

LIQUID FILTRATION PRESSURE DROP

What is pressure drop?

When liquid passes through a filter, it changes direction several times, and is forced through the filter media where contamination is removed.

All these actions result in a certain amount of resistance to the flow of the liquid resulting in lower pressure after the filter than before it. The difference in pressure before and after the filter is known as pressure drop, and is often called Delta P or ΔP .

What contributes to pressure drop?

There are 4 main factors that contribute to pressure drop. They are the filter media, contaminant, flow rate and the fluid being filtered.



1. Filter Media

The filter media is the material that actually removes the contaminant from the fluid. There are many different types of media used in filters and they range from the traditional cellulose to the newer synthetic types.

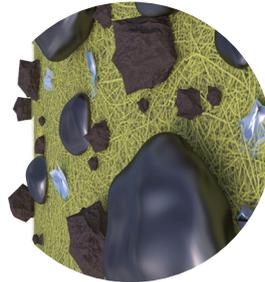
The cellulose media is a natural product and the fibres that make it are rough

and irregular in size and shape. The pore sizes in the media, the holes the fluid passes through, are relatively small in relation to the fibre size. This can cause a significant amount of friction as the fluid passes through it.

Synthetic media such as Donaldson Syntec™, are man-made fibres and are much smaller, smoother and more consistent in size. The smaller fibre size means more pores in a given area for fluid to pass through. The result is less friction, and therefore lower pressure drop than cellulose media.

2. Contaminant

The contaminant the filter removes from the fluid can be made up of many different things such as dirt, sludge and wear metals. Regardless of what the contaminant is, as it is removed from the fluid, it builds up, gradually blocking the pores in the media. It becomes harder for the fluid to pass through the media, increasing the pressure drop.



3. Flow

As the flow rate of the fluid is increased, more fluid is trying to pass through the same surface area and therefore more effort is required to encourage it through the media. This results in a larger pressure difference from the dirty side to the clean side, or pressure drop.

4. Viscosity

Viscosity is the term used to describe

how thick the fluid is. This viscosity is usually measured in Centistokes (cSt) or Saybolt Universal Seconds (SUS or SSU).

Thicker, more viscous fluids are harder to push through a filter than thinner fluids.

Importantly, viscosity is usually significantly increased as the temperature drops. Some fluids, such as heavy gear oils, which are already quite thick, can become very thick indeed.

As the viscosity increases, so does the pressure drop.

These four things all contribute to pressure drop and need to be considered when selecting a system. The only successful way to allow for pressure drop is to select the right filtration system for the job.

Why does pressure drop matter?

As the filter accumulates contaminant, the pressure drop increases until the filter reaches its maximum pressure drop, which is the point at which the filter needs to be changed. If the initial pressure drop is too high, the filter will reach this point very quickly resulting in short filter life. If there is a bypass valve in the filter head, the valve may open after only a short time, and filtration will not occur. This will leave your system vulnerable to unfiltered fluid.

DID YOU KNOW

As the pressure drop of a hydraulic filter reaches the bypass pressure setting, the bypass valve will open and the fluid will not be filtered.

