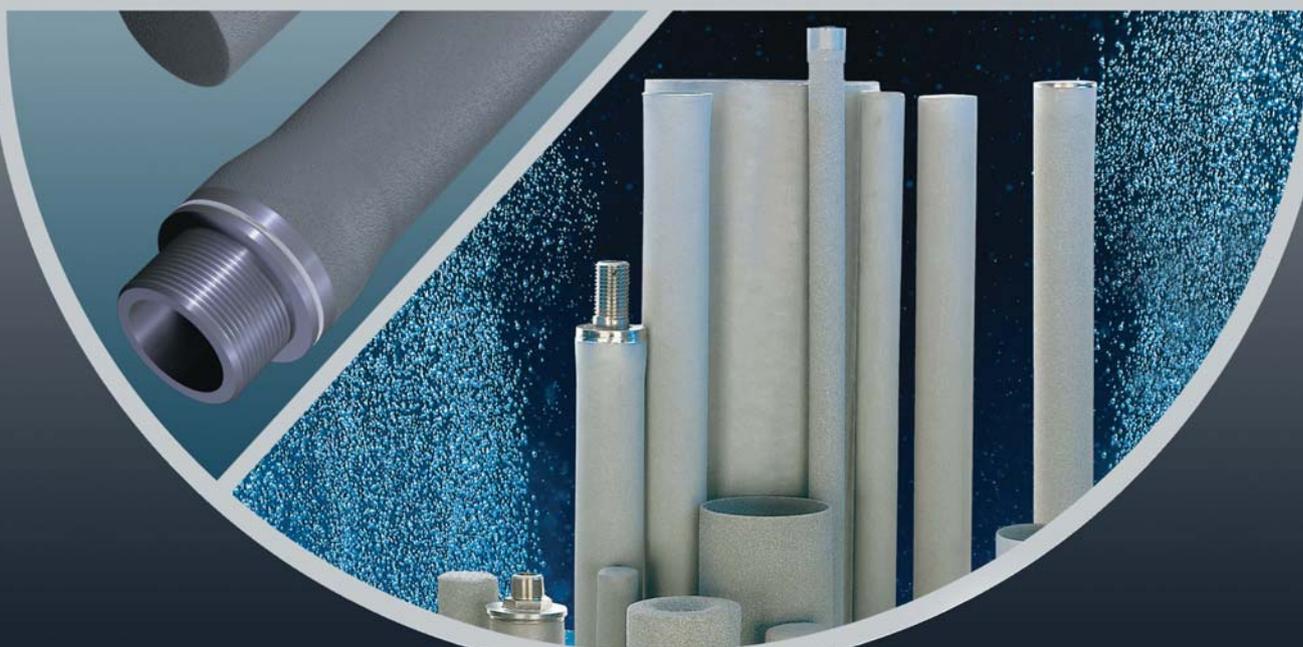


SIKA-R...IS/AS

Filter Technology





Since 1759

> 250 years of exceptional engineering

GKN Sinter Metals Filters, the leading manufacturer of porous sinter metal products, offers a variety of solutions to fulfil customer requirements.

We are familiar with various applications in almost every industrial branch.

Our products are applied in gas- and liquid filtration, dampening, sparging, sensor protection, bulk handling and many more. We offer solutions for high temperature and corrosive environments.

Sintered filter elements made of stainless steels, bronze, nickel based alloys, titanium and several special alloys can be manufactured seamless up to 1500 mm length and 320 mm OD. Larger elements will be assembled in our certified in-house welding shop.

Our most innovative product for the chemical industry is the patented metallic membrane SIKA-R...AS.

The filter cartridges equipped with this state-of-the-art technology offer a flow rate up to 4 times higher compared to conventional sinter metal filter cartridges. Furthermore an excellent back flush performance is guaranteed. The filter active membrane layer with filter grades down to 0.1 µm absolute has a thickness of only 200 µm and is made of the same alloy as the coarse support material. The membrane is sinter bonded to the support and therefore cannot peel off.

Another innovation introduced by GKN is the sinter bonded joint of porous parts with solid fittings in order to avoid welding seams – the weak spot of all sintered cartridges of our competitors.

All sintered materials of GKN offer a self-supporting structure with high mechanical strength.

We manufacture various filter grades with specified pore sizes and flow rates in order to have the appropriate solution for your requirements.



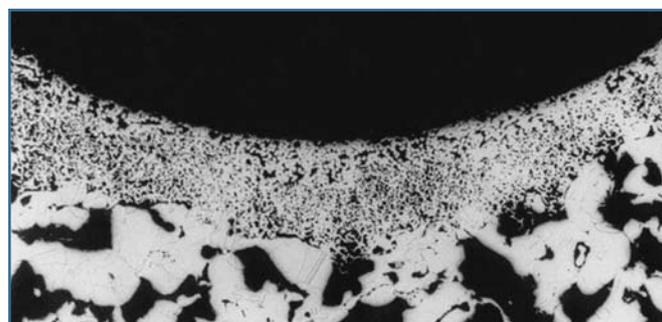
Filter-Elements High Porosity Sintered Materials SIKA-R...IS

SIKA-R...IS, a trademark of GKN Sinter Metals Filters, is our brand name for high porous stainless filter elements manufactured by our isostatic compaction process.



Metal Membranes SIKA-R...AS

SIKA-R...AS, a trademark of GKN Sinter Metals Filters, is our brand name for high porous asymmetric metallic membranes.



SIKA-R...IS/AS materials are used as self-supporting structural elements. The pores are mechanically fixed regarding size and position after the sintering process .

Properties

These characteristics go along with the following important properties of SIKA products:

- Shape-stability, i.e. self-supporting structural elements suitable for high differential pressures and pressure swings
- Particularly good properties under compression, vibration and changing conditions or with high impulse pressures
- High heat resistance and thermal stability up to 900°C
- High permeability with low pressure drop
- Precise filtration because of homogeneous pore size distribution
- Chemical resistance against acids and caustic solutions in various aggressive media
- Backflushing and easy cleaning with supersaturated superheated steam, chemical solvents, thermal and ultrasonic processes
- The variety of materials used can be welded, soldered and machined



Improved Properties of ASymmetric Filters Compared to Conventional (Symmetric) Filters

Asymmetric design allows manipulation of stability and particle retention functions which are independent.

As a result of this optimal combination, metallic SIKA-R...AS membranes truly impress.

SIKA-R...AS elements have the following features which are particularly advantageous in rigorous every day applications:

- Up to 4-times increase in permeability performance
- Improved back-flushing properties, resulted out of reduced pressure drop
- Filtration in the sub-micrometer-range
- Significant increase in service life
- Economical use
- No filter cake needed for clear filtration

The asymmetric metallic membrane can be manufactured in tube or disc shape.

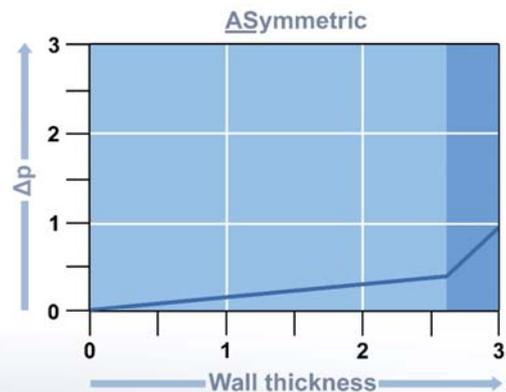
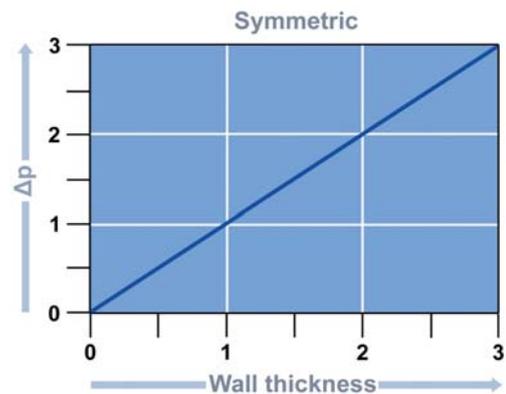
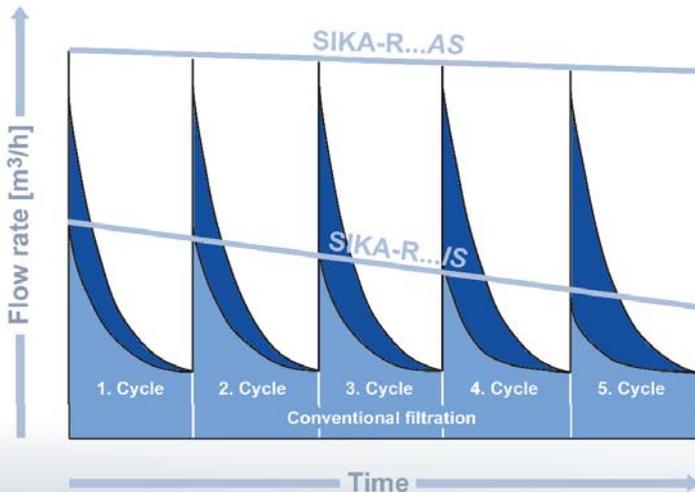
The filter layer is applied either to the inner or outer surface of the tube.

The application, whether outside - in or inside - out, determines the configuration.

Standard wall-thicknesses are 1.5 mm, 2 mm and 3 mm.

The filter effective layer of 0.2 mm is sintered on the support.

Naturally all the advantages that characterize metallic filter elements are also true for SIKA-R...AS. The metallic membrane is dimensionally stable, resistant to fluctuating mechanical loading and thermal stress, can be used at high temperatures and in corrosive media.





Applications

SIKA-R...IS and SIKA-R...AS are employed in:

- Catalyst separation and recovery
- Refinery applications
- Gas- and Liquid filtration
- Aerosol separation
- Sparging
- Fluidization
- Air bearings for polymer sheet production
- Silencing

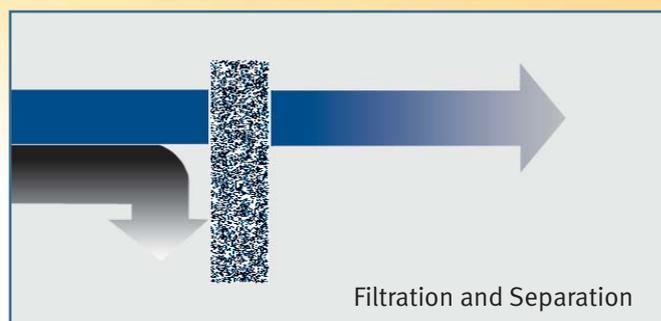
as well as in other fields of chemical and food processing industries, power engineering and environmental technology.

Further Applications of SIKA-R...AS

Metallic membranes can be used for various filtration jobs in chemical, food and pharmaceutical industries, also process engineering. Additionally, the energy and environmental sectors also use such elements.

The following is an exemplary list of keywords:

- Catalyst recovery in the chemical industry
- Cross-flow filtration
- Gas filtration
- Liquid filtration
- Analytical devices
- Medical devices
- Vegetable oil





Manufacturing of SIKA-R.../S and SIKA-R.../AS Products

Compaction

SIKA-R.../S filter elements are formed by cold isostatic pressing.

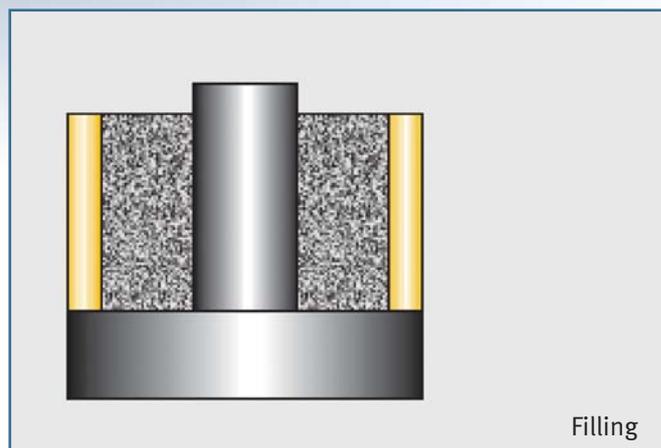
For the compaction process the metal powder is filled into the compaction tool which consists of a solid steel core and oversized outer rubber sleeve.

After sealing the filled assembly it is submerged into a vessel of hydraulic fluid.

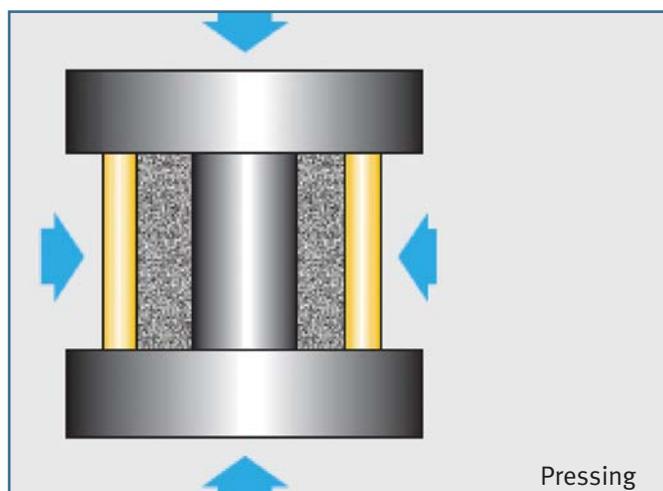
The next step is to apply pressure onto the fluid which moves the outer rubber sleeve towards the steel core and forms the porous part by compressing the powder in between.

Due to the uniformity of the hydro pressure the porous element excels by its uniform porosity with homogeneous physical characteristics and properties over the complete part.

Sizes that can be achieved are up to 1600 mm length and 320 mm diameter.



Filling



Pressing

Sintering

The compacted part is sintered in specially designed furnaces.

Sintering is the fundamental processing step for all Powdered Metal (P/M) products. It is the process of bonding the powder particles by fusing them together at temperatures well below their melting point.

After sintering, regardless of micron size, the separate grain structure of the original powdered metal becomes fully interlinked to form a rigid part.

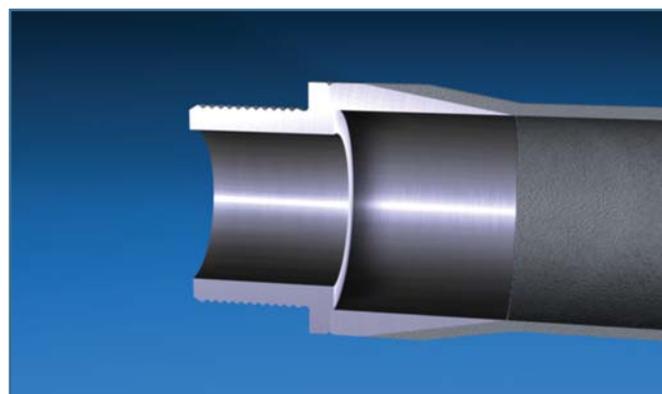
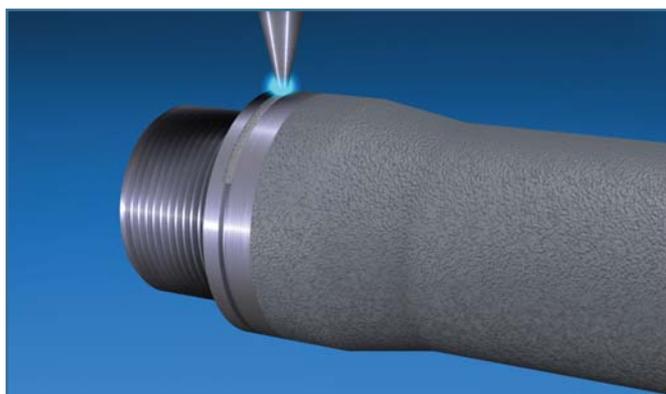
Sintering gives the high porous material the shape stability and property of a strong metal component.



Solid Connection

Furthermore, GKN owns specific know-how to integrate a solid connection fitting into the porous part prior to the pressing process.

Due to the sintered joint, any further porous to solid welding seams are avoided. This increases the strength and the reliability of the porous elements.



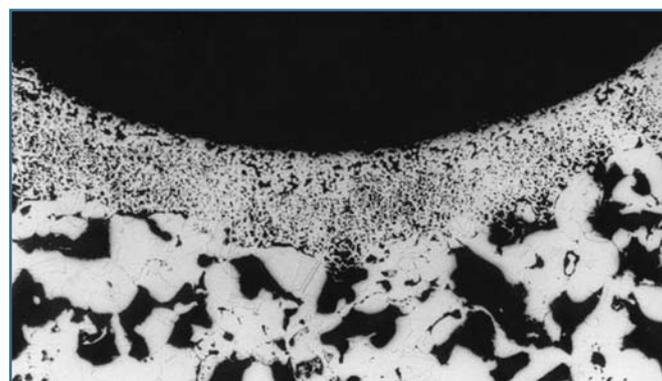
Further treatment of SIKA-R...AS products

SIKA-R...AS denotes asymmetrically constructed metallic membranes.

Coating technique

The metal membrane is produced by applying a layer of extremely fine metal powder onto carrier of coarser porosity, such as the standard sinter products of SIKA-R...IS or SIKA-R...AX.

The subsequent sintering produces an even metal coating of approximately 200 µm thickness so firmly bonded to the carrier as to exclude cracking and flaking in the layer.



Compared to the carriersupport, the sintered layer has significantly smaller pore size, so that during filtration particulate matter is retained on the filter coating surface. The support structure (carrier) has no discernible influence on the filtration process and merely serves to ensure pressure loss remains low.

As a result of years of development, the product offers users a sintered membrane that combines high permeability and very low pressure drop, yet retaining all the advantages of sintered metal filters.



Standard Materials

Material	Name	Mat.-No.	SIKA-				Fe	Cr	Ni	C	Mo	Miscellany	Max. Temperature °C		Keyword
			R...	FIL	B								Reduzierend Reducing	Oxidierend Oxidizing	
			IS	AX	AS	in Gewichts-% / in weight- %									
High alloyed material	AISI 304 L	1.4306	x	x	x		Bal.	18,0-20,0	8,0-12,0	≤0,03	0,5	N≤0,1	600	500	Standard for food application
	AISI 316 L	1.4404	x	x	x		Bal.	16,0-18,0	10,0-14,0	≤0,03	2,0-3,0	N≤0,1	540	400	
						x							380	320	
	AISI 904 L	1.4539	x	x	x		Bal.	19,0-21,0	24,0-26,0	≤0,02	4,0-5,0	N≤0,15 Cu 1,2-2,0	600	500	Resistant against sulphuric acid, phosphoric and hydrochloric acid
	AISI 310	1.4841	x			x	Bal.	24,0-26,0	19,0-22,0	≤0,25	-	-	800	600	Heat resistant
	FeCrAl	1.4767 Mod.				x	Bal.	19,0-22,0	-	≤0,10	-	Al 5,0-6,5 with rare earth elements	unfit	1000	
Nickel based alloys*	Hastelloy C 22	2.4602	x				2,0-6,0	20,0-22,5	Bal.	≤0,02	12,0-14,5	W 2,0-3,5 Co 2,5	650	650	Corrosion resistant with various aggressive media. Duration application at > 400 °C possible
	Hastelloy C 276	2.4819	x	x			4,0-7,0	14,0-16,0	Bal.	≤0,02	15,0-17,0	W 3,0-4,5	650	650	
	Hastelloy X	2.4665	x	x			17,0-20,0	20,5-23,0	Bal.	≤0,15	8,0-10,0	Co 0,5-2,5 W 0,2-1,0	930	800	
	Inconel 600	2.4816	x	x	x		6,0-10,0	14,0-17,0	≥72,0	≤0,15	-	-	700	600	
	Inconel 625	2.4856	x		x		≤5,00	20,0-23,0	≥58,0	≤0,10	8,0-10,0	Nb 3,15-4,15	650	650	
	Monel 400	2.4360	x	x	x		≤2,0	-	≥63,0	≤0,30	-	Cu 28,0-34,0	500	500	Resistant against Cl-containing media
Bronze	CuSn 11	2.1052				x	-	-	-	-	-	-	300	250	Typically used for hydraulic & pneumatic
Titanium**	Ti	-	x	x			-	-	-	-	-	Ti > 99 %	500	500	Medicine, acid, electrolysis
Other	Other materials on request														

* Nickel based AX-products only after consultation. Not all dimensions feasible. **Not all raw materials are in stock. Typical Iron or Nickel elements e.g. Si, Mn, P, S according to the literature.

Filter Elements High Porosity Sintered Materials SIKA-R...IS and SIKA-R...AS

All types of GKN-SIKA filter elements have following salient features:

- seamless construction up to 1,500 mm length
- seamless construction up to 320 mm diameter
- seamless assembly of solid flange and porous tube
- threads according to customers' requirement

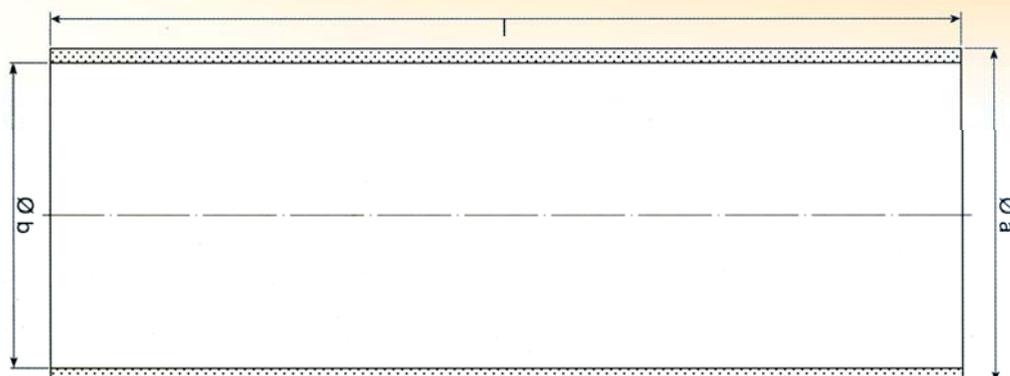
The construction without welding seams in the porous material provides best corrosion resistance and the fatigue strength is considerably higher compared to conventional welded constructions.

GKN Filter Grades

SIKA-R	0,1	AS
SIKA-R	0,3	AS
SIKA-R	0,5	IS
SIKA-R	0,5	AS
SIKA-R	1	IS
SIKA-R	1	AS
SIKA-R	2	AS
SIKA-R	3	IS
SIKA-R	3	AS
SIKA-R	5	IS
SIKA-R	8	IS
SIKA-R	10	IS
SIKA-R	15	IS
SIKA-R	20	IS
SIKA-R	30	IS
SIKA-R	50	IS
SIKA-R	80	IS
SIKA-R	100	IS
SIKA-R	150	IS
SIKA-R	200	IS



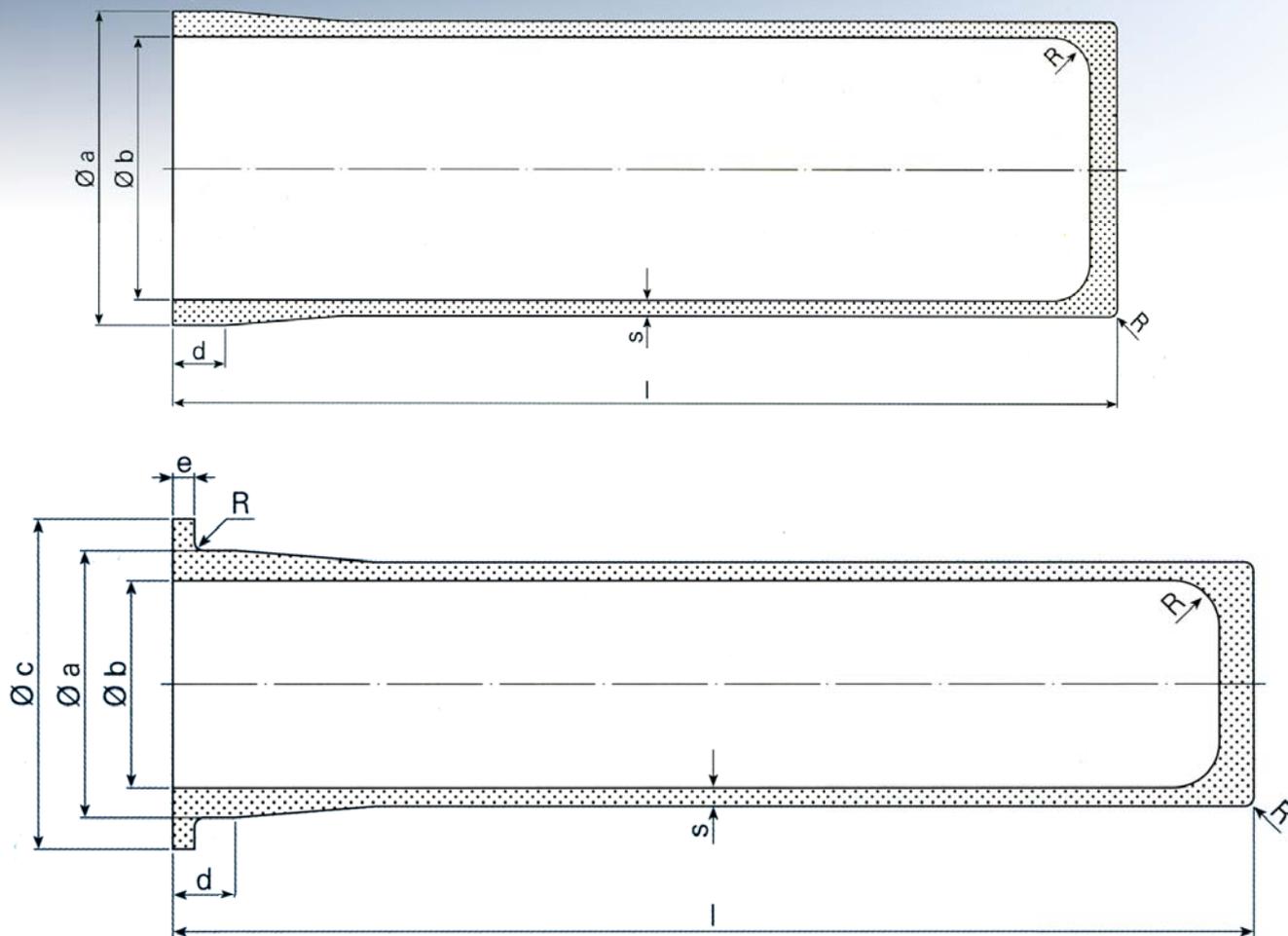
Standard Geometries

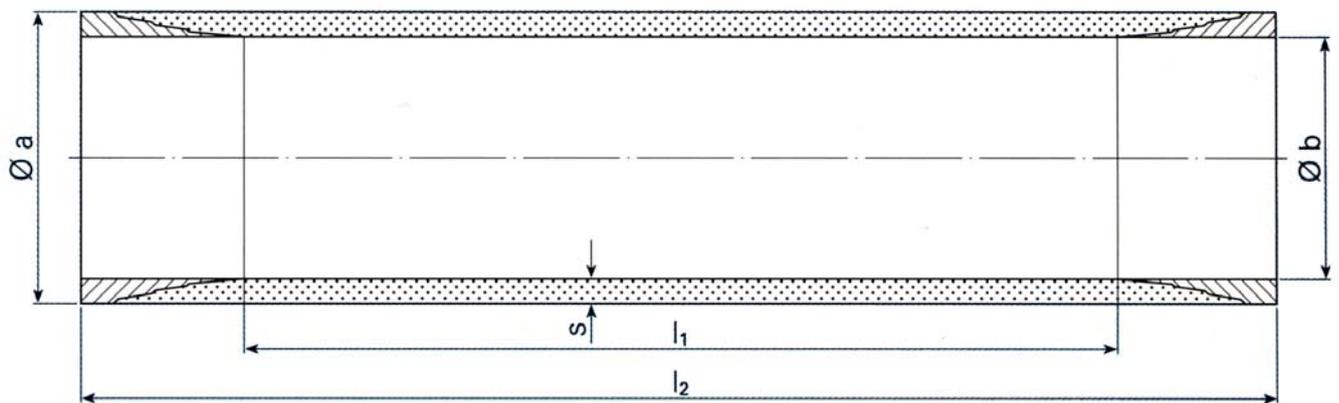
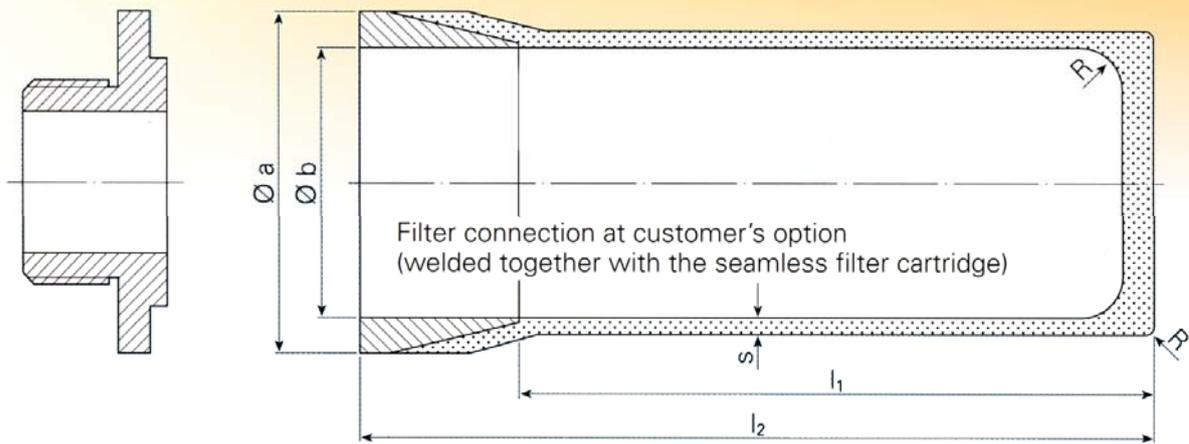


Standard DOE Tubes

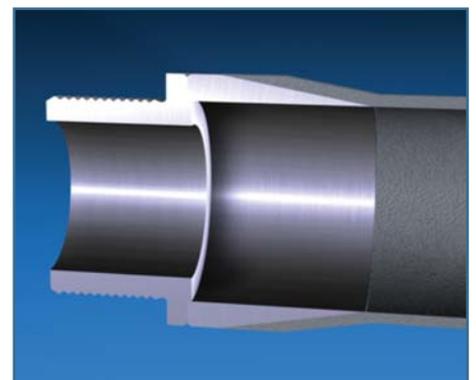
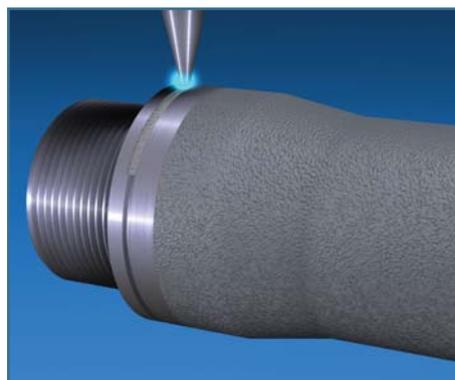
Length in inches	Nominal Diameter in inches						
	3/4"	1"	1.5"	2"	2.33"	2.5"	3"
	Actual dimension in mm						
MAX	19/16 x 1200	25,4/19 x 1260	38/34 x 1280	50,4/46 x 1560	60/56 x 1560	64/60 x 1590	75/70 x 1020
	Further Standard Dimensions						
7,5"	19/16 x 190,5	25,4/19 x 190,5	38/34 x 190,5	50,4/46 x 190,5	60/56 x 190,5	64/60 x 190,5	75/70 x 190,5
15"	19/16 x 381	25,4/19 x 381	38/34 x 381	50,4/46 x 381	60/56 x 381	64/60 x 381	75/70 x 381
30"	na	na	na	50,4/46 x 762	60/56 x 762	64/60 x 762	na
60"	na	na	na	50,4/46 x 1524 *	60/56 x 1524 *	64/60 x 1524 *	na

* not possible as SIKA-R ... AS; maximum length for SIKA-R ... **AS** is 1500 mm





Solid filter thread at customer's option - welded together with the seamless filter tube



The design with sinterbonded fittings and without porous to solid welding seams provides best corrosion resistance and fatigue strength is considerably higher compared to conventional welded constructions.



Additional Applications of GKN Filters

Catalyst recovery

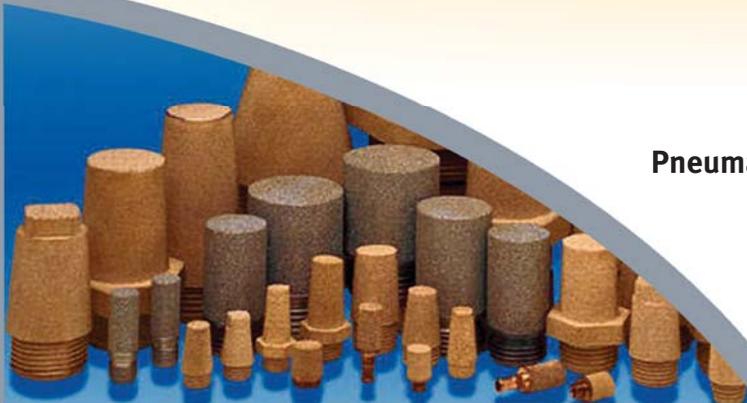


Refinery

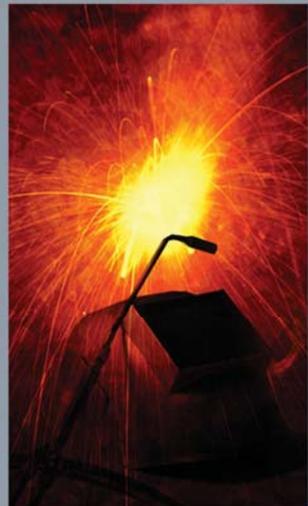


Water treatment





Pneumatic valves



Food shaping



Basic Information for Designing a Filter

Customer's Information

Enquiry date: _____

Company Name: _____

Contact Name: _____

Street Address: _____

ZIP: _____

Town, US State: _____

Country: _____

1. The planned application of the SIKA element?

Filtration Equalizing Fluidizing

Separation Silencing Sparging

Throttling Protecting Degassing

Others _____

2. What kind of gas or liquid will flow through the SIKA element?

Medium Specification

Operation density _____

Dynamic viscosity _____

Operation temperature _____

Operating flow rate _____

Absolute operating pressure before SIKA-element _____

Wanted or permissible pressure drop of clean filter _____

Max permissible pressure drop of used filter _____

3. Which particles must be retained by a SIKA element?

Description _____

Filter grade _____

4. How will the SIKA element be applied?

Shape of the element Tube Cartridge Sheet

Disc Other

Connecting Element Flange Thread Other

Housing diameter _____

Quantity _____

4. Short description of the process:



Further Brochures Available



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