




## CSF16 and CSF16T Stainless Steel Steam Filters

### Description

The CSF16 and CSF16T are horizontal, in-line high efficiency filters used to remove contaminate particles from steam systems. The filter housing is available in a choice of austenitic stainless steel (1.4301) designated CSF16 or (1.4404) designated CSF16T. The DN8 to DN80 (¼" to 3") housing is externally polished with an internal natural finish whereas the DN100 and DN150 (4" and 6") housing will have a natural finish both internally and externally. The housings are constructed in two halves, DN8 to DN80 will be joined by a food industry fitting to DIN 11851. DN100 and DN150 will be joined by bolts and nuts. Replaceable elements in sintered austenitic stainless steel are available with either 1, 5 or 25 micron absolute rating. In some pipe sizes the housing is available in a choice of low capacity designated 'L' and high capacity designated 'H'.

### Standards

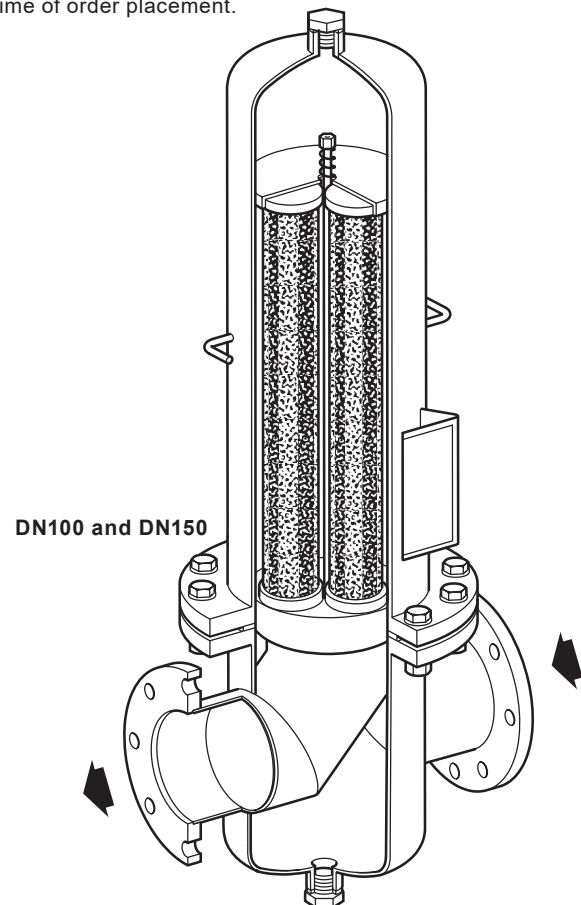
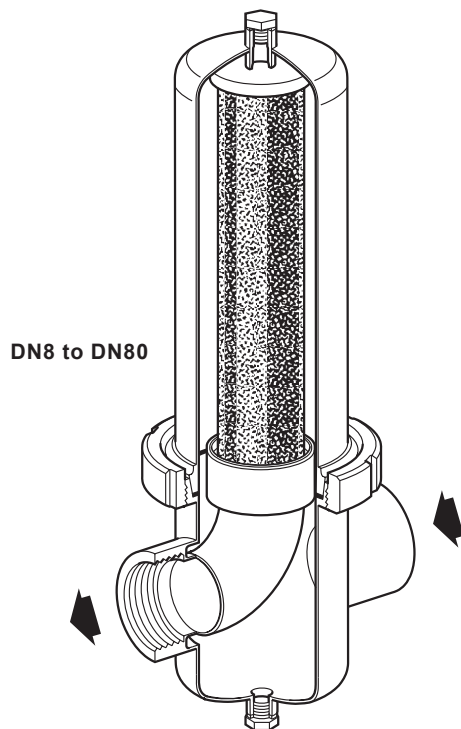
These products fully comply with the requirements of the Pressure Equipment Directive 2014/68/EU and carry the  mark when so required.

The CSF16 and CSF16T, when fitted with a 5 micron element are capable of removing 95% of particles 2 microns and larger in size, in accordance with the requirements for the production of culinary steam to 3A accepted practice number 609-03. Accepted in the U.S. Department of Agriculture for use in federally inspected meat and poultry plants. All materials meet the requirements as stipulated by the US FDA Regulations.

### Certification

These products can be supplied with certification to EN 10204 3.1.

**Note:** All certification/inspection requirements must be stated at the time of order placement.



## Sizes and pipe connections

### Screwed

**BSP and NPT:** 1/4", 3/8", 1/2", 3/4", 1", 1 1/4", 1 1/2", 2", 2 1/2" and 3".

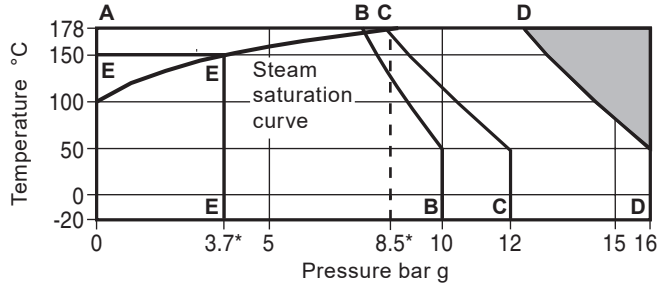
### Flanged

**EN 1092 PN16:** DN10, DN15, DN20, DN25, DN32, DN40, DN50, DN65 and DN80.

**EN 1092 PN10:** DN100 and DN150.

**ASME 150:** 1/2", 3/4", 1", 1 1/4", 1 1/2", 2", 2 1/2", 3", 4" and 6".

## Pressure/temperature limits



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

**A-B-B** Flanged PN10.

**A-C-C** Maximum allowable pressure for the DN80H.

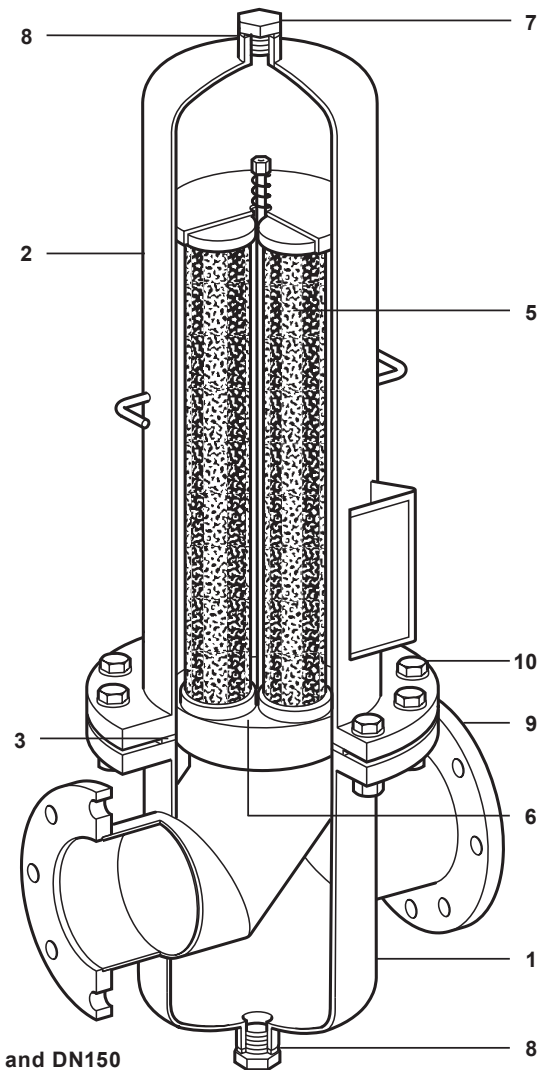
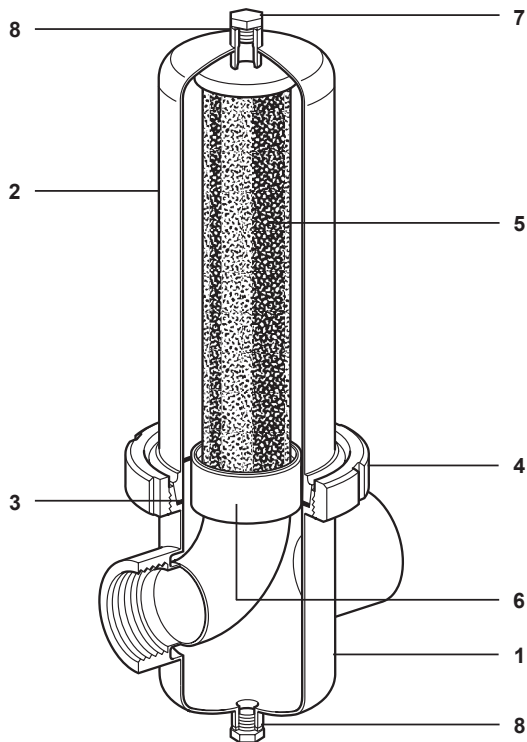
**A-D-D** Screwed BSP or NPT, flanged PN16 and ASME 150.

**E-E-E** Maximum operating limits for sizes DN100 and DN150.

Body design rating		PN16	
	DN8 - DN65 (1/4" - 2 1/2")	16 bar g	
PMA	Maximum allowable pressure	DN80 (3") L version	16 bar g
		H version	12 bar g
		DN100 and DN150	10 bar g
TMA	Maximum allowable temperature	DN8 - DN80	178 °C @ 8.5 bar g
		DN100 and DN150	150 °C @ 3.7 bar g
Minimum allowable temperature		-20 °C	
PMO *	Maximum operating pressure	DN8 - DN80	8.5 bar g @ 178 °C
		DN100 and DN150	3.7 bar g @ 150 °C
TMO	Maximum operating temperature	DN8 - DN80	178 °C @ 8.5 bar g
		DN100 and DN150	150 °C @ 3.7 bar g
Minimum operating temperature		0 °C	
ΔPMX	Maximum differential pressure	5 bar g	
	DN8 - DN65 (1/4" to 2 1/2")	27.5 bar g	
Designed for a maximum cold hydraulic test pressure of:	DN80 (3")	L version	27.5 bar g
		H version	20.6 bar g
		DN100 and DN150	18.3 bar g

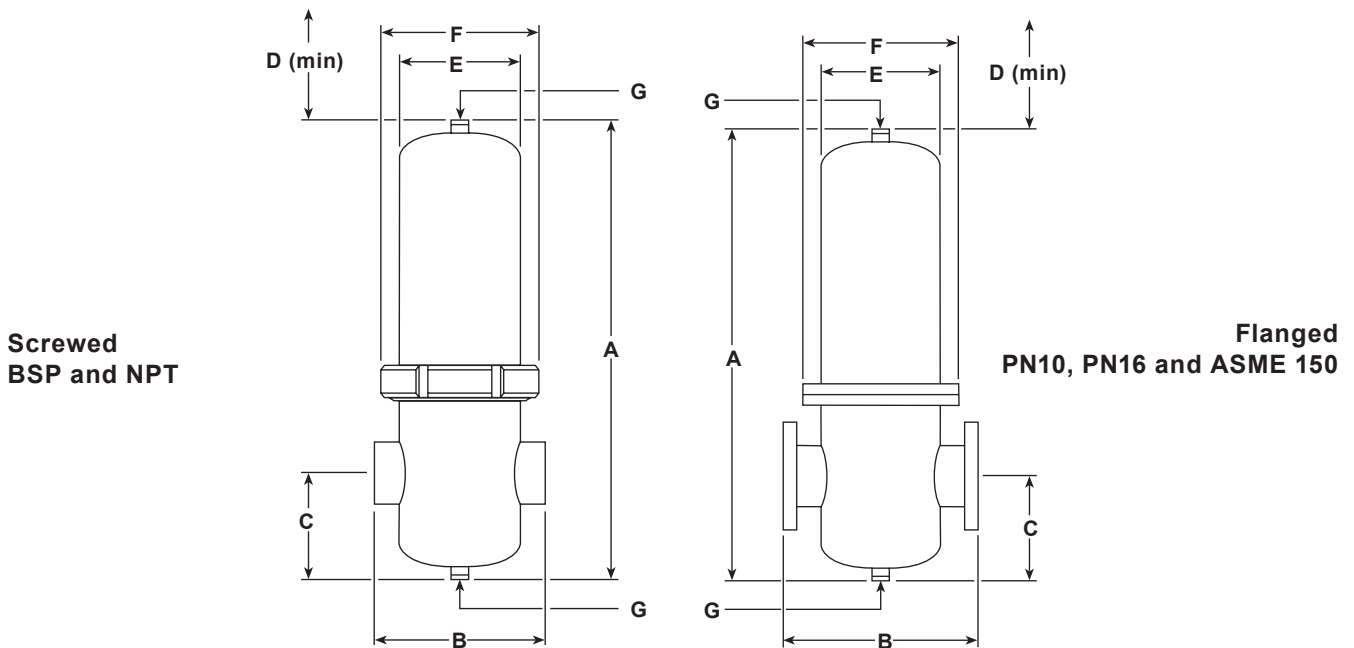
## Materials

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	For sizes DN8 to DN80 EPM is supplied as standard. For sizes DN100 and DN150 PTFE spirally wound gasket with stainless steel inner and outer rim support is supplied as standard - No other option is available.		
4	Housing ring (DN8 - DN80)	Stainless steel		1.4301
5	CSF16-S filter element	Stainless steel	Outer core	1.4301
			End cap	1.4301
6	Filter element seal (2 off)		EPM	
7	Plug	Stainless steel	CSF16	1.4301
			CSF16T	1.4404
8	Gasket	PTFE		
9	Flange	Stainless steel		1.4541
10	Bolts and nuts (DN100 and DN150)	Stainless steel		A2 - 70



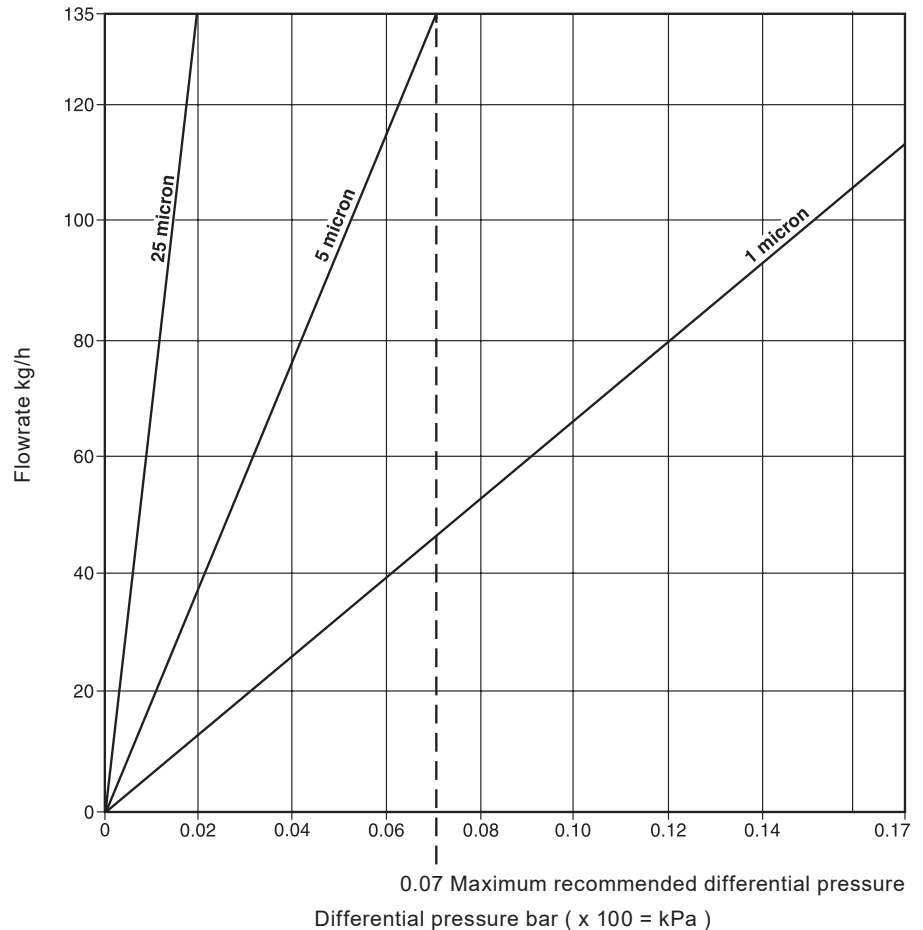
Dimensions/volume and weights (approximate) in mm, litres and kg

Filter	Size	Dimensions									Vol. Litres	Weight (kg) without element			
		A	Screwed	Flanged		C	D	E	F	G		Screwed	Flanged		
				PN	ASME								PN	ASME	
CSF16 and CSF16T	1/4" DN8	220	108			55	90	70	112	1/4"	0.60	2.0			
	3/8" DN10	248	105	180		55	120	70	112	1/4"	0.70	2.1	3.4		
	1/2" DN15	248	108	180	203	55	120	70	112	1/4"	0.70	2.2	3.6	3.2	
	3/4" DN20	272	125	202	230	55	150	70	112	1/4"	0.80	2.4	4.4	3.9	
	1" DN25	298	125	212	247	74	150	85	127	1/4"	1.30	3.2	5.7	5.4	
	1 1/4" DN32	350	140	220	254	74	200	85	127	1/4"	1.70	3.7	7.2	6.3	
	1 1/2" DN40	388	170	254	294	94	200	104	148	1/4"	2.80	5.2	8.9	8.0	
	2 1/2" DN65	740	216	306	356	107	580	129	178	1/4"	9.00	8.1	13.7	15.9	
6" DN150	1370		480	480	240	850	273	395	1"	75.00		85.0	85.0		
CSF16L and CSF16LT	2" DN50	463	170	260	297	94	280	104	148	1/4"	3.50	5.2	9.9	9.9	
	3" DN80	1002	240	316	356	111	850	129	178	1/4"	13.00	10.2	17.2	19.2	
	4" DN100	1040		430	430	190	850	219	340	1"	36.00		60.0	60.0	
CSF16H and CSF16HT	2" DN50	590	170	260	297	94	450	104	148	1/4"	4.50	5.8	10.5	10.6	
	3" DN80	1027	240	340	380	113	850	154	210	1/4"	17.70	13.2	19.9	21.8	
	4" DN100	1300		410	410	190	850	219	340	1"	45.00		65.0	65.0	



## Capacities

Saturated steam 1.0 bar g; DN50  
CSF16 and CSF16T



### Capacity correction factors for steam pressure

Steam pressure bar g	0	1	2	3	4	5	6	7	8	8.6
Correction factor	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	4.8

### Element size correction factors for filter element

	DN8	DN10	DN15	DN20	DN25	DN32	DN40	DN50L
Size of unit	¼"	⅜"	½"	¾"	1"	1¼"	1½"	2"L
Capacity correction factor	0.08	0.13	0.17	0.25	0.39	0.50	0.67	1.00

	DN50H	DN65	DN80L	DN80H	DN100L	DN100H	DN150
Size of unit	2"H	2½"	3"L	3"H	4"L	4"H	6"
Capacity correction factor	1.50	2.00	2.70	4.00	6.00	8.00	10.67

### Selection example

Select a steam filter for a flowrate of 850 kg/h with saturated steam pressure at 4 bar g. A 5 micron rating is required with maximum 0.05 bar pressure drop allowed.

- Step 1:** Divide the flowrate required by the capacity correction factor for the operating steam pressure. In this case, 850 kg/h is divided by 2.5 for an equivalent 340 kg/h flow.
- Step 2:** From the capacity graph, select the micron rating required. Note where this line intersects the maximum pressure drop and go horizontally to read off the flowrate. In this case, the 5 micron line meets the 0.05 bar pressure drop allowed at maximum flowrate of 100 kg/h.
- Step 3:** Divide the equivalent flow calculated in step (1) by the maximum flowrate in step (2).  
Hence in this example, we have  $340/100 = 3.4$  factor.
- Step 4:** From the element size correction factor table, select the nearest suitable conversion factor obtained in step (3) and select the appropriate element size. In the example DN80H CSF16 and CSF16T has a factor of 4.00. Note that if pressure drop must be minimized, always select the element based on a higher correction factor than that calculated.

## Filter element

In steam/gas service, 100% of particles larger than the pore size chosen will be retained by the element. Note that the 1 micron element has an efficiency of 99.7% based on 0.2 micron particles. Selecting a pore size smaller than required will result in reduced service life and higher pressure drop. The CSF16 and CSF16T elements can be cleaned by immersion in dilute hydrochloric acid, ultrasonic bath, clean water, or air, depending on the type of contamination. However, once the pressure drop across the filter (even after cleaning) reaches 0.7 bar the element should be replaced. Note: We strongly recommend that a spare filter element set is carried in stock.

## Safety information, installation and maintenance

For full details see the Installation and Maintenance Instructions (IM-P185-02) which is supplied with the product.

## How to order

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

Steam flowrate	kg/h
Steam pressure	bar
Allowable pressure drop bar	(0.07 bar maximum recommended)
Housing material	1.4301 or 1.4404
Size *	DN or NPS (")
Pipe connections	EN, BSP or NPT
Element rating	1, 5 or 25 micron
Housing seal/element seal material	

\* Note: For DN50 and DN80 high capacity version 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.

## Supply

The CSF16 and CSF16T are supplied in two parts:

1. The filter housing head and bowl with housing seal packed in one carton.
2. The filter element complete with filter element and two seals. (DN100 and DN150 CSF16 and CSF16T have multiple elements).

**Note:** The job 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 100 kg/h saturated steam at 4.0 bar g. Housing to be 1.4301 having NPT connections with EPM seals.

1 off CSF16-S filter element having a 5 micron rating.

1 off CSF16-S spare filter element set having a 5 micron rating.

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

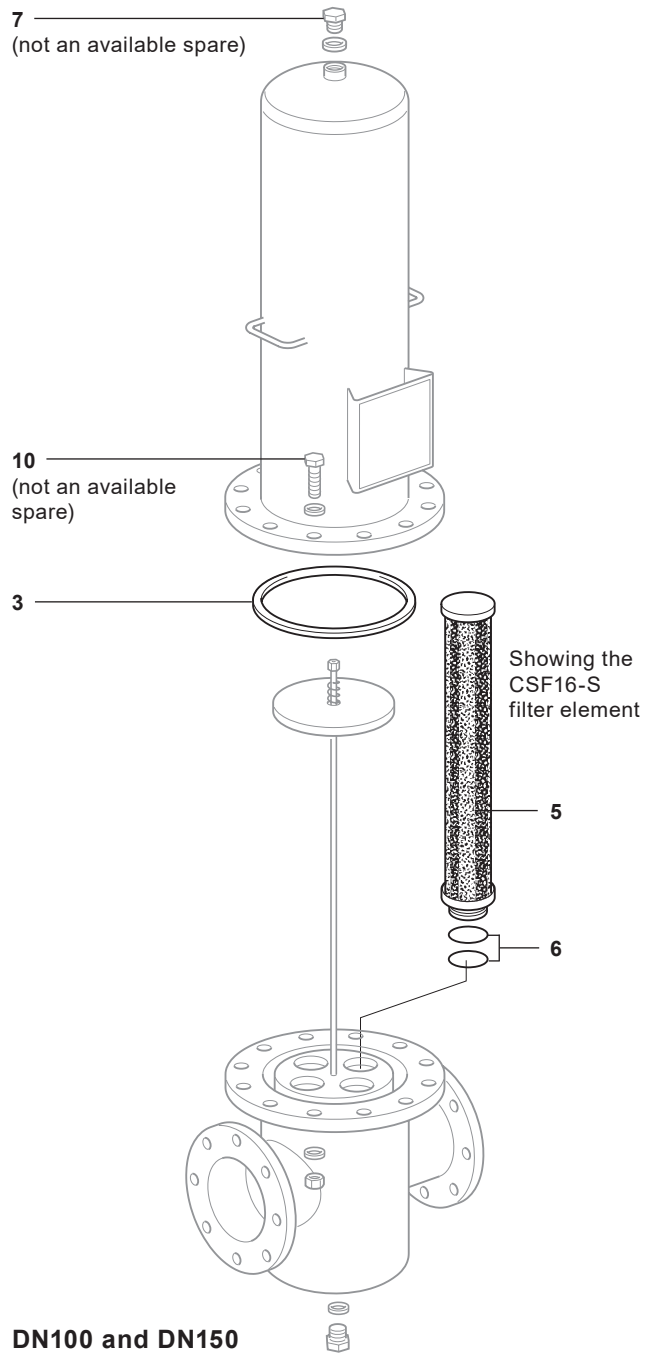
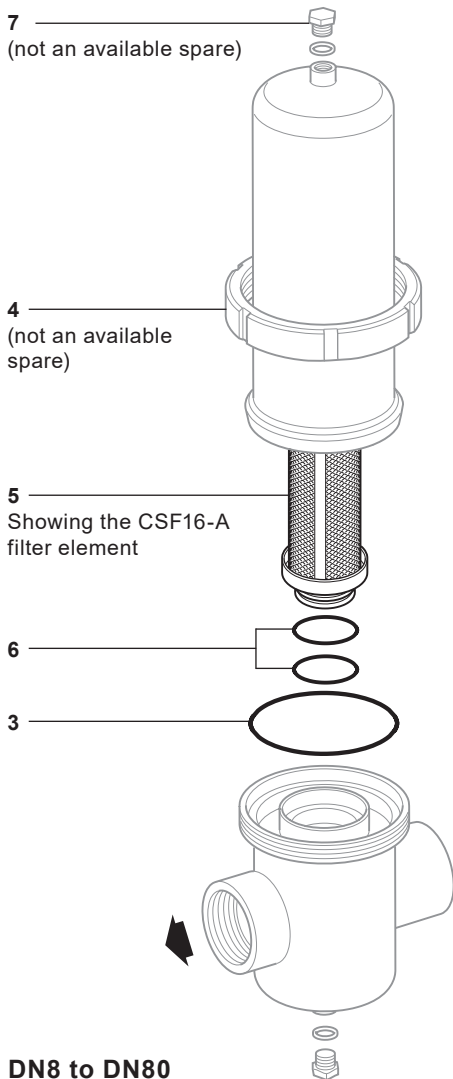
### Seal kit contents

Unit size	Housing seal (Part number 3)	Element seals (Part number 6)
DN8 - DN80	1	2
DN100	1	6
DN150	1	6



### 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 5 micron CSF16-S filter element kit for a Spirax Sarco DN25 CSF16 clean steam filter, with EPM filter element seals.



**Table 1 Recommended tightening torques**

Item	Part	 or 	N m
4		use C spanner	As required
7	DN8 - DN80	¼" BSP	As required
	DN100 and DN150	1" BSP	As required
10	DN100	A/F 30 M20	180
	DN150	A/F 30 M20	260