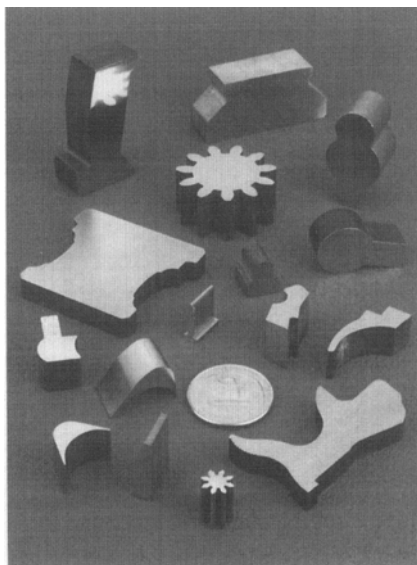

News

Materials/Products

Hoechst Technical Polymers has formulated *two gear grades of Celcon acetal copolymer for plastic gears and bearings*. Even unlubricated, the copolymers eliminate the squeaking sometimes generated by plastic mating gears molded in the same resin. M90AW is a low-wear grade for low-load, high-velocity gears. M90SW is for high-load, low-velocity applications. For further information, contact: Hoechst Technical Polymers, Hoechst Celanese Corp., 90 Morris Ave., Summit, NJ 07901-3914; tel: 908/598-4162; fax: 908/598-4165.

Rathbone Precision Metals is engineering *custom cold-drawn metal parts*. A cold-rolling process draws the parts into a rod with the profile of the final part. The rod has a hardened uniform granular structure and can be sliced into net-shaped final parts that require little machining. For further information, contact: Rathbone Precision Metals Inc., 241 Park St., Palmer, MA 01069; tel: 413/283-8961; fax: 413/283-9722.



Rathbone Precision Metals

ICI Chemical & Polymers has introduced Saffil HX, a grade of *alumina fiber*

(96% alumina, 4% silica) *for high-temperature insulation products*, such as vacuum formed boards, custom shapes, and papers operating at temperatures to 1750 °C (3100 °F). The fibers have low thermal shrinkage and resist chemical attack from metal oxides at high temperatures. Blends of the fiber with aluminosilicate fibers are adaptable to specific requirements. Median fiber diameter is 3.0 μm (0.0001 in.). For further information, contact: Lorena McMenemy, ICI Chemical & Polymers, Concord Plaza, Tatnall 2, 3411 Silverside Rd., P.O. Box 15391, Wilmington, DE 19850; tel: 302/887-4160.

DeWal Industries has available melt-processible *fluoropolymer films* produced from FEP, PFA, THV, PVDF, and MFA polymers. *Usable as impermeable linings* in tanks or hoses, the films are available from 0.001 to 0.15 cm (0.0005 to 0.060 in.) thick, from 0.63 to 96 cm (0.25 to 38 in.) wide, and with varying degrees of chemical resistance, temperature resistance, and permeability. The company also has conductive PFA and FEP films for static dissipation. For further information, contact: DeWal Industries Inc., 15 Ray Trainor Dr., P.O. Box 372, Saunderstown, RI 02874; tel: 401/789-9736.

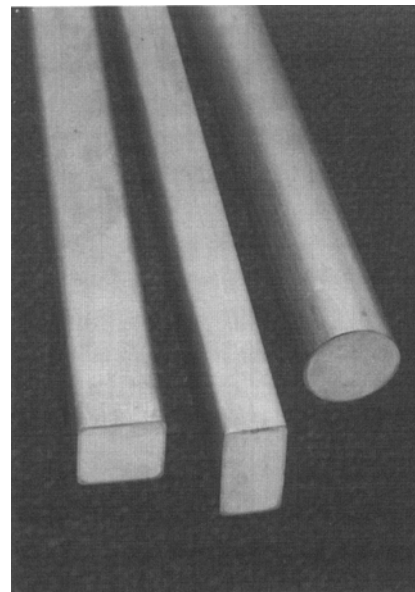
The *nonlubricated Power-Core gear*, from **Intech**, maintains stability and accuracy in applications in which noise, moisture, or corrosive chemicals are present. In the casting process, a composite material is cast onto a knurled metal core. The material forms a blank from which individual gears are machined. The metal core is fixed at the same distance from the pitch



Intech Corporation

line to maintain equilibrium of force and heat. The metal core attaches as securely to the shaft as metal gears, with connection made through the keyway. A stainless steel core is available for corrosive environments and an aluminum core for keeping inertia to a minimum. For further information, contact: Georg Bartosch, Intech Corp., 250 Herbet Ave., Closter, NJ 07624; tel: 201/767-8066.

Titanium-clad copper bus bar, from **Anomet Products Inc.**, has an OFHC copper core that provides uniform current distribution and a metallurgically bonded titanium cladding (in thicknesses from 0.1 to 0.3 cm, or 0.040 to 0.125 in.) for corrosion resistance. The bus bar is offered in round (1.3 to 4.4 cm, or 0.5 to 1.75 in., diameter), square (up to 3.8 cm, or 1.5 in., on a side), and rectangular (up to 1.3 × 10 cm, or 0.5 × 4 in.) configurations, in lengths to 9 m (30 ft). The bus bar is suitable for connecting to anodes or cathodes in electrochemical processes. Free evaluation samples are available on request. For further information, contact: Robert Gallant, Marketing, Anomet Products Inc., 830 Boston Tpke., Shrewsbury,



Anomet Products Inc.

MA 01545; tel: 508/842-3069; fax: 508/842-0847.

Halar ECTFE fluoropolymer, from **Ausimont USA**, has a surface five times smoother than commercial PVDF UPW pipe. In a surface smoothness test performed by the manufacturer, less biofilm was apparent on the fluoropolymer than on PVDF or stainless steel. ECTFE is available as a coating, lining, or tubing, as well as in piping for HP fluid process systems. For further information, contact: Alison Deutsch, Ausimont USA Inc., 10 Leonards Ln., Thorofare, NJ 08086; tel: 609/251-3486; fax: 609/853-6405; e-mail: prodinfo@ausiusa.com; web: <http://ausiusa.inter.net/ausiusa>.

A pipe tagging system clearly identifies substances flowing through pipes, such as compressed air, diesel fuel, water, or petroleum. Visible at a distance, the system provides a higher level of safety and simplifies tracing pipelines during shutdowns. These corrosion-proof, expandable tags are more durable than tape labels, which become worn, tattered, and peel off. The tags can be imprinted with company logos. The original design submitted by an Australian inventor to the Melbourne Office of the **Invention Submission Corporation** is available for licensing or sale to manufacturers or marketers. For further information, write Dept. 96-AUS-543, Invention Submission Corp., 217 Ninth St., Pittsburgh, PA 15222; tel: 412/288-1300, ext.1368.

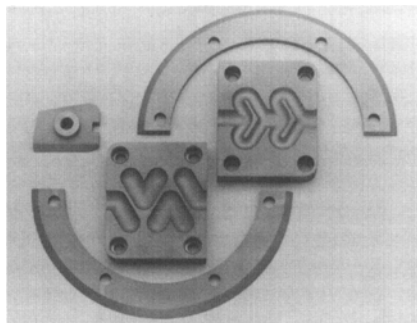
The **Din-A-Mite solid-state power control**, from **Watlow Electric Manufacturing Company**, is available in a family of five different packages and power-handling configurations, as an alternative to mercury relays. The controls are capable of current switching from 16 to 100 A, depending upon model. Applications include control of electric heaters in wash and rinse tanks and power-switching for



Watlow Electric Manufacturing Company

air-process heaters used for drying parts. For further information, contact: Watlow Controls, Watlow Electric Manufacturing Co., 1241 Bundy Blvd., P.O. Box 5580, Winona, MN 55987-5580; tel: 507/454-5300; fax: 507/452-4507.

Plasmadize *self-lubricating surface treatments provide protection against corrosion and wear of metal parts*. **General Magnaplate Corporation** applies the coatings either on-site or at the company's Materials Technology Centers in New Jersey, Texas, California, Wisconsin, and Ontario, Canada. The application method is a thermal spray coating of selected polymeric materials and dry lubricants. The low coefficient of friction of the coating protects the surface against abrasive wear and galling. The nonporous surface resists corrosive moisture and chemicals. The treatment improves the life and reliability of dryers, winders, rolls, guides, and other OEM metal parts. For further information, contact: General Magnaplate Corp., 1331 Rte. 1, Linden, NJ 07036; tel: 1/800/852-3301; fax: 908/862-6110; e-mail: info@magnaplate.com; web: <http://www.magnaplate.com>.



General Magnaplate Corporation

Enerpac, a unit of **Applied Power Inc.**, has introduced a series of *directional control valves designed for direct mounting on fixtures, power units, or circuits*. The valves provide manual control of single- or double-acting cylinders with operating pressures to 5 ksi (35 MPa). The VMTD-001 has threaded port connections and a removable holding bracket to enable panel mounting. The VMMD-001 is designed for multiple stacking on DO3 interface manifold. Handles on both units can be repositioned for side-by-side mounting. Pressure-seal design keeps leakage at near-zero levels. Handle positions can be

reached with low handle effort. The blocked pressure port in the center position allows demand style pumps to stall, saving energy. The No. 1 and 2 ports drain to the tank so downstream hoses can be disconnected from a palletized fixture. For further information, contact: Enerpac, P.O. Box 325, Milwaukee, WI 53201-0325; tel: 414/781-6600; fax: 414/781-1049.

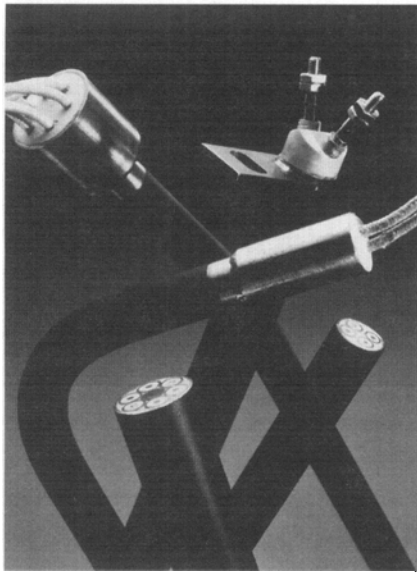


Enerpac

Rust-Oleum Corporation has added five tint bases to the **9800 Direct-to-Metal urethane high-build mastic system**, a coating line for application to sound, rusted, or prepared metals in mild to moderate industrial environments. 9807 Mastone, 9808 Deep, 9809 Light, 9805 Red, and 9806 Yellow create 250 additional colors. The 9800 coatings dry faster than competing polyurethanes and cure at temperatures as low as 4 °C (40 °F). The coatings require no thinning and have a premeasured base and activator package for easy mixing. For further information, contact: Rust-Oleum Corp., Industrial Business Group, c/o ISSI, 28045 Ashley Cir., Libertyville, IL 60048-9517; tel: 1/800/769-6565.

Watlow AOV, a subsidiary of **Watlow Electric Manufacturing Company**, has designed *multicell insertion heaters that operate at temperatures up to 1120 °C (2050 °F)*. These temperatures can be maintained uniformly, since the heater has up to six independently controlled zones. Special bending capabilities and longer lengths allow for 12 m (40 ft) reaches to meet unusual machinery needs and keep leads away from heated zones. An oxidized sheath provides high emissivity and improves the performance of the heater as oxidation increases. Individual metal-sheathed coils are swaged into an alloy outer sheath for protection. For further information, contact: Watlow AOV, 4545

E. LaPalma Ave., Anaheim, CA 92807;
tel: 714/779-2252; fax: 714/777-9626.



Watlow AOV

General Plastics has developed *powder-coating technology for applying a thick, pinhole-free layer of Teflon PFA fluoropolymer resin, made by DuPont, to surfaces of vessels and other equipment parts exposed to harsh or contamination-sensitive media.* Intended as an alternative to glass linings for chemical and pharmaceutical processing equipment, the coatings can protect damaged linings or new equipment, as well as surfaces with complex shapes that are difficult to coat. Typical applications include vessels, piping agitators, perforated centrifuge housings and curbs, and pump housings. Coating thickness runs to 0.76 mm (0.030 in.). Pieces up to 2.7 m (9 ft) in diameter by 4.6 m (15 ft) long can be coated. For further information about coating of process equipment, contact: General Plastics Division, PMC Inc., Bloomfield, NJ; tel: 201/749-5500; fax: 1/800/626-1682. For further information about Teflon fluoropolymer resins, contact: DuPont Co., Ref: Teflon (A-1050), Chestnut Run Plaza, Bldg. 711, Rm. 231, Wilmington, DE 19880-0711; tel: 302/479-7731.

The Light-Welder 3010-EC, from **Dymax Corporation**, is a high-intensity *UV/visible spot-curing lamp.* Combining high ultraviolet light intensity with long bulb and light guide life, the instrument achieves fast cures while lowering processing costs. Simplicity of design and sturdy construction ensure easy setup and use, low-cost maintenance, and reliability. For further information, contact: Dymax Corp., 51 Greenwood Rd., Torrington, CT 06790; tel: 860/482-1010.

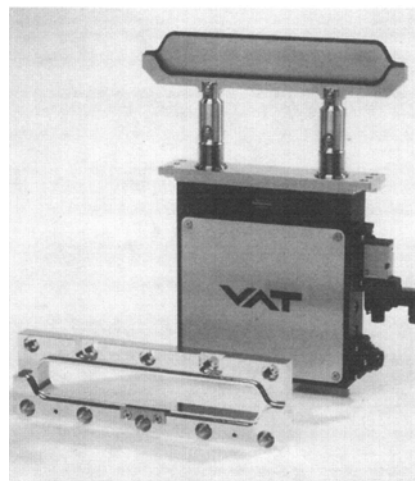


Dymax Corporation

Processing/Equipment

A first-of-its-kind *Intelligent Bending workstation*, developed at Carnegie Mellon's Robotics Institute, is being commercialized by **Amada Company Ltd.**, Japan, the world's largest sheet metal machine tool manufacturer. The system, which enables design-to-production of a variety of sheet metal parts in less than 30 min., was developed by Senior Systems Scientist David A. Bourne, an expert in intelligent systems for automated manufacturing, and his research group. Bourne says the system considers a new part and determines what it needs to do to fabricate it. A process planner lets the user know exactly what tools, time, and resources are needed. For further information, contact: David Bourne, Carnegie Mellon University, Pittsburgh, PA 15213; tel: 412/268-7811.

VAT Inc. is producing *retrofit vacuum valves.* Intended as a replacement for flapper and other particle-generating valves in load lock and wafer transfer chambers, these rectangular slit valve inserts are *for use in semiconductor wafer transfer.* The valves operate without closing shock and perform 1 million cycles before requiring maintenance. For further information, contact: George S. Geannaris, Vice Presi-

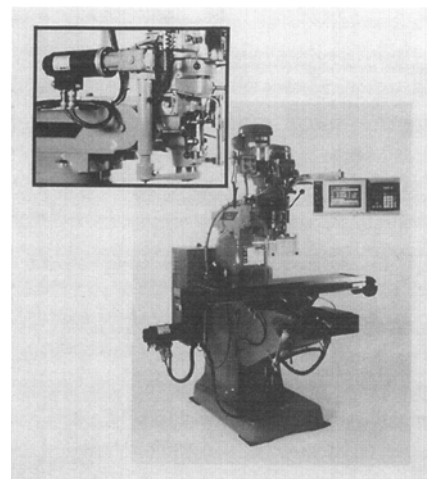


VAT Inc.

dent, VAT Inc., 500 W. Cummings Pk., Woburn, MA 01801; tel: 617/935-1446; fax: 617/935-3940.

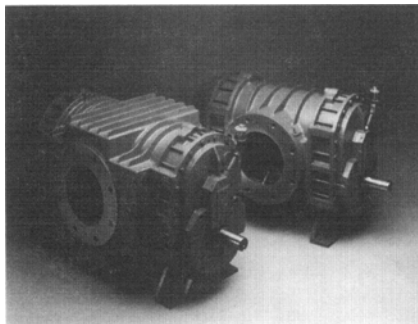
Bridgeport Machines based the *EzTrak automated knee mill* on the company's Series 1 standard knee mill. The operator need have no previous programming or CNC experience. Screen prompts request data on the finished part dimensions. The

software then calculates and displays for verification the machine path to create the part. A "teach" mode stores each machine move as the part is created manually, so subsequent parts can be run automatically. For further information, contact: Bridgeport Machines Inc., 500 Lindley St., Bridgeport, CT 06606; tel: 1/800/243-4292.



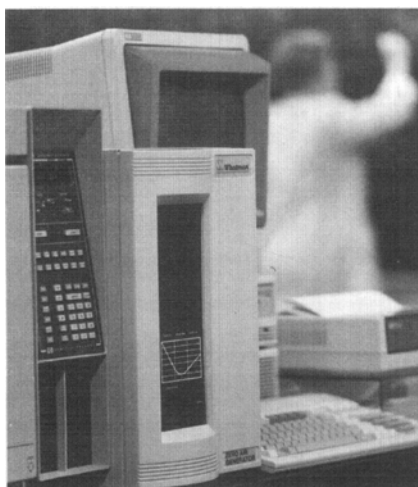
Bridgeport Machines

Stokes Vacuum has introduced a line of **15.25 cm (6 in.) high-speed vacuum blowers that cut cycle times by boosting pumping capacity.** Pumping capacity for the line ranges from 74,000 to 110,000 L/min (2600 to 3900 ft³/min). The blowers have four mechanical seals and water-cooled bearing housings. The seals isolate process gases from lubricating oils to prevent contamination. Helical timing gears have a large-load capacity and operate quietly. An optional oil injection system pumps low-molecular-weight gases or provides continuous operation at higher inlet pressures. For further information, contact: Jay Scherbik, Stokes Vacuum Inc., 5500 Tabor Rd., Philadelphia, PA 19120; tel: 888/4-STOKES; fax: 215/831-5420.



Stokes Vacuum Inc.

The **75-30 Hydrogen Gas Generator**, from **Whatman Inc.**, produces hydrogen gas flows of 80 cm³/min through the electrolytic dissociation of water. The resultant hydrogen stream then passes through a palladium membrane that lets penetrate only hydrogen and its isotopes. The purity of the output gas is guaranteed to be



Whatman Inc.

99.99999%. The hydrogen can be used with gas chromatographs, both as a fuel gas for flame ionization detectors and as a carrier gas, or for other laboratory applications. For further information, contact: Whatman Inc., 260 Neck Rd., Box 8223, Haverhill, MA 01835-0723; tel: 1/800/343-4048; fax: 508/374-7070.

Enerpac, a unit of Applied Power Inc., has introduced a line of **hydraulic-pressure intensifiers that boost low inlet pressures for workholding applications.** The eight models in the product line increase pressure ratios from between 3.2 to 1 and 6.6 to 1. An internal dump valve release high-pressure oil without using an external pilot-operated check valve. Designed for operating pressures to 5 ksi (35 MPa), the units stall once maximum system pressures are reached. If a pressure drop occurs in a downstream circuit, the reciprocating piston cycles automatically to maintain the operating level. For further information, contact: Enerpac, 13000 W. Silver Spring Dr., Butler, WI 53007; tel: 1/800/433-2766; fax: 414/781-1049.

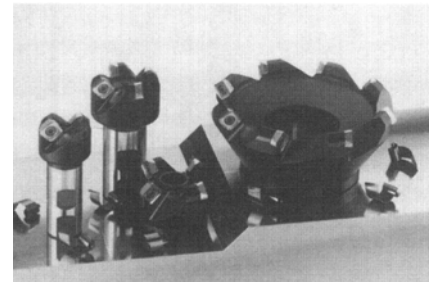


Enerpac

The **UMAC A20CF-4K wall-thickness sensor**, from **Zumbach Electronics**, is designed for installation at close proximity to the extruder. The sensor is fitted with four ultrasonic transducers arranged at 90° angles with a 45° offset from the vertical and horizontal planes made to coincide with the location of most extruder centering screws. For further information, contact: Zumbach Electronics Corp., 140 Kisco Ave., Mt. Kisco, NY 10549; tel: 914/241-7080; fax: 914/241-7096; e-mail: sales@zumbach.com.

The **M660 cutter**, from **Widia North America**, has the strength to cut at high feed rates with minimal force. **Designed for milling rough forging and uneven castings covered with layers of sand**, the

cutters have pinless chip gullets, can be used with varying pitch, have a thick indexable insert to withstand high feed rates, and a group wiper radius that produces a semifinished surface in the roughing mode and an excellent finish in the finishing cut. For further information, contact: Widia North America, 4701 Marburg Ave., P.O. Box 92950, Cincinnati, OH 45209; tel: 1/888/872-9434; fax: 513/841-8329; e-mail: tushar_desai@milacron.com.



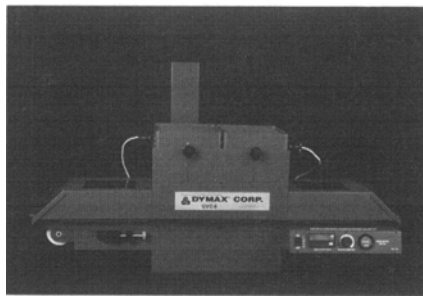
Widia North America

The **Model Mini II vibration welder**, from **Branson Ultrasonics**, has the smallest footprint in the industry (0.6 × 1.2 m, or 2 × 4 ft), yet offers all of the advantages of the vibration welding process with enhanced performance, ease of operation, and added serviceability features. The stroke of the welder (up to 38 cm, or 15 in.) and platen size can handle parts up to 18 cm (7 in.) long by 23 cm (9 in.) wide. A standard voltage of 240 V lets the unit be run from existing power lines. The company also offers the **921 AES advanced ultrasonic welder** is a compact (9.5 × 70 cm, or 3.75 × 29 in.), 20 kHz system with pneumatic controls designed for manual, semiautomated, or automated systems. For further information, contact: Branson Ultrasonics Corp., 41 Eagle Rd., Danbury, CT 06813-1961; tel: 203/796-0400.

The **EzSurf grinder** from **Harig Division, Bridgeport Machines**, is a **computer-controlled surface grinder**, based on the company's model 618 grinder. The operator inputs data when requested by menu prompts. The software then calculates the machine movements necessary to create the finished part, calculating tapers, radii, and canned cycles for wheel dressing and grinding. The operator need have no CNC experience. A graphic preview lets the operator verify the wheel and diamond dresser paths before grinding. For further information, contact: Bridgeport

Machines Inc., 500 Lindley St., Bridgeport, CT 06606; tel: 1/800/242-2404.

Dymax has released a line of *UV-curing conveyor systems* for processing ultraviolet or UV/visible curable coatings, adhesives, masks, sealants, potting, tacking, and laminating materials. The systems use high-intensity UV/visible light sources for fast curing. The UVC-6 has a 15 cm (6 in.)



Dymax Corporation

Measurement/Testing/Evaluation

A 48-page catalog (M-97), printed by **Velmex**, features 235 *motor-driven unislide assemblies for scanning, feeding, or incremental positioning*, for use by material scientists in research and development, manufacturing, or metal testing applications. The catalog includes a selection of linear and rotary Unislide mechanical assemblies, a selection of electrical motors and controls, and an appendix of assembly drawings. For a copy, contact: Velmex Inc., P.O. Box 38, 7550 Rte. 5 & 20, East Bloomfield, NY 14443; tel: 1/800/642-6446; fax: 716/657-6153.

AutoSimulations has developed *AutoMod simulation software and AutoSched scheduling software* for Windows 95. AutoMod has CAD-like drawing capabilities, as well as a simulation language for modeling material flow and manufacturing. AutoSched is a simulation-based finite capacity planning tool that schedules all factory constraints: shift schedules, task selection rules, batching, preventative maintenance, machine efficiency, and operator skill classes. For further information, contact: AutoSimulations Inc., 655 Medical Dr., Bountiful, UT 84010; tel: 801/298-1398; fax: 801/298-8186.

Eshape for Windows is **Entek IRD International's vibration analysis program**. The program simplifies the task of building, collecting, and analyzing operating deflection shapes (the study of machine motion due to internal or external operating forces). For further information, contact: Jeffery P. Watkins, Software Product Manager, Entek IRD International Corp., Cincinnati, OH; tel: 513/563-7500.

The Kombistereo *stereomicroscope* from **Leica** has both a stereomicroscope objective, for an overall view of specimens at

low magnifications, and a microscope objective for magnifications of interesting details from 6.4 \times to 600 \times . The instrument can analyze complete objects from overview to detail without destroying typical structures. For further information, contact: Leica Inc., 111 Deer Lake Rd., Deerfield, IL 60015; tel: 847/405-0123; fax: 847/405-0147; e-mail: 104704.1375@compuserve.com; web: <http://www.leica.com>.

NDT International is manufacturing the 710 *ultrasonic thickness gage kit*. The device is a microprocessor-based gage designed for thickness measurement of corroded metals such as piping, storage tanks, or pressure vessels. The kit includes the gage, a transducer, a battery pack, a couplant, a carrying case, and operator instructions. The instrument has a range of 7.5 to 50 cm (0.03 to 19.9 in.), depending on transducer used and material measured. For further information, contact: NDT International Inc., 834 McLennan Ct., Port Coquitlam, B.C., Canada V3C 5Z6; tel: 604/944-1571; fax: 604/552-1074; web: <http://infomatch.com>.

A six-page brochure describing the S-Series *benchtop universal testing machines for plastics and other materials* is available from **Tinius Olsen Testing Machine Company**. The brochure explains the features of the machines, which determine tension, compression, shear, flexural, and other mechanical and physical properties for most materials. The four benchtop units have capacities up to 50 kN (11,250 lbf). For a copy of bulletin BT-1, contact: Tinius Olsen Testing Machine Co. Inc., P.O. Box 429, Willow Grove, PA 19090-0429; tel: 215/675-7100; fax: 215/441-0899; e-mail: info@tiniusolsen.com; web: <http://www.tiniusolsen.com>.

fiberglass belt; the UVC-12 a 30 cm (12 in.) belt. System 6/D are available with a choice of two focused beam (1200-EC) or two floor (5000-EC) light sources. UVC/F conveyors are available with one or two Fusion F300 electrodeless lamps. For further information, contact: Dymax Corp., 51 Greenwoods Rd., Torrington, CT 06790; tel: 860/482-1010; fax: 860/496-0608.

Shimadzu Scientific Instruments is producing the RF-10AXL, a *spectrofluorometric detector for high-performance liquid chromatography*. The optical system has a signal-to-noise ratio greater than 300 for Raman spectrum of water. In addition, the use of appropriate excitation and emission spectral scan conditions together with wavelength time programming allows sensitive detection of multiple trace-level components. For further information, contact: Shimadzu Scientific Instruments Inc., Columbia, MD; tel: 410/381-1227; fax: 410/381-1222; e-mail: support@shimadzu.co.jp; web: <http://www.shimadzu.co.jp>.

Oxford Instruments has developed Link OpalMap, a *crystal orientation mapping system for the scanning electron microscope*. The system drives the microscope electron beam over the sample to collect an electron backscattering pattern (EBSP) at each grid of points. Then, the EBSP is solved to calculate the crystal orientation at each point. From this data, maps of the crystal orientation can be displayed and the microstructure of the sample regenerated. For further information, contact: Oxford Instruments, Microanalysis Group, 130 A Baker Ave. Ext., Concord, MA 01742, tel: 508/369-9933; fax: 508/369-8287; e-mail: maginfo@oxford.usa.com.

At a conference in Philadelphia, two speakers endorsed the *Virtual Manufacturing Simulation Assessment Validation Environment program* from **SimTech**, the simulation software vendors' association. James Poindexter of Air Force Wright Laboratories and Rendell Hughes of Lockheed Martin spoke on their joint use of the program over 4.5 years in an \$8.8 million project, as part of the Joint Strike Force aircraft. In a related story, SimTech is offering a Champions Club for

those who use simulation technology. To qualify, individuals are asked to provide a profile of an enterprise system they have modeled, with a description of the benefits or results. The club is intended as an information exchange between regular users of simulation software. For further information, contact: Bill Hakanson, Executive Director, 303 Freeport Rd., Pittsburgh, PA 15215; tel: 412/781-3255; fax: 412/781-2871; e-mail: info@sim-tech.org.

The series 200 line of *wire-wound RTD temperature sensors and transmitters* from Burns Engineering lets the user configure his own RTD assembly. The component design starts with a coil suspension construction technique, in which the element is coil wound with platinum wire to minimize stress and ensure accuracy over time. Each coil is suspended in a ceramic insulator and surrounded by a ceramic powder to enhance the vibration and shock resistance of the element without affecting the ability of the coil to expand and contract. A metallurgical bond is then formed between the element leads and the internal sheath leads to eliminate lead wire short-out. The instrument is then encapsulated with compacted ceramics for durability. For further information, contact: Jim Sulciner, Burns Engineering Inc., 10201 Bren Rd. E, Minnetonka, MN 55343; tel: 1/800/328-3871; fax: 612/935-8782.



Burns Engineering Inc.

Stat-Ease has available a two-page, fold-out brochure on Design-Expert 5 for Windows. The *software for experiment design* tests two- or three-dimensional de-

signs. Three-dimensional designs can be rotated and two-dimensional contours projected from three-dimensional plots. The program will test 15 factors and 10 process variables simultaneously. For a copy, contact: Stat-Ease Inc., Hennepin Square, Ste. 191, 2021 E. Hennepin Ave., Minneapolis, MN 55413-2723; tel: 612/378-9449; fax: 612/378-2152.

Atlas Electric Devices has published a four-page brochure on its *material testing instruments for weathering, lightfastness, and corrosion*. In addition to photographs and descriptions of the instruments, charts compare the relative irradiance by wavelength of the available lamps—xenon arc, metal halide, fluorescent, and carbon arc—to sunlight. For corrosion testing, the company has standard, cyclic, and specialty (humidity, CASS, Kesternich, and SO₂) chambers. For a copy, contact: Atlas Electric Devices Co., 4114 N. Ravenswood Ave., Chicago, IL 60613; tel: 312/327-4520; fax: 312/327-5787.

Nikon is producing the Veritas VM-500 *video measuring system*. The system has a working envelope of 50 × 53 × 15 cm (20 × 21 × 6 in.) and a stage speed of 20 cm/s (8 in./s). The optical system has a computer-controlled zoom ratio of 10 to 1. The illumination system has six channels of computer-controlled fiber optics. For further information, contact: Nikon Inc., 1300 Walt Whitman Rd., Melville, NY 11747-3064; tel: 516/547-4200.



Nikon Inc.

The TCS NT *laser-scanning confocal microscope system for materials research* from Leica provides perfect registration of ultraviolet and visible fluorescence images from 0.35 to 0.9 mm (0.014 to 0.036 in.) in three dimensions. The instrument has five detectors: four reflected light/fluorescence and one transmitted light. A high-resolution z-stage repositions accurately. For further information, contact: Leica Inc., 111 Deer Lake Rd., Deerfield, IL 60015; tel: 847/405-0123; fax: 847/405-0147; e-mail: 104704.1375@compuserve.com; web: http://www.leica.com.

The RID-10A *refractive index detector for high-performance liquid chromatography* from Shimadzu has double temperature-controlled housing of the optical system to shorten the warmup time for stabilizing the detector. Its flow system, high-pressure flow cell, and four-partitioned photodiode detector provide a wide dynamic range in three operation modes (analytical, semipreparative, and preparative). For further information, contact: Shimadzu Scientific Instruments Inc., Columbia, MD; tel: 410/381-1227; fax: 410/381-1222; e-mail: support@shimadzu.co.jp; web: http://www.shimadzu.co.jp.

The American Welding Society, Miami, FL, and the American Society for Nondestructive Testing are considering a *merger of their Level II NDE certification programs*. The societies are working to determine if a single qualification program for nondestructive examination personnel who inspect welds would address all aspects of nondestructive evaluation and the welding industry. For further information, contact: American Society for Nondestructive Testing Inc., 1711 Arlingate Ln., P.O. Box 28518, Columbus, OH 43228-0518; tel: 1/800/222-2768; fax: 614/274-6899; web: http://www.asnt.org/ndt.

International Research/Manufacturing Centers

Coating powdered calcite (the basic component of limestone-based objects such as marble statues and highway bridges and tunnels) *using a method developed at*

Sandia National Laboratories can increase its longevity by as much as a factor of ten when it is submerged in a solution with acidity roughly that of mild acid rain.

The coating makes use of a two-sided molecule that bonds to the carbonate structure as well as to an overlying protective layer involving silicon. Sandia is working

with the Metropolitan Museum of Art, New York, on the project. For further information, contact: Sandia National Laboratories, Albuquerque, NM 87185-0167; tel: 505/844-8066; fax: 505/844-6367; web: <http://www.sandia.gov>.

In other news from Sandia National Laboratories, engineers testing a one-tenth scale model of the *steel containment vessel used in Mark II-class commercial reactors* showed the vessel can withstand pressure six times its scaled design basis. The model, specially cast at Hitachi Works in Japan, was tested in a concrete fragment barrier and withstood pressure of nearly 0.7 ksi (5 MPa) before springing a leak. The test also validated Sandia com-

puter modeling, which predicted the vessel would fail at 0.652 ksi (4.5 MPa); the actual failure occurred at 0.676 ksi (4.6 MPa). For further information, contact: Sandia National Laboratories, Albuquerque, NM 87185-0167; tel: 505/844-8066; fax: 505/844-6367; web: <http://www.sandia.gov/labnews/ln12-20-96/contain.html>.

According to a report from Battelle, following years of stagnation, *investment in research and development (R&D) will show a real increase in 1997*. Research and development expenditures in 1997 are expected to increase 4.2% to \$192 billion. The increase signals the beginning of a trend that will last into the 21st century.

University View

The European Powder Metallurgy Association has chosen the winners of its *Powder Metallurgy Thesis Competition 1996*. In the Master's (diploma) category, Marc Holski, Institute of Materials Science at the Technical University, Aachen, Germany, won for his work on the "Optimization of Cutting Parameters when Drilling Sintered Stainless Steel 430 LHC," which explores ways to reduce the cost of machining of P/M stainless steel grades that are normally difficult to machine. Mr. Holski concluded that cutting speed has a higher influence on tool life and drilling cost than feed, but that the effects of feed optimization, the effects of coolant, MnS addition, and sintering atmosphere should be taken into account. In the Doctorate (Ph.D.) category, Thomas Viatte, Departement de Physique, Ecole Polytechnique Federale de Lausanne, Switzerland, won for his thesis, "High-Temperature Mechanical Properties of Ti (C,N)-Mo₂C-Ni Cermets Studied by Internal Friction and Creep Measurement." By measuring creep and friction, Mr. Viatte evaluated the deformation of cermets over the entire temperature range in which these materials are used, for example, in machining. By controlling the distribution of molybdenum between the different phases composing the material, the best compromise between high-temperature resistance and low-temperature toughness can be found, providing superior performances at high cutting speeds. For further information, contact: European Powder Metallurgy Association, Old Bank

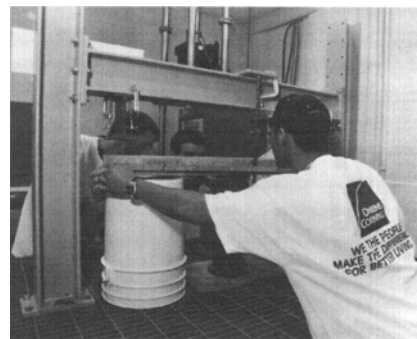
Buildings, Bellstone, Shrewsbury SY1 1HU, U.K.; tel: 44/(0)1743/248899; fax: 44/(0)1743/362968; e-mail: epma@diag.pipex.com.

In work supported by the Swiss National Science Foundation, a team of researchers at the *Ecole Polytechnique Federale de Lausanne*, Switzerland, have carried out a *chemical reaction in what may be the world's smallest set of test tubes: carbon nanotubes with inside diameters and lengths of less than 0.001 cm (0.0004 in.)*. The researchers formed carbon nanotubes using well-established techniques, then opened the ends of the tubes and allowed capillary action to fill them with silver nitrate (AgNO₃). Finally, they decomposed the AgNO₃ into metallic silver by heating the tubes with a beam from an electron microscope. The researchers found that only a small percentage of the nanotubes they produced—those with diameters of at least 0.0004 cm (0.00016 in.)—were filled with the silver nitrate. This shows that the capillary action used to fill the tubes depends on the diameter of the nanotubes. The relationship between size and capillary action is opposite of what would be expected in the "macro" world, where narrower tubes normally create a stronger attraction for liquids. But in nanoscale structures like the tiny tubes, the researchers believe the cylindrical shape alters electrical charges to cause reduced reactivity. The team developed mathematical formulas that predict the capillary action associated with tubes of different diameters. Even small differences in the polarizations of the nanotubes

Federal spending will rise only 0.5%, to \$62.2 billion, but industry will increase its spending by 6.0%, to \$120.5 billion. The remainder, \$9.2 billion, will be provided by universities and other nonprofit organizations. A key factor in the 1997 forecast is the fact that industrial support is now dominating both the amount and the growth of R&D spending. The Federal government, which once provided 50% of all R&D support, now accounts for only 34%. Most of the decrease in federal R&D funds has come through reductions in the budget of the Department of Defense. For further information, contact: Battelle, 505 King Ave., Columbus, OH 43201-2693; tel: 614/424-6512; fax: 614/424-3889.

had significant effects on the amount of capillary action that occurred. The researchers believe their research could have a range of applications: developing conductive wire inside a graphitic sheath, doping materials to produce encapsulated compounds or to create other elongated nanostructures for use in flat panel displays, and in microelectronics. For further information, contact: Dr. Walter A. de Heer, Georgia Institute of Technology, Atlanta, GA 30332-0828; tel: 404/894-6814; e-mail: deheer@nxs.gatech.edu.

Competitors from seven North American universities were challenged to design and construct a 14 × 6.3 cm (5.5 × 2.5 in.) concrete beam reinforced with glass-fiber-reinforced polymer. The students vied for a total of \$2000 in cash prizes as their beams were tested to failure. First place for "Highest Ultimate Load" went to North Carolina State University, second to Sherbrook University, and third to Winona State University. First place for



Owens Corning

"Most Accurate Prediction of Load" went to Sherbrook University, second to North Carolina State University, and third to Winona State University. The competition was cosponsored by **Owens Corning**. For further information, contact: Owens Corning, Fiberglas Tower, Toledo, OH 43659; tel: 419/248-8000.

Dr. John T. McDevitt, a professor and laboratory research director at the **University of Texas at Austin**, has been performing research, supported by the Office of Naval Research, on *copper-oxide superconductors*. His web site gives information on a high- T_c superconductor self-assembly method, the development of superconductor-based optical devices, conductive polymer/superconductor as-

semblies, and the environmental reactivity of high- T_c materials. For further information, contact: Dr. John T. McDevitt, University of Texas—Austin; web: <http://www.cm.utexas.edu/mcdevitt/interests.html#er>.

The Analytical Instrumentation Facility (AIF) at **North Carolina State University** is a series of *materials characterization laboratories* that provide industry and education with analytical services and expertise. In addition to offering expertise, access, and training in materials characterization, AIF is involved in research and development programs designed to improve methods of materials characterization. The AIF laboratories are the Variable Pressure Scan-

ning Electron Microscope Lab, the High-Resolution/Low-Voltage Field Emission Scanning Electron Microscope Lab, the High-Performance Secondary Ion Mass Spectrometry Lab, the Atomic Force Microscope & Scanning Tunneling Microscope Lab, the Electron Beam/IC Test Lab, the Energy-Dispersive X-Ray Microanalysis Lab, the X-Ray Diffraction Lab, the Optical Metallography Lab, the Specimen Preparation Lab, and the Photo Imaging & Dark Room Lab. For further information, contact: NCSU-AIF, Box 7916, North Carolina State University, Raleigh, NC 27695-7916; tel: 919/515-2128; web: http://www2.ncsu.edu/ncsu/research_outreach_extension/centers/aif.html.

Literature/Data Sources

The **Aluminum Extruders Council** reports in a *survey of U.S. and Canadian extruders* that the fastest growing markets from 1990 to 1995 were automotive, furniture, distributors, and jobbers. The survey also found that more extruders served four or more markets than during the previous five-year period. Metal purchased and average sales per press increased, and the industry's gross sales for 1995 reached \$6 billion. For further information, contact: Aluminum Extruders Council, 1000 N. Rand Rd., Ste. 214, Wauconda, IL 60084; tel: 847/526-2010; fax: 847/526-3993; e-mail: aec@mc.net.

An 84-page *publications catalog* from the **Materials Research Society** covers books, videotapes, and CD-ROMs on biomedical materials, catalysts, ceramics and composites, computational methods, electronic materials and processing, education, glasses and insulators, materials characterization, metals and alloys, novel processing/applications, nuclear waste management, polymers, and sensors. For a copy, contact: MRS, 9800 McKnight Rd., Pittsburgh, PA 15237-6006; tel: 412/367-3003; fax: 412/367-4373; web: <http://www.mrs.org>.

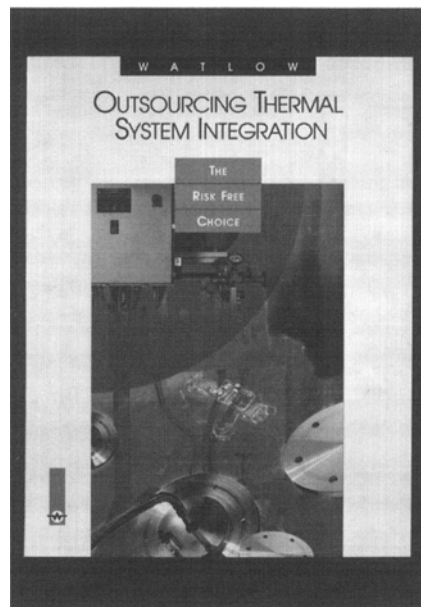
Nikon Instrument Group has available a brochure on the company's *full line of OEM instrument components and systems*: optics, focusing mounts, microscope stands, mechanical components, stereo microscopes, lamp housings, illumination systems, and power supplies. For a copy, contact: Nikon Instrument

Group, Nikon Inc., 1300 Walt Whitman Rd., Melville, NY 11747-3064; tel: 800/52-NIKON x P679; web: <http://www.mikonusa.com>.

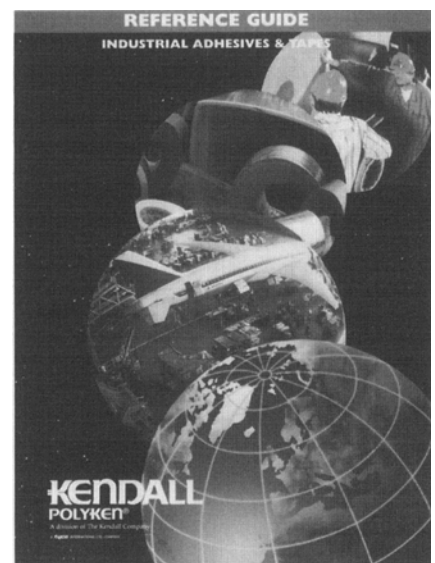
A brochure from **Watlow Electric Manufacturing Company** describes the expansion of the company's *thermal system product line*: heaters, sensors and controllers. The guide explains how Watlow can help customers with axial and SMT assembly, PCB test and calibration, machining, welding and brazing, sheet metal fabrication, finishing, agency approvals, plastic molding, metal casting, product test-

ing/compliance system application, purchasing/contracting, and literature and documentation support. For a copy, contact: Watlow Electric Manufacturing Co., 12001 Lackland Rd., St. Louis, MO 63146; tel: 314/878-4600; fax: 314/878-6814.

Kendall-Polyken has available a reference guide to its *industrial tapes and adhesives*. The company produces natural rubber, synthetic, and butyl rubber adhesives; and acrylic and silicone adhesives. Tape backing materials offered include cotton cloth, polyethylene film, polyester film, fiberglass, polypropylene foil, and



Watlow Electric Manufacturing Company



Kendall-Polyken

aluminum foil. For a copy, contact: Kendall-Polyken, 15 Hampshire St., Mansfield, MA 02048; tel: 508/261-6200; fax: 508/261-6271.

A 95-page *magnetic powder cores catalog*, published by **Arnold Engineering Company**, includes MPP, Hi-Flux, and Super-MSS powder cores. The catalog contains design information, formulas, and definitions for design calculations, comparative magnetic curves of the powder cores for performance evaluation, and electrical and physical specifications, along with single-layer winding data. For a copy, contact: Arnold Engineering Co., 300 N. West St., Marengo, IL 60152; tel: 815/568-2000; fax: 815/568-2228; telex 25-7448.

Widia North America, a carbide tool manufacturer, has an eight-page brochure on the company's line of *indexable carbide inserts, milling cutters, drills, tool holders, and grooving tools*. The tools are available in true inch and metric sizes. For a copy, contact: Widia North America, 4701 Marburg Ave., P.O. Box 92950, Cincinnati, OH 45209; tel: 1/888/872-9434; fax: 513/841-8329; e-mail: tushar_desai@milacron.com.

Technomic Publishing has published *Thermal Conductivity 23*, a 600-page book of the proceedings of the conference held 28 Oct to 1 Nov 1995 in Nashville, TN. Most of the reports examine developments in the thermal properties and behavior of specific classes of engineering, electronic, and optical materials. Additional reports cover advances in test methods and theory. The volume is divided into ten sections: techniques, coatings and thin films, theory, composites, insulation, fluids, metals, contact and joints, ceramics, and organics. For a copy (\$165.00), contact: Technomic Publishing Co. Inc., 851 New

In Business

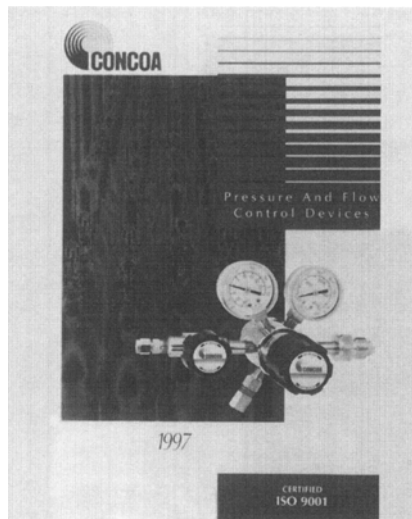
Eurotherm Controls Inc., Reston, VA, has purchased **Continental Industries**, Mesa, AZ, a manufacturer of solid-state relays and heat sinks. The acquisition expands Eurotherm's position as a supplier of temperature-control technology.

Peddinghaus Corporation, Bradley, IL, has begun construction on a 4300 m²

Holland Ave., P.O. Box 3535, Lancaster, PA 17604; tel: 717/291-5609; fax: 717/295-4538; e-mail: marketing@techpub.com; web: <http://www.techpub.com>.

William Reeves, a professor of industrial technology at **Ohio University**, has published a textbook, *Technology of Fluid Power*, for undergraduate engineering and technology students. Written primarily for beginning fluid power courses in programs such as industrial technology, mechanical engineering, manufacturing engineering, and industrial engineering, the textbook covers the fundamental concepts and basic skills necessary to understand and design a variety of fluid circuits. For a copy, contact: Ohio University, Russ College of Engineering and Technology, 169 Stocker Center, Athens, OH 45701; tel: 614/593-0894; fax: 614/593-0659.

Concoa has printed a 104-page catalog of *gas-pressure and flow control devices*. The catalog contains a materials compata-



Concoa

(47,000 ft²) manufacturing facility in Andrews, SC. At the facility, the company will produce the Bradley hydraulic steelworker, Anglemaster, Fabripunch, materials-handling systems, hydraulic portable punches, and shear product lines.

Wyle Laboratories Inc., El Segundo, CA, has acquired Westinghouse Western

bility chart for specific gases, flow-performance charts, conversion-factor tables, and information on Compressed Gas Association connections. The catalog also has directions for how to order equipment to modify series configurations to fit specific installations; defines applications and features for regulators, automatic switchover system, modular distribution systems, and flowmeters. For a copy, contact: Jonathan Ernst, Scientific Products Marketing Manager, Controls Corporation of America, 1501 Harpers Rd., Virginia Beach, VA 23454; tel: 1/800/225-0473.

International Specialty Products, Wayne, NJ, a manufacturer of specialty chemicals, has launched a home page on the internet at <http://www.ispcorp.com>. The page contains corporate business and financial information, as well as product information by market group: advanced materials, agricultural chemicals, beverage, filters, fine chemicals, industrial markets, pharmaceutical, and preservatives. An e-mail link is also available for requesting product and financial information from the company.

Advanced Polymer Sciences has produced a 20-min videotape on *Siloxirane, a polymer component used in the company's coatings*. The video explains the chemical background of the polymer and compares it to epoxies, phenolics, rubber, and stainless steel. When heat cured, Siloxirane-based coatings are used to protect surfaces from corrosion, abrasion, and high temperatures. With ambient curing, the polymer is used on steel structures, concrete, and containment areas. For a copy of the video, contact: Advanced Polymer Sciences, P.O. Box 269, Avon, OH 44011; tel: 1/800/334-7193; fax: 216/937-5046.

Service Center, Beaumont, CA. The acquisition of the valve, pump, and motor service center will enhance customer support for the western United States and the Pacific Rim.

The Special Metals Plant, Canton, OH, of **Republic Engineered Steels**, Massillon, OH, has received ISO 9002 certification.

The plant produces stainless, tool, and vacuum-remelted steels, as well as air-melted forged products.

Taber Bushnell Inc., Minneapolis, MN, a metal stamping company, has expanded its manufacturing, assembly, and warehouse space by 2500 m² (27,500 ft²).

Seco/Warwick Corporation, Meadville, PA, will provide manuals and nameplates in both Spanish and English for an aluminum brazing system purchased by **AAISA** for a plant expansion in Maracay, Venezuela. The system will be used to braze aluminum heat exchangers for automotive air conditioning.

Ford Motor Company, Dearborn, MI, has given Q1 certification to **Holcroft**, Livonia, MI, a division of Thermo TerraTech Inc. The company supplies Ford with controlled-atmosphere furnace systems for heat-treating automotive parts.

Hoover Materials Handling Group Inc., Alpharetta, GA, has opened a warehouse in Vancouver, WA, to reduce delivery times for containers to customers in Oregon, Washington, and British Columbia.

BFGoodrich Aerospace, Farnborough, U.K., has purchased a license from **MicroMet Technology Inc.**, Mineral Springs, NC, to develop and market Rhondite steel materials for aerospace applications. These materials have good

mechanical and physical properties in the near-net as-cast condition.

Van Waters & Rogers Ltd., Richmond, British Columbia, Canada, will distribute Tween, Span, Arlacel, Brij, Myrj, Renex, and Arlamol surfactants in Canada for **ICI Surfactants**, part of **ICI Performance Chemicals**, Wilmington, DE.

Industry Week magazine gave an award for one of 25 Technologies of the Year to **Neural Applications Corporation**, Coralville, IA, for the company's work in the optimization and control of total energy input into an electric arc furnace and its impact on the steel and energy industries.

Watlow Electric Manufacturing Company, St. Louis, MO, is celebrating its 75th anniversary in 1997. The company manufactures industrial heaters, sensors, and controls.

After acquiring **Widia**, Essen, Germany, last year, **Cincinnati Milacron**, Cincinnati, OH, has formed **Widia North America**, Cincinnati, OH, to market the company's line of cutting tools in the United States. The company produces carbide inserts, milling cutters, drills, tool holders, and grooving tools.

Ingersoll-Rand Company, Woodcliff Lake, NJ, has purchased a majority stake in **Wadco Tools Ltd.**, Sahibabad, India, a manufacturer of pneumatic power tools

for industrial assembly. **Wadco**, established in 1976, employs 200 people.

The Customer Analytical Department of **Nalco Chemical Company**, Naperville, IL, has received ISO-9002 certification. The department, which analyzes water, deposits, and other samples, has had all phases of its operations certified.

Computational Systems Inc. (CSI), Knoxville, TN, has created a subsidiary, **Status Technologies**, to focus on smart sensor technology for machinery condition monitoring. In other news, under an original equipment manufacturing agreement signed by the company and **Everest Imaging**, Austin, TX, CSI will develop firmware for existing digital imaging instrumentation, and Everest will market the equipment as the ImageSaver, for use with videoprobes, flexible fiberscopes, and rigid borescopes in remote visual inspection applications.

The **Society of the Plastics Industry's** Structural Plastics-Transportation award was given to an air intake manifold upper plenum designed by a team from **Alliance Precision Plastics**, **Delphi Energy & Engine Management Systems**, and **DuPont Automotive**, Troy, MI, the plenum is 430 × 280 × 90 mm (17 × 11 × 4 in.) high, is made of Zytel 70G33 nylon resin, and serves as a mounting point for other components.

Kudos

International Specialty Products, Wayne, NJ, a chemical producer, has appointed **Joseph Boelter** vice president and business director for industrial markets, a business unit of the company. Mr. Boelter had been a business director at BASF Corporation.



T.R. Strenk

Thomas R. Strenk has been named General Manager of **Connecticut Metallurgical Inc.**, East Hartford, CT, a materials testing laboratory and a subsidiary of **MMR Group Inc.**, West

Boylston, MA. Mr. Strenk had been a polymer/metals chemist at the **MMR Group's** Massachusetts Materials Research Inc. subsidiary.

The **American Association for the Advancement of Science**, Washington, DC, presented awards to five scientists during its annual meeting: **D. Allan Bromley**, **Yale University**, for his work in heavy ion science; **Philip W. Hemily**, **U.S. National Research Council**, for strengthening international collaborative relations in scientific research; **Alan Friedman**, for his expansion of the **New York Hall of Science**; and **Derrick K. Rollins**, **Iowa State University**, **William M. Jackson**, **Univer-**

sity of California at Davis, and **Joseph G. Gall**, **Carnegie Institution of Washington**, for mentoring minority students studying science.

Jerry M. Woodall has been elected 1997 President of the **American Vacuum Society**, New York. Dr. Woodall is the Charles William Harrison Distinguished Professor of Microelectronics at Purdue University. He received a B.S. in metallurgy from MIT and a Ph.D. in electrical engineering from Cornell University.

PPG Industries, Pittsburgh, PA, has inducted five employees into the company's

Collegium, in recognition of contributions to product development: **Philippe Faucher**, for work in cationic electrocoat technology; **James J. Finley**, for work on solar-control glass coatings and on electrochromic plastic lenses; **Hilary E. Holste**, for work on resin production; **John F. McConnell**, for advances in furnace technology; and **Barry VanGemert**, for photochromic technology development.

Dr. Robert S. Hamilton has been named Director of Advanced Ceramic Materials for **Washington Mills Electro Minerals Corporation**, North Grafton, MA, a producer of fused electro minerals used in the manufacture of refractories, ceramics, and abrasive products. Dr. Hamilton had been the Manager of Ceramic Engineering at

American Superconductor Corporation, Westborough, MA.

Jacques Bougie, Chairman and Chief Executive Officer of Alcan Aluminum Ltd., Montreal, Quebec, Canada, delivered the Industry Keynote Address on the state of the industry at the 1997 annual meeting of the **Aluminum Extruders Council**, Wauconda, IL.

ICI Group, Wilmington, DE, has appointed **Peter W. Johnson** the President of its newly formed **ICI Performance Chemicals** business. Mr. Johnson had been regional director, Americas, for ICI Surfactants.

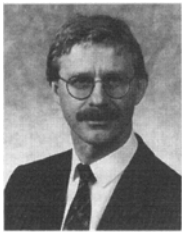
Kvaerner Davy, Pittsburgh, PA, has named **James J. McGrath** as head of its Pittsburgh operations. Mr. McGrath had been Vice President and General Manager of the company's Engineering and Construction Division.



von Schlippenbach

Dr. Uli von Schlippenbach has been named Vice President, Metallurgy Division, **Degussa Corporation**, Ridgefield Park, NJ. Dr. von Schlippenbach holds a Ph.D. from the Technical University, Aachen, Germany.

A Note from the Editor: Staff News



R. Farrow

Rachel Farrow, journal coordinator at **ASM International** for the past three years, has been promoted. In addition to those responsibilities already hers for the *Journal of Materials Engineering and Performance* and others, she is now also manager, International Metallographic Society (IMS) Services. She will be working with Dr. William W. Scott, associate managing director at ASM, to coordinate meeting the needs of the IMS members and Board of Directors through the ASM staff.

During her three years at ASM, Rachel has coordinated the activities associated with the *Journal of Phase Equilibria*, the *Journal of Materials Engineering and Performance*, and the *Journal of Thermal Spray Technology*. She has also prepared

feature articles for inclusion in *ASM News*, the monthly membership publication of ASM. In addition, she has provided assistance in promotion and product preparation for alloy phase diagram publications.

Rachel is leader of ASM's EXCEL Training Team, the team that trains ASM personnel to function successfully in a team environment.

Rachel graduated from Hiram College, Hiram, OH, with a degree in communications and has used her skills not only to keep our journal on schedule, but also to keep it the high-quality publication the readers enjoy.

We wish her well as she undertakes her new responsibilities for ASM in this very important area of international cooperation.
