

APPROVED TURBO COMPONENTS

TURBOCHARGER OIL LEAKS TROUBLESHOOTING TIPS

FEEL FREE TO CALL WITH ANY QUESTIONS 800-626-0367 (Florida)

A common problem encountered with turbocharger operations is the "turbocharger oil leak". Often the assumption is made that the turbo is at fault. This can cause unnecessary maintenance to be performed. In many cases the "oil leak" is not a turbo problem-rather it is caused by either improper turbo installation or engine maintenance.

To fully understand what causes a turbocharger to leak oil and how to prevent it, we will cover:

- Oil inside the turbocharger
 - Turbocharger Seals
 - Check Valves
- Leaks at the compressor outlet
- Leaks at the turbine outlet
 - Engine breathers

OIL INSIDE THE TURBOCHARGER

Engine oil *under pressure* enters the bearing housing from the oil inlet line. This oil passes between the bearing and wheel journal surfaces where, as a result of turbulence, air is mixed with the oil and is de-pressurized. This oil then flows either by gravity or scavenge pump through the oil drain line and into the engine sump. Anything which prevents this draining will cause the oil to build up in the bearing housing to a height above the oil seals. Under this condition, the oil will leak out into the compressor housing and/or the turbine housing past the piston ring seals.

SEALS

The main purpose of the seals at both the compressor and turbine ends of the center housing is to prevent high pressure gasses from entering the center housing and then to the crankcase! The fact that the seals prevent oil from entering the housings is secondary.

CHECK VALVES

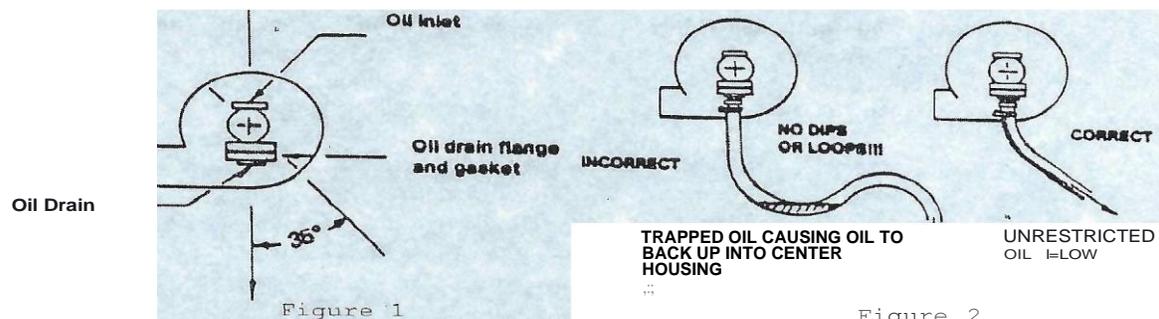
Check valves are sometimes installed into supply and drain lines of turbocharger oil systems to prevent oil from seeping by gravity (after engine shutdown) into the bearing housing. If the inlet or outlet check valves are faulty, all the oil that remains in the line will flow back into the bearing housing which can fill up to a point past the seals and cause the turbo to leak oil. The inlet check valve is usually the spring-loaded ball and seat type. "Cracking pressures vary between 5-20 lbs.". If air flows immediately, the valve is probably faulty. The outlet check valves usually have a spring loaded tensioned valve which will close with the absence of flowing oil. Sometimes the spring will break and allow the valve to always remain open. Check to see if the valve will open and close by depressing the valve.

OIL AT THE COMPRESSOR OUTLET

The air filter, as it accumulates dirt, offers an increasing restriction, causing a pressure drop across it. A partial vacuum at the compressor inlet will result. If this condition continues for any length of time, it will cause oil to be drawn from the bearing housing into the compressor housing and induction system. Service the air filter regularly to prevent this condition.

OIL AT THE TURBINE OUTLET

Problems with the oil drain system can cause leaks to turbochargers as well. Most turbocharger oil leaks are recognized at the turbine (exhaust) outlet. This is because you will get an indication of oil coming out the tailpipe or leaking out the parting lines of the center housing and turbine housing. If the center housing does not drain back to the sump properly, the level of oil in the bearing housing will exceed the height of the seals and leak. Check the following conditions and correct them to eliminate the problem. Make certain that the turbo oil drain port is pointing *down* at no more than a 35-degree swing on either side of a vertical centerline; (see figure 1). On gravity drain systems (no scavenge pump) ensure the drain lines slopes downward its entire length to prevent sink traps. (see figure 2).



Continued reverse

OIL AT TURBINE OUTLET (continued)

Finally, check the condition of the drain lines. Those made from a rubber-lined fabric covered hose may not cause any problems at all after running several years in one position. Even though the exterior of the hose looks fine, the rubber interior lining has become brittle. When replacing the turbocharger at any time, it is very possible that such a drain line could be disturbed and bent, causing pieces of the brittle rubber to break off inside the drain line and partially obstruct the flow of oil. To prevent this from happening, always inspect the drain line when the turbocharger has been removed.

ENGINE BREATHERS

Oil leaks in the turbocharger may also be the result of problems in the crankcase ventilation system. The vent or breather line may sometimes become clogged or restricted through engine operation. These conditions allow positive pressure to build up in the crankcase and restrict the oil from flowing down the drain hose and into the crankcase. This will cause oil to back up into the bearing housing and leak past the piston ring type seals.

A FRESHLY OVERHAULED TURBOCHARGER MAY SMOKE FOR A SHORT PERIOD (PERHAPS 30 MINUTES) UNTIL ASSEMBLY LUBRICATION ON SEALS HAS BEEN CONSUMED AND A CARBON FILM HAS FORMED ON THE EXHAUST SIDE PISTON RING.

We feel that if it were known that most turbocharger oil leaks are caused by non-turbocharger problems, much unnecessary maintenance, downtime and expense could be saved.

*** The information in this troubleshooting guide is presented for use only to aid properly qualified persons in the maintenance of the equipment covered herein. It no way replaces or changes the appropriate airframe, engine, or turbocharger manufacturer's service publications for the proper procedures on any maintenance performed.

APPROVED TURBO COMPONENTS LIMITED WARRANTY

Approved Turbo Components, Inc. (ATC) warrants each overhauled turbocharger or turbocharger system components overhauled by ATC to be free of defects in material and workmanship under normal use and service for 18 months from date of installation.

As an express condition of this warranty, the unit must be installed and operated in accordance with the manufacturer's recommended procedures and in conformity with applicable FAA/JAA regulations and procedures.

Approved Turbo Components, Inc.'s obligations under this warranty are limited to repairing or replacing, at its option, any part or parts returned in an 'as removed' condition which examination shall disclose to have been defective. The repair or replacement of defective parts under this warranty will be made by ATC without charge.

This warranty does not cover any unit which has been subject to misuse, neglect, alteration or accident. Normal wear of service items shall not be considered defects under this warranty. This warranty does not cover any defect, which is the result of improper installation, improper maintenance, or improper modification of the unit or any of its components

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