

ENGINE TROUBLESHOOTING CHECKLIST

1 AIR INTAKE SYSTEM CHECKS

- Air cleaner element holed or not sealing correctly.
- Incorrect size air cleaner element for type of housing.
- Cracked or distorted air cleaner element housing.
- Restriction gauge adapter broken.
- Inlet or induction system from air cleaner to engine damaged.
- Leak in vacuum piping.
- Leak in air feed to compressor.
- Inlet manifold gasket leaking or cracked.
- Injector seat leaking (petrol engines).
- Damaged or missing breather.
- Damaged or missing dip-stick seal.
- Faulty or missing oil filler cap.
- Faulty or missing crankcase ventilation.
- Oil storage or top-up containers and funnels dirty.

2 COOLING SYSTEM CHECKS

- Faulty thermostats, radiator shutters or shutterstats.
- Radiator fins or cores blocked or clogged.
- Defective water pump.
- Coolant level low.
- Radiator pressure relief cap defective.
- Fan belts loose.
- Faulty thermostatic fan.
- Engine overloaded (lugging).
- Cooling fins clogged or defective (air cooled engines).
- Engine caked with dirt.
- Defective water hoses.
- Pressurise system and check for leaks.
- Check sampling technique, was sample taken cold?
- Oil cooler passages blocked or restricted.
- Air entrained in cooling system.
- Insufficient coolant capacity.
- Incorrect air/fuel ratio or timing (gas and petrol engines).
- Incorrect coolant mixture.
- Incompatible coolant mixture.

3 FUEL DILUTION CHECKS

- Sampling technique (sample pump washed out with fuel or solvent).
- Leaking fuel inlet and return pipes, pump seals and unions.
- Faulty lift/transfer pump.
- Worn or faulty injectors (e.g. incorrect spray pattern or break out pressure).
- Extended idling periods.
- Faulty internal injector seals or O-rings.
- Fuel leaks - pressure test system.
- Incorrect thermostat fitted.
- Extended periods under low engine load.
- Pump calibration or timing incorrect.
- Restricted fuel return lines.
- Contaminated fuel.
- Faulty engine protection system.
- Low operating temperature.

4 BOTTOM END WEAR CHECKS

- Check filter for abnormal wear particles.
- Abnormal noise on start up.
- Check for low oil level.
- Check oil pressure profile.
- Check for faulty oil pump, oil pick up and pressure relief valve.
- Overheating.
- Coarse dirt entry.
- Check for cause of fuel dilution.
- Incorrect oil grade used.

5 TOP END WEAR CHECKS

- High blow-by and crankcase pressure.
- Low compression.
- Lack of power.
- Dirt entry in air intake system.
- Abnormal noise.
- Piston torching caused by defective injector spray pattern and timing.

6 INCOMPLETE COMBUSTION (SLUDGE) CHECKS

- Restricted air intake system.
- Restricted exhaust system (damaged exhaust pipe or silencer).
- Fuel system malfunction (timing and faulty injectors).
- Faulty turbocharger operation or pressures.
- Check for low compression and excessive blow-by.
- Extended oil and filter change periods.
- Excessive exhaust back pressure (exhaust brake malfunction).
- Low engine operating temperature.
- After-cooler or inter-cooler malfunction.
- Dirty oil or filter by-pass valve defective.
- Extended idling periods.
- Faulty altitude compensation device.
- Dirty or contaminated/adulterated fuel.
- Faulty thermostats or radiator shutters (incorrect operating temperature).
- Faulty or incorrect engine brake operation.
- Incorrect thermostat fitted.

7 WATER OR INTERNAL COOLANT LEAK CHECKS

- Pressure test cooling system to locate leak.
- Pressure test with sump removed to locate leak.
- Release pressure with sump removed to locate leak.
- Blown cylinder head gasket.
- Defective cylinder head seals.
- Leaking sleeve seals.
- Leaking oil cooler.
- Cylinder liner cracked or holed.
- Injector cooling seals leaking.
- Engine breather blocked, missing or damaged.
- Low engine operating temperature.
- Extended idling periods.