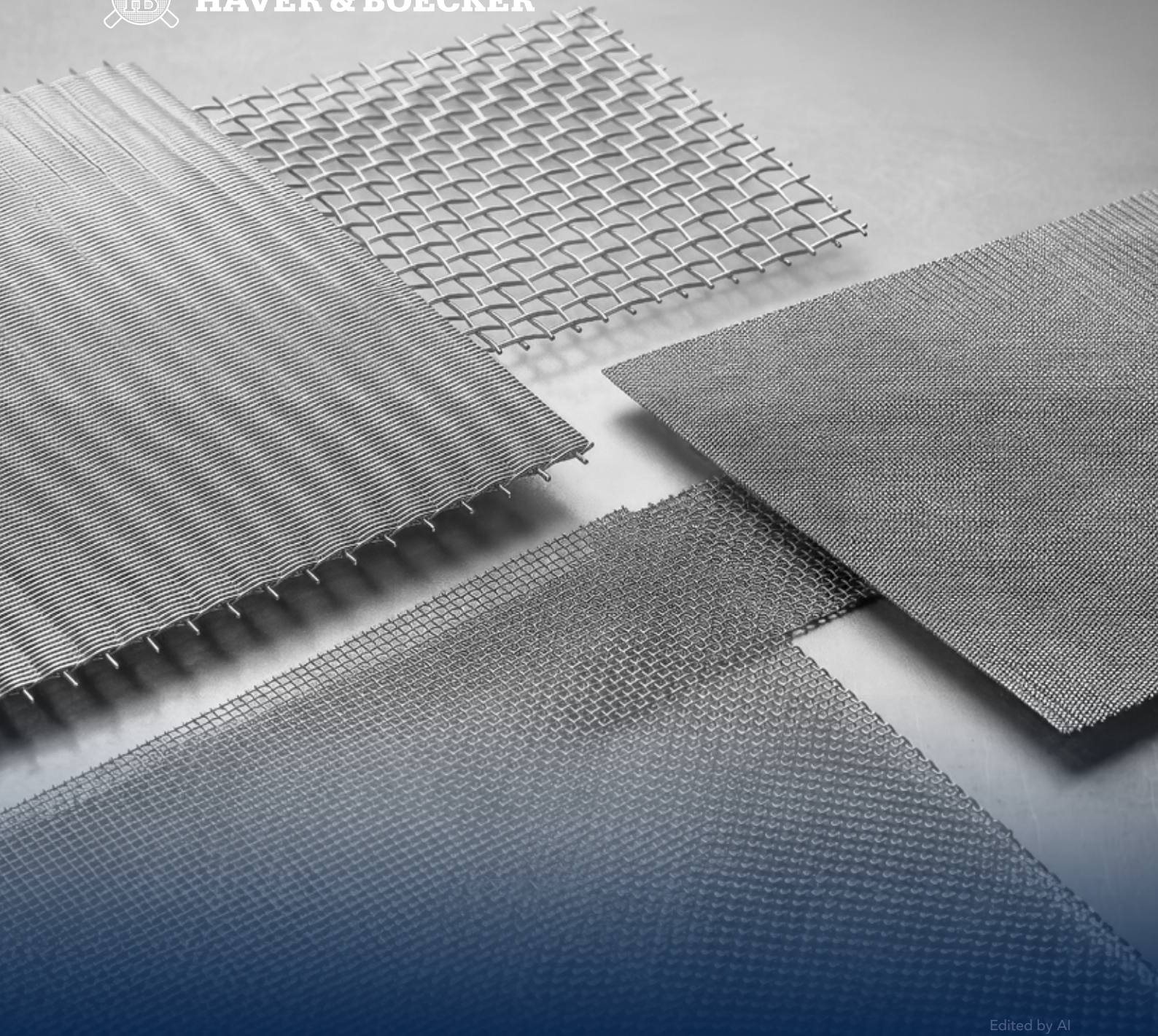




HAVER & BOECKER



Edited by AI

METAL WIRE MESH
DEFINED GEOMETRY.
WHERE STRUCTURE MEETS FUNCTION.

FASCINATING ENGINEERING. **AS ONE.**

METAL WIRE MESH

PRECISE, RELIABLY PREDICTABLE STRUCTURES

Wire mesh is a precision-engineered material created by weaving metal wires on specialized looms. Warp and weft wires intersect at right angles to form uniform mesh openings with clearly defined dimensions. These openings can be specified to exact requirements, creating a consistent geometric structure across the entire surface. The result is a highly functional material with predictable, measurable performance characteristics. Durable, repeatable, and adaptable, wire mesh is used across a wide range of industrial and technical applications.

When other materials reach their limits, wire mesh continues to perform. Compared to plastic meshes, nonwovens, metal foams, sintered materials, and perforated sheets, wire mesh offers a unique combination of precision, mechanical strength, and versatility.

Key advantages of wire mesh:

- Withstands temperatures up to 1,200°C and offers excellent resistance to corrosive environments (depending on material selection)
- Long service life and dimensional stability
- Precise filtration and separation performance through accurately defined aperture and pore sizes
- Excellent cleanability by mechanical, chemical or thermal methods
- Extensive customization options, including material, weave pattern, and geometric specifications
- A sustainable solution, made from durable, recyclable materials with recycled content of up to 99%

HAVER & BOECKER is a family-owned company built on the two strong pillars Wire Weaving Division and Machinery Division. Since 1887, we have been developing and producing solutions that make processes safer, more efficient, and more sustainable: wire mesh products for industry, technology, architecture and design, as well as machines, technologies and systems for storing, packaging, and shipping bulk materials and liquids. With more than 50 subsidiaries and 150 representatives, we are globally connected and locally rooted in Oelde, Germany. Together with our customers, we rethink processes and shape the future.

FASCINATING ENGINEERING. **AS ONE.**

WIRE MESH AT A GLANCE

5 DEFINING CHARACTERISTICS

1 MATERIALS – Wires and plastic monofilaments for every application

From carbon and stainless steels to nickel and copper alloys, titanium and selected specialty materials, material selection plays a critical role in the performance and service life of wire mesh. Factors such as corrosion resistance, temperature resistance, strength, and operating conditions determine the ideal material for each application. We carefully match materials to the process, environment, and performance requirements to ensure long-term reliability.

2 GEOMETRY – Precisely defined

Wire mesh features a highly engineered geometric structure. Aperture size, pitch, wire diameter and open area can be specified to exact requirements before production begins. International standards establish tolerances, requirements and testing procedures, ensuring consistency, reproducible results and a reliable basis for engineering process design.

3 PRECISION – Micron-scale structures engineered for precision

HAVER & BOECKER processes wire diameters ranging from 11 µm to robust millimeter-scale sizes. This enables wire mesh solutions for ultra-fine filtration as well as heavy-duty screening and protection applications. This broad range enables both maximum separation accuracy and mechanical strength, tailored to the respective application.

4 VARIETY – Open meshes or visually closed filter mesh

Different weave patterns are designed to meet specific process requirements. Open wire mesh weaves provide high throughput and efficient separation performance. Visually closed filter mesh (Dutch weaves) enables precisely controlled pore structures and maximum filtration accuracy. Both can be combined, layered and fabricated into functional components ranging from simple cut-to-size pieces to complex, application-specific assemblies.

5 MANUFACTURING DEPTH – From development to finished products

Our wire mesh products are manufactured entirely in-house, from selecting the right wire and designing the wire mesh to production on our own plant engineering. Every stage of production is carefully managed and monitored, from rolled goods to fabricated components such as coils, industrial and test sieve screens, filter elements and formed parts. Development, production, testing, cleaning and packaging are all precisely coordinated. This level of vertical integration provides reliability, flexibility and quality, from prototypes and custom components to high-volume production.

FROM WIRE TO FUNCTION

MATERIALS AND GEOMETRY

The performance of wire mesh begins with the wire itself. Material selection, wire geometry, and processing characteristics all play a critical role to the stability, functionality, durability and precision of the weave. When the wire is right, the result is a woven wire cloth that performs reliably over the long term.

Materials

The wire material determines the corrosion and temperature resistance, thermal conductivity, electrical resistance and mechanical strength of the wire cloth. When designing a solution, our experts therefore consider not only the operating environment, but also mechanical and thermal loads, processability (e.g. welding and deep drawing), standards and approvals.

Our material portfolio includes:

- Carbon and stainless steel
- High-strength and heat-resistant alloys
- Aluminum, copper and nickel-based materials
- Titanium and specialty materials
- Plastic monofilaments and high-performance polymers for technical and design-focused wire mesh applications



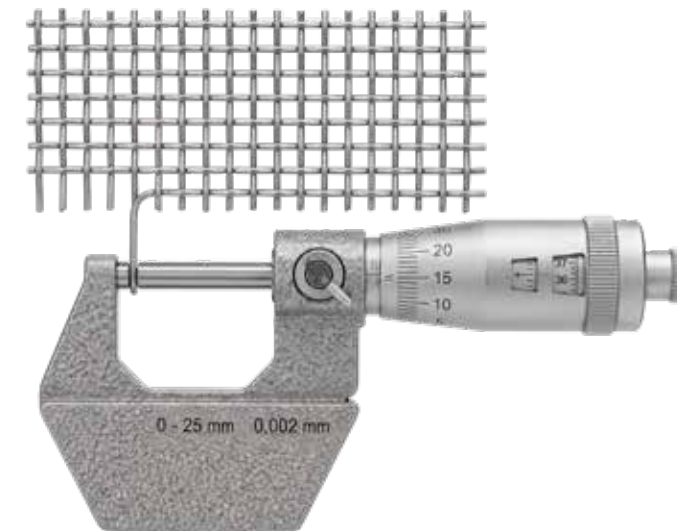
For more information about our wide range of materials, please visit our website.



Wire geometries

We work with an exceptionally wide range of wire sizes and profiles. Depending on the application, they are engineered and formed to meet specific requirements for mechanical performance, flow characteristics, or visual appearance.

- Wire diameters: from 11 μm to 6.3 mm
- Wires for heavy-duty grids: up to 20 mm wire diameter
- Available wire geometries:
 - Round wires
 - Flat wires
 - Square wires
 - Cylindrical wires (tubes)
 - Stranded wires
 - Polygonal shapes (e.g. triangular)



The wire diameter after weaving can be determined by measuring wires directly within the cloth using a micrometer screw (see the figure) or optical or scan-based methods.



AI-generated image

WIRE CLOTH TERMINOLOGY

DEFINED BY STANDARDS, DESCRIBED IN TECHNICAL TERMS

International standards provide a common framework for specifying, measuring, and evaluating wire mesh. The terminology below is based on DIN ISO 9044 and related international standards.

Aperture width (w)

The distance between two adjacent warp and weft wires. Measured at the center of the opening, it is a key parameter influencing both separation performance and throughput.

Wire diameter (d)

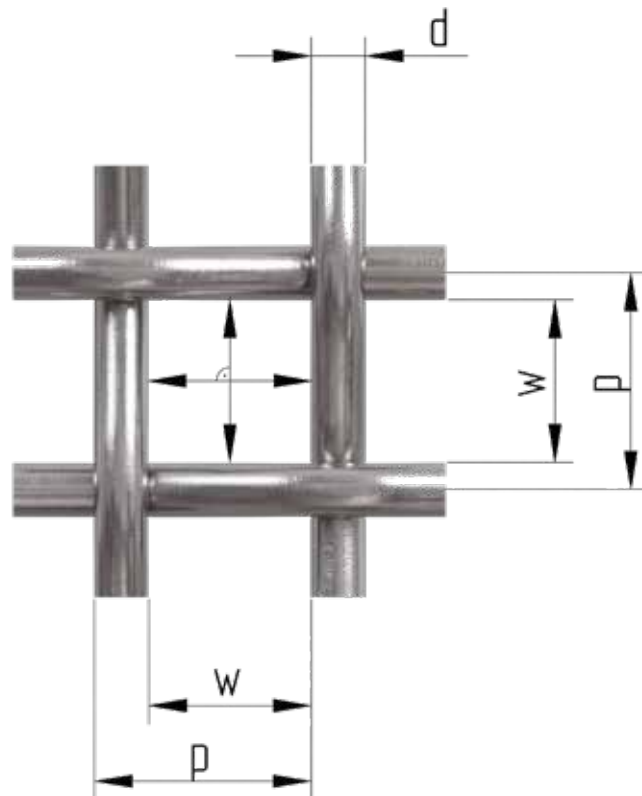
The diameter of the wire used in the woven cloth. The weaving process can slightly alter the original wire diameter. It influences mechanical stability, wear resistance and flow behavior, among other properties.

Pitch (p)

The distance between the centerlines of two adjacent wires.

It is calculated as: $p = w + d$

Pitch is an important parameter in engineering calculations, including the determination of open area.



Warp (k)

All wires running parallel to the weaving direction.

Weft (s)

All wires running perpendicular to the weaving direction (at right angles to the warp wires).

Open area A_0 (%)

The percentage of the total mesh surface that is open to the passage of the medium. It is one of the primary factors influencing throughput and flow performance. For square meshes, the approximate formula is:

$$A_0 = 100 \times (w / p)^2$$

Type of weave (binding)

The pattern in which the warp and weft wires are interlaced (e.g. plain weave, twilled weave or satin weave). The weave type influences surface characteristics, stability, permeability and cleanability.

Mesh count

The number of mesh openings within a specified unit of length (n), such as a centimeter, decimeter, or inch. The number of openings per inch (25.4 mm) is commonly referred to as the mesh count or simply mesh.

- Mesh: openings per inch (25.4 : p*)
- n/cm: openings per centimeter (10 : p)
- n/cm²: openings per square centimeter (10 : p)²

* p in mm

Important: Mesh count alone is not sufficient to fully define a wire cloth. At least one additional parameter, such as aperture width, wire diameter, or geometric pore size, is required.

Area weight, G_a

The area weight of wire mesh defines the mass of the mesh per unit area. It is typically expressed in kg/m² and depends on mesh opening, wire diameter, alloy and type of weave.

Determining aperture width (w) using the measurement row method:

- Measure a defined number of pitches (p) across a specified length (L)
- Calculate the average pitch by dividing the measured length by the number of pitches (L / p)
- Subtract the wire diameter (d) to determine the aperture width (w)

Recommended number of measurements:

- Aperture widths from 16 mm to 1 mm: minimum 10 pitches
- Aperture widths < 1 mm to 0.1 mm: minimum 20 pitches

This method provides a reliable average value for accurately characterizing mesh geometry.

Standards for wire cloth and wire screens:

The following standards establish terminology, performance requirements, and test methods for industrial wire cloth and wire screen products:

- DIN ISO 9044 – Industrial woven wire cloth
- DIN ISO 9045 – Industrial screens and screening
- DIN ISO 4782 – Metal wire for industrial wire cloth and screens
- DIN ISO 4783 – Industrial wire screens and woven wire cloth
- DIN ISO 14315 – Industrial wire screens
- DIN ISO 3310-1 – Test sieves

TYPES OF WEAVE AND APERTURES

ENGINEERED FOR THE SPECIFIC PROCESS

The diversity and performance of wire mesh is shaped by the combination of mesh geometry and type of weave. Depending on the requirements for throughput, separation accuracy, stability or cleanability, different mesh structures are used. In general, a distinction is made between open mesh and visually closed filter mesh (Dutch weave).

OPEN MESHERS

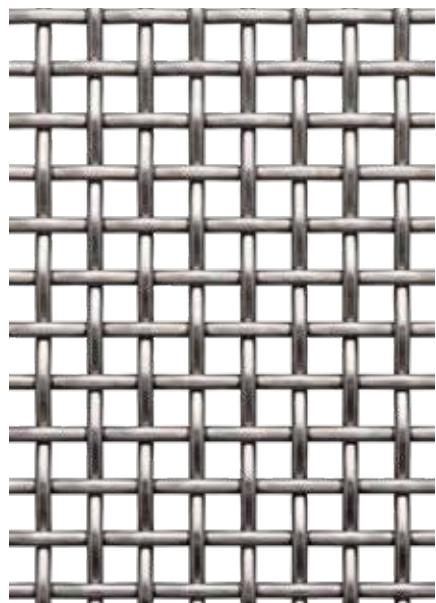
WHEN HIGH THROUGHPUT AND DURABILITY ARE CRITICAL

Wire mesh with an open screening surface forms the basis of numerous screening, separation and protection applications. Its clearly defined geometry ensures stable material flow, reproducible results and well-controlled processes.

Properties of open meshes:

- High throughput with defined aperture sizes
- Reduced risk of blinding and material buildup
- Good cleanability and long service life
- Suitable for gases, liquids, and bulk solids

APERTURE TYPES



Square mesh



Rectangular oblong mesh



Rectangular broad mesh

Square mesh

A square mesh has a uniform, symmetrical mesh structure for precise separation and reproducible results. Warp and weft wires generally have the same diameter, and the mesh openings are identical in length and width.

Rectangular mesh

A rectangular mesh (rectangular "Oblong" or rectangular "Broad") has symmetrical mesh openings that are longer or wider in the longitudinal direction.

The application determines the mesh orientation:

1. Parallel to the flow direction: increased throughput / performance
2. Perpendicular to the flow direction: defined separation cut

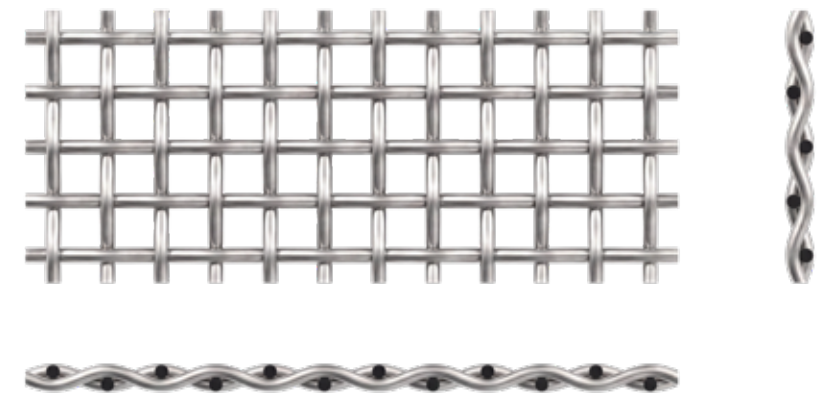
A larger aspect ratio improves the self-cleaning effect, especially with moist, sticky, or difficult-to-process materials.

WEAVE TYPES

The way in which the warp and weft wires are interlaced defines the weave pattern and influences surface characteristics, strength, permeability, and appearance. In addition to standard weave types such as plain, twilled and satin weaves, specialized designs including herringbone and rib weaves can be produced to meet specific technical, architectural, or design requirements. We are happy to advise you on your specific application.

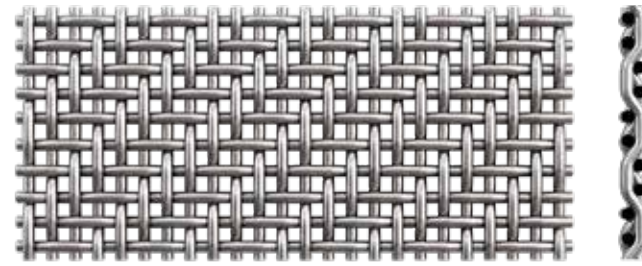
Plain weave

In a plain weave, warp and weft wires alternately pass over and under one another. This balanced construction creates a uniform appearance on both sides of the mesh and provides an excellent combination of strength, stability, and versatility.



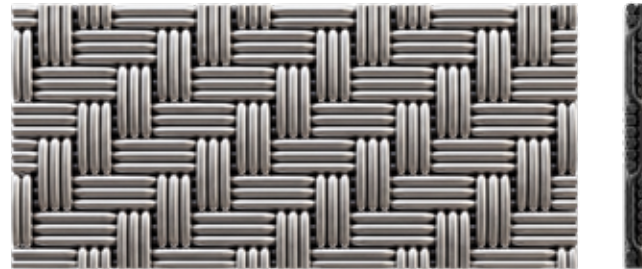
Twilled weave (4-bonded)

In twilled weaves, warp and weft wires are interlaced in a pattern that creates diagonal structures. As a surface filter medium, it is characterized by rapid filter cake formation and a low tendency to clog.



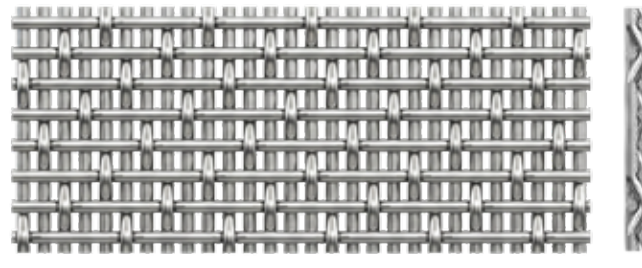
Multiplex (4-bonded)

Multiplex weave is used as a distributor mesh to ensure the uniform distribution of liquids. Its specialized structure enhances capillary action and promotes consistent wetting across the entire surface.



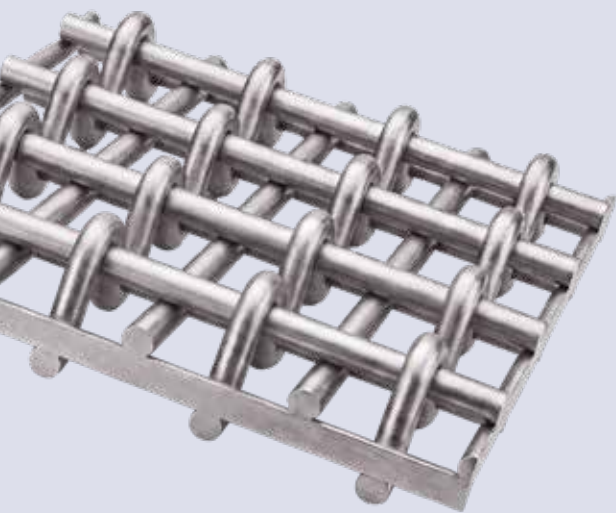
Satin twilled weave (5-bonded)

Satin twilled weave is characterized by one smooth and one rough side. It is used as a support layer or for catalytic liquid filtration.



3D weaves

3D wire mesh can be manufactured with the same aperture size and wire diameter as conventional wire mesh but use a different weaving technology. In filtration systems, 3D weaves offer high dirt-holding capacity and lower pressure drop, helping to extend filter service life. For screen-printing applications, they enable greater ink transfer for improved print performance.



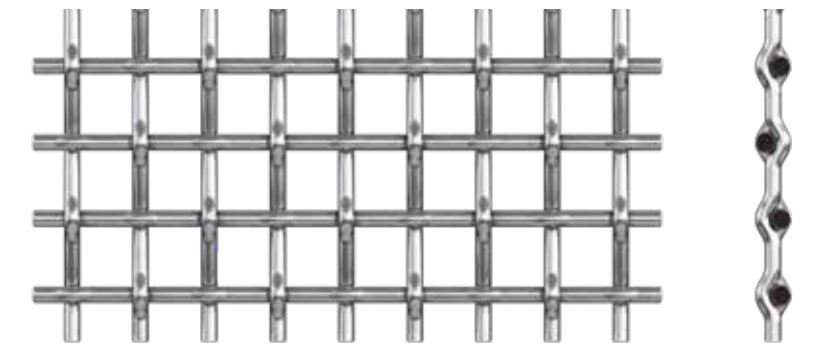
EGLA mesh – smooth on one side

EGLA meshes feature a smooth surface on one side. They provide excellent flow characteristics and resistance to blinding under uniform loading conditions. The smooth surface also makes cleaning easier, making EGLA meshes well suited for use as support layers. In industrial screening applications, the textured surface promotes greater material movement, improving screening efficiency. In architectural applications, the crimped wires create localized light reflections that produce a distinctive shimmering effect across the surface.



DOKA mesh

DOKA meshes combine a finely structured square geometry with high stability. Their uniform appearance makes them attractive for architectural and design applications where aesthetics and functionality are equally important. In industrial screening processes, the textured surface promotes intensive agitation of the screened material.



DOKAWELL mesh

DOKAWELL meshes feature intermediate crimps in one direction. This improves dimensional stability in meshes with larger open areas. In architectural applications, the crimped wires create localized light reflections, producing a sparkling surface effect.



MAIN TYPES OF WOVEN WIRE CLOTH

SELECTED SPECIFICATIONS BASED ON DIN ISO 4783 AND DIN ISO 4782

The table below highlights a representative selection of woven wire cloth specifications from our product portfolio. It includes proven combinations of aperture widths and wire diameters used across a broad range of industrial applications:

- Mesh openings: 0.020 mm to 50 mm
- Wire diameters: 0.020 mm to 5.0 mm

Aperture width w	Wire diameter d	Mesh per inch Mesh	Wire diameter	Open area A ₀	Area weight Ga
mm	mm	-	inch	%	kg/m ²
0.020	0.020	635	0.0008	25	0.130
0.025	0.025	500	0.001	25	0.160
0.032	0.028	425	0.011	28	0.170
0.040	0.025	400	0.001	38	0.124
0.050	0.032	300	0.032	37	0.172
0.063	0.040	250	0.016	37	0.200
0.080	0.050	200	0.020	38	0.240
0.100	0.063	155 (150)	0.025	38	0.310
0.125	0.080	125	0.032	37	0.400
0.160	0.100	100	0.040	38	0.490
0.200	0.125	80	0.050	38	0.610
0.250	0.160	62	0.063	37	0.790
0.280	0.125	62	0.050	48	0.490
0.315	0.112	60	0.045	54	0.370
0.315	0.200	50	0.080	37	0.990
0.400	0.250	40	0.010	38	1.220
0.500	0.200	36	0.080	51	0.730
0.500	0.315	31 (30)	0.125	38	1.550
0.630	0.400	25	0.016	37	1.970
0.800	0.500	20	0.020	38	2.440

© 2026 by HAVER & BOECKER

Aperture width w	Wire diameter d	Mesh per inch Mesh	Wire diameter	Open area A ₀	Area weight Ga
mm	mm	-	inch	%	kg/m ²
1.000	0.224	21	0.009	67	0.520
1.000	0.315	19	0.0125	58	0.960
1.000	0.630	16	0.025	38	3.090
1.250	0.400	15	0.016	57	1.230
1.250	0.630	14	0.025	44	2.680
1.250	0.800	12	0.032	37	3.960
1.600	1.000	9 3/4	0.040	38	4.880
2.000	0.250	11	0.100	79	0.350
2.000	0.560	10	0.220	61	1.560
2.000	0.900	8 3/4	0.035	48	3.550
2.500	1.000	7 1/4	0.040	51	3.630
3.150	0.800	6 1/2	0.032	64	2.060
4.000	1.000	5	0.040	64	2.540
5.000	1.250	4	0.050	64	3.180
6.300	1.250	3 1/3	0.050	70	2.630
8.000	1.000	2 4/5	0.040	79	1.410
10.000	1.800	2	0.071	72	3.490
12.500	2.500		0.100	69	5.290
16.000	2.500		0.100	75	4.290
20.000	1.500		0.060	87	1.300
25.000	4.000		0.158	74	7.250
30.000	3.000		0.118	83	3.700
40.000	4.000		0.158	83	4.900
50.000	5.000		0.197	83	6.150

The overview provides an application-oriented selection and does not represent the complete scope of DIN ISO 4783 or DIN ISO 4782. **We are happy to advise you if additional specifications are required.**

© 2026 by HAVER & BOECKER

FILTER MESH

WHEN SEPARATION PRECISION IS CRITICAL

Visually closed wire mesh (MINIMESH® filter mesh or Dutch weave) features a tightly woven construction with no visible mesh openings. Instead, they form pore channels whose permeability can be engineered to meet specific requirements. The geometric pore size (Xmax) serves as a parameter in this context. It defines the diameter of the largest sphere that can still pass through a mesh opening. For further information, see page 16.

Properties of filter mesh:

- Exceptional filtration accuracy through precisely controlled pore structures, even at the smallest pore sizes, e.g., 5 µm
- High mechanical stability
- Uniform flow performance
- Reduced risk of clogging and excellent cleanability for extended service life
- High dimensional stability

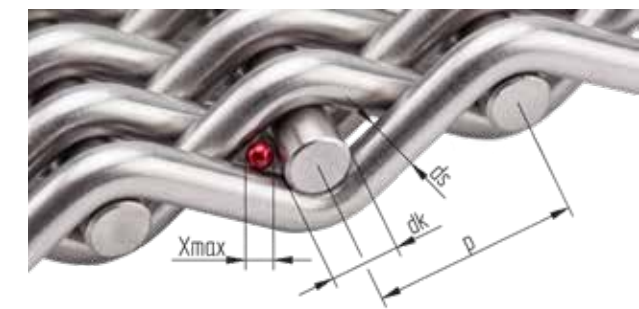
MINIMESH® filter meshes are the preferred choice for applications where product purity, process reliability, and consistent filtration performance are critical.

Comparison table of all MINIMESH® specifications

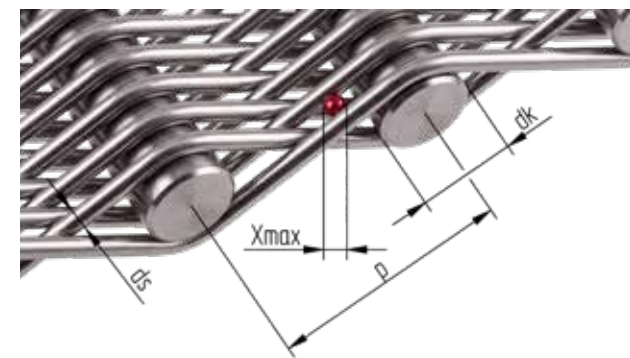
GEOMETRIC PORE SIZE [µm]	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	110	120	130	140	150	200	300	400	540																								
WEAVE TYPES																																																																	
 RPD HIFLO S																																																																	
 RPD HIFLO SR																																																																	
 HIFLO S																																																																	
 HIFLO SR																																																																	
 SPW S																																																																	
 DTW S																																																																	
 BMT-(ZZ) S																																																																	
 RPD S																																																																	
 TRD S																																																																	

Using advanced modeling and engineering methods, validated by well-known evaluation methods such as the glass bead test, HAVER & BOECKER has developed MINIMESH® S, the next generation of MINIMESH® metal filter cloths. These filter meshes feature optimized pore structures designed to improve filtration performance. MINIMESH® SR filter meshes offer enhanced durability and are engineered for demanding operating conditions.

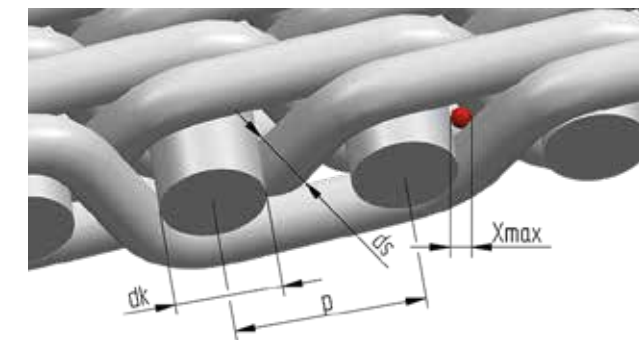
All filter mesh types at a glance:



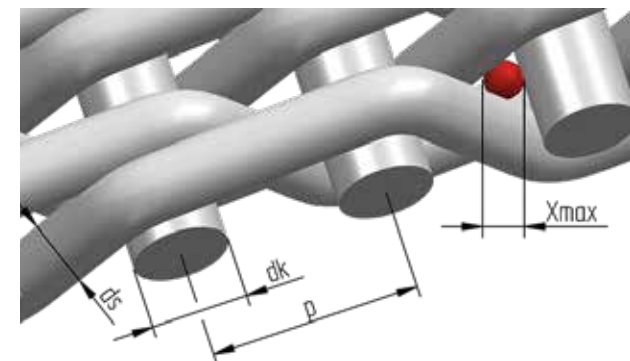
MINIMESH® SPW-S



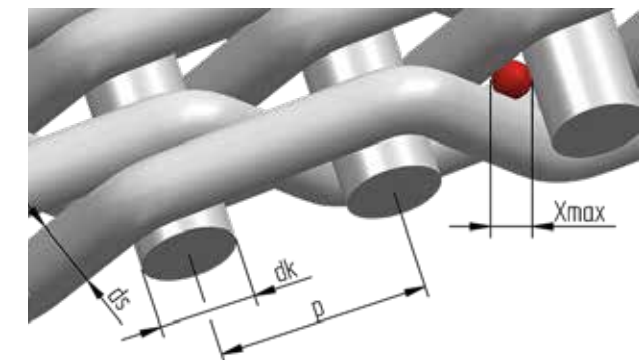
MINIMESH® HIFLO-S



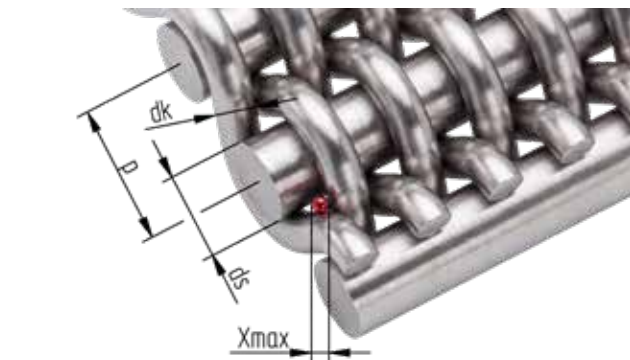
MINIMESH® DTW-S



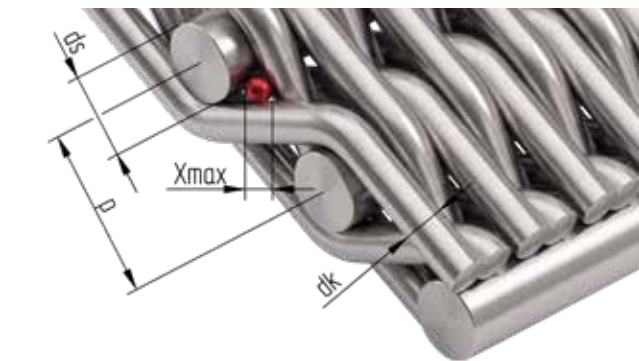
MINIMESH® BMT-S



MINIMESH® BMT-ZZ-S



MINIMESH® RPD-S



MINIMESH® TRD-S



MINIMESH® RPD-HIFLO-S

KEY VALUES FOR FILTRATION & SEPARATION METRICS FOR DESIGN AND PROCESS

Terms such as porosity, pressure drop and filter fineness are widely used to evaluate flow characteristics, separation efficiency and the mechanical behavior of wire mesh under real-world operating conditions.

Porosity [%]

The proportion of void volume relative to the total volume of the filter medium. Porosity influences flow rate, particle retention capacity, filtration performance and the mechanical stability of the filter medium.

Geometric pore size

A geometric parameter that describes the diameter of the largest sphere that can pass through a pore of the woven structure.

Filtration rate

Filtration rate describes the particle retention performance of a filter medium, i.e. the particle size retained under actual operating conditions.

It may be specified as:

- Nominal (e.g. 90% of particles $\leq 100 \mu\text{m}$ are retained)
- Absolute (100% retention of the specified particle size)

Geometric pore size vs. filtration rate

For media without a defined structure, such as nonwovens, the filtration rate is often the most useful performance metric. For wire mesh, however, the geometric pore size provides a more precise and directly comparable characteristic because the structure is precisely defined and measurable. This makes geometric pore size the preferred basis for product comparison, filter design and reproducible process performance.

Breaking load

The maximum tensile strength that a wire or wire cloth can withstand before failure occurs. Breaking load is an important indicator of mechanical strength and helps assess the ability of a woven structure to withstand tensile stresses during operation.

Pressure loss coefficient (ζ)

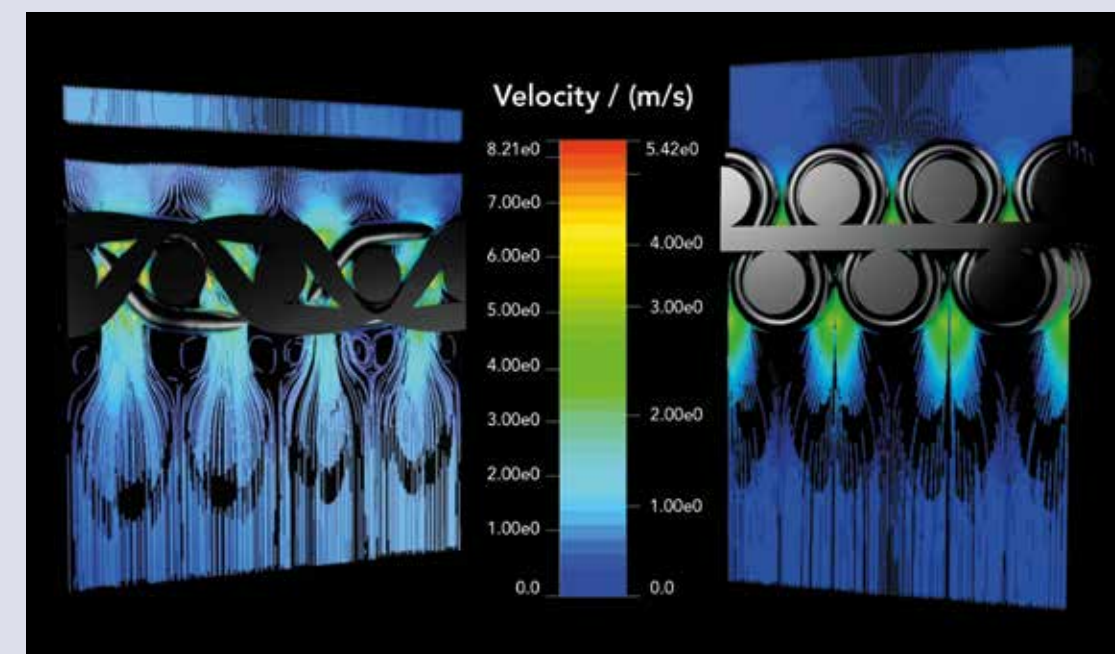
The pressure loss coefficient is a dimensionless parameter derived from fluid dynamics. Whenever a medium flows through a filter medium (HAVER & BOECKER typically uses air during testing) a pressure difference develops between the upstream and downstream sides. This pressure difference depends on filter geometry, filter loading and fluid properties. The coefficient ζ (zeta) is used to evaluate permeability under defined flow conditions. It indicates the pressure loss generated by the wire cloth and therefore provides a standardized measure of its flow characteristics.

Engineering Services:

Computational fluid dynamics (CFD) – predictable design through simulation

The precisely defined geometry of wire mesh allows woven structures to be accurately modeled using parameters such as weave type, mesh opening, pitch, wire diameter and mesh count. Using GeoDict software, we create realistic 3D models of woven wire cloth structures and configurations prior to production. These models can be simulated, analyzed and optimized at an early stage of development. Both individual mesh layers and multilayer wire cloth laminates can be evaluated with regard to flow behavior, pressure loss and geometric pore size. Different media, including air, water and fuel, as well as flow velocity and differential pressure, can also be incorporated into the design process.

The result is a filter medium precisely matched to the process, operating environment and system design, reducing testing effort, increasing planning reliability and providing a sound basis for selecting the optimum wire mesh configuration.





Welding



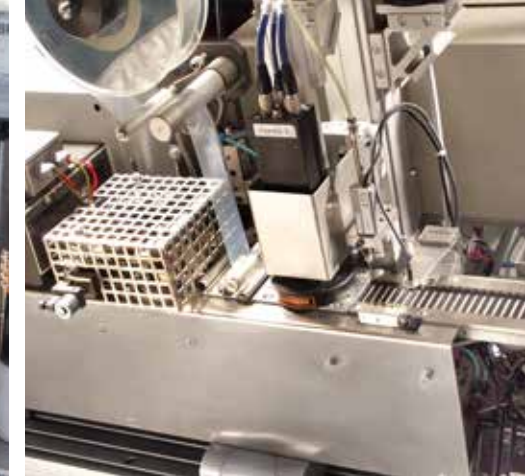
Cleaning



Calendering



Stamping / Deep drawing



Packaging



Automated production

MANUFACTURING EXPERTISE YOU CAN DEPEND ON

FROM DEVELOPMENT TO FINISHED PRODUCTS

Metal wire mesh products in the form of rolled goods, as well as customized coil products, screen sections, filter elements and fabricated parts, are built on decades of experience and a deep understanding of every stage of the manufacturing process. From development and production to quality assurance, we control the entire value chain. Our in-house machinery and tooling design, state-of-the-art manufacturing technologies, and continuous process monitoring ensure reproducible quality, from individual components to large-scale production.

Overview of our expertise:

- Integrated engineering and product development, including interconnected production lines
- Use of state-of-the-art CNC, welding and heat-treatment processes
- Plastic injection molding for combining wire cloth with plastics such as PA, PP, PPS or PEEK to create functional hybrid components
- Certified quality management according to DIN EN ISO 9001 and, for the automotive sector, IATF 16949



- Certified measuring and testing procedures in our in-house laboratory:
 - Chemical, physical and optical material properties
 - Tensile, compressive and corrosion behavior
 - Pore sizes, pore size distributions and filtration performance
 - Mesh and wire measurements using certified image-analysis systems
 - SEM analysis

Through laboratory analytics, digitally connected manufacturing processes and the HAVER Vision System, we maintain continuous quality control throughout production. This results in products that meet the high requirements of safety-critical industries, including automotive, medical technology and aerospace.



FASCINATING ENGINEERING. AS ONE.

P 17 E 608 092026 0,5 Fe
©HAVER & BOECKER - Jede Art der Vervielfältigung, auch auszugsweise, nur mit Genehmigung. FLEX-MAT® und OptimumWire® sind eingetragene Handelsmarken von MAJOR WIRE INDUSTRIES Ltd. Fotos: Fototeam Walkenhorst, Knut Reimann, iStock, Fotolia

HAVER & BOECKER OHG
Ennigerloher Straße 64 · 59302 Oelde · Germany
Phone: +49 (0) 2522 30 0
E-mail: wire-mesh@haverboecker.com
Internet: www.haverboecker.com

