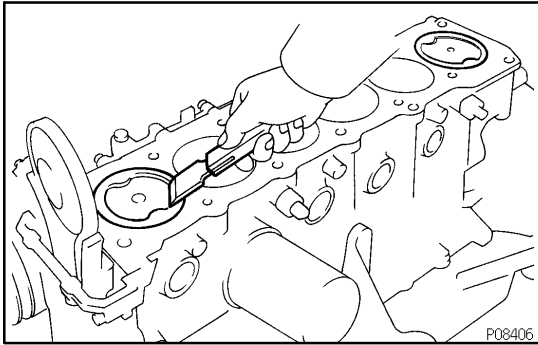
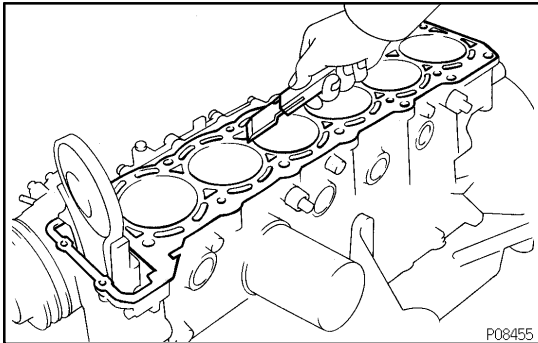




INSPECTION

1. CLEAN TOP SURFACES OF PISTONS AND CYLINDER BLOCK

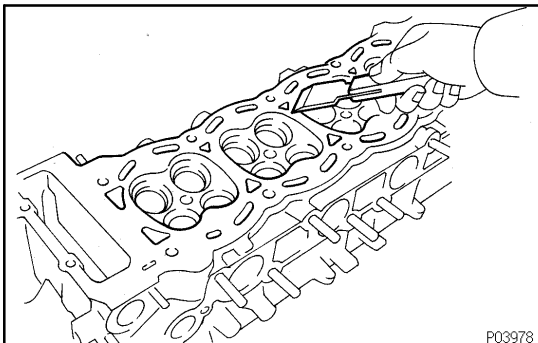
- (a) Turn the crankshaft, and bring each piston to top dead center (TDC). Using a gasket scraper, remove all the carbon from the piston top surface.



- (b) Using a gasket scraper, remove all the gasket material from the cylinder block surface.
- (c) Using compressed air, blow carbon and oil from the bolt holes.

CAUTION:

Protect your eyes when using high-compressed air.

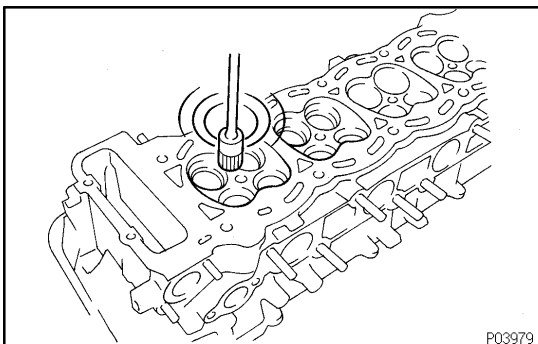


2. REMOVE GASKET MATERIAL

Using a gasket scraper, remove all the gasket material from the cylinder block contact surface.

NOTICE:

Be careful not to scratch the cylinder block contact surface.

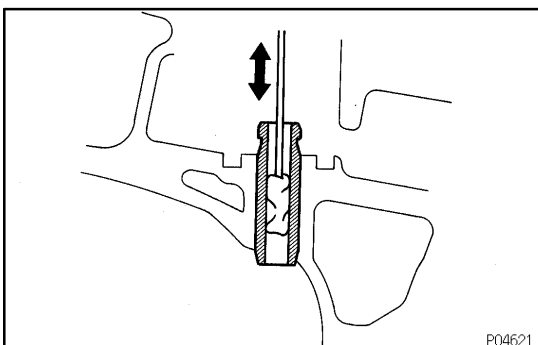


3. CLEAN COMBUSTION CHAMBERS

Using a wire brush, remove all the carbon from the combustion chambers.

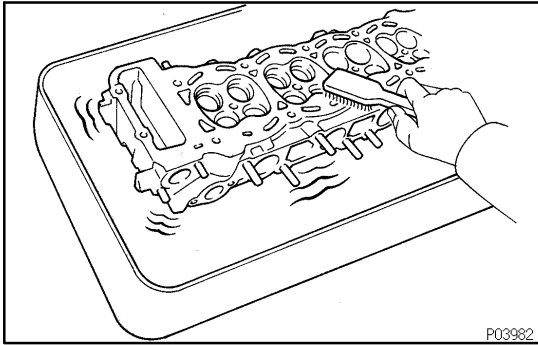
NOTICE:

Be careful not to scratch the cylinder block contact surface.



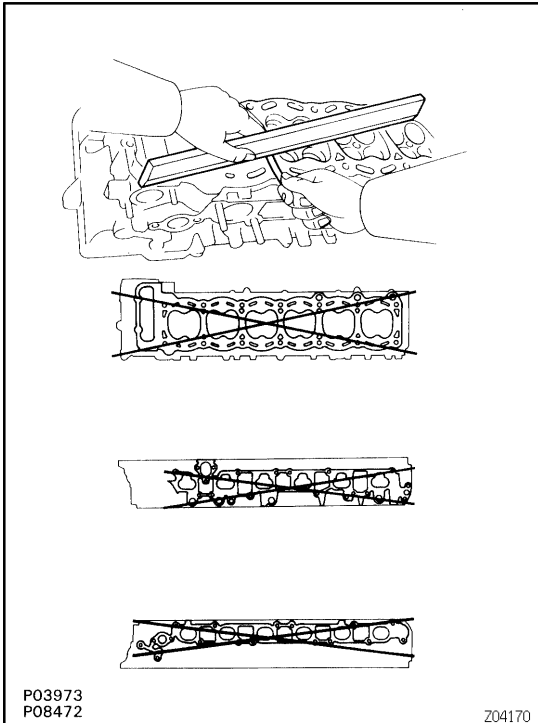
4. CLEAN VALVE GUIDE BUSHINGS

Using a valve guide bushing brush and solvent, clean all the guide bushings.



5. CLEAN CYLINDER HEAD

Using a soft brush and solvent, thoroughly clean the cylinder head.



6. INSPECT FOR FLATNESS

Using a precision straight edge and thickness gauge, measure the surfaces contacting the cylinder block and the manifolds for warpage.

Maximum warpage:

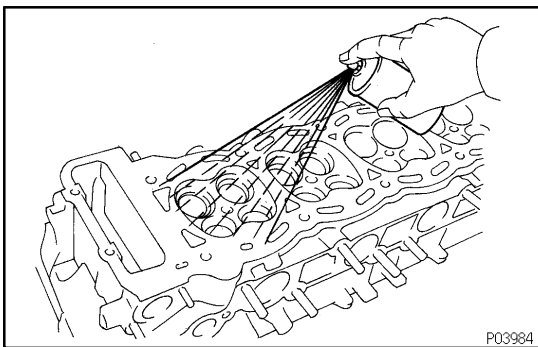
Cylinder block side

0.15 mm (0.0059 in.)

Manifold side

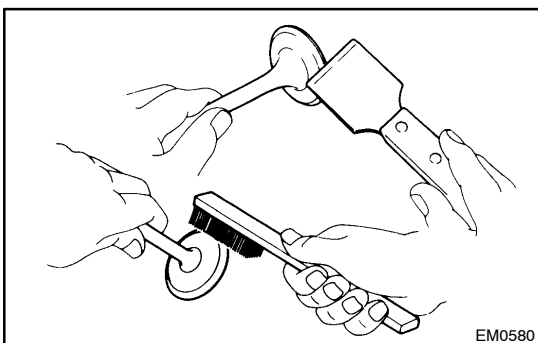
0.10 mm (0.0039 in.)

If warpage is greater than maximum, replace the cylinder head.



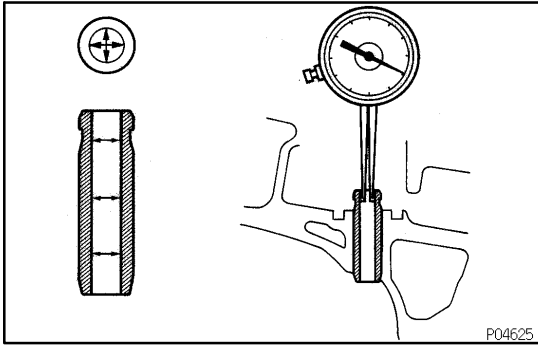
7. INSPECT FOR CRACKS

Using a dye penetrant, check the combustion chambers, intake ports, exhaust ports and cylinder block surface for cracks. If cracked, replace the cylinder head.



8. CLEAN VALVES

- (a) Using a gasket scraper, chip off any carbon from the valve head.
- (b) Using a wire brush, thoroughly clean the valve.

**9. INSPECT VALVE STEMS AND GUIDE BUSHINGS**

- (a) Using a caliper gauge, measure the inside diameter of the guide bushing.

Bushing inside diameter:

7.010 – 7.030 mm (0.2760 – 0.2768 in.)

- (b) Using a micrometer, measure the diameter of the valve stem.

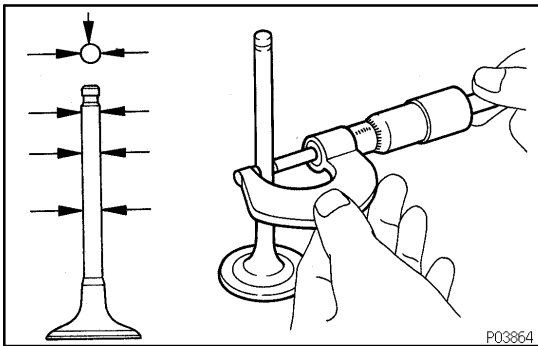
Valve stem diameter:

Intake

6.970 – 6.985 mm (0.2744 – 0.2750 in.)

Exhaust

6.965 – 6.980 mm (0.2742 – 0.2748 in.)



- (c) Subtract the valve stem diameter measurement from the guide bushing inside diameter measurement.

Standard oil clearance:

Intake

0.025 – 0.060 mm (0.0010 – 0.0024 in.)

Exhaust

0.030 – 0.065 mm (0.0012 – 0.0026 in.)

Maximum oil clearance:

Intake

0.08 mm (0.0031 in.)

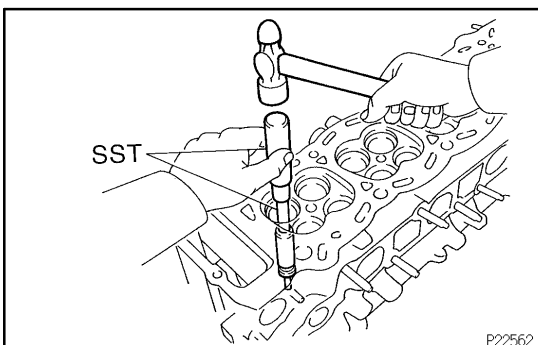
Exhaust

0.10 mm (0.0039 in.)

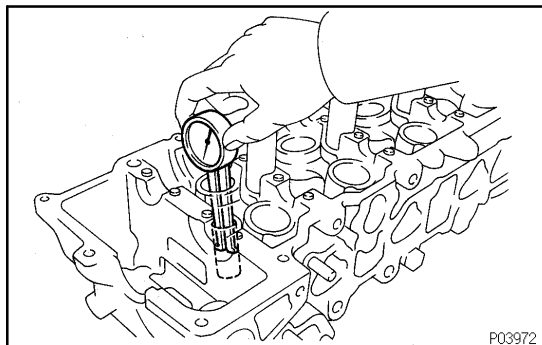
If the clearance is greater than maximum, replace the valve and guide bushing.

10. IF NECESSARY, REPLACE VALVE GUIDE BUSHINGS

- (a) Gradually heat the cylinder head to 80 – 100°C (176 – 212°F).



- (b) Using SST and a hammer, tap out the guide bushing.
SST 09201-10000 (09201-01070), 09950-70010 (09951-07100)

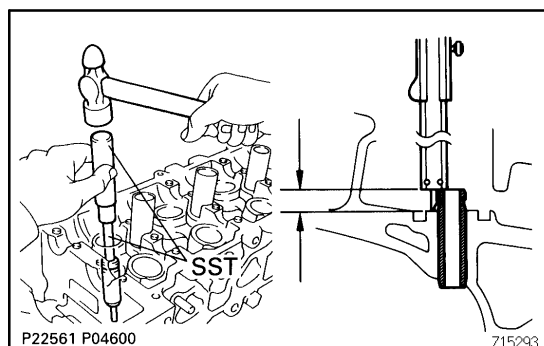


- (c) Using a caliper gauge, measure the bushing bore diameter of the cylinder head.

Both intake and exhaust

Bushing bore diameter mm (in.)	Bushing size
11.492 – 11.513 (0.4524 – 0.4533)	Use STD
11.542 – 11.563 (0.4544 – 0.4552)	Use O/S 0.05

V00741



- (d) Select a new guide bushing (STD size or O/S 0.05). If the bushing bore diameter of the cylinder head is greater than 11.513 mm (0.4533 in.), machine the bushing bore to the following dimension:

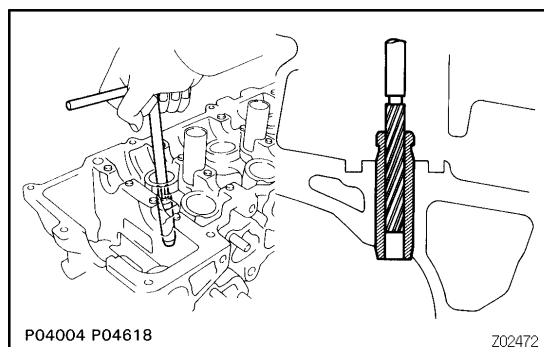
11.542 – 11.563 mm (0.4544 – 0.4552 in.)

- If the bushing bore diameter of the cylinder head is greater than 11.563 mm (0.4552 in.), replace the cylinder head.

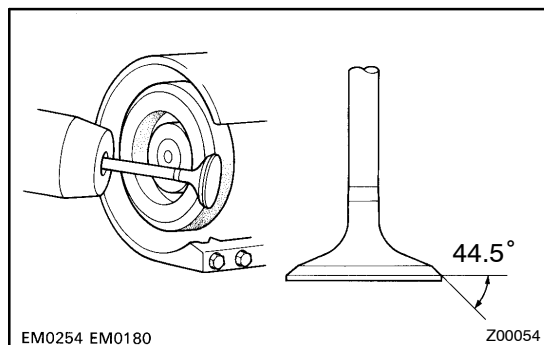
- (e) Gradually heat the cylinder head to 80 – 100°C (176 – 212°F).

- (f) Using SST and a hammer, tap in a new guide bushing until it protrudes 8.2 – 8.6 mm (0.323 – 0.339 in.) from the cylinder head.

SST 09201-10000 (09201-01070), 09950-70010 (09951-07100)



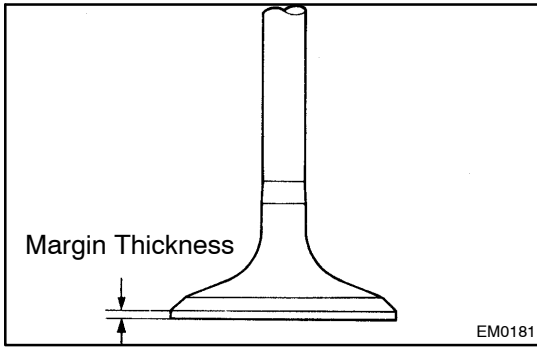
- (g) Using a sharp 7 mm reamer, ream the guide bushing to obtain the standard specified clearance (See step 9 above) between the guide bushing and valve stem.



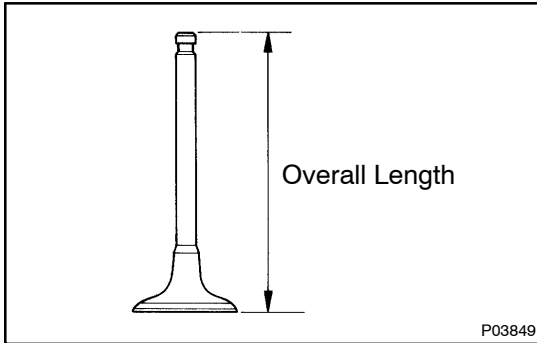
11. INSPECT AND GRIND VALVES

- (a) Grind the valve enough to remove pits and carbon.
(b) Check that the valve is ground to the correct valve face angle.

Valve face angle: 44.5°

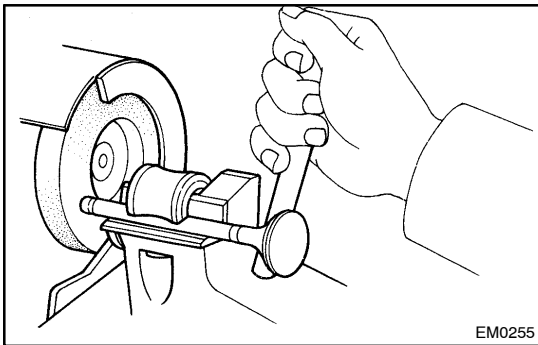


- (c) Check the valve head margin thickness.
Standard margin thickness: 1.2 mm (0.047 in.)
Minimum margin thickness: 1.0 mm (0.039 in.)
 If the margin thickness is less than minimum, replace the valve.



- (d) Check the valve overall length.
Standard overall length:
Intake
98.4 mm (3.874 in.)
Exhaust
97.9 mm (3.854 in.)
Minimum overall length:
Intake
97.9 mm (3.854 in.)
Exhaust
97.4 mm (3.835 in.)

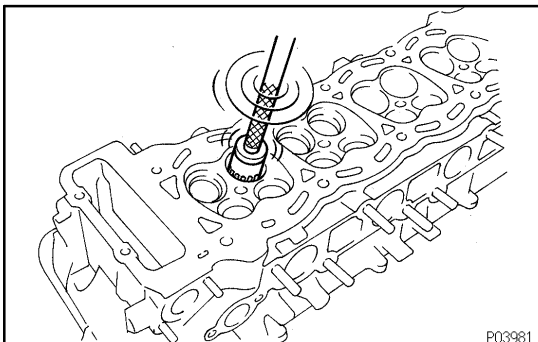
If the overall length is less than minimum, replace the valve.



- (e) Check the surface of the valve stem tip for wear.
 If the valve stem tip is worn, resurface the tip with a grinder or replace the valve.

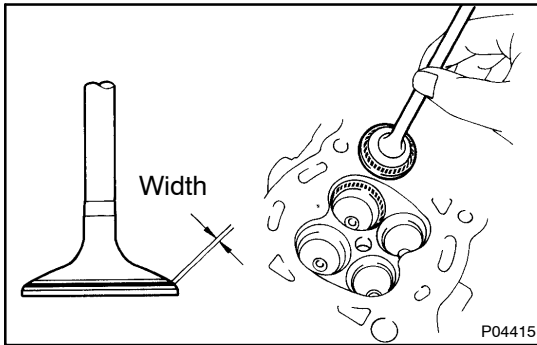
NOTICE:

Do not grind off more than minimum.



12. INSPECT AND CLEAN VALVE SEATS

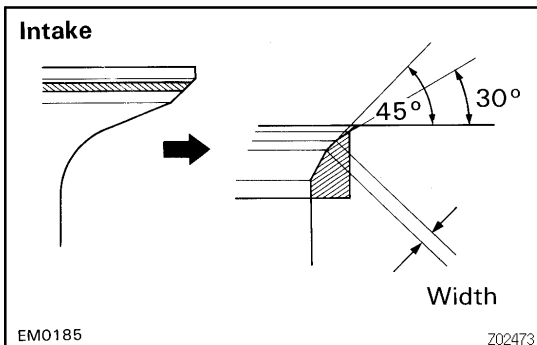
- (a) Using a 45° carbide cutter, resurface the valve seats. Remove only enough metal to clean the seats.



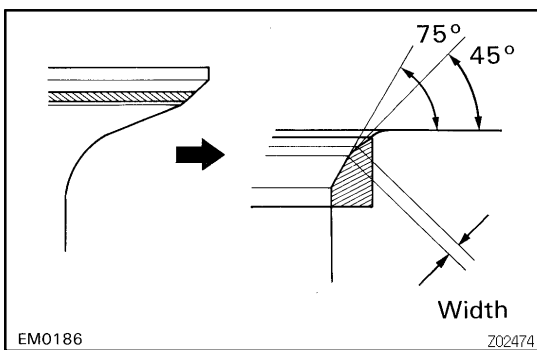
- (b) Check the valve seating position.
Apply a light coat of prussian blue (or white lead) to the valve face. Lightly press the valve against the seat. Do not rotate valve.
- (c) Check the valve face and seat for the following:
- If blue appears 360° around the face, the valve is concentric. If not, replace the valve.
 - If blue appears 360° around the valve seat, the guide and face are concentric. If not, resurface the seat.
 - Check that the seat contact is in the middle of the valve face with the following width:

Intake**1.2 – 1.6 mm (0.047 – 0.063 in.)****Exhaust****1.0 – 1.4 mm (0.039 – 0.055 in.)**

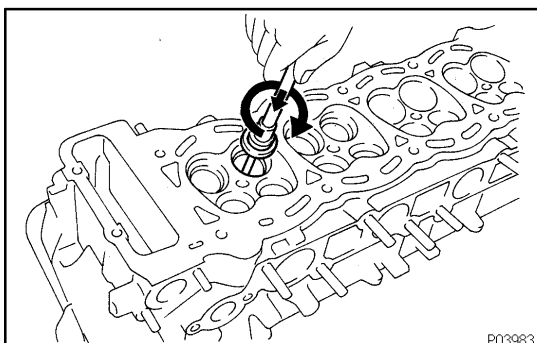
If not, correct the valve seats as follows:



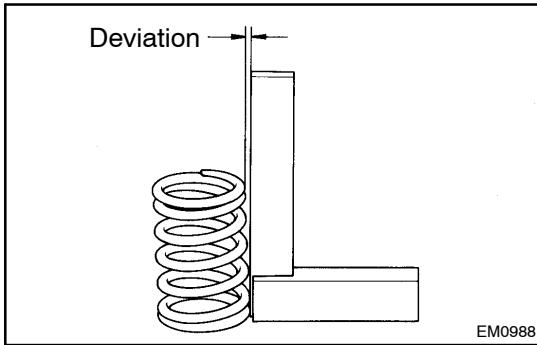
- (1) Intake:
If the seating is too high on the valve face, use 30° and 45° cutters to correct the seat.



- (2) If the seating is too low on the valve face, use 75° and 45° cutters to correct the seat.



- (d) Hand-lap the valve and valve seat with an abrasive compound.
- (e) After hand-lapping, clean the valve and valve seat.

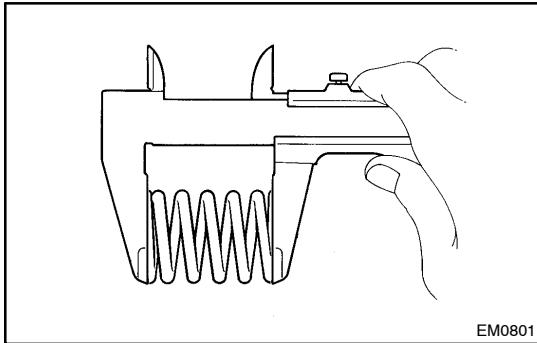


13. INSPECT VALVE SPRINGS

- (a) Using a steel square, measure the deviation of the valve spring.

Maximum deviation: 2.0 mm (0.079 in.)

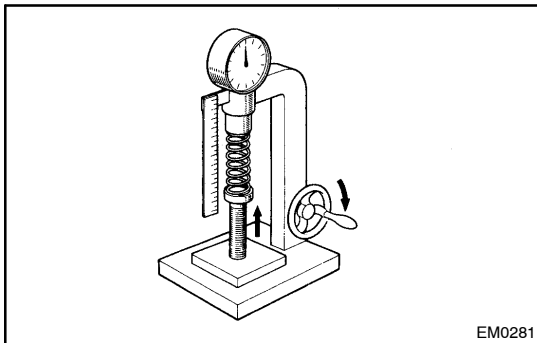
If the deviation is greater than maximum, replace the valve spring.



- (b) Using vernier calipers, measure the free length of the valve spring.

Free length: 43.94 – 45.06 mm (1.7299 – 1.7740 in.)

If the free length is not as specified, replace the valve spring.



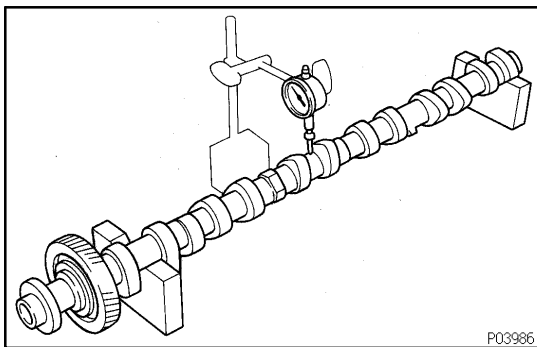
- (c) Using a spring tester, measure the tension of the valve spring at the specified installed length.

Installed tension:

214 – 238 N (21.8 – 24.2 kgf, 48.1 – 53.4 lbf)

at 36.5 mm (1.437 in.)

If the installed tension is not as specified, replace the valve spring.

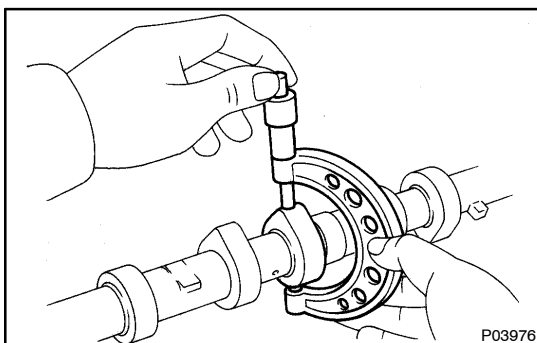


14. INSPECT CAMSHAFT FOR RUNOUT

- (a) Place the camshaft on V-blocks.
(b) Using a dial indicator, measure the circle runout at the center journal.

Maximum circle runout: 0.06 mm (0.0024 in.)

If the circle runout is greater than maximum, replace the camshaft.



15. INSPECT CAM LOBES

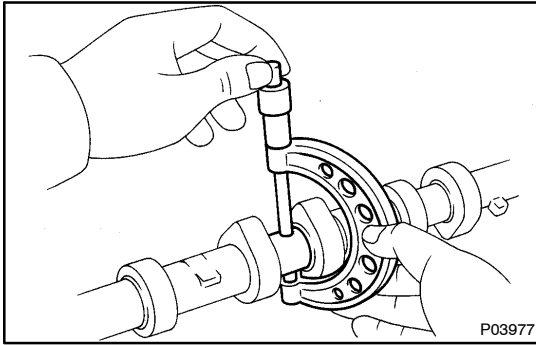
Using a micrometer, measure the cam lobe height.

Standard cam lobe height:

50.61 – 50.71 mm (1.9925 – 1.9965 in.)

Minimum cam lobe height: 50.51 mm (1.9886 in.)

If the cam lobe height is less than minimum, replace the camshaft.



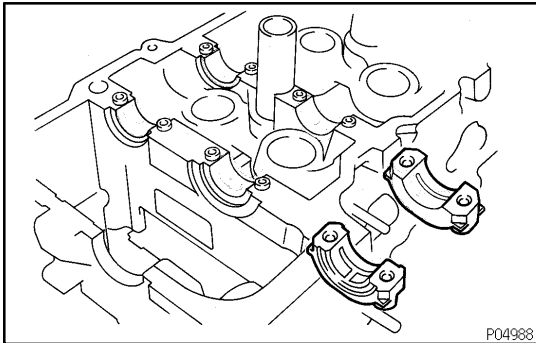
16. INSPECT CAMSHAFT JOURNALS

Using a micrometer, measure the journal diameter.

Journal diameter:

26.959 – 26.975 mm (1.0614 – 1.0620 in.)

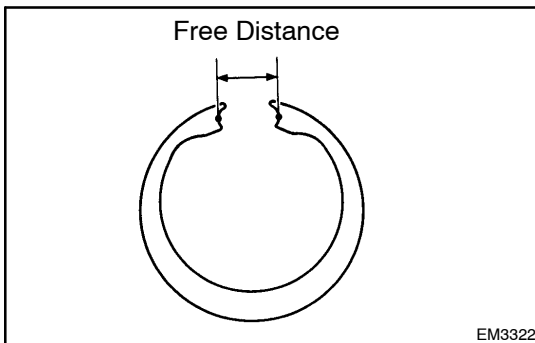
If the journal diameter is not as specified, check the oil clearance.



17. INSPECT CAMSHAFT BEARINGS

Check that bearings for flaking and scoring.

If the bearings are damaged, replace the bearing caps and cylinder head as a set.

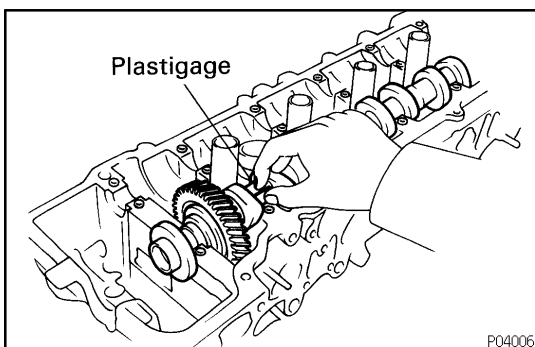


18. INSPECT CAMSHAFT GEAR SPRING

Using vernier calipers, measure the free distance between the spring ends.

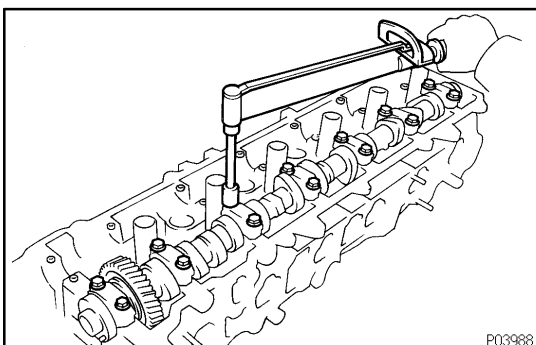
Free distance: 18.2 – 18.8 mm (0.717 – 0.740 in.)

If the free distance is not as specified, replace the gear spring.



19. INSPECT CAMSHAFT JOURNAL OIL CLEARANCE

- Clean the bearing caps and camshaft journals.
- Place the camshafts on the cylinder head.
- Lay a strip of Plastigage across each of the camshaft journals.



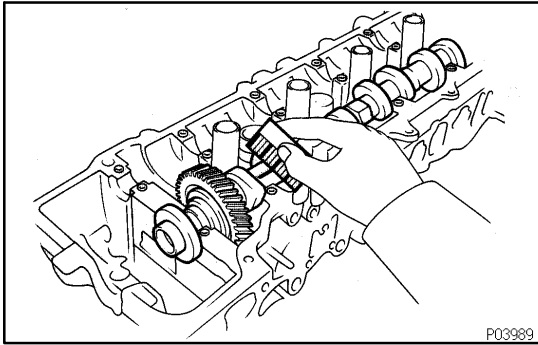
- Install the bearing caps (See installation).

Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)

NOTICE:

Do not turn the camshaft.

- Remove the bearing caps.



- (f) Measure the Plastigage at its widest point.

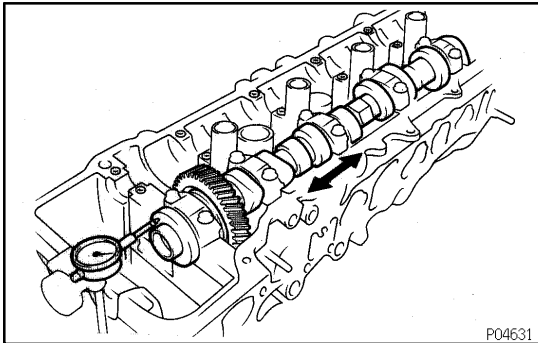
Standard oil clearance:

0.025 – 0.062 mm (0.0010 – 0.0024 in.)

Maximum oil clearance: 0.10 mm (0.0039 in.)

If the oil clearance is greater than maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head as a set.

- (g) Completely remove the Plastigage.



20. INSPECT CAMSHAFT THRUST CLEARANCE

- (a) Install the camshaft (See installation).

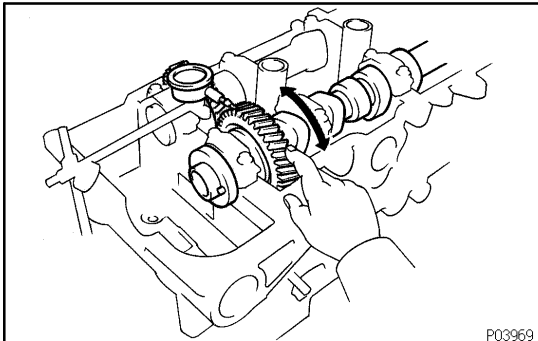
- (b) Using a dial indicator, measure the thrust clearance while moving the camshaft back and forth.

Standard thrust clearance:

0.030 – 0.080 mm (0.0012 – 0.0031 in.)

Maximum thrust clearance: 0.10 mm (0.0039 in.)

If the thrust clearance is greater than maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head as a set.



21. INSPECT CAMSHAFT GEAR BACKLASH

- (a) Install the camshafts without installing the exhaust cam sub-gear (See installation).

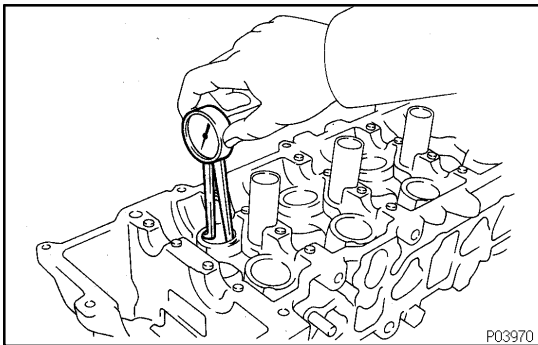
- (b) Using a dial indicator, measure the backlash.

Standard backlash:

0.020 – 0.200 mm (0.0008 – 0.0079 in.)

Maximum backlash: 0.30 mm (0.0188 in.)

If the backlash is greater than maximum, replace the camshafts.

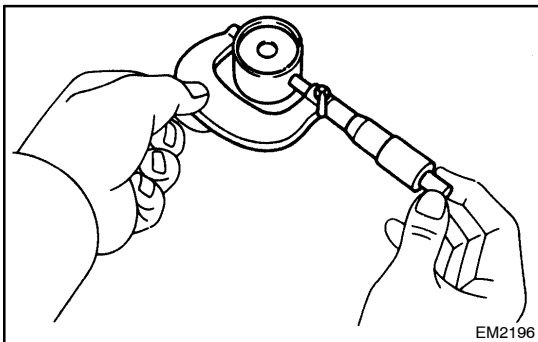


22. INSPECT VALVE LIFTERS AND LIFTER BORES

- (a) Using a caliper gauge, measure the lifter bore diameter of the cylinder head.

Lifter bore diameter:

34.000 – 34.021 mm (1.3386 – 1.3394 in.)



- (b) Using a micrometer, measure the lifter diameter.

Lifter diameter:

33.966 – 33.976 mm (1.3372 – 1.3376 in.)

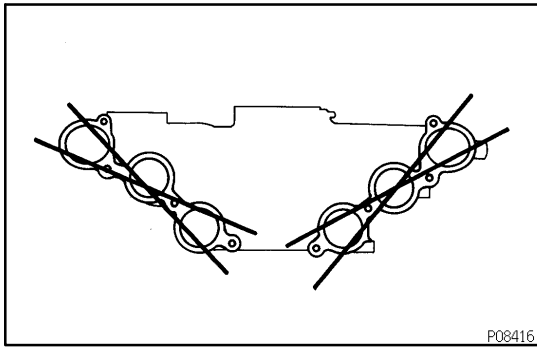
- (c) Subtract the lifter diameter measurement from the lifter bore diameter measurement.

Standard oil clearance:

0.024 – 0.055 mm (0.0009 – 0.0022 in.)

Maximum oil clearance: 0.07 mm (0.0028 in.)

If the oil clearance is greater than maximum, replace the lifter. If necessary, replace the cylinder head.

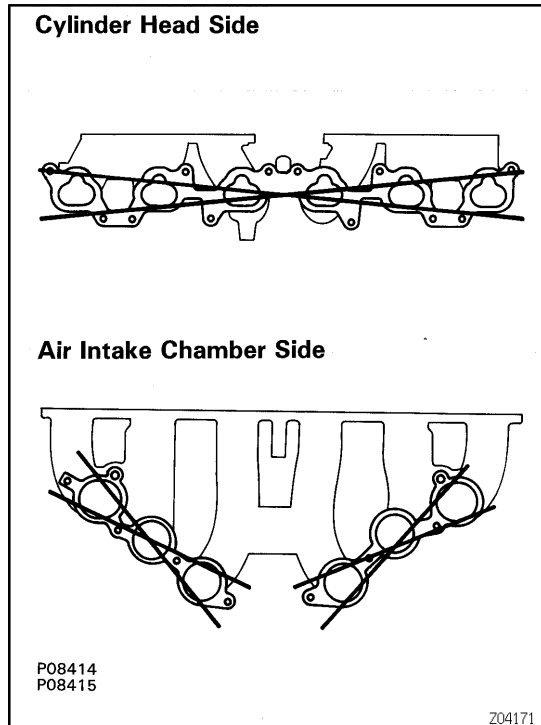
**23. INSPECT AIR INTAKE CHAMBER**

Using a precision straight edge and thickness gauge, measure the surface contacting the intake manifold for warpage.

Maximum warpage:

0.30 mm (0.0118 in.)

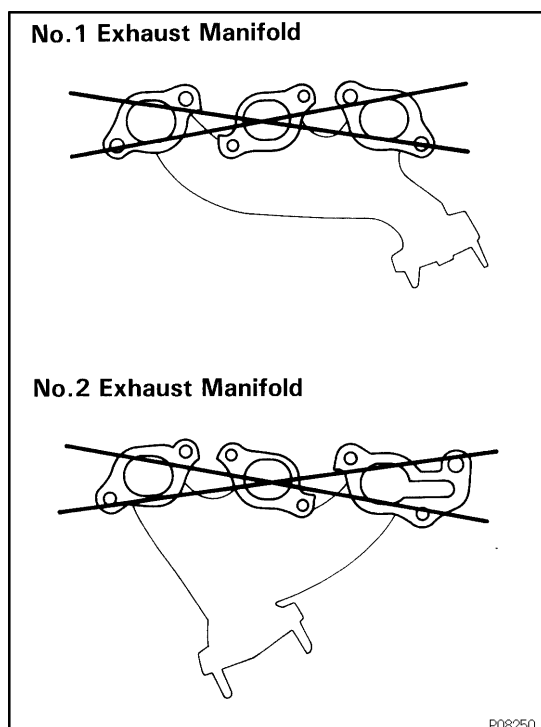
If warpage is greater than maximum, replace the air intake chamber.

**24. INSPECT INTAKE MANIFOLD**

Using a precision straight edge and thickness gauge, measure the surface contacting the cylinder head and air intake chamber for warpage.

Maximum warpage: 0.30 mm (0.0118 in.)

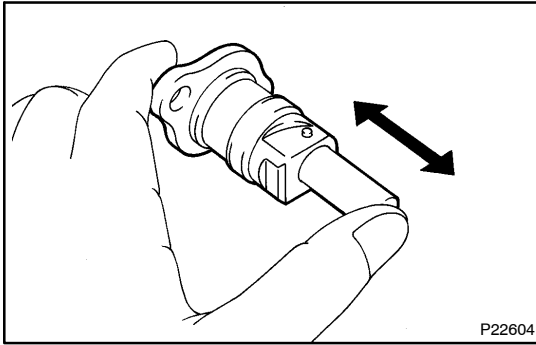
If warpage is greater than maximum, replace the manifold.

**25. INSPECT EXHAUST MANIFOLDS**

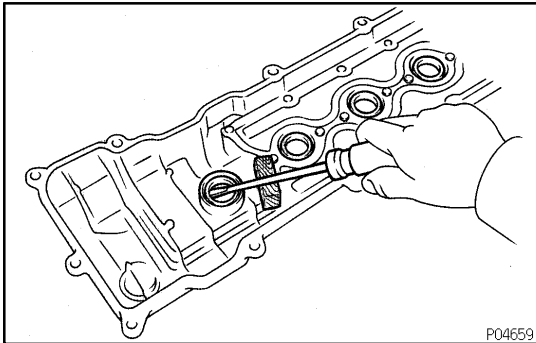
Using a precision straight edge and thickness gauge, measure the surface contacting the cylinder head for warpage.

Maximum warpage: 0.30 mm (0.0118 in.)

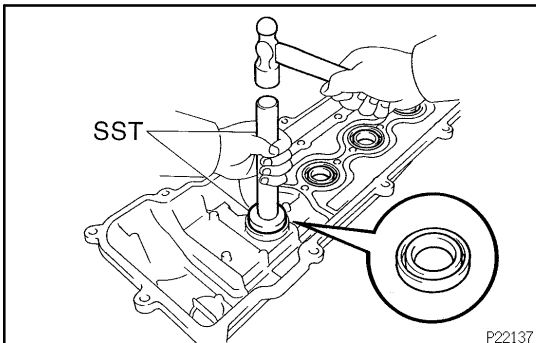
If warpage is greater than maximum, replace the manifold.

**26. INSPECT CHAIN TENSIONER**

Check that the plunger moves smoothly.

**27. IF NECESSARY, REPLACE SPARK PLUG TUBE GASKETS**

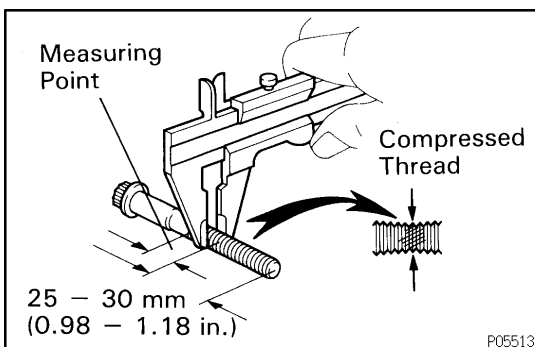
- (a) Using a screwdriver, pry off the tube gasket.



- (b) Using SST and a hammer, tap in a new tube gasket as shown in the illustration.

SST 09950-60010 (09951-00480), 09950-70010 (09951-07150)

- (c) Apply a light coat of MP grease to the gasket lip.

**28. INSPECT CYLINDER HEAD BOLTS**

Using vernier calipers, measure the thread outside diameter of the bolt.

Standard outside diameter:

10.85 - 11.00 mm (0.4272 - 0.4331 in.)

Minimum outside diameter: 10.6 mm (0.417 in.)

If the diameter is less than minimum, replace the bolt.