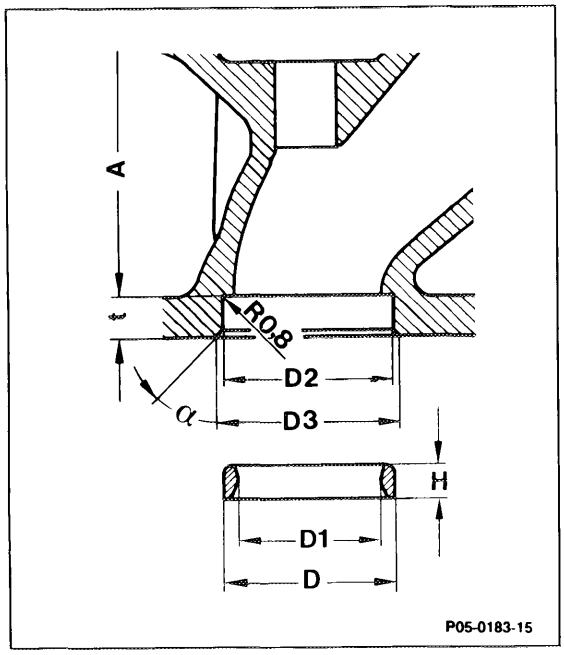
05-290 Replacing valve seat inserts

Preceding work:
Valve guides checked (05-285).



Valve seat insert	turn out valve seat insert with the lathe tool. Note operating instructions for the valve seat turning equipment.
Basic bore (D2)	check (table). Bore out to the repair stage, if required.
	Caution! Machine basic bore for the valve seat insert if minimum overlap is not achieved (Number 3).
Valve seat insert	supercool with liquid nitrogen and insert into basic bore.
	⚠Warning Do not touch supercooled valve seat inserts with bare hands. Valve seat insert must be square to the cylinder head.
Valve seats	machine (05-291).

Data

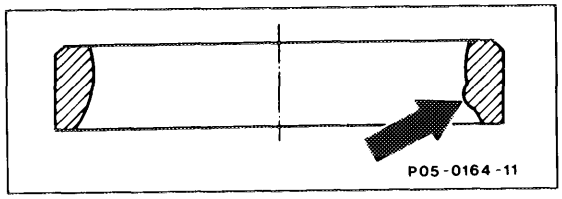
		Intake	Exhaust
Overlap of valve seat inserts in cylinder head		0.068 – 0.100	0.068 – 0.100
D 2	Standard dimension	40.000 40.016	37.000 37.016
	Repair stage max. up to	40.500 40.516	37.500 37.516
D	Standard dimension	40.100 40.084	37.100 37.084
	Repair stage	40.600 40.584	37.600 37.584
D 1		33.400 33.600	30.400 30.600
H	Standard dimension	6.955 7.045	6.955 7.045
	Repair stage	7.155 7.245	7.155 7.245
t (New value)		9.35 9.25	9.35 9.25
D 3		43.0 43.4	40.0 40.4
A (This dimension is valid up to the upper edge of cylinder head on reworked cylinder head parting surface)		133.4	133.4
α		37° 30'	37° 30'

Note

Exhaust valve seat inserts are made from centrifugally cast material on the naturally-aspirated engines, and sintered metal on turbo engines.

The intake valve seat inserts are made from sintered metal on all engines.

The hardened valve seat inserts (sintered metal) had a high spot (arrow) on inside of the insert for a short time.



This high spot must be turned off in order to machine the valve seat insert. There is a repair valve seat insert with larger outside diameter as a replacement part for all valve seat insert designs. After replacing the valve seat inserts the location of the hydraulic valve clearance compensating elements must be checked and corrected, if necessary (05-211).

Conventional tools

Cylinder head clamping fixture	e. g.	Hunger, D–8000 München 70 Part No. 221.60.000
Seat insert lathe tool, size 2	e. g.	Hunger, D–8000 München 70 Part No. 220.03.110
Valve seat turning equipment, model VDSNL 1/45/30	e. g.	Hunger, D–8000 München 70 Part No. 236.03.308
Test set for valves	e. g.	Hunger, D–8000 München 70 Part No. 216.93.300
65° correction steel No. 13 for lower correction angle	e. g.	Hunger, D–8000 München 70 Part No. 216.64.622
Internal-thread-measuring equipment (range 25 - 60 mm)	e. g.	Mahr, D–7300 Esslingen Part No. 844
External micrometer (range 25 - 50 mm)	e. g.	Mahr, D–7300 Esslingen Part No. 40 S

Replacement

1 Turn out old valve seat insert with lathe tool.

Note operating instructions for the tool.

2 Check valve guides, replace if required (05-285).

3 Measure basic bore D2.

A new valve seat insert standard dimension can be used, when the specified overlap exists.

If the minimum overlap is not achieved, machine basic bore for valve seat insert.

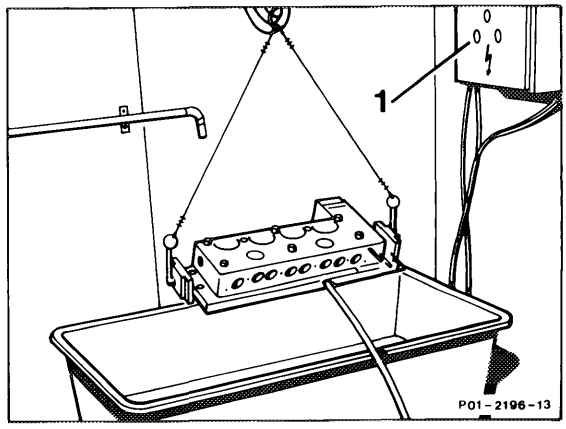
4 Turn basic bore D2 with the seat insert lathe tool so that the bore is properly cleaned up.

5 Measure machine base bore.

6 Turn valve seat insert repair stage so that the specified overlap is produced. Compensate height of reworked front face, if applicable.

7 Heat up cylinder head to approx. 80°C in water bath.

8 Supercool valve seat insert with liquid nitrogen.



Drive home valve seat insert with suitable pilot bar.

10 Machining valve seats (05-291).