What does “Full-Flow” oil filtration really mean?

“Full-flow”……..what does that term mean as it relates to the oil filtration systems found in our automotive, marine and industrial engines? The simple definition would be to say that all of the oil leaving the pump passes through a filter before entering the engine’s oil gallery….right? Right…….but there is an important qualifying element in that statement. That definition is accurate if the pump is designed with a pressure regulating device incorporated into the pump itself or in a position in the oiling circuit that regulates the flow before it enters the main oil gallery, which is the case in the typical modern engine. By regulating output in this fashion, the output volume is regulated to only that which is required to maintain designed oil pressure, making possible the employment of an intervening filtration device.

The Hudson, certain Chrysler Corporation pressure lubricated engines and many others of that era are ***not*** so designed, having the pressure regulating device situated in a “down-stream” position, typically at the distal end of an oil gallery or a major secondary passage. Such an oiling system, designed and constructed to direct the gross, unregulated pump output through a filter, would certainly overwhelm it with an excessively high volume of oil (roughly proportionate with engine speed) which would pose the danger of activating the filter’s bypass device or, worse yet, cause a rupture of the filter media, rendering the filter ineffective from that time forward…… *AND*, you wouldn’t know it. Simply installing an intervening filter between the pump discharge and the engine’s oil gallery does not meet the contemporary definition of the “full-flow” filtration system. The pump output must be first regulated to the flow demand of the engine (Keep in mind that these engines were designed in an era when the modern full flow filter element didn’t yet exist). Additionally, there is little point in filtering oil that is simply dumped back into the reservoir in addition to the flow that is actually used in the system. The primary purpose of full-flow filtration is to filter the oil *prior* to being delivered into the engine’s lubrication system, thus removing harmful contaminants before they can reach the moving parts.

If one was to consider safe, effective filtration of the gross output from an unregulated pump, two choices become evident: Use of a filter element with sufficient flow capacity to pass the gross output under all operating conditions, or, use of a filter element with a numerically high micron rating, allowing sufficiently free passage of oil under all operating conditions. Either choice, adequately engineered, will deal with flow rate issues but neither is practical.

The first choice would require that the pump output be redirected through an unusually large filter or a high capacity, multi-element filtration device before being re-introduced into the system, exhausting the surplus volume at the downstream location as usual. Further, little gain in performance is realized by filtration of oil that simply gets dumped back into the reservoir. In the absence of a true “full-flow” alternative, this design could be considered.

The downside of the second choice is obvious in that a poor level of filtration would result due to allowance of large contaminant particles passing through the filter, thus limiting its effectiveness.

In conclusion, it is my opinion that a conversion from a non-filtered or bypass filtered oiling system to a true full-flow type must necessarily include conversion of the oil pump to one having internal regulation in conjunction with abandonment of the original regulating device or retrofitting of that device to activate at pressures significantly above the normal operating pressure of the system.

It is to that end that I have developed the oil pump modification device and full-flow filter conversion, The Vintage Full Flow System (VFF). VFF converts the original oil pump to an internally regulated unit, directs the regulated pump output through an appropriate filter before introducing the filtered oil into the engine’s oil gallery. Oil flow that is surplus to the demands of the system is directed back to the inlet side of the pump, just as it occurs in the typical contemporary lubrication system designs.