HJS Industrial Filtration



Innovation through Experience

HJS Sintered Metal Technology



HJS Emission Technology

HJS Emission Technology GmbH & Co. KG, based in Menden in central Germany is a medium-sized company founded in 1976.

HJS is an industry leader providing expertise and solutions in the field of emission exhaust-gas aftertreatment and filtration with extensive experience. Some 450 employees are engaged in the development, production and marketing of modular systems for reducing emissions. HJS has a wideranging patent portfolio for the manufacturing of sintered metal filter media (SMF) for liquid and gas filtration.

Current focus is centered on solutions for diesel engines – especially solutions for reducing the emissions of soot particles (particulate matter, PM) and nitrogen oxides (NO_x) in addition to creative solutions for Air Pollution Control and for hot gas applications.

HJS is making a significant contribution to meeting environmental and climate targets worldwide. Our innovative environmental technologies can be used for industrial filtration, original equipment, or for retrofitting of passenger cars, commercial vehicles as well as on a wide range of non-road mobile machinery and stationary applications, and sparkignition engines.



Innovation through Experience



Sintered Metal Filter Media - SMF®

More than 2 million m^2 of HJS Sintered Metal Filter media (SMF[®]) have been produced over the past 15 years, with a peak production of 300.000 m^2 p. a. It is the objective now to utilize the known advantages of this thin, pleatable SMF[®] material, such as sharp separation efficiency or good cleanability, for new industrial applications, like gas and liquid filtration.

SMF® material is a thin porous sintered metal in which a precisely defined stainless steel powder which forms the porous structure is sintered and supported by an expanded

metal carrier responsible for the required strength. This results in a mechanically and thermally highly stable filter medium, which can be pleated like paper or synthetic filter media.

The SMF® base material is manufactured on a highly automated continuous production line and comes as a quasi-endless strip, wrapped on a coil. In a subsequent step the material, which has been qualified for hot gas and exhaust filtration in the automotive industry can be processed into filter elements typical for different applications.

Parameter	Unit	Values SMF-10	Values SMF-20	Values SMF-30
Weight	g/m²	1650	1725	1825
Thickness	mm	0.38	0.41	0.44
Porosity	%	45	48	51
Alloy		3105	316L	316L
Air permeability @ *1200 Pa	l/dm² min	20	82	137
Max. Pore size	μm	16	38	50
Mean Flow Pore Size	μm	13	27	33
Min. Pore size	μm	12	22	26
Conductivity @ 20 °C	S/m	0.5 x 10⁵	0.5 x 10 ⁶	0.5 x 10 ⁶
Operating temperature* ²	°C	450	375	375
Peak Temperature	°C	800	700	700
Tensile strength (R _{p0.2})	MPa (x/y)	25 / 36	15 / 35	14 / 33

*1 ISO 4022 · *2 air, 50% rel. hum

SMF® Success Factors

- Sintered metal band material for flexible mass production
- Flexible in metal forming and design via pleating cutting, folding and gluing
- Highest filtration efficiency
- Reduced thickness
- Back flushable in air and liquids
- Durability up to 450 °C
- Catalytic properties through coating (functional surface)

SMF®- Gas Filtration

GAS

To meet the specific requirements in air pollution control applications, the SMF[®] serial media has been adapted and qualified at a renowned test institute according to the test standards relevant for APC. The tests, which were carried out

according to VDI 3926 and ISO 16890 standards, using 125 mm diameter flat sheet probes, show a F9 filtration efficiency (according to old EN779).



Parameter	Unit	Values SMF-10	Values SMF-20	Values SMF-30	
Efficiency	%	99.996 ^{*3}			
Efficiency	%	99.940 ^{*4}			
	%	99,997 *5	Investigations in progress		
Δp @ 3,3cm/s, clean⁺ ⁶	PA	236			
Δp @ 3,3cm/s, after 30 cycles⁺ ⁶		+25%			
Efficiency ISO ePM1 ^{÷7} (80% - 95% anal. F9 EN779)		85% @ 4,0cm/s			

 3 ISO 5011, Dust PTI fine acc. ISO 12103, A2 · 4 VDI 3926; Dust Pural NF (x_{503} =3,8 µm) · 5 VDI 3926m Dust Ulmer Weis XMF (x_{503} =3,3 µm) · 5 VDI 3926m Dust Ulmer Weis XMF · 7 ISO 16890 (sheet test up to Δp 450 Pa), conditioning in 2/20 cyles acc. VD 3926

Filtration results

In order to demonstrate the general suitability of the SMF® material for applications in the field of gas filtration, basic measurements of the filtration efficiency were carried out

with the material in accordance with the usual standard norms ISO 5011, VDI 3926 and ISO 16890. The results are shown in the table above.

Conclusion

GAS

SMF[®] shows very good filtration properties for gas and as well for liquid filtration. The investigations described here have proven that the filter material is very well suited for the dedusting of highly charged gas flows, whether hot or cold, due to its excellent regeneration behaviour.

The combination of these properties offers the possibility to support the decarbonisation of industries, where CO₂ emissions are difficult to avoid due to the process, namely through energy recovery or the provision of hot clean filtered process

gases for further use. Cooling hot dust-laden process gases can now be eliminated in most cases.

Manufacturing processes for filter cartridges has been defined by an optimized welding process and will be demonstrated for elements with diameters of around 130 mm – 200 mm and in steps up to approx. 10 m in length.

The first pilot applications in industrial high-temperature dedusting are in preparation.



SMF® Target Segments & Applications

Air Pollution Control

Industries across the globe produce an ever-increasing amount of harmful emissions of dust smoke, and aerosols which further contributes to greenhouse gases and global warming. New environmental regulations will require filter manufacturers to provide new and inventive solutions to address this.

The cement industry is responding to an increasing world demand, however, it's one of the most emission-intensive industrial processes. The manufacturing process generates huge air volumes of up to 1,000,000 m³/h to move and collect the cement dust which is cleaned in large filter bag houses.

HJS Sintered Metal Filter Technology (SMF[®]) offers very specific material advantages which will serve as a growth platform. Due to the high inherent stability and strength of the SMF material, existing fabric filters can be replaced by modular filter cartridge elements. Tests have proven the high filter efficiency and cleanability of SMF[®].

In contrast to the current filters used, filtration with SMF[®] can take place at up to 450 °C in continuous operation. This results in an immense reduction of the energy requirement (CO_2) that would normally be necessary for cooling the exhaust gas. In addition, the material offers the possibility of a catalytic coating, e.g., for the reduction of harmful carbon monoxides. The SMF[®] filter material is currently being mass-produced on highly automated production lines.





SMF®-Liquid Filtration

SMF® serial material has subsequently been qualified in the multi-pass test recognised in the hydraulic and process filtration industry to obtain a meaningful classification of the SMF[®] serial material. The average results of these multipass tests according to ISO 16889 carried out on several discs with a diameter of 125 mm.



Parameter	Unit	Values SMF-10	Values SMF-20	Values SMF-30
Filter medium resistance	10 ⁸ /m	4.1	0.89	0.56
DHC @ 10 bar ^{*8}	mg/cm ²	7.18	11.96	11.69
Efficiency ^{∗9}				
β 10	μm	5.3	14.4	19.8
β 75		9.1	21.1	26.2
β 100		9.6	21.9	26.9
ß 200		10.9	-	28.5

 *8 Mulitpass acc. 16889 Test dust A4 $\cdot\,^{*9}$ Mulitpass acc. 16889 Test dust A4

Put your trust in *HJS* and benefit from our extensive experience

- > Products for liquid and hot gas filtration
- > Certified reduction of emissions
- > Products for OEM and retrofit
- > Protection of human health and the environment







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