Note:

*If the **ROA** is negative, the valve will open after TDC.

If the **AFE is negative, the valve will close before TDC.

Theoretical settings for a lift of 0.7mm (no clearance)

	Inlet	Exhaust
Inlet Opening Retardation ROA	**-9°**	**-**
Inlet Closing Retardation RFA	**20°**	**-**
Exhaust Opening Advance AOE	**-**	**27°**
Exhaust Closing Advance **AFE**	**-**	**-7°**

XIV - TURBOCHARGER

Turbocharging pressure regulation valve

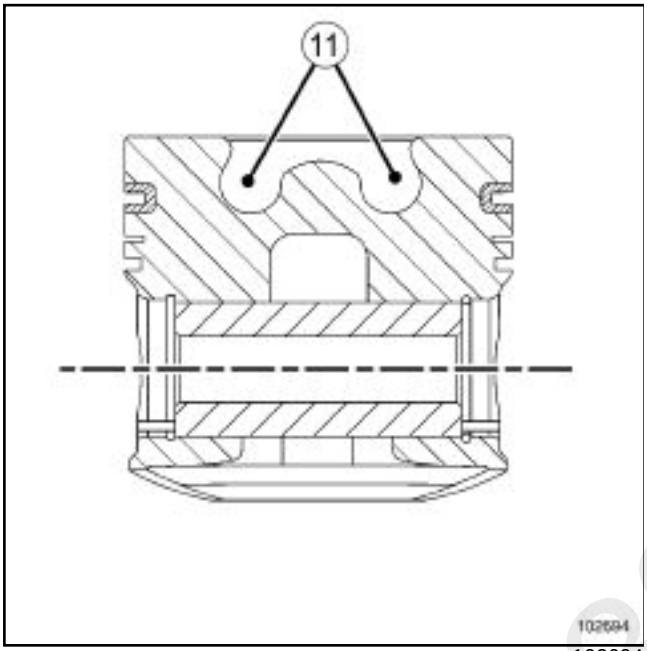
Engine type	Pressure regulation valve value in bar		Valve rod movement value in mm
	Pressure	Vacuum	
K9K 272-700-704-710-752-790	**1.3**	**-**	**1.95 ± 0.6**
K9K 260-270-702-706-722-750	**1.4**	**-**	**4.3 ± 0.6**
K9K 712-728-729-732-764	**-**	**0.5**	**1.7**
K9K 276-718-724-760-766	**-**	**0.6**	**7 ± 0.5**
K9K 274-714-716-762-768-792	**1.1**	**-**	**2.2 ± 0.5**

I - PISTONS

1 - Piston brand

These engines are fitted with **FEDERAL MOGUL** pistons.

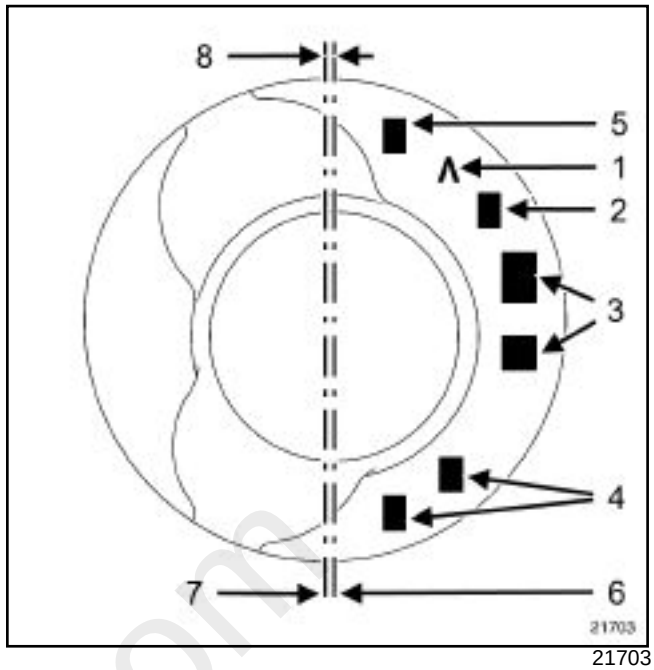
2 - Piston combustion chamber volume



102694

Engine type	Piston combustion chamber volume
K9K 260-270-272-274-276-700-702-704-706-710-712-714-716-718-722-724-728-729-750-752-760-762-766-768-790-792	**16.418 ± 0.25 cc**
K9K 732-764	**19.96 ± 0.25 cc**

3 - Piston markings



21703

(**1**) Direction of fitting the piston **Λ** facing the flywheel.

(**2**) Gudgeon pin height class which corresponds to the height between the gudgeon pin and the piston crown.

(**3**) Used by the supplier only.

(**4**) Used by the supplier only.

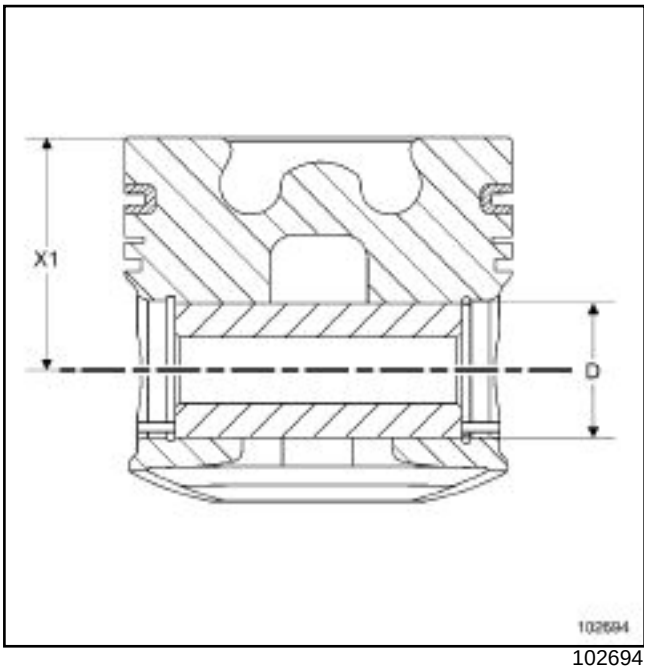
(**5**) Used by the supplier only.

(**6**) Piston axis of symmetry.

(**7**) Gudgeon pin hole axis.

(**8**) Offset between gudgeon pin hole and piston axis of symmetry is **0.3mm** .

4 - Gudgeon pin height classes



102694

Dimension (**X1**) represents the height of the gudgeon pin.

Dimension (**D**) represents the gudgeon pin diameter.

Engine type	Diameter of gudgeon pin D = 25mm		Diameter of gudgeon pin D = 26mm	
	Piston category	**Gudgeon pin height in mm**	**Piston category**	**Gudgeon pin height in mm**
K9K 260-700-702-704-710-722 **up until 25/11/2002**	K*	**41.646 to 41.687**	-	-
	L*	**41.688 to 41.730**	-	-
	M*	**41.731 to 41.772**	-	-
	N*	**41.773 to 41.814**	-	-
	P	**41.815 to 41.856**	-	-
K9K 260-700-702-704-710-722 **from 25/11/2002** K9K 270-272-274-706-714-716-750-752-762-768-790-792	-	-	K*	**41.646 to 41.687**
	-	-	L*	**41.688 to 41.730**
	-	-	M*	**41.731 to 41.772**
	-	-	N*	**41.773 to 41.814**
	-	-	P	**41.815 to 41.856**

Engine type	Diameter of gudgeon pin D = 25mm		Diameter of gudgeon pin D = 26mm	
	Piston category	Gudgeon pin height in mm	Piston category	Gudgeon pin height in mm
K9K 276-712-718-724-728-729-732-760-764-766	-	-	J	**41.605 to 41.646**
	-	-	K*	**41.647 to 41.688**
	-	-	L*	**41.689 to 41.730**
	-	-	M*	**41.731 to 41.772**
	-	-	N	**41.773 to 41.814**

Note:

***** = piston sold by the Parts Department.

WARNING

- For engines **K9K 260-270-274-700-702-704-706-710-714-716-722-750-752-762-768-790-792** fitted with gudgeon pins of diameter D = **25 or 26mm** , the Parts Department will only supply four categories of piston **K, L, M, N** .

- If the engine is fitted with a category **P** piston, replace it with a category **N** piston.

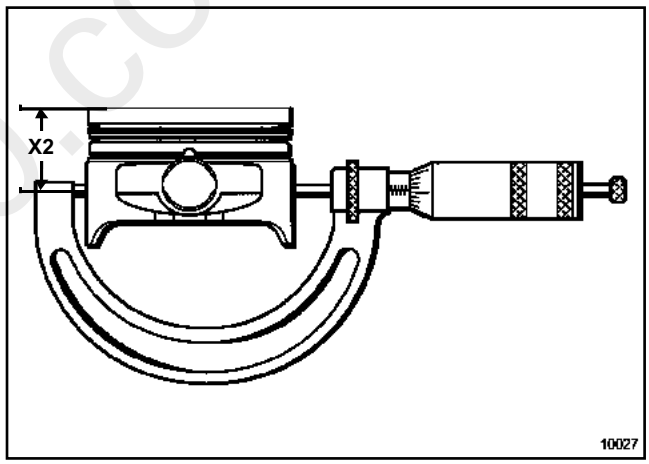
WARNING

- For engines **K9K 276-712-718-724-728-729-732-760-764-766** , the Parts Department will only supply three categories of piston **K, L, M** .

- If the engine is fitted with a category **J** piston, replace it with a category **K** piston.

- If the engine is fitted with a category **N** piston, replace it with a category **M** piston.

5 - Piston diameter



10027

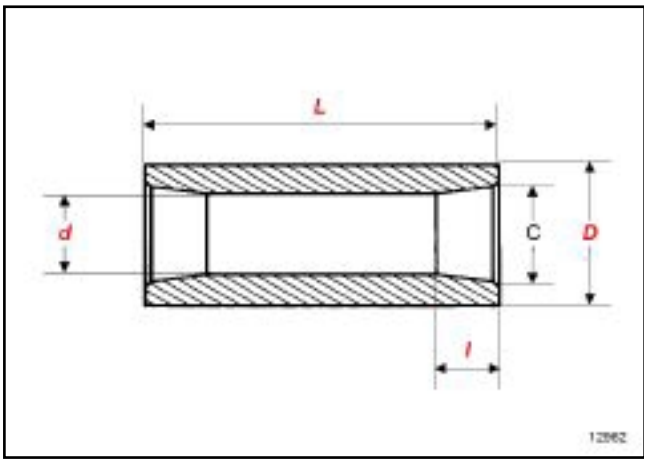
The piston diameter must be measured with (**X2**) = **56mm**

Engine type	Piston diameter in mm
K9K 260-270-272-274-700-702-704-706-710-714-716-722-750-752-762-768-790-792	**75.949 ± 0.007**
K9K 276-712-718-724-728-729-732-760-764-766	**75.945 ± 0.007**

6 - Gudgeon pin

Fitting the free floating pin in the con rod and in the piston.

The gudgeon pin is retained by circlips.

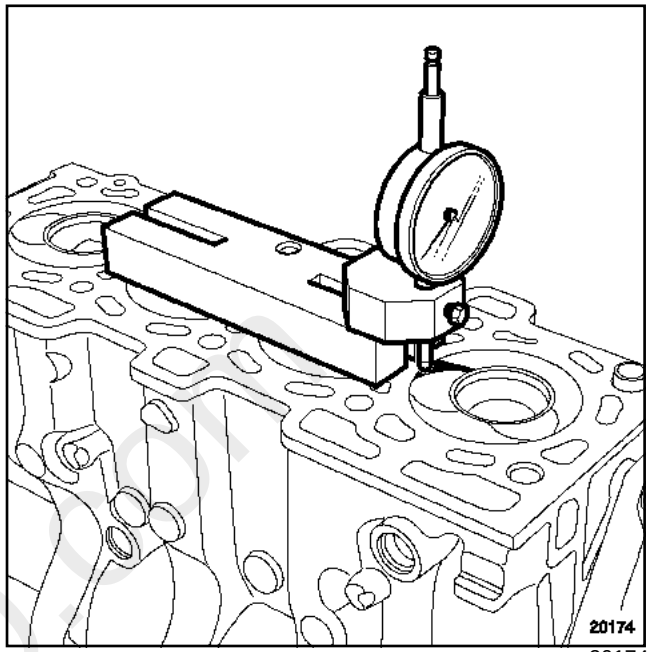


12962

	Gudgeon pin dimensions in mm	Engine type
Length (**L**)	**60 +0 / -0.3**	All K9K
External diameter (**D**)	**25 +0 / -0.005**	K9K 260-700-702-704-710-722 **up until 25/11/2002**
	26 +0 / -0.005	K9K 260-700-702-704-710-722 **from 25/11/2002** K9K 270-272-274-276-706-712-714-716-718-724-728-729-732-750-752-760-762-764-766-768-790-792
Internal diameter (**d**)	**13.75 +0.1 / -0.2**	K9K 260-700-702-704-710-722 **up until 25/11/2002**
	13.5 +0.1 / -0.2	K9K 260-700-702-704-710-722 **from 25/11/2002** K9K 270-272-274-276-706-712-714-716-718-724-728-729-732-750-752-760-762-764-766-768-790-792
Chamfer diameter (**C**)	**20 ± 0.25**	K9K 732-764
Chamfer length (**l**)	**6**	

7 - Piston protrusion

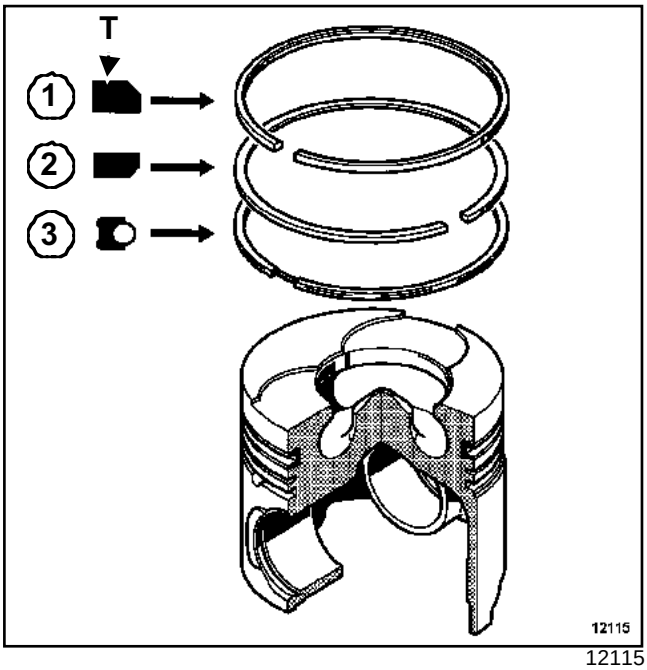
WARNING
The dial gauge rod must not be in a valve clearance.



20174

Engine type	Piston protrusion in mm
K9K 260-700-702-704-710-722 **up until 25/11/2002**	**0.192 ± 0.093**
K9K 260-700-702-704-710-722 **from 25/11/2002** K9K 270-272-706-750-752-790	**0.154 ± 0.130**
K9K 274-276-712-714-716-718-724-728-729-732-760-762-764-766-768-792	**0.159 ± 0.129**

II - PISTON RINGS



12115

Piston rings are supplied ready adjusted.

(**T**) = TOP

1 - Thickness of the piston rings

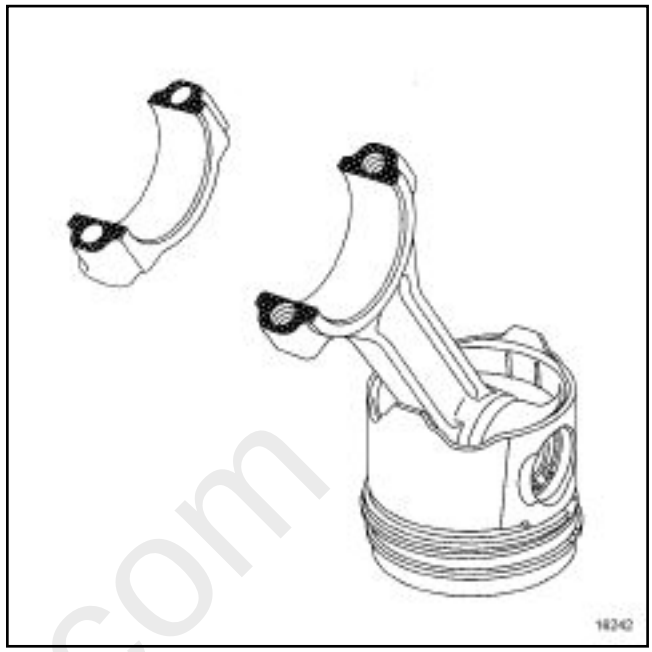
Piston rings	Thickness (in mm)
Compression ring ***(1)***	**2 -0.01 / -0.03**
Sealing ring ***(2)***	**2 -0.01 / -0.03**
Scraper ring ***(3)***	**2.5 -0.01 / -0.03**

2 - Piston ring clearance in groove

Piston rings	Piston ring clearance in mm
Compression	**0.2 to 0.35**
Sealing	**0.7 to 0.9**
Scraper	**0.25 to 0.5**

III - CON RODS

1 - Type of con rod

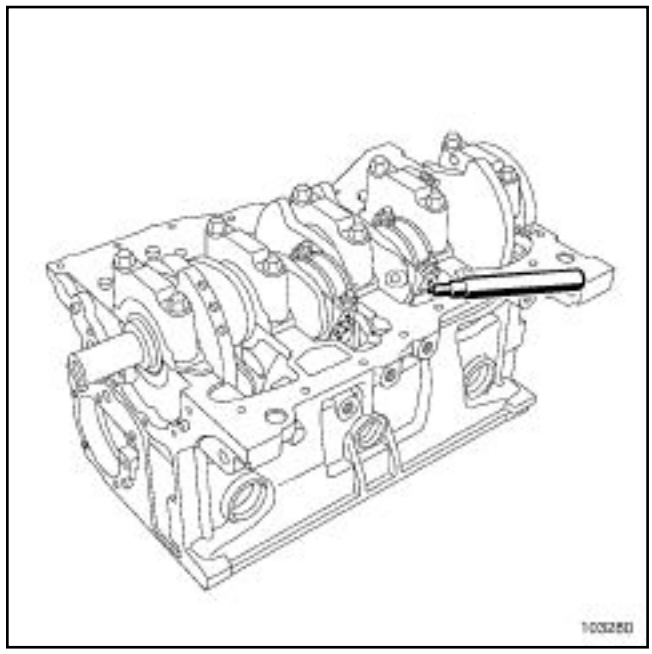


16242

The con rods are of the "SPLIT" type.

Note: The con rod small end bushes cannot be replaced.

2 - Guidelines for marking con rods



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WARNING

Do not use a punch or an etching tool to mark the con rod caps to match their bodies, to prevent incipient breakage of the con rod.

Use an indelible marker pen.

3 - Weigh difference for the con rod-piston-gudgeon pin assembly

The maximum weight difference for the con rod-piston-gudgeon pin assembly for the same engine must be **25 g** .

4 - Con rod dimensions

	Con rod dimensions in mm	**Engine type**
Distance between big end and little end centres	**133.75**	All K9K
Big end diameter	**47.619 ± 0.009**	All K9K
Small end diameter (with bush)	**25.019 ± 0.006**	K9K 260-700-702-704-710-722 **up until 25/11/2002**
	26.019 ± 0.006	K9K 260-700-702-704-710-722 **from 25/11/2002** K9K 270-272-274-276-706-712-714-716-718-724-728-729-732-750-752-760-762-764-766-768-790-792

5 - Big end longitudinal play

The longitudinal play must be between **0.205 and 0.467mm** .

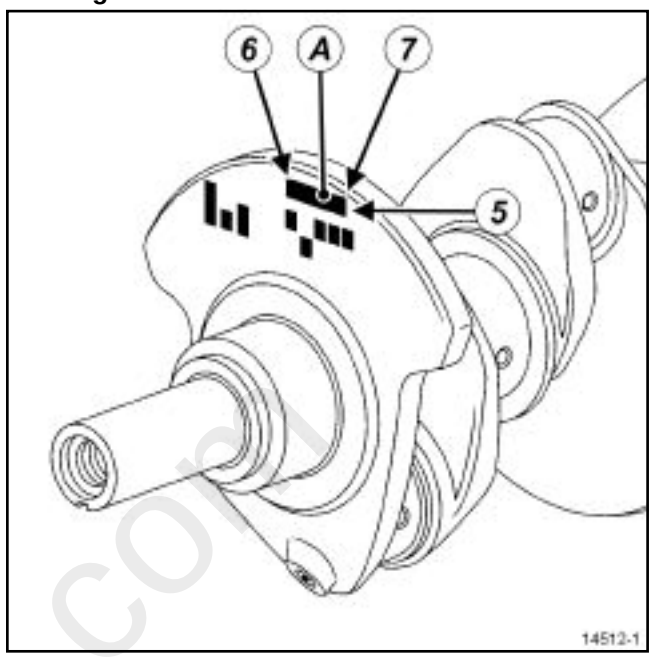
6 - Big end radial play

The radial play must be between **0.010 and 0.064mm** .

IV - CRANKSHAFT

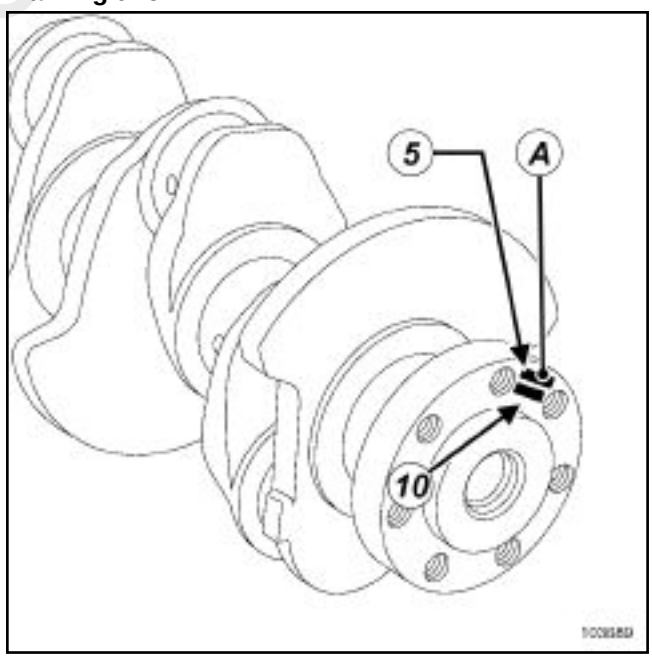
1 - Crankshaft markings

Marking one



14512-1

Marking two



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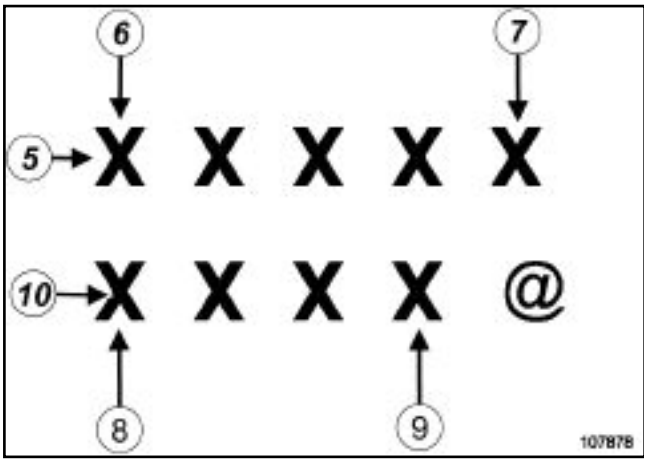
Marking "A" in detail



107878

(**5**) : line indicating the diameter category of the journals,

(**6**) : diameter category of journal no. 1, flywheel end,

(**7**) : diameter category of journal no. 5, timing end,

(**8**) : diameter category of crankpin no. 1, flywheel end,

(**9**) : diameter category of crankpin no. 4, timing end,

(**10**) : line indicating the diameter category of the crankpins.

2 - Categories of journal diameters

Table of journal diameter categories

Journal category mark on the crankshaft	Journal diameter categories (mm)
A, G, K, R,W	**D1 = 47.990 to 47.997 exclusive**
B, H, L, S,Y	**D2 = 47.997 inclusive to 48.003 exclusive**
C, J, O, T, Z	**D3 = 48.003 inclusive to 48.010**

3 - Crankshaft dimensions

Diameter of the journals	**48 ± 0.01mm**
Crankpin diameter	**43.97 ± 0.01**
Maximum run-out allowed on the flywheel bearing face of the flywheel	**0.6mm**

4 - Crankshaft lateral play:

The lateral play of the crankshaft must be between:

- Without crankshaft lateral shim wear **0.045 and 0.252mm** ,
- With crankshaft lateral shim wear **0.045 and 0.852mm** .

5 - Journal radial play

The radial play of the journals must be between **0.010 and 0.054mm** .

6 - Number of journals

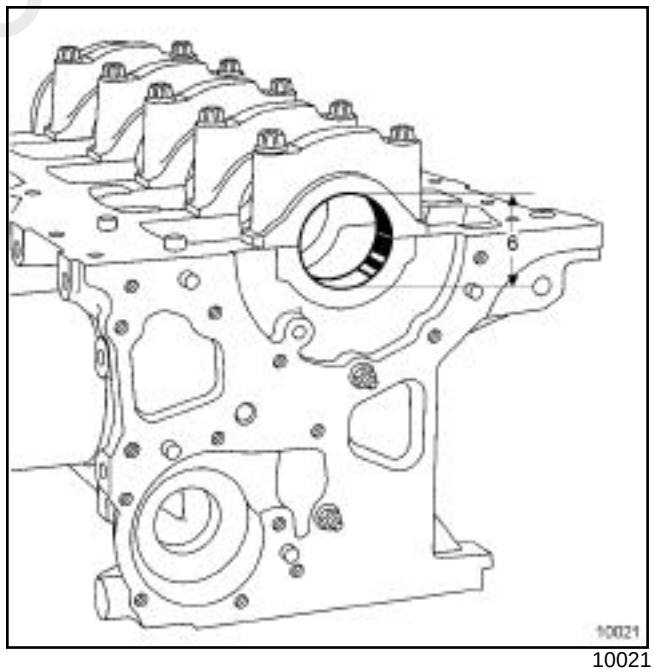
There are **5** journals.

V - CYLINDER BLOCK

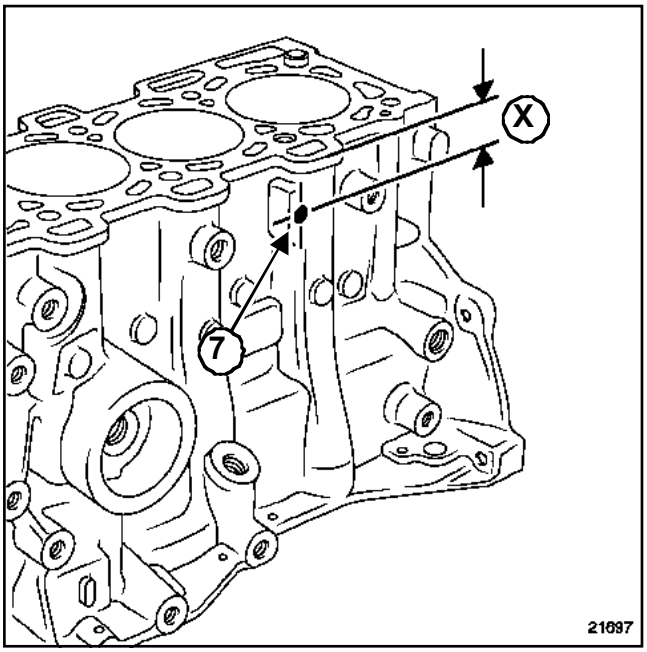
1 - Diameter of the shafts

This engine only has one category of shaft diameter **76.009 ± 0.015mm**

2 - Identifying the bearing journal diameters on the cylinder block



10021



21697

The cylinder block bearing diameters (**6**) are marked with a drill hole on it (**7**) located above the oil filter.

For every engine there can only be one category of crankshaft bearing diameter.

3 - Table of bearing diameter classes

Positions of hole (7)	Category marking	Cylinder block bearing diameter (mm)
X = 33mm	1 or Blue	**51.936 to 51.942 exclusive**
X = 43mm	2 or Red	**51.942 inclusive to 51.949**

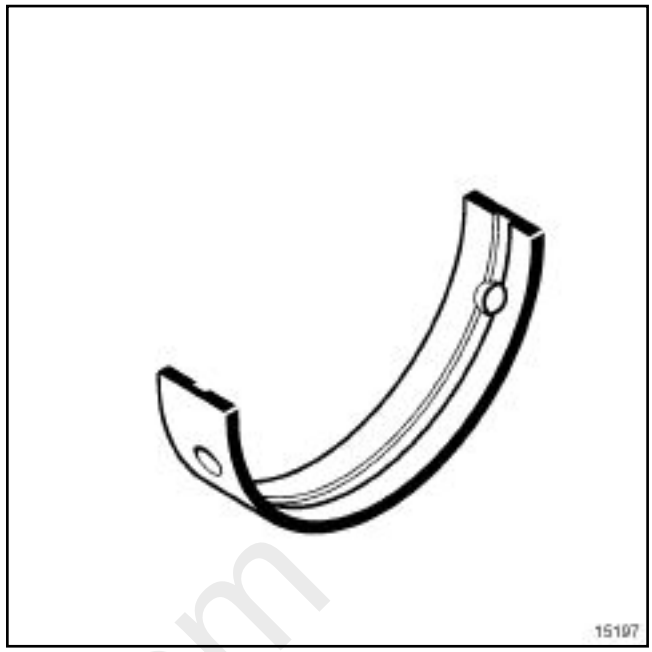
4 - Cylinder block gasket face bow

The maximum cylinder block gasket face bow is **0.03mm** .

VI - BEARING SHELLS

1 - Crankshaft bearing shells

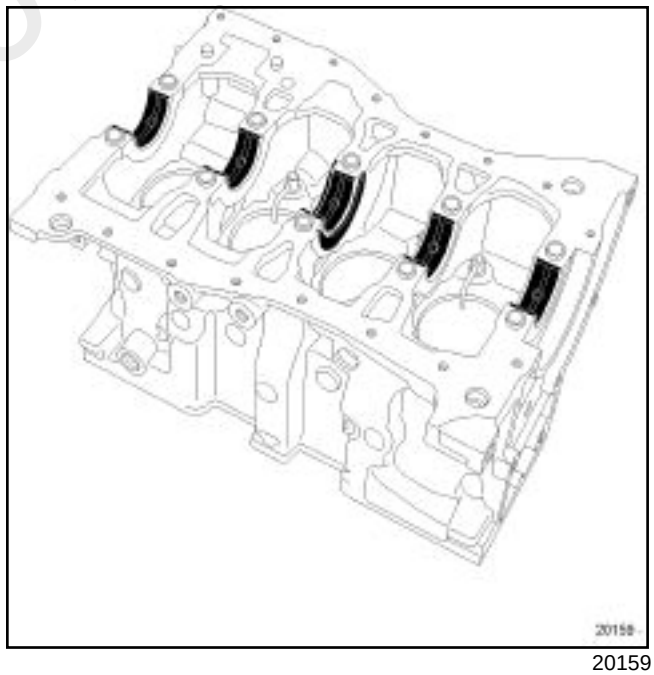
The engine is fitted with bearing shells without fool-proofing.



15197

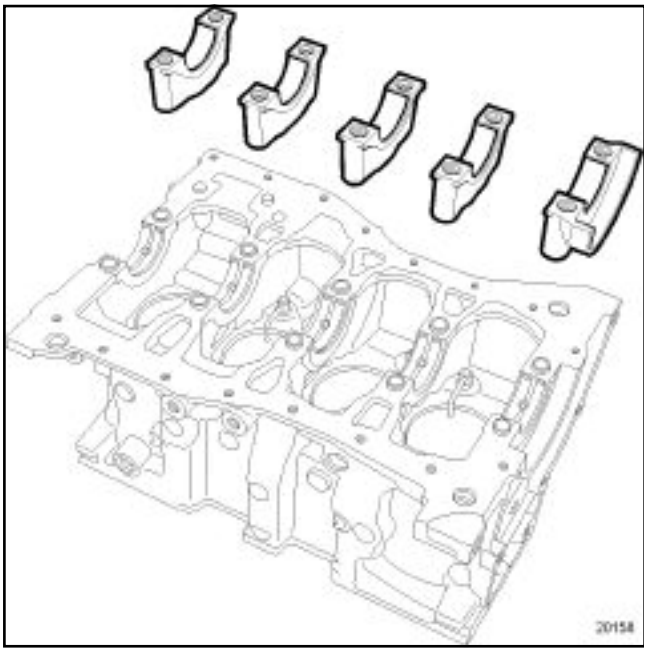
The crankshaft bearing shells are fitted on the cylinder block and the bearings using the **Mot. 1493-01** .

a - Direction of fitting the journal shells



20159

Fit the **grooved** bearing shells on all the bearings on the cylinder block



20158

Fit the **non-grooved** bearing shells on the bearing caps.

b - Matching the journal shells to the cylinder block

Cylinder block bearing diameter categories	Crankshaft journal diameter category		
	D1	**D2**	**D3**
1	C1 1.949 to 1.955 Yellow	C2 1.946 to 1.952 Blue	C3 1.943 to 1.949 Black
2	C4 1.953 to 1.959 Red	C1 1.949 to 1.955 Yellow	C2 1.946 to 1.952 Blue
	Bearing shell thickness and category		