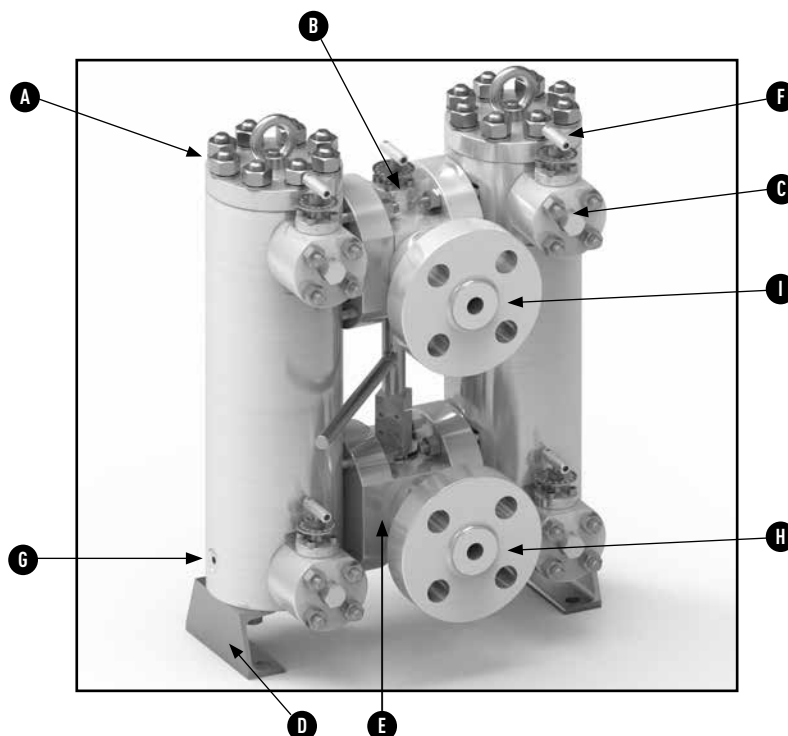


- A** – Bolted cover design
- B** – Integrated equalizing line
- C** – Drain and vent connections (0°, 90°, 180°, 270°). Available in flanged, NPT and other options.
- D** – Bracket or panel mount installation options
- E** – Double block and bleed transfer valve
- F** – Bolted bonnet kit (lockable)
- G** – Grounding/Earthing boss
- H** – Inlet
- I** – Outlet



### Product Description

Indufil FCF Series Seal Gas Filtration Systems are available in single and duplex configuration, in stainless steel as a standard and in higher alloys. The filters comply with international pressure vessel and design codes and were designed for compliance with API614 and API692.

In addition to complying to filtration requirements for contaminants of 1 micron and smaller at particulate efficiencies of 99.9% and coalescing performance down to 0.005 ppm (w), all within a smaller footprint.

### Applications

- Centrifugal compressors fitted with dry gas seals
- Turbo expanders

### Qualification Standards

Standard compliance: ASME VIII Div. 1/PED/ATEX Ex II 2G/API614 /API 692  
Optional: U-stamp, TR-CU, ML, Dosh, NR13, ARH, AS1210, CRN, etc.

### Operating Parameters/Design Conditions

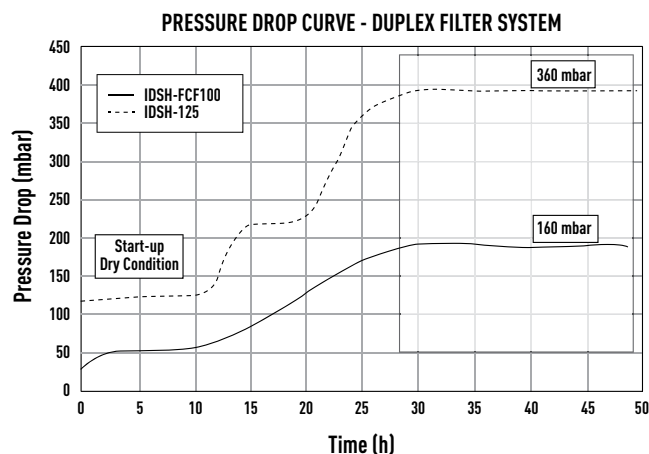
- Filtering of process gases and nitrogen with cleanliness requirements down to 1 micron or smaller
- Removal of liquids from gas down to 0.005 ppm (w)
- Temperatures from -94 to 482°F/-70 to 250°C
- Pressure up to 5990 psig/413 barg
- Standard material Stainless steel ASTM A 182 GRF 316(L) with higher grade alloys as option
- Maximum Flow Rate: Sizing in accordance with API614, API 692 or alternatively based on maximum filter media drain layer velocity

### Design Features

- Coalescing/particle or particle only filtration element options
- Interlinked transfer valves with bolted construction and providing a safe and zero-leak operation both to atmosphere and isolating the pressure vessels
- Both transfer valve (class A) and needle valve (class B) compliant to ISO 15848 (fugitive emission)
- Bolted cover construction allowing an easy and clean filter element change out
- Integrated equalizing line and standardized, modular needle valve simplifying tubing and flange requirements

| Product Range |              | Options |        |                        |           |
|---------------|--------------|---------|--------|------------------------|-----------|
| Size          | In/Outlet    | Single  | Duplex | Double block and bleed | Reservoir |
| FCF-50        | 1/2-3/4-1"   | •       | •      | •                      | •         |
| FCF-100       | 1/2-3/4-1"   | •       | •      | •                      | •         |
| FCF-200       | 3/4-1-1 1/2" | •       | •      | •                      | •         |
| FCF-300       | 1-1 1/2-2"   | •       | •      | •                      | •         |
| FCF-400       | 2-3"         | •       | •      | •                      | •         |

## Performance Characteristics



### Pressure-drop

The pressure-drop in a filter system is the pressure difference before and after the filter system. Pressure-drop occurs due to transfer valves, pipe bends, filter media selection and the loading of the filter element.

Pressure drop curves in seal gas coalescing application show three stages:

#### 1. Start-up (clean) pressure-drop

When a new filter element is installed, the element is clean and dry, the filter media pores are not blocked with particles or liquid droplets, and gas flows freely; most of the pressure-drop is caused by the filter system. The start-up pressure-drop (clean and dry filter element) of the total system is described in the API 692 as filter sizing parameter.

#### 2. Operational (saturated) pressure-drop

The filter element is capturing/coalescing and draining liquids from the gas flow. The filter element pores are partially blocked with captured droplets (saturated) and the gas has more restrictions when passing through. The operational pressure-drop when fully saturated can be 4 times higher than start-up. Depending on the liquid concentrations in the gas, the filter element becomes saturated in a time ranging from several hours to several days.

#### 3. Replacement stage

Over time, the element also traps more and more particle contamination from the gas flow. Increased particle loading blocks more of the filter media leading to a further increase in pressure drop, up to the alarm point where the filter element requires to be replaced.

### Why is pressure-drop important?

- API 692 prescribes specific sizing parameters based on system (start-up/clean) pressure-drop.
- Operational/saturated pressure drop has direct impact on the performance, lifetime and energy consumption of the filter element.

The Indufil FCF series has a combination of solutions to keep both clean- and saturated pressure-drop as low as possible:

- Flow optimized system design
- Oleophobic filter media
- Patented flow straightener element in filter element
- Optimal filter element size

Using advanced prediction software based on actual CFD tests, clean- and saturated pressure-drop is predicted for every filter to optimize filter size for process conditions.



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