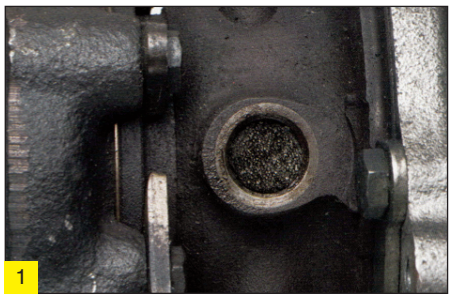
# Turbo failure: causes and repair

Damage to the turbine is one of the primary reasons behind poor turbo performance, or even complete component failure. Mahle explains how contamination, of some form, is generally responsible, and steps to take after a failed turbo has been replaced.

**Oil Matters**

If oil carbon enters the bearing case, (Fig. 1) it can result in any or all of the following: blue smoke, loss of engine performance, loss of engine oil, contamination of the charge-air cooler, clogged exhaust gas cleaning system and with adjustable turbochargers, blocked control mechanisms.



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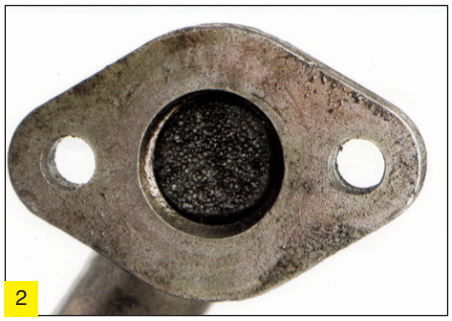
Generally, these effects are caused by poor quality engine oil, an overheating turbo or the immediate shut down of a hot engine. Therefore it is vital to use the correct grade of oil as specified by the vehicle manufacturer (VM) and to let a hot engine run for at least a minute before shutting it down.

In addition, mechanics must thoroughly clean the oil pan, and flush the oil following turbocharger damage to ensure that no foreign deposits enter the lubrication circuit. Mechanics must also pay close attention to the necessary installation instructions and performance measures during engine tuning.

Naturally, observing the VM's oil change intervals and replacing the filter with an OE replacement is a prerequisite.

Oil carbon deposits in the oil pipe (Fig. 2) can have similar effects to oil carbon in the bearing case, but can also lead to excessive turbocharger noise, and even total turbocharger failure.



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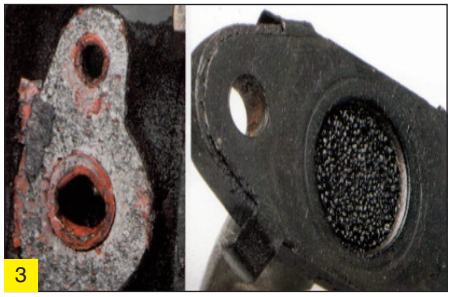
Additional causes include an overdue oil change, incorrectly installed oil pipe or a missing heat shield. Subsequent additional remedies include replacing the oil pipe and ensuring its correct installation and replacing the charge-air cooler and particulate filter if the turbocharger has been replaced.

Excessive oil consumption can often be due to a problem with the oil return pipe (Fig. 3), which in common to the aforementioned oil related issues, means that oil can be forced into the turbine and the compressor, which can affect the operation of the internal components and can collect in the charge-air cooler.



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Probable causes include constriction or a bend in the oil return pipe, the use of sealing compound rather than a gasket set, the failure to replace the engine connection when replacing the return pipe, or even simply too much oil in the engine.

Mechanics therefore need to ensure that the return pipe is thoroughly cleaned, if it is to be reused, and whether reinstalled or replaced, a new gasket set must be used. In addition, the turbo must be replaced if any its internal components (VTG, by-pass, waste gate etc.) have become stiff.

**Compressor Related Problems**

When it comes to the air intake side of the equation, contamination of, or stress to, the compressor wheel or compressor itself will result in blue smoke (or black in the case of stress marks on the compressor wheel), excessive noise or whistling and contamination inside the charge-air cooler.

The causes can vary, but can include contamination entering the system from the crankcase vent (Fig. 4), a build up of ice or even a leak in the system from, for example, a split turbo hose.

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When it comes to the compressor wheel, stress is generally caused by dirty or an insufficient oil supply to the bearing, an increase in exhaust back pressure or a clogged air filter.

To remedy these situations, mechanics must carefully clean the entire intake system, replace the air filter with an OE replacement, clean or renew the crankcase vent and check the system for leaks. In addition, if fitted, the air compressor's cylinder head must be dismantled and cleaned. Also following the replacement of the turbocharger and charge-air cooler, the mass air flow sensor must be checked.

If the compressor wheel bearing is damaged (Fig. 5), its clearance on the rotor shaft must be checked, the engine oil flushed, a new OE filter fitted and refilled with the correct grade of engine oil, as specified by the VM.

**For more information or general advice, please contact the MAHLE Technical Team on +44 (0)845-688-5006 or email technical.bilston@gb.mahle.com.**

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