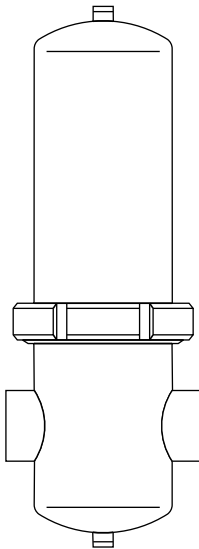


Stainless Steel Filter
Installation and Maintenance Instructions



- 1. *General safety information*
- 2. *General product information*
- 3. *Installation*
- 4. *Commissioning*
- 5. *Operation*
- 6. *Maintenance*
- 7. *Spare parts*

— 1. *General safety information* —

Safe operation of this unit can only be guaranteed if it is properly installed, commissioned and maintained by a qualified person (see Section 11 of the attached Supplementary Safety Information) in compliance with the operating instructions. General installation and safety instructions for pipeline and plant construction, as well as the proper use of tools and safety equipment must also be complied with.

Isolation

Consider whether closing isolating valves will put any other part of the system or personnel at risk. Dangers might include; isolation of vents and protective devices or alarms. Ensure isolation valves are turned off in a gradual way to avoid system shocks.

Pressure

Before attempting any maintenance consider what is or may have been in the pipeline. Ensure that any pressure is isolated and safely vented to atmospheric pressure before attempting to maintain the product, this is easily achieved by fitting Spirax Sarco depressurisation valves type DV (see separate literature for details). Do not assume that the system is depressurised even when a pressure gauge indicates zero.

Temperature

Allow time for temperature to normalise after isolation to avoid the danger of burns and consider whether protective clothing (including safety glasses) is required.

PTFE - Gasket:

If parts made from PTFE have been subjected to a temperature approaching 260°C (500°F) or higher, they will give off toxic fumes, which if inhaled are likely to cause temporary discomfort. It is essential for a no smoking rule to be enforced in all areas where PTFE is stored, handled, or processed as persons inhaling the fumes from burning tobacco contaminated with PTFE particles can develop 'polymer fume fever'.

Disposal

The product is recyclable. No ecological hazard is anticipated with the disposal of this product providing due care is taken, EXCEPT:

PTFE - Gasket:

- Can only be disposed of by approved methods, not incineration.
- Keep PTFE waste in a separate container, do not mix it with other rubbish, and consign it to a landfill site.

— 2. General product information —

2.1 Description

The CSF16 is a horizontal, in-line high efficiency filter used to remove contaminate particles from steam, gas and liquid systems. The filter housing is available in a choice of austenitic stainless steel type 304 designated CSF16 or type 316L designated CSF16T. The housing is externally polished with an internal natural finish. The housing is constructed in two halves joined by a food industry fitting to DIN 11851. 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'.

Options

As indicated in Section 2.3 - Pressure/temperature limits, the CSF16 housing and element is available with a variety of different seal materials, some of which meet the requirements of FDA regulations (EPDM and PTFE). However for higher temperature, or more aggressive applications other materials are available on request. Please consult Spirax Sarco.

Standards

The CSF16, when fitted with a 5 micron element is 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.

Supply

The CSF16 is supplied in two parts:-

1. The filter housing head and bowl with housing seal packed in one carton.
2. The filter element complete with 2 off filter element seals.

Note:

For additional information see the following Technical Information Sheets: TI-P185-01 and TI-P185-05.

2.2 Sizes and pipe connections

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

Flanged ANSI 150, PN16: DN10, DN15, DN20, DN25, DN32, DN40, DN50, DN65 and DN80. Alternative end connections and larger sizes are available, please consult Spirax Sarco for details.

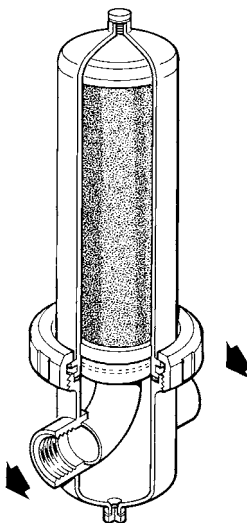
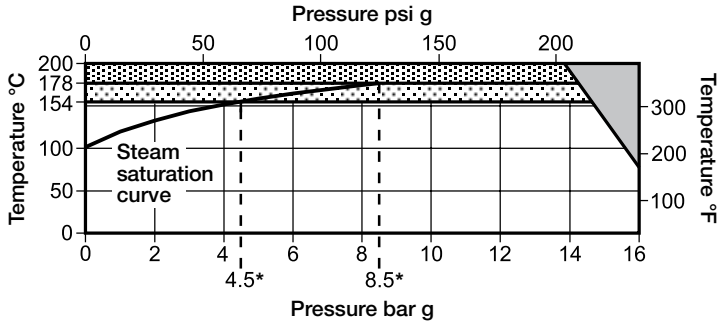





Fig. 1

2.3 Pressure/temperature limits



-  The product must not be used in this region.
-  The product should not be used in this region due to the limits of the housing seal.
-  The product should not be used in this region due to the limits of the EPDM seal.

Recommended maximum operating conditions for steam service:

PMA	Maximum allowable pressure	DN10 to DN65 (¼" to 2½")	16 bar g	(232 psi g)	
		DN80 (3")	L version	16 bar g	(232 psi g)
			H version	12 bar g	(174 psi g)
TMA	Maximum allowable temperature		200°C @ 14 bar g	(392°F @ 203 psi g)	
* PMO	Maximum operating pressure	EPDM	4.5 bar g @ 154°C	(65 psi g @ 309°F)	
		AFLAS and Flouraz	8.5 bar g @ 178°C	(123 psi g @ 352°F)	
TMO	Maximum operating temperature	EPDM	154°C @ 4.5 bar	(309°F @ 65 psi g)	
		AFLAS and Flouraz	178°C @ 8.5 bar	(352°F @ 123 psi g)	
ΔPMX	Maximum differential pressure		5 bar	(72 psi)	
Designed for a maximum cold hydraulic test pressure of:		DN10 to 65 (¼" to 2½")	20.8 bar g	(301.7 psi g)	
		DN80 (3")	L version	20.8 bar g	(301.7 psi g)
			H version	15.6 bar g	(226.3 psi g)

3. Installation

Note: Before actioning any installation observe the 'Safety information' in Section 1.

Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended installation:
Note: The CSF16 is supplied in two parts:

1. The filter housing head and bowl with housing seal packed in one carton.
2. The filter element complete with 2 off filter element seals.

Installation

There are 6 main criteria which need to be met in order to ensure that the CSF16 filter works effectively and for a long trouble free life.

1. When used on steam or gas services a separator should be installed upstream of the filter to remove droplets of condensate held in suspension. Not only will this help the condition of the steam or gas but it will also prolong the life of the filter element. For certain applications, such as culinary steam a separator is mandatory in order to comply with sanitary standards.
2. It is recommended that for maximum service life a Y-type strainer complete with 100 mesh stainless steel screen is installed upstream of the CSF16.
3. The filter must be installed in horizontal pipework with the filter bowl vertically above the interconnecting pipes.
4. While at the same time the direction of flow for compressed air and liquids can be in any direction through the filter, for steam the flow must be from outside to inside. This can be checked by looking into the filter head before installation in the pipeline, see Figure 2.

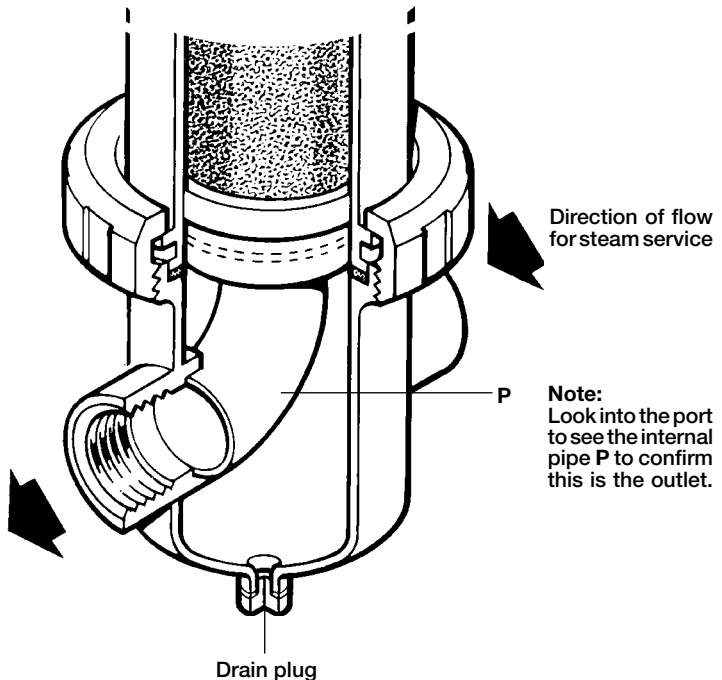
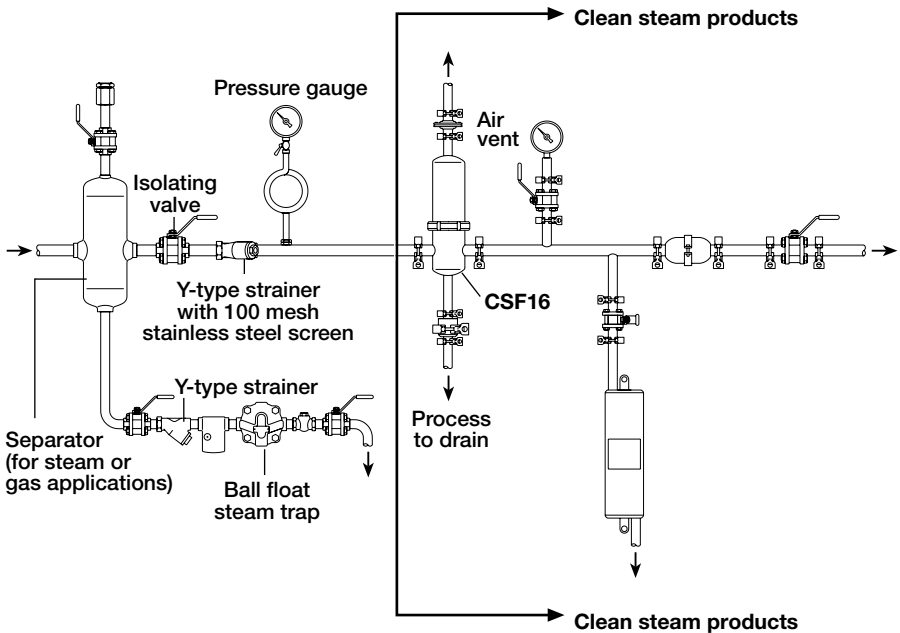


Fig. 2

5. When used on steam the plugs and gaskets on the filter head should be removed and pipework connected to a steam trap installed below the filter. The condensate from this trap should then be piped away to drain, or to the receiver of a pump, providing no back pressure, i.e. lift, is imposed upon the steam trap (see Figure 3).
Should it not be possible to install a steam trap at the drain point itself, then a full size equal tee drain point should be incorporated into the horizontal pipework prior to the filter, this to be drained by a steam trap, unless a separator with drain trap is upstream of the filter.
For those steam systems where air can be present, air can collect in the upper portion of the filter. In this situation a suitable air vent should be connected to the air vent connection.
6. Pressure gauges should be installed before and after the filter to check the differential pressure across the filter itself. Once the differential pressure reaches 0.7 to 1 bar the filter element should be removed for cleaning and/or replacement.



Note: The installation should include the necessary isolating valves for the purpose of servicing the CFS16 filter.

Fig. 3 Installation for steam or gas application

4. Commissioning

Once the pipework installation has been completed the following Steps should be taken in sequence, referencing Figure 4, to commission the CSF16 filter:

1. All isolating valves should be closed.
2. The housing ring (4) holding together the filter housing head (2) and the filter housing bowl (1) should be unscrewed using a 'C' spanner. The filter housing head (2) can then be removed.
3. The filter element seals (2 off, item 6) should then be lubricated using FDA or DAB approved Vaseline or silicone oil, before fitting to the filter housing bowl (1).
4. The filter element (5) needs to be gently pushed into the filter housing bowl (1).
5. Ensure the filter seal (3) is fitted.
6. The housing ring (4) should then be carefully placed into the seating land on the filter housing bowl (1), before then gently lowering the filter housing head (2) over the filter element and tightening the housing ring (4) to the recommended torque (See Table 1). The housing ring (4) is designed with a coarse thread to minimise the possibility of galling. Thread lubrication is not normally necessary. However, a FDA or DAB approved Vaseline or silicone oil may be used if required.
7. Once Steps 1-6 have been completed the upstream isolating valve can be cracked open slowly to admit the medium into the CSF16 filter then proceed with Steps 8-12, page 8.

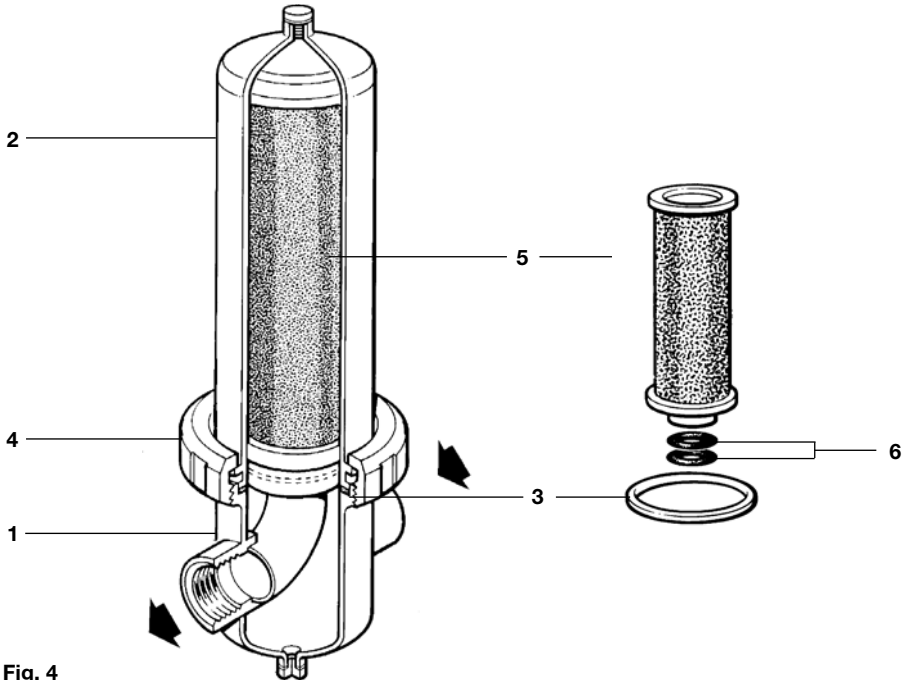




Fig. 4

Table 1 Recommended tightening torques

Item	Part	 or  mm	N m
4	Housing ring	use C spanner	As required
7	Plug	1/4" BSP	As required

8. If on gas or steam service an audible signal (whistling tone) is heard then the filter housing has been incorrectly assembled and the upstream isolating valve should be closed immediately.
In checking the filter housing, the plug (7) on top of the filter housing head must be loosened slowly and carefully, in order to ensure time for any pressure within the CSF16 filter to disperse. Once this has happened the housing ring (4) can be undone, the filter housing bowl and head (1 and 2) plus filter element (5) and especially the housing seal (3) can be carefully checked, before reassembly.
9. Should no audible signal be heard after the upstream isolating valve has been opened, then the downstream valve can be opened slowly until fully open. The medium will now be flowing through the CSF16 filter and at this stage a note should be taken of the pressure gauge readings before and after the CSF16 filter, in order to check the differential pressure.
10. All interconnecting pipework, fixtures and fittings should then be checked for leakage especially if steam is the operating medium. This check should include steam traps.
11. Within the first few days of commissioning a new CSF16 filter, the filter should be isolated and the new strainer preceding the filter checked by removing the screen. Any pipe debris can be removed and the strainer screen replaced before commissioning takes place.
12. After the CSF16 filter has been in use for some time (determined by experience) the pressure gauges should be checked to establish the differential pressure. If this has reached 0.7 bar to 1 bar then the filter element must be removed for cleaning or replacement (see Section 6, Maintenance).

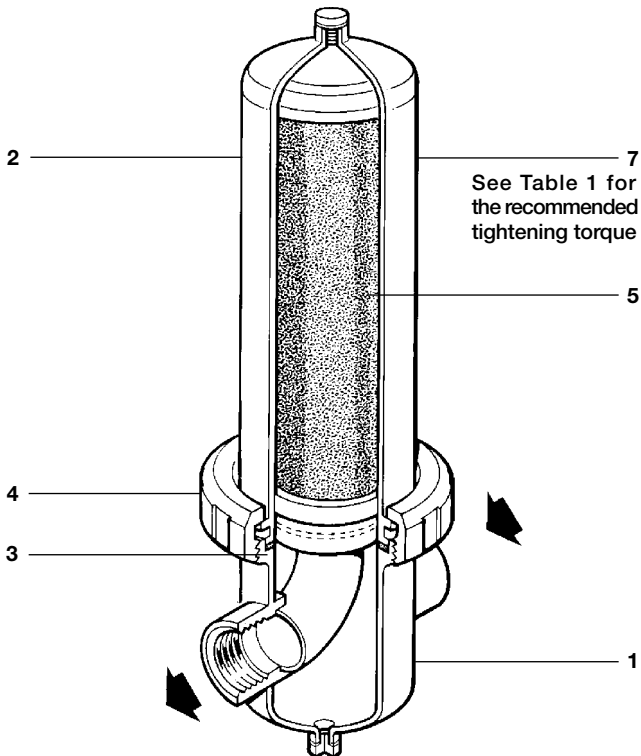


Fig. 5

5. Operation

The CSF16 is a high quality, high efficiency, stainless steel filter that uses sintered austenitic stainless steel filter elements with a 1, 5 or 25 micron absolute rating. It allows steam to be filtered such that all sub-visible solid and liquid particles are removed.

The rating for the filter element means that for steam and gas service 100% of liquid and gas particles larger than the rating will be retained by the filter element. In order to minimise pressure drop and extend filter element life the coarsest rating compatible with the application should be selected. As well as retaining all particles larger than the pore size, the filter element will also stop a percentage of smaller particles. For example the 1 micron filter element has an efficiency of 99.7% based on 0.2 micron particles.

6. Maintenance

Note: Before actioning any maintenance observe the 'Safety information' in Section 1.

6.1 General information

Before undertaking any maintenance on the filter, it must be isolated from both the supply line and return line and any pressure allowed to safely normalise to atmosphere. The CSF16 filter should then be allowed to cool. When reassembling, ensure that all joint faces are clean.

6.2 How to clean or replace the filter element:

- The housing ring (4) holding together the filter housing head (2) and filter housing bowl (1) should be unscrewed using a 'C' spanner. The filter housing head (2) can then be removed.
- Remove the filter element (5) carefully.
- Cleaning can be by immersion or preferably back flushing, with dilute hydrochloric acid, clean water or air, or alternatively by immersion in an ultrasonic bath, depending upon the type of contamination. If hydrochloric acid is to be used it should be in a 1-2% solution at around room temperature (no greater than 40°C) and should take ½ - 2 hours depending on the degree of contamination. Gentle brushing may be used to aid cleaning. If after replacement back into the filter itself the pressure drop quickly reaches 0.7 to 1 bar, then the filter element should be completely replaced.

Note: The service life of the filter element is solely dependant upon the degree of solid particle contamination. Thus, in time, the filter element will become saturated.

It is strongly recommended that a spare filter element set is carried in stock to minimise downtime.

- Reassemble and commission following Steps 3-12 laid down in Section 4, Commissioning.

7. Spare parts

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

Available spares

Filter element	5, 6 (2 off)
Seal kit	6 (6 off), 3 (3 off)

Note: The job of the filter element 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 always readily available.

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 filter element kit for a Spirax Sarco DN25 CSF16 clean steam filter, with AFLAS filter element seals.

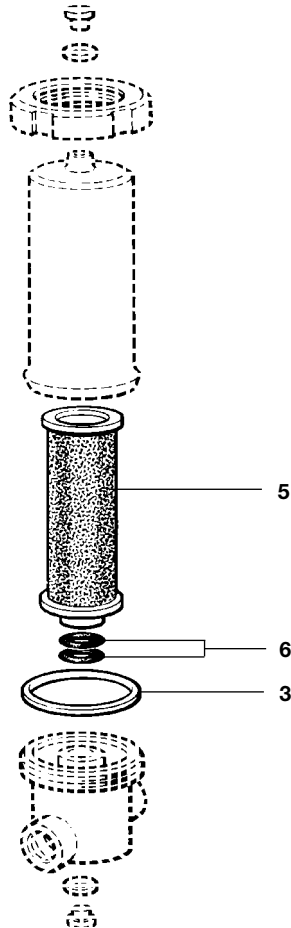


Fig. 6

