



The turbocharger people

# Turbo troubleshooting and damage analysis

If you think your vehicle has a turbo-related problem, stop before you replace the turbo.

Less than 1% of turbo failures are due to a manufacturing problem with the turbo itself – the cause is nearly always elsewhere and you must eliminate it first.



## BEFORE YOU REPLACE YOUR TURBO, COMPLETE OUR DIAGNOSTIC CHECKLIST.

### EXCESSIVE SMOKE OR OIL CONSUMPTION

- ✓ Check air filter is not restricted or blocked.
- ✓ Check oil exactly matches vehicle manufacturer's specifications.
- ✓ Check for excessive crankcase pressure and correct engine breather system operation.
- ✓ Check hoses and joints are in good condition.
- ✓ Check lubrication system if oil or carbon deposits are found in the exhaust manifold or turbine inlet.

### LACK OF POWER

- ✓ Check air intake system is in good condition

and clean internally.

- ✓ Check fuel injection system is in good condition and correctly adjusted.
- ✓ Check vehicle ECU has the latest updates.
- ✓ Check exhaust system, catalyst and DPF are not blocked or damaged.
- ✓ Check EGR valve is operating correctly.

### NOISY OPERATION

- ✓ Check the turbo pipes and supports are not loose or damaged, and all connections are good.
- ✓ Check for leaks or cracks in the intercooler.

## WHAT HAPPENS IF CAUSES ARE NOT ELIMINATED

### OIL STARVATION

Caused by restricted oil supply, incorrect gasket fitting, blockage from liquid gasket or poor quality lubricant. Results in excessive temperatures, metal to metal friction and fatigue cracks.



This marking is evident of contaminated oil



Extreme wear on the turbine shaft caused by oil contamination

### OIL CONTAMINATION

Caused by carbon deposits or metallic particles in oil, due to poor maintenance, overdue oil and filter changes, excessive wear or insufficient cleaning following overhaul. Results in extreme turbo bearing and shaft wear.



Compressor end oil leakage due to low air pressure



Compressor end oil leakage

### OIL LEAKS

Caused by restrictions or leaks in air supply, exhaust or EGR system, blocked turbo oil drain or engine breather. Prolonged idling or frequent hot engine shutdowns results in oil leaks into turbine housing, and starved bearings.

### IMPACT DAMAGE

Caused by small objects entering turbo or compressor housing. Results in restricted vane movement and compressor and turbine damage.



Any object sucked into the compressor will damage it



Even small items can completely destroy the blades

### OVERSPEEDING

Caused by turbo spinning faster than its design limits, due to unauthorised performance upgrades, poor maintenance, leaks in air intake system or worn injectors. Results in turbine or compressor wheel and bearing damage, and possible major engine damage.



Compressor destroyed by overspeeding



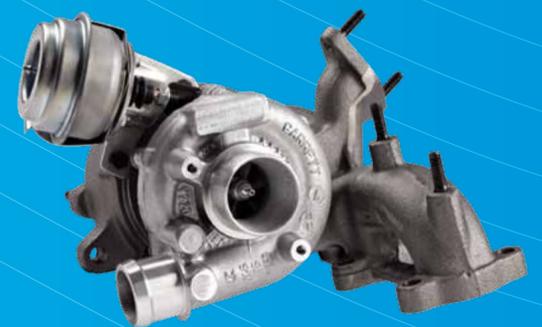
Orange peel effect on backface caused by overspeeding

You'll find more information and advice on turbo fault diagnosis and easy, trouble-free fitting, at [www.btnturbo.com/turbotech](http://www.btnturbo.com/turbotech)

## WHAT CAUSES TURBO DAMAGE?

In 90% of cases, it's oil related: oil starvation, contamination or leaks. So if you use the right oil, you'll take care of the turbo.

- Investing in a new turbo isn't cheap but if the engine oil isn't replaced at the same time, then it is highly likely that the new turbo will fail.
- Always use fresh, good quality oil and new oil and air filters as recommended by the engine manufacturer when fitting a new turbo. This will keep the engine clean and prevent deposits damaging your turbocharger.
- Keep to regular service intervals and check the oil level regularly, making sure it looks clean on the dipstick and is at the right level:
  - If your oil level gets too low, the remaining oil can over-heat and carbonise. The resulting, solid deposits can damage your turbocharger.
  - Overfilling with oil causes excessive pressure which can damage the turbo's oil seals.
- To minimise the risk of turbocharger failure, ensure you are fitting the right grade of a good quality engine oil. Comma Performance Motor Oil should be the first choice for anyone looking for just that.
- Get the right oil every time – use Comma's online recommendation guide at [www.CommaOil.com](http://www.CommaOil.com)
- Comma Performance Motor Oils meet the latest industry and manufacturer standards and are covered by a 100% Quality Guarantee.



## BTN TURBO: THE BEST TURBO SERVICE ON EARTH.

- All turbos from BTN are OE quality but cost less than those from franchised dealers.
- OEM turbos are brand new, direct from the OE production line with a two year warranty and no surcharge.
- OMX are Original Manufacturers Exchange variable turbine turbos, or remanufactured non-VNT turbos using genuine OE parts. Saving up to 35% compared to the equivalent new turbo, with one year warranty and surcharge refundable on exchange.
- 98% of turbos supplied by BTN include a Free FitKit, with gaskets, studs and an oil-filled pre-priming injector to prevent oil starvation on start-up.
- 17,000 turbos in stock and nearly 40 years turbo experience.
- The only UK supplier of all major turbocharger brands:

