Drives Technologies, Alpharetta, GA
Tahoe Design Software, Nevada City, CA
Technical Database Services, Inc. (TDS), New York, NY

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; web site: www.abzinc.com)

Adaptive Research, Honolulu, HI
Airflow Sciences Corporation, Livonia, MI
Tahoe Design Software, Nevada City, CA
Technip Benelux B.V., Zoetermeer, Netherlands

Data acquisition & process control

Acromag, Inc., Wixom, MI
Airflow Sciences Corporation, Livonia, MI
Auburn Systems, LLC, Danvers, MA
Campbell Scientific Inc., Logan, UT
Industrial Automation Technology, Inc., Vernon, British Columbia, Canada
Intergraph Corporation Corporate Headquarters, Madison, AL
Norman N. Axelrod Associates, Optical/Laser /Imaging: Instrumentation & Control Div., New York, NY
Omega Engineering Inc., An Omega Group Co., Stamford, CT
Quality America, Inc., Tucson, AZ
Rockwell Software Brand, Rockwell Automation, Inc., Milwaukee, WI
Siemens, Industry USA, Solutions, Automation and Drives Technologies, Alpharetta, GA
Sierra Monitor Corp., Milpitas, CA
StatPoint Technologies Inc., Warrenton, VA
Technical Database Services, Inc. (TDS), New York, NY
VEGA Grieshaber KG, Schiltach, Germany
VEGA Americas, Inc., Cincinnati, OH
Werum Software & Systems AG, Lueneburg, Germany
Werum Software & Systems America, Inc., Parsippany, NJ

Data visualization

Intergraph Corporation, Houston, Texas
StatPoint Technologies Inc., Warrenton, VA
VEGA Grieshaber KG, Schiltach, Germany
VEGA Americas, Inc., Cincinnati, OH

Design of experiments

CAMO Software, Oslo, Norway
StatPoint Technologies Inc., Warrenton, VA
Ultramax Corporation, Cincinnati, OH

Enterprise resource planning

AVEVA Inc, Houston, TX
ProcessPro Software, St. Cloud, MN

Environmental-compliance reporting

Auburn Systems, LLC, Danvers, MA
Dakota Software Corp., Cleveland, OH
Technical Database Services, Inc. (TDS), New York, NY

Environmental, health & safety

Dakota Software Corp., Cleveland, OH
K-Sun Corporation, Somerset, WI
Technical Database Services, Inc. (TDS), New York, NY

Failure analysis

Chemir, A Division of Evans Analytical Group, Maryland Heights, MO

Hazardous-waste management

Clean Harbors, Norwell, MA
Dakota Software Corp., Cleveland, OH
Technical Database Services, Inc. (TDS), New York, NY

Heat-exchange modeling

Airflow Sciences Corporation, Livonia, MI
Heat Transfer Research, Inc. (HTRI), College Station, TX

Information Technologies

Information management

Accelerated Technology Laboratories, Inc., West End, NC
AVEVA Inc, Houston, TX
Intergraph Corporation, Houston, Texas
Intergraph Corporation Corporate Headquarters, Madison, AL
StatPoint Technologies Inc., Warrenton, VA
Technical Database Services, Inc. (TDS), New York, NY

ISO compliance

Accelerated Technology Laboratories, Inc., West End, NC
Beamex, Inc., Marietta, GA
Dakota Software Corp., Cleveland, OH
Quality America, Inc., Tucson, AZ
StatPoint Technologies Inc., Warrenton, VA

Laboratory information management

Accelerated Technology Laboratories, Inc., West End, NC

Maintenance management

AVEVA Inc, Houston, TX
Beamex, Inc., Marietta, GA
Intergraph Corporation Corporate Headquarters, Madison, AL
Intergraph European Headquarters, Hoofddorp, Netherlands
MicroWest Software Systems Inc., San Diego, CA

Manufacturing execution systems

Siemens, Industry USA, Solutions, Automation and Drives Technologies, Alpharetta, GA
Werum Software & Systems AG, Lueneburg, Germany
Werum Software & Systems America, Inc., Parsippany, NJ

Material Safety Data Sheet (MSDS) management

K-Sun Corporation, Somerset, WI
ProcessPro Software, St. Cloud, MN

Materials management

AVEVA Inc, Houston, TX
Intergraph Corporation, Houston, Texas
Intergraph Corporation Corporate Headquarters, Madison, AL
MicroWest Software Systems Inc., San Diego, CA
ProcessPro Software, St. Cloud, MN
Siemens, Industry USA, Solutions, Automation and Drives Technologies, Alpharetta, GA

Mathematics & statistics

CAMO Software, Oslo, Norway
Quality America, Inc., Tucson, AZ
StataCorp LP, College Station, TX
StatPoint Technologies Inc., Warrenton, VA

Physical properties

Technical Database Services, Inc. (TDS), New York, NY

Plant optimization

AVEVA Inc, Houston, TX
Dematic Corp., Grand Rapids, MI
MicroWest Software Systems Inc., San Diego, CA
Siemens AG, Karlsruhe, Germany
Technip Benelux B.V., Zoetermeer, Netherlands
TowerScan, Sarnia, Ontario, Canada
TowerScan, Port Huron, MI

Process control

CAMO Software, Oslo, Norway
Combustion Controls Solutions Environmental Services, Toledo, OH
FOSS NIRSystems, Inc., Laurel, MD
Industrial Automation Technology, Inc., Vernon, British Columbia, Canada

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)

Norman N. Axelrod Associates, Optical/Laser /Imaging: Instrumentation & Control Div., New York, NY
ProcessPro Software, St. Cloud, MN
Quality America, Inc., Tucson, AZ
Rockwell Automation, Inc., Milwaukee, WI
Rockwell Software Brand, Rockwell Automation, Inc., Milwaukee, WI
Schenck Process GmbH, Darmstadt, Germany
Siemens AG, Karlsruhe, Germany
StatPoint Technologies Inc., Warrenton, VA
Werum Software & Systems AG, Lueneburg, Germany
Werum Software & Systems America, Inc., Parsippany, NJ

Process optimization

Adaptive Resources, Carnegie, PA
CAMO Software, Oslo, Norway
OILTECH srl, Milan (MI), Italy
Quality America, Inc., Tucson, AZ
Siemens AG, Karlsruhe, Germany
StatPoint Technologies Inc., Warrenton, VA

PRODUCT DIRECTORY

Information Technologies

TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

TowerScan, Sarnia, Ontario, Canada
TowerScan, Port Huron, MI
Ultramax Corporation, Cincinnati, OH
Werum Software & Systems AG, Lueneburg, Germany
Werum Software & Systems America, Inc., Parsippany, NJ

Process safety management

AVEVA Inc, Houston, TX
Siemens AG, Karlsruhe, Germany

Process simulation

Airflow Sciences Corporation, Livonia, MI
Heat Transfer Research, Inc. (HTRI), College Station, TX
Tahoe Design Software, Nevada City, CA
Technip Benelux B.V., Zoetermeer, Netherlands
WinSim Inc., Richmond, TX

Production scheduling

Werum Software & Systems AG, Lueneburg, Germany
Werum Software & Systems America, Inc., Parsippany, NJ

Project management

AVEVA Inc, Houston, TX
MicroWest Software Systems Inc., San Diego, CA

Quality assurance or control

Beamex, Inc., Marietta, GA
CAMO Software, Oslo, Norway
FOSS NIRSystems, Inc., Laurel, MD
Norman N. Axelrod Associates, Optical/Laser /Imaging: Instrumentation & Control Div., New York, NY
ProcessPro Software, St. Cloud, MN
Quality America, Inc., Tucson, AZ
StatPoint Technologies Inc., Warrenton, VA
Ultramax Corporation, Cincinnati, OH
Werum Software & Systems AG, Lueneburg, Germany
Werum Software & Systems America, Inc., Parsippany, NJ

Regulatory compliance

Beamex, Inc., Marietta, GA
Dakota Software Corp., Cleveland, OH
Industrial Automation Technology, Inc., Vernon, British Columbia, Canada
Intergraph Corporation Corporate Headquarters, Madison, AL
K-Sun Corporation, Somerset, WI
MicroWest Software Systems Inc., San Diego, CA
ProcessPro Software, St. Cloud, MN
TRINITY CONSULTANTS, 12770 Merit 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)
Ultramax Corporation, Cincinnati, OH
Werum Software & Systems AG, Lueneburg, Germany
Werum Software & Systems America, Inc., Parsippany, NJ

Software development

AVEVA Inc, Houston, TX
Heat Transfer Research, Inc. (HTRI), College Station, TX
Intergraph Corporation, Houston, Texas
MicroWest Software Systems Inc., San Diego, CA
ProcessPro Software, St. Cloud, MN
Rockwell Software Brand, Rockwell Automation, Inc., Milwaukee, WI
StataCorp LP, College Station, TX
Tahoe Design Software, Nevada City, CA
Technical Database Services, Inc. (TDS), New York, NY
Volian Enterprises, Murrysville, PA
Werum Software & Systems AG, Lueneburg, Germany
Werum Software & Systems America, Inc., Parsippany, NJ

Software, other

Dakota Software Corp., Cleveland, OH
Intergraph Corporation Corporate Headquarters, Madison, AL
Intergraph European Headquarters, Hoofddorp, Netherlands
K-Sun Corporation, Somerset, WI
MicroWest Software Systems Inc., San Diego, CA
PRUEFTECHNIK, Ismaning, Germany
Sopheon, Minneapolis, MN
StataCorp LP, College Station, TX
StatPoint Technologies Inc., Warrenton, VA

TLV CORPORATION, 13901 S. Lakes Dr., Charlotte, NC 28273 (800-858-8727; 704-597-9070; FAX: 704-583-1610; web site: www.tlv.com)

Werum Software & Systems America, Inc., Parsippany, NJ

Supply chain management

Dematic Corp., Grand Rapids, MI
Intergraph Corporation, Houston, Texas
Intergraph Corporation Corporate Headquarters, Madison, AL

COMPUTERS FOR DESIGN & ENGINEERING

Computer aided design & drafting systems

Advanced GeoServices Corp., West Chester, PA
AVEVA Inc, Houston, TX
Intergraph Corporation Corporate Headquarters, Madison, AL

Intergraph European Headquarters, Hoofddorp, Netherlands
kubit USA, Houston, Texas
Pedro Panzardi & Associates, CAGUAS, PR

Process simulation systems

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)
OILTECH srl, Milan (MI), Italy

1 in 14 Americans will be diagnosed with lung cancer, and 60% will be never or former smokers.



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E-COMMERCE

E-COMMERCE

E-Procurement

ProcessPro Software, St. Cloud, MN

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ENVIRONMENTAL SERVICES

163 Air pollution control equipment & systems

164 Environmental services

165 Waste handling equipment & systems

165 Water pollution control equipment & systems

AIR POLLUTION CONTROL EQUIPMENT & SYSTEMS

Adsorption systems, carbon

Advanced Air Technologies, Inc., Corunna, MI
Branch Environmental Corp., Somerville, NJ
Durr Systems, Inc., Clean Technology Systems, Plymouth, MI
Environmental C&C, St. Charles, IL
MAST Carbon International Ltd, Guildford
TIGG Corporation, Oakdale, PA
United Manufacturing International 2000, Red Bluff, CA

Adsorption systems, other

Durr Systems, Inc., Clean Technology Systems, Plymouth, MI
Munters Corporation, Zeol, Amesbury, MA
TIGG Corporation, Oakdale, PA

Afterburners

ADWEST TECHNOLOGIES, INC, VOC Control Division, Wellsville, NY
Anguil Environmental Systems, Inc., Milwaukee, WI

Combustion Controls Solutions Environmental Services, Toledo, OH
Process Combustion Corp., Pittsburgh, PA
TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA

Air pollution abatement systems

Advanced Industrial Technology Corp., Paramus, NJ
ADWEST TECHNOLOGIES, INC, VOC Control Division, Wellsville, NY
Air Products and Chemicals, Inc., Allentown, PA
Ambient Engineering Inc., Rocky Hill, NJ
Anguil Environmental Systems, Inc., Milwaukee, WI
BASF Corporation, Catalysts & Adsorbents, Iselin, NJ
Beltran Technologies, Inc, Brooklyn, New York
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)
Combustion Controls Solutions Environmental Services, Toledo, OH
Durr Systems, Inc., Clean Technology Systems, Plymouth, MI
Environmental C&C, St. Charles, IL
Epcor Industrial Systems, LP, The Woodlands, TX

GEA WIEGAND GMBH, Am Hardtwald 1, Ettlingen, Germany 76275 (49-7243-7050; FAX: 49-7243-705330; e-mail: gea-wiegand.info@gea.com; web site: www.gea-wiegand.com)

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
Met-Pro Environmental Air Solutions, Owosso, MI
Munters Corporation, Air Treatment, Amesbury, MA
Munters Corporation, Zeol, Amesbury, MA
Nederman USA, Westland, MI
Newman Regency Group, Stafford, TX

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)

Process Combustion Corp., Pittsburgh, PA
Strobic Air Corporation, a subsidiary of Met-Pro Corp., Harleysville, PA
TIGG Corporation, Oakdale, PA

Carbon dioxide recovery plants

Advanced Heat Recovery, Inc., Division of AQUA Innovations, Inc., Baltimore, MD

Chimneys, stacks & vents

FABRICATED PLASTICS LIMITED, 2175 TESTON ROAD, MAPLE, Canada L6A 1T3 (905-832-8161; FAX: 905-832-2111; e-mail: info@fabricatedplastics.com; web site: www.fabricatedplastics.com)

McGill AirFlow LLC, Groveport, OH

Combustors, catalytic

ADWEST TECHNOLOGIES, INC., VOC Control Division, Wellsville, NY

Combustion Controls Solutions Environmental Services, Toledo, OH

Hypercat Advanced Catalyst Products, West Chester, PA
TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA

Combustors, other

ADWEST TECHNOLOGIES, INC., VOC Control Division, Wellsville, NY

TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA

Deodorizers

Epcon Industrial Systems, LP, The Woodlands, TX

Flares, stack & accessories

Met-Pro Environmental Air Solutions, Owosso, MI
Process Combustion Corp., Pittsburgh, PA

Hydrogen sulfide removal systems

ADI Systems Inc., Fredericton, New Brunswick, Canada
McGill AirClean LLC, Columbus, OH
Met-Pro Environmental Air Solutions, Owosso, MI
sera ProDos GmbH, Immenhausen, Germany

NOx control systems

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)

Branch Environmental Corp., Somerville, NJ

Durr Systems, Inc., Clean Technology Systems, Plymouth, MI

Hypercat Advanced Catalyst Products, West Chester, PA
McGill AirClean LLC, Columbus, OH
M&C TechGroup, Ventura, CA

Met-Pro Environmental Air Solutions, Owosso, 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)

Spraying Systems Co., Wheaton, IL

TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA

Ultramax Corporation, Cincinnati, OH

Odor-control systems

ADI Systems Inc., Wolfeboro, NH

Advanced Industrial Technology Corp., Paramus, NJ

Advanced Air Technologies, Inc., Corunna, MI

ADWEST TECHNOLOGIES, INC., VOC Control Division, Wellsville, NY

Ambient Engineering Inc., Rocky Hill, NJ

Combustion Controls Solutions Environmental Services, Toledo, OH

Durr Systems, Inc., Clean Technology Systems, Plymouth, MI

Environmental C&C, St. Charles, IL

FABRICATED PLASTICS LIMITED, 2175 TESTON ROAD, MAPLE, Canada L6A 1T3 (905-832-8161; FAX: 905-832-2111; e-mail: info@fabricatedplastics.com; web site: www.fabricatedplastics.com)

Hypercat Advanced Catalyst Products, West Chester, PA
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)

Met-Pro Environmental Air Solutions, Owosso, MI
Process Combustion Corp., Pittsburgh, PA
TIGG Corporation, Oakdale, PA

Particulate removal systems

Advanced Cyclone Systems, S. A., Porto, Portugal

Beltran Technologies, Inc, Brooklyn, New York

Hypercat Advanced Catalyst Products, West Chester, PA
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)

McGill AirClean LLC, Columbus, OH

Met-Pro Environmental Air Solutions, Owosso, 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)

Vapor recovery systems

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)

Durr Systems, Inc., Clean Technology Systems, Plymouth, MI

Environmental C&C, St. Charles, IL

Nash, a Gardner Denver Product, Bentleyville, PA

ENVIRONMENTAL SERVICES

Air pollution control

Advanced Cyclone Systems, S. A., Porto, Portugal
ADWEST TECHNOLOGIES, INC., VOC Control Division, Wellsville, NY

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, Brooklyn, New York

Combustion Controls Solutions Environmental Services, Toledo, OH

Durr Systems, Inc., Clean Technology Systems, Plymouth, MI

Environmental C&C, St. Charles, IL

Hypercat Advanced Catalyst Products, West Chester, PA

M&C TechGroup, Ventura, CA

Met-Pro Environmental Air Solutions, Owosso, MI

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)

Pedro Panzardi & Associates, CAGUAS, PR

Schutte & Koerting, Trevoze, PA

Siemens Industry, Inc., Solutions, Automation and Drive Technologies, Norcross, GA

Strobic Air Corporation, a subsidiary of Met-Pro Corp., Harleysville, PA

TIGG Corporation, Oakdale, PA

TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA

TRINITY CONSULTANTS, 12770 Merit Drive, Suite 900, Dallas, TX 75251 (800-229-6655; 972-661-8100; FAX: 972-385-9203; e-mail: lredmon@trinityconsultants.com; web site: www.trinityconsultants.com)

United Manufacturing International 2000, Red Bluff, CA

Asbestos removal services

Scientific Dust Collectors, Alsip, IL

Bioremediation services

Petro-Green Inc., Dallas, TX

Compliance-information management

Clean Air Engineering, Palatine, IL

Dakota Software Corp., Cleveland, OH

TRINITY CONSULTANTS, 12770 Merit Drive, Suite 900, Dallas, TX 75251 (800-229-6655; 972-661-8100; FAX: 972-385-9203; e-mail: lredmon@trinityconsultants.com; web site: www.trinityconsultants.com)

Environmental consulting

Advanced GeoServices Corp., West Chester, PA

Airflow Sciences Corporation, Livonia, MI

Ambient Engineering Inc., Rocky Hill, NJ

Clean Air Engineering, Palatine, IL

Durr Systems, Inc., Clean Technology Systems, Plymouth, MI

HOERBIGER KOMPRESSORTECHNIK HOLDING

GMBH, Donau-City-Str/ue 1, Vienna, Austria A-1220 (+43 1 22 440-0; FAX: +43 1 22 440 990; e-mail: info-hkth@hoerbiger.com; web site: www.hoerbiger.com)

Pedro Panzardi & Associates, CAGUAS, PR

Spartan Chemical Services Inc., Jersey City, NJ

TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA

Environmental Solutions Since 1974

Trinity Consultants' highly responsive staff delivers innovative, cost effective solutions. Our services include:

- Air permitting & compliance assistance
- Environmental management services
- Air dispersion modeling
- Environmental training
- EH&S information management solutions

Trinity Consultants Offices Nationwide
(800) 229-6655
trinityconsultants.com

TRINITY CONSULTANTS, 12770 Merit Drive, Suite 900, Dallas, TX 75251 (800-229-6655; 972-661-8100; FAX: 972-385-9203; e-mail: lredmon@trinityconsultants.com; web site: www.trinityconsultants.com)

Environmental laboratories

Ambient Engineering Inc., Rocky Hill, NJ
Clean Air Engineering, Palatine, IL

Environmental regulations, interpreting

Advanced GeoServices Corp., West Chester, PA
Dakota Software Corp., Cleveland, OH
TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA

TRINITY CONSULTANTS, 12770 Merit Drive, Suite 900, Dallas, TX 75251 (800-229-6655; 972-661-8100; FAX: 972-385-9203; e-mail: lredmon@trinityconsultants.com; web site: www.trinityconsultants.com)

Full-service environmental firms

ADI Systems Inc., Wolfeboro, NH
Advanced GeoServices Corp., West Chester, PA
Ambient Engineering Inc., Rocky Hill, NJ
Clean Harbors, Norwell, MA
Pedro Panzardi & Associates, CAGUAS, PR

Geotechnical services

Advanced GeoServices Corp., West Chester, PA

Groundwater remediation

Advanced GeoServices Corp., West Chester, PA
TIGG Corporation, Oakdale, PA
United Manufacturing International 2000, Red Bluff, CA

Hazard audits

Dakota Software Corp., Cleveland, OH
TRINITY CONSULTANTS, 12770 Merit Drive, Suite 900, Dallas, TX 75251 (800-229-6655; 972-661-8100; FAX: 972-385-9203; e-mail: lredmon@trinityconsultants.com; web site: www.trinityconsultants.com)

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

Ambient Engineering Inc., Rocky Hill, NJ
BASF Corporation, Catalysts & Adsorbents, Iselin, NJ
Strobic Air Corporation, a subsidiary of Met-Pro Corp., Harleysville, PA

Recycling firms

GfE Metalle und Materialien GmbH, Nuernberg, Germany
Midwest Steel Company Inc, Houston, Texas

Remote monitoring

HOERBIGER KOMPRESSORTECHNIK HOLDING GMBH, Donau-City-Str/ue 1, Vienna, Austria A-1220 (+43 1 22 440-0; FAX: +43 1 22 440 990; e-mail: info-hkth@hoerbiger.com; web site: www.hoerbiger.com)
M&C TechGroup, Ventura, CA
Russelectric Inc., Hingham, MA

Sludge handling

BOERGER PUMPS, 2860 Water Tower Place, Chanhasen, 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)

ProSonic LLC, Milwaukee, WI
TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA

Veolia Environmental Services, Chicago, Illinois

Soil remediation

Advanced GeoServices Corp., West Chester, PA
Anguil Environmental Systems, Inc., Milwaukee, WI

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)

Petro-Green Inc., Dallas, TX
TIGG Corporation, Oakdale, PA
TMTS Associates, Inc., Combustion/Air Pollution Control, Atlanta, GA

Total Energy, North Salem, NY

Spill contingency, emergency response

TRINITY CONSULTANTS, 12770 Merit 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)

Spill control & emergency response

Clean Harbors, Norwell, MA
ITW Polymers Adhesives, North America, Danvers, MA
Petro-Green Inc., Dallas, TX
TIGG Corporation, Oakdale, PA

Training services

Combustion Controls Solutions Environmental Services, Toledo, OH
Industrial Training Consultants, Inc., Pelham, AL
Team Industrial Services, Inc., Alvin, TX

TRINITY CONSULTANTS, 12770 Merit 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)

VOC control

ADWEST TECHNOLOGIES, INC., VOC Control Division, Wellsville, NY
Anguil Environmental Systems, Inc., Milwaukee, WI
Combustion Controls Solutions Environmental Services, Toledo, OH
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
United Manufacturing International 2000, Red Bluff, CA

Waste minimization & recycling

Clean Harbors, Norwell, MA
Herbold Meckesheim USA, Resource Recycling Systems Inc., Slatersville, RI
Progressive Recovery Inc., Dupo, IL
Veolia Environmental Services, Chicago, Illinois

Waste testing & analysis

Ambient Engineering Inc., Rocky Hill, NJ

Waste transportation

Clean Harbors, Norwell, MA
Veolia Environmental Services, Chicago, Illinois

Waste treatment facilities, other

ADI Systems Inc., Fredericton, New Brunswick, Canada
ADI Systems Inc., Wolfeboro, NH
Alstom Power, Inc., Raymond & Bartlett-Snow Products, Warrenville, IL
Biowater Technology, Cumberland, Rhode Island
Clean Harbors, Norwell, MA
GEA Niro PT B.V., 's-Hertogenbosch, Netherlands
Veolia Environmental Services, Chicago, Illinois
WABASH POWER EQUIPMENT CO., 444 Carpenter Ave., P.O. Box C, Wheeling, IL 60090-0427 (800-704-2002; 847-541-5600; FAX: 847-541-1279; e-mail: info@wabashpower.com; web site: www.wabashpower.com)

Water-pollution control services

ADI Systems Inc., Fredericton, New Brunswick, Canada
ADI Systems Inc., Wolfeboro, NH
Combustion Controls Solutions Environmental Services, Toledo, OH

Entex Technologies Inc, Chapel Hill, NC
Met-Pro Environmental Air Solutions, Owosso, MI
Siemens Industry, Inc. - Water Technologies, Alpharetta, GA

Spartan Chemical Services Inc., Jersey City, NJ
TIGG Corporation, Oakdale, PA

TRINITY CONSULTANTS, 12770 Merit 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)

WASTE HANDLING EQUIPMENT & SYSTEMS

Anaerobic treatment systems

ADI Systems Inc., Fredericton, New Brunswick, Canada
ADI Systems Inc., Wolfeboro, NH
BOERGER PUMPS, 2860 Water Tower Place, Chanhasen, 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, Garrett, IN
Associated Bag Company, Milwaukee, WI

Disposal units, hazardous waste

Alstom Power, Inc., Raymond & Bartlett-Snow Products, Warrenville, IL
Process Combustion Corp., Pittsburgh, PA
S & G Enterprises, Germantown, WI

Incinerators

ADWEST TECHNOLOGIES, INC., VOC Control Division, Wellsville, NY
Anguil Environmental Systems, Inc., Milwaukee, WI
Combustion Controls Solutions Environmental Services, Toledo, OH
Process Combustion Corp., Pittsburgh, PA

Incinerators, gas & liquid

Combustion Controls Solutions Environmental Services, Toledo, OH
Met-Pro Environmental Air Solutions, Owosso, MI
Process Combustion Corp., Pittsburgh, PA

Oxidizers, catalytic

Branch Environmental Corp., Somerville, NJ
Combustion Controls Solutions Environmental Services, Toledo, OH
Met-Pro Environmental Air Solutions, Owosso, MI
Newman Regency Group, Stafford, TX

Oxidizers, thermal

ADWEST TECHNOLOGIES, INC., VOC Control Division, Wellsville, NY
Anguil Environmental Systems, Inc., Milwaukee, WI
Branch Environmental Corp., Somerville, NJ
Combustion Controls Solutions Environmental Services, Toledo, OH
Met-Pro Environmental Air Solutions, Owosso, MI
Procedyne Corp., New Brunswick, NJ

WATER POLLUTION CONTROL EQUIPMENT & SYSTEMS

Aerators, water pollution

Elmridge Inc., Livonia, MI
Newman Regency Group, Stafford, TX
Team Industries, Inc., Kaukauna, WI

Biological treatment

ADI Systems Inc., Fredericton, New Brunswick, Canada
ADI Systems Inc., Wolfeboro, NH
Biowater Technology, Cumberland, Rhode Island
Entex Technologies Inc, Chapel Hill, NC
Met-Pro Environmental Air Solutions, Owosso, MI
Siemens Industry, Inc. - Water Technologies, Alpharetta, GA

Bio-oxidation units

Ambient Engineering Inc., Rocky Hill, NJ
Entex Technologies Inc, Chapel Hill, NC
Met-Pro Environmental Air Solutions, Owosso, MI

Chlorinators

Fluid Metering, Inc., Syosset, NY
PCA GmbH, Heusweiler, Germany

Diffusers, water pollution control

Newman Regency Group, Stafford, TX

Digesters, sewage sludge

Westech Engineering Inc., Salt Lake City, UT

Flocculation equipment

Newman Regency Group, Stafford, TX
ProQuip Inc., Macedonia, OH
sera ProDos GmbH, Immenhausen, Germany

Liners, pond

Watersaver Co., a division of CDI, Commerce City, CO

Separators, oil-water

AMACS, Houston, TX
BOERGER PUMPS, 2860 Water Tower Place, Chanhasen, MN 55317 (877-726-3743; 612-435-7300; FAX: 612-435-7301; e-mail: america@boerger.com; web site: www.boerger.com)

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)

Newman Regency Group, Stafford, TX
Rhine Ruhr Pty. Ltd., Sunshine West., Australia
Siemens Industry, Inc. - Water Technologies, Alpharetta, GA

Settlers, inclined plate

Rhine Ruhr Pty. Ltd., Sunshine West., Australia

Sewage treating units

Air Products and Chemicals, Inc., Allentown, PA
Entex Technologies Inc, Chapel Hill, NC
Microdyn Technologies, Inc., Raleigh, NC
MICRODYN-NADIR GmbH, Wiesbaden, Germany
ProQuip Inc., Macedonia, OH

Sludge dewaterers

AKW Apparate + Verfahren GmbH, Hirschau, Bavaria, Germany

BOERGER PUMPS, 2860 Water Tower Place, Chanhasen, 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)

Nier Systems Inc, Boca Raton, Florida
WYSSMONT CO. INC., 1470 Bergen Blvd., Fort Lee, NJ 07024 (201-947-4600; FAX: 201-947-0324; e-mail: sales@wyssmont.com; web site: www.wyssmont.com)

Sludge dryers

Buss-SMS-Canzler GmbH, Butzbach, Germany
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 67100 (33-3-88-79-41-41; FAX: 33-3-88-79-02-04; e-mail: comessa@comessa.fr; web site: www.comessa.com)

Encon Evaporators, Hooksett, NH
GIG Karasek GmbH, Gloggnitz-Stuppach, Austria
HEYL & PATTERSON INC., RENNEBURG DIVISION, PO Box 36, Pittsburgh, PA 15230 (412-788-9810; FAX: 412-788-9822; e-mail: info@heylpatterson.com; web site: www.heylpatterson.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)

Strippers, air

Branch Environmental Corp., Somerville, NJ
Environmental C&C, St. Charles, 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)
Met-Pro Environmental Air Solutions, Owosso, MI

Tanks, settling

Charles Ross & Son Co., Hauppauge, NY

Waste-recovery treating systems

ADI Systems Inc., Fredericton, New Brunswick, Canada
Alstom Power, Inc., Raymond & Bartlett-Snow Products, Warrenville, IL
Encon Evaporators, Hooksett, NH
Lyntek, Inc., Lakewood, CO
Progressive Recovery Inc., Dupo, IL

Wastewater neutralization systems

Acrison Inc., Moonachie, NJ

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PROCESS CHEMICALS

167 Process chemicals

PROCESS CHEMICALS

Acids, inorganic

AIC, Framingham, MA
 Bayer MaterialScience LLC, Pittsburgh, PA
 Cole Chemical, Houston, TX
 De Dietrich Process Systems GmbH, Mainz, Germany
 ThyssenKrupp Uhde GmbH, Dortmund, Germany
 Transene Co. Inc., Danvers, MA

Acids, organic

ThyssenKrupp Uhde GmbH, Dortmund, Germany

Activated carbon

Environmental C&C, St. Charles, IL
 MAST Carbon International Ltd, Guildford
 Siemens Industry, Inc. - Water Technologies, Alpharetta, GA
 TIGG Corporation, Oakdale, PA
 United Manufacturing International 2000, Red Bluff, CA

Active pharmaceutical ingredients

AIC, Framingham, MA
 VanDeMark Chemical Inc., Lockport, NY

Adsorbents, for carbon dioxide

Arkema Inc., King of Prussia, PA
 BASF Corporation, Catalysts & Adsorbents, Iselin, NJ

Adsorbents, for hydrocarbons

Environmental C&C, St. Charles, IL

Adsorbents, nonpolar

TankLink, a wholly-owned subsidiary of Telular Corporation, Chicago, IL

Adsorbents, spill control

Cole Chemical, Houston, TX

Adsorbents, zeolites

BASF Corporation, Catalysts & Adsorbents, Iselin, NJ

Alcohols, other

Cole Chemical, Houston, TX

Alkalies

Cole Chemical, Houston, TX

Antioxidants

Cachat, M. F., Co., Headquarters, Lakewood, OH
 Cole Chemical, Houston, TX
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)

Argon

Air Products and Chemicals, Inc., Allentown, PA

Biocides, halogenated

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, inorganic

Cachat, M. F., Co., Headquarters, Lakewood, OH

Biocides, 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)

Biocides, phenolics

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)

Catalyst supports & systems

BASF Corporation, Catalysts & Adsorbents, Iselin, NJ
 CAI Catalysts, Gwynedd Square, PA
 Christy Catalytics LLC, St. Louis, MO
 CPI Wirecloth & Screens Inc, Pearland, TX

Catalysts, cracking

BASF Corporation, Catalysts & Adsorbents, Iselin, NJ

Catalysts, custom

ALFA International Corporation, Woonsocket, RI
 BASF Corporation, Catalysts & Adsorbents, Iselin, NJ
 CAI Catalysts, Gwynedd Square, PA

Catalysts, dehydrogenation, spent

BASF Corporation, Catalysts & Adsorbents, Iselin, NJ

Catalysts, desulfurization

BASF Corporation, Catalysts & Adsorbents, Iselin, NJ

Catalysts, hydrogenation

Alfa Aesar, Johnson Matthey, Ward Hill, MA
 BASF Corporation, Catalysts & Adsorbents, Iselin, NJ
COMESSA, 101 rue du Rhin-Napoleon, Strasbourg, France 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, other

ALFA International Corporation, Woonsocket, RI
 BASF Corporation, Catalysts & Adsorbents, Iselin, NJ
 CAI Catalysts, Gwynedd Square, PA
 Dow Corning Corporation, Midland, MI

Catalysts, oxidation

BASF Corporation, Catalysts & Adsorbents, Iselin, NJ
 Cachat, M. F., Co., Headquarters, Lakewood, OH
 Hypercat Advanced Catalyst Products, West Chester, PA
 KDF Fluid Treatment, Inc., Three Rivers, MI

Catalysts, palladium

Alfa Aesar, Johnson Matthey, Ward Hill, MA
 BASF Corporation, Catalysts & Adsorbents, Iselin, NJ

Catalysts, platinum

Alfa Aesar, Johnson Matthey, Ward Hill, MA
 BASF Corporation, Catalysts & Adsorbents, Iselin, NJ
 Hypercat Advanced Catalyst Products, West Chester, PA

Catalysts, polymerization

Arkema Inc., King of Prussia, PA
 BASF Corporation, Catalysts & Adsorbents, Iselin, NJ
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)

Catalysts, polyolefin production

BASF Corporation, Catalysts & Adsorbents, Iselin, NJ

Catalysts, precious metal

Alfa Aesar, Johnson Matthey, Ward Hill, MA
 BASF Corporation, Catalysts & Adsorbents, Iselin, NJ
 CAI Catalysts, Gwynedd Square, PA
 Hypercat Advanced Catalyst Products, West Chester, PA

Catalysts, Raney nickel

BASF Corporation, Catalysts & Adsorbents, Iselin, NJ

Catalysts, reforming

BASF Corporation, Catalysts & Adsorbents, Iselin, NJ
 CAI Catalysts, Gwynedd Square, PA

Catalysts, rhenium

BASF Corporation, Catalysts & Adsorbents, Iselin, NJ

Catalysts, rhodium

Alfa Aesar, Johnson Matthey, Ward Hill, MA
 BASF Corporation, Catalysts & Adsorbents, Iselin, NJ

Catalysts, ruthenium

Alfa Aesar, Johnson Matthey, Ward Hill, MA
 BASF Corporation, Catalysts & Adsorbents, Iselin, NJ

Catalysts, urethane production

Air Products and Chemicals, Inc., Allentown, PA
 Cachat, M. F., Co., Headquarters, Lakewood, OH

Catalysts, vinyl production

Arkema Inc., King of Prussia, PA

Catalysts, zeolite

BASF Corporation, Catalysts & Adsorbents, Iselin, NJ

Chelating agents

AIC, Framingham, MA
 Cole Chemical, Houston, TX

Coagulants, other inorganic

Pristine Water Solutions Inc., Subsidiary of Met-Pro Corp., Waukegan, IL

Coagulants, other organic

Pristine Water Solutions Inc., Subsidiary of Met-Pro Corp., Waukegan, IL

Coagulants, polymer-based

Pristine Water Solutions Inc., Subsidiary of Met-Pro Corp., Waukegan, IL

Defoamers

Arkema Inc., King of Prussia, PA
 Cachat, M. F., Co., Headquarters, Lakewood, OH
 Dow Corning Corporation, Midland, MI
 Momentive Performance Materials Inc., Waterford, NY

Defoamers, chemical

Air Products and Chemicals, Inc., Allentown, PA
 Dow Corning Corporation, Midland, MI
 Momentive Performance Materials Inc., Waterford, NY
 Spartan Chemical Services Inc., Jersey City, NJ

Desiccants

Arkema Inc., King of Prussia, PA
 BASF Corporation, Catalysts & Adsorbents, Iselin, NJ
 Cachat, M. F., Co., Headquarters, Lakewood, OH
 VanDeMark Chemical Inc., Lockport, NY

Dewatering agents

VanDeMark Chemical Inc., Lockport, NY

Dispersing agents, leather

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)

Dispersing agents, other

AOC RESINS, 955 Highway 57 East, Collierville, TN 38017 (800-238-7536; 901-854-2800; FAX: 901-854-1183; e-mail: sales@aoc-resin.com; web site: www.aoc-resins.com)

Arkema Inc., King of Prussia, PA
 Momentive Performance Materials Inc., Waterford, NY
 Spartan Chemical Services Inc., Jersey City, NJ

Dispersing agents, pigment

Cachat, M. F., Co., Headquarters, Lakewood, OH

Dispersing agents, rubber

Cachat, M. F., Co., Headquarters, Lakewood, 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)

Dispersing agents, textile

Momentive Performance Materials Inc., Waterford, NY

Emulsifiers

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)

Flame retardants

Arkema Inc., King of Prussia, PA
 Cachat, M. F., Co., Headquarters, Lakewood, 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)

Flocculants

Pristine Water Solutions Inc., Subsidiary of Met-Pro Corp., Waukegan, IL

Helium

Air Products and Chemicals, Inc., Allentown, PA

Hydrogen

Air Products and Chemicals, Inc., Allentown, PA
 ThyssenKrupp Uhde GmbH, Dortmund, Germany

Hydrogen peroxide

ThyssenKrupp Uhde GmbH, Dortmund, Germany
 Transene Co. Inc., Danvers, MA

Inhibitors, corrosion

Cachat, M. F., Co., Headquarters, Lakewood, 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)

Pristine Water Solutions Inc., Subsidiary of Met-Pro Corp., Waukegan, IL

Nitrogen

Air Products and Chemicals, Inc., Allentown, PA

Odor-control chemicals

Pristine Water Solutions Inc., Subsidiary of Met-Pro Corp., Waukegan, IL

Organic intermediates

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)

VanDeMark Chemical Inc., Lockport, NY

Oxygen

Air Products and Chemicals, Inc., Allentown, PA
AirSep Corporation, A Chart Industries Company, Buffalo, NY

Ozone

Air Products and Chemicals, Inc., Allentown, PA
AirSep Corporation, A Chart Industries Company, Buffalo, NY

Pigments

AOC RESINS, 955 Highway 57 East, Collierville, TN 38017 (800-238-7536; 901-854-2800; FAX: 901-854-1183; e-mail: sales@aoc-resin.com; web site: www.aoc-resins.com)

Cachat, M. F., Co., Headquarters, Lakewood, OH

Cristal, Hunt Valley, MD

KronosWorldwide, Inc., Cranbury, NJ

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)

Preservatives

AIC, Framingham, MA

Cachat, M. F., Co., Headquarters, Lakewood, O

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)

Resins, alcohol-soluble

ALFA International Corporation, Woonsocket, RI

Resins, water-soluble

ALFA International Corporation, Woonsocket, RI
AOC RESINS, 955 Highway 57 East, Collierville, TN 38017 (800-238-7536; 901-854-2800; FAX: 901-854-1183; e-mail: sales@aoc-resin.com; web site: www.aoc-resins.com)

Bayer MaterialScience LLC, Pittsburgh, PA

Cachat, M. F., Co., Headquarters, Lakewood, OH

Sartomer USA, LLC, Exton, PA

Solvents, adhesive

ALFA International Corporation, Woonsocket, RI

Solvents, alcohols

Cole Chemical, Houston, TX

Transene Co. Inc., Danvers, MA

Solvents, electronic

Transene Co. Inc., Danvers, MA

Solvents, glycol ether

Cole Chemical, Houston, TX

Solvents, high flash

Spartan Chemical Services Inc., Jersey City, NJ

Solvents, hydrocarbons

Cole Chemical, Houston, TX

Solvents, ketones

Cole Chemical, Houston, TX

Solvents, nonflammable

TCPI Inc., Dr. Diesel, Diesel Fuel Additive, Houston, TX

Solvents, nontoxic

Spartan Chemical Services Inc., Jersey City, NJ

TCPI Inc., Dr. Diesel, Diesel Fuel Additive, Houston, TX

Solvents, petroleum

TCPI Inc., Dr. Diesel, Diesel Fuel Additive, Houston, TX

Static eliminators

Amstat Industries Inc., Glenview, IL

Newson Gale Ltd, Nottingham

Surface active agents, anionic

Cachat, M. F., Co., Headquarters, Lakewood, OH

Surface active agents, nonionic

Air Products and Chemicals, Inc., Allentown, PA

Cachat, M. F., Co., Headquarters, Lakewood, OH

Surface active agents, not further specified

Momentive Performance Materials Inc., Waterford, NY

Surface active agents, other

Air Products and Chemicals, Inc., Allentown, PA

Cachat, M. F., Co., Headquarters, Lakewood, OH

Thickeners, cellulose ethers

Cachat, M. F., Co., Headquarters, Lakewood, OH

Thickeners, other

Cachat, M. F., Co., Headquarters, Lakewood, OH

Thickeners, thixotropes

Cachat, M. F., Co., Headquarters, Lakewood, OH

Water treatment chemicals

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)

Pristine Water Solutions Inc., Subsidiary of Met-Pro Corp.,

Waukegan, IL

Spartan Chemical Services Inc., Jersey City, NJ

Zeolites

BASF Corporation, Catalysts & Adsorbents, Iselin, NJ

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A repeat near miss

It is with extreme reticence that I author this page, even though I received permission several months ago to do so. FRI had a near miss in 2010, which was identical to a near miss that occurred in 2007. In the safety world, such things should never happen.

In 2007, FRI was running butanes in its high-pressure test column. A gasket blew, releasing butanes to the atmosphere; the butanes did not ignite. Shortly thereafter, one FRI employee sent an email with six brief questions to another FRI employee. The second employee responded with six brief answers. That was the full extent of the investigation and documentation. Following that incident, a certain mythology developed around it. For many months after the incident, staff members referred to a “window failure” as the cause of the release. In fact, the cause of the release was a gasket failure. Virgin Teflon gaskets had been supplied inappropriately by a vendor.

In November of 2010, there was another butanes release from the high-pressure test column. All of the appropriate government agencies were informed immediately. An investigation was initiated immediately. It took several months, but it was ultimately determined that the exact same vendor had supplied the exact same (and inappropriate) virgin Teflon gaskets. Other vendors graciously assisted with the investigation, which included a chemical analysis of the 2010 gaskets. The 2010 investigation also included a review of the too-brief documentation of the 2007 “window incident” which was truly a “gasket incident.” The entire organization was embarrassed to find out that the same thing had happened twice.

The 2010 investigation also revealed the following about the 2007 investigation: The results were not properly distributed to the staff members; the action items were unclear; there was zero long-term follow-up; the 2007 vendor might not have been informed; and the vendor was not changed. The 2010 investigation resulted in the longest safety investigation and report

in the company’s history. None of the mistakes of the 2007 investigation was repeated.

As an extra response to the second incident, FRI contracted for a professional dispersion study. That study identified the paths that butanes might take during any future (and preventable) releases. For winter and summer conditions, that study estimated the flammability potentials along the paths.

FRI’s attention to safety seems to increase in quantum steps every ten years. This also seemed to be true at the companies that I worked at before joining FRI. For all of us, the next ten years will probably bring another valuable quantum step.

When looking back on both incidents, another lesson seems to be available to us. Sellers sell and buyers



Mike Resetarits is the technical director at Fractionation Research, Inc. (FRI; Stillwater, Okla.; www.fri.org), a distillation research consortium. Each month, Mike shares his first-hand experience with CE readers

buy. Both parties are totally responsible for the protection of their employees, their neighbors, the environment — and their customers. ■

Mike Resetarits

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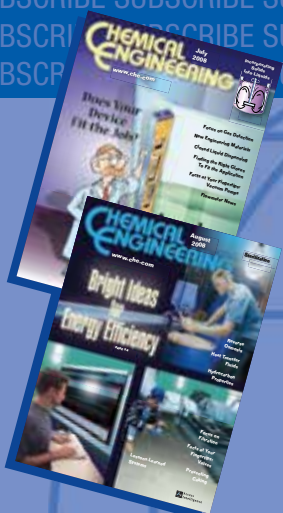
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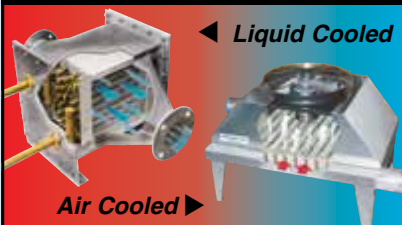


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NOVEMBER WHO'S WHO



O'Toole

Bryan O'Toole becomes president of **Bryan Steam LLC** (Peru, Ind.), a manufacturer of boilers, replacing *Tom May*, who retired in July.

Edwin Reidel becomes business manager for North America for **LemnaTec GmbH** (Aachen, Germany), a producer of hardware and software for the life sciences.

Benjamin Potier becomes director of business development within the Water Solutions business unit of **Pellerin Energy Group** (Broussard,



Potier



Mathews

La.), an integrated service provider for the oil-and-gas industries.

The Composites Group (Highland Heights, Ohio), a provider of thermo-set compounds and molding solutions, promotes *Dale Mathews* to market manager and *Todd Waddle* to sales manager.

Cameron McCreary becomes sales account manager for **Variable Bore Rams** (Broussard, La.), a maker of blowout-preventer components, based in San Antonio, Tex.



Waddle

Rolf Drewes joins specialty chemical firm **Songwon Industrial Group** (Ulsan, Korea), as vice president business sector specialty chemicals.

Renewable chemicals company **Allylix, Inc.** (San Diego, Calif.) welcomes *Leandro Nonino* as vice president of sales and marketing for flavors and fragrance products.

Chris Huntsman becomes operations manager of **Cooper Valves** (Stafford, Tex.).

Suzanne Shelley



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e. Total Nonrequested Distribution	1,562	2,317
f. Total Distribution (Sum of 15c and 15e)	35,255	35,022
g. Copies not Distributed (Office, Returns, Spoilage, Unused)	960	1,036
h. Total (Sum of 15f and g)	36,215	36,058
i. Percent Paid and/or Requested Circulation	95.57%	93.38%

16. Publication of Statement of Ownership for a Requester Publication is required and will be printed in the November 2013 issue of this publication

17. Signature of Fulfillment Manager: George Severine Date: 10/7/2013

PS Form 3526-R, August 2012

PLANT WATCH**Novozymes and Beta Renewables open advanced biofuels facility in Italy**

October 9, 2013 — Novozymes (Copenhagen, Denmark; www.novozymes.com), a producer of industrial enzymes, and Beta Renewables, opened what is said to be the world's largest advanced biofuels facility, located near Crescentino, Italy. The plant will be the world's first to produce bioethanol from agricultural residues via enzymatic conversion at a commercial scale. This facility is designed to produce 75 million L/yr of bioethanol.

Technip and Zachry awarded polyethylene project in the U.S.

October 3, 2013 — Technip (Paris, France; www.technip.com) and Zachry Industrial (San Antonio, Tex.; www.zhi.com), in a partnership called Gulf Coast Partners, have been awarded a contract to design and build two polyethylene (PE) plants for Chevron Phillips Chemical Company LP in Old Ocean, Tex. The scope of work includes the design, supply and installation of two 500,000 metric tons per year (m.t./yr) PE plants, along with the related offsites, utilities and railyard. Detailed design has started and on-site mobilization will commence in the first half of 2014.

Solvay to build large bicarbonate plant in Thailand

September 30, 2013 — Solvay S.A. (Brussels, Belgium; www.solvay.com) plans to build Southeast Asia's largest sodium bicarbonate plant. Located in Thailand, and with a total capacity of 100,000 m.t./yr, this new facility is planned for startup in the first half of 2015. Solvay's investment in the plant will be €20 million.

PPG to invest \$60 million in new coatings facility in Russia

September 30, 2013 — PPG Industries (Pittsburgh, Pa.; www.ppg.com) has announced plans to invest \$60 million in a new manufacturing facility and commercial operation for its coatings businesses in the Lipetsk region of Russia. The company anticipates project completion in the second half of 2015. The facility will manufacture both industrial and performance coatings. In addition to the manufacturing hub, the facility will include a new warehouse and distribution center, as well as offices and technical laboratories.

Henkel opens world's largest adhesives factory in China

September 18, 2013 — Henkel AG & Co. (Düsseldorf, Germany; www.henkel.com) has inaugurated what is said to be the world's largest adhesives factory in Shanghai. The new factory will be the central production site for industrial adhesives in the Asia-Pacific region. Production capacity is expected to reach up to 428,000 m.t./yr of adhesives.

Chandra Asri awards contract for naphtha cracker expansion to Toyo

September 17, 2013 — PT Chandra Asri Tbk (Jakarta, Indonesia; www.chandra-asri.com) has signed a cooperation contract for engineering, procurement and construction with Toyo Engineering Corp. for the expansion of Chandra Asri's naphtha cracker, increasing its capacity by about 43%. The expansion will also increase the production capacity of petrochemical products. Ethylene capacity will be 860,000 m.t./yr, increased from the previous capacity of 600,000 m.t./yr. Propylene production will be increased to 470,000 m.t./yr, up from 150,000 m.t./yr. The investment cost for the expansion is estimated to be \$380 million.

MERGERS AND ACQUISITIONS**Dow sells Unipol polypropylene licensing and catalyst business to W.R. Grace**

October 11, 2013 — W.R. Grace & Co. (Columbia, Md.; www.grace.com) has agreed to acquire the assets of the Unipol Polypropylene Licensing and Catalysts business of The Dow Chemical Co. (Midland, Mich.; www.dow.com) for a cash purchase price of \$500 million. The transaction is expected to close by year-end, pending regulatory approvals. Dow had previously announced its intent to divest this business in March 2013.

Solvay to acquire California-based Chemlogics for \$1.345 billion

October 7, 2013 — Solvay S.A. has signed an agreement to acquire privately held Chemlogics (Paso Robles, Calif.) for \$1.345 billion. With expertise in friction reducers, non-emulsifiers and extraction technologies, the company serves the needs of the oil-and-gas industry's stimulation and cementing segments. The completion of the transaction, expected before the end of 2013, is subject to customary closing conditions, including U.S. anti-trust clearance.

Airgas to acquire Encompass Gas Group, a gas supply company

October 7, 2013 — Airgas, Inc. (Radnor, Pa.; www.airgas.com) announced that it has reached a definitive agreement to acquire the assets and operations of The Encompass Gas Group, Inc., headquartered in Rockford, Ill. Encompass is one of the largest privately owned suppliers of industrial, medical, and specialty gases and related accessories in the U.S., generating approximately \$55 million in annual sales in 2012. Terms of the agreement were not disclosed. The transaction was expected to close on November 1, subject to regulatory approval and satisfaction of other customary closing conditions.

Clariant acquires organic pigment business, invests in new plant in China

September 30, 2013 — Clariant (Mutztenz, Switzerland; www.clariant.com) announced that it has acquired the organic pigment business of Jiangsu Multicolor Fine Chemical Co., Ltd (JMC). JMC is a supplier of several types of high-performance pigments and pigment preparations in China. Additionally, as part of this project, Clariant will build a pigment plant in Zhenjiang, Jiangsu Province, China.

Kemira acquires Canadian specialty chemicals provider Soto Industries

September 20, 2013 — Kemira Oyj (Helsinki, Finland; www.kemira.com) has signed an agreement to acquire Soto Industries Inc., a privately owned company headquartered in Vancouver, Canada. Soto is a specialty chemicals and services supplier to the pulp-and-paper industry. The parties have agreed not to disclose the transaction price.

BASF announces cash offer to acquire biotechnology company Verenum

September 20, 2013 — BASF SE (Ludwigshafen, Germany; www.basf.com) says that its U.S. affiliate, BASF Corp., has agreed to commence a cash tender offer for all of the outstanding shares of common stock of the biotechnology company Verenum Corp. (San Diego, Calif.) for \$4.00 per share. The enterprise value is approximately \$62 million. Verenum generated sales of \$57 million in 2012. The acquisition is expected to close in the fourth quarter of 2013. The transaction has been unanimously approved by the Boards of Directors of both companies. ■

Mary Page Bailey

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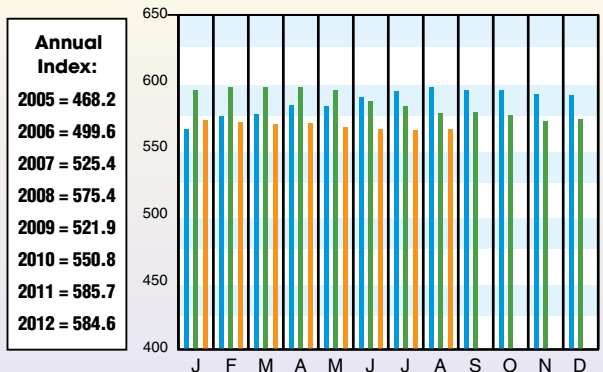
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CHEMICAL ENGINEERING PLANT COST INDEX (CEPCI)

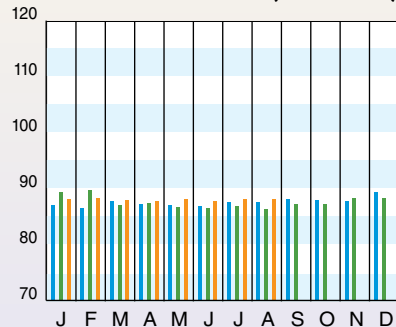
(1957-59 = 100)	Aug. '13 Prelim.*	Jul. '13 Final	Aug. '12 Final
CE Index	564.7	564.0	576.6
Equipment	682.9	682.0	700.1
Heat exchangers & tanks	615.8	620.7	641.6
Process machinery	653.3	655.0	663.3
Pipe, valves & fittings	871.2	861.8	899.2
Process instruments	410.9	407.4	420.1
Pumps & compressors	920.7	920.7	929.0
Electrical equipment	513.0	512.4	511.3
Structural supports & misc	736.3	729.8	741.2
Construction labor	319.6	320.2	323.6
Buildings	531.6	531.1	524.5
Engineering & supervision	325.6	324.1	328.6



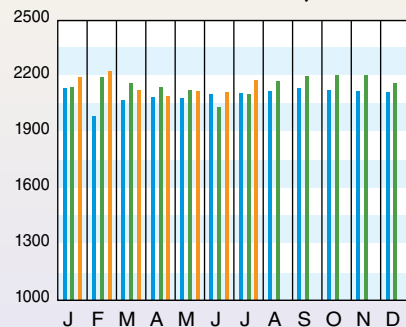
CURRENT BUSINESS INDICATORS*

	LATEST	PREVIOUS	YEAR AGO
CPI output index (2007 = 100)	Aug. '13 = 88.2	Jul. '13 = 88.2	Jun. '13 = 87.8
CPI value of output, \$ billions	Jul. '13 = 2,183.1	Jun. '13 = 2,116.5	May '13 = 2,124.9
CPI operating rate, %	Aug. '13 = 74.6	Jul. '13 = 74.6	Jun. '13 = 74.4
Producer prices, industrial chemicals (1982 = 100)	Aug. '13 = 301.0	Jul. '13 = 299.6	Jun. '13 = 304.0
Industrial Production in Manufacturing (2007 = 100)	Aug. '13 = 96.0	Jul. '13 = 95.3	Jun. '13 = 95.7
Hourly earnings index, chemical & allied products (1992 = 100)	Aug. '13 = 156.8	Jul. '13 = 156.8	Jun. '13 = 156.0
Productivity index, chemicals & allied products (1992 = 100)	Aug. '13 = 105.1	Jul. '13 = 104.6	Jun. '13 = 104.7
			Aug. '12 = 86.4
			Jul. '12 = 2,105.1
			Aug. '12 = 73.7
			Aug. '12 = 295.2
			Aug. '12 = 93.5
			Aug. '12 = 155.7
			Aug. '12 = 104.4

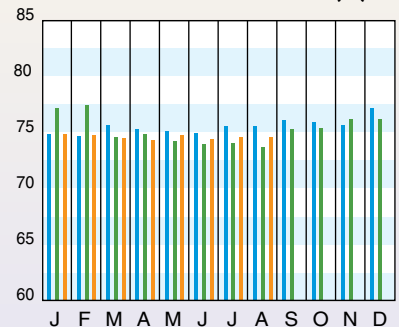
CPI OUTPUT INDEX (2007 = 100)



CPI OUTPUT VALUE (\$ BILLIONS)



CPI OPERATING RATE (%)



Current Business Indicators provided by IHS Global Insight, Inc., Lexington, Mass.

Equipment Cost Index Available Exclusively from Marshall & Swift



Quarterly updates of our industry-leading Equipment Cost Index are now available at www.equipment-cost-index.com.

***CURRENT TRENDS**

Because the CE Plant Cost Index (CEPCI; top) is calculated using economic data sourced from the U.S. government, the preliminary August 2013 CEPCI numbers have been affected by the shutdown of the U.S. Federal Government that began on October 1. As of press time, a temporary measure had been passed to reopen the government, but the data used for the CEPCI calculations have not been updated since September 30. Meanwhile, updated values for the Current Business Indicators from IHS Global Insight (middle) are not available, since they also depend on government data. CE has re-published the CBI numbers from August, and will revisit both the PCI and CBI as soon as newer information becomes available. ■



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