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SOTRAS



FILTERS & PRODUCTS FOR
COMPRESSORS, VACUUM PUMPS
AND COMPRESSED AIR






PRODUCT QUALITY SUPPORTED BY EFFICIENT SERVICE...

Sotras is well established in the filtration industry as one of the leaders in its field, offering a wide range of standard, high quality products as well as customised products designed to satisfy specific needs and requirements thanks to the support of our technical department.

Evidence of the high quality of our products lies in the fact that Sotras has been cooperating with compressor manufacturers for a long time and on a regular basis, providing expertise and technical solutions, developing new products with OEMs, as well as providing assistance to the numerous small, medium and large firms which are all part of the wide network of Sotras' customers all over the world.

This manual presents our standard product specifications regarding Sotras business units:



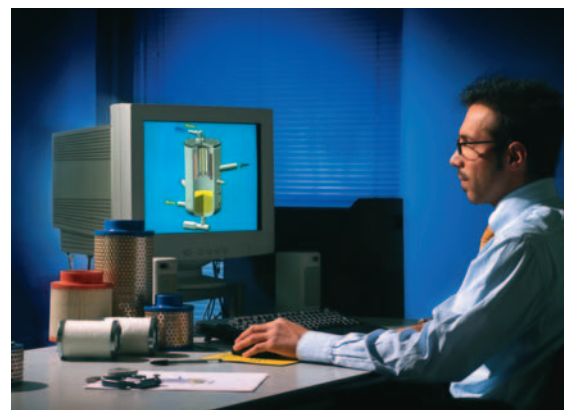
- Filters and products for compressors
- Filters and products for vacuum pumps
- Compressed air filter and accessories

and integrates Sotras' new Customer Service Support Department, which guarantees a specific and prompt service to customers around the globe.

Sotras help line 0039.011.262.22.22

E-mail: customer.service@sotras.com
or sales@sotras.com

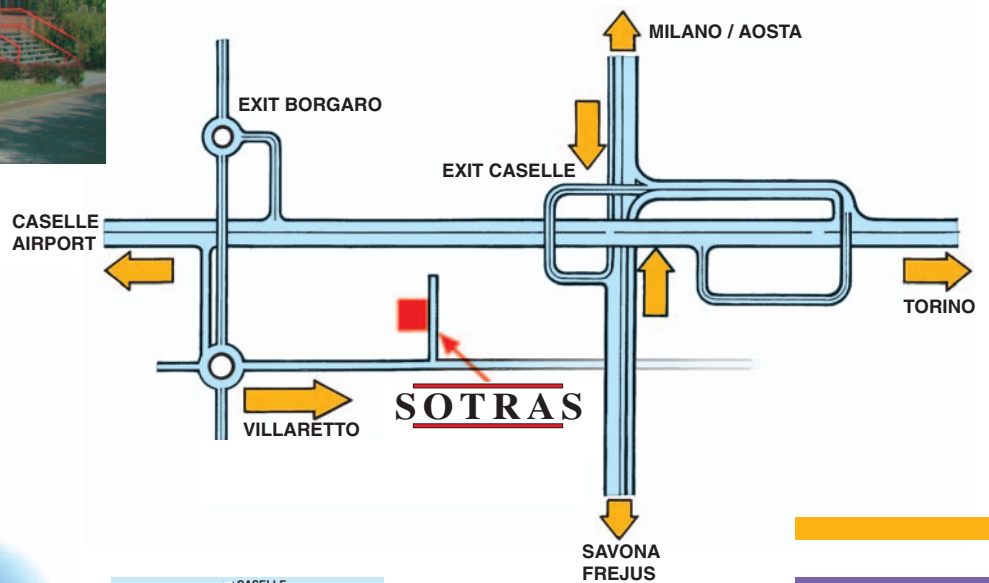
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SOTRAS



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SOTRAS

FILTERS AND PRODUCTS FOR COMPRESSORS

- AIR-OIL SEPARATORS
- FILTER HEADS & ADAPTERS
- AIR FILTERS
- SPIN-ON OIL FILTERS

FILTERS AND PRODUCTS FOR VACUUM PUMPS

- DEMISTERS
- VACUUM AIR FILTERS
- SPIN-ON OIL FILTERS

FILTERS AND PRODUCTS FOR COMPRESSED AIR

- COMPRESSED AIR FILTERS
- ACCESSORIES

PRATICAL ADVICE

- PREMATURE INCREASE IN PRESSURE DIFFERENTIAL
- EXCESSIVE USE OF OIL
- COLLAPSED SEPARATOR CAUSES
- FLASH FIRES

QUALITY CONTROL AND GUARANTEE

- QUALITY
- GUARANTEE



SOTRAS



FILTERS & PRODUCTS
FOR COMPRESSORS



AIR-OIL SEPARATORS

During the last century compressed air became associated with many industrial applications and compressor manufacturers focused their attention on rotary screw and vane compressor whose compression systems use lubricating oil as a coolant. Hence the necessity of using air/oil separators.

Sotras designs and manufactures separators specifically for installation in rotary screw and rotary vane compressors and they are available in vertical, horizontal and spin on configurations.

Their purpose is to separate the oil droplets from the compressed air, thereby producing cleaner air and allowing the oil to be scavenged and re-circulated in the compressor.

Sotras separators are manufactured to satisfy OEM's needs in terms of:

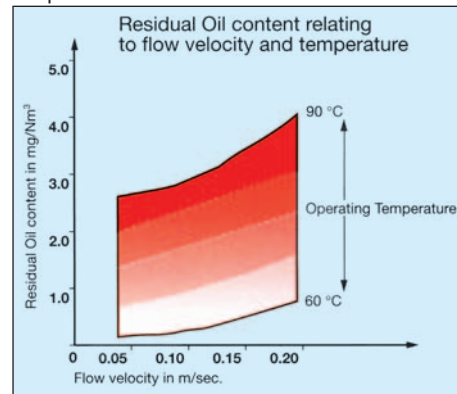
- Physical principle of air/oil separation
 - Element dimensions according to the compressor's performance and tank dimensions.
 - Oil consumption to ensure a correct functional performance
 - Use of high grade filtration and separation media to ensure the best quality of clean air needed for industrial applications.
- Additionally it is very important to highlight that Sotras separators can be used with all types of oils, whether standard, mineral based, synthetic or partially synthetic.

In order to decide which is the best separator to be used for a specific compressor, OEMs have to consider what level of separation needs to be achieved, in other words to target the minimum of parts per million of residual oil content required. Then a technical solution is needed in order to reduce the oil concentration in the air.

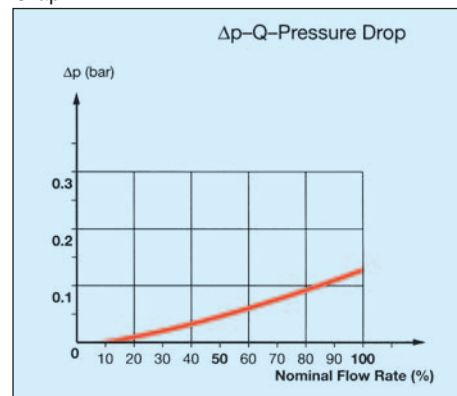
Often OEMs need to consider a pre-separation system, which will reduce the PPM and increase the life of the air/oil separator.



Graph 1



Graph 2



SOTRAS

CONSTRUCTION AND SEPARATION:

Corrosive resistant materials are used in the construction of the air/ oil separators. Careful welding procedures and the use of the latest twin pack adhesive ensure that the element has high mechanical strength and can endure operating temperature up to 120°C.

Normally, the air and oil mixture passes from the outside to the inside of the separator and the coalescing effect is carried out through a multi stage separation process resulting in the recovery of the oil and producing clean air.



Type	Pressure drop at nominal flow rate (bar)	General specifications
single wrapped	0,16	low production costs, good performance and long life span
double wrapped	0,18	excellent performance on small dimensions or long life span
pleated	0,15	low pressure drop
pleated+wrapped	0,17	low pressure drop and excellent separation levels
with pre-separation fleece	0,2	for applications showing high oil percentage before separation or under particular environmental conditions
spin on	0,25	for easy maintenance and small flow rates

PRESSURE DROP - EFFICIENCY AND PERFORMANCE

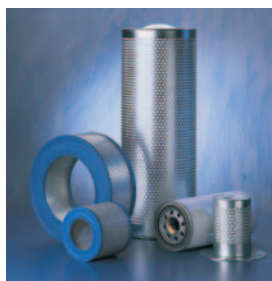
At a nominal working pressure of 7 bar, the pressure drop on a new element varies between approximately 0.15 and 0.25 bar.

At other working pressures, the pressure drop is proportional to the air velocity across the separator (graph 2)

By using our separators, the oil carryover after separation is limited to about 1 to 3 ppm. The life of the separator depends on many

factors: the designs and regular maintenance of the compressor, clean environment, working temperature, quality of the air and oil filters.

To ensure maximum separator efficiency, the joints must create a perfect seal. Experience has shown that through correct installation and also using the correct type of oil, Sotras separators can have a life expectancy of many thousands of hours.



STANDARD SEPARATORS

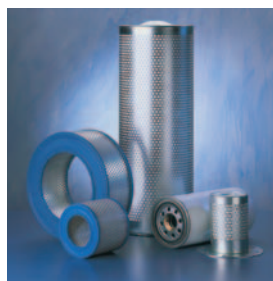
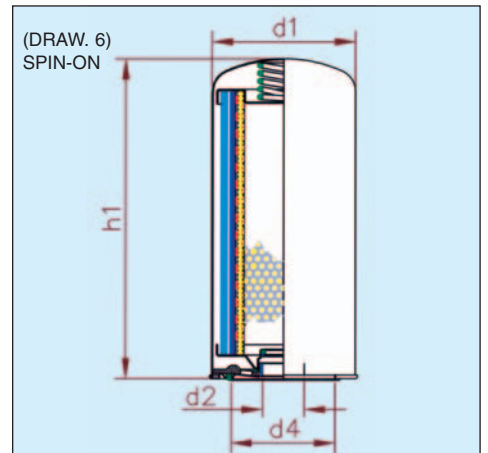
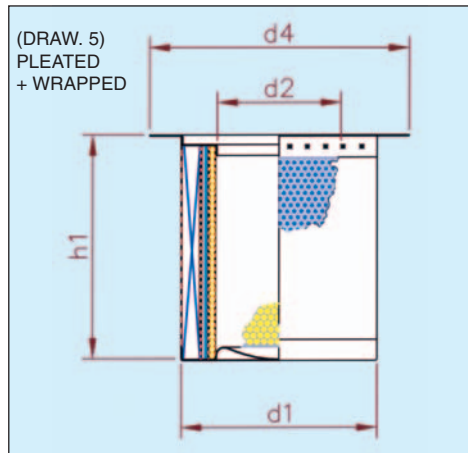
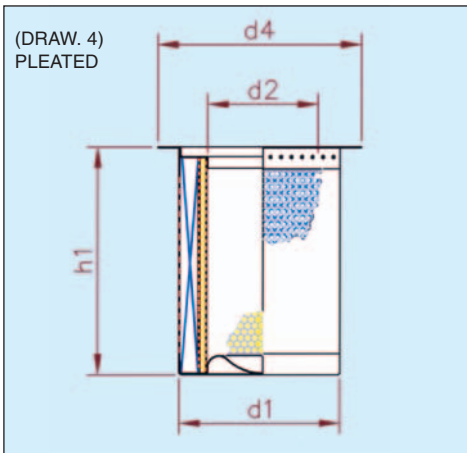
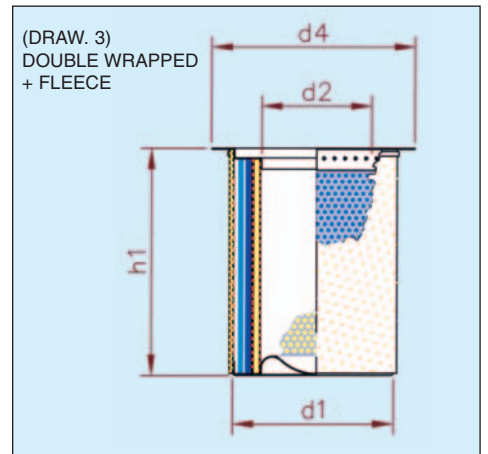
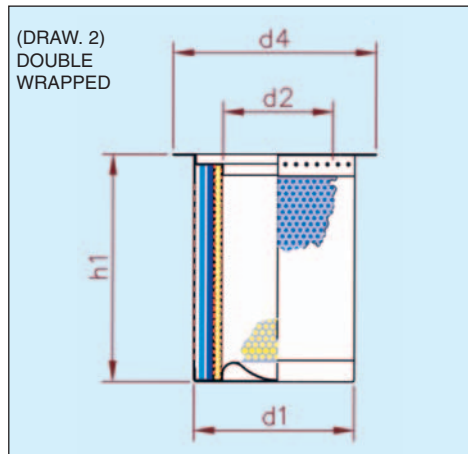
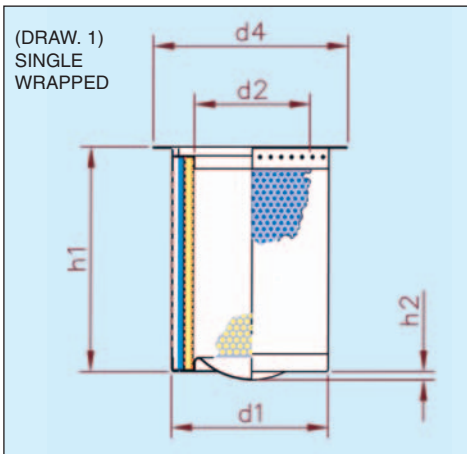
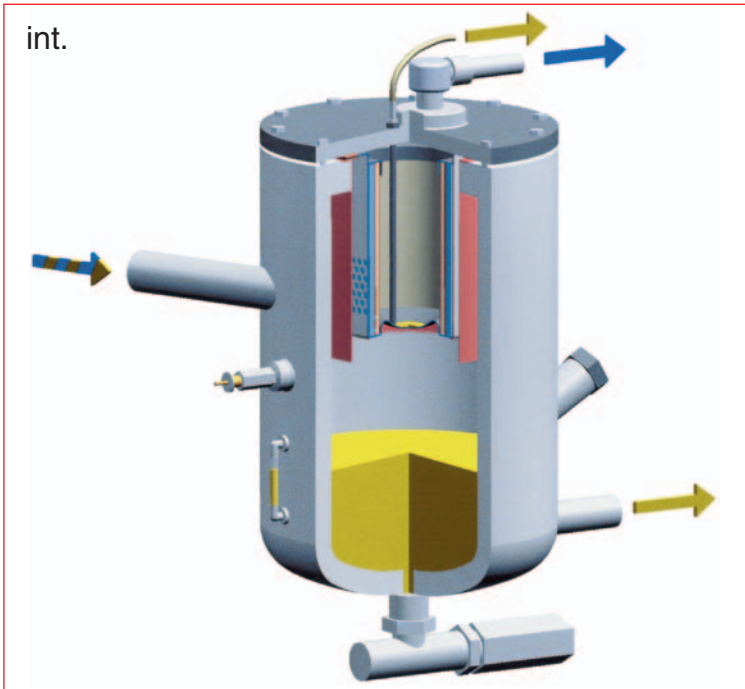
The table shows some of Sotras standard separators; special types are available on request.

SOTRAS Ref.	Nominal flow rate (m3/min)	Type	Drawing	d1 (mm)	d2 (mm)	d4 (mm)	h1 (mm)	h2 (mm)
DF 5010	1	ext	6	76	M22X1,5	62	123	0
DB 2001	1,5	int	1	135	88	165	140	12
DB 2002	2	int	1	135	88	170	200	12
DF 5005	2	ext	6	96	M24X1,5	62	210	0
DF 5006	3	ext	6	136	M39X1,5	99	177	0
DB 2003	3,5	int	1	135	88	170	305	12
DB 2006	3,5	int	1	170	122	200	230	12
DB 2057	3,5	int	2	135	75	170	160	0
DF 5009	4	ext	6	108	M32X1,5	93	260	0
DB 2009	4,5	int	1	170	122	200	305	12
DB 2074	4,5	int	2	135	75	170	200	0
DB 2085	5	int	2	170	108	200	180	0
DF 5004	5,5	ext	6	136	M39X1,5	99	303	0
DB 2021	6,5	int	1	275	219	328	250	0
DB 2012	7	int	1	170	122	200	435	12
DB 2160	7	int	3	170	108	200	230	0
DB 2186	7	int	2	170	108	200	230	0
DB 2022	8	int	1	275	219	328	305	12
DB 2018	8,5	int	1	220	165	273	430	12
DB 2105	9	int	2	220	157	273	230	0
DB 2319	9	int	4	220	157	273	230	0
DB 2132	9,5	int	2	170	108	200	305	0
DB 2020	12	int	1	220	165	273	600	12
DB 2024	12	int	1	275	219	324	448	12
DB 2104	12	int	2	220	157	273	305	0
DB 2026	12,5	int	1	300	243	348	445	12
DB 2027	14	int	1	300	243	355	500	12
DB 2118	16	int	2	220	157	288	400	0
DB 2130	16,5	int	2	300	219	345	305	0
DB 2029	17	int	1	300	243	355	600	12
DB 2353	18	int	5	300	219	343	314	0
DB 2030	19	int	1	300	243	355	660	12
DB 2082	19,5	int	1	400	314	439	520	0
DB 2025	20	int	1	275	219	324	750	12
DB 2138	20	int	2	275	210	325	400	0
DB 2051	21,5	int	1	300	243	348	750	12
DB 2102	22	int	2	300	219	350	400	0
DB 2055	23,5	int	1	300	243	355	820	12
DB 2061	23,5	int	1	400	314	439	620	0
DB 2124	25	int	2	220	157	273	612	0
DB 2084	25,5	int	2	275	210	325	500	0
DB 2089	28	int	2	300	219	355	500	0
DB 2147	29	int	1	300	243	355	1000	12
DB 2090	34,5	int	2	300	219	355	600	0
DB 2382	39	int	5	393	304	439	510	5
DB 2167	40	int	2	300	219	355	700	0
DB 2126	43	int	2	400	314	439	600	0
DB 2129	44	int	1	475	398	740	900	19

The data is indicative and based on 7 bar working pressure

SOTRAS

TYPES AND DRAWINGS

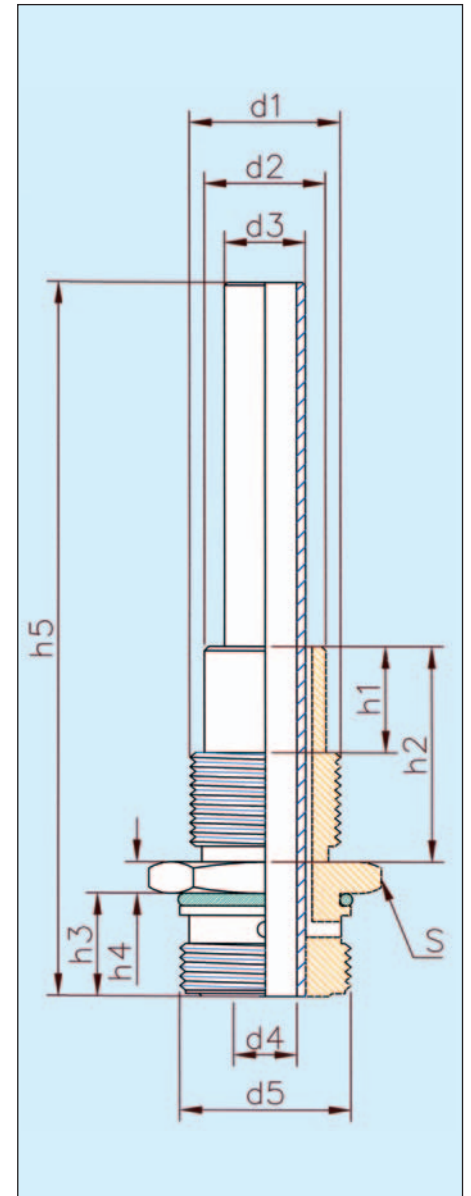


FILTER HEADS & ADAPTERS

For OEMs that use spin on separators but do not make filter heads and adapters in house, we are able to offer different options.

Besides simple separator heads, SOTRAS is also able to provide models with integrated connectors for oil cartridges. Depending on the OEM's requirements it is possible to order the filter head alone or together with the relevant elements - separator and oil filter.

On request, we provide information regarding heads with thermostatic valves, minimum pressure valves and visual oil indicators.

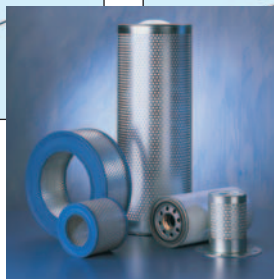
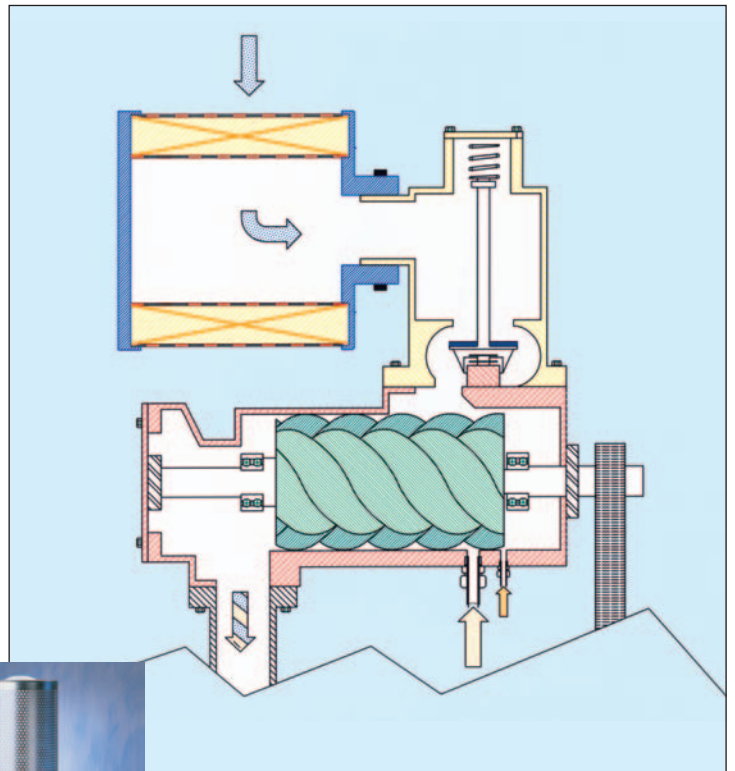
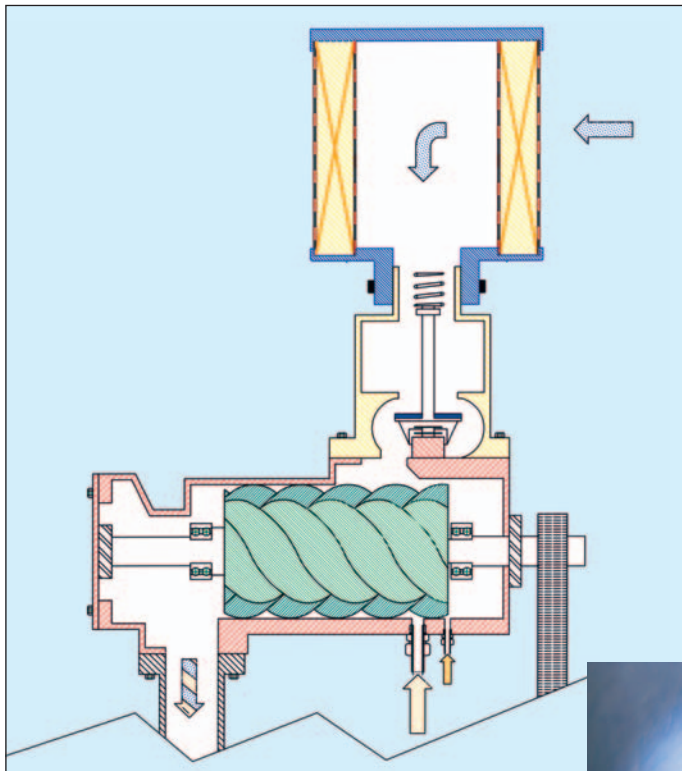


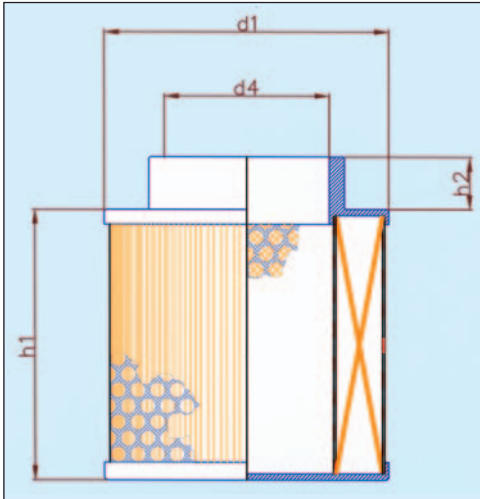
SOTRAS Ref.	d1	d2 (mm)	d3 (mm)	d4 (mm)	d5	h1 (mm)	h2 (mm)	h3 (mm)	h4 (mm)	h5 (mm)	S	Corresp. separator
NP 0001	M22X1,5	19,2	14	12	M 27X1,5	16	32	18	5	115	32	DF 5010
NP 0002	M24X1,5	19,8	15	13	M27X1,5	16	32	18	5	195	32	DF 5005
NP 0003	M32X1,5	28,1	22	19	1"-1/4 G	20	41	18	5	137	50	DF 5009
NP 0004	M39X1,5	35,8	30	26,5	1"-1/4 G	20	41	18	5	155	50	DF 5004 DF 5006

AIR-FILTERS

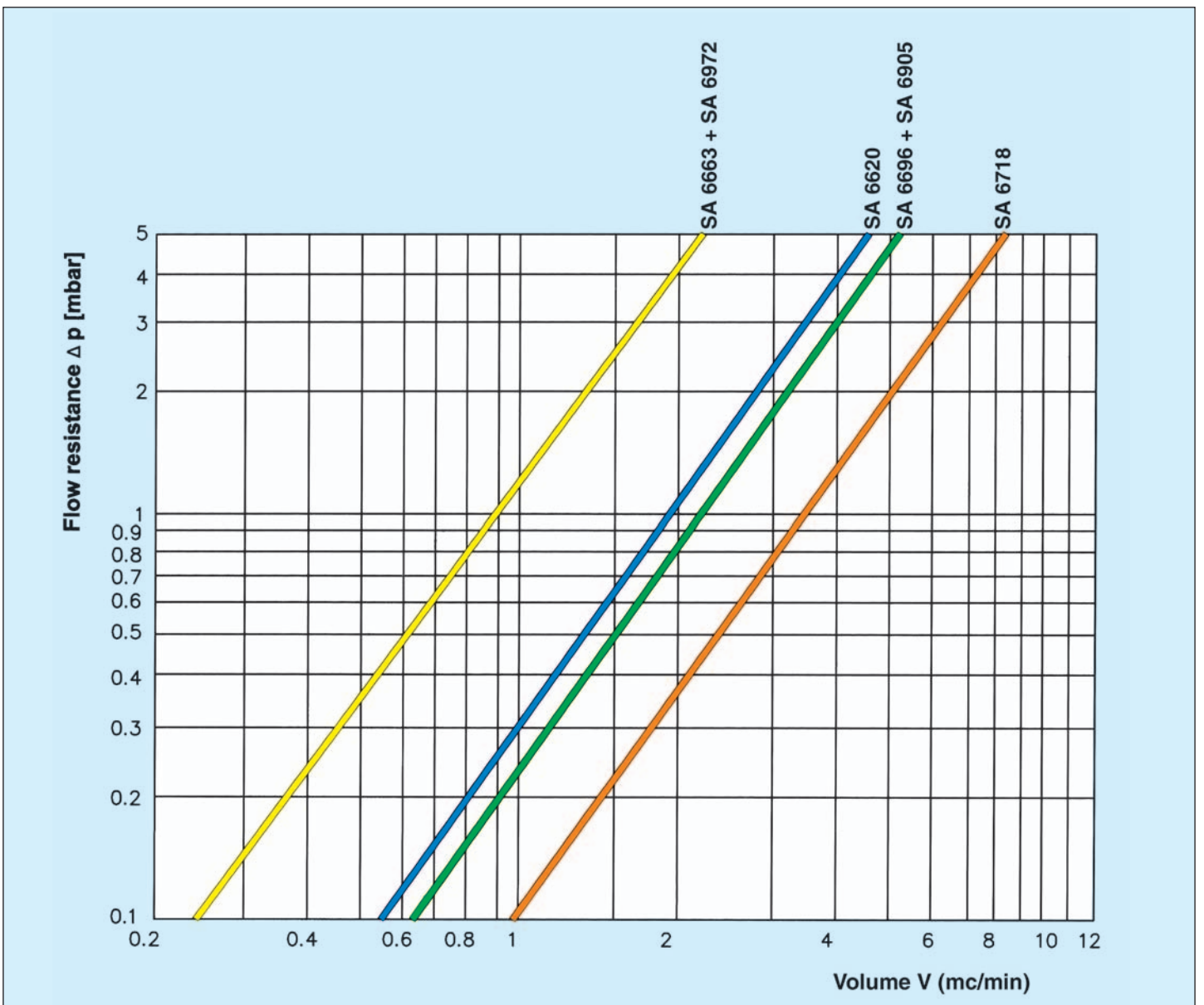
Besides being able to provide a wide range of adaptable air cartridges, SOTRAS can offer OEMs a series of air filters that do not require a housing. These filters are recommended for 1 to 12 m³/min flow rates and can be installed vertically or horizontally.

This type of solution offers a low pressure drop and very simple installation and replacement procedures. (On specific requests we can offer fibreglass or oiled cellulose filtering media).





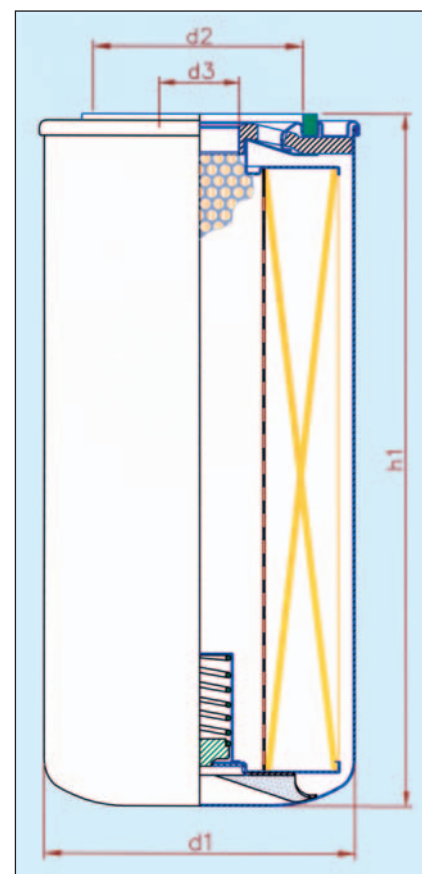
SOTRAS Ref.	d1 (mm)	d4 (mm)	h1 (mm)	h2 (mm)	Nominal flow rate (m3/min)
SA 6663	110	51	93	25	1
SA 6972	110	41	93	25	1
SA 6620	130	76	125	25	2
SA 6696	164	76	135	25	4
SA 6905	164	60	135	25	4
SA 6718	230	100	116	35	6



SPIN-ON OIL FILTERS

Thanks to its experience in the hydraulic sector, SOTRAS has developed a range of oil filters, especially suitable for screw and vane compressor applications, “bearing in mind,, that these filters will have to endure sudden changes and extreme limits in pressure and temperature. The oil filters that SOTRAS offers are usually of the spin-on type and can be provided with a by pass valve, if it is not already to be found on the heads or in the lubrication circuit. Generally the most commonly used filtering media is made of cellulose, however fibreglass and metallic mesh versions are available on request.

Every batch undergoes stringent laboratory performance tests in terms of resistance to cyclic and maximum working pressure.



SOTRAS Ref.	d1 (mm)	d2 (mm)	d3	h1 (mm)	Non-return Valve-(bar)	by pass Valve (bar)	Nominal flow rate (l/min)	Max. operating Pressure(bar)
SH 8118	76	62	3/4" 16-UNF	95	0,12	2,5	15	14
SH 8196	93	62	3/4" 16-UNF	58	0,12	0,8	15	14
SH 8113	76	62	3/4" 16-UNF	125	0,12	2,5	20	14
SH 8152	76	62	3/4" 16-UNF	140	-	3,5	20	35
SH 8153	93	62	3/4" 16-UNF	97	-	2,5	25	25
SH 8112	93	62	3/4" 16-UNF	143	0,12	2,5	40	14
SH 8119	93	62	1" 12-UNF	143	0,12	2,5	40	14
SH 8154	93	62	3/4" 16-UNF	144	-	2,5	40	25
SH 8155	93	62	1" 12-UNF	172	-	2,5	40	25
SH 8143	96	62	3/4" G	146	-	-	40	14
SH 8146	93	62	1" 12-UNF	170	0,12	2,5	45	14
SH 8130	96	62	3/4" G	193	-	-	55	14
SH 8147	93	62	1" 12-UNF	210	0,12	2,5	70	14
SH 8149	108	62	1" 12-UNF	210	0,12	1,2	70	14
SH 8107	93	62	1" 12-UNF	210	-	2,5	70	14
SH 8110	93	62	1" 12-UNF	212	-	2,5	70	25
SH 8150	93	62	M 20x1,5	212	-	2,5	70	30
SH 8144	127	98	1" 1/4 G	182	-	-	80	14
SH 8114	136	99	1" 1/2 16-UN	177	-	-	95	20
SH 8108	108	93	1" 1/8 -16 UN	260	0,12	2,5	100	14
SH 8145	127	98	1" 1/4 G	228	-	-	150	12
SH 8109	136	100	1" 1/2 16-UN	302	-	2,5	180	20

SOTRAS



FILTERS & PRODUCTS
FOR VACUUM PUMPS



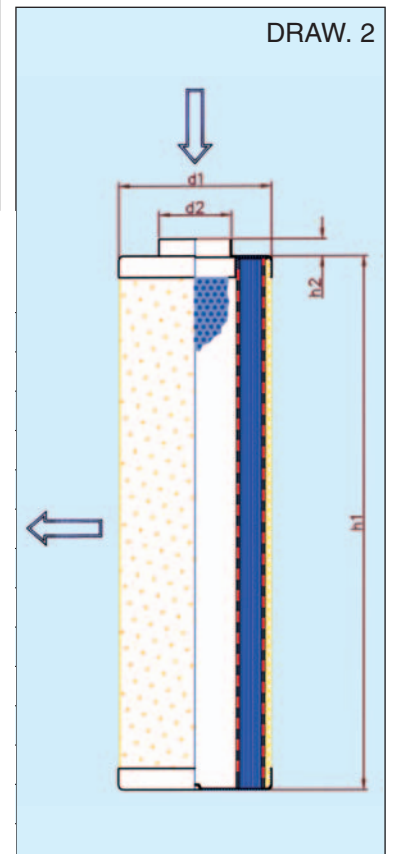
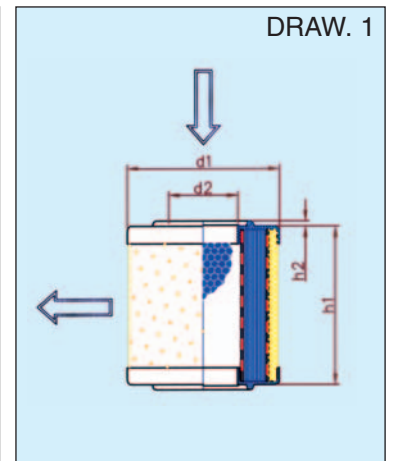
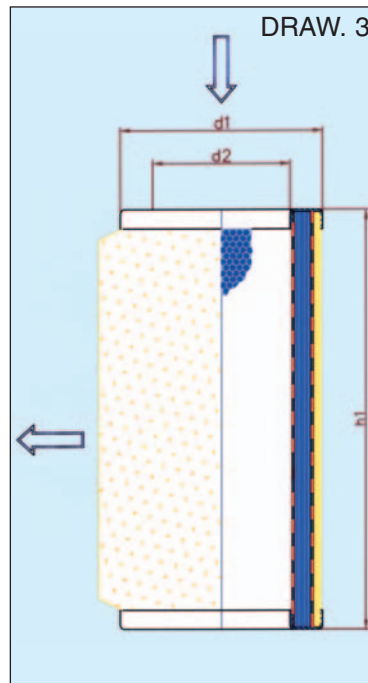
DEMISTERS



The media used in our separators enables us to obtain excellent air/oil separation rates up to 1-3 mg/m³.

All oil separators are manufactured using materials to withstand high pressures and temperatures and to minimise moisture induced deterioration.

In order to achieve the best possible separation efficiency and long working life of the element it is essential that regular maintenance procedures are followed and joints are applied correctly, as well as the use of good quality air and oil filters.



SOTRAS Ref.	d1 (mm)	d2 (mm)	h1 (mm)	h2 (mm)	Drawing	Flow rate (m ³ /min)
DA 1050	54,5	25,5	68	2,5	1	0,25
DA 1051	71,5	32,5	74	2,5	1	0,4
DA 1022	79,5	45	117,5	3,5	1	0,7
DA 1060	72	35	132	8	2	0,8
DA 1120	79	46	144	0	3	0,9
DA 1013	70	40	175	0	3	0,9
DA 1014	70	40	200	0	3	1,1
DA 1111	72	35	200	8	2	1,2
DA 1015	70	40	255	0	3	1,4
DA 1047	72	35	250	8	2	1,5
DA 1020	106	72	218	0	3	2,2
DA 1048	72	35	375	8	2	2,2
DA 1030	106	72	284	0	3	2,8
DA 1049	72	35	500	8	2	2,9

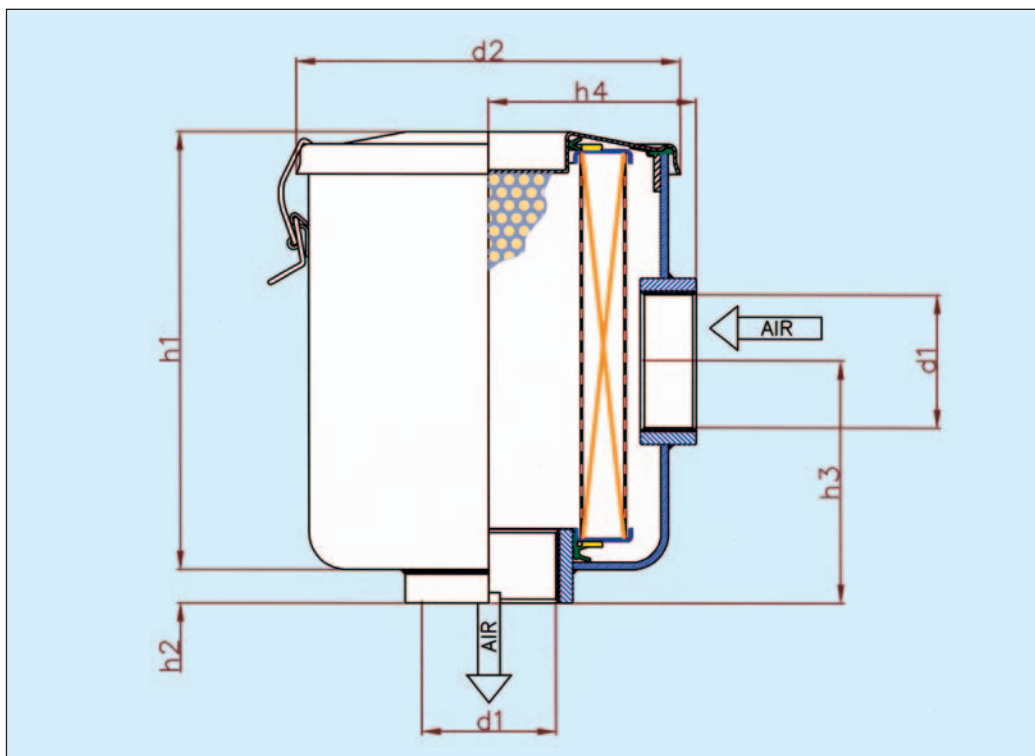
VACUUM AIR FILTERS

Sotras offers a wide range of filters to suit most requirements in this field and the elements are usually interchangeable with those produced by other leading manufacturers.

Steel housings are treated with a special protective coating thereby guaranteeing a longer durability. They also undergo thorough tests to ensure the seals withstand high vacuum levels.

The elements have high dust retention and are available with paper media (having a normal filtration rate of 5 microns) as well as glassfibre media for special applications.





SOTRAS Ref.	d1	MALE-FEMALE	d2 (mm)	h1 (mm)	h2 (mm)	h3 (mm)	h4 (mm)	flow rate (m3/h)	Element Ref.
SA 6654	G 3/8"	F	80	66	12	39	45	24	SA 6715
SA 6058	G 3/4"	F	110	76	14	53	54	42	SA 6091
SA 6647	G 1/2"	F	110	76	14	53	54	42	SA 6091
SA 6952	G 1"	F	133	85	17	53	78	85	SA 6120
SA 6059	G 1 1/4"	F	133	85	17	53	78	96	SA 6120
SA 6819	1 1/4 NPT	F	133	85	17	53	78	96	SA 6120
SA 6061	G 1 1/4"	F	170	141	17	93	96	108	SA 6122
SA 6635	G 1 1/4"	M	170	141	17	93	96	108	SA 6122
SA 6820	1 1/4 NPT	F	170	141	17	93	96	108	SA 6122
SA 6821	1 1/2 NPT	F	170	141	17	93	96	108	SA 6122
SA 6648	G 1 1/2"	F	170	170	18	124	100	192	SA 6651
SA 6822	1 1/2 NPT	F	170	170	18	124	100	192	SA 6651
SA 6649	G 2"	F	200	240	18	124	114	310	SA 6096
SA 6823	2" NPT	F	200	240	18	124	114	310	SA 6096
SA 6060	G 2 1/2"	F	200	240	18	124	114	360	SA 6096
SA 6824	2 1/2 NPT	F	200	240	18	124	114	360	SA 6096
SA 6650	G 3"	F	270	180	50	145	165	550	SA 6095
SA 6652	G 4"	F	270	180	50	145	165	720	SA 6095
SA 6825	4" NPT	F	270	180	50	145	165	720	SA 6095
SA 6749	G 3"	F	280	395	50	330	190	1080	SA 6005
SA 6750	G 4"	F	360	590	50	400	230	1260	SA 6025

SPIN ON OIL FILTERS

The oil filters that Sotras offers for vacuum pumps applications have the same characteristics as the products used for compressors

(See pag. 13)

SOTRAS

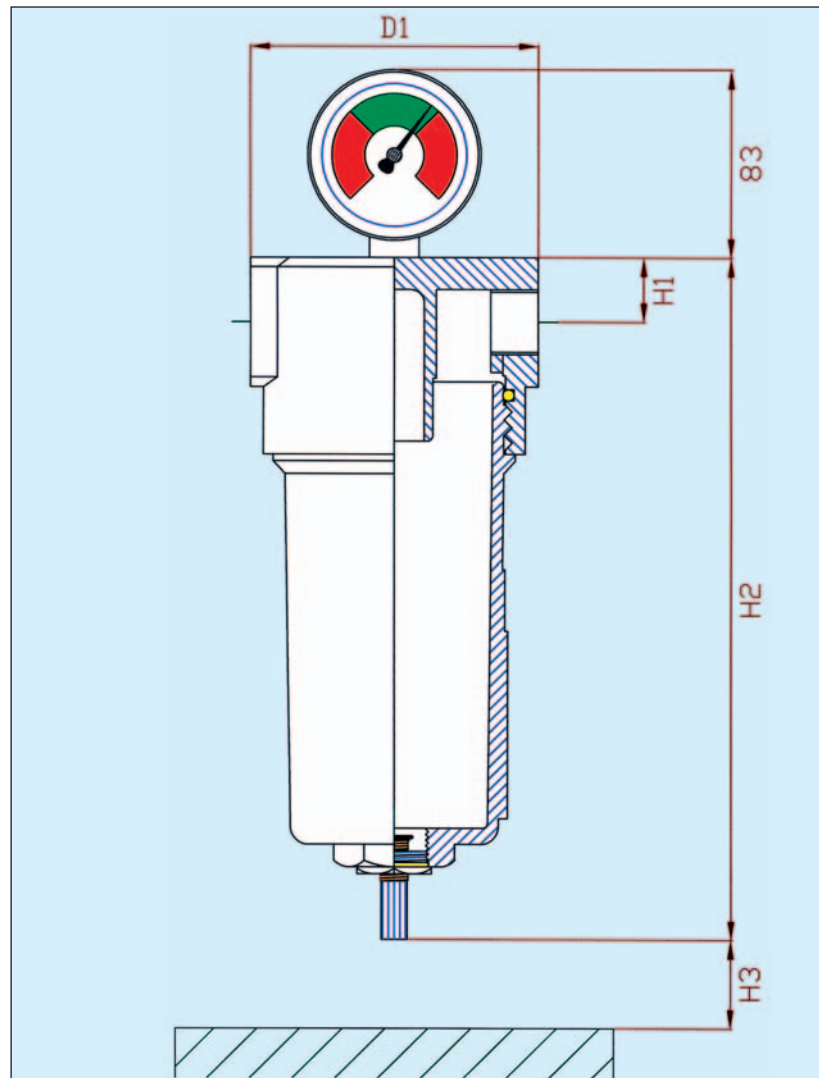


FILTERS & PRODUCTS
FOR COMPRESSED AIR



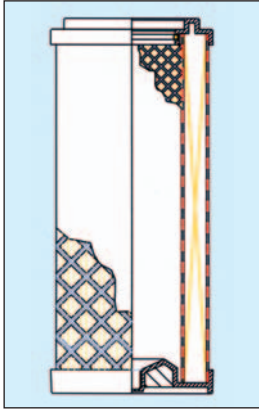
COMPRESSED AIR FILTERS

Due to the continuous demand of users of compressed air for clean, high quality air, Sotras offers a range of coalescing filters specifically designed to suit most requirements. Our established experience enables us to offer simple, efficient and high quality products at competitive prices. There are four series of elements available for various types of applications, depending on the level of filtration required. (See pag. 20)

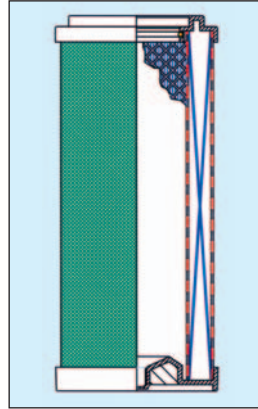


SOTRAS Ref.	Capacity (m ³ /h at 7 bar)	Connections	D1 (mm)	H1 (mm)	H2 (mm)	H3 (mm)	Max operating pressure (bar)
SM 9001	60	3/8"	87	21	209	75	16
SM 9002	78	1/2"	87	21	209	75	16
SM 9003	120	3/4"	87	21	279	160	16
SM 9004	198	1"	130	43	315	135	16
SM 9005	335	1"	130	43	415	235	16
SM 9006	510	1 1/2"	130	43	515	335	16
SM 9007	780	1 1/2"	130	43	715	525	16
SM 9008	1000	2"	164	48	823	520	16
SM 9009	1500	2"	164	48	1073	770	16
SM 9010	2760	3"	250	74	1202	780	12

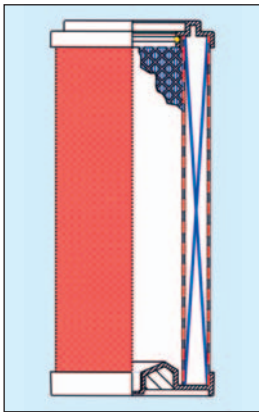




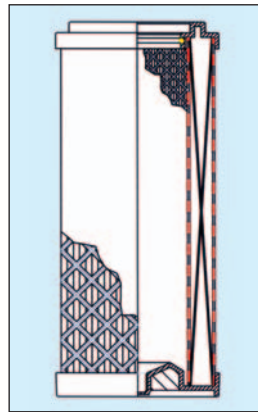
PRE FILTERS
“Series 1”
 Coarse filtration and dust removal
 Air flow through filter element- out to in



FINE FILTERS
“Series 2”
 General purpose protection
 Particle removal down to 0,1 micron.
 Maximum residual oil content down to 0,5 PPM.
 Air flow through filter element-in to out.



MICRO FILTERS
“Series 3”
 High efficiency
 Particle removal down to 0.01 micron.
 Maximum residual oil content down to 0,01 PPM.
 Air flow through filter element-in to out



ACTIVATED CARBON FILTER
“Series 4”
 Oil vapour and odour removal
 Particle removal below 0.01 micron.
 Maximum residual oil content down to 0,005 PPM.
 Air flow through filter element-in to out

FILTER HOUSING	FILTER ELEMENTS			
	PREFILTER (series 1)	FINE FILTER (series 2)	MICROFILTER (series 3)	ACT. CARB. (series 4)
SOTRAS Ref. SM 9001	SM 9017	SM 9018	SM 9019	SM 9020
SM 9002	SM 9021	SM 9022	SM 9023	SM 9024
SM 9003	SM 9025	SM 9026	SM 9027	SM 9028
SM 9004	SM 9029	SM 9030	SM 9031	SM 9032
SM 9005	SM 9033	SM 9034	SM 9035	SM 9036
SM 9006	SM 9037	SM 9038	SM 9039	SM 9040
SM 9007	SM 9041	SM 9042	SM 9043	SM 9044
SM 9008	SM 9045	SM 9046	SM 9047	SM 9048
SM 9009	SM 9049	SM 9050	SM 9051	SM 9052
SM 9010	SM 9053	SM 9054	SM 9055	SM 9056

SERIES	PARTICLE REMOVAL DOWN TO (micron)	OIL REMOVAL DOWN TO (mg/m ³)	NOMINAL INITIAL PRESSURE DROP (bar g)
1	3	-	0,03
2	0,1	0,5	0,05
3	0,01	0,01	0,06
4	0,01	0,005	0,12

Sotras also offers a wide range of alternative elements suitable for other makes of housing.



ACCESSORIES

Cyclon kits, differential pressure gauges, manual, automatic condense drains and technical specifications are available for all types.



PRACTICAL ADVICE

Our products regularly undergo stringent quality control and only very seldom the malfunctioning of the compressor has to be ascribed to the filter itself.

Here below are listed some of the most common causes which lead on to an improper functioning of the machine.

Premature increase in pressure differential

This usually occurs when compressors work under the following conditions:

- a) Air intake filter and oil no longer efficient
- b) Unsuitable or heavily contaminated oil
- c) Water contamination-recognised by rust deposits in separator tank

To help in avoiding these problems, there should be frequent replacements of the Air and Oil filters and the oil should be changed completely at regular intervals. Check for deposits of 'varnish' which can quickly block a separator.

Compressor should not be run at excessively high temperatures.

Excessive use of oil

This normally occurs under the following circumstances:

- a) Separator not changed at the appropriate time. If the separator has reached the end of its lifespan or has worked in arduous conditions and is not replaced, it can suffer structural damage (collapse) or media breakdown causing oil carry-over.
- b) Blocked or malfunctioning scavenge tube. This situation increases the level of oil inside the separator and the amount of oil carry-over. To avoid this problem, the scavenge tube must be checked for correct length at every separator change and kept free from blockage.
- c) Incorrect oil level in tank. Overfilling with oil alters the pre-separation process and increases the quantity of oil in the air/oil mist thereby reducing the efficiency of the separator. "Foaming" created by the oil can also create this situation.
- d) Gaskets applied incorrectly or use of unsuitable or used gaskets. When installing a new separator the incorrect application of joints (bad seal) can cause heavy movements of oil thereby by-passing the separating system.
- e) Inefficient separation system. In some instances, the design of the compressor separation system is inefficient. In these cases the manufacturers improve the separation efficiency by adding baffles or through modification of separations by adding pre-separation media to the outside of the element.

Collapsed separator causes

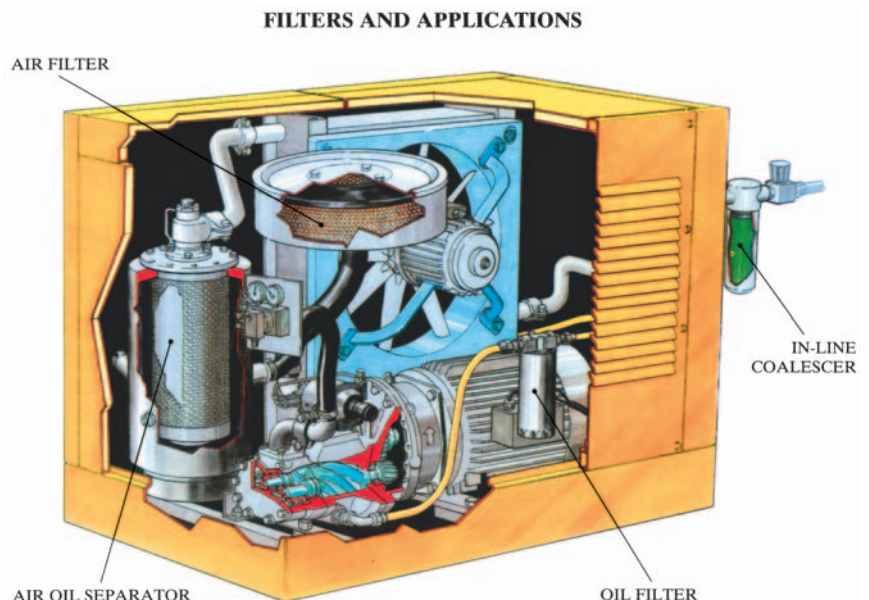
This normally occurs under the following circumstances:

- a) Separator excessively contaminated
- b) Sudden surges caused by:
 - malfunctioning valves
 - sudden release of air to atmosphere (mobile compressors)
- c) Rotary compressors working in parallel with reciprocating compressors without a suitable air receiver.

Flash fires

These are very rare and are caused by several factors occurring simultaneously and not directly related to the Air/Oil separator.

It is good practice to ensure that the gaskets have a reliable form of grounding by the use of suitable materials (at least one or two metal staples or metal foil) so that there is contact between the element and the separator tank.



SOTRAS

QUALITY CONTROL AND GUARANTEE

The efficiency of our separators is tried through Johnson or Balston tests as well as the use of artificial smoke. All types of filters are passed to our Quality control Department for approval before being marketed and the performance of every batch in terms of resistance to cyclical and maximum working pressure regularly undergoes stringent laboratory tests

We would like to emphasise that Sotras filters undergo stringent quality control and are frequently tested in order to ensure satisfactory operation in the application of which they are designed. Evidence of the high quality of our products lies in the fact that Sotras manufactures original equipment for some of the most important compressor manufacturers, to some of which Sotras guarantees product exclusivity.

We guarantee that filters produced by Sotras are free from defects either in materials or construction, always provided that the machinery is maintained in accordance with manufacturers' recommendations and filters are correctly installed and changed.

Sotras will replace any item found to be defective as described above but will not be held responsible for any other replacement or contingencies or consequential loss.

In addition Sotras manufacturing quality system has had approved certification to **UNI EN ISO 9002-94** since 1999.

In year 2003, Sotras has gained a new certification to **UNI EN ISO 9001-2000**.





SOTRAS

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