



TECH TIP

SERVICE INTERVALS 201

MAINTENANCE AND SERVICE INTERVALS

The Key to Extending Engine Life

With proper maintenance and timely service intervals, the life of the engine and related components can be extended. Neglecting these service intervals can result in poor engine performance and internal engine damage due to the formation of sludge deposits. These deposits can restrict the flow of lubricant, promoting accelerated wear.

Some early indications that would confirm the accumulation of these deposits include the following:

- 1) Heavy deposits in the oil filter.
- 2) Cartridge type filters with heavy deposits in the filter housing or cap.
- 3) Sludge deposits in the valve covers and crankcase.
- 4) Oil return ports restricted.
- 5) Heavy deposits on the rocker arms, valve springs and camshaft.
- 6) Camshaft wear promoting loss of oil pressure.
- 7) Loss of oil pressure due to accumulation of sludge deposits.

MODERN TECHNOLOGY

Modern engines incorporate precise bearing clearances and are comprised of special metals. In addition, they feature new camshaft designs, all of which require special lubricants and filtration designs. Metals used in the construction of the bearings require a higher level of filtration efficiency.

To establish optimum engine performance, fuel economy and lower exhaust emissions, camshaft timing is a critical issue. Variable Valve Timing offers a range

of camshaft profiles engineered into one camshaft design, controlled by the Powertrain Control Module. Many engines are equipped with Variable Valve Timing. These systems can experience premature failure due to sludge or other deposit formations that can prevent lubricant flow through the oil galleries and solenoids, preventing precise camshaft timing. Oil viscosity for these applications is critical for the function and life of the system.

OIL FILTERS AND LUBRICANTS

The physical size of the filter is not an indication of the efficiency of the filter. Filters with the same physical dimensions may be constructed with a different filtration media or the number of pleats, which affects the efficiency. A filter smaller in design may have a higher efficiency rating than a larger filter. The point being... the size of the filter does not determine the efficiency of the filter.

Newer engine designs require an increased oil flow rate, which results in a higher-pressure differential across the filter. These applications require a higher by-pass valve setting. A filter with a lower by-pass valve setting can result in unfiltered oil flowing through the engine resulting in accelerated bearing wear and engine failure.

Know your filter supplier and always verify the correct filter for a given application. Many filters share common characteristics, but their efficiency and by-pass valve settings can vary greatly.

Failure to follow the lubrication service interval recommended by the vehicle manufacturer can result in some major expensive repairs. Frequent oil changes, the correct oil filter and lubricant viscosity is imperative in achieving long engine life.

TURBOCHARGERS AND EXTENDED SERVICE INTERVALS

Turbochargers are becoming common as the vehicle manufacturers continue to produce smaller displacement engines for fuel economy reasons. The addition of a turbocharger and direct injection is a means of obtaining performance compatible with that of a larger displacement engine, plus improved fuel economy. Turbochargers operate under extreme temperatures and pressure and often in a range exceeding 200K RPMs. This technology can pose some challenges with the cooling and lubrication of the turbocharger, especially on vehicles that fail to receive timely lube service maintenance, which can result in deposit formations or sludge.

The vehicle manufacturer's maintenance schedule recommendation should be considered prior to performing service on a given application. The service recommendation should be posted as normal or severe service. The service interval may vary with the production year of the vehicle, as one recommended service interval may not be compatible with all year models. Consider the following precautions illustrated by Subaru involving their turbocharged engines and service intervals.

EXTENDED SERVICE INTERVALS AND TURBOCHARGER FAILURE

According to Subaru, a high incidence of turbocharger failure is due to poor lubrication, resulting from improper maintenance and the incorrect lubricant being installed in the engine during service. Subaru recommends synthetic motor oil in the designated viscosity in all their turbocharged engines. The recommended lube service intervals must be adhered to in order to prevent damage to the system. Subaru recommends that 2010 and prior turbocharged engines should have the oil and filter changed every 3,750 miles or 3.75 months, and 2011 and newer turbocharged engines must have the oil and filter changed every 7,500 miles or 7.5 months.

Gelling and the formation of sludge, resulting in clogged oil passages, occurs when the lube service is not performed at the proper service interval. Insufficient lubrication results in excessive wear on the engine components. If the filter mesh screen located inside the banjo bolt that secures the turbocharger oil supply pipe to the back of the right cylinder head becomes plugged, the turbocharger will fail. Lack of lubrication to the turbocharger will result in damage to the turbine center shaft bearing. The worn bearing will allow radial movement of the shaft, allowing the compressor impellers to make contact with the housing. Subaru recommends that an oil system flush should be performed prior to replacing the turbocharger, especially if there is evidence that the engine has not been properly maintained. Subaru recommends replacing the banjo bolt and mesh filter screen when replacing the turbocharger.

Poor lubrication service intervals can also result in damage to the Active Valve Control System (AVCS). The AVCS system utilizes variable valve timing technology to control the timing of the intake valves. The system functions via hydraulic oil pressure and is not receptive to contaminated oil or the improper oil viscosity.

General Motors and Nissan have documented similar issues due to oil contamination and the improper oil viscosity being used affecting their Variable Valve Timing Systems. One viscosity oil is not compatible with all engines and if the customer waits until the oil turns to sludge before servicing the vehicle, damage has most likely occurred. It is imperative that these systems receive their service at the recommended manufacturer's service interval. Compare the cost of lubricant and a new oil filter to the cost of an engine or turbocharger. Why would anyone take the chance, when adhering to the proper service interval can extend the life of the engine components and turbocharger.

LARRY HAMMER, Technical Services
Mighty Distributing System of America



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