OHIO FABRICATORS COMPANY

Application Bulletin

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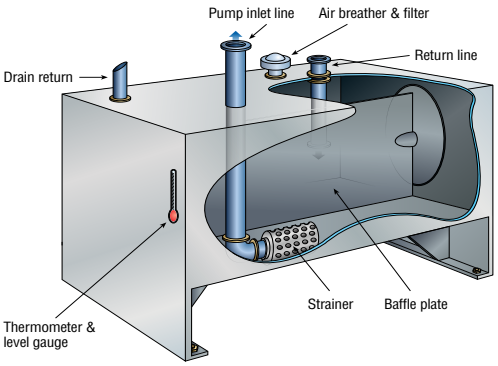
Filter vs. Strainer

Understanding the Difference and Optimal Installation Points

There are two terms that are the same, yet different. Make sense? Not at all. Well, there really is a difference and we are going to clear things up right now. The key difference between filtering and straining is the size of the particles removed from the system. Strainers remove the larger particles and allow the smaller particles to pass through. Filters remove fine particles. Typically, when we refer to large or coarse particles, we refer to 74 micron (200 mesh) or larger. Fine or small particles are those in the range of 40 micron or finer. Keep in mind the human eye can see no smaller than 40 microns (320 mesh), so fluid that may look clean, may not be. Another consideration to remember is that filter people like to talk in terms of microns while wire cloth people like to talk in terms of mesh. Therefore, it is important to always be familiar with both measurements because the end result of selecting the wrong filtration level of device could be damaging to the system.

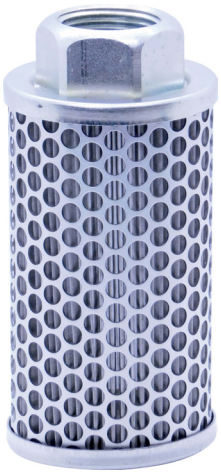


Strainers are devices used to remove solid particulates through a perforated or mesh media. That is why most strainers are manufactured with stainless steel perforated support tubes and pleated stainless steel wire mesh, mostly in mesh sizes 30, 60, 100, or 200 mesh. Filters are devices that remove particulates using media such as paper (cellulose), polyester, polypropylene, and other synthetics. The filtration levels can be anywhere from 40 micron to sub-micron levels. The selection of both strainers and filters depends on the application's requirement for particle size removal.

Let's take it from the top, not figuring any filtration at all. We start with a reservoir. From there, the fluid path takes us through the pump. It makes sense to protect it. Pumps are made to take a beating and can usually handle most things thrown at it in a perfect world. But we don't live in a perfect world, so the pump must be protected. This is where the term, "straining," comes in. Protecting the pump is most important because if the pump breaks down, the system will break down. Pumps can handle most particles with ease. That is why some larger particles can be allowed to pass through the pump to be captured downstream. Pumps merely require straining. Generally, pumps require no finer straining than 200 mesh.

At this point, be mindful of a very important term called "cavitation." If suction straining is too restrictive, cavitation may occur. Cavitation is when bubbles or cavities in the fluid form because the flow restriction through the pump causes the pressure drop to be too high. The bubbles will implode, creating shockwaves inside the pump which could cause damage or destruction. Proper strainer selection, maintenance, and servicing should prevent cavitation.

From the pump, the fluid continues traveling to the actuation. This is where the finest level of filtration will most likely be installed because tolerances are most critical here. Depending on the application, the level of filtration should be installed that keeps the system at peak efficiency. Filtration in this location will most certainly be finer than 200 mesh (40 microns), and depending on the application, the level of filtration may even be in the sub-micron range.



After actuation has done its job, the fluid eventually returns to the reservoir. Sometimes there will be a return line filter or strainer installed to clean the fluid before it reenters the reservoir. Depending on the system's application, either a filter or strainer will be installed. However, no matter if a return line strainer or filter is installed, or neither, there will be some particle contamination that makes its way back into the reservoir. How much contamination returns to the reservoir is determined by the system operation and how many filters and strainers, and at what level, are installed throughout the system. Wisdom states, though, when the fluid passes through the suction line again, it should be clean.

To recap, "straining" generally means anything that is 74 microns (200 mesh) or coarser. The locations in the system to find straining are the suction line and sometimes the return line. "Filtering" generally means anything that is finer than 74 microns. The locations in the system where filters should be installed are after the pump in the pressure line and possibly in the return line.

Filtration should never be taken for granted. If the filtration breaks down, the system will eventually break down. The level of filtration throughout the system is dictated by the specific application itself. All filters and strainers should be sized properly to the operation. A good rule of thumb is to consider fluid viscosity, fluid quality, flow rate, working pressure, and operating temperature. Contamination control along with good preventative and scheduled maintenance will have a positive impact on your bottom line.