



*The BSGS business model has resulted in millions of dollars of savings for customers, as well as providing numerous process improvements.*



# ***The GASGUARD<sup>®</sup> Very High Flow System (VHF)***

*the next generation of BSGS solutions*

# BSGS Systems: the Benchmark



HUNDREDS OF WORLDWIDE BSGS INSTALLATIONS PROVIDE SAFE AND RELIABLE SUPPLY OF BULK SPECIALTY GASES.

## Key Benefits of the Very High Flow System:

### Reduced Cost of Ownership

- Replaces multiple gas cabinets reducing installation, ventilation and space requirements.
- Improved flow rates.
- Lower product costs.
- Lower labor costs and reduced cylinder handling.
- Bulk systems can be sited indoors or outdoors for most systems.

### Improved Safety & Operations

- Less handling and connections reduces potential exposure to hazardous gases and chemicals.
- Reduces fab downtime.
- VHF is available in multiple layers of redundancy for best possible fab uptime.

## Introduction

Since their introduction in the late 1990s, Air Products' GASGUARD® Bulk Gas Delivery Systems (BSGS) have revolutionized the global electronics industry in many ways. There are now hundreds of installations worldwide, dedicated to the safe and reliable supply of an array of electronic specialty gases.

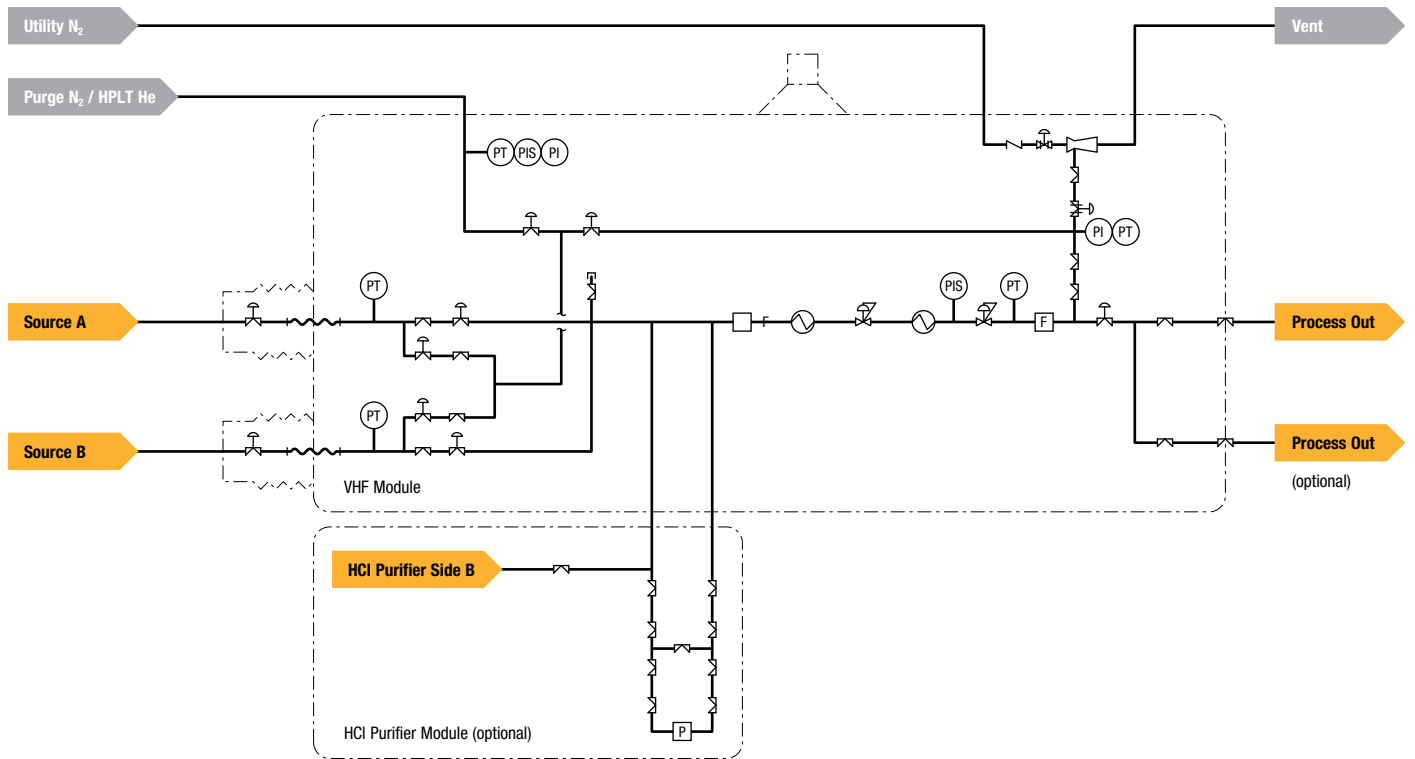
Today, Air Products' BSGS systems are the benchmark for the safe and continuous delivery of large volumes of electronic specialty gases and materials. Air Products listens to its customers and delivers solutions that match their needs.

The new VHF is our fourth generation BSGS and delivers all of the advantages of the first three systems:

- Combines Air Products' Universal Pigtail functions with original BSGS in one box for a smaller footprint and lower cost of ownership.
- Close to the source for easy operation during source change.
- Flexible and easy to install systems can all deliver  $\text{SiH}_4$ ,  $\text{NF}_3$ ,  $\text{NH}_3$ ,  $\text{N}_2\text{O}$ ,  $\text{HCl}$ .



## Basic BSGS Very High Flow System (VHF) Module



### Design Overview

- Flows of up to 1000 standard liters per minute (slpm), contingent on options and gas service selected (see chart below).
- Automated purge and leak checks.
- Automated vent and vacuum system monitoring.
- Our new VHF system adapts to support your fab operations and can be configured to economically accommodate a variety of needs. Available operating configurations include:
  - **Single-source, single VHF:** Standalone VHF module and a single gas source.
  - **Single-source, dual VHF:** Two VHF modules, each with a single-source container.
  - **Dual-source, single VHF:** Standalone VHF module with two gas sources and auto switching.
  - **Dual-source, dual VHF:** Two VHF modules, each with two gas sources. Both source containers A and B can be on-line simultaneously for higher flow Y applications.
  - **Single-source, three-module:** Three VHF modules, each with one source container.
  - **Dual-source, three-module:** Three VHF modules, each with two source containers. Both source containers A and B can be on-line simultaneously for higher flow Y applications.

#### Gas Flow Rates

SiH <sub>4</sub>	N <sub>2</sub> O	NH <sub>3</sub>	NF <sub>3</sub>	HCl
1000 slpm	1000 slpm	1600 slpm	1000 slpm	1000 slpm



## Available Options

- Sources can include ISOs, tube trailers, drums, cylinder packs, and Y-cylinders.
- Source scales and source heaters.
- Tube switching is available for improved safety on pyrophoric and toxic gases.
- VHF can be built as an enclosed system or rack.
- Temperature or flame (UVIR) monitoring.
- Single or dual-stage regulation and single or dual-stage JT heating.
- Heat tracing.
- Networking via Ethernet communication is available.
- Houseline pressure monitor and interstage pressure monitor.
- Houseline filtration.
- Dual isolation.
- Coaxial monitoring.
- Trickle vent valve.
- Vacuum source selection.
- Z-purge.
- Independent, external, high-flow HCl purifier available.



## Our Emphasis on Safety

For Air Products, nothing is more important than safety—not sales, not production, not profits. It is a shared commitment with our customers and through our partnerships. We have earned more safety-related awards than any other industrial gas company and are among the top performers of the CMA's Responsible Care program.

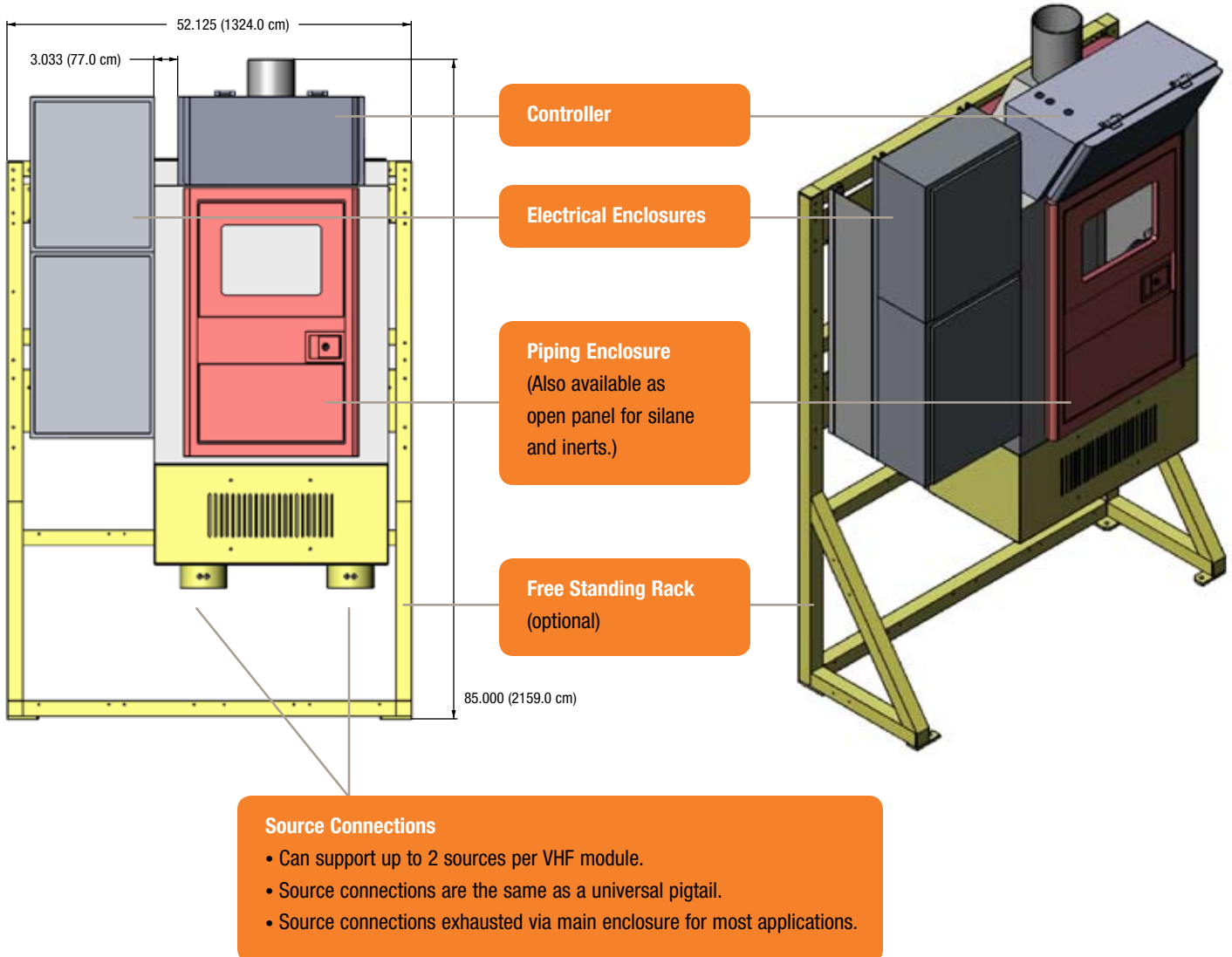
AIR PRODUCTS TECHNICIANS HELP YOU LOWER FAB COST OF OWNERSHIP USING BSGS SYSTEMS.

the next generation of BSGS solutions





## Very High Flow Module (VHF) Layout



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○ **A History of Proven Performance  
& Commitment to Our Customers**

Since we understand that our customers like options, Air Products' VHF systems are available for quotation in several ways: We can provide for outright sale of equipment (SOE); or we can offer other commercial options at a cost per unit volume incorporating ESM, trailer/ISO rentals, freight, monthly service charge and other costs.

This brochure provides only a brief overview of our broad range of capabilities for bulk delivery of electronic specialty gases and materials and our industry-leading BSGS delivery systems. Visit us at [www.airproducts.com/electronics](http://www.airproducts.com/electronics) or contact:

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