Checking and Replacing Valve Guides

Job No. 01–6

Change: Paragraphs marked with "x" were added

A. OM 636

The inlet and exhaust valve guides consist of cast iron, they differ in length and shape. The inlet valve guide (see Figure 01–6/2 and 01–6/4) is 5 mm longer than the exhaust valve guide and is chamfered at 45° on top. This chamfer scrapes the oil off the valve stem. The exhaust valve guide (see 01–6/3 and 01–6/5) has an inside chamfer 0.5 mm deep, thus adequately lubricating the exhaust valve which is exposed to higher thermal stresses.

The valve guides of the light metal cylinder head are in addition furnished with an annular groove (see Figure 01–6/4 and 01–6/5). A retaining ring seated in this annular groove prevents axial movement of the valve guides in the bore. The thrust rings (1) (see Figure 01–6/1) support the valve springs and prevent loosening of the valve guides.

B. OM 621

The intake and exhaust valve guides are grey cast, they differ in length and shape. The intake valve guides of models 190 D and 190 Db are 1 mm shorter (see Figure 01–5/4) and are chamfered inwards at an angle of 30° (see Figure 05–11/5). Further, these guides are provided with a radial groove with locking ring to prevent axial movement; at top they are cut to a dia. of 13.8 mm at a length of 14.5 mm to allow the seal ring holder to slide on it. The exhaust valve guides have no radial groove and are chamfered at an angle of 60° (see Figure 05–11/4). The top of the intake and exhaust valve guides are designed in accordance with the valve seal (see Job No. 05–16, Figure 05–11/3 and 05–11/4).

x The intake and exhaust valve guides for models 180 Dc, 190 Dc and L and O 319 D have a 3 mm wide valve seal ring groove, see Figure 01–6/6. For dimensions of valve guides, see Job No. 01–0.

Checking Valve Guides and Removal, if necessary OM 636 and OM 621:

1. Clean the bores of the valve guides with cylinder brush Part No. 000 583 02 38.

2. Check the bore with control arbor of 9.0 to 9.015 mm dia., Part No. 636 589 00 21 on OM 636, and with control arbor 10.0 to 10.015 mm dia., Part No. 187 589 01 21 on OM 621. On its "go" side the arbor should just fall, whereas on the "no go" side the arbor should stick. If the arbor can be inserted on the "no go" side, the valve guide should be replaced. If it is difficult to insert the arbor on the "go" side then the bore is too tight.

   A reamer is no suitable tool to remove hard oil carbon residues from the valves guides. To remove hard oil carbon residues in the valve guides, use honing tool Part No. 000 589 01 67, clamping tool 000 589 04 31 and honing shaft with 9 mm dia. stone, Part No. 000 589 03 67 on OM 636, on OM 621 the honing shaft with 10 mm dia. stone, Part No. 000 589 05 67. For lubrication use petroleum or Diesel fuel. After removing the carbon, thoroughly clean valve guide bores.

Note: Use only perfect control arbors to check the bores. Reference is made to the fact **that the control arbors must be checked for accuracy from time to time.**

3. When replacing a valve guide, knock out the old valve guide with Drift Part No. 136 589 00 39.

Note: On a light metal cylinder head of OM 636 drive out the valve guides from the bottom towards the top, because the retaining ring is installed on top.

With the OM 621 cylinder head, knock out the intake valve guides from bottom towards top and the exhaust valve guides from top downwards.

If a valve guide sticks due to oil carbon deposits, then mill off the valve guide above the retaining ring (2) (see Figure 01-6/1), remove the retaining ring and drive out the valve guide towards the bottom or the top.

4. Measure the basic bores in the cylinder head before installing new valve guides. The standard dimension of the bore is 14.00 to 14.018 mm. If the bore is larger on OM 636, determine whether adequate force-fit can be reached by using a valve guide of the intermediate stage (grey mark = + 0.03 mm). If not, ream the basic bore for the first overhaul stage with Reamer Part No. 000 589 04 53. The basic bore must be machined exactly vertical to the cylinder head separating line.

Note: If a valve guide with the specified force-fit is not available, grind or turn a valve guide with a larger O. D. to the specified dimension. If a bore must be reamed beyond the dimension specified for the 1st overhaul stage, make a new valve guide. For this purpose, ream the I. D. of the valve guide on a lathe with a reamer to the finished dimension prior to pressing in. Observe the dimensions on table (see Figure 01-0/4) to obtain the specified force-fit for the O. D. and specified clearance between valve guide I. D. and valve stem in each case.

Installing Valve Guides on OM 636 and OM 621:

5. Select the new valve guides so that force-fit tolerance will be 0.010 to 0.039 mm.

6. Apply some tallow to the bores in the cylinder head. On OM 636 grey cast cylinder head press in valve guides by means of arbor Part No. 136 589 00 39 from the bottom upwards, until there is a distance between parting line and valve guide of 26 ± 0.5 mm for the inlet valve guide and 31 ± 0.5 mm for the exhaust valve guide.

x On the grey cast cylinder head OM 621, type 621.910 press in exhaust valve guides with arbor Part No. 621 589 01 35 from bottom upwards until the specified distance between parting line and valve guide is obtained. (see Job No. 01-0). Press in intake valve guides from **the top** downwards until retainer ring (1) abuts on cylinder head (see Figure 01-5/4).

x **Note:** If on OM 621, type 621.910 the valve guides are replaced, install the new Teflon seals and valve guides of type 621.912 (see Figure 01-6/6).

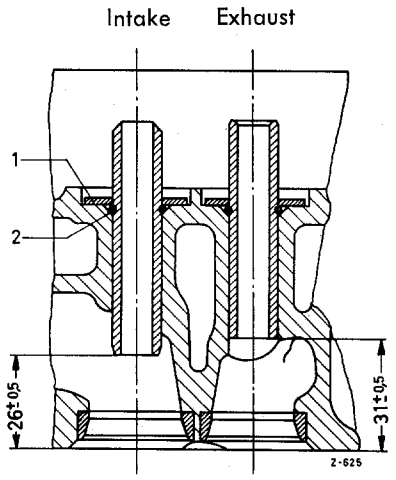


Figure 01-6/1

Light metal cylinder head OM 636

1 Thrust ring for valve springs
2 Retainer ring

x On engines of model OM 621, type 621.912, 913, 914 press in intake and exhaust valve guides from **the bottom** upwards until the specified distance between parting line and valve guide is obtained (see Job No. 01-0 and Figure 01-6/6).

On light metal cylinder head OM 636 press in the valve guides from the top downwards until retainer ring (2) abuts on the chamfer

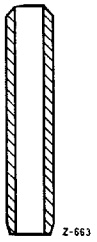


Figure 01–6/2

Intake

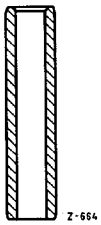


Figure 01–6/3

Exhaust

Valve guides on
grey cast cylinder head

OM 636

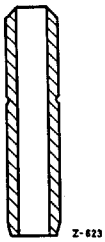


Figure 01–6/4

Intake

Part No. 636 053 0730

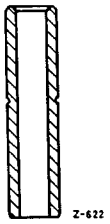


Figure 01–6/5

Exhaust

Part No. 636 053 0629

Valve guides on
light metal cylinder head

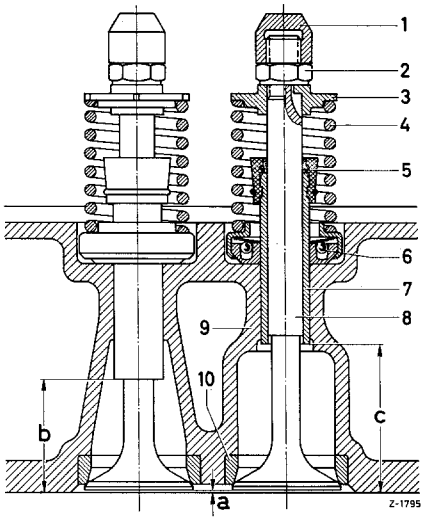
OM 636

on cylinder head (see Figure 01–6/1). In addition, install valve guides on the light metal cylinder head when **undercooled** or heat cylinder head to approx. 60° C prior to insertion of valve guide.

For undercooling of the valve guide, use liquid air or dry ice.

7. Check valve guides in cylinder head for tight seat. Use punch and try to drive the guide out by means of light hammer blows. If the guide remains firmly seated, the correct force-fit has been achieved. If the guide can be punched out again, press in a guide having a larger O. D. Following pressing in of valve guides, check again the bores with plug gauge Part No. 636 589 00 21 on the OM 636 and with plug gauge Part No. 187 589 01 21 on the OM 621. Refinish narrow spots on new valve guides by means of a valve guide reamer. (For inspection of valve guides, see item 2).

For dimensions and tolerances of valve guides and bores in cylinder head, see Job No. 01–0



Intake Exhaust

x Figure 01–6/6

1 Cap nut
2 Hexagon nut
3 Valve spring disk
4 Valve spring
5 Valve seal
6 Valve turning device
7 Valve guide – exhaust
8 Exhaust valve
9 Cylinder head
10 Valve seat ring – exhaust

a = Distance from separating line of cylinder head to valve disk
b = Distance from separating line of cylinder head to front face of intake valve guide
c = Distance from separating line of cylinder head to front face of exhaust valve guide