

INSTALLATION, OPERATION, AND MAINTENANCE

PREFACE

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

GENERAL

A Tee Strainer is installed into a pipeline system to remove unwanted debris from the pipeline flow. In comparison to Y-Strainers, Tee Strainers are commonly used in pipelines where debris loading is high and the collection of solids is required. Straining of the pipeline flow is accomplished via a perforated or mesh lined basket, internal to the strainer. In general, the size of the basket perforation should be slightly smaller than the smallest debris particle to be removed. If the basket perforation is undersized, the basket may require excessive cleaning. Consequently, if the basket perforation is oversized, unwanted debris may be permitted to flow through the pipeline, possibly damaging down stream equipment.

Figure 1



GENERAL (CONTINUED)

Prior to selection of a Keckley Tee Strainer, the following factors must be determined:

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

Please contact a Keckley Design Engineer 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 Keckley Tee Strainers 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 Strainer 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 Tee Strainers, the appropriate material handling equipment must be used to prevent injury and possible damage to the Y-Strainer.

- 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. Tee Strainers that are damaged during transportation are the responsibility of the customer. For information regarding Keckley Warranty policy, please refer to the last page of this document.
- Before installation, the Tee Strainer's cover should be removed and inspected internally for any loose or foreign materials that may have become trapped in the screen during transportation. After inspection, ensure sealing surfaces are clean prior to reinstalling the gasket and cover. Make sure the gasket is seated correctly before tightening the cover bolts.
- If the Tee Strainer 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 Tee Strainer. If long term storage is required, a desiccant may be necessary. This would be based upon the local, environmental storage conditions. Please consult a Keckley 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/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 media flowing in the pipeline.
- Inspect the Tee Strainer'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. Keckley 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.
- If pipeline strain is a concern when installing larger Tee Strainers (6" and above), a concrete or steel pad should be used to provide additional support. Larger Tee Strainers can also be fitted with legs to assist in reducing strain on the pipeline.
- If the Tee Strainer is to be located on the discharge side of a pump, then a safety release valve must be installed between the Tee Strainer and the pump..

Installation Procedure

Step 1:

Keckley 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.

Step 2:

To provide for easier maintenance, the Tee Strainer should be located where the drain plug can be removed and where there is ample space above the Tee Strainer for basket removal. Refer to the certified engineering drawing to determine the basket clearance requirements.

Step 3:

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

Step 4:

Place the Tee Strainer into the pipeline, ensuring that the flow arrow on the body of the Tee Strainer is pointing in the direction of the pipeline flow. For large or heavy Tee Strainers, lift the Tee Strainer into place using slings positioned underneath the inlet and outlet connections.

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:

Remove air from the pipeline by opening the blow-down valve or other vent near the Tee Strainer.

CAUTION:

With piping system that contain fluids other than water or when the working temperature is above 120°F, fluid must be drained to safe area, away from the operator. Operators should always be fitted with appropriate protective equipment when venting is performed.

Step 2:

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.

Step 3:

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

Step 4:

Close the blow-down or other pipeline vent.

MAINTENANCE:

Keckley Tee Strainers require little monitoring once they are properly installed. The pressure differential across the Tee Strainer should be checked periodically to determine if the basket needs to be cleaned or replaced. If the pressure differential goes unchecked and the basket becomes completely clogged, the basket will break and require replacing.

CAUTION:

Tee Strainer baskets are not designed to withstand the same pressure ratings as the housings. If the basket becomes completely clogged, it will be exposed to the same pressure as the housing. In most cases, this will cause the basket to fail and potentially damage downstream equipment.

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

- Timely cleaning or replacement of basket and gasket.
- Periodically checking for leaks.

During normal use, the basket 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 psi to 10 psi, it is time to clean or replace the basket. It is not advisable to let the differential pressure increase beyond 10 psi. This may cause the basket to fail and possibly damage downstream equipment.

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

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.

Basket Removal/Cleaning/Replacement:

Step 1:

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

Step 2:

Open vent or drain plug to relieve pressure inside the Tee Strainer. Drain fluid.

Step 3:

Once pressure is relieved, remove the cover.

Step 4:

Remove basket and clean. Avoid banging or hitting the basket to remove stubborn debris. For perforated baskets, it is recommended to use high pressure water or air stream to clean the baskets.

Step 5:

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

Step 6:

Remove any debris or sludge from within the Tee Strainer.

Step 7:

Replace cleaned basket into its original position.

Step 8:

Replace cover gasket and replace cover. Tighten cover to specified torque rating.

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 Tee Strainer model, please refer to the corresponding Technical Data page. For special or fabricated units, please refer to the certified engineering drawing for that unit.

RECOMMENDED SPARE PARTS:

Qty. 1 Keckley Replacement Basket

Qty. 1 Keckley Replacement Gasket

Always use genuine Keckley replacement parts for guaranteed fit and performance.

TERMS AND CONDITIONS OF SALE

PRICE QUOTATION

Written quotations are firm for a period of 30 days unless Seller indicates on the quotation a longer period. All orders placed by the Buyer from a published price list, written quotation or verbal quotation are subject to acceptance by the Keckley Company. All delivery dates are subject to prior sale.

PAYMENT

Unless otherwise noted on Seller's Invoice to Buyer's Purchase Order, payment shall be net cash 30 days after shipment from Seller to approved credit purchasers. Seller reserves the right to demand terms of payment different from those specified herein whenever it reasonably appears that the Buyer's financial condition requires such change, and may demand assurance of Buyer's ability to pay whenever it reasonably appears that such ability is in doubt. Seller may suspend production, shipment or delivery until it receives payment of all amounts, whether or not due, owing to Seller or until adequate arrangements for payments are made.

PACKAGING

Unless Buyer specifies in writing, material will be packed as Seller deems necessary for proper protection. Export shipments will be subject to an additional charge for special overseas shipping. Additional charges may also be imposed if packaging instructions/specifications are other than standard.

SHIPMENT

Routing and manner of shipment will be at Seller's discretion and may be insured at Buyer's expense, value to be stated at order price. The Seller does not accept standing general or blanket shipping instructions. Full shipping instructions must accompany each individual order. No claim for shortages will be allowed unless made in writing with (10) days of receipt of shipment. Claims for material damaged or lost in transit should be made to the carrier, as Seller's responsibility ceases on delivery to the carrier.

DELIVERY

Delivery and shipment dates are estimated dates only, and unless otherwise specified, schedules commence with the date the Seller receives authorization to proceed with the order and order is accepted into production. In estimating such dates, no allowance has been made for delays of carriers or delays from labor difficulties, shortages, strikes or stoppages of any sort, fires, accidents, failure or delay in obtaining materials or manufacturing facilities, acts of government affecting Seller directly or indirectly, bad weather, or any cause beyond our control or causes designated Acts of God or forces majeure by any court of law, and the estimated delivery date shall be extended accordingly.

Shipping schedules and statements as to the expected date of shipment by Seller represent Seller's best estimate and shipment in accordance with such estimate is not guaranteed. Seller is not liable for any freight costs because of late delivery.

WARRANTY

Seller warrants all parts and assemblies are warranted to be free from defects in materials and workmanship for a period of one year from date of shipment from the Seller's plant. The Seller reserves the right to examine all parts or assemblies claimed to be defective to determine whether they are defective in material or workmanship. All parts or assemblies which are determined to be defective in either material or workmanship may, upon express authority of the Seller, be returned to the Seller's plant prepaid and will be repaired or replaced or credit allowed at the Seller's option. In no event shall the Seller be liable for consequential costs or damages. This warranty is expressly in lieu of all other warranties, expressed or implied and whether of merchantability or fitness. This warranty does not apply to parts or assemblies which have been subject to misuse, negligence or accident. Also, it does not apply if repairs, modifications or reconditioning work is undertaken without prior written approval of the Seller. The customer is required to examine all parts and assemblies immediately upon receipt of shipment and promptly notify the Seller of any defects or alleged defects of the parts and assemblies.

RETURNS

Returns must not be made without our written consent. Goods must in all cases be carefully handled, properly packed and shipped prepaid. Goods authorized for return are subject to a restocking charge. Restocking charges will be based upon our inspection which may include any charges for retesting, reconditioning or repainting as required. Seller reserves the right to refuse credit for unwanted fabricated items. Goods returned for repair will be subject to our evaluation and charges will be based upon replacement of parts and labor.

CANCELLATION

Any order or part thereof may be canceled by the purchaser upon written notice to the Seller prior to 45 days before completion. Upon receipt of a cancellation notice, all work on the order or part thereof being canceled will be stopped as promptly and as reasonably as possible, and the purchaser will be liable for a cancellation charge. This charge is calculated on the basis of established or quoted prices for all completed items and for the full cost incurred by the Seller up to the time of work stoppage plus 15% on incomplete items. In addition, there will be supplementary costs for packing and storing those items.

NOTE

We reserve the right to correct obvious clerical errors in quotations, invoice and other contracts.

TERMS

Net 30 days.

MINIMUM CHARGE

\$35.00 (Net)

FREIGHT

All shipments are F.O.B. Skokie, IL.