

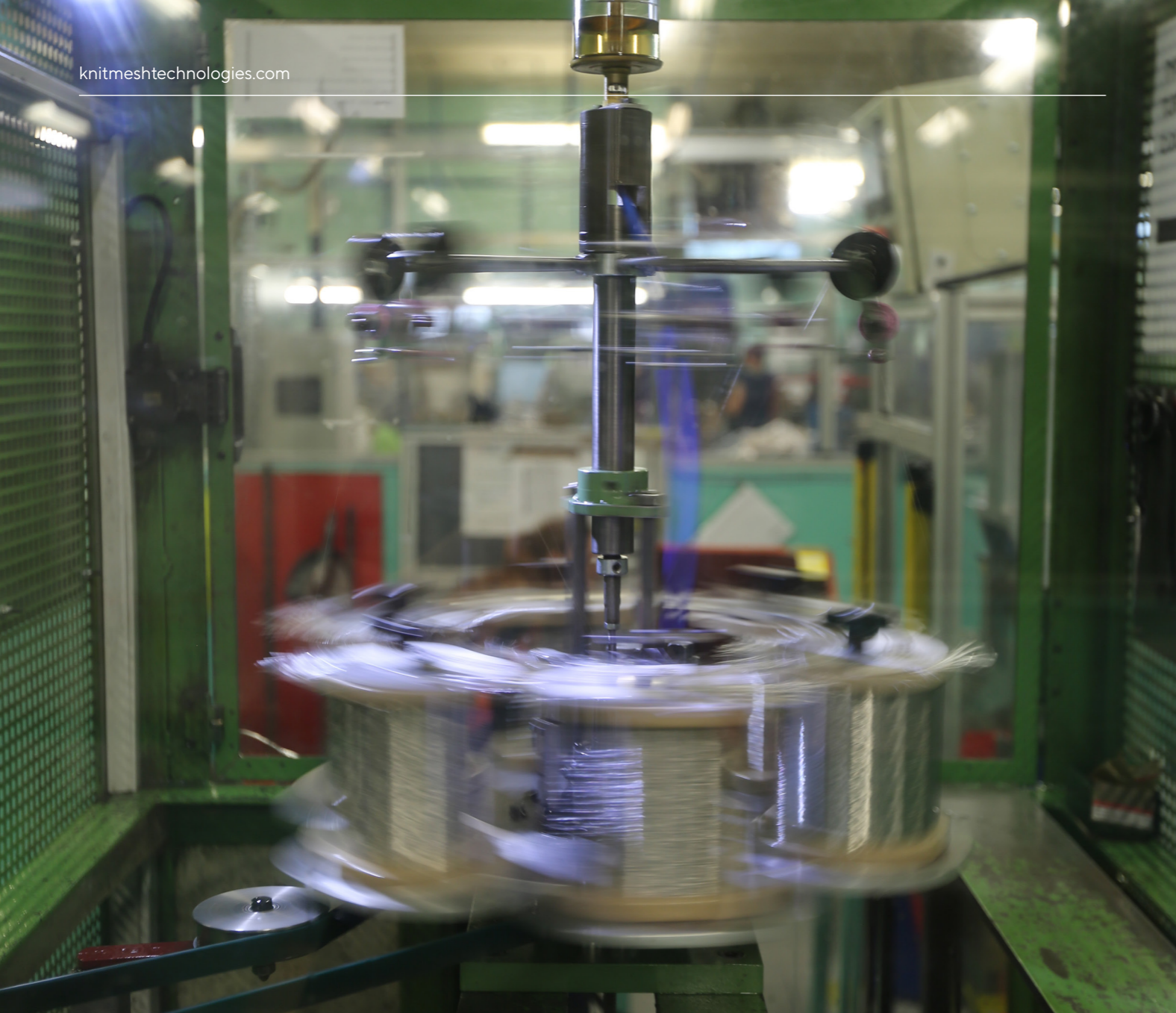
Filtration

Innovative Knitted Wire Mesh Solutions



KnitMesh[®]
Technologies

Protecting People, Property and our Planet



Why use knitted mesh?

KnitMesh products are manufactured as flattened tubes of knitted wire or polymeric fibres to form 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. The various meshes can be flattened, or crimped to a diagonal or herring-bone pattern, to give increased surface area or 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 filtration efficiency requirements.

Features & Benefits

- High free volumes in the range 93% to 99% yields, low pressure drops at high solids loadings.
- Adaptability resulting from infinitely variable range of design configurations.
- Inherent flexibility and resilience allows the mesh to effect tight seals in randomly shaped cavities. High specific surface area ensures excellent capacity for dust retention.
- Robust nature and high free volume facilitates rapid cleaning and drying cycles.
- Metallic filters facilitate high temperature and abrasion resistance.
- Bespoke designs available for retro-fitting into existing equipment.
- Dual purposes designs available with both filtration and noise attenuating properties.
- Inexpensive – extra durability enables favourable cost comparison with disposable media.
- Materials can be selected to provide specific resistance to corrosion and solvent attack.
- Free volumes can be tightly controlled by material selection and construction method.

KnitMesh Technologies



KnitMesh Technologies is the global technical leader in the design, development and manufacture of innovative knitted wire mesh solutions for use in a wide range of industrial applications and environmental conditions.

Established in 1957, KnitMesh Technologies offers state-of-the-art knitting and research & development capabilities that enable the business to provide diverse knitted mesh solutions for some of the most challenging technical problems. The products are used in filtration applications in many industry sectors including: automotive, electronics, transportation, military, marine and industrial/domestic cleaning.



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 requirements. As a general guide, metal meshes are used where strength and resistance to heat and corrosion are important.

Polymeric (or plastic) meshes are lightweight and provide resistance to acid mist corrosion. Flattened wire and filaments have enhanced dust arresting qualities, 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. Crossing the diagonal crimps on adjacent layers of mesh results in a constant change of direction in the airflow which promotes improved particulate impingement in both filters and entrainment separators.

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 where conventional materials are unsuitable. The knitting process creates a material that, when layered, spiral wound or compressed, produces a tortuous path yielding highly efficient particle capture. Knitted mesh filters can be manufactured from any metallic or non-metallic material that can be drawn into a filament. The products are supplied in a wide variety of forms including mesh rolls, circular and rectangular pads, complete filters and compressed elements.

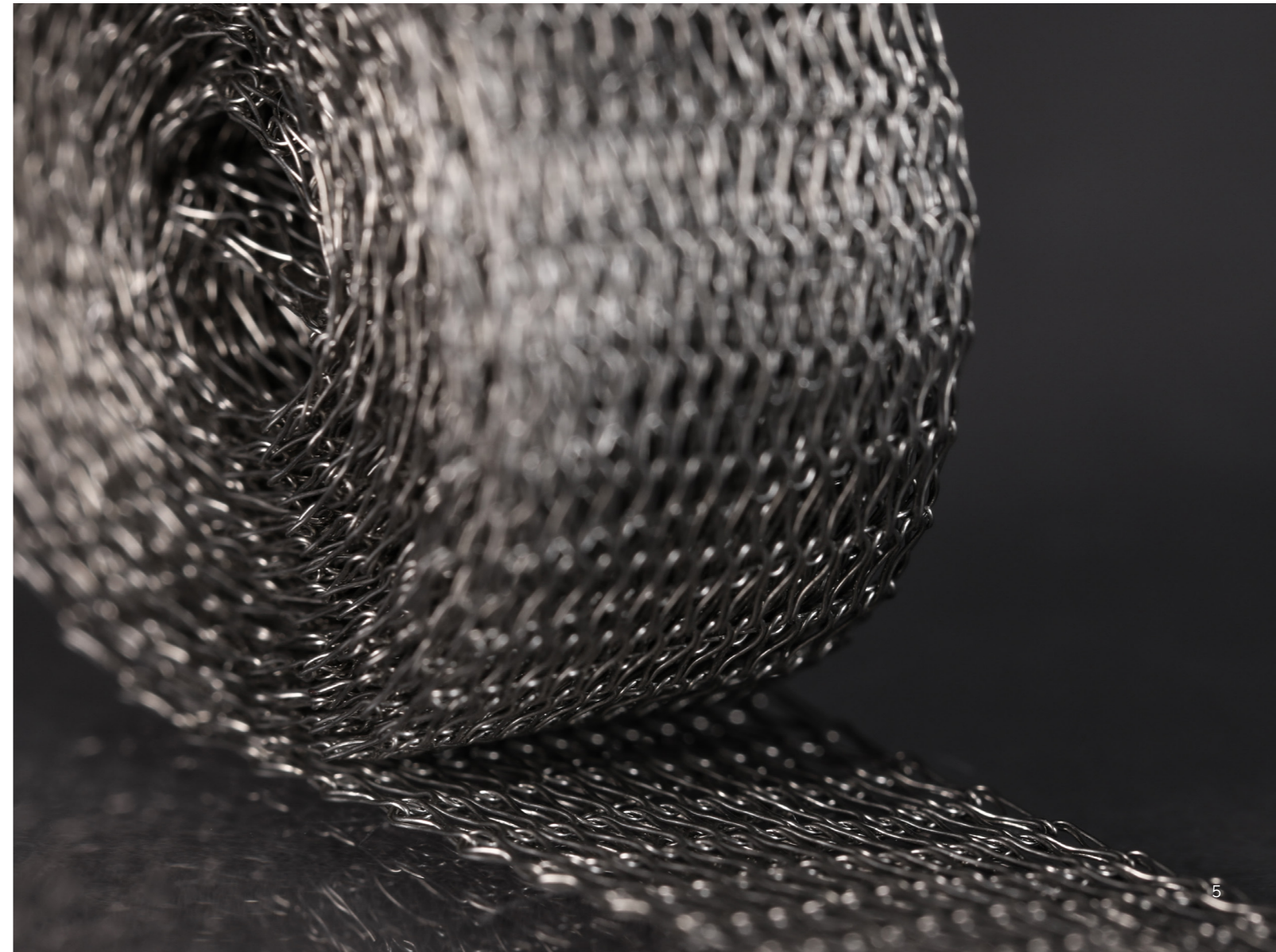
Metal alloys or polymeric mesh filters can be supplied to withstand temperatures in excess of 1000°C and/or high levels of chemical attack.

The flexibility of knitted mesh allows the material to withstand thermal shock and vibration without breaking up giving it considerable advantages over other types of filter. These properties also permit a tight interference fit within housings without having to machine to close tolerances.

Tooling, if required, is low cost and allows for the production of compressed elements which give a minimal pressure drop and a final product that exhibits excellent post-compression recovery characteristics.

Typical Applications for KnitMesh Filters

- Engine crankcase breather elements.
- Automotive air bag 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 coal mines and quarries, etc.
- Silencer packings for engine exhausts.
- Air inlet/outlet filters for gas turbines and compressors.



Availability

KnitMesh filtration products can be supplied in several forms:

Mesh Rolls

In continuous rolls for manufacture into filters.

Filter Pads

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 are 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 area to droplets entrained in gas streams. Separation is achieved by impingement on, and capture by, the mesh filaments where the droplets coalesce and drain.

Complete Filters

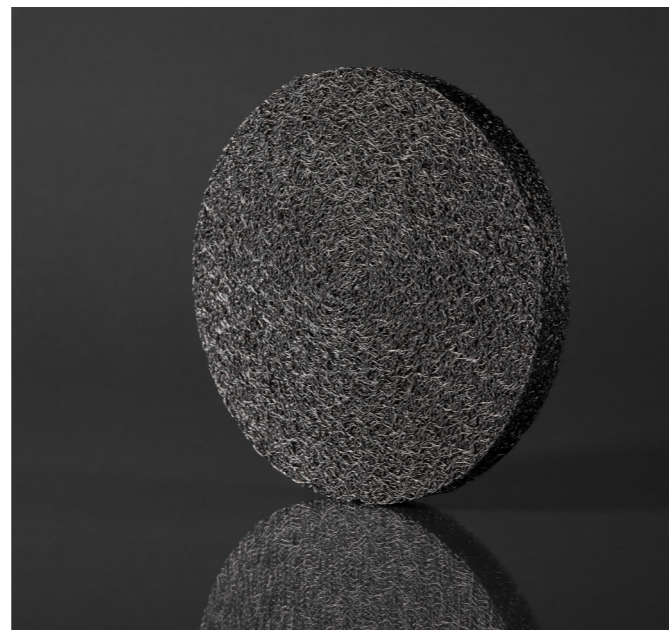
Filter pads complete with associated support frameworks which may include bar and rod supports, channel frames, welded mesh, extruded polypropylene mesh, expanded metal, perforated sheet and handles for easy removal. Associated ductwork and the installation of filter units is however the responsibility of the customer.



Compressed Elements

KnitMesh compressed elements are manufactured by die-compressing metallic meshes – these 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. 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 rapid 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.
- Scale (or fur) collectors used in heating equipment in hard water areas.
- Biomass support media.

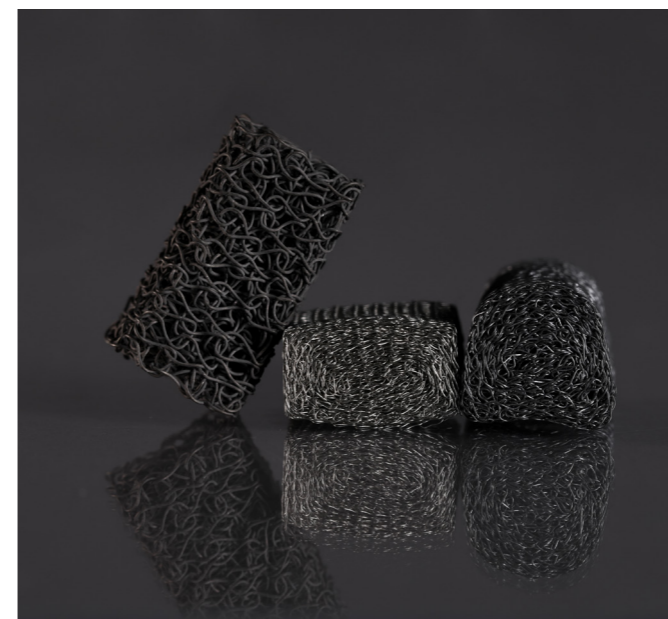
Materials

In practice any material which can be drawn or spun into filament form can be used to produce knitted mesh. Extensive stocks of wire and filament are available to meet most process requirements. The most frequently used materials are stainless steel grades 304L, 316L, 321, 310, 310S for long life and to cope with high temperature and 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 for use in marine or saline environments, polypropylene is lightweight, inexpensive and corrosion resistant.

Hostafion 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, Teflon and glass wool can also be knitted together with wire (co-knit) 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:

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

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.
≠	Hostafion is a registered trade mark of Hoechst, Germany.
≈	Fecralloy is a registered trade mark of Kanthal AB.

For more information on any of our products, please don't hesitate to contact us.

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All specifications are correct at time of print, are for guidance purposes only and subject to change without prior notice.



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