

spirax sarco

TI-P185-01
ST Issue 12

CSF16 and CSF16T Stainless Steel Steam Filters

Sizes and pipe connections

Screwed

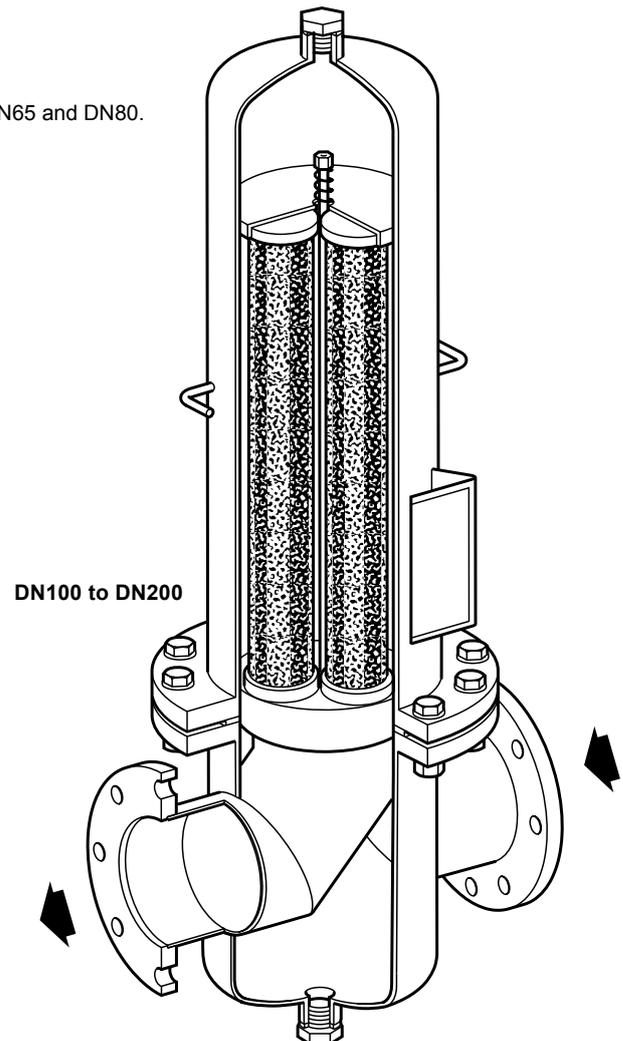
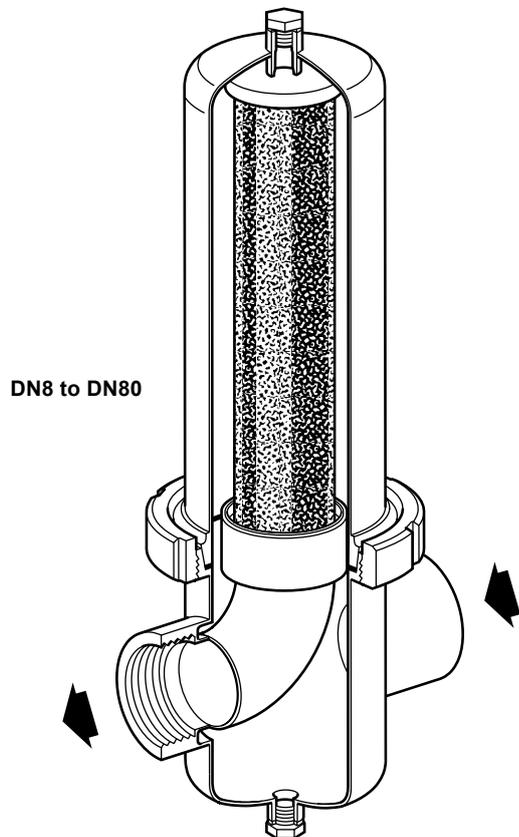
BSP and NPT: ¼", ⅜", ½", ¾", 1", 1¼", 1½", 2", 2½" and 3".

Flanged

EN 1092 PN16: DN8, DN10, DN15, DN20, DN25, DN32, DN40, DN50, DN65 and DN80.

EN 1092 PN10: DN100, DN150 and DN200.

ASME 150: ¼", ⅜", ½", ¾", 1", 1¼", 1½", 2", 2½", 3", 4", 6" and 8".



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 to DN200 (4" to 8") 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 to DN200 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 element 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 European Pressure Equipment Directive 97/23/EC and carry the **CE** mark when so required.

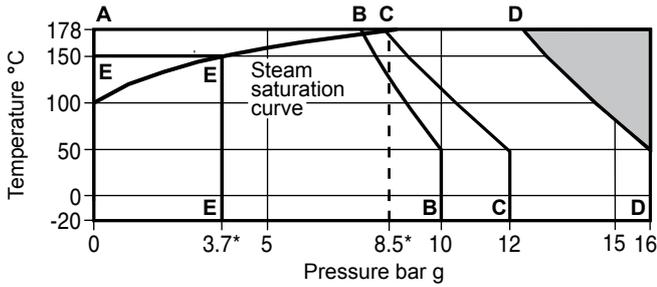
The CSF16 and CSF16T, when fitted with a 5 micron element are capable of removing 95% of particles 2 microns and larger in size, in accordance with the requirements for the production of culinary steam to 3A accepted practice number 609-03. Accepted in the U.S. Department of Agriculture for use in federally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

All materials meet the requirements as stipulated by the US FDA Regulations.

Certification

These products can be supplied with a modified housing in order to provide certification to EN 10204 3.1. **Note:** All certification/inspection requirements must be stated at the time of order placement.

Pressure/temperature limits



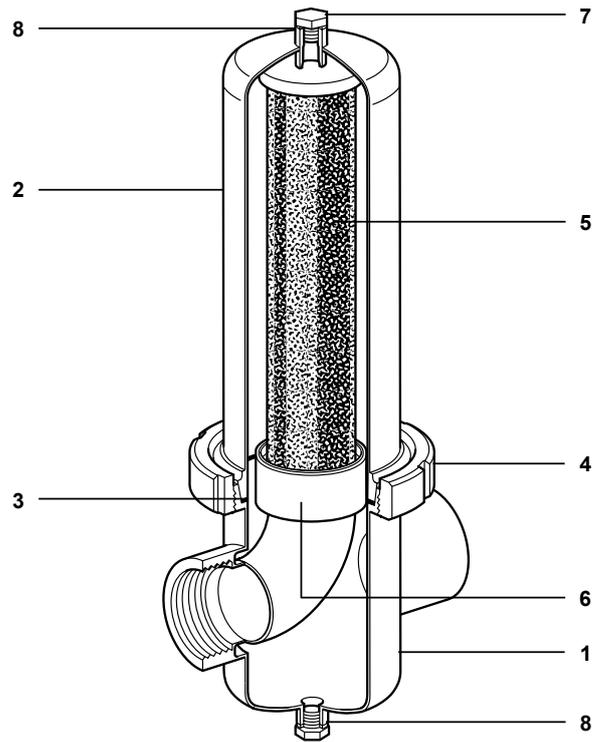
The product **must not** be used in this region.

- 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 to DN200.

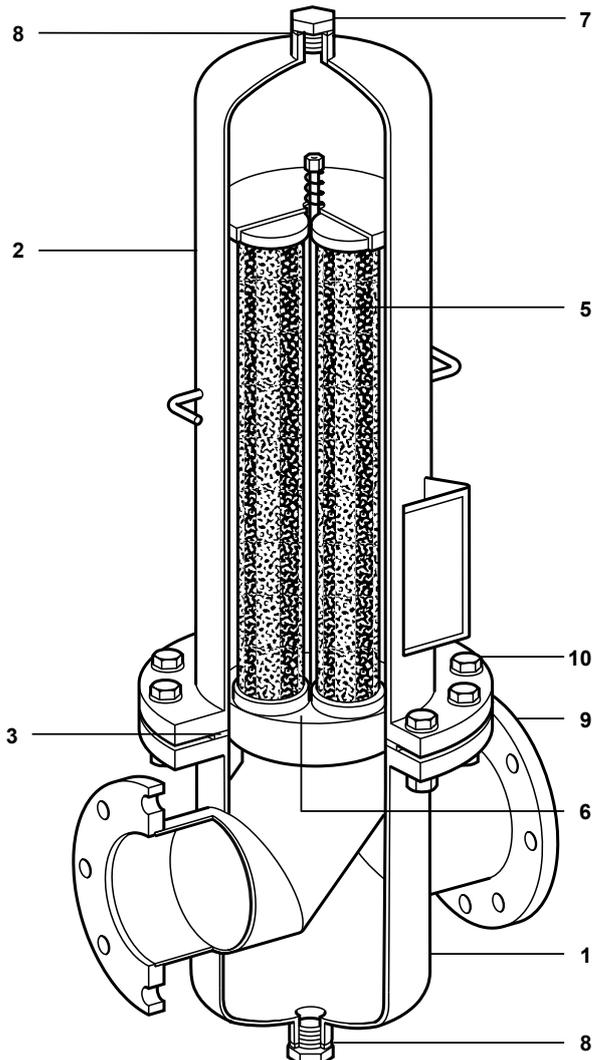
Body design rating		PN16		
PMA	Maximum allowable pressure	DN8 - DN65 (¼" - 2½")	16 bar g	
		DN80 (3")	L version	16 bar g
			H version	12 bar g
		DN100 - DN200	10 bar g	
TMA	Maximum allowable temperature	DN8 - DN80	178°C @ 8.5 bar g	
		DN100 - DN200	150°C @ 3.7 bar g	
Minimum allowable temperature		-20°C		
* PMO	Maximum operating pressure	DN8 - DN80	8.5 bar g @ 178°C	
		DN100 - DN200	3.7 bar g @ 150°C	
TMO	Maximum operating temperature	DN8 - DN80	178°C @ 8.5 bar g	
		DN100 - DN200	150°C @ 3.7 bar g	
Minimum operating temperature		0°C		
ΔPMX Maximum differential pressure		5 bar g		
		DN8 - DN65 (¼" to 2½")	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 - DN200

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 to DN200 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 - DN200)	Stainless steel	A2 - 70	

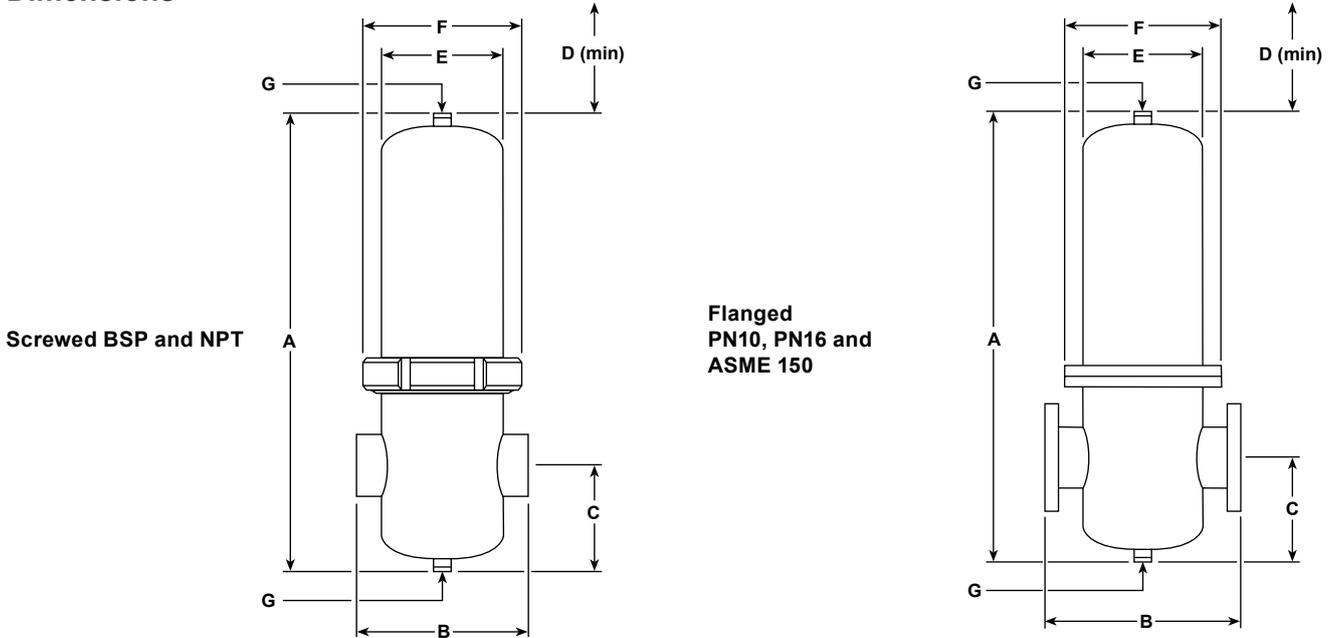


DN8 to DN80



DN100 to DN200

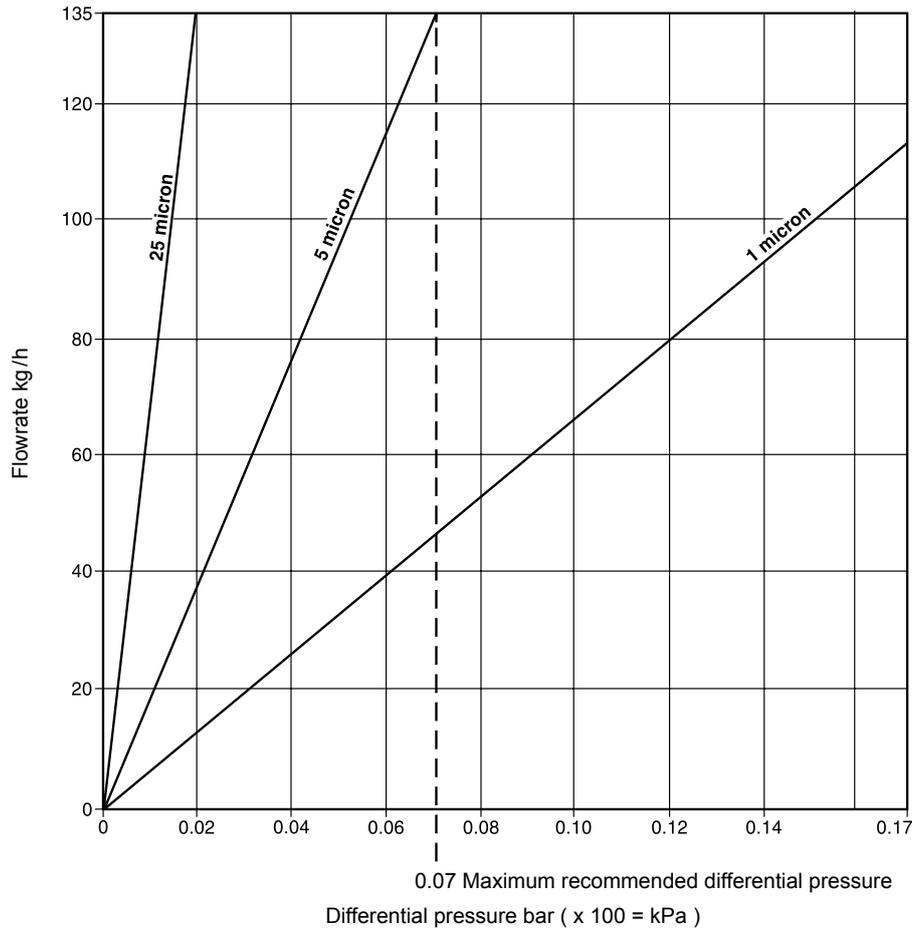
Dimensions



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

Filter	Size	Dimensions								Vol. Litres	Weight (kg) without element			
		A	B		C	D	E Ø	F Ø	G		Screwed	Flanged		
			Screwed	PN								ASME	PN	ASME
CSF16 and CSF16T	¼" DN8	220	108	180	203	55	90	70	112	¼"	0.60	2.0	3.3	3.1
	⅜" DN10	248	105	180	203	55	120	70	112	¼"	0.70	2.1	3.4	3.2
	½" DN15	248	108	180	203	55	120	70	112	¼"	0.70	2.2	3.6	3.2
	¾" DN20	272	125	202	230	55	150	70	112	¼"	0.84	2.4	4.4	3.9
	1" DN25	298	125	212	247	74	150	85	127	¼"	1.40	3.2	5.7	5.4
	1¼" DN32	350	140	220	254	74	200	85	127	¼"	1.80	3.7	7.2	6.3
	1½" DN40	388	170	254	294	94	200	104	148	¼"	3.00	5.2	8.9	8.0
	2½" DN65	740	216	306	356	107	580	129	178	¼"	9.30	8.1	13.7	15.9
CSF16L and CSF16LT	2" DN50	463	170	260	297	94	280	104	148	¼"	3.60	5.2	9.9	9.9
	3" DN80	1002	240	316	356	111	850	129	178	¼"	12.60	10.2	17.2	19.2
	4" DN100	1040		430	430	190	850	219	340	1"	36.00		60.0	60.0
	6" DN150	1370		480	480	240	850	273	395	1"	77.00		85.0	85.0
	8" DN200	1550		660	660	295	850	406	565	1"	190.00		168.0	168.0
CSF16H and CSF16HT	2" DN50	590	170	260	297	94	450	104	148	¼"	4.60	5.8	10.5	10.6
	3" DN80	1027	240	340	380	113	850	154	210	¼"	18.30	13.2	19.9	21.8
	4" DN100	1300		410	410	190	850	219	340	1"	45.00		65.0	65.0
	6" DN150	1410		540	540	245	850	324	445	1"	110.00		100.0	100.0
	8" DN200	1550		660	660	295	850	406	565	1"	190.00		168.0	168.0

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

Size of unit	DN8	DN10	DN15	DN20	DN25	DN32	DN40	DN50L	DN50H
	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"L	2"H
Capacity correction factor	0.08	0.13	0.17	0.25	0.39	0.50	0.67	1.00	1.50

Size of unit	DN65	DN80L	DN80H	DN100L	DN100H	DN150L	DN150H	DN200L	DN200H
	2 1/2"	3"L	3"H	4"L	4"H	6"L	6"H	8"L	8"H
Capacity correction factor	2.00	2.70	4.00	6.00	8.00	10.67	16.00	21.33	26.67

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 - DN200 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 broken 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)

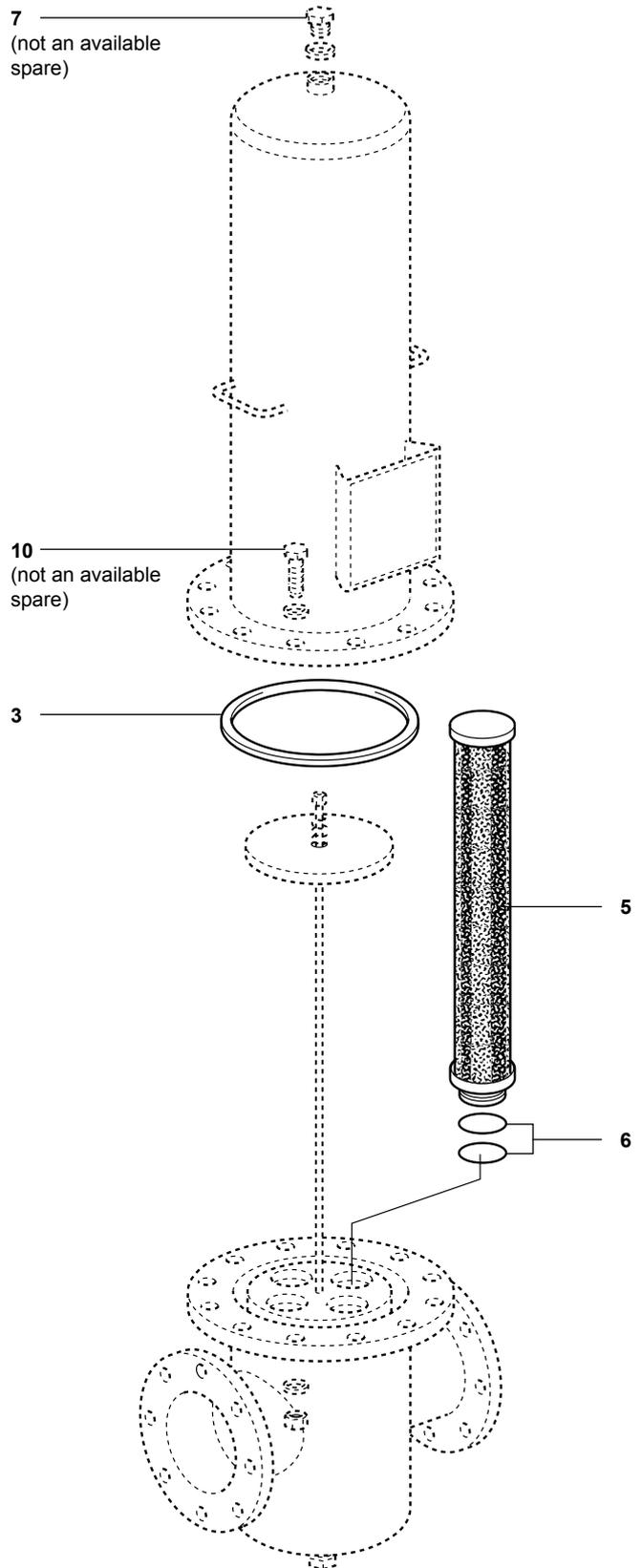
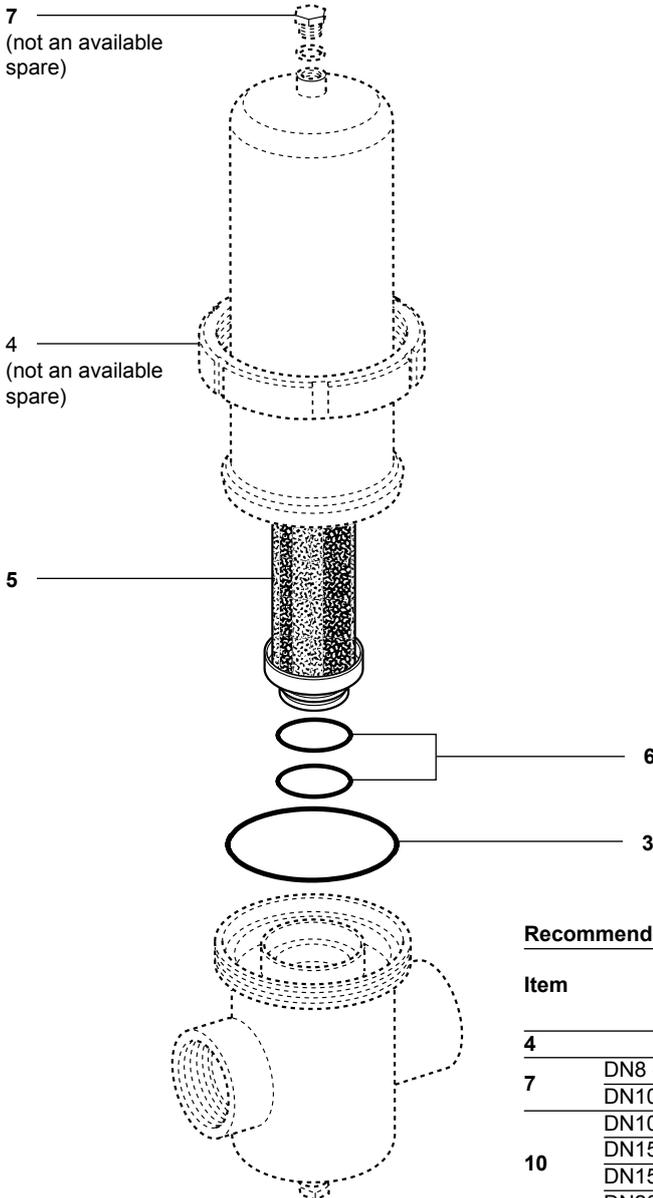
Seal kit contents

Unit size	Housing seal (3)	Element seals (6)
DN8 - DN80	1	2
DN100	1	6
DN150	L	6
	H	12
DN200	L	16
	H	20

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.



Recommended tightening torques

Item		or mm		N m
4	use C spanner			As required
7	DN8 - DN80		1/4" BSP	As required
	DN100 - DN200		1" BSP	As required
10	DN100	A/F 30	M20	340
	DN150L	A/F 30	M20	235
	DN150H	A/F 30	M20	270
	DN200	A/F 36	M24	400