

INSTALLATION, OPERATION, AND MAINTENANCE

PREFACE

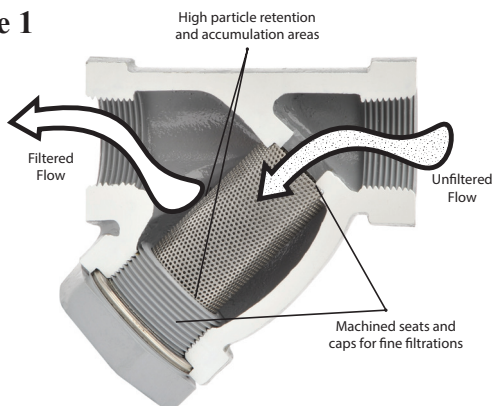
This manual contains information concerning the installation, operation, and maintenance of Keckley Y-Strainers. To ensure efficient and safe operation of Keckley Y-Strainers, the instructions in this manual should be thoroughly read and understood. This manual is general in nature and is not meant to 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 Y-Strainers. Please retain this manual in a location where it is readily available for reference.

GENERAL

A Y-Strainer is installed into a pipeline system to remove unwanted debris from the pipeline flow by utilizing a perforated or mesh lined straining element. This is illustrated in Figure 1. Y-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



GENERAL (CONTINUED)

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

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

- Material construction requirements of Y-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 Y-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 Strainers, the appropriate material handling equipment must be used to prevent injury and possible damage to the Y-Strainer.

- Visually inspect the Y-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. Y-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 Y-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 Y-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 Y-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 all sealing surfaces to ensure gasket surfaces are free of defects (no nicks or cuts). The pipeline should also be checked for proper alignment. Keckley Y-Strainers should never be utilized to realign an existing piping system.
- Ensure the pipeline's mating flanges are the same type as the Y-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 1/4" gap for gasket, and have sufficient clearance for easy opening of cover and screen removal. Refer to the certified drawing for screen removal clearance requirements.
- If the Y-Strainer is to be located on the discharge side of a pump, then a safety release valve must be installed between the Y-Strainer and the pump.

PRECAUTION:

A Keckley Y-Strainer should always be installed ahead of pumps and other expensive, downstream equipment to help ensure proper protection and trouble-free operation. This even holds true for "clean lines" to protect against pipe scale and accidentally introduced items such as: gaskets or tools.

Installation Procedure

Step 1:

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).

Step 2:

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

Step 3:

To provide for easier maintenance, the Y-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. If installed in the vertical position, the wye side of the strainer must be pointing downward.

Step 4:

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.

Step 5:

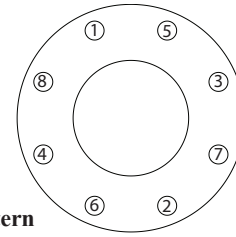
Before placing the Y-Strainer into place, support the existing pipeline with pipe supports near the inlet and outlet connections.

Step 6:

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

Step 7:

Install a standard ANSI (1/8" thick) flange gasket between the Y-Strainer and pipeline flanges on both sides. Install lubricated flange bolts and hand tighten. Flange bolts should then be tightened, using a start or crisscross pattern to evenly load the bolts, in accordance with established piping standards.



Bolting Sequence Pattern

CAUTION:

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

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. This is **extremely** important for steam service.

Start-up Procedure

Step 1:

Open blow-down valve to remove air from the Strainer. To remove all fluid from the Strainer belly, a drip-leg can be installed or the piping can be placed at a 1/4" slope.

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

Step 3:

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

Step 4:

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

MAINTENANCE:

Keckley Y-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 housings. 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.

Keckley Y-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 psi to 10 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 is 5 to 10 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 Y-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 Y-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/Replacement:

Step 1:

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

Step 2:

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

Step 3:

Once pressure is relieved, remove the wye side cap or cover.

Step 4:

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.

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 Strainer.

Step 7:

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

Step 8:

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

Step 9:

Close blow-down valve.

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 Y-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 Screen

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.

Contracts or orders having penalty clauses for failure to meet shipment are not acceptable unless specifically approved in writing by an authorized individual in our office. All delivery dates are subject to prior sale.

DELIVERY

Delivery promises are based on conditions at the time of quoting and are subject to change for causes beyond the seller's control. Under no circumstance will the seller be liable for consequential damages due to failure to fulfill a delivery promise.

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.

Nonstandard, special, and fabricated orders cannot be canceled after acceptance by Seller, unless agreed upon in writing by the Seller. The Buyer shall be liable for up to the full purchase price in any stage of completion.

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.

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 within (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.

RETURNS

Returns must not be made without our written consent. Goods must in all cases be carefully handled, properly packed and shipped prepaid. A copy of the Seller's authorization for return must be attached to the returned material. 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.

NOTE

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

TERMS

Net 30 days from date of invoice, unless otherwise agreed upon by both the Seller and Buyer. Past due accounts are subject to a 1.5% service charge per month (18% per annum).

MINIMUM CHARGE

\$50.00 (Net)

FREIGHT

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