

Common Turbo Failures

Overspeeding

Overspeeding is a term used when a turbo is operating well above its normal operating limits.

So, what causes overspeeding?

- Engine modifications including 'chipping' or 'over-fuelling';
- Inconsistent flow of air into the turbo – this can be caused by a tear in the air hose or it becoming completely detached, or by restrictions in the air intake filter or pipe work;
- The wastegate or VNT mechanism has been set incorrectly;
- Worn injectors;
- Installing an incorrect turbo;
- Loss of signal to the SREA (Simple Rotary Electronic Actuator) for the wastegate or VNT control;
- Operation at altitude.

Oil Contamination

Oil is very often overlooked as a critical component, however clean filtered engine oil is a major requirement and a necessity for all turbochargers. Contamination will cause rapid wear to various components and eventually cause catastrophic failure.

Signs of oil contamination:

- Scoring to thrust parts;
- Scoring to journal bearings;
- Scoring to journal bearing diameter of shaft and wheel;
- Smell of fuel in the oil.

Alternatively, if oil levels are too low or if the wrong grade of oil is used, the turbocharger will also fail. If the original cause of failure is not identified it is likely the same type of failure will occur on the remanufactured turbo. Catastrophic damage to the bearing systems can occur within seconds of the turbocharger commencing operation.

Oil Leaks

Oil is very often overlooked as a critical component. Oil leaks can be caused by a variety of factors which often originate around the correct pressure within the compressor and turbine housing.

When an oil leak occurs it is important not only to think of the piston ring as the seal, but consider the flinger/ bearing housing bore, piston rings as well as the pressure in the housings as a complete 'seal assembly' – these all work together to create a seal.

If any one part of the seal assembly is faulty it can have adverse effects on the other parts in the 'seal assembly'. For example, a piston ring and flinger bore can be geometrically correct, but oil leaks still occur on the compressor side. This is because the third piece of the puzzle, the pressure,

is not correct. If the original cause of failure is not identified it is likely the same type of failure will occur on the remanufactured turbo.

Oil leaks can cause catastrophic damage to the bearing systems and occur within seconds of the turbocharger commencing operation. To help you identify and prevent oil leaks from reoccurring when carrying out a repair, we have highlighted some of the main causes and the signs of oil leaks.

Lack of lubrication / Oil Starvation

A lack of lubrication can result in catastrophic damage to the bearing systems which can occur within seconds of the turbocharger commencing operation. Quite simply:

- If oil levels are too low, the turbocharger will fail;
- If the wrong grade of oil is used, the turbocharger will fail;
- If oil becomes contaminated, the turbocharger will fail.

Signs of lack of lubrication / oil starvation:

- Material transfer (caused by high temperature due to friction from bearings) to other thrust parts and the journal bearing diameter of the shaft and wheel;
- Discolouration to the thrust parts and the journal bearing diameter of the shaft and wheel;
- Excessive wear to the thrust pads of the thrust bearing;
- Excessive wear to the journal bearings.

Foreign Object Damage

A foreign object is simply any object that enters the turbocharger through the air inlet or exhaust inlet. When a foreign object enters the turbocharger, its performance will be affected very quickly.

Signs of foreign object damage:

- Noise from the turbo during operation;
- Loss of performance;
- Chipping of compressor or turbine blades;
- Pitting around the compressor inlet;
- Pitting on the compressor blades.

Causes of foreign object damage:

- Small particles entering through damaged hoses;
- If the air filter is damaged (or faulty), of a low quality or missing, objects will be sucked into the air intake;
- Debris from a previous turbocharger failure;
- Broken engine components, e.g. valves or fragments of damaged piston, injector tips;
- Bolts, nuts, washers, rags or other items left in the intake pipe during servicing.