

A summary of new products and services for materials research...

Dry Pumping for Vacuum Processes: Leybold Vacuum Products' 16-page brochure describes DRYVAC® dry compression vacuum pumps that utilize a four-stage hook-and-claw principle. The DRYVAC® pumps can provide high-compression ratios at high-pressure ranges, process integrity through elimination of oil back-migration, purging at various pump stages to combat particle formation and increase pump life, and lower operating costs through elimination of oil filtration systems and pump oil purchases. The brochure compares dry to wet vacuum pumping, safety, cost, and maintenance. Included are pump design illustrations and flow schematics, gas pressure and pumping curves, worldwide service locations, and technical data and ordering information on 11 models.
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Non-toxic Hard Chrome Coatings: BeamAlloy's CHROMION™ process allows users to deposit chrome and other metallic coatings on component surfaces made from most metals, ceramics, plastics, glasses, and advanced composites, without using or producing toxic chemicals. Coatings up to 0.01 mm thick can be deposited on engineered components such as gears, bearings, pump impellers, and valves to selectively improve wear- and corrosion-resistance. The CHROMION™ coatings are harder than chemically deposited chrome and nickel coatings because they are hydrogen-free, fully dense, and deposited in compression. Applications include components used in aircraft/aerospace systems, medical devices, chemical processing equipment, and oil/gas drilling and logging equipment.
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Plasma Cleaning for Semiconductors: Balzers' PC²M 406 plasma chemical cleaning module removes hydrocarbons, boron, phosphorus, sulfur, and other contaminants from the surfaces of semiconductor substrates, offering an alternative to conventional wet-chemical processes. Oxidation layers can be reduced without damaging the crystal structure of the semiconductor and without corrosive chemicals. The unit can be used in conjunction with Balzers' ultra-high-vacuum systems.
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Nondestructive Ultra-Low-Voltage Backscatter Electron Detector: Galileo Electro-Optics' SEM 6484 is designed to upgrade performance of existing JEOL Series JSM 820, 840, 6300, and 6400 scanning

electron microscopes to closely match new models. The ultra-low-voltage imaging capability of this microchannel plate-based, backscatter and secondary electron detector can be used in nondestructive testing of semiconductor and sensitive materials and in failure analysis applications. Two independent on-axis anodes provide multiple signal processing options. Symmetrical SE imaging, topographical imaging, pure backscatter imaging, and various combinations of these are possible with a single detector.

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Four-Inch MBE System: Intevac's MOD GEN II MBE system handles four-inch wafers. Users may upgrade to the four-inch platform, and the original one-inch Varian MBE-360 can be upgraded through two-, three-, and four-inch capabilities. Systems may be configured to enable users to work within the II-VI, IV-VI, and Group IV material systems.

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Superconductor Synthesis Tabletop Apparatus: The QUICKPRESS™ from Depths of the Earth may be used for hot isostatic pressing, new materials synthesis, thermodynamic studies, electrical studies, and other experiments requiring generation of high pressures at high temperatures. The table-top piston-cylinder device has a temperature range of 25-1,600°C, a pressure range of 5-25 kilobars, and sample container volume of 30 mm³. The QUICKPRESS™ is suitable for creating superconductive materials at high pressures.

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High-Torque Overhead Mixer: Compact Heidolph electronic stirrer from Brinkmann Instruments features a constant torque motor with up to 100W of stirring power that provides reproducible speeds regardless of load. The unit's drive mechanism has a brushless, sparkless dc motor and a sealed control panel to protect from splashes. Housing ventilation slots are eliminated because the motor and drive mechanism do not become hot. Control and stability are provided by dual-speed ranges of 40-100 rpm for controlled high-torque mixing of more viscous materials, and 200-2,000 rpm for fast mixing of less viscous materials. The digital readout displays both speed and torque, and an automatic safety shut-off prevents motor damage if constant overload occurs.

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Directory of Testing, Research, and Inspection Firms: The American Council of Independent Laboratories' 1992-93 *Directory: A Guide to Leading Independent Testing, Research, and Inspection Firms in America* allows users reference to third-party, commercial scientific, or engineering services. The new edition highlights the capabilities of 447 U.S. and foreign companies offering a broad range of services. Company listings are cross-referenced in indexes containing more than 300 product and service categories and nearly 200 testing fields. A geographical index provides addresses and telephone and fax numbers for more than 1,000 facilities.

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Quantitative Color Image Analysis Software: Media Cybernetics' Image Pro Plus 2.0 can process 24-bit color and grayscale or black-and-white images. Counting, sizing, statistical, and image enhancement capabilities make the software suited for applications where examination of an image can help in understanding processes, making comparisons, or identifying microscopic objects. A 386-based computer is required, and multiband segmentation allows users to separate objects from background by specifying ranges of hue, saturation, and intensity. Various types of capture are supported, including camera, microscope with camera, VCR, scanner, and file import. Memory management allows scanning of large images at full scanner resolution, even when they are larger than display memory size.

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High-Purity Products: Free 483-page catalog from Electronic Space Products International details a diverse number of metals, chemicals, rare earths, exotic and precious metals, and other high-purity products. The catalog is divided into nine categories that include high-purity metals and compounds, alloys, sputtering targets, vacuum deposition and evaporation materials, phosphors, fasteners, single crystals, ceramics, and DeContam, a biodegradable, noncorrosive, nonfoaming cleansing agent.

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Materials Testing Newsletter: Instron's free newsletter, *Instron World*, covers new developments in materials testing applications, equipment, and software. Also included are sections on testing accessories and training news.

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What do all these have in common?



The uncommon solution...Schlumberger's 1260.

Advanced, high accuracy, component and materials testing demands the most advanced instrumentation. Schlumberger's 1260 keeps you decades ahead (10 μ Hz – 32 MHz) for the measurement and analysis of gain-phase, group delay and impedance.

In use worldwide, the 1260 has already proven itself in materials research, including dielectrics and ceramics, battery development and electrochemical investigations, as well as circuit design and electronic component testing.

Can you afford to be left behind in the field of electronics and materials testing? To find out more about the power of impedance analysis call us today on 1-800-225-5765.

Please visit Booth No. 902 at the MRS Equipment Exhibit/Table Top Display in Boston, December 1-3, 1992.

Schlumberger Technologies

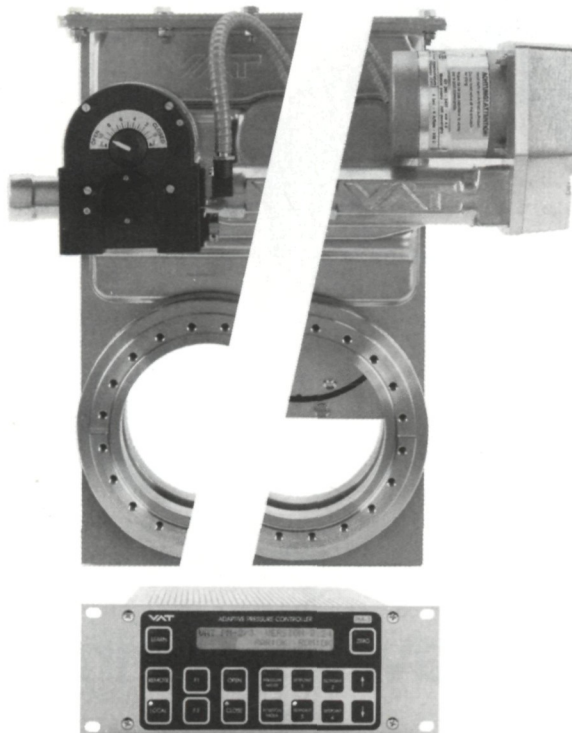
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INTRODUCING THE FIRST THROTTLE VALVE WITH A DUAL PERSONALITY.

One valve. Two jobs. That's right, VAT developed the first valve that throttles *and* seals. We've incorporated our patented VATLOCK sealing mechanism into our line of high performance throttle valves and produced the Series 64 Throttling Control Gate Valve. One valve that does both jobs. But then, what else would you expect from the world leader in innovative vacuum valve technology?

We also gave the Series 64 Pressure Control System a mind of its own. It's so smart, it can automatically adapt to varying operating conditions for a smooth, stable flow. And its fast response time ensures extraordinary accuracy over a broad dynamic range.

For more information about our Series 64, read our technical profile column to the right.



1-800-VATLOCK
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Tel: (617) 935-1446

Please visit Booth No. 4 at the MRS Equipment Exhibit/Table Top Display in Boston, December 1-3, 1992.

VAT Technical Profile

The Series 64 is a highly sophisticated yet easy-to-use system that incorporates several technological advances in pressure control.

Performance

- Fully adaptive to changing process conditions — No need for phase lead or gain adjust.
- Auto-learning automatically adjusts the controller to the vacuum system's characteristics.
- Most impressive response curve in the industry — Reaches set point and stabilizes faster than any controller.

Features

- User-friendly keyboard for easy manual operation.
- Totally programmable multiple set points for position and pressure control.
- Fully programmable valve speed control for process optimization and soft starts.
- Visual verification of valve position.
- Available with all common flanges from 63mm - 400mm I.D.

Options

- Power Failure — The Series 64 Control Valve will automatically seal to protect your process and system in the event of a power failure.
- Analog Logic Interface — Remotely duplicates all keyboard functions.
- Digital RS232 — Provides total remote programmability and uniquely adapts the Series 64 to complex processes that require multiple gas flows, even at the same pressure.

Series 61 Control Butterfly Valve

The Series 61 Butterfly Valve offers the same features and benefits as our Series 64 but is designed for applications that do not require a vacuum-tight seal. Its butterfly design is especially well suited for higher pressure processes. The Series 61 is available with all common flanges from 40mm - 200mm I.D.



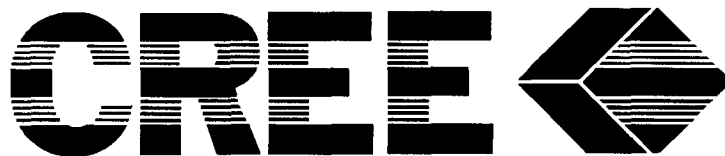
Single Crystal Silicon Carbide Wafers and Epi from Cree Research, Inc.

Cree Research, Inc. offers the only commercially viable wide bandgap semiconductor material - SINGLE CRYSTAL 6H SILICON CARBIDE (SiC). High quality substrates and epitaxy doped n or p type are available. Whether you need small quantities for research or large quantities for production, Cree Research, Inc. can meet your requirements. Many

new device applications are beyond the capabilities of conventional semiconductors. Now is the time to get involved with the advanced material able to meet these challenges, Silicon Carbide. Call our sales department today to find out more about Cree's complete line of SiC products. We're revolutionizing the semiconductor industry with Silicon Carbide.

Electronic and Physical Properties of SiC, GaAs and Si

	6H-SiC	GaAs	Si	Advantages of SiC Based Devices
Band gap energy - E_g (eV)	3.0	1.43	1.12	<ul style="list-style-type: none"> • High Temperature Operation • Blue Light Emission • UV Detection • Ultra Low Leakage
Breakdown Electric Field - E_B [V/cm (for 1000 V operation)]	2.5×10^6	3×10^5	2.5×10^5	<ul style="list-style-type: none"> • High Power • High Density Integration
Thermal Conductivity (W/cm \cdot K @RT)	4.9	0.5	1.5	<ul style="list-style-type: none"> • High Thermal Conductivity (greater than any metal)
Saturated Electron Drift Velocity [cm/sec (@ $E \geq 2 \times 10^5$ V/cm)]	2.0×10^7	1.0×10^7	1.0×10^7	<ul style="list-style-type: none"> • High Frequency Operation in High Electric Fields



R E S E A R C H • I N C

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