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## SINTERED POROUS METAL FOR THE AUTOMOTIVE INDUSTRY

Mott's sintered porous metal products are used in many filtration and flow control applications within the automotive industry. Emission controls, engine life cycle and power, as well as accurate testing equipment are critical to automotive designers and manufacturers. Mott has provided products that solve many of the issues being experienced within the industry. Our application experience and technical knowledge assists our customers in manufacturing improved products that are more durable and long-lasting.

### Fuel Filtration

Mott provides porous metal fuel filter assemblies used in diesel engines. These filters have replaced other types of filters because they are more robust and can endure the conditions characteristic of diesel engines (such as strong vibrations).

### Fluid Controls

Mott porous metal flow restrictors are used in automotive leak tightness testing equipment. The test uses air or nitrogen and the result correlates to a liquid leak rate. The restrictors function as 'calibration leak standards'; they are used to calibrate the component that measures the gas leak. The multi-pore construction of a Mott restrictor gives it an advantage over an orifice restrictor. The Mott restrictor is less susceptible to flow rate variation as a result of clogging by debris that may be in the test gas. Since a Mott restrictor contains thousands of three-dimensional pore pathways, gas can easily flow around an obstructed area. Once calibrated, a porous metal flow device will never deviate from its calibrated flow as long as the supply gas pressure and cleanliness are maintained.

In its most basic form, a Mott flow restrictor is a sleeved encapsulated porous metal plug. It is typically installed into an application by means of a press fit operation. Mott also supplies restrictor assemblies, in which a restrictor is mounted into a fitting or other type of hardware.



Flow Restrictor Configurations

### Fuel Cells / Hydrogen Generation

Porous metal has been successfully used in a variety of alternative energy and green energy applications and is an outstanding material for use in PEM or SOFC fuel cells, flow batteries, electrolyzers, and other alternative energy devices. Rugged and robust, porous metal can be processed with smooth, scratch free surfaces that can be used as a membrane support, catalyst support, gaseous diffusion layer or as an electrode in cell stacks or cell assemblies.

## About Mott Porous Metal Products

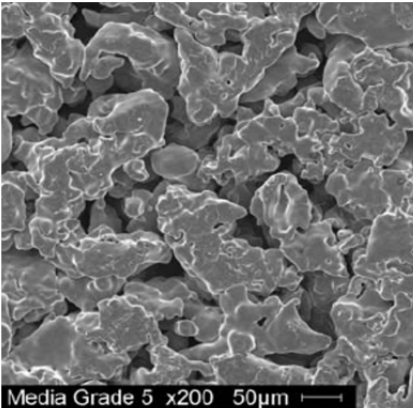


Figure 1 – Magnified View of Porous Metal

Mott's porous metal products start in the form of powdered metal consisting of irregularly shaped particles. Through the use of powder metallurgy processes, the powder is formed and sintered causing diffusion bonding which gives the metal strength and porosity. (See Figure 1 showing a magnified view of Mott's porous metal media.)

The standard material offering is 316L stainless steel. However other offerings are available which include 304L stainless, 430 stainless, nickel, Hastelloy® C-276, Inconel® 600, titanium and a wide variety of other alloys.

Functionality of Mott's porous metal media is classified by Media Grade (filtration rating<sup>1</sup>), permeability, density, or some combination of these characteristics dependent upon the requirements for a specific application.

The primary manufacturing process produces porous metal shapes such as discs, sheet, cups, tubes, rods and shallow domes. Secondary operations are performed to achieve custom shapes, features and tolerances that cannot be realized in an as-sintered part. Porous metal can also be assembled to hardware to facilitate its installation into an application. As examples of this, a porous cup is often welded or press-fitted into a threaded fitting. Or a porous metal sheet can be formed into a seam-welded cylinder with added hardware to form an easily installed element.



Porous Metal Assemblies

The benefits of Mott's porous metal media are derived from its all-metal and sinter-bonded construction. The alloys offered possess practical corrosion resistance in automotive environments. (As an example, 316L stainless steel is compatible with biodiesel.) These products also provide practical heat tolerance as a result of resistance to oxidation and retention of strength at elevated temperatures. The metal powder compaction, furnace sintering, and diffusion-bonding create a structure with a valuable combination of strength and ductility. Porous metal is far superior to non-metallic products for high stress environments.

<sup>1</sup>Media Grade indicates the nominal particle size in micrometers that is retained in filtration applications. Standard Mott Media Grades are 0.2, 0.5, 1, 2, 5, 10, 20, 40, and 100.

## Rapid Response and Technical Expertise

Mott manufactures products for automotive applications specific to customer and application specifications. Typically conception of a porous metal item to its full-scale production in the automotive industry is fast-paced. Mott has in place an organizational structure centered around an experienced development team that can fast-track requirements such as drawings; development, prototype, and validation work; the production part approval process (PPAP); the design and acquisition of new tooling and equipment; and ramp-up to production.

Mott also offers useful design tools including design guides and technical data sheets (including filtration efficiency and permeability information). These items can be found in the Resource Center section of our website, [www.mottcorp.com](http://www.mottcorp.com).

Mott porous metal products have been proven in various automotive, off road, and heavy equipment applications. Its all-metal construction and durability make it preferred over filter papers, wire mesh, and plastics where ruggedness and the ability to endure extreme operating conditions and environments are required. The use of porous metal technology in this industry is widely accepted and successful. Having the right product for the application and the engineering and development teams to support new challenges makes Mott the engineered solution provider for the automotive industry.

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*Hastelloy is a registered trademark of Haynes International, Inc.  
Inconel is a registered trademark of Special Metals Corporation*