

Engine System - General Information - Crankshaft Main Bearing Journal Clearance

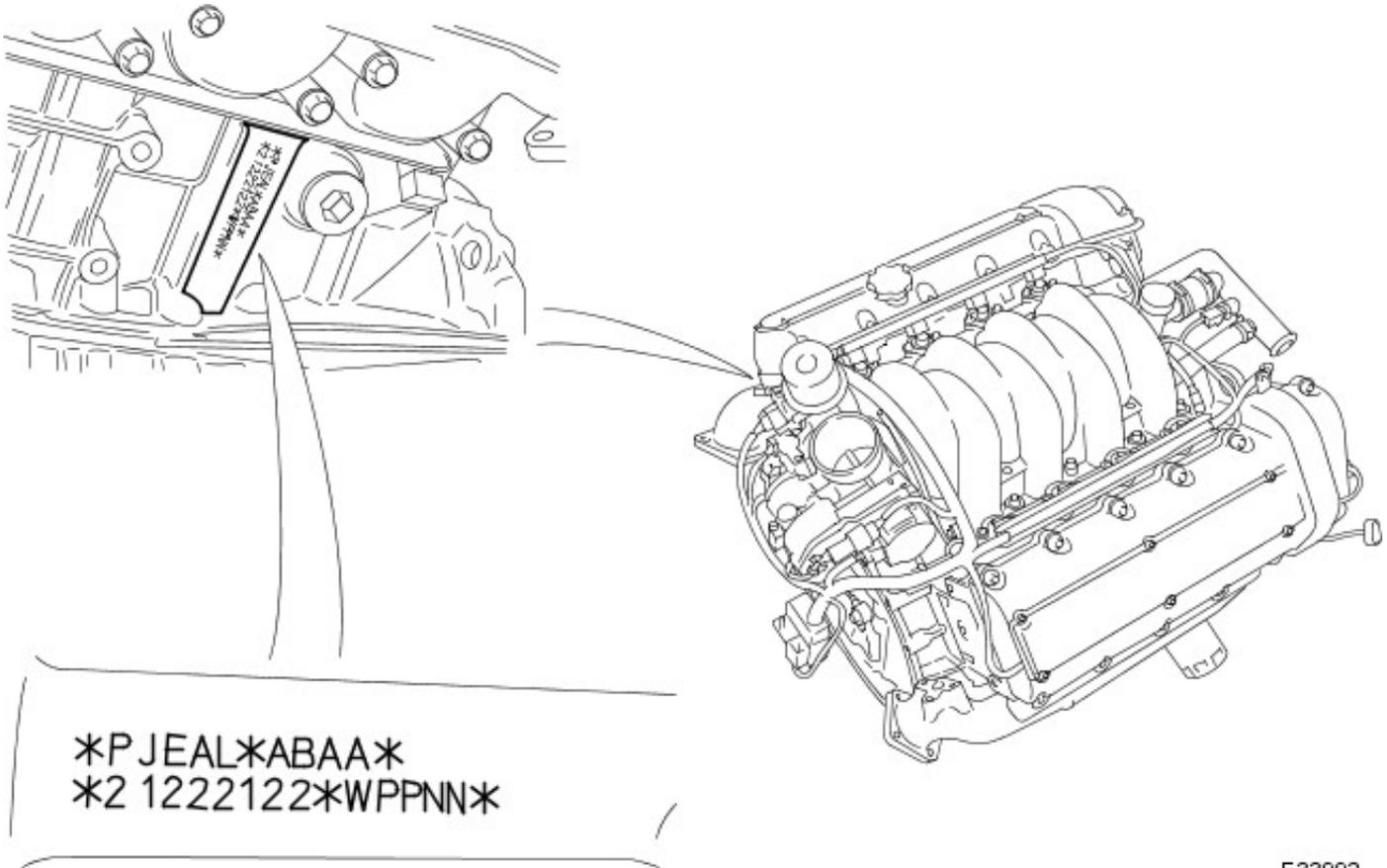
General Procedures

CAUTION: THESE PROCEDURES SHOULD NOT BE CARRIED OUT DURING THE MANUFACTURERS WARRANTY PERIOD.

1.  **NOTE: Example - *PJEAL* - Crankshaft Main Journal Diameter.**

Read the grade letters from LEFT to RIGHT = FRONT to REAR of engine eg. for this example engine, the crank journal at the front of the engine is grade P, and at the rear is grade L.

- The selection of main bearing shells is described in the following chart.



E33992

2. NOTES:

 **Example - *ABAA* - Crankshaft (Big End Bearing) Crankpin Diameter**

 **For vehicles built up to 2002 MY.**

 **If the crankshaft main bearing carrier retaining bolts have been marked with a center punch dot, they must be discarded and new bolts installed.**

Read the grade letters from LEFT to RIGHT = FRONT to REAR of engine eg. for this example engine, the crankpin at the front of the engine is grade A and at the rear is also grade A.

- Grade A = 56,000 to 55,994 mm (Bearing Shell Color Code - Blue).

- Grade B = 55,994 to 55,988 mm (Bearing Shell Color Code - Green).
- Grade C = 55,988 to 55,982 mm (Bearing Shell Color Code - Yellow).

3. NOTES:



Example - *ABAA* - Crankshaft (Big End Bearing) Crankpin Diameter



For vehicles built from 2002 MY.



If the crankshaft main bearing carrier retaining bolts have been marked with a center punch dot, they must be discarded and new bolts installed.

Read the grade letters from LEFT to RIGHT = FRONT to REAR of engine eg. for this example engine, the crankpin at the front of the engine is grade A and at the rear is also grade A.

- Grade A = 53,000 to 52,994 mm (Bearing Shell Color Code - Blue).
- Grade B = 52,994 to 52,988 mm (Bearing Shell Color Code - Green).
- Grade C = 52,988 to 52,982 mm (Bearing Shell Color Code - Yellow).



4. NOTE: Example - *21222122* - Cylinder Bore and Piston

The cylinder bore grades read from LEFT to RIGHT as follows:

- Bank 2 - Cylinder 1, Bank 2 - Cylinder 2, Bank 2 - Cylinder 3, Bank 2 - Cylinder 4, Bank 1 - Cylinder 4,
- Bank 1 - Cylinder 3, Bank 1 - Cylinder 2, Bank 1 - Cylinder 1.
- **(Note, in earlier publications Bank 1 was described as A-Bank and Bank 2 as B-Bank)**
- Grade 1 Bore = 85,990 to 86,000 mm.
- Grade 2 Bore = 86,000 to 86,010 mm.
- Grade 3 Bore = 86,010 to 86,020 mm.



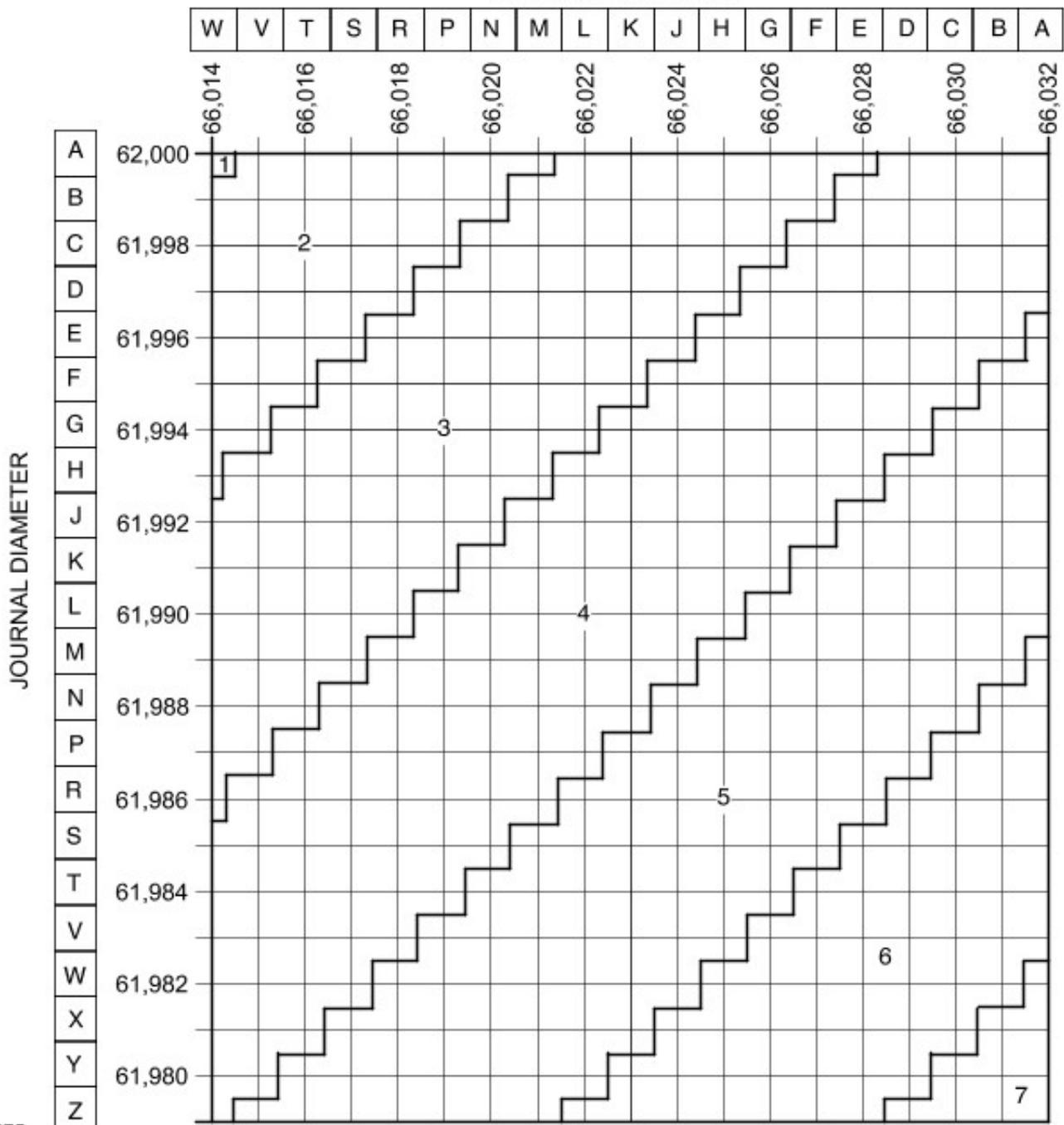
5. NOTE: Example - *WPPNN* - Crankshaft Main Bearing Bore in Cylinder Block

Read the grade letters from LEFT to RIGHT = FRONT to REAR of engine eg. for this example engine, the crank journal bore at the front of the engine is grade W, and at the rear is grade N.

- The selection of main bearing shells is described in the following **JOURNAL DIAMETER AND MAIN BEARING BORE CHART.**

6. JOURNAL DIAMETER AND MAIN BEARING BORE CHART

MAIN BEARING BORE



E94075

7. NOTES:



THIS PROCEDURE SHOULD ONLY BE CARRIED OUT WHEN REPLACING MAIN BEARING SHELLS.



Refer to the **JOURNAL DIAMETER AND MAIN BEARING BORE CHART** in step 6 for tolerance and bearing information.

The number in each diagonal band represents a PAIR of color coded main bearing shells which must be used with a specific journal, depending on the combination of journal diameter and crankshaft bore diameter. The color codes for each band are as follows:

1. **Blue / Green and Blue / Green**
2. **Blue / Green and Blue**
3. **Blue and Blue**
4. **Blue and Green**
5. **Green and Green**
6. **Green and Yellow**
7. **Yellow and Yellow**

- Consider crankshaft journal 5 (from the example grade)

markings on the cylinder block) - the cylinder block bore is Grade N and the crankshaft journal diameter is Grade L. From the chart, it will be seen that the point of intersection is in Band 4 which equates to one Blue shell and one Green shell.

- When the appropriate pair of color codes have been selected for a journal, either color may be installed to the cylinder block or to the bedplate, but, the shell which is to be installed to the cylinder block must have an oil groove and the shell which is to be installed to the bedplate must be plain.

8. NOTES:



THIS PROCEDURE SHOULD ONLY BE CARRIED OUT WHEN A REPLACEMENT CRANKSHAFT OR CYLINDER BLOCK HAS BEEN FITTED.



Refer to the **JOURNAL DIAMETER AND MAIN BEARING BORE CHART** in step 6 for tolerance and bearing information.

The thickness grade of all main bearing shells are to be selected to give a total running clearance of not less than 0.022 mm or greater than 0.040 mm.

- Each bearing bore in the block/bedplate assembly should be measured at two mutually perpendicular diameters 45° to the vertical in the middle of the bearing.
- The minimum diameter of the two is to be used.
- Each crankshaft main bearing journal should be measured dynamically at a point in line with the middle of each bearing.
- When the appropriate pair of color codes have been selected for a journal, either color may be installed to the cylinder block or to the bedplate, but, the shell which is to be installed to the cylinder block must have an oil groove and the shell which is to be installed to the bedplate must be plain.