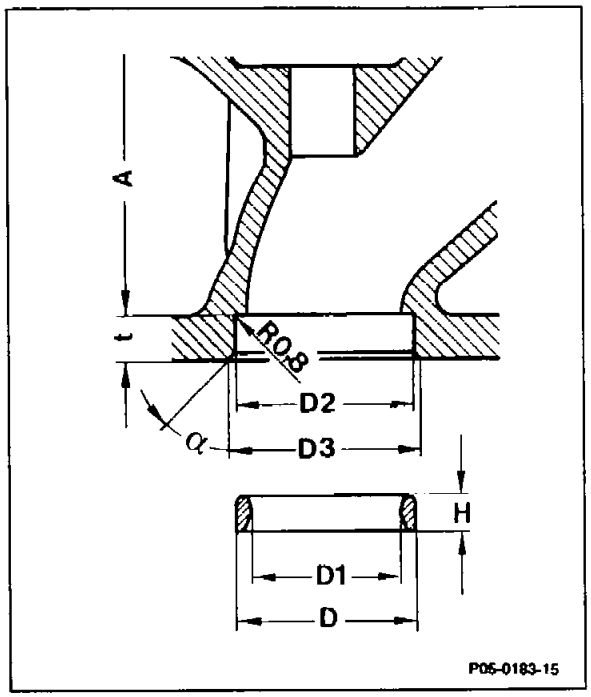
05–290 Replacement of valve seat inserts

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

Operation no. of operation texts and work units or standard texts and flat rates



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.
	⚠ 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 in basic bore.
	⚠ 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).

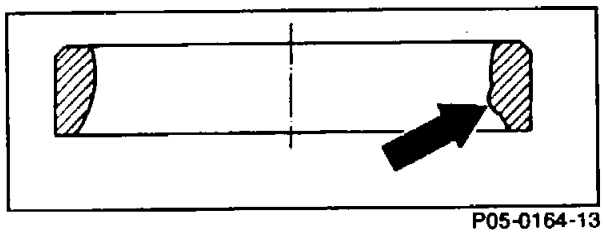
Data

		Intake	Exhaust
Overlap of valve seat rings in cylinder head		0.068–0.100	0.068–0.100
D 2	Standard size 1st version	40.000 / 40.016	37.000 / 37.016
	Repair size 1st version	40.500 / 40.516	37.500 / 37.516
	Standard size 2nd version	39.000 / 39.016	36.000 / 36.016
	Repair size 2nd version	–	–
D	Standard size 1st version	40.100 / 40.084	37.100 / 37.084
	Repair size 1st version	40.600 / 40.584	37.600 / 37.584
	Standard size 2nd version	39.100 / 39.084	36.100 / 36.084
	Repair size 2nd version	–	–
D 1		33.400 / 33.600	30.400 / 30.600
H	Standard size 1st version	6.955 / 7.045	6.955 / 7.045
	Repair size 1st version	7.155 / 7.245	7.155 / 7.245
	Standard size 2nd version	5.962 / 6.037	5.962 / 6.037
	Repair size 2nd version	–	–
t (value when new)	1st version	9.35 / 9.25	9.35 / 9.25
	2nd version	8.35 / 8.25	8.35 / 8.25
D 3		43.0 / 43.4	40.0 / 40.4
A (size up to top edge of cylinder head applies to machined cylinder head contact 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 the inside of the insert for a short time.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This high spot must be turned off in order to machine the valve seat insert. Repair valve seat inserts with larger outer diameter are available as replacement parts for all valve seat insert versions. After replacement of the valve seat inserts check the location of the hydraulic valve clearance compensating elements and correct, if required (05–211).

It is also necessary to check the distance between the end of the valve stem and base of the camshaft bearing (01–418).

Modified valve seat rings
Since 07/94 valve seat rings with reduced overall dimensions have been installed (see table 2nd version).

⚠
Valve seat rings of the 1st version must not be installed in cylinder heads of the 2nd version otherwise leaks may occur at the water jacket.

Commercially available tools and test equipment [1)]

Designation	e.g. company	Order no.
Valve seat turning tool with hand drive	Serdi GmbH Bregenzer Str. 69 88131 Lindau	SL 1050
Holding device for cylinder head and valve seat turning device	Serdi GmbH Bregenzer Str. 69 88131 Lindau	
e.g. Wall support or work place or machining center		SL 1100 SL 1200 SL 1300
Forming cutter	Serdi GmbH Bregenzer Str. 69 88131 Lindau	L 12
Vacuum tester for leakage check	Serdi GmbH Bregenzerstr. 69 88131 Lindau	8000
Motorization	Serdi GmbH Bregenzerstr. 69 88131 Lindau	SCL 660
Internal measuring unit (Measuring range 35–100 mm)	Hahn und Kolb Borsigstraße 50 70469 Stuttgart	33 520 080
External micrometer (Measuring range 25–50 mm)	Hahn und Kolb Borsigstraße 50 70469 Stuttgart	31 414 150

[1)] Other approved valve seat turning equipment and accessories are listed in the catalog "Test Reports for Test Benches and Equipment for Mercedes-Benz Workshops", Volume 1.

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.

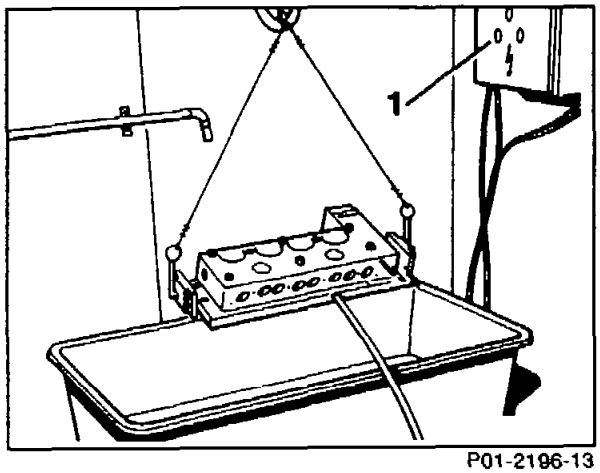
4 Turn basic bore D2 with the seat insert lathe tool so that the bore is properly cleaned up.

5 Measure machined basic bore.

6 Turn replacement valve seat insert 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.



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Drive home valve seat insert with suitable pilot bar.

10 Machine valve seats (05-291).