



INSTALLATION, OPERATION, AND MAINTENANCE

PREFACE:

This manual contains information concerning the installation, operation, and maintenance of Stayflow Suction Diffusers. To ensure efficient and safe operation of Stayflow Suction Diffusers, the instructions in this manual should be thoroughly read and understood. This manual is general in nature and is not meant to take the place of an on-site, process engineer or pipe fitter. As such, Stayflow recommends that only experienced, skilled personnel be allowed to install and maintain Stayflow Suction Diffusers. Please retain this manual in a location where it is readily available for reference.

GENERAL INFORMATION:

A Suction Diffuser is a pump protection device which provides a means of mechanically removing solids from flowing media by utilizing a perforated or mesh lined straining element (screen). In addition to removing unwanted debris, Stayflow suction diffusers utilize flow straightening vanes that reduce turbulence and provide a smooth, even flow into the pump. Stayflow Suction Diffusers are

designed to be economical and efficient and can be used to replace the 90° elbow, strainer, and flow stabilizer traditionally installed on the suction side of the pump.

Specific engineering design data, not contained in this manual, may be located within the SD Suction Diffuser Engineering Specification Sheet or on certified Engineering drawings available upon request.

Prior to selection of a Stayflow Suction Diffuser, the following factors must be determined:

- Material construction requirements of the Suction Diffuser.
- Design and working pressure/temperature requirements.
- Operating conditions (throttling, pressure drop, condensation, flow reversal, operation frequency, etc.).
- Service media type (liquid, gas, abrasive, corrosive, dirty, etc.).
- Pipeline Media Flow-rate and Viscosity.
- Clean Start-up Pressure of the Pipeline.
- Space availability for installation.

Please contact a Stayflow Design Engineer to assist in the determination of these requirements prior to selection and purchase.



Figure 1: Suction Diffuser

UNPACKING AND INSPECTION:

Upon receipt of product, it is important to follow these unpacking and inspection procedures.

All Stayflow Suction Diffusers are shipped in specialized shipping containers designed to prevent damage during transportation. If external damage to the shipping container is evident upon receipt of product, please request that a representative of the shipping carrier be present before unpacking the product.

- Carefully open the shipping container, following any instructions that may be marked on the container. Remove all packing material surrounding the Suction Diffuser and carefully lift it from the container. It is recommended to keep the shipping container and all packing material for reuse in storage or reshipment.

CAUTION:

For large or heavy Suction Diffusers, the appropriate material handling equipment must be used to prevent injury and possible damage to the Suction Diffuser.

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UNPACKING AND INSPECTION: Continued...

- Visually inspect the Suction Diffuser for any signs of damage including scratches, loose parts, broken parts or any other physical damage that may have occurred during shipment. If damage is observed, immediately file a claim with the shipping carrier. Suction Diffusers that are damaged during transportation are the responsibility of the customer. For information regarding Stayflow's warranty policy, please refer to the last page of this document.
- Prior to installation, remove the flange protectors from the Suction Diffuser and inspect it internally for any loose or foreign materials that may have become trapped inside the Suction Diffuser during transportation.
- If the Suction Diffuser is not required to be installed immediately, it should be stored indoors in a clean, dry, consistent temperature environment. It is also recommended to utilize the original shipping container and packing materials to properly store the Suction Diffuser. If long term storage is required, a desiccant may be necessary. This would be based upon the local, environmental storage conditions. Please consult a Stayflow Design Engineer to assist in this determination.
- When ready to install, remove any preservatives with solvent dampened cloths. Remove any loose material and protective packing material.

INSTALLATION:

Pre-Installation Checklist

- Ensure Working conditions (pressure and temperature) are within the specified capacity of the product being installed. Please refer to the certified Engineering drawings to assist in determining these values.
- Make sure that the construction material of the Strainer is chemically compatible with the media flowing in the pipeline.

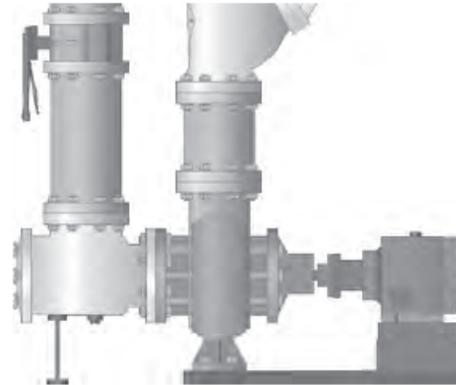


Figure 2: Illustration of an Installed Suction Diffuser with Pump

Pre-Installation Checklist continued...

- Inspect the Suction Diffuser's flange ends and the pipeline's mating flanges to ensure gasket surfaces are free of defects. The pipeline should also be checked for proper alignment. Stayflow Suction Diffusers should never be utilized to realign an existing piping system.
- Ensure that the pipeline's mating flanges are the same type as the Suction Diffuser being installed. Raised face flange ends cannot be mated to flat face flange ends.
- Ensure the gap for product installation and Suction Diffuser end to end length are within a 1/4" gap for gasket installation. Also, check that there is sufficient clearance for easy opening of cover and screen removal. Refer to the Engineering Specification Sheet for screen removal clearance requirements.
- The appropriate material handling equipment (joist and slings) should be available to lift larger units into position.

Installation Procedure

Step 1:

The upstream side of the Suction Diffuser may be installed in either the vertical or horizontal position. However, the existing pipe sizes must match the inlet and outlet sizes of the unit being installed.

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Installation Procedure continued...

Step 2:

Place the Suction Diffuser into position, using the appropriate material handling equipment for large or heavy units. Ensure that the flow arrow (cast into the Suction Diffuser) is pointed towards the suction side (inlet) of the pump.

Step 3:

Ensure that there is ample space at the cover end of the Suction Diffuser for screen removal. Refer to the Engineering Specification Sheet for screen clearance requirements.

Step 4:

For large Suction Diffusers, support the existing pipeline with pipe supports near the inlet and outlet connections before attempting installation.

Step 5:

Install a standard, ANSI (1/8" thick) flange gasket between the Suction Diffuser and pipeline flanges, on both sides. Install lubricated flange bolts and hand tighten.

Step 6:

A support leg (not included with the Suction Diffuser) is required to support the Suction Diffuser and reduce strain on the pump. Support pads (bosses) are cast into the Suction Diffuser to assist in correctly placing the support leg. Cut a piece of pipe (schedule 40 with same diameter as the support boss) to the approximate length from the support boss to the ground. Place the pipe into position to support the Suction Diffuser.

Step 7:

Flange bolts should then be tightened, using a star or crisscross pattern to evenly load the bolts, in accordance with established piping standards. This is illustrated in Figure 3.

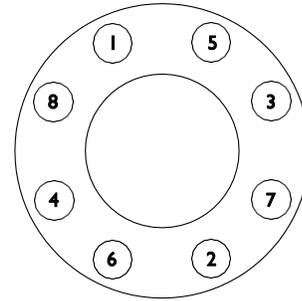


Figure 3: Bolting Sequence Pattern

OPERATION:

Once proper installation has been successfully completed, start the system gradually, at start up as well as after shut down. This eliminates sudden shock to the strainer and other equipment in the line.

Start-up Procedure:

Step 1:

Gradually increase system pressure until working pressure is reached.

Step 2:

Inspect flange connections for leaks. If leaking occurs, check for piping misalignment, that the flange bolts are properly tightened, and that the cover is properly seated.

Step 3:

After initial circulation and cleaning of system has been completed, *remove the disposable, fine mesh start-up screen.* (Do not remove the permanent, perforated screen.)

Step 4:

Close blow-down valve or other pipeline vent.

MAINTENANCE:

Stayflow Suction Diffusers require little monitoring once they are properly installed. The pressure differential across the strainer should be checked periodically to determine if the screen needs to be cleaned or replaced. If the pressure differential goes unchecked and the screen becomes completely clogged, the screen will break and require replacing.

CAUTION:

Excessive bolt torque may damage flanges. Please refer to established flange bolt torques for guidelines.



CAUTION:

Suction Diffuser screens are not designed to withstand the same pressure ratings as the housings. If a screen becomes completely clogged, it will be exposed to the same pressure as the housing. In most cases, this will cause the screen to fail and potentially damage downstream equipment.

Screen Removal/Cleaning/Replacement

CAUTION:

Before removing the cover of the Suction Diffuser, the pressure inside the vessel must be reduced to atmospheric via suction or venting. Failure to do so may result in serious bodily injury.

Stayflow Suction Diffusers are designed to require very little maintenance. Regular maintenance involves:

- Blow-down cleaning
- Timely cleaning or replacement of screen.
- Periodically checking for leaks

CAUTION:

Before removing the Suction Diffuser's cover, ensure that the media that is flowing in the pipeline is known and any special handling precautions are understood. Please review the Material Safety Data Sheet (MSDS) for that specific fluid.

During normal use, when installed on suction side of the pump, the screen will become clogged with foreign matter, causing the differential pressure to increase. Once the differential pressure has increased to an unacceptable value (4 psi maximum), it is time to clean or replace the screen.

A convenient and safe way to determine when the screen needs to be replaced is to install pressure gauges on the inlet and outlet sides of the Suction Diffuser. The maximum acceptable pressure drop across the Suction Diffuser will indicate when the screen needs to be replaced. Screen size and construction determine the maximum pressure drop a Suction Diffuser screen can withstand. Please consult factory for exact pressure ratings.

Blow-down Cleaning

To avoid shutting down the system and provide a method to quickly clean the unit, a blow-down valve can be installed on the Suction Diffuser in place of the NPT plug. To perform blow-down cleaning, with the system running open the blow-down valve to flush out accumulated debris from the Suction Diffuser. Keep the blow-down valve open until all debris has been removed and the differential pressure returns to acceptable limits. Close the valve and resume normal operation. If the differential pressure does not lower via blow-down cleaning, then normal cleaning of the screen needs to be performed.

CAUTION:

Blow-Down cleaning should not be performed after initial system start-up and is only recommended when regular cleaning can not be performed (as described below).

Step 1:

Isolate the Suction Diffuser by closing the inlet and outlet valve connections on either side of the Suction Diffuser.

Step 2:

Open NPT plug or blow-down valve to relieve pressure inside the Suction Diffuser. Drain fluid up to screen seat level.

Step 3:

Once pressure is relieved, remove the cover.

Step 4:

Remove screen and clean. Avoid banging or hitting the screen to remove Stubborn debris. It is recommended to use a high pressure water or air stream to clean screen.

Step 5:

Inspect screen and cover gasket for damage. If either is damaged, replace. Always ensure there is a spare gasket and screen on hand prior to maintenance.

Step 6:

Remove any debris or sludge from within the Suction Diffuser.

Step 7:

Replace clean screen into its original position, ensuring it is squarely positioned on the screen seat.

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Screen Removal/Cleaning/Replacement continued...

Step 8:
Replace cover gasket and replace and tighten cover.

Follow the Start-up procedure outlined within the OPERATION section of this manual.

SPARE PARTS LIST:

For the bill of materials and spare parts listing of each Suction Diffuser model, please refer to the corresponding Engineering Specification Sheet. For special or fabricated units, please refer to the certified engineering drawing for that unit.

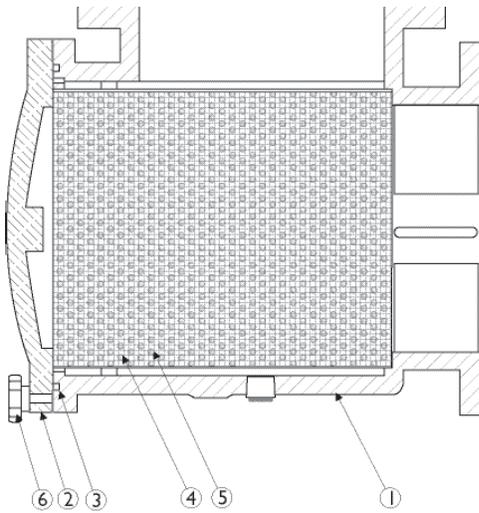


Figure 4: Illustration of Suction Diffuser

PARTS LIST	
No.	Suction Diffuser
1	BODY
2	COVER
3*	O-RING
4*	STRAINING ELEMENT
5	START-UP SCREEN
6	BOLT

* Denotes recommended spare parts

WARRANTY:

Seller warrants each of the products and parts sold hereunder, under normal use of service, and subject to user's compliance with any operating instructions and

other directions given by seller, to be free from defects in materials or workmanship for a period of one year from date of shipment from seller's plant. Seller's liability, under this warranty, shall be limited to, at the seller's option, to repairing or replacing any such defective product FOB seller's plant, and reimbursing purchaser for shipping costs, subject to the following:

(1) Timely receipt of purchaser's written notice that such products are defective. (2) Seller's written authorization to purchaser for the return of such products, (3) the return of such products to seller with shipping charges prepaid and (4) seller's inspection of and confirmation that such products are defective in materials or workmanship. If seller's inspection shows that the products returned are defective due to dirt, rust or any foreign material not attributable to seller: improper usage, over tightening on threads, abuse or incorrect assembly in the field, or other cause not due to seller's improper manufacture, seller will, subject to purchaser's written authorization, repair or replace such products at cost. Seller's factory inspection and testing reports will be made available to purchaser upon request.

THIS WARRANTY IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF FITNESS OR MERCHANTABILITY. SELLER SHALL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES. NO REPRESENTATIVE OR SELLER HAS AUTHORITY TO MAKE ANY REPRESENTATIONS OR WARRANTIES, EXCEPT AS STATED HEREIN.