

COMPRESSED AIR TREATMENT

- Basic Principals
- Air Filters
- Refrigeration Dryers
- Adsorption Dryers
- Air Receiver Tanks
- Condensate Drains
- Oil / Water Separators





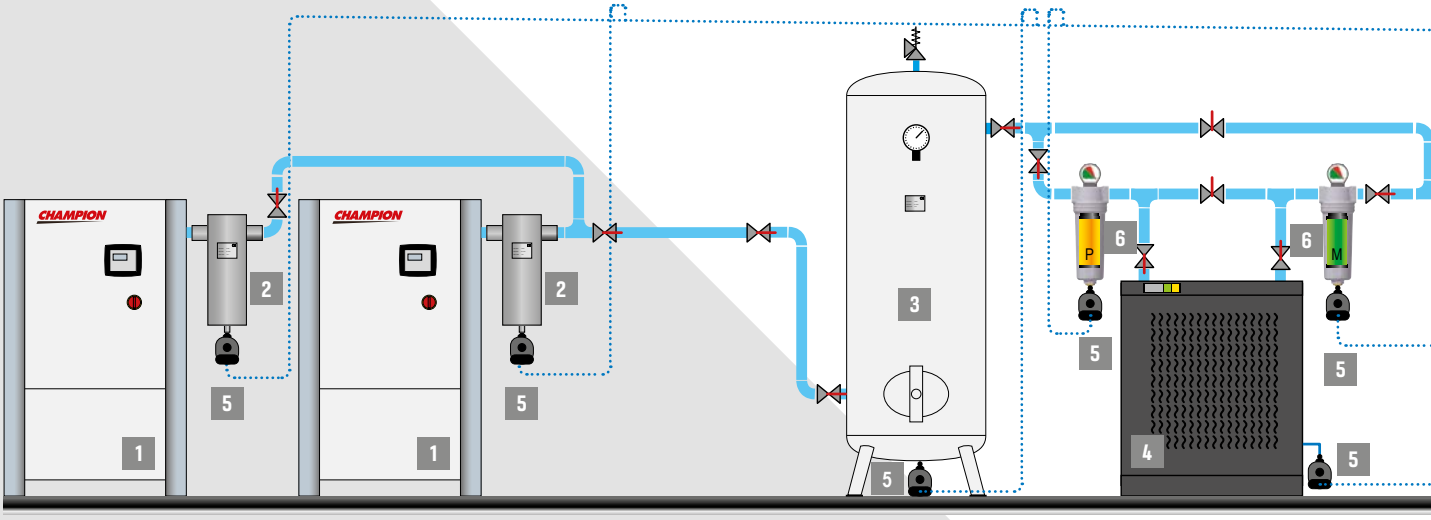
Compressed air quality classes according to ISO 8573-1:2010

CLASS	SOLID PARTICLES MAXIMUM NUMBER OF PARTICLES PER CUBIC METER AS A FUNCTION OF PARTICLE SIZE, D[2]			HUMIDITY AND LIQUID WATER PRESSURE DEW POINT		OIL CONCENTRATION OF TOTAL OIL[2] (LIQUID, AEROSOL AND VAPOUR)	
	[0.1 µm < d ≤ 0.5 µm]	[0.5 µm < d ≤ 1.0 µm]	[1.0 µm < d ≤ 5.0 µm]	[°C]	[°F]	[mg/m³]	[ppm / w / w]
0	As specified by the equipment user or supplier and more stringent than class[1]						
1	≤ 20,000	≤ 400	≤ 10	≤ -70	-94	≤ 0.01	≤ 0.008
2	≤ 400,000	≤ 6,000	≤ 100	≤ -40	-40	≤ 0.1	≤ 0.08
3	Not specified	≤ 90,000	≤ 1,000	≤ -20	-4	≤ 1	≤ 0.8
4	Not specified	Not specified	≤ 10,000	≤ +3	38	≤ 5	≤ 4
5	Not specified	Not specified	≤ 100,000	≤ +7	45	Not specified	Not specified
6				≤ ±10	50		

	MASS CONCENTRATION[2] - C_p [mg/m³]	LIQUID WATER CONTENT[2] - C_W [g/m³]		
6	$0 < C_p \leq 5$		Not specified	Not specified
7	$5 < C_p \leq 10$	$C_W \leq 0.5$	Not specified	Not specified
8	Not specified	$0.5 \leq C_W \leq 5$	Not specified	Not specified
9	Not specified		Not specified	Not specified
X	$C_p > 10$		> 5	> 4

[1] To qualify for a class designation, each size range and particle number within a class shall be met.
[2] At reference conditions: air temperature of 20° C, absolute air pressure of 100 kPa (1 bar), 0 relative water vapour pressure.

BASIC PRINCIPLES OF MOST TYPICAL COMPRESSED AIR APPLICATION



1. Compressor: The basic working principle of an air compressor is to compress atmospheric air, which is then used as per the requirements. In the process, atmospheric air is drawn in through an intake valve; more and more air is pulled inside a limited space mechanically by means of piston, impeller, or vane.

Since the amount of pulled atmospheric air is increased in the receiver or storage tank, volume is reduced and pressure is raised automatically. In simpler terms, free or atmospheric air is compressed after reducing its volume and at the same time, increasing its pressure.

Champion can provide many types of compressor to suit your needs.

2. Cyclone condensate separator: Cyclone condensate separators use centrifugal motion to force liquid water out of compressed air.

The spinning causes the condensate to join together on the centrifugal separators walls when the condensate gains enough mass it falls to the bottom of the separators bowl where it pools in the sump until it is flushed out of the system by the automatic float drain valve.

They are installed following aftercoolers to remove the condensed moisture.

3. Pressure vessel: Pressure vessel plays very important role in compressed air system:

- Damping pulsations caused by reciprocating compressors
- Providing a location for free water and lubricant to settle from the compressed air stream
- Supplying peak demands from stored air without needing to run an extra compressor
- Reducing load/unload or start/stop cycle frequencies to help screw compressors run more efficiently and reduce motor starts
- Slowing system pressure changes to allow better compressor control and more stable system pressures

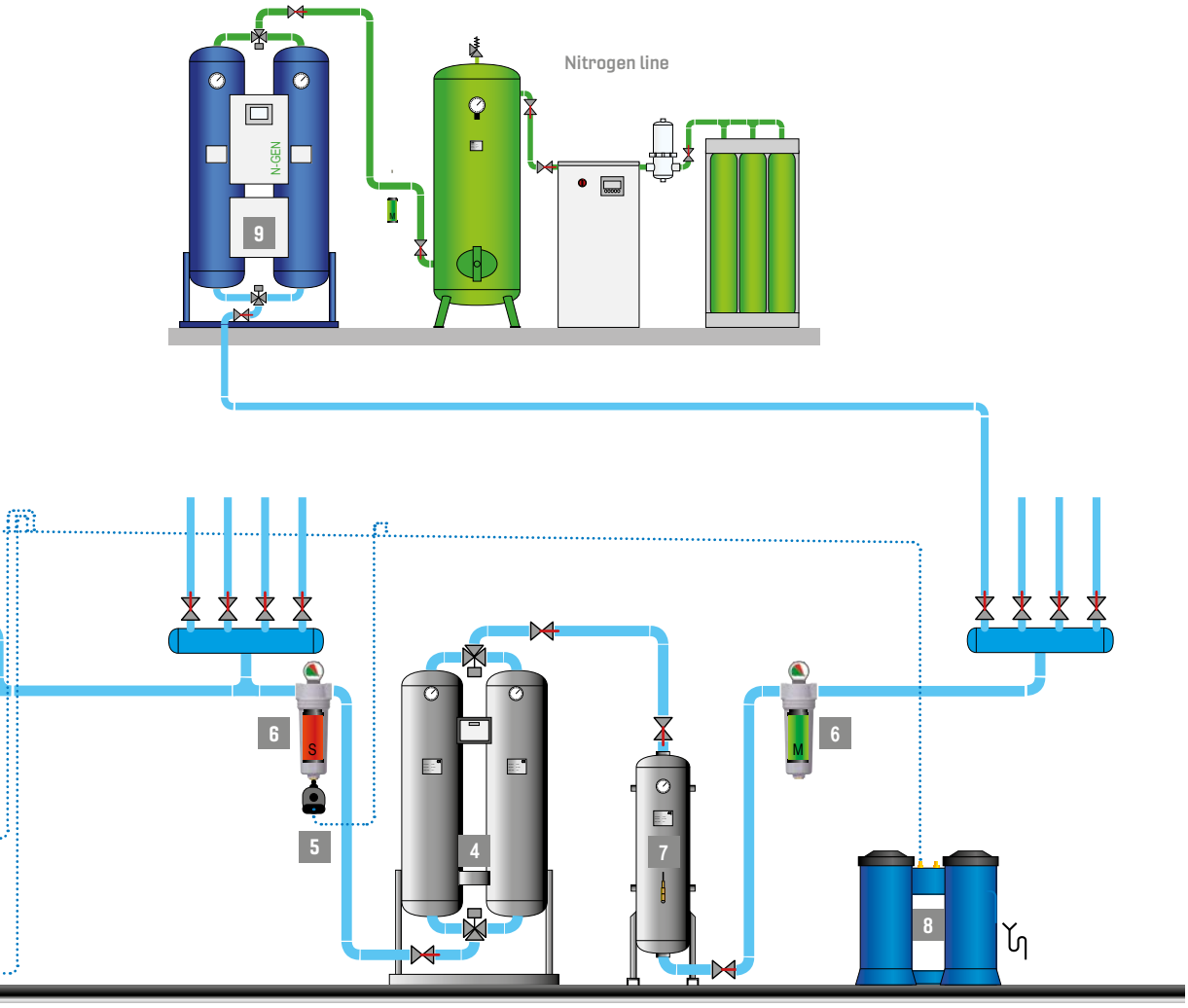
4. Compressed air dryer : Compressed air leaving the compressor aftercooler and moisture separator is normally warmer than the ambient air and fully saturated with moisture. As the air cools the moisture will condense in the compressed air lines. Excessive entrained moisture can result in undesired pipe corrosion and contamination at point of end use.

For this reason some sort of air dryer is normally required.

Some end use applications require very dry air, such as compressed air distribution systems where pipes are exposed to winter conditions. Drying the air to dew points below ambient conditions is necessary to prevent ice buildup.

Common types:

- Refrigerant
- Dessicant
- Membrane



5. Condensate drain: Drains are needed at all separators, filters, dryers and receivers in order to remove the liquid condensate from the compressed airsystem.

Failed drains can allow slugs of moisture to flow downstream that can overload the air dryer and foul end use equipment.

6. Filter: Compressed air filters are used for high efficient removal of solid particles, water, oil aerosols, hydrocarbons, odour and vapours from compressed air systems.

To meet the required compressed air quality appropriate filter element must be installed into filter housing.

7. Activated carbon tower: Activated carbon tower eliminates hydrocarbon vapours and odours from compressed air. Towers are filled with activated carbon adsorbent that adsorbs contaminants onto the surface of its internal pores. Activated carbon towers are used at applications where content of oil vapours needs to be reduced to minimum.

Activated carbon towers can be incorporated in existing compressed air systems significantly minimising the risks of contamination.

They are able to absorb oil carry-over (both liquid and vapour) to provide the plant with technically oil-free compressed air.

8. Oil/water separator: Local environmental laws and regulations state that condensate drained from compressed air systems cannot be returned to the sewage system due to the content of compressor lubricating oil. Water/oil separators are one of the most efective and economical solution. Multi-stage separation process using oleophilic filters and activated carbon, ensures exceptional performance and trouble free operation.

9. Nitrogen generator: The nitrogen generators extract the available nitrogen in the ambient air from the other gases by applying the Pressure Swing Adsorption (PSA) technology. During the PSA process compressed, cleaned ambient air is led to a molecular sieve bed, which allows the nitrogen to pass through as a product gas, but adsorbs other gases.

End user advice

- Replace inappropriate end use applications with efficient models (vortex nozzles, atomizers)
- Install a flow controller to lower plant pressure and reduce artificial demand caused by higher than required pressures
- Turn off air consuming equipment, using electric solenoids or manual shutoff valves
- Avoid operation of air tools without a load, as this consumes more air than a tool under load
- Replace worn tools, as they often require higher pressure and consume excess compressed air than tools in good shape
- Lubricate air tools as recommended by the manufacturer. Keep air used by all end uses free of condensate in order to maximise tool life and effectiveness
- Where possible and practical, group end use air equipment that has similar air requirements of pressure and air quality

At a glance...

Nominal Pressure
17 bar

Connections
3/8" - 3"

Volume Flow
18 - 18247 cfm



ALUMINUM COMPRESSED AIR FILTERS **CHF SERIES**

The reliability of compressed air filtration is paramount to the ongoing fight against problems caused through contamination entering the air system. Contamination in the form of dirt, oil and water can lead to:

- Pipescale and corrosion within pressure vessels
- Damage to production equipment, air motors, air tools, valves and cylinders
- Premature and unplanned desiccant replacement for adsorption dryers
- Spoiled product

The Champion filtration range offers various products and grades of filtration to provide peace of mind whatever the air quality requirement. It has been designed with focus on reliability and efficiency.

Designed and Built for Exceptional Performance

The advanced compressed air filter range from Champion reduces contamination in your air stream to help protect your critical processes and valuable equipment.

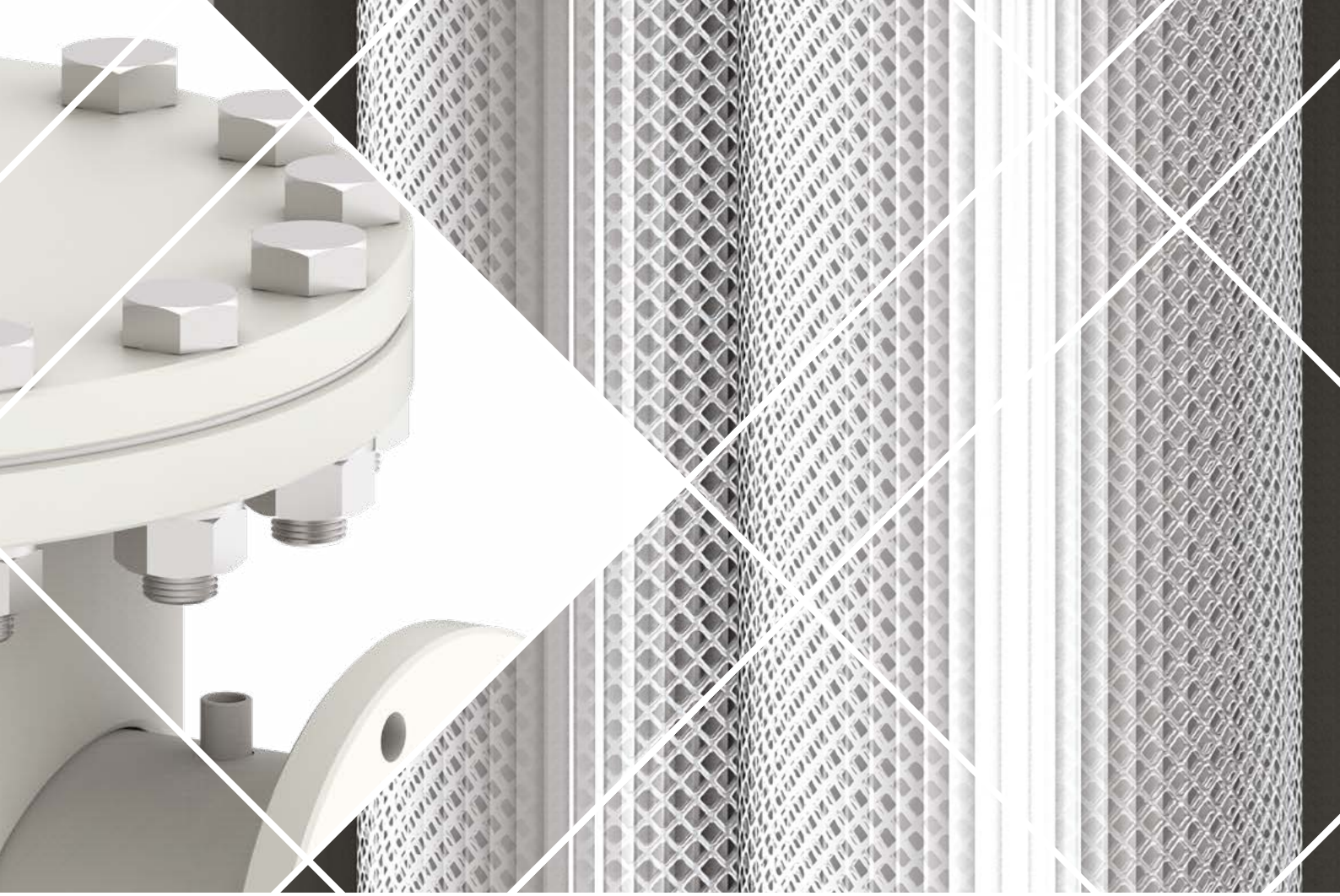
These filters are rigorously tested and engineered with superior components to provide years of reliable performance and consistently high-quality air.

The standard for high-quality air

The Champion filter range provides clean, high-quality air as defined by ISO 8573.1:2010 and are certified by a third party under ISO 12500-1.

Applications

- General industrial applications
- Automotive
- Electronics
- Food and beverage
- Chemical
- Petrochemical
- Plastics
- Paint



Compressed Air Purification -
The perfect choice!

Water Separation – The CHF Range of water separators

The CHF-range of water separators provide bulk condensed water and liquid oil removal and are used to protect coalescing filters against bulk liquid contamination.

0.5 – 200 m³/min*

18 – 7062 cfm*



Filtration – The CHF Range of compressed air filters

The CHF-range of filters efficiently removes water and oil aerosols, atmospheric dirt and solid particles, rust, pipescale and micro-organisms.

0.5 – 45 m³/min*

18 – 1600 cfm*



Compressed air contamination will ultimately lead to:

- **Inefficient production processes**
- **Spoiled, damaged or reworked products**
- **Reduced production efficiency**
- **Increased manufacturing costs**

Filtration – The CHF Range of flanged filters**

For larger flowrate or higher pressure applications the flanged filters are available in the standard four filtration grades.

48 – 516 m³/min*

1702 – 18247 cfm*

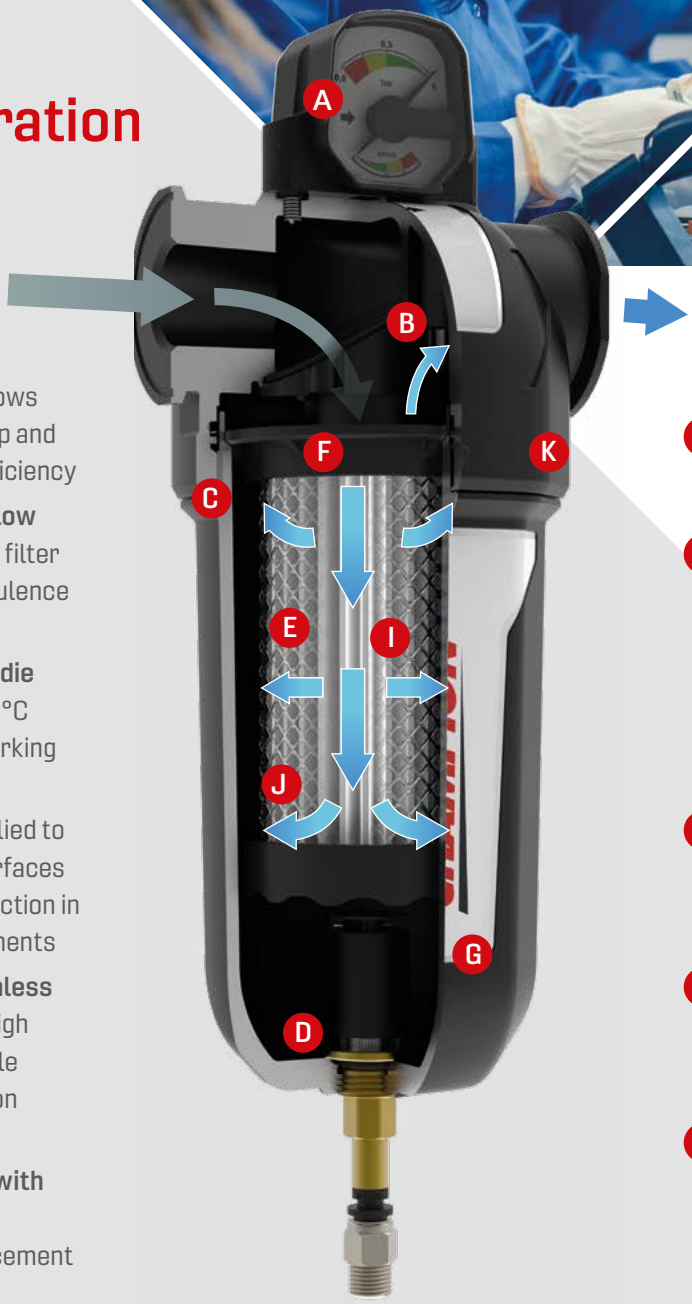


* Flow rate at 20° C, 7 bar

** On request



Superior Filtration Technology



- **A** **Patented dual indicator (optional accessory)** shows differential pressure drop and economical operating efficiency
- **B** **Patented smooth bore flow insert** directs air into the filter element, minimising turbulence and pressure losses
- **C** **All-aluminum, precision die cast body** suitable for 80°C and 17 bar g maximum working pressure applications
- **D** **Proprietary coating** applied to the inside and outside surfaces provides corrosion protection in harsh industrial environments
- **E** **Filter element with stainless steel mesh** withstands high differential pressure while minimizing flow restriction through the element
- **F** **Ergonomic bowl design with no-touch filter element** simplifies element replacement
- **G** **Time strip label indicates** when it's time to change the element (CHF Grade only)
- **H** **Reliable discharge** The M and S grade filters and water separators are equipped with internal float drain. The Particulate (R) and Activated Carbon (A) filters have manual drain
- **I** **Deep-pleated filter media** reduces air flow velocity to maximise filtration efficiency and minimise pressure losses
- **J** **High-efficiency drainage layer** improves liquid drainage properties and enhances chemical compatibility
- **K** **Simple visual alignment** of the filter head and bowl ensures accurate assembly of components and helps to improve safety

High efficiency bulk liquid removal

Water separators remove bulk liquids such as condensate, water and liquid oil from the air flow through directional and centrifugal separation. Installed before a coalescing filter the water separator can provide added protection against bulk liquid contamination enabling the filter to operate more efficiently.

The CHF Series water separator range from Champion can operate across various flow conditions and have been optimised to reduce differential pressure with very low maintenance.



Technical data

Compressed Air Condensate Separators - CHF Series

SEPARATOR MODEL	CHAMPION PART NUMBER CCN	CONNECTION SIZE	FLOW RATE		MAX. PRESSURE		DIMENSIONS [MM]		WEIGHT
			m³/min	cfm	bar	psi	W	H	kg
CHF005W	47700907001	3/8"	0.50	18	17	250	76	175	0.6
CHF007W	47700908001	1/2"	0.66	23	17	250	76	175	0.6
CHF018W	47700909001	3/4"	1.8	64	17	250	98	230	1.2
CHF040W	47700910001	1"	4.0	141	17	250	129	268	2.2
CHF085W	47700911001	1 1/2"	8.5	300	17	250	129	268	2.1
CHF170W	47700912001	2"	17.0	600	17	250	170	467	5.1
CHF380W	47700913001	3"	38.0	1342	17	250	205	548	20

Compressed Air Filters CHF Series - Grade M

FILTER MODEL	CHAMPION PART NUMBER CCN	CONNECTION SIZE	FLOW RATE		MAX. PRESSURE		DIMENSIONS [MM]		WEIGHT
			m³/min	cfm	bar	psi	W	H	kg
CHF005LM	47698906001	3/8"	0.5	18	17	250	76	225	0.55
CHF007LM	47698907001	1/2"	0.7	24	17	250	76	225	0.55
CHF013LM	47698908001	3/4"	1.3	44	17	250	98	280	1.07
CHF018LM	47698909001	3/4"	1.8	65	17	250	98	280	1.09
CHF025LM	47698910001	1"	2.5	88	17	250	129	319	2.06
CHF032LM	47698911001	1"	3.2	112	17	250	129	319	2.06
CHF038LM	47698912001	1"	3.8	135	17	250	129	319	2.06
CHF067LM	47698913001	1 1/2"	6.7	235	17	250	129	409	2.36
CHF082LM	47698914001	1 1/2"	8.2	288	17	250	129	409	2.36
CHF100LM	47698915001	2"	10	353	17	250	170	518	5.2
CHF0133LM	47698916001	2"	13.3	471	17	250	170	518	5.24
CHF0167LM	47698917001	2"	16.7	589	17	250	170	518	5.26
CHF0200LM	47698918001	3"	20	706	17	250	205	600	9.31
CHF0260LM	47698919001	3"	26	918	17	250	205	700	10.69
CHF0305LM	47698920001	3"	30.5	1077	17	250	205	700	10.69
CHF0383LM	47698921001	3"	38.3	1354	17	250	205	930	13.7
CHF0450LM	47698922001	3"	45	1589	17	250	205	930	13.7



Compressed Air Filters CHF Series - Grade S

FILTER MODEL	CHAMPION PART NUMBER CCN	CONNECTION SIZE	FLOW RATE		MAX. PRESSURE		DIMENSIONS [MM]		WEIGHT
			m³/min	cfm	bar	psi	W	H	kg
CHF005LS	47698923001	3/8"	0.5	18	17	250	76	225	0.55
CHF007LS	47698924001	1/2"	0.7	24	17	250	76	225	0.55
CHF013LS	47698925001	3/4"	1.3	44	17	250	98	280	1.07
CHF018LS	47698926001	3/4"	1.8	65	17	250	98	280	1.09
CHF025LS	47698927001	1"	2.5	88	17	250	129	319	2.06
CHF032LS	47698928001	1"	3.2	112	17	250	129	319	2.06
CHF038LS	47698929001	1"	3.8	135	17	250	129	319	2.06
CHF067LS	47698930001	1 1/2"	6.7	235	17	250	129	409	2.36
CHF082LS	47698931001	1 1/2"	8.2	288	17	250	129	409	2.36
CHF100LS	47698932001	2"	10	353	17	250	170	518	5.2
CHF0133LS	47698933001	2"	13.3	471	17	250	170	518	5.24
CHF0167LS	47698934001	2"	16.7	589	17	250	170	518	5.26
CHF0200LS	47698935001	3"	20	706	17	250	205	600	9.31
CHF0260LS	47698936001	3"	26	918	17	250	205	700	10.69
CHF0305LS	47698937001	3"	30.5	1077	17	250	205	700	10.69
CHF0383LS	47698938001	3"	38.3	1354	17	250	205	930	13.7
CHF0450LS	47698939001	3"	45	1589	17	250	205	930	13.7

Compressed Air Filters CHF Series - Grade A

FILTER MODEL	CHAMPION PART NUMBER CCN	CONNECTION SIZE	FLOW RATE		MAX. PRESSURE		DIMENSIONS [MM]		WEIGHT
			m³/min	cfm	bar	psi	W	H	kg
CHF005LA	47698957001	3/8"	0.5	18	17	250	76	225	0.55
CHF007LA	47698958001	1/2"	0.7	24	17	250	76	225	0.55
CHF013LA	47698959001	3/4"	1.3	44	17	250	98	280	1.07
CHF018LA	47698960001	3/4"	1.8	65	17	250	98	280	1.09
CHF025LA	47698961001	1"	2.5	88	17	250	129	319	2.06
CHF032LA	47698962001	1"	3.2	112	17	250	129	319	2.06
CHF038LA	47698963001	1"	3.8	135	17	250	129	319	2.06
CHF067LA	47698964001	1 1/2"	6.7	235	17	250	129	409	2.36
CHF082LA	47698965001	1 1/2"	8.2	288	17	250	129	409	2.36
CHF100LA	47698966001	2"	10	353	17	250	170	518	5.2
CHF0133LA	47698967001	2"	13.3	471	17	250	170	518	5.24
CHF0167LA	47698968001	2"	16.7	589	17	250	170	518	5.26
CHF0200LA	47698969001	3"	20	706	17	250	205	600	9.31
CHF0260LA	47698970001	3"	26	918	17	250	205	700	10.69
CHF0305LA	47698971001	3"	30.5	1077	17	250	205	700	10.69
CHF0383LA	47698972001	3"	38.3	1354	17	250	205	930	13.7
CHF0450LA	47698973001	3"	45	1589	17	250	205	930	13.7



Compressed Air Filters CHF Series - Grade R

FILTER MODEL	CHAMPION PART NUMBER CCN	CONNECTION SIZE	FLOW RATE		MAX. PRESSURE		DIMENSIONS [MM]		WEIGHT
			m³/min	cfm	bar	psi	W	H	kg
CHF005LR	47698940001	3/8"	0.5	18	17	250	76	225	0.55
CHF007LR	47698941001	1/2"	0.7	24	17	250	76	225	0.55
CHF013LR	47698942001	3/4"	1.3	44	17	250	98	280	1.07
CHF018LR	47698943001	3/4"	1.8	65	17	250	98	280	1.09
CHF025LR	47698944001	1"	2.5	88	17	250	129	319	2.06
CHF032LR	47698945001	1"	3.2	112	17	250	129	319	2.06
CHF038LR	47698946001	1"	3.8	135	17	250	129	319	2.06
CHF067LR	47698947001	1 1/2"	6.7	235	17	250	129	409	2.36
CHF082LR	47698948001	1 1/2"	8.2	288	17	250	129	409	2.36
CHF100LR	47698949001	2"	10	353	17	250	170	518	5.2
CHF0133LR	47698950001	2"	13.3	471	17	250	170	518	5.24
CHF0167LR	47698951001	2"	16.7	589	17	250	170	518	5.26
CHF0200LR	47698952001	3"	20	706	17	250	205	600	9.31
CHF0260LR	47698953001	3"	26	918	17	250	205	700	10.69
CHF0305LR	47698954001	3"	30.5	1077	17	250	205	700	10.69
CHF0383LR	47698955001	3"	38.3	1354	17	250	205	930	13.7
CHF0450LR	47698956001	3"	45	1589	17	250	205	930	13.7

Grade M - General Purpose Protection

Particle removal down to 0.1 micron including coalesced liquid, water and oil, providing a maximum remaining oil aerosol content of 0.03 mg/m³ @ 21°C

Grade S - High Efficiency Oil Removal Filtration

Particle removal down to 0.01 micron including water and oil aerosols, providing a maximum remaining oil aerosol content of 0.01 mg/m3 @ 21°C (Precede with Grade M filter)

Grade A - Activated Carbon Filtration

Oil vapor and hydrocarbon odor removal, providing a maximum remaining oil content of <0.003 mg/m³ (<0.003 ppm) @ 21°C (Precede with Grade S filter)

Grade R - General Purpose Dust Filtration

Dust particle removal down to 1 micron

Operating Limitations:

Max Operating Pressure 17.2 bar g

Max Recommended Operating Temp 80°C (Grade M, S, R)

Max Recommended Operating Temp 50°C (Grade A)

Min Recommended Operating Temp 1°C

LINE PRESSURE	bar g	1	2	3	5	7	9	11	13	15	17
CORRECTION FACTOR		0.38	0.53	0.65	0.85	1.00	1.13	1.25	1.36	1.46	1.56

To use correction factors, multiply the filter's capacity by the correction factor to get the new filter flow capacity at the non-standard operating pressure. For example, a 190 m³/h filter operating at 11 bar has a correction factor of 1.25. 1.25 x 190 = 237.5 m³/h capacity at 11 bar.



Technical data

Compressed Air Filter Elements CHF Series - Grade M

FILTER MODEL	FILTER ELEMENT
CHF005LM	47699428001
CHF007LM	47699432001
CHF013LM	47699436001
CHF018LM	47699440001
CHF025LM	47699444001
CHF032LM	47699448001
CHF038LM	47699452001
CHF067LM	47699456001
CHF082LM	47699460001
CHF100LM	47699464001
CHF0133LM	47699468001
CHF0167LM	47699472001
CHF0200LM	47699476001
CHF0260LM	47700081001
CHF0305LM	47700085001
CHF0383LM	47700089001
CHF0450LM	47700093001

Compressed Air Filter Elements CHF Series - Grade A

FILTER MODEL	FILTER ELEMENT
CHF005LA	47699431001
CHF007LA	47699435001
CHF013LA	47699439001
CHF018LA	47699443001
CHF025LA	47699447001
CHF032LA	47699451001
CHF038LA	47699455001
CHF067LA	47699459001
CHF082LA	47699463001
CHF100LA	47699467001
CHF0133LA	47699471001
CHF0167LA	47699475001
CHF0200LA	47700080001
CHF0260LA	47700084001
CHF0305LA	47700088001
CHF0383LA	47700092001
CHF0450LA	47700096001

Compressed Air Filter Elements CHF Series - Grade S

FILTER MODEL	FILTER ELEMENT
CHF005LS	47699429001
CHF007LS	47699433001
CHF013LS	47699437001
CHF018LS	47699441001
CHF025LS	47699445001
CHF032LS	47699449001
CHF038LS	47699453001
CHF067LS	47699457001
CHF082LS	47699461001
CHF100LS	47699465001
CHF0133LS	47699469001
CHF0167LS	47699473001
CHF0200LS	47700078001
CHF0260LS	47700082001
CHF0305LS	47700086001
CHF0383LS	47700090001
CHF0450LS	47700094001

Compressed Air Filter Elements CHF Series - Grade R

FILTER MODEL	FILTER ELEMENT
CHF005LR	47699430001
CHF007LR	47699434001
CHF013LR	47699438001
CHF018LR	47699442001
CHF025LR	47699446001
CHF032LR	47699450001
CHF038LR	47699454001
CHF067LR	47699458001
CHF082LR	47699462001
CHF100LR	47699466001
CHF0133LR	47699470001
CHF0167LR	47699474001
CHF0200LR	47700079001
CHF0260LR	47700083001
CHF0305LR	47700087001
CHF0383LR	47700091001
CHF0450LR	47700095001

Notes