



GASKETS AND SEALS

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

Knitted Wire Mesh Gaskets and Seals for Superior Performance in Harsh Environments

Metex knitted wire mesh gaskets and seals provide resiliency, strength in compression, and a nearly unlimited choice of materials, constructions, or shapes for specific applications. Most important, they provide superior performance in hostile environments where other materials would fail as a result of decomposition or deformation.

Knitted mesh seals have no seams or ribs—normally the weak areas of any seal—so that when used in gasketing and sealing applications, they provide high-strength uniformity throughout the sealing area. Unlike woven or braided materials, knitted mesh consists of a continuous series of interlocking loops knitted in a tubular form, allowing two-dimensional movement in the plane of the mesh. This results in unusual flexibility and resiliency, even under heavy compression loads and exposure to extreme temperatures.

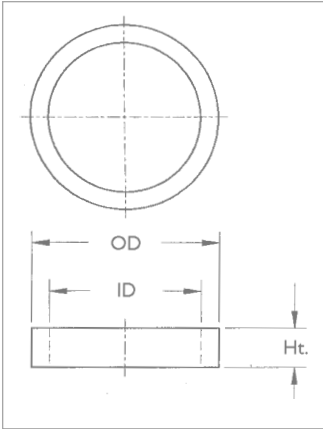
Due to its inherent resiliency and strength in compression, knitted wire mesh also yields to applied force—yet recovers to nearly its original shape when the force is removed.

Flexibility in Design and Performance

When knitted mesh is combined with other materials, the mesh serves as a “backbone” support imparting resiliency and strength in compression to the seal. Because of the wide array of materials available for construction, knitted wire mesh can also be used to create any number of flexible, resilient gasketing or seal configurations over a broad range of operating conditions.

Knitted wire mesh seals and gasketing may be used for static joints, as well as those where there is freedom of positioning in repeated closures. In all of these applications, conventional materials require periodic replacement. Even where replacement can be scheduled well in advance of the estimated failure point, replacement cost and downtime are high.





PRODUCT BENEFITS

- Heat resistant—knitted wire mesh dissipates, transfers or resists heat
- High strength and durability—resistant to wear
- Withstands cryogenic temperatures and wear
- Resistant to corrosion, deterioration, and heat at over 500°F and below - 100°F
- Can be compressed, layered, calendared, and wound to present a tortuous path



Typical static and dynamic seals and gaskets to meet a wide range of applications

Seals and Gaskets that Offer Flexibility, Strength, High-Temperature Resistance... And Long-Term Performance

Depending on the specific application, knitted wire can be fabricated from almost any material or combination of materials that can be drawn into wire or filament form. For extreme environments, the most frequently used material is stainless steel wire.

But other ductile metals, such as aluminum, copper and special alloys, can also be used—as well as synthetic fibers, polymers and yarns—as either single substrates or configurations of multiple materials. This wide range of material options permits flexibility in producing gaskets that can be expressly designed for specific critical applications.

Sealing for some of the world's harshest environments

Metex has also developed a family of seals which combine knitted wire mesh technology with a variety of other materials to form unique composites. The resulting composite seals exhibit characteristics which can be useful in extremely harsh, chemical-process system environments. These seals are generally die-formed to fit specific applications within allowable tolerances. Available composite materials include graphite, ceramics, and other similar fillers.

Typical applications include process valve shaft and stem seals where sealability is required along with seal resiliency, and temperature and corrosion resistance. Due to these performance characteristics, Metex seals are also commonly used in many other applications and industries, including petroleum and petrochemicals.

Metex also has the unique capability to integrate elastomers and plastics with knitted wire mesh technology for extremely hostile-environment applications—including the kinds of sealing problems encountered with temperatures to 260°C and pressures to 138 MPa.

The unique characteristics of knitted wire mesh construction provide the necessary resilience and mechanical strength to restrict extrusion of the most free-flowing materials while maintaining excellent memory.

Applications

The unique fabrication process used by Metex makes possible the production of seals, gaskets, and gland packings in forms, shapes and densities unobtainable by any other method or material. This process allows the creation of sealing media for virtually any application, including:

■ Exhaust system gasket seals

Exhaust systems for gasoline, diesel, and gas turbine engines are subjected to temperature extremes, corrosion, vibration, and thermal shock. Most of the negative effects of these conditions occur at the seals. Conventional seals simply can not meet these criteria. In conjunction with leading automotive manufacturers, Metex has developed knitted wire mesh designs that exceed them.

■ Furnace, oven and boiler joints

Gaskets used in high-temperature sealing for furnaces, ovens, and boilers are tubular or flat constructions of knitted wire mesh and refractory materials. Generally, the mesh is knitted with metals or alloys and then covered with fiberglass or a similar material. Metex knitted wire gasket constructions are obtainable in any desired length or as preformed gaskets, and withstand direct exposure to flame, combustion products, superheated steam, petrochemicals, rapid temperature changes such as those occurring during start-up, and the oscillatory pressures generated by the combustion process. Unlike other gaskets, knitted wire gaskets need not be replaced when removed but can be reused indefinitely, providing additional savings in maintenance costs.

Applications continued

■ High-temperature door seals

- Furnace, boiler, and oven doors that must be opened and closed frequently impose intense demands on gasket materials. The gasket must compress readily to seal the joint—yet retain its resiliency and integrity under prolonged, repeated use. Knitted wire has been field documented in controlled tests that exceeded 50,000 openings and closings without failure.
- Two basic knitted wire configurations have been used for high-temperature door seals: single or double refractory rope covered with a knitted wire sleeve, and “tadpole” type, comprising a webbed sleeve of refractory material with a knitted wire core.

The sleeve for single or double refractory rope retains a cylindrical rope shape, reinforces it, and protects it against deterioration due to impact and abrasion. The “tadpole” type provides greater mounting adaptability, increased resiliency, and a more uniform seal against the escape of gases and vapors under small pressure differentials.

■ Foundry mold gasketing

- The unique properties of knitted wire provide a sophisticated yet simple solution to the problem encountered in sealing open-bottom foundry molds used in casting iron. The molds stand upright on the casting stool, requiring a seal for the spaces between the mold and the stool in order to chill the molten metal to prevent costly leakage. Metex knitted wire formed into a multi-core cable solves this problem. Consisting of five plain or galvanized steel wire-mesh tubes bound together by a single knitted wire sleeve, the gasket is compressed between the mold and the stool, filling all gaps around the joint. The poured metal flashes into the gasket, where it cools, forming a slag skin, thereby minimizing leakage, waste, and safety hazards.

■ Cryogenic system seals

- Cold can often be more stressful on gasket materials than extreme heat, since the molecular structure of many materials is affected by cold conditions. Ordinary gasketing materials become rigid, hard, and brittle—and may crack, crumble, or even shatter on contact with liquefied air or gases. Metex knitted wire technology provides a solution to this problem. This design withstands the destructive effects of cryogenic temperatures, creating a perfect seal yet maintaining resiliency under the most severe conditions.

In a typical application of a Metex gasket in a production-line installation for quick-freezing hamburger, tadpole gaskets are used on the cover flanges to seal in the freezing gas when the covers are closed. At the (-170°C) operating temperature, conventional gasket materials shatter, not only destroying the seal and releasing gas, but contaminating the food as well. Metex gasketing retains its integrity at cryogenic temperatures, removing the threat of contamination and performing its sealing function indefinitely.

Similar compositions and configurations are available for use on all types of cryogenic instruments, machinery, vehicles, and equipment where liquid air, oxygen, nitrogen, and helium are common media. Knitted wire gaskets provide an effective seal and remain resilient down to temperatures as low as -195°C.



Knitted wire mesh high-temperature door seals



Custom exhaust seals for a wide variety of automotive, transportation and industrial applications



Cryogenic mesh and grafoil to meet extreme temperatures and sealing requirements



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

Our **Knitted Wire Mesh Gaskets and Seals** continue a long-standing 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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