

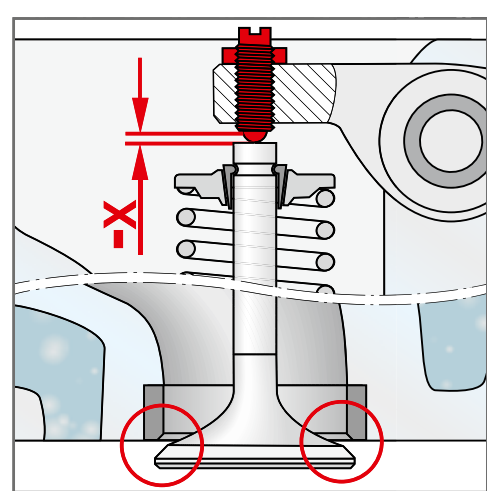
Valve damage and causes

TRW

EngineComponents

Installation / Alignment Errors

Incorrect Valve Clearance Settings

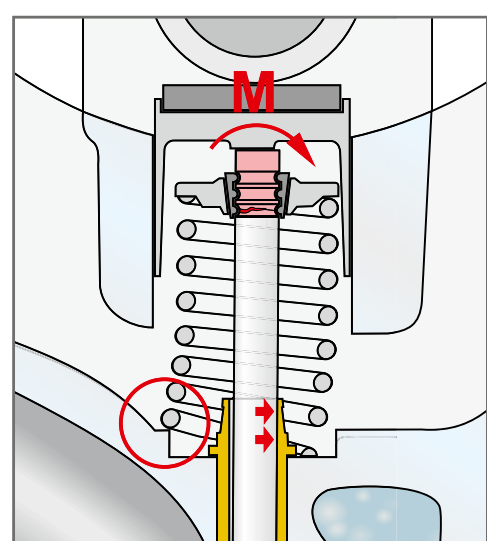


Cause:
The valve clearance is set too tight or the maintenance intervals are exceeded.

Result:
The valve no longer closes properly. Combustion gases flow past the valve seat and heat up the valve head. This causes the valve head to overheat and burn through in the area of the seat.



Error during Installation of the Valve Springs

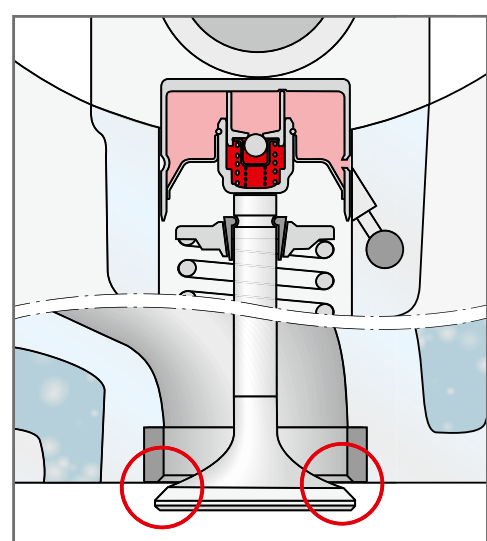


Cause:
The spring was not inserted correctly during installation. The tilted spring had induced a lateral bending moment (M) on the valve stem.

Result:
The direction of the resulting bending load changed alternately from one side to another, caused a fracture of the end of the valve stem and destroyed the valve guide.



Error during Installation of the Hydraulic Tappets



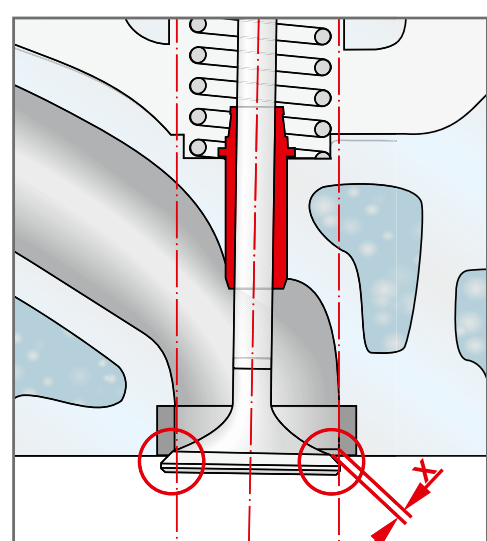
Cause:
After installation of the tappets, the minimum required waiting time before starting the engine (at least 30 minutes) was not observed. As a result, the excess oil in the working chamber of the tappets did not have enough time to escape.

Result:
If the engine is started prematurely the valves strike against the piston and can bend or break.



Machining Errors

Alignment Error on the Valve Seat Insert or Valve Guide

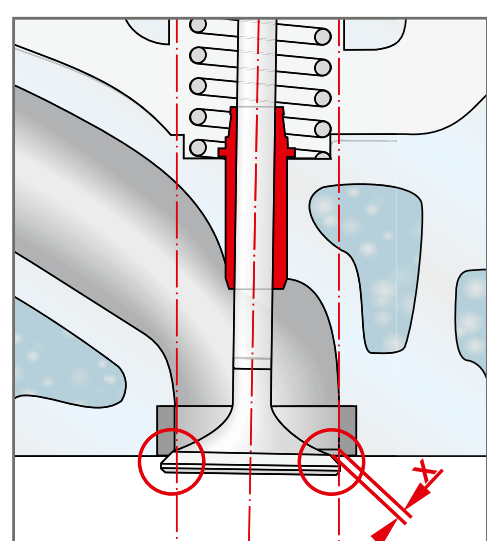


Cause:
Non-centric remachining of the valve seat or guide.

Result:
The valve fails to close properly, overheats and burns through in the area of the seat. Fatigue fractures in the area of the recess may also occur as a result of the unilateral loading of the valve head.



Excessive Valve Guide Clearance

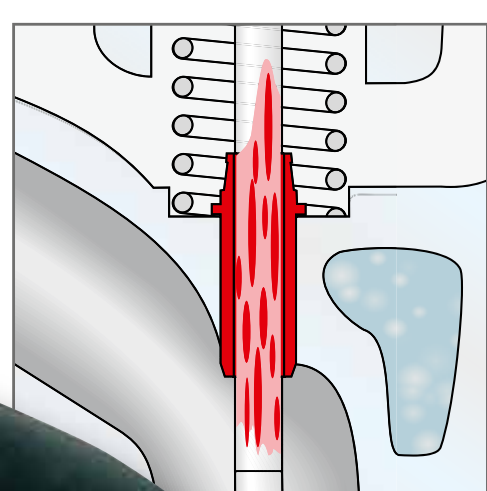


Cause:
The valve guide clearance is too large due to excessive wear of the valve guides or due to excessive reaming during reconditioning.

Result:
The influence of hot gases can cause significant heat induction in the valve guide. The valve becomes stiff and fails to close properly, with overheating of the seating surface occurring as a result (material is burned or melted off).



Insufficient Valve Guide Clearance



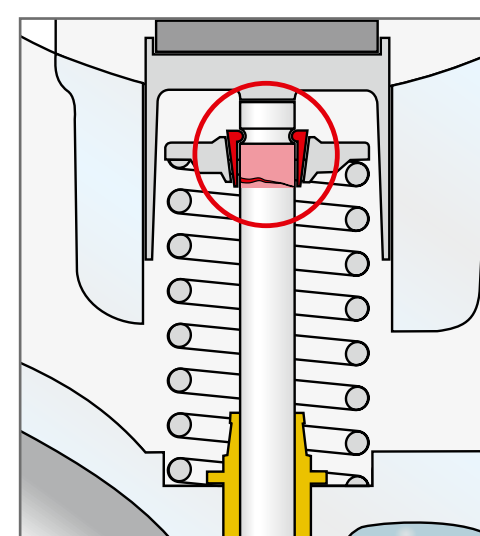
Cause:
The guide diameter was dimensioned too small during replacement of the valve guides.

Result:
Stiffness and seizures between valve stem and valve guide. Consequential damage such as overheating of the disk or seat area can occur.



Installation of Worn Parts

Use of Worn Valve Cotters

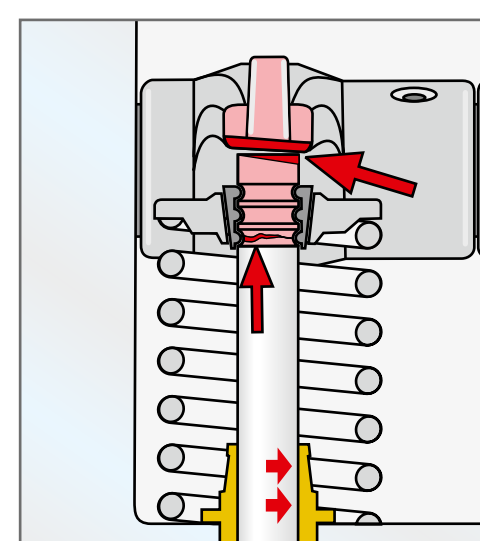


Cause:
Old, worn valve cotters were used during replacement of the valves.

Result:
If worn valve cotters are reused the clamp fitting can become loose during operation. This results in frictional corrosion on the stem and weakening of the valve in this area. This can cause vibration failure and a breakage of the valve stem.



Installation of Damaged Rocker Arms or Cam Followers

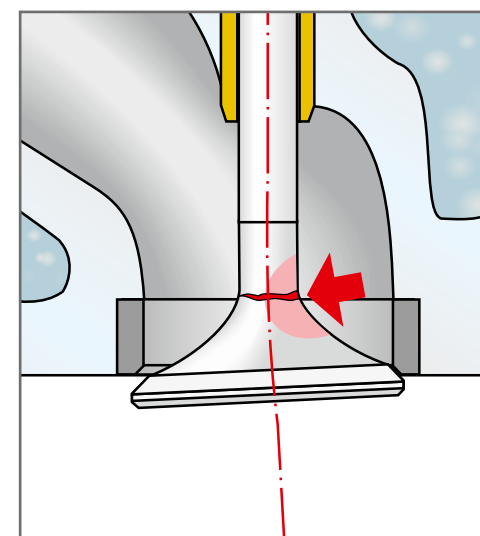


Cause:
Forces are directed eccentrically from the rocker arm to the end face of the valve stem.

Result:
One-sided wear occurs on the stem and the end face of the stem. The lateral forces induced on the valve stem by the eccentric load transfer cause fatigue fractures in the area of the clamp fitting.



Installation of Bent Valves



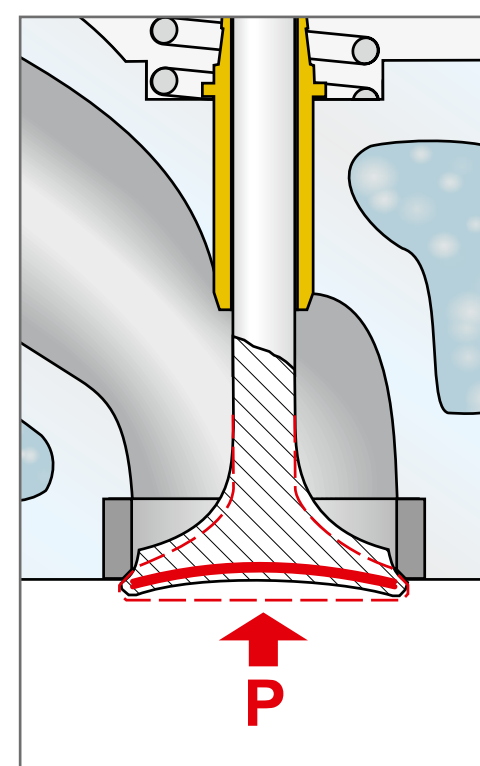
Cause:
A bent valve stem will cause overhang seating of the valve head on the valve seat insert.

Result:
The unilateral load causes the direction of the resulting bending load to change alternately from one side to another, causing fatigue fractures in the valve chamfer at the transition to the shaft or valve head.



Abnormal Combustion

Valve Overloading Due to Abnormal Combustion



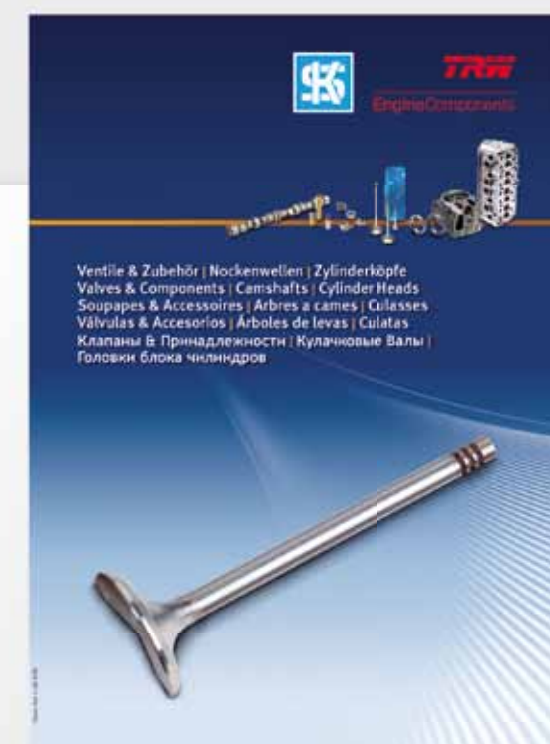
Cause:
Significantly increased pressure and temperature loads occur in the combustion chamber as a result of abnormal combustion.

Result:
The valve head can no longer withstand the high thermal and mechanical loads and bends inwards. This results in the valve head being deformed into a so-called tulip shape and causes fractures in the area of the valve head.



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