

## Filters & Centrifugal Separators

Flow rates 0.58 to 248 m<sup>3</sup>/min



**Why use compressed air filters?**

On average, a compressor sucks in up to 190 million particles of dirt, hydrocarbons, viruses and bacteria with every cubic meter of atmospheric air. The compressor itself can only remove the larger particles and the majority of the contaminants remain in the compressed air. This means that for most applications careful treatment of the air is necessary: Clean, quality compressed air maximises air-tool service life, ensures that pneumatic machinery and control systems operate at the peak of their performance and keeps pipes & valves free from contamination. It therefore not only reduces service, maintenance and repair costs, but can also reduce initial investment costs.

**KAESER filters ensure a dependable and cost-effective source of quality compressed air**

Compressed air filters from KAESER KOMPRESSOREN are ideally suited for use with our compressors and compressed air drying systems. This ensures dependable compressed air treatment and exceptional efficiency.



- 1 Compressed air inlet
- 2 Compressed air outlet
- 3 Filter housing
- 4 Filter element
- 5 Electronically controlled ECO DRAIN condensate drain

# KAESER Compressed Air Filters

## Dependable and efficient



Centrifugal separator

High-pressure filters

Compressed air filters



**Tailored compressed air treatment**

All Kaeser filters and compressed air treatment components are specifically designed for use in combination with one another.

Compressed air of every quality class is available ranging from general works air right up to foodstuff and pharmaceutical grade air. KAESER compressed air filters are also available for high pressure applications up to 62 bar<sub>(g)</sub>.



**Compressed air filters**

Kaeser's extensive range of filters ensures that there's a model available to suit every compressed air need. Water, oil and dust are removed efficiently and with minimal differential pressure.



**Centrifugal separator**

For removal of liquid condensate. Typically used downstream from the compressor. Results in near 100% relative humidity, which is ideal for further drying systems.



**Filters up to 48 or 62 bar**

We also have an extensive range of filters available for high-pressure applications, such as PET container production. Suited for use with pressures of up to 48 or 62bar, these high-quality filters remove oil, water and dust.



**Certified: Clean compressed air**

Kaeser compressed air systems provide the required grade of compressed air quality to suit every compressed air application. This includes technically oil-free compressed air, which is many times cleaner than normal ambient air. All systems and equipment are tested and certified by the German Technical Inspection Institute (TÜV).

# Compressed air filters

Perfectly matched to compressor and compressed air treatment equipment, Kaeser's extensive range of filters ensures that all relevant compressed air quality classes are maintained reliably and efficiently over the long-term.

## Filter change maintenance indicator

### The filter monitor... (optional)

- ...indicates when filter change is required.
- **Microprocessor-controlled LCD display**
- **Comprehensive filter monitoring based on:**
  - operating time
  - differential pressure
  - operation efficiency: comparison of increasing energy requirement caused by filter clogging to a maximum value that is dependent on the operating conditions and which is calculated by the monitor
- **Significant energy savings**
- **'Filter change' warning** with red LED and alarm contact
- **Continuous measurement of pressure differential** to an accuracy of 0.025 bar via precision pressure transducer
- **Direct data input**, no separate programming device required

### The high performance filter element...

- ...ensures **reliable filtration** with minimal pressure losses:
- **Coalescence filter** with new, matrix filter-fibre structure
- **High efficiency even at low air volumes** of only five percent of nominal flow
- **Reliable element-to-housing seal**
- Stainless steel orifice tubes, **oil & acid resistant** coated sleeves and end caps

### The filter housing...

- ...that lasts:
- **Long service life** thanks to the epoxy resin coating inside and out (proven in over 1000 hours of salt contamination tests)
- **Easy filter element removal** with Kaeser's O-ring seal system
- **Minimal pressure drop** due to optimised air flow
- The conical bowl **and turbulence-free lower filter zone** prevent condensate from being carried along with the air flow
- **audible warning** should leakages occur or if the filter is opened under pressure

### The shut-off valve...

...allows maintenance of the condensate drain without interrupting air supply.

### Condensate drainage with the ECO Drain...

- ...is electronically level-controlled and fully automatic, which means:
- **No air losses**
- **Maximum reliability**

D-Pack Version:  
with electronic ECO DRAIN condensate drain, including floating alarm contact

D-Pack *basic* version:  
With electronic ECO DRAIN 30 condensate drain; for filter sizes F6 to F221



FFG microfilter combination comprising:  
FF microfilter and FG activated carbon filter

Optionally available without electronic  
condensate drain ("Standard version")

**KAESER**  
COMPRESSORS

## Tailored filtration for every compressed air need



**Use:** For removal of solid particles and larger volumes of condensate.

To be used as a pre-filter for solid particles and for removal of larger volumes of condensate.

**Size of particles removed:** > 3 µm  
**Max. fluid load at inlet:** 25 g/m<sup>3</sup>

**FB pre-filter 3 µm**



**Use:** For removal of solid particles and smaller volumes of condensate.

To be used as a pre-filter for solid particles and for removal of small volumes of condensate.

A centrifugal separator or an air receiver should be installed upstream to provide initial removal of condensate.

**Size of particles removed:** > 1 µm  
**Max. fluid load at inlet:** 2 g/m<sup>3</sup>

**FC pre-filter 1 µm**



**Use:** For removal of solid particles

To be used only as a dust filter for solid particles, often used downstream from desiccant dryers and activated carbon adsorbers. Through-flow from outside to inside - ensures exceptionally high dust load capacity and maximum reliability.

**Size of particles removed:** > 1 µm  
**Max. fluid load at inlet:** Compressed air must be dry

**FD dust filter**



**Use:** For removal of fine solid particles, condensate droplets and oil aerosols.

For use as a fine filter for enhanced compressed air quality. The filter removes solid particles, condensate droplets and oil aerosols.

**Size of particles removed:** > 0.1 µm  
**Max. fluid load at inlet:** 1 g/m<sup>3</sup>

**FE fine microfilter**



**Use:** For removal of solid particles, the smallest of condensate droplets and oil aerosols.

The high capacity filter ensures exceptional compressed air quality in accordance with the most stringent requirements, e.g. for the pharmaceutical, electronics and foodstuff industries. Preferably use only with condensate-free compressed air. Ensure that a FE filter or a refrigeration dryer is installed upstream from this filter.

**Size of particles removed:** > 0.1 µm  
**Max. fluid load at inlet:** 0.1 g/m<sup>3</sup>

**FF finest microfilter**



**Use:** For removal of oil and adsorbable hydrocarbons, particularly suited to odour elimination.

The activated carbon filter ensures exceptional compressed air quality in accordance with the most stringent requirements, e.g. for the pharmaceutical, electronics and foodstuff industries. Compressed air must be dried and filtered beforehand. Ensure that a FE/FF filter and a dryer are installed upstream from this filter. Designed for approx. 1000 operating hours under reference conditions. Use an activated carbon adsorber (ACT series) if significantly longer service life is required.

**Size of particles removed:** -  
**Max. fluid load at inlet:** Compressed air must be dry

**Max. working pressure** 16 bar  
**Max. working temperature** +66 °C

**FG activated carbon filter**

# Filters for 48 or 62 bar

KAESER high-pressure 48/62 bar filters are available for installation at the booster outlet for special high pressure applications, e.g. PET container production. These also ensure certified compressed air quality.

## Filter housing

Durable, pressure-resistant steel housing

## Filter element

Five different filter elements, ranging from pre-filters to activated carbon filters, are available for pressures up to 62 bar

## Special electronic condensate drain (optional)

KAESER high-pressure filters can also be equipped with the electronically controlled ECO DRAIN condensate drain (PN63)



# Centrifugal separator

## Function:

The centrifugal separator removes large volumes of condensate from the compressed air. Optimised design enhances the centrifugal effect and ensures a near constant degree of condensate separation over a wide flow volume range. Furthermore, particles up to 5 µm are also “washed out”.

## Application:

A centrifugal separator is recommended for systems where the refrigeration dryer is installed “directly” downstream from the rotary screw compressor.

The centrifugal separator is installed between the compressor and the refrigeration dryer and removes the ‘liquid condensate’ from the compressed air. This provides the refrigeration dryer with additional reserve drying capacity. This is particularly important at high ambient temperatures in order to ensure that the required dew point is consistently maintained.

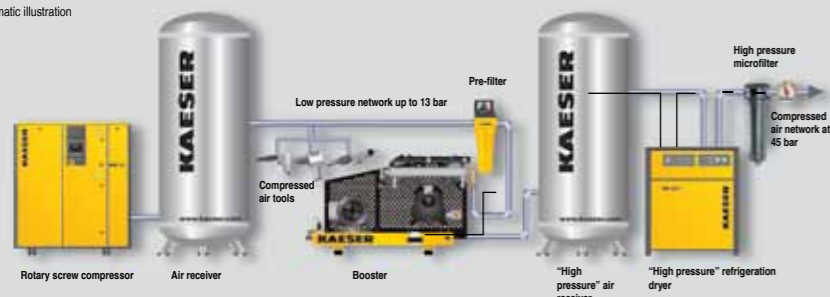
KAESER centrifugal separators are maintenance-free.

## Tip:

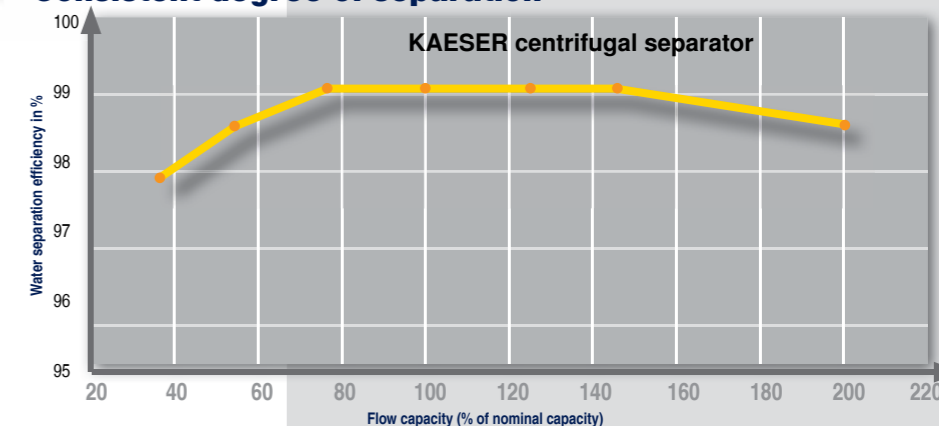
Each centrifugal separator should be fitted with an electronic ECO DRAIN condensate drain (available as a complete set with all necessary components).

## Compressed air system with booster

Schematic illustration



## Consistent degree of separation

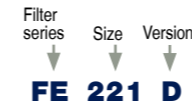


# Technical Specifications

**Filter series:** FB, FC, FD, FE, FF, FG, FFG – **Filter sizes:** 6, 10, 18, 28, 48, 71, 107, 138, 177, 221, 185, 283, 354, 526, 708, 885, 1420, 1950, 2480  
**Versions:** “Normal” with float-controlled drain – “D” With electronic level-sensing controlled ECO DRAIN condensate drain  
**Aluminium casing** for filter sizes from 6 to 221, **Steel casing** for filter sizes from 185 to 2480

## Compressed air filter for max. 16bar, max. operating temp. +66°C

Designation: Filter housing



Correction factors

## Replacement filter elements



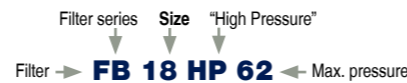
Flow rate*) m³/min	Filter size	Air connection	Weight kg (Normal version)					Dimensions A, B, C in mm (Normal version)					Removal height (for maintenance) mm
			FB – FFG	FB – FC	FD	FE – FF	FG	FFG	FB – FC	FD	FE – FF	FG	
0.58	6	R 3/8	3.6	3.5	3.6	3.4	7.1	105, 233, 163	105, 306, 224	105, 306, 224	105, 182, 163	210, 306, 224	76
1.0	10	R 1/2	3.7	3.6	3.7	3.5	7.3	105, 306, 224	105, 306, 224	105, 306, 224	105, 255, 244	210, 306, 224	76
1.75	18	R 1/2	3.9	3.8	3.9	3.7	7.7	105, 367, 285	105, 367, 285	105, 367, 285	105, 316, 285	210, 367, 285	76
2.83	28	R 3/4	4.4	4.3	4.4	4.2	8.7	133, 389, 298	133, 389, 298	133, 389, 298	133, 338, 298	266, 389, 298	89
4.83	48	R 1	4.8	4.7	4.8	4.6	9.5	133, 497, 406	133, 497, 406	133, 497, 406	133, 446, 406	266, 497, 406	89
7.1	71	R 1 1/2	4.6	4.5	4.6	4.4	9.1	164, 579, 482	164, 579, 482	164, 579, 482	164, 528, 482	328, 579, 482	102
10.7	107	R 1 1/2	5.1	5.0	5.1	4.9	10.1	162, 693, 596	164, 693, 596	164, 693, 596	164, 642, 596	328, 693, 596	102
13.8	138	R 2	12.7	12.6	12.7	12.5	25.3	194, 789, 681	194, 789, 681	194, 789, 681	194, 739, 681	388, 789, 681	102
17.7	177	R 2 1/2	15	14.9	15	14.8	29.9	194, 935, 827	194, 935, 827	194, 935, 827	194, 885, 827	388, 935, 827	102
22.1	221	R 2 1/2	17.2	17.1	17.2	17	34.3	194, 1091, 983	194, 1091, 983	194, 1091, 983	194, 1040, 983	388, 1091, 983	102
18.5	185	DN 80	29.9	28.4	29.3	28.6	58.6	350, 1130, 950	350, 1025, 845	350, 1130, 950	350, 1025, 845	700, 1130, 950	610
28.3	283	DN 80	41.1	37.0	40.1	37.2	78	400, 1205, 1013	400, 1045, 853	400, 1205, 1013	400, 1045, 853	800, 1205, 1013	610
35.4	354	DN 80	41.8	37.4	40.5	38.1	79.3	400, 1240, 1013	400, 1045, 853	400, 1205, 1013	400, 1045, 853	800, 1205, 1013	610
52.6	526	DN 100	53.4	48.4	51.5	49.7	101.9	440, 1240, 1023	440, 1085, 868	440, 1240, 1023	440, 1085, 868	880, 1240, 1023	610
70.8	708	DN 100	70	64.4	66.7	66.2	133.6	535, 1255, 1022	535, 1105, 872	535, 1255, 1022	535, 1105, 872	1070, 1255, 1022	610
88.5	885	DN 100	71.7	65.4	67.7	67.8	136.2	535, 1255, 1022	535, 1105, 872	535, 1255, 1022	535, 1105, 872	1070, 1255, 1022	610
142	1420	DN 150	126.5	118.4	121.5	122.4	244.6	600, 1355, 1043	600, 1215, 903	600, 1355, 1043	600, 1215, 903	1200, 1355, 1043	610
195	1950	DN 150	182.8	171.4	175.9	177.1	353.7	720, 1520, 1183	720, 1245, 908	720, 1520, 1183	720, 1245, 908	1440, 1520, 1183	610
248	2480	DN 150	237.7	224.4	228.9	231.7	461.3	750, 1540, 1192	750, 1265, 917	750, 1540, 1192	750, 1265, 917	1500, 1540, 1192	610

Working pressure bar	Conversion factor for flow rate
2	0.38
3	0.52
4	0.63
5	0.75
6	0.88
7	1
8	1.13
9	1.26
10	1.38
11	1.52
12	1.65
13	1.76
14	1.87
15	2
16	2.14

Filter size	No.	Replacement filter elements					
		FB	FC	FD	FE	FF	FG
6	1	E-B-6	E-C-6	E-D-6	E-E-6	E-F-6	E-G-6
10	1	E-B-10	E-C-10	E-D-10	E-E-10	E-F-10	E-G-10
18	1	E-B-18	E-C-18	E-D-18	E-E-18	E-F-18	E-G-18
28	1	E-B-28	E-C-28	E-D-28	E-E-28	E-F-28	E-G-28
48	1	E-B-48	E-C-48	E-D-48	E-E-48	E-F-48	E-G-48
71	1	E-B-48	E-C-71	E-D-71	E-E-71	E-F-71	E-G-71
107	1	E-B-107	E-C-107	E-D-107	E-E-107	E-F-107	E-G-107
138	1	E-B-138	E-C-138	E-D-138	E-E-138	E-F-138	E-G-138
177	1	E-B-177	E-C-177	E-D-177	E-E-177	E-F-177	E-G-177
221	1	E-B-138	E-C-221	E-D-221	E-E-221	E-F-221	E-G-221
185	1	E-B-185	E-C-185	E-D-185	E-E-185	E-F-185	E-G-185
283	2	E-B-283	E-C-283	E-D-283	E-E-283	E-F-283	E-G-283
354	2	E-B-185	E-C-185	E-D-185	E-E-185	E-F-185	E-G-185
526	3	E-B-185	E-C-185	E-D-185	E-E-185	E-F-185	E-G-185
708	4	E-B-185	E-C-185	E-D-185	E-E-185	E-F-185	E-G-185
885	5	E-B-185	E-C-185	E-D-185	E-E-185	E-F-185	E-G-185
1420	8	E-B-185	E-C-185	E-D-185	E-E-185	E-F-185	E-G-185
1950	11	E-B-185	E-C-185	E-D-185	E-E-185	E-F-185	E-G-185
2480	14	E-B-185	E-C-185	E-D-185	E-E-185	E-F-185	E-G-185

## Filters for 48 or 62 bar

Designation: High pressure filter



Flow rate*) m³/min	Filter size	Air connection	Weight kg					Dimensions A, B mm					Removal height mm	Max. working pressure bar
			FB	FC	FE	FF	FG	FB	FC	FE	FF	FG		
1.75	18	R 1/2	9					371 x 146					300	62
2.83	28	R 1	9					371 x 117					300	62
7.1	71	R 1	12					591 x 117					520	48
14.2	142	DN 65	35					930 x 350					650	48

\*) Air flow at 7bar (g) referred to 1bar (a) und 20°C

## Correction factors

Working pressure bar	7	25	40	64
Conversion factor for flow rate	1	3	5	8

## Replacement filter elements



Filter size	No.	Replacement filter elements for high-pressure filter series				
		FB	FC	FD	FE	FF
18	1	E-B-18/28	E-B-18/28	E-B-18/28	E-B-18/28	E-B-18/28
28	1	E-B-18/28	E-B-18/28	E-B-18/28	E-B-18/28	E-B-18/28
71	1	E-B-71	E-C-71	E-E-71	E-F-71	E-G-71
142	1	E-B-283	E-C-283	E-E-283	E-F-283	E-G-283

## Centrifugal separator for max. 16 bar

Air flow rate*) m³/min	Model	Air connection	Volume l	Weight kg	Dimensions H x W x Ø mm
2.0	ZK 01	G 3/4	0.8	1.1	292 x 89 x –
4.1	ZK 02	G 1	1.8	2.2	391.5 x 109 x –
6	ZK 03	G 1 1/4	1.8	2.2	391.5 x 109 x –
9.3	ZK 04	G 1 1/2	1.8	2.2	391.5 x 109 x –
15.2	ZK 05	G 2	5.3	4.3	575 x 150 x –
16.3	ZK 061	DN 65	11.0	22.0	654 x 370 x 168.3
26.4	ZK 071	DN 65	17.5	28.0	733 x 400 x 193.7
26.4	ZK 072	DN 80	18.0	30.0	733 x 400 x 193.7
46.1	ZK 08	DN 125	35.5	50.0	865 x 450 x 244.5
30.6	ZK 081	DN 80	34.0	44.0	892 x 460 x 244.5
36.8	ZK 091	DN 80	47.0	52.0	983 x 550 x 273
47.7	ZK 09	DN 125	50.0	60.0	983 x 550 x 273
80	ZK 10	DN 150	76.0	74.5	1082 x 570 x 324

\*) Air flow at 7bar (g) referred to 1bar (a) und 20°C

## KAESER filters – Options and accessories

### Filter monitor

Indicates when filter change is required.

- Indicates filter changes based on prescribed operational parameters



- Continuous measurement using intelligent electronics
- Easy-to-read LCD display, alarm LED
- Digital display of pressure drop

### Condensate drain ECO DRAIN

- Non-wearing electronic sensor, no moving parts
- Maximum reliability, no sticking or clogging
- No compressed air losses
- Button for test function
- self-monitoring electronics with automatic alarm sequences
- Floating alarm contact (not for ECO DRAIN 30)
- LED indicators for voltage supply and alarm messages (not ECO DRAIN 30)
- AC and DC (50 / 60 Hz) versions available
- All operating controls and control systems are water-resistant as per IP 65 (IP 54 for ECO DRAIN 30 and 31)



### Filter monitor box

The Filter Monitor Box allows remote filter monitoring. It evaluates the signals from a filter monitor, as well as from an ECO DRAIN condensate drain, and can pass messages to a central maintenance control system via two alarm contacts.



#### Group alarm (floating contact)

- Indication of (demand-dependent) service interval for filter element change
- Indication of optimum time for filter element change – computed by microprocessor-aided measurement value processing
- Maximum differential pressure exceeded (two minute delay)
- Condensate drain alarm

#### Safety alarm (floating contact only active in safety mode)

- Maximum differential pressure exceeded (5 second delay)

The power supply for the filter monitor and ECO DRAIN is provided by the filter monitor.

### Wall Bracket

Simple installation:

- Remove differential pressure indicator, remove fixing screws
- Screw the bracket to the wall
- Screw the filter housing to the bracket
- Reinstall the pressure differential indicator

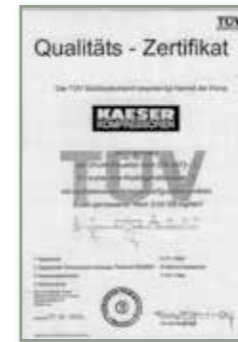


### Modular design

The specially designed housing allows various filters to be combined together in series without the need for additional piping.



### Certified Compressed Air Quality



The oil and solid particle content is reliably kept below ISO 8573-1 Class 1 limits. After passing through the air treatment systems, the delivered compressed air is designated as technically oil-free. The quality of the air produced by the KAESER compressed air system is tested and certified by TÜV, the German Technical Inspection Authority.

Note: Please also consider KAESER Air Main Charging Systems (see brochure P773), as these also help to ensure consistent compressed air quality.

### Genuine KAESER replacement filter elements

Only genuine KAESER replacement filter elements ensure reliable filtration with minimal pressure losses.

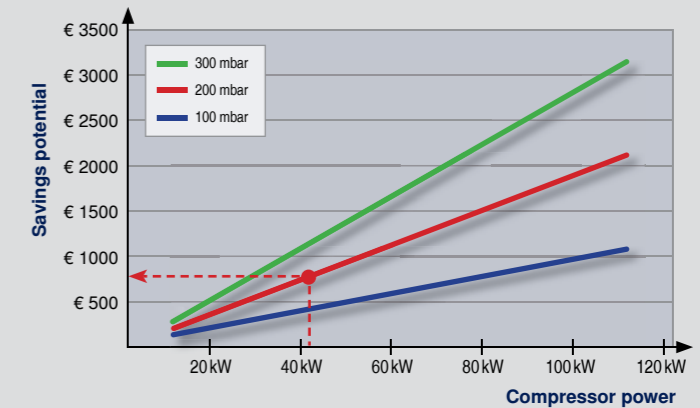
- Coalescence filter with new, matrix filter-fibre structure
- High efficiency even at low air volumes of only five percent of nominal flow
- Reliable element to housing seal
- Stainless steel orifice tubes, oil & acid resistant coated sleeves and end caps



KAESER replacement filter elements are also available for other housings.

### Savings potential with timely element changes

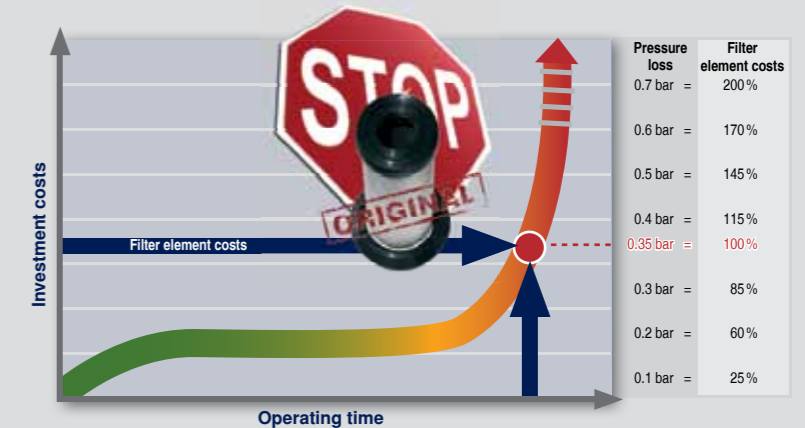
Timely element changes (which prevent a further differential pressure increase of 200mbar) result in annual energy cost savings of € 864 for a 45 KW compressor.



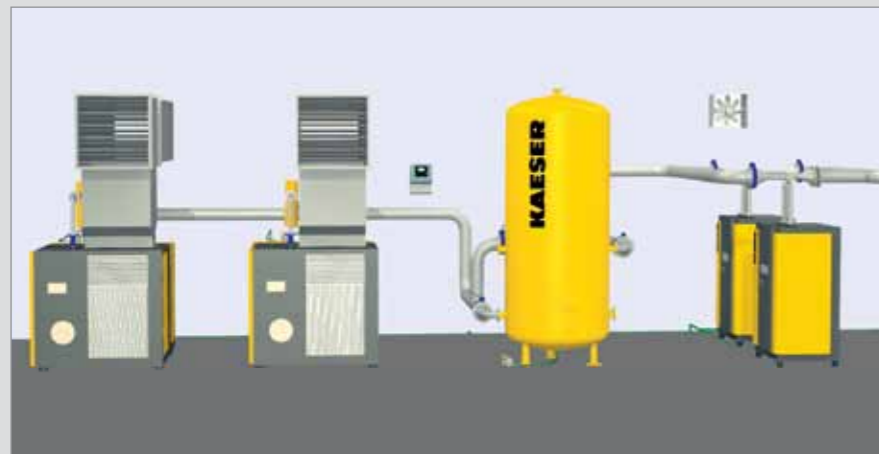
**Calculation parameters:**  
6000 operating hours/year – energy price 0.20 €/kWh – 8% increase in electrical power consumption per 1 bar increase in differential pressure – Compressor specific power 6.55 kW/(m³/min)

### Reduce operating costs

A pressure loss of only approx. 0.35bar is significantly more expensive than the costs required to change the filter element. Timely filter changes save considerable operating costs.



## Comprehensive design know-how

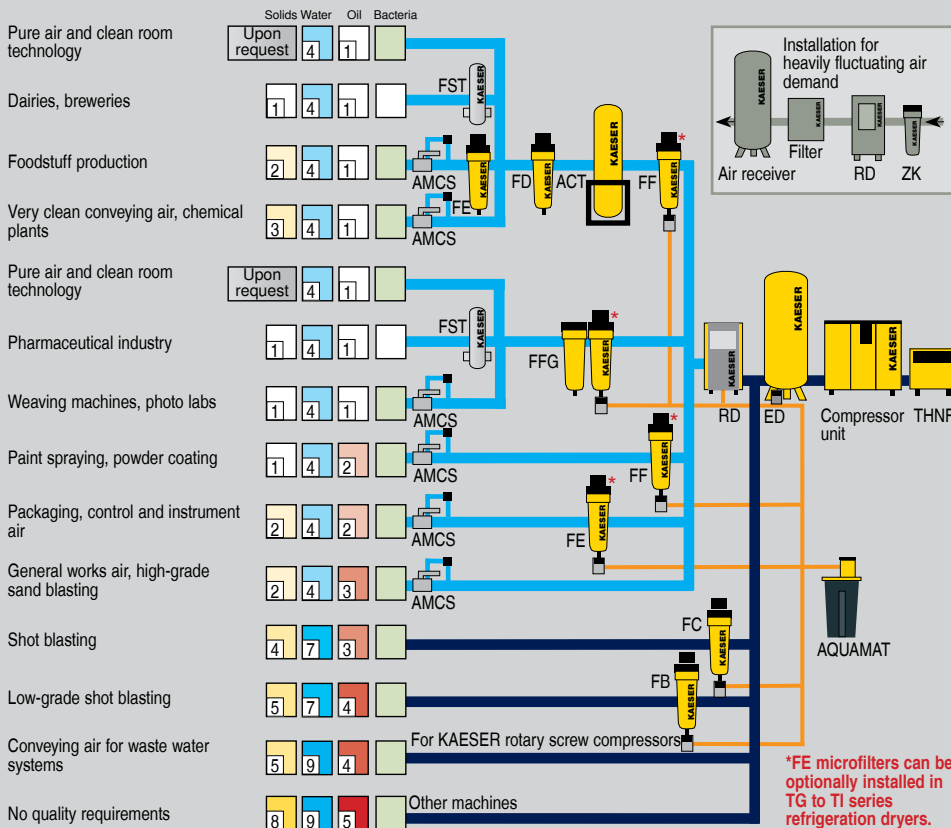


KESS (KAESER's Energy Saving System) provides comprehensive analysis of your compressed air usage, enabling KAESER's experts to plan and design a system that is specially tailored to meet all of your compressed air needs. Typically ensuring a 95-98% load capacity, KAESER compressed air systems provide exceptional efficiency and produce application-specific quality compressed air at lowest possible cost. Use this expertise to your advantage and let KAESER design your compressed air system.

## Choose the required grade of treatment according to your field of application:

Air treatment using a refrigeration dryer (pressure dew point +3°C)

Application examples: Selection of treatment classes to ISO 8573-1 (2010)



	Explanation
THNF	Bag filter
ZK	Centrifugal separator
ED	ECO DRAIN
FB / FC	Pre-filter
FD	Particulate filter
FE / FF	Microfilter
FG	Activated carbon filter
FFG	Activated carbon and microfilter combination
RD	Refrigeration dryer
DD	Desiccant dryers
ACT	Activated carbon adsorber
FST	Sterile filter, upon request
Aquamat	Aquamat
AMCS	Air-main charging system

Compressed air quality classes to ISO 8573-1(2010):

Solid particles/dust			
Class	max. particle count per m <sup>3</sup> of a particle size with d [µm]*		
	0.1 ≤ d ≤ 0.5	0.5 ≤ d ≤ 1.0	1.0 ≤ d ≤ 5.0
0	e.g. Consult KAESER regarding pure air and cleanroom technology		
1	≤ 20.000	≤ 400	≤ 10
2	≤ 400.000	≤ 6.000	≤ 100
3	Not defined	≤ 90.000	≤ 1.000
4	Not defined	Not defined	≤ 10.000
5	Not defined	Not defined	≤ 100.000
Particle concentration C <sub>p</sub> in mg/m <sup>3</sup> *			
6	0 < C <sub>p</sub> ≤ 5		
7	5 < C <sub>p</sub> ≤ 10		
X	C <sub>p</sub> > 10		

Water	
Class	Pressure dew point, in °C
0	e.g. Consult KAESER regarding pure air and cleanroom technology
1	≤ -70 °C
2	≤ -40 °C
3	≤ -20 °C
4	≤ +3 °C
5	≤ +7 °C
6	≤ +10 °C
Concentration of liquid water C <sub>w</sub> in g/m <sup>3</sup> *	
7	C <sub>w</sub> ≤ 0.5
8	0.5 < C <sub>w</sub> ≤ 5
9	5 < C <sub>w</sub> ≤ 10
X	C <sub>w</sub> > 10

Oil	
Class	Total oil concentration (fluid, aerosol + gaseous) [mg/m <sup>3</sup> ]*
0	e.g. Consult KAESER regarding pure air and cleanroom technology
1	≤ 0.01
2	≤ 0.1
3	≤ 1.0
4	≤ 5.0
X	> 5.0

\*) At reference conditions 20°C, 1 bar(a), 0% humidity

## For non frost protected air systems: Compressed air treatment with a desiccant dryer (down to -70 °C pressure dew point)

