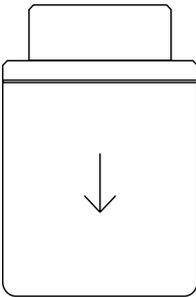
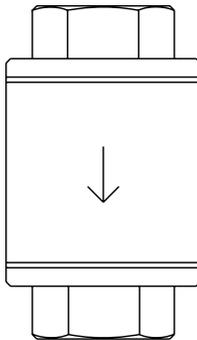


DF1 and DF2
Diffusers
Installation and Maintenance Instructions



DF1



DF2

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

1. Safety information

Safe operation of these products can only be guaranteed if they are properly installed, commissioned, used and maintained by qualified personnel (see Section 1.11) 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.

1.1 Intended use

Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended use/application. The DF1 and DF2 comply with the requirements of the European Pressure Equipment Directive 97/23/EC and fall in the category 'SEP'.

- i) The products have been specifically designed for use on steam, air or water/condensate which are in Group 2 of the above mentioned Pressure Equipment Directive. The products' use on other fluids may be possible but, if this is contemplated, Spirax Sarco should be contacted to confirm the suitability of the product for the application being considered.
- ii) Check material suitability, pressure and temperature and their maximum and minimum values. If the maximum operating limits of the product are lower than those of the system in which it is being fitted, or if malfunction of the product could result in a dangerous overpressure or overtemperature occurrence, ensure a safety device is included in the system to prevent such over-limit situations.
- iii) Determine the correct installation situation and direction of fluid flow.
- iv) Spirax Sarco products are not intended to withstand external stresses that may be induced by any system to which they are fitted. It is the responsibility of the installer to consider these stresses and take adequate precautions to minimise them.
- v) Remove protection covers from all connections and protective film from all name-plates, where appropriate, before installation on steam or other high temperature applications.

1.2 Access

Ensure safe access and if necessary a safe working platform (suitably guarded) before attempting to work on the product. Arrange suitable lifting gear if required.

1.3 Lighting

Ensure adequate lighting, particularly where detailed or intricate work is required.

1.4 Hazardous liquids or gases in the pipeline

Consider what is in the pipeline or what may have been in the pipeline at some previous time. Consider: flammable materials, substances hazardous to health, extremes of temperature.

1.5 Hazardous environment around the product

Consider: explosion risk areas, lack of oxygen (e.g. tanks, pits), dangerous gases, extremes of temperature, hot surfaces, fire hazard (e.g. during welding), excessive noise, moving machinery.

1.6 The system

Consider the effect on the complete system of the work proposed. Will any proposed action (e.g. closing isolation valves, electrical isolation) put any other part of the system or any personnel at risk?

Dangers might include isolation of vents or protective devices or the rendering ineffective of controls or alarms. Ensure isolation valves are turned on and off in a gradual way to avoid system shocks.

1.7 Pressure systems

Ensure that any pressure is isolated and safely vented to atmospheric pressure. Consider double isolation (double block and bleed) and the locking or labelling of closed valves. Do not assume that the system has depressurised even when the pressure gauge indicates zero.

1.8 Temperature

Allow time for temperature to normalise after isolation to avoid danger of burns.

1.9 Tools and consumables

Before starting work ensure that you have suitable tools and/or consumables available. Use only genuine Spirax Sarco replacement parts.

1.10 Protective clothing

Consider whether you and/or others in the vicinity require any protective clothing to protect against the hazards of, for example, chemicals, high/low temperature, radiation, noise, falling objects, and dangers to eyes and face.

1.11 Permits to work

All work must be carried out or be supervised by a suitably competent person. Installation and operating personnel should be trained in the correct use of the product according to the Installation and Maintenance Instructions.

Where a formal 'permit to work' system is in force it must be complied with. Where there is no such system, it is recommended that a responsible person should know what work is going on and, where necessary, arrange to have an assistant whose primary responsibility is safety.

Post 'warning notices' if necessary.

1.12 Handling

Manual handling of large and/or heavy products may present a risk of injury. Lifting, pushing, pulling, carrying or supporting a load by bodily force can cause injury particularly to the back. You are advised to assess the risks taking into account the task, the individual, the load and the working environment and use the appropriate handling method depending on the circumstances of the work being done.

1.13 Residual hazards

In normal use the external surface of the product may be very hot. If used at the maximum permitted operating conditions the surface temperature of some products may reach temperatures in excess of 250°C (482°F).

Many products are not self-draining. Take due care when dismantling or removing the product from an installation (refer to 'Maintenance instructions').

1.14 Freezing

Provision must be made to protect products which are not self-draining against frost damage in environments where they may be exposed to temperatures below freezing point.

1.15 Disposal

Unless otherwise stated in the Installation and Maintenance Instructions, this product is recyclable and no ecological hazard is anticipated with its disposal providing due care is taken.

1.16 Returning products

Customers and stockists are reminded that under EC Health, Safety and Environment Law, when returning products to Spirax Sarco they must provide information on any hazards and the precautions to be taken due to contamination residues or mechanical damage which may present a health, safety or environmental risk. This information must be provided in writing including Health and Safety data sheets relating to any substances identified as hazardous or potentially hazardous.

— 2. General product information —

2.1 General description

DF1

The Spirax Sarco DF1 diffuser is a compact unit designed to be fitted to the outlet of a steam or air trap discharging to atmosphere. The diffuser reduces the problem of noise and erosion by cushioning high velocity discharge. It can be fitted to any trap where conditions promote blast discharge similar to that associated with balanced pressure, inverted bucket or thermodynamic traps.

A reduction of more than 80% of sound pressure level can be expected measured at 1 m (3 ft) from the discharge point.

DF2

The Spirax Sarco DF2 diffuser is a compact unit designed to be fitted to the outlet of steam traps discharging into flooded condensate return lines. It reduces the problem of noise and waterhammer when the flash steam formed on discharge from the steam trap condenses due to rapid cooling.

Note: For further information see the following Technical Information Sheets: TI-P155-02 for the DF1 and TI-P155-06 for the DF2.

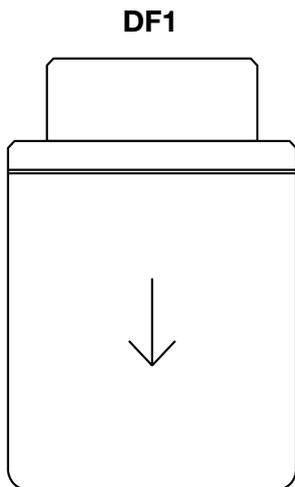


Fig. 1

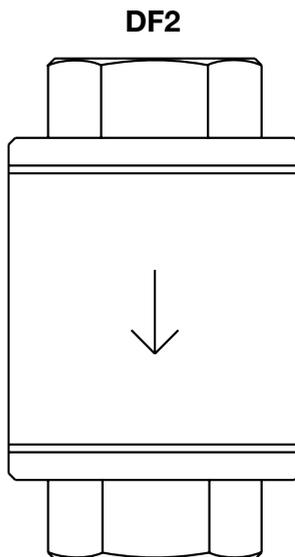


Fig. 2

2.2 Sizes and pipe connections

DF1 1/2" and 3/4" screwed BSP (BS 21 parallel) or NPT (inlet only).
1/2" and 3/4" socket weld end (inlet only).

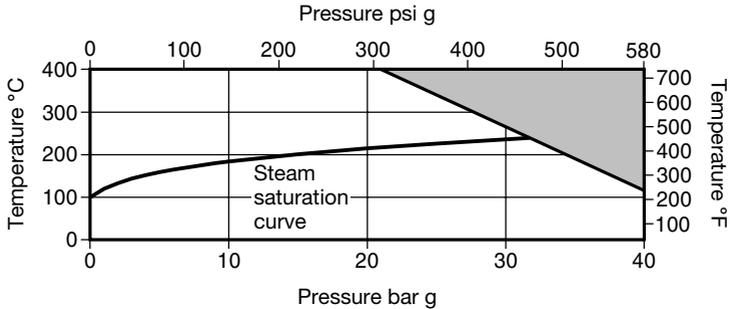
DF2 1/2" and 3/4" screwed BSP / NPT and socket weld.

2.3 Pressure / temperature limits

DF1

Suitable for use with traps rated up to PN63

DF2 only



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

DF2

Body design conditions		PN40
PMA	Maximum allowable pressure	40 bar g @ 110°C (580 psi g @ 230°F)
TMA	Maximum allowable temperature	400°C @ 21 bar g (752°F @ 305 psi g)
Minimum allowable temperature		-29°C (-22°F)
PMO	Maximum operating pressure for saturated steam service	32 bar g (464 psi g)
TMO	Maximum operating temperature	400°C @ 21 bar g (752°F @ 305 psi g)
Minimum operating temperature		0°C (32°F)
Design for a maximum cold hydraulic test pressure of:		60 bar g (870 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:

- 3.1** Check materials, pressure and temperature and their maximum values. If the maximum operating limit of the product is lower than that of the system in which it is being fitted, ensure that a safety device is included in the system to prevent overpressurisation.
- 3.2** Determine the correct installation situation and the direction of fluid flow.
- 3.3** Remove protection covers from all connections and protective film from all name-plates, where appropriate, before installation on steam or other high temperature applications.

DF1

The DF1 should be fitted on the outlet side of a steam trap or air trap with a suitable fitting to ensure that the discharge of condensate is towards the ground or an alternative safe enclosure.

Important note:

If the trap is to discharge to atmosphere ensure it is to a safe place, the discharging fluid may be at a temperature of 100°C (212°F). The recommended distance from the bottom of the diffusers and the ground is 100 mm (4"). The discharge from the DF1 must be facing vertically downwards.

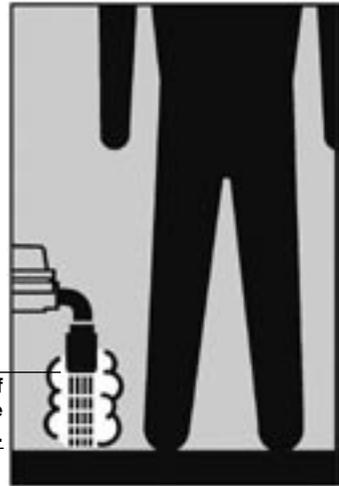


Fig. 3

Recommended maximum distance from the bottom of the diffuser and the ground is 100 mm (4"). If suitable guarding is installed then this distance may be increased.

DF2

The DF2 should be fitted on the outlet side of the steam trap ensuring that the directional arrow on the body is in the flow direction.

Important note:

If installing diffusers on compressed air systems, ensure any excess oil is drained away, as emulsified oil can cause the diffusing element to become blocked - impairing system performance. Regular inspection of the element may be required. Diffusers are not recommended for use with safety relief valves or strainer blowdown valves.

4. Commissioning

After installation or maintenance ensure that the system is fully functional. Carry out tests on any alarms or protective devices. Check for safe noise levels from a DF1 discharging to atmosphere.

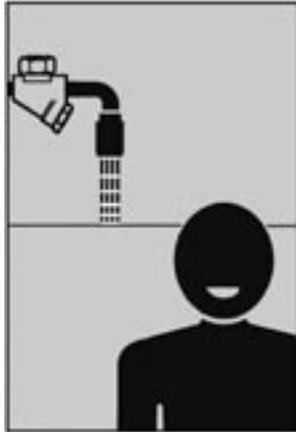


Fig. 4 80% reduction in noise level

5. Operation

The diffuser is especially designed to reduce noise levels of discharging traps by more than 80%. It is also capable of cushioning the erosion effect of high velocity discharge. The knitted, compacted stainless steel diffusing element is highly effective for energy dissipation. The DF range of diffusers are designed to be maintenance free.

6. Maintenance

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

The DF1 and DF2 are sealed units. They are non-maintainable.

7. Spare parts

There are no spare parts available for the DF1 or DF2. To order a replacement product, please use the description given below.

How to order a replacement product

Example: 1 off Spirax Sarco ½" DF2 with screwed BSP end connections.