



Fiber metal gas filtration.

High strength and flow,  
precisely formed to  
your application.

# Fiber metal.

## The high-flow, low-pressure drop alternative.

### Unique filtration media.

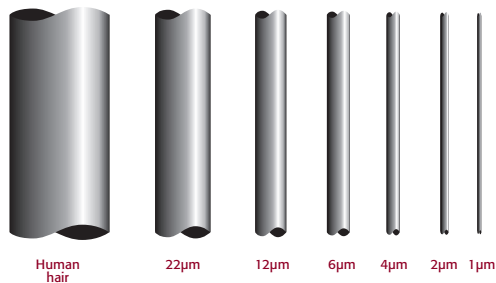
Mott offers integrated, innovative solutions for many gas filtration problems, based on the unique advantages of fiber metal media:

- High permeate flux
- Very low pressure drop
- Excellent mechanical strength
- Easy to clean
- High corrosion resistance
- Long on-stream life
- High-temperature resistance (up to 1000°C)
- Design flexibility (e.g. tubes, candles, discs)

### What are metal fibers?

Metal fibers are very thin metal filaments, with diameters ranging from 1 to 80 micrometers. As a comparison: human hair has a diameter between 70 and 100 micrometers. A wide variety of product forms can be produced, such as:

- Continuous bundles
- Yarns
- Needle felts
- Chopped fibers and pellets
- Sintered porous media



Metal fibers and processed products are available in various alloys, such as stainless steel, high temperature resistant alloys, Nickel and Nickel alloys.

Standard diameters: 1.5, 2, 4, 6.5, 8, 12 and 22 micrometers.

Overall diameter range: 1 to 100 micrometers.

### Dependability with options.

Fiber metal has an extensive track record in highly demanding applications where extremely high porosity, high efficiency and a long on-stream lifetime need to be combined with exceptional cleaning ability and corrosion and temperature resistance. Two basic types of fiber metal are offered, with further options such as material and fiber density to adapt media performance to specific applications needs.

### Bekiflow® HG

Bekiflow® surface media is designed using layers of metal fiber with a mesh support. The design creates an upper filtration layer of very fine fibers and a support layer of coarser fibers below the mesh.



Higher porosity and smaller thickness allows easier cleanability of the filter. Bekiflow® HG also provides lower pressure drop over the filter and alleviates clogging by means of surface filtration.

The standard alloy is 316L stainless steel. Specialty alloys such as Inconel® 601 and Fecralloy® are available for severe temperatures and corrosive environments.



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Fecralloy® is a registered trademark of UKEA, UK

Bekiflow® is a registered trademark of N.V. Bekaert S.A.

# Process gas filtration using Mott fiber metal filters.

## The ideal media for sustaining flow.

Process gas filtration is a unique challenge. In addition to potentially high temperatures and, in many applications, caustic elements, there is often the need for sustaining high flow rates and minimizing pressure drop. Fiber metal filtration systems and elements from Mott can provide the solution.

Filter elements composed of metal fiber are extremely stable and offer extended performance without need for replacement. Cartridges are completely welded and are not subject to cracks which can be caused by severe vibrations in chemical filtration systems. In addition, metal fiber elements are easily cleanable and can be used in applications where Cleaning-In-Place (CIP) is required since there is no trespassing of dust when the filter element is cleaned by backpulsing.

## High-strength all-metal media

Fiber metal elements are solid and rigid and are, therefore, not subject to any wear by movement or friction. They are also resistant to damage by abrasion of penetrating particles. Fiber filter elements made from 316L stainless steel can be used in environments up to 350°C/650°F, while even higher temperatures can be tolerated with elements made of Inconel 601 (to 560°C/1040°F) or Alloy HR (to 600°C/1100°F). Through extensive research, fiber elements have also been developed to resist temperatures to 1000°C/1800°F through the use of Fecralloy.

## High flow and efficiency

Filtration ratings as low as 1µm can be achieved, while even smaller particulate can be filtered out with a high percentage due to dust cake formation. Metal fiber filtration media achieve porosities between 70% and 87%, providing high-efficiency particle capture with minimal pressure drop and maximum flow rates.

## Fiber metal features and benefits:

- Heat and corrosion resistant
- Excellent cleaning through backpulsing
- High porosity
- Low initial pressure drop
- Solid construction, enabling high filtration velocities and long on-stream life
- Broad filtration range available
- Customized dimensions upon design or request
- Flexible in design
- Lightweight elements
- Rigid filtration media



## Process gas filtration.

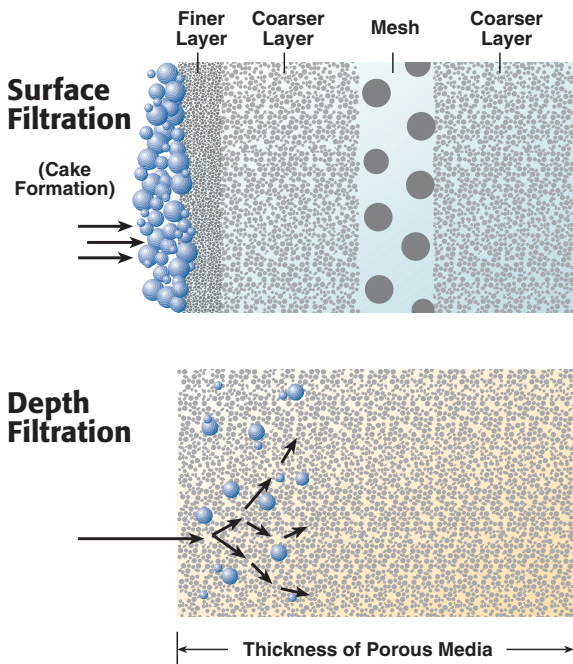
In process gas filtration, the gas stream is heavily laden with solids which must be removed from the filter in place (in-situ), or the filters must remain on line with periodic cleaning in place. Mott precision porous media is ideally suited to this type of service due to its uniform permeability, precise bubble-point control, and mechanical integrity.

## Gas filtration dynamics.

Starting with a clean filter at time zero, the particle capture mechanisms are identical to those of the trap filter. After some time, differential pressure increases as solids are captured on the surface of the element forming a filter cake. This stable surface cake becomes the "real" filter media. Blowback occurs at a terminal differential pressure which is appropriate for each specific application.

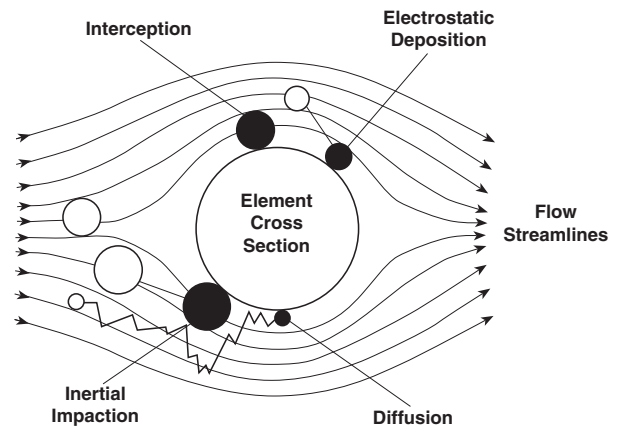
## Surface filtration.

Surface filters are a more practical proposition than depth filters for long-term operation of industrial processes with high dust concentrations.



The surface cake is the "real" filter, which prevents clogging. Through blowback techniques, periodic cake removal from the filter surface enables stable operating conditions without shutdown. Even very fine particles only penetrate into the surface layer and not into the support body. A filtration condition will be reached after a certain number of back-cleaning actions, which enables a constant residual pressure drop profile to be maintained.

## Depth filtration



## Final/depth filtration.

Final or depth filtration is generally used in a relatively clean gas stream where there is no need for in-situ blowback cleaning. This type of filtration assures protection of downstream equipment or processes, and protects the downstream system from catastrophic failure of an upstream piece of equipment, or a process upset. Usually a specific nominal or absolute particle-removal requirement is given, along with a clean differential pressure. A particular media can be selected to meet the removal requirements, and a face velocity is selected to meet the clean differential pressure (and practical process) limits.

In these applications, the filter may remain in service for months, or for the duration of a process campaign. Then the elements are removed and cleaned for reuse. Cleaning methods can be chemical, controlled atmosphere burnout, or ultrasonic.

## Filter configurations.

Mott Corporation offers several filter configurations to meet specific process requirements. The GS or GST trap filter, the GSP plenum blowback filter, and the GSV venturi pulse blowback filter.

### GS or GST Filter

GS or GST filters used for depth filtration allow the user to remove the elements from the vessel for cleaning or disposal. This type of filtration is used particularly in applications where the stream produces low solids loading. For higher solids loading applications, Mott offers two types of process filtration designs, the GSP and GSV models.

### Blowback of porous metal

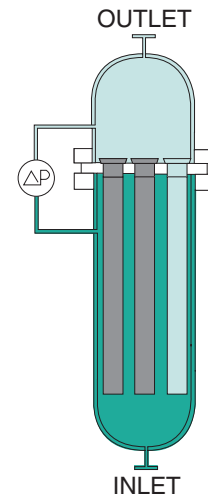
There are two types of in-situ blowback cleaning methods for gaseous process filters – the reverse blow plenum blowback, and the venturi pulse blowback. With the plenum blowback, it is necessary to isolate the filter, or a section of the filter, from service during the cleaning process. With the venturi pulse blowback, the entire filter can remain on forward flow with no interruption of service.

With a **Mott GSP plenum blowback**, the filter inlet and outlet valves are closed, the solids outlet valve is opened, then the reverse blow gas valve is opened. This gas passes from the inside to the outside of the elements, removing the solids and expelling them through the solids outlet valve. The reverse blow should be at a velocity between one-half and equal to the forward flow velocity of the filter in service. Duration of the blowback can be from 2 - 3 seconds or up to 15 seconds, depending on the characteristics of the solids and process requirements.

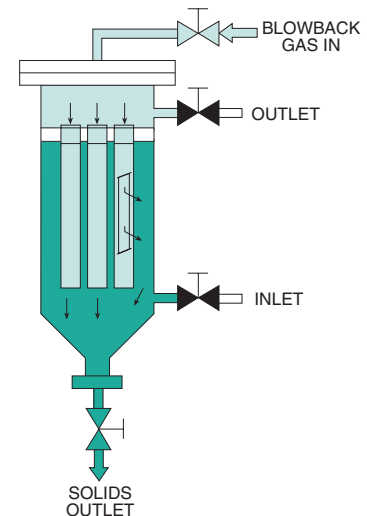
With a **Mott GSV venturi pulse blowback** system, each element has a venturi throat with a nozzle pointing into the venturi. In most filters the elements would be manifolded, and the manifolds blown back sequentially. The fundamental principle of the venturi pulse blowback is the use of a fast-acting gas valve, such as a pilot-operated diaphragm valve, to create a shock wave through the blowback piping and nozzles.

The blowback gas pressure should be 90 psi/6 bar above the system pressure. The blowback pulse duration (valve opening) should be from 0.25 up to 0.5 seconds. This gas flow is directed from the nozzle into the element venturi; at the same time, it educts additional clean gas through the venturi to create a wave down the element, which “pops” the cake from the filter media back into the fluid bed reactor or solids collection tank.

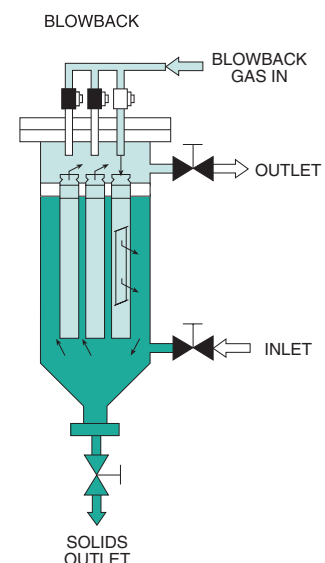
### GS or GST (no blowback)



### GSP Plenum Blowback Filter



### GSV Venturi Pulse Blowback Filter



# Filter element configurations, materials and properties.

Connection flange =  
outlet of filtered gas

Fixation of the filtration media  
to the supporting structure



Block flange



Welded & fixed



Demountable



Filtration velocity  
> 0.05 m/s (> 10 ft/min)



Flat flange

## Formed to your specifications

Filter elements made of metal fibers can be customized. The length can vary from 300mm (11.81 inches) up to 3m (9.84 feet). The elements are manufactured with a weld-on

metallic carrier in case high filtration velocities must be met. The type of mounting flange of the element on the base plate can be specified by the customer.

<b>Available Alloys</b>	AISI 316L SS	INCONEL 601	ALLOY HR	FECRALLOY
<b>Maximum Operational Temperature</b>	350-380°C 650-720°F	560°C 1040°F	600°C 1100°F	1000°C 1800°F

# Applications and industries.

## Process applications

Several drivers support the significance of using porous metal fiber in process applications:

- Recovery of high-value product in a process
- Environmental protection requirements
- Cleaning of process gases before additional use



### Hot gas filtration

Fiber metal offers high permeability and low pressure drop, making it ideal for particulate separation in hot gases. Media performance is further enhanced by its excellent thermal-mechanical characteristics, particularly in comparison with ceramics.

Hot gas applications include:

- Catalyst recovery in chemical processes
- Clean process gases in chemical processes
- Clean combustion gases and waste incineration
- Power generation – coal gasification

Specific applications within specialized industries include:

#### **Petrochemical:**

- Polyolefins
- Polypropylene
- Polyethylene
- Melamine

#### **General Chemical:**

- Catalyst production
- Nitric Acid
- Pigments
- Others: Acrylonitrile, Ammonia, Aniline, Fumed silica, Maleic anhydride

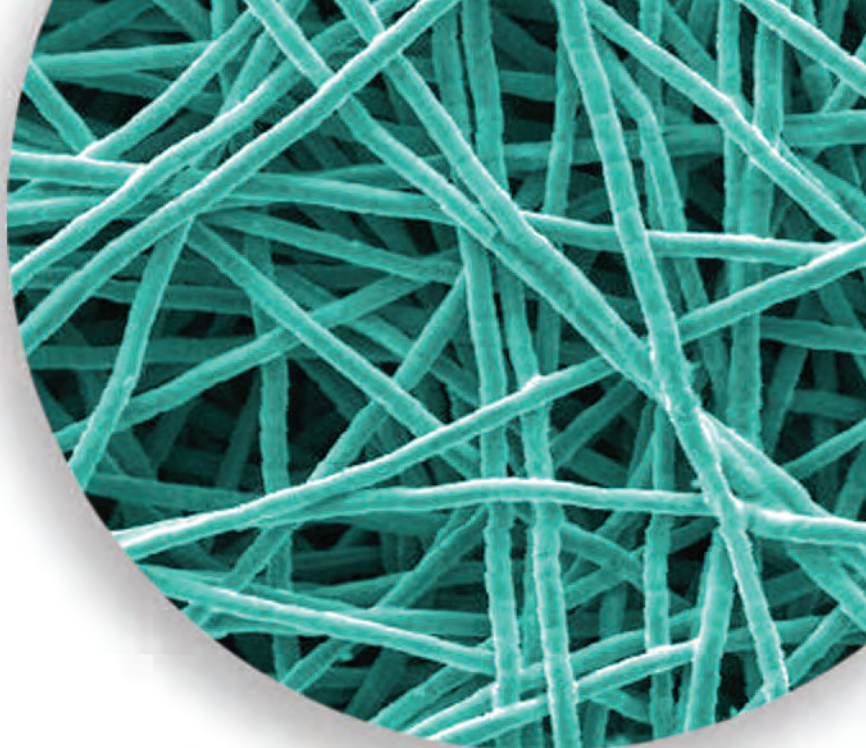
#### **Refinery:**

- Fluid catalytic cracking
- Steam cracker
- Continuous catalytic reforming/regeneration
- Catalytic dehydrogenation

## Application overview

Because of its high strength, flexibility in form and desirable flow characteristics, fiber metal has been used by many industries in a great number of applications all over the world. Some of these include:

- Biochemical industry
- Food and beverage sector
- Chemical industry
- Waste treatment
- Pharmaceutical industry
- Water treatment
- Hot gas cleaning
- Chemical and catalyst recovery
- Oil and gas filtration
- HEPA filter media
- Medical and pharmaceutical industries
- Nuclear venting
- Aerospace



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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84 Spring Lane, Farmington, CT 06032-3159  
www.mottcorp.com, email: quest@mottcorp.com  
860-747-6333 Fax 860-747-6739



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