

■ Porous Metal Solutions

**mott corporation**

Transforming Ordinary  
into Extraordinary



> porous metal products



> [mottcorp.com](http://mottcorp.com)

# Mott sintered porous metal media.

## Absolutely reliable, engineered in any way or shape you can imagine.

The ideal solution for filtration, flow control, sparging and dispersion – for virtually any device or process.

Whether you're flowing gas or liquid, Mott porous metal is the proven, reliable, long-lasting media for efficient particle capture, flow restriction, wicking and gas/liquid contacting. For decades, users of alternative media such as fabric- and polymer-based filters have switched over to Mott for the distinct advantages that Mott porous metal provides:

**Long life** – In most applications, Mott porous metal maintains high filtration efficiency and structural integrity through years of continuous use.

**High strength** – Mott media is unsurpassed in tensile strength, making it well suited for high differential pressures and flow rates.

**Uniform porosity** – A strictly controlled sintering process enables Mott to produce uniformly sized and distributed pores, in media grades ranging from 0.1 to 100.

**Fully cleanable** – Particles may be removed from Mott media using backpulse and other cleaning methods, restoring the media to its original efficiency for repeated performance.

Material	Maximum Temperature	
	Oxidizing Atmosphere	Reducing Atmosphere
316L SS	750°F/399°C	900°F/482°C
Hastelloy C-276	850°F/454°C	1000°F/538°C
Inconel 600	1100°F/593°C	1500°F/815°C
Hastelloy X	1450°F/788°C	1700°F/927°C

**No media migration** – Solid-state diffusion bonding” holds filter media together at the molecular level, making it virtually inseparable, even under the harshest conditions.

**High heat tolerance** – All-metal construction and welded joints and seams endure high temperatures, even in the midst of oxidizing atmospheres.

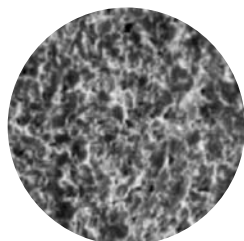
**Wide choice of materials** – In addition to 316L stainless steel – Mott's standard material of construction – customers may choose from many other metals and alloys to meet special requirements such as greater temperature and corrosion resistance:

- Stainless Steel; 316L, 304L, 310, 347 and 430
- Hastelloy® C-276, C-22, X, N, B and B2
- Inconel® 600, 625 and 690
- Nickel 200 and Monel® 400 (70 Ni-30 Cu)
- Titanium
- Alloy 20
- Many others – Consult factory

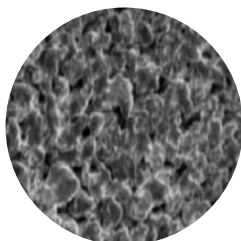
Precise manufacturing helps control a variety of performance characteristics.

Controlling the physical characteristics of Mott media results in still more benefits – controlled performance. By altering shape, porosity, material of construction, and many other factors, Mott can provide complete functional control over a wide range of properties including:

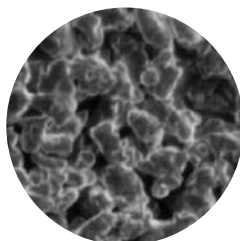
- Mean pore size
- Density
- Capillary attraction
- Particle size retention
- Surface characteristics
- Mechanical properties
- Thermal conductivity
- Permeability



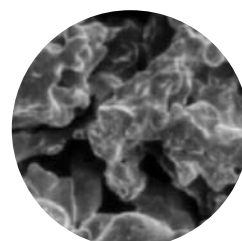
Media Grade 0.2 (x100)



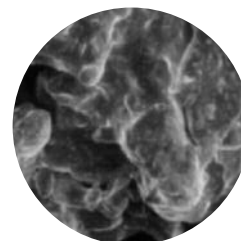
Media Grade 0.5 (x100)



Media Grade 5 (x100)



Media Grade 20 (x100)



Media Grade 100 (x100)



## Primary design considerations.

All porous products, whatever the material of construction, have specific properties which must be taken into account in design and manufacturing processes. Proper attention to these characteristics will help control costs in manufacturing, while at the same time, produce the best combination of properties and performance.

In order to select the best media for any application, one should be able to provide Mott with the following information:

### Primary application considerations

- Desired particle retention
- Process temperature
- Pressure drop
- System pressure
- Flow rate
- Corrosive effects, if any
- Cleanliness requirements
- Operating fluid – type, density, viscosity

### Primary application considerations

- Mean pore size
- Pore size distribution
- Density

### Primary application considerations

OEMs who wish to alter the shape or configurations of Mott products need to be aware of procedural limitations and guidelines to avoid compromising permeability. Listed here are basic considerations.

- **Forming** – Mott porous metal media has significant ductility, which allows cold forming within certain limits. For example, Mott standard 316L stainless steel, 1/16" - thick sheets can be roll formed into cylindrical filter elements with an outside diameter as small as 1 1/4". Smaller diameter tubes may be formed by using thinner sheets.
- **Machining** – Conventional machining will close surface pores, making the machined surface impermeable. It is possible, however, to keep surface pores open with electrical discharge machining (EDM) and subsequent cleaning. Mott provides these machining services. Ask our sales professionals for more information.

If conventional machining is to be applied, Mott recommends using only water-soluble oils as lubricants. The machined components may subsequently be reactivated with a proprietary technique developed by Mott, performed at the factory. Customer-machined media may be returned to have this technique applied.

- **Brazing** – Brazing porous metal is extremely difficult. The porous metal tends to act as a wick, so when molten braze is applied, it is soaked up into the pores, filling them and destroying porosity. To avoid this effect, Mott has developed a special brazing technique which will be performed upon request.
- **Welding** – Mott sintered porous metal can be readily welded – to other porous and solid metal parts – as long as certain procedures are followed. Approximately 50% of porous metal consists of voids which tend to collapse under the heat of the welding arc. When this happens, additional metal must be added during the welding process to compensate for the reduced volume. This can be accomplished with a filler rod, or can be provided in the weld preparation of the mating solid component.

Achieving optimal welds requires proper joint design. Our in-house weld shop has the experience and expertise to get the job done right. Contact us directly for more information on our services.

### Cleaning considerations

Mott porous metal media can be cleaned for continuous reuse through a variety of techniques. The best method depends on the application – how the media is used, and what types of gases, liquids and particles are present. The following table shows some of the more common cleaning techniques.

Cleaning recommendations may be obtained by contacting Mott or visiting our website, [www.mottcorp.com](http://www.mottcorp.com).

Application	Recommended cleaning method
Barrier filter (particulate retained on filter surface)	Reverse flush (clean fluid or gas)
Depth-type filter (particulate entrained particulate within pores)	Ultrasonic cleaning (backflush with solvent first if are nonreactive with the media)
Combustible contaminant	Salt bath at elevated temperature (use nitrogen blanket if bath temperature is >750°F)
Barrier and depth contaminant	Oven burning with steam blanket, followed by ultrasonic cleaning

## Designs for your application.



### Air film rolls/air bearings

**Function:** Guide surface-sensitive webs on a cushion of air during transport.

**Application Examples:** Photographic film; magnetic audio, video or computer tape; pressure-sensitive adhesive tape; metal foils; polyethylene films.



### Flow restrictors

**Function:** Provide laminar flow and precise control/regulation of gas or liquid flows.

**Application Examples:** Flow control of liquid drugs; gas mixing into beverages; safety devices on anesthesia machines; flow control in gas chromatographs, laminar flow elements, flow splitters, calibrated leaks.



### Breathers/pressure equalizers

**Function:** Relieve pressure, allows pressure equalization while excluding contaminants.

**Application Examples:** Vents, vent covers, tank vents, sound/ speaker enclosures, mold vents, rate of rise pressure devices.

**Note:** Media can be treated to repel water while maintaining permeability.



### Instrument filters

**Function:** Protect critical instruments by providing maximum purity and optimal flow.

**Application Examples:** In-line filtration, chromatography solvents, protects HPLC pump inlet check valves from particulate.



### Flame arrestors

**Function:** Prevent flammable gases from burning back to supply source by quenching/cooling flame.

**Application Examples:** Welding torches, gas cabinets, gas analyzers, electrical enclosures, pressure regulators for flammable gases or oxygen service.



### Custom designs

**Purpose:** Accommodate applications that require non-standard porous metal shapes, or that call for the integration of one or more welded fittings to create fabricated components engineered specifically for application requirements.

## Designs for your application.



### Silencers

**Function:** Sound dampening/reduction.

**Application Examples:** Sound attenuation for pneumatic devices.



### Wicks

**Function:** Absorb liquids for dispersion, removal or vaporization.

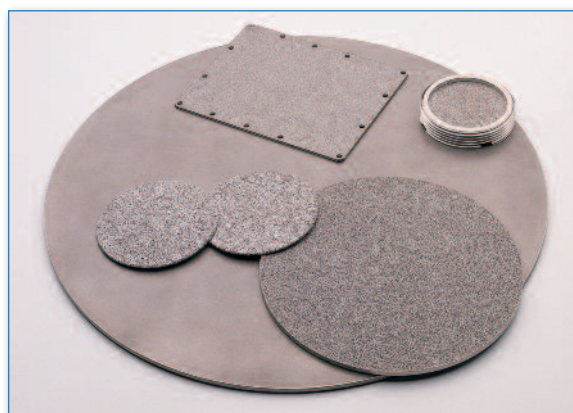
**Application Examples:** Ink adsorption plates, thermal management heat pipes, butane lighters.



### Spargers

**Function:** Distribution device for gas/liquid interfacing.

**Application Examples:** Aeration; bulking, carbonation, hydrogenation, oxidation, oxygen stripping ozone delivery.



### Fluidizers

**Function:** Uniformly disperses gas into particle bed.

**Application Examples:** Aeration, heat-treating powder hoppers to aid powder flow by preventing bridging.



### Polymer filters

**Function:** Remove cross-linked and gelled molecules which lead to filament breakage.

**Application Examples:** Nylon 6 and 6,6 production, polyethylene, rayon.



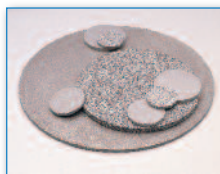
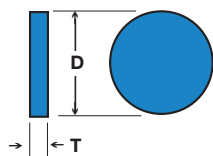
## Basic shapes.

Standard shapes of Mott porous metal media offer an expedient, cost-effective means of satisfying application requirements.

NOTE: Tighter tolerances are available for all products shown. Please contact Mott to speak with our Sales Department if you have more exacting requirements.

For more information about these or other products call Mott at 1-800-BUY-MOTT (800-289-6688), 1-860-747-6333 or visit our website, [www.mottcorp.com](http://www.mottcorp.com).

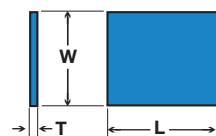
**Discs** Mott porous 316L SS discs, Series 1000.  
Use part desc. 1000-D-T-Media Grade.



Discs	D, in. (standard tolerance)	T, in. (standard tolerance)
Smallest standard size	0.062 ( $\pm 0.002$ )	0.039 ( $\pm 0.005$ )
Largest standard size	1.000 ( $\pm 0.008$ )	0.125 ( $\pm 0.015$ )

Also available: discs from 0.020" to 8.375" in diameter.  
Larger discs cut from porous metal sheets are also available.

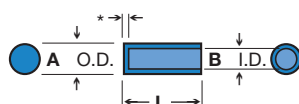
**Sheets** Mott porous 316L SS sheet, Series 1100.  
Use part desc. 1100-W-L-T-Media Grade.



Sheets	W, in. (standard tolerance)	L, in. (standard tolerance)	T, in. (standard tolerance)
Smallest standard size	8.50 (+0.093/-0.062)	10.00 (+0.093/-0.062)	0.039*/0.062* 0.078*/0.093**
Largest standard size	10.00 (+0.093/-0.062)	12.00 (+0.093/-0.062)	0.125 ( $\pm 0.010$ )

Other sizes and thicknesses are also available.  
\* =  $\pm 0.005$ ; \*\* = +0.015/-0.010

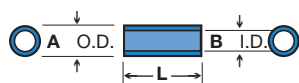
**Cups** Mott porous 316L SS cups, Series 1200.  
Use part desc. 1200-A-B-L-Media Grade.



Cups	A, in. (standard tolerance)	B, in. (standard tolerance)	L, in. (standard tolerance)
Smallest standard size	0.125 ( $\pm 0.005$ )	0.062 ( $\pm 0.005$ )	0.125 ( $\pm 0.015$ )
Largest standard size	0.812 ( $\pm 0.015$ )	0.641 ( $\pm 0.010$ )	1.060 ( $\pm 0.015$ )

Also available: cups from 0.078" to 1.57" O.D.

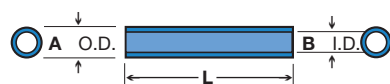
**Bushings** Mott porous 316L SS bushings, Series 1300.  
Use part desc. 1300-A-B-L-Media Grade.



Bushings	A, in. (standard tolerance)	B, in. (standard tolerance)	L, in. (standard tolerance)
Smallest standard size	0.250 ( $\pm 0.005$ )	0.125 ( $\pm 0.005$ )	1 ( $\pm 0.015$ )
Largest standard size	0.375 ( $\pm 0.005$ )	0.250 ( $\pm 0.005$ )	1 ( $\pm 0.015$ )

Also available: bushings from 0.138" to 18" O.D.

**Seamless Tubes** Mott porous 316L SS seamless tubing, Series 1400. Use part desc. 1400-A-B-L-Media Grade.



Seamless Tubes	A, in. (standard tolerance)*	B, in. (standard tolerance)	L, in. (standard tolerance)**
Smallest standard size	0.250 (+0.012/-0.002)	0.125 (nom.)	6 (+0.125/-0.000)
Largest standard size	1.000 (+0.050/-0.010)	0.750 (nom.)	24 (+0.125/-0.000)

Standard tube lengths: 6", 12", 18", 24".  
Other tube lengths, diameters and sizes available - consult factory.  
\* 0.250" OD in 6" length only.  
\*\*  $\pm 0.015$  tolerance is also available - consult factory.

**Key:** D=Diameter, T=Thickness, W=Width, L=Length, A=Outside Diameter, B=Inside Diameter

## Typical applications of Mott precision porous metal products.

Mott can be your solution provider.

This applications list is a quick review of the varied uses that have been developed for Mott precision porous metal products. Use this list as a handy reference, coupled with the unique design properties of porous media, to see how Mott products can solve problems for you.

Mott engineers can develop new ideas for product design or product and process improvement, using porous media in imaginative ways. Their experience in this field, backed by a commitment to technical service, provides the specialized help you need. Put Mott to the test – ask for an application analysis or design review.

### Filtration applications:

#### Chemical/Petrochemical

- Corrosive liquids, gases
- Air, nitrogen, carbon dioxide, argon, helium, ammonia
- Process steam
- Oxygen (filters cleaned and certified for O<sub>2</sub> service)
- Solvents, ketones, esters, amines, liquid hydrocarbons, polymers
- Feedwater and makeup water
- High-temperature liquids, gases
- High-pressure ethylene gas
- Cryogenic fluids
- Ethylene glycol
- Catalyst retention, fluid bed reactors
- Catalyst recovery, slurry phase reactors
- High-efficiency solids recovery or liquid cycling

#### Food/Beverage

- Process steam filtration
- Catalyst recovery from hydrogenation reactors
- Polishing of syrups, liquors and other liquids
- Carbon removal for decolorization operations
- Bleaching clay filtration

#### Medical/Pharmaceutical

- Liquid drug delivery
- Fluid cooling filters
- Oxygenation for bioreactors/fermentors
- Flow control/safety devices for medical equipment

#### Electronics

- Filtration of oxide slurries for magnetic tapes
- Filtration of ink for high-speed printers

#### Instrumentation

- In-line filtration
- Chromatography solvents
- HPLC pump inlet check valve protection

#### Textile

- Nylon 6 and 6,6 production
- Polyethylene
- Rayon

#### Refinery

- Filtration of FCCU Slurry Oil

#### Energy

- Porous metal septa for powered resin filter/demineralizers
- Condensate polishing

### Other applications:

#### Gas-liquid contacting/sparging

- Carbonation
- Oxygenation
- Aeration
- Hydrogenation
- Dewatering oil

#### Nitrogen sparging

- Deoxidizing wines and other liquids
- Bulking mayonnaise and similar products

#### Chromatography column frits

#### Flame arrestors for instruments and analyzers

#### Breathers and vents

#### Wicks

#### Flow restrictors

#### Pressure snubbers

#### Fluidization

#### Vacuum lance for deaerating powders

#### Air platens for transport or support

#### Gas diffusion

#### Silencers

#### Fuel Cell Applications

#### Thermal Management

## Who We Are:

We design, manufacture, and service high precision filters and fluid control devices that dramatically improve performance of mission critical equipment and processes.

## Need More Info:

Visit the **Resource Center** section of our website for additional literature, publications and technical data.



Established in 1959, Mott Corporation coordinates engineering, sales, service and manufacturing from two adjacent facilities totalling 90,000 square feet. Mott's skilled workforce, along with strategically located overseas affiliates, services thousands of customers all over the world, in virtually every major segment of industry.

## Need a product? Need advice?

Call us either way. Whether you need a stock solution, a customized design, or simply guidance, we welcome your call. Contact the experts at Mott Corporation today.

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