FST GmbH
Filtrations-Separations-Technik

Compressed air filtration

If compressed air simply is to be clean

What is ...?

Compressed air

is energy in the form of compressed ambient air. Compressed air is permanently trying to expand back to atmospheric pressure and thus performs work during the expansion process. Besides electrical energy compressed air is one of the most important forms of power for industrial production processes and is widely used thanks to numerous advantages:

- Can be produced locally and on demand
- Can be stored easily and without losses
- Can be transported easily
- High amount of energy per volume
- Can be easily converted to other forms of energy, e.g. blast air, fast linear movement with increased force, rotary movement with increased torque, in a space-saving way
- Versatile applications

The compressed air contains contaminations and moisture from the ambient air which are concentrated according to the operating pressure. Oil-lubricated compressors will add amounts of oil to the compressed air (residual oil). When the compressed and hot air is cooled down to an appropriate operating temperature, larger amounts of water will condense (condensate).
Untreated contamination in the compressed air would contaminate and damage the compressed air system, the compressed air consumers and the products that come into contact with the compressed air.

Compressed air treatment

removes the unwanted contamination and provides the purity of the compressed air required for the application, e.g. standard instrument air, technically oil-free compressed air up to sterile ultra-pure air or medical breathing air. Many industries have a specific air quality requirement governed by best practice or legislation.

The aim of compressed air treatment is to ensure continuous and trouble-free operation of applications using compressed air, to minimise downtimes, unscheduled maintenance and repair work, and to remove specific contamination that may be harmful to the product.

And, most of all, compressed air treatment actively contributes to environmental protection as well as to occupational health and safety. Liquid oil droplets, finest oil mist, oil-contaminated solid particles and gaseous, foul-smelling oil vapour, i.e. contamination which occurs on site during compressed air production, can be completely eliminated and thus will not contaminate the local environment.

The compressed air treatment system comprises several consecutive treatment components, referred to as treatment chain, which treat the compressed air in stages in order to achieve the required purity.

Compressed air filtration

is an elementary component for compressed air treatment and is present more than once in the treatment chain. Compressed air filters remove all types of solid and liquid contaminants from the compressed air in stages, i.e. large amounts of condensate and coarse contamination particles such as rust, abrasion particles, oil droplets and dust are filtered in the first stages and then fine oil mist and fine dust particles are filtered in subsequent stages. Compressed air filters containing activated carbon also remove foul-smelling odours and oil vapour. Specific compressed air filters even remove viruses and germs and thus produce sterile compressed air.

The different types of filtration, the filtration grades and designs of compressed air filters available from FST GmbH will be described in more detail in this brochure. The foldout guide for the application of compressed air filtration and the compressed air purity can be used as an additional guide for determining an optimised and individual customer solution.

Overview of the FST compressed air filter series

For operating pressures from 16 bar to 350 bar; made from aluminium, steel, and stainless steel

Compressed air filters - Design and accessories

Differential pressure gauges

measure the differential pressure across the filter element. It indicates when a filter element needs to be replaced either because it has reached the end of its useful life or if a large amount of contamination has been discharged upstream.

Oil indicators

measure the oil content in the compressed air. Oil indicators are mainly used to determine the saturation level and whether the activated carbon needs to be replaced.

Filter housings

are pressure housings with a method for supporting the filter element, a compressed air inlet and outlet with the flow paths to and from the filter element, a condensate outlet for discharging separated liquids, and connections for monitoring the differential pressure across the filter element.

Filter elements

are the core of a compressed air filter and separate levels of contaminants from the compressed air depending on the filtration grade. The element permanently captures the solid particles and will therefore require periodic replacement dependent upon the level of initial contamination.

Manual condensate drains

are used for manually discharging the separated liquids and for pressure relief of the filter.

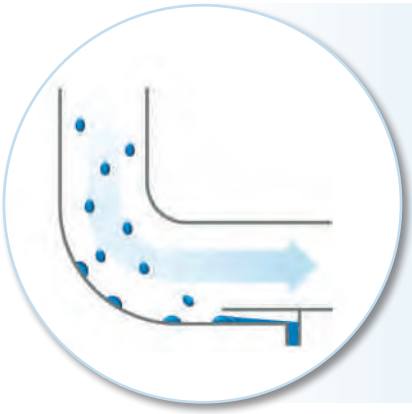
Electronic condensate drains

store the separated liquids in an individual collecting chamber and discharge the liquids from the compressed air system in an electronically controlled way.

Automatic condensate drains

automatically discharges the separated liquids from the compressed air system. These condensate drains operate mechanically and are mounted inside or outside the filter housing.

Types of filtration

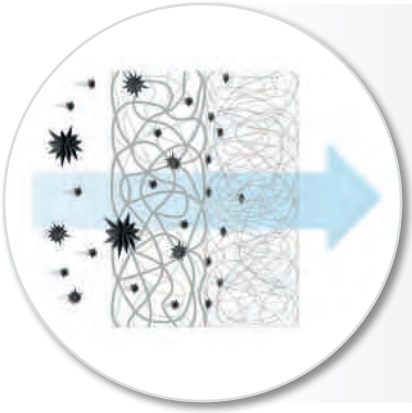


Water separation

Separation of large, „heavy“ and therefore slow, amounts of liquid from a compressed air flow by means of gravitational forces, centrifugal forces, inertial effects etc.

The differential pressure is constant.

The direction of flow depends on the operation principle.

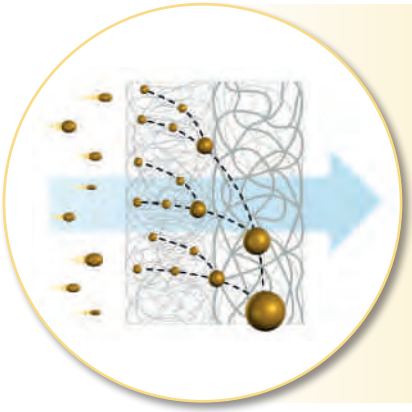


Dry-type filtration

Separation of solid contaminants from the compressed air flow. The solid contaminants contact the fibres of the filter media, where they remain. A coarse and a fine multi-layer filter media are often used in combination (2-stage dry separator). The coarse filter media protects the fine filter media against coarse contaminants and thus increases the service life of the filter element.

The differential pressure (dry) increases with an increasing amount of contamination.

The preferred direction of flow is towards the finer filter fibres, i.e. from the outside to the inside.



Wet-type filtration

Separation of liquid contaminants from the compressed air flow using a fine multi-layer filter media in combination with a drainage media (coalescing filter). The liquid contaminants contact the fibres of the fine filter media, move along the fibres due to the compressed air flow and form larger droplets when they are merged (coalescing effect). The droplets are absorbed by the drainage media, discharged to the filter element bottom due to gravitational forces, and drop off the filter element.

Theoretically, the differential pressure (wet) is constant. However, it rises as the filter element is continuously loaded with liquid and solid contaminants.

The direction of flow is towards the drainage media, i.e. from the inside to the outside.

Oil vapour adsorption

Separation of gaseous oil vapour (hydrocarbon molecules), i.e. removal of odour from the compressed air flow by means of adsorption to activated carbon. The compressed air becomes undersaturated with oil vapour which cannot condense into a liquid any more. There is often a filter media downstream of the activated carbon in order to eliminate activated carbon abrasion particles (abrasion-free activated carbon filter).

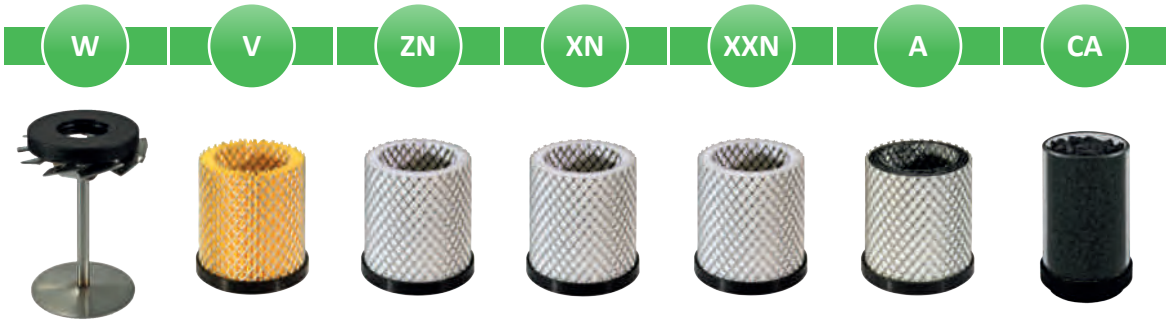
The differential pressure (dry) is constant.

The direction of flow is always towards the filter media, i.e. from the inside to the outside.

Liquid oil or water would dramatically reduce the retention capacity of the activated carbon for oil vapour and should therefore be separated in advance using appropriate grade filters.

Filtration grades

Filtration grade



Designation	Water separator	Coarse filter	General purpose filter	Fine filter	Super fine filter	Activated carbon element	Activated carbon cartridge
Specification	**99,9 %** (>100 µ) separation (droplets)	**99,99 %** (3 µ) separation (coarse particles) Reduction of liquid particles	**99,9999 %** (1 µ) separation (fine particles) **0.5 mg/m³** residual oil content (liquid oil)	**99,9999 %** (0,01 µ) separation (finest particles) **0.01 mg/m³** residual oil content (liquid oil)	**99,99999 %** (0.01 µ) separation (finest particles) **0.001 mg/m³** residual oil content (liquid oil)	**0.003 mg/m³** residual oil content (oil vapour)	**0,003 mg/m³** residual oil content (oil vapour)
Purity class acc. to ISO 8573-1[*1]	[X : 7 : X]	[6 : - : 4]	[2 : - : 2]	[1 : - : 1]	[0-1 : - : 0-1]	[2 : - : 0-1]	[2 : - : 0-1]
Type of filtration	Water separation	Wet-type and dry-type filtration	Wet-type and dry-type filtration	Wet-type and dry-type filtration	Wet-type and dry-type filtration	Oil vapour adsorption	Oil vapour adsorption
Application	Removal of large amounts of liquids e.g. downstream of coolers	Removal of large amounts of solid or liquid coarse contaminants e.g. rust, abrasion particles, dust and liquids	Removal of medium amounts of solid or liquid fine contaminants e.g. fine dust particles, small droplets and aerosols	Removal of small amounts of solid or liquid finest contaminants e.g. finest dust particles, oil mist and aerosols Combined with upstream coarse or general purpose filter in the event of increased amounts of contaminants	Removal of small amounts of solid or liquid finest contaminants e.g. finest dust particles, oil mist and aerosols Combined with upstream general purpose or fine filter in the event of increased amounts of contaminants	Removal of small amounts of gaseous contaminants in particular oil vapour Upstream fine filter or super fine filter required With integrated general purpose filter	Removal of small amounts of gaseous contaminants in particular oil vapour for low volume flow rates Upstream fine filter or super fine filter required With integrated general purpose filter

*1 - typical result according to ISO 8573-1:2010, on the assumption that the suitable inlet concentrations and operating and marginal conditions are given

For detailed technical data and reference variables, please refer to the relevant product data sheet which can be downloaded at www.fstweb.de

The advantages at a glance

Double surface protection

The high-grade, corrosion-resistant aluminium filter housings (FCA and FMA series) are manufactured by means of completely chrome(VI)-free passivation and finished with an impact-proof and abrasion-proof powder coating on the outer side. Steel filter housings (FWS series) have a primer of a polyester resin base on the inner and outer sides and, additionally, a high-grade 2-component acrylic paint layer on the outer side. High-pressure, steel filter housings (FMS series) are manufactured by means of iron phosphate passivation and have an additional powder coating. This multi-layer surface protection ensures high resistance and a long service life of the filter housings and prevents rust and corrosion.

Conformity with EU Directive 97/23/EC

All the filters comply with Pressure Equipment Directive 97/23/EC and have the marking of this directive depending on the filter model. Numerous international approvals are available on request.

Comprehensive accessories range

A complete accessories range is available for all the filter series.

- Differential pressure gauges with and without alarm contact
- Oil indicators
- Manual, automatic and electronic condensate drains
- Mounting kits and wall brackets

1-person-easy-maintainance concept

Series FCA filters have lugs in the lower filter part to which the filter element is securely mounted. The filter element is securely fastened and sealed when the filter housing is screwed tightly and eliminates the need for a tie rod, which allows the filter to be located only a few centimetres above ground level. A mechanical end stop prevents the housing thread from being overstressed and ensures easy opening of the filter housing by hand and without any tools, even after prolonged operating period.
Opening of the series FWS filter housings for filter element replacement is particularly easy because the housing flange is located far down which means that only the “light” housing base needs to be removed. From models FWS 200 - 2000 the housing base is even provided with a handle and a hinge and can therefore easily be opened. The filter element holder has guide-paths in order for the filter elements to be automatically locked in the holder when being installed. We call this the 1-person-easy-maintainance concept.

Validation according to ISO 12500

Specific filtration grades have been validated from an independent institute according to ISO 12500-1, ISO 12500-2 and ISO 12500-3.
The filters showed superior results even when used under the harsh and demanding test conditions of these standards.

Filter media

High-quality compressed air filtration starts with selecting the correct filter media. FST therefore uses high-quality filter media of well-known European manufacturers. At the same time, the FST filter elements stop the perpetual discussion about the use of filter media with or without binders. The FST filter elements contain both types which are layered. This neutralises the inherent disadvantages and, as a result, retains the advantages of both types. The fine filter media is protected on both sides using a supporting fabric to increase both the stability and reliability.

Pleated filter elements

Pleated filter elements provide significantly greater filtration volumes than non-pleated. Due to the large filter surface, the flow velocity and thus the differential pressure caused by the filter element are reduced thereby improving the separation performance. The significantly higher filter volume provides more space for “holding” contaminants, which also reduces the differential pressure caused by retention of solid particles. The service life of the filter element increases proportionally, which results in operating and maintenance costs savings!

Incorporated drainage media

The filter and drainage media are compacted between two stainless steel supporting cylinders thereby eliminating any potential detachment of the filter media. The drainage media is located inside the filter element thereby eliminating potential handling damage.

2-stage dry-type separation

During dry-type separation with a direction of flow through the filter elements from the outside to the inside, the drainage media functions as a pre-filter stage thereby preventing coarse contaminants from entering the fine filter media. The differential pressure caused by contaminants is therefore further reduced and the service life of the filter element is increased. As an additional advantage, the filter elements can be used for wet-type or dry-type filtration.

Abrasion-free activated carbon filter with 100% activated carbon

Both the filter element type and the cartridge type contain pure activated carbon granulate. The increased filling quantities contribute to a high separation performance and a long service life. Both the filter elements and the cartridges have an integrated general purpose filter element, which significantly reduces the abrasion particles of the activated carbon. As a result, downstream dust filtration is not required thereby significantly reducing the installation, operation and maintenance costs compared against other filter types.

FCA series

Volume flow rate from 30 m³/h to 2,500 m³/h
Threaded connection from G ¼ to G 3

The advantages...

✓ **Rugged aluminium die-cast housing with double surface protection**
- No corrosion or rust formation
- Long service life

✓ **Validated pleated filter elements**
- Increased separation performance
- Low differential pressure
- Long service life

✓ **Validated activated carbon cartridges with activated carbon granulate**
- Increased amounts of activated carbon
- Long service life

✓ **Filter elements with plug-in connection, a housing thread protected against overstress and the 1-person-easy-maintainace concept**
- Easy filter element replacement
- Reliable sealing between filter housing and filter element

...result in a filter providing...

✓ Maximum operational reliability
✓ Minimum total operating costs
✓ Long service life
✓ Easy maintenance

For the technical data, please refer to „Filtration grades“ on page 5.

Compressed air filtration setting new standards - With regard to performance, efficiency and operational reliability

Series FCA filters are used to remove solid, liquid and, when using activated carbon cartridges, gaseous contaminants from compressed air flows. In addition to liquids and dust, the filters practically remove all oil droplets and finest dust particles from the compressed air. Filters with activated carbon cartridges remove practically all oil vapour and odours.

Series FCA filters consist of an aluminium die-cast housing, which is pressure-rated up to 16 bar and provided with threaded connections at the compressed air inlet and outlet. The filter housings are manufactured by means of completely chrome(VI)-free passivation and finished with a powder coating. The housing thread has an end stop which prevents the thread from being overstressed and thereby provides the most convenient design for filter element replacement. The filter elements are connected to the filter housing using a plug-in connection with a radial O-ring seal. They are installed on lugs in the filter housing. In this way, the height below the filter element required for replacement is low and the connection between the filter housing and the filter element is securely sealed.

Due to the filtration grades available, any application requirements in the field of industrial compressed air filtration can be fulfilled. The selected filter media and their pleated design guarantees increased separation performance and, at the same time, low differential pressures as well as a long service life of the filter elements resulting in the lowest cost of ownership. Complete integration of all the relevant filter layers between the two cylinders results in filter elements with maximum operational reliability even under critical operating conditions.

Available accessories

Differential pressure gauge with/without alarm contact	Oil indicator	Manual drain	Automatic condensate drains	Electronic condensate drains	Wall brackets
					
not for FCA20-25	not for FCA20-25				up to FCA130

Technical data

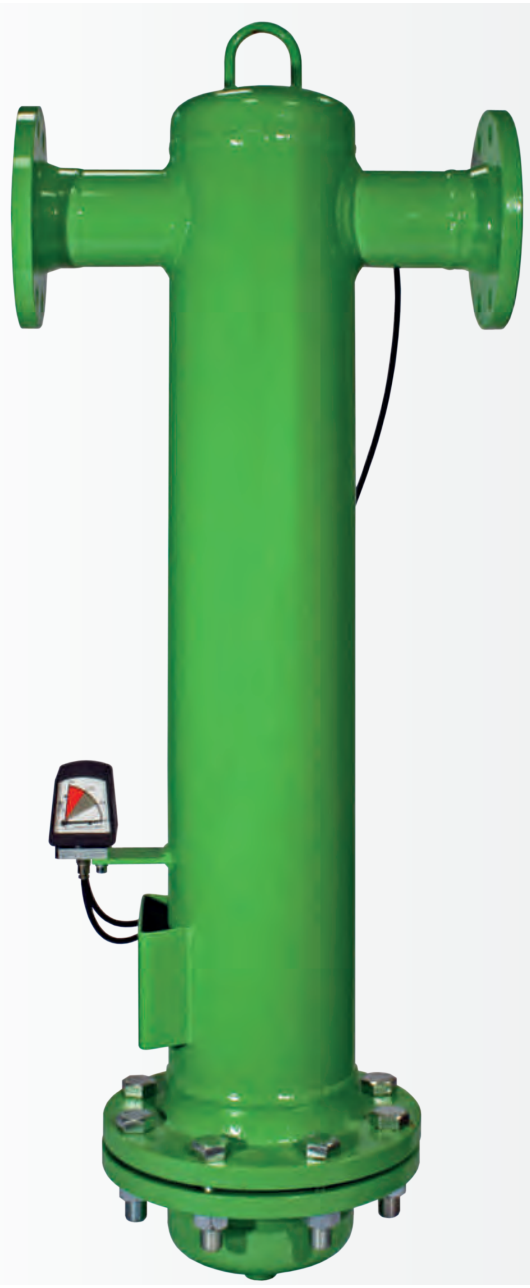
Model	Nominal volume flow*1	Max. allowable operating pressure	Connection	Filter element model	Height	Width	Depth	Weight
FCA20	30 m³/h	16 bar	G 1/4	EFST25	136 mm	61 mm	60 mm	0.5 kg
FCA25	35 m³/h	16 bar	G 3/8	EFST25	136 mm	61 mm	60 mm	0.5 kg
FCA30	50 m³/h	16 bar	G 3/8	EFST30	183 mm	87 mm	80 mm	1.0 kg
FCA50	70 m³/h	16 bar	G 1/2	EFST50	183 mm	87 mm	80 mm	1.0 kg
FCA70	100 m³/h	16 bar	G 1/2	EFST70	253 mm	87 mm	80 mm	1.1 kg
FCA90	160 m³/h	16 bar	G 3/4	EFST90	289 mm	130 mm	122 mm	3.9 kg
FCA95	160 m³/h	16 bar	G 1	EFST90	289 mm	130 mm	122 mm	3.8 kg
FCA110	330 m³/h	16 bar	G 1	EFST110	387 mm	130 mm	122 mm	4.3 kg
FCA115	330 m³/h	16 bar	G 1½	EFST110	387 mm	130 mm	122 mm	4.1 kg
FCA120	500 m³/h	16 bar	G 1½	EFST120	487 mm	130 mm	122 mm	4.7 kg
FCA130	800 m³/h	16 bar	G 1½	EFST130	689 mm	130 mm	122 mm	5.7 kg
FCA140	1,000 m³/h	16 bar	G 2	EFST140	670 mm	164 mm	146 mm	7.8 kg
FCA170	1,500 m³/h	16 bar	G 2	EFST170	923 mm	164 mm	146 mm	9.5 kg
FCA180	2,000 m³/h	16 bar	G 2½	EFST180	897 mm	250 mm	225 mm	22.9 kg
FCA185	2.000 m³/h	16 bar	G 3	EFST180	879 mm	250 mm	225 mm	22.4 kg
FCA190	2,500 m³/h	16 bar	G 3	EFST190	1,049 mm	250 mm	225 mm	24.5 kg

*1 - refers to 1 bar(a) and 20°C at 7 bar operating pressure

For detailed technical data and reference variables, please refer to the relevant product data sheet which can be downloaded at www.fstweb.de

FWS series

Volume flow rate from 1,500 m³/h to 30,000 m³/h
Flange connection from DN80 to DN300



The advantages...

✓ **Rugged steel housing with double surface protection**
- No rust formation
- Long service life

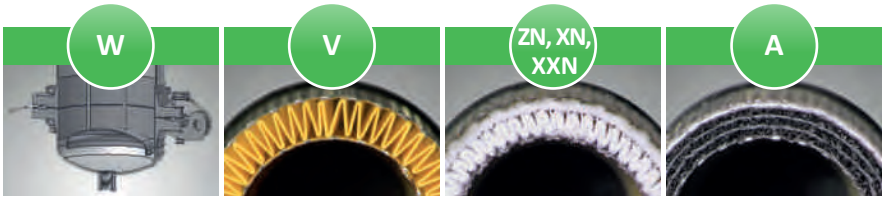
✓ **Validated pleated filter elements**
- Increased separation performance
- Low differential pressure
- Long service life

✓ **Validated activated carbon cartridges with activated carbon granulate**
- Increased amounts of activated carbon
- Long service life

✓ **Self-fixing filter elements and the 1-person-easy-maintainace concept**
- Easy filter element replacement
- Reliable sealing between filter housing and filter element

...result in a filter providing...

- ✓ Maximum operational reliability
- ✓ Minimum total operating costs
- ✓ Long service life
- ✓ Easy maintenance



For the technical data, please refer to „Filtration grades“ on page 5.

Compressed air filtration on a large scale - Also with regard to quality and performance

Series **FWS** filters are used to remove solid, liquid and, when using activated carbon cartridges, gaseous contaminants from compressed air flows. In addition to liquids and dust, the filters practically remove all oil droplets and finest dust particles from the compressed air. Filters with activated carbon cartridges remove practically all oil vapour and odours.

Series **FWS** filters consist of a welded steel housing which is pressure-rated up to 16 bar and provided with flange connections at the compressed air inlet and outlet. The filter housings are completely primed and painted with an additionally finished coating on the outside. Opening of the filter housings for filter element replacement is particularly easy because the housing flange is located far down which means that only the „light" housing base needs to be removed. From models FWS 200 - 2000 the housing base is even provided with a handle and a hinge and can therefore be opened easily. The filter element holder has guide-paths in order for the filter elements to be automatically locked in the holder when being installed. The radial O-ring ensures seal-tight connections between the filter housing and the filter element.

Due to the filtration grades available, any application requirements in the field of industrial compressed air filtration can be fulfilled. The selected filter media and their pleated design guarantees increased separation performance and, at the same time, low differential pressures as well as a long service life of the filter elements resulting in the lowest cost of ownership. Complete integration of all the relevant filter layers between the two cylinders results in filter elements with maximum operational reliability even under critical operating conditions.

Available accessories

Differential pressure gauge with/without alarm contact	Oil indicator	Manual drain	Automatic condensate drains	Electronic condensate drains
				

Technical data

Model	Nominal volume flow*1	Max. allowable operating pressure	Connection	Filter element model	Height	Width	Depth	Weight
FWS170	1,500 m³/h	16 bar	DN80	EFST170	1,115 mm	440 mm	285 mm	46 kg
FWS190	2,500 m³/h	16 bar	DN80	EFST190	1,115 mm	440 mm	285 mm	46 kg
FWS200	3,000 m³/h	16 bar	DN100	2 x EFST170	1,298 mm	550 mm	405 mm	105 kg
FWS300	4,500 m³/h	16 bar	DN100	3 x EFST170	1,298 mm	550 mm	405 mm	105 kg
FWS400	6,000 m³/h	16 bar	DN150	4 x EFST170	1,503 mm	640 mm	460 mm	136 kg
FWS600	9,000 m³/h	16 bar	DN150	6 x EFST170	1,531 mm	800 mm	580 mm	205 kg
FWS800	12,000 m³/h	16 bar	DN200	8 x EFST170	1,531 mm	800 mm	580 mm	208 kg
FWS1000	15,000 m³/h	16 bar	DN200	10 x EFST170	1,590 mm	840 mm	715 mm	342 kg
FWS1200	18,000 m³/h	16 bar	DN250	12 x EFST170	1,695 mm	940 mm	715 mm	450 kg
FWS1600	24,000 m³/h	16 bar	DN250	16 x EFST170	1,740 mm	940 mm	840 mm	537 kg
FWS2000	30,000 m³/h	16 bar	DN300	20 x EFST170	1,790 mm	940 mm	840 mm	558 kg

*1 - refers to 1 bar(a) and 20°C at 7 bar operating pressure

For detailed technical data and reference variables, please refer to the relevant product data sheet which can be downloaded at www.fstweb.de

FCA../50, FWS../50 series

Volume flow rate from 153 m³/h to 12,750 m³/h
Threaded connection from G ¼ to G 1½, flange connection from DN50 to DN80

The advantages...

✓ **Rugged aluminium or steel housings with double surface protection**
- No corrosion or rust formation
- Long service life

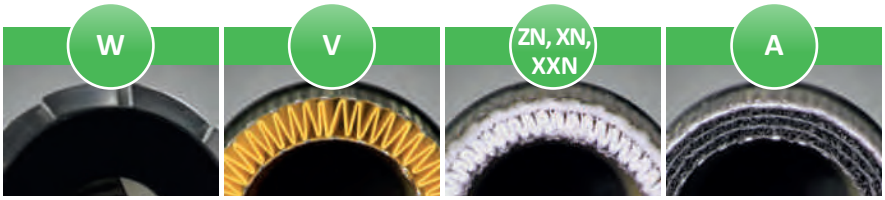
✓ **Validated pleated filter elements**
- Increased separation performance
- Low differential pressure
- Long service life

✓ **Validated activated carbon cartridges with activated carbon granulate**
- Increased amounts of activated carbon
- Long service life

✓ **Filter elements with plug-in connection, a housing thread protected against overstress, self-fixing filter elements and the 1-person-easy-maintainace concept**
- Easy filter element replacement
- Reliable sealing between filter housing and filter element

...result in a filter providing...

✓ Maximum operational reliability
✓ Minimum total operating costs
✓ Long service life
✓ Easy maintenance



For the technical data, please refer to „Filtration grades“ on page 5.

Compressed air filtration for pressures up to 50 bar - The pressure increases but the advantages remain

Series **FCA../50** and **FWS../50** filters are used to remove solid, liquid and, when using activated carbon cartridges, gaseous contaminants from compressed air flows. In addition to liquids and dust, the filters practically remove all oil droplets and finest dust particles from the compressed air. Filters with activated carbon cartridges remove practically all oil vapour and odours.

Series **FCA../50** filters consist of an aluminium die-cast housing which is pressure-rated up to 50 bar and provided with threaded connections at the compressed air inlet and outlet. The filter housings are manufactured by means of completely chrome(VI)-free passivation and finished with a powder coating. The housing thread has an end stop which prevents the thread from being overstressed and thereby provides the most convenient design for filter element replacement. The filter elements are connected to the filter housing using a plug-in connection with a radial O-ring seal. They are installed on lugs in the filter housing. In this way, the height below the filter element required for replacement is low.

Series **FWS../50** filters consist of a welded steel housing which is pressure-rated up to 50 bar and provided with flange connections at the compressed air inlet and outlet. The filter housings are completely primed and additionally painted with a coating layer. Opening of the filter housings for filter element replacement is particularly easy because the housing flange is located far down which means that only the „light“ housing base needs to be removed. The filter element holder has guide-ways in order for the filter elements to be automatically locked in the holder when being installed.

Due to the filtration grades available, any application requirements in the field of industrial compressed air filtration can be fulfilled. The selected filter media and their pleated design guarantees increased separation performance and, at the same time, low differential pressures as well as a long service life of the filter elements resulting in the lowest cost of ownership. Complete integration of all the relevant filter layers between the two cylinders results in filter elements with maximum operational reliability even under critical operating conditions.

Available accessories

Differential pressure gauge with/without alarm contact	Manual drain (standards)	Electronic condensate drains	Wall brackets (only for individual filters)
			
not for FCA20-25			

Technical data

Model	Nominal volume flow*1	Max. allowable operating pressure	Connection	Filter element model	Height	Width	Depth	Weight
FCA20/50	153 m³/h	50 bar	G 1/4	EFST25	136 mm	61 mm	60 mm	0.5 kg
FCA25/50	179 m³/h	50 bar	G 3/8	EFST25	136 mm	61 mm	60 mm	0.5 kg
FCA30/50	255 m³/h	50 bar	G 3/8	EFST30	183 mm	87 mm	80 mm	1.0 kg
FCA50/50	357 m³/h	50 bar	G 1/2	EFST50	183 mm	87 mm	80 mm	1.0 kg
FCA70/50	510 m³/h	50 bar	G 1/2	EFST70	253 mm	87 mm	80 mm	1.1 kg
FCA90/50	816 m³/h	50 bar	G 3/4	EFST90	289 mm	130 mm	122 mm	3.9 kg
FCA95/50	816 m³/h	50 bar	G 1	EFST90	289 mm	130 mm	122 mm	3.8 kg
FCA110/50	1,683 m³/h	50 bar	G 1	EFST110	387 mm	130 mm	122 mm	4.3 kg
FCA115/50	1,683 m³/h	50 bar	G 1½	EFST110	387 mm	130 mm	122 mm	4.1 kg
FCA120/50	2,550 m³/h	50 bar	G 1½	EFST120	487 mm	130 mm	122 mm	4.7 kg
FCA130/50	4,080 m³/h	50 bar	G 1½	EFST130	689 mm	130 mm	122 mm	5.7 kg
FWS140/50	5,100 m³/h	50 bar	DN50	EFST140	916 mm	440 mm	345 mm	83 kg
FWS170/50	7,650 m³/h	50 bar	DN80	EFST170	1,166 mm	440 mm	345 mm	95 kg
FWS190/50	12,750 m³/h	50 bar	DN80	EFST190	1,166 mm	440 mm	345 mm	95 kg

*1 - refers to 1 bar(a) and 20°C at 50 bar operating pressure

For detailed technical data and reference variables, please refer to the relevant product data sheet which can be downloaded at www.fstweb.de

FMA, FMS series

Volume flow rate from 380 m³/h to 4,290 m³/h
Threaded connection from G ⅜ to G 1

The advantages...

✓ **Rugged aluminium or steel housings with double surface protection**
- No corrosion or rust formation
- Long service life

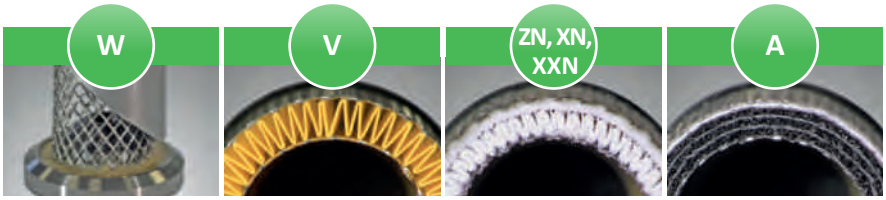
✓ **Validated pleated filter elements**
- Increased separation performance
- Low differential pressure
- Long service life

✓ **Validated activated carbon cartridges with activated carbon granulate**
- Increased amounts of activated carbon
- Long service life

✓ **Filter elements with radial sealing and double protected housing thread protected against overstress**
- Easy filter element replacement
- Reliable sealing between filter housing and filter element

...result in a filter providing...

- ✓ Maximum operational reliability
- ✓ Minimum total operating costs
- ✓ Long service life
- ✓ Easy maintenance



For the technical data, please refer to „Filtration grades“ on page 5.

High-pressure compressed air filtration - The filters remain stress-relieved

Series **FMA** and **FMS** filters are used to remove solid, liquid and, when using activated carbon cartridges, gaseous contaminants from compressed air flows. In addition to liquids and dust, the filters practically remove all oil droplets and finest dust particles from the compressed air. Filters with activated carbon cartridges remove practically all oil vapour and odours.

Series **FMA** filters consist of a pressure-resistant, machined aluminium housing with completely chrome(VI)-free passivation. Series **FMS** filters consist of a machined steel housing with complete iron phosphate passivation.
Both filter series are provided with threaded connection at the compressed air inlet and outlet. The housings are pressure-rated up to 100 bar and 350 bar respectively. Higher pressure levels are available on request. The filter housings have a double O-ring to protect the housing thread against negative effects from the inside and outside. An end stop prevents the thread from being overstressed and thus ensures easy opening of the filter housing when replacing the filter element. The filter housing can also be opened using a hook spanner wrench. The filter elements are connected to the filter housing using a radial O-ring seal and, because of the very high pressure ratings, fixed using a tie rod.

Due to the filtration grades available, any application requirements in the field of industrial compressed air filtration can be fulfilled. The selected filter media and their pleated design guarantees increased separation performance and, at the same time, low differential pressures as well as a long service life of the filter elements resulting in the lowest cost of ownership. Complete integration of all the relevant filter layers between the two cylinders results in filter elements with maximum operational reliability even under critical operating conditions.

Available accessories

Differential pressure gauge with/without alarm contact	Manual drain (standards)	Electronic condensate drains
		

Technical data

Model	Nominal volume flow*1	Max. allowable operating pressure	Connection	Filter element model	Height	Width	Depth	Weight
FMA30/100	380 m³/h	100 bar	G 3/8	EFST30	225 mm	82 mm	87 mm	2.3 kg
FMA50/100	532 m³/h	100 bar	G 1/2	EFST50	225 mm	82 mm	87 mm	2.3 kg
FMA70/100	760 m³/h	100 bar	G 1/2	EFST70	290 mm	82 mm	87 mm	2.7 kg
FMS90/100	1,216 m³/h	100 bar	G 3/4	EFST90	325 mm	116 mm	125 mm	18.8 kg
FMS110/100	2,508 m³/h	100 bar	G 1	EFST110	410 mm	116 mm	125 mm	22.4 kg
FMA30/350	650 m³/h	350 bar	G 3/8	EFST30	225 mm	82 mm	87 mm	2.3 kg
FMA50/350	910 m³/h	350 bar	G 1/2	EFST50	225 mm	82 mm	87 mm	2.3 kg
FMA70/350	1,300 m³/h	350 bar	G 1/2	EFST70	290 mm	82 mm	87 mm	2.7 kg
FMS90/350	2,080 m³/h	350 bar	G 3/4	EFST90	325 mm	116 mm	125 mm	18.8 kg
FMS110/350	4,290 m³/h	350 bar	G 1	EFST110	410 mm	116 mm	125 mm	22.4 kg

*1 - refers to 1 bar(a) and 20°C at 100 bar or 350 bar operating pressure

For detailed technical data and reference variables, please refer to the relevant product data sheet which can be downloaded at www.fstweb.de

FWP, FWPV series

Volume flow rate from 30 m³/h to 2,500 m³/h
Threaded connection from G ¼ to G 3

The advantages...

✓ **High-grade, polished stainless steel housing with profile seal**
- Smooth surfaces where contaminants cannot adhere to
- No dead spaces

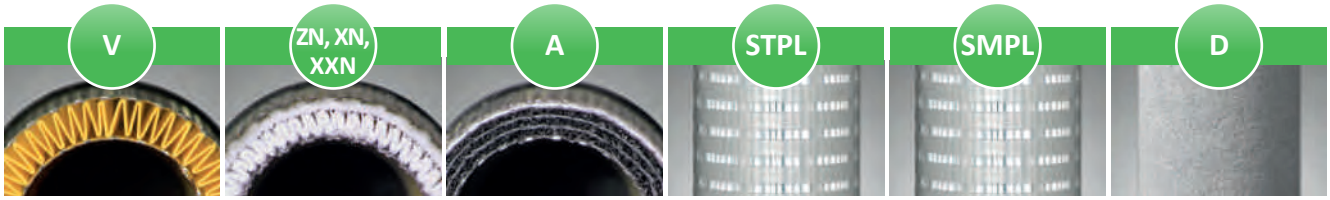
✓ **Welded, pleated sterile filter elements**
- Increased separation performance
- Low differential pressure
- High integrity

✓ **Welded steam filter elements**
- Increased separation performance
- High integrity

✓ **Filter elements with double O-ring bayonet plug-in connection and standardised food-grade coupling for the housing**
- Easy filter element replacement
- Reliable sealing between filter housing and filter element

...result in a filter providing...

✓ Maximum operational reliability
✓ Minimum total operating costs
✓ Easy maintenance



For the technical data, please refer to „Filtration grades“ on page 5.

Compressed air filtration in the process area - A combination of highly purity materials and modern filtration technology

Sterile filters are used to remove microbiological contaminants and thus produce sterile and germ-free compressed air. Because microbiological contaminants are fertile and living organisms, they need to be devitalised at a specified time by means of sterilisation. In this process, steam filters produce the steam quality required for sterilisation.

Series **FWP** filters consist of a stainless steel housing which is pressure-rated up to 16 bar and provided with threaded connections at the compressed air inlet and outlet. Other types of connections are available on request. The housing surface is finished by means of electropolishing on the inside and outside and, in addition, mechanical polishing on the outside. The upper and lower filter parts are connected using a food-grade coupling (DIN 11851) and sealed using an aseptic profile seal. As a result, there is no void inside the entire filter housing. The filter elements are connected to the filter housing by means of a bayonet plug-in connection with a double O-ring seal.

Series **FWPV** filters are ventilation and aeration filters for venting and bleeding of vessels at atmospheric operating conditions, i.e. in the event that filtered air must be fed in or discharged due to changing levels in the vessel. Usually, ventilation and aeration filters are used in combination with a sterile filter element.

Thermally welded or crimped and pleated sterile and steam filter elements without binders and with different designs and separation performances are available to provide different process filtration grades for the production of sterile compressed air and pure steam up to food-grade steam quality. In addition, filter elements providing all industrial filtration standard grades are available.

STPL	SMPL	D25	D1
Sterile filter	Sterile filter	Sinter body steam filter	Sinter body steam filter
0.01µ	0.01µ	25µ	1µ

Technical data

Model	Nominal volume flow*1	Steam throughput*2	Steam throughput*3	Max. allowable operating pressure	Connection	Filter element model	Height	Width	Depth	Weight
FWP20	30 m³/h	10 kg/h	4 kg/h	16 bar	G 1/4	EFSTP90	220 mm	147 mm	108 mm	2.3 kg
FWP30	50 m³/h	14 kg/h	6 kg/h	16 bar	G 3/8	EFSTP90	220 mm	147 mm	108 mm	2.4 kg
FWP70	100 m³/h	32 kg/h	10 kg/h	16 bar	G 1/2	EFSTP90	220 mm	151 mm	108 mm	2.4 kg
FWP90	160 m³/h	50 kg/h	13 kg/h	16 bar	G 3/4	EFSTP90	220 mm	151 mm	108 mm	2.4 kg
FWP110	330 m³/h	86 kg/h	22 kg/h	16 bar	G 1	EFSTP120	312 mm	188 mm	135 mm	3.4 kg
FWP120	500 m³/h	130 kg/h	30 kg/h	16 bar	G 1½	EFSTP120	312 mm	198 mm	135 mm	3.5 kg
FWP130	800 m³/h	205 kg/h	55 kg/h	16 bar	G 1½	EFSTP140	486 mm	233 mm	170 mm	6.2 kg
FWP140	1,000 m³/h	290 kg/h	70 kg/h	16 bar	G 2	EFSTP140	486 mm	233 mm	170 mm	6.2 kg
FWP170	1,500 m³/h	370 kg/h	100 kg/h	16 bar	G 2	EFSTP180	792 mm	233 mm	170 mm	7.7 kg
FWP180	2,000 m³/h	550 kg/h	140 kg/h	12 bar	G 2½	EFSTP180	792 mm	275 mm	200 mm	11.7 kg
FWP190	2,500 m³/h	820 kg/h	210 kg/h	12 bar	G 3	EFSTP190	1.056 mm	289 mm	200 mm	13.1 kg
FWPV70	20 m³/h	–	–	–	G 1/2	EFSTP90	166 mm	70 mm	70 mm	1.0 kg
FWPV110	30 m³/h	–	–	–	G 1	EFSTP120	221 mm	70 mm	70 mm	1.3 kg
FWPV120	35 m³/h	–	–	–	G 1½	EFSTP120	221 mm	70 mm	70 mm	1.8 kg
FWPV140	100 m³/h	–	–	–	G 2	EFSTP140	406 mm	129 mm	129 mm	3.3 kg
FWPV180	160 m³/h	–	–	–	G 2½	EFSTP180	654 mm	129 mm	129 mm	5.1 kg
FWPV190	200 m³/h	–	–	–	G 3	EFSTP190	901 mm	129 mm	129 mm	6.7 kg

*1 – FWP: refers to 1 bar(a) and 20°C at 7 bar operating pressure for V, ZN, XN, XXN, A, STPL, SMPL ; FWPV: refers to 50 mbar differential pressure for STPL
*2 – refers to saturated steam at 134°C for D25 filter elements
*3 – refers to saturated steam at 134°C for D1 filter elements

For detailed technical data and reference variables, please refer to the relevant product data sheet which can be downloaded at www.fstweb.de

EFST series

Filter elements with FST filtration technology suitable for ZANDER filter housings

FST	ZANDER
EFST 25 V	1030 V
EFST 30 V	1050 V
EFST 50 V	1070 V
EFST 70 V	1140 V
EFST 90 V	2010 V
EFST 110 V	2020 V
EFST 120 V	2030 V
EFST 130 V	2050 V
EFST 140 V	3050 V
EFST 170 V	3075 V
EFST 180 V	5060 V
EFST 190 V	5075 V

FST	ZANDER
EFST 25 ZN	1030 ZP
EFST 30Z N	1050 ZP
EFST 50 ZN	1070 ZP
EFST 70 ZN	1140 ZP
EFST 90 ZN	2010 ZP
EFST 110 ZN	2020 ZP
EFST 120 ZN	2030 ZP
EFST 130 ZN	2050 ZP
EFST 140 ZN	3050 ZP
EFST 170 ZN	3075 ZP
EFST 180 ZN	5060 ZP
EFST 190 ZN	5075 ZP

FST	ZANDER
EFST 25 XN	1030 XP
EFST 30 XN	1050 XP
EFST 50 XN	1070 XP
EFST 70 XN	1140 XP
EFST 90 XN	2010 XP
EFST 110 XN	2020 XP
EFST 120 XN	2030 XP
EFST 130 XN	2050 XP
EFST 140 XN	3050 XP
EFST 170 XN	3075 XP
EFST 180 XN	5060 XP
EFST 190 XN	5075 XP

FST	ZANDER
EFST 25 XXN	1030 XP4
EFST 30 XXN	1050 XP4
EFST 50 XXN	1070 XP4
EFST 70 XXN	1140 XP4
EFST 90 XXN	2010 XP4
EFST 110 XXN	2020 XP4
EFST 120 XXN	2030 XP4
EFST 130 XXN	2050 XP4
EFST 140 XXN	3050 XP4
EFST 170 XXN	3075 XP4
EFST 180 XXN	5060 XP4
EFST 190 XXN	5075 XP4

FST	ZANDER
EFST 25 A	1030 A
EFST 30 A	1050 A
EFST 50 A	1070 A
EFST 70 A	1140 A
EFST 90 A	2010 A
EFST 110 A	2020 A
EFST 120 A	2030 A
EFST 130 A	2050 A
EFST 140 A	3050 A
EFST 170 A	3075 A
EFST 180 A	5060 A
EFST 190 A	5075 A

ERAC series

Filter elements with FST filtration technology suitable for Atlas-Copco filter housings

FST	Atlas-Copco
ERAC 009 V	–
ERAC 017 V	–
ERAC 032 V	–
ERAC 044 V	–
ERAC 060 V	–
ERAC 120 V	–
ERAC 150 V	–
ERAC 175 V	–
ERAC 260 V	–
ERAC 390 V	–
ERAC 520 V	–
ERACF 520 V	–
ERACF 780 V	–

FST	Atlas-Copco
ERAC 009 ZN	DD 9
ERAC 017 ZN	DD 17
ERAC 032 ZN	DD 32
ERAC 044 ZN	DD 44
ERAC 060 ZN	DD 60
ERAC 120 ZN	DD 120
ERAC 150 ZN	DD 150
ERAC 175 ZN	DD 175
ERAC 260 ZN	DD 260
ERAC 390 ZN	DD 390
ERAC 520 ZN	DD 520
ERACF 520 ZN	DD 520 F
ERACF 780 ZN	DD 780 F

FST	Atlas-Copco
ERAC 009 XN	PD 9
ERAC 017 XN	PD 17
ERAC 032 XN	PD 32
ERAC 044 XN	PD 44
ERAC 060 XN	PD 60
ERAC 120 XN	PD 120
ERAC 150 XN	PD 150
ERAC 175 XN	PD 175
ERAC 260 XN	PD 260
ERAC 390 XN	PD 390
ERAC 520 XN	PD 520
ERACF 520 XN	PD 520 F
ERACF 780 XN	PD 780 F

FST	Atlas-Copco
ERAC 009 XXN	–
ERAC 017 XXN	–
ERAC 032 XXN	–
ERAC 044 XXN	–
ERAC 060 XXN	–
ERAC 120 XXN	–
ERAC 150 XXN	–
ERAC 175 XXN	–
ERAC 260 XXN	–
ERAC 390 XXN	–
ERAC 520 XXN	–
ERACF 520 XXN	–
ERACF 780 XXN	–

FST	Atlas-Copco
ERAC 009 A	QD 9
ERAC 017 A	QD 17
ERAC 032 A	QD 32
ERAC 044 A	QD 44
ERAC 060 A	QD 60
ERAC 120 A	QD 120
ERAC 150 A	QD 150
ERAC 175 A	QD 175
ERAC 260 A	QD 260
ERAC 390 A	QD 390
ERAC 520 A	QD 520
ERACF 520 A	QD 520 F
ERACF 780 A	QD 780 F

ERDH series

Filter elements with FST filtration technology suitable for domnick-hunter (dh) filter housings

FST	dh
ERDH 009 V	K 009 PF
ERDH 017 V	K 017 PF
ERDH 030 V	K 030 PF
ERDH 058 V	K 058 PF
ERDH 145 V	K 145 PF
ERDH 220 V	K 220 PF
ERDH 330 V	K 330 PF
ERDH 430 V	K 430 PF
ERDH 620 V	K 620 PF

FST	dh
ERDH 009 ZN	K 009 AO
ERDH 017 ZN	K 017 AO
ERDH 030 ZN	K 030 AO
ERDH 058 ZN	K 058 AO
ERDH 145 ZN	K 145 AO
ERDH 220 ZN	K 220 AO
ERDH 330 ZN	K 330 AO
ERDH 430 ZN	K 430 AO
ERDH 620 ZN	K 620 AO

FST	dh
ERDH 009 XN	K 009 AA
ERDH 017 XN	K 017 AA
ERDH 030 XN	K 030 AA
ERDH 058 XN	K 058 AA
ERDH 145 XN	K 145 AA
ERDH 220 XN	K 220 AA
ERDH 330 XN	K 330 AA
ERDH 430 XN	K 430 AA
ERDH 620 XN	K 620 AA

FST	dh
ERDH 009 XXN	K 009 AX
ERDH 017 XXN	K 017 AX
ERDH 030 XXN	K 030 AX
ERDH 058 XXN	K 058 AX
ERDH 145 XXN	K 145 AX
ERDH 220 XXN	K 220 AX
ERDH 330 XXN	K 330 AX
ERDH 430 XXN	K 430 AX
ERDH 620 XXN	K 620 AX

FST	dh
ERDH 009 A	K 009 ACS
ERDH 017 A	K 017 ACS
ERDH 030 A	K 030 ACS
ERDH 058 A	K 058 ACS
ERDH 145 A	K 145 ACS
ERDH 220 A	K 220 ACS
ERDH 330 A	K 330 ACS
ERDH 430 A	K 430 ACS
ERDH 620 A	K 620 ACS
ERDH 006 CA	K 006 AC
ERDH 013 CA	K 013 AC
ERDH 025 CA	K 025 AC
ERDH 040 CA	K 040 AC
ERDH 065 CA	K 065 AC
ERDH 085 CA	K 085 AC

ERHK series

Filter elements with FST filtration technology suitable for Hankison filter housings

FST	Hankison
ERHK 012 V	E9-12
ERHK 016 V	E9-16
ERHK 020 V	E9-20
ERHK 024 V	E9-24
ERHK 028 V	E9-28
ERHK 032 V	E9-32
ERHK 036 V	E9-36
ERHK 040 V	E9-40
ERHK 044 V	E9-44
ERHK 048 V	E9-48
ERHK 052 V	E9-52
ERHK 054 V	E9-54

FST	Hankison
ERHK 012 ZN	E7-12
ERHK 016 ZN	E7-16
ERHK 020 ZN	E7-20
ERHK 024 ZN	E7-24
ERHK 028 ZN	E7-28
ERHK 032 ZN	E7-32
ERHK 036 ZN	E7-36
ERHK 040 ZN	E7-40
ERHK 044 ZN	E7-44
ERHK 048 ZN	E7-48
ERHK 052 ZN	E7-52
ERHK 054 ZN	E7-54

FST	Hankison
ERHK 012 XN	E5-12
ERHK 016 XN	E5-16
ERHK 020 XN	E5-20
ERHK 024 XN	E5-24
ERHK 028 XN	E5-28
ERHK 032 XN	E5-32
ERHK 036 XN	E5-36
ERHK 040 XN	E5-40
ERHK 044 XN	E5-44
ERHK 048 XN	E5-48
ERHK 052 XN	E5-52
ERHK 054 XN	E5-54

FST	Hankison
ERHK 012 XXN	E3-12
ERHK 016 XXN	E3-16
ERHK 020 XXN	E3-20
ERHK 024 XXN	E3-24
ERHK 028 XXN	E3-28
ERHK 032 XXN	E3-32
ERHK 036 XXN	E3-36
ERHK 040 XXN	E3-40
ERHK 044 XXN	E3-44
ERHK 048 XXN	E3-48
ERHK 052 XXN	E3-52
ERHK 054 XXN	E3-54

FST	Hankison
ERHK 012 A	E1-12
ERHK 016 A	E1-16
ERHK 020 A	E1-20
ERHK 024 A	E1-24
ERHK 028 A	E1-28
ERHK 032 A	E1-32
ERHK 036 A	E1-36
ERHK 040 A	E1-40
ERHK 044 A	E1-44
ERHK 048 A	E1-48
ERHK 052 A	E1-52
ERHK 054 A	E1-54

ERUF series

Filter elements with FST filtration technology suitable for ultrafilter filter housings

FST	ultrafilter
ERUF 02/05 V	V-PE 02/05
ERUF 03/05 V	V-PE 03/05
ERUF 03/10 V	V-PE 03/10
ERUF 04/10 V	V-PE 04/10
ERUF 04/20 V	V-PE 04/20
ERUF 05/20 V	V-PE 05/20
ERUF 05/25 V	V-PE 05/25
ERUF 07/25 V	V-PE 07/25
ERUF 07/30 V	V-PE 07/30
ERUF 10/30 V	V-PE 10/30
ERUF 15/30 V	V-PE 15/30
ERUF 20/30 V	V-PE 20/30
ERUF 30/30 V	V-PE 30/30
ERUF 30/30 V	V-PE 30/50

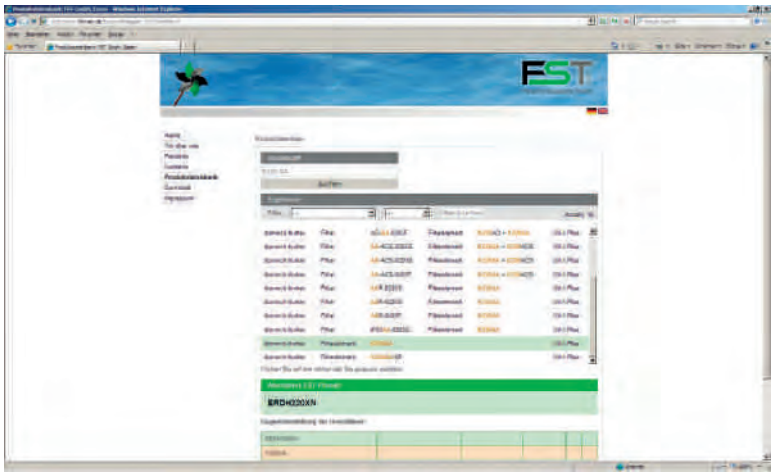
FST	ultrafilter
ERUF 02/05 ZN	FF 02/05
ERUF 03/05 ZN	FF 03/05
ERUF 03/10 ZN	FF 03/10
ERUF 04/10 ZN	FF 04/10
ERUF 04/20 ZN	FF 04/20
ERUF 05/20 ZN	FF 05/20
ERUF 05/25 ZN	FF 05/25
ERUF 07/25 ZN	FF 07/25
ERUF 07/30 ZN	FF 07/30
ERUF 10/30 ZN	FF 10/30
ERUF 15/30 ZN	FF 15/30
ERUF 20/30 ZN	FF 20/30
ERUF 30/30 ZN	FF 30/30
ERUF 30/50 ZN	FF 30/50

FST	ultrafilter	ultrafilter
ERUF 02/05 XN	MF 02/05	SMF 02/05
ERUF 03/05 XN	MF 03/05	SMF 03/05
ERUF 03/10 XN	MF 03/10	SMF 03/10
ERUF 04/10 XN	MF 04/10	SMF 04/10
ERUF 04/20 XN	MF 04/20	SMF 04/20
ERUF 05/20 XN	MF 05/20	SMF 05/20
ERUF 05/25 XN	MF 05/25	SMF 05/25
ERUF 07/25 XN	MF 07/25	SMF 07/25
ERUF 07/30 XN	MF 07/30	SMF 07/30
ERUF 10/30 XN	MF 10/30	SMF 10/30
ERUF 15/30 XN	MF 15/30	SMF 15/30
ERUF 20/30 XN	MF 20/30	SMF 20/30
ERUF 30/30 XN	MF 30/30	SMF 30/30
ERUF 30/50 XN	MF 30/50	SMF 30/50

FST	ultrafilter
ERUF 02/05 XXN	–
ERUF 03/05 XXN	–
ERUF 03/10 XXN	–
ERUF 04/10 XXN	–
ERUF 04/20 XXN	–
ERUF 05/20 XXN	–
ERUF 05/25 XXN	–
ERUF 07/25 XXN	–
ERUF 07/30 XXN	–
ERUF 10/30 XXN	–
ERUF 15/30 XXN	–
ERUF 20/30 XXN	–
ERUF 30/30 XXN	–
ERUF 30/50 XXN	–

FST	ultrafilter
ERUF 02/05 A	AK 02/05
ERUF 03/05 A	AK 03/05
ERUF 03/10 A	AK 03/10
ERUF 04/10 A	AK 04/10
ERUF 04/20 A	AK 04/20
ERUF 05/20 A	AK 05/20
ERUF 05/25 A	AK 05/25
ERUF 07/25 A	AK 07/25
ERUF 07/30 A	AK 07/30
ERUF 10/30 A	AK 10/30
ERUF 15/30 A	AK 15/30
ERUF 20/30 A	AK 20/30
ERUF 30/30 A	AK 30/30
ERUF 30/50 A	AK 30/50

The FST product portfolio comprises numerous other filter elements. For quick, easy and comprehensive searching for filter elements suitable for competitor housings or for other products used for compressed air treatment and condensate technology, please refer to our product database on www.fstweb.de



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