



# Turbo Troubleshooting & Damage Analysis

If you think your vehicle might have a turbo-related problem, stop before you replace because turbo damage can often be a symptom of an underlying problem rather than the cause itself.

A lack of power, noisy operation, excessive smoke or oil consumption could result from a faulty fuel injection system, restricted or blocked air filter, a damaged exhaust system or a lubrication problem. So, before you replace your turbo, complete the diagnostic check list below.

## CHECK LIST IF YOU EXPERIENCE

### LACK OF POWER

- Check that filter, hoses and pipes are clean and in good condition.
- Check that the fuel injection system is in good condition and correctly adjusted. Also check that vehicle ECU has latest software updates.
- Check that the exhaust system, including catalyst and DPF, is not blocked or damaged.

### NOISY OPERATION

- Check that the pipework and support brackets are not loose or damaged and that the connections are good.
- Check for any leaks or cracks in the intercooler.

### EXCESSIVE SMOKE OR OIL CONSUMPTION

- Check that air filter is not restricted or blocked.
- Check that engine oil specifications strictly correspond to car manufacturer's recommendations.
- Check that the oil drain pipe is clean and not restricted.
- Check for excessive pressure in engine crankcase and correct function of engine breather system.
- Check that hoses and joints are in good condition.
- Check for lubrication problems in engine block if oil or carbon deposits are found in exhaust manifold or in the turbine inlet.



## WORLD-RENOWNED OE QUALITY

We're trusted by the biggest names in the automotive industry for the development and application of turbo technologies that deliver on quality, reliability and outstanding performance for light vehicles, trucks and off-highway equipment. Every Garrett® turbo is intricately calibrated to the finest tolerances to meet the original specifications of the automotive manufacturer and is shipped to distributors with a comprehensive parts guarantee.

**If there is no obvious cause, make sure your turbo specialist completes an extensive troubleshooting program.**

The causes of turbo damage usually fall into the following four categories:

### 1. FOREIGN OBJECTS

Turbo wheel and/or variable vane damage, caused by small objects entering the turbine or compressor housing at high speed, leading to vane movement restriction and wheel imbalance.



Damage to a compressor wheel



Damage to a nozzle assembly

### 2. LACK OF LUBRICATION

Turbo fatigue cracking and material transfer created by metal to metal friction and high temperatures as a result of oil inlet supply restrictions, incorrect gasket placement and use of liquid gaskets or poor quality lubricants.



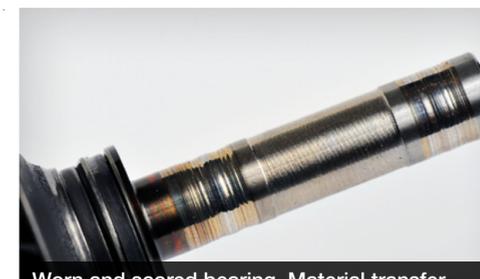
High temperature and material transfer to bearing



Incorrect shape and position of gasket

### 3. OIL CONTAMINATION

Turbo bearing system damage commonly caused by a high concentration of carbon suspended in oil, created by extended oil & filter change intervals or poor maintenance. Bearing damage may also be caused by metallic particles from engine wear or by steel shot suspended in oil following a major engine overhaul.



Worn and scored bearing. Material transfer to the shaft



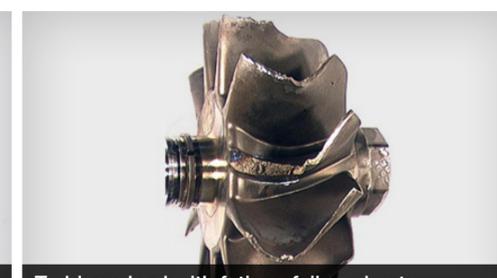
Large particles in oil can cause deep scoring and impacts

### 4. OVERSPEED AND EXCESSIVE TEMPERATURE

Turbo damage caused by working beyond its designed parameters or outside the vehicle manufacturer's specification. Maintenance problems, engine malfunction or unauthorized performance upgrades can push turbo rotating speeds beyond its operating limits, causing fatigue failure of compressor and turbine wheels.



Orange peel effect on back face of compressor wheel is a clear sign of overspeeding



Turbine wheel with fatigue failure due to cyclic overspeed