



Filter Knowledge, Unfiltered

Technical Service Bulletin 99-1R3

Gasket Displacement

The information in this bulletin corresponds with TSB 83-1 regarding over-pressurized lubrication oil filters and TSB 94-4 regarding compression gaskets. As stated in TSB 83-1, deformed filters are the direct result of excessive lubricating system pressure. Excessive lubricating pressure is the result of a stuck or otherwise malfunctioning pressure regulating valve in the oil pump assembly and should not be attributed to a fault with the filter. This bulletin addresses situations that involve gasket displacement between the filter and the filter mounting base on the engine, when no physical evidence of filter deformation due to excessive internal oil pressure is evident.

Gaskets displace from filters due to excessive lubrication system pressure, insufficient gasket compression or a combination of both. Gaskets that are displaced from filters may have witness marks in the areas where the displaced gasket was trapped between the base of the filter and the mounting base. These witness marks may be found on any surface of the gasket, but are generally found on the inner wall of the gasket. The illustrations below give an example of how these witness marks may appear on a used gasket.



Generally, the filter will be permanently deformed prior to the displacement of a properly compressed gasket. Such deformation can be seen in the canister, seam or base-plate of the filter. Since most filters will withstand a minimum of 100 - 150psi without deformation, a deformed filter is a definite indicator of excessive pressure in the lubrication system. However, there are occasions when filter manufacturers receive reports of displaced gaskets on filters that have no permanent deformation.

In these instances, the gasket may have displaced from the filter at a pressure significantly less than 200psi. The most probable cause of this situation is a slow operating or malfunctioning pressure regulating valve in conjunction with a gasket that was insufficiently compressed to the sealing surface of the base.

The filter is a passive component of the lubrication system. It is neither designed nor constructed with the capability of either increasing or decreasing the lubrication system pressure. As a passive component, the filter is subject to the pressure developed and regulated by the oil pump and its pressure regulating valve. TSB 83-1 explains this issue in more detail. In the event that a gasket is displaced from a filter due to excessive lubrication system pressure, the equipment owner should have the oil pump and pressure regulating valve, which is usually a component of the oil pump assembly, serviced or replaced to avoid future failures.

Most filter manufacturers recommend tightening their filters two-thirds to one full rotation after the gasket contacts the base to achieve adequate gasket compression on automotive applications. Filters for heavy-duty applications may require up to one and one-half rotations to properly compress the gaskets. In most cases, the proper installation instructions can be found on the filter or packaging. It is important that the proper installation instructions be followed for each filter to avoid premature filter failure. Test data shows that the gasket can be displaced from the filter at pressures much lower than required to permanently deform the filter if the gasket is not sufficiently compressed.

The proper installation instructions must be followed closely for each filter application to insure gasket displacement does not occur during operation with normal internal oil pressure ranges or surges. Other practices that will help protect against leaks from the filter include; pre-lubricating the gasket with the recommended fluid, cleaning the sealing surface of the filter mounting base on the engine and assuring the gasket is properly positioned in or on the filter.

For additional information, contact:

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