

Issue no. 03/2022

Damage caused by breaking in an engine incorrectly after repair

Breaking in a repaired engine at idle is supposed to prevent wear and damage, but it does exactly the opposite.

It's still common practice in some repair workshops to break in engines by running them at idle for hours or even days. The reason being that, since no load is applied at idle, this is supposedly a particularly gentle way to break in an engine. But in reality, doing this causes severe wear and damages the engine and the new components.

Reasons for increased wear

After an overhaul, engines must be broken in to allow new and existing components to bed in against each other. If done at idle, however, a number of problems can arise:

- The low speed means that the oil pump doesn't build up enough pressure to deliver sufficient oil to the lubrication points. Contamination and abrasion can't be flushed out properly if at all—and will cause increased wear even while the engine is still in the break-in phase.
- Too little oil spun out from the crankshaft reaches the cylinder walls. Dirt cannot be washed away properly, leading to more abrasion to the pistons and piston rings.
- The piston rings sometimes form a poorer seal at idle. This allows more combustion gases to flow into the crankcase, further reducing the oil film on the cylinder and causing additional wear.

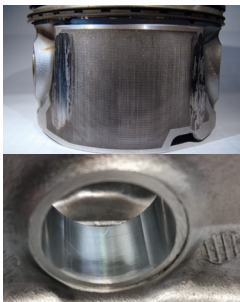


Figure 1: Seizing marks on the piston skirt and pin bore

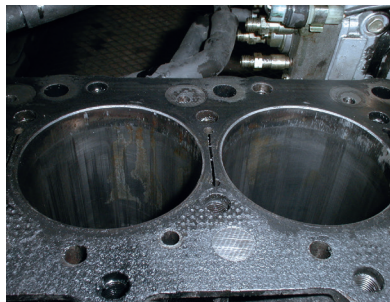


Figure 2: Grooves in the cylinder bores

- The pressure valve used to cool the piston crowns can be closed, which means that the pistons are only cooled slightly. Surrounding components, such as the piston pin and the connecting rod bearing bush, receive less lubrication as a result.
- Low oil pressure can also damage components in the valve train and turbocharger. The reduced amount of oil spun out from the camshaft increases wear on hydraulic followers and rocker arms, for example.

How to break in an engine correctly

Ideally, a reconditioned engine should be broken in on a test bench using a predefined program.

Important!

Ideally, a reconditioned engine should be broken in on a test bench using a predefined program.

- Monitor the operating temperature closely (oil temperature of at least 80°C).
- Load the engine at no more than two-thirds of its maximum speed and pay attention to changes in the rpm.
- Preferably, drive on cross-country routes or free-flowing urban roads and keep away from congested areas.
- Where possible, avoid steep ascents and descents and driving at low revs.
- Don't drive at full load or top speeds and avoid engine braking.
- Check the oil level every 50 to 100 km and adjust if necessary.
- Change the oil and oil filter after around 1,000 km.
- Be sure to comply with any other manufacturer's specifications.