



Replacing the lined valve seat (oversized)

1. Commercially available tools:

- Pin milling cutter, 10 mm
- Internal bore meter
- Sliding gauge
- Machine for working the cylinder heads
- Press
- Industrial aspirator
- Presser
- Vertical drill
- Nitrogen (liquid)



DANGER

Risk of accident, do not touch super cooled components or liquid nitrogen! Wear protective gloves and safety goggles!



WARNING

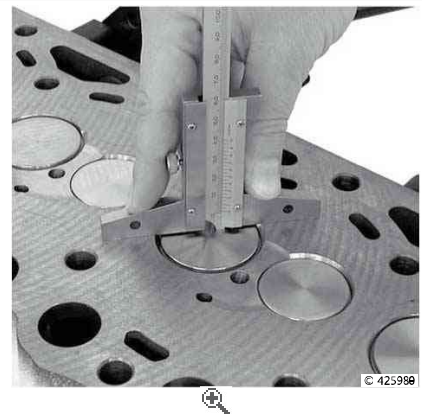
The process of pressure fitting must be carried out quickly due to the thermal shock between the cylinder head and the inserted valve seat. The necessary work steps must be carried out before pressure fitting.



NOTE

When using the machine to process the cylinder heads, following the specific instructions provided by the manufacturer. To replace an inserted valve seat, the respective valve guide must be present.

- Check the valve residual.
See para.
- Disassemble the valves.
See para.



2.

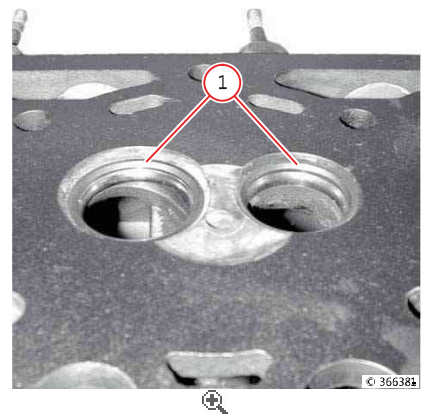
Checking the inserted valve seat

- Check the inserted valve seat (1).



NOTE

Check the installation position is correct.



1.

Disassembly of the inserted valve seat

- Close the coolant channels.
- Tighten the cylinder head.
- Align the inserted valve seat with the pin milling cutter.



1.
 - Laterally cut the inserted valve seat (arrow) until it can be removed without tension.



WARNING

Do not damage the cylinder head.



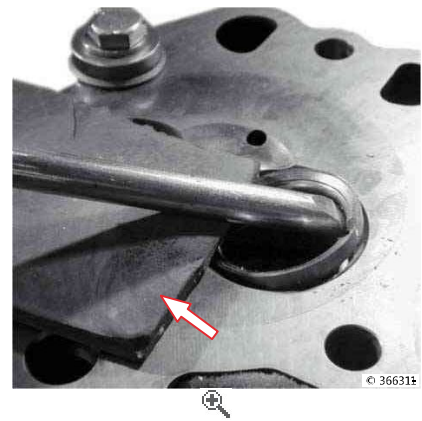
2.
 - Apply a protective sublayer (arrow).
 - Remove the inserted valve seat by applying leverage.



WARNING

Do not damage the cylinder head.

- Release the cylinder head.



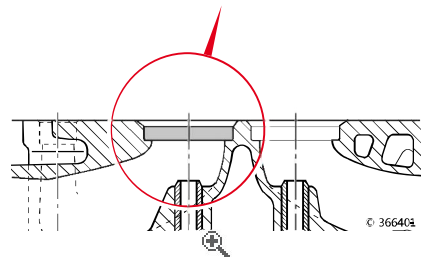
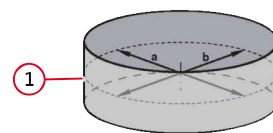
3.

Check the hole of the housing for the inserted valve seat



NOTE

Measurement diagram hole of the housing in points "a and b", central in surface "1".



1.
 - Measure the hole of the housing with an internal bore meter.

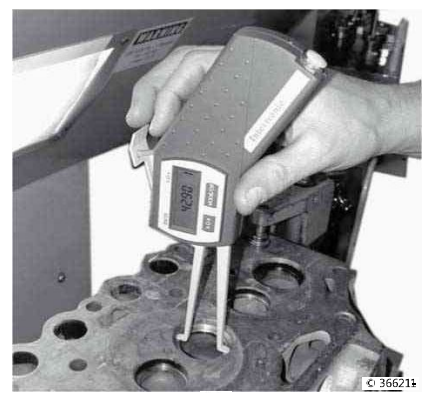


NOTE

Measurement points, see diagram.

- Read the value measured.

- Intake: 42.7 (+0.025, -0) mm
- 2 degrees of oversizing for: + 0.2 mm
- Exhaust: 36.9 (+0.025, -0) mm
- 2 degrees of oversizing for: + 0.2 mm



2.

NOTE



If the wear limit reached the 2nd degree of oversizing, replace the cylinder head. Alternatively, determine the diameter of the seat hole with a measuring ring (1). For example, a lined valve seat lathed to half its height may be used as a measurement ring, which is then inserted in the hole to measure the diameter.



3.

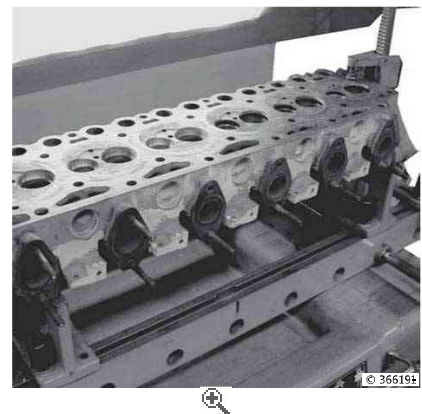
Make the housing hole for the inserted valve seat (interference)

- Set the cutting tool.



1.

- Tighten the cylinder head on the machine for processing the cylinder heads.
- Close the coolant channels.
- Align the cylinder head.



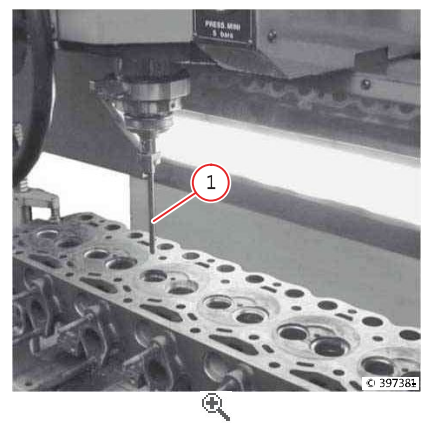
2.

NOTE



The valve guides may have different diameters, therefore select a guide bolt suitable for aligning the drilling units. The guide bolt must move easily without noticing resistance in the valve guide.

- With the guide bolt (1) align the drilling unit with respect to the housing hole.



3.

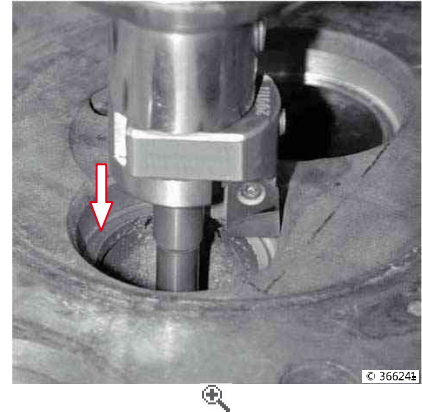
- Enlarge the housing hole based on the degree of oversizing.



WARNING

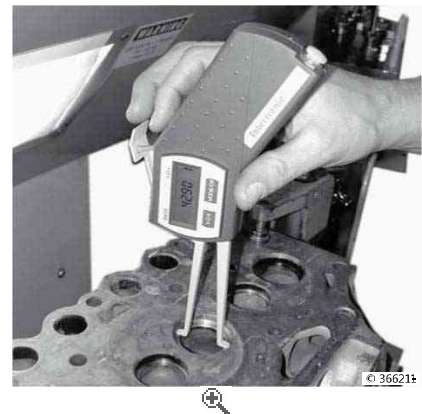
The inserted valve seat support (arrow) must not be machined with a cutting tool.

- Remove the shavings from the bottom.



4.

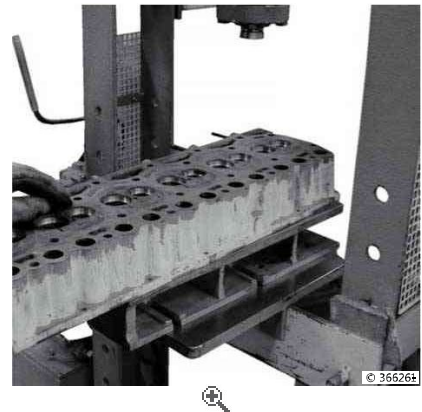
- Measure the hole of the housing with an internal bore meter.



5.

Pressure insertion of the inserted valve seat

- Apply the cylinder head.
- Select a inserted valve seat suitable for the housing hole.
 - Intake: 42.79 (+0, -0.02) mm
 - Degree of oversizing: 42.99 mm
 - Degree of oversizing: 43.19 mm
 - Exhaust: 36.99 (+0, -0.02) mm
 - Degree of oversizing: 37.19 (+0, -0.02) mm
 - Degree of oversizing: 37.39 (+0, -0.02) mm



1.

- Supercool the inserted valve seat in liquid nitrogen.



NOTE

Use containers suitable for liquid nitrogen and a tool suitable for the component insertion and removal operations. When starting to cool the metal, the liquid nitrogen will boil intensely, the effervescence process

is maintained until the metal components reach the temperature of the liquid nitrogen (-196°C). The inserted valve seat will have the correct temperature once the effervescence process of the nitrogen is concluded.



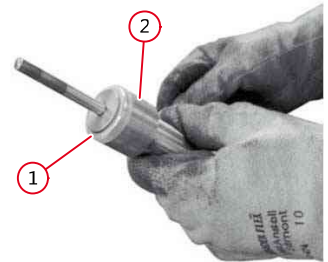
2.

- Position the inserted valve seat (1) on the presser (2).



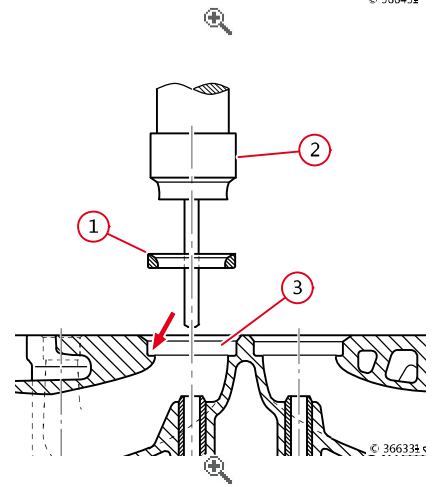
NOTE

Observe the installation position. The valve seat surface must face towards the presser tool.



3.

- Insert the inserted valve seat (1) with the presser (2) in the housing hole (3) to the stop (arrow).
- Remove the cylinder head.
- Machining the inserted valve seat.
- Assemble the valves.
See para.
- Check the valve residual.
See para.



4.



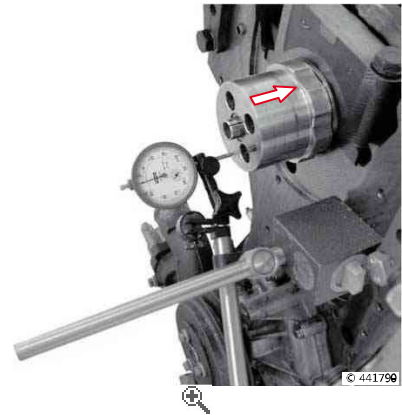
Check the endfloat of the crankshaft

1. Commercially available tools:

- Magnetic stand for measurements
- Palmer
- Internal bore meter
- Box spanner insert: 8035

Special tools:

- Dial gauge: 100400
- Disassemble the front cover.
See para.
- Disassemble the gear case cover.
See para.
- Apply the magnetic stand for measurements.
- Insert the dial gauge.
- Apply the preloaded probe on the end of the crankshaft.
- Press the crankshaft towards the arrow.
- Adjust the dial gauge to "0".



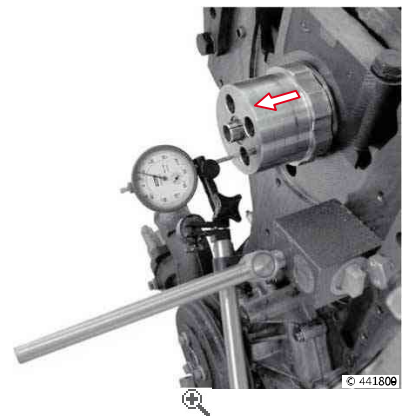
2.

- Press the crankshaft towards the arrow.
- Read the value measured: 0.1 - 0.3 mm



NOTE

If there is a difference in the endfloat, set the permitted value by replacing the halves of the thrust ring.



3.

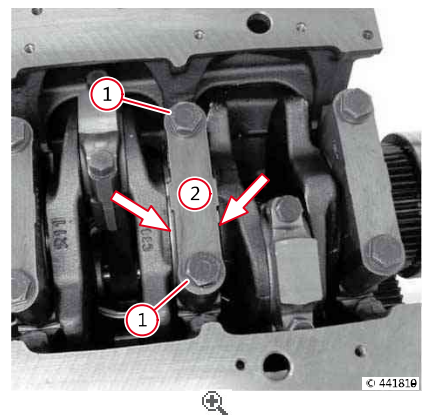
- Remove screws (1).



NOTE

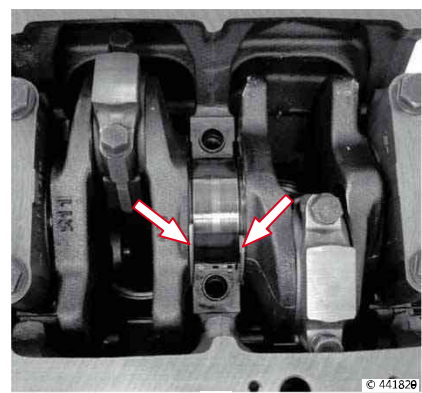
Use the box spanner insert.

- Remove flanged bearing cover (2).
- Remove the lower bearing shell.
- Remove the two halves of the thrust ring (arrows).



4.

- Remove the two halves of the thrust ring (arrows).



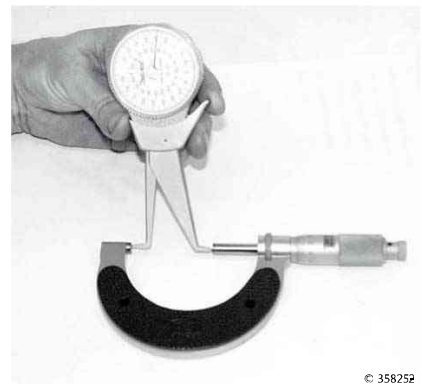
5.

- Measure the thickness of the halves of the thrust ring.
 - Standard: 2.00 (+0.05, -0) mm
 - Interference: 2.20 (+0.05, -0) mm
- Select the thrust ring halves based on the measured value.



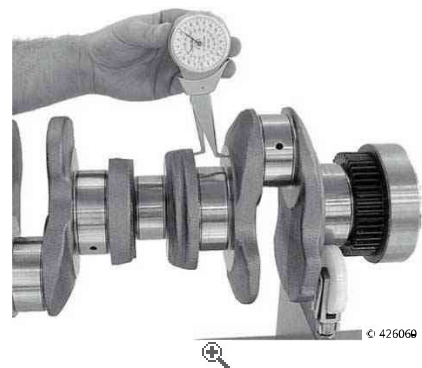
6.

- Disassemble the crankshaft.
See para.
- Adjust the palmer to 32 mm.
- Push the internal bore meter between the test surfaces of the palmer and bring to "0".



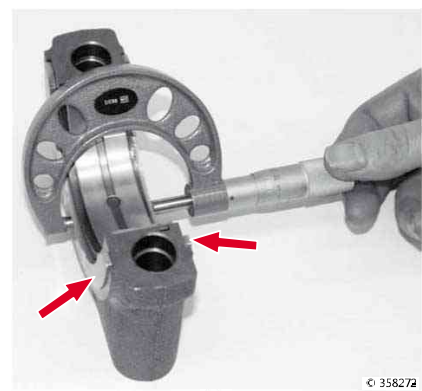
7.

- Measure the width of the flanged bearing.
- Make a note of dimension (a).



8.

- Apply the thrust ring halves on the flanged bearing cover (arrows).
- Measure the width with the palmer.
- Make a note of dimension (b).



- 9.
10. o Calculate the endfloat: 0.1 - 0.3 mm

Calculation example:

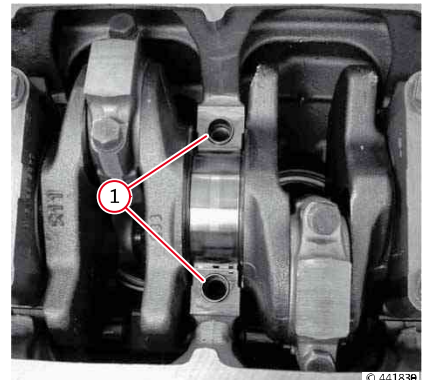
Target:	Endfloat
Data:	-
Measured value:	(a) = 32.8 mm, (b) = 32.7 mm
Calculation:	Dimension (a) - dimension (b)
The results of all this are:	= 0.1 mm

- o Assemble the crankshaft.
See para.



NOTE

Check that tightening bush (1) is present.

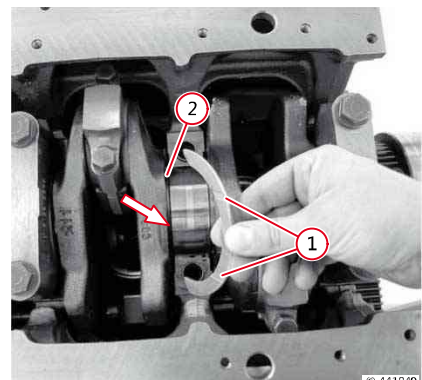


- 11.
- o Assemble the upper thrust ring halves based on the measured endfloat.



NOTE

The oil grooves (1) in the thrust ring halves face towards the thrust discs (2) of the crankshaft (arrows). Insert the thrust ring halves between the crankcase and the crankshaft shoulder (arrows).



- 12.
- o Fix the two thrust ring halves with a small amount of grease on the flanged bearing cover.



NOTE

Use the lower halves of the thrust ring with the key (arrow). Use the thrust ring halves based on the measured endfloat. Flanged bearing cover marked

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