Triton™ Fabricated Tee Strainer

Installation, Operation, and Maintenance Manual

Revision 0 09/23/2024

Background Process Information

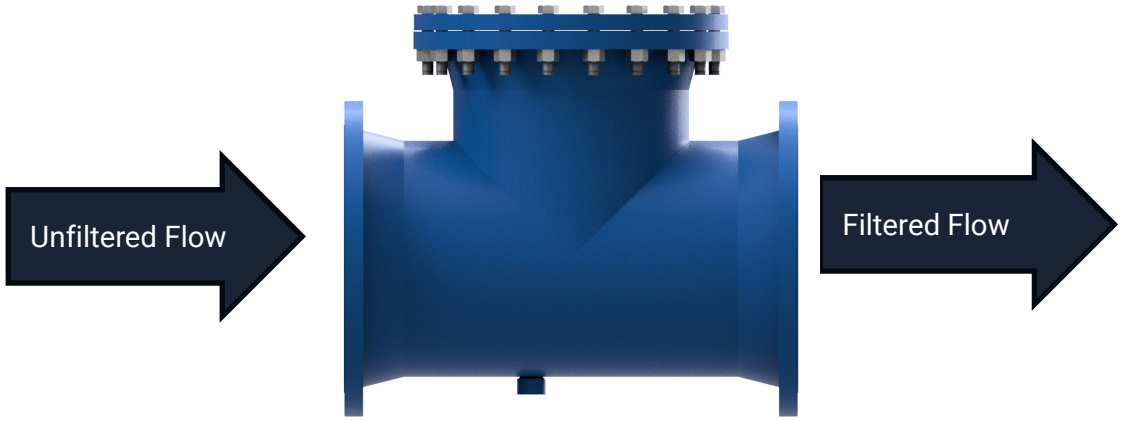
This manual provides information regarding the installation, operation, and maintenance of Innovas Triton™ Fabricated Tee Strainers. It is intended for use by operators, maintenance personnel, and other individuals involved in the handling and maintenance of the Tee Strainer. To ensure efficient and safe operation, 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, Innovas recommends that only experienced, skilled personnel be allowed to install and maintain Innovas Tee Strainers. Please retain this manual in a location where it is readily available for reference.

Tee Strainer Overview

A Tee Strainer is installed into a pipeline system to remove unwanted debris from the pipeline flow by utilizing a perforated or mesh lined straining element. Tee Strainers remove only insoluble floating impurities with the most common range of particle retention ranging from 1 inch to 50 micron (0.002 inch).

Straining of the pipeline flow is accomplished via a perforated or mesh lined screen, internal to the strainer. In general, the size of the screen perforation should be slightly smaller than the smallest debris particle to be removed. If the screen perforation is undersized, the screen may require excessive cleaning. Consequently, if the screen perforation is oversized, unwanted debris may be permitted to flow through the pipeline; possibly damaging downstream equipment.

Figure 1. Tee Strainer Overview



Innovas offers a wide variety of Tee Strainer styles to meet all your strainer requirements. Specific engineering design data, not contained in this manual, may be located within Technical Data Sheets for each strainer model or within the certified engineering drawing.

For ease of operation and maintenance, Innovas Triton Tee Strainers may be fitted with a QuikClean™ service port. The Quikclean™ port provides operators a simple, fast, and effective way to access the interior of the strainer screen for inspection or light cleaning without the need to remove the entire strainer cover or lid.

Figure 2. QuikClean™ Service Port on Innovas Triton™ Tee Strainer

Prior to selection of an Innovas Tee Strainer, the following factors must be determined:

- Material construction requirements of the Tee Strainer to resist corrosion and environmental factors.
- Design working pressure and temperature requirements.
- Operating conditions (throttling, pressure drop, condensation, flow reversal, service frequency, etc.).
- Pipeline fluid service type (liquid, gas, abrasive, corrosive, dirty, etc.).
- The debris size to be removed.
- The debris loading of the pipeline.
- Pipeline fluid flow rate and viscosity.
- Clean start-up pressure of the pipeline.
- Space availability for installation.

Please contact Innovas to assist in the determination of these requirements prior to selection and purchase.

Unpacking and Inspection

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

All Innovas Tee Strainers are shipped in specialized shipping packaging designed to prevent damage during transportation. If external damage to the packaging or strainer is evident upon receipt of product, please request that a representative of the shipping carrier be present before unpacking the product.

Visually inspect the Tee Strainer 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. Immediately notify Innovas of any strainers that are damaged during transportation.

If the Tee Strainer is not required to be installed immediately, it should be stored indoors in a clean, dry, consistent temperature environment.

When ready to install, remove any loose material and protective packing material.

Pre-Installation Checklist

Ensure working conditions (pressure/temperature) are within the specified capacity of the product being installed. Please refer to the certified drawings to assist in determining these values.

Make sure the construction material of the strainer is chemically compatible with the fluid flowing in the pipeline.

Inspect all sealing surfaces to ensure gasket surfaces are free of defects (no nicks or cuts). The pipeline should also be checked for proper alignment. Innovas Tee Strainers should never be utilized to realign an existing piping system.

Ensure the pipeline's mating flanges are the same type as the Tee Strainer being installed. Raised face flange ends cannot be mated to flat face flange ends.

For flanged units, ensure strainer end-to-end length and installation gap are within ¼" gap for gasket, and have sufficient clearance for easy opening of cover and screen removal. Refer to the certified strainer drawing for screen removal clearance requirements.

Installation

Read each step completely prior to proceeding.

Install blow down valve (if provided) at blow-off connection. Also, for maximum efficiency, install a differential pressure gauge at inlet and outlet connections or at the Strainer gauge tap (if provided).

Innovas Tee Strainers must be positioned in the pipeline ahead of the equipment requiring protection. If the equipment requiring protection is a pump, the Tee Strainer must be placed on the suction side of the pump.

To provide for easier maintenance, the Tee Strainer should be located where the drain plug can be removed. Additionally, ensure the drain or blow-off is located at the lowest position when installed.

Ensure there is ample space at the wye side of the Strainer for screen removal. Refer to the certified engineering drawing to determine the screen clearance requirements.

Before placing the Tee Strainer into place, support the existing pipeline with pipe supports near the inlet and outlet connections.

Place the Tee Strainer into the pipeline, ensuring that the flow arrow on the body of the Tee Strainer is pointing in the same direction as the pipeline flow. For large or heavy strainers, appropriate material handling equipment must be used.

For flanged-end strainers, install gaskets and tighten and torque flange bolts in a criss-cross pattern to ensure uniform gasket pressure distribution, in accordance with relevant piping standards or facility piping specifications.

An Innovas Tee Strainer should always be installed ahead of pumps, heat exchangers, and other expensive, downstream equipment to help ensure proper protection and trouble-free operation. This even holds true for new piping to protect against future pipe scale, corrosion products, and accidentally introduced items such as gaskets, cooling tower fill media, or tools.

Operation

Before startup, ensure that all installation and connection procedures have been completed. Once proper installation has been successfully completed and verified, start the system gradually, at start up as well as after shut down. This eliminates water hammer and sudden shock to the strainer and other equipment in the line. This is extremely important for steam service.

Start Up Procedure

Open blow-down valve to remove air from the Strainer.

Start the piping system by opening the outlet valve nearest the Tee Strainer's outlet first. Then gradually open the inlet valve nearest the Tee Strainer's inlet, approximately 25% of normal operational flow. It is important to start the system gradually to avoid displacing or damaging the Tee Strainer.

Continue to open the inlet valve until the desired service flow has been reached.

Close the blow-down valve when the air is removed and fluid begins to flow. The system is now ready to start.

Maintenance

Innovas Tee Strainers 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! Strainer screens are not designed to withstand the same pressure ratings as the housing. If the 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.

Innovas Tee Strainers are designed to require very little maintenance. Regular maintenance involves:

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

During normal use, the screen will become clogged with foreign matter, causing the differential pressure to increase. Once the differential pressure has increased to an unacceptable value, typically by 5-7 psi, it is time to clean or replace the screen. It is not advisable to let the differential pressure increase beyond 10 psi. This may cause the screen to fail and possibly damage downstream equipment.

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

Blow-Down Cleaning

To avoid shutting down the system, when possible, clean the screen when pressure differential has doubled from "clean screen" performance. At a minimum, clean the screen via blow-down cleaning when the screen pressure differential reaches a range of 3 to 5 psi. Clean the screen of debris by opening the blow-down valve. Keep valve open until all debris has been removed and pressure differential returns to normal range. Close the valve and resume normal operation. If pressure differential does not return to an acceptable level after blow-down cleaning, then the screen needs to be removed and cleaned or replaced.

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

CAUTION! Before removing the Tee Strainer'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.

Screen Removal, Cleaning, and Replacement

Isolate the Strainer by closing the inlet and outlet valve connections on either side of the Tee Strainer. Make sure valves are bubble tight.

Open blow-down valve or other vent to relieve pressure inside and drain fluid from the Strainer.

Once pressure is relieved, if the strainer is equipped with a QuikClean™ service port, remove the QuikClean™ service port cover.

Visually inspect and clean the interior of the strainer screen as needed. A wet-dry vacuum with hose attachment can be used for light cleaning of the strainer screen, through the QuikClean™ service port.

If additional screen cleaning is needed, remove the wye side cap or cover.

Remove screen and clean. Do not permit screen to dry as it will be difficult to remove debris after it has hardened. Avoid banging or hitting the screen to remove stubborn debris. For perforated screens, it is recommended to use high pressure water or air stream to clean the screen. This is not recommended for mesh or mesh lined screens as this may cause the mesh to tear. Solvent may be required if service is fuel, oil, or chemicals. Follow manufacturer's instructions when using solvent to clean the screen.

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.

Remove any debris or sludge from within the strainer.

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

Replace cover gasket and cap or cover. Tighten cap or cover to specified torque rating.

Close blow-down valve.

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

Spare Parts Inventory

It is recommended to maintain a spare parts inventory for critical components, including:

- Spare strainer basket
- Spare strainer lid gasket
- Spare QuikClean™ service port gasket (if equipped)

Technical Questions

For more information about Innovas Technologies products and services please visit:

www.innovastechnologies.com.

Or contact us at:

E-mail: info@innovastechnologies.com

Toll Free: 1-877-897-6564

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