TECHNI/TIPS

A Publication of the Lubrication Engineers Technical Department

LEADERS IN LUBRICANTS NUMBER 59

SIMPLE MAINTENANCE CAN INCREASE TURBOCHARGER LIFE

BASIC TURBOCHARGER CARE-A simple cleaning is about the only required turbocharger maintenance. The frequency of cleaning is dictated primarily by how and where the engine, on which the turbocharger is mounted, is used. When used in an extremely dirty environment, more frequent cleaning will be required. In some applications, cleaning may not be required during the entire service life of the unit. The manufacturer's recommendation should always be checked, to meet the specific requirements of the particular operation.

Any time the engine is taken down for major overhaul, the turbocharger should also be disassembled, inspected and thoroughly cleaned. About the only preventive maintenance procedure necessary is to use a turbocharger parts kit, containing new journal bearings, thrust bearings, seal ring, seals and various other parts.

As long as a turbocharger is supplied with an adequate amount of premium quality filtered lubricating oil, is not subjected to excessive exhaust temperatures, and is kept free from physical damage from foreign matter, the service life of the turbocharger should be indefinite.

The intake of foreign material into the compressor or turbine wheels; high exhaust temperatures; and improper lubrication are the three most generally recurring reasons for turbocharger failure.

Failures related to faulty lubrication cover everything from low-quality oil being used in the engine to abrasive material in the oil. Whatever the problem, lubricant usage records should be kept and analysis of parts from failed turbochargers should be made.

Lubrication failures can be caused by several things. Undersized or plugged oil lines are common. Turbocharger bearings require a constant supply of top quality, clean oil at full engine oil pressure. A momentary interruption of oil supply can cause turbocharger overheating. Oil should pass through a good filter of proper size to insure a constant oil pressure. Even after thousands of hours of operation, bearing wear will be negligible when a sufficient supply of clean, high quality oil reaches the bearings.

Turbocharger bearings will show considerable wear when abrasives are present in the oil. Such wear is prevalent on the thrust bearing and outside diameters of the shaft bearings. Abrasive particles can sometimes be so small they escape the centrifuge effect of spinning bearings. In such cases, considerable scoring of the journal sections of the rotor shaft will be noted. Acids in lesser quality oils can corrode shafts, introducing abrasive contaminants into the system.

Inadequate or improper oil type and improper oil change intervals can cause unnecessary wear. Such wear is accentuated when lesser quality oils with more volatile components evaporate in the heat of service. Sludge or varnish can build up on internal surfaces. Such deposits are heaviest at the turbine end and can eventually cause seal ring and ring groove wear. With proper maintenance, and the use of high quality, premium oils like LE's 8800 MONOLEC ULTRA Engine Oil, LE's 8130 MONOLEC ULTRA-BLEND Engine Oil and LE's 8410-8450 MONOLEC GFS Engine Oils, such costly downtime can be avoided.

Cold engine startup can cause oil lag, which results in oil starvation. The results will be obvious. Low or no oil pressure can cause the bearings and shaft to overheat. Unnecessary wear then becomes apparent. Oil leakage past the compressor seal rings and turbine seal rings can be caused by a clogged filter element or restricted oil return.

Foreign material intake causes damage, and possible failure, of turbine wheel blades. Such material can be pieces of burned or broken valves, or from other internal engine parts or initial wear-in of a recently overhauled engine. Material can break out of hot manifolds and ports to cause damage. Some material can be from improperly installed gaskets or other negligence of a mechanic. Compressor wheel breakage can also occur from foreign material intake. Sometimes pieces from the air cleaner system can break loose. Particles from hose connections or pieces of rubber or wire can be ingested.

The cleaner the system, the better it will run. Some foreign material such as sand or salt cannot be avoided. Under such dirty conditions the air filter change intervals should be accelerated.

High exhaust temperatures can damage the turbocharger. Over speeding and over fueling of an engine can drastically increase exhaust temperature. Clogged air filters, restricted exhaust, high altitude engine operation and engine lugging can increase exhaust temperatures. Air inlet restrictions can result in excessive exhaust temperatures, and can literally cause a system to burn itself up. Here are some of the internally caused turbocharger failures.

	DEFECT OR FAULT WHICH CAUSES	THIS PROBLEM OR CONDITION
1.	Worn shaft, shaft bearings, or bearing housing bore.	Wheel-to-housing contact, hammered or worn seal rings.
2.	*Marred seal ring bore in bearing housing or insert.*	*External oil leakage.*
3.	Bent, broken or out-of-balance rotor elements.	Bearing failure, wheel-to-housing contact, hammered seal rings.
4.	*Worn thrust or assembly parts.*	*Wheel-to-housing contact.*
5.	Insufficiently torqued compressor wheel locknut.	Wheel slippage or spinning of compressor wheel on shaft.
6.	*Counter section (core assembly) cocked cover or turbine housing.*	*Wheel-to-housing contact. in compressor*
7.	Missing insert or retaining snap ring.	Thrust bearing failure, wheel-to-housing contact.
8.	*Compressor components or turbine housing other than specified.*	*Impaired engine performance with potential turbocharger failure.*
9.	Unseated internal snap rings.	Shaft bearings distress, wheel-to-housing contact.
10.	*Damaged or missing seals, 0-rings or*	*External oil leakage. gaskets.*

Most of all use a high quality, premium grade engine oil from Lubrication Engineers, Inc. with sufficient alkaline reserve to keep the lubricant free of harmful acids. Analyze the oil following severe operating conditions, and don't abuse the engine. Don't lug it, overspeed, overfuel it, starve it of oil or expect it to work properly without proper oil change intervals. Use of a high quality oil, although higher in cost initially, can be a cost saving item when used along with proper turbocharger maintenance.

In summary, it is better to invest in proper installation, proper preventive maintenance and to use a better premium grade oil than to live with what will otherwise be the inevitable result. Premium quality engine oils in all straight grade viscosities and SAE 15W-40 and SAE 10W-30 are available from LE for fleet and industrial use.

LI 20059
Rev. 07-95

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