INTRODUCTION TO

Eaton Y strainers are available with threaded, socket weld and flanged connections

Y strainers are devices for mechanically removing unwanted solids from liquid, gas or steam lines by means of a perforated or wire mesh straining element. They are used in pipelines to protect pumps, meters, control valves, steam traps, regulators and other process equipment.

Y strainers are very cost effective straining solutions in many applications. Where the amount of material to be removed from the flow is relatively small, resulting in long intervals between screen cleanings, the strainer screen is manually cleaned by shutting down the line and removing the strainer cap. For applications with heavier dirt loading, Y strainers can be fitted with a ″blow off″ connection that permits the screen to be cleaned without removing it from the strainer body.

Y strainers are used in a wide variety of liquid straining applications to protect downstream process system components in many industries, including: chemical processing, petroleum, power generation and marine. Water handling applications, where Y strainers are used to protect equipment that could be damaged or clogged by unwanted sand, gravel or other debris, are very common.

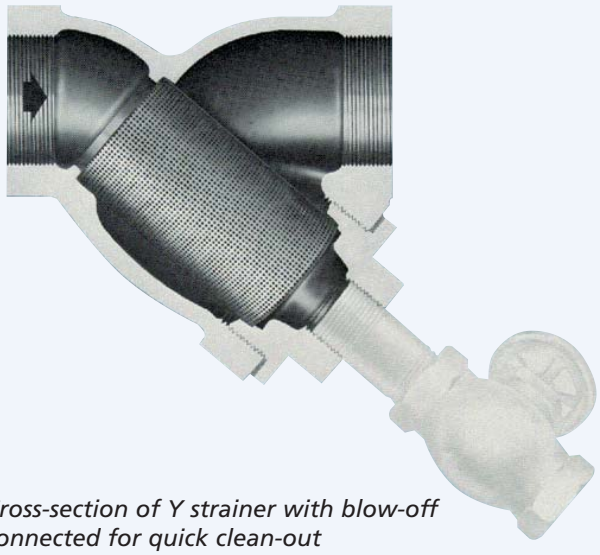
Applications

While often used in many different types of liquid applications, a Y strainer is considered the standard for steam applications – and is almost universally used for these applications. Its compact, cylindrical shape is very strong and can handle high pressures. It is, literally, a pressure vessel. Y strainers which handle pressures up to 6000 psi are not uncommon. Of course, in these cases, the design of the strainer is critical so that it can stand up to these high pressures without fear of failure. When high pressure steam is being handled, another complicating factor arises – temperature. With steam pressures of 1500 psi or higher, standard carbon steel is sometimes not suitable because the steam temperature may be 1000°F or higher. In these cases, the Y strainer body is generally made of chrome-moly steel.

Besides steam, Y strainers are often used in air and natural gas applications. Here again, high pressures are not uncommon. However, unlike steam, high air pressure does not automatically mean high temperature – and so, ordinary carbon steel bodies of sufficient wall thickness will generally suffice.

Unlike other types of strainers, a Y strainer has the advantage of being able to be installed in either a horizontal or vertical position. Obviously, in both cases, the screening element must be on the ″down side″ of the strainer body so that the entrapped material can properly collect in it.

Some manufacturers reduce the size of the Y strainer body to save material and cut cost. Before installing a Y strainer, be sure it is large enough to properly handle the flow. A low-priced strainer may be an indication of an undersized unit.



Cross-section of Y strainer with blow-off connected for quick clean-out

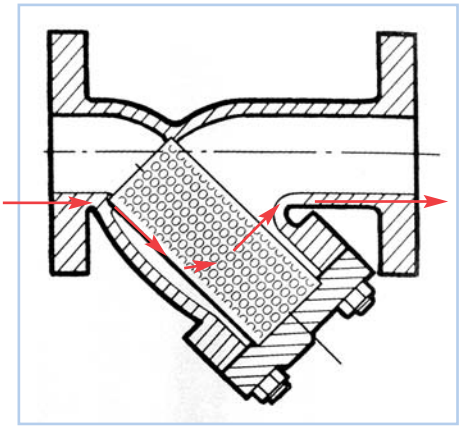
Y STRAINERS

Carbon steel strainers are used mainly in the oil and petrochemical industry. They have excellent resistance to mechanical or thermal shock – and these are important considerations in the event of a fire. Most oil refineries will not permit iron piping components for this reason. Carbon steel strainers are also used for higher pressure applications because of their great strength.

Stainless steel strainers, of course, are used where high corrosion resistance or where freedom from contamination is required. They are popular in the chemical, food and pharmaceutical industries.

Design Criteria

It cannot be stressed too highly that Y strainers for critical applications must be adequately designed. This means sufficiently heavy wall thickness and blowoff connections. As an example, in improperly trapped steam lines, condensate can collect in low points and become a slug of water traveling at very high velocity down the line. Even the slight change in direction caused by a Y strainer can produce a tremendous shock which can damage the strainer. Manufacturers who thin down walls to save weight and cost are asking for trouble in these cases.



Flow path through a Y strainer

A Y strainer, if fitted with a blowoff connection, can be a self cleaning strainer. A valve is installed on the connection located on the strainer cap. The screen can thus be cleaned by simply opening and then closing the valve without shutting off the flow or disassembling the strainer. When the valve is opened the material trapped inside the screen drains out.

Another critical thing to check for in Y strainers is the point where the screen or straining element seals to the body. This seat should be carefully machined so no particle can bypass it. The same thing applies to the cleanout end. The screen should fit tightly. Beware of strainers with unmachined seats: the improperly seated screen will permit bypass of the fluid – allowing dirt or debris downstream.

Screen Construction

The screen is the heart of the Y strainer and the point where the dirt or unwanted material is trapped. Strainer screens made with thin gauge material and soldered, rather than welded, connections can compromise the entire system. When a screen is damaged in service or in cleaning, the Y strainer is effectively out of service. While brass is sometimes used as a screen material to cut costs, it is truly false economy. Stainless steel, because of its strength and corrosion resistance, is always the preferred material for Y strainer screens. The screen is critical to the operation of the strainer, and it is recommended that the user have on hand an extra screen for each size Y strainer installed.

Types of Connections

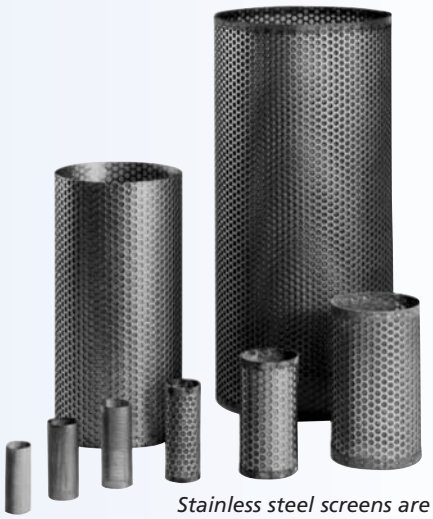
Y strainers are available in a wide variety of end types including threaded, flange, or welded. Flanges are designed to ANSI specifications.

Special flanges such as ring joints are often available as well. Y strainers can also be constructed to US Navy flange dimensions, which are different from commercial standards. For extremely high pressure applications, Y strainers with socket or butt weld end connections are often specified.

Final Considerations

When specifying or buying a Y strainer, price, which is often the prime consideration, should be the least important consideration. A well made and properly designed Y strainer will last almost indefinitely. Its first cost is, therefore, not important compared to other features when spread out over a service life of many years.

Is the screen area large enough to assure adequate flow? Are the seats carefully machined to eliminate bypass of dirt? Is the body strong enough to resist mechanical shock and avoid accidents? Are blowoff connections heavy enough to avoid leakage or failure? All these factors should be considered carefully before selecting a Y strainer.



Stainless steel screens are standard for all Eaton Y strainers.