

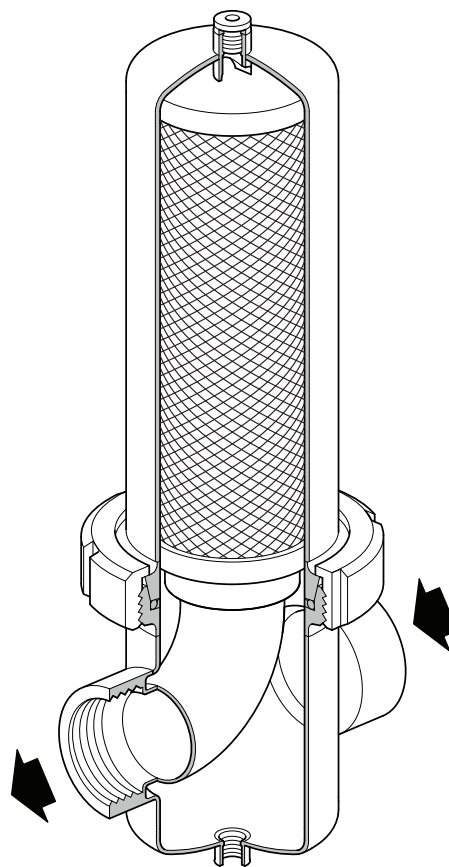


CSF16 and CSF16T Stainless Steel Sterile Air Filters

Description

The CSF16 and CSF16T are horizontal, in-line high efficiency filters used to remove contaminate particles and bacteria from compressed air systems.

The filter housings are available in a choice of austenitic stainless steel and the material grades are defined in the table below. Also referenced is the surface finish.



Filter Housing model	Sizes	Material of Filter Housing (Bowl and Head)	Connection type (Bowl and Head)	Internal surface finish	External surface finish
CSF16, CF16L*, CSF16H*	DN8 (1/4") to DN80 (3")	1.4301 (304 stainless steel)	Food industry fitting to DIN 11851	Etched, Passivated and Polished Ra 0.8µm	Etched, Passivated and Polished Ra 1.6µm
CSF16T, CF16LT*, CSF16HT*	DN8 (1/4") to DN80 (3")	1.4404 (316L stainless steel)	Food industry fitting to DIN 11851	Etched, Passivated and Polished Ra 0.8µm	Etched, Passivated and Polished Ra 1.6µm

*In some pipe sizes the housing is available in a choice of low capacity designated 'L' and high capacity designated 'H'.

Replaceable borosilicate depth filter elements are available with a retention rate of >than 99.9998% related to 0.2 µm. For Bacterial retention, Log Reduction Value (LRV) >7cm² for viruses and Phages. These must be ordered separately to the filter housing.

Standards

These products fully comply with the requirements of the EU Pressure Equipment Directive/UK Pressure Equipment (Safety) Regulations and carry the  /  marks when so required.

Please note that all materials meet the requirements as stipulated by the US FDA Regulations.

The complete product and component parts are, manufactured, assembled, tested and packaged in a facility verified and approved by an accredited registered body to ISO 9001:2015.

Certification

The CSF16/CSF16T can be supplied with material certification as per the table below. Note: All certification/inspection requirements must be stated at the time of order placement.

Housing PED Category (SEP, Category I, Category II)	EN10204 Inspection Documents
SEP	No certification supplied
Cat. I	No certification supplied
Cat. II	Type 3.1 (Inspection Certificate) is supplied as standard

If type 3.1 certification is required for SEP or Cat. I Filter Housings, this must be ordered separately.

Filter Housings options matrix

CSF16 and CSF16T Filter Housing Options, PED Classification and Design Reference (PT Curve)

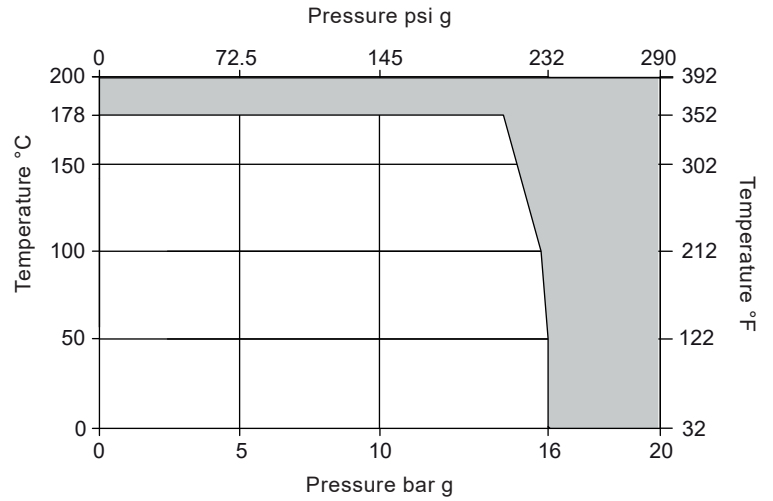
Filter Housing Size	Filter Housing code	Filter Housing Seal Material	Screwed Filter Housings (Design reference/ PED Category)	Flanged Filter Housings (Design reference/ PED Category)
			NPT	EN 1735-1 Class 150
DN8 (¼")	CSF16/CSF16T	EPM	Design Ref. A/SEP	Not available
DN10 (⅜")	CSF16/CSF16T		Design Ref. A/SEP	Not available
DN15 (½")	CSF16/CSF16T		Design Ref. A/SEP	Design Ref. A/SEP
DN20 (¾")	CSF16/CSF16T		Design Ref. A/SEP	Design Ref. A/SEP
DN25 (1")	CSF16/CSF16T		Design Ref. A/SEP	Design Ref. A/SEP
DN32 (1¼")	CSF16/CSF16T		Design Ref. A/SEP	Design Ref. A/SEP
DN40 (1½")	CSF16/CSF16T		Design Ref. A/SEP	Design Ref. A/SEP
DN50 (2")	CSF16L/CSF16LT		Design Ref. A/Cat. I	Design Ref. A/Cat. I
	CSF16H/CSF16HT		Design Ref. A1/Cat. I	Design Ref. A/Cat. I
DN65 (2½")	CSF16/CSF16T		Design Ref. A/Cat. I	Design Ref. A/Cat. I
DN80 (3")	CSF16L/CSF16LT		Design Ref. A/Cat. II	Design Ref. A/Cat. II
	CSF16H/CSF16HT		Design Ref. B/Cat. II	Design Ref. B/Cat. II

Pressure/temperature limits

CSF16/CSF16T

Product Design Reference A

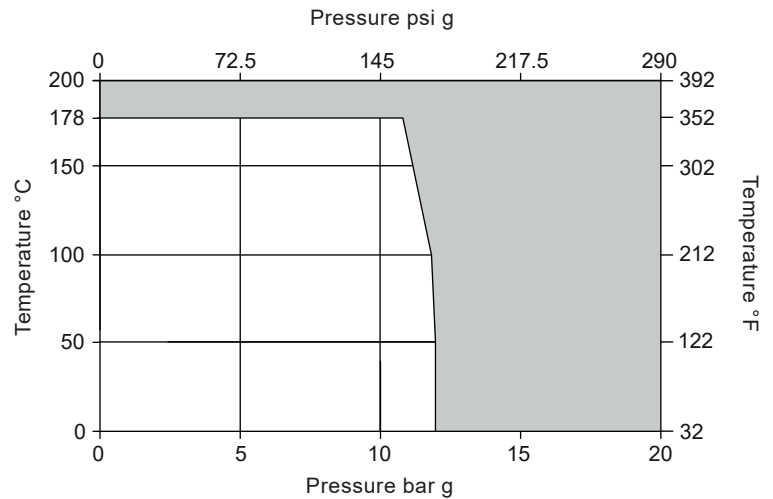
PMA	Maximum allowable pressure	16 bar g	232 psi g
TMA	Maximum allowable temperature	178 °C	352 °F
PMO	Maximum operating pressure	16 bar g	232 psi g
TMO	Maximum operating temperature	178 °C	352 °F
	Minimum allowable temperature	-5 °C	23 °F
	Minimum operating temperature	0 °C	32 °F
	Cold hydraulic test pressure	27.5 bar g	399 psi g



The product **must not** be used in this region.

Product Design Reference B

PMA	Maximum allowable pressure	12 bar g	174 psi g
TMA	Maximum allowable temperature	178 °C	352 °F
PMO	Maximum operating pressure	12 bar g	174 psi g
TMO	Maximum operating temperature	178 °C	352 °F
	Minimum allowable temperature	-5 °C	23 °F
	Minimum operating temperature	0 °C	32 °F
	Cold hydraulic test pressure	20.6 bar g	299 psi g



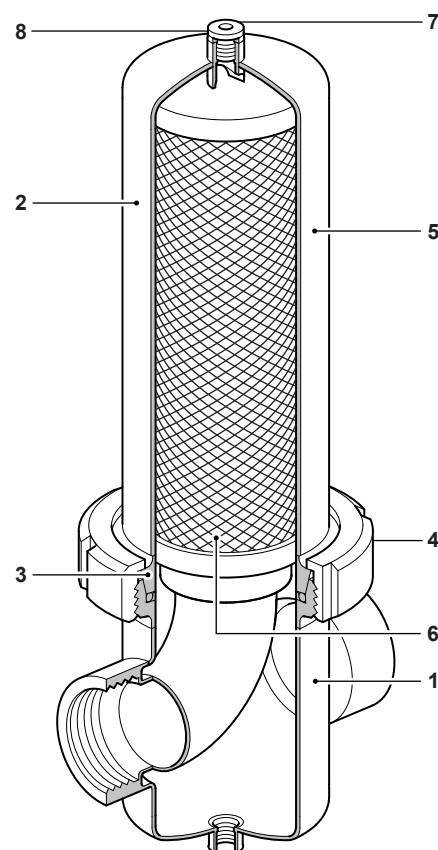
The product **must not** be used in this region.

CSF16 and CSF16T filter housing options and corresponding filter elements

Filter housing			Filter Element		
Filter Housing Size	Filter Housing code	Filter Housing Seal Material	0.2 micron O-ring seal type	Filter element code	No. of elements per housing
DN8 (¼")	CSF16/CSF16T	EPM	EPM	CSF16-A 03/10	1
DN10 (⅝")	CSF16/CSF16T			CSF16-A 04/10	1
DN15 (½")	CSF16/CSF16T			CSF16-A 04/20	1
DN20 (¾")	CSF16/CSF16T			CSF16-A 05/20	1
DN25 (1")	CSF16/CSF16T			CSF16-A 05/25	1
DN32 (1¼")	CSF16/CSF16T			CSF16-A 07/25	1
DN40 (1½")	CSF16/CSF16T			CSF16-A 07/30	1
DN50 (2")	CSF16L/CSF16LT			CSF16-A 10/30	1
	CSF16H/CSF16HT			CSF16-A 15/30	1
DN65 (2½")	CSF16/CSF16T			CSF16-A 20/30	1
DN80 (3")	CSF16L/CSF16LT			CSF16-A 30/30	1
	CSF16H/CSF16HT			CSF16-A 30/50	1

Materials

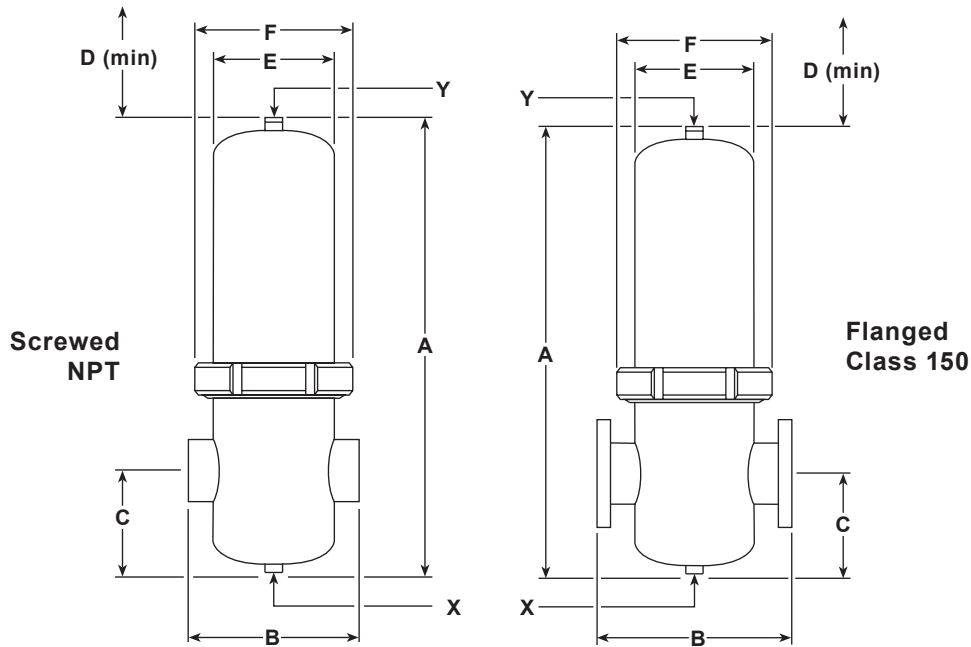
No.	Part	Materials		
1	Filter housing bowl	Stainless steel	CSF16	1.4301*
			CSF16T	1.4404**
2	Filter housing head	Stainless steel	CSF16	1.4301*
			CSF16T	1.4404**
3	Housing seal	EPM		EP380
4	Housing lockring	Stainless steel	CSF16	1.4301*
			CSF16T	1.4404**
5	CSF16-A filter element	Outer core, inner core and end caps		1.4401
		Filter media		Borosilicate
		Bonding compound		Silicon
6	Filter element seal (2 off per element)	EPM		EP380
7	Plug	Stainless steel		A4-70
8	Gasket	Stainless steel		1.4571
9	Flange (not shown)	Stainless steel	CSF16	1.4541
			CSF16T	1.4571



*1.4301 - Material may also include grades 1.4307, 1.4404, 1.4432, 1.4435, 1.4541, 1.4571 for manufacturing purposes. Weld filler will be 1.4430.

** 1.4404 - Material may also include grades 1.4432, 1.4435 and 1.4571 for manufacturing purposes. Weld filler will be 1.4430.

Dimensions/volume and weights (approximate) in mm, litres and kg



Filter	Size		Dimensions								Thread X	Thread Y
			A	B Screwed NPT	B Flanged PN	B Flanged Class 150	C	D	E Ø	F Ø		
	½"	DN15	245	108	180	203	54	120	70	112	¼" NPT	G¼"
	¾"	DN20	269	125	202	230	54	150	70	112		
	1"	DN25	295	125	212	247	73	150	85	127		
	1¼"	DN32	347	140	220	254	73	200	85	127		
	1½"	DN40	386	170	254	294	92	200	104	148		
	2½"	DN65	737	216	306	356	106	580	129	178		
CSF16L and CSF16LT	2"	DN50	460	170	260	297	92	280	104	148		
	3"	DN80	999	220	316	356	110	850	129	178		
CSF16H and CSF16HT	2"	DN50	587	170	260	297	92	450	104	148		
	3"	DN80	1024	240	340	380	113	850	154	210		

Note : No plug is fitted at the bottom of the filter housing

Volume and weights (approximate) in litres and kg

Filter			Vol.		Weight (kg) without element	
	Size		Litres			
			Screwed NPT	Flanged Class 150	Screwed NPT	Flanged Class 150
CSF16 and CSF16T	¼"	DN8	0.6		2.0	
	⅜"	DN10	0.7		2.1	
	½"	DN15	0.7	0.7	2.2	3.6
	¾"	DN20	0.8	0.85	2.4	4.4
	1"	DN25	1.3	1.4	3.2	5.7
	1¼"	DN32	1.6	1.8	3.7	7.2
	1½"	DN40	2.8	3	5.2	8.9
	2½"	DN65	9	9.4	8.1	15.9
CSF16L and CSF16LT	2"	DN50	3.2	3.75	5.2	10.6
	3"	DN80	12.6	13	9.6	19.2
CSF16H and CSF16HT	2"	DN50	4.5	4.7	5.8	11.2
	3"	DN80	17.8	18.3	13.2	22.2

Sterile air filter elements (weight in kg)

Filter element code (EPM)	Filter element (individual) Weight
CSF16-A 03/10	0.2
CSF16-A 04/10	0.26
CSF16-A 04/20	0.37
CSF16-A 05/20	0.45
CSF16-A 05/25	0.47
CSF16-A 07/25	0.57
CSF16-A 07/30	1.27
CSF16-A 10/30	1.6
CSF16-A 15/30	2.25
CSF16-A 20/30	2.77
CSF16-A 30/30	3.81
CSF16-A 30/50	4.98

CSF16 and CSF16T air sizing:

The correction and sizing tables above are based upon compressed air in Nm³/h.

Nm³/h refers to the flow at normal conditions. Therefore, the calculated flow rate needs to be quantified before a selection can be made.

The sizing scenarios below show how we calculate Nm³/h taking into consideration the operating air pressure and temperature and how this deviates from 'Normal conditions' which are defined as 1 bar abs and 20 °C.

CSF16 and CSF16T air sizing table

Please note that the flowrates displayed on the CSF16 and CSF16T air sizing table are based on an air pressure of 7 bar g.

	DN8	DN10	DN15	DN20	DN25	DN32	DN40	DN50L	DN50H	DN65	DN80L	DN80H
Size of unit	¼"	⅜"	½"	¾"	1"	1¼"	1½"	2"L	2"H	2½"	3"L	3"H
Maximum flowrate Nm ³ /h	60	90	120	180	270	360	480	720	1080	1440	1920	2880

Capacity correction factors for air pressure

Air pressure	bar g	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Correction factor		0.25	0.375	0.5	0.625	0.75	0.875	1.0	1.125	1.25	1.375	1.5	1.625	1.75	1.875	2.0	2.125

Sizing scenario 1:

Customer provides flow rate in m³/h (room temperature but at a given pressure)

Example conditions:

- Flowrate of air = 200 m³/h
- Air operating pressure = 4 bar (g)
- Air operating temperature = 20 °C (ambient)

Step 1:

Convert m³/h to Nm³/h

Nm³/h = Pressure (Abs) x Volumetric Flow (m³/h)

Nm³/h = 5 bar (Abs) x 200 m³/h

Nm³/h = 1,000

Step 2:

Identify the Capacity Correction Factor for a given operating air pressure using the Capacity Correction Factors for air pressure table

For 4 bar (g), correction factor is 0.625

Step 3:

Divide the calculated Nm³/h by the Capacity Correction Factor and select the housing size using the calculated flow value.

1,000 Nm³/h / 0.625 = Calculated Flow value = 1600 Nm³/h

Select 3"L (DN80L) with a maximum flow capacity of 1920 Nm³/h

Sizing scenario 2:

Customer provides flow rate in m³/h (air temperature above room temperature, >20 °C, and at a given pressure)

Example conditions:

- Flowrate of air = 200 m³/h
- Air operating pressure = 4 bar (g)
- Air operating temperature = 50 °C (elevated above ambient)

Step 1:

Convert m³/h to Nm³/h

V_1 = Volumetric flow (m³/h) = 200

V_2 = Volumetric flow (Nm³/h) = to be determined

T_1 = Ambient temperature of air (Kelvin) = 20 °C + 273 = 293

T_2 = Elevated operating temperature of air (Kelvin) = 50 °C + 273 = 323

P_1 = Elevated operating pressure of air (Abs) = 4 bar g + 1 = 5

P_2 = Atmospheric pressure of air (Abs) = 0 bar g + 1 = 1

Solve to find V_2 (Nm³/h):

$$V_2 = (P_1 * V_1 * T_1) / (T_2 * P_2)$$

$$V_2 = (5 * 200 * 293) / (323 * 1)$$

$$V_2 = 907 \text{ Nm}^3/\text{h}$$

Step 2:

Identify the Capacity Correction Factor for a given operating air pressure using the Capacity Correction Factors for air pressure table

For 4 bar (g), correction factor is 0.625

Step 3:

Divide the calculated Nm³/h by the Capacity Correction Factor and select the housing size using the calculated flow value.

907 Nm³/h / 0.625 = Calculated Flow value = 1451 Nm³/h

Select 3"L (DN80L) with a maximum flow capacity of 1920 Nm³/h

Safety information, installation and maintenance

For full details see the Installation and Maintenance Instructions (IM-P180-48) which is supplied with the product.

How to order

The following information must be specified when ordering a Spirax Sarco CSF filter:

Maximum sterile air flowrate	m ³ /h	* Note: For DN50 and DN80 the high capacity version is denoted by 'H' and low capacity by 'L'. For a 1.4404 housing version, the suffix 'T' must be added to the nomenclature e.g. CSF16T.
Maximum sterile air pressure	bar g	
Allowable pressure drop bar	0.07 bar g maximum recommended	
Housing material	1.4301 or 1.4404	
Size *	DN or NPS (") and 'H' or 'L' where applicable	
Pipe connections	Class 150 or NPT	
Element rating	0.2 micron	
3.1 Certification for SEP and Category I filter housings	Yes/No	

Supply

The CSF16 and CSF16T filter housings are supplied separately to the filter elements.

1. The filter housing head and bowl with housing seal are packed in one carton, complete with EN 10204 3.1 certification where applicable, documentation and installation and maintenance instructions.
2. The filter element complete with two seals.

Note: The purpose of the filter is to remove (and retain) unwanted contamination. In time, the filter element will become saturated. To ensure a minimum downtime, we recommend that a spare filter element set is ordered at the same time as the CSF16 and CSF16T filter housing.

Example:

- 1 off Spirax Sarco DN20 CSF16 to pass sterile air at 4.0 bar g. Housing to be 1.4301 having NPT connections.
- 1 off CSF16-A 5/20 filter element
- 1 off CSF16-A 5/20 spare filter element set
- 1 off 3.1 Certification (for filter housing)

Spare parts

The spare parts available are shown in solid outline.
Parts drawn in a grey line are not supplied as spares.

Available spares

CSF16-A filter element kit	5, 6 (2 off)
Seal kit	3, 6 (please see table below for quantities)

Seal kit contents

Unit size	Housing seal (Part number 3)	Element seals (Part number 6)
DN8 - DN80	1	2

How to order spares

Always order spares by using the description given in the column headed 'Available spares' and state the size and type of filter housing, filter element rating and housing/filter element seal material required.

Example: 1 off CSF16 A filter element kit for a Spirax Sarco DN25 CSF16 sterile air.

Table 1 Recommended tightening torque

Item	 or 	N m
4	use C spanner	As required
7	6 mm Hex G1/4"	55

