

# Boring and Honing of Cylinder Bore

Types 220 and 220a

Operation No.
M 4b

Clean cylinder bores and check with an internal measuring instrument in directions A and B at top, center and bottom of bore (Fig. M 4b/1).

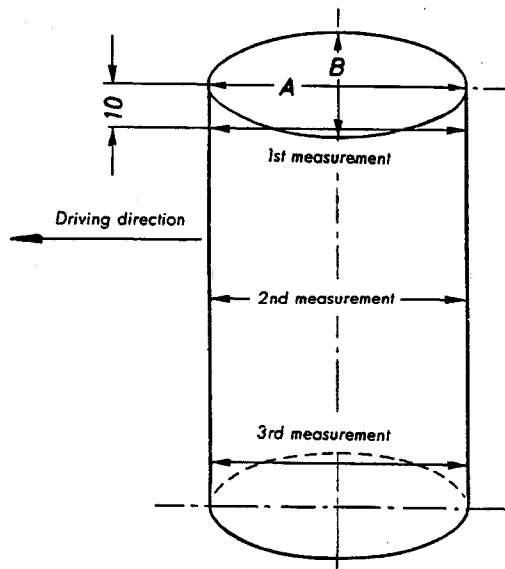


Fig. M 4b/1

A = longitudinal direction, B = transverse direction

Out of round cylinder bores are the cause of excessive oil consumption. They must be rebored and honed. Honing alone does not suffice, as the honing tool will follow the out of round cylinder walls.

If the taper of the cylinder bores is less than 0.05 mm (0.002"), it will suffice to hone the bore. However, if the taper exceeds this value, the bore must be rebored as well as honed.

The required oversize is determined by the greatest wear of the cylinder bores. When reconditioning the bores to 2nd or even 3rd oversize, make sure that the cylinder wall thickness is not less than 3 mm (0.12"). See Operation No. 4a, cf. 1.

Before you start reconditioning the cylinder bore, screw on a template and tighten to a torque of 8 mkg (58 ft.lb.) like the cylinder head (see Operation No. M 20, cf. 8).

Take the template off again after the bores have been checked subsequent to the honing operation (Fig. M 4b/2).

When honing the bores, do not remove more than 0.03 mm (0.0012") at a time. The dimensions given in Table 2 must be strictly adhered to.

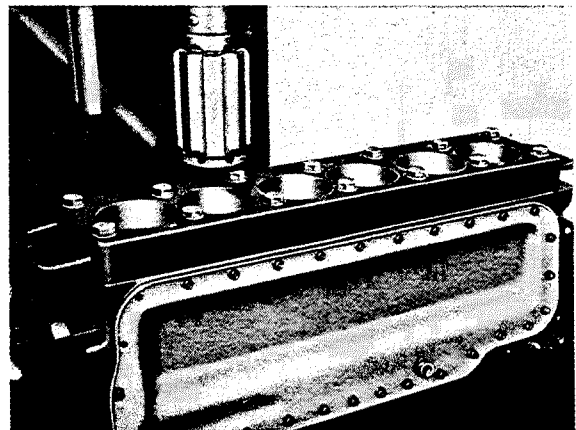


Fig. M 4b/2

Permissible tolerances:

Out of roundness 0.013 mm (0.00051")

Taper 0.013 mm (0.00051")

Deviation perpendicular to crankshaft axis in relation to height of cylinder 0.05 mm (0.002")

After the cylinder bores have been honed, the walls must be free from scrapes and scratches.

**Cylinder Bore Machining Sizes**  
in mm (in.)

**Table 2**

Size	Cylinder bore	Piston
Standard size	<u>80.000 (3.14961)</u> 80.019 (3.15036)	79.96 (3.14803) 79.97 (3.14842) 79.98 (3.14881)
1st oversize	<u>80.500 (3.16929)</u> 80.522 (3.17016)	80.46 (3.16772) 80.47 (3.16811) 80.48 (3.16851)
2nd oversize	<u>81.000 (3.18897)</u> 81.022 (3.18984)	80.96 (3.18741) 80.97 (3.18780) 80.98 (3.18819)
3rd oversize	<u>81.500 (3.20865)</u> 81.522 (3.20952)	81.46 (3.20708) 81.47 (3.20747) 81.48 (3.20787)

Within the oversizes the pistons are available in three sizes varying from 0.01 to 0.01 mm (0.0004 to 0.0004"). See third column of Table 2. Select the pistons so that play between piston and cylinder wall is 0.04 mm (0.0016").

**Note:** In new engines the numbers 0, 1 or 2 are stamped into the upper mating surface of the cylinder crankcase beside the respective cylinder bores.

0 indicates a cylinder bore diameter of 80.00 mm (3.1496")

1 indicates a cylinder bore diameter of 80.01 mm (3.1500")

2 indicates a cylinder bore diameter of 80.02 mm (3.1504")