



Valve Inspection

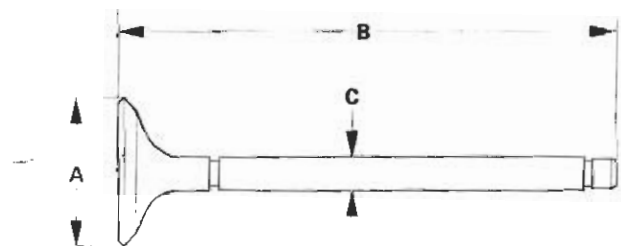
Measure the valve in these areas.

Intake Valve Dimensions

A Standard (New):	29.85—30.15 mm (1.175—1.187 in.)
B Standard (New):	118.27—118.87 mm (4.656—4.680 in.)
C Standard (New):	5.480—5.490 mm (0.2157—0.2161 in.)
C Service Limit:	5.45 mm (0.215 in.)

Exhaust Valve Dimensions

A Standard (New):	25.85—26.15 mm (1.018—1.030 in.)
B Standard (New):	115.65—116.25 mm (4.553—4.577 in.)
C Standard (New):	5.450—5.460 mm (0.2146—0.2150 in.)
C Service Limit:	5.42 mm (0.213 in.)



Valve Stem-to-Guide Clearance Inspection

- Slide the valve out of its guide about 10mm, then measure the guide-to-stem clearance with a dial indicator while rocking the stem in the direction of normal thrust (wobble method).
 - If the measurement exceeds the service limit, recheck it using a new valve.
 - If the measurement is now within the service limit, reassemble using a new valve.
 - If the measurement with a new valve still exceeds the service limit, go to step 2.

Intake Valve Stem-to-Guide Clearance

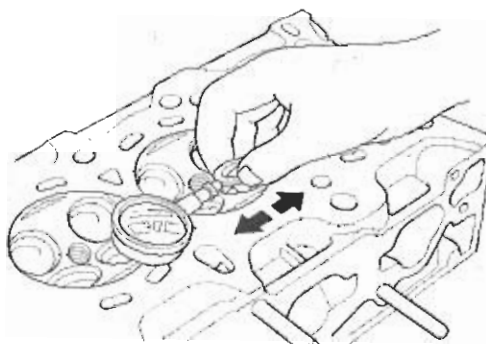
Standard (New): 0.04—0.10 mm
(0.002—0.004 in.)

Service Limit: 0.16 mm (0.006 in.)

Exhaust Valve Stem-to-Guide Clearance

Standard (New): 0.10—0.16 mm
(0.004—0.006 in.)

Service Limit: 0.22 mm (0.009 in.)



- Subtract the O.D. of the valve stem, measured with a micrometer, from the I.D. of the valve guide, measured with an inside micrometer or ball gauge. Take the measurements in three places along the valve stem and three places inside the valve guide. The difference between the largest guide measurement and the smallest stem measurement should not exceed the service limit.

Intake Valve Stem-to-Guide Clearance

Standard (New): 0.02—0.05 mm
(0.0008—0.0020 in.)

Service Limit: 0.08 mm (0.003 in.)

Exhaust Valve Stem-to-Guide Clearance

Standard (New): 0.05—0.08 mm
(0.0020—0.0031 in.)

Service Limit: 0.11 mm (0.004 in.)

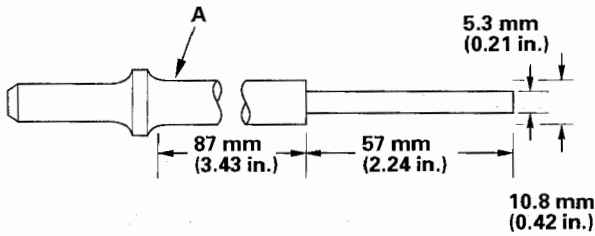
Cylinder Head

Valve Guide Replacement

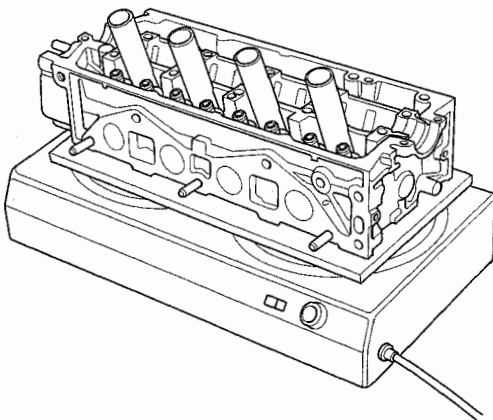
Special Tools Required

- Valve guide driver, 5.5 mm 07742-0010100
- Valve guide reamer, 5.5 mm 07HAH-PJ7A100

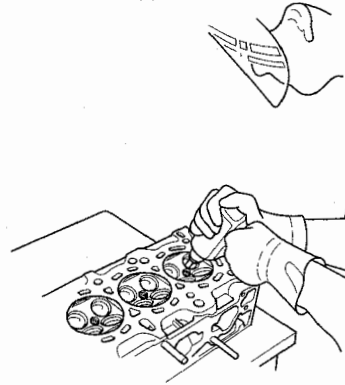
1. As illustrated, use a commercially available air-impact valve guide driver (A) modified to fit the diameter of the valve guides. In most cases, the same procedure can be done using the special tool and a conventional hammer.



2. Select the proper replacement guides, and chill them in the freezer section of a refrigerator for about an hour.
3. Use a hot plate or oven to evenly heat the cylinder head to 300 °F (150 °C). Monitor the temperature with a cooking thermometer. Do not get the head hotter than 300 °F (150 °C); excessive heat may loosen the valve seats.



4. Working from the camshaft side, use the driver and an air hammer to drive the guide about 2 mm (0.1 in.) towards the combustion chamber. This will knock off some of the carbon and make removal easier. Hold the air hammer directly in line with the valve guide to prevent damaging the driver.
5. Turn the head over and drive the guide out toward the camshaft side of the head.



6. If a valve guide won't move, drill it out with a 8 mm (5/16 in.) bit, then try again. Drill out the guides only in extreme cases; you could damage the cylinder head if the guide breaks.
7. Remove the new guide(s) from the freezer, one at a time, as you need them.

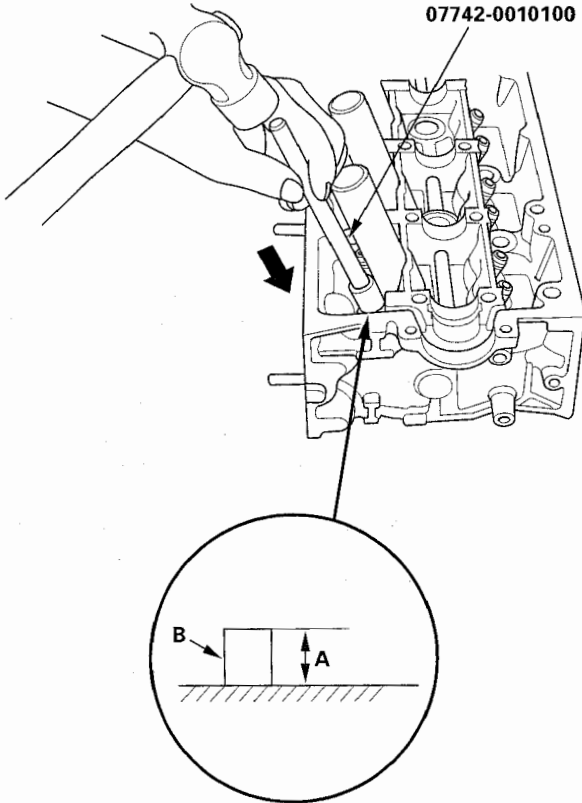


8. Apply a thin coat of clean engine oil to the outside of the new valve guide. Install the guide from the camshaft side of the head; use the special tool to drive the guide into the specified installed height (A) of the guide (B). If you have all 16 guides to do, you may have to reheat the head.

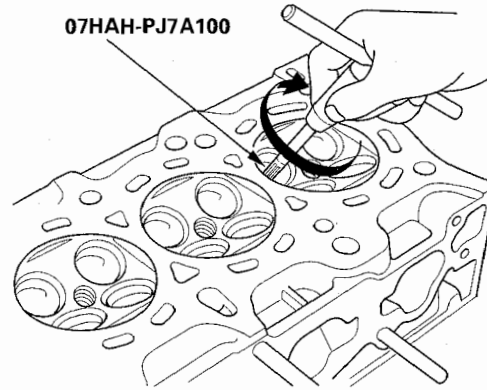
Valve Guide Installed Height

Intake: 17.85—18.35 mm (0.703—0.722 in.)

Exhaust: 18.65—19.15 mm (0.734—0.754 in.)



9. Coat both the reamer and valve guide with cutting oil.
10. Rotate the reamer clockwise the full length of the valve guide bore.



11. Continue to rotate the reamer clockwise while removing it from the bore.
12. Thoroughly wash the guide in detergent and water to remove any cutting residue.
13. Check the clearance with a valve (see page 6-43). Verify that the valve slides in the intake and exhaust valve guides without exerting pressure.

Cylinder Head

Valve Seat Reconditioning

Inspect valve stem-to-guide clearance (see page 6-43). If the valve guides are worn (see page 6-43), replace them (see page 6-44) before cutting the valve seats.

1. Renew the valve seats in the cylinder head using a valve seat cutter.
 - 1 Carefully cut a 45° seat, removing only enough material to ensure a smooth and concentric seat.
 - 2 Bevel the upper edge of the seat with the 30° cutter and the lower edge of the seat with the 67.5° cutter (intake) or 60° cutter (exhaust). Check the width of the seat and adjust accordingly.
 - 3 Make one more very light pass with the 45° cutter to remove any possible burrs caused by the other cutters.

Valve Seat Width

Intake:

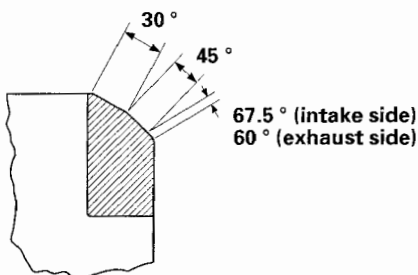
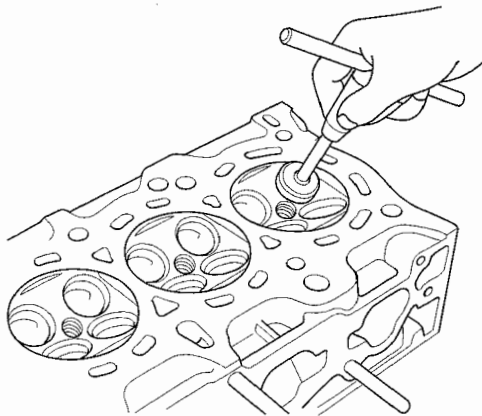
Standard (New): 0.85—1.15 mm
(0.033—0.045 in.)

Service Limit: 1.60 mm (0.063 in.)

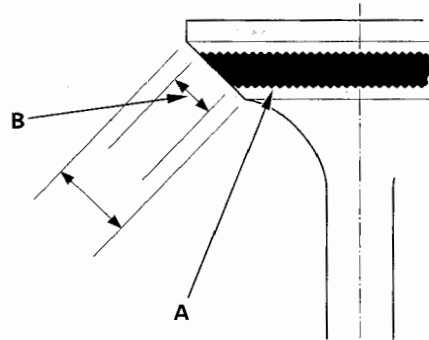
Exhaust:

Standard (New): 1.25—1.55 mm
(0.049—0.061 in.)

Service Limit: 2.00 mm (0.079 in.)



2. After resurfacing the seat, inspect it for even valve seating. Apply Prussian Blue compound (A) to the valve face. Insert the valve in its original location in the head, then lift it and snap it closed against the seat several times.



3. The actual valve seating surface (B), as shown by the blue compound, should be centered on the seat.
 - If it is too high (closer to the valve stem), you must make a second cut with the 67.5° cutter (intake) or 60° cutter (exhaust) to move it down, then one more cut with the 45° cutter to restore seat width.
 - If it is too low (closer to the valve edge), you must make a second cut with the 30° cutter to move it up, then one more cut with the 45° cutter to restore seat width.

NOTE: The final cut should always be made with the 45° cutter.

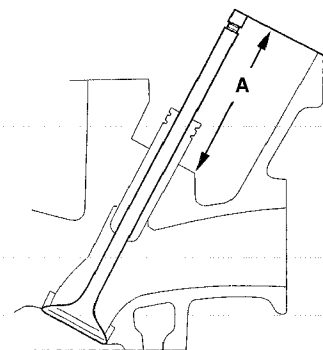


4. Insert the intake and exhaust valves in the head and measure the valve stem installed height (A).

Valve Stem Installed Height

Standard (New): 53.17—53.64 mm
(2.093—2.112 in.)

Service Limit: 53.89 mm (2.122 in.)



5. If the valve stem installed height is over the service limit, replace the valve and recheck. If it is still over the service limit, replace the cylinder head; the valve seat in the head is too deep.