

BASKET STRAINERS:

Differences between Simplex and Duplex Style Strainers

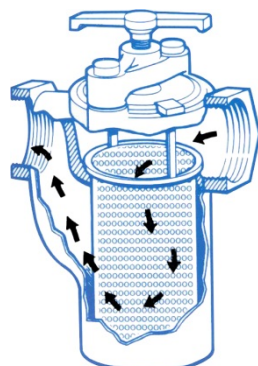
By: Chris Pasquali, CEO Factory Direct Pipeline Products, Inc.

Basket strainers are important pieces of equipment used in a wide array of filter applications. It is a closed pressure vessel with a cleanable screen element that filters particulate out of the process liquid to protect valves, pumps, and machines downstream. These strainers are designed to be installed horizontally and to provide quick access to the strainer basket for cleaning. The two most common styles of basket strainers are simplex (single basket) and duplex (dual basket).

Simplex Strainers

With the simplex design, baskets can be removed for cleaning only when the process is shut down and thus are used for "batch" applications or processes which can be interrupted for basket cleaning. Usually, shut-down time is minimal due to the quick-opening basket chamber cover closures.

Once the flow has stopped and the strainer chamber isolated, a vent valve is used to relieve the chamber pressure and to facilitate quicker draining with the drain valve or plug at the chamber bottom.



Simplex Strainer

for the next cleaning cycle.

Simplex strainers are available in both cast and custom fabricated designs to match the pipeline pressure class and material.

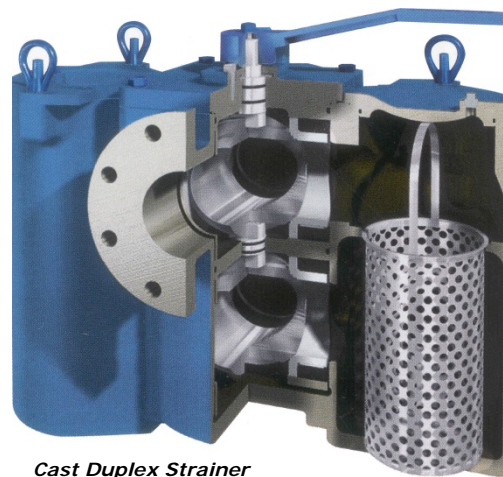
Duplex Strainers

The duplex strainer design is for continuous duty applications which cannot tolerate an interruption in flow for basket cleaning; i.e.

the system flow cannot be interrupted.

A duplex strainer is essentially two simplex strainers connected with a three-way valve used to divert flow from the dirty basket chamber to the clean basket chamber.

The style of valve used to divert the flow differs with cast and custom fabricated designs. Cast designs require only a lever to divert the flow because there's on three-way valve being operated. The flow remains continuous because as one side of the valve closes, the other side opens.



Cast Duplex Strainer

The custom fabricated designs often use four butterfly valves; sometimes they can be linked to a single lever operator, however more often they need to be individually opened and closed, thus the order they are manipulated becomes important. You begin by opening the inlet valve to the clean chamber, followed by opening the outlet valve for the clean chamber, then closing the outlet valve for the dirty chamber and finally closing off the inlet valve to the dirty chamber.

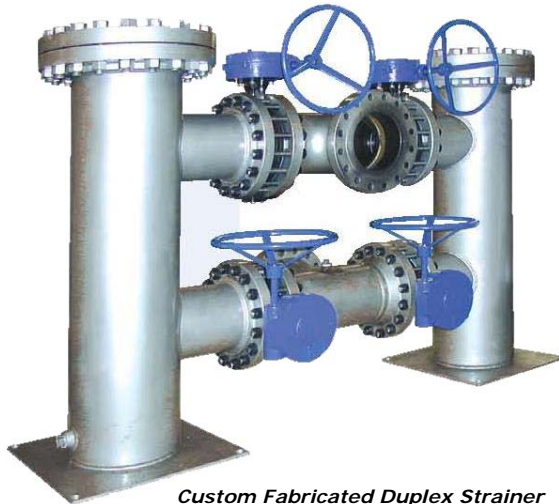
Once the dirty chamber is isolated, the access and change-out procedure is the same as it is for a simplex strainer.

The choice of a cast or custom fabricated design is typically dictated by the design criteria for the application; castings are suggested wherever applicable to reduce cost and lead time.

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Custom Fabricated Duplex Strainer

Sizing Guidelines

There are four general steps to take when sizing for a strainer:

- 1) Ensure that the pipeline flow velocity and clean differential pressure falls within the standard design range of the strainer.
- 2) The strainer should be compatible with the process fluid and satisfy both design pressure and temperature requirements.
- 3) Consider the quantity, type, and nature of debris to be removed.
- 4) Choose the proper screen perforation/mesh for your application, if you choose something unnecessarily restrictive it will increase the clean differential pressure and thus require more frequent cleaning.

Cv Value

Basket strainers typically have an open area ratio (OAR) of 6:1 and sometimes as high as 8:1. This is the ratio of net free area of the screen to pipe area. The area is calculated with a clean basket and as the basket begins to clog, the ratio will drop. As material collects on the basket surface, the available amount of open area is reduced thereby resulting in reduced flow through the strainer and/or exhibiting a higher differential pressure.

Most strainer elements are perforated and for

finer retentions a second layer of wire mesh cloth is welded to the basket interior.

The finer the retention, the less open area the straining element has because there is a certain amount of structural material required for a sturdy strainer basket design. Strainer baskets are generally designed to withstand up to 20 PSI differential pressure, however a properly sized strainer will begin with ≤ 2 PSI differential pressure and be cleaned once the differential pressure increases by 5 PSI because at this point nearly all the basket surface area is covered and the differential pressure will begin to increase

exponentially. The "trick" is to allow sufficient time to divert flow before the differential pressure increases sufficiently to damage the strainer basket.

In summary, it is important to know if an application is batch or continuous before deciding between a simplex and duplex strainer design.



Mesh Lined Strainer Basket

Chris Pasquali has been trained by Hayward Flow Control and Eaton Hydraulics Filtration Division, having provided sales and engineering support for these companies since 2001.