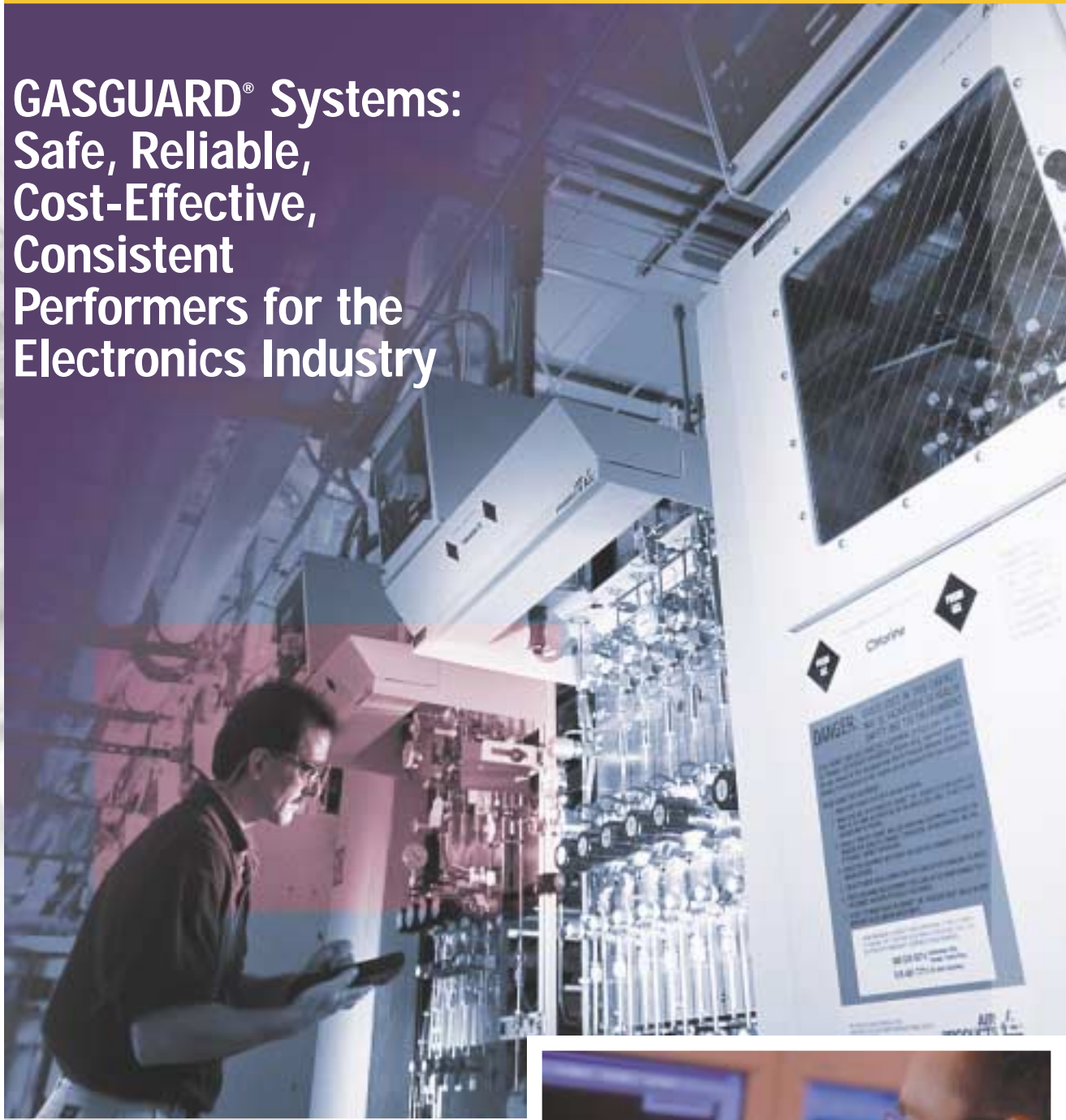


GASGUARD® Systems:
Safe, Reliable,
Cost-Effective,
Consistent
Performers for the
Electronics Industry



GASGUARD Gas Cabinets

The GASGUARD product line includes both automatic and manual systems in a variety of configurations—from a single source system to a three cylinder source and purge system. Our enclosures, panel designs, and advanced control systems are the benchmark for gas cabinet technology.

At the heart of our product line are the various easy-to-use control platforms. Each control system provides the operator with a menu-driven interface and the keypad provides the operator with an easy to learn and use control method for cylinder change, purge, and normal system operation.

In keeping with Air Products commitment to safety, GASGUARD systems comply with applicable codes and guidelines by OSHA, NFPA, TGO, NEC, CE and are NRTL listed.

GASGUARD Valve Manifold Boxes

GASGUARD Valve Manifold Boxes (VMBs) optimize gas delivery system performance and reduce cost of ownership. These gas distribution manifolds enable a single GASGUARD system to supply multiple use points. This can reduce the number of gas source systems, decrease equipment and piping needs, cut air handling and floor space requirements, and lower the number of cylinders stored or in use.

Air Products VMBs can be configured as manual, semi-automatic or fully automatic and can be used with any GASGUARD gas cabinet or Bulk Specialty Gas System (BSGS). A VMB consists of one main process gas line, which enters an exhausted enclosure and branches into four, six or eight process lines dedicated to specific tools. Each individual branch can include an automatic shut-off valve, pressure monitoring, pressure regulation, filtration and either manual or automatic purging.

When installed, a VMB shortens critical piping runs, saving facilitation costs, and makes line purging quicker and more convenient. The VMB also allows other process tools to be kept on-line while maintenance is performed on other specific process lines in the VMB.

The GASGUARD gas cabinet product line includes both automatic and manual systems in a variety of configurations



Air Products relies on its long-standing relationships with worldwide electronics industry customers for feedback to maintain GASGUARD systems state-of-the-art capabilities.



GASGUARD® Systems: Experience Makes the Difference

Air Products GASGUARD® gas cabinets, valve manifold boxes and bulk specialty gas delivery systems, are the industry standard. GASGUARD systems deliver safe, reliable, consistent, and flexible performance—all at an affordable cost. They encompass the latest technologies in engineering, safety, materials selection, fabrication, and controls.

Since the start of our gas cabinet business in 1983, Air Products has worked with more than 100 semiconductor manufacturers and installed more than 6,000 GASGUARD systems around the world. The evolution of GASGUARD systems is strongly supported by the long-standing relationships Air Products has established with its many global electronics industry customers.

GASGUARD systems are proven performers for the electronics industry.

Exacting Design, Engineering, and Manufacturing

Air Products' product line approach to engineering and design gives us the flexibility to provide customized systems for source, distribution, and bulk applications—each matching the functional needs of individual customers. Our dedicated Semiconductor Equipment Manufacturing Center in the United States, and Hanyang Technology in South Korea, ensure worldwide product consistency and sufficient capacity to accommodate global demand.

Air Products uses a comprehensive quality management program to support the construction of all of our GASGUARD equipment products. Our manufacturing center maintains both Class 10 and Class 100 clean room areas. Components are managed through a rigorous SQC/SPC process prior to use. All tubing cut in the manufacturing process is cleaned with hot and cold 18 megohm-cm DI water and purged with MEGAClass™ argon prior to use.

Orbital welding and panel assembly take place in the Class 10 clean room. Completed assemblies are pressure tested and certified for oxygen, moisture, and particles.

GASGUARD BSGS systems bring lower costs, consistent product quality, higher reliability, and improved safety to your facility. An own and operate option is available.





Manufacturing includes Class 10 and Class 100 clean room areas.

GASGUARD Bulk Specialty Gas Systems (BSGS)

Air Products' GASGUARD BSGS systems are the benchmark for the safe and continuous delivery of large volumes of specialty gas. Offerings include our BSGS Type I (manual), Type II and Type III (automated) gas delivery systems, and Type IV liquid delivery system.

Air Products is in a unique position to provide state-of-the-art BSGS systems, largely the result of our strong customer relationships, continuous developments and patented technology for the supply of high-purity HCl, SiH₄, TCS, halocarbons, and related products. Building on expertise in bulk atmospheric and specialty gas delivery systems, Air Products offers the latest advancements in regulators, monitoring, filtration, and component design. This provides superior and reliable specialty gas delivery for large-volume users.

Typical equipment for BSGS Type I, Type II and Type III gas delivery systems consists of the product container, High Pressure Control Manifold (HPCM) and monitoring. The bulk supply can be in large mobile containers, from Y cylinders up to tube trailer size, or stationary such as a liquid tank. The HPCM contains all the equipment necessary to filter, regulate, purify, and monitor the process feed.

Our Type IV liquid system bulk delivery module (BDM) delivers process gases and is designed as a safe, economical and self-sufficient delivery option for the supply of TCS and SiCl₄ into fabs. It connects liquid containers to the customer product delivery header with supply source options that include 200-liter or 55-gallon drums, or large-volume ISO modules (up to 40,000-pound containers).

A liquid valve manifold box (LVMB) distributes liquid from the main delivery header to several usage points. An auto-refill bubbler delivers process gases to the tool, or to multiple tools via standard VMB. The bubbler consists of a process piping cabinet (PPC) with electrical control cabinet (ECC).

Key options for the BSGS delivery system include Air Products' proven, high-pressure, high-flow HCl purifier and GASGUARD BSGS Y-container heater.



Air Products has installed more than 6,000 GASGUARD systems around the world for more than 100 semiconductor manufacturers.

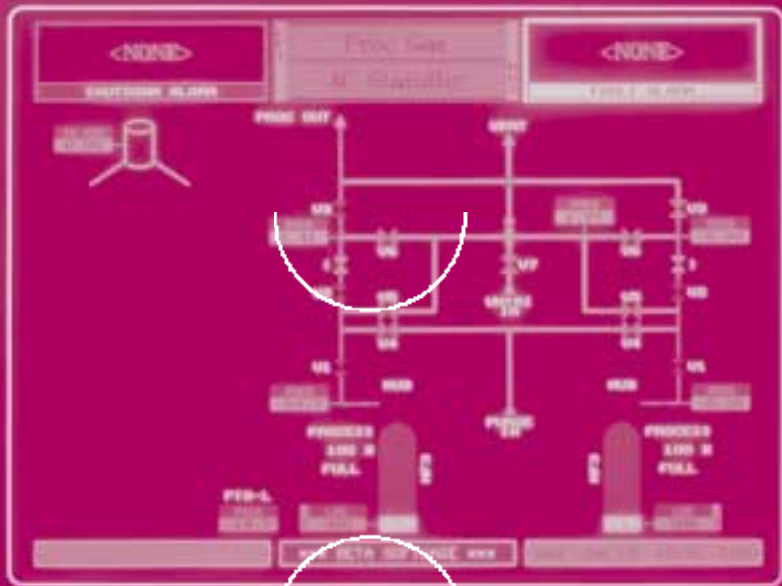


At the heart of GASGUARD cabinets is an easy-to-use controller with a newly designed, simplified control system that facilitates operator interface.

9750

LEGEND

- OPEN VALVE
- CLOSED VALVE
- VALVE
- CONTROL VALVE
- REGULATOR
- VACUUM VENTURI



<NONE> SHUTDOWN ALARM <NONE>
 PROCESS GAS FLOW METER

AIR PRODUCTS

GASGUARD® AP3

WARNING PRESSURIZED ENCLOSURE

This enclosure shall not be opened unless the user is trained to the level of technician. Attention is given to safety risks that have been identified. It should not be tampered with until the next scheduled maintenance. The user should not attempt to repair or modify the unit without the assistance of a qualified technician. The user should not attempt to repair or modify the unit without the assistance of a qualified technician. The user should not attempt to repair or modify the unit without the assistance of a qualified technician.

- SHUTDOWN ALARM
- FAULT ALARM
- GAS FLOWING
- POWER

ENTER

7 8 9

4 5 6

1 2 3

0 -

STOP

- ACK
- RESET
- MENU
- SHIFT
- ESC

QMAC® Analytical Systems

For semiconductor manufacturers' monitoring of bulk gas systems, for system upsets and integrity, and for those customers looking to manage and identify excursions, our GASGUARD QMAC (Quality Monitoring and Control) Plus System is the answer.

It provides on-line information to screen, identify, and manage trace impurity levels and particulate contaminations during semiconductor fabrication.

Two systems are available: a Mobile Analytical Cart and a Fixed System. Both help process engineers, quality control managers, and other fab personnel to detect and eliminate potential purity and gas flow problems at ppb levels.

Strong Safety Support

As a member of the chemical industry, Air Products is committed to the tenets of Responsible Care to help guide our performance with respect to health, safety, and the environment.

The hazardous nature of most electronic gases makes safety an extremely important aspect of GASGUARD gas cabinet, VMB and BSGS design, operation, and maintenance. We conduct thorough hazards analyses through all stages of design, development and start up.

In the event of an emergency with any GASGUARD system, Air Products regional Electronics Technical Centers maintain Emergency Response teams who are ready 24 hours a day to react to hazardous incidents.

Finally, our corporate Technical Information Center is an important central resource for not only safety questions, but also technical assistance with gas and equipment selection, applications, guidelines/regulations, technical/analytical data, and problem solving.



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