











SPECIALISTS IN KNITTED ENGINEERING MATERIALS





FILTRATION WITH KNITTED WIRE MESH

Knitted mesh with its unique structure of interlocking wire loops offers many advantages over other materials in air and liquid filtration applications. Careful selection of material, wire diameter, density and shape can help overcome challenging filtration problems other materials find difficult to handle. The knitting process creates a material that when layered, spiral wound or compressed produces a tortuous path which allows highly effective particle capture. Knitted mesh filters can be supplied in any metallic or non-metallic material that can be drawn into a filament and are supplied in a wide variety of forms including mesh rolls, circular and rectangular pads, complete filters and compressed elements.

Where necessary metal alloys or plastics can be supplied that are highly resistant to corrosion and can withstand temperatures in excess of 1000°C. The flexibility of knitted mesh allows the material to withstand thermal shock and vibration without breaking up giving it considerable advantages over paper and sintered filters. This also permits a tight interference fit within housings without machining to close tolerances.

Tooling, if required, is low cost and allows for the production of compressed elements which give a minimal pressure drop and also a product exhibiting excellent recovery characteristics after compression.

TYPICAL APPLICATIONS FOR KNITMESH WIRE MESH FILTERS

- Engine crankcase breather elements.
- Air bag slag filters.
- Air intake filters for automotive, agricultural and marine engines.
- Oil filler cap breathers.
- Fuel injector filters.
- Lint filters on washing machine outlet pipes.
- Filters for paint spray plant air outlets.
- Intake filters on air compressors.
- Bag separator layers or elements in dust collection systems.
- Noise attenuating filters in pneumatic tools.
- Coarse dust pre filters in heating and ventilating systems.
- Grease filters above kitchen ranges, cookers, and charcoal grills.
- Pre-filters and retaining/reinforcing cores in composite filters.
- Permanently sprayed dust filters for coalmines, quarries, etc.
- Silencer packings for engine exhausts.
- Air inlet/outlet filters for gas turbines and compressors.



Engine breathers



Noise attenuating filters



Co-knit mesh





Air bag filter

THE MATERIAL

KnitMesh is manufactured as a flattened tube of knitted wire, plastics or fibres forming a continuous strip of double-layer mesh up to 1000mm wide. The mesh can be manufactured in a variety of stitch patterns to suit many applications. Metal meshes can be crimped to a diagonal or herring-bone pattern to give depth to each layer of media. This allows the free volume and specific surface area of the filters to be adjusted to suit pressure drop limitations and efficiency requirements. Wires and other filaments can also be flattened to increase specific surface area and efficiency.







FEATURES AND BENEFITS

- High free volumes in the range 93% to 99% mean low pressure drops, even at high solids loadings.
- Adaptability to a wide range of design configurations.
- Flexibility and resilience allows knitted mesh to conform to openings without the need for exacting tolerance whilst maintaining a tight side wall fit.
- High specific surface area ensures excellent capacity for dust retention.
- The robust nature and high free volume of knitted wire mesh allows quick and easy washing.
- Heat resistant all metal filters can be designed for high temperatures.
- Filters can be manufactured to specifications which allow retro-fitting into existing equipment.
- Many KnitMesh products are designed for dual purposes having both filtration and noise attenuating properties.
- Inexpensive, compares well with disposable media.
- Careful choice of materials overcomes problems of corrosion and solvent attack.
- Construction methods for compressed filters allow free volumes (Density) to be highly controlled.













CHOOSING YOUR MESH / FILTER

Our experienced engineers can specify the correct mesh for your application taking into account the environment, particle size, filter cleaning interval, efficiency and pressure drop required. As a general guide metal meshes are used where strength and resistance to heat and corrosion are important. Plastic meshes are light weight and provide resistance to acid mist corrosion. Flattened wire and flattened filaments have enhanced dust arresting gualities, and can have a 25% to 75% greater surface area than their round equivalents. Crimping increases mesh thickness and free volume, adds stiffness to the mesh and reduces its air resistance. By crossing the diagonal crimps on adjacent layers of mesh, the resultant constant changes of air flow direction promote impingement in filters and entrainment separators to allow up to 99% separation efficiency with very low pressure drop.

AVAILABILITY

In continuous rolls for manufacture into filters.

Basic mesh pads for dust filtration or mist elimination can be made up ready for

installation into ducting, vessels, channel

frames and housings. Dust adhesion and dust

holding capacity is improved if filters are lightly

oiled after cleaning. KnitMesh mist eliminators

are produced as a bed of knitted mesh which

presents a tortuous path and a large surface

Separation is achieved by impingement on, and

Filter pads complete with associated support

frameworks which may include bar and rod

supports, channel frames, welded mesh,

extruded polypropylene mesh, expanded metal, perforated sheet and handles for easy

removal. Associated ductwork and the

installation of filter units is however the

responsibility of the customer.

area to droplets entrained in gas streams.

capture by, the mesh filaments where the

droplets coalesce and drain.

COMPLETE FILTERS

KnitMesh filtration products can be supplied in

FILTER / MIST ELIMINATOR PADS

several forms:

MESH ROLLS

Heat transfer elements



Vibration damping filters

COMPRESSED ELEMENTS

KnitMesh compressed elements are manufactured by die compressing metallic meshes and are usually circular or annular although many other shapes are possible. Similar in appearance to sintered metal but at lower cost they also have the added advantage of not disintegrating or fracturing under vibration or impact. KnitMesh compressed elements are available in free volumes ranging from 30% to 95% and in a variety of wire gauges. Thickness of the elements is normally in the 1mm to 25mm range but increased thickness is possible by stacking.

Special manufacturing techniques ensure that an even density is maintained throughout the compressed filter and on long production runs statistical process control (SPC) is used to ensure uniformity of product. Tooling costs are comparatively low, depending on the complexity of the product and large stocks of existing tools often allow production, very quickly of representative samples for assessment. In addition to gas/liquid and solid/liquid filtration, KnitMesh compressed elements are also used in the following applications:

- Engine and oil filler cap breathers, shock and vibration absorbers, silencer packings for pneumatic tools and engine exhausts.
- Catalytic convertor and diesel particulate filter supports.
- Heat exchange media/thermal shields.
- Fur collectors for water heating equipment in hard water areas.
- Biomass support media.
- EMI/RFI shielding gaskets.

ILTERS

MATERIALS

In practice any material which can be drawn or spun into filament form can be used to produce KnitMesh. Extensive stocks of wire and filament are available to meet most process requirements with the most frequently used materials being stainless steel grades 304L, 316L, 321, 310, 310S for long life and to cope with high temperature corrosive conditions. For less aggressive environments, low cost galvanised steel can be used for applications such as grease filters and engine breathers.

Aluminium being lightweight has many applications in the aerospace, military and nuclear industries. Copper is often used in compressed form as breathers and liquid filters, nickel and copper-nickel alloys such as monel have high resistance to corrosion being used in marine or saline environments, polypropylene is lightweight inexpensive and corrosion resistant.

Stainless Steel grade 304, 316, 321, 310 & 310S
Galvanised Steel
Mild Steel
Monel*
Copper
Aluminium
Tinned Copper
Tin Plated Copper Clad Steel
Nickel Plated Copper
Silver Clad Copper
Phosphor Bronze
Brass
Nickel
Inconel* 600 & 601
Incoloy* DS & 825
Molybdenum
Titanium
Hastelloy*
Fecralloy [⊥]
Platinum
Silver Alloy
Alloy 20

Hostaflon^{*} and Teflon FEP[†] are fluoro polymers that provide high efficiencies and excellent corrosion resistance particularly in acidic environments. Glass wool and Teflon[†] wool fibrous materials can be used to improve performance when very fine particle sizes are present. Plastic filament and multi-filaments such as polypropylene wool, glass wool and Teflon can also be knitted together with wire for special high efficiency applications and where noise reduction is important.

Compressed elements can only be produced from metallic filaments such as those shown in the table below:

TECHNICAL ADVICE & SAMPLES

Many years of experience combined with committed research mean that first class technical advice on design and application is readily available from our engineers. Samples for testing can often be provided quickly and frequently free of charge.

- Monel, Hastelloy, Incoloy and Inconel are registered trade marks of Special Metals Corporation, USA.
- † Teflon is a registered trade mark of Dupont, USA.
- ≠ Hostaflon is a registered trade mark of Hoechst, Germany.
- Δ $\,$ Fecralloy is a registered trade mark of Kanthal AB.





Brake components

Rest Knitlesh®









QUALITY

Central to the KnitMesh philosophy is to manufacture high quality products at competitive world class prices always aiming for zero defects. Approved to BS EN ISO 9001 in 1992, our commitment to continuously improve our quality has been rewarded by approval in 1998 to QS 9000. In 1999 approval to environmental standard BS EN ISO 14001 was achieved by enabling cost efficient production with minimum environmental impact.

DELIVERY

KnitMesh Ltd has been supplying filtration products for over 40 years to OEM's, first and second tier customers throughout the world. State of the art knitting machines allow for cost efficient production and the highest quality components are manufactured to ensure long term reliability. Our modern manufacturing facilities are located in North Wales. Local support is provided by a worldwide network of agents and distributors.



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