MANN+HUMMEL Filters for Vacuum Pumps

MANN+HUMMEL Vacuum Filters
Contents

MANN+HUMMEL Speyer
Industrial filtration

The MANN+HUMMEL Group is a company with international operations and employs 16,000 people worldwide at 60 international locations. The company develops, produces and sells technically complex components and systems for the automotive industry and the field of mechanical engineering. A key area is high-quality filtration products for vehicles, engines and industrial applications.

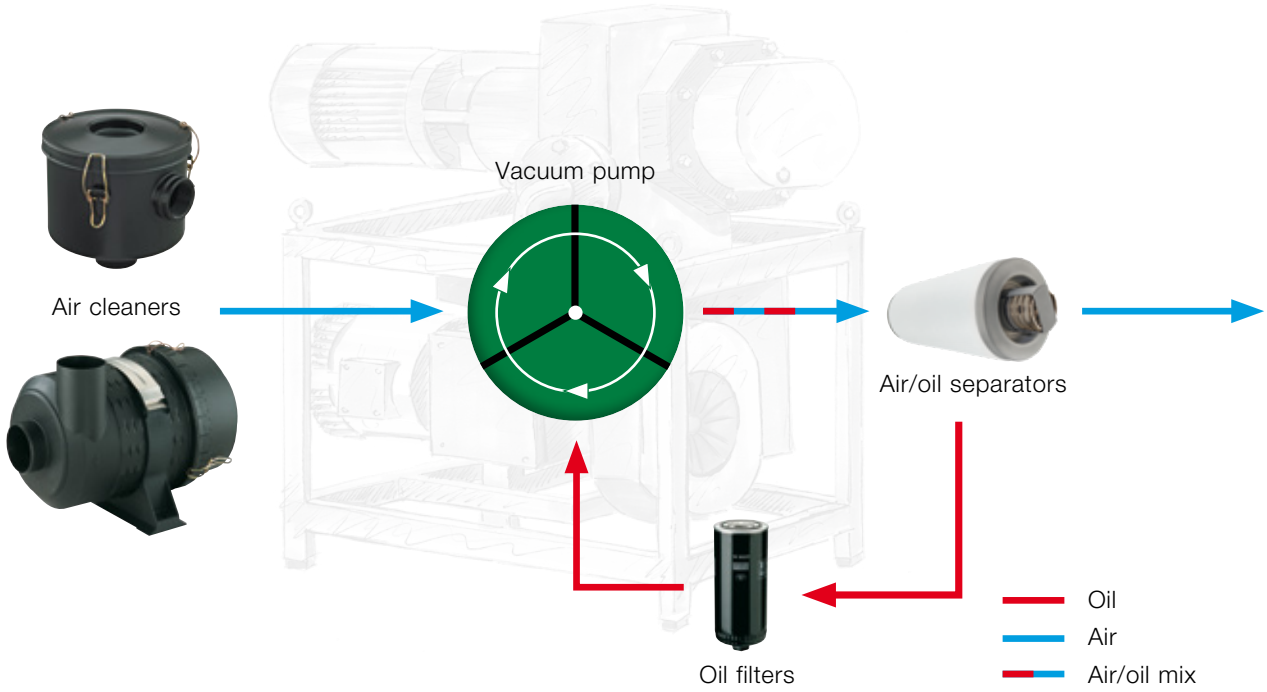
The industrial filtration business unit has its headquarters in Speyer, Germany, and is specialised in meeting the requirements of compressed air and vacuum technology, off-highway vehicle and engine applications, mechanical engineering and plant construction. For these and other industrial fields MANN+HUMMEL Industrial Filters offers high-performance products for the filtration and separation of air, gases and liquids. Today it is hard to imagine the operation of compressed air and vacuum technology without MANN+HUMMEL.

For a number of decades the global market leader has successfully pursued a strategy of providing the best filter solutions for compressed air systems. Whether air cleaners, oil filters or air/oil separators, MANN+HUMMEL products are characterised by the highest energy efficiency and long service life and are perfectly matched for integration in a filter chain. Quality products from MANN+HUMMEL stand for the reliable functioning of compressed air and vacuum systems. Customers can choose between solutions taken from our modular range of products or specially developed products.

In addition, our global organisation at 60 international locations offers customers excellent local support for sales, engineering, production and logistics. 1,000 employees working in R&D worldwide are constantly developing high-performance products for the many varied filter applications of our customers. Our innovative drive is documented by numerous patents and therefore it's no coincidence that the German patent office lists our company as one of the companies with the most patent applications.


MANN+HUMMEL

MANN+HUMMEL Vacuum Filters
Product overview



MANN+HUMMEL offers the whole filter chain for vacuum pumps. High-quality air cleaners, oil filters and air/oil separators ensure the process reliability of vacuum pumps, protect against premature wear and enable long machine availability.

MANN+HUMMEL supports customers with the configuration of the right filter for each application. Our customers also have the choice of selecting a product from our wide range of standard filters or ordering a customised version exactly designed to meet their requirements.

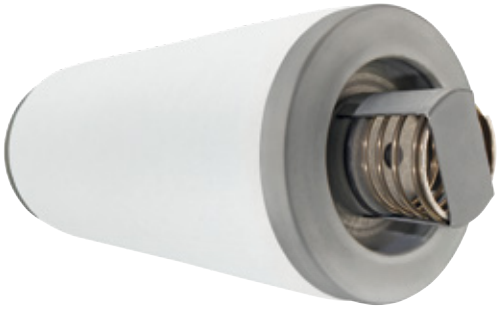
Air cleaners

Volume flow range	0.8 m^3/min to 15 m^3/min
Operating temperature	Continuous: -40 °C to +80 °C / For a short period: +100 °C
Preseparation	Tangential inlet
Main element	Star-pleated element, centre tube in the housing, radial sealing, metal-free
Selection criterion	Flexibility and economy with a long service life

Vacuum filters

Volume flow range	0.7 m^3/min to 12 m^3/min
Operating temperature	Continuous: -30 °C to +80 °C / For a short period: +100 °C
Filter element	Star-pleated element with centre tube, axial sealing, reinforced with metal

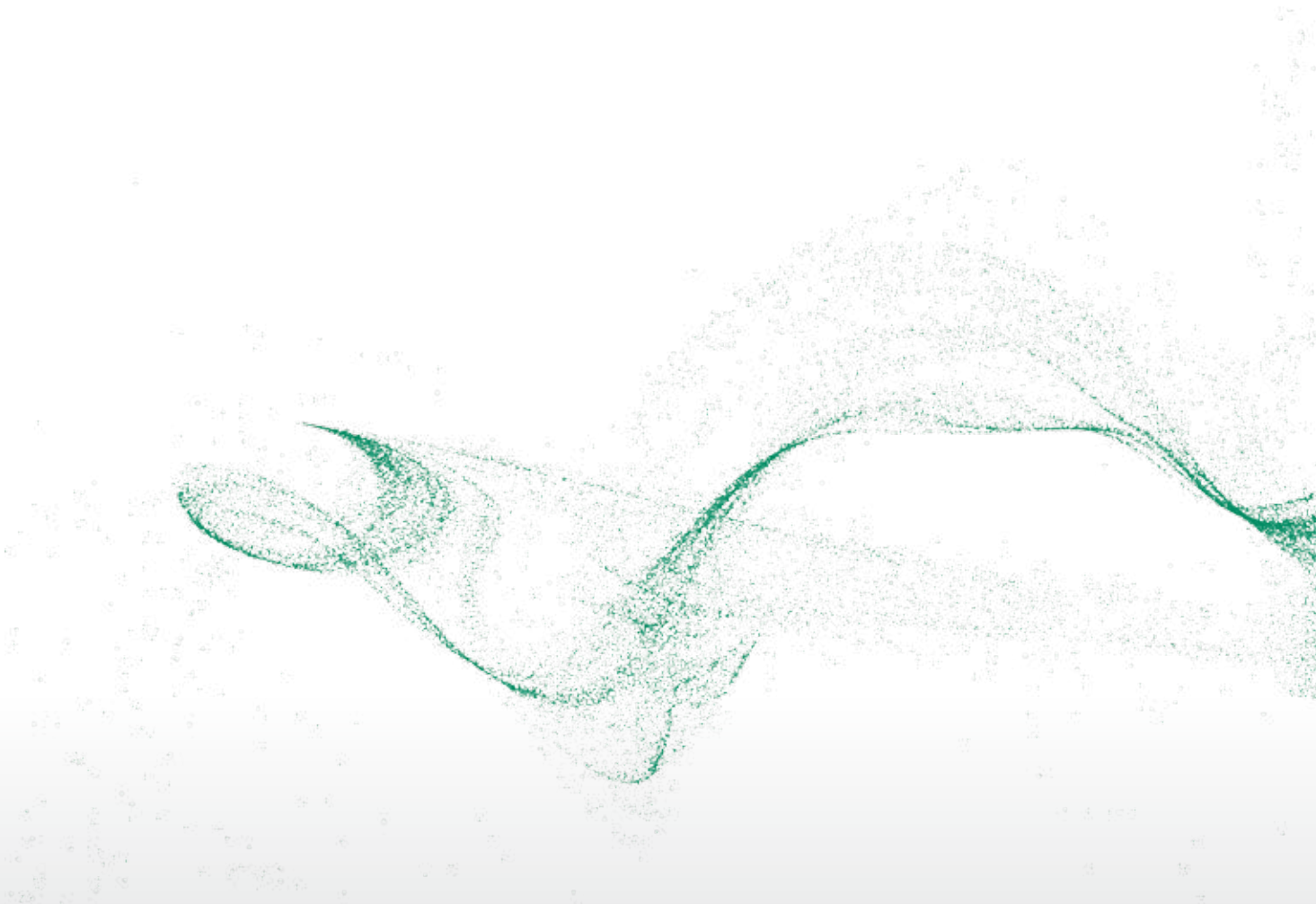
Air/oil separators



Application	Oil-flooded rotary vane vacuum pumps
Installation position	in pressure reservoir
Residual oil content in mg/m^3	1 to 3 mg/m^3
Operating temperature	120 °C
Pressure drop at given nominal flow rate	0.25 bar
Available nominal flow rates	0.1 to 3.6 m^3/min

Spin-on filters

Application	Oil-flooded vacuum pumps
Permissible operating pressure	14 bar
Available nominal flow rates	15 - 50 l/min

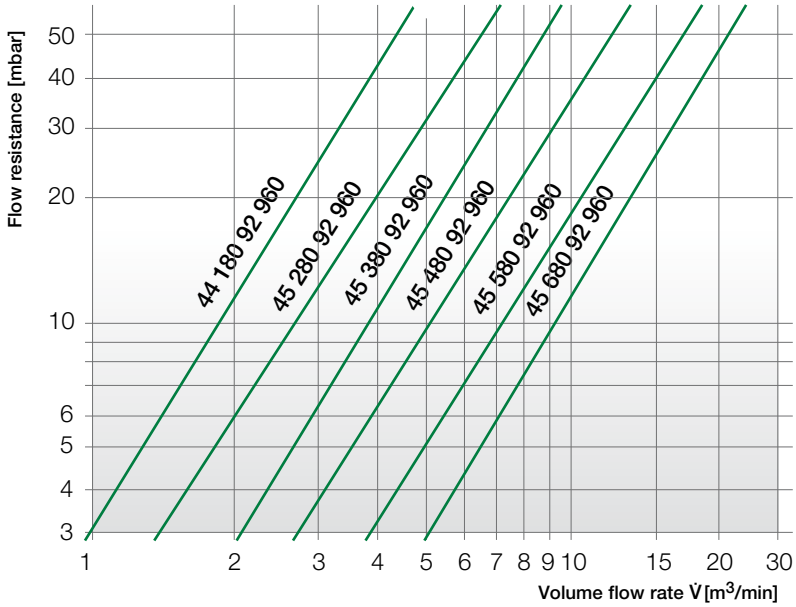


Air cleaners for vacuum pumps
EUROPICLON

MANN+HUMMEL Air cleaners for vacuum pumps
EUROPICLON

There are specially adapted air cleaner systems available for vacuum pumps.

Typical applications, for example, are vacuum lifting devices and other negative pressure systems. The negative pressure resistance is 950 mbar.



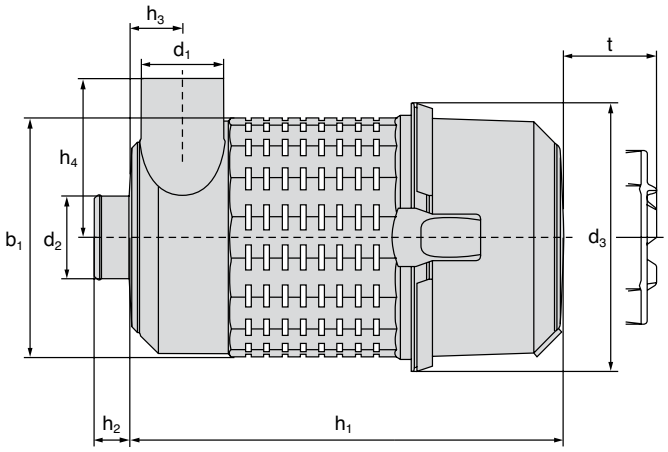


Fig. 1: housing lower part with snap-fit closing (open 44 180 ...)

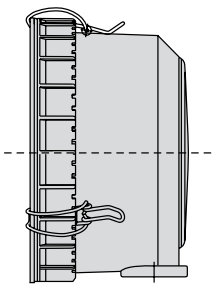


Fig. 2. housing lower part with wire clips (45 280 ... to 45 680 ...)

Size EUROPICLON	Order no. without secondary element	Fig.	Nominal flow rate [m³/min]	Replacement filter element MANN-FILTER Main element
100	**44 180 92 960**	1	1 - 3	**C 11 100**
200	**45 280 92 960**	2	2 - 4.5	**C 14 200**
300	**45 380 92 960**	2	3 - 6	**C 15 300**
400	**45 480 92 960**	2	4 - 8	**C 16 400**
500	**45 580 92 960**	2	6 - 12	**C 20 500**
600	**45 680 92 960**	2	7.5 - 15	**C 23 610**

Air cleaners for vacuum pumps
EUROPICLON

Order no. without secondary element	Fig.	Dimensions in mm [inches]								
		b_1	d_1	d_2	d_3	h_1	h_2	h_3	h_4	t
44 180 92 960	1	158 [6.22]	54 [2.12]	50 [1.97]	188 [7.40]	260 [10.24]	27 [1.06]	38 [1.50]	104 [4.09]	237 [9.39]
45 280 92 960	2	173 [6.81]	62 [2.44]	60 [2.36]	198 [7.80]	327 [12.87]	27 [1.06]	42 [1.65]	112 [4.41]	304 [11.97]
45 380 92 960	2	203 [7.99]	70 [2.76]	70 [2.76]	228 [8.98]	367 [14.45]	30 [1.18]	45 [1.77]	135 [5.32]	344 [13.54]
45 480 92 960	2	223 [8.78]	82 [3.23]	80 [3.15]	248 [9.76]	383 [15.08]	32 [1.26]	52 [2.05]	144 [5.67]	359 [14.13]
45 580 92 960	2	264 [10.39]	102 [4.02]	100 [3.94]	288 [11.34]	408 [16.06]	37 [1.46]	62 [2.44]	174 [6.85]	384 [15.12]
45 680 92 960	2	295 [11.61]	110 [4.33]	110 [4.33]	323 [12.72]	414 [16.30]	27 [1.06]	65 [2.56]	190 [7.48]	384 [15.12]

Accessories for EUROPICLON

Bracket

90° elbow

Rain cap

Size EUROPICLON	Rain cap	Straight port		90° elbow	
	Form A	without connector	with connector	without connector	with connector
100	**39 020 67 910**	**39 100 27 999**	**39 100 27 979**	**39 100 25 999**	**39 100 25 979**
200	**39 028 67 910**	**39 200 27 999**	**39 200 27 979**	**39 200 25 999**	**39 200 25 979**
300	**39 040 67 910**	**39 300 27 999**	**39 300 27 979**	**39 300 25 999**	**39 300 25 979**
400	**39 056 67 910**	**39 400 27 999**	**39 400 27 979**	**39 400 25 999**	**39 400 25 979**
500	**39 080 67 910**	**39 500 27 999**	**39 500 27 979**	**39 500 25 999**	**39 500 25 979**
600	**39 100 67 910**	**39 600 27 999**	**39 600 27 979**	**39 600 25 999**	**39 600 25 979**

MANN+HUMMEL Air cleaners
EUROPICLON Brackets

The brackets are specially designed for the outer wall of the housing of the Europiclon and enable vibration-resistant mounting of the air cleaner.

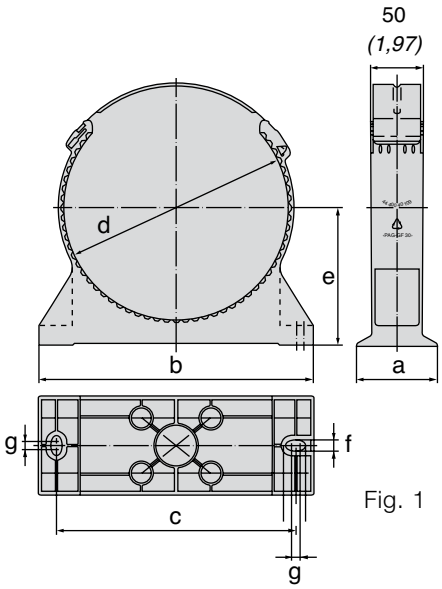


Fig. 1

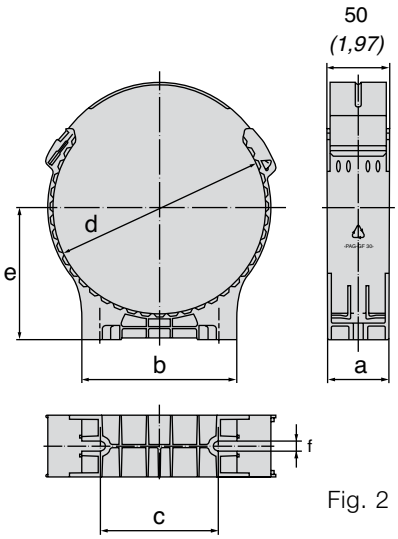


Fig. 2

Order no.	suitable for EUROPICLON Size	Fig.	Dimensions in mm [inches]						
			a	b	c	d	e	f	g
39 100 40 999	100	1	60 [2.36]	205 [8.07]	175 [6.89]	156 [6.14]	105 [4.13]	8.5 [0.33]	15.5 [0.61]
39 200 40 999	200	1	80 [3.15]	220 [8.66]	190 [7.48]	171 [6.73]	110 [4.33]	8.5 [0.33]	15.5 [0.61]
39 300 40 999	300	1	80 [3.15]	250 [9.84]	220 [8.66]	201 [7.91]	125 [4.92]	8.5 [0.33]	15.5 [0.61]
39 400 40 999	400	1	80 [3.15]	270 [10.63]	240 [9.45]	221 [8.70]	135 [5.32]	8.5 [0.33]	15.5 [0.61]
39 500 40 999	500	1	80 [3.15]	310 [12.20]	280 [11.02]	262 [10.32]	155 [6.10]	8.5 [0.33]	15.5 [0.61]
39 600 40 999	600	1	80 [3.15]	345 [13.58]	315 [12.40]	296 [11.65]	173 [6.81]	8.5 [0.33]	15.5 [0.61]
39 100 40 989	100	2	50 [1.97]	110 [4.33]	80 [3.15]	156 [6.14]	100 [3.94]	8.5 [0.33]	-
39 200 40 989	200	2	50 [1.97]	125 [4.92]	95 [3.74]	171 [6.73]	106 [4.17]	8.5 [0.33]	-
39 300 40 989	300	2	50 [1.97]	140 [5.51]	110 [4.33]	201 [7.91]	121 [4.76]	8.5 [0.33]	-
39 400 40 989	400	2	50 [1.97]	157 [6.18]	127 [5.00]	221 [8.70]	132 [5.20]	8.5 [0.33]	-
39 500 40 989	500	2	50 [1.97]	182 [7.17]	152 [5.98]	262 [10.32]	153 [6.02]	8.5 [0.33]	-
39 600 40 989	600	2	50 [1.97]	182 [7.17]	152 [5.98]	296 [11.65]	173 [6.81]	8.5 [0.33]	-

Air cleaners for vacuum pumps
Sheet metal filters

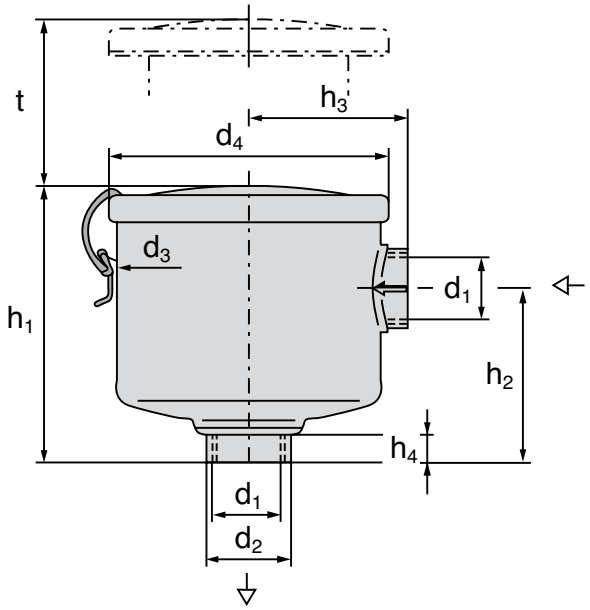
MANN+HUMMEL Vacuum filters for air and gas lines

The negative pressure-resistant vacuum filters from MANN+HUMMEL are designed for installation in air and gas lines. They are resistant to negative pressure up to 950 mbar and equipped with a filter element. They are used as an intake filter for vacuum pumps.

The filter elements of the standard version are fitted with cellulose media. Depending on the requirements, MANN+HUMMEL also offers elements with other media: glass fibre media for a higher chemical resistance, air/oil separators for air containing oil or oil-wetted air cleaners for moist air.

The advantages at a glance:

- Reliable sealing
- Compact design
- Robust metal construction
- Different connections available
- Excellent filtration performance



Order no.	MANN-FILTER main element	Nominal flow rate [m³/min]	Dimensions in mm [inches]									Weight [kg]
			d_1	d_2	d_3	d_4	h_1	h_2	h_3	h_4	t	
45 009 72 105	**C 75**	0.7	G ¾	35 [1.38]	90 [3.54]	97 [3.82]	89 [3.50]	45 [1.77]	59 [2.32]	6 [0.24]	70 [2.76]	0.6
45 021 72 105	**C 1112**	1.6	G 1 ¼	50 [1.97]	125 [4.92]	136 [5.35]	116 [4.57]	68 [2.68]	81 [3.19]	17 [0.67]	75 [2.95]	1.0
45 037 72 105	**C 1337**	1.8	G 1 ¼	50 [1.97]	162 [6.38]	172 [6.77]	170 [6.69]	108 [4.25]	98 [3.86]	17 [0.67]	130 [5.12]	1.5
45 124 72 104	**C 15 124/1**	6.0	G 2 ½	86 [3.39]	194 [7.64]	200 [7.87]	250 [9.84]	129 [5.08]	123 [4.84]	10 [0.39]	240 [9.45]	4.3
45 124 72 114	**C 15 124/1**	6.0	2 ½ NPT	86 [3.39]	194 [7.64]	200 [7.87]	250 [9.84]	129 [5.08]	123 [4.84]	10 [0.39]	240 [9.45]	4.3
45 138 72 105	**C 21 138/1**	12.0	G 4	123 [4.84]	268 [10.55]	272 [10.71]	263 [10.35]	147 [5.79]	197 [7.76]	74 [2.91]	165 [6.50]	14.5

Applications for vacuum air cleaners

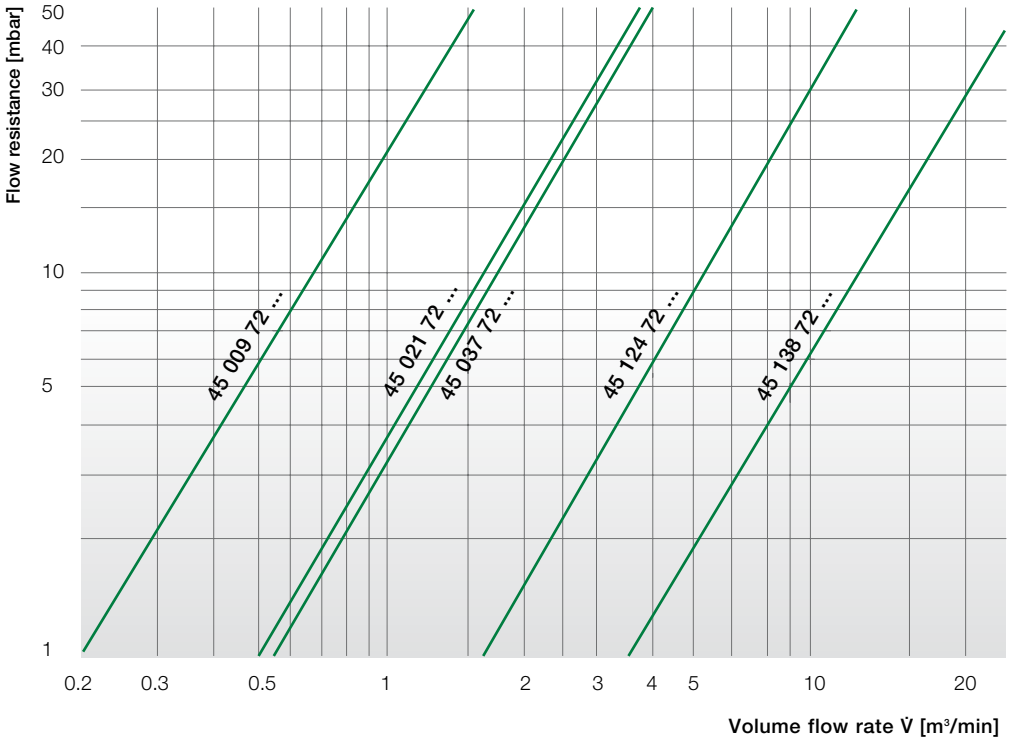
Vacuum air cleaner	MANN-FILTER main element	Glass fibre element	Air/oil separator	Element for higher air moisture
45 009 72 105	C 75	-	49 000 50 261	43 009 52 102
45 021 72 105	C 1112	C 1112/1	-	43 021 52 102
45 037 72 105	C 1337	C 1337/2	49 000 50 841	-
45 124 72 104	C 15 124/1	C 15 124/3	-	43 148 54 102
45 138 72 105	C 21 138/1	-	-	-

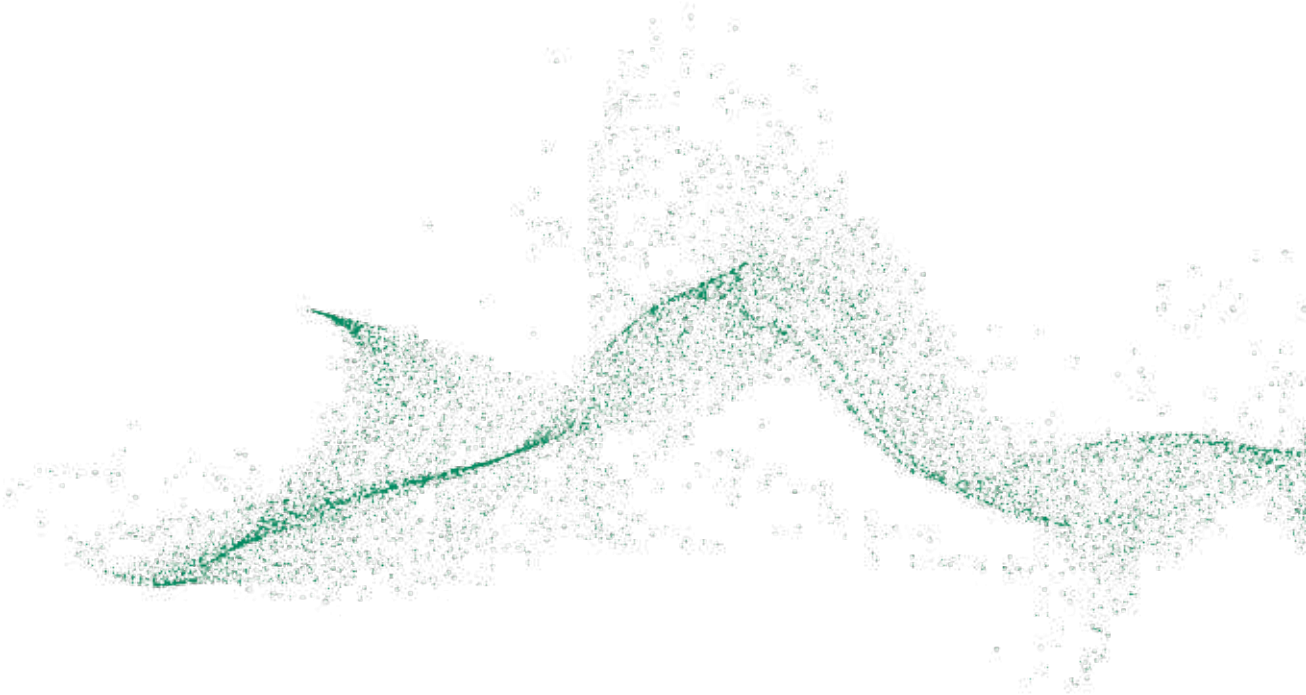
Technical information

The nominal flow rate of the filter is decisive for the filter size. The filter size must be selected so that the nominal flow rate of the filter is the same or higher than the air requirement.

The filter can be mounted in an upright or horizontal position. However, it should not be mounted with the clean air port pointing downwards as otherwise dirt may enter the clean air line when the filter element is changed.

Characteristic curve for flow rate acc. to ISO 5011





Air/oil separators for vacuum pumps

MANN+HUMMEL
Air/oil separators for vacuum pumps

Service life
The increase in the flow resistance and therefore also the service life depend on the cleanness of the oil and the quality of the air cleaner used. In a smooth-running system the air/oil separators operate for some thousand operating hours.

Installation instructions
The excellent separation performance of the air/oil separators is only effective as far as the seals between the raw air side and the clean air side are in good condition.

Design and function
This design type is used when the flow is from the inside to the outside. The listed selection of air/oil separators is particularly suitable for integration in oil-flooded vacuum pumps. The installation position is unrestricted.

Pressure resistance
The air/oil separators for vacuum pumps are designed for a differential pressure up to at least 1.5 bar (150 KPa).

Separation performance
The residual oil content of the exhaust air at nominal load is approx. 1 to 3 mg/m^3.

Air/oil separators for vacuum pumps

Dimensions and order numbers

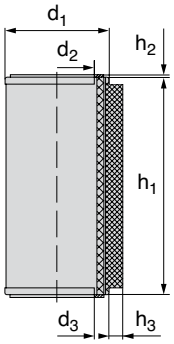


Fig. 1

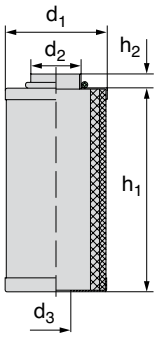


Fig. 2

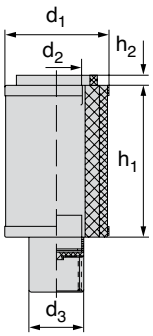


Fig. 4

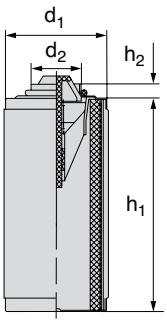


Fig. 6

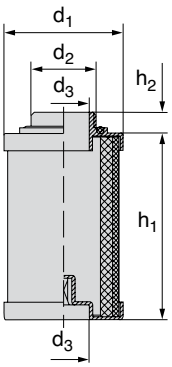


Fig. 7

Order no.	Fig.	Nominal flow rate [m³/min] [cfm]	Dimensions in mm [inches]						with seals
			d_1	d_2	d_3	h_1	h_2	h_3	
49 000 53 108	1	0.1 [3.53]	30 [1.18]	10 [0.39]	10 [0.39]	60 [2.36]	–	–	–
49 000 52 114	2	0.1 [3.53]	35 [1.38]	G 3/8”	–	55 [2.17]	11 [0.43]	–	–
49 000 52 102	2	0.15 [5.30]	35 [1.38]	G 3/8”	–	55 [2.17]	11 [0.43]	–	–
49 000 51 401	4	0.15 [5.30]	55 [2.17]	26.5 [1.04]	29 [1.14]	40 [1.57]	5 [0.20]	–	x
49 000 52 115	2	0.2 [7.06]	35 [1.38]	G 3/8”	–	75 [2.95]	11 [0.43]	–	–
49 000 52 171	2	0.2 [7.06]	35 [1.38]	G 3/8”	–	85 [3.35]	11 [0.43]	–	–
49 000 52 109	2	0.25 [8.83]	35 [1.38]	G 3/8”	–	110 [4.33]	11 [0.43]	–	–
49 000 54 121	4	0.3 [10.59]	55 [2.17]	26.5 [1.04]	29 [1.14]	80 [3.15]	5 [0.20]	–	x
49 000 52 351	6	0.3 [10.59]	55 [2.17]	25.2 [0.99]	–	75 [2.95]	3 [0.12]	–	–
49 000 54 361	7	0.3 [10.59]	55.5 [2.19]	M 25x2	15 [0.59]	77 [3.03]	13 [0.51]	–	x
49 000 52 501	2	0.4 [14.13]	53 [2.09]	28 [1.10]	–	120 [4.72]	9 [0.35]	–	–
49 000 50 391	4	0.4 [14.13]	55 [2.17]	26.5 [1.04]	29 [1.14]	95 [3.74]	5 [0.20]	–	x
49 000 52 352	6	0.4 [14.13]	72 [2.83]	32.2 [1.27]	–	80 [3.15]	2.5 [0.10]	–	–
49 000 53 106	1	0.5 [17.66]	55 [2.17]	25 [0.98]	25 [0.98]	135 [5.31]	–	–	–
49 000 52 271	6	0.5 [17.66]	55 [2.17]	25.2 [0.99]	–	130 [5.11]	3 [0.12]	–	–
49 000 55 251	1	0.5 [17.66]	65 [2.56]	43 [1.69]	43 [1.69]	100 [3.94]	3 [0.12]	–	x
49 000 54 351	7	0.5 [17.66]	72.5 [2.85]	M 32x2	22 [0.87]	83 [3.27]	13 [0.51]	–	x

Air/oil separators for vacuum pumps
Dimensions and order numbers

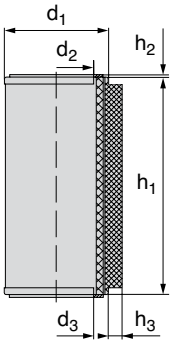


Fig. 1

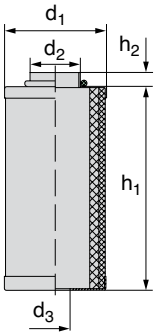


Fig. 2

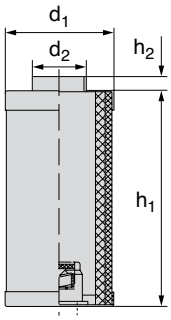


Fig. 3

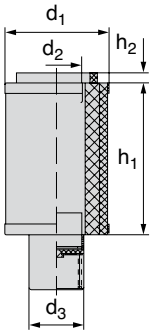


Fig. 4

Order no.	Fig.	Nominal flow rate [m³/min] [cfm]	Dimensions in mm [inches]						with seals
			d_1	d_2	d_3	h_1	h_2	h_3	
49 000 54 201	4	0.6 [21.19]	56 [2.20]	26 [1.02]	29 [1.14]	177 [6.97]	5 [0.20]	–	x
49 000 54 151	1	0.6 [21.19]	65 [2.56]	43 [1.69]	43 [1.69]	100 [3.94]	3 [0.12]	–	x
49 000 54 191	4	0.6 [21.19]	84 [3.31]	51 [2.01]	35.5 [1.40]	100 [3.94]]	5 [0.20]	–	x
49 000 54 131	4	0.7 [24.72]	55 [2.17]	26.5 [1.04]	29 [1.14]	177 [6.97]	5 [0.20]	–	x
49 000 52 353	6	0.7 [24.72]	80 [3.15]	45.2 [1.78]	–	125 [4.92]	3.5 [0.14]	–	–
49 000 54 111	4	0.7 [24.72]	82 [3.23]	52.5 [2.07]	35 [1.38]	100 [3.94]	5 [0.20]	–	x
49 000 52 181	2	0.8 [28.25]	53 [2.09]	28 [1.10]	–	202 [7.95]	9 [0.35]	–	–
49 000 55 241	5	0.8 [28.25]	72 [2.83]	35 [1.38]	3 [0.12]	130 [5.12]	10 [0.39]	–	x
49 000 55 301	7	0.8 [28.25]	82 [3.23]	M 45x3	35 [1.38]	128 [5.04]	14 [0.55]	–	x
49 000 50 611	1	0.9 [31.78]	80 [3.15]	45 [1.77]	45 [1.77]	145 [5.70]	–	–	–
49 000 50 612	1	0.9 [31.78]	80 [3.15]	45 [1.77]	45 [1.77]	145 [5.70]	–	–	–
49 000 54 261	1	1.2 [42.38]	71 [2.80]	41 [1.61]	8.4 [0.33]	227 [8.94]	2 [0.08]	–	x
49 000 55 221	5	1.25 [44.14]	72 [2.83]	35 [1.38]	3 [0.12]	208 [8.19]	10 [0.39]	–	x
49 000 51 451	4	1.3 [45.91]	82 [3.23]	52.5 [2.07]	35 [1.38]	200 [7.87]	5 [0.20]	–	x
49 000 53 107	1	1.4 [49.44]	70 [2.76]	41 [1.61]	41 [1.61]	250 [9.84]	–	–	–
49 000 52 103	2	1.45 [51.21]	72 [2.83]	35 [1.38]	–	252 [9.92]	9 [0.35]	–	–
49 000 50 571	3	1.45 [51.21]	72 [2.83]	35 [1.38]	–	252 [9.92]	9 [0.35]	–	–
49 000 52 201	2	1.5 [52.97]	72 [2.83]	35 [1.38]	–	252 [9.92]	9 [0.35]	–	–

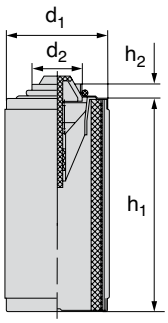


Fig. 5

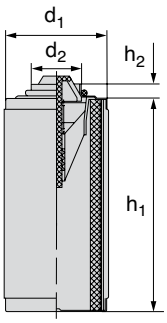


Fig. 6

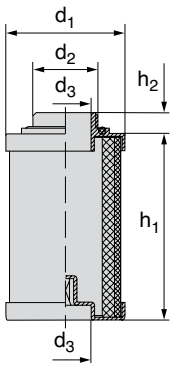
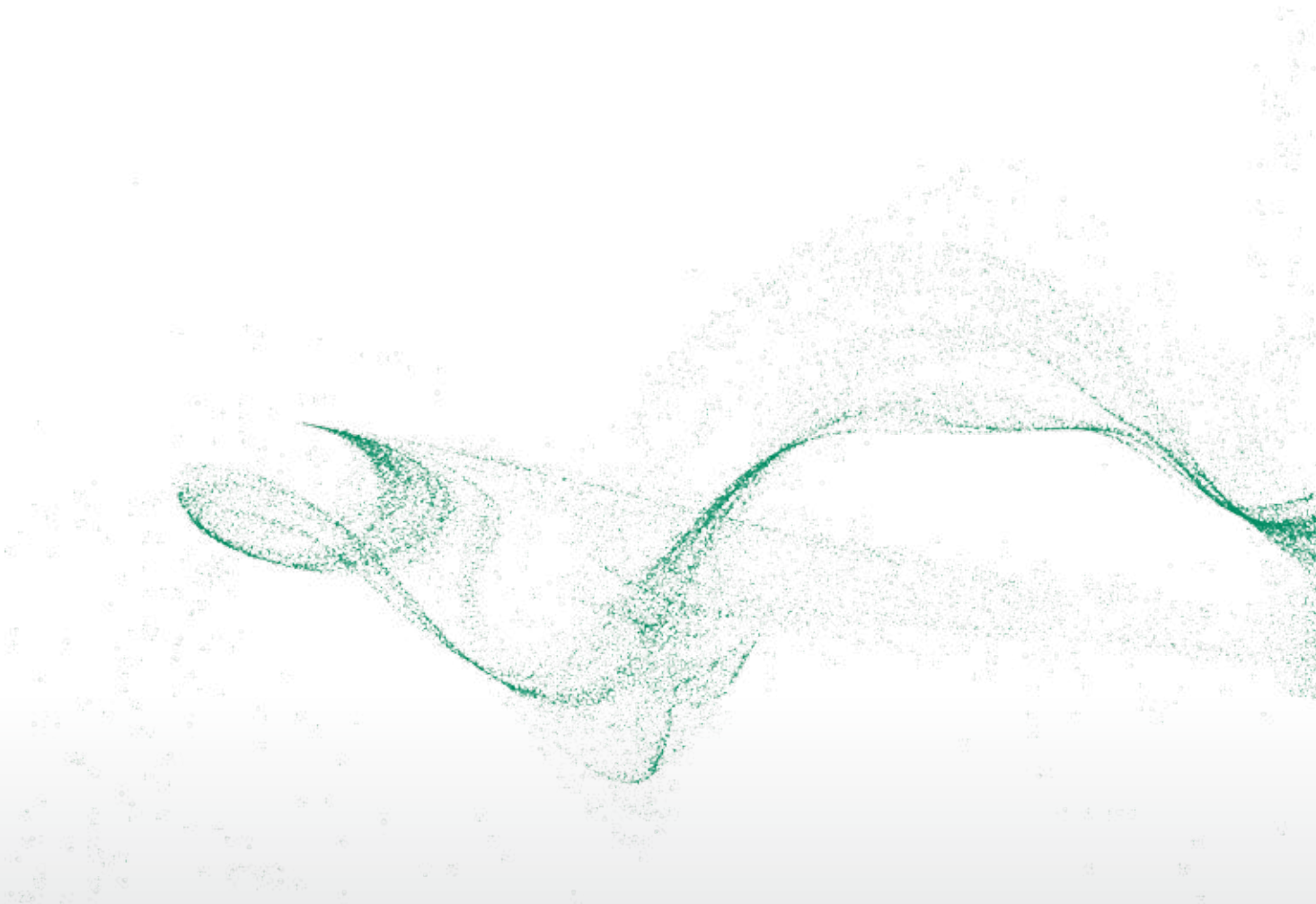


Fig. 7

Order no.	Fig.	Nominal flow rate [m³/min] [cfm]	Dimensions in mm [inches]						with seals
			d_1	d_2	d_3	h_1	h_2	h_3	
49 000 55 341	2	1.5 [52.97]	72 [2.83]	35 [1.38]	3 [0.12]	250 [9.84]	9 [0.35]	–	x
49 000 55 231	5	1.5 [52.97]	72 [2.83]	35 [1.38]	3 [0.12]	250 [9.84]	10 [0.39]	–	x
49 001 53 112	1	1.8 [63.57]	70 [2.76]	41 [1.61]	41 [1.61]	330 [12.99]	–	–	–
49 000 50 461	1	2.0 [70.63]	108 [4.25]	73 [2.87]	73 [2.87]	220 [8.66]	6 [0.24]	12 [0.47]	x
49 001 52 171	2	2.2 [77.69]	72 [2.83]	35 [1.38]	–	377 [14.84]	9 [0.35]	–	–
49 000 50 651	3	2.2 [77.69]	72 [2.83]	35 [1.38]	–	377 [14.84]	9 [0.35]	–	–
49 001 55 171	2	2.3 [81.22]	72 [2.83]	35 [1.38]	3 [0.12]	375 [14.76]	10 [0.39]	–	x
49 001 55 201	5	2.3 [81.22]	72 [2.83]	35 [1.38]	3 [0.12]	375 [14.76]	10 [0.39]	–	x
49 001 54 100	1	2.5 [88.29]	108 [4.25]	73 [2.87]	73 [2.87]	285 [11.22]	6 [0.24]	12 [0.47]	x
49 001 52 110	2	2.5 [88.29]	82 [3.23]	50 [1.97]	9 [0.35]	380 [14.96]	10 [0.39]	–	x
49 000 51 341	4	2.65 [93.58]	82 [3.23]	52.5 [2.07]	35 [1.38]	400 [15.75]	5 [0.20]	–	x
49 001 54 281	1	2.70 [95.35]	71 [2.80]	41 [1.61]	8.4 [0.33]	398.5 [15.69]	2 [0.08]	25 [0.98]	x
49 001 52 151	2	2.90 [102.41]	72 [2.83]	35 [1.38]	–	502 [19.76]	9 [0.35]	–	–
49 001 52 172	2	2.90 [102.41]	72 [2.83]	35 [1.38]	–	502 [19.76]	9 [0.35]	–	–
49 000 50 661	3	2.90 [102.41]	72 [2.83]	35 [1.38]	–	502 [19.76]	9 [0.35]	–	–
49 001 55 181	2	3.10 [109.48]	72 [2.83]	35 [1.38]	3 [0.12]	500 [19.69]	10 [0.39]	–	x
49 001 55 191	5	3.10 [109.48]	72 [2.83]	35 [1.38]	3 [0.12]	500 [19.69]	10 [0.39]	–	x
49 002 52 171	2	3.60 [127.13]	82 [3.23]	50 [1.97]	9 [0.35]	540 [21.26]	10 [0.39]	–	x

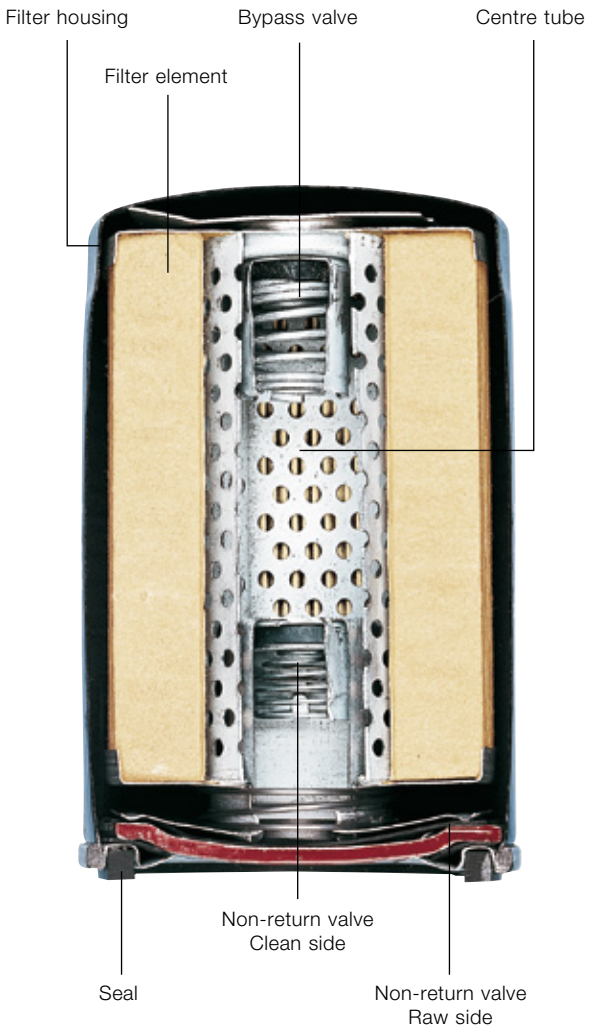


Oil filters for vacuum pumps

MANN+HUMMEL Oil filters for vacuum pumps

MANN+HUMMEL spin-on filters are used for the filtration of oil in vacuum pumps. The oil has a cooling, lubricating and sealing function. It prevents wear. Efficient oil filtration lengthens the life of the machine and its availability. MANN+HUMMEL has been a leading manufacturer of spin-on filters for some decades. The filters are distributed under the MANN-FILTER brand and also under numerous customer brands.

Sectional view



The advantages at a glance:

- Available with different filter media
- Efficient separation and high dirt holding capacity with low pressure drop
- Robust, corrosion-free housing with high pulsation and pressure stability
- Geometry optimised for flow
- Bypass valves with clearly defined opening characteristics and leakage-free closing
- Seal attached to housing
- Stable, collapse-resistant centre tube
- Non-return valve with low pressure drop

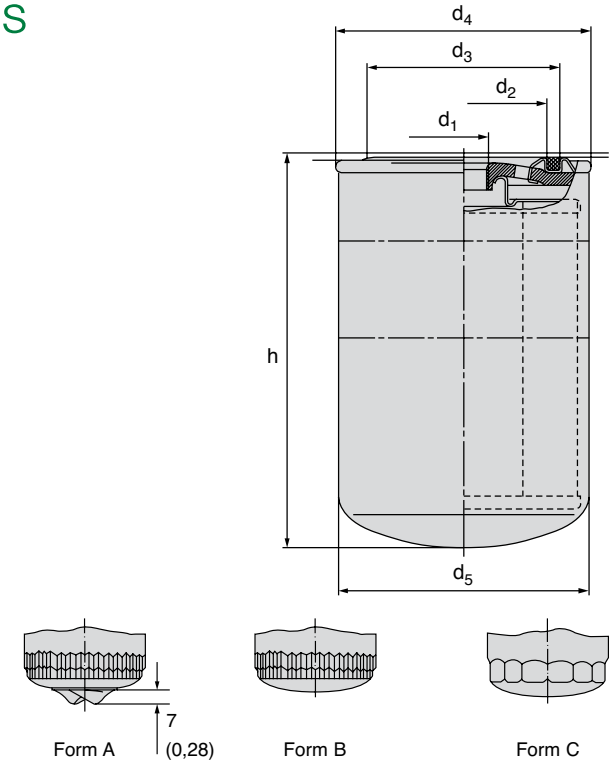
Design

The spin-on filter consists of a robust metal housing with a filter element fitted inside. Depending on the application, the spin-on filter can be equipped with various components such as a different filter medium, a non-return valve, a bypass valve, etc.. The liquid to be filtered flows into the cover plate through concentric openings, flows through the filter element and finally the cleaned liquid exits through the central connection. An undetachable seal integrated in the cover plate ensures optimum sealing to the outside under all operating conditions.

Maintenance

The time when to perform maintenance is defined by the vacuum pump manufacturer. The maintenance is limited to replacing the complete spin-on filter. Use a MANN+HUMMEL filter wrench to easily untighten a spin-on filter.

Oil filters for vacuum pumps
W-type for the main flow



MANN+HUMMEL spin-on filters for oil are usually used in the main flow so that the full volume of oil flows through the filter. As an option a bypass valve can be fitted which opens with a cold start so that an adequate supply of oil is ensured at all times.
On request the integration of a non-return valve is also possible on the raw and clean side which prevents the spin-on filter from running dry when the vacuum pump is standing still.
As a result when the pump starts the oil reaches the areas more quickly where cooling and lubrication is required.

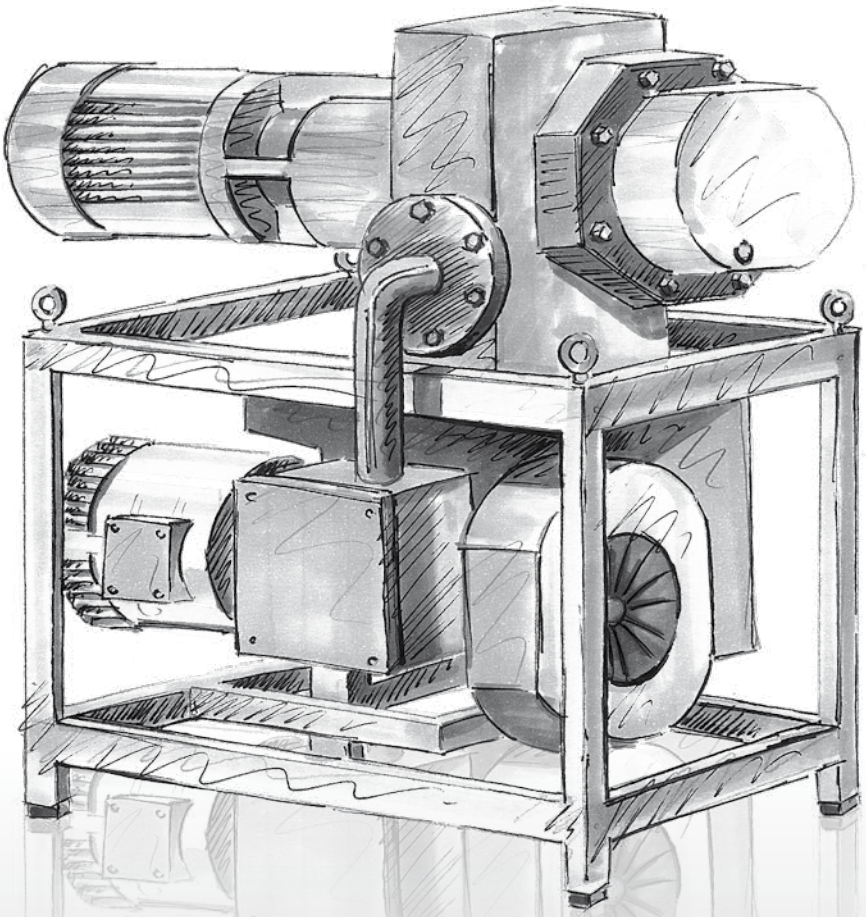
Design of the spin-on filters
The dimension tables refer to these forms.

MANN-FILTER	Nominal flow rate [l/min] [gpm]	Dimensions in mm [inches]						Filter fineness acc. to ISO 16 889 [m (c)]* at 50% 99% separation efficiency		Non-return valve [bar]	Bypass valve [bar]	Permissible operating pressure [bar]	Form
		d_1	d_2	d_3	d_4	d_5	h						
W 712/20	15 [3.96]	¾“ - 16 UNF	62 [2.44]	71 [2.80]	80 [3.15]	76 [2.99]	79 [3.11]	20	>50	-	2.5	14	C
W 712/4	20 [5.28]	¾“ - 16 UNF	62 [2.44]	71 [2.80]	80 [3.15]	76 [2.99]	93 [3.66]	20	>50	0.12	2.5	14	C
W 712/52	15 [3.96]	¾“ - 16 UNF	62 [2.44]	71 [2.80]	80 [3.15]	76 [2.99]	79 [3.11]	14	38	0.12	2.5	14	C
W 719/14	25 [6.61]	¾“ - 16 UNF	62 [2.44]	71 [2.80]	80 [3.15]	76 [2.99]	123 [4.84]	20	>50	0.12	2.5	14	C
W 719/30	25 [6.61]	¾“ - 16 UNF	62 [2.44]	71 [2.80]	80 [3.15]	76 [2.99]	123 [4.84]	14	38	0.12	2.5	14	C
W 920	30 [7.93]	¾“ - 16 UNF	62 [2.44]	71 [2.80]	96 [3.78]	93 [3.66]	95 [3.74]	20	>50	0.12	2.5	14	A
W 920/7	30 [7.93]	¾“ - 16 UNF	62 [2.44]	71 [2.80]	96 [3.78]	93 [3.66]	95 [3.74]	14	38	0.12	1.5	14	B
W 930	30 [7.93]	¾“ - 16 UNF	62 [2.44]	71 [2.80]	96 [3.78]	93 [3.66]	114 [4.49]	20	>50	0.12	2.5	14	A
W 930/21	30 [7.93]	¾“ - 16 UNF	62 [2.44]	71 [2.80]	96 [3.78]	93 [3.66]	114 [4.49]	14	38	0.12	3.0	14	B
W 940	50 [13.21]	¾“ - 16 UNF	62 [2.44]	71 [2.80]	96 [3.78]	93 [3.66]	142 [5.59]	20	>50	0.12	2.5	14	A

Exemplary selection from our range of filters. Numerous variations with other media, valve equipment, sealing materials, release aids, etc. are also available.
* Compared to the calibration formerly used for the same filter, the new calibration lists a low filter fineness for small particles.

Technical appendix

Conversion tables, filter glossary and range of catalogues



Conversion tables

Pressure, weight, temperature, performance

Pressure				
5 mbar	=	0.5 kPa	=	2“ H_2O
10 mbar	=	1.0 kPa	=	4“ H_2O
15 mbar	=	1.5 kPa	=	6“ H_2O
20 mbar	=	2.0 kPa	=	8“ H_2O
25 mbar	=	2.5 kPa	=	10“ H_2O
30 mbar	=	3.0 kPa	=	12“ H_2O
35 mbar	=	3.5 kPa	=	14“ H_2O
40 mbar	=	4.0 kPa	=	16“ H_2O
45 mbar	=	4.5 kPa	=	18“ H_2O
50 mbar	=	5.0 kPa	=	20“ H_2O
55 mbar	=	5.5 kPa	=	22“ H_2O
60 mbar	=	6.0 kPa	=	24“ H_2O
65 mbar	=	6.5 kPa	=	26“ H_2O
70 mbar	=	7.0 kPa	=	28“ H_2O
75 mbar	=	7.5 kPa	=	30“ H_2O
80 mbar	=	8.0 kPa	=	32“ H_2O

Weight								
10 g	=		=	0.35 ounces	=			
25 g	=		=	0.88 ounces	=			
50 g	=		=	1.75 ounces	=			
100 g	=		=	3.5 ounces	=			
250 g	=		=	8.8 ounces	=			
500 g	=		=	17.6 ounces	=			
1,000 g	=	1 kg	=	35.3 ounces	=	2.2 lb		
2,000 g	=	2 kg	=	70.5 ounces	=	4.4 lb		
3,000 g	=	3 kg	=	105.8 ounces	=	6.6 lb		
4,000 g	=	4 kg	=	141.1 ounces	=	8.8 lb		
5,000 g	=	5 kg	=	176.4 ounces	=	11.03 lb		
10,000 g	=	10 kg	=		=	22.05 lb		
20,000 g	=	20 kg	=		=	44.1 lb		
50,000 g	=	50 kg	=		=	110.23 lb		

Temperature		
-30 °C	=	-22.0 °F
-10 °C	=	14.0 °F
0 °C	=	32.0 °F
10 °C	=	50.0 °F
30 °C	=	86.0 °F
50 °C	=	122.0 °F
80 °C	=	176.0 °F
100 °C	=	212.0 °F
120 °C	=	248.0 °F

Performance		
10 kW	=	13.4 HP
20 kW	=	26.8 HP
50 kW	=	67.1 HP
100 kW	=	134.1 HP
150 kW	=	201.2 HP
200 kW	=	268.2 HP
250 kW	=	335.3 HP
500 kW	=	670.5 HP
1,000 kW	=	1341.0 HP

Conversion tables
Volume flow rate

Volume flow rate $m^3/min \rightarrow cfm$		
1 m^3/min	=	35.3 cfm
1.7 m^3/min	=	60.0 cfm
2 m^3/min	=	70.6 cfm
3 m^3/min	=	105.9 cfm
4 m^3/min	=	141.3 cfm
4.5 m^3/min	=	158.9 cfm
6 m^3/min	=	211.9 cfm
8 m^3/min	=	282.5 cfm
10 m^3/min	=	353.1 cfm
12 m^3/min	=	423.8 cfm
15 m^3/min	=	529.7 cfm
18 m^3/min	=	635.7 cfm
20 m^3/min	=	706.3 cfm
21 m^3/min	=	741.6 cfm
24 m^3/min	=	847.6 cfm
25 m^3/min	=	882.9 cfm
28 m^3/min	=	988.8 cfm
32 m^3/min	=	1130.1 cfm
37 m^3/min	=	1306.6 cfm
40 m^3/min	=	1412.6 cfm
42 m^3/min	=	1483.2 cfm
50 m^3/min	=	1765.7 cfm
60 m^3/min	=	2118.9 cfm
80 m^3/min	=	2825.2 cfm
100 m^3/min	=	3531.5 cfm

Volume flow rate $cfm \rightarrow m^3/min$		
25 cfm	=	0.7 m^3/min
50 cfm	=	1.4 m^3/min
75 cfm	=	2.1 m^3/min
100 cfm	=	2.8 m^3/min
150 cfm	=	4.2 m^3/min
200 cfm	=	5.7 m^3/min
250 cfm	=	7.1 m^3/min
300 cfm	=	8.5 m^3/min
350 cfm	=	9.9 m^3/min
400 cfm	=	11.3 m^3/min
450 cfm	=	12.7 m^3/min
500 cfm	=	14.2 m^3/min
550 cfm	=	15.6 m^3/min
600 cfm	=	17.0 m^3/min
650 cfm	=	18.4 m^3/min
700 cfm	=	19.8 m^3/min
750 cfm	=	21.2 m^3/min
800 cfm	=	22.7 m^3/min
850 cfm	=	24.1 m^3/min
900 cfm	=	25.5 m^3/min
950 cfm	=	26.9 m^3/min
1,000 cfm	=	28.3 m^3/min
1,500 cfm	=	42.5 m^3/min
2,000 cfm	=	56.6 m^3/min
3,000 cfm	=	85.0 m^3/min

Filter glossary

Bypass valve
Ensures oil flow to the lubrication point, e.g. during a cold start with thick oil or a clogged filter.

Clean air line
The pipe downstream of the air cleaner through which the cleaned air is directed to the vacuum pump.

Dirt holding capacity [g]
The dirt holding capacity of a filter or filter element is the mass of the dirt which under laboratory conditions is added to the filter until the agreed end of a test has been reached.

Dirt load
The volume of dirt which a filter can retain.

Europiclon
A MANN+HUMMEL brand for a two-stage air cleaner series in plastic.

Flow resistance Δp
Measured in [mbar] or [kPa]. Measured variable for the pressure drop of a filter.

Laboratory dust capacity
Measured in [g]. The measured quantity of a defined test dust which is added to a filter under laboratory conditions until the service point is reached.

Medium
Material used to carry out the filtration.

Nominal flow rate m^3
Measured in [m^3/min]. Describes the design point of an air cleaner. Depending on the design or series the nominal flow rate describes the volume flow with which the filter has a pressure drop of 25 mbar or 30 mbar.

Nominal pressure [bar/mbar/kPa]
The pressure for which the filter is designed.

Preseparation efficiency
Measured as a [%] of the dust volume which is separated in the first stage of a two-stage filter.

Raw air line
The intake pipe upstream of the air cleaner through which the sucked-in ambient air is fed to the air cleaner.

Single-stage filter
Air cleaner without preseparation. Available with or without a secondary element.

Spin-on filter
A filter which during maintenance is completely replaced together with its integrated filter element.

Two-stage filter
A filter housing with integrated filtration stage for preseparation of dust from the intake air.

Viscosity
The dynamic viscosity is a measure of the internal friction of a fluid. The kinematic viscosity represents the dynamic viscosity of the medium per unit density.

Volume flow rate $\dot{V}$
Measured in [m^3/min]. Flow volume per unit of time.

The range of catalogues for industrial filters
A selection

MANN+HUMMEL
Air cleaners

Catalogue order no.
19 941 10 100 (German)
19 941 10 101 (English)
Further languages available on request.

ProVent

The series for crankcase ventilation

Catalogue order no.
19 944 10 100 (German)
19 944 10 101 (English)
Further languages available on request.

PreLine

Prefilters for diesel fuel

Catalogue order no.
W9 942 21 100 (German)
W9 942 21 101 (English)
Further languages available on request.

Filters for liquids

Spin-on filters
Fuel filters
In-line filters

Catalogue order no.
19 942 10 100 (German)
19 942 10 101 (English)
Further languages available on request.

MANN+HUMMEL Group

The MANN+HUMMEL Group is a company with international operations and employs 16,000 people worldwide at more than 60 international locations. The company develops, produces and sells technically complex components and systems for the automotive industry and the field of mechanical engineering.
A key area is high-quality filtration products for vehicles, engines and industrial applications. The OEM business with leading global manufacturers in the fields of vehicles, machines and plants form the basis for the quality and high performance of the products. Filters for the international aftermarket are sold under numerous well-known customer brands as well as under the company's own MANN-FILTER brand.

MANN+HUMMEL Industrial Filtration
The Industrial Filtration Business Unit with its headquarters in Speyer, Germany, specialises in meeting the requirements of off-highway vehicle and engine applications, compressed air and vacuum technology, mechanical engineering and plant construction. Under the Vokes Air brand the company also produces filtration solutions for HVAC and process air applications.

MANN+HUMMEL Industrial Filtration offers high-performance products for these and other industrial fields for the filtration and separation of air, gases and liquids.

Thanks to the quick and easy distributor/partner network and its global sales networks the products are available at any time at almost any location.

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