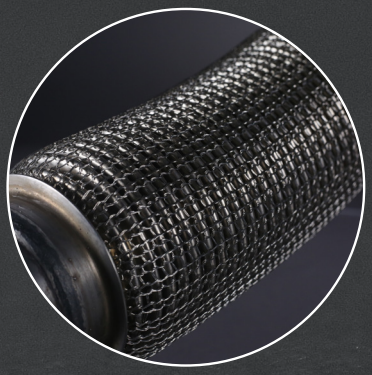
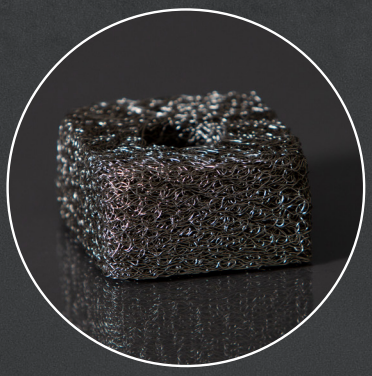
Anti-Vibration, Sound Attenuation and Heat Shield Components





KnitMesh® Technologies

Protecting People, Property and our Planet

About our Knitted Mesh

Knitted mesh is a versatile material made from metal, ceramic, or synthetic wire, meticulously knitted into a mesh of interlocking loops. This remarkable material boasts incredible heat and corrosion resistance along with the ability to reduce vibration, shock, and noise. With its exceptional strength, flexibility, and resilience, knitted mesh is the ideal choice for the most demanding applications.

Main properties:

- Flexible & Malleable
- Energy Absorbing
- Variable Porosity
- Harsh Environments
- High Resilience
- High Strength
- Encapsulates & Protects
- EMC & RFI Shielding
- Cost Efficient
- Electrically Conductive
- Environmentally Friendly
- Material Versatility
- High Surface Area

How Does Knitted Mesh Absorb Energy?

Knitted mesh is a specialized material that can reduce vibration, absorb shock, attenuate sound, and disperse heat. It achieves this through a combination of a proprietary manufacturing process and its unique physical properties.

During the mesh knitting process, loops are created that act as tiny springs. These loops can compress partially and then return to their original shape. This property of the loops allows them to absorb and dissipate the energy generated by vibrations or sound.

Additionally, knitted mesh has elastic characteristics, which enable the wire loops to move in multiple directions simultaneously. This flexibility and movement of the loops help to disrupt and attenuate vibrations and sound waves.

Material selection is important for the application. When subjected to airborne or structural noise (vibrations), knitted mesh components can be designed to vibrate. This vibrational energy can be dissipated in the form of heat, resulting in a vibration and sound attenuation effect, as the waves lose intensity.

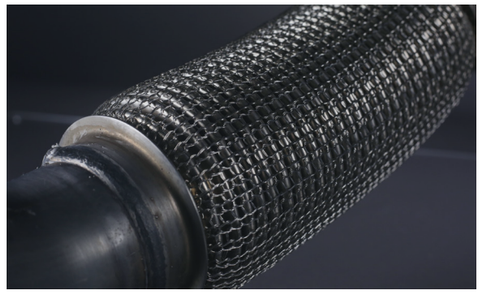
Compressing metallic knitted mesh in a die creates a structure with intricate pores and passages. These passages present a tortuous path through which energy waves must pass. This causes the sound to be diffracted and absorbed which reduces the intensity of the resulting waves. Essentially, the knitted mesh acts as a damper that filters structural noise (vibrations) and is effective for shock isolation and as an elastic element in airborne noise isolation systems.

A Sound Solution:
Tackling NVH, BSR and Shock Problems

Anti-Vibration

Our knitted mesh is a game-changer for anti-vibration. With its unique structure, it provides superior vibration damping and isolation. By incorporating our knitted mesh into your systems, you can significantly reduce the impact of vibrations, both reducing stresses in the system and aiding comfort for users. Additionally, our knitted mesh is highly durable and able to withstand the most demanding conditions, often within very limited available space, making it ideal for many long-lasting anti-vibration solutions.

Sound Attenuation

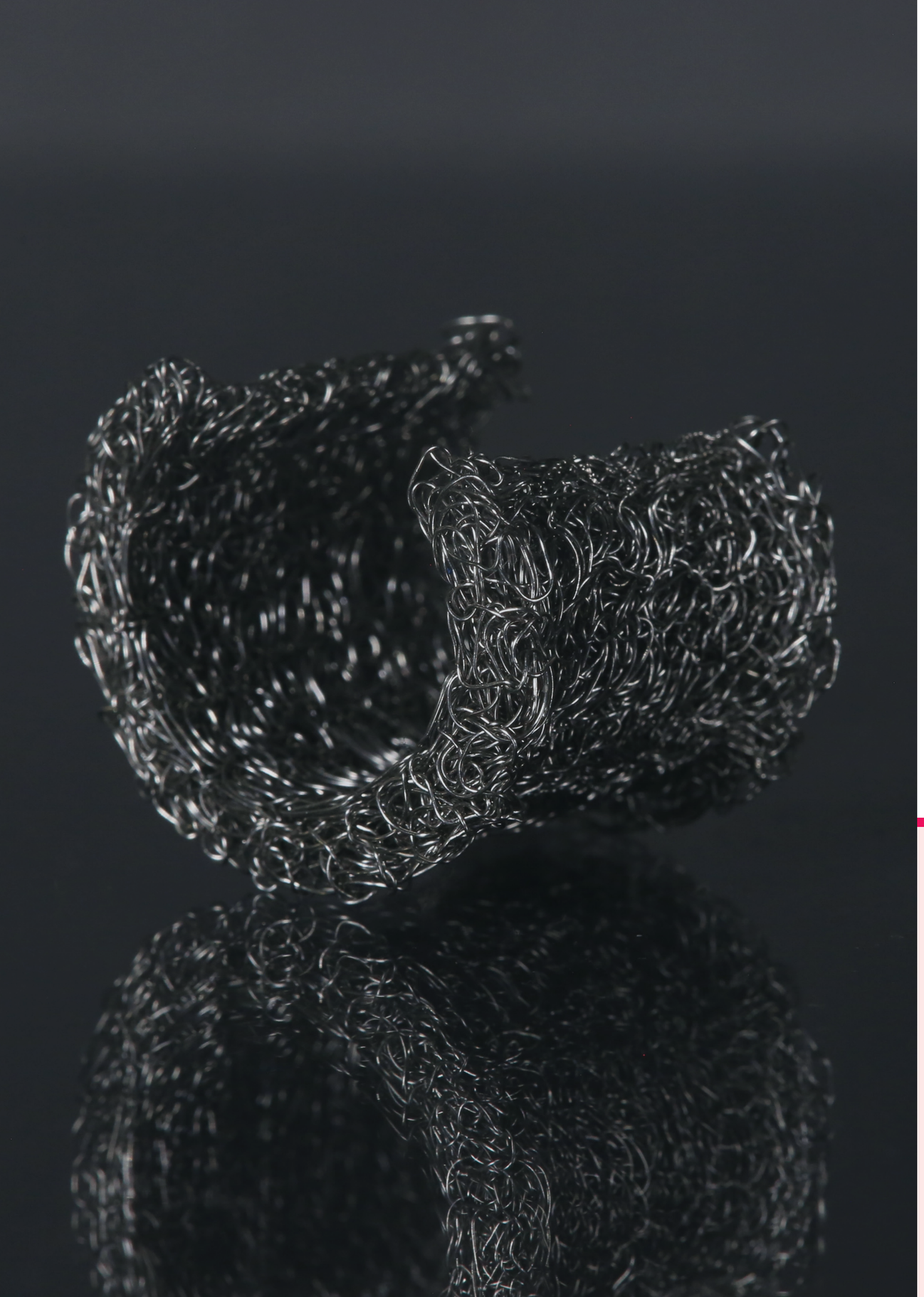


Materials can be selected to both absorb and diffract sound energy. Our engineers will work with you to help optimize solutions for your vibration and sound attenuation problems. The unique formability of our knitted mesh means that solutions can be found for the most difficult technical problems in the most awkward and constrained locations.

Contact us today to arrange a free no-obligation consultation with one of our engineers.

Heat Shield Components

Securing heat shields in hot (or extremely cold) locations that may be subject to harsh chemical attacks is no longer difficult. Our knitted mesh is an unparalleled solution for heat shield components. The vibration damping and sound attenuating properties of the mesh are unaffected by high temperatures - applications at 900°C are not uncommon. With our knitted mesh, you can ensure longevity, reliability, and optimum performance, even in the most extreme conditions.



Features and Benefits

Customised solutions: Knitted mesh can be tailored to meet specific customer requirements, including a wide range of materials, dimensions, and stiffness. This customisation ensures that the mesh perfectly fits the intended solution and provides optimal performance in the specific application.

High-temperature applications: Knitted mesh can withstand high temperatures, making it suitable for applications where temperatures of up to 900°C are encountered. This heat resistance allows the mesh to maintain stability and performance in the most demanding of operating conditions.

Resilience in harsh environments: Knitted mesh is highly resistant to harsh environments, including exposure to acid, and alkaline conditions, solvents and oils. It retains its integrity and functionality in these challenging conditions, making it ideal for applications that require durability and reliability.

Long life and stability: With its high cyclic loading capability and resistance to plastic deformation, knitted mesh offers long-lasting performance. It can withstand repeated stresses and strains without losing its shape or effectiveness, resulting in a stable and reliable solution.

Versatile applications: Knitted mesh excels in environments where vibration and shock loading are present. It effectively dampens vibrations and absorbs shocks, making it suitable for a wide range of industries such as automotive, aerospace, and industrial equipment.

Welding and easy installation: Knitted mesh can be welded to adjacent components, simplifying the installation process. This ease of installation saves time and effort during assembly, ensuring a smooth and efficient installation of the mesh in a wide variety of applications.

Rapid prototyping: Bespoke, application-specific samples of knitted mesh can be provided in as little as three weeks, enabling fast prototyping and development. This quick turnaround time allows for efficient testing and evaluation of the mesh's performance in specific applications.

Cost-effective solution: Knitted mesh invariably offers a lower cost when compared to alternative solutions without compromising on quality and performance. Its durability, customization options, and long life contribute to reducing overall costs thus making it the obvious commercial choice.

Technical Parameters

Wide range of frequencies: Knitted mesh typically operates at natural frequencies from 10Hz to 30Hz. Natural frequency can be changed by the design of the mesh and the pre-load applied. Knitted mesh dampers or isolators are used on rotating machines operating over 2000 rpm.

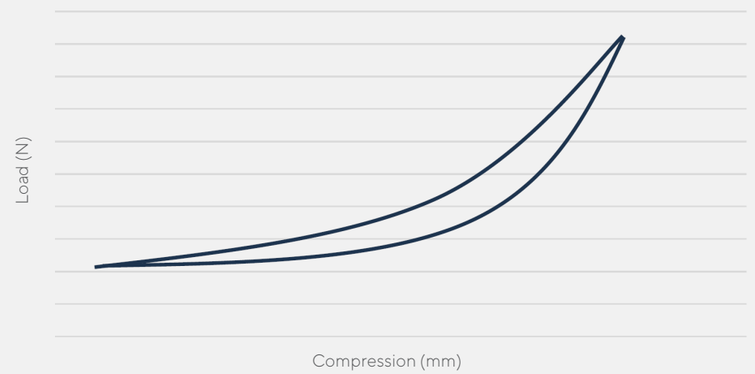
High load capacity at low heights: Knitted mesh excels in applications where space is limited. It can maintain a high load capacity even at reduced thicknesses down to 2mm. This capability allows for compact design and integration into space-constrained environments without sacrificing performance.

Damping ratios: High damping from 15% to 20% and tan delta from 0.3 to 0.4 (magnification at resonance $3<Q<4$) are standard. Damping performance can be modified by changing the applied pre-load within the design of the damping system. A lower pre-load enables more movement and higher damping, and a higher pre-load reduces movement resulting in lower damping.

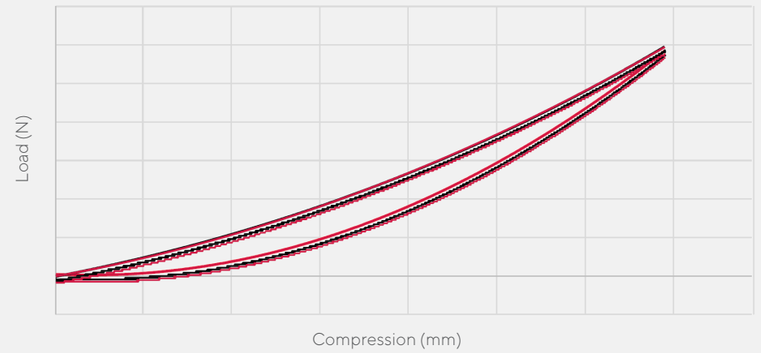
Compression and tension applications: Knitted mesh vibration dampers can be welded making them suitable for tension applications, compression and for attachment to adjacent components.

Typical Curves

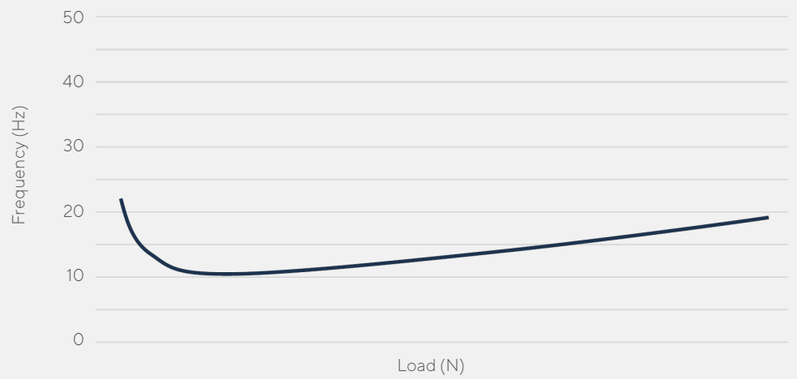
Load vs. Compression



Load vs. Compression – Cyclic Loading and Unloading

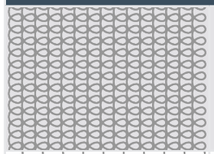
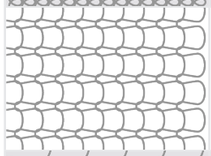
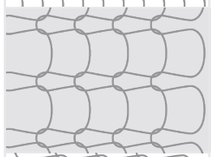
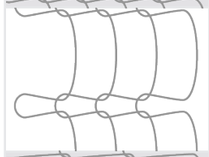
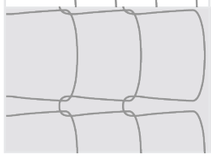


Frequency vs. Load



Material Selection

Material	Description
Stainless steel grade 304	Our best-selling material, and one of the least expensive.
Stainless steel grade 316	Used primarily in saline and marine environments.
Stainless steel grade 310s	Ideal for high temperature applications.
Stainless steel grade 309	Ideal for high temperature applications.
Nickel 200	Used in alkaline environments such as KOH.
FeCrAl alloy	Ideal for extreme temperature conditions.
Haynes alloy	Widely used in commercial, military, and general aviation aircraft.

Mesh Type		Wire Diameter (mm)	Natural Width (mm)	No. of Stitches per cm (Length)	No. of Stitches per cm (Lay-Flat)
	Fine Mesh	0.05 - 0.15	6 - 165	3.5	4.4
	Medium-Fine Mesh	0.15	40 - 635	2.4	3.5
	Standard Mesh	0.2 - 0.35	30 - 1000	1.6	1.9
	Coarse Mesh	0.2 - 0.35	30 - 550	1.6	0.74
	Super-Coarse Mesh	0.4 - 0.6	330 - 350	0.5	0.5

Customer Support

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