TECH TALK

Full Flow, By-pass and Two-Stage Lube Filtration

The difference between the various types of oil filters available today can be confusing. There are conflicting views in the industry as to which is the best type to use. The three most common oil filtration methods are full flow, by-pass and two stage, a brief explanation of each follows.

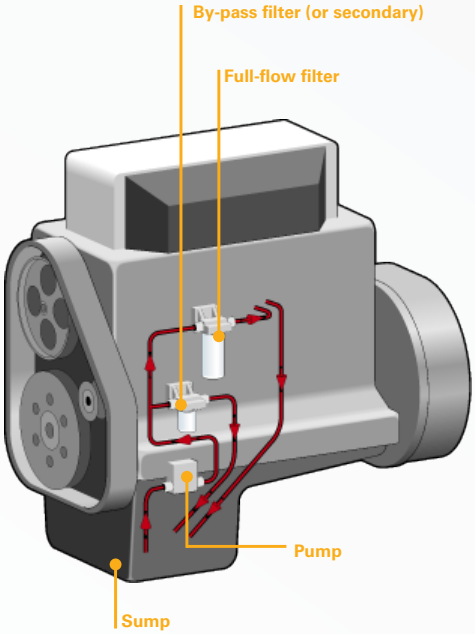

Figure 1: Typical Lube Filtration System

Full Flow Filtration

Full flow filters are the most common type, and receive all, or nearly all the oil pumped around the engine. They provide essential engine protection for maximum cold flow performance and filter life. Full flow filters need to be able to provide good filtration, handle the required flow rate even when the oil is cold, and provide adequate dirt holding capacity.

The use of synthetic media such as Donaldson Synteq™, will provide finer filtration and better flow with increased dirt holding capacity than traditional cellulose media filters.

By-pass (secondary) Filtration

Sometimes referred to as a secondary filter, a by-pass filter is usually fitted to a separate line where a small portion, usually of about 5 – 10% of the total oil flow, passes through them and is then diverted back to the sump. A bypass filter is usually a much finer filter to capture smaller particles than the full flow. Because it has a higher efficiency, it will have a much lower flow rate than a full flow filter; especially when the oil is cold. It is designed to improve the overall cleanliness of the oil without compromising the flow rate to the engine. See an illustration in Figure 2 below.

Two-stage Filtration

A two-stage filter design attempts to combine the features of both a full flow and a by-pass filter. The two-in-one design significantly increases restriction, causing shorter filter life and decreased cold flow performance. Poor cold flow performance starves the engine of oil during start up, leaving the engine temporarily unprotected. This will lead to increased engine wear that may result in premature repairs or even engine replacement.

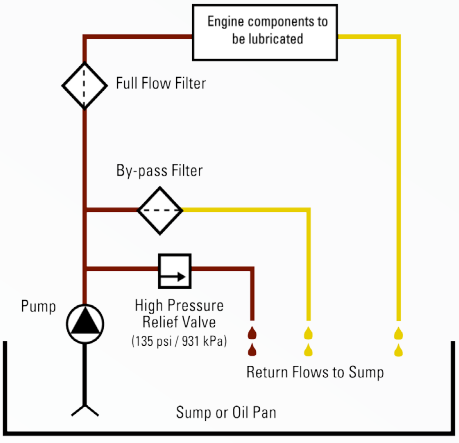

Figure 2: Typical Lube Circuit

Did You Know?

As the efficiency of an oil filter is increased, it needs to have more dirt holding capacity to provide the same filter life.

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