



BEKO Products

CLEARPOINT®



Filtration



# The efficiency concept for compressed-air filtration

CLEARPOINT®: the filter generation with the 3E effect



## Make use of saving potentials

### The CLEARPOINT® principle for the reduction of energy and operating costs

During compressed-air processing, the highest saving potential lies in the reduction of the energy costs: depending on the capacity utilisation of the plant, these amount to up to 80% of the total costs. The energy consumption is significantly influenced by the filtration of the compressed air: the pressure drop resulting from filtration needs to be compensated by higher compressor performance to maintain the required operating pressure. The consequences are higher energy demand, premature compressor wear and thus higher costs.

With the CLEARPOINT® compressed-air filter series for volume flows from 35 to 34,680 m³/h (at 7 bar), an economic concept for efficient compressed-air filtration is now available. Through innovative filter elements and a flow-optimised, corrosion-protected housing construction, CLEARPOINT® offers safe and reliable filtration, and qualitatively better compressed air at significantly reduced operating costs.

### + The advantages at a glance

Reduction of the operating costs, increased profitability during operation

Easy installation, reliable operation

Easy maintenance

Demand-oriented – from 25 microns to 0.01 micron

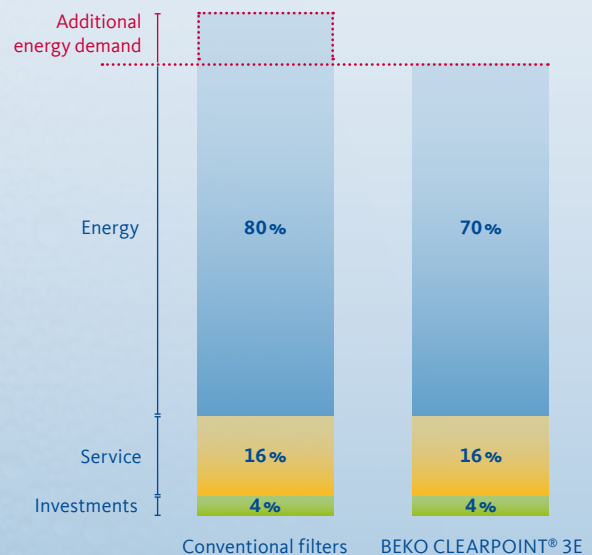
Range of performance from 35 to 34,680 m³/h at 7 bar

Fast replacement of filter elements



### Savings with 3E by lower differential pressure

A plus for productivity and the environment  
(energy savings = CO<sub>2</sub> reduction)



# The medium decides

## Filtration with 3E: extra efficient

With a unique fibre structure and a new manufacturing technology, the filter elements of the CLEARPOINT® series set new standards in compressed-air filtration. For decades, conventional filter media have been manufactured with the addition of binding agents. These can settle on the fibres of the filter medium and reduce the air flow. As a consequence, the pressure difference will be increased.

## Optimised material and method

In the new CLEARPOINT® 3E filter elements (3E = Energy Efficient Element), the use of binding agents is fully avoided. For the new medium, micro-fine borosilicate fibres and polyester fibres are firmly thermally fused with each other. Here, a high amount of fibres with a smaller diameter ensures a finer fibre structure. The material thus offers a separation surface which is four times larger than the separation surface of conventional filter media, and a larger cavity volume. The long-term stable composition of

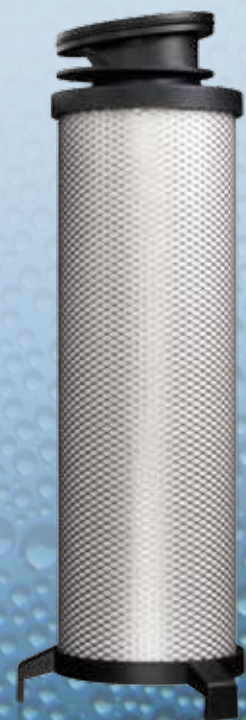
the fibres ensures high separation efficiency over the full depth of the filter bed and provides long-term support to the dirt retention capacity. Furthermore, this structure enables excellent fluid mechanics and thus additionally reduces the pressure difference. The results are significant energy savings at maximum filtration performance.

## Performance comparison: ISO 12500

The performance data of the CLEARPOINT® 3E filter elements which are offered for different applications and filtration degrees were tested and validated by an independent institution in accordance with the new international filter standard ISO 12500.



	Old filter material	New filter material
Borosilicate fibres	2 ... 10 µm	< 2 µm
Separation area	100 %	400 ... 500 %
Cavity volume	95 %	98 %
Material volume	5 %	2 %
Max. temperature	120 °C	80 °C
Max. temperature (1 h)		100 °C
Mechanical stability through	Binding agents	Thermally fused borosilicate and polyester fibres
Material emissions	Possible	Impossible



## Pressure difference and cost reduction

The decisive factor for the determination of the life-cycle costs of compressed-air filters is the direct energy consumption resulting from the differential pressure. As regards the new CLEARPOINT® 3E filter elements, this pressure difference is particularly low. The energy consumption thus decreases by up to 40%.

The saving potential is particularly evident when considering that with the reduction of the pressure difference by 1 bar up to 10% less current is required for the operation of the compressors of a 7-bar plant. With an installed compressor performance of 132 kW, a utilisation of 8,000 operating hours per annum and electricity costs of 8 cents per kWh, € 8,448 could be saved each year in this manner.

### CLEARPOINT® 3E (Energy Efficient Element)

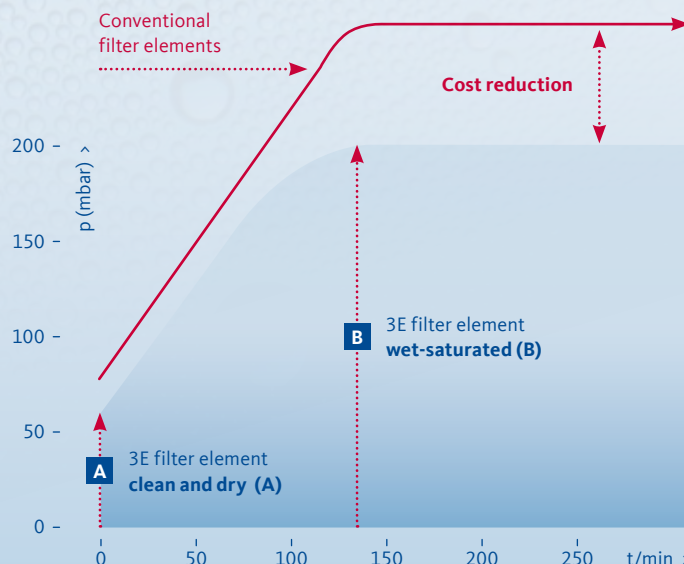
- › Max. 0.2 bar pressure difference (wet-saturated, for an energy-optimised volume flow)
- › Performance-optimised: volume flow higher by up to 30%
- › Validated in accordance with ISO 12500
- › With BEKOMAT® 20 FM (filter management) or float drain
- › Max. operating temperature: 60°C
- › Max. operating pressure: 16 bar (L204-L304: 10 bar, optional 16 bar)
- › Filters for natural gas (CNG) upon request

### + The 3E performance features

Performance-optimised: volume flow higher by up to 30%	Improved separation performance	Low flow resistance through an optimised interior and exterior stainless steel supporting cylinder
Tested and validated in accordance with ISO 12500	High dirt retention capacity	Energy-optimised pressure difference
	No intrinsic particle release	



**Pressure difference of a 3E filter element**  
Super-fine filter S type – dry and wet-saturated



### Full filter performance

The specifications regarding the pressure difference in dry condition (A), customary in the market, say little in practice, as the wet-saturated condition, meaning the full load of the drainage layer (B), is often already reached after only a few hours.

Even in this comparatively unfavourable condition, the highly-efficient 3E filter material causes an energy-optimised pressure difference of merely 0.05 to 0.2 bar (coarse to ultrafilter).





## Validated quality

Compressed-air quality is classified in accordance with ISO 8573-1. To meet the quality requirements for the respective case of application, filters with defined separation features are employed. For the assessment of the filter materials, ISO 12500 is available. This standard describes the test methodology regarding the determination of the efficiency of the retainment of particles and aerosols. The validation in accordance with ISO12500 allows both the classification of the efficiency and the comparison

with other filter materials. In addition, it can be calculated by means of the separation capacity and the inlet conditions which compressed-air quality in accordance with ISO 8573-1 can be achieved. The CLEARPOINT® 3E filter elements were validated by an independent institute in accordance with ISO 12500 – with outstanding results as far as the efficiency and pressure difference are concerned.

Quality class	Solid particles, max. amount of particles per m <sup>3</sup>			Pressure dew point °C at 7 bar	Oil (incl. oil vapour) mg/m <sup>3</sup>
	0.1–0.5 µm	0.5–1.0 µm	1.0–5.0 µm		
1	≤ 20,000	≤ 400	≤ 10	≤ –70	≤ 0.01
2	≤ 400,000	≤ 6,000	≤ 100	≤ –40	≤ 0.1
3	–	≤ 90,000	≤ 1,000	≤ –20	≤ 1.0
4	–	–	≤ 10,000	≤ +3	≤ 5
5	–	–	≤ 100,000	≤ +7	> 5
6	≤ 5 mg/m <sup>3</sup>			≤ +10	–

### Air qualities in accordance with ISO 8573-1/2010:

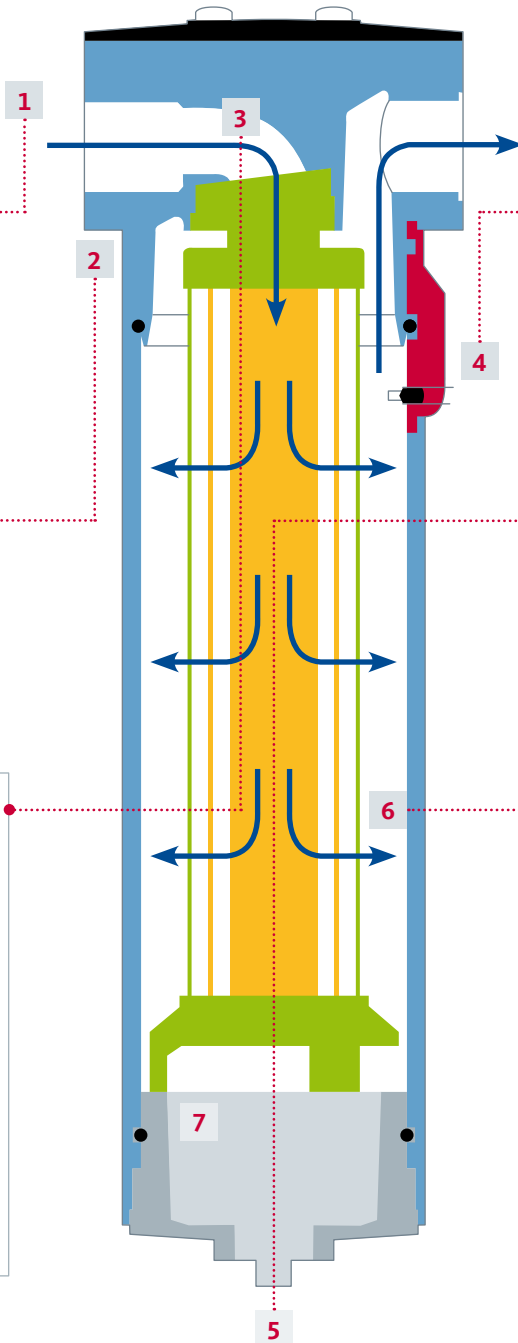
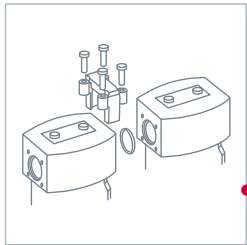
Depending on the filtration stage, the requirements of ISO 8573-1 are minimally met or are even exceeded. Therefore, you can firmly rely on CLEARPOINT® filters.

### Compressed-air quality CLEARPOINT® 3E

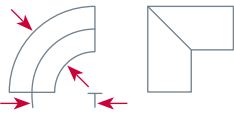
Filter element	Type	C (coarse filter)	G (universal filter)	F (fine filter)	S (super-fine filter)	N (nanofilter)
Particles and residual oil content	Achievable class in accordance with DIN ISO 8573-1	4	3	2	1	1
Residual oil content at 20°C and 1 bar	Inlet	20 mg/m <sup>3</sup>	10 mg/m <sup>3</sup>	5 mg/m <sup>3</sup>	2 mg/m <sup>3</sup>	2 mg/m <sup>3</sup>
	Outlet	5 mg/m <sup>3</sup>	1 mg/m <sup>3</sup>	0.1 mg/m <sup>3</sup>	0.01 mg/m <sup>3</sup>	0.005 mg/m <sup>3</sup>
Initial pressure difference for an energy-efficient flow	Wet-saturated	0.05 bar	0.12 bar	0.15 bar	0.2 bar	> 0.2 bar
	Dry	0.03 bar	0.04 bar	0.05 bar	0.06 bar	0.08 bar

In the case of a deviating operating pressure, please multiply the indicated volume flow by the corresponding correction factor.

Bar	0.3	0.6	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Correction factor	0.21	0.29	0.38	0.53	0.65	0.76	0.84	0.92	1	1.07	1.13	1.19	1.25	1.31	1.36	1.41	1.46	1.51



**More profitability**



Connec- tion	bend, R=d	angle, 90°
3/8"	0.2	0.8
1/2"	0.3	1.0
3/4"	0.3	1.2

Flow resistance of an angle at equivalent pipe lengths in mm

**Effective corrosion protection**

Aluminium (1999)

Aluminium, chro-  
matised (2000)

Aluminium, cathodic  
dip-coating (2001)

Saltwater-proof aluminium,  
anodised (2002)

**BEKO**

Resistant in a salt spray test in hours >  
(DIN 50021)

200 400 600 800 1,000

# CLEARPOINT® threaded filter connection (up to 3,120 m<sup>3</sup>/h)

1

## Connections

The threaded end fittings of the CLEARPOINT® compressed-air filters are, compared with those of other filter brands, generously dimensioned and are optimally aligned with the connections of the different compressor manufacturers. Energy-guzzling constrictions are therefore a thing of the past. Through the innovative connection method, the full cross-section will also be maintained when combining several CLEARPOINT® compressed-air filters.

2

## Filter elements

CLEARPOINT® filter elements are employed without cross-section-reducing and disturbing tension anchor. This reduces the flow resistance and also diminishes the space required for the element replacement to one-third of what is required otherwise, which is particularly advantageous in limited space conditions. The innovative push-fit design of the elements allows easy and fast replacement. An O-ring seal at the upper cap and three supports in the lower part of the housing keep the element securely and tight in position.

3

## More profitability

Up to 75% less resistance; more profitability. The new flow-optimised supply saves energy costs.

4

## Increased safety

The safe shutter mechanism offers a 100% control when opening the filter housing. In the event that the housing is opened under pressure, a warning signal sounds. The shutter mechanism also prevents unlatching as a result of vibration.

5

## External hexagon

An external hexagon for easy opening of the filter housing.

6

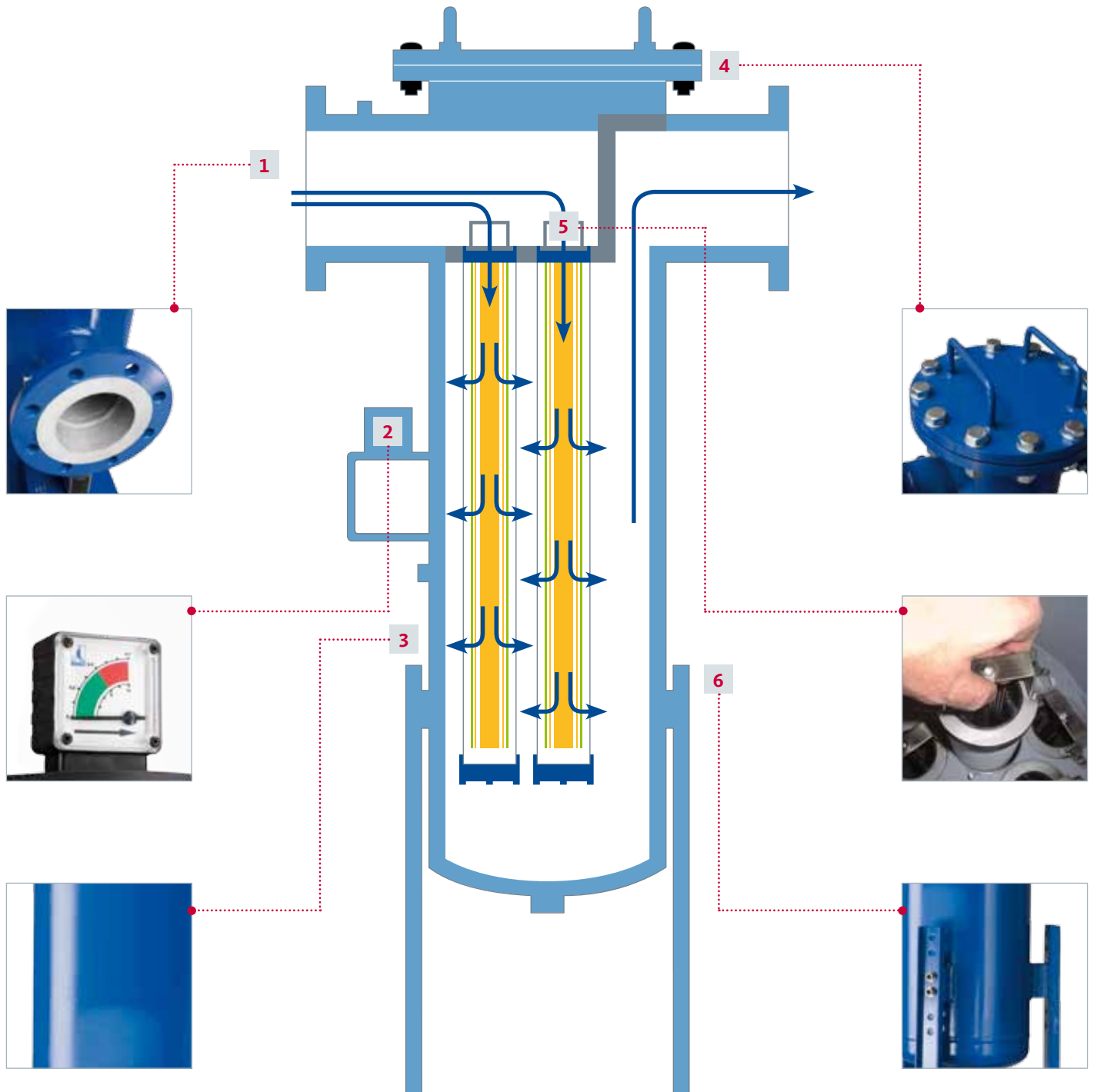
## Effective corrosion protection

Condensate accumulating during compressed-air filtration is almost always aggressive, so that unprotected housings corrode. CLEARPOINT® filter housings are made of saltwater-proof aluminium and, in addition, are fully anodised. This increases the operational safety because corrosion cannot develop on the clean-air side; the ultimate consumer is therefore protected. Moreover, the permanently smooth surface reduces the flow resistance.

7

## Condensate quiet zone

A generously-dimensioned condensate quiet zone prevents the entrainment of already separated condensate.





# CLEARPOINT® filters with a flanged connection

## (1,420 bis 34,680 m<sup>3</sup>/h)

1

### Connections

The filter housing has two one-level compressed-air connections enabling easy installation in existing pipeworks.

2

### Differential manometer

To be able to also optically monitor the contamination degree of the filter elements when the housings are closed, all filters can be optionally equipped with a differential manometer which is readable from both sides. The scaled indication can be used for the direct energy-cost analysis.

3

### Housings

BEKO flanged-filter housings receive full-bath galvanising according to the high-temperature method. Prior to the galvanising process, the housings are subject to alkaline degreasing and pickling, which results in high-grade inside and outside surface protection.

4

### Easy to maintain

As regards the CLEARPOINT® flanged filters, the replacement of filter elements is easily undertaken from the top. The inconvenient dismantling of condensate drains is therefore no longer necessary.

To open the filter housing, only the upper blank flange is loosened, except for one remaining flange screw which is then used like a pivot joint. In smaller filter sizes, the blank flange can easily be fully removed.

5

### Filter element

The large surface of the filter elements reduces the air velocity to energetically favourable values. The cavity volume of the polyfibre filter material of 98% ensures lowest pressure loss. With this, the cross-sectional area free for the through-flow is many times larger in CLEARPOINT® filters.

6

### Installation option

As an alternative to usual suspended mounting, the housing can also be base mounted. Seat plates welded-on radially enable the optional mounting of feet which can be anchored on the floor.



Flanged and threaded filters with BEKOMAT®



High-pressure filter  
up to 50 bar



High-pressure filter  
100 to 500 bar



Water separator

## The overall concept for individual requirements: CLEARPOINT® high-pressure filters, water separators and drains

The CLEARPOINT® compressed-air filters are part of an integrated overall concept for professional compressed-air processing. They therefore offer all advantages of the BEKO technology for more efficiency and profitability: function-optimised components in connection with a quality without compromises.

### Performance under high pressure

CLEARPOINT® high-pressure filters are available for an operating pressure of up to 50 bar and for 100 to 500 bar. The construction of the filter housing is, in all details, designed to meet the special challenges in high-pressure systems and ensures optimum separation performance.

### Efficient condensate management

CLEARPOINT® water separators for the employment at aftercoolers and refrigeration dryers achieve an efficiency of up to 99% over a wide volume spectrum due to the flow-optimised design. Through this, they guarantee highest separation rates at lowest costs.

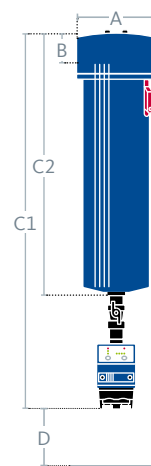
### Optimum performance in a combination

The electronically level-controlled BEKOMAT® 20 FM condensate drain is specifically designed for the employment in combination with CLEARPOINT® compressed-air filters. Besides the known reliable draining functions of a BEKOMAT®, further advantages result from this combination like an integrated filter service life monitoring or the transmission of trouble indications via a potential-free contact.



## CLEARPOINT® threaded filter

Model	S040	S050	S055	S075	M010	M012	M015	M018	M020	M022	M023	M025	M027	M030	M032
Connection (in inches)	3/8	1/2	1/2	3/4	1	1	1 1/2	1 1/2	2	2	2	2 1/2	2 1/2	3	3
Volume flow 7 bar (m³/h), performance-oriented	46	85	130	195	260	325	415	545	780	1,015	1,325	1,690	2,100	2,520	3,120
Volume flow 7 bar (m³/h), energy-optimised	35	65	100	150	200	250	320	420	600	780	1,020	1,300	1,620	1,940	2,400
Volume (l)	0.25	0.31	0.42	0.87	1.12	1.26	2.52	2.97	3.40	4.23	5.24	13.88	16.49	19.51	23.24
Weight (kg)	0.75	0.85	1.20	1.70	2.10	2.20	4.10	4.50	5.10	6.10	7.10	19.9	22.6	25.9	29.9
Category in accordance with PED 97/23/EC, fluid group 2	-	-	-	-	-	-	-	-	I	I	I	II	II	II	II



### Dimensions in mm

A	75	75	75	100	100	100	146	146	146	146	146	260	260	260	260
B	28	28	28	34	34	34	48	48	48	48	48	77	77	77	77
C1	395	425	480	495	565	600	580	633	683	780	898	886	990	1010	1260
C2	180	210	265	280	350	385	365	418	468	565	683	671	775	895	1045
D	150	150	150	150	150	150	160	160	160	160	160	200	200	200	200

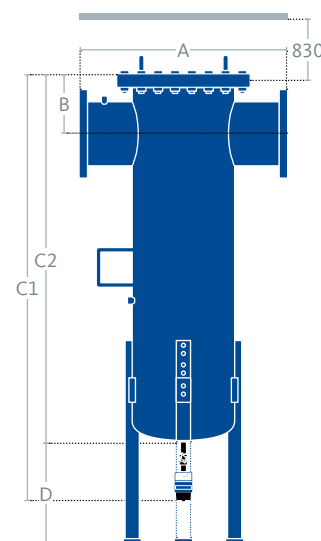
**Threaded filter (S040–M032):** flow-optimised housing made of saltwater-proof aluminium, high-grade corrosion protection through complete anodisation, additionally powder-coated outside, max. operating overpressure 16 bar. All volume-flow indications are based on 1 bar absolute and 20°C.

## CLEARPOINT® flanged filters

Model	L080	L100	L102	L150	L156	L200	L204	L254	L304
PN16 DIN 2633	DN80	DN100	DN100	DN150	DN150	DN200	DN200	DN250	DN300
Volume flow 7 bar (m³/h), performance-oriented	1,580	3,160	4,740	6,320	11,060	12,640	15,800	22,120	34,680
Volume flow 7 bar (m³/h), energy-optimised	1,420	2,840	4,260	5,680	9,940	11,360	14,200	19,880	31,240
Volume (l)	22	40	63	66	95	120	160	265	407
Weight (kg)	58	68	93	120	130	160	175	260	365
Category in accordance with PED 97/23/EC, fluid group 2	II	II	II	II	II	III	III	III	IV

### Dimensions in mm

A	490	540	540	600	600	710	710	880	990
B	173	200	208	233	238	273	273	246	312
C1	1.350	1.399	1.420	1.470	1.478	1.553	1.570	1.607	1.750
C2	1.134	1.183	1.204	1.254	1.262	1.337	1.354	1.391	1.534
D	330	330	460	460	460	460	460	460	460

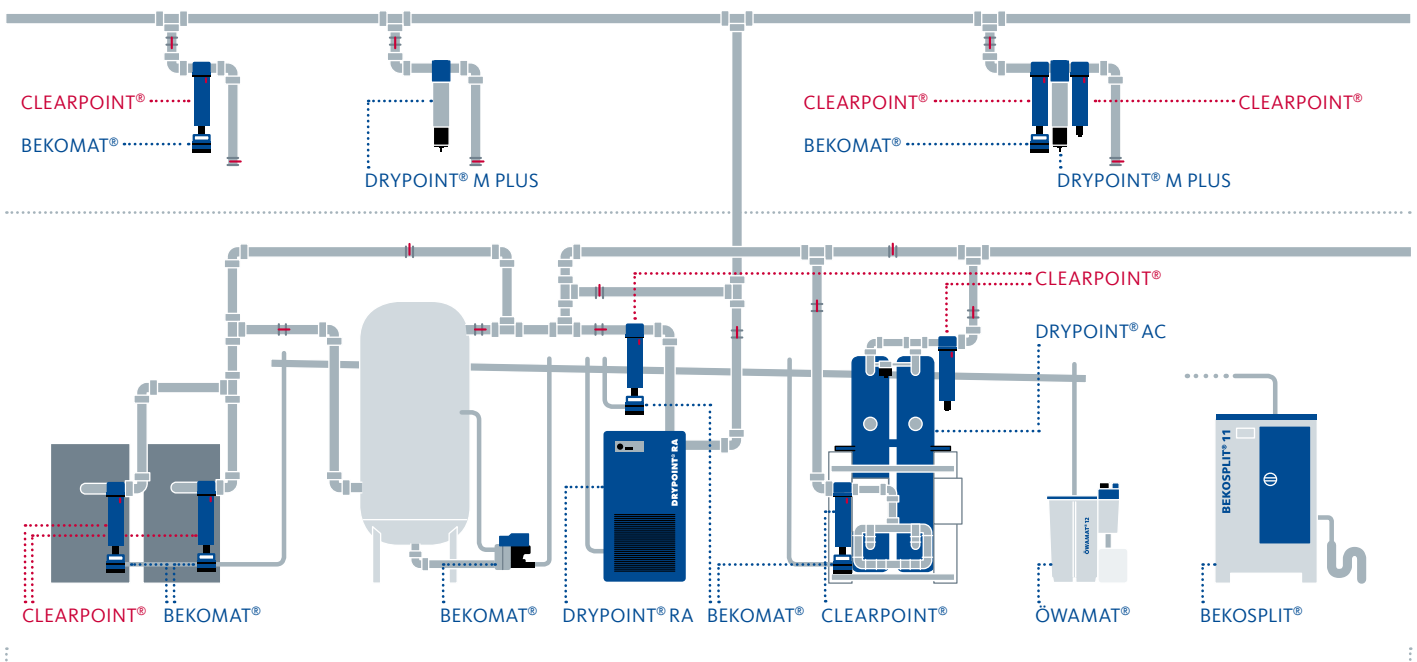


**Flanged filters (L080–L304):** housing made of carbon steel, element take-up made of stainless steel, manufacture/testing in accordance with PED 97/23/EC/AD2000, painted outside, flanges in accordance with DIN 2633 for 16-bar operating overpressure (from L204 onwards max. 10 bar) with BEKOMAT®, feet optional. All volume-flow indications are based on 1 bar absolute and 20°C.


## Quality with a system. Worldwide

We at **BEKO TECHNOLOGIES** develop, manufacture and distribute products and systems for an optimised compressed-air and compressed gas quality throughout the world. From the processing of compressed air and compressed gas through filtration and drying, via the proven condensate technology to instruments for the quality supervision and measurement. From small compressed-air applications to demanding process technology.

Since its founding, **BEKO** has continuously given decisive innovation to compressed-air technology. Our pathbreaking ideas have exerted considerable influence on the development. In order to keep this going, more than 10% of our employees work in the field of product development. With this potential and with our personal commitment, we at **BEKO** stand for trend-setting technologies, products and services.



## The product categories

 <b>Filtration   CLEARPOINT®</b>	 <b>Condensate drainage   BEKOMAT®</b>	 <b>Compressed-air distribution BEKOFLOW®</b>
The performance spectrum of the CLEARPOINT® filters ranges from 35 to 34,680 m³/h; includes threaded and flanged filters as well as high-pressure filters up to 500 bar.	 <b>Condensate processing ÖWAMAT®   BEKOSPLIT®</b>	 <b>Measurement technology METPOINT®</b>
	 <b>Drying   DRYPOINT®</b>	 <b>Process technology BEKOBLIZZ®   BEKOKAT®</b>



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