



MANN+HUMMEL Air Cleaners

MANN+HUMMEL Industrial Filters

The MANN+HUMMEL Group is an international company with its headquarters in Ludwigsburg, Germany. The group employs approx. 9100 people worldwide at more than 40 locations.

The company develops, produces and sells technically complex components for the

automotive industry and many other fields. A key area is high quality filtration products for vehicles, engines and industrial applications. The OEM business with global market leaders and producers of vehicles, machines and installations defines the quality and performance of the group. Filters for the

international aftermarket are sold under numerous international brands as well as under the MANN-FILTER brand.

The Industrial Filters Business Unit with its headquarters in Speyer, Germany is specialised in meeting the requirements of off-highway vehicle

and - engine applications, compressed air and vacuum technology, 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.

Air cleaners for many fields of application

Modern, high performance vehicles, machines, devices and engines require filters and components with a correspondingly high performance. The documentation presented here will give you an overview of our air cleaners and the respective accessories – naturally in the renowned MANN+HUMMEL OEM quality. Since our customers operate in many varied fields, such as

- construction machines
- agricultural machines
- compressors
- mechanical engineering
- engines and gear units
- commercial and customised vehicles, etc.

MANN+HUMMEL has extensive experience elaborating individual concepts and solutions for your special field of application.

Close to you

Production facilities and sales offices at various locations in Europe, America, South America and in Asia enable the clarification of technical questions locally. A subsidiary company or representative located near you means we are always available to offer you assistance.

How to find your contact partner:

If you are not yet in contact with MANN+HUMMEL or one of our representatives, please call

Tel.: +49 (62 32) 53-80
Fax: +49 (62 32) 53-88 99

and name your field of application. We will then pass you on to the appropriate sales team.

Information is also available in the internet at:
www.mann-hummel.com
E-Mail: if.info@mann-hummel.com

Contents

Company profile	Page 2
Contents	Page 3
MANN-HUMMEL New products	Page 4
Product overview	Page 6
PicoFlex®	Page 11
Europiclon®	Page 19
NLG	Page 33
NLG Pico	Page 34
NLG Piclon	Page 35
NLG DualSpin® Combination air cleaners	Page 35
Piclon	Page 49
Pico-E	Page 59
Oil-bath air cleaners	Page 67
Inline Piclon	Page 73
Picolino	Page 77
Picolight	Page 85
Oil-wetted air cleaners	Page 89
Vacuum air cleaners	Page 93
Air cleaners for two-way ventilation	Page 97
Silencer cleaners	Page 97
Accessories	Page 103
Brackets	Page 105
Rain caps	Page 108
Precleaners	Page 110
Air connecting parts	Page 114
Ejectors	Page 122
Service switches/service indicators	Page 124
Technical Appendix	Page 129
Glossary	Page 130
Filter configuration	Page 132
Servicing and installation instructions	Page 136
MANN+HUMMEL Industrial Filters Worldwide	Page 138
Conversion table (folding flap)	

MANN+HUMMEL New products



PicoFlex®

The new PicoFlex® air cleaner developed by MANN+HUMMEL meets the current and future requirements for greater air throughput with simultaneously less installation space. The innovative filtration technology of the PicoFlex® in its robust housing of polyamide reinforced with fibre-glass offers the ideal solution for demanding applications.

The PicoFlex® line will cover flow rates in the range of 4.5 m³/min to 18 m³/min.

Advantages at a glance:

- lower space requirement (-40%) compared with conventional filters with the same service life
- compact design

- long service life
- flexible use of available installation space
- very easy to maintain
- inline air flow enables new installation possibilities
- connection for service switch integrated in housing
- metal-free filter elements are easily disposed of by incineration and therefore are environmentally friendly with inexpensive disposal
- variable installation positions
- easy solution for fitting to a bracket

Further information on the new PicoFlex® line is available on page 11 of this brochure or on our CD-ROM "PicoFlex® interactive" which can be ordered from your MANN+HUMMEL partner under the order no. 19 941 20 500.

CompacPlus® Filter Element

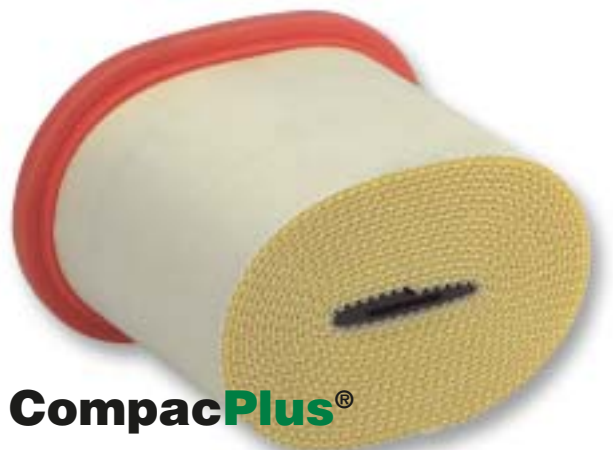
The core of the PicoFlex® is the CompacPlus® filter element newly developed by MANN+HUMMEL. This innovative element is characterised by its special design with alternately closed filtration channels and offers producers and users a number of advantages.

Advantages at a glance:

- high dust capacity
- 50% greater filter surface area compared with star-pleated elements
- minimal pressure drop
- inline air flow
- reliable axial seal
- metal-free filter elements are easily disposed of by incineration and therefore are environmentally friendly with inexpensive disposal

The many advantages of the CompacPlus® element make it particularly suitable for use in the PicoFlex® air cleaner. In addition, the element is also suitable for use in a number of other applications,

e.g. as a single-stage air cleaner for compressors. Our technical sales personnel will be happy to advise you on the extensive possibilities offered by the CompacPlus®.



 **CompacPlus®**

MANN+HUMMEL New products

Europiclón® 50

MANN+HUMMEL has extended the proven Europiclón® line with the Europiclón® 50 which was developed specially for engines and machines up to approx. 20 kW (27 HP) – corresponding to a flow rate of up to 2 m³/min.

Advantages at a glance:

- high filtration performance in a robust housing
- connection for service switch integrated in housing
- flexible bracket

- also available with 90° clean air elbow
- minimal pressure drop, especially when using a secondary element
- easy to maintain
- metal-free filter elements are easily disposed of by incineration and therefore are environmentally friendly with inexpensive disposal

Further information on the new Europiclón® 50 is available on page 26 of this brochure.



Europiclón® 50 with main element and secondary element

NLG and DualSpin® Precleaners

The new NLG line from MANN+HUMMEL offers a flexible and economic solution for many applications in the field of air filtration. The NLG filters are available in different configurations:

- NLG Pico version as single-stage cleaner for low to medium dust loads
- NLG Piclon version as two-stage air cleaner for medium to heavy dust loads
- NLG Combination air cleaner as two-stage air cleaner with DualSpin® pre-cleaner for particularly heavy dust loads

The NLG line covers flow rates in the range of 10 m³/min to 50 m³/min.

Advantages at a glance:

- different configurations make it suitable for almost all applications
- high flexibility and economy through modular system with standard parts
- easy element change without tools
- metal-free filter elements are easily disposed of by incineration and therefore are environmentally friendly with inexpensive disposal
- three different positions for the dirty air connection
- threaded inserts enable easy fitting

Further information on the new NLG line is available on page 33 of this brochure.



NLG Pico Combination filter with DualSpin® pre-cleaner



NLG Pico

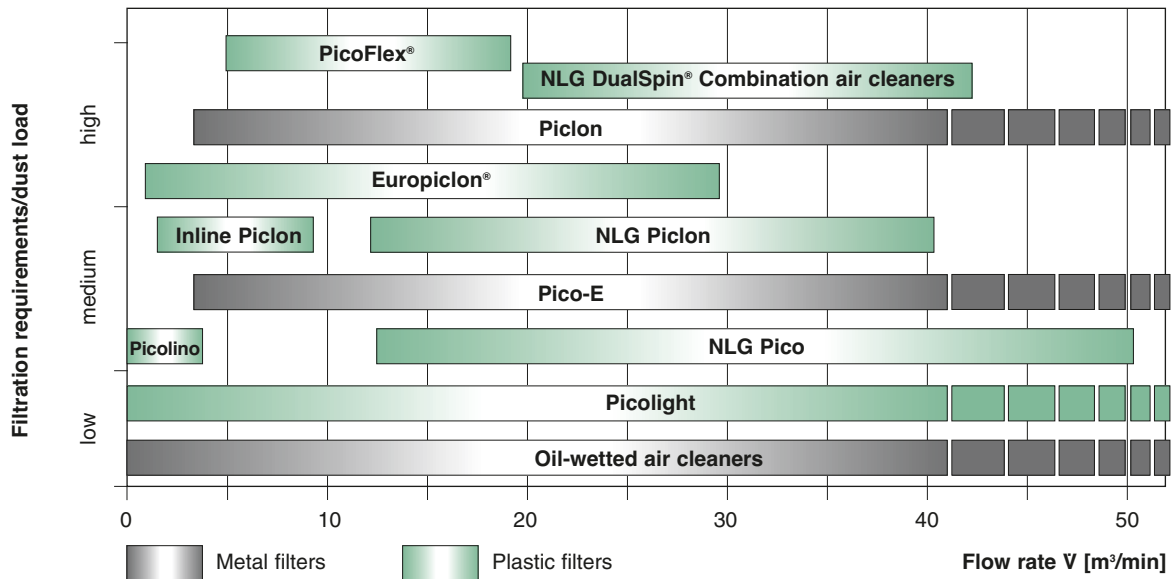


NLG filter elements



NLG Piclon

Product overview



PicoFlex®

Design
 Volumetric flow range
 Operating temperature

Pre-separation
 Main element

Secondary element

Selection criteria

Typical applications

Page 11

Two-stage air cleaner
 Plastic 4.5 m³/min to 18 m³/min*
 Continuous: -30 °C to +100 °C
 For short periods: +120 °C
 Multi-cyclone block
 CompacPlus® element, axial seal – metal-free
 Flat element with frame, radial seal – metal-free
 Very long service life for arduous conditions
 Construction and agricultural machines with small packaging envelope and highest requirements, e.g. loaders and tractors



Europiclon®

Design
 Volumetric flow range
 Operating temperature

Pre-separation
 Main element

Secondary element

Selection criteria

Typical applications

Page 19

Two-stage plastic air cleaner
 0.8 m³/min to 28 m³/min
 Continuous: -40 °C to +80 °C
 For short periods: +100 °C
 Tangential inlet
 Star-pleated element, centre tube in the housing, radial seal, metal-free
 Synthetic fabric element with centre tube, radial seal, metal-free
 Flexibility and economy with longer service life
 Construction and agricultural machines, mobile compressors



* see page 18

Product overview

NLG Pico

Design
Volumetric flow range
Operating temperature

Main element

Secondary element

Selection criteria

Typical applications

Page 34

Single-stage plastic air cleaner
10 m³/min to 50 m³/min
Continuous: -40 °C to +80 °C
For short periods: +100 °C
Star-pleated element with centre tube, radial seal, metal-free
Synthetic fabric element with centre tube, radial seal, metal-free
Low pressure drop and highly economical with low dust loads
Trucks, mobile cranes, buses, stationary compressors, generators



NLG Piclon

Design
Volumetric flow range
Operating temperature

Pre-separation

Main element

Secondary element

Selection criteria

Typical applications

Page 35

Two-stage plastic air cleaner
10 m³/min to 40 m³/min
Continuous: -40 °C to +80 °C
For short periods: +100 °C
Vane to generate air spin
Star-pleated element with centre tube, radial seal, metal-free
Synthetic fabric element with centre tube, radial seal, metal-free
Highly economical with medium dust loads
Mobile compressors, mobile cranes, construction site trucks, construction and agricultural machines



NLG DualSpin® Combination air cleaners

Design
Volumetric flow range
Operating temperature

Pre-separation

Main element

Secondary element

Selection criteria

Typical applications

Page 35

Two-stage plastic air cleaner
20 m³/min to 40 m³/min
Continuous: -40 °C to +80 °C
For short periods: +100 °C
External monocyclone with integrated pressure regeneration (DualSpin®)
Star-pleated element with centre tube, radial seal, metal-free
Synthetic fabric element with centre tube, radial seal, metal-free
Long service life with heavy dust conditions
Combine harvesters, field choppers, harvesting machines, construction and agricultural machines in very dusty conditions



Product overview

Piclon

Page 49

Design	Two-stage metal air cleaner
Volumetric flow range	2 m ³ /min to 60 m ³ /min
Operating temperature	Continuous: -40 °C to +100 °C For short periods: +120 °C
Pre-separation	Vane to generate air spin
Main element	Star-pleated element with centre tube, axial seal, reinforced with metal
Secondary element	Synthetic fabric element with centre tube, axial seal, reinforced with metal
Selection criteria	Long service life with very high mechanical stress on the housing
Typical applications	Construction and agricultural machines, engine construction



Pico-E

Page 59

Design	Single-stage metal air cleaner
Volumetric flow range	4.5 m ³ /min to 60 m ³ /min
Operating temperature	Continuous: -40 °C to +100 °C For short periods: +120 °C
Main element	Star-pleated element with centre tube, axial seal, reinforced with metal
Secondary element	Synthetic fabric element with centre tube, axial seal, reinforced with metal
Selection criteria	Low pressure drop with very high mechanical stress on the housing
Typical applications	Compressors, generators



Inline Piclon

Page 73

Design	Two-stage plastic air cleaner
Volumetric flow range	3 m ³ /min to 8 m ³ /min
Operating temperature	Continuous: -40 °C to +80 °C For short periods: +100 °C
Pre-separation	Vane to generate air spin
Main element	Star-pleated element with centre tube, axial seal, reinforced with metal
Secondary element	Synthetic fabric element with centre tube, axial seal, reinforced with metal
Selection criteria	Linear air flow when fitting to engine and medium dust loads
Typical applications	General mechanical engineering and vehicle construction



Product overview

Picolino

Design
Volumetric flow range
Operating temperature

Filter element

Typical applications

Page 77

Single-stage plastic air cleaner
0.15 m³/min to 3.2 m³/min
Continuous: -30 °C to +100 °C
For short periods: +120 °C
Star-pleated element, radial seal, metal-free
Filters for two-way ventilation, small engines, small piston compressors, general mechanical engineering



Picolight

Design
Volumetric flow range
Operating temperature

Filter element

Typical applications

Page 85

Single-stage air cleaner without housing
1 m³/min to 100 m³/min
Continuous: -30 °C to +80 °C
For short periods: +100 °C
Star-pleated element, radial seal, metal-free
Stationary compressors, generators, marine applications



Oil-wetted air cleaners

Design
Volumetric flow range
Operating temperature

Filter element

Typical applications

Page 89

Single-stage air cleaner without housing
0.5 m³/min to 100 m³/min
Continuous: -30 °C to +100 °C
For short periods: +130 °C
Steel mesh wetted with oil, radial seal
Stationary compressors, generators, marine applications



Vacuum filters

Design
Volumetric flow range
Operating temperature

Filter element

Typical applications

Page 93

Single-stage metal air cleaner
0.7 m³/min to 12 m³/min
Continuous: -30 °C to +80 °C
For short periods: +100 °C
Star-pleated element with centre tube, axial seal, reinforced with metal
Air and gas pipes with negative pressure (vacuum pumps)



MANN+HUMMEL



MANN+HUMMEL PicoFlex®
The new compact air cleaner
for your highest requirements

PicoFlex®: An intelligent solution

The new PicoFlex® air cleaner developed by MANN+HUMMEL meets the current and future requirements for greater

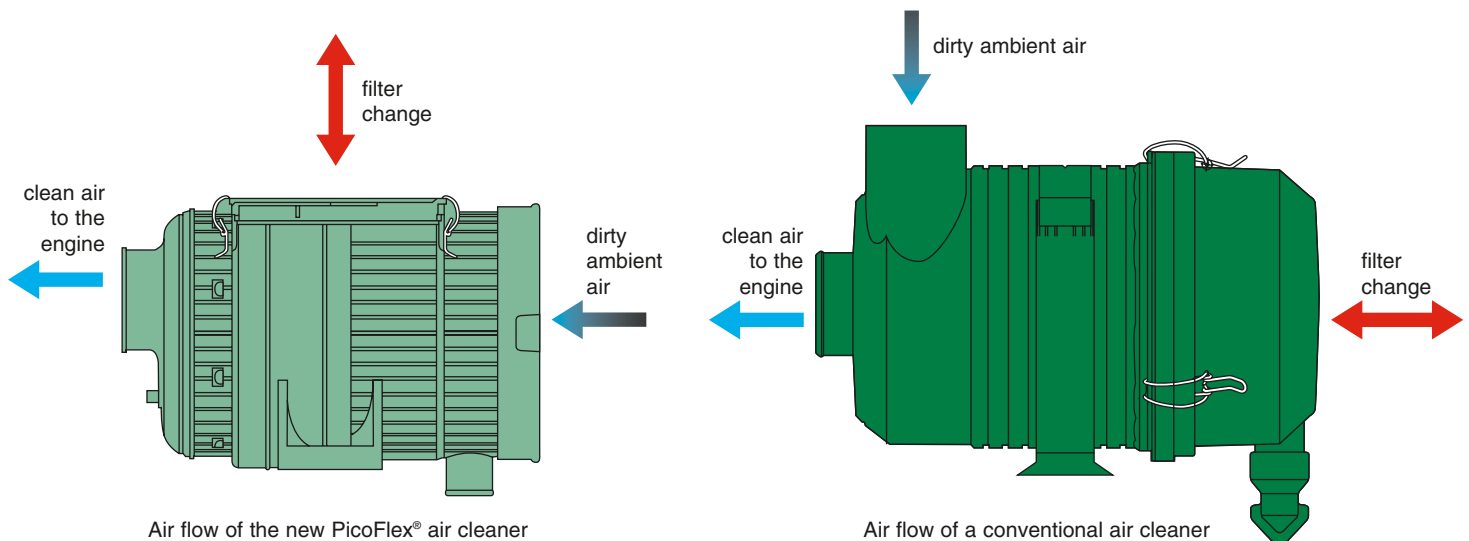
air throughput with simultaneously less installation space and offers the ideal solution for demanding applications.

Advantages at a glance:

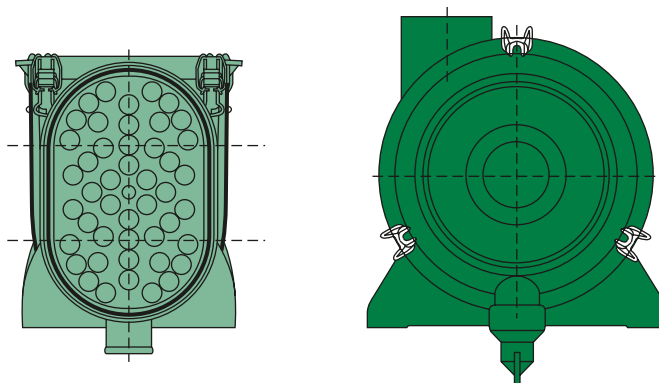
- low space requirement through compact design
- long filter service life through highly efficient multi-cyclone block pre-cleaner and CompacPlus® compact element with patent pending
- highest reliability through filter element with axial seal and additional secondary element with radial seal
- especially easy to maintain via side access to the filter element, removal of the air pipes is not required
- inline air flow enables new installation possibilities
- easy monitoring of dirt accumulation level through integrated connection for service switch
- cleaning the multi-cyclone block made easy through a central fixing screw
- metal-free filter elements are easily disposed of by incineration and therefore are environmentally friendly with inexpensive disposal
- problem-free fitting to different units through variable installation positions
- quick first-fit through various fixing possibilities



The innovative inline concept



An air cleaner suitable for small packaging envelopes



A size comparison with a conventional air cleaner having a similar filter service life clearly shows that the PicoFlex® saves valuable installation space!

Pre-separation



PicoFlex® Multi-cyclone block

A more efficient pre-cleaner leads to a longer filter service life and as a result it is not necessary to change the filter element as often – an advantage which has an immediate effect on the economy of the machine.

The best and most technically demanding solution is achieved by the connection in parallel of many small, separate pre-cleaner cells in a multi-cell separator, the

so-called multi-cyclone block. The MANN+HUMMEL multi-cyclone block of the PicoFlex® with its 46 pre-cleaner cells is a real filtration highlight with an efficiency of more than 95% and has a patent pending. Compared with a conventional standard two-stage air cleaner with a pre-separation efficiency of 85% the PicoFlex® multi-cyclone block offers dust pre-separation which is three times as effective.

CompacPlus® Filter element

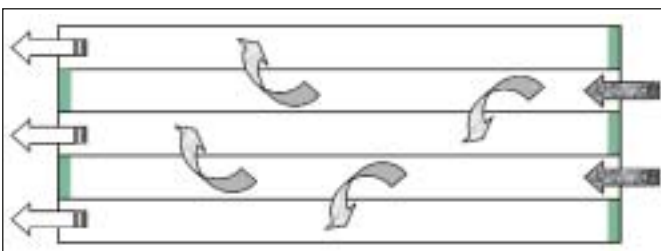
The core of the PicoFlex® is the new CompacPlus® compact element developed by MANN+HUMMEL which has a patent pending. In comparison with a conventional filter element the CompacPlus® offers a 50% higher filter surface area in the same installation space. This is achieved by a special design with alternately closed filtration channels. A further advantage of this special design is the linear air flow

which allows an inline design and enables completely new installation possibilities.

The metal-free filter element is easily disposed of by incineration and therefore environmentally friendly. The element carrier frame is re-used which makes it only necessary to change the filter insert with the integrated seal. In this way the PicoFlex® is able to make a contribution towards conservation of resources.

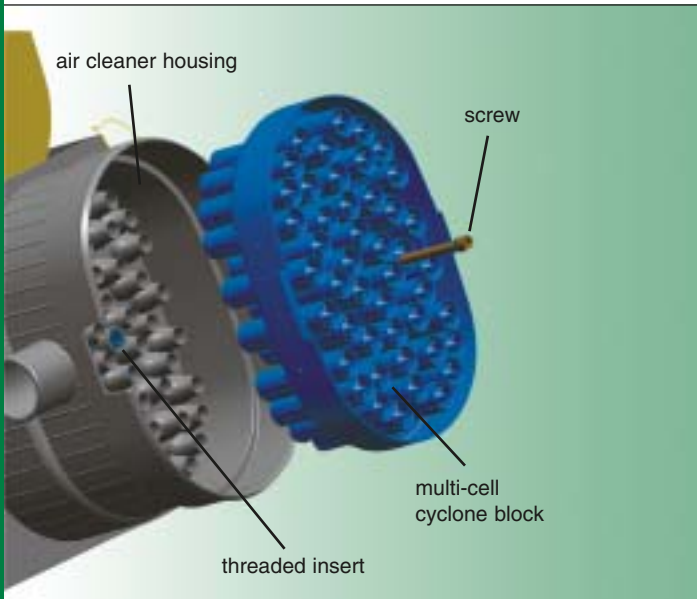


CompacPlus® Compact element



The principle of alternately closed filtration channels

Installation and maintenance

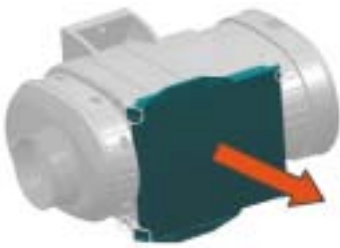


Servicing the precleaner

If unfavourable operating conditions (e.g. the simultaneous entry of large amounts of dust and water) cause the precleaner to clog, it can easily be quickly serviced:

The central holding screw is firstly unscrewed. Then the cyclone block is removed from the housing and cleaned, e.g. with compressed air or by washing out.

Changing the filter elements



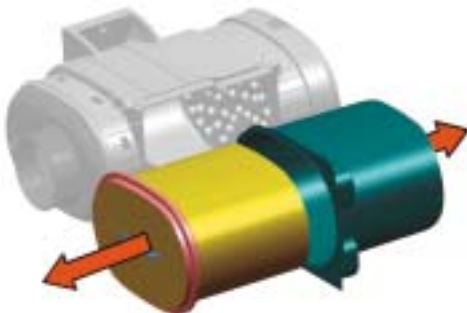
Step 1

Firstly, the cover is opened and removed.



Step 2

Then, the element carrier frame is taken out together with the CompacPlus®.



Step 3

The CompacPlus® is removed from the carrier frame and disposed of in an environmentally friendly way. The carrying frame is re-used.



Step 4

The secondary element is pulled out using the integrated handle and also disposed of in an environmentally friendly way.

The frequency of the element change largely depends on the respective application conditions and is defined by the machine producer.

We recommend replacing the main filter element at least once per year and the secondary element every two years. This will maintain the full efficiency of the air cleaner system and give your engine optimum protection.

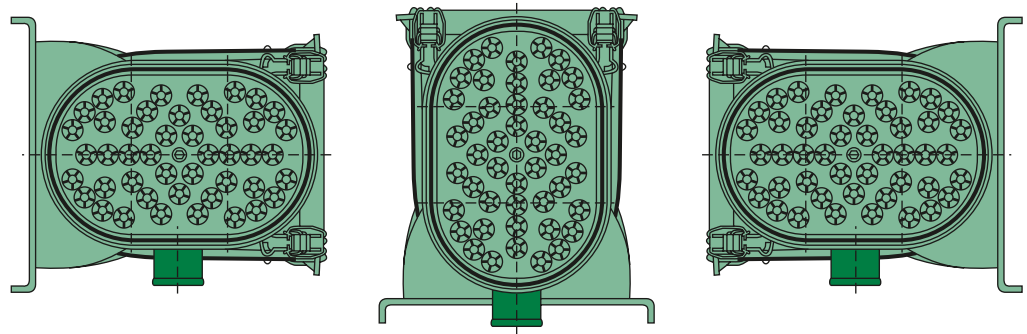
Intensive use in very dusty conditions may make more frequent replacement of the filter necessary.

We recommend using the MANN+HUMMEL service switch or indicator to monitor the level of dirt accumulation.

Installation positions

In order to ensure ideal dust discharge in different installation positions, the PicoFlex® is available with three different orientation positions for the scavenging port. The best separation performance

is achieved when the dust discharge port is pointed downwards. If the direction of the dust discharge deviates by more than 45° to the vertical, then the next port position should be selected.

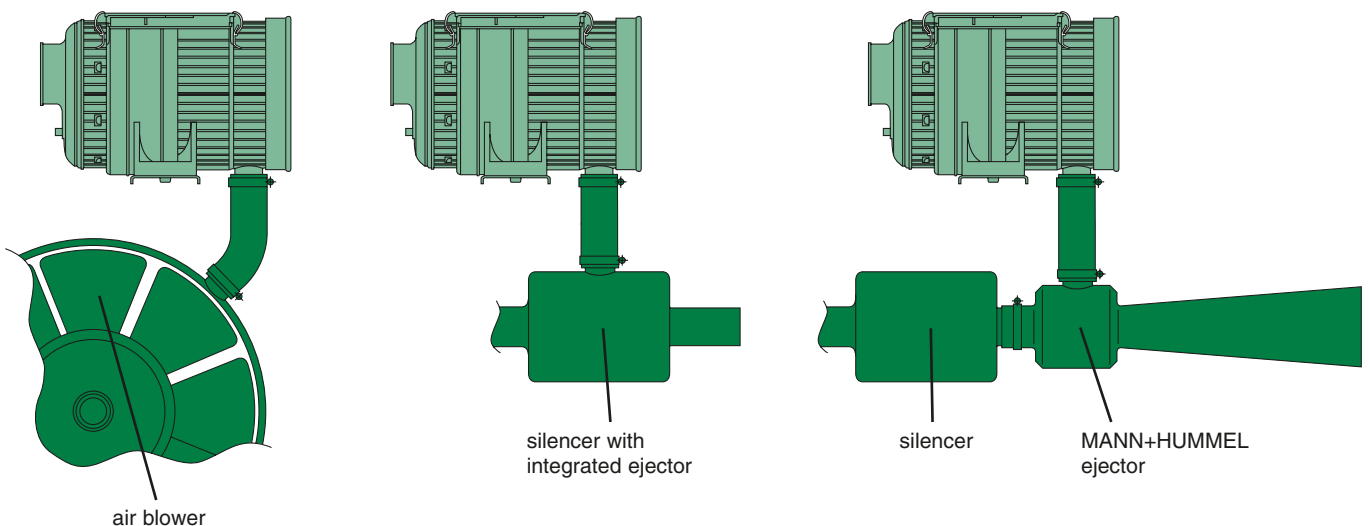


Continuous scavenging

To make sure the PicoFlex® functions reliably, it is necessary to continuously scavenge the precleaner. This removes the pre-separated dust from the precleaner and avoids deposits which would otherwise considerably reduce

efficiency and service life. Reliable scavenging requires negative pressure over the precleaner of a minimum of 8 mbar for a nominal flow rate of 7 m³/min. In order to determine the required total negative pressure, the pipe

resistance values for the dirty air pipe and the scavenging pipe must also be added. If there is any uncertainty, we recommend measurement of the actual negative pressure present.



Dimensions and order numbers

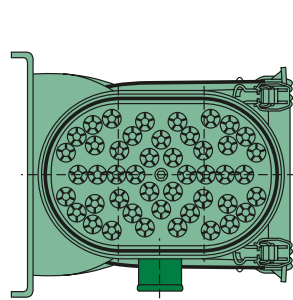
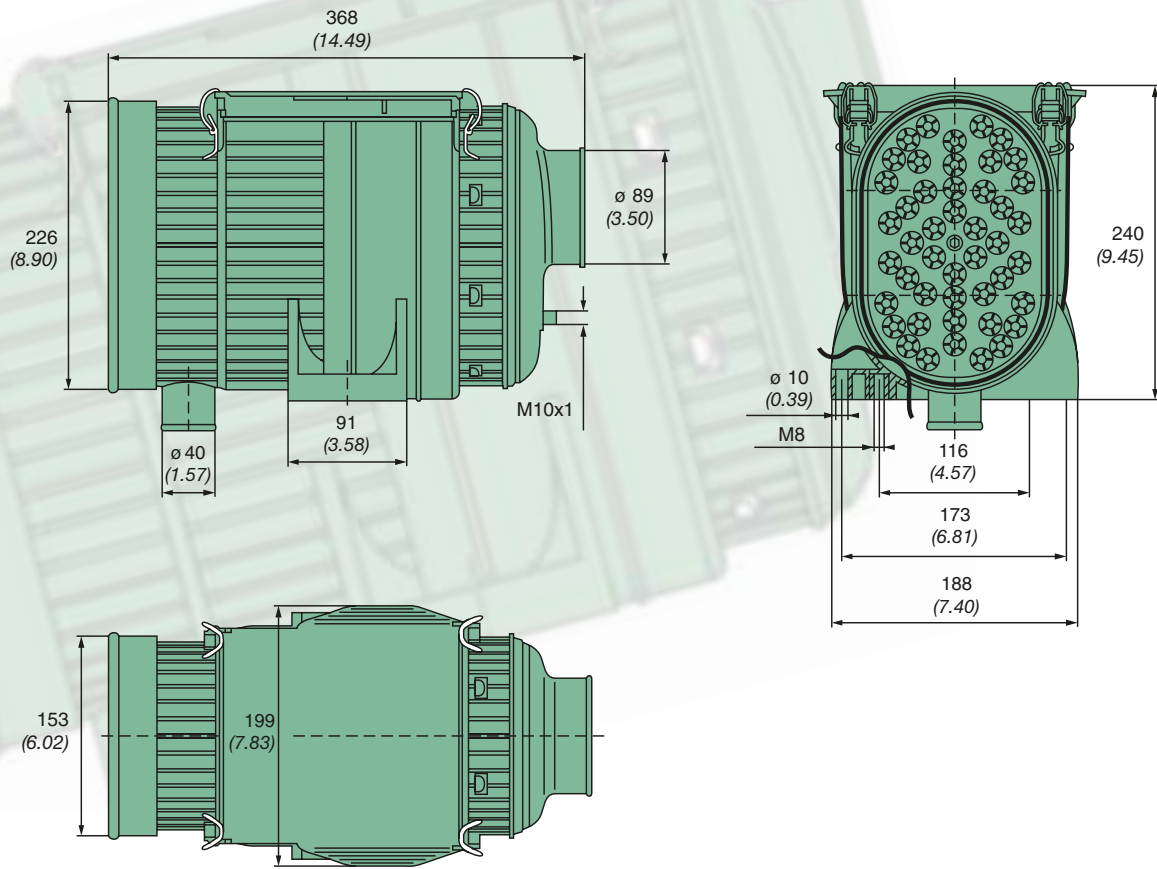


Fig. 1

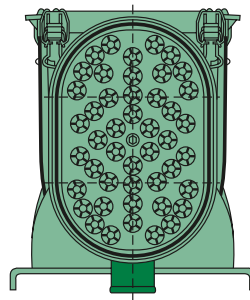


Fig. 2

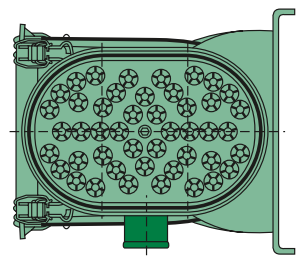


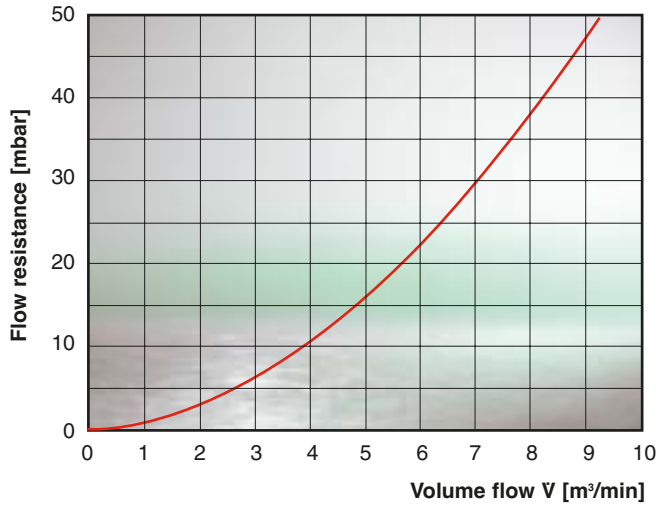
Fig. 3

Order No.		Fig.	Nominal flow rate [m³/min]	Replacement filter element		Approx. weight [kg]
without secondary element	with secondary element			CompacPlus® filter element	MANN-FILTER secondary element	
45 210 95 913	45 210 95 910	1	4.5 – 7			3.5
45 210 95 914	45 210 95 911	2	4.5 – 7	CP 23 210	CF 2135	3.5
45 210 95 915	45 210 95 912	3	4.5 – 7			3.5

Flow characteristics ...

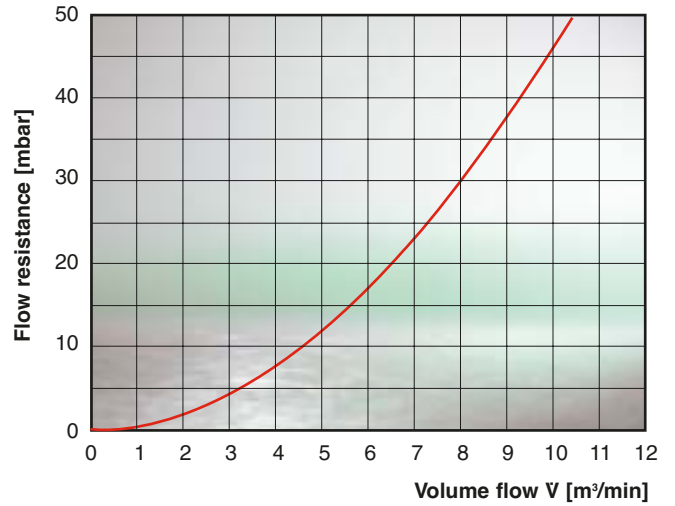
... with secondary element ...

... for flow rates as per ISO 5011

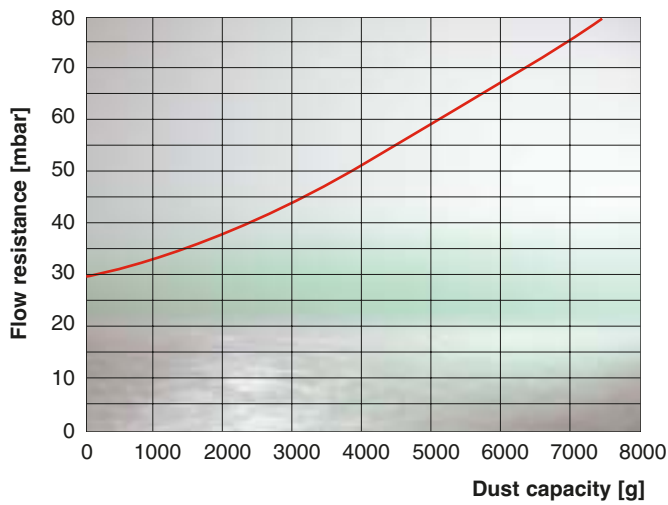


... without secondary element ...

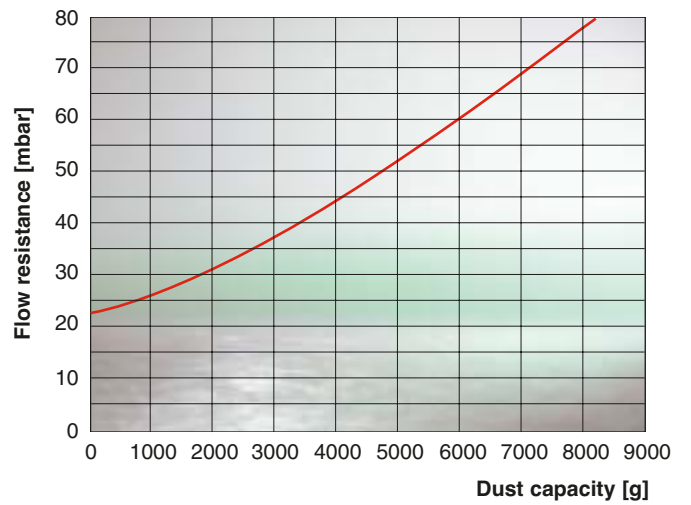
... for flow rates as per ISO 5011



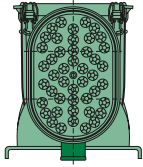
... for dust capacity as per ISO 5011



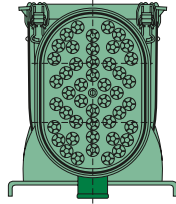
... for dust capacity as per ISO 5011



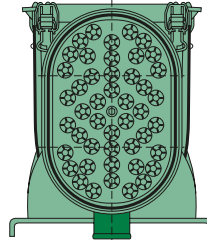
Additional sizes



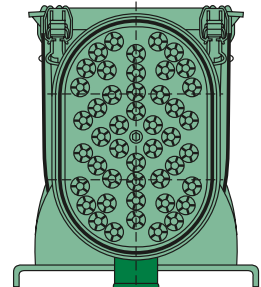
PicoFlex® 7



PicoFlex® 10
available in 2005



PicoFlex® 14
available in 2005



PicoFlex® 18
available in 2006

The PicoFlex® 7 was introduced by MANN+HUMMEL at the end of 2003. This innovative type of air cleaner has now been integrated into a

construction vehicle which is in worldwide use. Three additional air cleaner sizes are currently under development to consolidate this success:

PicoFlex® 10, PicoFlex® 14 and PicoFlex® 18. Your MANN+HUMMEL partner has further information on these additional sizes.

MANN+HUMMEL



MANN+HUMMEL Europiclone®
Two-stage air cleaner – Modular system

Europiclone® : The flexible allrounder

The Europiclone® from MANN+HUMMEL is characterised by its high dust capacity and low pressure drop.

These characteristics have made the Europiclone® the tried and tested air cleaner for all machines and equipment used in conditions with

medium to heavy dust loads. These include construction and agricultural machines, mobile compressors and harvesting machines.

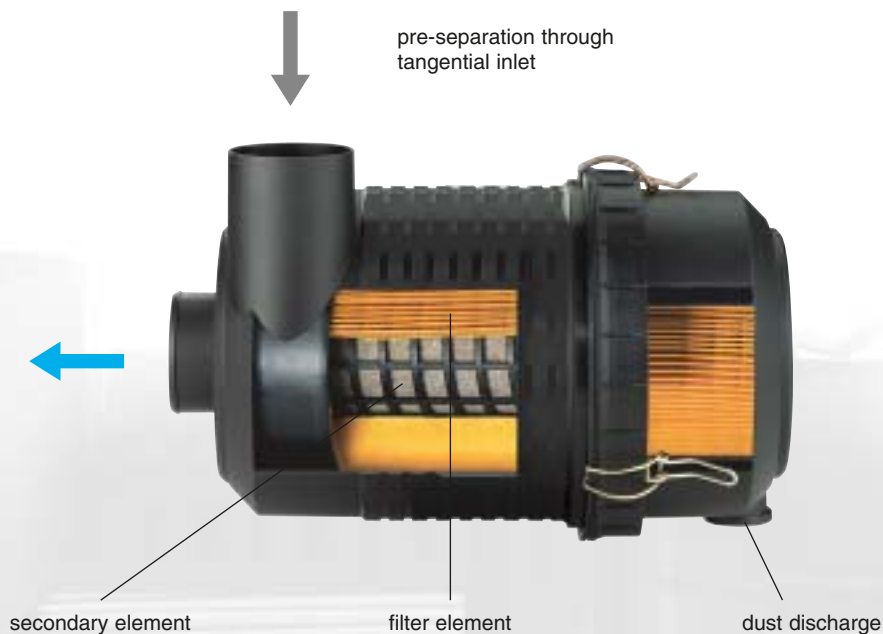
- easy element change without tools
- highest operational reliability through elements with proven radial seal
- metal-free filter elements are easily disposed of by incineration and therefore are environmentally friendly with inexpensive disposal
- easy adaptation to other equipment with a flexible bracket system
- patented filter elements

Advantages at a glance:

- long service life through integrated pre-separation
- highly economical through modular system
- extensive range of accessories
- corrosion free housing in impact resistant plastic



Sectional view



Filter elements



The Europiclon® elements are free of metal and therefore easily disposed of by incineration. This enables inexpensive and environmentally friendly disposal of the used elements.

Main element

- high dust capacity through special MANN+HUMMEL filter medium
- high reliability through radial seal on housing

- reliable pleat stability prevents pleats sticking together under demanding conditions

Secondary element

- MANN+HUMMEL synthetic fabric allows a high safety margin with low pressure drop
- secure fit in housing prevents unintentional removal of the secondary element

Housing

The housing of the Europiclon® is made of impact resistant polypropylene and is suitable for continuous use in the temperature range - 40 °C to +80 °C or for short periods up to +100 °C.

The external polygon design of the housing is recognizable in the picture. The Europiclon® bracket, designed especially for this structure, can be turned in steps of 5° contrary to the housing.

Depending on the air cleaner size, the housing can be turned in the axial direction to six different locking positions. This offers the designer up to 432 different fitting possibilities for the air cleaner. In addition, the wire clamps which lock the air cleaner housing can be placed in special pockets on the cap to adapt to special installation conditions.



Europiclone® 100 to 800

Dimensions and order numbers

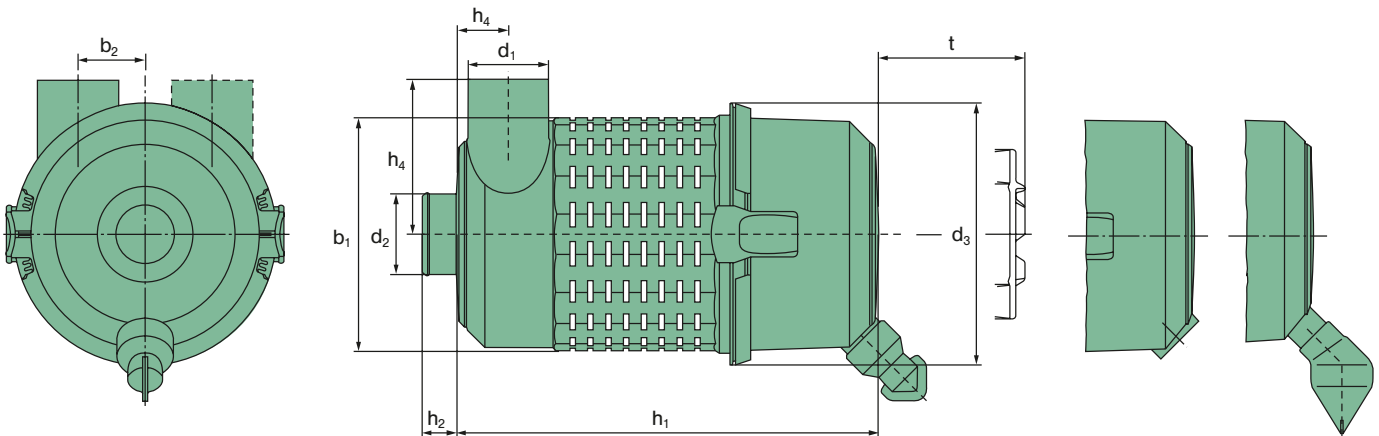


Fig. 1
Mirror image version of dirty air connection available on request

1a
Cover with snap fasteners
(just for 44 100 ...)

1c

Order No.		Fig.	Nominal flow rate [m ³ /min]	Replacement filter element		Approx. weight [kg]
without secondary element	with secondary element			MANN-FILTER main element	MANN-FILTER secondary element	
44 100 92 910	44 100 92 911	1a	1 – 3	C 11 100	CF 100	0.9
44 100 92 920	44 100 92 921	1b				
44 100 92 940	44 100 92 941	1c				
45 200 92 910	45 200 92 911	2a	2 – 4.5	C 14 200	CF 200	1.7
45 200 92 920	45 200 92 921	2b				
45 200 92 940	45 200 92 941	2c				
45 300 92 910	45 300 92 911	2a	3 – 6	C 15 300	CF 300	2.1
45 300 92 920	45 300 92 921	2b				
45 300 92 940	45 300 92 941	2c				
45 400 92 910	45 400 92 911	2a	4 – 8	C 16 400	CF 400	3.0
45 400 92 920	45 400 92 921	2b				
45 400 92 940	45 400 92 941	2c				
45 500 92 910	45 500 92 911	2a	6 – 12	C 20 500	CF 500	3.8
45 500 92 920	45 500 92 921	2b				
45 500 92 940	45 500 92 941	2c				
45 600 92 910	45 600 92 911	2a	7.5 – 15	C 23 610	CF 610	5.0
45 600 92 920	45 600 92 921	2b				
45 600 92 940	45 600 92 941	2c				
45 700 92 940	45 700 92 941	2c	15 – 21	C 25 710	CF 710	6.0
45 800 92 940	45 800 92 941	2c	18 – 28	C 30 810	CF 810	9.0

Europiclone® 100 to 800

Dimensions and order numbers

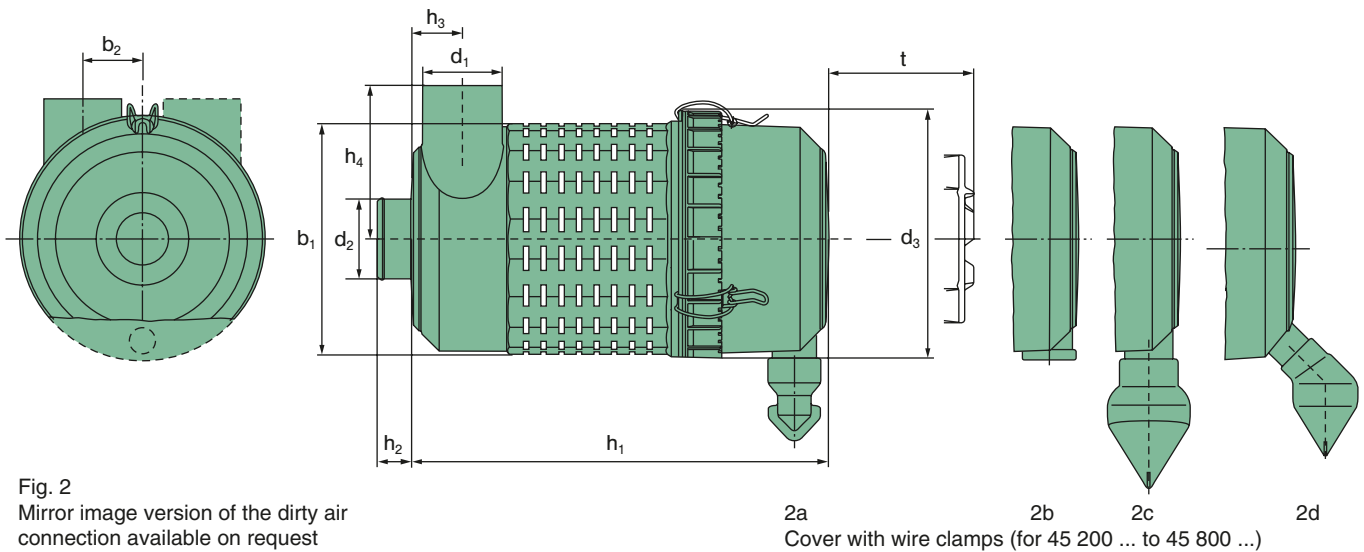


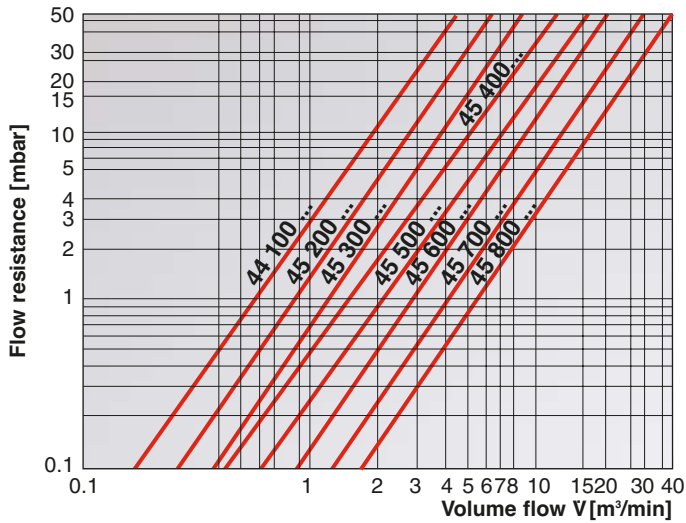
Fig. 2
Mirror image version of the dirty air connection available on request

Order No.		Fig.	Dimensions in mm (<i>dimensions in inches</i>)									
without secondary element	with secondary element		b ₁	b ₂	d ₁	d ₂	d ₃	h ₁	h ₂	h ₃	h ₄	t
44 100 92 910	44 100 92 911	1a	158	45	54	50	188	260	27	38	104	237
44 100 92 920	44 100 92 921	1b	(6.22)	(1.77)	(2.12)	(1.97)	(7.40)	(10.24)	(1.06)	(1.50)	(4.09)	(9.39)
44 100 92 940	44 100 92 941	1c										
45 200 92 910	45 200 92 911	2a	173	48	62	60	198	327	27	42	112	304
45 200 92 920	45 200 92 921	2b	(6.81)	(1.89)	(2.44)	(2.36)	(7.80)	(12.87)	(1.06)	(1.65)	(4.41)	(11.97)
45 200 92 940	45 200 92 941	2c										
45 300 92 910	45 300 92 911	2a	203	59	70	70	228	367	30	45	135	344
45 300 92 920	45 300 92 921	2b	(7.99)	(2.32)	(2.76)	(2.76)	(8.98)	(14.45)	(1.18)	(1.77)	(5.32)	(13.54)
45 300 92 940	45 300 92 941	2c										
45 400 92 910	45 400 92 911	2a	223	63	82	80	248	383	32	52	144	359
45 400 92 920	45 400 92 921	2b	(8.78)	(2.48)	(3.23)	(3.15)	(9.76)	(15.08)	(1.26)	(2.05)	(5.67)	(14.13)
45 400 92 940	45 400 92 941	2c										
45 500 92 910	45 500 92 911	2a	264	73	102	100	288	408	37	62	174	384
45 500 92 920	45 500 92 921	2b	(10.39)	(2.87)	(4.02)	(3.94)	(11.34)	(16.06)	(1.46)	(2.44)	(6.85)	(15.12)
45 500 92 940	45 500 92 941	2c										
45 600 92 910	45 600 92 911	2a	295	87	110	110	323	414	27	65	190	384
45 600 92 920	45 600 92 921	2b	(11.61)	(3.43)	(4.33)	(4.33)	(12.72)	(16.30)	(1.06)	(2.56)	(7.48)	(15.12)
45 600 92 940	45 600 92 941	2c										
45 700 92 940	45 700 92 941	2d	325	92	132	130	353	548	32	76	212	500
			(12.80)	(3.62)	(5.20)	(5.12)	(13.90)	(21.57)	(1.26)	(2.99)	(8.35)	(19.69)
45 800 92 940	45 800 92 941	2d	390	114	150	150	418	598	32	85	241	500
			(15.35)	(4.49)	(5.91)	(5.91)	(16.46)	(23.54)	(1.26)	(3.35)	(9.49)	(19.69)

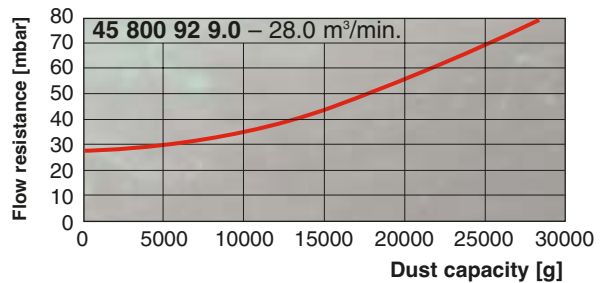
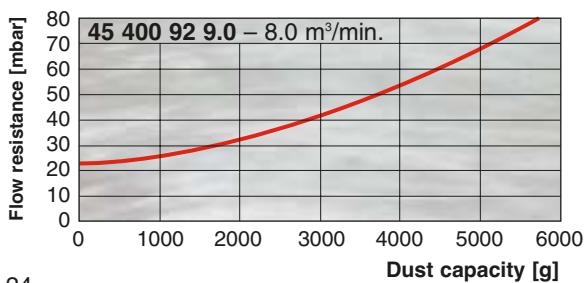
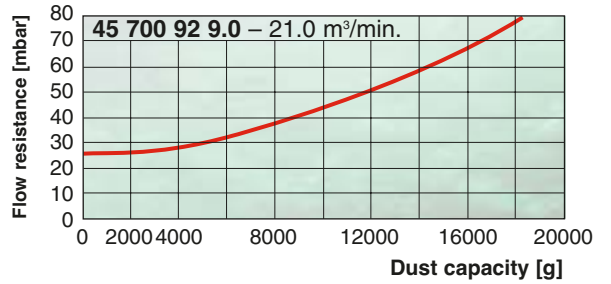
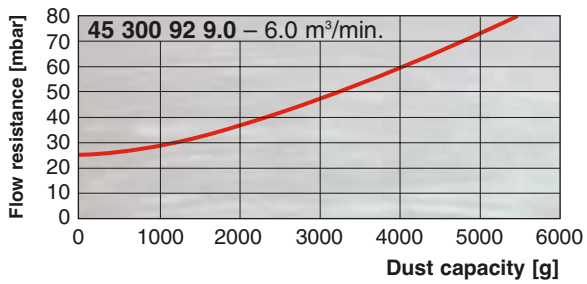
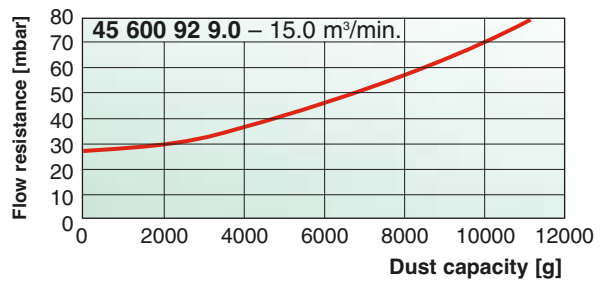
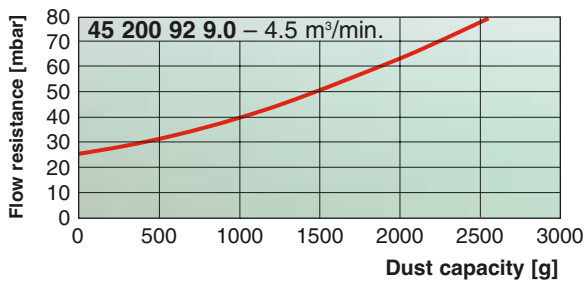
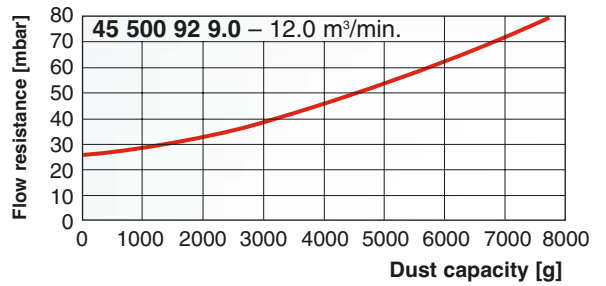
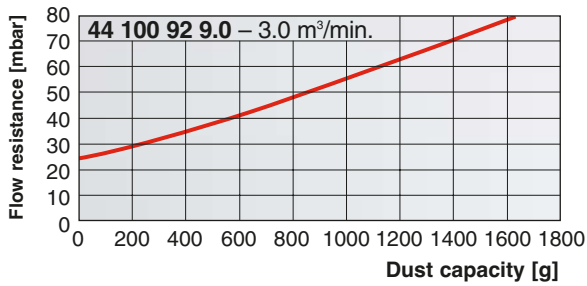
Europiclone® 100 to 800

Flow characteristics without secondary element ...

... for flow rates as per ISO 5011



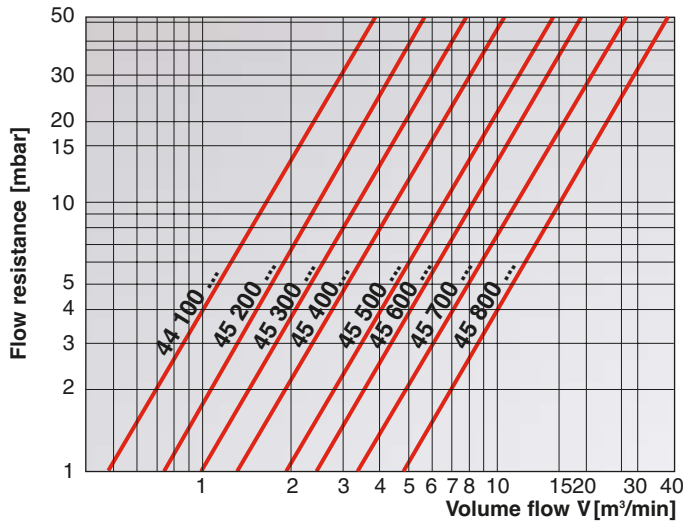
... for dust capacity as per ISO 5011 with SAE coarse test dust



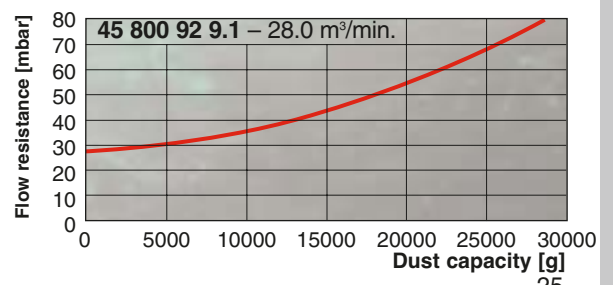
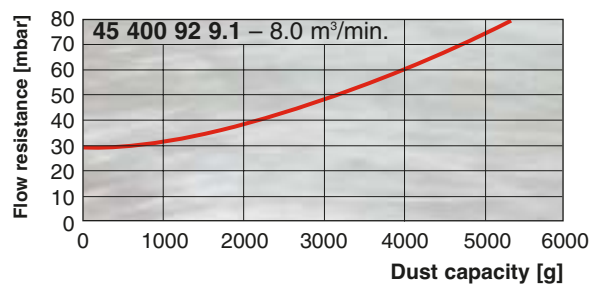
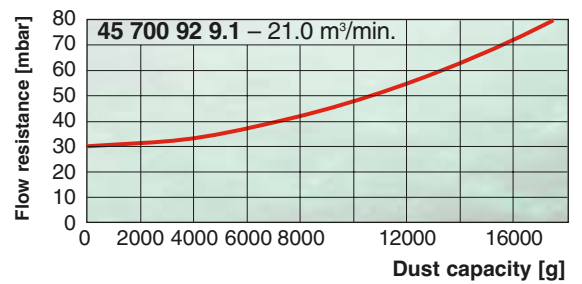
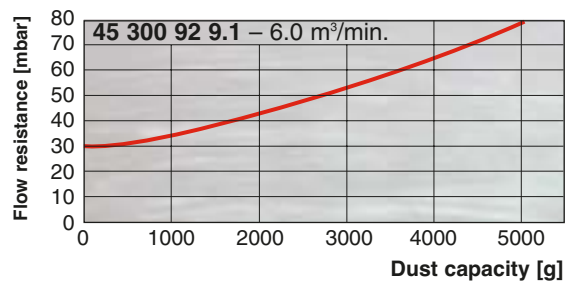
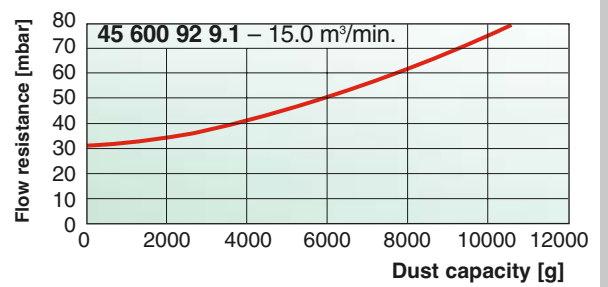
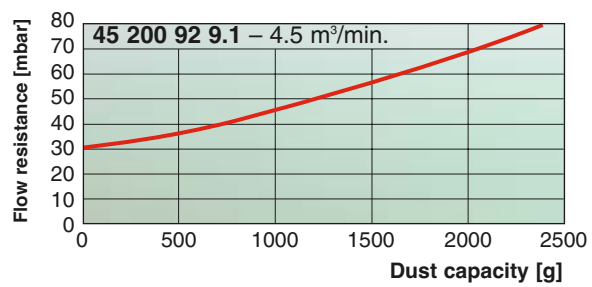
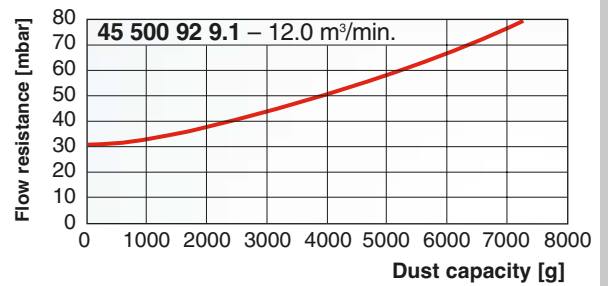
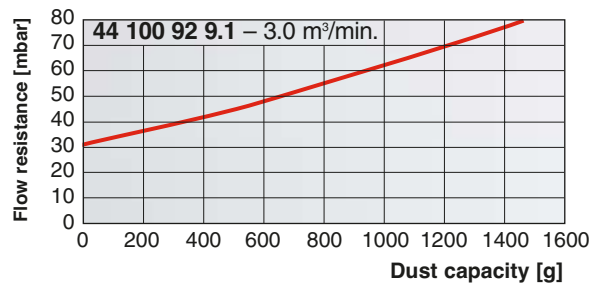
Europiclone® 100 bis 800

Flow characteristics with secondary element ...

... for flow rates as per ISO 5011



... for dust capacity as per ISO 5011 with SAE coarse test dust



Europiclon® 50



The new Europiclon® 50 from MANN+HUMMEL extends the range of the successful Europiclon® line to engines and equipment with a power rating up to 20 kW.

Along with the known advantages of the Europiclon® line which include reliability, long service life and its robust, corrosion-free housing, the new Europiclon® 50 has a number of additional features which offer important advantages for the designer and user.

Advantages at a glance:

- rotatable clean air outlet with integrated connection for service indicator or switch
- clean air outlet available with straight pipe connection or with a 90° elbow
- new space-saving turn-lock fastener and easy filter element change without tools
- especially low pressure drop also in operation with fitted secondary element
- highly economical

Filter elements

The new filter elements for the Europiclon® 50 offer high performance and are highly economical. The radial seal used for the main element in connection with the special pleat stabilisation enables a high separation efficiency of more than 99.95% and a high dust capacity. A further advantage is the patented MANN+HUMMEL production technology where the seal and the element end plates are manufactured in one process step using special elastomers.

A plastic centre tube in the housing provides good support for the element without negatively influencing the withdrawal distance.

A secondary element protects the engine during a filter service or if the main element is damaged. It is an important component for comprehensive engine protection which ensures the maximum service life

of your machine. The secondary element of the new Europiclon® 50 consists of a special synthetic fabric, a plastic centre tube and a radial seal in PUR foam. The filter surface area is approx. 45% larger than comparable products from the competition. This leads to minimal pressure drop with an increase in the service life of the filter.



Bracket

The Europiclön® 50 bracket offers flexibility during installation with 16 different available positions around its circumference and two possible locking positions in the axial direction.

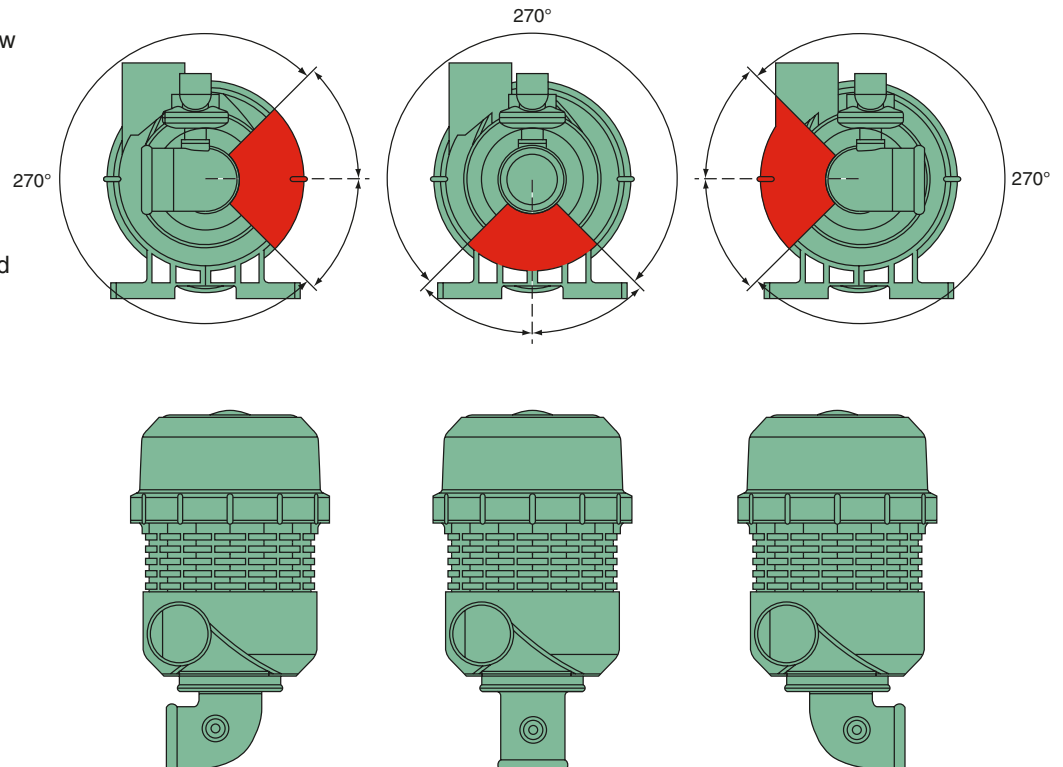
The special polygon design is matched to the air cleaner housing and ensures that the air cleaner fits securely in the bracket.



Clean air outlet

On the clean air side the new Europiclön® 50 is equipped with a rotatable clean air outlet. This port is available in a straight pipe version or with a 90° elbow.

As the hanging installation position is not recommended for the service switch, MANN+HUMMEL offers the 90° elbow in two versions. Before placing your order, please check to see which orientation is more appropriate for your installation conditions.



Europiclón® 50

Dimensions and order numbers

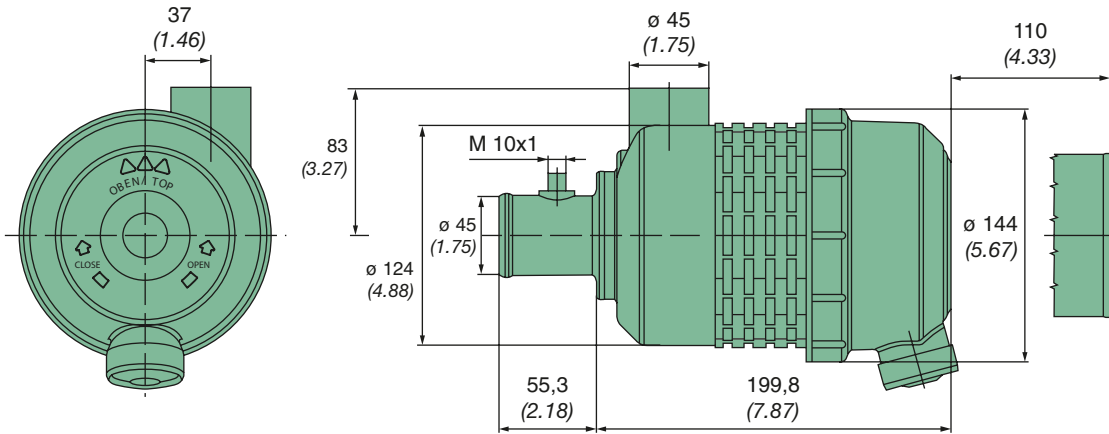


Fig. 4

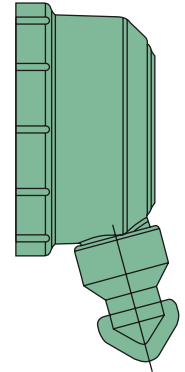
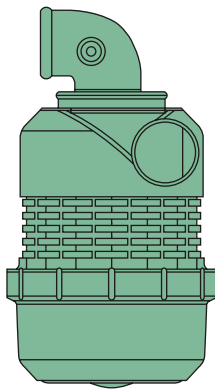
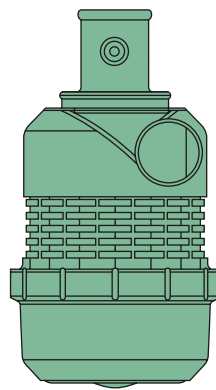


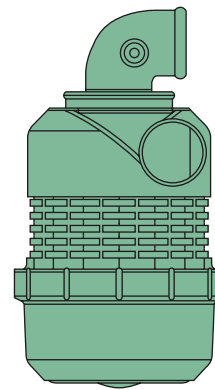
Fig. 5



90° elbow
Fig. 1



Straight pipe
Fig. 2



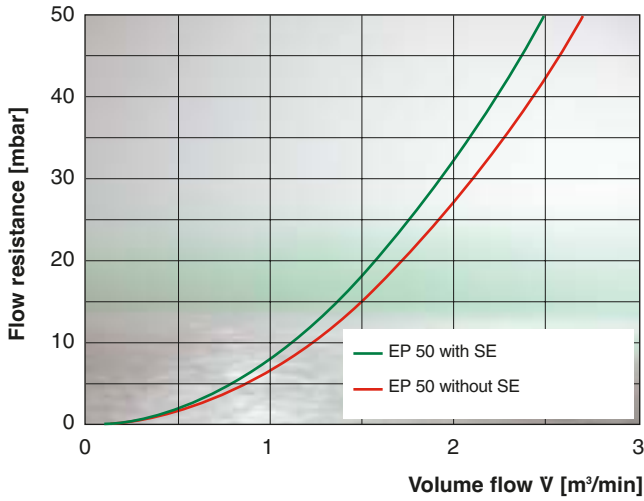
90° elbow
Fig. 3

Order No.		Version Clean air outlet	Version Dust discharge	Nominal flow rate [m³/min]	Replacement filter element		Approx. weight [kg]
without secondary element	with secondary element				MANN-FILTER main element	MANN-FILTER secondary element	
44 058 92 910	44 058 92 911	1	5	0.8 – 2	C 10 050	CF 50	0.7
44 058 92 920	44 058 92 921	1	4				
44 050 92 910	44 050 92 911	2	5	0.8 – 2	C 10 050	CF 50	0.7
44 050 92 920	44 050 92 921	2	4				
44 059 92 910	44 059 92 911	3	5	0.8 – 2	C 10 050	CF 50	0.7
44 059 92 920	44 059 92 921	3	4				

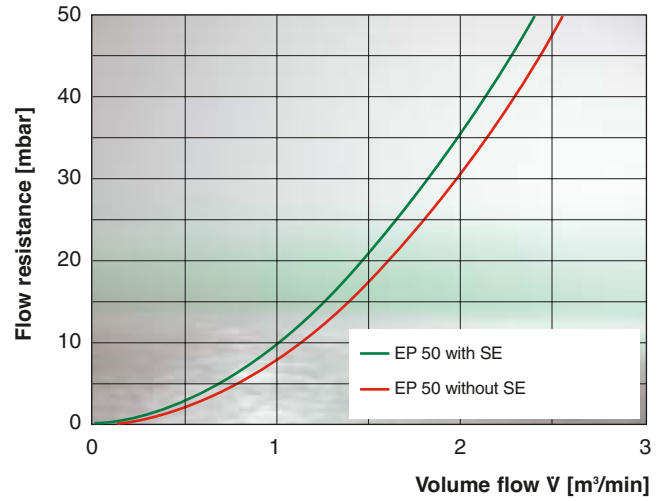
Europiclone® 50

Flow characteristics ...

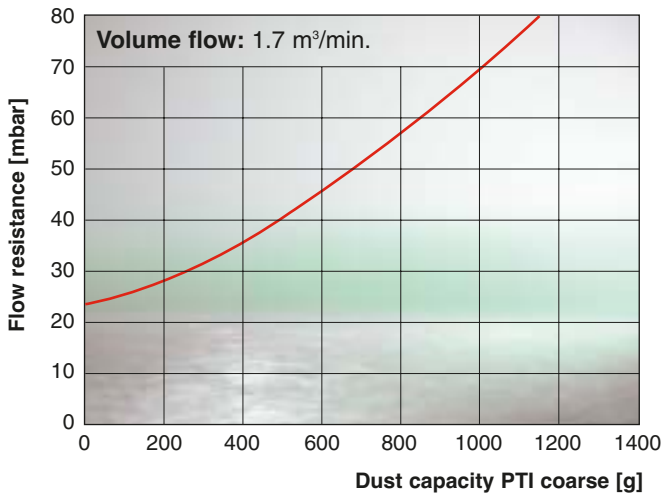
... for flow rates as per ISO 5011 with straight pipe



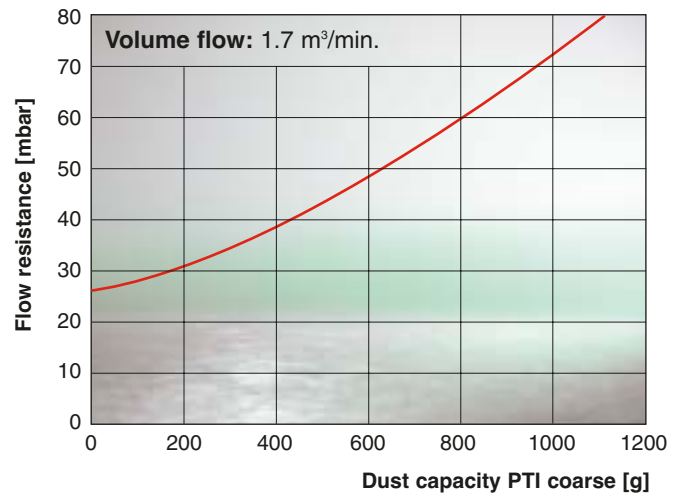
... for flow rates as per ISO 5011 with 90° elbow



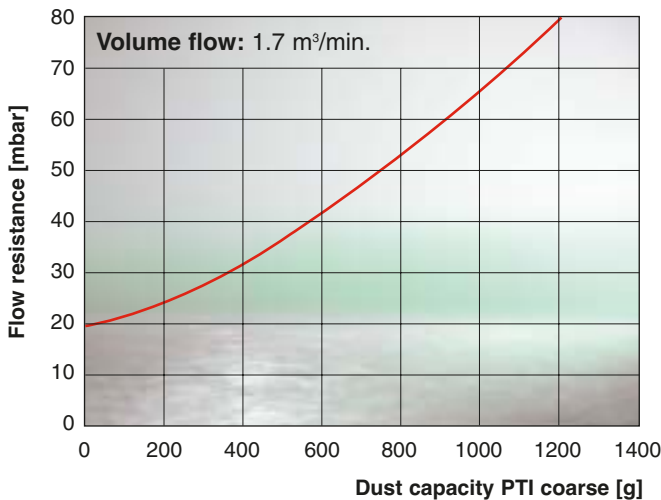
... for dust capacity as per ISO 5011 with straight pipe with secondary element ...



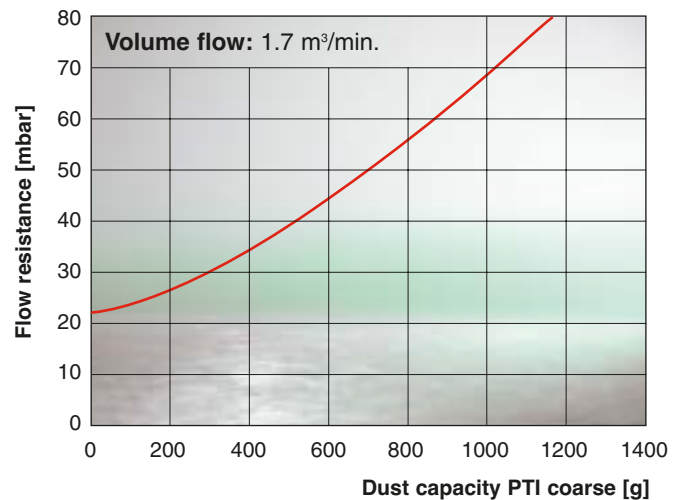
... for dust capacity as per ISO 5011 with 90° elbow with secondary element ...



... for dust capacity as per ISO 5011 with straight pipe without secondary element ...



... for dust capacity as per ISO 5011 with 90° elbow without secondary element ...



Special versions

Europiclone® with dust collector (sizes 100 to 800)

The Europiclone® with a dust collector is especially suitable for applications where the dust discharge process should not dirty the immediate surroundings, e.g. as a requirement for production equipment. At the same time the service life advantages of a two-stage air cleaner are still valid. In these conditions the cover of the Europiclone® is fitted with a dust collector and sealed to

the surroundings. The functionality of the pre-separation remains exactly the same.

The dust is separated reliably into the dust collector and is emptied manually from time to time. The timing of the service intervals depends on the application conditions.

Your MANN+HUMMEL partner will be happy to answer any questions on this version.



Dimensions and air cleaner specifications identical to types ... 920/921, see page 23

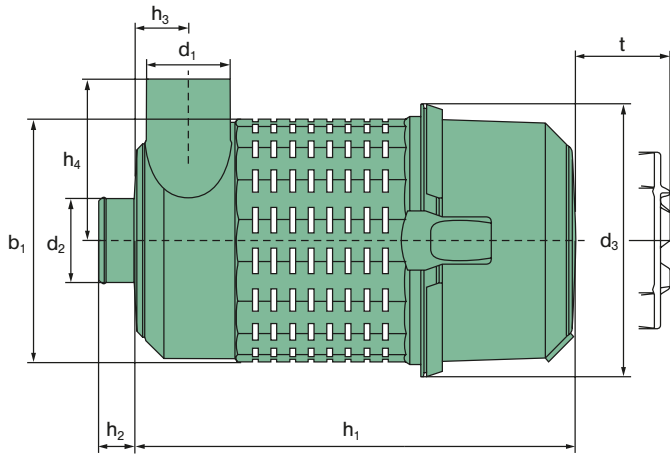


Fig. 1 Cover with snap fasteners (only 44 100 ...)

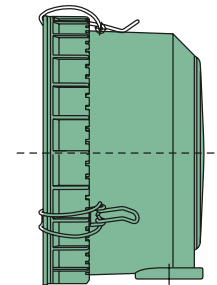
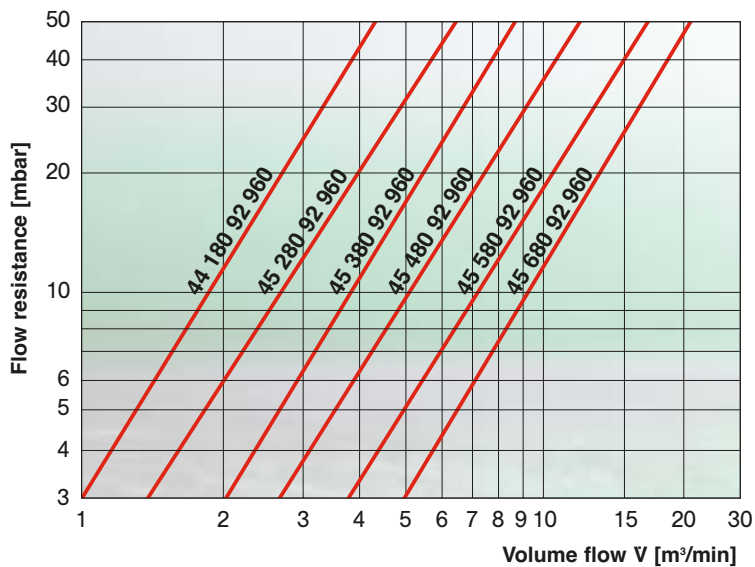


Fig. 2 Cover with wire clamps (45 200 ... to 45 800 ...)

Order No.		Fig.	Nominal flow rate [m³/min]	Replacement filter element	
without secondary element	with secondary element			MANN-FILTER main element	MANN-FILTER secondary element
44 100 92 950	44 100 92 951	1	1 – 3	C 11 100	CF 100
45 200 92 950	45 200 92 951	2	2 – 4.5	C 14 200	CF 200
45 300 92 950	45 300 92 951	2	3 – 6	C 15 300	CF 300
45 400 92 950	45 400 92 951	2	4 – 8	C 16 400	CF 400
45 500 92 950	45 500 92 951	2	6 – 12	C 20 500	CF 500
45 600 92 950	45 600 92 951	2	7.5 – 15	C 23 610	CF 610
45 700 92 950	45 700 92 951	2	14 – 21	C 25 710	CF 710
45 800 92 950	45 800 92 951	2	18 – 28	C 30 810	CF 810

Special versions

Europiclone® for vacuum applications (sizes 100 to 600)



Specially modified filter types are available for use with vacuum applications.

Typical applications are vacuum lifting devices and other negative pressure systems.

Dimensions identical to types ... 920/921, see page 23

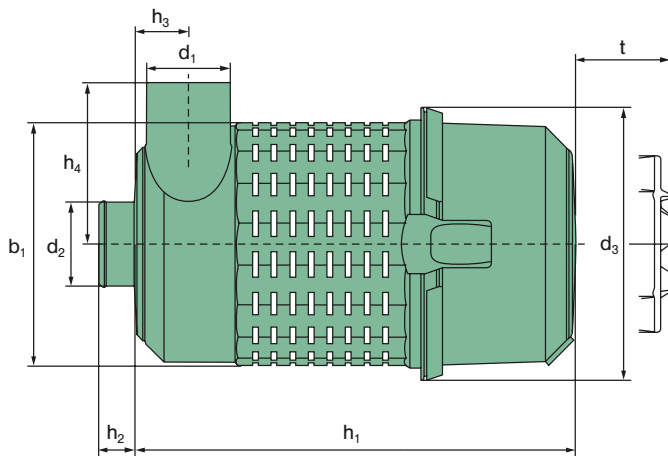


Fig. 1 Cover with snap fastener (only 44 180 ...)

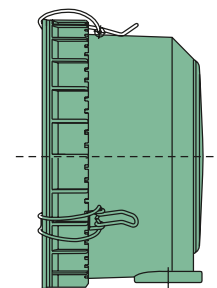


Fig. 2 Cover with wire clamps (45 280 ... to 45 680 ...)

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



Europiclone® accessories

	Bracket		Rain cap design A * (p. 108)	Straight pipes		90° elbow	
	narrow version (p. 105)	wide version (p. 105)		without connec- tion (p. 115)	with connection (p. 115)	without connec- tion (p. 114)	with connection (p. 114)
Europiclone® 50	–	39 050 40 959	39 014 67 910	–	–	–	–
Europiclone® 100	39 100 40 989	39 100 40 999	39 020 67 910	39 100 27 999	39 100 27 979	39 100 25 999	39 100 25 979
Europiclone® 200	39 200 40 989	39 200 40 999	39 028 67 910	39 200 27 999	39 200 27 979	39 200 25 999	39 200 25 979
Europiclone® 300	39 300 40 989	39 300 40 999	39 040 67 910	39 300 27 999	39 300 27 979	39 300 25 999	39 300 25 979
Europiclone® 400	39 400 40 989	39 400 40 999	39 056 67 910	39 400 27 999	39 400 27 979	39 400 25 999	39 400 25 979
Europiclone® 500	39 500 40 989	39 500 40 999	39 080 67 910	39 500 27 999	39 500 27 979	39 500 25 999	39 500 25 979
Europiclone® 600	39 600 40 989	39 600 40 999	39 100 67 910	39 600 27 999	39 600 27 979	39 600 25 999	39 600 25 979
Europiclone® 700	39 700 40 989	39 700 40 999	39 160 67 910	39 700 27 999	39 700 27 979	39 700 25 999	39 700 25 979
Europiclone® 800	39 800 40 989	39 800 40 999	39 190 67 910	39 800 27 999	39 800 27 979	39 800 25 999	39 800 25 979

You will find the complete range of accessories for our air cleaners and service indicators/service switches on page 103.

* Alternative design B possible (see page 109)

Dust discharge valves

Order No.	Name	Suitable for
23 040 30 111	Diaphragm valve	45 .00 92 920/921
39 000 40 391	Small dust discharge valve	45 .00 92 910/911
39 000 40 661	Large dust discharge valve	44 100 92 940/941
39 000 40 102	Large dust discharge valve	45 .00 92 940/941



MANN+HUMMEL NLG
Modular air cleaner system
for a wide range of applications

NLG: Flexible – Robust – Economical

The new NLG line from MANN+HUMMEL offers a flexible and economic solution for many varied applications in the field of intake air filtration.

Advantages at a glance:

- high flexibility through variable modular system
- economic air cleaner system through modular design
- easy element change without tools

- corrosion-free and robust housing through use of plastic reinforced with fibre-glass
- the Picon version with integrated dust pre-separation can also be used with medium to heavy dust loads
- as a combination air cleaner with DualSpin® precleaner also suitable for very difficult dust conditions due to its long service life
- metal-free filter elements are easily disposed of by

- incineration and therefore are environmentally friendly with inexpensive disposal
- problem-free adaptation to other equipment through

- variable connection positions
- quick first-fit on the vehicle through threaded inserts
- patented filter elements



NLG Pico

Single-stage air cleaners

The Pico is the single-stage version of the NLG, i.e. without integrated dust pre-separation. It is particularly suitable for applications with low dust loads where minimal pressure drop in the air cleaner is a special requirement.

These are, for example:

- commercial vehicles (trucks)
- buses
- mobile cranes
- compressors
- stationary engines
- generators
- marine applications



NLG Piclon

Two-stage air cleaners with integrated pre-separation



The Piclon version is the two-stage version of the NLG with integrated dust pre-separation and an efficiency of more than 75%. It is particularly suitable for applications with medium to heavy dust loads.

These are, for example:

- construction and agricultural machines
- all typical Pico applications with a requirement for longer service life

The Pico and Piclon versions both have identical housing and connection dimensions. Therefore the Piclon can replace the Pico if the use of a machine in a certain region requires a special version. In this situation changing the air cleaner does not require making any changes to the pipe connections or to the fixing of the air cleaner bracket.

NLG DualSpin® Combination air cleaners

Two-stage air cleaners with external pre-separation

The combination air cleaners consist of Pico versions of the NLG air cleaner in size 37 and the new DualSpin® precleaners specially developed for these air cleaners which have an efficiency of more than 90% with a low pressure drop. Due to its long service and special version of the precleaner, where clogging is almost unheard of, the combination air cleaners are suitable for use with most applications in very dusty conditions.

These include, for example:

- combine harvesters
- field choppers
- special harvesting machines, e.g. for cotton, sugar cane or peat
- construction and agricultural machines in very dusty conditions

You can configure the combination air cleaner exactly according to the service life you require and the air requirement of the machine. There are three housing lengths available for the air cleaner and two versions of the precleaner for volume flows between 20 m³/min and 40 m³/min.



Modular system

The combination of housings and elements allows selection of a suitable solution from 12 different basic variations. Thus it is possible to adapt the NLG to meet individual machine requirements of different regions. Whereas, for example, a NLG with short housing and short elements may be sufficient for

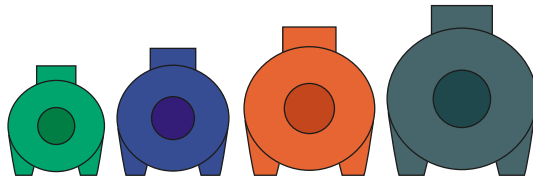
the standard version of a certain machine, versions for machines with higher dust loads can be equipped with a longer housing and longer elements. With the same pipe connections and bracket fixing you can match the service life ideally to the respective conditions to achieve the most economical solution.



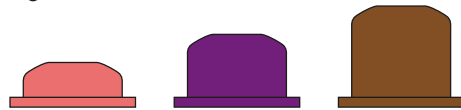
The largest and the smallest: NLG 37-42 and NLG 15-12

NLG Modular system

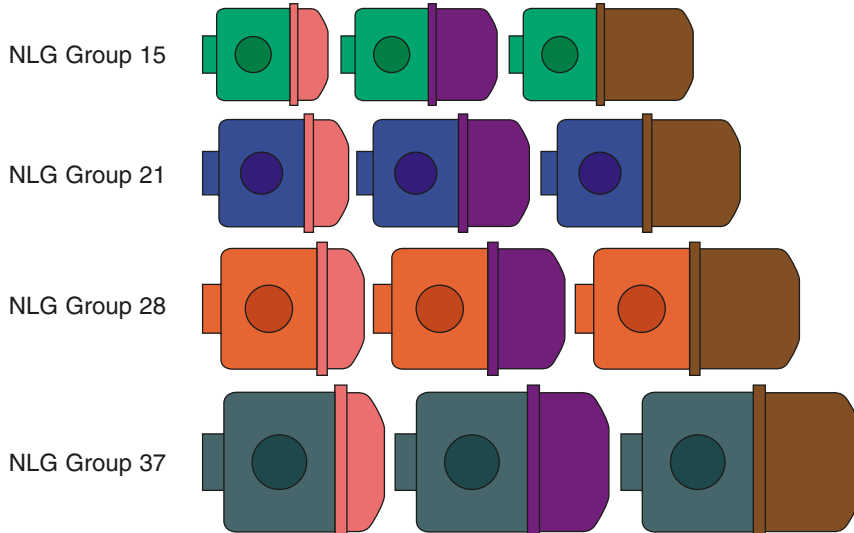
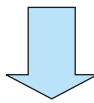
4 different air cleaner diameters ...



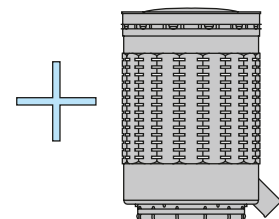
... with 3 different housing lengths ...



... result in 12 basic variations



 **DualSpin®**



Filter elements



NLG Filter element

- high dust capacity through MANN+HUMMEL graded medium
- robust design with plastic centre tube
- patented design
- element protection due to integrated handle prevents damage during filter change

NLG Secondary element

- MANN+HUMMEL synthetic fabric for high separation efficiency with low pressure drop
- secure fit in housing with screw fitting which further protects the engine as this prevents unintentional removal of the secondary element
- robust design with plastic centre tube

DualSpin® Precleaner

MANN+HUMMEL has developed a precleaner especially designed for the NLG air cleaner. The DualSpin® is suitable for use in very difficult operating conditions, such as harvesting applications.

Advantages of the DualSpin® precleaner:

- high pre-separation efficiency with low pressure drop
- the housing is made from special antistatic plastic which is very suitable for organic particles
- various distributor inserts can be used to adapt the pre-cyclone perfectly to the air requirement of the machine
- the polygon structure of the housing exterior allows use of the proven bracket of the Europiclone® 700 (Order No. 39 700 40 999)

DualSpin®



NLG Pico

Dimensions and order numbers

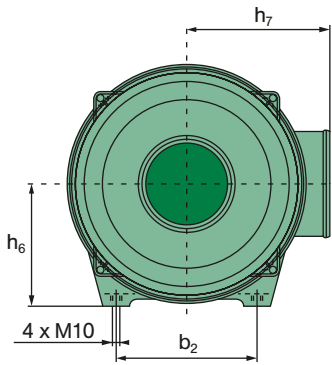


Fig. 1

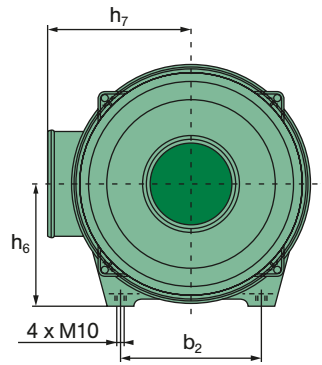


Fig. 2

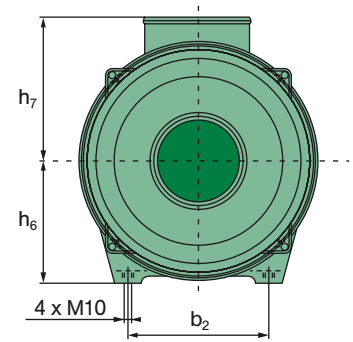
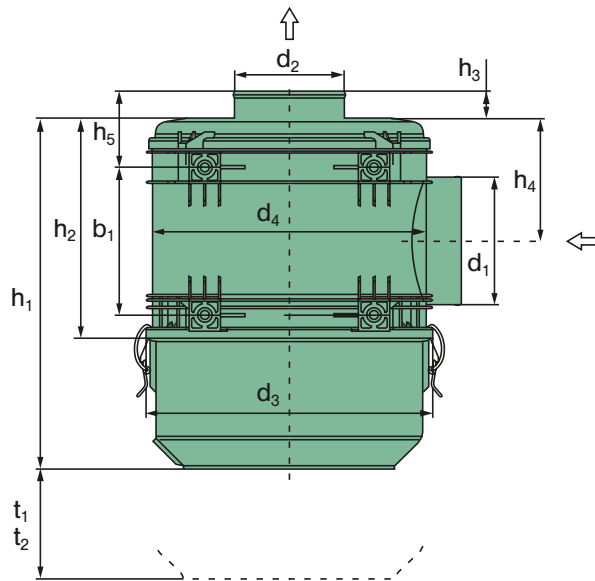


Fig. 3

Order No.		Fig.	Filter size	Nominal flow rate [m ³ /min]	Replacement filter element		Weight [kg]
without secondary element	with secondary element				MANN-FILTER main element	MANN-FILTER secondary element	
44 513 85 901	44 513 85 950	1	NLG 15 – 12	10 – 18	C 23 513	CF 1240	3.3
44 513 85 902	44 513 85 951	2					
44 513 85 900	44 513 85 952	3					
44 632 85 905	44 632 85 951	1	NLG 15 – 15	10 – 18	C 23 632/1	CF 1250	3.6
44 632 85 906	44 632 85 952	2					
44 632 85 900	44 632 85 950	3					
44 750 85 903	44 750 85 951	1	NLG 15 – 18	10 – 18	C 23 750	CF 1260	4.3
44 750 85 904	44 750 85 950	2					
44 750 85 901	44 750 85 952	3					
44 742 85 905	44 742 85 950	1	NLG 21 – 18	12 – 24	C 25 740	CF 1420	4.3
44 742 85 906	44 742 85 952	2					
44 742 85 904	44 742 85 953	3					
44 860 85 908	44 860 85 952	1	NLG 21 – 21	12 – 24	C 25 860/2	CF 1430	4.6
44 860 85 909	44 860 85 953	2					
44 860 85 900	44 860 85 951	3					
44 860 85 911	44 860 85 954	1	NLG 21 – 24	12 – 24	C 25 990	CF 1440	5.1
44 860 85 912	44 860 85 950	2					
44 860 85 904	44 860 85 955	3					
44 920 85 926	44 920 85 950	1	NLG 28 – 24	18 – 30	C 27 1020	CF 1631	5.2
44 920 85 927	44 920 85 955	2					
44 920 85 916	44 920 85 956	3					
44 920 85 915	44 920 85 954	1	NLG 28 – 28	18 – 30	C 27 1170	CF 1640	5.6
44 920 85 914	44 920 85 957	2					
44 920 85 904	44 920 85 952	3					
44 920 85 928	44 920 85 958	1	NLG 28 – 32	18 – 30	C 27 1320	CF 1650	6.3
44 920 85 924	44 920 85 951	2					
44 920 85 918	44 920 85 959	3					
44 930 85 912	44 930 85 950	1	NLG 37 – 32	25 – 45	C 30 1330	CF 1820	6.4
44 930 85 913	44 930 85 956	2					
44 930 85 902	44 930 85 957	3					
44 930 85 908	44 930 85 958	1	NLG 37 – 37	25 – 45	C 30 1530	CF 1830	7.4
44 930 85 909	44 930 85 959	2					
44 930 85 900	44 930 85 951	3					
44 930 85 914	44 930 85 955	1	NLG 37 – 42	25 – 45	C 30 1730	CF 1840	7.9
44 930 85 915	44 930 85 952	2					
44 930 85 901	44 930 85 954	3					

NLG Pico

Dimensions and order numbers

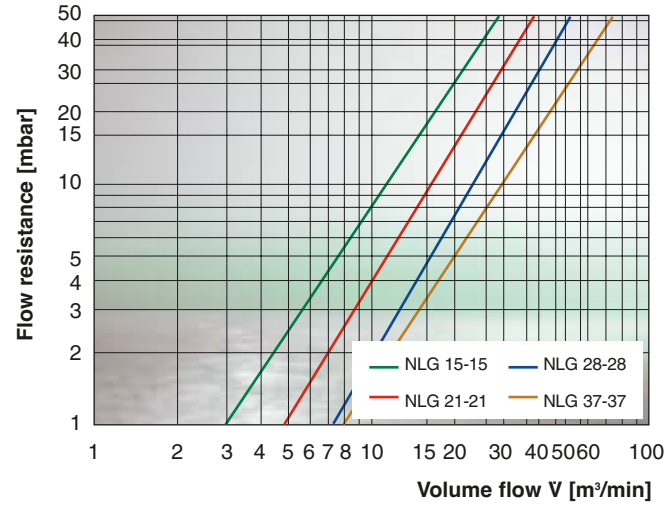


Group	Filter size	Dimensions in mm (<i>dimensions in inches</i>)														
		d_1	d_2	d_3	d_4	b_1	b_2	h_1	h_2	h_3	h_4	h_5	h_6	h_7	t_1	t_2
15	NLG 15-12							305								273
	NLG 15-15							(12.01)								(10.75)
	NLG 15-18	130	110	299	285	140	200	360	228	33	120	91	153	182	230	328
		(5.12)	(4.33)	(11.77)	(11.22)	(5.51)	(7.87)	(14.17)	(8.98)	(1.30)	(4.72)	(3.59)	(6.02)	(7.17)	(9.06)	(12.91)
								415								383
								(16.34)								(15.08)
21	NLG 21-18							365								332
	NLG 21-21							(14.37)								(13.07)
	NLG 21-24	150	130	339	323	175	200	415	260	33	145.5	91	173	203	260	382
		(5.91)	(5.12)	(13.35)	(12.72)	(6.89)	(7.87)	(16.34)	(10.24)	(1.30)	(5.73)	(3.59)	(6.81)	(7.99)	(10.24)	(15.04)
								465								432
								(18.31)								(17.01)
28	NLG 28-24							427								395
	NLG 28-28							(16.81)								(15.55)
	NLG 28-32	180	150	365	349	210	200	480	295	33	163	91	185	215	296	448
		(7.09)	(5.91)	(14.37)	(13.74)	(8.27)	(7.87)	(18.90)	(11.61)	(1.30)	(6.42)	(3.59)	(7.28)	(8.46)	(11.65)	(17.64)
								533								501
								(20.98)								(19.72)
37	NLG 37-32							498								465
	NLG 37-37							(19.61)								(18.31)
	NLG 37-42	210	180	407	393	245	240	563	363	33	188	91	207	237	364	530
		(8.27)	(7.09)	(16.02)	(15.47)	(9.65)	(9.45)	(22.17)	(14.29)	(1.30)	(7.40)	(3.59)	(8.15)	(9.33)	(14.33)	(20.87)
								628								595
								(24.72)								(23.43)

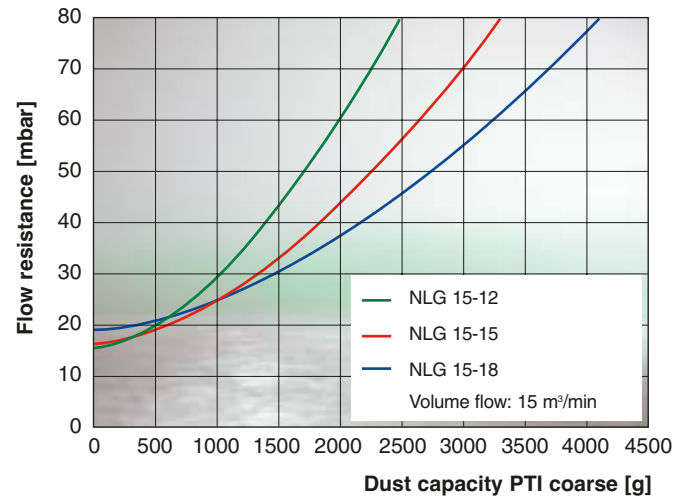
NLG Pico

Flow characteristics without secondary element ...

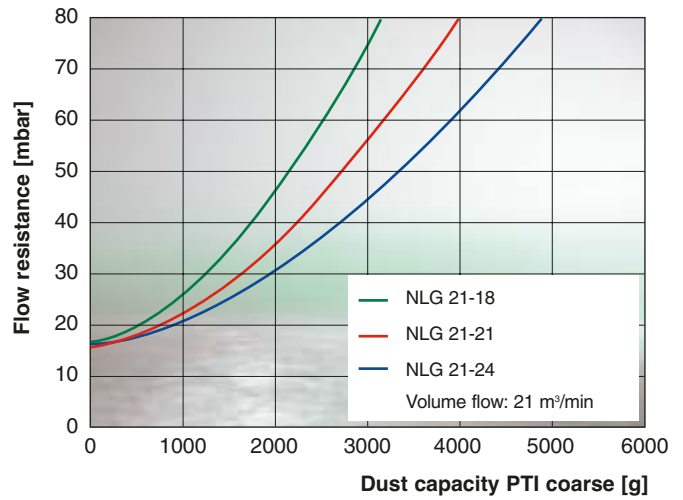
... for flow rates as per ISO 5011



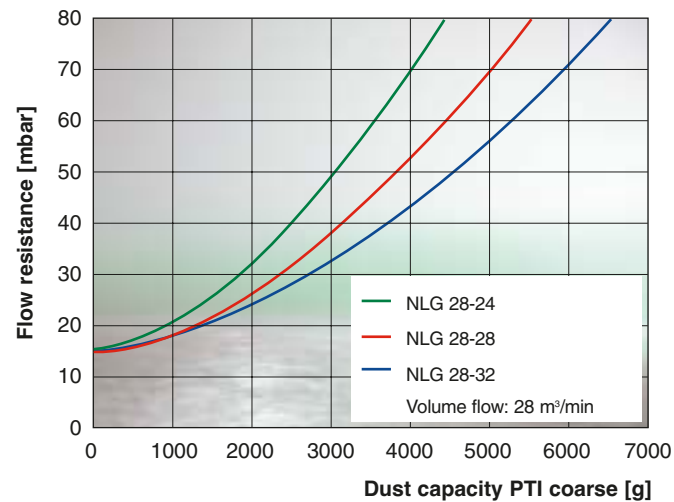
... for dust capacity as per ISO 5011



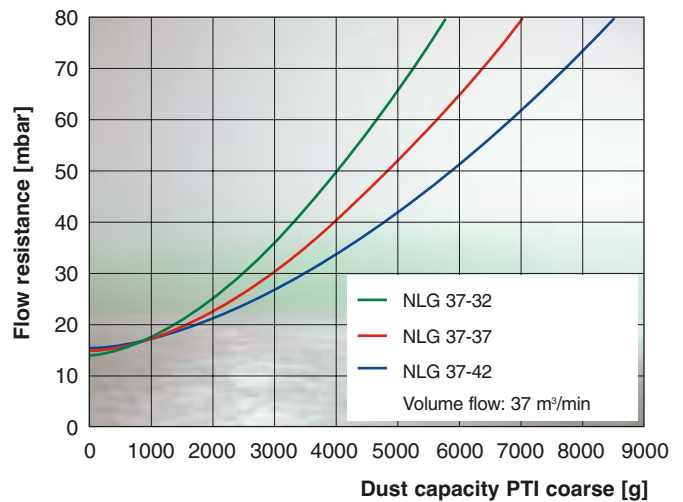
... for dust capacity as per ISO 5011



... for dust capacity as per ISO 5011



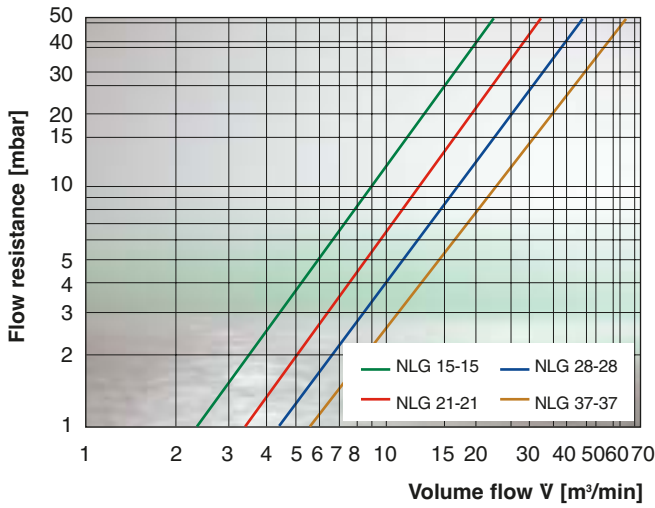
... for dust capacity as per ISO 5011



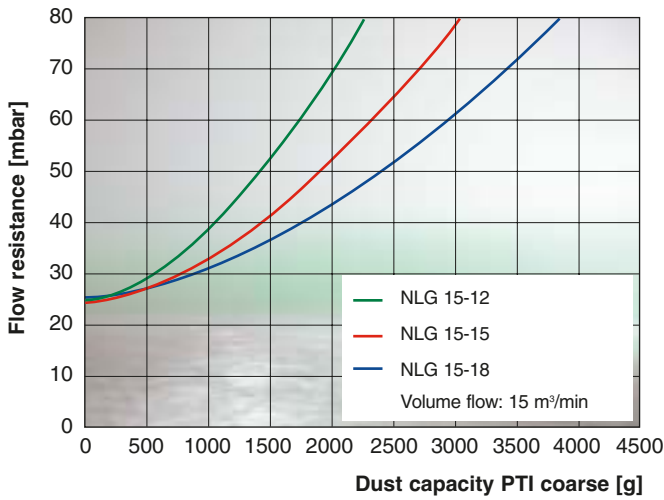
NLG Pico

Flow characteristics with secondary element ...

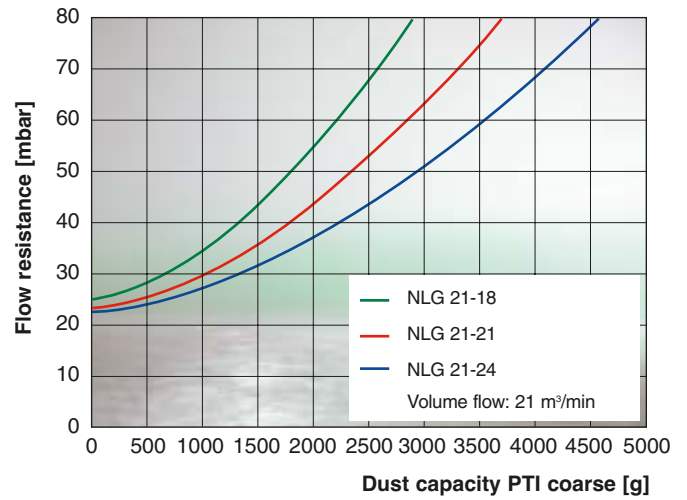
... for flow rates as per ISO 5011



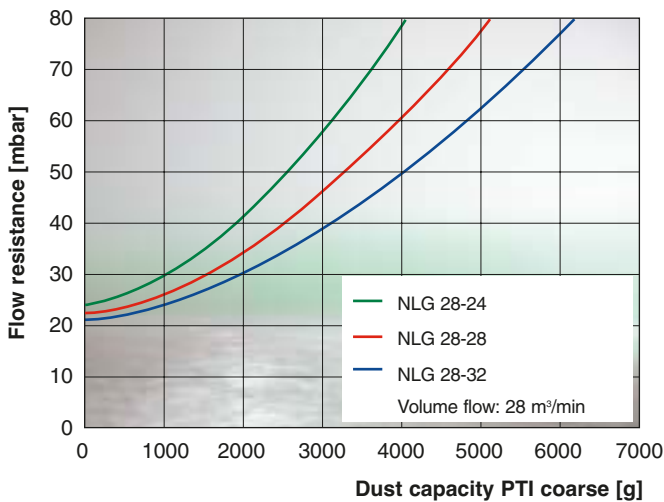
... for dust capacity as per ISO 5011



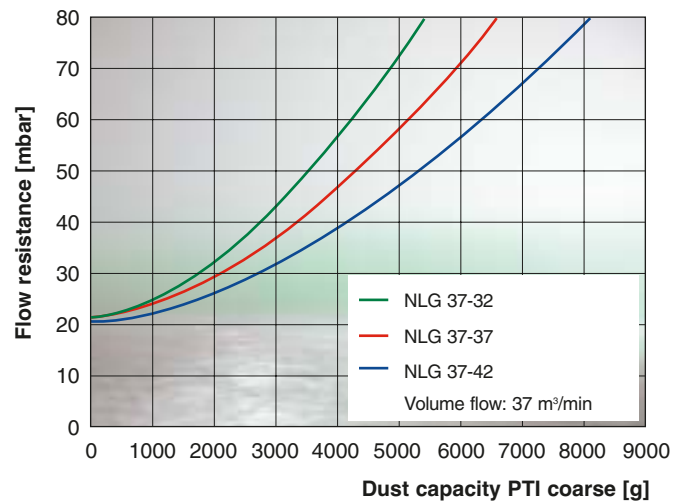
... for dust capacity as per ISO 5011



... for dust capacity as per ISO 5011



... for dust capacity as per ISO 5011



NLG Piclon

Dimensions and order numbers

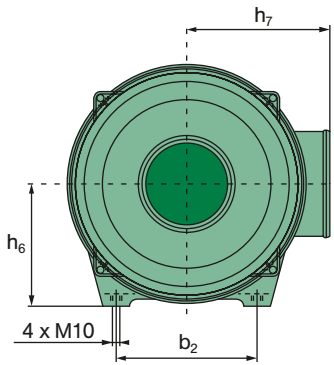


Fig. 1

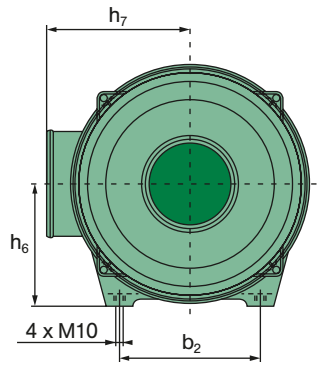


Fig. 2

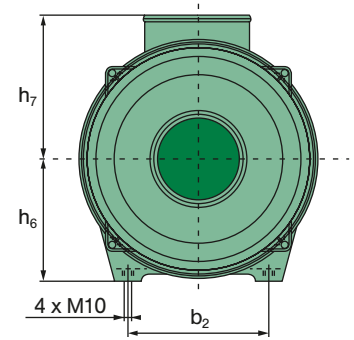
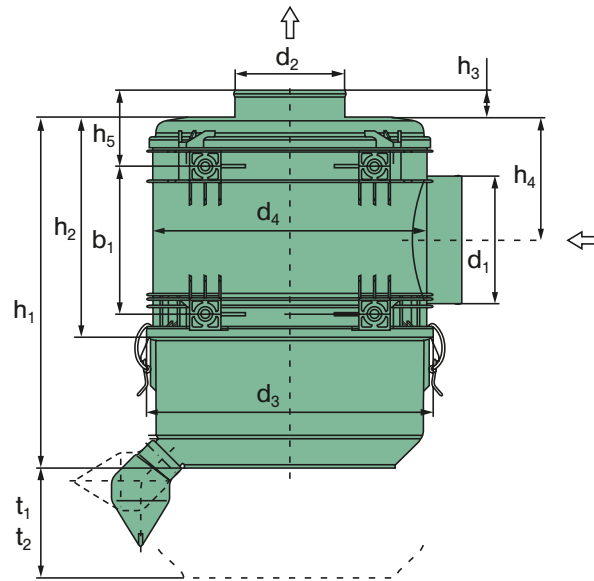


Fig. 3

Order No.		Fig.	Filter size	Nominal flow rate [m ³ /min]	Replacement filter element		Weight [kg]
without secondary element	with secondary element				MANN-FILTER main element	MANN-FILTER secondary element	
44 526 92 900	44 526 92 951	1	NLG 15 – 15	10 – 15	C 22 526	CF 1250	3.6
44 526 92 901	44 526 92 952	2					
44 526 92 902	44 526 92 950	3					
44 625 92 901	44 625 92 951	1	NLG 15 – 18	10 – 15	C 22 625	CF 1260	4.3
44 625 92 902	44 625 92 952	2					
44 625 92 900	44 625 92 950	3					
44 722 92 905	44 722 92 954	1	NLG 21 – 21	15 – 21	C 24 745/1	CF 1430	4.6
44 722 92 906	44 722 92 953	2					
44 722 92 904	44 722 92 950	3					
44 722 92 907	44 722 92 956	1	NLG 21 – 24	15 – 21	C 24 820	CF 1440	5.1
44 722 92 908	44 722 92 957	2					
44 722 92 903	44 722 92 951	3					
44 920 92 906	44 920 92 956	1	NLG 28 – 28	20 – 28	C 26 980	CF 1640	5.6
44 920 92 907	44 920 92 954	2					
44 920 92 902	44 920 92 950	3					
44 920 92 908	44 920 92 957	1	NLG 28 – 32	20 – 28	C 26 1100	CF 1650	6.3
44 920 92 909	44 920 92 958	2					
44 920 92 903	44 920 92 951	3					
44 930 92 902	44 930 92 950	1	NLG 37 – 37	25 – 40	C 28 1275	CF 1830	7.4
44 930 92 903	44 930 92 953	2					
44 930 92 900	44 930 92 951	3					
44 930 92 904	44 930 92 954	1	NLG 37 – 42	25 – 40	C 28 1440	CF 1840	7.9
44 930 92 905	44 930 92 955	2					
44 930 92 901	44 930 92 952	3					

NLG Piclon

Dimensions and order numbers

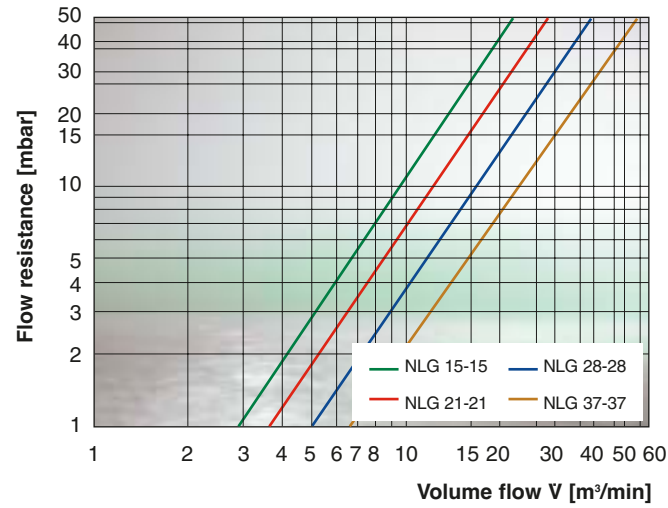


Group	Filter size	Dimensions in mm (<i>dimensions in inches</i>)														
		d_1	d_2	d_3	d_4	b_1	b_2	h_1	h_2	h_3	h_4	h_5	h_6	h_7	t_1	t_2
15	NLG 15-12							305								273
	NLG 15-15							(12.01)								(10.75)
	NLG 15-18	130	110	299	285	140	200	360	228	33	120	91	153	182	230	328
21	NLG 21-18							(14.17)								(12.91)
	NLG 21-21							415								383
	NLG 21-24	(5.12)	(4.33)	(11.77)	(11.22)	(5.51)	(7.87)	(16.34)	(8.98)	(1.30)	(4.72)	(3.59)	(6.02)	(7.17)	(9.06)	(15.08)
28	NLG 28-24							365								332
	NLG 28-28							(14.37)								(13.07)
	NLG 28-32	150	130	339	323	175	200	415	260	33	145.5	91	173	203	260	382
37	NLG 37-32							(16.34)								(15.04)
	NLG 37-37							465								432
	NLG 37-42	(5.91)	(5.12)	(13.35)	(12.72)	(6.89)	(7.87)	(18.31)	(10.24)	(1.30)	(5.73)	(3.59)	(6.81)	(7.99)	(10.24)	(17.01)
37	NLG 37-32							427								395
	NLG 37-37							(16.81)								(15.55)
	NLG 37-42	180	150	365	349	210	200	480	295	33	163	91	185	215	296	448
37	NLG 37-32							(18.90)								(17.64)
	NLG 37-37							533								501
	NLG 37-42	(7.09)	(5.91)	(14.37)	(13.74)	(8.27)	(7.87)	(20.98)	(11.61)	(1.30)	(6.42)	(3.59)	(7.28)	(8.46)	(11.65)	(19.72)
37	NLG 37-32							498								465
	NLG 37-37							(19.61)								(18.31)
	NLG 37-42	210	180	407	393	245	240	563	363	33	188	91	207	237	364	530
37	NLG 37-32							(22.17)								(20.87)
	NLG 37-37							628								595
	NLG 37-42	(8.27)	(7.09)	(16.02)	(15.47)	(9.65)	(9.45)	(24.72)	(14.29)	(1.30)	(7.40)	(3.59)	(8.15)	(9.33)	(14.33)	(23.43)

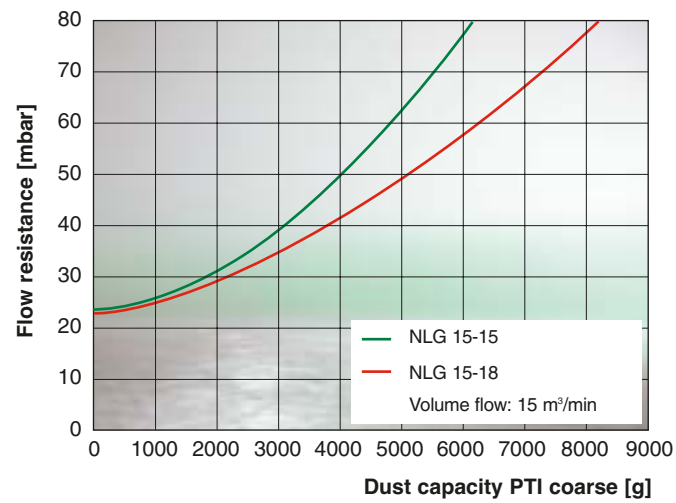
NLG Piclon

Flow characteristics without secondary element ...

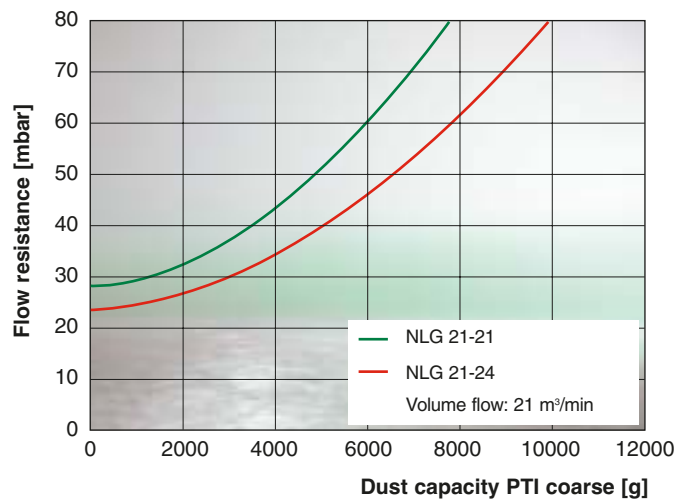
... for flow rates as per ISO 5011



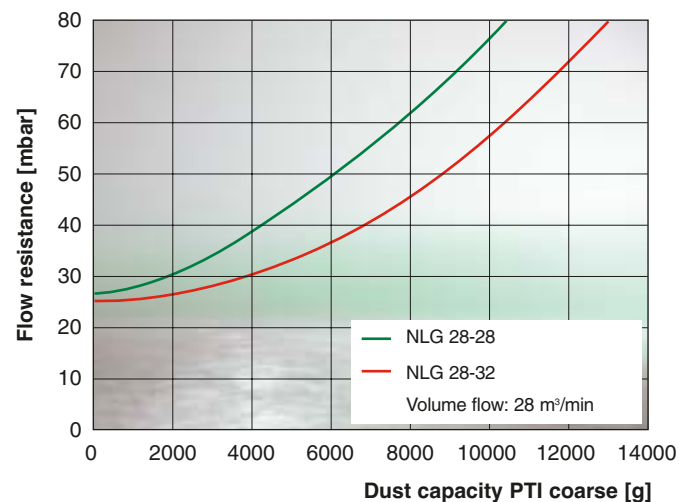
... for dust capacity as per ISO 5011



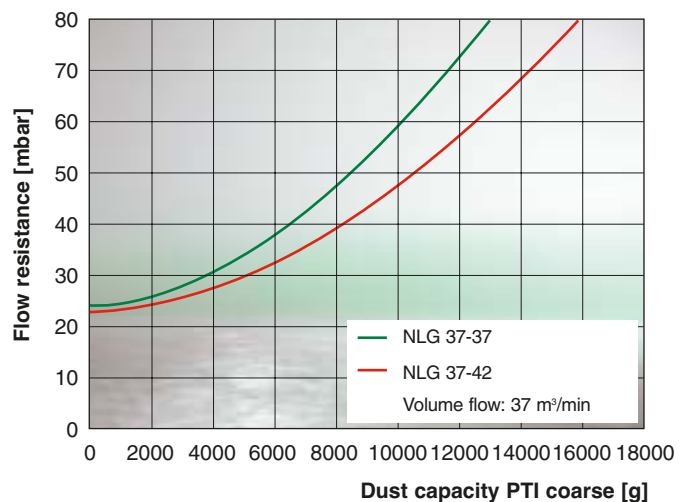
... for dust capacity as per ISO 5011



... for dust capacity as per ISO 5011



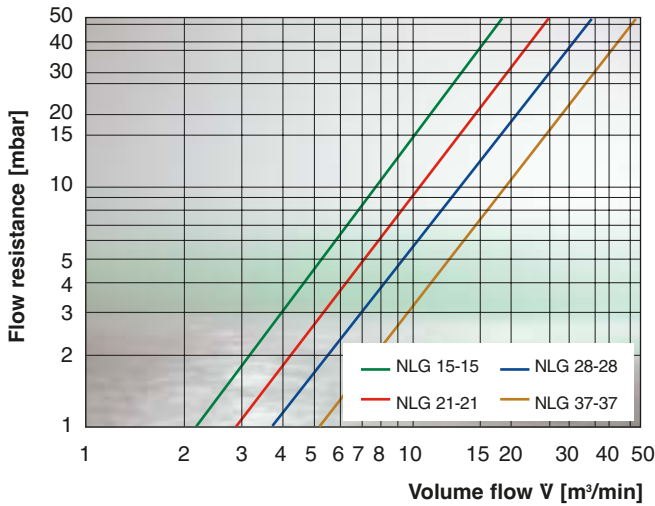
... for dust capacity as per ISO 5011



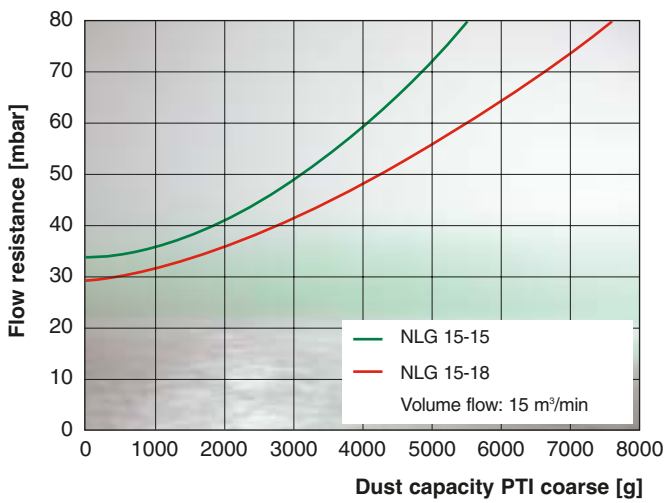
NLG Piclon-Ausführung

Flow characteristics with secondary element ...

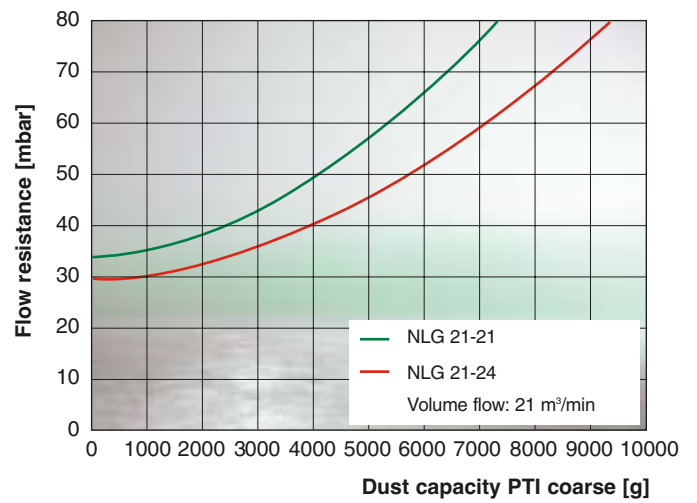
... for flow rates as per ISO 5011



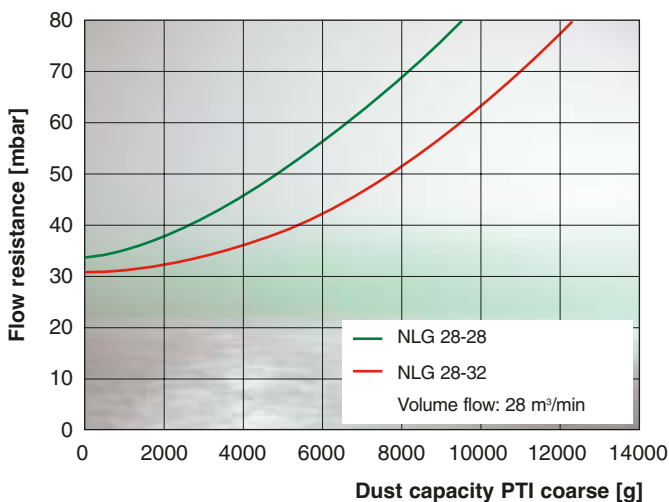
... for dust capacity as per ISO 5011



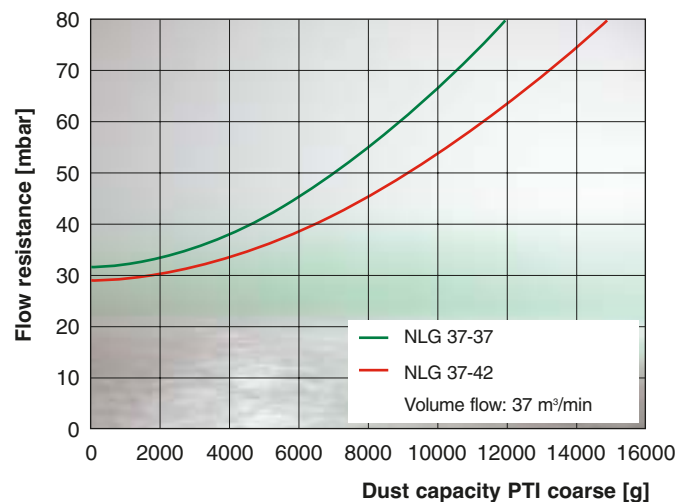
... for dust capacity as per ISO 5011



... for dust capacity as per ISO 5011

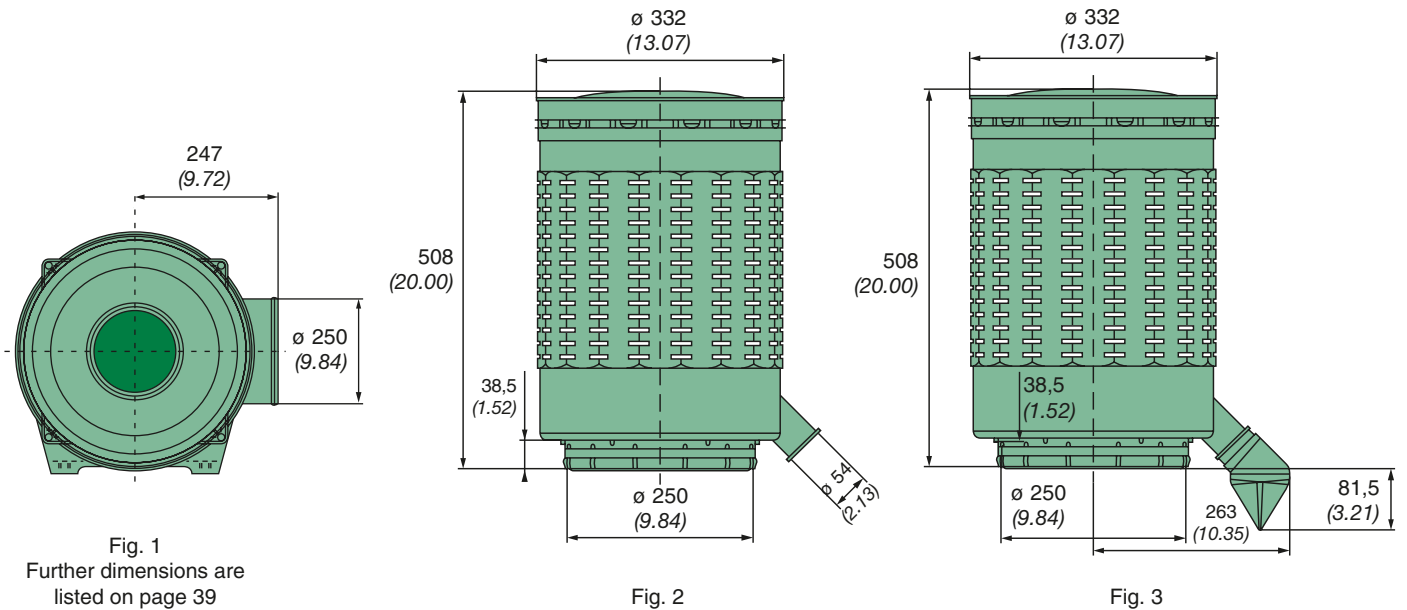


... for dust capacity as per ISO 5011



NLG Combination air cleaners

Dimensions and order numbers



NLG Pico to be used with DualSpin®

Order No. with secondary element	Fig.	Filter size	Replacement filter element	
			MANN-FILTER main element	MANN-FILTER secondary element
44 930 85 953	1	NLG 37 – 37	C 30 1530	CF 1830
44 930 85 960	1	NLG 37 – 42	C 30 1730	CF 1840

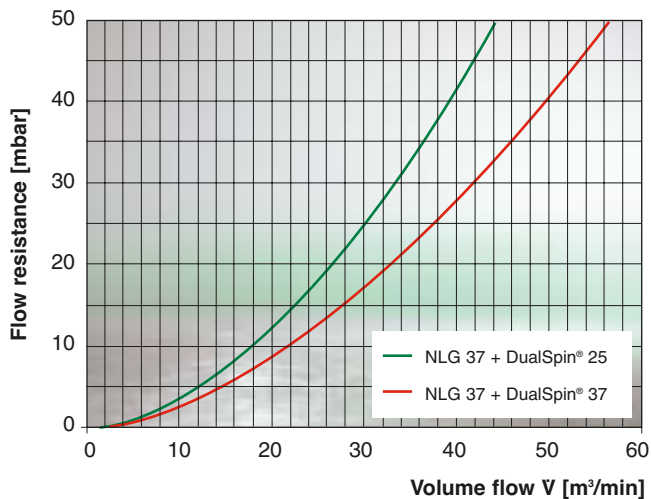
DualSpin® precleaners (Fig. 2 and 3)

Order No. without dust discharge valve (Fig. 2)	Order No. with dust discharge valve (Fig. 3)	Nominal flow rate [m³/min]
48 025 75 900	48 025 75 910	18 – 25
48 037 75 910	48 037 75 920	25 – 40

NLG Combination air cleaners

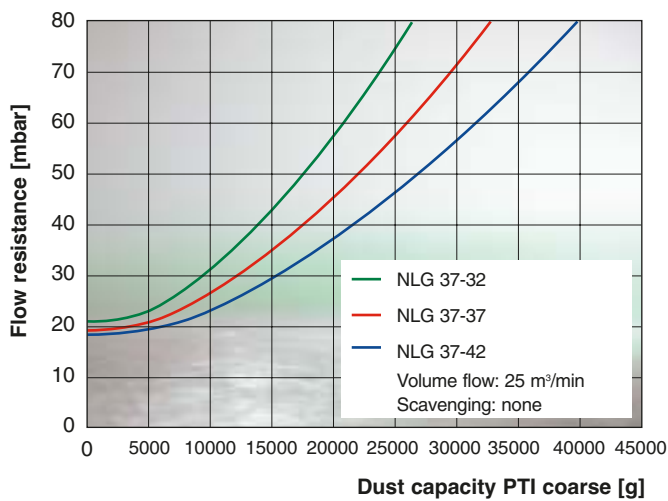
Flow characteristics with secondary element ...

... for flow rates as per ISO 5011



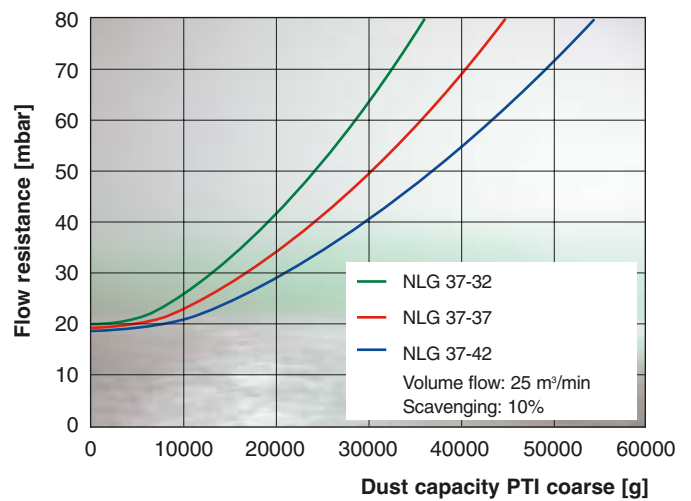
... for dust capacity as per ISO 5011

Precleaner: DualSpin® 25



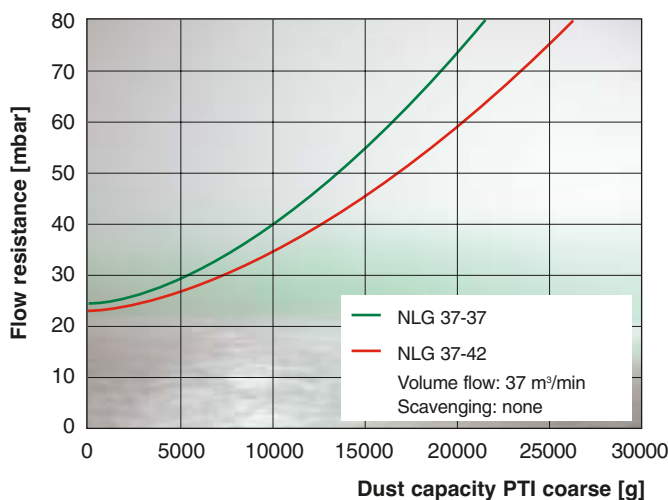
... for dust capacity as per ISO 5011

Precleaner: DualSpin® 25



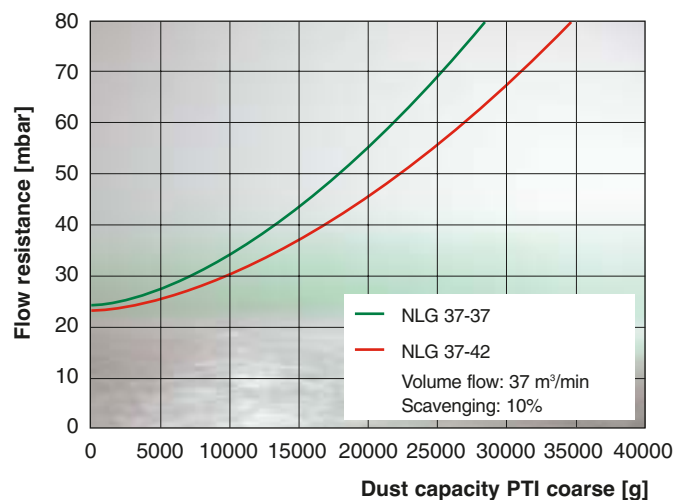
... for dust capacity as per ISO 5011

Precleaner: DualSpin® 37



... for dust capacity as per ISO 5011

Precleaner: DualSpin® 37





NLG Accessories

	Rain cap design A * (p. 108)	Straight pipe connection		90° elbow	
		without connection (p. 115)	with connection (p. 115)	without connection (p. 114)	with connection (p. 114)
NLG Group 15	39 160 67 910	39 600 27 999	39 600 27 979	39 600 25 999	39 600 25 979
NLG Group 21	39 190 67 910	39 700 27 999	39 700 27 979	39 700 25 999	39 700 25 979
NLG Group 28	39 220 67 910	39 800 27 999	39 800 27 979	39 800 25 999	39 800 25 979
NLG Group 37	39 320 67 210	39 000 27 182	available shortly	available shortly	available shortly

You will find the complete range of accessories for our air cleaners and service indicator/service switches on page 103.

* Alternative design B possible (see page 109)

Dust discharge valves

Order-No.	Name	Suitable for
39 000 40 661	Large dust discharge valve	NLG Piclon
23 040 30 121	Water discharge valve	NLG Pico
39 000 40 671	Large dust discharge valve	DualSpin®



MANN+HUMMEL Piclon
High performance two-stage air cleaner
with robust metal housing

Piclon: Two-stage air cleaner with metal housing

The Piclon line from MANN+HUMMEL, with its proven two-stage air cleaners, has long been established in our range of air cleaners.

The air cleaners are particularly robust, have very good filtration characteristics and are excellently suited for use in very dusty conditions with high mechanical loads, e.g.

in construction and agricultural machines. But you will also find these filters at work in quarries, cement plants and mines. They are also used in applications which specify a flame-resistant housing.

Advantages at a glance:

- especially robust metal design
- long filter service life with low pressure drop
- particularly robust filter elements with centre tubes in metal
- different versions available for the dust discharge
- secondary element available as optional extra



Sectional view



Filter elements

Filter element

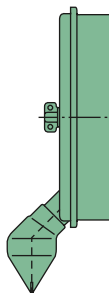
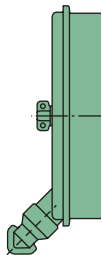
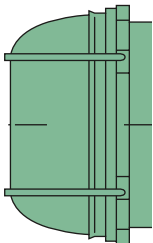
- high dust capacity through special MANN+HUMMEL filter medium
- reliable pleat stabilisation prevents pleats sticking together under unfavourable conditions
- an axial tie-rod firmly welded into the housing and a fastening nut hold the element securely in the sealed position

Secondary element

- MANN+HUMMEL synthetic fabric for a high safety margin with low pressure drop
- secure fit in housing through tie-rod and fastening nut prevent unintentional removal of the secondary element
- secondary element available as an optional extra



Versions



The Piclon is available in the following versions:

- with dust collector, last digit of the order no. is .. .04
- with a small dust discharge valve for strongly pulsating intake air, last digit of the order no. is .. .14
- with large dust discharge valve for non-pulsating or weak-pulsating intake air, last digit of the order no. is .. .44



Piclon

Dimensions and order numbers

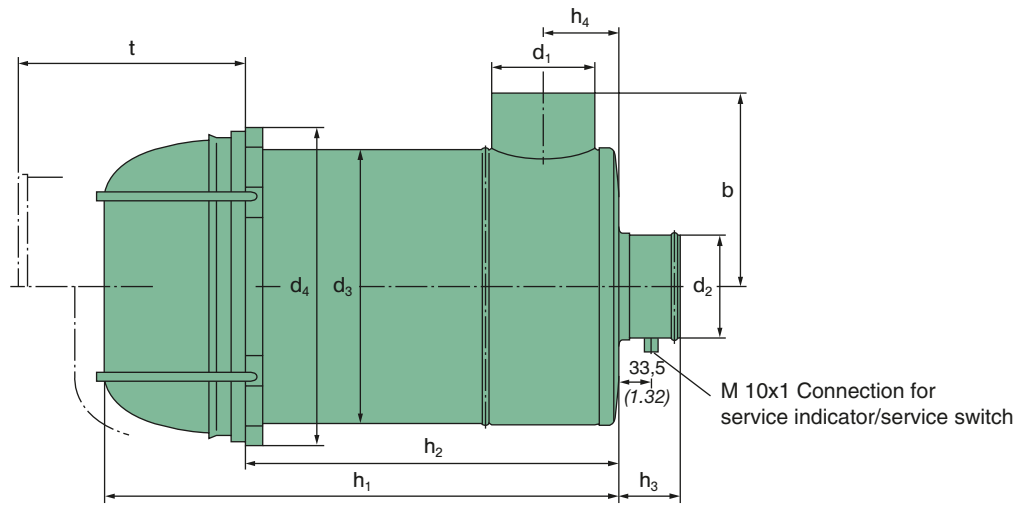


Fig. 1
Piclon with dust collector

Dust collector with toggle clip on request

Order No.		Nominal flow rate ¹⁾ [m ³ /min]	Replacement filter element		Approx. weight ²⁾ [kg]
without secondary element	with secondary element		MANN-FILTER main element	MANN-FILTER secondary element	
45 043 92 304	—	2	C 1043/1	—	1.4
45 043 92 314	—				
45 076 92 304	—	3	C 1176/3	—	2.0
45 076 92 314	—				
45 114 92 304	45 114 92 404	4.5	C 13 114/4	CF 600	3.1
45 114 92 314	45 114 92 414				
45 114 92 344	45 114 92 444				
45 165 92 304	45 165 92 404	6	C 15 165/3	CF 700	4.5
45 165 92 314	45 165 92 414				
45 165 92 344	45 165 92 444				
45 225 92 304	45 225 92 404	8	C 17 225/3	CF 800	5.4
45 225 92 344	45 225 92 444				
45 325 92 304	45 325 92 404	12	C 20 325/2	CF 1000	7.2
45 325 92 344	45 325 92 444				
45 440 92 304	45 440 92 404	15	C 23 440/1	CF 1200	9.4
45 440 92 344	45 440 92 444				
45 650 92 304	45 650 92 404	21	C 24 650/1	CF 1300	13.2
45 650 92 344	45 650 92 444				
45 880 92 304	45 880 92 404	28	C 30 850/2	CF 1600	17.5
45 880 92 344	45 880 92 444				
45 920 92 304	45 920 92 404	40	C 33 920/3	CF 2100	26.0
45 920 92 344	45 920 92 444				
44 940 92 104	—	60	C 45 3265	—	46.0

¹⁾ The nominal flow rate relates to a flow resistance [Δp] of approx. 20 mbar (2 kPa) and for air cleaners with a secondary element to approx. 30 mbar (3 kPa).

²⁾ Weight valid for the versions with last digit... 304, ... 314, ... 344.

Piclon

Dimensions and order numbers

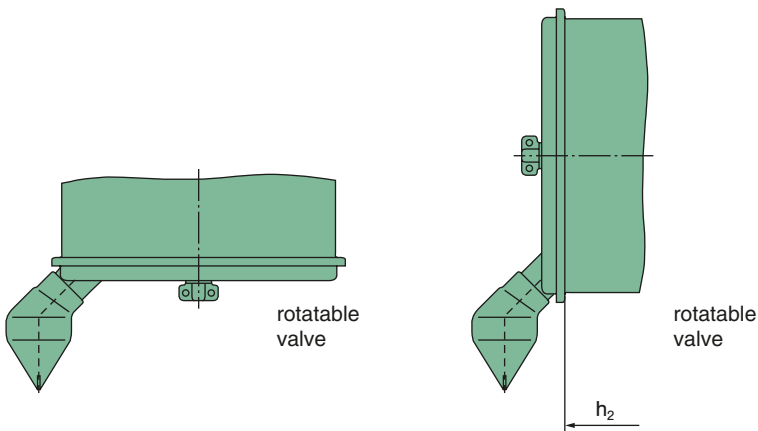


Fig. 2
Piclon with large dust
discharge valve

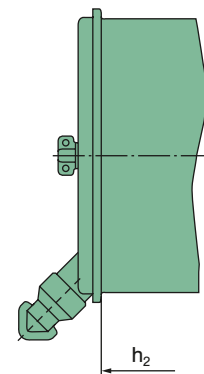


Fig. 3
Piclon with small dust
discharge valve

Order-No.		Fig.	Dimensions in mm (<i>dimensions in inches</i>)									
without secondary element	with secondary element		b	d ₁	d ₂	d ₃	d ₄	h ₁	h ₂	h ₃	h ₄	t ¹⁾
45 043 92 304	—	1	90	42	40	120	137	233	172	70	35	190
45 043 92 314	—	3	(3.54)	(1.65)	(1.57)	(4.72)	(5.39)	(9.17)	(6.77)	(2.76)	(1.38)	(7.48)
45 076 92 304	—	1	105	54	50	140	157	300	224	70	45	250
45 076 92 314	—	3	(4.13)	(2.13)	(1.97)	(5.51)	(6.18)	(11.81)	(8.82)	(2.76)	(1.77)	(9.84)
45 114 92 304	45 114 92 404	1	120	62	60	165	182	360	291	70	50	305
45 114 92 314	45 114 92 414	3	(4.72)	(2.44)	(2.36)	(6.50)	(7.17)	(14.17)	(11.46)	(2.76)	(1.97)	(12.01)
45 114 92 344	45 114 92 444	2										
45 165 92 304	45 165 92 404	1	140	68	70	195	212	416	335	80	55	350
45 165 92 314	45 165 92 414	3	(5.51)	(2.68)	(2.76)	(7.68)	(8.35)	(16.38)	(13.19)	(3.15)	(2.17)	(13.78)
45 165 92 344	45 165 92 444	2										
45 225 92 304	45 225 92 404	1	155	82	80	215	232	442	350	80	65	365
45 225 92 344	45 225 92 444	2	(6.10)	(3.23)	(3.15)	(8.47)	(9.13)	(17.40)	(13.78)	(3.15)	(2.56)	(14.37)
45 325 92 304	45 325 92 404	1	180	102	100	255	272	476	375	90	75	390
45 325 92 344	45 325 92 444	2	(7.09)	(4.02)	(3.94)	(10.04)	(10.71)	(18.74)	(14.76)	(3.54)	(2.95)	(15.35)
45 440 92 304	45 440 92 404	1	205	110	110	290	312	495	380	100	80	405
45 440 92 344	45 440 92 444	2	(8.07)	(4.33)	(4.33)	(11.42)	(12.28)	(19.49)	(14.96)	(3.94)	(3.15)	(15.94)
45 650 92 304	45 650 92 404	1	230	132	130	320	342	610	496	105	95	515
45 650 92 344	45 650 92 444	2	(9.06)	(5.20)	(5.12)	(12.60)	(13.46)	(24.02)	(19.53)	(4.13)	(3.74)	(20.28)
45 880 92 304	45 880 92 404	1	280	150	150	385	407	597	474	105	102	495
45 880 92 344	45 880 92 444	2	(11.02)	(5.91)	(5.91)	(15.16)	(16.02)	(23.50)	(18.66)	(4.13)	(4.02)	(19.49)
45 920 92 304 ²⁾	45 920 92 404 ²⁾	1	305	210	200	420	442	760	615	105	132	635
45 920 92 344	45 920 92 444	2	(12.01)	(8.27)	(7.87)	(16.54)	(17.40)	(29.92)	(24.21)	(4.13)	(5.20)	(25.00)
44 940 92 104	—	1	380	240	250	540	572	760	615	105	150	630
			(14.96)	(9.45)	(9.84)	(21.26)	(22.52)	(29.92)	(24.21)	(4.13)	(5.91)	(24.80)

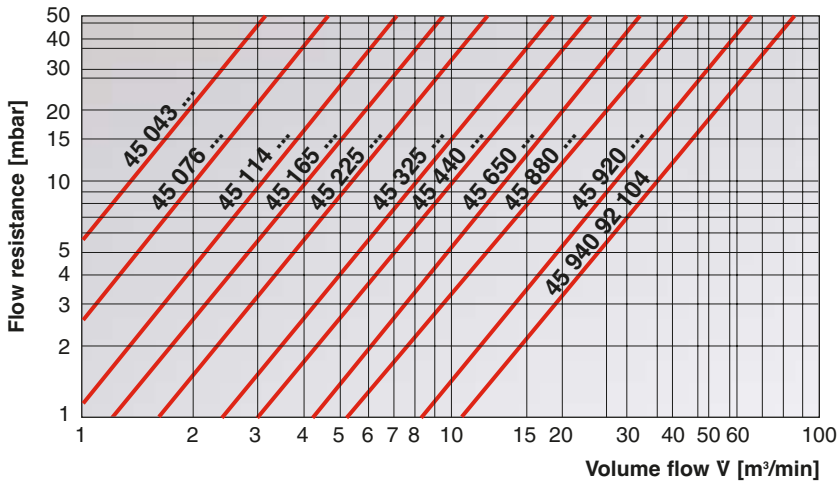
1) Removal height of the filter elements.

2) Dust collector only with toggle clip.

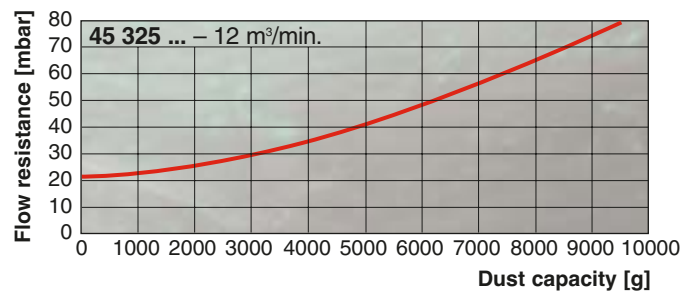
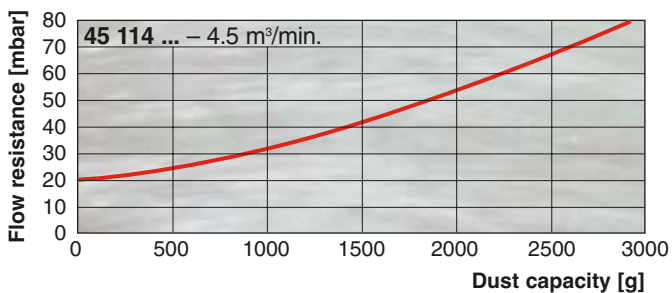
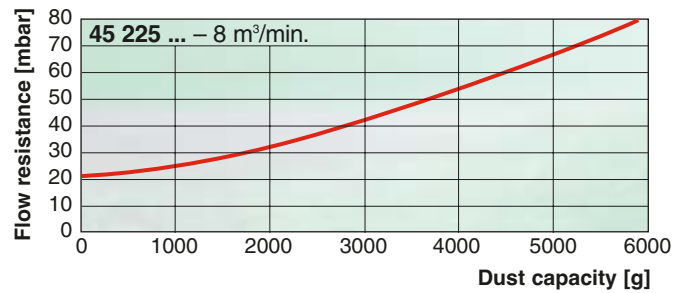
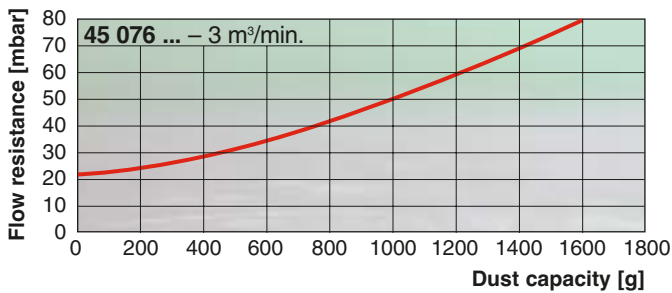
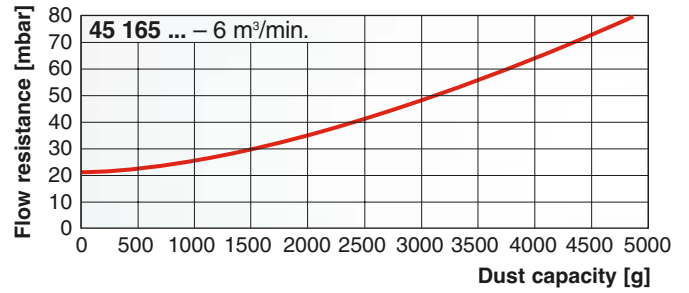
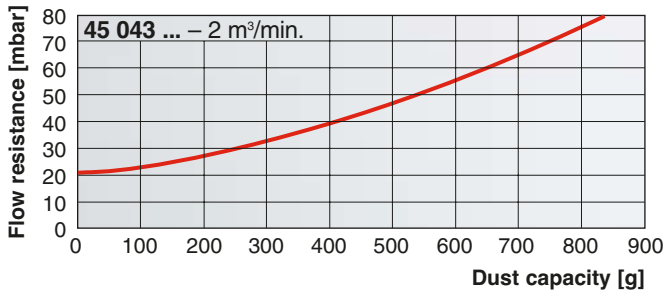
Piclon

Flow characteristics without secondary element ...

... for flow rates as per ISO 5011



... for dust capacity as per ISO 5011
with SAE coarse test dust

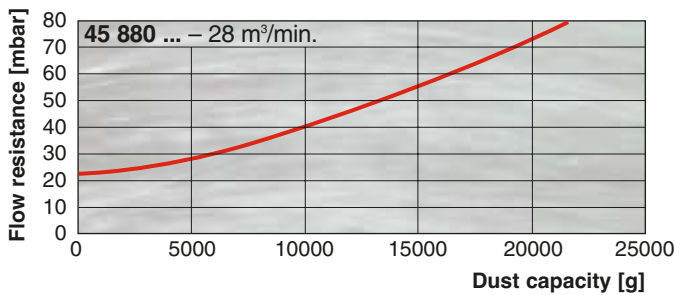
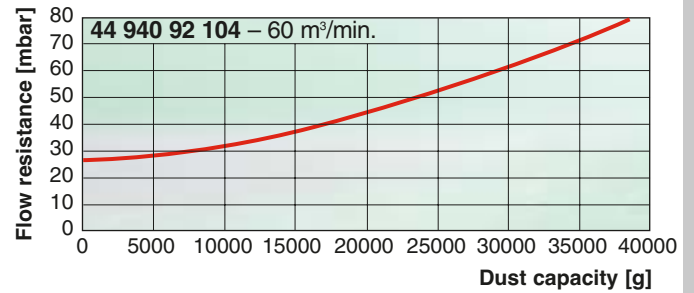
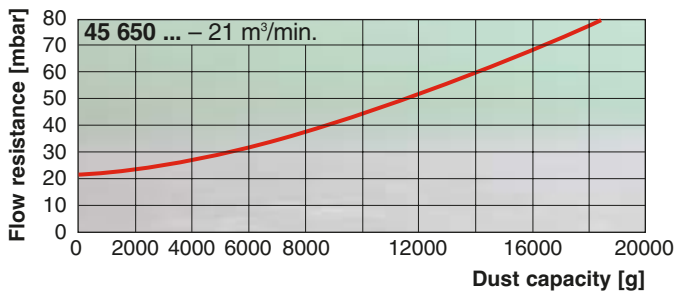
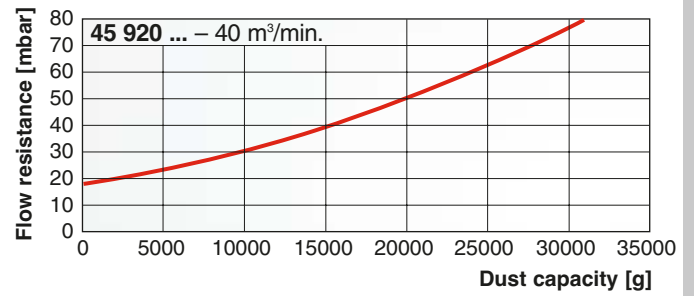
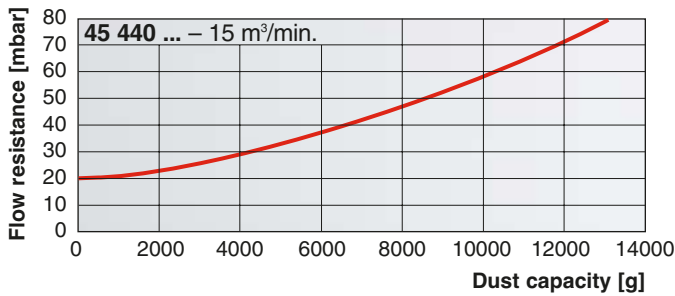


Piclon

Flow characteristics without secondary element ...



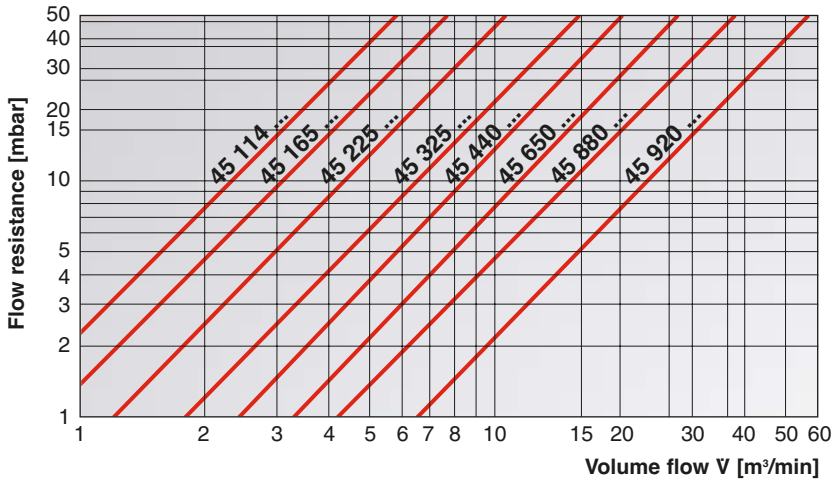
... for dust capacity as per ISO 5011
with SAE coarse test dust



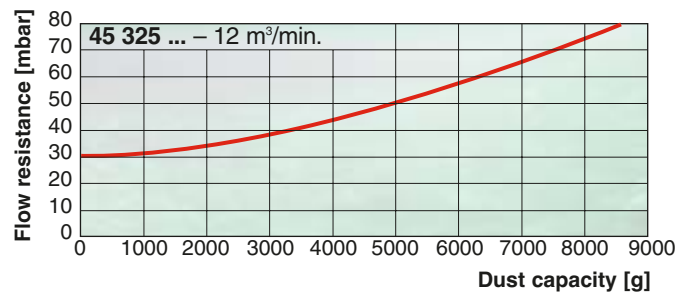
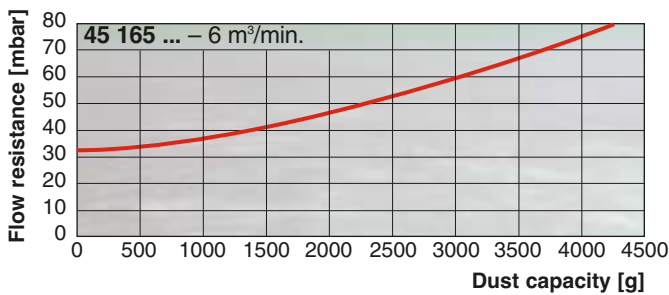
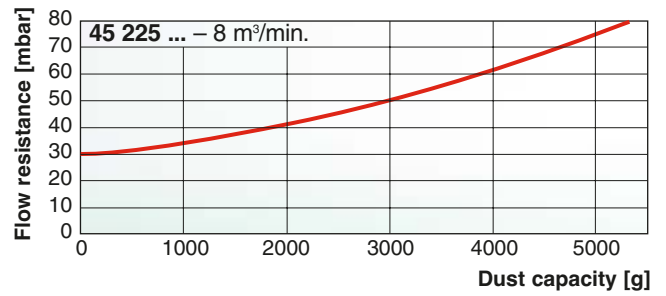
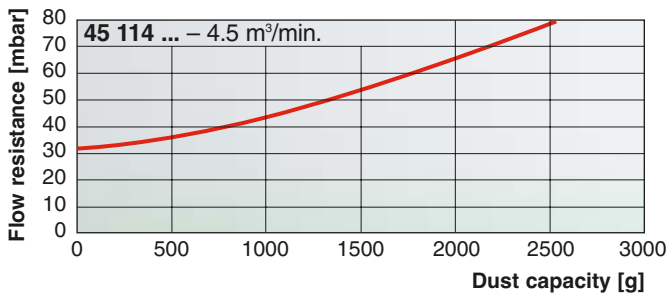
Piclon

Flow characteristics with secondary element ...

... for flow rates as per ISO 5011



... for dust capacity as per ISO 5011
with SAE coarse test dust

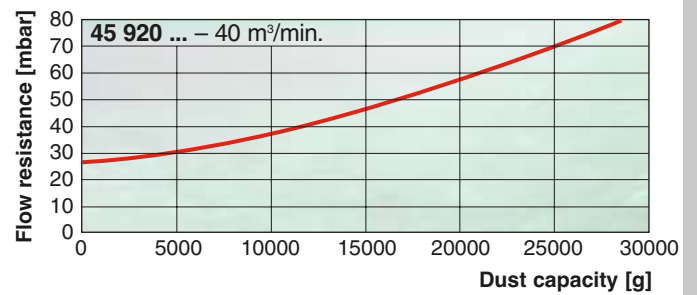
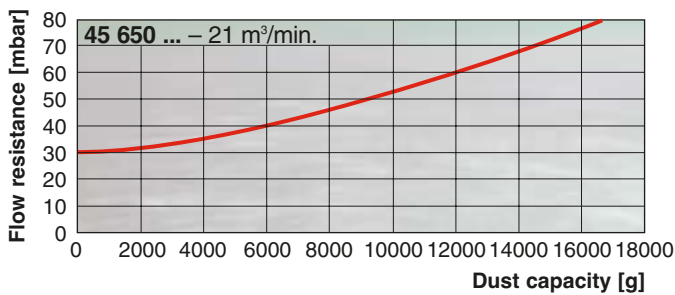
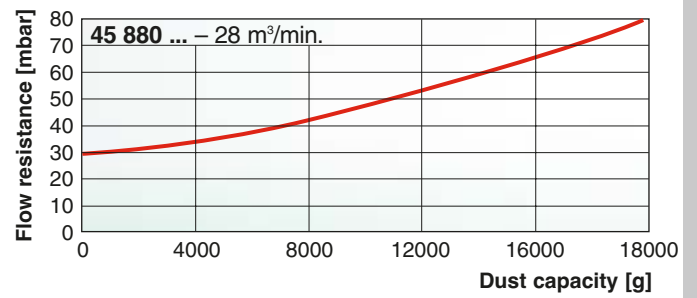
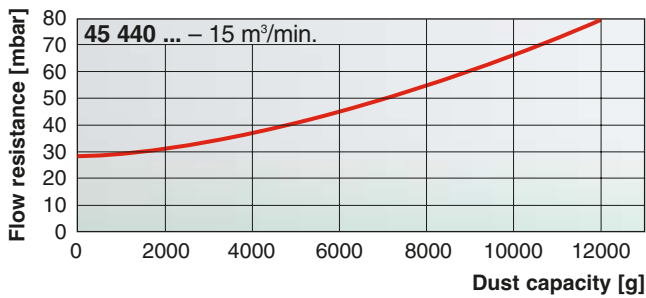


Piclon

Flow characteristics with secondary element ...



... for dust capacity as per ISO 5011
with SAE coarse test dust





Piclon Accessories

	Bracket (p. 106)	Rain cap design B * (p. 109)	Straight connection pipes connection for service indicator/service switch integrated in housing (p. 115)	90° elbow connection for service indicator/service switch integrated in housing (p. 114)
Piclon 45 043 ...	39 014 38 990	39 014 67 900	39 000 27 203	–
Piclon 45 076 ...	39 076 38 970	39 020 67 900	39 100 27 999	39 100 25 999
Piclon 45 114 ...	39 114 38 970	39 028 67 900	39 200 27 999	39 200 25 999
Piclon 45 165 ...	39 165 38 970	39 040 67 900	39 300 27 999	39 300 25 999
Piclon 45 225 ...	39 225 38 970	39 056 67 900	39 400 27 999	39 400 25 999
Piclon 45 325 ...	39 325 38 970	39 080 67 900	39 500 27 999	39 500 25 999
Piclon 45 440 ...	39 440 38 970	39 100 67 020	39 600 27 999	39 600 25 999
Piclon 45 650 ...	39 120 38 980	39 160 67 020	39 700 27 999	39 700 25 999
Piclon 45 880 ...	39 880 38 990	45 880 67 100	39 800 27 999	39 800 25 999
Piclon 45 920 ...	45 920 38 990	39 320 67 100	39 000 27 345	39 000 25 270
Piclon 44 940 ...	44 940 38 991	–	–	–

You will find the complete range of accessories for our air cleaners and service indicators/switches on page 103.

* Alternative design A possible (see page 108)

Dust discharge valves

Order No.	Name	Suitable for
39 000 40 391	Small dust discharge valve	... 314 + ... 414
39 000 40 661	Large dust discharge valve	... 344 + ... 444



MANN+HUMMEL Pico-E
High performance single-stage air cleaner
with very robust metal housing

Pico-E: Single-stage air cleaner with metal housing

The Pico-E line from MANN+HUMMEL, with its proven single-stage air cleaners, has long been established in our range of air cleaners.

The air cleaners are particularly robust and are characterised by excellent filtration performance. They are very suitable for use in conditions with low to medium dust loads and for applications with high mechanical loads such as with stationary engines, locomotives, fire-fighting vehicles,

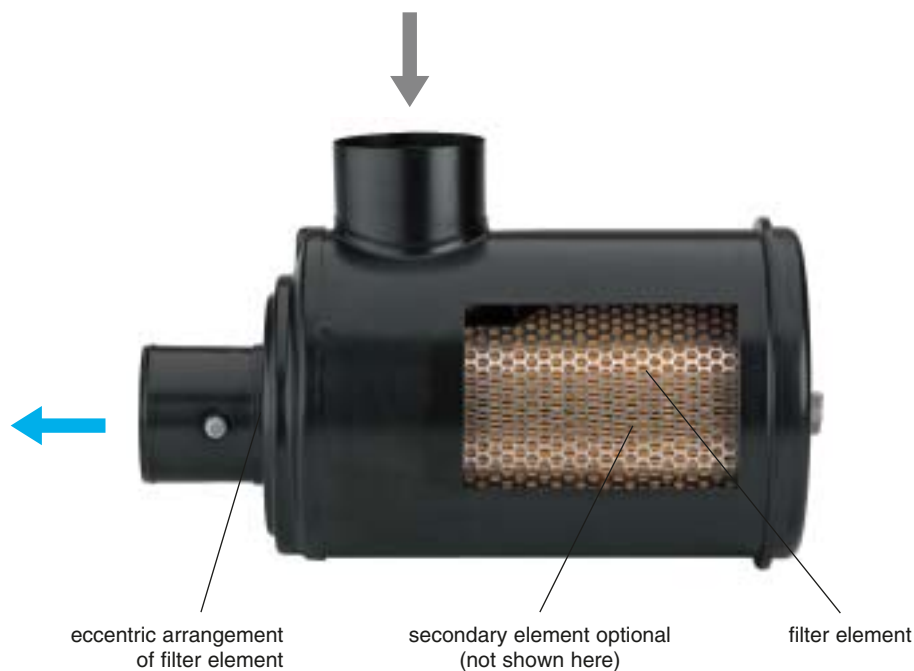
marine applications and other applications where a low pressure drop, particularly high mechanical stability, or a flame-resistant housing are required.



Advantages at a glance:

- very robust metal design
- long filter service life with low pressure drop
- especially robust filter elements with centre tubes in metal
- secondary element available as optional extra

Sectional view



Filter elements

Filter element

- high dust capacity through special MANN+HUMMEL filter medium
- reliable pleat stabilisation prevents pleats sticking together under unfavourable conditions
- an axial tie-rod firmly welded into the housing and a fastening nut hold the element securely in the sealed position.



Secondary element

- MANN+HUMMEL synthetic fabric for a high safety margin with low pressure drop
- secure fit in housing through tie-rod and fastening nut prevent unintentional removal of the secondary element
- secondary element available as option from air cleaner size 44 114 ...

The exceptionally low pressure drop of the Pico-E is made possible through the enlarged dirty air connection and eccentric arrangement of the filter element in the housing



Pico-E

Dimensions and order numbers

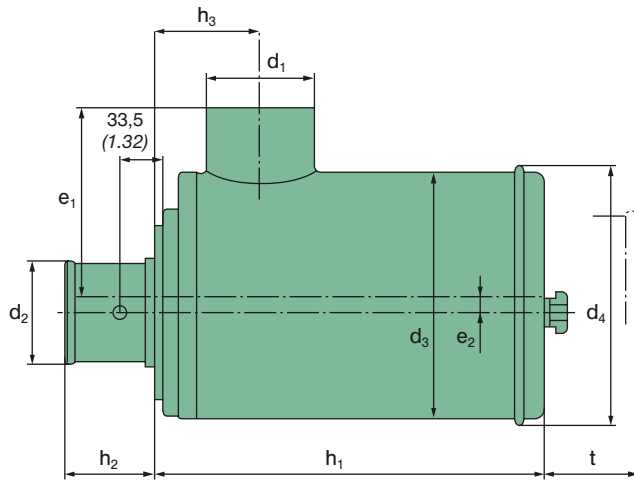
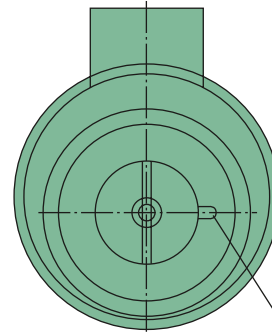


Fig. 1



Connection for service indication equipment (M10 x 1)

Order No.		Fig.	Nominal flow rate ¹⁾ [m ³ /min]	Replacement filter element		Approx. weight ²⁾ [kg]
without secondary element	with secondary element			MANN-FILTER main element	MANN-FILTER secondary element	
44 076 75 204	–	1	3	C 1176/3	–	1.8
44 114 75 204	44 114 75 304	1	4.5	C 13 114/4	CF 600	2.6
44 165 75 204	44 165 75 304	1	6	C 15 165/3	CF 700	3.9
44 225 75 204	44 225 75 304	1	8	C 17 225/3	CF 800	4.7
44 325 75 204	44 325 75 304	1	12	C 20 325/2	CF 1000	6.8
44 440 75 204	44 440 75 304	1	15	C 23 440/1	CF 1200	8.5
44 650 75 204	44 650 75 304	1	21	C 24 650/1	CF 1300	12
44 880 75 204	44 880 75 304	1	28	C 30 850/2	CF 1600	15
44 920 75 204	44 920 75 304	1	40	C 33 920/3	CF 2100	20
45 950 75 104	–	2	60	C 45 4444	–	57

¹⁾ The nominal flow rate relates to a flow resistance [Δp] of approx. 15 mbar (1.5 kPa), for air cleaners with secondary element up to approx. 22 mbar (2.2 kPa).

²⁾ Weight valid for versions with last digits ... 204.

Pico-E

Dimensions and order numbers

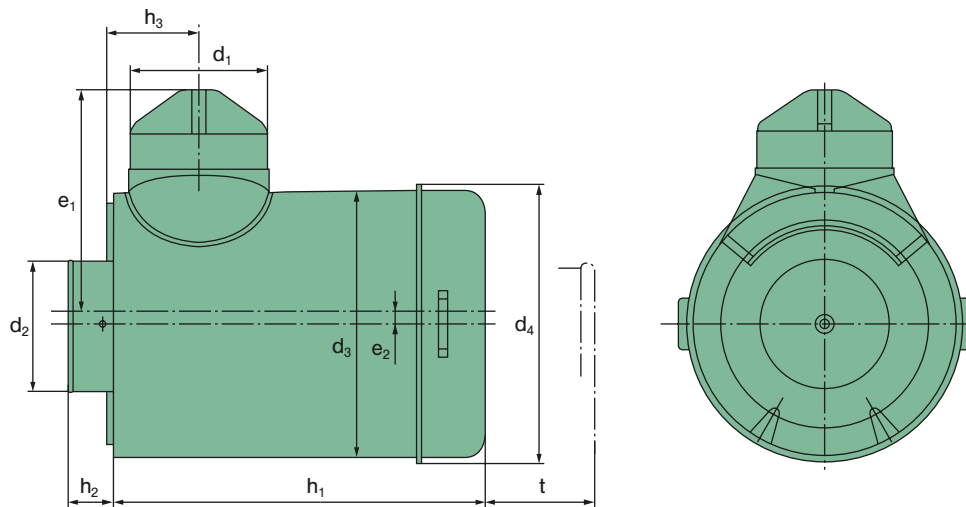


Fig. 2

Order No.		Dimensions in mm (<i>dimensions in inches</i>)									
without secondary element	with secondary element	d_1	d_2	d_3	d_4	e_1	e_2	h_1	h_2	h_3	t ¹⁾
44 076 75 204	—	62 (2.44)	50 (1.97)	130 (5.12)	148 (5.83)	110 (4.33)	5 (0.20)	235 (9.25)	70 (2.76)	70 (2.76)	235 (9.25)
44 114 75 204	44 114 75 304	68 (2.68)	60 (2.36)	150 (5.91)	168 (6.61)	125 (4.92)	6 (0.24)	303 (11.93)	70 (2.76)	75 (2.95)	300 (11.81)
44 165 75 204	44 165 75 304	82 (3.23)	70 (2.76)	170 (6.69)	188 (7.40)	140 (5.51)	6 (0.24)	345 (13.58)	80 (3.15)	85 (3.35)	345 (13.58)
44 225 75 204	44 225 75 304	102 (4.02)	80 (3.15)	190 (7.48)	208 (8.19)	155 (6.10)	7 (0.28)	360 (14.17)	80 (3.15)	95 (3.74)	355 (13.98)
44 325 75 204	44 325 75 304	110 (4.33)	100 (3.94)	240 (9.45)	258 (10.16)	185 (7.28)	16 (0.63)	385 (15.16)	90 (3.54)	105 (4.13)	385 (15.16)
44 440 75 204	44 440 75 304	132 (5.20)	110 (4.33)	270 (10.63)	288 (11.34)	210 (8.27)	16 (0.63)	400 (15.75)	100 (3.94)	115 (4.53)	390 (15.35)
44 650 75 204	44 650 75 304	150 (5.91)	130 (5.12)	290 (11.42)	308 (12.13)	230 (9.06)	16 (0.63)	505 (19.88)	105 (4.13)	125 (4.92)	500 (19.69)
44 880 75 204	44 880 75 304	180 (7.09)	150 (5.91)	345 (13.58)	363 (14.29)	265 (10.43)	16 (0.63)	490 (19.29)	105 (4.13)	142 (5.59)	485 (19.09)
44 920 75 204	44 920 75 304	210 (8.27)	200 (7.87)	370 (14.57)	388 (15.28)	290 (11.42)	16 (0.63)	635 (25.00)	105 (4.13)	160 (6.30)	615 (24.21)
45 950 75 104	—	315 (12.40)	300 (11.81)	610 (24.02)	642 (25.28)	445 (17.52)	—	850 (33.46)	120 (4.72)	185 (7.28)	630 (24.80)

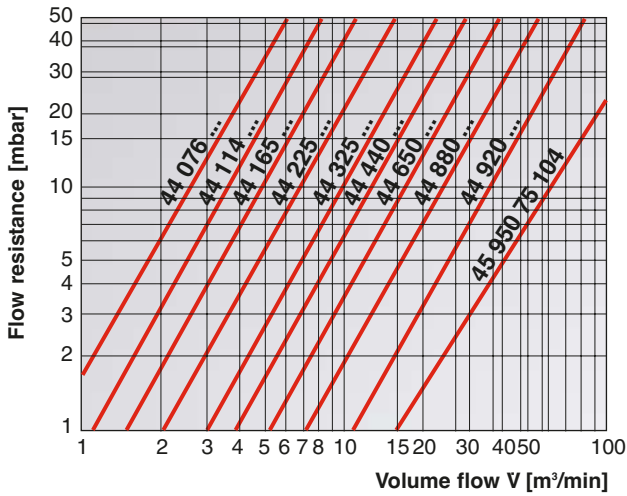
1) Removal height of the filter elements

Pico-E

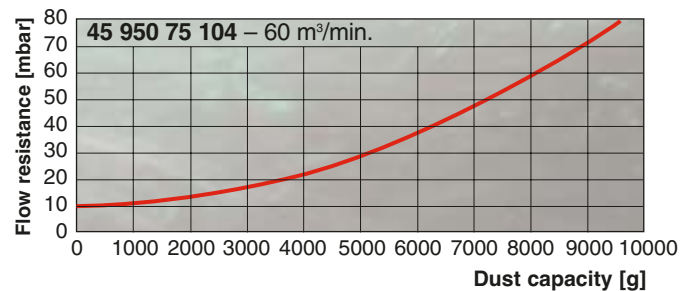
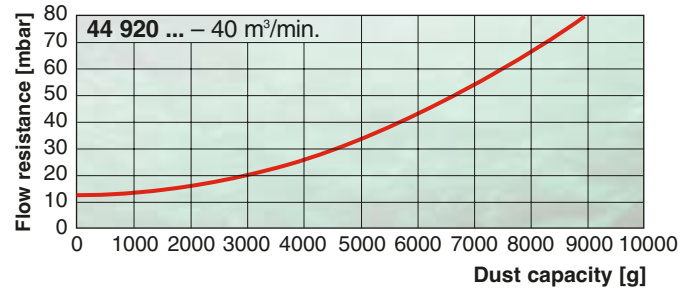
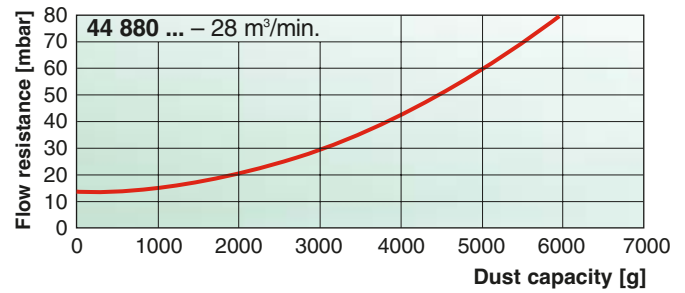
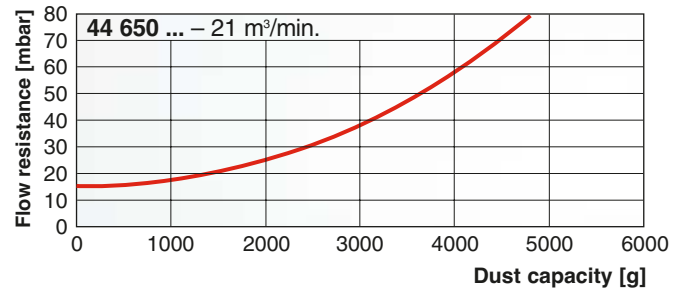
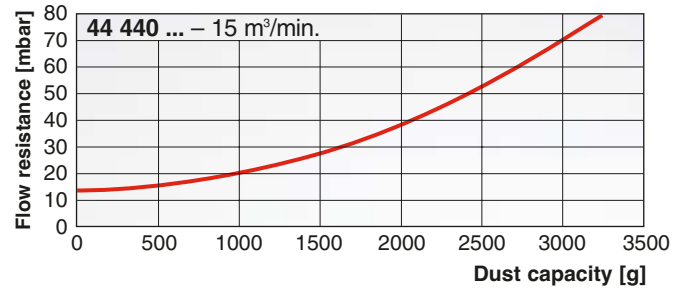
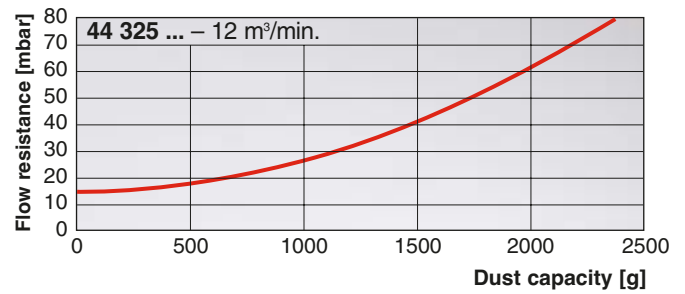
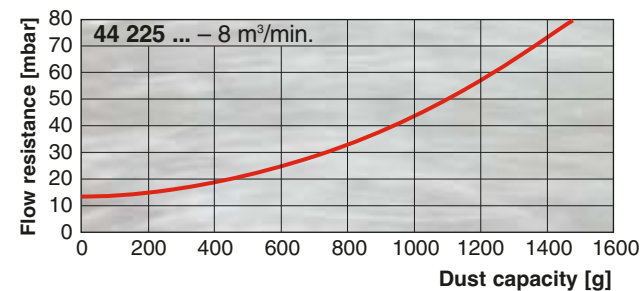
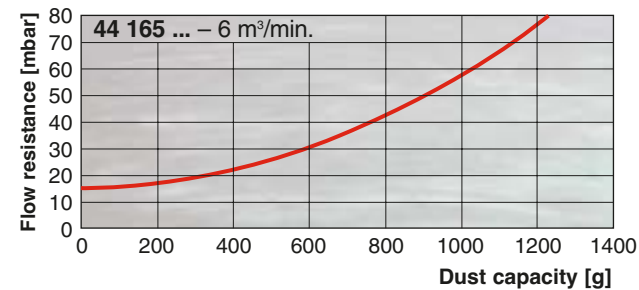
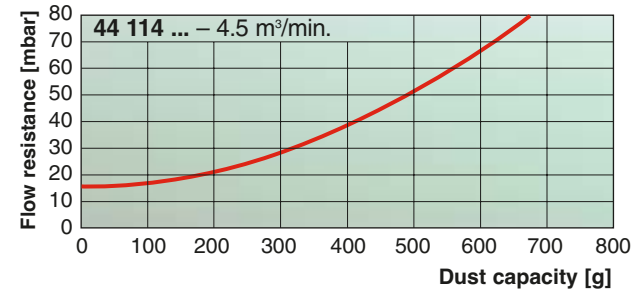
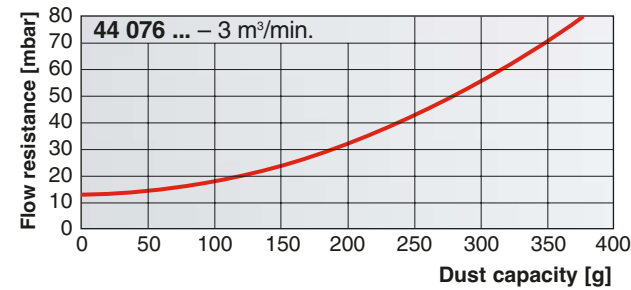
Flow characteristics without secondary element ...



... for flow rates as per ISO 5011



... for dust capacity as per ISO 5011
with SAE coarse test dust

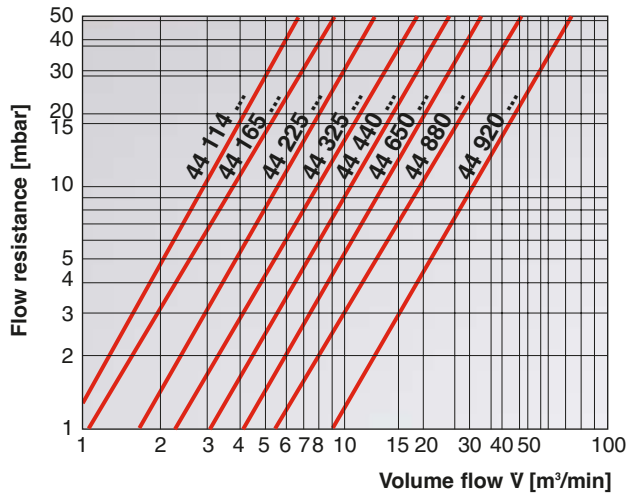


Versions for volume flows below 4.5 m³/min available on request.

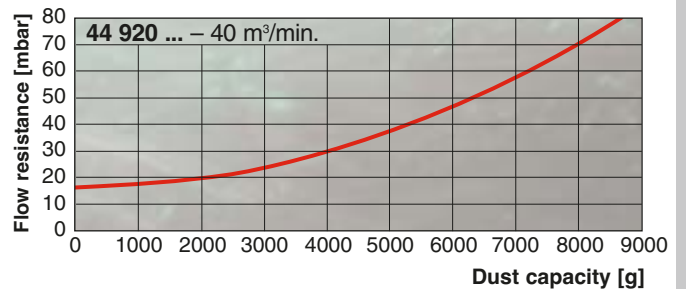
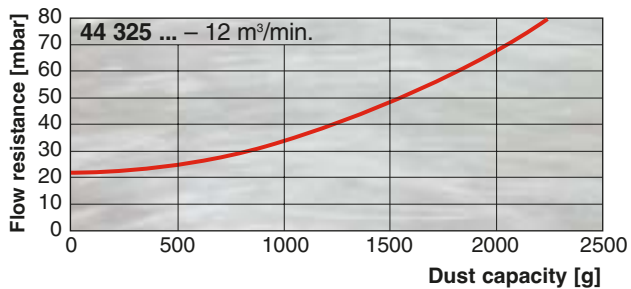
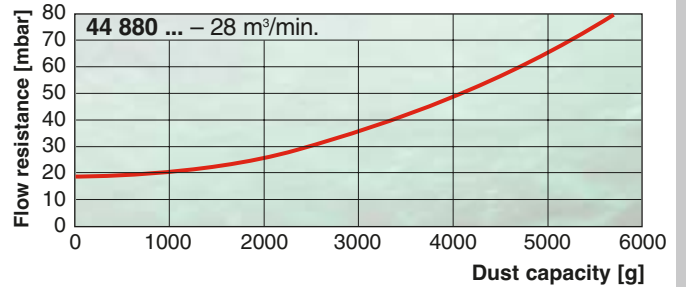
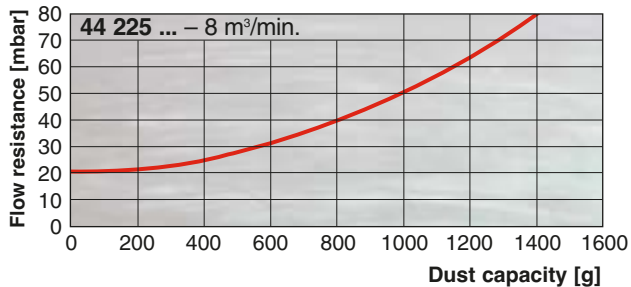
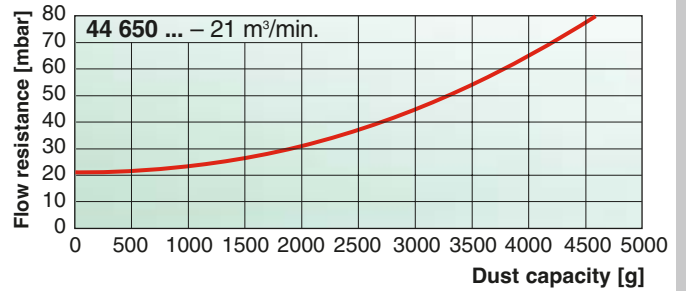
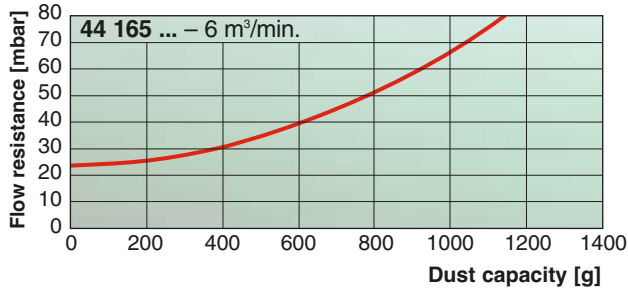
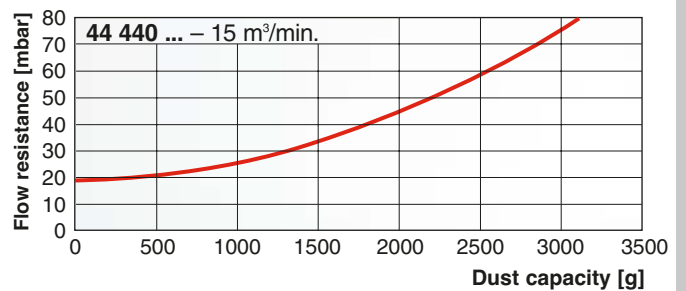
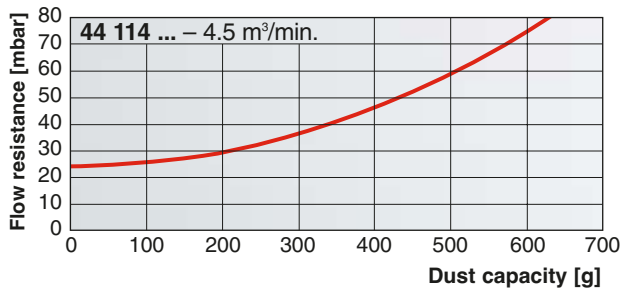
Pico-E

Flow characteristics with secondary element ...

... for flow rates as per ISO 5011



... for dust capacity as per ISO 5011
with SAE coarse test dust





Pico-E Accessories

	Bracket (p. 107)	Rain cap design B * (p. 109)	Straight pipes connection for service indicator/service switch integrated in housing (p. 115)	90° elbow connection for service indicator/service switch integrated in housing (p. 114)
Pico-E 44 076 ...	45 076 38 980	39 028 67 900	39 100 27 999	39 100 25 999
Pico-E 44 114 ...	45 114 38 990	39 040 67 900	39 200 27 999	39 200 25 999
Pico-E 44 165 ...	45 165 38 980	39 056 67 900	39 300 27 999	39 300 25 999
Pico-E 44 225 ...	45 225 38 990	39 080 67 900	39 400 27 999	39 400 25 999
Pico-E 44 325 ...	39 056 38 980	39 100 67 020	39 500 27 999	39 500 25 999
Pico-E 44 440 ...	45 440 38 990	39 160 67 020	39 600 27 999	39 600 25 999
Pico-E 44 650 ...	39 440 38 990	45 880 67 100	39 700 27 999	39 700 25 999
Pico-E 44 880 ...	39 880 38 940	39 220 67 100	39 800 27 999	39 800 25 999
Pico-E 44 920 ...	45 880 38 990	39 320 67 100	39 000 27 345	39 000 25 270
Pico-E 45 950 ...	45 940 38 841	–	–	–

You will find the complete range of accessories for our air cleaners and service indicators/switches on page 103.

* Alternative design A possible (see page 108)



MANN+HUMMEL Oil-bath air cleaner
Single-stage air cleaner without spare parts

Oil-bath air cleaner: Servicing without spare parts

The proven oil-bath air cleaners from MANN+HUMMEL are suitable for light to medium dust conditions and have long been established in our range of air cleaners.

Servicing can be made without spare parts using engine oil available on site and cleaning can be carried out with Diesel fuel. This makes the oil-bath cleaner practically independent of service

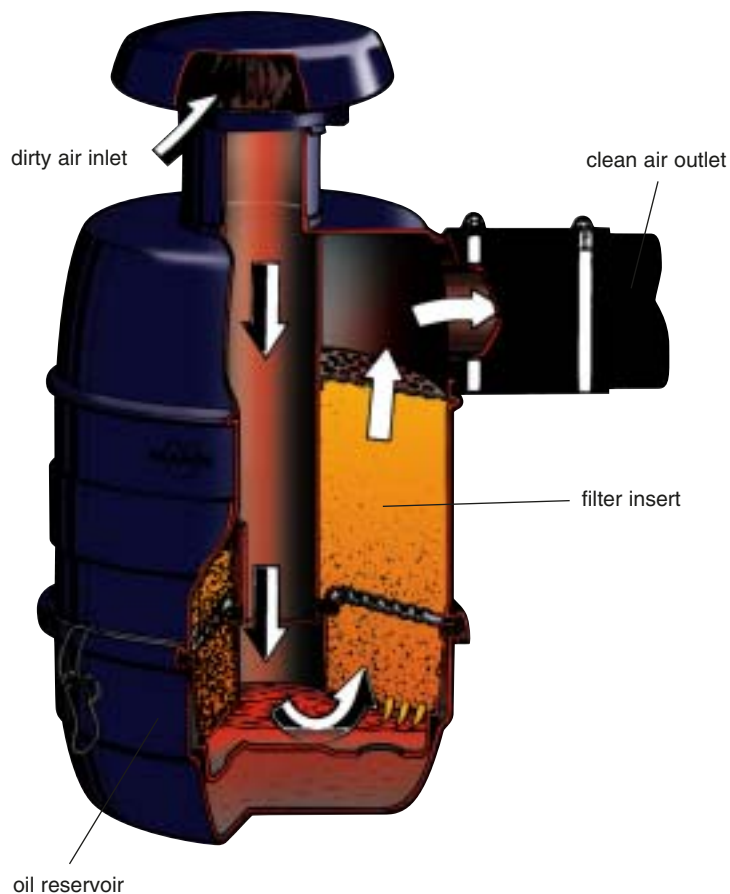
supplies. It is therefore often used in machines and vehicles which have to operate reliably in remote regions where a supply of spare parts is not always guaranteed.

Advantages at a glance:

- very robust metal design
- servicing without spare parts
- volumetric flow rates between 1.4 m³/min and 19 m³/min are covered
- different versions; available with integrated mounting flange



Sectional view



Design and principle of operation

Intake air is routed via the oil bath. There the coarse particles are removed from the air and the air is rerouted upwards. As the air streams upwards, oil from the oil bath wets the filter packing and the dirt in the intake air is deposited there. The oil flows back to the bath where the dirt settles.

The oil bath achieves a maximum separation efficiency of approx. 98.5% and is therefore not as efficient as the filtration performance of a modern dry air cleaner (> 99.95%)

Servicing

A correctly dimensioned oil-bath cleaner will not lose oil when in operation. The servicing of the oil-bath cleaner should be carried out at the latest when the deposited dirt has reached half the height of the oil level or if the oil has become thick. To service the air cleaner the oil reservoir is first removed and the oil is disposed of according to the

environmental regulations. Then the sludge is removed from the oil reservoir and the metal filter insert is taken out. This is cleaned with Diesel or with a pressure washer. Then the oil reservoir is re-filled with fresh standard engine oil up to the marking and placed in the housing together with the insert.



Dimensioning and installation

When configuring the size, care should be taken that the nominal flow rate of the air cleaner is as close as possible to, but not more than, the maximum air requirement of the engine. If an oil-bath air cleaner is specified to be too large, or if the oil level is too low, then the separation efficiency decreases.



If the oil-bath air cleaner is specified to be too small, or if the oil level is too high, then oil containing dirt may be drawn through to the clean side, resulting in premature engine wear. When oil-bath cleaners are used with compressors and engines with 1 – 4 cylinders (not turbocharged), dimensions must be corrected using pulsation factors to compensate for the pulsations in the air stream.

Oil-bath air cleaners must be installed vertically.

Oil-bath air cleaner

Dimensions and order numbers

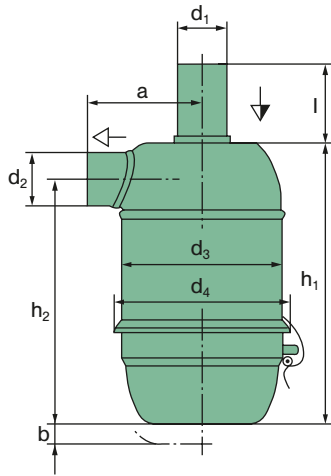


Fig. 1
Plain air intake connection and clean air connection;
Mounting through separate bracket

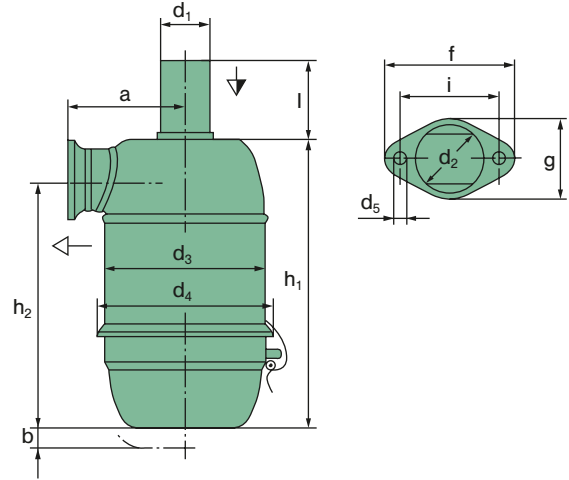


Fig. 2
Plain air intake connection; mounting via
flange on intake pipe

Order No.	Nominal flow rate [m ³ /min]	Fig.	Dimensions in mm (<i>dimensions in inches</i>)									Weight	
			a	b	d ₁	d ₂	d ₃	d ₄	h ₁	h ₂	l	Filter [kg]	Oil [ltr.]
31 020 75 023	2.0	1	110 (4.33)	25 (0.98)	54 (2.13)	54 (2.13)	140 (5.51)	158 (6.22)	253 (9.96)	222 (8.74)	55 (2.17)	2.1	0.50
31 024 75 023	2.4	1	110 (4.33)	25 (0.98)	54 (2.13)	54 (2.13)	140 (5.51)	158 (6.22)	283 (11.14)	252 (9.92)	55 (2.17)	2.3	0.50
31 028 75 023	2.8	1	125 (4.92)	20 (0.79)	62 (2.44)	62 (2.44)	173 (6.81)	190 (7.48)	267 (10.51)	232 (9.13)	60 (2.36)	3.0	0.75
31 034 75 023	3.4	1	125 (4.92)	20 (0.79)	62 (2.44)	62 (2.44)	173 (6.81)	190 (7.48)	302 (11.89)	266 (10.47)	60 (2.36)	3.3	0.75
31 040 75 023	4.0	1	140 (5.51)	20 (0.79)	68 (2.68)	70 (2.76)	200 (7.87)	220 (8.66)	297 (11.69)	255 (10.04)	75 (2.95)	3.7	1.00
31 045 75 023	4.5	1	140 (5.51)	20 (0.79)	68 (2.68)	70 (2.76)	200 (7.87)	220 (8.66)	327 (12.87)	285 (11.22)	75 (2.95)	4.3	1.00
31 056 75 023	5.6	1	160 (6.30)	25 (0.98)	82 (3.23)	82 (3.23)	240 (9.45)	260 (10.24)	322 (12.68)	276 (10.87)	85 (3.35)	5.6	1.70
31 068 75 023	6.8	1	160 (6.30)	25 (0.98)	82 (3.23)	82 (3.23)	240 (9.45)	260 (10.24)	362 (14.25)	316 (12.44)	85 (3.35)	6.4	1.70
31 080 75 043	8.0	1	185 (7.28)	20 (0.79)	102 (4.02)	102 (4.02)	280 (11.02)	300 (11.81)	367 (14.45)	304 (11.97)	135 (5.32)	7.8	2.50
31 100 75 043	10.0	1	210 (8.27)	35 (1.48)	110 (4.33)	110 (4.33)	320 (12.60)	344 (13.54)	395 (15.55)	325 (12.80)	140 (5.51)	10.7	3.00
31 120 75 043	12.0	1	210 (8.27)	35 (1.48)	110 (4.33)	110 (4.33)	320 (12.60)	344 (13.54)	425 (16.73)	355 (13.98)	110 (4.33)	11.2	3.00
31 160 75 043	16.0	1	260 (10.24)	45 (1.77)	132 (5.20)	132 (5.20)	400 (15.75)	422 (16.61)	445 (17.52)	365 (14.37)	165 (6.50)	18.0	5.50
31 190 75 043	19.0	1	260 (10.24)	45 (1.77)	132 (5.20)	132 (5.20)	400 (15.75)	422 (16.61)	495 (19.49)	410 (16.14)	120 (4.72)	20.0	5.50

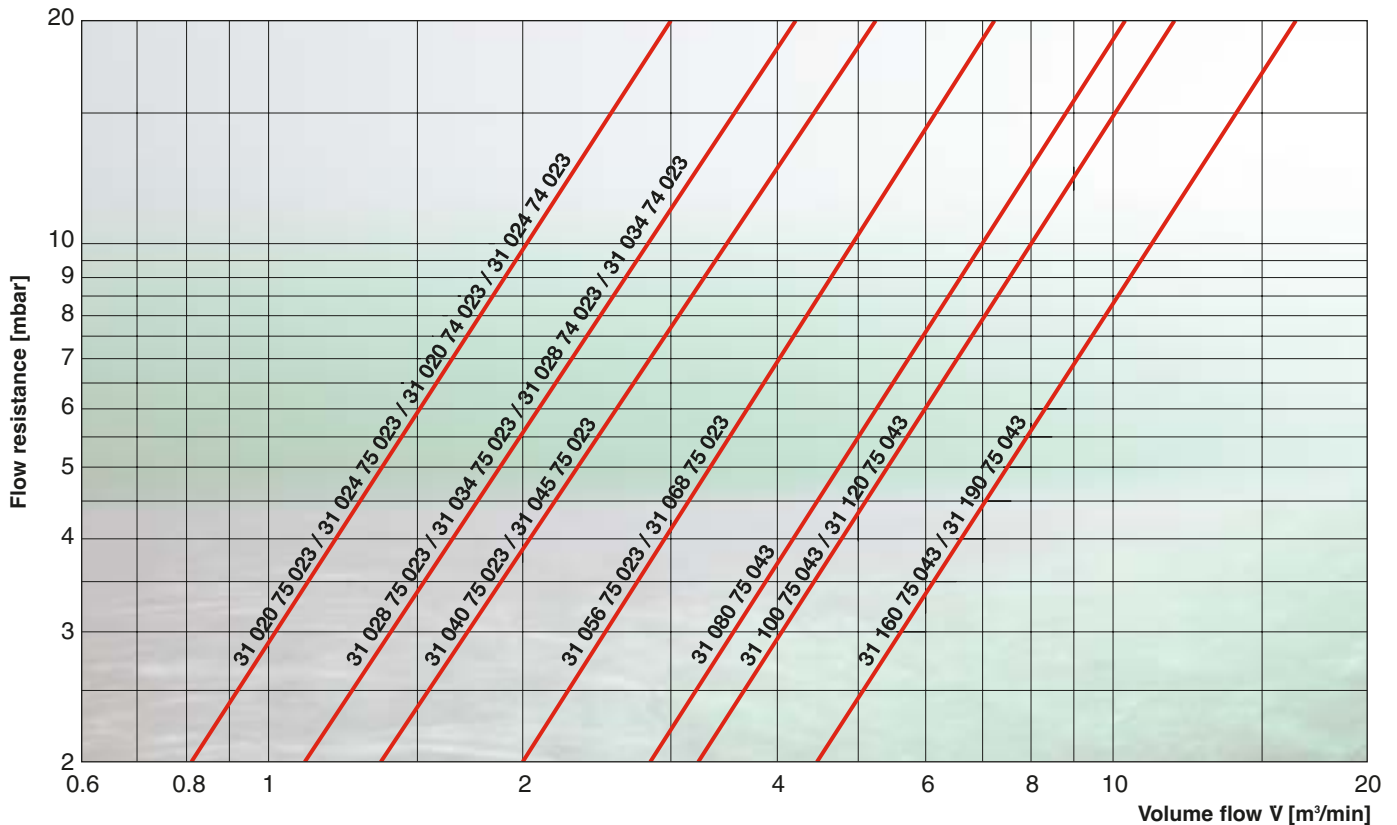
Oil-bath air cleaner

Dimensions and order numbers

Order No.	Nominal flow rate [m ³ /min]	Fig.	Dimensions in mm (<i>dimensions in inches</i>)													Weight	
			Filter									Filter flange				Filter [kg]	Oil [ltr.]
			a	b	d ₁	d ₂	d ₃	d ₄	h ₁	h ₂	l	d ₅	f	g	i		
31 014 74 013	1.4	2	85 (3.35)	20 (0.79)	42 (1.65)	40 (1.57)	120 (4.72)	137 (5.39)	220 (8.66)	193 (7.60)	32 (1.26)	11 (0.43)	90 (3.54)	56 (2.20)	68 (2.68)	1.5	0.36
31 017 74 013	1.7	2	85 (3.35)	20 (0.79)	42 (1.65)	40 (1.57)	120 (4.72)	137 (5.39)	242 (9.53)	218 (8.58)	28 (1.10)	11 (0.43)	90 (3.54)	56 (2.20)	68 (2.68)	1.7	0.36
31 020 74 023	2.0	2	100 (3.94)	25 (0.98)	54 (2.13)	52 (2.05)	140 (5.51)	158 (6.22)	253 (9.96)	222 (8.74)	55 (2.17)	11 (0.43)	105 (4.13)	70 (2.76)	82 (3.23)	2.0	0.50
31 024 74 023	2.4	2	100 (3.94)	25 (0.98)	54 (2.13)	52 (2.05)	140 (5.51)	158 (6.22)	283 (11.14)	252 (9.92)	55 (2.17)	11 (0.43)	105 (4.13)	70 (2.76)	82 (3.23)	2.2	0.50
31 028 74 023	2.8	2	110 (4.33)	20 (0.79)	62 (2.44)	60 (2.36)	173 (6.81)	190 (7.48)	267 (10.87)	232 (9.13)	60 (2.36)	13 (0.51)	122 (4.80)	78 (3.07)	94 (3.70)	2.8	0.75
31 034 74 023	3.4	2	110 (4.33)	20 (0.79)	62 (2.44)	60 (2.36)	173 (6.81)	190 (7.48)	302 (11.89)	266 (10.47)	60 (2.36)	13 (0.51)	122 (4.80)	78 (3.07)	94 (3.70)	3.1	0.75

Flow characteristics ...

... for flow rates as per ISO 5011





Accessories for oil-bath air cleaners

	Bracket (p. 107)	Rain cap design B * (p. 109)
Oil-bath air cleaner 31 014 ... Oil-bath air cleaner 31 017 ...	integrated (flange)	39 014 67 900
Oil-bath air cleaner 31 020 ... Oil-bath air cleaner 31 024 ...	integrated (flange)	39 020 67 900
Oil-bath air cleaner 31 020 ... Oil-bath air cleaner 31 024 ...	39 020 38 981	39 020 67 900
Oil-bath air cleaner 31 028 ... Oil-bath air cleaner 31 034 ...	integrated (flange)	39 028 67 900
Oil-bath air cleaner 31 028 ... Oil-bath air cleaner 31 034 ...	39 028 38 981	39 028 67 900
Oil-bath air cleaner 31 040 ... Oil-bath air cleaner 31 045 ...	39 040 38 981	39 040 67 900
Oil-bath air cleaner 31 056 ... Oil-bath air cleaner 31 068 ...	39 056 38 981	39 056 67 900
Oil-bath air cleaner 31 080 ...	39 080 38 991	39 080 67 900
Oil-bath air cleaner 31 100 ... Oil-bath air cleaner 31 120 ...	39 120 38 991	39 100 67 020
Oil-bath air cleaner 31 160 ... Oil-bath air cleaner 31 190 ...	39 160 38 991	39 160 67 020

You will find the complete range of accessories for our air cleaners and service indicators/switches on page 103.

* Alternative design A possible
(see page 108)



MANN+HUMMEL Inline Piclon
Two-stage plastic air cleaner with inline air flow

Inline Piclon: Two-stage air cleaner with plastic housing

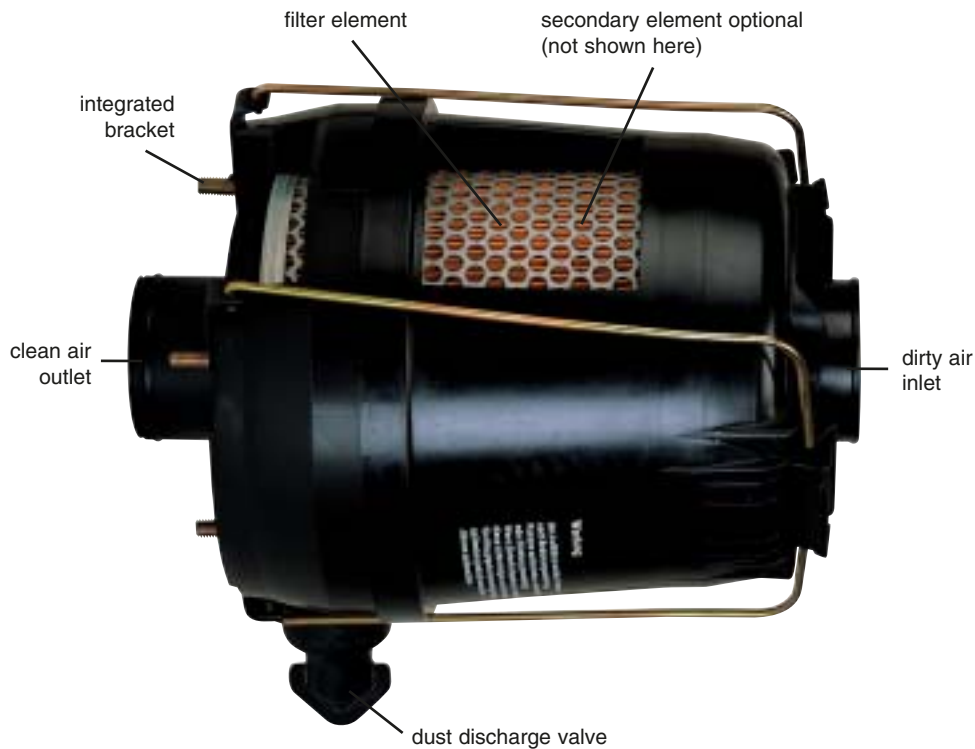
This two-stage air cleaner from MANN+HUMMEL with integrated pre-separation is available in three sizes. The Inline Piclon is particularly suited for use in medium dust conditions and for use with engines and compressors with pulsating intake air.

Advantages at a glance:

- linear air flow
- compact design
- economical air cleaner system with integrated bracket
- easy element change without tools
- corrosion-free and robust housing through use of recyclable plastic
- threaded inserts integrated in housing enable quick first-fit on vehicle



Sectional view



Filter configuration and installation

The Inline Piclon consists of a plastic housing which is closed on the outside by two wire clamps. Four screws located on the bottom allow the air cleaner to be mounted in a vertical, hanging or horizontal position. If the air cleaner is mounted in a vertical position, a secondary element must be installed. Dust discharge is made via a valve. A separate bracket is not necessary.

Filter elements



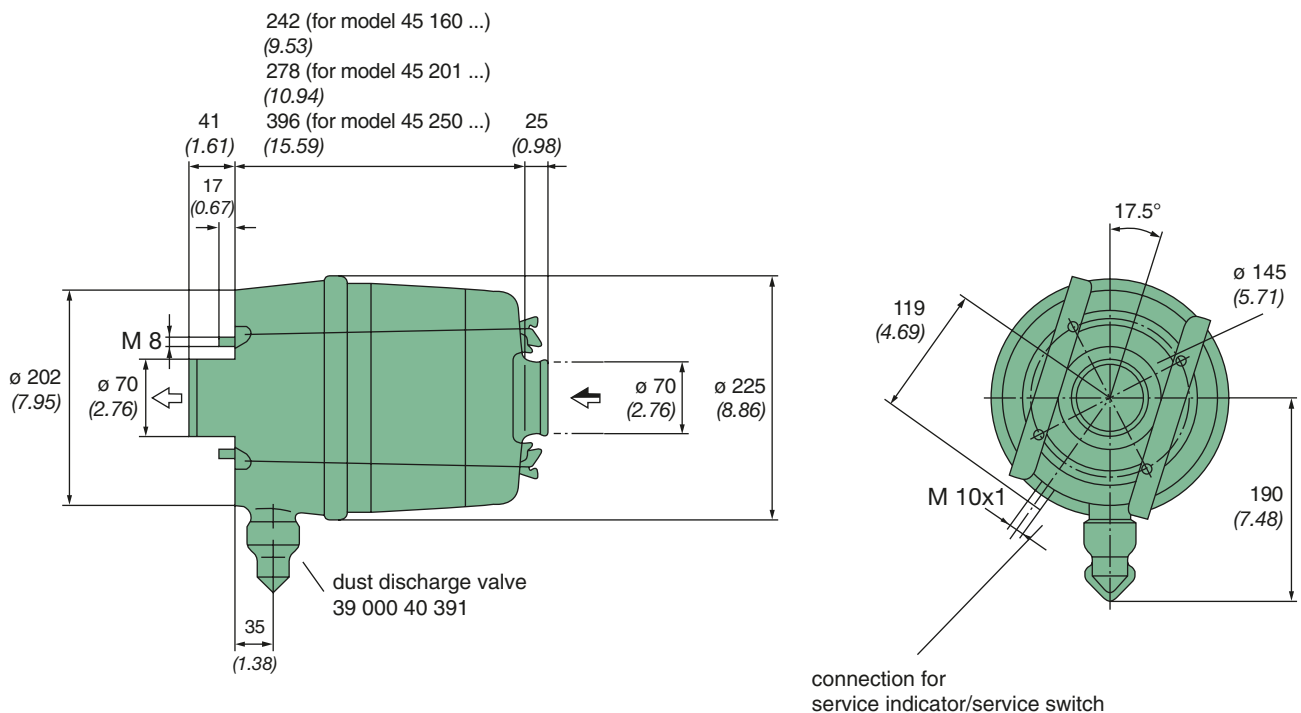
Filter element

- high dust capacity through special MANN+HUMMEL filter medium
- reliable pleat stabilisation prevents pleats sticking together in unfavourable conditions
- two closing clamps on the outside of the housing ensure that the filter element is securely fitted in the housing

Secondary element

- MANN+HUMMEL synthetic fabric for a high safety margin with low pressure drop
- secure fitting in the housing through a tie-rod and a fastening nut prevent an unintentional removal of the secondary element

Dimensions and order numbers



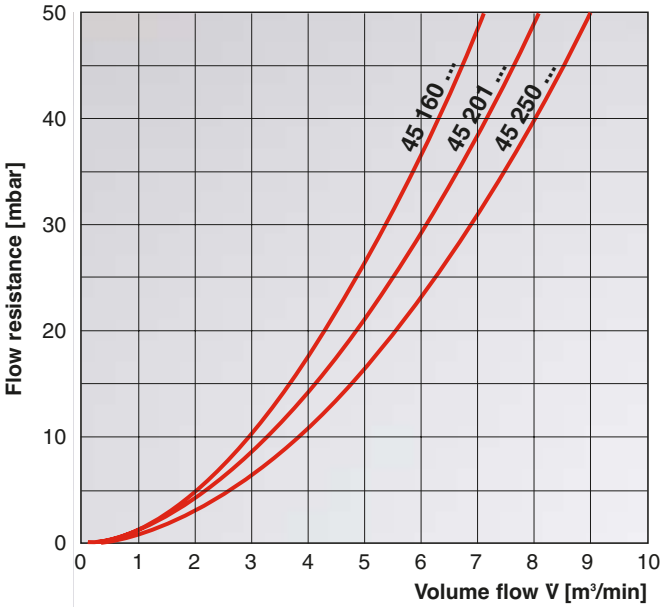
Order No.		Nominal flow rate [m³/min]	Replacement filter element		Approx. weight [kg]
without secondary element	with secondary element		MANN-FILTER main element	MANN-Filter secondary element	
45 160 92 901	45 160 92 951	5.3	C 17 160	CF 820	2.5
45 201 92 904	45 201 92 951	6.0	C 17 201	CF 820	2.7
45 250 92 905	45 250 92 906	6.7	C 17 250	CF 830	3.4

Inline Piclon

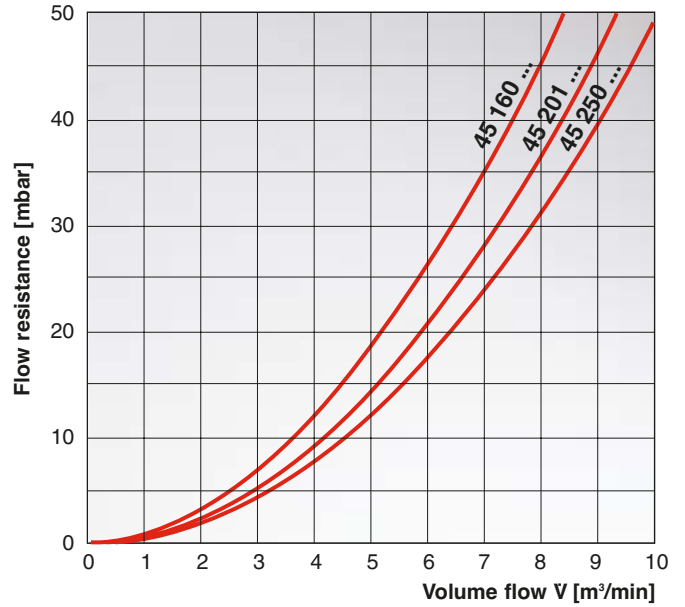
Flow characteristics ...



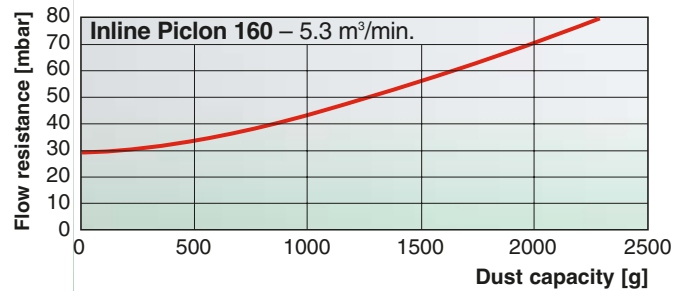
... with secondary element ...
... for flow rate as per ISO 5011



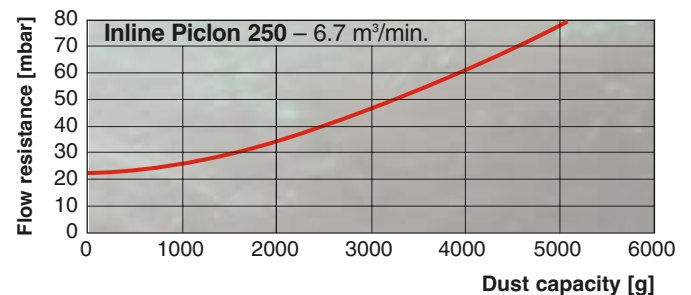
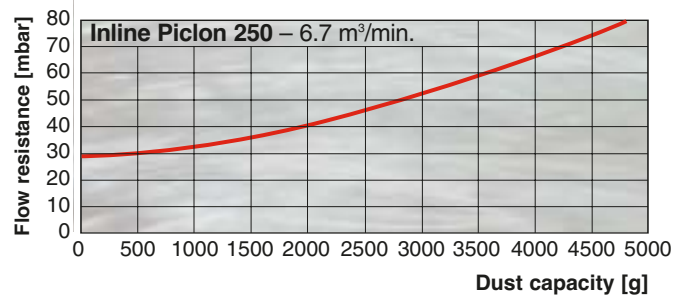
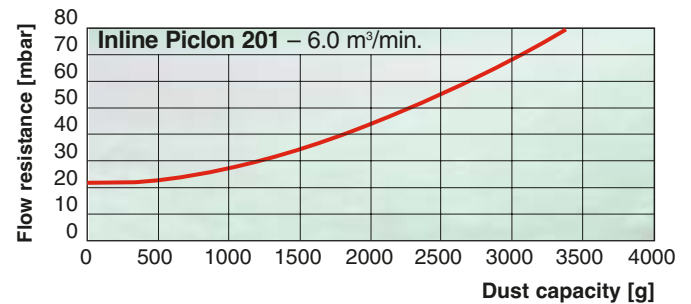
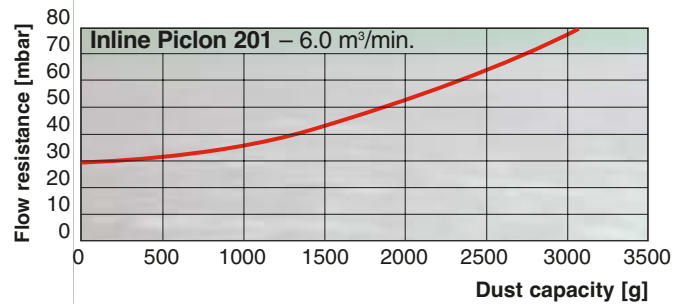
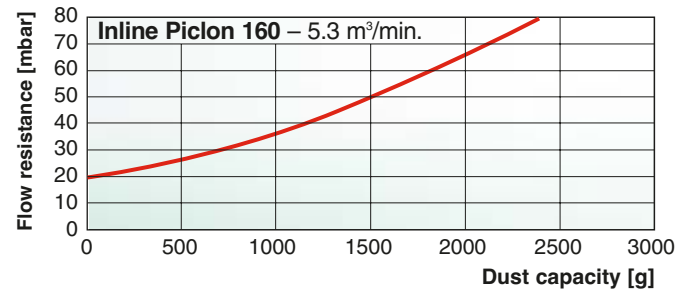
... without secondary element ...
... for flow rate as per ISO 5011



... for dust capacity with secondary element
as per ISO 5011 with SAE coarse test dust



... for dust capacity without secondary element
as per ISO 5011 with SAE coarse test dust





MANN+HUMMEL Picolino

Compact air cleaner system for high requirements

Picolino: Compact air cleaner for high requirements

The Picolino line from MANN+HUMMEL offers exceptional filtration in a compact installation space with excellent flexibility. The Picolino line is available with a number of different connections to enable it to adapt to different applications.

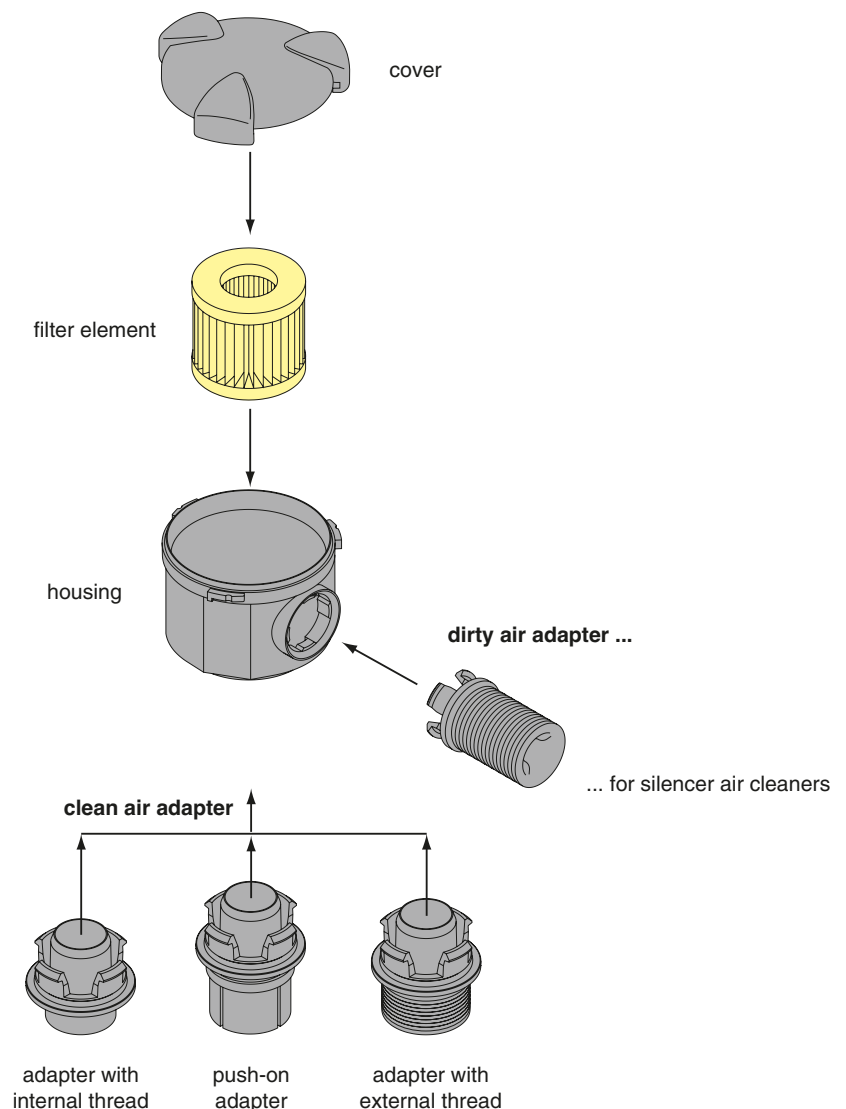


Advantages at a glance:

- excellent flexibility through variable modular system
- economical air cleaner system through combination of standard parts
- easy element change without tools
- corrosion-free and robust housing through use of plastic reinforced with fibre-glass
- temperature resistant to +130 °C (for short periods)
- material with high temperature stability available for adapters on request
- quick response to customised filtration solutions
- metal-free filter elements are easily disposed of by incineration and therefore are environmentally friendly with inexpensive disposal
- patented filter elements with radial seal

Picolino modular system

The product line consists of five master housings with various adapter pieces which can be used to adapt the cleaner to the individual requirements of customised applications. The housing, adapters and filter elements are free of metal. Depending on the design, the system covers nominal flow rates from 0.15 m³/min to 3.2 m³/min.



Filter elements

- high dust capacity through special MANN+HUMMEL filter medium
- radial seal through elastomer end plates (protected by patents)
- reliable pleat stabilisation prevents pleats sticking together under unfavourable conditions



Applications

The right configuration for every application

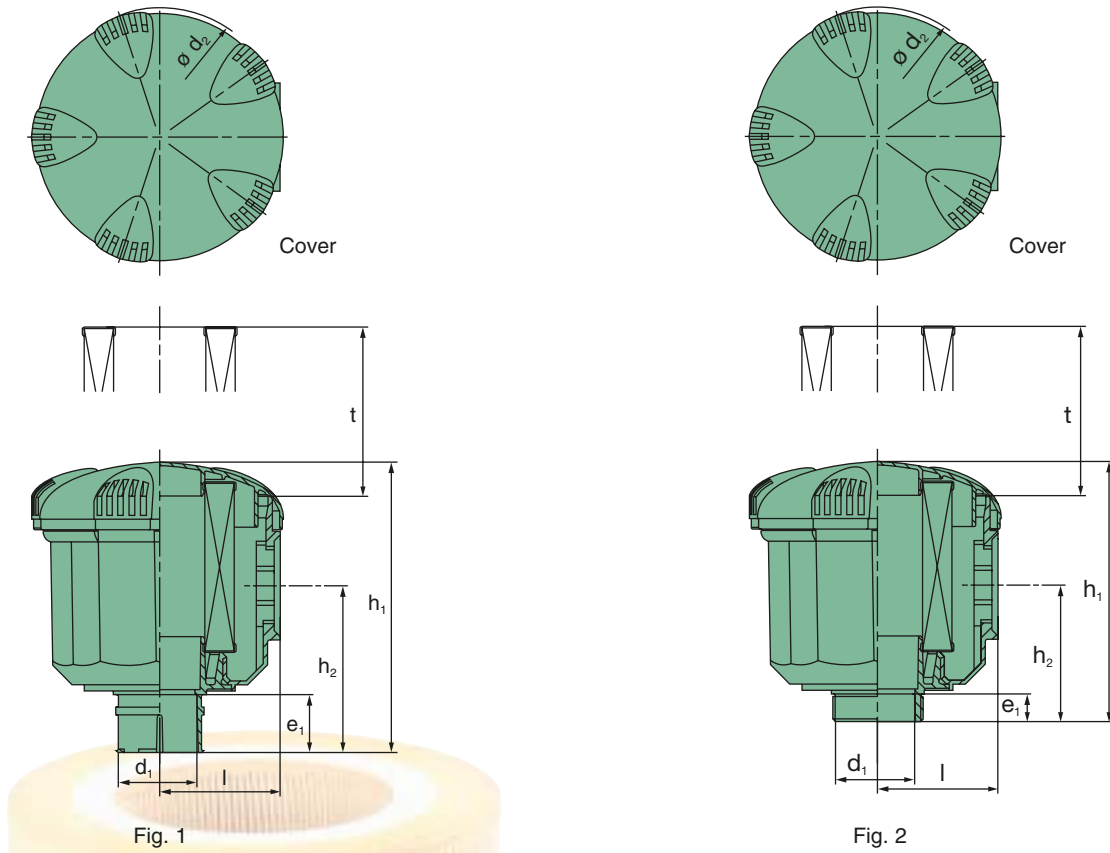
The air cleaners of the Picolino line are available with a number of connection fittings and are, for example, suitable for:

- silencer air cleaners for low-noise air intake, e.g. in small piston compressors
- intake air cleaners for small engines (lawn mowers, power generators, etc.)
- two-way ventilation air cleaners for gear units and tanks for liquids



Picolino Intake air cleaners (two-way ventilation air cleaners)

Dimensions and order numbers



Picolino Intake air cleaners (two-way ventilation air cleaners)

Dimensions and order numbers

Order No.	Fig.	Nominal flow rate [m ³ /min] ¹⁾	Dimensions in mm (<i>dimensions in inches</i>)							MANN-FILTER main element
			d ₁	d ₂	e ₁	h ₁	h ₂	l	t	
44 010 72 996	2	0.3	G 1/2 ³⁾	58 (2.28)	14 (0.55)	61 (2.40)	34 (1.34)	27 (1.06)	30 (1.18)	C 410
44 010 72 997	2	0.2	G 3/8 ³⁾	58 (2.28)	11 (0.43)	61 (2.40)	34 (1.34)	27 (1.06)	30 (1.18)	C 410
44 010 72 999	2	0.2	M 18x1.5 ²⁾	58 (2.28)	10 (0.39)	61 (2.40)	34 (1.34)	27 (1.06)	30 (1.18)	C 410
44 010 77 999	1	0.3	35 (1.38)	58 (2.28)	23 (0.91)	73 (2.87)	64 (2.52)	27 (1.06)	30 (1.18)	C 410
44 020 72 996	2	0.3	G 1/2 ³⁾	68 (2.68)	14 (0.55)	62 (2.44)	34 (1.34)	31 (1.22)	30 (1.18)	C 420
44 020 72 997	2	0.3	G 3/8 ³⁾	68 (2.68)	11 (0.43)	62 (2.44)	34 (1.34)	31 (1.22)	30 (1.18)	C 420
44 020 72 999	2	0.2	M 18x1.5 ²⁾	68 (2.68)	10 (0.39)	62 (2.44)	34 (1.34)	31 (1.22)	30 (1.18)	C 420
44 020 77 999	1	0.3	35 (1.38)	68 (2.68)	23 (0.91)	74 (2.91)	46 (1.81)	31 (1.22)	30 (1.18)	C 420
44 030 72 999	2	0.8	G 3/4 ³⁾	102 (4.02)	15 (0.59)	94 (3.70)	45 (1.77)	48 (1.89)	68 (2.68)	C 630
44 030 77 997	1	1.2	40 (1.57)	102 (4.02)	25 (0.98)	116 (4.57)	67 (2.64)	48 (1.89)	68 (2.68)	C 630
44 030 77 998	1	1.2	30 (1.18)	102 (4.02)	23 (0.91)	116 (4.57)	67 (2.64)	48 (1.89)	68 (2.68)	C 630
44 030 77 999	1	0.7	20 (0.79)	102 (4.02)	23 (0.91)	116 (4.57)	67 (2.64)	48 (1.89)	68 (2.68)	C 630
44 040 72 999	2	2.1	G 1 1/4 ³⁾	145 (5.71)	19 (0.75)	131 (5.16)	71 (2.80)	69 (2.72)	79 (3.11)	C 1140
44 040 77 996	1	3.0	71 (3.00)	145 (5.71)	25 (0.98)	136 (5.35)	76 (2.99)	69 (2.72)	79 (3.11)	C 1140
44 040 77 997	1	2.8	60 (2.36)	145 (5.71)	25 (0.98)	136 (5.35)	76 (2.99)	69 (2.72)	79 (3.11)	C 1140
44 040 77 998	1	2.6	52 (2.05)	145 (5.71)	25 (0.98)	136 (5.35)	76 (2.99)	69 (2.72)	79 (3.11)	C 1140
44 040 77 999	1	2.1	40 (1.57)	145 (5.71)	25 (0.98)	136 (5.35)	76 (2.99)	69 (2.72)	79 (3.11)	C 1140
44 050 72 999	2	2.3	G 1 1/4 ³⁾	181 (7.13)	19 (0.75)	188 (7.40)	112 (4.41)	86 (3.39)	135 (5.32)	C 1250
44 050 77 996	1	3.5	71 (3.00)	181 (7.13)	25 (0.98)	193 (7.60)	117 (4.61)	86 (3.39)	135 (5.32)	C 1250
44 050 77 997	1	3.4	60 (2.36)	181 (7.13)	25 (0.98)	193 (7.60)	117 (4.61)	86 (3.39)	135 (5.32)	C 1250
44 050 77 998	1	3.1	52 (2.05)	181 (7.13)	25 (0.98)	193 (7.60)	117 (4.61)	86 (3.39)	135 (5.32)	C 1250
44 050 77 999	1	2.3	40 (1.57)	181 (7.13)	25 (0.98)	193 (7.60)	117 (4.61)	86 (3.39)	135 (5.32)	C 1250

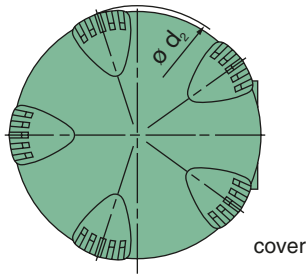
1) The nominal flow rate relates to a flow resistance of 15 mbar. The flow rate depends on the cross-section of the clean air outlet.

2) External thread

3) Internal thread

Picolino Silencer air cleaners

Dimensions and order numbers



cover

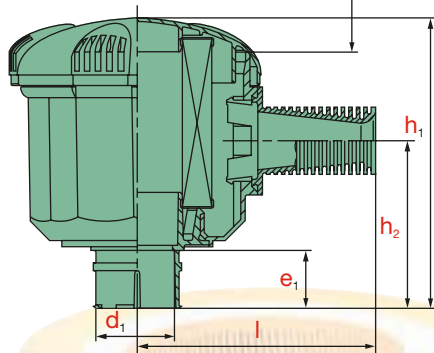
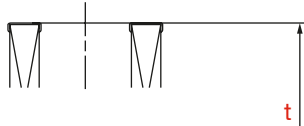
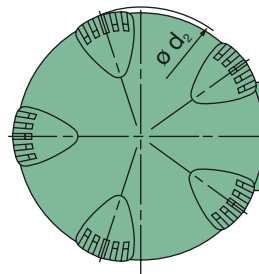


Fig. 1



cover

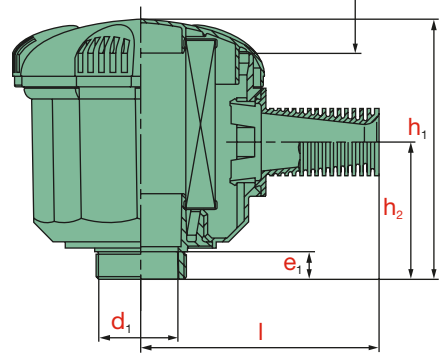
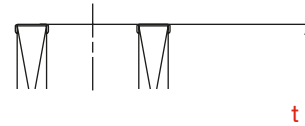


Fig. 2



Picolino Silencer air cleaners

Dimensions and order numbers

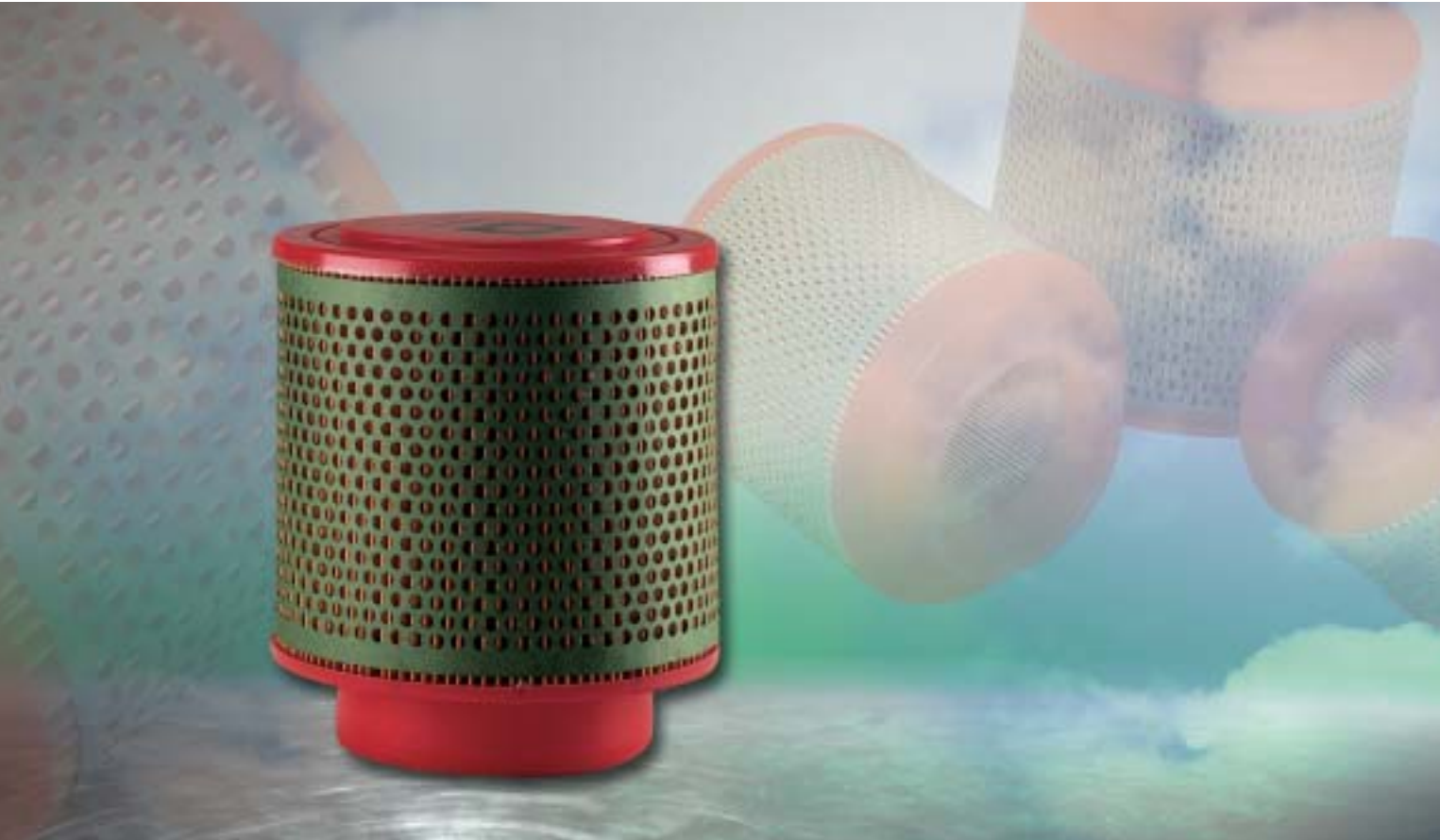
Order No.	Fig.	Nominal flow rate [m ³ /min] ¹⁾	Dimensions in mm (<i>dimensions in inches</i>)								MANN-FILTER main element	
			d ₁	d ₂	e ₁	e ₂	h ₁	h ₂	l	t		
44 010 82 996	2	0.2	G 1/2 ³⁾	58 (2.28)	14 (0.55)	29 (1.14)	61 (2.40)	34 (1.34)	56 (2.20)	30 (1.18)	C 410	
44 010 82 997	2	0.1	G 3/8 ³⁾	58 (2.28)	11 (0.43)	29 (1.14)	61 (2.40)	34 (1.34)	56 (2.20)	30 (1.18)	C 410	
44 010 82 999	2	0.1	M 18x1.5 ²⁾	58 (2.28)	10 (0.39)	29 (1.14)	61 (2.40)	34 (1.34)	56 (2.20)	30 (1.18)	C 410	
44 010 87 999	1	0.2		35 (1.38)	58 (2.28)	23 (0.91)	29 (1.14)	73 (2.87)	46 (1.81)	56 (2.20)	30 (1.18)	C 410
44 020 82 996	2	0.2	G 1/2 ³⁾	68 (2.68)	14 (0.55)	29 (1.14)	62 (2.44)	34 (1.34)	60 (2.36)	30 (1.18)	C 420	
44 020 82 997	2	0.2	G 3/8 ³⁾	68 (2.68)	11 (0.43)	29 (1.14)	62 (2.44)	34 (1.34)	60 (2.36)	30 (1.18)	C 420	
44 020 82 999	2	0.2	M 18x1.5 ²⁾	68 (2.68)	10 (0.39)	29 (1.14)	62 (2.44)	34 (1.34)	60 (2.36)	30 (1.18)	C 420	
44 020 87 999	1	0.2		35 (1.38)	68 (2.68)	23 (0.91)	29 (1.14)	74 (2.91)	46 (1.81)	60 (2.36)	30 (1.18)	C 420
44 030 82 999	2	0.6	G 3/4 ³⁾	102 (4.02)	15 (0.59)	47 (1.85)	94 (3.70)	45 (1.77)	95 (3.74)	68 (2.68)	C 630	
44 030 87 997	1	0.8		40 (1.57)	102 (4.02)	25 (0.98)	47 (1.85)	116 (4.57)	67 (2.64)	95 (3.74)	68 (2.68)	C 630
44 030 87 998	1	0.8		30 (1.18)	102 (4.02)	23 (0.91)	47 (1.85)	116 (4.57)	67 (2.64)	95 (3.74)	68 (2.68)	C 630
44 030 87 999	1	0.5		20 (0.79)	102 (4.02)	23 (0.91)	47 (1.85)	116 (4.57)	67 (2.64)	95 (3.74)	68 (2.68)	C 630
44 040 82 999	2	1.7	G 1 1/4 ³⁾	145 (5.71)	19 (0.75)	55 (2.17)	131 (5.16)	71 (2.80)	79 (3.11)	79 (3.11)	C 1140	
44 040 87 996	1	2.0		71 (2.80)	145 (5.71)	25 (0.98)	55 (2.17)	136 (5.35)	76 (2.99)	79 (3.11)	79 (3.11)	C 1140
44 040 87 997	1	2.0		60 (2.36)	145 (5.71)	25 (0.98)	53 (2.09)	136 (5.35)	76 (2.99)	116 (4.57)	79 (3.11)	C 1140
44 040 87 998	1	1.9		52 (2.05)	145 (5.71)	25 (0.98)	53 (2.09)	136 (5.35)	76 (2.99)	116 (4.57)	79 (3.11)	C 1140
44 040 87 999	1	1.6		40 (1.57)	145 (5.71)	25 (0.98)	53 (2.09)	136 (5.35)	76 (2.99)	116 (4.57)	79 (3.11)	C 1140
44 050 82 999	2	2.0	G 1 1/4 ³⁾	181 (7.13)	19 (0.75)	55 (2.17)	188 (7.40)	112 (4.41)	133 (5.24)	135 (5.32)	C 1250	
44 050 87 996	1	2.8		71 (2.80)	181 (7.13)	25 (0.98)	55 (2.17)	193 (7.60)	117 (4.61)	133 (5.24)	135 (5.32)	C 1250
44 050 87 997	1	2.8		60 (2.36)	181 (7.13)	25 (0.98)	59 (2.32)	193 (7.60)	117 (4.61)	133 (5.24)	135 (5.32)	C 1250
44 050 87 998	1	2.5		52 (2.05)	181 (7.13)	25 (0.98)	59 (2.32)	193 (7.60)	117 (4.61)	133 (5.24)	135 (5.32)	C 1250
44 050 87 999	1	2.0		40 (1.57)	181 (7.13)	25 (0.98)	59 (2.32)	193 (7.60)	117 (4.61)	133 (5.24)	135 (5.32)	C 1250

1) The nominal flow rate relates to flow resistance of 15 mbar. The flow rate depends on the cross-section of the clean air outlet.

2) External thread

3) Internal thread

MANN+HUMMEL



MANN+HUMMEL Picolight
Single-stage air cleaner without housing

Picolight: Single stage air cleaner without housing

The metal-free air cleaners of the Picolight line from MANN+HUMMEL are characterised by an especially low-weight and compact design. We particularly recommend these air cleaners for use in stationary applications with low dust loads such as generators, compressors, marine engines, etc.



Advantages at a glance:

- low pressure drop
- very economical
- compact design
- metal-free design
- excellent filtration performance

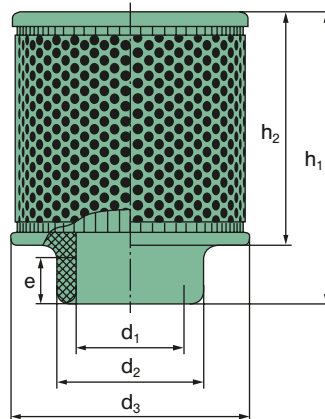
Technical information

Use of MANN+HUMMEL standard high quality filter media achieves high separation efficiency and filtration performance in the Picolight. The Picolight is recommended for use in installation areas which are enclosed or protected against humidity. The types shown here cover volumetric flows from 1 m³/min to 100 m³/min. A tensioning strap is required to mount the air cleaner.



Picolight

Dimensions and order numbers

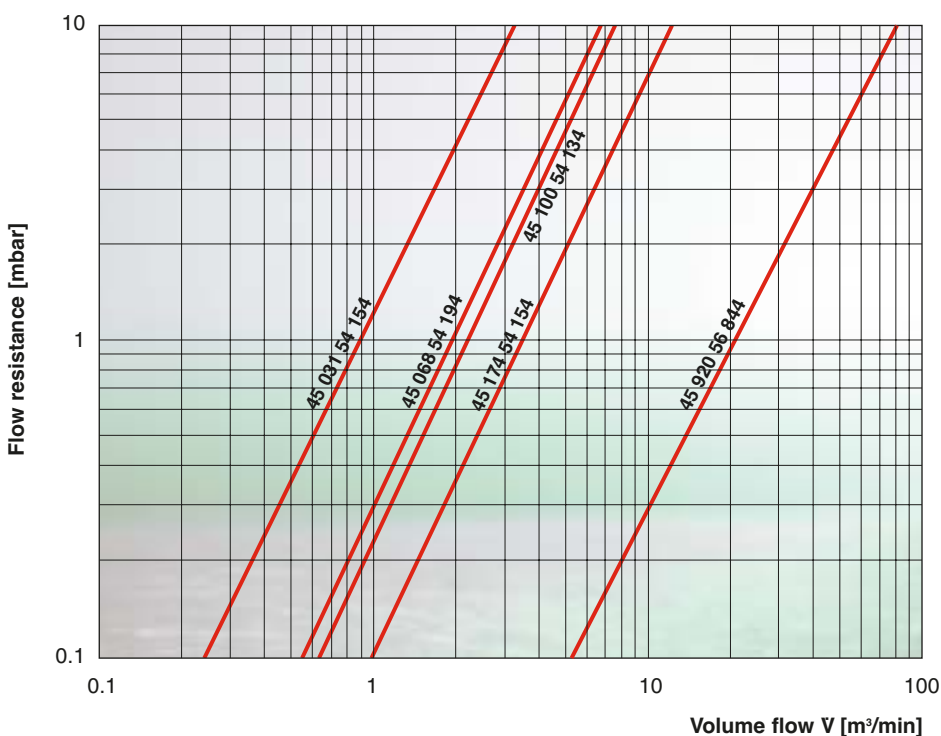


Order No. MANN-FILTER Picolight		Nominal flow rate ¹⁾ [m ³ /min]	Dimensions in mm (<i>dimensions in inches</i>)						Approx. weight [kg]	Tightening strap
unpacked	packed		d_1	d_2	d_3	h_1	h_2	e		
45 031 54 154	C 1131	3.3	50 (1.97)	65 (2.56)	110 (4.33)	120 (4.72)	95 (3.74)	20 (0.79)	0.16	02 018 01 709
45 068 54 194	C 1368	6.8	76 (2.99)	90 (3.54)	130 (5.12)	150 (5.91)	125 (4.92)	20 (0.79)	0.24	02 018 01 712
45 100 54 134	C 17 100	7.7	76 (2.99)	90 (3.54)	160 (6.30)	165 (6.50)	140 (5.51)	25 (0.98)	0.38	02 018 01 712
45 174 54 154	C 23 174	12.5	100 (3.94)	120 (4.72)	230 (9.06)	156 (6.14)	120 (4.72)	30 (1.18)	0.68	02 018 01 715
45 920 56 844	C 43 1090/1	80	250 (9.84)	260 (10.24)	425 (16.73)	404 (15.91)	335 (13.19)	80 (3.15)	5.60	02 018 01 728

¹⁾ The nominal flow rate relates to flow resistance of 10 mbar.

Flow characteristics ...

... for flow rates as per ISO 5011



MANN+HUMMEL



MANN+HUMMEL Oil-wetted air cleaners
Single-stage air cleaners without housing

Oil-wetted air cleaners



MANN+HUMMEL oil-wetted air cleaners are suitable for the filtration of intake air in engines and machines operating in low-dust areas.

These include stationary engines, compressors in closed rooms and marine engines, etc. Oil-wetted air cleaners contain parts which do not require replacement for the life of the product. Regular servicing ensures that the filtration performance is maintained for the life of product.

An oil-wetted air cleaner, however, with a maximum separation efficiency of approx. 70% (ISO 5011) does not achieve the performance of a modern dry air cleaner (> 99.95%).

Advantages at a glance:

- parts do not require replacing
- compact design
- robust metal design

Technical information

The air drawn in through an oil-wetted air cleaner flows through a packing wetted with oil and made of expanded metal or knitted steel mesh. Dust particles are deposited on the oil-wetted surface of the filter packing. Position the air cleaner in such a way that extracted dust cannot be shaken back onto the clean side. It may be installed horizontally to vertically downwards. The air cleaner must be adequately shielded from rain and any water spray. The tightening strap necessary for mounting is already integrated on the air cleaner so that no additional parts are required for installation.

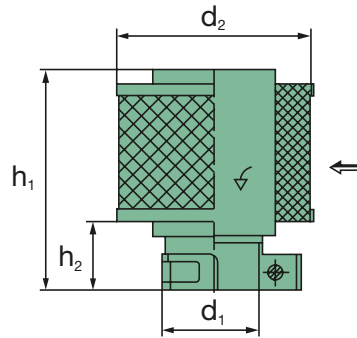


Servicing

When dust becomes clearly visible on the filter, wash it out with Diesel fuel. After washing, shake off the excess fuel well. Oil-wetted air cleaners may also be cleaned with a steam jet cleaner. After cleaning, apply an even, thin layer of engine oil to the filter packing (if dipped in an oil bath, shake off the excess oil afterwards). If servicing is neglected, separation performance will reduce significantly.

Oil-wetted air cleaners

Dimensions and order numbers



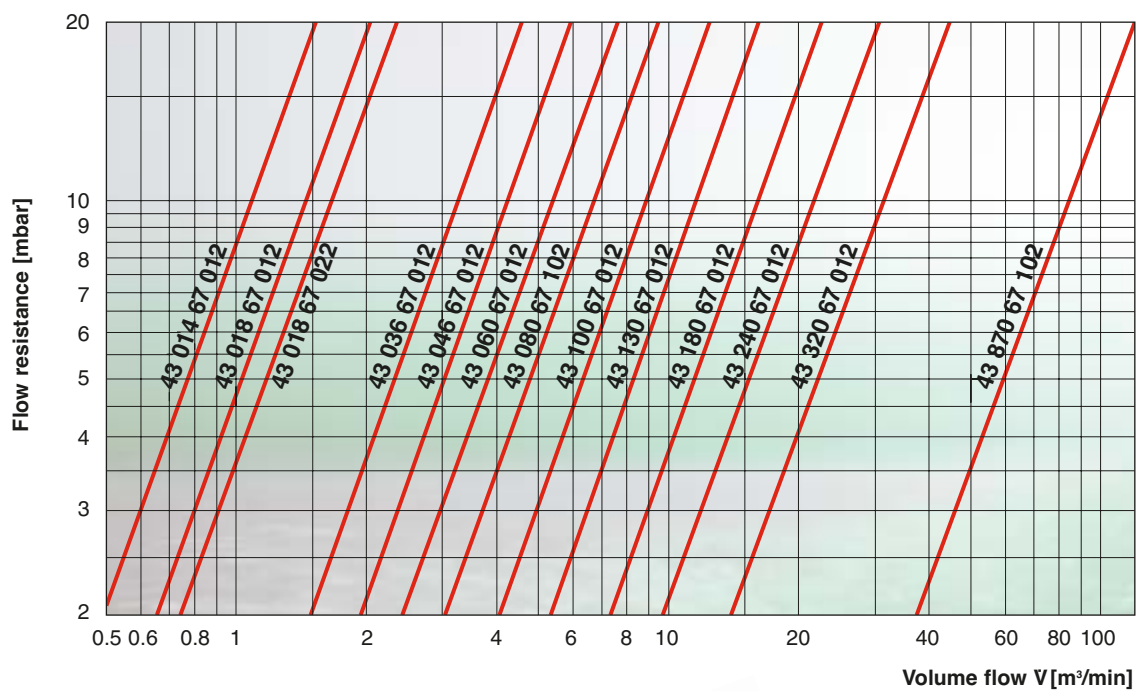
Order No.	Nominal flow rate ¹⁾ [m ³ /min]	Dimensions in mm (<i>dimensions in inches</i>)				Weight approx. [kg]
		d ₁	d ₂	h ₁	h ₂	
43 014 67 012	1.4	30 (1.18)	80 (3.15)	78 (3.07)	32 (1.26)	0.25
43 018 67 012	1.8	35 (1.38)	80 (3.15)	90 (3.54)	32 (1.26)	0.4
43 018 67 022	1.8	40 (1.57)	80 (3.15)	90 (3.54)	32 (1.26)	0.3
43 036 67 012	3.6	52 (2.05)	107 (4.21)	110 (4.33)	32 (1.26)	0.6
43 046 67 012	4.6	60 (2.36)	107 (4.21)	128 (5.04)	34 (1.34)	0.8
43 060 67 012	6	66 (2.60)	120 (4.72)	140 (5.51)	35 (1.38)	1.0
43 080 67 102	8	70 (2.76)	120 (4.72)	175 (6.89)	35 (1.38)	1.2
43 100 67 012	10	80 (3.15)	147 (5.79)	180 (7.09)	38 (1.38)	1.5
43 130 67 012	13	100 (3.94)	147 (5.79)	215 (8.46)	38 (1.38)	1.8
43 180 67 012	18	120 (4.72)	166 (6.54)	250 (9.84)	38 (1.38)	2.5
43 240 67 012	24	150 (5.91)	196 (7.72)	285 (11.22)	50 (1.97)	3.3
43 320 67 012	32	200 (7.87)	232 (9.13)	330 (12.99)	45 (1.77)	5.4
43 870 67 102	87	300 (11.81)	340 (13.39)	640 (25.20)	95 (3.74)	16.0

1) Nominal flow rate relates to approx. 15 mbar.

Oil-wetted air cleaners

Flow characteristics ...

... for flow rates as per ISO 5011



MANN+HUMMEL



MANN+HUMMEL Vacuum air cleaners

Vacuum air cleaners

The airtight vacuum air cleaners from MANN+HUMMEL are designed for installation in air and gas pipes. They are airtight up to 1000 mbar negative pressure and equipped with a filter element. They are also used as intake filters in vacuum pumps.



Advantages at a glance:

- reliable sealing
- compact design
- robust metal design
- different connections are available
- excellent filtration performance



Technical information

The air cleaner size depends on its nominal flow rate. The air cleaner size is to be selected so that the nominal flow rate of the air cleaner is equal or greater than the air requirement.

The air cleaner can be installed vertically or horizontally, however it should not be mounted with the clean air outlet at the bottom, as otherwise dirt can enter the clean air pipe during a service.

Vacuum air cleaners

Dimensions and order numbers

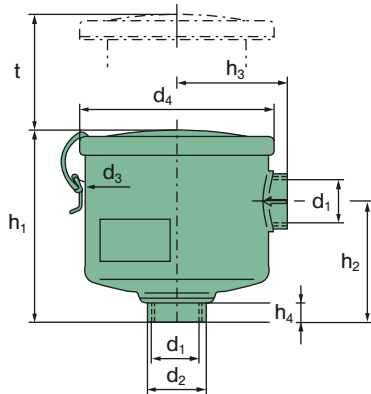


Fig. 1: Model with thread

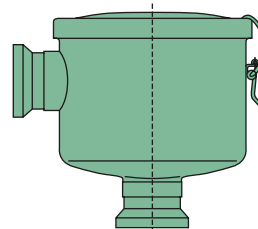


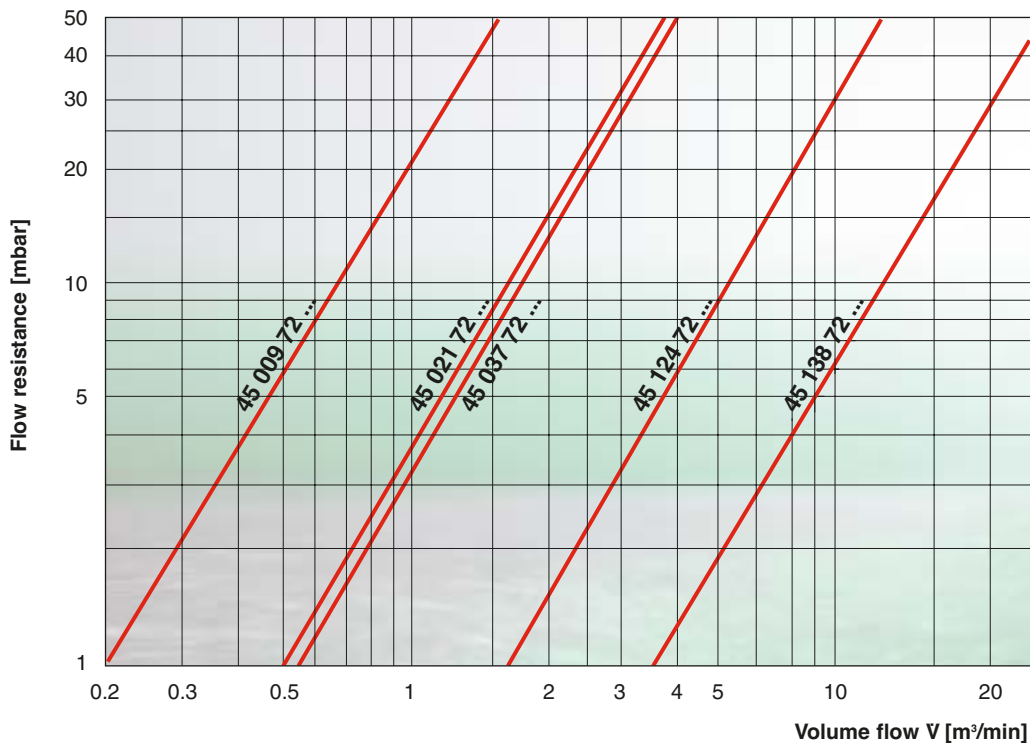
Fig. 2: Model with small flange as per DIN 28403-2

Order No.	Nominal flow rate [m ³ /min]	Fig.	Dimensions in mm (<i>dimensions in inches</i>)									MANN-FILTER main element	Approx. weight [kg]
			d ₁	d ₂	d ₃	d ₄	h ₁	h ₂	h ₃	h ₄	t		
45 009 72 105	0.7	1	G 3/4	35 (1.38)	90 (3.54)	97 (3.82)	89 (3.50)	45 (1.77)	59 (2.32)	6 (0.24)	70 (2.76)	C 75	0.8
45 021 72 105	1.6	1	G 1 1/2	50 (1.97)	125 (4.92)	136 (5.35)	116 (4.57)	68 (2.68)	81 (3.19)	17 (0.67)	75 (2.95)	C 1112	1.0
45 021 72 125		1	1 1/4 NPT										
45 021 72 305	1.8	2	DN 40 KF	50 (1.97)	162 (6.38)	172 (6.77)	170 (6.69)	108 (4.25)	98 (3.86)	17 (0.67)	130 (5.12)	C 1337	1.5
45 037 72 105		1	G 1 1/2										
45 037 72 135	6.0	1	1 1/4 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)	C 15 124/1	4.3
45 037 72 305		2	DN 40 KF										
45 124 72 104	12.0	1	G 2 1/2	123 (4.84)	286 (11.26)	272 (10.71)	263 (10.35)	147 (5.79)	197 (7.76)	74 (2.91)	165 (6.50)	C 21 138/1	14.5
45 124 72 114		1	2 1/2 NPT										
45 124 72 305	2	DN 50 KF											

Vacuum air cleaners

Flow characteristics ...

... for flow rates as per ISO 5011



Vacuum air cleaners

Further MANN+HUMMEL filters suitable for use with vacuums

There are other filter systems available from MANN+HUMMEL in addition to the vacuum air cleaners listed here which are suitable for use with applications with vacuums. These are specially modified plastic and metal filters. The modified Europiclon® line is shown on page 31. Further information is available from your MANN+HUMMEL partner.





MANN+HUMMEL Two-way ventilation air cleaners for crankcases, gear unit housings and hydraulic tanks

MANN+HUMMEL Silencer air cleaners

Air cleaners for two-way ventilation

The two-way ventilation air cleaners from MANN+HUMMEL are single-stage air cleaners which are mainly used for the two-way ventilation of liquids in tanks and gear units. The cleaners are available as dry air cleaners and as oil-wetted cleaners.

Dry air cleaners offer a very high filtration performance of over 99.5%, but must be replaced when they are full of dirt. Oil-wetted air cleaners achieve a lower separation of only approx. 70%, but can be cleaned and re-used.

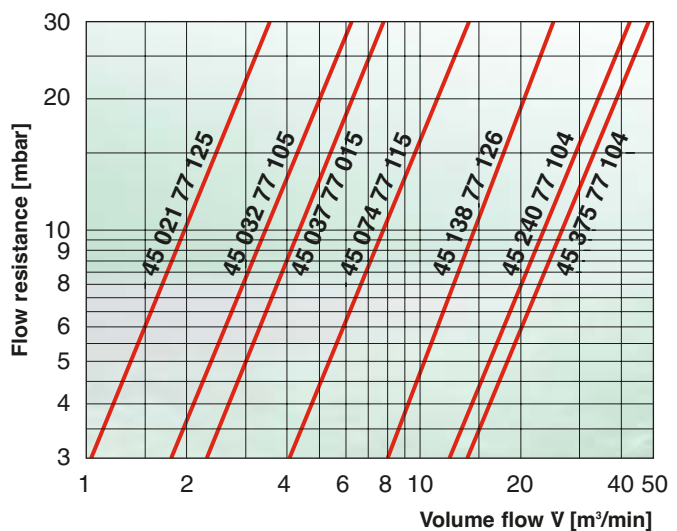
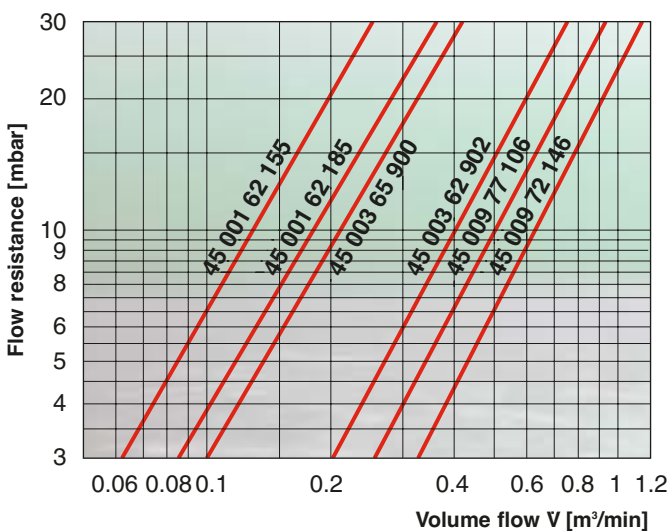
There are models available with an integrated pressure regulating valve. There is also the option of using the metal-free filters of the Picolino line (see page 77).



Two-way ventilation air cleaners (dry air cleaners)

Flow characteristics ...

... for flow rates as per ISO 5011



Two-way ventilation air cleaners (dry air cleaners)

Dimensions and order numbers

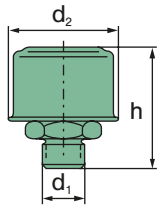


Fig. 1

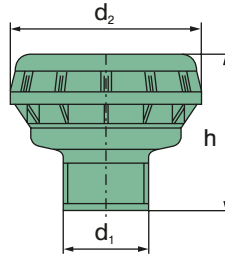


Fig. 2

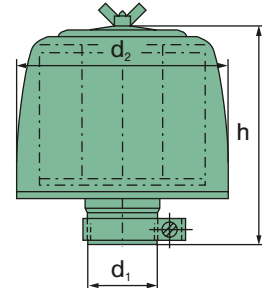


Fig. 3

Order No.	Fig.	Approx. nominal flow rate [m ³ /min]	Opening pressure		Dimensions in mm (dimensions in inches)			MANN-FILTER main element	Approx. weight [kg]
			[bar]	[kPa]	d ₁	d ₂	h		
45 001 62 155	1	—	—	—	M 14x1.5	45 (1.77)	47 (1.85)	- ¹⁾	0.05
45 001 62 185	1	—	—	—	M 18x1.5	45 (1.77)	47 (1.85)	- ¹⁾	0.08
45 003 65 900	2	—	—	—	35 (1.38)	80 (3.15)	65 (2.56)	- ¹⁾	0.06
45 003 62 902	2	—	—	—	G 3/4	80 (3.15)	73.5 (2.89)	- ¹⁾	0.08
45 003 62 900 ²⁾	2	0.2	0.85	85	G 3/4	80 (3.15)	73.5 (2.89)	- ¹⁾	0.1
45 003 62 901 ²⁾	2	0.2	0.35	35	G 3/4	80 (3.15)	73.5 (2.89)	- ¹⁾	0.1
45 009 72 146	3	0.5	—	—	M 26x1.5	98 (3.86)	110 (4.33)	C 75/4	0.3
45 009 77 106	3	0.5	—	—	20 (0.79)	98 (3.86)	110 (4.33)	C 75/4	0.3
45 021 77 125	3	2.0	—	—	40 (1.57)	132 (5.20)	120 (4.72)	C 1112	0.5
45 032 77 105	3	3.5	—	—	52 (2.05)	132 (5.20)	152 (5.98)	C 1132	0.65
45 037 77 015	3	4.5	—	—	60 (2.36)	170 (6.69)	175 (6.89)	C 1337	1.1
45 074 77 115	3	8.0	—	—	80 (3.15)	208 (8.19)	185 (7.28)	C 1574	1.3
45 138 77 126	3	15.0	—	—	100 (3.94)	283 (11.14)	200 (7.87)	C 21 138/1	7.0
45 240 77 104	3	23.0	—	—	140 (5.51)	318 (12.52)	302 (11.89)	C 26 240	9.0
45 375 77 104	3	32.0	—	—	180 (7.09)	396 (15.59)	285 (11.22)	C 30 375	11.0

¹⁾ The entire air cleaner is exchanged during a service.

²⁾ With integrated pressure regulating valve.

Two-way ventilation air cleaners (oil-wetted air cleaners)

Dimensions and order numbers

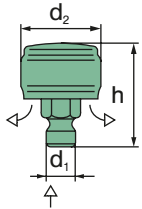


Fig. 1

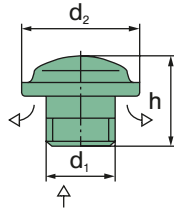


Fig. 2

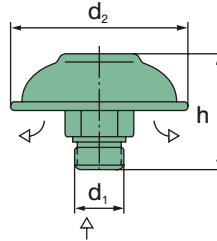


Fig. 3

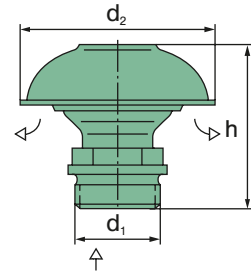


Fig. 4

Order No.	Fig.	Nominal flow rate ¹⁾ approx. [m ³ /min]	Dimensions in mm (<i>dimensions in inches</i>)			Approx. weight [kg]
			d ₁	d ₂	h	
41 001 62 112	4	0.1	M 30x1.5	60 (2.36)	42 (1.65)	0.06
41 002 62 102	4	0.2	M 26x1.5	60 (2.36)	50 (1.97)	0.09
41 004 62 102	3	0.4	M 16x1.5	76 (2.99)	62 (2.44)	0.15
41 004 62 201	2	0.4	M 45x1.5	76 (2.99)	76 (2.99)	0.25
42 001 62 103	1	0.1	M 12x1.5	30 (1.18)	37 (1.46)	0.04
42 001 62 142	3	0.1	M 20x1.5	50 (1.97)	42 (1.65)	0.03
42 001 62 173	1	0.1	M 10x1.0	30 (1.18)	35 (1.38)	0.04
42 002 62 112	2	0.2	M 18x1.5	50 (1.97)	27 (1.06)	0.03

¹⁾ The flow resistance of the oil-wetted air cleaner is $\Delta p = 10$ mbar (1 kPa).

Silencer air cleaners

Dimensions and order numbers

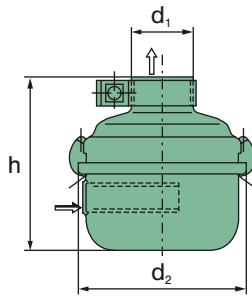


Fig. 1
Clamp connection

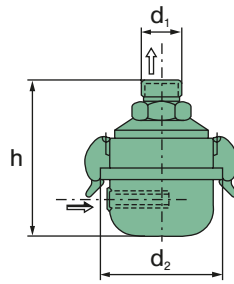
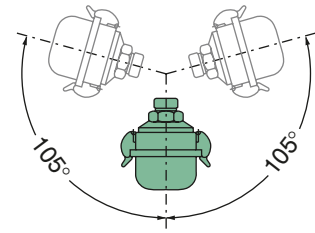


Fig. 2
Threaded connection



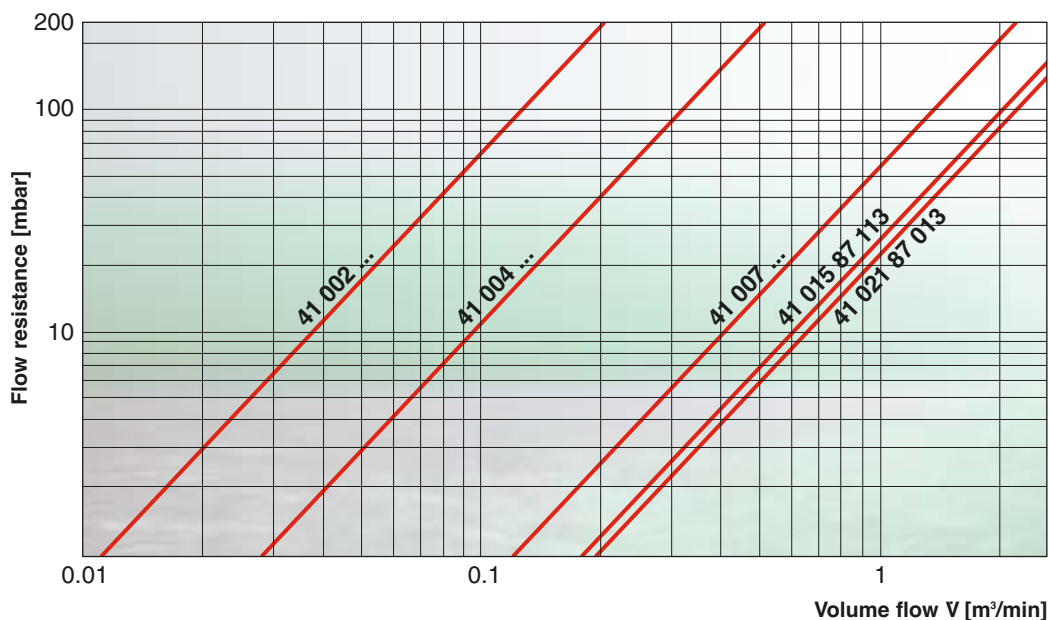
Range of possible
installation angles

Order No.	Fig.	Nominal flow rate ¹⁾ approx. [m ³ /min]	Dimensions in mm (<i>dimensions in inches</i>)				Approx. weight [kg]
			Silencer pipe	d ₁	d ₂	h	
41 007 87 103	1	0.8	with	25 (0.98)	82 (3.23)	88 (3.46)	0.2
41 007 87 113	1	0.8	with	30 (1.18)	82 (3.23)	85 (3.35)	0.2
41 010 87 113	1	1.3	with	35 (1.38)	98 (3.86)	97 (3.82)	0.3
41 015 87 113	1	2.0	with	40 (1.57)	118 (4.65)	120 (4.72)	0.5
41 021 87 013	1	2.2	with	52 (2.05)	138 (5.43)	130 (5.12)	0.5
41 004 82 123	2	0.33	without	M 22x1.5	66 (2.60)	74 (2.91)	0.2
41 004 82 183	2	0.33	with	G 1/2	66 (2.60)	84 (3.31)	0.2

¹⁾ With 100 mbar flow resistance.

Flow characteristics ...

... for flow rates as per ISO 5011



MANN+HUMMEL



MANN+HUMMEL Accessories for air cleaners



The right accessories for each air cleaner

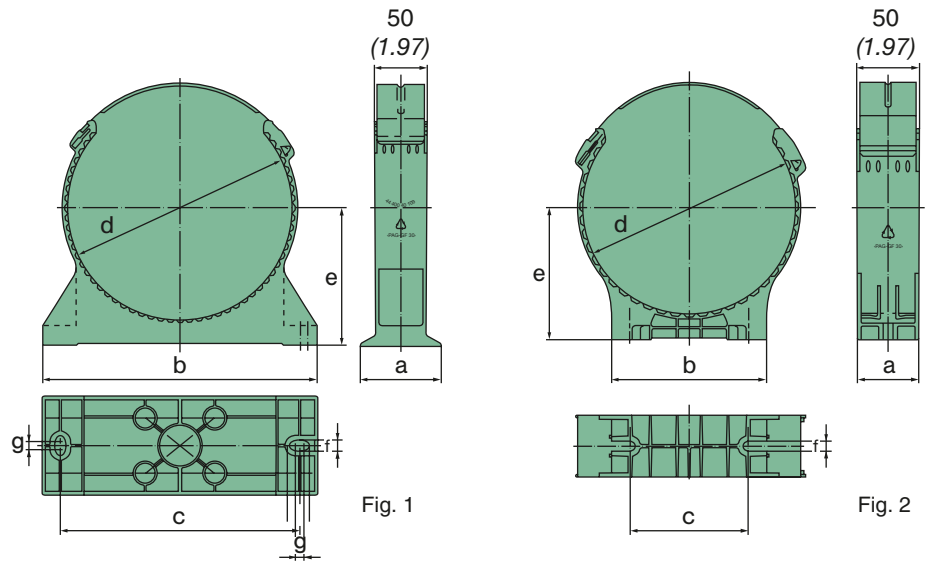
The reliable operation of intake air cleaners for internal combustion engines and compressors must also be ensured under the most difficult operating conditions. This is only possible if the air cleaner and the accessories are perfectly matched to each other.

MANN+HUMMEL offers a comprehensive range of accessories for all air cleaners especially designed for the respective type of air cleaner. These are proven products which offer reliability and long life in numerous applications – also under the hardest operating conditions.

Brackets	Ensure vibration-free mounting on the machine	Page 105
Rain caps	Protect against ingress of water and coarse dirt particles	Page 108
Precleaners	Extend the service life of single-stage air cleaners	Page 110
Air connecting parts	For the secure connection of the air cleaner to the engine or compressor	Page 114
Ejectors	For the maintenance-free scavenging of precleaners and two-stage air cleaners	Page 122
Service indicators	Indicate via a display when a filter service is required	Page 124
Service switches	Provide an electrical indication when a filter service is required	Page 125

Brackets for the Europiclon®

The brackets are especially designed for the external surface of the Europiclon® housing and allow vibration-free mounting of the air cleaner. From size 700 it is necessary to use two brackets.



Order No.	Suitable for Europiclon®	Fig.	Dimensions in mm (<i>dimensions in inches</i>)						
			a	b	c	d	e	f	g
39 050 40 959	44 05. 92 ...	1	40 (1.57)	137 (5.39)	116 (4.57)	122 (4.80)	85.7 (3.37)	9 (0.35)	–
39 100 40 999	44 100 92 ...	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	45 200 92 ...	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	45 300 92 ...	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	45 400 92 ...	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	45 500 92 ...	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	45 600 92 ...	1	80 (3.15)	345 (13.58)	315 (12.40)	296 (11.65)	173 (6.81)	8.5 (0.33)	15.5 (0.61)
39 700 40 999	45 700 92 ...	1	80 (3.15)	285 (11.22)	355 (13.98)	326 (12.83)	206 (8.11)	8.5 (0.33)	7.0 (0.28)
39 800 40 999	45 800 92 ...	1	80 (3.15)	452 (17.80)	422 (16.61)	391 (15.39)	220 (8.66)	8.5 (0.33)	7.0 (0.28)
39 100 40 989	44 100 92 ...	2	50 (1.97)	110 (4.33)	80 (3.15)	156 (6.14)	100 (3.94)	8.5 (0.33)	–
39 200 40 989	45 200 92 ...	2	50 (1.97)	125 (4.92)	95 (3.74)	171 (6.73)	106 (4.17)	8.5 (0.33)	–
39 300 40 989	45 300 92 ...	2	50 (1.97)	140 (5.51)	110 (4.33)	201 (7.91)	121 (4.76)	8.5 (0.33)	–
39 400 40 989	45 400 92 ...	2	50 (1.97)	157 (6.18)	127 (5.00)	221 (8.70)	132 (5.20)	8.5 (0.33)	–
39 500 40 989	45 500 92 ...	2	50 (1.97)	182 (7.17)	152 (5.98)	262 (10.32)	153 (6.02)	8.5 (0.33)	–
39 600 40 989	45 600 92 ...	2	50 (1.97)	182 (7.17)	152 (5.98)	296 (11.65)	173 (6.81)	8.5 (0.33)	–
39 700 40 989	45 700 92 ...	2	50 (1.97)	233 (9.17)	203 (7.99)	326 (12.83)	206 (8.11)	8.5 (0.33)	–
39 800 40 989	45 800 92 ...	2	50 (1.97)	233 (9.17)	203 (7.99)	391 (15.39)	221 (8.70)	8.5 (0.33)	–

Brackets for the Piclon

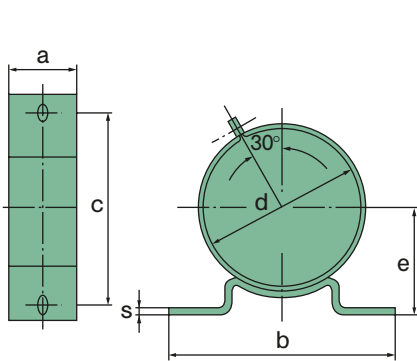


Fig. 1

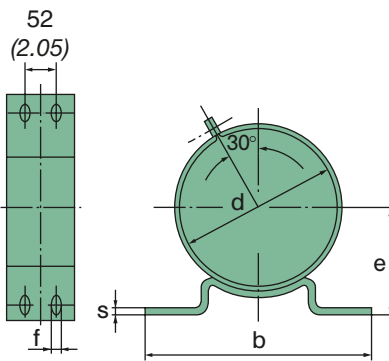


Fig. 2

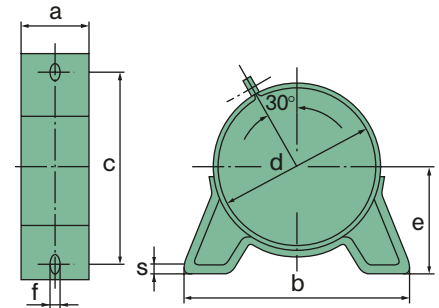


Fig. 3

Order No.	Suitable for Piclon	Fig.	Dimensions in mm (<i>dimensions in inches</i>)							Approx. weight [kg]
			a	b	c	d	e	f	s	
39 014 38 990	45 043 92...	1	40 (1,57)	170 (6,69)	130 (5,12)	120 (4,72)	70 (2,76)	10 (0,39)	2,5 (0,10)	0,6
39 076 38 970	45 076 92...	1	20 (0,79)	190 (7,48)	150 (5,91)	140 (5,51)	80 (3,15)	10 (0,39)	3 (0,12)	0,3
39 114 38 970	45 114 92...	1	20 (0,79)	220 (8,66)	180 (7,09)	165 (6,50)	100 (3,94)	10 (0,39)	3 (0,12)	0,3
39 165 38 970	45 165 92...	1	40 (1,57)	240 (9,45)	200 (7,87)	195 (7,68)	125 (4,92)	10 (0,39)	3 (0,12)	0,6
39 165 38 960	45 165 92...	3	40 (1,57)	250 (9,84)	200 (7,87)	195 (7,68)	125 (4,92)	10 (0,39)	3 (0,12)	0,7
39 225 38 970	45 225 92...	1	40 (1,57)	240 (9,45)	200 (7,87)	215 (8,46)	130 (5,12)	10 (0,39)	3 (0,12)	0,6
39 325 38 970	45 325 92...	1	40 (1,57)	280 (11,02)	240 (9,45)	255 (10,04)	145 (5,71)	12 (0,47)	3 (0,12)	0,8
39 440 38 970	45 440 92...	1	40 (1,57)	310 (12,20)	270 (10,63)	290 (11,42)	165 (6,50)	12 (0,47)	3 (0,12)	0,9
39 440 38 941	45 440 92...	3	40 (1,57)	322 (12,68)	270 (10,63)	290 (11,42)	165 (6,50)	12 (0,47)	3 (0,12)	1,0
39 120 38 980	45 650 92...	1	40 (1,57)	310 (12,20)	270 (10,63)	320 (12,60)	185 (7,28)	12 (0,47)	3 (0,12)	1,0
45 650 38 761	45 650 92...	3	40 (1,57)	322 (12,68)	270 (10,63)	320 (12,60)	185 (7,28)	12 (0,47)	3 (0,12)	1,1
39 880 38 990	45 880 92...	3	40 (1,57)	340 (13,39)	270 (10,63)	385 (15,16)	220 (8,66)	12 (0,47)	3 (0,12)	1,0
45 920 38 990	45 920 92...	2	80 (3,15)	420 (16,54)	380 (14,96)	420 (16,54)	235 (9,25)	12 (0,47)	3 (0,12)	2,3
44 940 38 991	44 940 92...	3	40 (1,57)	480 (18,90)	420 (16,54)	540 (21,26)	284 (11,18)	14 (0,55)	3 (0,12)	2,0

Brackets for the Pico-E

Order No.	Suitable for Pico-E	Fig.	Dimensions in mm (<i>dimensions in inches</i>)							Approx. weight [kg]
			a	b	c	d	e	f	s	
45 076 38 980	44 076 75 204	1	40 (1,57)	190 (7,48)	150 (5,91)	130 (5,12)	75 (2,95)	10 (0,39)	3 (0,18)	0,7
45 114 38 990	44 114 75 204	1	60 (2,36)	190 (7,48)	150 (5,91)	150 (5,91)	85 (3,35)	10 (0,39)	3 (0,18)	0,7
45 165 38 980	44 165 75 204	1	60 (2,36)	220 (8,66)	180 (7,09)	170 (6,69)	110 (4,33)	10 (0,39)	3 (0,18)	0,8
45 225 38 990	44 225 75 204	1	80 (3,15)	240 (9,45)	200 (7,87)	190 (7,48)	125 (4,92)	10 (0,39)	3 (0,18)	1,0
39 056 38 980	44 325 75 204	1	80 (3,15)	280 (11,02)	240 (9,45)	240 (9,45)	130 (5,12)	12 (0,47)	3 (0,18)	1,5
45 440 38 990	44 440 75 204	2	80 (3,15)	310 (12,20)	270 (10,63)	270 (10,63)	155 (6,10)	12 (0,47)	3 (0,18)	1,6
39 440 38 990	44 650 75 204	2	80 (3,15)	310 (12,20)	270 (10,63)	290 (11,42)	165 (6,50)	12 (0,47)	3 (0,18)	1,7
39 880 38 940	44 880 75 204	2	80 (3,15)	310 (12,20)	270 (10,63)	345 (13,58)	195 (7,68)	12 (0,47)	3 (0,18)	1,9
45 880 38 990	44 920 75 204	2	80 (3,15)	310 (12,20)	270 (10,63)	370 (14,57)	210 (8,27)	12 (0,47)	3 (0,18)	2,0
45 940 38 841	45 950 75 104	3	45 (1,77)	580 (22,83)	520 (20,47)	610 (24,02)	325 (12,80)	14 (0,55)	3 (0,18)	3,5

Brackets for the oil-bath air cleaners

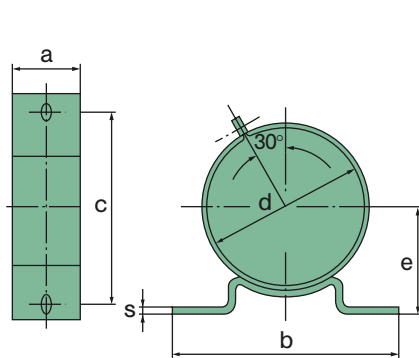


Fig. 1

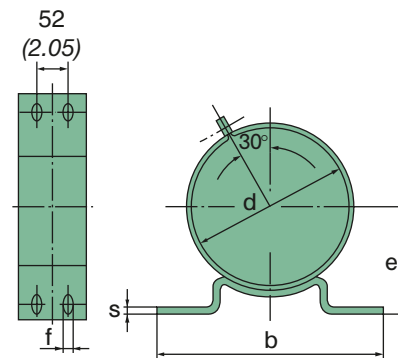
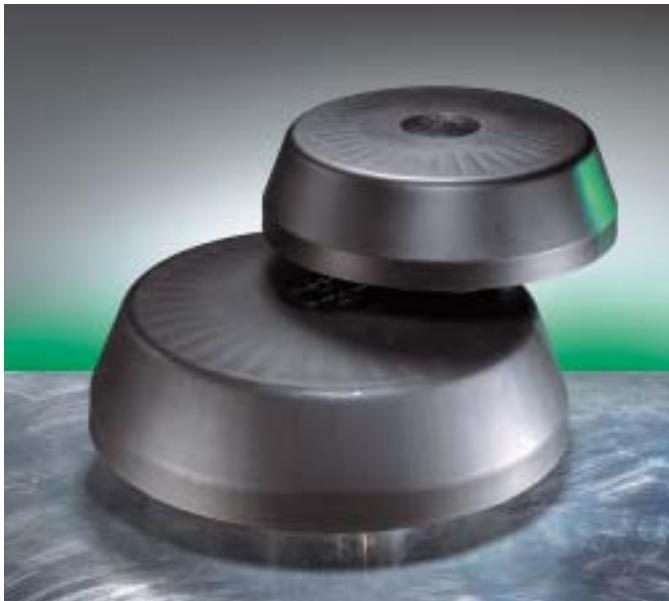


Fig. 2

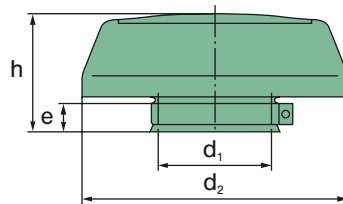
Order No.	Suitable for Oil-bath air cleaners	Fig.	Dimensions in mm (<i>dimensions in inches</i>)							Approx. weight [kg]
			a	b	c	d	e	f	s	
39 020 38 981	31 020... and 31 024...	1	60 (2,36)	190 (7,48)	150 (5,91)	140 (5,51)	80 (3,15)	12 (0,47)	3 (0,12)	0,7
39 028 38 981	31 028... and 31 034...	1	60 (2,36)	220 (8,66)	180 (7,09)	173 (6,81)	110 (4,33)	12 (0,47)	3 (0,12)	0,8
39 040 38 981	31 040... and 31 045...	1	80 (3,15)	240 (9,45)	200 (7,87)	200 (7,87)	130 (5,12)	12 (0,47)	3 (0,12)	1,4
39 056 38 980	31 056... and 31 068...	1	80 (3,15)	280 (11,02)	240 (9,45)	240 (9,45)	130 (5,12)	14 (0,55)	3 (0,12)	1,5
39 080 38 991	31 080...	2	80 (3,15)	310 (12,20)	270 (10,63)	280 (11,02)	160 (6,30)	14 (0,55)	3 (0,12)	1,7
39 100 38 991	31 100... and 31 120...	2	80 (3,15)	310 (12,20)	270 (10,63)	320 (12,60)	185 (7,28)	14 (0,55)	3 (0,12)	1,9
39 160 38 991	31 160... and 31 190...	2	80 (3,15)	310 (12,20)	270 (10,63)	400 (15,75)	225 (8,98)	14 (0,55)	3 (0,12)	2,2

One bracket is required per air cleaner.

Rain caps – Design A



In order to effectively prevent ingress of rain, snow, spray water, etc., MANN+HUMMEL recommends equipping the air cleaner with a rain cap. Since this also protects the air cleaner against coarse contaminant particles, the main element is less exposed to damage and this extends the service interval.



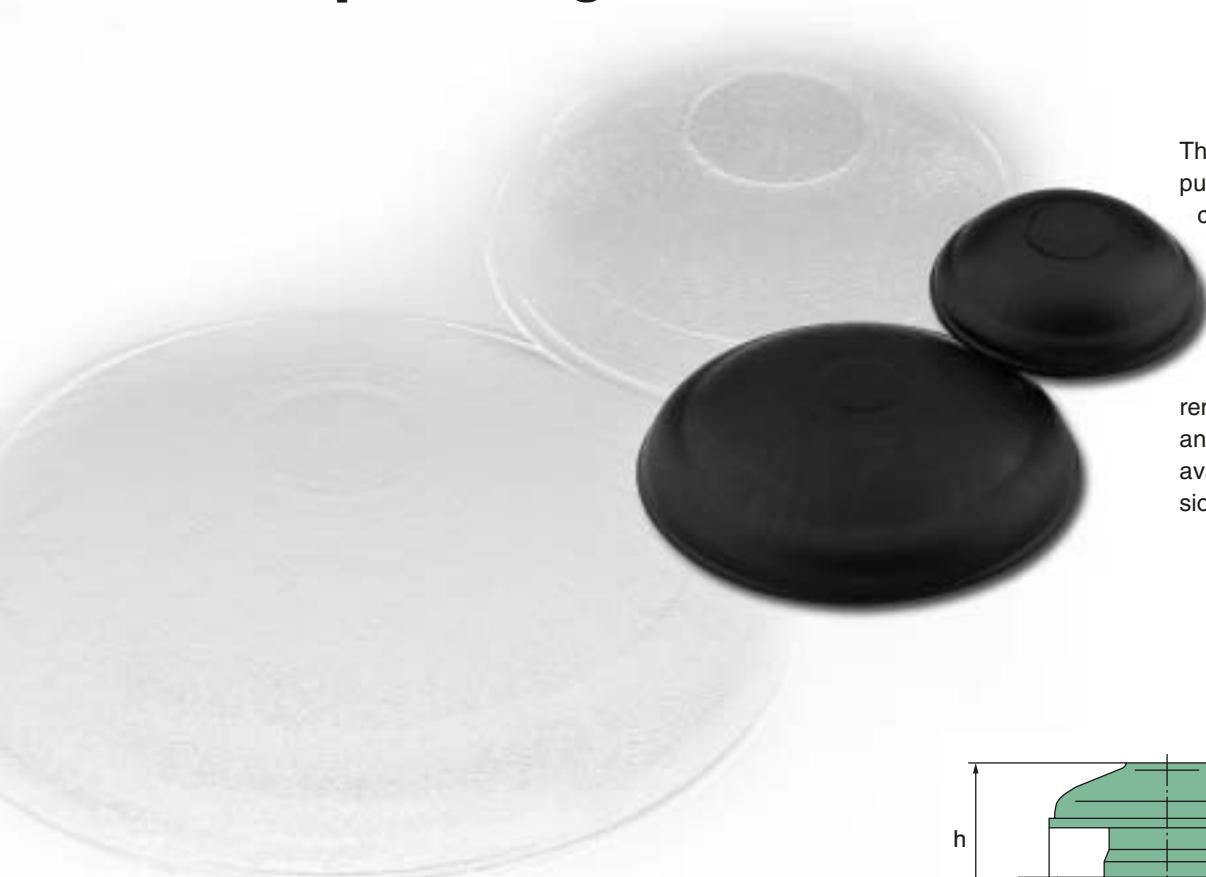
e = insertion depth

Order No.	Suitable for					Dimensions in mm (dimensions in inches)				Approx. weight [kg]
	Europiclon®	NLG	Piclon	Pico-E	Oil-bath air cleaner	d ₁	d ₂	e	h	
39 014 67 910 ¹⁾	44 050 ...	–	45 043 ...	–	31 014 ... 31 017 ...	45 (1.77)	150 (5.91)	22 (0.87)	63 (2.48)	0.11
39 020 67 910 ¹⁾	44 100 ...	–	45 076 ...	–	31 020 ... 31 024 ...	54 (2.13)	150 (5.91)	22 (0.87)	63 (2.48)	0.11
39 028 67 910 ¹⁾	45 200 ...	–	45 114 ...	44 076 ...	31 028 ... 31 034 ...	62 (2.44)	150 (5.91)	22 (0.87)	63 (2.48)	0.11
39 040 67 910 ¹⁾	45 300 ...	–	45 165 ...	44 114 ...	31 040 ... 31 045 ...	68 (2.68)	200 (7.87)	30 (1.18)	85 (3.35)	0.23
39 056 67 910 ¹⁾	45 400 ...	–	45 225 ...	44 165 ...	31 056 ... 31 068 ...	82 (3.23)	200 (7.87)	30 (1.18)	85 (3.35)	0.23
39 080 67 910 ¹⁾	45 500 ...	–	45 325 ...	44 225 ...	31 080 ...	102 (4.02)	270 (10.63)	40 (1.57)	115 (4.53)	0.44
39 100 67 910 ¹⁾	45 600 ...	–	45 440 ...	44 325 ...	31 100 ... 31 120 ...	110 (4.33)	270 (10.63)	40 (1.57)	115 (4.53)	0.44
39 160 67 910 ¹⁾	45 700 ...	NLG 15 - ...	45 650 ...	44 440 ...	31 160 ... 31 190 ...	132 (5.20)	360 (14.17)	50 (1.97)	150 (5.91)	0.90
39 190 67 910 ¹⁾	45 800 ...	NLG 21 - ...	45 880 ...	44 650 ...	–	150 (5.91)	360 (14.17)	50 (1.97)	150 (5.91)	0.90
39 220 67 910 ¹⁾	–	NLG 28 - ...	–	44 880 ...	–	180 (7.09)	405 (15.94)	33 (1.30)	128 (5.04)	0.95
39 320 67 210 ²⁾	–	NLG 37 - ...	45 920 ...	44 920 ...	–	210 (8.27)	460 (18.11)	65 (2.56)	190 (7.48)	3.00

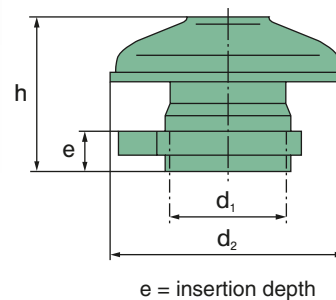
¹⁾ Plastic model

²⁾ Metal model

Rain caps – Design B



The rain caps are simply pushed on to the dirty air connection of the air cleaner or onto the air intake of the dirty air pipe and then fastened using the tightening strap supplied. In order to cater for different installation requirements and styling, the rain caps are available in two different versions.



Order No.	Suitable for				Oil-bath air cleaner	Dimensions in mm <i>(dimensions in inches)</i>				Approx. weight [kg]
	Europiclone®	NLG	Piclone	Pico-E		d ₁	d ₂	e	h	
39 014 67 900 ¹⁾	44 050 ...	–	45 043 ...	–	31 014 ... 31 017 ...	45 (1.77)	92 (3.62)	22 (0.87)	53 (2.09)	0.07
39 020 67 900 ¹⁾	44 100 ...	–	45 076 ...	–	31 020 ... 31 024 ...	54 (2.13)	110 (4.33)	22 (0.87)	53 (2.09)	0.08
39 028 67 900 ¹⁾	45 200 ...	–	45 114 ...	44 076 ...	31 028 ... 31 034 ...	62 (2.44)	124 (4.88)	22 (0.87)	56 (2.20)	0.11
39 040 67 900 ¹⁾	45 300 ...	–	45 165 ...	44 114 ...	31 040 ... 31 045 ...	68 (2.68)	145 (5.71)	22 (0.87)	63 (2.48)	0.12
39 056 67 900 ¹⁾	45 400 ...	–	45 225 ...	44 165 ...	31 056 ... 31 068 ...	82 (3.23)	172 (6.77)	22 (0.87)	64 (2.52)	0.15
39 080 67 900 ¹⁾	45 500 ...	–	45 325 ...	44 225 ...	31 080 ... 31 100 ...	102 (4.02)	203 (7.99)	35 (1.38)	90 (3.54)	0.18
39 100 67 020 ²⁾	45 600 ...	–	45 440 ...	44 325 ...	31 120 ... 31 160 ...	110 (4.33)	236 (9.29)	40 (1.57)	125 (4.92)	0.82
39 160 67 020 ²⁾	45 700 ...	NLG 15 - ...	45 650 ...	44 440 ...	31 190 ...	132 (5.20)	292 (11.50)	40 (1.57)	138 (5.43)	1.50
45 880 67 100 ²⁾	45 800 ...	NLG 21 - ...	45 880 ...	44 650 ...	–	150 (5.91)	342 (13.46)	40 (1.57)	166 (6.54)	2.00
39 220 67 100 ²⁾	–	NLG 28 - ...	–	44 880 ...	–	180 (7.09)	342 (13.46)	45 (1.77)	163 (6.42)	2.20
39 320 67 100 ²⁾	–	NLG 37 - ...	45 920 ...	44 920 ...	–	210 (8.27)	410 (16.14)	87 (3.43)	223 (8.78)	4.20

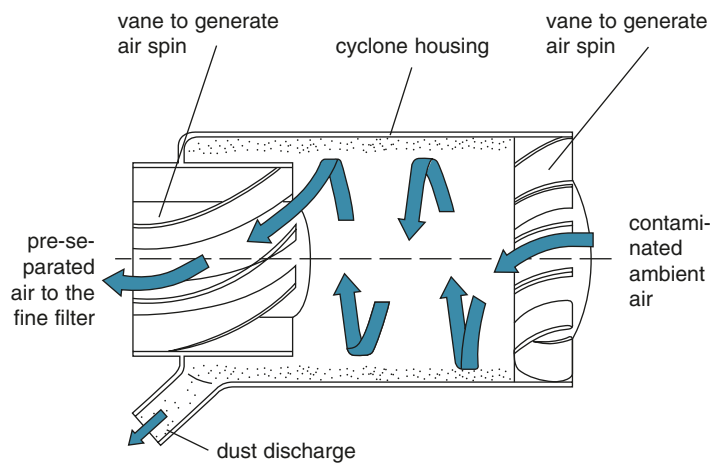
¹⁾ Plastic model

²⁾ Metal model

DualSpin® Precleaners

The DualSpin® precleaner newly developed by MANN+HUMMEL offers excellent separation efficiency with a simultaneous minimal drop in pressure. The special arrangement of both distributors reduces the pressure drop of the precleaners by up to 50%. Generously dimensioned cross-sectional flow

areas almost completely prevent clogging – even under unfavourable conditions, such as with harvesting machines. The DualSpin® is the ideal complement to the air cleaners of the NLG line (see page 33), but it can also be combined with other air cleaners (e.g. metal air cleaners).



Working principle of the DualSpin® precleaner

Advantages of the DualSpin® precleaner:

- The highest separation performance ($\eta > 90\%$, SAE-C) with scavenging is achieved by connecting an exhaust ejector (see page 122), radiator fan or an external blower.
- operation with dust discharge valve possible as a more economic alternative ($\eta > 85\%$, SAE-C)
- Different distributor inserts are used to adjust the pre-cyclone within a range of 18 m³/min to 50 m³/min ideally to the air requirement of the machine.
- The polygon design of the housing enables use of the proven bracket of the Europiclone® 700 (Order No. 39 700 40 999).



DualSpin® Precleaners

Dimensions and order numbers

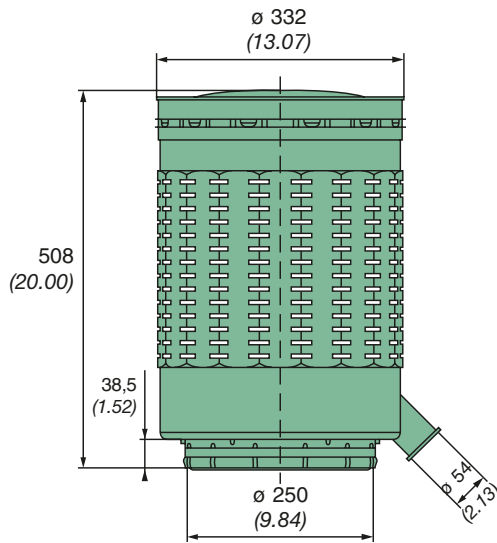


Fig. 1
(Scavenging)

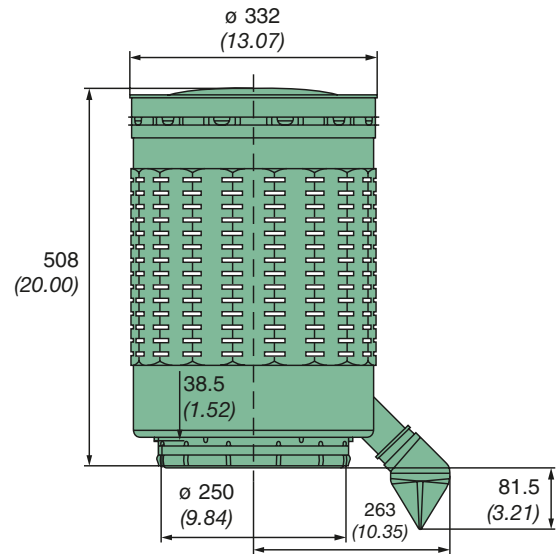
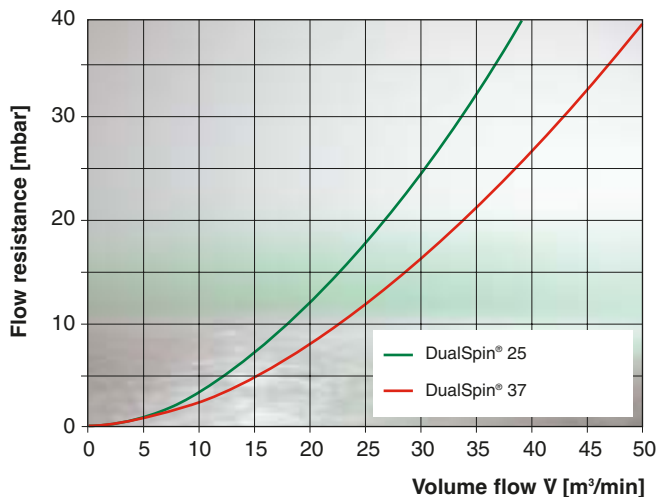


Fig. 2
with dust discharge valve 39 000 40 671

Order No.		Nominal flow rate [m ³ /min]	Approx. weight [kg]
without dust discharge valve (Fig. 1)	with dust discharge valve (Fig. 2)		
48 025 75 900	48 025 75 910	18 – 25	2.4
48 037 75 910	48 037 75 920	25 – 50	2.4

Flow characteristics ...

... for flow rates (only DualSpin®) as per ISO 5011

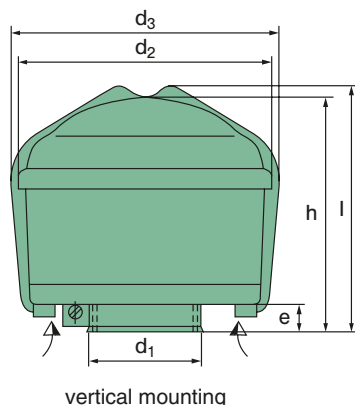


Precleaners

Dust bowls (plastic version)

The proven precleaners from MANN+HUMMEL are suitable for extending the service life of single-stage air cleaners such as the NLG Pico or Pico-E. Due to its transparent insert, it is possible to read the filling level of the pre-cleaner at any time and accordingly select the right time for the service.

The easy and problem-free emptying of the dust bowl is made possible by the closing clamp. Precleaners offer protection against ingress of spray water and rain.



Order No.	Application		Dimensions in mm (<i>dimensions in inches</i>)						Approx. weight [kg]
	Nominal flow rate [m ³ /min]	at Δp ¹⁾ [mbar]	d ₁	d ₂	d ₃	e ²⁾	h	l	
48 017 67 900	1.4 – 1.7	7 – 10.5	42.2 (1.66)	164 (6.46)	175 (6.89)	52 (2.05)	140 (5.51)	150 (5.91)	0.4
48 024 67 900	2 – 2.4	8.5 – 12	54.2 (2.13)	164 (6.46)	175 (6.89)	52 (2.05)	140 (5.51)	150 (5.91)	0.4
48 030 67 900	2.8 – 3.4	9 – 13	62.2 (2.45)	164 (6.46)	175 (6.89)	52 (2.05)	140 (5.51)	150 (5.91)	0.4
48 034 67 900	2.8 – 3.4	6 – 9	62.2 (2.45)	219 (8.62)	236 (9.29)	62 (2.44)	167 (6.57)	180 (7.09)	1.0
48 048 67 900	4 – 4.5	10 – 12.5	68.2 (2.69)	219 (8.62)	236 (9.29)	62 (2.44)	167 (6.57)	180 (7.09)	1.0
48 056 67 900	5.6 – 6.8	12 – 17.5	82.2 (3.24)	219 (8.62)	236 (9.29)	62 (2.44)	167 (6.57)	180 (7.09)	1.0
48 068 67 900	5.6 – 6.8	7 – 10.5	82.2 (3.24)	303 (11.93)	315 (12.40)	84 (3.31)	208 (8.19)	217 (8.54)	1.3
48 096 67 900	8 – 9.6	8.5 – 12	102.2 (4.02)	303 (11.93)	315 (12.40)	84 (3.31)	208 (8.19)	217 (8.54)	1.3
48 120 67 900	10 – 12	11 – 16	110.2 (4.34)	303 (11.93)	315 (12.40)	84 (3.31)	208 (8.19)	217 (8.54)	1.3

¹⁾ Δp = Flow resistance. When using as pre-cleaner, add 70% of the stated flow resistance to the resistance of the air cleaner fitted downstream.

²⁾ e = insertion depth

Precleaners

Precleaners (metal version)

The metal version of the pre-cleaner is available in two variations:

- as a throughput pre-cleaner with integrated rain cap for vertical mounting at the air intake
- as a throughput pre-cleaner for horizontal installation in the air intake pipe

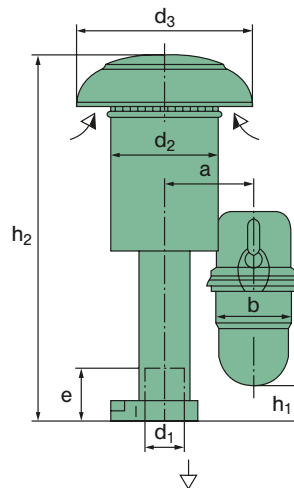


Fig. 1
Vertical mounting

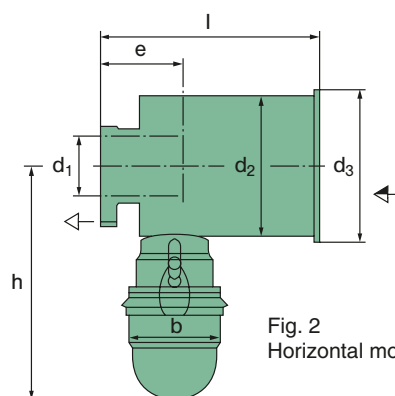


Fig. 2
Horizontal mounting

Order No.	Application		Fig.	Dimensions in mm (<i>dimensions in inches</i>)										Approx. weight [kg]
	Nominal flow rate [m³/min]	at Δp ¹⁾ [mbar]		a	b	d ₁	d ₂	d ₃	e ²⁾	h	h ₁	h ₂	l	
48 024 67 020	2 – 2.8	7 – 13.5	1	84 (3.31)	85 (3.35)	54.2 (2.13)	100 (3.94)	155 (6.10)	60 (2.36)	–	10 (0.39)	300 (11.84)	–	1.0
48 024 67 030	2.8 – 3.4	8.5 – 12.5	1	84 (3.31)	85 (3.35)	62.2 (2.45)	100 (3.94)	155 (6.10)	60 (2.36)	–	40 (1.57)	330 (12.99)	–	1.0
48 036 67 110	3.6 – 4.5	11 – 18	1	95 (3.74)	85 (3.35)	68.2 (2.69)	114 (4.49)	180 (7.09)	70 (2.76)	–	45 (1.77)	350 (13.78)	–	1.4
48 048 67 020	5.6 – 6.8	14 – 20.5	1	100 (3.94)	85 (3.35)	82.2 (3.24)	136 (5.35)	215 (8.46)	80 (3.15)	–	40 (1.57)	400 (15.75)	–	2.0
48 066 67 110	7.3 – 9.6	14 – 24.5	1	113 (4.45)	85 (3.35)	102.2 (4.02)	159 (6.26)	258 (10.16)	100 (3.94)	–	15 (0.59)	418 (16.46)	–	2.5
48 096 67 140	10 – 13	14 – 23.5	1	113 (4.45)	85 (3.35)	110.2 (4.34)	158 (6.22)	255 (10.04)	110 (4.33)	–	30 (1.18)	433 (17.05)	–	3.5
48 132 67 020	16 – 19	13.5 – 19	1	164 (6.46)	125 (4.92)	132.2 (5.20)	230 (9.06)	368 (14.49)	130 (5.12)	–	35 (1.38)	615 (24.21)	–	5.9
48 024 67 140	2 – 2.8	7 – 13.5	2	–	85 (3.35)	54.2 (2.13)	100 (3.94)	107 (4.21)	60 (2.36)	191 (7.52)	–	–	144 (5.67)	0.9
48 024 67 180	2.8 – 3.4	8.5 – 12.5	2	–	85 (3.35)	62.2 (2.45)	100 (3.94)	107 (4.21)	60 (2.36)	191 (7.52)	–	–	144 (5.67)	0.7
48 036 67 160	3.6 – 4.5	11 – 18	2	–	85 (3.35)	68.2 (2.69)	114 (4.49)	120 (4.72)	70 (2.76)	198 (7.80)	–	–	162 (6.38)	1.0
48 048 67 220	5.6 – 6.8	14 – 20.5	2	–	85 (3.35)	82.2 (3.24)	136 (5.35)	145 (5.71)	80 (3.15)	210 (8.27)	–	–	203 (7.99)	1.2
48 066 67 090	7.3 – 9.6	14 – 24.5	2	–	85 (3.35)	102.2 (4.02)	158 (6.22)	166 (6.54)	100 (3.94)	224 (8.82)	–	–	232 (9.13)	1.6
48 096 67 200	10 – 13	14 – 23.5	2	–	85 (3.35)	110.2 (4.34)	158 (6.22)	166 (6.54)	110 (4.33)	220 (8.66)	–	–	245 (9.65)	1.7
48 132 67 120	16 – 19	13.5 – 19	2	–	125 (4.92)	132.2 (5.20)	230 (9.06)	240 (9.45)	130 (5.12)	336 (13.23)	–	–	370 (14.57)	3.9

¹⁾ Δp = Flow resistance. When using as pre-cleaner, add 70% of the stated flow resistance to the resistance of the air cleaner fitted downstream.

²⁾ e = insertion depth

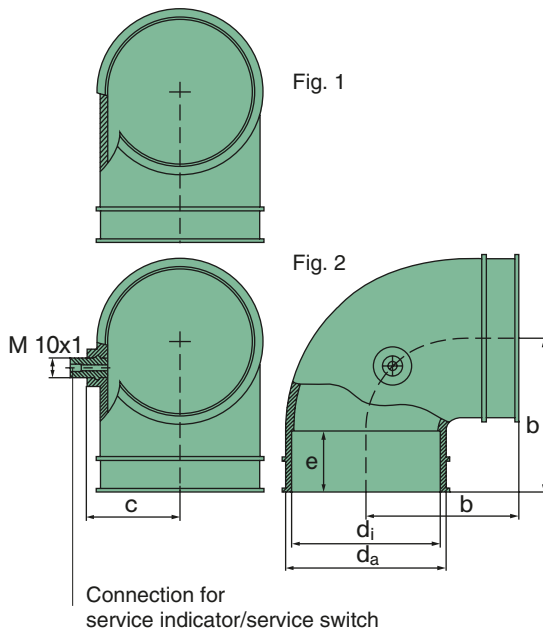
Air connecting parts

Elbow pipes



90° elbows

Operating temperature:
-40 °C to +120 °C



Order No.	Fig.	Dimensions in mm (dimensions in inches)						Con- nection for
		b	c	d _i	d _a	e	l	
39 100 25 999	1	57	–	50	55	25	68	–
39 100 25 979	2	(2.24)	33 (1.30)	(1.97)	(2.17)	(0.98)	(2.68)	M 10x1
39 200 25 999	1	62	–	60	65	25	68	–
39 200 25 979	2	(2.44)	38 (1.50)	(2.36)	(2.56)	(0.98)	(2.68)	M 10x1
39 300 25 999	1	72	–	70	75	28	75	–
39 300 25 979	2	(2.83)	43 (1.69)	(2.76)	(2.95)	(1.10)	(2.95)	M 10x1
39 400 25 999	1	77	–	80	85	30	78	–
39 400 25 979	2	(3.03)	48 (1.89)	(3.15)	(3.35)	(1.18)	(3.07)	M 10x1
39 500 25 999	1	92	–	100	105	35	88	–
39 500 25 979	2	(3.62)	58 (2.28)	(3.94)	(4.13)	(1.38)	(3.46)	M 10x1
39 600 25 999	1	89	–	110	119	27	72	–
39 600 25 979	2	(3.50)	63 (2.48)	(4.33)	(4.69)	(1.06)	(2.83)	M 10x1
39 700 25 999	1	98.5	–	130	135	27	72	–
39 700 25 979	2	(3.88)	75 (2.95)	(5.12)	(5.32)	(1.06)	(2.83)	M 10x1
39 800 25 999	1	108.5	–	150	155	27	72	–
39 800 25 979	2	(4.27)	83 (3.27)	(5.91)	(6.10)	(1.06)	(2.83)	M 10x1

Air connecting parts

Connections

Straight connections

Operating temperature:
-40 °C to +120 °C

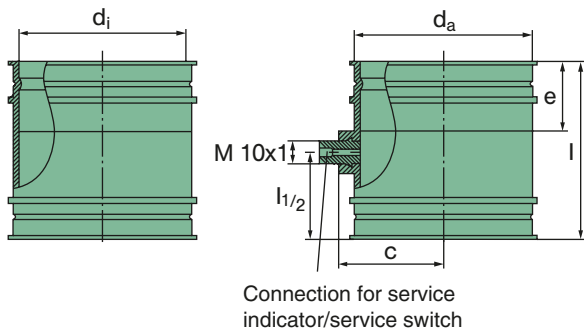


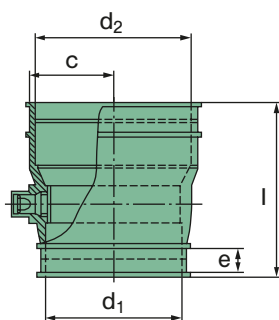
Fig. 1

Fig. 2

Order No.	Fig.	Dimensions in mm (dimensions in inches)					Con- nection for
		c	d _i	d _a	e	l	
39 100 27 999	1	–	50	55	25	68	–
39 100 27 979	2	33 (1.30)	50 (1.97)	55 (2.17)	25 (0.98)	68 (2.68)	M 10x1
39 200 27 999	1	–	60	65	25	68	–
39 200 27 979	2	38 (1.50)	60 (2.36)	65 (2.56)	25 (0.98)	68 (2.68)	M 10x1
39 300 27 999	1	–	70	75	28	75	–
39 300 27 979	2	43 (1.69)	70 (2.76)	75 (2.95)	28 (1.10)	75 (2.95)	M 10x1
39 400 27 999	1	–	80	85	30	78	–
39 400 27 979	2	48 (1.89)	80 (3.15)	85 (3.35)	30 (1.18)	78 (3.07)	M 10x1
39 500 27 999	1	–	100	105	35	88	–
39 500 27 979	2	58 (2.28)	100 (3.94)	105 (4.13)	35 (1.38)	88 (3.46)	M 10x1
39 600 27 999	1	–	110	119	27	72	–
39 600 27 979	2	63 (2.48)	110 (4.33)	119 (4.69)	27 (1.06)	72 (2.83)	M 10x1
39 700 27 999	1	–	130	135	27	72	–
39 700 27 979	2	75 (2.95)	130 (5.12)	135 (5.32)	27 (1.06)	72 (2.83)	M 10x1
39 800 27 999	1	–	150	155	27	72	–
39 800 27 979	2	83 (3.28)	150 (5.91)	155 (6.10)	27 (1.06)	72 (2.83)	M 10x1

Reducer connections

Operating temperature:
-40 °C to +120 °C



Order No.	Dimensions in mm (dimensions in inches)				
	c	d ₁	d ₂	e	l
39 300 27 949	43 (1.69)	70 (2.76)	80 (3.15)	13.5 (0.53)	89.5 (3.52)
39 300 27 959	43 (1.69)	70 (2.76)	60 (2.36)	13.5 (0.53)	85.5 (3.35)
39 300 27 969	43 (1.69)	70 (2.76)	50 (1.97)	13.5 (0.53)	85.5 (3.35)

Air connecting parts

Accordion hoses

Order No.	Dimensions in mm (dimensions in inches)				
	d _i	d _a	e	l _{min}	l _{max}
39 000 27 164	40 (1.57)	51 (2.01)	30+5 (1.18+0.20)	180 (7.09)	250 (9.84)
39 000 27 161	50 (1.97)	62 (2.44)	30+5 (1.18+0.20)	190 (7.48)	285 (11.22)
39 000 27 140	60 (2.36)	70 (2.76)	30+5 (1.18+0.20)	190 (7.48)	285 (11.22)
39 000 27 139	70 (2.76)	80 (3.15)	30+5 (1.18+0.20)	195 (7.68)	310 (12.20)
39 000 27 138	80 (3.15)	90 (3.54)	30+5 (1.18+0.20)	205 (8.07)	340 (13.39)
39 000 27 158	100 (3.94)	100 (3.94)	40+5 (1.57+0.20)	230 (9.06)	395 (15.55)
39 000 27 152	110 (4.33)	118 (4.65)	35+5 (1.38+0.20)	240 (9.45)	425 (16.73)
39 000 27 151	130 (5.12)	138 (5.43)	45+5 (1.77+0.20)	280 (11.02)	500 (19.69)
39 000 27 150	150 (5.91)	165 (6.50)	45+5 (1.77+0.20)	300 (11.81)	545 (21.46)

Accordion hoses with moulded-on end sleeves (standard model)

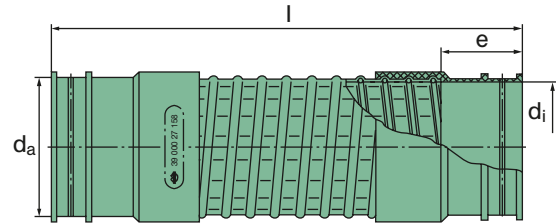
Material: TPO

Operating temperature:

-30 °C to +100 °C

Maximum curvature:

90° (depending on the vibration load)



Order No.	Dimensions in mm (dimensions in inches)			
	d _i	d _a	e	l
39 000 27 205	50 (1.97)	58 (2.28)	25 (0.98)	110±5 (4.33+0.20)
39 000 27 206	60 (2.36)	68 (2.68)	50 (1.97)	215±5 (8.46+0.20)
39 000 27 207	70 (2.76)	78 (3.07)	50 (1.97)	215±5 (8.46+0.20)
39 000 27 208	80 (3.15)	88 (3.46)	50 (1.97)	215±5 (8.46+0.20)
39 000 27 212	90 (3.54)	98 (3.86)	50 (1.97)	215±5 (8.46+0.20)
39 000 27 213	100 (3.94)	108 (4.25)	50 (1.97)	215±5 (8.46+0.20)
39 000 27 214	110 (4.33)	118 (4.65)	50 (1.97)	215±5 (8.46+0.20)
39 000 27 215	130 (5.12)	138 (5.43)	50 (1.97)	215±5 (8.46+0.20)
39 000 27 184	150 (5.91)	158 (6.22)	50 (1.97)	215±5 (8.46+0.20)
39 000 27 346	200 (7.87)	138 (5.43)	50 (1.97)	215±5 (8.46+0.20)

Accordion hoses (reinforced model)

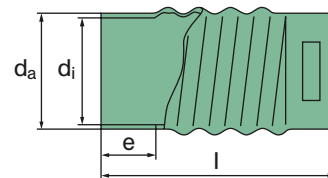
Material: rubber with fabric insert

Operating temperature:

-30 °C to +100 °C

Maximum curvature:

45° (depending on the vibration load)



Air connecting parts

Straight couplings in rubber

Order No.	Dimensions in mm (dimensions in inches)		
	d_i	d_a	l
39 000 27 203	40 (1.57)	52 (2.05)	100 (3.94)
39 000 27 202	50 (1.97)	63 (2.48)	100 (3.94)
39 000 27 171	60 (2.36)	74 (2.91)	100 (3.94)
39 000 27 198	60 (2.36)	74 (2.91)	150 (5.91)
39 000 27 197	70 (2.76)	84 (3.31)	150 (5.91)
39 000 27 252	70 (2.76)	84 (3.31)	80 (3.15)
39 000 27 196	80 (3.15)	96 (3.78)	150 (5.91)
39 000 27 950	80 (3.15)	96 (3.78)	75 (2.95)
39 000 27 195	90 (3.54)	106 (4.17)	150 (5.91)
39 000 27 103	100 (3.94)	116 (4.57)	75 (2.95)
39 000 27 104	100 (3.94)	116 (4.57)	100 (3.94)
39 000 27 194	100 (3.94)	118 (4.65)	150 (5.91)
39 000 27 193	110 (4.33)	126 (4.96)	150 (5.91)
39 000 27 359	110 (4.33)	128 (5.04)	75 (2.95)
39 000 27 188	130 (5.12)	148 (5.83)	100 (3.94)
39 000 27 192	130 (5.12)	148 (5.83)	150 (5.91)
39 000 27 297	130 (5.12)	148 (5.83)	65 (2.56)
39 000 27 183	150 (5.91)	166 (6.54)	150 (5.91)
39 223 27 111	150 (5.91)	168 (6.61)	100 (3.94)
39 000 27 182	180 (7.09)	198 (7.80)	150 (5.91)
39 000 27 345	200 (7.87)	218 (8.58)	200 (7.87)
39 000 27 306	210 (8.27)	228 (8.98)	200 (7.87)

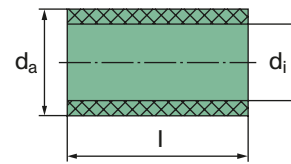
Straight couplings

Material:

rubber (NBR, 60±5 Shore)
with fabric insert

Operating temperature:

-30 °C to +100 °C



Air connecting parts

Elbow pipes in rubber

Order No.	Fig.	Dimensions in mm (dimensions in inches)			
		b	d ₁	d _a	r
39 000 25 280	1	115 (4.53)	52 (2.05)	60 (2.36)	75 (2.95)
39 000 25 264	1	115 (4.53)	60 (2.36)	68 (2.68)	75 (2.95)
39 000 25 263	1	140 (5.51)	70 (2.76)	79 (3.11)	90 (3.54)
39 000 25 262	1	140 (5.51)	80 (3.15)	90 (3.54)	95 (3.74)
39 000 25 258	2	205 (8.07)	100 (3.94)	110 (4.33)	155 (6.10)
39 000 25 265	2	215 (8.46)	110 (4.33)	120 (4.72)	165 (6.50)
39 000 25 266	2	265 (10.43)	130 (5.12)	140 (5.51)	210 (8.27)
39 000 25 267	2	300 (11.81)	150 (5.91)	160 (6.30)	245 (9.65)
39 000 25 270	2	355 (13.98)	200 (7.87)	210 (8.27)	300 (11.81)

90° elbows

Material:
rubber (NBR, 60±5 Shore)
with fabric insert

Operating temperature:
-30 °C to +100 °C

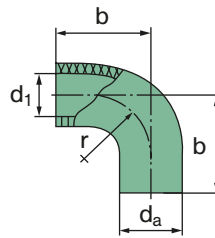


Fig. 1

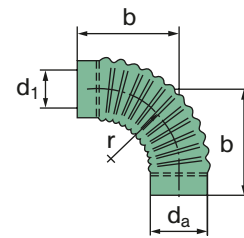
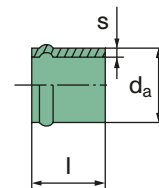


Fig. 2

Couplings in metal

Order No.	Dimensions in mm (dimensions in inches)		
	d _a	l	s
39 000 25 178	42 (1.65)	40 (1.57)	0.75 (0.03)
39 000 25 177	52 (2.05)	50 (1.97)	0.75 (0.03)
39 000 25 167	62 (2.44)	65 (2.56)	1.0 (0.04)
39 000 25 164	70 (2.76)	50 (1.97)	1.0 (0.04)
39 000 25 168	82 (3.23)	50 (1.97)	1.0 (0.04)
39 000 25 165	92 (3.62)	50 (1.97)	1.0 (0.04)
39 000 25 175	102 (4.02)	50 (1.97)	1.0 (0.04)
39 000 25 176	110 (4.33)	50 (1.97)	1.0 (0.04)
39 000 25 174	132 (5.20)	50 (1.97)	1.0 (0.04)
39 000 25 184	150 (5.91)	90 (3.54)	1.0 (0.04)
39 000 25 185	180 (7.09)	90 (3.54)	1.0 (0.04)

Couplings (black painted metal)

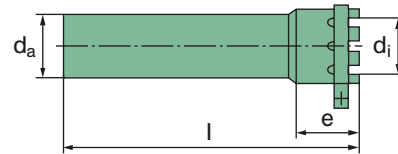


Air connecting parts

Connection pipes and couplings in metal

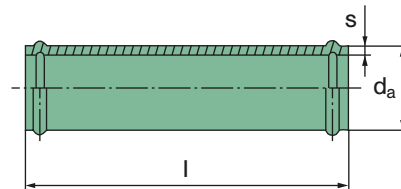
Order No.	Dimensions in mm (dimensions in inches)			
	d_i	d_a	e	l
31 028 25 831	62.2 (2.45)	62 (2.44)	60 (2.36)	225 (8.86)
31 056 25 821	82.2 (3.24)	82 (3.23)	80 (3.15)	245 (9.65)
31 080 25 731	102.2 (4.02)	102 (4.02)	80 (3.15)	250 (9.84)
39 100 25 991	110.2 (4.34)	110 (4.33)	110 (4.33)	200 (7.87)
31 100 25 983	110.2 (4.34)	110 (4.33)	110 (4.33)	400 (15.75)
31 160 25 771	132.2 (5.20)	132 (5.20)	110 (4.33)	400 (15.75)

Intermediate pipe (black painted metal)
only for dirty air intake



Order No.	Dimensions in mm (dimensions in inches)		
	d_a	l	s
39 000 25 172	42 (1.65)	500 (19.69)	0.75 (0.03)
39 000 25 182	52 (2.05)	500 (19.69)	0.75 (0.03)
39 000 25 162	62 (2.44)	500 (19.69)	0.75 (0.03)
39 000 25 163	70 (2.76)	500 (19.69)	0.75 (0.03)
39 000 25 173	82 (3.23)	500 (19.69)	0.75 (0.03)
39 000 25 158	92 (3.62)	500 (19.69)	0.75 (0.03)
39 000 25 183	102 (4.02)	500 (19.69)	0.75 (0.03)
39 000 25 166	110 (4.33)	500 (19.69)	0.75 (0.03)
39 000 25 157	132 (5.20)	500 (19.69)	0.75 (0.03)
39 000 25 155	150 (5.91)	500 (19.69)	0.75 (0.03)

Pipes (black painted metal)



Air connecting parts

Elbow pipes in metal

Order No.	Fig.	Dimensions in mm (dimensions in inches)				
		a	b	d _a	r	s
39 000 25 188	1	60 (2.36)	60 (2.36)	52 (2.05)	40 (1.57)	0.75 (0.03)
31 034 25 442	1	95 (3.74)	95 (3.74)	62 (2.44)	60 (2.36)	0.75 (0.03)
39 000 25 152	1	70 (2.76)	70 (2.76)	70 (2.76)	60 (2.36)	1.0 (0.04)
39 000 25 207	2	100 (3.94)	100 (3.94)	70 (2.76)	60 (2.36)	1.0 (0.04)
39 000 25 956	2	110 (4.33)	110 (4.33)	80 (3.15)	55 (2.17)	1.0 (0.04)
39 000 25 148	1	61 (2.40)	61 (2.40)	82 (3.23)	55 (2.17)	1.0 (0.04)
39 000 25 153	1	80 (3.15)	67 (2.64)	90 (3.54)	60 (2.36)	1.0 (0.04)
39 000 25 273	1	80 (3.15)	80 (3.15)	100 (3.94)	65 (2.56)	1.0 (0.04)
39 000 25 124	2	110 (4.33)	110 (4.33)	100 (3.94)	65 (2.56)	1.0 (0.04)
39 000 25 146	1	90 (3.54)	90 (3.54)	110 (4.33)	85 (3.35)	1.0 (0.04)
39 000 25 192	2	110 (4.33)	110 (4.33)	110 (4.33)	85 (3.35)	1.0 (0.04)
39 000 25 198	2	125 (4.92)	125 (4.92)	110 (4.33)	85 (3.35)	1.0 (0.04)
39 000 25 147	1	120 (4.72)	120 (4.72)	130 (5.12)	95 (3.74)	1.0 (0.04)
39 000 25 224	2	140 (5.51)	140 (5.51)	130 (5.12)	95 (3.74)	1.0 (0.04)
39 000 25 142	1	180 (7.09)	180 (7.09)	150 (5.91)	110 (4.33)	1.0 (0.04)
39 000 25 333	2	180 (7.09)	180 (7.09)	150 (5.91)	110 (4.33)	1.0 (0.04)

Metal elbow pipes (black painted metal)

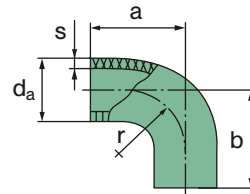


Fig. 1

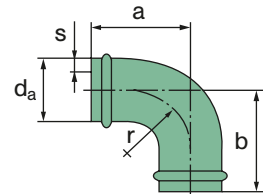


Fig. 2

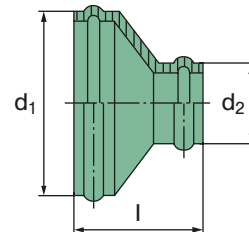


Air connecting parts

Adapter pieces in metal, hose clips

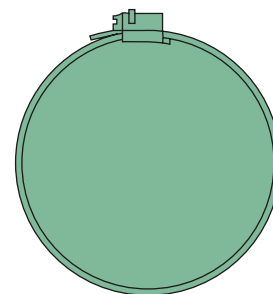
Order No.	Dimensions in mm (dimensions in inches)		
	d ₁	d ₂	l
39 000 25 621	70 (2.76)	40 (1.57)	65 (2.56)
39 000 25 622	70 (2.76)	60 (2.36)	56 (2.20)
39 000 25 631	80 (3.15)	50 (1.97)	65 (2.56)
39 000 25 431	82 (3.23)	70 (2.76)	56 (2.20)
39 000 25 461	100 (3.94)	70 (2.76)	75 (2.95)
31 080 25 511	102 (4.02)	80 (3.15)	76 (2.99)
39 000 25 295	110 (4.33)	80 (3.15)	75 (2.95)
39 000 25 193	110 (4.33)	100 (3.94)	70 (2.76)
39 000 25 105	132 (5.20)	102 (4.02)	71 (2.80)
39 000 25 253	132 (5.20)	110 (4.33)	76 (2.99)
39 000 25 325	150 (5.91)	130 (5.12)	86 (3.39)
39 000 25 145	180 (7.09)	150 (5.91)	95 (3.74)
39 000 25 327	200 (7.87)	150 (5.91)	105 (4.13)

Adapter pieces (black painted metal)



Order No.	Clamping range (diameter) [mm and inches]	Order No.	Clamping range (diameter) [mm and inches]
02 018 01 707	32 – 50 (1.26 – 1.97)	02 018 01 717	130 – 150 (5.12 – 5.91)
02 018 01 708	40 – 60 (1.57 – 2.36)	02 018 01 718	140 – 160 (5.51 – 6.30)
02 018 01 709	50 – 70 (1.97 – 2.76)	02 018 01 719	150 – 170 (5.91 – 6.69)
02 018 01 710	60 – 80 (2.36 – 3.15)	02 018 01 720	160 – 180 (6.30 – 7.09)
02 018 01 711	70 – 90 (2.76 – 3.54)	02 018 01 721	170 – 190 (6.69 – 7.48)
02 018 01 712	80 – 100 (3.15 – 3.94)	02 018 01 722	180 – 200 (7.09 – 7.87)
02 018 01 713	90 – 110 (3.54 – 4.33)	02 018 01 723	190 – 210 (7.48 – 8.27)
02 018 01 714	100 – 120 (3.94 – 4.72)	02 018 01 724	200 – 220 (7.87 – 8.66)
02 018 01 715	110 – 130 (4.33 – 5.12)	02 018 01 725	210 – 230 (8.27 – 9.06)
02 018 01 716	120 – 140 (4.72 – 5.51)	02 018 01 728	240 – 260 (9.45 – 10.24)

Hose clips



Exhaust ejectors

Maintenance-free dust scavenging with two-stage air cleaners

MANN+HUMMEL ejectors are designed to provide maintenance-free scavenging of the pre-separated dust in two-stage air cleaners. In addition to being maintenance-free, the ejectors achieve a significantly improved pre-separation efficiency of the two-stage air cleaner. This enables a considerably longer filter service life (up to 60%).

The ejector is fitted behind the exhaust silencer on the tailpipe. The flow energy of the exhaust gases generates a negative pressure in the ejector. This enables the pre-separated dust to be scavenged to the ejector and the dust is then blown out together with the exhaust gases.



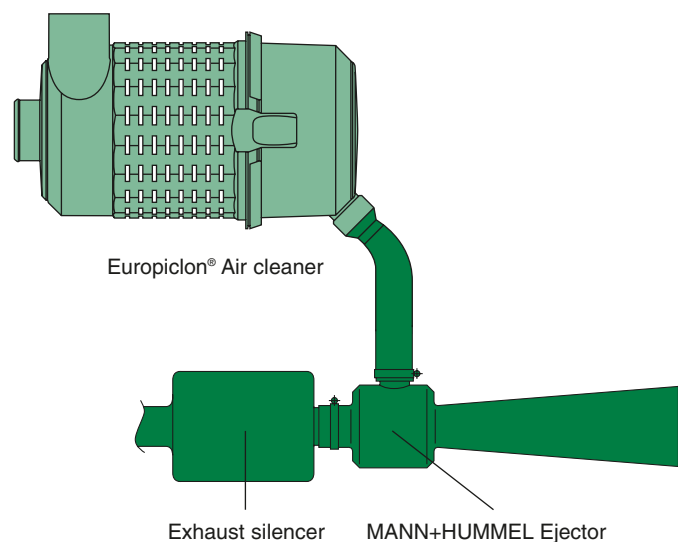
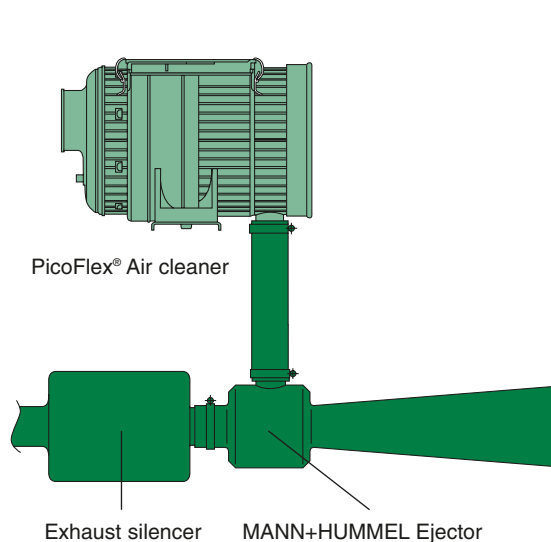
Installation instructions

The connection pipe between the air cleaner and ejector should be as short as possible and not have any tight elbows which would increase flow resistance. Coarse contaminant particles in the intake air (e.g. awns, fibres, stems or leaves) can lead to clogging in the air cleaner.

In order to avoid this, the scavenging should either be made in a closed area (cooling air shaft, scavenging under engine bonnet) or installed upstream with a basket sieve. When using an ejector, care should also be taken that the maximum permissible exhaust

back pressure specified by the engine producer is not exceeded. In addition, in all operational conditions there must be a pressure drop to the ejector in order to prevent exhaust gas being sucked in. In case of doubt we recommend use of a non-return adapter.

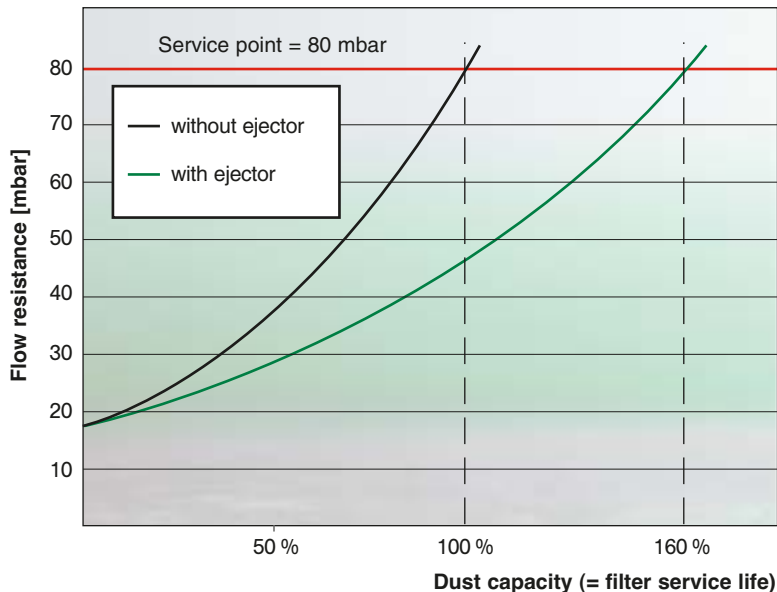
Installation examples



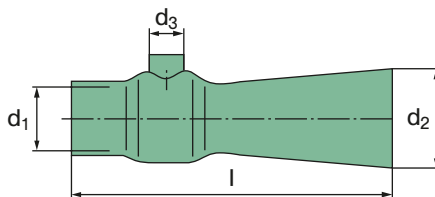
Exhaust ejectors

Significant extension of the air cleaner service life

The use of exhaust ejectors enables the service life of a two-stage air cleaner to be increased by 60%. This is demonstrated by the graphic pictured here which shows the typical flow characteristics for the dust capacity in relation to the increase in pressure drop.



Dimensions and order numbers



Order No.	Application [kW]	Suitable for				Dimensions in mm (dimensions in inches)			
		PicoFlex®	Europiclön®	NLG-Piclön	Piclön (metal)	d ₁	d ₂	d ₃	l
39 330 70 111	50 – 75	PicoFlex® 7	45 400 ...	–	45 225 ...	55.5 (2.19)	75 (2.95)	32 (1.26)	352 (13.86)
39 330 70 100	75 – 100	–	45 500 ...	–	45 325 ...	72.5 (2.85)	80 (3.15)	32 (1.26)	312 (12.28)
39 105 67 110	100 – 130	–	45 600 ...	NLG 15	45 440 ...	80.2 (3.16)	88 (3.46)	32 (1.26)	345 (13.58)
39 150 65 100	130 – 195	–	45 700 ...	NLG 21	45 650 ...	90.0 (3.54)	109 (4.29)	40 (1.57)	416 (16.38)
39 170 67 100	180 – 300	–	45 800 ...	NLG 28	45 880 ...	110.0 (4.33)	143 (5.63)	40 (1.57)	547 (21.54)

Accessories for ejectors

Order No.	Fig.
39 000 25 919	1
39 000 25 751	2

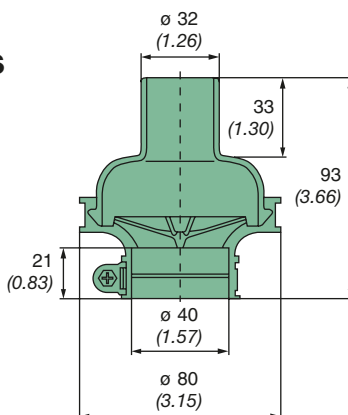


Fig. 1
Non-return adapter

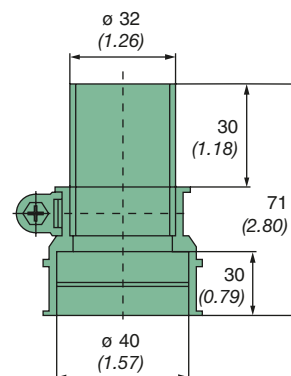


Fig. 2
Ejector adapter

Service indicators

Level of dirt accumulation readable at any time

The MANN+HUMMEL service indicator allows you to read the current level of dirt accumulation in the air cleaner, even when the engine is not in operation. The yellow indicating piston catches on a scale of 12 snap-in positions. In the triangular display, the remaining service life of the filter is displayed, in relation to the increased clogging of the filter element.

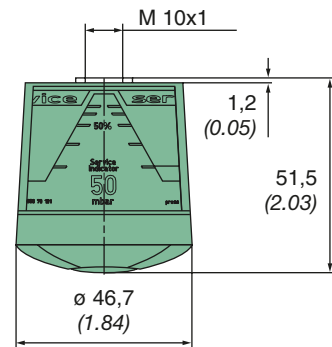


The service indicator is insensitive to the intake air pulsations of the engine, excluding the possibility of a false indication. Maintenance is necessary when the yellow piston reaches the red zone. After maintenance has been carried out, the indicator level is readjusted to "zero" by pressing the reset button.

Order No.	snaps into place at gauge pressure	
	[mbar]	[kPa]
39 035 70 911	35±3	3.5±0.3
39 050 70 911	50±4	5.0±0.4
39 060 70 911	60±4	6.0±0.4
39 065 70 911	65±5	6.5±0.5
39 080 70 911	80±5	8.0±0.5

Specifications

- Material: PC
- Permissible operating temperature: -30 °C to +100 °C
- Switching pressure (negative pressure): 35 mbar to 80 mbar (3.5 kPa to 8 kPa)



Service indicators with 90° flange

The 90° connecting flange allows nearly any fitting position. The red indicating piston snaps into position upon

reaching the maximum value possible, signalling that maintenance is needed. After maintenance has been

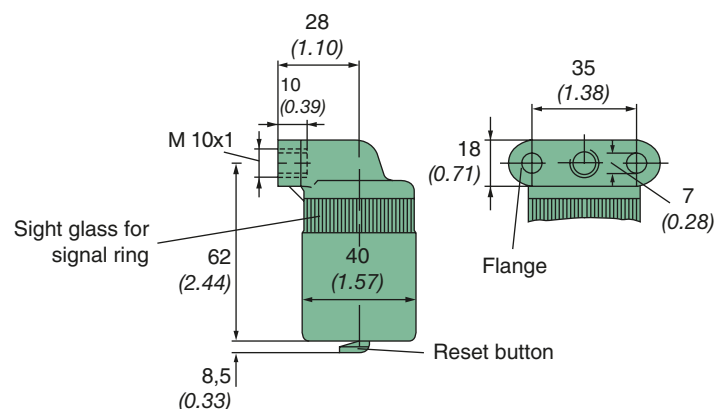
carried out, the indicating piston is readjusted to the start position by pressing the reset button.



Order No.	snaps into place at gauge pressure	
	[mbar]	[kPa]
39 000 62 924	35±3	3.5±0.3
39 000 62 925	50±6	5.0±0.6
39 000 62 926	65±7	6.5±0.7
39 000 62 927	80±8	8.0±0.8

Specifications

- Material: PA
- Permissible operating temperature: -40 °C to +100 °C
- Switching pressure (negative pressure): 35 mbar to 80 mbar (3.5 kPa to 8 kPa)



Service switches

Electrical monitoring of the level of accumulated dirt

The electrical service switch monitors the level of accumulated dirt in the air cleaner and sends an electrical signal when maintenance is required. This enables constant supervision of the state of the air cleaner and maintenance only takes place when it is really necessary.

This removes potential damage to equipment which may occur through frequent and careless maintenance actions.

Models

MANN+HUMMEL service switches are available with a number of different connection threads and plug connectors versions.



Technical instructions

Thanks to the completely insulated and fully enclosed contact insert, the switch is insensitive to dust or humidity. The system is not mechanical but pressure-dependent

so that possible tolerances of the components do not affect the accuracy of the switch. The heart of the system is a kick-over spring that makes readjustment of the switching

point unnecessary. The spring contacts are not affected by contact erosion. As a result of the hysteresis between the points for switching and switching back, contact

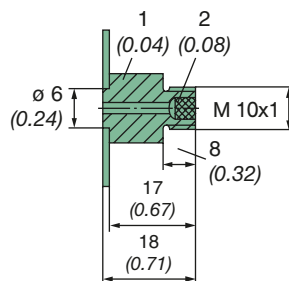
fluttering is reduced to a minimum. The service switch should not be fitted in a hanging position so as to prevent ingress of any condensed water into the air pipe.

Specifications

- Material: polyamide 6 GF 30
- Permissible operating temperature: -30 °C to + 120 °C
- Switching pressure (negative pressure): 35 mbar to 80 mbar (3.5 kPa to 8.0 kPa)
- Max. switching capacity: 6W/24V DC (ohmnic load, $U_{max} = 24V$, $I_{max} = 0,25 A$)

Accessories for external mounting

Installation examples: Connection on air cleaner (generally existing)

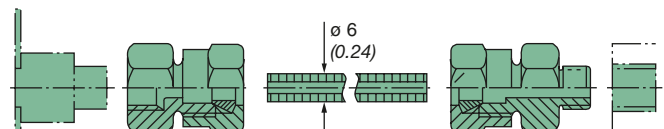


For retro-fitting in the clean air pipe

- 1 Connection nipple Order No. : 21 010 15 121
- 2 Felt disc Order No. : 23 005 31 171

Ensure that the felt disc is fitted to the nipple before installing.

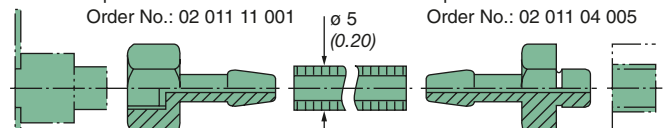
Parts for pipe connection



Pipe connector
Order No.: 02 011 11 001

Pipe connector
Order No.: 02 011 04 005

Parts for hose connection



Hose connector
Order No.: 39 000 47 211

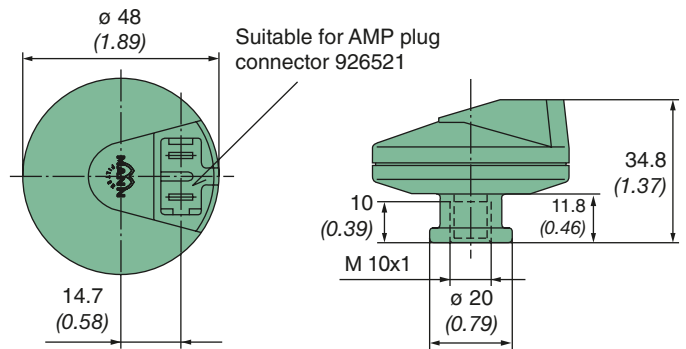
Hose connector
Order No.: 39 000 47 221

Service switches

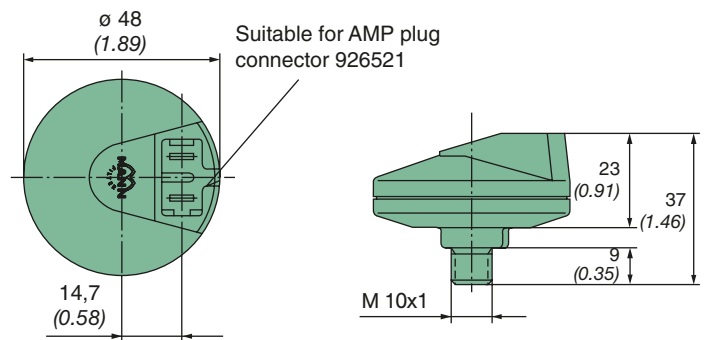
with connection for flat plug



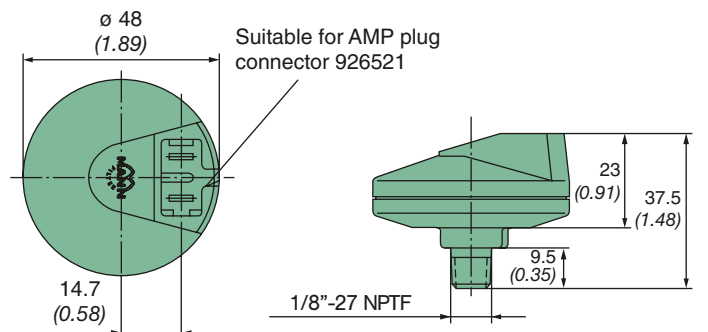
Service switch internal thread M 10x1		
Make contact Order No.	switches at gauge pressure	
	[mbar]	[kPa]
39 035 70 902	35±3	3.5±0.3
39 050 70 902	50±3	5.0±0.3
39 055 70 902	55±3	5.5±0.3
39 060 70 902	60±3	6.0±0.3
39 065 70 902	65±3	6.5±0.3
39 070 70 902	70±4	7.0±0.4
39 080 70 902	80±4	8.0±0.4



Service switch external thread M 10x1		
Make contact Order No.	switches at gauge pressure	
	[mbar]	[kPa]
39 035 70 952	35±3	3.5±0.3
39 050 70 952	50±3	5.0±0.3
39 055 70 952	55±3	5.5±0.3
39 060 70 952	60±3	6.0±0.3
39 065 70 952	65±3	6.5±0.3
39 070 70 952	70±4	7.0±0.4
39 080 70 952	80±4	8.0±0.4



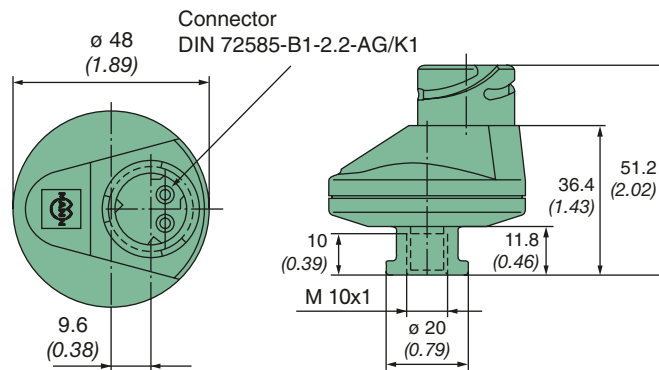
Service switch external thread 1/8"-27 NPTF		
Make contact Order No.	switches at gauge pressure	
	[mbar]	[kPa]
39 035 70 962	35±3	3.5±0.3
39 050 70 962	50±3	5.0±0.3
39 055 70 962	55±3	5.5±0.3
39 060 70 962	60±3	6.0±0.3
39 065 70 962	65±3	6.5±0.3
39 080 70 962	80±4	8.0±0.4



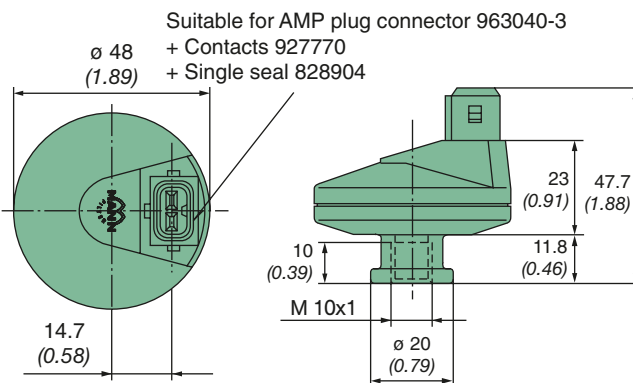
Service switches

for water-tight electrical connections

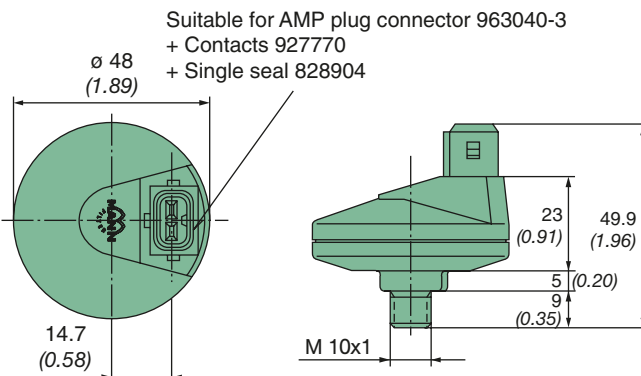
Service switch internal thread M 10x1		
Make contact Order No.	switches at gauge pressure	
	[mbar]	[kPa]
39 035 70 702	35±3	3.5±0.3
39 050 70 702	50±3	5.0±0.3
39 055 70 702	55±3	5.5±0.3
39 060 70 702	60±3	6.0±0.3
39 065 70 702	65±3	6.5±0.3
39 070 70 702	70±4	7.0±0.4
39 080 70 702	80±4	8.0±0.4



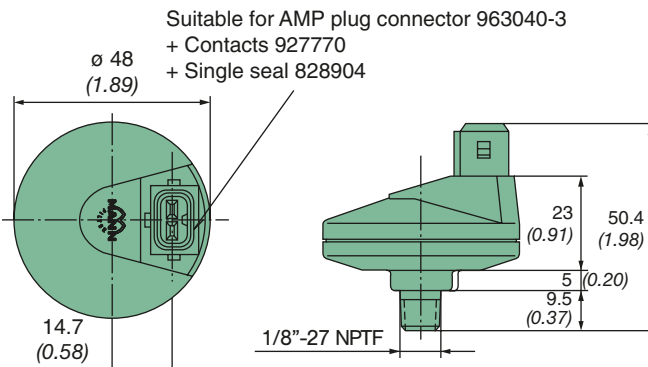
Service switch internal thread M 10x1		
Make contact Order No.	switches at gauge pressure	
	[mbar]	[kPa]
39 035 70 802	35±3	3.5±0.3
39 050 70 802	50±3	5.0±0.3
39 055 70 802	55±3	5.5±0.3
39 060 70 802	60±3	6.0±0.3
39 065 70 802	65±3	6.5±0.3
39 070 70 802	70±4	7.0±0.4
39 080 70 802	80±4	8.0±0.4



Service switch external thread M 10x1		
Make contact Order No.	switches at gauge pressure	
	[mbar]	[kPa]
39 035 70 852	35±3	3.5±0.3
39 050 70 852	50±3	5.0±0.3
39 055 70 852	55±3	5.5±0.3
39 060 70 852	60±3	6.0±0.3
39 065 70 852	65±3	6.5±0.3
39 070 70 852	70±4	7.0±0.4
39 080 70 852	80±4	8.0±0.4



Service switch external thread 1/8"-27 NPTF		
Make contact Order No.	switches at gauge pressure	
	[mbar]	[kPa]
39 035 70 862	35±3	3.5±0.3
39 050 70 862	50±3	5.0±0.3
39 055 70 862	55±3	5.5±0.3
39 060 70 862	60±3	6.0±0.3
39 065 70 862	65±3	6.5±0.3
39 070 70 862	70±4	7.0±0.4
39 080 70 862	80±4	8.0±0.4



MANN+HUMMEL



Technical Appendix

Glossary of filtration terms

Clean air pipe

Pipe after air cleaner through which cleaned air is fed to the engine/compressor etc.

CompacPlus®

MANN+HUMMEL brand name for a special filter element design with a linear air flow.

Dirty air intake

Dirty air pipe before the air cleaner through which ambient air (unfiltered) is sucked in.

DualSpin®

MANN+HUMMEL brand name for a precleaner line for use under heavy dust conditions.

Dust discharge valve

Valve on the housing of two-stage air cleaners which discharges the separated dust from the air cleaner housing.

Ejector

A component in the exhaust tract of the engine where a cross-section constriction (using the Venturi principle) generates a negative pressure for the continuous scavenging of the air cleaner.

Europiclon®

MANN+HUMMEL brand name for a two-stage air cleaner line in plastic.

Flow resistance Δp

[mbar] or [kPa]. Measured variable for the pressure drop of a filter.

Laboratory dust capacity

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

Laboratory service life

[h]. The time measured under laboratory conditions that an air cleaner with air flowing through it and loaded with dust will reach a defined flow resistance. The test dust, dust concentration and volume flow must be defined.

Main element

Also called the filter element or primary element. An air cleaner insert consisting of a filter medium and seal which effect the fine filtration in a dry air cleaner.

NLG

MANN+HUMMEL brand name for an air cleaner line in plastic. This line is available as a single-stage or two-stage air cleaner.

Nominal flow rate \dot{V}

Describes a design consideration for an air cleaner. Depending on the design or line the nominal flow rate describes the respective volume flow where the filter will show a pressure drop of 25 mbar to 30 mbar.

Piclon

MANN+HUMMEL brand name for a two-stage air cleaner line in metal or in general for a two-stage version of a dry air cleaner (e.g. NLG Piclon).



Pico

MANN+HUMMEL brand name for a single-stage air cleaner line in metal or in general for a single-stage version of a dry air cleaner (e.g. NLG Pico).

PicoFlex®

MANN+HUMMEL brand name for a two-stage air cleaner line in plastic with a highly efficient precleaner and CompacPlus® filter element.

Picolight

MANN+HUMMEL brand name for a single-stage air cleaner line without housing.

Picolino

MANN+HUMMEL brand name for a single-stage air cleaner line in plastic.

Precleaner

Centrifugal force separator to filter out particles from the intake air.

Pre-separation efficiency

[%]. Amount of dust separated in the first stage of a two-stage air cleaner.

Pulsation

Pressure oscillations in the intake channel of an engine or a compressor.

Secondary element

An additional air cleaner insert which is fitted downstream from the main element and which prevents ingress of dust into the clean air pipe during maintenance work or when the main element is defective.

Service indicator

Mounted device which indicates the time when to service.

Service life

[h]. Life of filter determined in the field before the filter needs servicing.

Service switch

Mounted device which triggers an electric signal when the time for a service is reached which in turn sets off an audio or visual warning signal.

Single-stage air cleaner

Air cleaner without pre-separation. Available with or without a secondary element.

Two-stage air cleaner

An air cleaner with an integrated filtration stage for pre-separation of dust from the intake air before subsequent fine filtration.

Volume flow V

[m³/min]. Quantity which flows through filter per unit of time, also called the volumetric flow.

Criteria for dimensioning the size of air cleaners

Separation efficiency

The most important task of a dry air cleaner is to ensure sufficient protection of the engine against wear under all possible dust conditions, i.e., the **separation efficiency** of the air cleaner must be of such a high standard that an engine fitted with it will demonstrate a wear pattern in dusty conditions similar to that of an engine running on completely particle-free intake air. The specification of an air cleaner's quality with respect to the quantity transmitted is indicated with the so-called **overall separation efficiency** η , which is

the ratio of all particles separated to the total quantity of particles fed to the air cleaner. MANN+HUMMEL dry air cleaners offer the following values for this characteristic when internationally recognised SAE coarse and SAE fine test dusts are used:

η SAE coarse $\geq 99,9\%$
 η SAE fine $\geq 99,5\%$

The correct definition of air cleaner quality with respect to the size of the largest particle allowed to pass through is provided by fractional separation efficiencies; these indicate a filter's separation performance in relation to the

particle size. The values shown in Fig. 1 apply to MANN+HUMMEL dry air cleaners and were obtained on test rigs using SAE test dusts. Note the high probability of separation found even

for 1 μm particles, and the virtually certain separation of particles larger than 3 μm in size. The values given above are valid for the entire design range under test rig conditions.

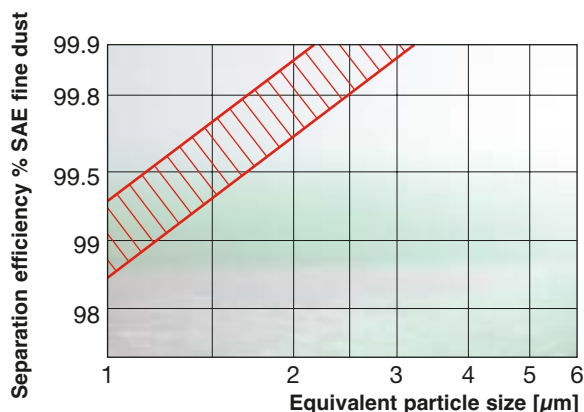


Fig. 1: Separation efficiencies

Service life

Another important requirement for dry air cleaners is, in addition to specified separation efficiencies, a high dust-holding capacity. This quality factor – also referred to as service life – can be defined in terms of the quantity of dust taken up by the filter within a given increase in air-flow resistance.

In order to ensure a high dust-holding capacity, the paper pleats are provided with surface contours that maintain clearance, guarantee an unhindered flow of dust-laden air into the pleats, and simultaneously prevent the pleats from sticking together.

Specification of filter size

Step 1: Determine the air requirement

The size of the air cleaner depends primarily on the maximum air requirement (V) of the engine. Please ask your equipment and engine manufacturers.

The air requirement can also be determined from the engine data, i.e. piston-swept volume, rotational speed, number of cylinders and volumetric efficiency, by using the following equation (1):

4 stroke engines:

$$(V) = \frac{\text{swept volume} \cdot \text{rotational speed} \cdot \text{volumetric efficiency}}{2 \cdot 1000} \left[\frac{\text{m}^3}{\text{min}} \right]$$

2 stroke engines:

$$(V) = \frac{\text{swept volume} \cdot \text{rotational speed} \cdot \text{volumetric efficiency}}{1 \cdot 1000} \left[\frac{\text{m}^3}{\text{min}} \right]$$

with swept volumes in [dm^3], rotational speed in [min^{-1}]

Equation (1): Air requirement (V)

Use a factor of 0.9 for the volumetric efficiency of 4-stroke and 0.7 for 2-stroke S.I. engines. For turbocharged engines, please consult the manufacturer for the volumetric efficiency.

Specification of filter size

Step 2: Determine the pulsation factors

With a small number of cylinders, flow pulsations occur in the intake system. The corresponding varying velocities must be taken into account when determining the size of the filter. The use of so-called pulsation factors (Fig. 2) can be used to overcome this problem.

No. of cylinders	Pulsation factors for dry air cleaners (aspirating engines)		
	4 stroke engines	2 stroke engines	Piston compressors ¹⁾
1	2	1.5	1.5
2	1.4	1.2	1.2
3	1.3	1.1	1.1
4	1.1	1	1
5 and more	1	1	1

¹⁾ The pulsation factor is 2.0 for all grab-controlled compressors

No. of cylinders	Pulsation factors for oil-bath cleaners	
	4 stroke engines	2 stroke engines
1	3	2
2	2	1.4
3	1.4	1.2
4	1.2	1.1
5 and more	1	1

Fig. 2: Pulsation factors

Step 3: Determine the design flow rate

With 1-4 cylinders, the air requirement obtained above must be multiplied with the corresponding pulsation factor to determine the filter size. This results in the following equation (2):

$$\text{Design flow rate} = \text{air requirement} \cdot \text{pulsation factor} \left[\frac{\text{m}^3}{\text{min}} \right]$$

with air requirement in [m³/min]

Equation (2): Design flow rate

For naturally aspirated engines with 5 or more cylinders, and for all turbocharged engines, the air requirement corresponds to the design flow rate of the filter, i.e., the

filter size is specified directly with the determined design flow rate (m³/min). The **nominal flow rate of the filter** (m³/min) is a deciding factor for the air cleaner size.

Example 1:

3 cylinder 4 stroke Diesel engine
Swept volume 1.7 dm³
Rotational speed: 2100 rpm

1. Air requirement after equation (1)

$$\dot{V} = 1.7 \cdot 2100 \cdot 0.9 / 2000$$

$$\dot{V} = 1.6 \text{ m}^3/\text{min}$$

2. Pulsation factor from the table

Dry air cleaner
3 cylinder, 4 stroke engine
Pulsation factor = 1.3

3. Design flow rate after equation (2)

$$\dot{V} = 1.6 \text{ m}^3/\text{min} \cdot 1.3$$

$$\dot{V} = 2.1 \text{ m}^3/\text{min}$$

Result:
The design flow rate of the engine is 2.1 m³/min.

Estimation of the design flow rate based on engine performance

If necessary data is not available for the previous calculation, the air requirement can be estimated using the following approximations:

Diesel engines*
1 kW approx. 0.08 m³/min
(1 HP approx. 0.06 m³/min)

Turbocharged Diesel engines*
1 kW approx. 0.09 m³/min
(1 HP approx. 0.065 m³/min)

Petrol engines*
1 kW approx. 0.07 m³/min
(1 HP approx. 0.05 m³/min)

* We can assume that modern Diesel and petrol engines which fulfil the exhaust emission regulations of today and tomorrow will have an increase in the air requirement of around 10%.

Example 2:

Turbocharged Diesel engine acc. to Euro 3 with 107 kW power

$$\dot{V} = (107 \cdot 0.09) + 10 \%$$

$$\dot{V} = 9.63 + 10 \%$$

$$\dot{V} = 10.6 \text{ m}^3/\text{min}$$

Defining the dust capacity

All MANN+HUMMEL air cleaners are tested on special test benches. The resulting data allows a uniform basis for comparison for the dust capacity of the various filter types and sizes.

This offers true comparison possibilities for filters from different sources and enables a service life estimation for use in practice.

On the following pages the mean value curves of the effective dust-holding capacity for the described filters are illustrated based on the nominal volume flow (V).

These values relate to a standard SAE C test dust with an exactly defined particle size distribution and were determined with a dust concentration of 1 g/m³. Here one can speak of a so-called laboratory service life.

In order to calculate the working service life in hours or driving kilometres from the laboratory dust-capacity data for a given dry air cleaner, the dust concentration prevailing in practice must be known. Extensive tests have led to the overview on this page (Fig. 3):

Mean dust concentration in	[mg/m ³]
Truck in normal European road traffic:	0.6
Truck in road traffic outside Europe:	3
Off-highway truck (construction site use):	8
Buses with intake at the rear in normal European road traffic:	5
Buses with intake at the rear in road traffic outside Europe:	30
Construction machines (front-end loaders, track vehicles, mobile compressors):	35
Sweeping vehicles:	8
Agricultural machines in central Europe (agriculture without periods of drought):	5
Agricultural machines in areas outside Europe in single operation:	15
Agricultural machines used in fleets:	50
Quick-moving track vehicles:	100

Fig. 3: Dust concentrations in practice

Calculation of hours of operation in practice

Equation (3) is used in order to calculate the hours of operation in practice from the laboratory dust capacities:

$$\text{Hours in practice} = \frac{\text{laboratory dust capacity} \cdot 1000}{\text{dust concentration} \cdot \text{air requirement} \cdot 60}$$

with dust capacity in [g]
dust concentration in [mg/m³]
air requirement in [m³/min]

Equation 3: Hours of operation

Using equation (4) it is possible to calculate the driving kilometres from the hours of operation:

$$\text{Driving kilometres} = \text{hours of operation} \cdot \text{speed}$$

with speed in km/h

Equation 4: Driving kilometres

Example 3:

A construction machine with an air requirement of 12 m³/min is equipped with a filter with a laboratory dust capacity of 5800 g. The expected hours of operation are to be calculated.

According to equation (3):

$$\text{Hours of operation} = \frac{5800 \cdot 1000}{35 \cdot 12 \cdot 60}$$

Hours of operation = 230 hours



Defining the dust capacity

Application example

Vehicle data	Engine data	Requirements
Vehicle type: tractor Location: Central Europe, but designed for use in harvesting fleet	Fuel: Diesel Type: aspirating engine Engine capacity: 5.3 dm ³ Nominal rot. speed: 2300 rpm No. cylinders: 4	Initial resistance: 30 mbar max. End resistance: 65 mbar max Required service life: min. 200 operating hours

Step 1: Defining the air requirement

According to equation (1):

$$\dot{V} = \frac{5.3 \cdot 2300 \cdot 0.9}{2 \cdot 1000}$$

$$\dot{V} = 5.49 \text{ m}^3/\text{min}$$

Step 2: Determining the pulsation factors

From Fig. 2 we can see:

No. of cylinders	Pulsation factors for dry air cleaners (aspirating engines)		
	4 stroke engines	2 stroke engines	Piston compressors ¹⁾
1	2	1.5	1.5
2	1.4	1.2	1.2
3	1.3	1.1	1.1
4	1.1	1	1
5 and more	1	1	1

Step 3: Defining the design flow rate

Acc. to equation (2):

$$\dot{V} = 5.49 \text{ m}^3/\text{min} \cdot 1.1$$

$$\dot{V} = 6.0 \text{ m}^3/\text{min}$$

Step 4: Filter recommendation

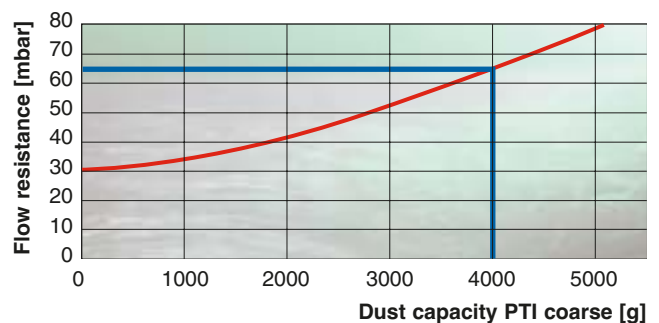
Due to the operating conditions a **Europiclon® 300** is recommended with a secondary element and a small dust discharge valve.

Order No:
45 300 92 911

In the resistance diagram on page 25 the initial pressure drop of the filter can be read to be 30 mbar.

Step 5: Laboratory dust capacity from the diagram

From the diagram on page 25 a dust capacity of 4000 g can be read.



Step 6: Dust concentration in practice

Acc. to Fig. 3 "Dust concentrations" there is a concentration of 50 mg/m³ for fleet operations.

Step 7: Calculation of hours in practice

According to equation (3):

$$\text{Hours in practice} = \frac{4000 \cdot 1000}{50 \cdot 6,0 \cdot 60}$$

$$\text{Hours in practice} = 222 \text{ hours}$$

General instructions for installation and maintenance

Filter installation

There are a number of important points to be observed when installing dry air cleaners:

- The temperature stability of MANN+HUMMEL filter elements covers $-40\text{ }^{\circ}\text{C}$ to $+80\text{ }^{\circ}\text{C}$ in continuous operation with short peaks of up to $+100\text{ }^{\circ}\text{C}$ (e.g. due to heating up from the switched-off engine).
- The filters should be fitted as close to the engine as possible and should be easily accessible for servicing.
- Enough room must be left for filter element removal.
- Service indicators should be clearly visible, and in some cases service switches are recommended with external service displays.
- The air cleaner should be installed in such a way that the clean air pipes (the connection between air cleaner and engine) do not need to be removed under any circumstances during air cleaner or engine servicing.
- Avoid positioning the air cleaner in an area where water is splashed or a lot of dust is raised (e.g. in areas where the wheels spray).
- The air cleaner should be mounted on the vehicle frame or some sturdy body component. The matching brackets shown on page 105 to 107 are recommended for this purpose. If the air cleaner is subjected to heavy impacts, it should be installed on an elastic mounting.
- The air cleaner should be installed where it is protected against collision damage (observe the gradient of slope). This is especially valid for off-road vehicles.

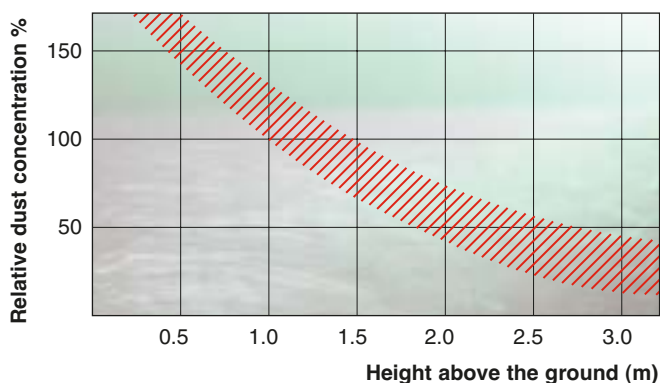
Air intake

- The air intake should be located in a low-dust area. This generally means as high as possible and, for on-road vehicles, as far forward as possible (see Fig. 4).
- The air intake should not be where the wheels spray or under the floor.
- Screening against the entrance of water (e.g. while the vehicle is being washed) and rainfall is required. Rain caps are recommended.
- The intake of hot air (e.g. radiator cooling air) and exhaust gases should be avoided. Intake of exhaust soot drastically shortens the air cleaner service intervals.
- The intake openings should be as large as possible. Intake-flow velocities should not exceed 3 m/sec .

Air pipes

- Only use suitable material for these pipes. This applies in particular to the clean air pipe. MANN+HUMMEL accessories fulfil these requirements.
- The line cross sections should not be selected smaller than the connection cross sections on the air cleaner.
- Due to their being attached to different parts of the vehicle (engine, chassis, driver's cab), the connection pieces in the air intake system are subject to relative movement. This should be compensated by fitting flexible intermediate links between the air intake pipes. Spiral and rubber accordion hoses are recommended for this purpose. The pipes are not to be welded to the inlet and outlet connections on the air cleaner. Rubber hoses are also recommended for these connections.
- Pipes should be fitted to avoid damage from scuffing, melting of rubber hoses on hot exhaust components or damage through other causes, such as stones thrown up from vehicle wheels. When fitting these dirty air pipes, care should be taken to ensure that water pockets cannot form. Drain points must be provided if necessary.

Fig. 4: Dust concentration depending on the position of the air intake



General instructions for installation and maintenance

Clean air pipes

The clean air pipes must be airtight. Leaky clean air pipes allow dirt to bypass the filter and enter the engine, causing premature wear. Therefore, particular attention should be paid to the clean air pipes. The following points should be observed:

- The clean air pipes should be as short as possible and use the least number of joints.
- The material used for the pipes must retain its shape and remain airtight during operation (it is a vacuum system). This applies in particular to all flexible connections. Fabric-ply rubber hoses retain their shape well and are also sufficiently resistant to oil, fuel, ozone and weather and are adequately temperature-resistant.
- Hose clamps for securing the connecting elements must be sufficiently wide and strong, and must not cut into the hoses. In the closing area they should be designed so that no folding of the hose is possible.
- Pipes and couplings must not have any rough welding or casting seams, or overlapping metal. Connecting sleeves for mounting rubber hoses or elbows should be provided with a sealing bead. The length of overlap must be sufficient (at least 30 mm).

- Self-made clean air pipes should be descaled and varnished on the inside before being fitted.
- Clean air pipes must be checked for leaks at regular intervals. Faulty connection components must be replaced.

Servicing

An air cleaner service becomes necessary when the MANN+HUMMEL filter element is exhausted. The following basic principles should be observed:

- Always select the service point according to the service indicator or service switch. A regular inspection or cleaning of the element, as is sometimes practised in the field, is more likely to be damaging than useful as there is a risk that the element will be damaged and that dust will gain access to the engine.
- **MANN+HUMMEL always recommends exchanging the filter element in order to avoid damage and ensure maximum engine protection.**
- If, however, cleaning cannot be avoided, care should be taken that the filter element is not washed out.
- In order to clean, position a pipe with an end bent by approx. 90° on the end of compressed-air pistol. The pipe must be long enough to reach to the bottom of the filter element. Carefully blow out the filter element with dry compressed air (max. 5 bar) from the inside to the outside, or from the clean air side to the dirty air side until there is no more development of dust. The end of the pipe must not touch the element (see Fig. 5).
- Next, carefully examine the filter for possible damage.
- Never beat or knock the filter element as this will damage it and there will be a danger of damage to the engine.
- Please note that the secondary element is never cleaned, but must be always replaced.
- Please note that a cleaned element will never match the service life and performance of a new element.

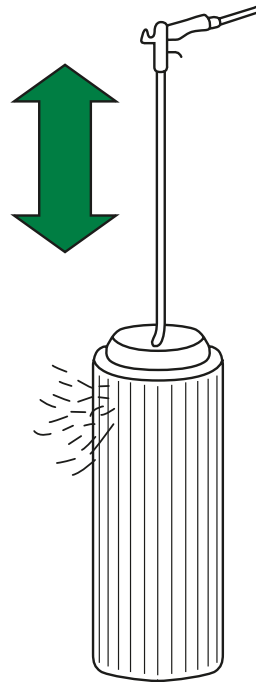


Fig. 5: Cleaning the main element

- After servicing the filter element carefully wipe out the inside of the housing and the seal contact surface with a moist cloth. Take care that no dust or dirt gains access to the clean air side of the air cleaner.
- When fitting the filter element take care that it is correctly positioned in the housing so that the function of the seals is not impaired.
- Please note that engine damage can cause considerable costs and stoppage times which can make the cost of a new filter element appear insignificant.
- There are detailed maintenance instructions available for the various filter lines from MANN+HUMMEL which offer detailed instructions on the correct maintenance of your filter. Please ask us – and we will be happy to answer your questions.

MANN+HUMMEL Industrial Filters worldwide

HEADQUARTERS

MANN+HUMMEL GMBH
Business Unit Industrial Filters
Brunckstr. 15
67346 Speyer, Germany
Tel.: +49 (6232) 53-80
Fax: +49 (6232) 53-88 99
E-Mail: if.info@mann-hummel.com
Internet: www.mann-hummel.com



EUROPE

United Kingdom

MANN+HUMMEL (UK) LTD
Business Unit Industrial Filters
Suite 12, 30 Churchill Square
Kings Hill, West Malling, Kent, ME19 4YU
Tel.: +44 1732 846522
Fax: +44 1732 870673
E-Mail: uk.info@mann-hummel.com
Internet: www.mann-hummel.com/mhuk

France

MANN+HUMMEL FRANCE S.A.S.
Z.I. du Val d'Argent
11, rue Jean Poulmarch
95100 Argenteuil
Tel.: +33 1 30258242
Fax: +33 1 30258259
E-Mail: anne.laurin@mann-hummel.com
Internet: www.mann-hummel.com/mhfr

Italy

MANN+HUMMEL GMBH
Direzione Commerciale Italia
P.O. Box 126, Via Nazario Sauro, 1
23100 Sondrio (SO)
Tel.: +39 0342 2112 70
Fax: +39 0342 2106 90
E-Mail: it.info@mann-hummel.com
Internet: www.mann-hummel.com

Spain / Portugal

MANN+HUMMEL IBERICA S.A.U.
C/ Pertusa n° 8, Polig. Industrial PLA-ZA,
parcela ALI 7,3
50197 Zaragoza
Tel.: +34 (976) 287 300
Fax: +34 (976) 287 418
E-Mail: mhes_fi@mann-hummel.com
Internet: www.mann-hummel.com/mhes

Czech Republic

MANN+HUMMEL (CZ) s.r.o.
Nová Ves č. 66
67521 Okříšky
Tel.: +420 568 898 111
Fax: +420 568 898 314
E-Mail: cz.info@mann-hummel.com
Internet: www.mann-hummel.com/mhcz

Russia

MANN+HUMMEL GMBH
Regional Office
Konenkova Str. 11 A
127560 Moskau
Tel.: +7 095 742 7976
Fax: +7 095 742 7988
E-Mail: oleg.paratnov@mann-hummel.com
Internet: www.mann-filter.ru

MANN+HUMMEL Industrial Filters worldwide

NORTH AMERICA

USA / Canada

MANN+HUMMEL USA, INC.
6400 South Sprinkle Road
Portage Michigan, 49002-8720
Tel.: +1 (269) 329-7200
Fax: +1 (269) 329-7201
E-Mail: info-us@mann-hummel.com
Internet: www.mann-hummel.com/mhus

Mexico

MANN+HUMMEL MEXICO S.A. DE C.V.
Validad el Pueblito No. 104
Parque Industrial Queretaro
Santa Rosa Jauregui
Santiago de Queretaro, Queretaro, C.P. 76220
Tel.: +52 442 103 1100
Fax: +52 442 103 1103
E-Mail: infomx@mann-hummel.com
Internet: www.mann-hummel.com/mhmx

ASIA / AUSTRALIA

Australia

MANN+HUMMEL AUSTRALIA (PTY) LTD.
15/10 Chilvers Road
Thornleigh, NSW 2120
Tel.: +61 2 9484 4300
Fax: +61 2 9484 4175
E-Mail: info@mann-hummel.com.au
Internet: www.mann-hummel.com

India

MANN+HUMMEL
FILTER TECHNOLOGY (S.E.A.) PTE LTD.
India Representative Office
#346, 1st Floor, 3rd Cross
8th 'A' Main, 4th Block
Koramangala
560034 Bangalore
Tel.: +91 80 5121 7111
Fax: +91 80 2553 8584
E-Mail: ajith.nair@mann-hummel.com
Internet: www.mann-hummel.com.sg

Japan

MANN+HUMMEL WAKO CO. LTD.
Shin Yokohama Daiichi Bldg 2F
2-14-27, Shin Yokohama
Kohoku-ku, Yokohama-shi Kanagawa-ken 222-0033
Tel.: +81 (45) 470-4611
Fax: +81 (45) 470-0812
E-Mail: info@mann-hummel-wako.com
Internet: www.mann-hummel.com

SOUTH AMERICA

Argentina

MANN+HUMMEL Argentina S.A.
Sdor. Francisco Quindimil 4425/95
B1822APC Valentín Alsina
Buenos Aires
Tel.: +54 11 4208 1200
Fax: +54 11 4228 6691
E-Mail: info@mann-hummel.com.ar
Internet: www.mann-hummel.com/mhar

Brazil

MANN+HUMMEL Brasil Ltda.
Caixa Postal 210
Alameda Filtros Mann 555
CEP 13330-970 Indaiatuba-SP
Tel.: +55 19 3894 94 00
Fax: +55 19 3894 51 31
E-Mail: marketec@mann-hummel.com.br
Internet: www.mann-hummel.com.br

China

MANN+HUMMEL FILTER TRADING
(SHANGHAI) CO.,LTD.
Huadu Mansion, Floor 24/A-F,
No. 838, Zhangyang Road, Pudong
Shanghai 200122
Tel.: +86 21 58 20 1086
Fax: +86 21 58 20 6015
E-Mail: infomhcn@mann-hummel.com
Internet: www.mann-hummel.com

Singapore

MANN+HUMMEL FILTER TECHNOLOGY
(S.E.A.) PTE LTD.
3 Toh Tuck Link
#03-01/02/03 German Districentre
596228 Singapore
Tel.: +65 6586 8181
Fax: +65 6586 8180
E-Mail: mhsg@mann-hummel.com.sg
Internet: www.mann-hummel.com.sg

Conversion table

Pressure

5 mbar	=	0.5 kPa	=	2 " H ₂ O
10 mbar	=	1.0 kPa	=	4 " H ₂ O
15 mbar	=	1.5 kPa	=	6 " H ₂ O
20 mbar	=	2.0 kPa	=	8 " H ₂ O
25 mbar	=	2.5 kPa	=	10 " H ₂ O
30 mbar	=	3.0 kPa	=	12 " H ₂ O
35 mbar	=	3.5 kPa	=	14 " H ₂ O
40 mbar	=	4.0 kPa	=	16 " H ₂ O
45 mbar	=	4.5 kPa	=	18 " H ₂ O
50 mbar	=	5.0 kPa	=	20 " H ₂ O
55 mbar	=	5.5 kPa	=	22 " H ₂ O
60 mbar	=	6.0 kPa	=	24 " H ₂ O
62.5 mbar	=	6.3 kPa	=	25 " H ₂ O
65 mbar	=	6.5 kPa	=	26 " H ₂ O
70 mbar	=	7.0 kPa	=	28 " H ₂ O
75 mbar	=	7.5 kPa	=	30 " H ₂ O
80 mbar	=	8.0 kPa	=	32 " H ₂ O

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
1000 g	=	1 kg = 35.3 ounces = 2.2 lb
2000 g	=	2 kg = 70.5 ounces = 4.4 lb
3000 g	=	3 kg = 105.8 ounces = 6.6 lb
4000 g	=	4 kg = 141.1 ounces = 8.8 lb
5000 g	=	5 kg = 176.4 ounces = 11.03 lb
10000 g	=	10 kg = 22.05 lb
20000 g	=	20 kg = 44.1 lb
50000 g	=	50 kg = 110.23 lb

Volume flow m³/min → 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 cfm → m³/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
1000 cfm	=	28.3 m ³ /min
1500 cfm	=	42.5 m ³ /min
2000 cfm	=	56.6 m ³ /min
3000 cfm	=	85.0 m ³ /min

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

Power

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
1000 kW	=	1341.0 HP

A selection of catalogues for **MANN+HUMMEL** Industrial Filters



ProVent®

The line for crankcase ventilation

Catalogue order no.
19 944 10 100 de
19 944 10 101 en
19 944 10 102 fr
Further languages on request.

Filters for liquids

Spin-on filters
Fuel filters
In-line filters

Catalogue order no.
19 942 10 100 de
19 942 10 101 en
19 942 10 102 fr

Further languages on request.



Air/oil separators for compressors and vacuum pumps

Air/oil separator elements
Air/oil separator boxes

Catalogue order no.
19 943 00 100 de
19 943 00 101 en
19 943 00 102 fr
Further languages on request.



MANN-FILTER

Filter elements in OEM quality for construction and agricultural machines:

- Air cleaners
- Oil filters
- Fuel filters
- Hydraulic filters
- Cabin filters

Catalogue order no.
19 939 24 600 Multi-lingual



MANN+HUMMEL Industrial Filters

The MANN+HUMMEL Group is an international company with its headquarters in Ludwigsburg, Germany. The group employs approx. 9100 people worldwide at more than 40 locations.

The company develops, produces and sells technically complex components for the

automotive industry and many other fields. A key area is high quality filtration products for vehicles, engines and industrial applications. The OEM business with global market leaders and producers of vehicles, machines and installations defines the quality and performance of the group. Filters for the

international aftermarket are sold under numerous international brands as well as under the MANN-FILTER brand.

The Industrial Filters Business Unit with its headquarters in Speyer, Germany is specialised in meeting the requirements of off-highway vehicle

and - engine applications, compressed air and vacuum technology, 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.



MANN+HUMMEL GMBH, Business Unit Industrial Filters
 67346 Speyer, Germany, Telephone +49 (62 32) 53-80, Fax +49 (62 32) 53-88 99
 E-Mail: if.info@mann-hummel.com, Internet: www.mann-hummel.com