

Turbocharged Engines And the Importance of Timely Service Intervals

Turbocharged engines are becoming common, as the vehicle manufacturers utilize smaller displacement engines. Turbochargers and direct injection can make a small displacement engine behave like a larger displacement engine, plus achieve better fuel economy, and that is the reason for their popularity. Engines that operate at higher altitudes benefit greatly from the turbocharged arrangement.

Many fail to consider that the service intervals recommended by the vehicle manufacturers are designed to protect more than just the engine's internal components. The health of the turbocharger is also at stake and some additional attention should be given to it when performing a service on the vehicle.

Turbochargers operate under extreme pressure and temperature and often in a speed range exceeding 200K RPMs. Most of the failures are the result of poor maintenance, inadequate lubrication due to contamination and the introduction of foreign objects from the airway. Hot engine shutdowns can result in bearing failure and shaft seizure due to lack of lubrication and overheating.

Contaminated Oil

Contaminated oil is a major factor and leading cause of turbocharger failures. Engines operated beyond the recommended service interval encounter heavy deposits that can restrict lubricant flow through the turbocharger, resulting in bearing failure. Poor lubrication can promote wear and shaft breakage, resulting in the impeller contacting the turbocharger housing. Much of the contamination found in the lubricant consists of minute carbon deposits from the combustion process. These deposits are abrasive, resulting in clearance issues, in addition to plugging of the oil feed tubes/galleries. Like an engine that requires clean lubricant to protect the bearings and internal lubricated components, the turbocharger requires the same clean flow of lubricant in the correct viscosity to protect the bearings and provide coolant for the turbocharger. If the service recommendation is not followed, a buildup of contaminants will result in premature turbocharger failure.

Hard acceleration during cold engine operation will also contribute to premature turbocharger failure due to lack of

lubrication. Following a hard run, the engine should be allowed to idle for few minutes to provide cooling time for the turbocharger. Unfortunately, these recommendations are seldom followed, as most vehicle owners are not aware of these requirements, or simply will not take the necessary time.

Oil Filter Selection

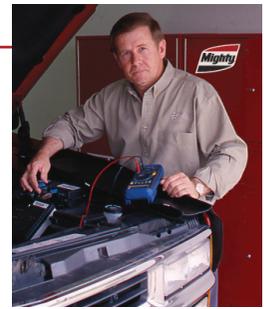
Today's engines require an increased oil flow rate, which results in a higher-pressure differential across the filter. These applications require a filter with a higher by-pass valve setting. Installing a filter with a lower by-pass valve setting can result in unfiltered/contaminated oil flowing through the engine and turbocharger, leading to premature failure.

Know your filter supplier and always verify the correct oil filter for the application. What you see is not necessarily what you get. Many filters share common characteristics, but their efficiency and by-pass valve settings can vary greatly.

Turbochargers Need Clean Air

A restricted, contaminated or damaged air filter can result in more than performance or fuel economy issues. Expensive components such as turbochargers or mass airflow sensors can be damaged. When servicing, do you inspect the condition of the airbox and related plumbing? Damage to these components can allow foreign material to enter the system, resulting in damage to some expensive components. The turbine shaft is driven by hot exhaust gases at speeds often exceeding 200K RPMs. Filtered air is entering the compressor side of the turbocharger. Any debris or foreign material/objects that make contact with the turbine/compressor wheel spells disaster, as total destruction can occur in seconds.

In Summary: The proper oil viscosity, clean air and timely service intervals are imperative for the health of the engine and turbocharger. Stretching the service interval beyond the vehicle manufacturer's recommended service interval can contribute to some costly repairs.



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Technical Services



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