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Engine damage due to incorrectly mounted valve springs

If, after working on the cylinder head, the test drive ends up in engine damage, the cause may be a bit of negligence.

Sometimes, after doing repair work on the valve train, another repair is needed immediately afterward. After opening the cylinder head, a typical damage scenario emerges: one or even several torn-off valves that have broken off above the third groove and across the valve shaft. The cause is an easily avoidable installation error.

Cause of damage

If a valve spring is mounted at an angle when the valves are installed, it will be subjected to a greater load on one side, even when the valve is closed. When the valve opens, the spring is compressed to the limit. The stroke of the camshaft creates a

very large lateral bending moment in the upper area of the valve shaft. Due to the recurring bending load, the valve tears off, falls into the combustion chamber, and is severely deformed by the piston and cylinder head.

Typical damage scenario

- The damage occurs immediately after the repair.
- The valve fracture starts at the third groove (the lowest in the installation position) and runs across the valve shaft (see Figure 2).
- The valve collets are partially deformed at the partitions.
- There are uneven pressure marks on the contact surfaces of the valve spring in the cylinder head (see Figure 3).
- The fracture surface exhibits the typical structure of a forced rupture.



Figure 1: Valve spring mounted at an angle



Figure 2: Valve fracture at the lowest groove and across the shaft



Figure 3: Pressure marks on the cylinder head

Important!

When mounting the valve springs, ensure that they are seated correctly in the cylinder head. Used valve springs should be checked for dimensional accuracy before reinstallation. We recommend that you always use new valve collets when installing new or used valves.