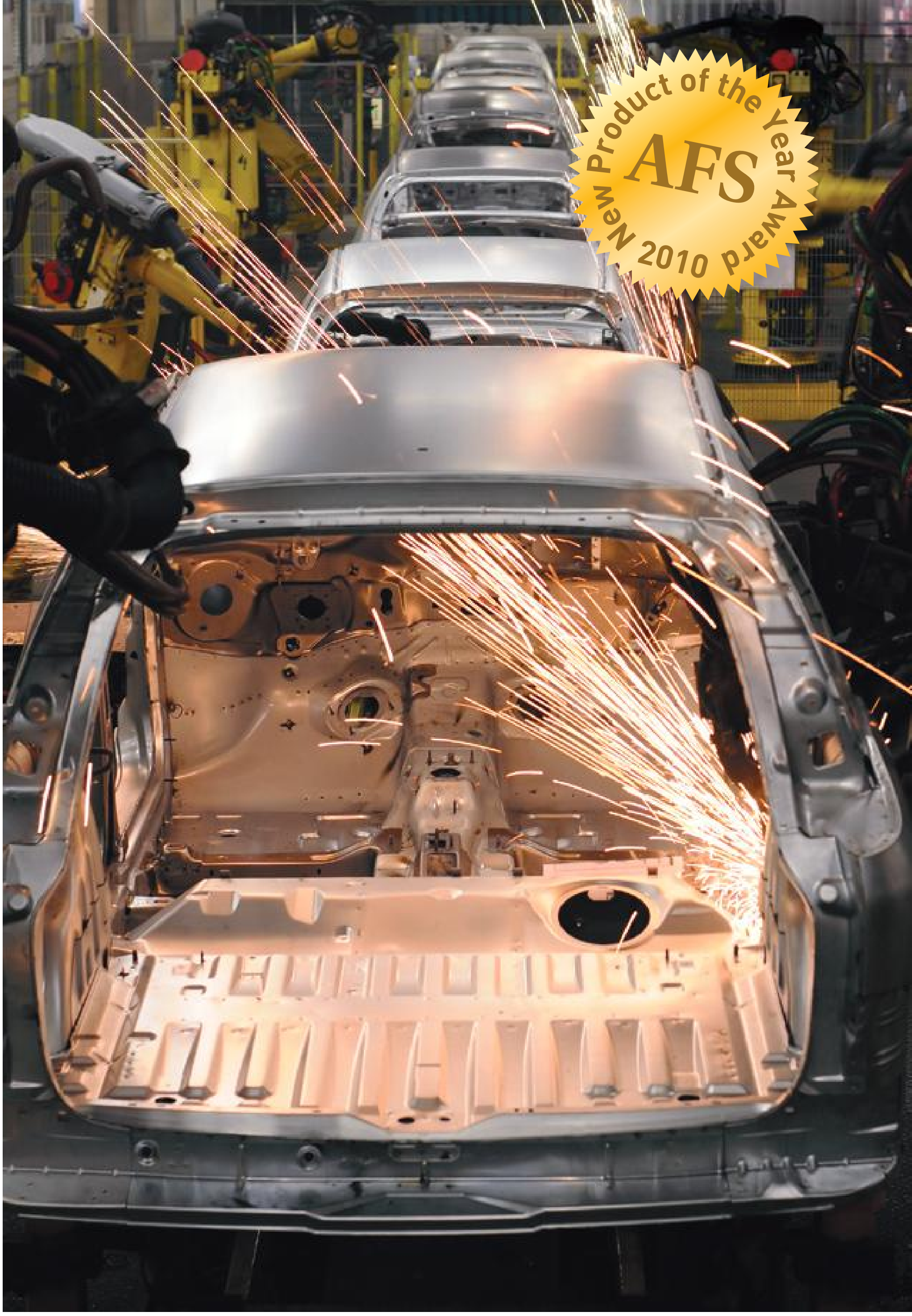
aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



GL-Filter Series

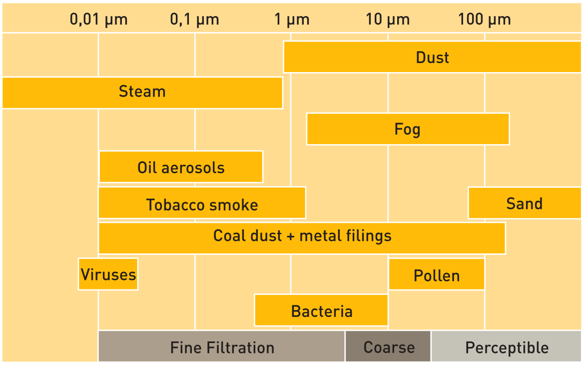
High-performance filter

Parker Avilo Quality Air & Gas

ENGINEERING YOUR SUCCESS.

Attention: Contamination!

Compressed air is widely used throughout industry and recognised as a safe and reliable energy source. Unfortunately after being produced it contains a large amount of unwanted contamination in the form of particulate, water and oil which gets carried into downstream piping without restraint.



Much of the contamination is less that 40 millionth of meter in size (40 µm) and thus remains hidden from the human eye.

Water

Water in a compressed air system is present in the form of water vapour, water droplets and water aerosol.
Large amounts of atmospheric humidity are taken in via the compressor intake. During the process of compression these contaminants are multiplied many times whilst the air temperature is increased considerably, leading to complete saturation of the compressed air with humidity. When the temperature eventually starts to fall, water starts to condense out of the saturated air, resulting in the corrosion of downstream equipment and the consequential costs of maintenance and downtime. In order to guarantee faultless operation and efficient performance this surplus water must be entirely removed from the system.

Total amount of humidity entering the compressed air system in liters per day. based on inlet flow conditions of 250 m^3/h (20 °C. 1 bar_a) at a compressor end-pressure of 8 bar_a.

Temperature °C	Humidity content (saturated) g/m^3	Relative humidity 50 %	60 %	70 %
15	12.8	38.4 L	46.1 L	53.8 L
20	17.3	51.9 L	62.3 L	72.7 L
25	23.1	69.3 L	83.2 L	97.0 L
30	30.4	91.2 L	109.4 L	127.7 L
35	39.6	118.8 L	142.6 L	166.3 L
40	51.1	153.3 L	184.0 L	214.6 L
45	65.4	196.2 L	235.4 L	274.7 L

Particulate

Particle contamination in a compressed air system comprises atmospheric dirt, micro-organisms, rust and condensate deposits.
Atmospheric air in an industrial or urban environment can contain up to 150 million dirt-particles per cubic meter.

80 % of all dirt particles are less than 2 microns in size and are not held back by the coarse intake filter on the compressor. They therefore enter the compressed air system in an unrestrained manner. In the presence of water-condensate, particulate often acts even more corrosive, forming sludge and leading to the irreparable blockage of instrumentation and control systems. Furthermore the final product itself can be rendered unusable.

Total amount of particulate entering the compressed air system based on inlet flow conditions of 250 m^3/h (20 °C, 1 bar_a) at a compressor end-pressure of 8 bar_a.

Size	Approx. qty. per m^3	Approx. qty. per day
< 2 µm	120 Million	720 Billion
> 2 µm	30 Million	180 Billion

Oil

Oil is used in the majority of compressor types as a means of sealing, lubricating and cooling. However, on completion of the compression process this same oil can work its way into the compressed air system. The amount is dependent on the age of the compressor in question. Even so-called oil-free compressors can contribute to compressed air oil-contamination. The source, in this case, being atmospheric air containing un-burnt hydrocarbons which enter the compression chamber via the compressor inlet.

Once present in the compressed air system oil combines with water already there to form a corrosive acidic substance. This leads to damage in air receivers, pipe-work, instrumentation and the final product. Furthermore oil-vapour escaping into the atmosphere can contribute to an unhealthy working environment.

Total amount of remaining oil from different compressor types at an inlet flow of 250 m³/h (20 °C, 1 bar_a) at a compressor end-pressure of 8 bar_a

Remaining oil content after compression				
Compressor Type	condition	per m³	per day	per year
Piston compressor, oil-lubricated	new	30 mg	180 g	77 L
	old	60 - 180 mg	360 - 1080 g	155 - 464 L
Rotary-vane compressor, oil-lubricated	new	< 6 mg	< 35 g	15 L
	old	60 - 180 mg	360 - 1080 g	155 - 464 L
screw-compressor, oil-lubricated	stationary	2.4 - 12 mg	14.4 - 72 g	6 - 31 L
	mobile	18 - 30 mg	108 - 180 g	46 - 77 L
Turbo-compressor, oil-free	dependent upon operation	0.06 - 0.5 mg	0.36 - 3 g	0.15 - 1 L

Oil-density 0,85 kg/L

In short:

Where compressed air contamination is not reduced or removed, many problems can arise in the compressed air system:

- **Corrosion in the air-receiver and in pipe-work**
- **Blocked or damaged valves, cylinders, air-motors or compressed air tools**
- **Damage to plant and equipment**
- **Product contamination**

Leading to:

- **Unusable or damaged final products**
- **Reduced production efficiency**
- **Increased costs of manufacture**

Compressed air must not only be clean, but also efficient

As well as the removal of contamination, the economics of using compressed air filters play an important role. Here, the requirement is one of minimising costs and achieving a balance between the compressed air quality being sought and the amount of energy necessary to achieve it.

Compressed air quality in accordance with ISO 8573-1:2001

The required compressed air quality in a customary compressed air system is dependent on the application. When manufacturing pharmaceutical products or foodstuffs, the demands placed on compressed air quality are far greater for example, than the operation of pneumatic tools on a production line. The international standard for compressed air quality provides a simple and clear system which classifies the three main sources of contamination present in all compressed air systems: Water, Oil and Particulate. Albeit ISO 8573-1 remains completely exposed when it comes to stipulating the inlet concentrations at which these purity classes are to be achieved. For a few years now, compulsory standards have existed which stipulate the inlet concentration and the test equipment to be met and referred to, when such performance levels are required and quoted.

Classification	Solid particulate Maximum number of particles per m³ Particle size				Water (vapour state) Pressure dewpoint in °C	Oil (vapour, aerosols, liquids) Content in mg/m³
	≤ 0,1 µm	0,1 - 0,5 µm	0,5 - 1 µm	1 - 5 µm		
0	As specified between the supplier and equipment user (better than class 1)					
1	not agreed	< 100	1	0	≤ -70	≤ 0,01
2	not agreed	100.000	1.000	10	≤ -40	≤ 0,1
3	not agreed	not agreed	10.000	500	≤ -20	≤ 1
4	not agreed	not agreed	not agreed	1.000	≤ +3	≤ 5
5	not agreed	not agreed	not agreed	20.000	≤ +7	not agreed
6	not applicable				≤ +10	not agreed

Reference conditions 1 bar_a, 20 °C, 0 % relative humidity; Pressure dewpoint at compressor end-pressure of 8 bar_a.

New release – ISO 8573-1:2010

A current new-release of ISO 8573-1 has been published and establishes considerably higher limits for particulate contamination. At first glance, it would appear that there has been a worsening of the recommended purity classes ...
In actual fact, we owe this new ISO 8573-1 release to the customary practices of industrial applications, which up until now have required an absolute-rated filter (as already required by the pharmaceutical and food industry) to comply with purity class 1 in terms of particulate. For this reason, industrial users will benefit from the improved reference to customary practice which this new release now takes account of. It is nevertheless advisable to always state the year of publication in all agreements made in accordance with ISO 8573-1.

Classification	Maximum number of particles per m³ Particel size		
	0,1 - 0,5 µm	0,5 - 1 µm	1 - 5 µm
0	As specified between the supplier and equipment user (better than class 1)		
1	≤ 20.000	≤ 400	≤ 10
2	< 400.000	≤ 6.000	≤ 100
3	not agreed	≤ 90.000	≤ 1.000
4	not agreed	not agreed	≤ 10.000
5	not agreed	not agreed	≤ 100.000

Reference conditions 1 bar_a, 20 °C, 0 % relative humidity

Proof of performance: The bar is high – but we`re raising it higher.

Test methods in accordance with ISO 12500 – finally, clear basic principles

Air purity classes in accordance with ISO 8573-1 have been around for many years. Standardisation however on the establishment of inlet-concentrations has only existed since 2007. After a period of uncertainty, these basic principles were finally established and now govern how measurements are to be taken and how validation is to be carried out.

ISO 12500	Part 3	Part 2	Part 1
	Solid particulate 0.01 - 5 µm Inlet number[a)] per m³	Oil-vapours Inlet concentration mg n-Hexane/ kg Air	Oil-aerosols 0.15 - 0.4 µm Inlet concentration in mg/m³
	10^{9} to 10^{12}	1.000	40
	–	– or	10

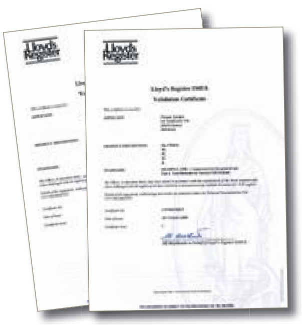
[a)] Reference to EN 182-1 Reference conditions 1 bar_a, 20 °C, 0 % relative humidity

Taking a high-performance filter for oil-aerosol removal as an example, the effects can be observed:

Oil-aerosols	ISO 12 500-1	Parker Zander	Competitor	Customary remaining oil content of compressors		
standardised inlet-loading	40 mg/m³	40 mg/m³	—	30 mg/m³	Piston and mobile screw-compressors	
	10 mg/m³	10 mg/m³	—	12 mg/m³	Stationary screw-compressors	
other inlet-loading	—	—	3 mg/m³	< 6 mg/m³	Rotary-vane compressors	

Reference conditions 1 bar_a, 20 °C, 0 % relative humidity.

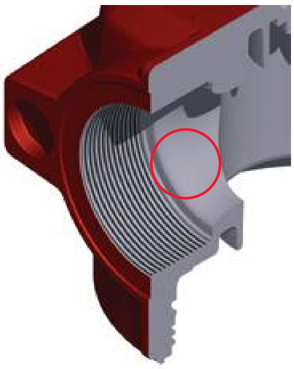
It all now becomes clear: Stated remaining oil-content values, following a high-performance filter are in actual fact limited in their meaningfulness. However, where account is taken of the validated inlet-loading in accordance with ISO 12500-1, it becomes clear in what range high-performance filters really do perform.



New GL-Filtration technology delivers what it states and offers you an independent, validated statement of performance in accordance with ISO 12500.

New GL-Technology: lowest energy requir

The perfect combination of innovative construction features illustrated in the form of cost-saving Air-Flow-Management and the choice of high-performance filtration materials. The Result: best compressed air treatment at the lowest pressure drop.



Do away with energy-killers: Conical „full-flow" Filter-housing inlet

Free-flow, turbulence-free transition of the air on entering the filter element – Inlet & outlet connections harmonised to meet those of the various compressor types.

„Going around the bend": smooth 90°- curve

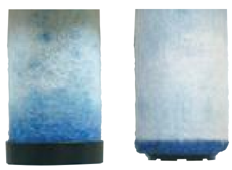
No dead-areas, no turbulence – Almost zero pressure drop, thanks to optimum air distribution.

No impact: Conical air disperser

Soft air-dispersion at the base of the element prevents turbulence.

„No wet feet"

No wet-band, no extra turbulent-free zone. Optimum drainage, shrouds the bottom end-cap with drainage material and utilises cast ribs in the filter housing bowl to compress the lower part of the filter element and encourage liquid coalescence via capillary forces.

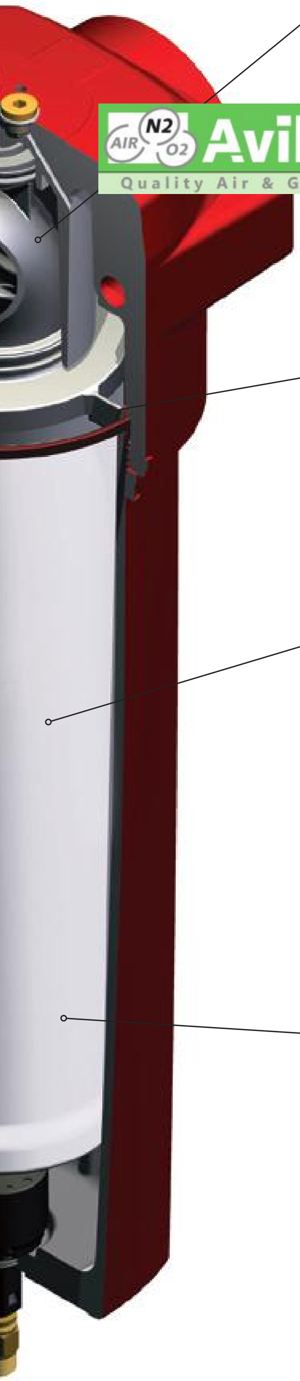


Old technology | New technology

ement at highest, validated performance

„Its plain sailing”: Aerospace deflector-vanes

Unrestricted, air-flow guidance



„Go with the flow”: Flow-distribution

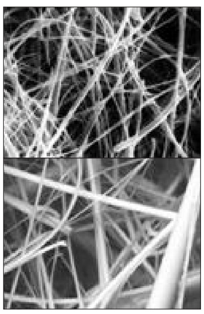
Optimum air distribution throughout the entire element

Successful „escape“

External air-stabilisers located on the filter element top end-cap ensure the even-flow of compressed air exhausting the filter housing.

Large area – greater outcome

Deep-bed pleating techniques result in 4.5 times more effective filtration area than conventional filter elements – resulting in increased particulate retention, reduced space and lower operating costs.



Performance at the highest level: High-performance filters

Utilising high-efficiency filter element media, manufactured from borosilicate nano-fibres with a voids-volume of 96% and external drainage layer: VL - coarse particulate removal filter elements (3 µm), ZL - coalescing fine-filter elements (1 µm) and XL – high-performance filter elements (0.01 µm) for droplet and aerosol removal. A – adsorption elements for high-efficiency surface adsorption of oil-vapours and odours.

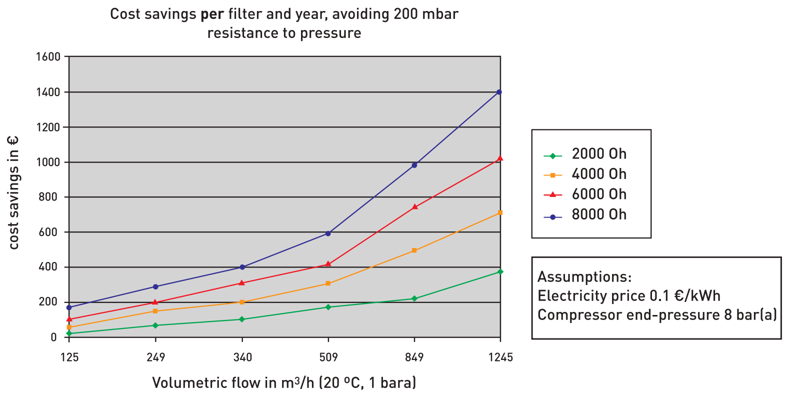
Putting on the pressure – but not at all cost!

Basically, filter media can be manufactured to be so impenetrable that it is capable of removing all contamination: This is however only possible at the expense of operating pressure. In order to maintain the operating pressure required for the application, any resistance to pressure in the system must be compensated for by increased compressor performance.
The result is a high energy requirement, premature compressor wear and increasing costs. The optimum balance between filtration performance and the lowest possible energy requirement is the key.

Resistence to pressure, otherwise known as Differential pressure (pre- and post equipment)

Out-dated technology costs money – every day!

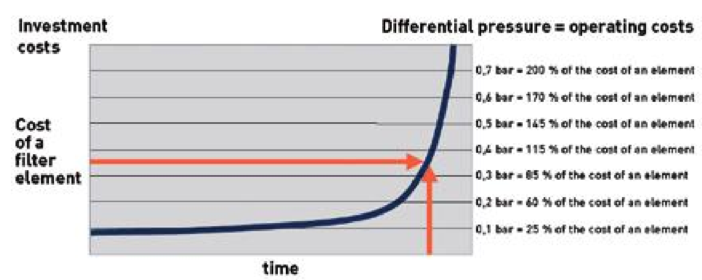
Conventional filters cause an average increase in differential pressure within the first year of operation up to 200 mbar: Depending upon the operating parameters – 5-day week, with one shift (2000 working hours), two shifts (4000 working hours), three shifts (6000 working hours) or continuous, 365 days per annum (8000 working hours), the increase in compressor inlet performance results in a considerable increase in the energy requirement.



The solution is simple: Avoid experiencing unnecessary pressure drop in the first place by refraining from the use of old filters and trust in modern GL-technology from the outset!

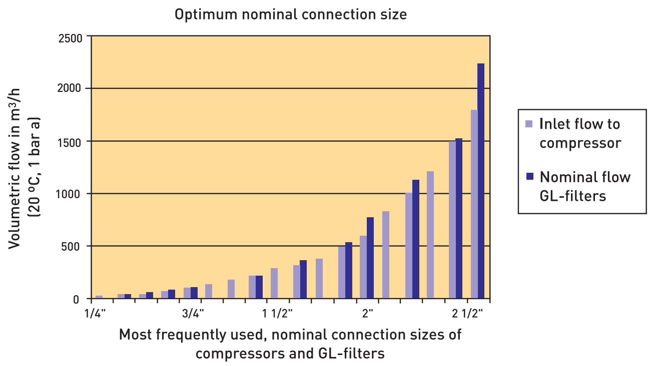
Dirty filters can end up costing you a lot!

Every filter element has a limited lifetime. The dirt-particle removal capacity becomes exhausted and the materials of construction age – the result is an ever increasing resistance to pressure in the filter. Compare the investment costs of a new filter element to the energy costs necessary to compensate for the resistance to pressure of a dirty filter element. It´s worth changing in time!



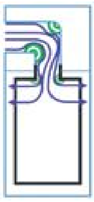
Optimum fit – no “bottle-necks”

GL-series filters have nominal inlet & outlet connections which have been matched to meet those of the most popular compressor flow rates:

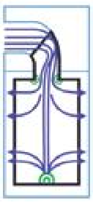


A well-rounded package: Air-Flow-Management

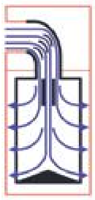
Where air flows over a sharp edge, turbulence occurs. This leads to increased resistance to flow and insufficient distribution of the air-stream. Air-Flow-Management, incorporated into the GL-Series, avoids this problem by guiding the air through a smooth bend with the aid of aerospace deflector-vanes into the heart of the filter element in a turbulence-free manner.



To date: The in-coming air is forced to change direction through 90°. The result is turbulence, pressure drop and insufficient distribution of the air throughout the filter media.



An improvement: Rounded corners reduce turbulence however do not allow the air-stream to penetrate the filter media in optimum fashion.



The optimum solution: By incorporating deflector-vanes into the inlet of the filter element and an air dispenser in the base, turbulence is prevented, flow distribution is optimised and pressure drops are kept to an absolute minimum. Hard to believe, but just compare a conventional 90° angle and the savings of up to 75 % to be gained from turbulence-free flow management:

Resistance to flow	Nominal pipe-size based on identical pipe-length		
	⅜"	½"	¾"
90°- Angle	100 %	100 %	100 %
90°- Bend	25 %	30 %	30 %

In short: As much as necessary, as little as possible.

- Different applications call for different compressed air quality.
- The more filter media, the higher the resistance to pressure – the so-called differential pressure.
- The higher the differential pressure, the higher the energy requirement and wear on the compressor.

The result:

- The grade of filtration must be matched to the application in question.
- Filter media, meeting current technology standards serve to keep differential pressure low.
- Regular replacement of filter elements keeps operating costs under control.
- Only the combination of removal rate and the efficient utilisation of energy renders compressed air economical for use.

This is of value to you: A summary of the benefits

Investing in compressed air filters to save money can turn out to be a costly mistake. After all, they should serve to enable the stringent regulations for compressed air quality to be met, without creating high pressure drop in the system. The resulting additional expenditure spent on energy considerably increases operating costs. Rely on the merits of the new GL-series – a decision you will not regret.

- **Compressed air quality independently validated in accordance with ISO 12500-1:2007 and ISO 8573-1:2010**
- **Reliable removal of particulate, oil and water aerosols as well as oil-vapours**
- **Increase in machinery capacity and productivity with minimum down-time and low maintenance costs**
- **Constantly low differential pressure throughout the entire lifetime of the filter element - high dirt-holding capacity**
- **Low differential pressure reduces operating costs and guarantees economic operation**
- **Optimum price/performance ratio in terms of operating costs and costs of wear & tear**
- **Guaranteed compressed air quality where maintenance recommendations are adhered to**
- **10 year filter housing guarantee**
- **High energy savings with corresponding improvements in CO_2- reduction for your organisation**

Simple and reliable maintenance

Clear marking removes the danger of confusion

The compressed air inlet to the filter housing is clearly recognisable and marked by a slightly raised metal step above the inlet port of the filter head. In this way, confusion regarding the correct direction of flow when installing or re-installing the filter is avoided. The replacement of filter elements requires no time-consuming checking to ascertain the clean and dirty side of the filter: Filter elements are simply placed into the housing bowl and during the process of housing closure, the correct direction of flow is automatically achieved.

Light and compact construction – a minimum of space required below the housing

Ease of opening and the avoidance of incorrect element replacement, by simply placing the filter element into the housing bowl, serve to limit maintenance to a minimum.
Safe housing closure, recognisable by the external mating of a mark on the filter head and bowl, prevent the housing from being incorrectly screwed together. The efficient sealing of the filter element at the inlet to the filter housing avoids any unwanted by-pass of flow (i.e. short-circuiting between the dirty and the clean side).

Regular maintenance – avoids unexpected events

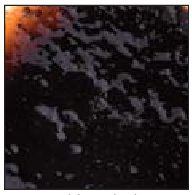
A compressed air filter in operation is subject to a great deal of stress. A high frequency of pressure and temperature variation, bombardment with dirt, oil and water particulate, not to mention general wear, leads to element blinding and reduces the retention capacity during the period of use. This results in an inevitable increase in the differential pressure. For this reason, filter elements should be replaced in accordance with the manufacturers´ recommendations. Even though a filter is fitted with a differential pressure gauge and the needle remains in the green area, this does not necessarily mean that filter element replacement is avoidable. Even the smallest of holes can result in penetration of the filter media. This renders the differential pressure gauge useless – the needle continually remaining in the green area. Applications downstream, even after element replacement, can remain contaminated for a long period of time. The consequences of such an event would be far more serious and costly than any timely replacement of a filter element.

The GL-filter series offers you a one year lifetime performance guarantee in accordance with ISO 12500-1 and ISO 8573-1:2001.

Effective oil removal - even with critical synthetic oils

Metal filings and dust, corrosion, (arising from flash-temperatures in the compression stages) corrosive air/oxygen contact (e.g. oil-lubricated screw-compressors) and water condensate forming during periods of off-load, lead to premature ageing of the oil – in conjunction with corrosive acidic deposits.
Owing to their long-life characteristics and extended maintenance periods, the use of synthetic oil as compressor oil is on the increase. This increases the necessity for improved materials of construction, above necessary all for material-critical synthetic oils.
The GL-filter series is perfectly suited to meet all of these challenges. Not withstanding its excellent oil removal efficiency and outstanding chemical compatibility with popular mineral-oil based compressor oils and comparable European synthetic Poly-α-Olefines (PAO), but also with material sensitive synthetic oils such as Poly-alkylene-glycols (PAG) as they are known in the English-speaking World, to polyether and high-temperature synthetic oils of esther basis.


New fresh oil


Old used oil

Complete corrosion protection - guaranteed

In comparison with ordinary filter housings, the GL-series is alocromed and externally protected with a tough, durable dry powder epoxy-coating against corrosion. We are so confident of this protection treatment that our housings carry a 10 year guarantee, where recommended operating parameters are maintained.

We have thought of everything: Technical Data and Filtration Grades

Filter selection and correction factors

Stated flows are for an assumed compression of 7 bar(g) rsp. 100 psi(g).
For flows at other minimum pressures the corresponding correction factors should be used.

Model	Nominal pipe size[1]	Flow rate[2] m^3/h	Flow rate[2] cfm	Replacement kit
GL2_[3]	¼"	36	21	CP1008_[3]
GL3_[3]	⅜"	55	32	CP2010_[3]
GL5_[3]	½"	72	42	CP2010_[3]
GL7_[3]	¾"	108	64	CP2020_[3]
GL9_[3]	1"	216	127	CP3025_[3]
GL11_[3]	1 ½"	396	233	CP3040_
GL12_[3]	1 ½"	576	339	CP4040_[3]
GL13_[3]	2"	792	466	CP4050_[3]
GL14_[3]	2 ½"	1188	699	CP4065_[3]
GL17_[3]	2 ½"	1548	911	CP5065_[3]
GL19_[3]	3"	2232	1314	CP5080_[3]

[1] in accordance with DIN ISO 228 (BSP-P) or ANSI B 1.20.1 (NPT-F), [2] with reference to 20 °C, 1 bar, 0 % relative humidity. [3] _replace underscale with filtration grade VL, ZL, XL or A.

Operating pressure bar(g)	Operating pressure psi(g)	Correction factor
1	15	2,65
1,5	22	2,16
2	29	1,87
2,5	37	1,67
3	44	1,53
3,5	51	1,41
4	58	1,32
4,5	66	1,25
5	73	1,18
5,5	89	1,13
6	87	1,08
6,5	95	1,04
7	100	1,00
7,5	110	0,97
8	116	0,94
8,5	124	0,91
9	131	0,88
9,5	139	0,86
10	145	0,84
10,5	153	0,82
11	160	0,80
11,5	168	0,78
12	174	0,76
12,5	183	0,75
13	189	0,73
13,5	197	0,72
14	203	0,71
14,5	212	0,69
15	218	0,68
15,5	226	0,67
16	232	0,66
16,5	241	0,65
17	248	0,64
17,5	256	0,63
18	263	0,62
18,5	270	0,62
19	277	0,61
19,5	285	0,60
20	290	0,59

Example – Product selection

The correct sizing of a filter is dependent on the following:

- the minimum operating pressure of the system and
- the maximum volumetric flow of the system

Procedure:

1. Choose the correction factor in accordance with the minimum operating pressure (if necessary choose the next level down).
2. Multiply the correction factor by the maximum volumetric flow to arrive at a nominal comparative value.
3. Using the table, take the nominal comparative value and compare this with the size of the filter in the table and choose the same or larger flow.

Example calculation:
Maximum inlet volumetric flow of the system: 285 m^3/h
Minimum operating pressure of the system: 4.3 bar(g)
285 m^3/h x 1.32 = 376.2 m^3/h, corresponds to filter size GL11.

Filtration Grades

Filtration Grade	VL	ZL	XL	A
Filtration Grade suitability	Solid particulate	Solid particulate, Aerosols (Oil, Water)	Solid particulate, Aerosols (Oil, Water)	Vapours
Recommended pre-filter	n. a.	WS (wall flow)	ZL	ZL+XL
Recommended after-filter	–	–	–	ZL
Suitability in accordance with ISO 8573-1:2010	[3:–:–]	[2:–:3]	[1:–:2]	[1:–:1]
Particulate retention down to	≥ 3 µm	≥ 1 µm	≥ 0.01 µm	n. a.
Aerosol content acc. to ISO 12500-1	n.a.	40 mg/m^3	10 mg/m^3	n.a.
Remaining oil Content	n. a.	0.6 mg/m^3	0.01 mg/m^3	0.003 mg/m^3
Filtration efficiency	99.95 %	99.925 %	99.9999 %	n. a.
Differential pressure (dry)	< 70 mbar < 1 psi	< 70 mbar < 1 psi	< 140 mbar < 2 psi	< 70 mbar < 1 psi
Differential pressure (saturated)	n.d.	< 140 mbar < 2 psi	< 200 mbar < 3 psi	n.d.
Element replacement	12 months	12 months	12 months	50-650 Oh

n. a. - not applicable; n.d. - no details; Oh - Operating hours

Available standard pressure vessel approvals

- European approval in accordance with the pressure vessel directive 97/23/EC
- Strength calculation according to ASME VIII Div. 1, no obligation for approval
- Canadian approval in accordance with CRN
- Australian approval in accordance with AS1210
- Russian approval in accordance with TR

Technical Data

Operating parameters

Filter size from/to	Filtration element grade	Differential pressure gauge	Drain	Min. operating temperature		Max. operating temperature		Max. operating pressure	
				°C	°F	°C	°F	bar(g)	psi(g)
GL2 - GL19	VL	-	+	1.5	35	80	176	16	232
GL2 - GL19	VL	-	H	1.5	35	100	212	20	290
GL3 - GL19	VL	D	+	1.5	35	80	176	16	232
GL3 - GL19	VL	D	H	1.5	35	80	176	16	232
GL2 - GL19	VL	-	OA	1.5	35	100	212	20	290
GL2 - GL19	ZL	-	+	1.5	35	80	176	16	232
GL2 - GL19	ZL	-	H	1.5	35	100	212	20	290
GL3 - GL19	ZL	D	+	1.5	35	80	176	16	232
GL3 - GL19	ZL	D	H	1.5	35	80	176	16	232
GL2 - GL19	ZL	-	OA	1.5	35	100	212	20	290
GL2 - GL19	XL	-	+	1.5	35	80	176	16	232
GL2 - GL19	XL	-	H	1.5	35	100	212	20	290
GL3 - GL19	XL	D	+	1.5	35	80	176	16	232
GL3 - GL19	XL	D	H	1.5	35	80	176	16	232
GL2 - GL19	XL	-	OA	1.5	35	100	212	20	290
GL2 - GL19	A	-	+	1.5	35	50	122	20	290
GL2 - GL19	A	-	OA	1.5	35	50	122	20	290

Explanation of terms
D = optional differential pressure gauge ZD90GL fully-installed; **+** = Standard drain installed: Float drain PD15NO with filtration grades VL,ZL or XL, manual drain for filter grade A; **H** = Manual drain HV15, optionally installed on filter grades VL,ZL or XL; **OA** = Optional – no drain installed: Drain outlet open

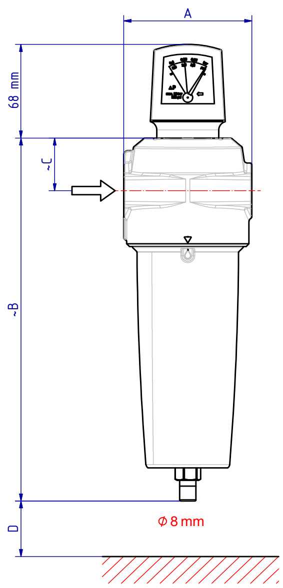
Product Key

Series	Size	Filtration element grade	Options (if deviating from standard)	Connection (only for NPT-F)
↓	↓	↓	↓	↓
GL	2 to 19	VL, ZL, XL or A	D, H or OA	-N

Examples:
GL3VLH-N -> Filter NPT ⅜", 3µm solid particulate element, with manual drain HV15 installed
GL9XLDH -> Filter 1" (BSP-P), 0,01 µm high-performance filter element, with differential pressure gauge installed ZD90GL and manual drain HV15
GL5ZLDOA -> Filter ½" (BSP-P), 1 µm fine-filter element, with differential pressure gauge installed ZD90GL, drain outlet open

Weights and Dimensions

Model	Nominal pipe size[1]	A Width		B Height		C Installation height		D Space required to remove element		Depth		Weight	
		mm	ins	mm	ins	mm	ins	mm	ins	mm	ins	kg	lbs
GL2_	¼"	67	2.6	203	8	23	0.9	≥ 40	≥ 1.6	65	2.6	0.55	1.3
GL3_	⅜"	89	3.5	270	10,6	38	1.5	≥ 50	≥ 2.0	85	3.3	1.3	2.9
GL5_	½"	89	3.5	270	10,6	38	1.5	≥ 50	≥ 2.0	85	3.3	1.3	2.9
GL7_	¾"	89	3.5	270	10,6	38	1.5	≥ 50	≥ 2.0	85	3.3	1.3	2.9
GL9_	1"	130	5.1	309	12,2	46	1.8	≥ 70	≥ 2.8	116	4.6	3	6.6
GL11_	1 ½"	130	5.1	399	15,7	46	1.8	≥ 70	≥ 2.8	116	4.6	3.2	7.1
GL12_	1 ½"	164	6.5	471	18,5	57	2.2	≥ 100	≥ 3.9	156	6.1	6.9	15.2
GL13_	2"	164	6.5	563	22,2	57	2.2	≥ 100	≥ 3.9	156	6.1	7.3	16.1
GL14_	2 ½"	164	6.5	563	22,2	57	2.2	≥ 100	≥ 3.9	156	6.1	7.1	15.7
GL17_	2 ½"	192	7.6	685	27	72	2.8	≥ 120	≥ 4.7	182	7.2	10.3	22.7
GL19_	3"	192	7.6	875	34,4	72	2.8	≥ 120	≥ 4.7	182	7.2	15.3	33.7



[1] In accordance with DIN ISO 228 (BSP-P) or ANSI B 1.20.1 (NPT-F)

You have the choice: further accessories

Wall mounting brackets For filters, if necessary incl. combination accessories	
Model	**Suitable for**
BF/GL2	GL2, single stage
BF/GL2/2	GL2, dual stage
BF/GL2/3	GL2, triple stage
BF/GL3 - GL7	GL3 - GL7, single stage
BF/GL3 - GL7/2	GL3 - GL7, dual stage
BF/GL3 - GL7/3	GL3 - GL7, triple stage
BF/GL9-GL11	GL9 - GL11, single stage
BF/GL9-GL11/2	GL9 - GL11, dual stage
BF/GL9-GL11/3	GL9 - GL11, triple stage
BF/GL12-GL14	GL12 - GL14, single stage
BF/GL12-GL14/2	GL12 - GL14, dual stage
BF/GL12-GL14/3	GL12 - GL14, triple stage
BF/GL17-GL19	GL17 - GL19, single stage
BF/GL17-GL19/2	GL17 - GL19, dual stage
BF/GL17-GL19/3	GL17 - GL19, triple stage

Mounting kits For filter combinations	
Model	**Suitable for**
BFS/GL2/2	GL2, dual stage
BFS/GL2/3	GL2, triple stage
BFS/GL3 - GL7/2	GL3 - GL7, dual stage
BFS/GL3 - GL7/3	GL3 - GL7, triple stage
BFS/GL9 - GL11/2	GL9 - GL11, dual stage
BFS/GL9 - GL11/3	GL9 - GL11, triple stage
BFS/GL12 - GL14/2	GL12 - GL14, dual stage
BFS/GL12 - GL14/3	GL12 - GL14, triple stage
BFS/GL17 - GL19/2	GL17 - GL19, dual stage
BFS/GL17 - GL19/3	GL17 - GL19, triple stage

Differential pressure gauges for all filter sizes GL3 - GL19	
Model	**Type**
ZD90GL	Analogue

Drain		
Model	**Type**	**Filter size**
HV15	Manual	GL2 - GL19
ZK15NO/2013	Float	GL2 - GL19

Electronic drain series ED3000 see individual product brochure BROED-00-EN

Mounting kits For filter combinations GL2 - GL19			
Model	**Connection**		**Suitable for**
	Filter	**Drain**	**drain type**
MK-G15-G10	G½ a	G⅜ a	Trap 22
MK-G15-G10I	G½ a	G⅜ i	ED3002
MK-G15-G15	G½ a	G½ a	ED3004 - 3100

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