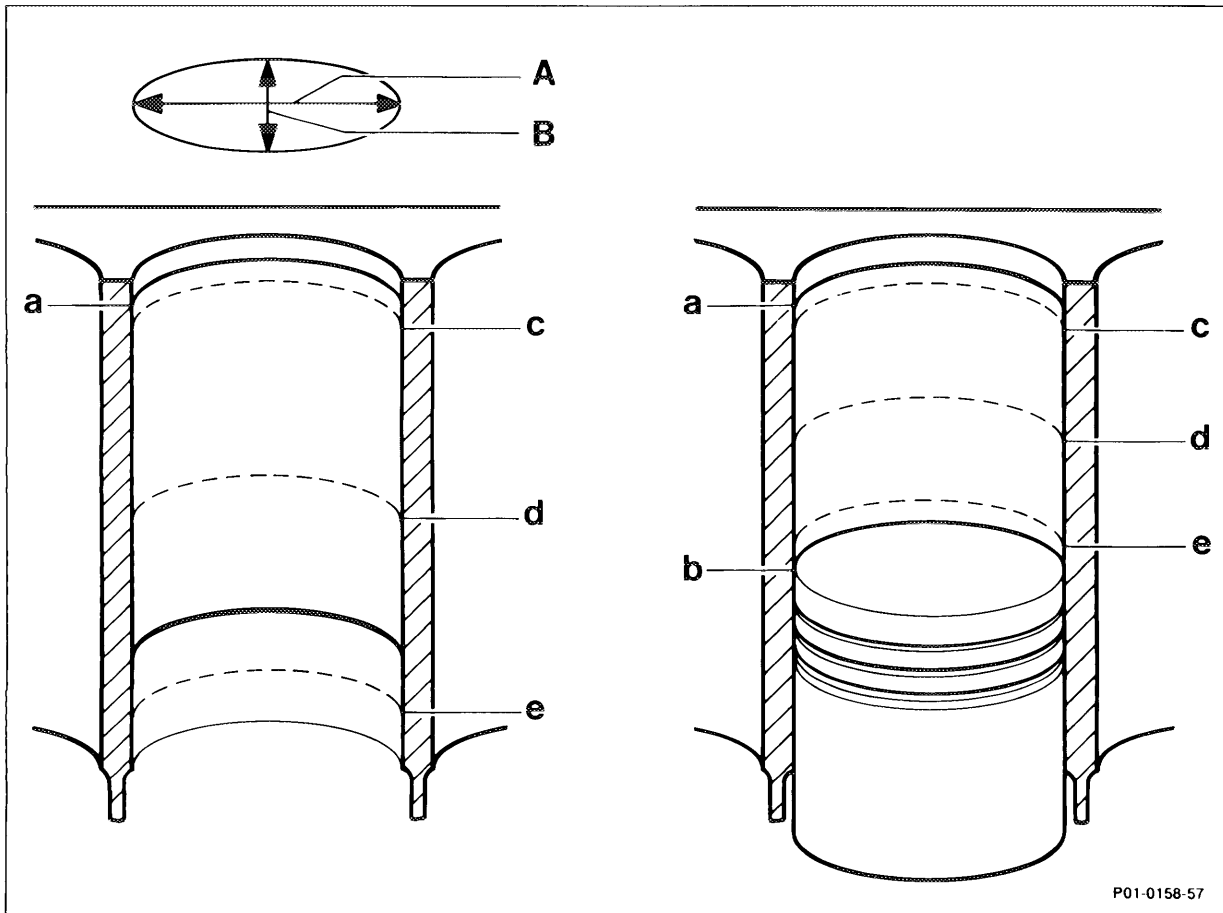


# 01-110 Measuring, boring and honing cylinder bores

Preliminary operations:  
Pistons removed (03-316).

## A. Measuring Engines with and without cylinder sleeves



Cylinder bores .....  
Cylinder bore .....

clean thoroughly.  
Measure cylinder bore diameter with internal measuring instrument at 3 measuring points (c, d, e) in longitudinal direction (A) and transverse direction (B).

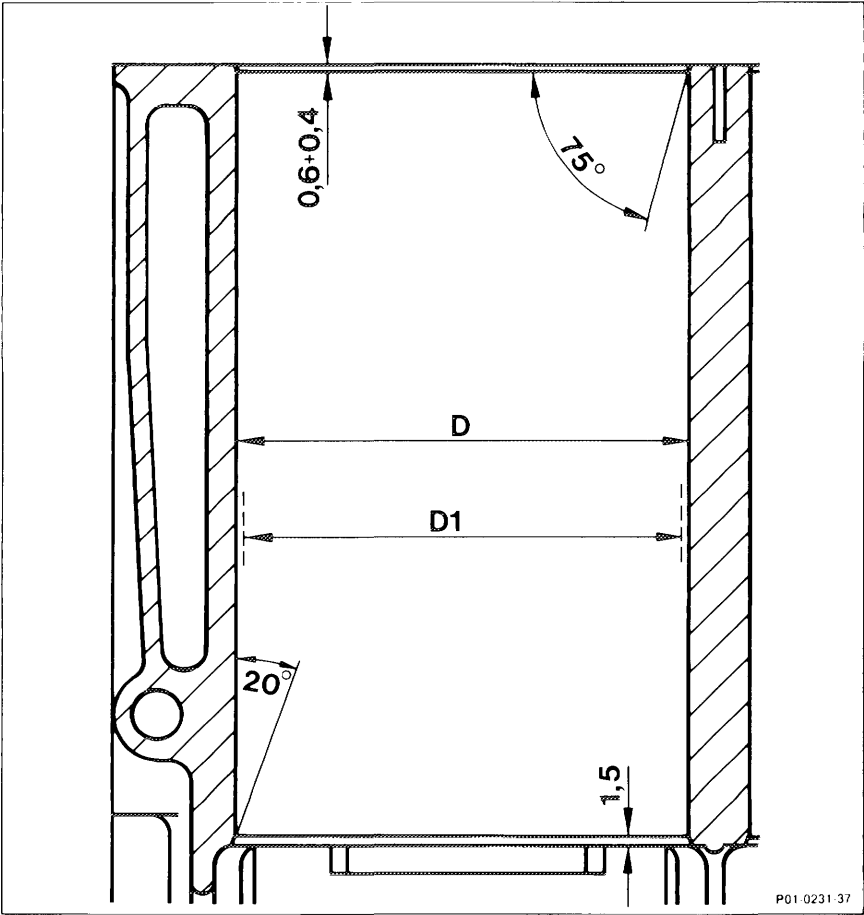
**Note**

Compare measured cylinder bore diameters with standard or repair stage specifications for engine (except for engines with cylinder sleeves).

Observe group ident. letters A, X or B stamped on the crankcase or piston crown. On used engines the difference between the diameter measured at point (c) and the original diameter is equal to the wear (max. permissible wear 0.2 mm).

The original diameter can be measured at the piston top land after it has been cleaned thoroughly (the top land is the area between the piston crown and the top surface of the block in the TDC position on ignition stroke).

**B. Boring and honing  
Engines without cylinder sleeves**



Cylinder bore diameter (D) ..... measure.

Bore diameter (D <sub>1</sub> )	determine and adjust boring tool.
	<b>Note</b>
	The bore diameter "D1" is the cylinder bore diameter "D" minus the material which will be removed by honing. The material removed by honing should not exceed max. 0.05 mm. Select repair stage diameter "D" according to engine model and group code letter A, X, B" (stamped in block).
Boring operation	perform according to operating instructions for boring tool used.
Cylinder bore	bevel at upper and lower edges of cylinder (see drawing for dimensions).
Honing operation	perform according to specified data.

### Maximum permissible wear for cylinder bores

Measuring range "a" (upper reversal point of 1st piston ring) in longitudinal and/or transverse direction	0.2 mm
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### Standard and repair stage diameter "D" for cylinder bores

Engine			602, 603	603.970
Version	Cylinder	Group code letter	Cylinder dia. D in mm	Cylinder dia. D in mm
Standard	1 - 4, 5, 6	A	87.000 - 87.006	89.000 - 89.006
		X	over 87.006 - 87.012	over 89.006 - 89.012
		B	over 87.012 - 87.018	over 89.012 - 89.018
Repair stage <sup>1)</sup> (+0,7 mm)		A	87.700 - 87.706	89.700 - 89.706
		X	87.706 - 87.712	89.706 - 89.712
		B	87.712 - 87.718	89.712 - 89.718

<sup>1)</sup> Does not apply for engines with cylinder sleeves. Cylinder sleeves must be replaced when the wear limit is reached.

### Machining tolerances

Permissible out-of-round and conicity of cylinder bore	0.07 mm
Permissible roughness of cylinder bore (R3Z)	0.003 - 0.006 mm
Permissible waviness of cylinder bore	50 % of roughness
Honing angle	45°
Roughness of block parting surface	0.006 - 0.016 mm
Chamfer of cylinder bores	refer to figure

## Introduction of engines without cylinder sleeves

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### Note

Beginning in 1987 the cylinder sleeves were eliminated partially on engines 602/603. The following tables show exactly when and on which model or engine the new version was introduced. Engine 603.970 was introduced into production without cylinder sleeves. Installation of cylinder sleeves is not permissible.

### Production breakpoint: 08/89

Model	Engine	Engine end no.		Vehicle ident. end no.	
		manual transmission	automatic transmission	A	F
201.126	602.911	081638	016218	*	*

### Production breakpoint:

Model	Engine	Engine end no.		Vehicle ident. end no.	
		manual transmission	automatic transmission	A	F
201.126	602.911	083630	016502	*	*

### Commercially available tool

Internal measuring instrument for 50 – 150 mm dia., with 0.01 mm increments and measuring point pressure relief	e.g.	Hommel Handel D-5000 Köln 71 Sunnen Grm-2125
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