

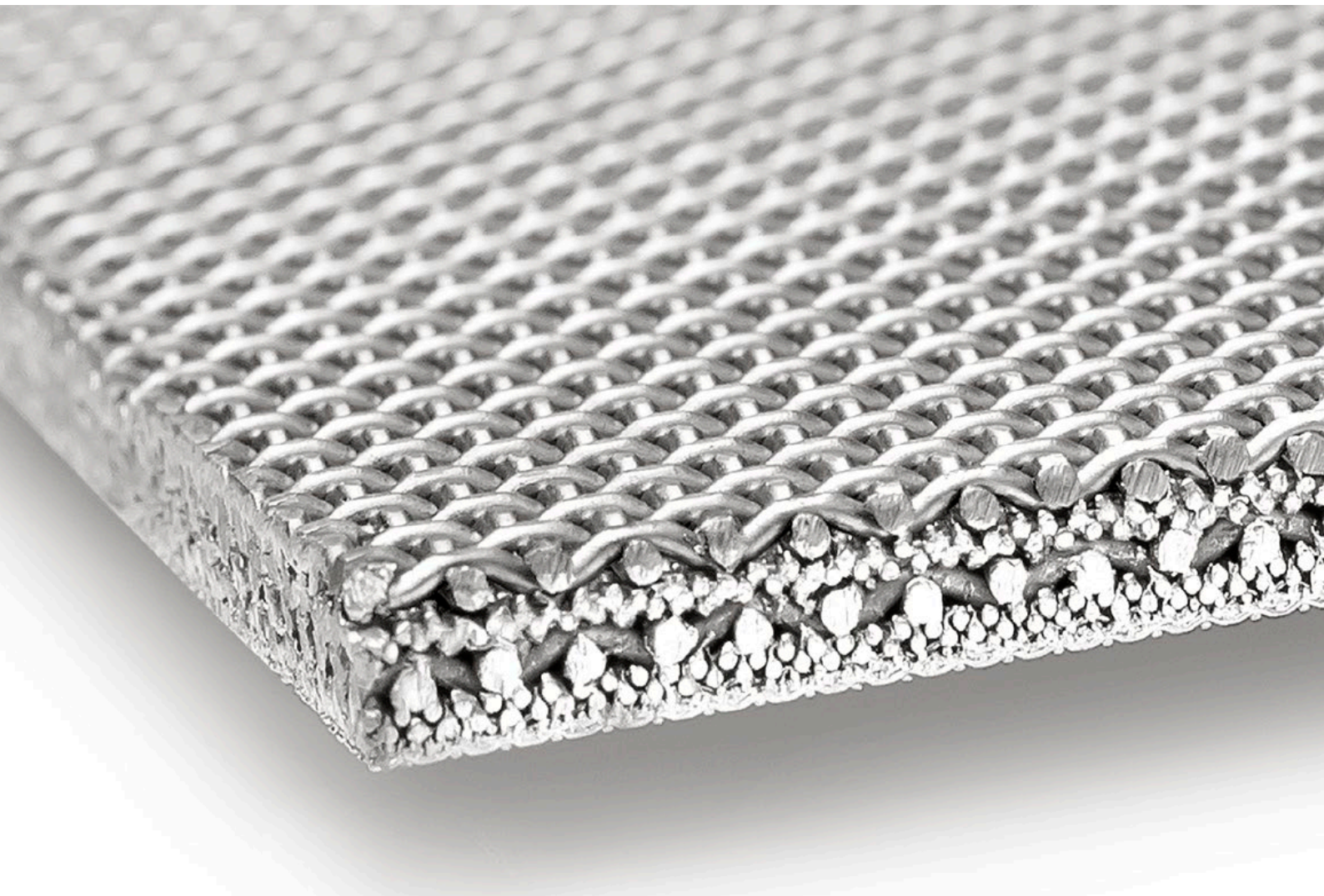
HAYER & BOECKER



DIE DRAHTWEBER

POROSTAR® FILTERELEMENTS

**MADE FROM WOVEN WIRE CLOTH
LAMINATED PANELS.**



HAVER POROSTAR®

ROBUST, PRECISE, CUSTOMISED.

Demanding filtration tasks in complex environments pose special challenges for a filter medium. Combined with the highest precision, the resistance and stability of a filter medium create the preconditions for safe processes and consistently high product quality.

HAVER POROSTAR® consist of a great number of wire mesh layers, which are firmly bonded together by diffusion. After the first heat treatment, the composite panels are sintered a second time. This **Duo-Sinter-Technique** results in a firm bonding of all contacting wires without changing the geometric structure of the individual cloth layers. The result is a robust porous filter medium with characteristics that can be determined in advance, such as the pore size, pore distribution, porosity and permeability.

We will define the type, structure and number of mesh layers according to individual customer requirements in order to optimally meet the needs of the respective filtration tasks. The filter layer is responsible for the precise selectivity. In order to withstand high pressures as well as mechanical, thermal and chemical processes, fragile filter meshes are firmly embedded in a composite with stronger mesh layers.

These composite metal wire mesh panels can be shaped and welded and thus be further processed into robust filter elements. Furthermore, we can bind the wire cloth laminates with additional support materials such as perforated metal plates. The wide range of processing options creates the basis for customised filters.

Application

As a filter medium HAVER POROSTAR® achieves foreign particle-free filtration in the range of < 1 µm and 200 µm. Composite metal wire mesh panels are used as filter candles in centrifuges and in Nutsch filter systems. HAVER POROSTAR® has proven its worth for solid-liquid filtration and gas ifiltration in numerous areas of application including the chemical and petrochemical, pharmaceutical, plastics, food, automotive, mechanical engineering sectors and many more.

Formats

HAVER POROSTAR® is produced in the standard format 1,200 mm x 1,200 mm. Maximum formats of 1,400 mm x 2,050 mm or 1,520 mm x 1,900 mm without weld seams are also possible. We use modern welding processes to join the panels to create larger formats to produce filter plates, for example, with diameters larger than 1,200 mm or filter cylinders larger than 400 mm in diameter.



Materials

HAVER POROSTAR® is mostly manufactured from Chromium-Nickel-Molybdenum-Steel, Materials 1.4404 = AISI 316-L, 1.4539 = 904L and special alloys 2.4602 = Hastelloy C22 .

The table below states other alloys, that are also processed into HAVER POROSTAR®.

Material	Material No.	AISI ~	C	Si	Mn	Cr	Mo	Ni	Cu	Ti	Co	W	Fe	N	V	Al
Chromium-Nickel-Molybdenum Steel	1.4404	316 L	≤ 0.03	≤ 1.00	≤ 2.0	16.5–18.5	2.0–2.5	11.0–14.0	–	–	–	–	Rest	–	–	–
Chromium-Nickel-Molybdenum Steel + Special Alloys	1.4571	316 Ti	≤ 0.08	≤ 1.00	≤ 2.0	16.5–18.5	2.0–2.5	10.5–13.5	–	≤ 5 x C ≤ 0.8	–	–	Rest	–	–	–
Chromium-Nickel-Molybdenum Steel + Special Alloys	1.4539	904 L	≤ 0.02	≤ 0.70	≤ 2.0	19.0–21.0	4.0–5.0	24.0–26.0	1.0–2.0	–	–	–	Rest	0.04–0.15	–	–
Hastelloy C22 High Corrosion Resistant Alloy	2.4602	UNS N06022	≤ 0.01	≤ 0.08	≤ 0.5	20.0–22.5	12.5–14.5	Rest	–	–	2.5	2.5–3.5	2–6	–	≤ 0.35	–
Alloy 59	2.4605	UNS N06095	≤ 0.01	≤ 0.10	≤ 0.5	22.0–24.0	15.0–16.5	Rest/Bal.	–	–	≤ 0.3	–	≤ 1,5	–	–	0.1–0.4
Inconel 600	2.4816	UNS N06600	≤ 0.01	≤ 0.50	≤ 1.0	14.0–17.0	–	≥72.0	≤ 0,5	–	–	–	–	–	–	–
Carpenter 20 Cb 3	2.4660	UNS N08020	≤ 0.07	≤ 1.00	≤ 2.0	19.0–21.0	2-3	32.0–38.0	3.0–4.0	Nb+Ta ≥8xC ≤1.0	≤ 1.5	–	–	–	–	–
Alloy 254 SMO (AVESTA)	1.4547	254 SMO	≤ 0.02	≤ 0.70	≤ 1.0	19.5–20.5	6.00–7.00	17.5–18.5	0.50–1.00	–	–	–	–	0.18–0.25	–	–



Haver & Boecker began producing wire cloth in Hohenlimburg, Germany, in 1887. Today we are one of the world's leading wire weaving companies with a global network of branches and manufacturing facilities.

Our work is based upon experience, continuous research and development of our products and manufacturing processes, along with the knowledge and ability of our staff. This combination of tradition and innovation allows us to meet and exceed the high expectations of our customers.

POROSTAR® EXECUTIONS

HAYER POROSTAR® is manufactured as STANDARD-type and as special types LIGHT, HIFLO and COMBI. Specifications up to 80 mm thick have been produced. Pressure drop measurements of standard types are available on request.

HAVER POROSTAR®					
Poresize Micrometer	STANDARD		HIFLO	LIGHT	COMBI
	5-layers	6-layers	5-layers		
< 1	x	x		x	x
1	x	x		x	x
2	x	x	x	x	x
5	x	x	x	x	x
10	x	x	x	x	x
20	x	x	x	x	x
30	x	x	x		x
40	x	x	x		x
50	x	x	x		x
75	x	x	x		x
100	x	x	x		x
Thickness apx. mm	1.7	3.3	2.5	0.5	*
Weight apx. kg/m ²	11	17	11	3	*

Other poresizes as agreed upon

* depending on the execution

Physical Properties

Upon request we can calculate the tenacity values of filters after having studied the construction designs and the operating conditions. There is a charge for this service.

POROSTAR	Proportional Limit R _P 0.2	Tensile Strength R _m	Ductile Yield ε
	N/cm	N/cm	%
STANDARD 5-layers	1250	2700	22
STANDARD 6-layers	1950	3950	23
HIFLO 5-layers	900	2300	28

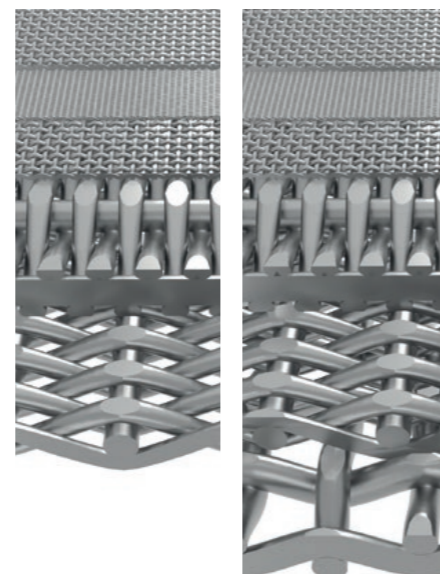
POROSTAR® Standard

POROSTAR® STANDARD is put in filter sheets and cylinders. It is designed with five or six layers and specially suitable for unbalanced loads.

Construction and Function

1. Protection layer: Protection of the filter layer against physical influences
2. Filter layer: selected according to the poresize
3. Protection layer: protects the filtration layer from possible deformation under high pressure
4. Support layer
5. Support layer 90°
6. Drainage layer: improves the quantity of the filter capacity

If materials processing makes it necessary the construction can be made without the first protection layer.



5-layers

6-layers

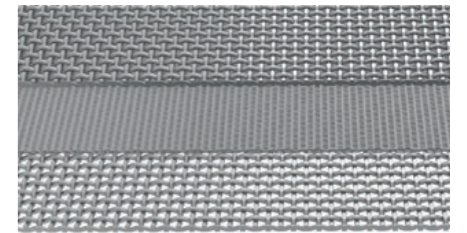
POROSTAR® SPECIAL TYPES

POROSTAR® Light

POROSTAR® LIGHT is suitable for the manufacturing of pleated filter cylinders and is composed of three woven wire cloth layers.

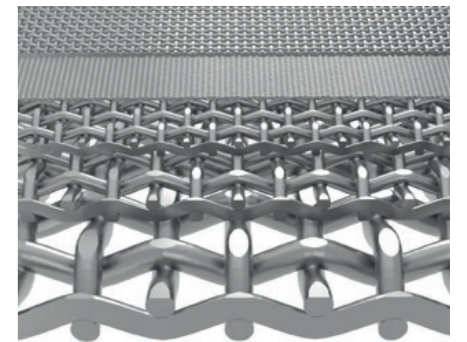
Construction and function:

1. Protection layer: protects the filtration layer and improves its stability
2. Filtration layer: selected according to the poresize
3. Protection layer: protects the filtration layer and improves its stability



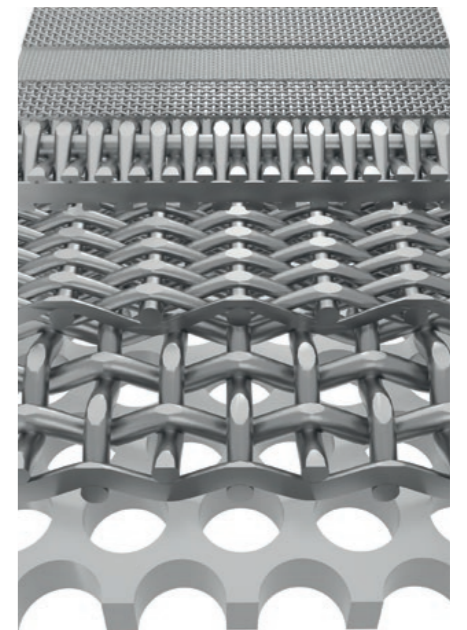
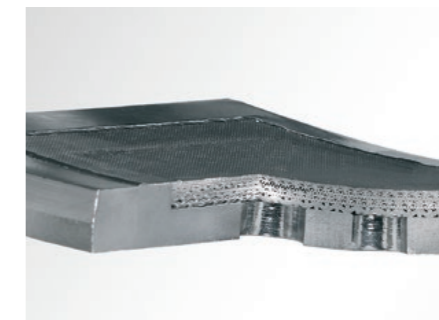
POROSTAR® Hiflo

Because of its important flow capacity POROSTAR® HIFLO is specially suitable for sieving and filtering methods using minimized pressures. Each woven wire cloth layer has square meshes.



POROSTAR® Combi

POROSTAR® COMBI is suitable for high pressures even in reverse direction flow. Woven wire cloth layers and a perforated metal plate are bonded by sintering. POROSTAR® COMBI is available in STANDARD type and in special types LIGHT and HIFLO as well. The number of layers and the thickness of the perforated metal plate are variable.



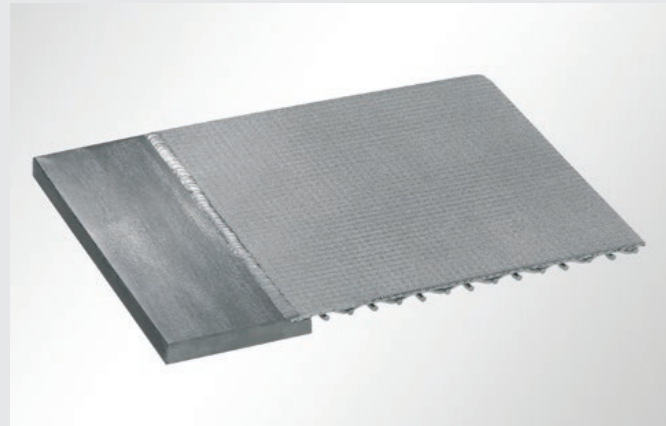
Drainage

Drainage layers are often integrated in the porous wire cloth laminate, e.g. in POROSTAR® STANDARD with six layers. When manufacturing filter components with POROSTAR®, EGLA flat top screens are preferred,

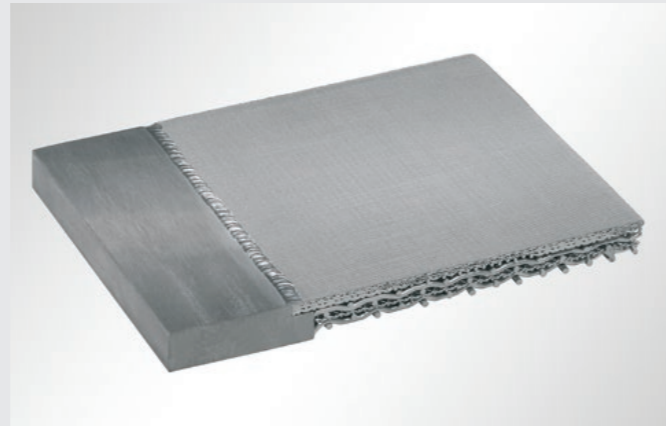
because of their high efficacy. The smooth top surface allows the POROSTAR® laminates to rest well, while the rough underside acts as drainage.

EGLA-FLAT TOP SCREENS	
Aperture Width, w	Wire Diameter, d
mm	mm
5	1.6
63	2.5
15	3.8

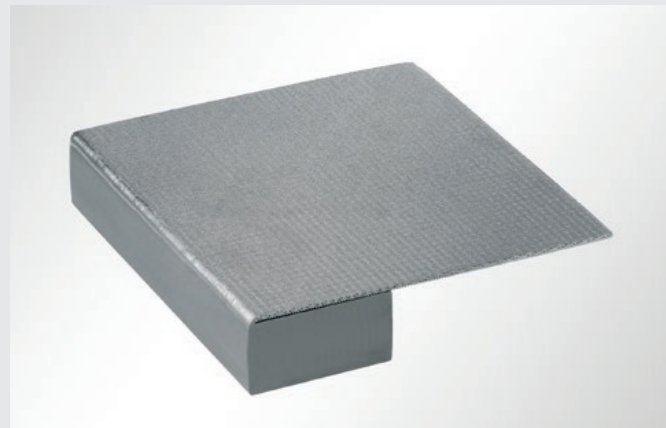
PLASMA-WELDED JOINTS OF POROSTAR®



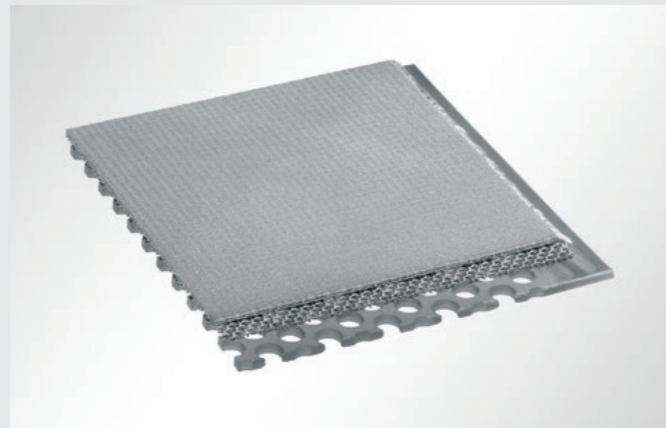
POROSTAR® butt welded to a profile with EGLA flat top screen as an additional drainage and support layer.



POROSTAR® butt welded to a profile with two layers of EGLA flat top screen and an intermediate square mesh layer.

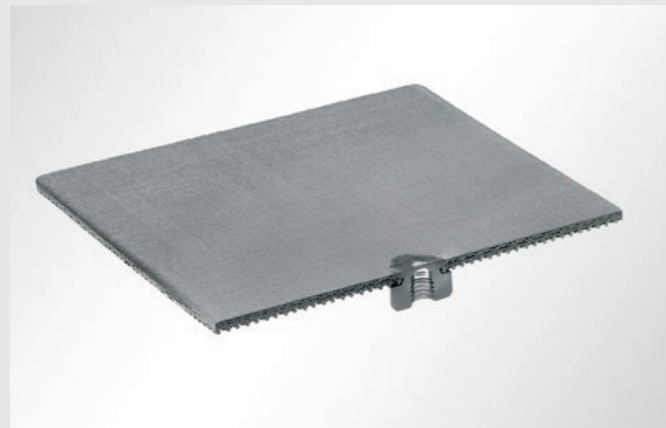


POROSTAR® welded to the outer edge of a steel rod.



POROSTAR® and drainage layer welded to a perforated metal plate.

POROSTAR® Connector-Types of Screw and welded Joints with Carrier Plate

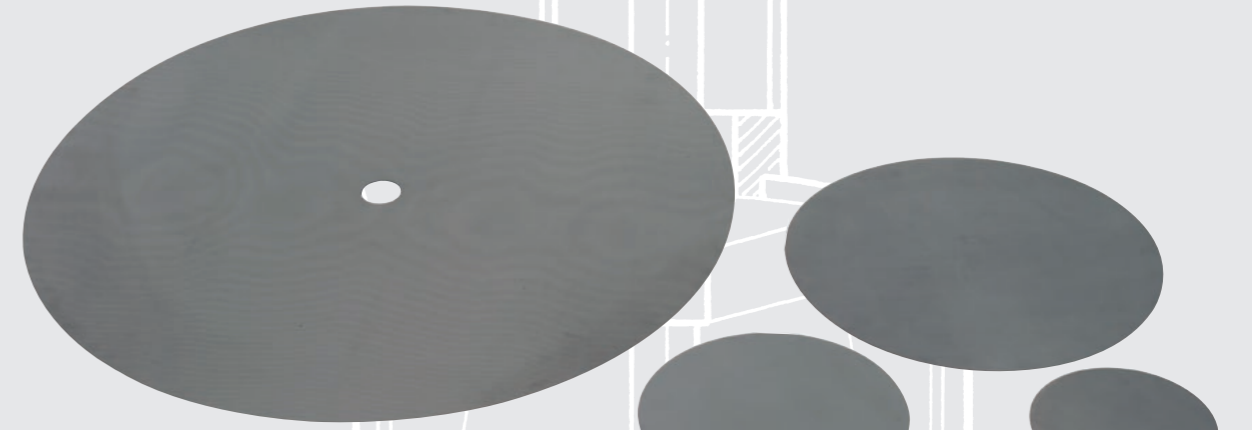


POROSTAR® with female screw connectors plugged through and bonded on both sides.

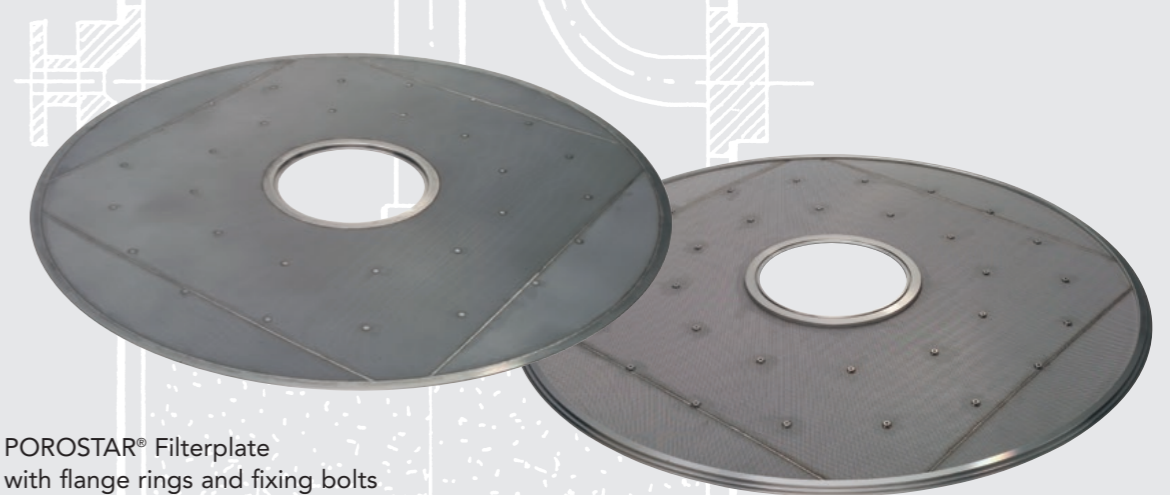


POROSTAR® and perforated metal plate bonded by means of plasma-welding.

FINISHED PRODUCTS POROSTAR® FILTERPLATES AND FILTERDISCS



POROSTAR® Filterdiscs
Dimensions: \varnothing 2.4 mm up to 3 m
Applications: Chromatography,
Plastic melt filtration



POROSTAR® Filterplate
with flange rings and fixing bolts
Applications: Nutsche filter



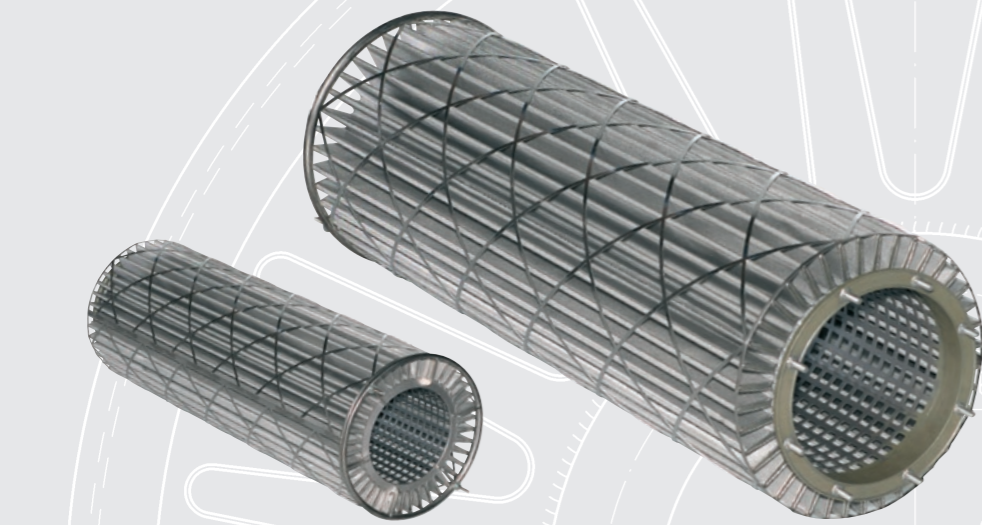
POROSTAR® Filtersegment
Application: Nutsche filter



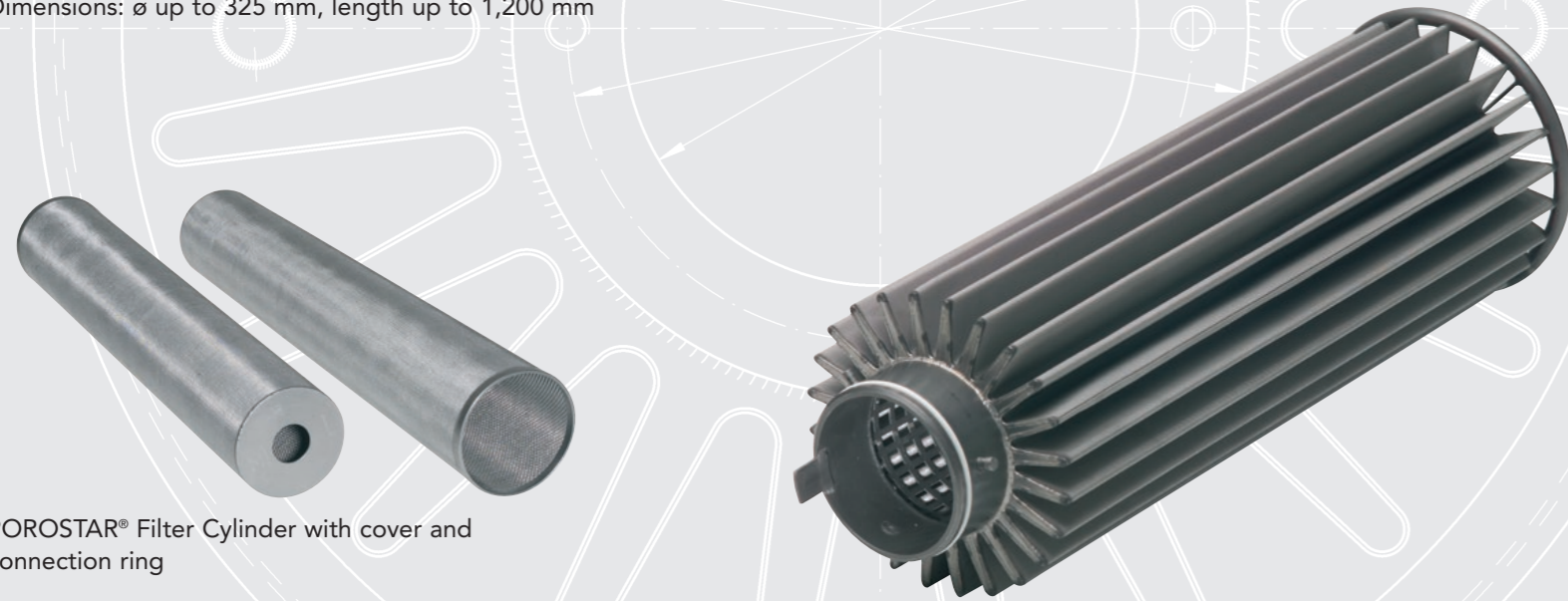
POROSTAR® Filter Cells

FILTER CYLINDER

FILTER CANDLES

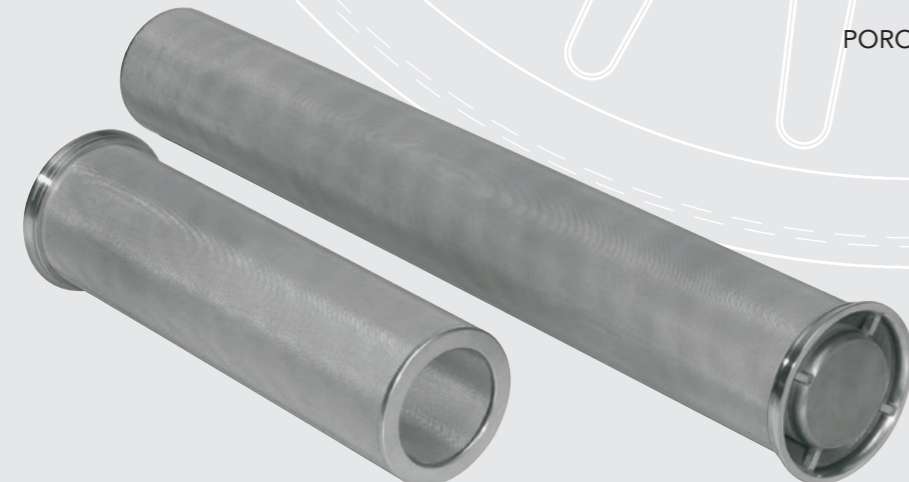


POROSTAR® Starfilter with reinforcement cage
Dimensions: \varnothing up to 325 mm, length up to 1,200 mm



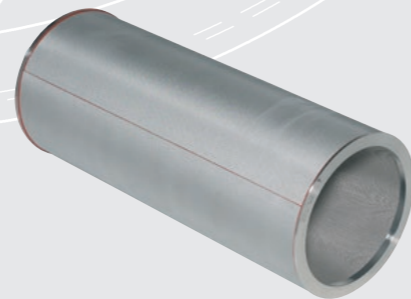
POROSTAR® Starfilter, of variable \varnothing and length

POROSTAR® Filter Cylinder with cover and connection ring

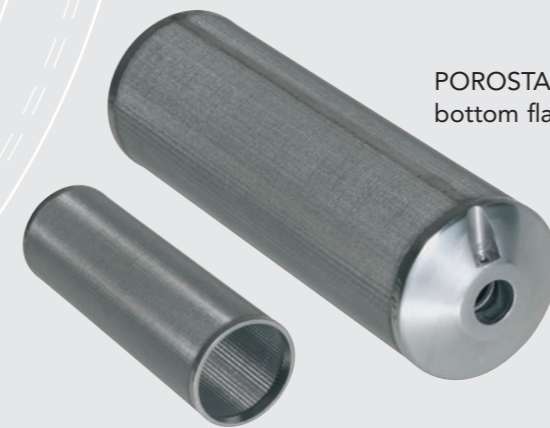


POROSTAR® Tandem-Filter Candle
Dimensions: \varnothing 170 / 125 mm,
Lengths: 422 mm, 622 mm, 822 mm, 1,222 mm

POROSTAR® Cylinder with flange rings.
Longitudinal and circumferential seam glued
Dimensions: \varnothing 230 mm, length 570 mm



POROSTAR® Filter Candle with different connectors.
Dimensions: from \varnothing 14 mm upwards,
length variable

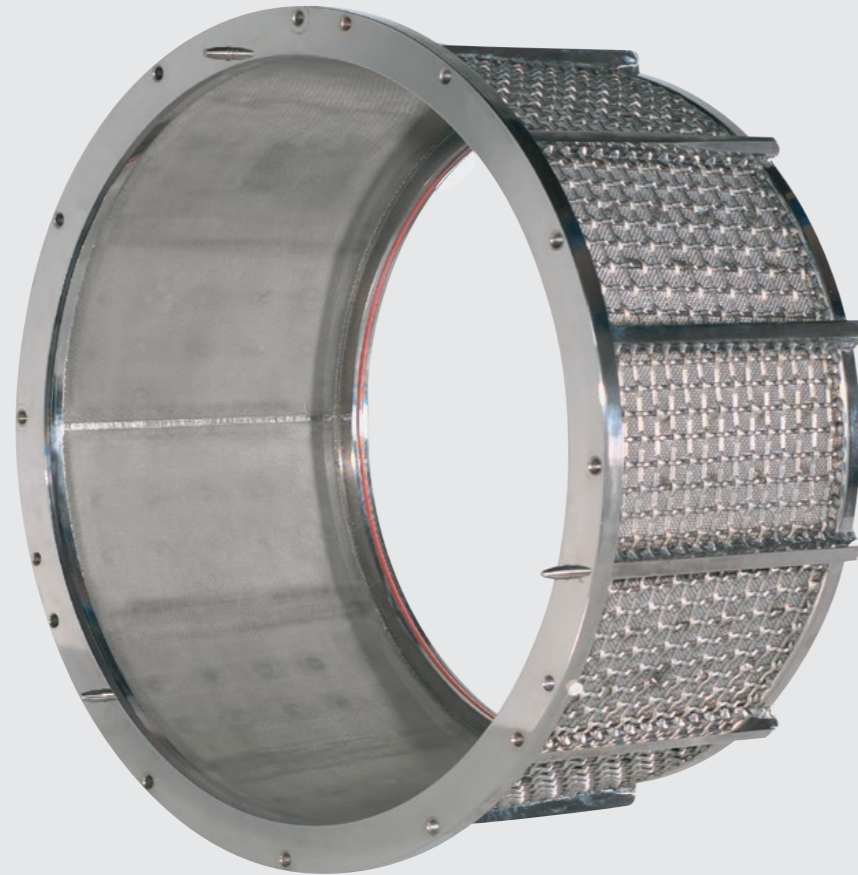
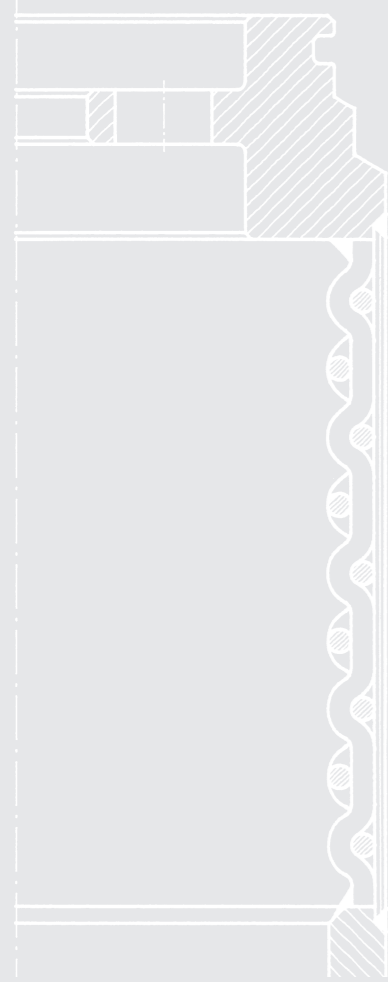


POROSTAR® Filter Candle with bottom flange and receiving ring



POROSTAR® Filter Candle with a threaded connector and end cap
Dimensions: \varnothing 25 mm, length variable

CENTRIFUGAL DRUMS AND BASKETS



POROSTAR® Centrifugal Basket for TZT
 Dimensions: ø 400 mm, 600 mm, 800 mm, 1,300 mm,
 Lengths: 300 mm, 400 mm, 500 mm, 600 mm



POROSTAR® Centrifugal Basket

SUSTAINABLE FILTERING, CLEANING AND RECONDITIONING

The service life of a filter medium is primarily influenced by the type of material to be filtered. Abrasive materials subject the surface of the metal mesh laminate to greater abrasion than substances with a less abrasive effect. In addition, careful handling during application also aids in maintaining flawless and long-lasting performance.

Filters and filter elements made of HAVER POROSTAR® metal wire cloth laminate can be cleaned after use and can generally be reused after product or batch changeover. The mesh laminates can be recycled once they become unusable. We can completely refurbish and repair HAVER POROSTAR® filter elements that have been

damaged through natural wear and tear, external influences or incorrect handling. Depending on the damage situation and individual requirements, we will weld defective areas, replace the affected areas of defective laminates or replace them completely. Since in many instances connectors, hold-downs, flange rings or perforated metal plate bases can be reused.

HAVER POROSTAR® thus contributes to the economic efficiency of the production process and at the same time protects the environment and conserves resources.



Robust



Process reliable



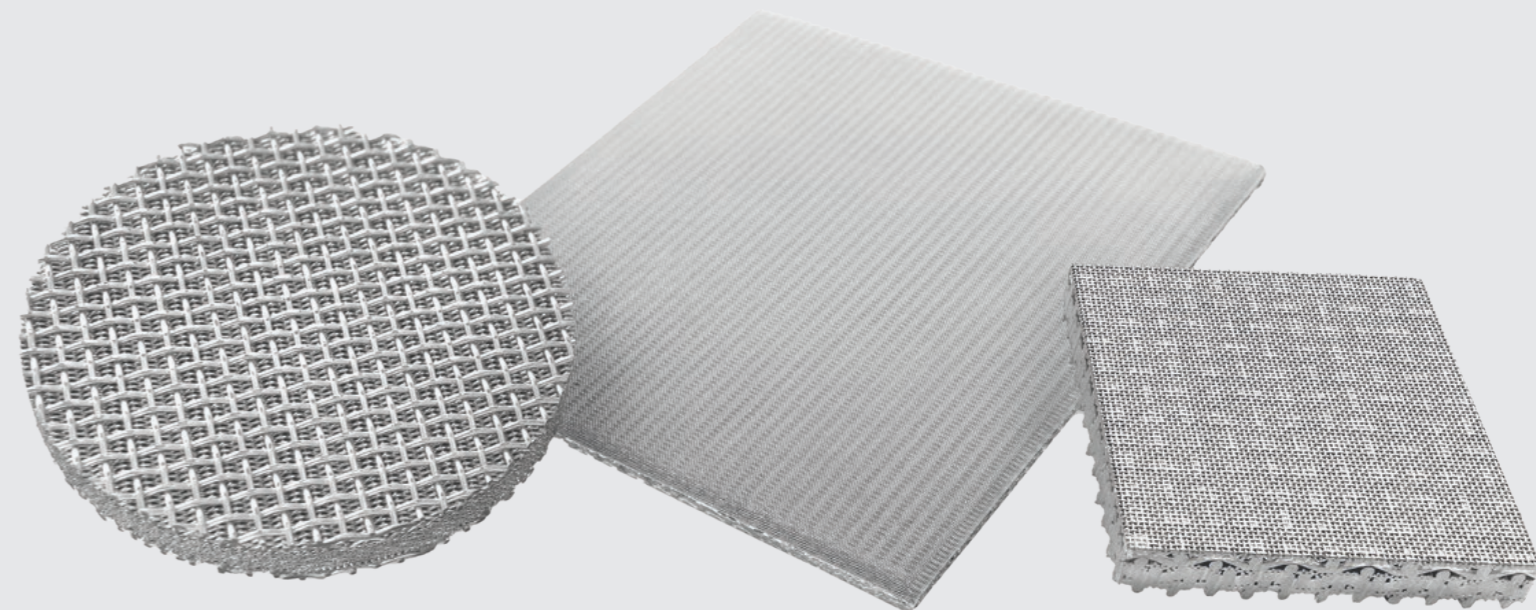
Precision cut point



Corrosion-resistant



Regenerative



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