

## ► How Mott flow restrictors outperform other devices?

### Semiconductor Industry – High Purity Flow Restrictors

Porous metal flow restrictors provide permanent, reliable flow control in high purity applications without the high cost of mass flow controllers. These flow restrictors also eliminate the susceptibility to tampering and incorrect adjustment of needle valves, and the turbulence and clogging caused by calibrated orifices.



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### Flow Restrictors

#### Mott High Purity Flow Restrictors

#### The high-reliability, cost-effective choice for flow control

Whatever your priorities in flow control – whether you want low cost, consistent performance, or resistance to clogging – there’s one alternative that will satisfy on all counts: Mott High Purity Porous Metal Flow Restrictors. Featuring Mott’s unique porous metal media developed specifically for semiconductor manufacturing, Mott Flow Restrictors provide compact, long-lasting flow control coupled with:

- **A cost-effective design** – Mott’s simple flow restrictor design consists of a porous metal element inside a standard fitting, providing maximum strength and reliability at minimum cost.
- **Fixed, tamper-proof performance** – Each Mott Flow Restrictor delivers the specified downstream flow for the life of the product. There are no moving parts or potential adjustments to hamper performance.
- **Clog-free performance, with laminar flow** – The porous metal element spans the full width of the inner channel, allowing gases to move through hundreds of microchannels without increasing flow velocity or creating irregular flow paths. Downstream flow is smooth and constant, and the media will not wear from friction, or clog when exposed to sporadic particles.



*Mott High Purity Flow Restrictor – A device containing porous metal component(s) that limits the volumetric flow of a given gas at a given upstream and*

*downstream pressure with a high degree of accuracy.*

### Semiconductor Industry Users:

- Tool Designers
- Gas Distribution Panels
- Chamber Fill Lines

### High Purity Flow Restrictor Applications:

- **Safety** – Flow limiting for hazardous production materials
- **Control** – Metering of critical flows / Accuracy and repeatability
- **Dilution**
- **Component Protection** – Upstream protection for critical flow components, i. e., mass flow controllers (MFC)
- **Flow Balancing** – System Maintenance / Pump Purge / Purge Gas Bleed

### Why the Mott Solution

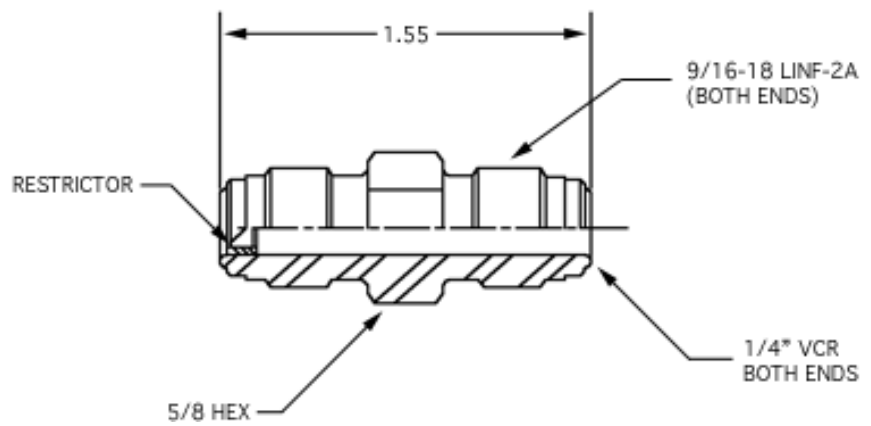
Mott flow restrictors offer several key advantages over competitive methods of flow control.

- Mott restrictors replace a single calibrated opening (i.e. orifice) with hundreds of smaller pore openings, reducing the flow burden
- Flow velocity approaching and leaving the porous metal restrictor are much lower due to larger total surface area
- By distributing energy of the flow over a cross-sectional area of media:
  - Laminar flow is achieved
  - Safeguards are provided against plugging

### Specifications

Features and benefits of Mott High Purity Flow Restrictors include:

- Materials of construction: Media and housing are 316L SS with a 10 Ra surface finish on all wetted surfaces
- Stainless steel flow restrictors withstand sustained temperatures of 450°C (inert gas), and pressures to 120 psig, standard; up to 1500 psig by request
- Encapsulated in 1/4" face seal fittings (male VCR unions as standard, other fitting types as optional)
- Mott can provide virtually any desired flow, from 100 slpm to  $< 1 \times 10^{-6}$  sccm/sec
- Standard downstream flow rates from 50 slpm – higher flows available
- Flow tolerance:  $\pm 7\%$  of rated flow at rated pressure ( $\pm 2\%$  available upon request)
- Assembled, tested, cleaned & bagged in a Class 100 clean room
- Calibrated to inert gas flow for specialty gas applications flows are correlated through viscosity, specific gravity, temperature and pressure curves
- Externally labeled for identification



### For proper sizing of your Mott High Purity Flow Restrictor:

- Choose hardware configuration:
  - 1/4" or 1/2" VCR, 316LSS (code 5140)
  - 1/4" compression, 316LSS (code 5100)
- Specify Flow Rate in SCCM
- Specify Gas Type – N<sub>2</sub> is standard
- Specify Upstream Pressure in PSIG (positive pressure only) – 30 PSIG is standard
- Specify Downstream Pressure in PSIG or vacuum (vacuum limited to 12 Torr) – Atmosphere is standard
- All Restrictors are 10 RA bore finish and class 100 assembled, tested, cleaned and bagged

*Part Number Description*

**5140-1/4-SS-50 SCCM-N<sub>2</sub> @30 PSI/ATM-10C**

### High Purity Metal Flow Restrictors are also available for Surface Mount Systems

Mott Corporation supports the 1.125" and 1.5" high-flow c-seal configuration of integrated gas systems with a full line of porous metal flow restrictors. These products use the same sealing specifications as described in SEMI PR 3.1.

### Configuration

Our spool piece design (GSMR- 20 and 30) allows the modular restrictor to be mounted between the substrate and another two-port surface mount component. Please specify at time of order which port (center or side port) requires the porous restrictor. The spool piece requires seals for both sealing surfaces on top and bottom.



### How to specify a Mott High Purity Modular Mount Flow Restrictor:

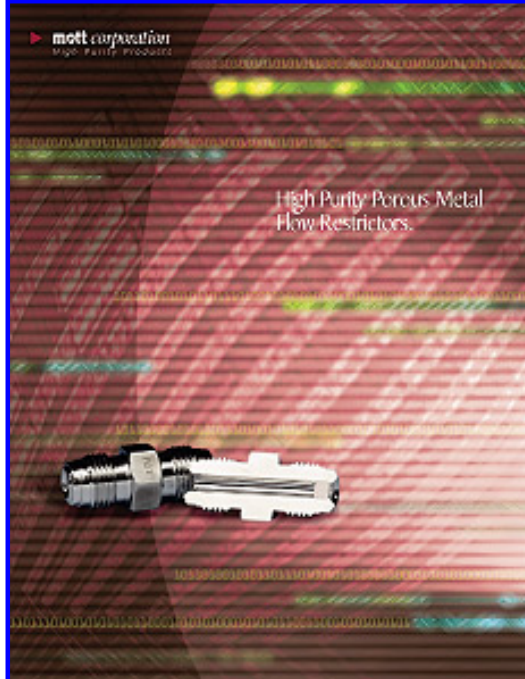
- Choose seal configuration (C-Seal or W-Seal)
- Specify Flow Rate in SCCM
- Specify Gas Type – N<sub>2</sub> is standard
- Specify Upstream Pressure in PSIG (positive pressure only) – 30 PSIG is standard
- Specify Downstream Pressure in PSIG or vacuum (vacuum limited to 12 Torr) – Atmosphere is standard
- Specify Number of ports (2 or 3)
- Specify Restrictor plug port location (Center or Side)

*Part Number Description*

**GSMR-20-1-500 SCCM – N<sub>2</sub>@30PSIG-2-C**

### For more information

Click on the images below to download our [4-page High Purity Flow Restrictors Brochure](#). You may also contact us at High Purity Sales, Mott Corporation, 84 Spring Lane, Farmington, CT 06032, 1-860-747-6333 or Toll-Free 1-800-BUY-MOTT. E-mail: [quest@mottcorp.com](mailto:quest@mottcorp.com), for additional information or to find a distributor in your area.



[High Purity Flow Restrictor Brochure](#)

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