| | | |
|---|---|---|
| **Last Modified:** 9-29-2009 | 5.6 N | **From:** 200501 |
| **Model Year:** 2006 | **Model:** Hiace | **Doc ID:** RM000000122Z000X |
| **Title:** 5L-E ENGINE MECHANICAL: VALVE CLEARANCE: ADJUSTMENT (2006-2010 Hiace) | | |

# ADJUSTMENT

### 1. REMOVE AIR CLEANER HOSE NO.2 INFO

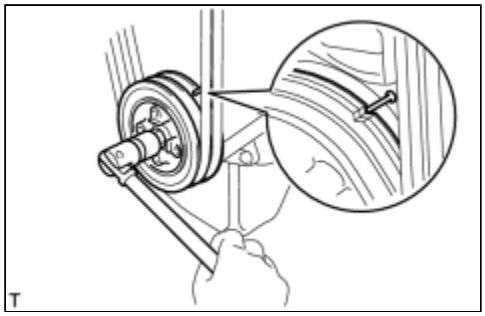
### 2. REMOVE INTAKE AIR CONNECTOR SUB-ASSEMBLY INFO

### 3. REMOVE CYLINDER HEAD COVER SUB-ASSEMBLY

(a) Disconnect the ventilation hose.

(b) Remove the 9 bolts, nut, cylinder head cover and gasket.

### 4. SET NO.1 CYLINDER TO TDC/ COMPRESSION

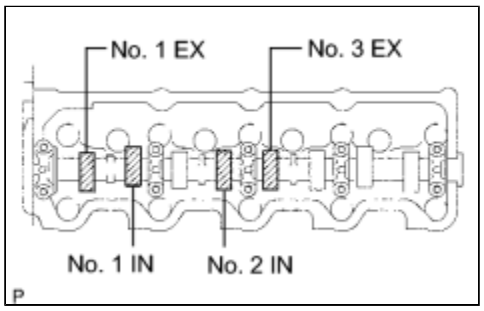



(a) Turn the crankshaft pulley and align its groove with the timing pointer.

(b) Check that the valve lifters on the No.1 cylinder are loose and valve lifters on the No.4 are tight.

If not, turn the crankshaft one revolution (360°) and align the mark as above.

### 5. INSPECT VALVE CLEARANCE



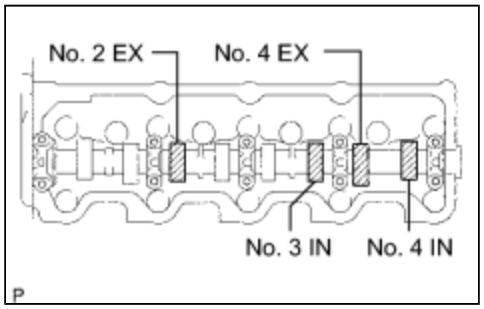

(a) Check only the valves indicated in the illustration.

(1) Using a feeler gauge, measure the clearance between the valve lifter and camshaft.

(2) Record the out-of-specification valve clearance measurements. They will be used later to determine the required replacement adjusting shim.

## Valve clearance (Cold):

| | |
|---|---|
| Intake | 0.20 to 0.30 mm (0.008 to 0.012 in.) |
| Exhaust | 0.40 to 0.50 mm (0.016 to 0.020 in.) |




(b) Turn the crankshaft one revolution (360°) and align the mark as above. (See procedure in step 3)

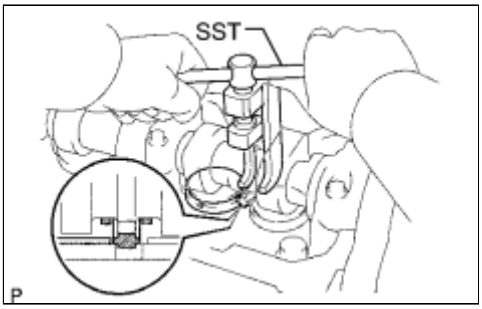
(c) Check only the valves indicated in the illustration. Measure the valve clearance. (See procedure in step (a))

**Valve clearance (Cold):**

| | |
|---|---|
| Intake | 0.20 to 0.30 mm (0.008 to 0.012 in.) |
| Exhaust | 0.40 to 0.50 mm (0.016 to 0.020 in.) |

### 6. ADJUST VALVE CLEARANCE

(a) Remove the adjusting shim.

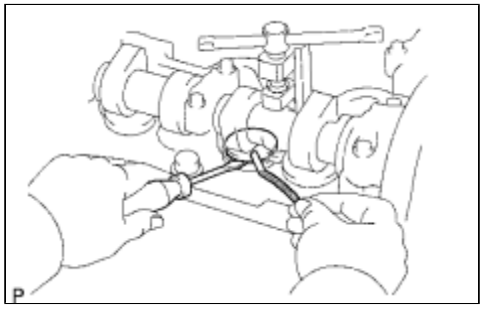



(1) Turn the crankshaft so that the cam lobe of the camshaft on the adjusting valve points upward.

(2) Using SST, press down the valve lifter.

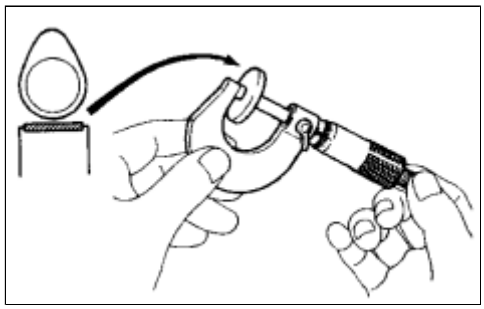
**SST: 09248-64011**

(3) Position the notch of the valve lifter with it facing the exhaust manifold side.




(4) Remove the adjusting shim with a screwdriver and magnetic finger.

(b) Determine the replacement adjusting shim size by following the formula or charts:



(1) Using a micrometer, measure the thickness of the removed shim.

(2) Calculate the thickness of a new shim so that the valve clearance comes within the specified value.

T = Thickness of removed shim

A = Measured valve clearance

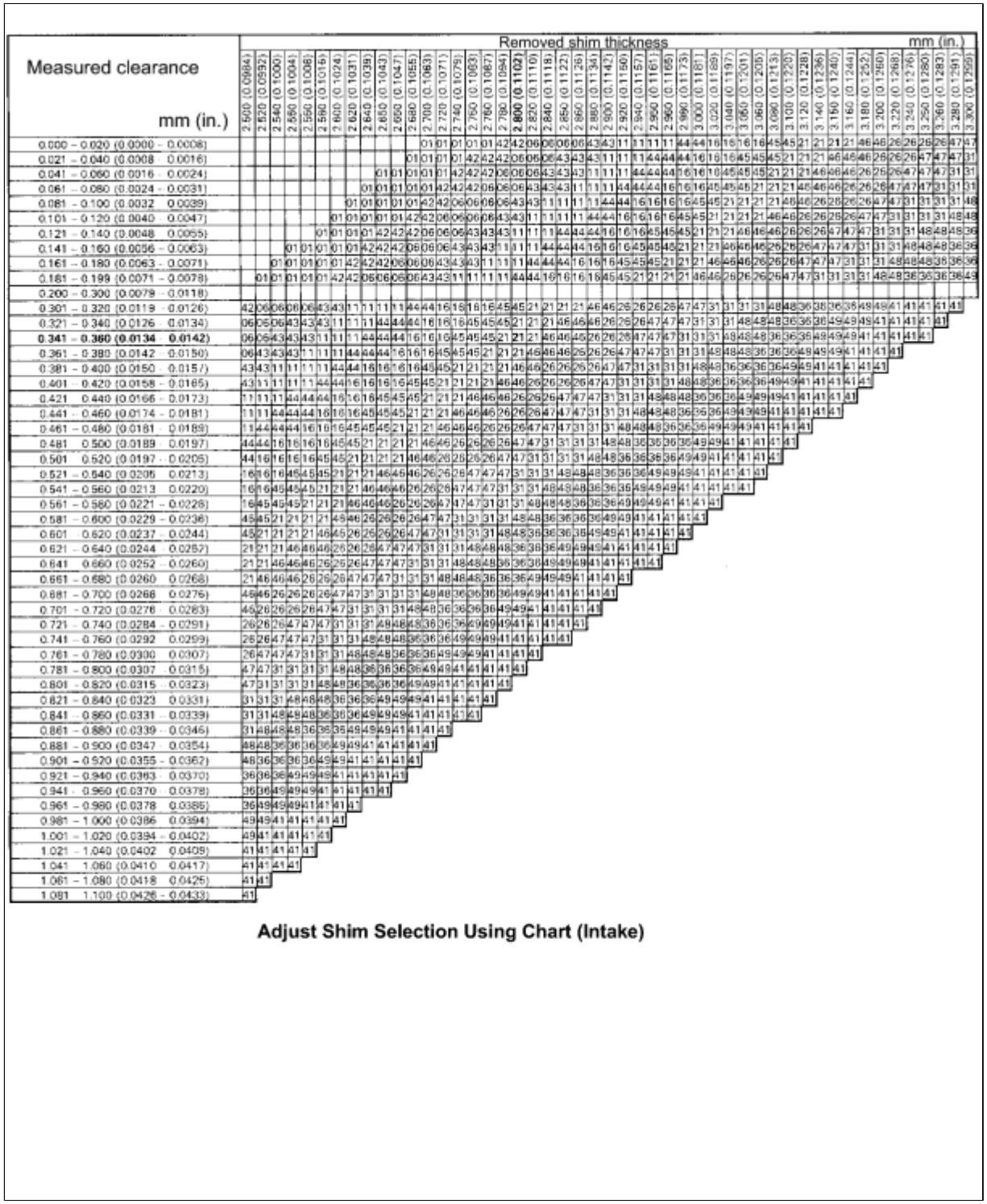
N = Thickness of new shim

| | |
|---|---|
| Intake | N = T + (A - 0.25 mm (0.010 in.)) |
| Exhaust | N = T + (A - 0.45 mm (0.018 in.)) |

(3) Select a new shim with a thickness as close as possible to the calculated value.

**HINT:**

**Shims are available in 17 sizes in increments of 0.05 mm (0.0020 in.), from 2.50 mm (0.0984 in.) to 3.30 mm (0.1299 in.).**




**Adjust Shim Selection Using Chart (Intake)**

**New shim thickness mm (in.)**

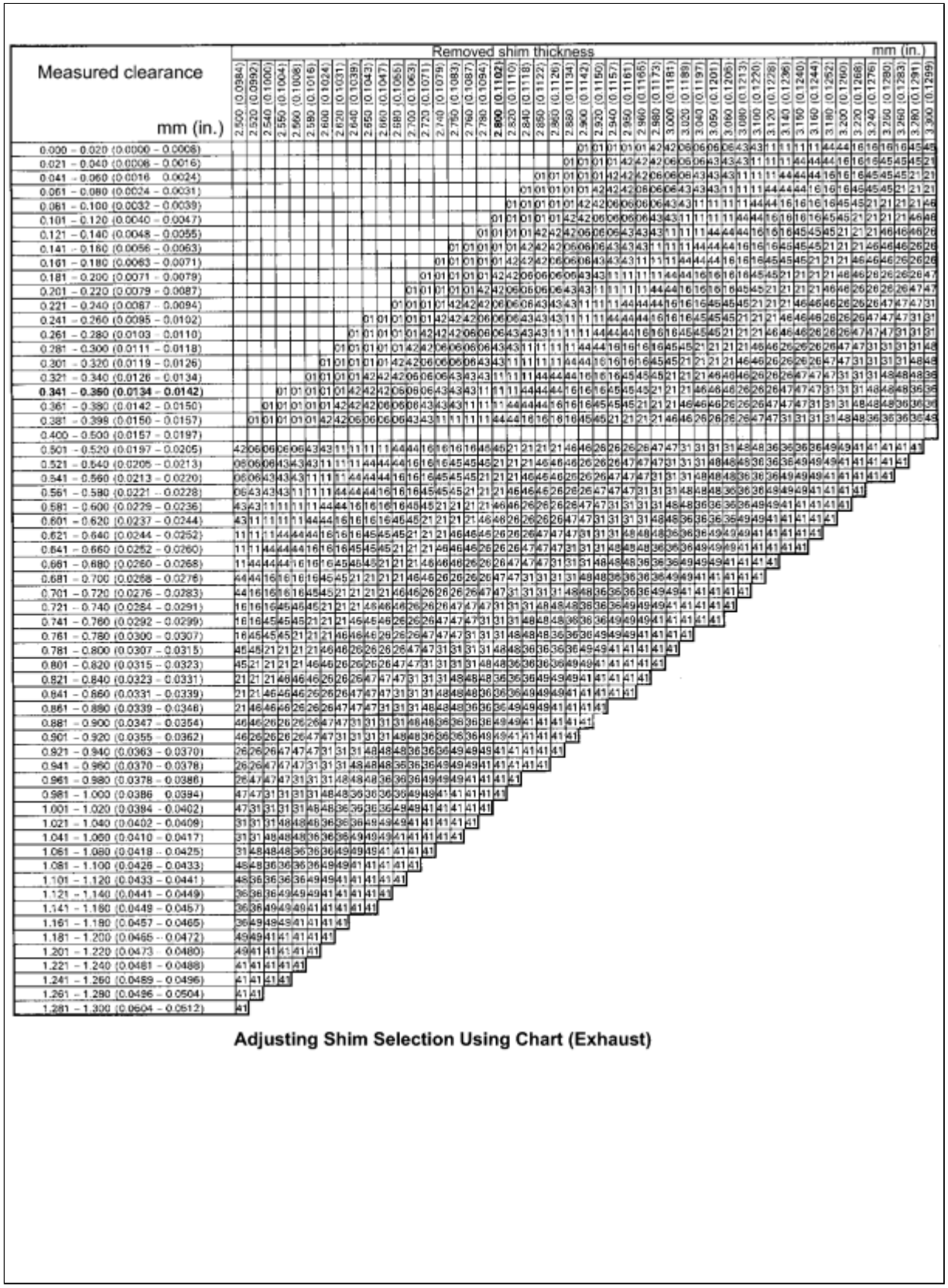
| SHIM NO. | THICKNESS | SHIM NO. | THICKNESS |
|---|---|---|---|
| 01 | 2.50 (0.0984) | 46 | 2.95 (0.1161) |
| 42 | 2.55 (0.1004) | 26 | 3.00 (0.1181) |
| 06 | 2.60 (0.1024) | 47 | 3.05 (0.1201) |

| | | | |
|---|---|---|---|
| 43 | 2.65 (0.1043) | 31 | 3.10 (0.1220) |
| 11 | 2.70 (0.1063) | 48 | 3.15 (0.1240) |
| 44 | 2.75 (0.1083) | 36 | 3.20 (0.1260) |
| 16 | 2.80 (0.1102) | 49 | 3.25 (0.1280) |
| 45 | 2.85 (0.1122) | 41 | 3.30 (0.1299) |
| 21 | 2.90 (0.1142) | | |

Intake valve clearance (Cold):
0.20 to 0.30 mm (0.008 to 0.012 in.)

EXAMPLE:

The 2.800 mm (0.1102 in.) shim is installed and the measured clearance is 0.350 mm (0.0138 in.). Replace the 2.800 mm (0.1102 in.) shim with a No.21 shim.



| Measured clearance mm (in.) | Removed shim thickness mm (in.) |
|---|---|
| 0.000 – 0.020 (0.0000 – 0.0008) | 2.500 (0.0984) … 2.800 (0.1102) … 3.300 (0.1299) |
| 0.021 – 0.040 (0.0008 – 0.0016) | 2.520 (0.0992) … 2.800 (0.1102) … 3.300 (0.1299) |
| 0.041 – 0.060 (0.0016 – 0.0024) | 2.540 (0.1000) … 2.800 (0.1102) … 3.300 (0.1299) |
| 0.061 – 0.080 (0.0024 – 0.0031) | 2.560 (0.1008) … 2.800 (0.1102) … 3.300 (0.1299) |
| 0.081 – 0.100 (0.0032 – 0.0039) | 2.580 (0.1016) … 2.800 (0.1102) … 3.300 (0.1299) |
| 0.101 – 0.120 (0.0040 – 0.0047) | 2.600 (0.1024) … 2.800 (0.1102) … 3.300 (0.1299) |
| 0.121 – 0.140 (0.0048 – 0.0055) | 2.620 (0.1031) … 2.800 (0.1102) … 3.300 (0.1299) |
| 0.141 – 0.160 (0.0056 – 0.0063) | 2.640 (0.1039) … 2.800 (0.1102) … 3.300 (0.1299) |
| 0.161 – 0.180 (0.0063 – 0.0071) | 2.660 (0.1047) … 2.800 (0.1102) … 3.300 (0.1299) |
| 0.181 – 0.200 (0.0071 – 0.0079) | 2.680 (0.1055) … 2.800 (0.1102) … 3.300 (0.1299) |
| 0.201 – 0.220 (0.0079 – 0.0087) | 2.700 (0.1063) … 2.800 (0.1102) … 3.300 (0.1299) |
| 0.221 – 0.240 (0.0087 – 0.0094) | 2.720 (0.1071) … 2.800 (0.1102) … 3.300 (0.1299) |
| 0.241 – 0.260 (0.0095 – 0.0102) | 2.740 (0.1079) … 2.800 (0.1102) … 3.300 (0.1299) |
| 0.261 – 0.280 (0.0103 – 0.0110) | 2.760 (0.1087) … 2.800 (0.1102) … 3.300 (0.1299) |
| 0.281 – 0.300 (0.0111 – 0.0118) | 2.780 (0.1094) … 2.800 (0.1102) … 3.300 (0.1299) |
| 0.301 – 0.320 (0.0119 – 0.0126) | 2.800 (0.1102) … 3.300 (0.1299) |
| 0.321 – 0.340 (0.0126 – 0.0134) | 2.820 (0.1110) … 3.300 (0.1299) |
| **0.341 – 0.360 (0.0134 – 0.0142)** | 2.840 (0.1118) … 3.300 (0.1299) |
| 0.361 – 0.380 (0.0142 – 0.0150) | 2.860 (0.1122) … 3.300 (0.1299) |
| 0.381 – 0.398 (0.0150 – 0.0157) | 2.880 (0.1126) … 3.300 (0.1299) |
| 0.400 – 0.500 (0.0157 – 0.0197) | 2.880 (0.1134) … 3.300 (0.1299) |
| 0.501 – 0.520 (0.0197 – 0.0205) | 2.900 (0.1142) … 3.300 (0.1299) |
| 0.521 – 0.540 (0.0205 – 0.0213) | 2.920 (0.1150) … 3.300 (0.1299) |
| 0.541 – 0.560 (0.0213 – 0.0220) | 2.940 (0.1157) … 3.300 (0.1299) |
| 0.561 – 0.580 (0.0221 – 0.0228) | 2.960 (0.1165) … 3.300 (0.1299) |
| 0.581 – 0.600 (0.0229 – 0.0236) | 2.980 (0.1173) … 3.300 (0.1299) |
| 0.601 – 0.620 (0.0237 – 0.0244) | 3.000 (0.1181) … 3.300 (0.1299) |
| 0.621 – 0.640 (0.0244 – 0.0252) | 3.020 (0.1189) … 3.300 (0.1299) |
| 0.641 – 0.660 (0.0252 – 0.0260) | 3.040 (0.1197) … 3.300 (0.1299) |
| 0.661 – 0.680 (0.0260 – 0.0268) | 3.060 (0.1205) … 3.300 (0.1299) |
| 0.681 – 0.700 (0.0268 – 0.0276) | 3.080 (0.1213) … 3.300 (0.1299) |
| 0.701 – 0.720 (0.0276 – 0.0283) | 3.100 (0.1220) … 3.300 (0.1299) |
| 0.721 – 0.740 (0.0284 – 0.0291) | 3.120 (0.1228) … 3.300 (0.1299) |
| 0.741 – 0.760 (0.0292 – 0.0299) | 3.140 (0.1236) … 3.300 (0.1299) |
| 0.761 – 0.780 (0.0300 – 0.0307) | 3.160 (0.1240) … 3.300 (0.1299) |
| 0.781 – 0.800 (0.0307 – 0.0315) | 3.160 (0.1244) … 3.300 (0.1299) |
| 0.801 – 0.820 (0.0315 – 0.0323) | 3.180 (0.1252) … 3.300 (0.1299) |
| 0.821 – 0.840 (0.0323 – 0.0331) | 3.200 (0.1260) … 3.300 (0.1299) |
| 0.841 – 0.860 (0.0331 – 0.0339) | 3.220 (0.1268) … 3.300 (0.1299) |
| 0.861 – 0.880 (0.0339 – 0.0346) | 3.240 (0.1276) … 3.300 (0.1299) |
| 0.881 – 0.900 (0.0347 – 0.0354) | 3.260 (0.1280) … 3.300 (0.1299) |
| 0.901 – 0.920 (0.0355 – 0.0362) | 3.280 (0.1291) … 3.300 (0.1299) |
| 0.921 – 0.940 (0.0363 – 0.0370) | 3.300 (0.1299) |
| 0.941 – 0.960 (0.0370 – 0.0378) | |
| 0.961 – 0.980 (0.0378 – 0.0386) | |
| 0.981 – 1.000 (0.0386 – 0.0394) | |
| 1.001 – 1.020 (0.0394 – 0.0402) | |
| 1.021 – 1.040 (0.0402 – 0.0409) | |
| 1.041 – 1.060 (0.0410 – 0.0417) | |
| 1.061 – 1.080 (0.0418 – 0.0425) | |
| 1.081 – 1.100 (0.0426 – 0.0433) | |
| 1.101 – 1.120 (0.0433 – 0.0441) | |
| 1.121 – 1.140 (0.0441 – 0.0449) | |
| 1.141 – 1.160 (0.0449 – 0.0457) | |
| 1.161 – 1.180 (0.0457 – 0.0465) | |
| 1.181 – 1.200 (0.0465 – 0.0472) | |
| 1.201 – 1.220 (0.0473 – 0.0480) | |
| 1.221 – 1.240 (0.0481 – 0.0488) | |
| 1.241 – 1.260 (0.0489 – 0.0496) | |
| 1.261 – 1.280 (0.0496 – 0.0504) | |
| 1.281 – 1.300 (0.0504 – 0.0512) | |

**Adjusting Shim Selection Using Chart (Exhaust)**

**New shim thickness mm (in.)**

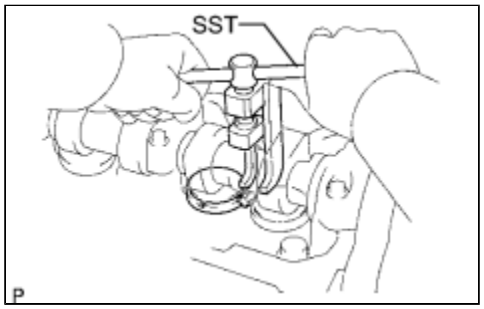
| SHIM NO. | THICKNESS | SHIM NO. | THICKNESS |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 01 | 2.50 (0.0984) | 46 | 2.95 (0.1161) |
| 42 | 2.55 (0.1004) | 26 | 3.00 (0.1181) |
| 06 | 2.60 (0.1024) | 47 | 3.05 (0.1201) |
| 43 | 2.65 (0.1043) | 31 | 3.10 (0.1220) |
| 11 | 2.70 (0.1063) | 48 | 3.15 (0.1240) |
| 44 | 2.75 (0.1083) | 36 | 3.20 (0.1260) |
| 16 | 2.80 (0.1102) | 49 | 3.25 (0.1280) |
| 45 | 2.85 (0.1122) | 41 | 3.30 (0.1299) |
| 21 | 2.90 (0.1142) | | |

Exhaust valve clearance (Cold):
0.40 to 0.50 mm (0.016 to 0.020 in.)

EXAMPLE:

The 2.800 mm (0.1102 in.) shim is installed and the measured clearance is 0.350 mm (0.0138 in.). Replace the 2.800 mm (0.1102 in.) shim with a No.11 shim.



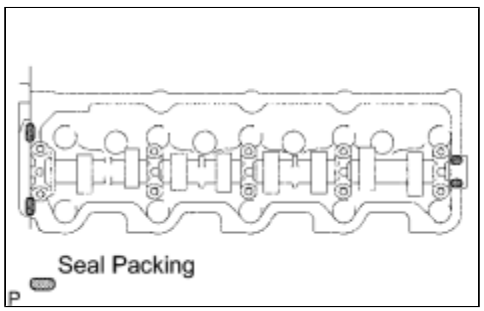

(c) Install a new adjusting shim.

(1) Place a new adjusting shim on the valve lifter.

(2) Remove the SST.

(d) Recheck the valve clearance.

**7. INSTALL CYLINDER HEAD COVER SUB-ASSEMBLY**




(a) Remove the any oil packing (FIPG) material.

(b) Apply seal packing to the cylinder head as shown in the illustration.

Seal packing:

Part No.08826-00080 or equivalent

(c) Install the gasket to the cylinder head cover.

(d) Install the cylinder head cover with the 9 bolts and nut. Uniformly tighten the bolts and nuts in several steps.

**Torque: 12 N·m (120 kgf·cm, 9ft·lbf)**

(e) Connect the ventilation hose.

**8. INSTALL INTAKE AIR CONNECTOR SUB-ASSEMBLY** INFO

**9. CONNECT AIR CLEANER HOSE NO.2** INFO

**10. CHECK IDLE SPEED** INFO

**11. INSPECT MAXIMUM ENGINE SPEED** INFO