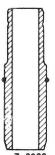


Inspection and Replacement of Valve Guides 05.0

Cylinder head removed and disassembled

Data

Model	Part No.	Rep. stage	Color coded	OD	Bore in cylinder head	Over-lap	Valve guide		Shape of valve guide
							ID	Length	
Inlet									
M 116 M 117	116 050 35 24	Standard	green	$\frac{14.014}{14.019}$	$\frac{14.000}{14.006}$	0.008 0.019	$\frac{9.000}{9.015}$	47.5	
			—	$\frac{14.020}{14.025}$	$\frac{14.007}{14.012}$				
			brown	$\frac{14.026}{14.031}$	$\frac{14.013}{14.018}$				
	116 050 36 24	Repair stage 1	grey-green	$\frac{14.032}{14.037}$	$\frac{14.019}{14.024}$				
			grey	$\frac{14.038}{14.043}$	$\frac{14.025}{14.030}$				
			grey-brown	$\frac{14.044}{14.049}$	$\frac{14.031}{14.036}$				
	116 050 37 24	Repair stage 2	red	$\frac{14.214}{14.231}$	$\frac{14.200}{14.218}$				
	116 050 38 24	Repair stage 3	white	$\frac{14.414}{14.431}$	$\frac{14.400}{14.418}$				

Exhaust

M 116 M 117	116 050 40 24	Standard	green	$\frac{15.014}{15.019}$	$\frac{15.000}{15.006}$	0.008 0.019	$\frac{11.000}{11.018}$	48.5	
			—	$\frac{15.020}{15.025}$	$\frac{15.007}{15.012}$				
			brown	$\frac{15.026}{15.031}$	$\frac{15.013}{15.018}$				
	116 050 41 24	Repair stage 1	grey-green	$\frac{15.032}{15.037}$	$\frac{15.019}{15.024}$				
			grey	$\frac{15.038}{15.043}$	$\frac{15.025}{15.030}$				
			grey-brown	$\frac{15.044}{15.049}$	$\frac{15.031}{15.036}$				
	116 050 42 24	Repair stage 2	red	$\frac{15.214}{15.231}$	$\frac{15.200}{15.218}$				
	116 050 43 24	Repair stage 3	white	$\frac{15.414}{15.431}$	$\frac{15.400}{15.418}$				

05.0 Inspection and Replacement of Valve Guides

Special Tools

Model	M 116, M 117			
	Inlet	Dia. mm	Exhaust	Dia. mm
Plug gauge	636 589 00 21 00	9	108 589 01 21 00	11
Removal and installation mandrel ¹⁾	136 589 00 39 00	9	116 589 02 43 00	11
Adjustable reamers	000 589 04 53 00	13.8–15	000 589 05 53 00	16.8–18
Special reamers	000 589 10 53 00	8.99 H 7	000 589 15 53 00	10.99 H 7

1) Use fitting punch for knocking out inlet valve guides.

Inspection

- 1 Clean valve guide (51) with a brush. Remove hard oil carbon deposits with special reamer.
- 2 Measure bore with plug gauge. The go end of the gauge should just fall in, while the no-go end should barely obtain a hold. If the no-go end can be inserted, replace valve guide.

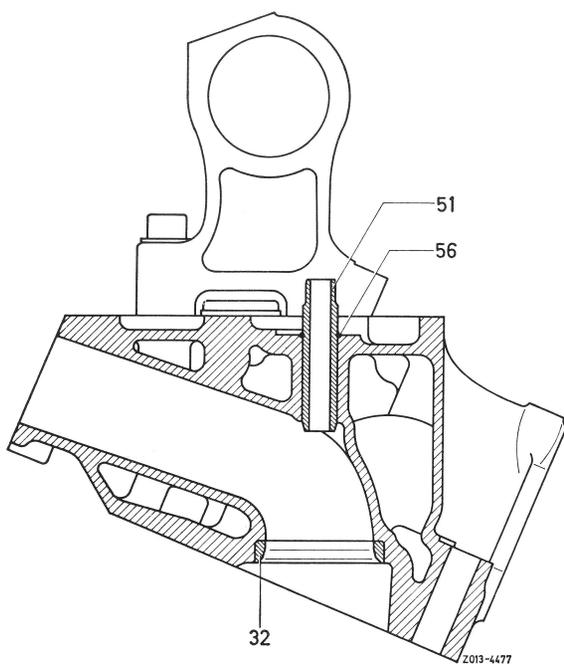


Fig. 1

32 Valve seat ring
51 Valve guide

56 Snap ring

Replacement

- 1 Knock out valve guide with pertinent removing mandrel.
 - 2 Check basic bore in cylinder head. Equalize rough spots with a reamer. If required, refinish basic bore to next repair stage. Make sure that the basic bore is at an accurate right angle to cylinder head parting surface.
 - 3 Select valve guide so that the specified overlap is always maintained.
- Note:** In an emergency, a valve guide with larger OD can be ground to the required dimension.
- 4 Clean basic bore.
 - 5 Heat cylinder head in water bath to approx. 80 to 90° C.
 - 6 Undercool valve guide, if possible.
 - 7 Install valve guide with installation mandrel, with the snap ring (56) seated on cylinder head (Fig. 1).
- Note:** Prior to insertion, coat bores of valve Guides with some tallow.

8 Permit cylinder head to cool down and check valve guides for tight seat. Use suitable plastic mandrel and try by means of light hammer blows to knock the guide out again. If the guide can be knocked out, a new fit must be selected.

9 Check ID of valve guide with pertinent plug gauge. Equalize rough spots with special reamer.