

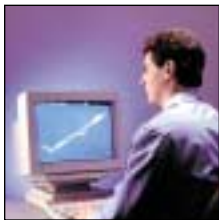


## AIR & LIQUID FILTERS

### CUSTOM-ENGINEERED SOLUTIONS IN KNITTED WIRE MESH

For forty years, Metex design, development, and manufacturing engineers have been producing engineered components that take maximum advantage of the unique characteristics and robust nature of knitted wire mesh. Its interlocked looped structure, which offers excellent resiliency, memory—even when subjected to high temperatures as well as high-tensile or compressive stress—and strength, make knitted wire the ideal choice in materials when both performance and cost are paramount.

Metex products now meet a wide range of critical needs—from providing flexible, yet durable, seals and joints to noise attenuation, thermal insulation, and filtration—in some of the most demanding industrial applications and environments.



Complete in-house design, R&D, and test facilities



Flexibility in manufacturing for JIT requirements

## Superior Filtration in Hostile Environments with Knitted Wire Mesh

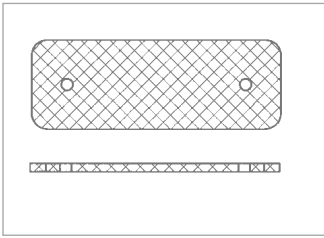
Filtering liquids or air in hostile environments—such as those subject to temperature extremes, high orders of shock/vibration, and caustic fuels or fumes—has posed problems for paper filter elements. These types of elements simply will not withstand these types of operating conditions.

Since paper filters are typically composed of organic materials, they are also subject to attack by the caustic byproducts of many industrial processes—such as those involving combustion. For example, corrosion often takes place when high-temperature lubricating oils are loaded with such acids. After extended use, the surface area of the paper filter becomes heavily loaded, resulting in filter weak spots. (If the pressure relief valve is not set low enough, and the pressure is allowed to remain at normal operating pressure [500 to 700 kPa], paper filter elements may tear, fracture, or even burst.)

Sintered metal filters—due to their granular construction—are also prone to fracture or disintegration when subjected to the stresses of high temperature and shock. Unless the fusion process involved in their construction is 100% complete, small particles may begin to break away. As a result, when installed on either rotating or reciprocating machinery, little particles of filter material very frequently detach and migrate to block the very devices the filter was designed to protect.

Metex knitted wire mesh liquid and air filters overcome the limitations and deficiencies of these and many other filtration methods. Where resistance to degradation, corrosion, mechanical, or thermal shock is desired—and where a resilient product is needed for proper cavity fit—Metex filters provide an economical, robust alternative. From cryogenic operating conditions up to temperatures of 650° C, knitted wire mesh filters maintain their integrity even when subjected to extremely high vibration and exposed to destructive gases such H<sub>2</sub>, SO<sub>4</sub>, and HNO<sub>3</sub>.





## PRODUCT BENEFITS

- ❑ Resistant to high temperatures up to 650°C
- ❑ Immune to mechanical stress
- ❑ Impervious to chemical corrosion
- ❑ Withstands extreme thermal shock
- ❑ Resilient—permitting tight fit to a given filter cavity without machining to critical tolerances
- ❑ Can be supplied in virtually any geometry
- ❑ Lasts four times longer than competing products
- ❑ Can be fabricated from a wide variety of alloys and plastics
- ❑ Competitively priced
- ❑ Minimal tooling costs



Fuel injection filter—the convoluted maze provides a tortuous path to trap contaminants

## Metex Knitted Mesh—A Superior Alternative to Paper or Sintered Metal

Knitted mesh consists of wires of various metals or strands of other materials that have been knitted into a mesh structure—creating a matrix of interlocking loops that can move freely in the same plane without distorting the mesh. (Each loop is actually free to move in three directions, and the finished metal knit permits two-way stretch.)

In addition, each loop acts as a small spring when subjected to compressive stress. Thus, filters of compressed knitted metal mesh yield when subject to the stresses of shock and vibration—yet, depending on the construction, can immediately recover to 90% of their original size when the force is removed.

### Versatility for demanding filtration applications

Knitted mesh is also versatile. It can be made from any metallic, nonmetallic, or combination of metallic and nonmetallic materials that can be drawn into wire. By careful selection of the combination of materials, proper filtration can be provided in corrosive atmospheres, ultra-high and cryogenic temperatures, as well as for radioactively-contaminated dust particles, oil, or other extreme operating conditions.

Use of knitted mesh produces a “depth” or “three-dimensional” filter that provides an ideal tortuous-path-entrainment filtration effect. This is achieved by carefully balancing such variables as:

- Wire diameter
- Density and thickness of the pressed unit
- Configuration

### Greater filter efficiency

Even when compressed to extremely light densities, or where pore size is larger than the particle size of the contaminate, proper filtration is still achieved and small contaminate particles are efficiently removed from the fluid stream. In addition, the tortuous path construction results in greater dirt-retention, without blockage, than can be expected from other filter media.

Since there are literally thousands of voids resulting from the interstices of the overlapping wires, good filter efficiency accompanied by minimal pressure drop is maintained, despite knitted mesh’s high dirt-retention factor. And, since Metex knitted mesh filters are made from continuous lengths of wire interlocked with each other, particles can not break off to cause equipment damage or failure.

Knitted mesh filters are resilient enough to fit (or retrofit) into filter cavities of virtually any configuration and still retain a secure friction fit.

**Liquid Filtration**

Metex knitted wire mesh may be used for liquid filtration and/or separation in the following industries:

- Chemical processing
- Gas turbines
- Food processing
- Water and waste treatment
- Pharmaceuticals
- Plastics
- Brewing and winemaking
- Gasoline, diesel or alternate fuel engines

**Air Filtration**

Metex knitted wire mesh filters are used in the following applications:

- **Engine crankcase**—breather elements
- **Air conditioning systems**—to filter compressor oil from air and to remove pollen from intake air
- **Restaurant range hoods**—as grease traps
- **Heating and ventilating systems**—to filter dust
- **Intake filters**—for air compressors
- **Clean air rooms**—as dust traps
- **Engine air intake filters**
- **Industrial vacuum cleaner filters**
- **Air cleaning and smog suppressant equipment**
- **Washing machines**—as lint traps

**Optimizing Density, Particle Retention, Dirt-Holding Capacity**

Metex filtration-development engineers can help you determine the proper combination of wire diameter, compression density—which directly affect particle retention and dirt-holding capacity—and filter thickness that satisfy the requirements of each filter's intended application.

**Performance Characteristics**

The tables below list the particle-retention and dirt-holding capacities of typical units. (It should be noted that dirt-holding capacity is an important consideration only in applications where the filter will not be cleaned regularly.)

Typical Micron Ratings (Nominal and Absolute)

Filter Density (%)	ø0.05 mm Wire		ø0.09 mm Wire		ø0.11 mm Wire		ø0.15 mm Wire		ø0.20 mm Wire		ø0.28 mm Wire	
	Nom.	Abs.	Nom.	Abs.	Nom.	Abs.	Nom.	Abs.	Nom.	Abs.	Nom.	Abs.
50	15	40	25	50	35	90	45	120	50	140	75	160
45	20	50	30	60	40	100	50	140	60	160	80	180
40	25	60	35	70	50	120	60	160	70	180	90	200
35	30	70	40	80	60	140	70	170	80	200	100	250
30	40	80	50	100	70	160	80	180	90	225	120	275

Data applies to a ø12.7 mm, 9.5 mm thick filter

Typical Dirt-Holding Capacities

Filter Density (%)	ø0.05 mm Wire		ø0.09 mm Wire		ø0.11 mm Wire		ø0.15 mm Wire		ø0.20 mm Wire		ø0.28 mm Wire	
	(mg)	(g/cm <sup>3</sup> )	(mg)	(g/cm <sup>3</sup> )	(mg)	(g/cm <sup>3</sup> )	(mg)	(g/cm <sup>3</sup> )	(mg)	(g/cm <sup>3</sup> )	(mg)	(g/cm <sup>3</sup> )
50	910	0.714	960	0.757	860	0.677	620	0.488	640	0.506	680	0.537
45	840	0.659	850	0.690	820	0.647	560	0.445	580	0.458	620	0.488
40	900	0.708	960	0.757	970	0.763	830	0.653	680	0.537	940	0.738
35	960	0.757	970	0.763	920	0.726	1010	0.793	650	0.513	1010	0.793
30	1140	0.897	1120	0.879	1050	0.824	1020	0.806	810	0.635	920	0.726

Data applies to a ø12.7 mm, 9.5 mm thick filter



Knitted wire construction permits production of filters in almost any material, density, thickness, or configuration



Air-bag slag filter for particle entrapment and heat transfer

▶ **NOTE:** Density refers to the degree of compression given to the knitted mesh in the design and manufacture of a filter. It can also be described as the proportion of the amount of wire relative to the total volume of the unit after compression (usually expressed as a percentage of the volume of the unit). For example, a solid stainless steel wire filter with 50% of its area consisting of voids and interstices would create a unit of 50% density.



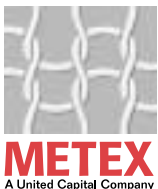
## Metex Knitted Wire Mesh Products Solve Problems Cost Effectively

Metex knitted wire mesh is manufactured from an "endless" wire that is formed into loops and subsequently networked, providing elasticity and resilience not found with woven wire or powdered metal products.

The diversity and versatility of wire mesh enables Metex to produce products for a wide variety of applications, including:

- |                                    |                        |                        |
|------------------------------------|------------------------|------------------------|
| • Seals                            | • Heat Wicks           | • Air Gap Rings        |
| • Breathers                        | • Noise Attenuators    | • Filters              |
| • Coalescers                       | • Mufflers             | • Shock Absorbers      |
| • Gaskets                          | • Air Filters          | • Protective Coverings |
| • Heat Shields                     | • Electronic Shielding | • Exhaust Seals        |
| • Navin Rings                      | • Ball Joint Seal      | • Catalytic Converter  |
| • Catalytic Converter Support Mesh | • Systems              | • End Rings            |
|                                    |                        | • Flame Arrestors      |

Our **Knitted Wire Mesh Filters** continue a longstanding Metex tradition of integrating the right designs, materials, and manufacturing methods to meet customer needs for optimal performance at lowest possible cost.



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