

PROCEDURE

1.INSPECT CYLINDER HEAD SET BOLT

11101A

Click here [Engine / Hybrid System>1GR-FE ENGINE MECHANICAL>ENGINE UNIT>INSPECTION](#)

2.INSPECT CYLINDER HEAD SUB-ASSEMBLY

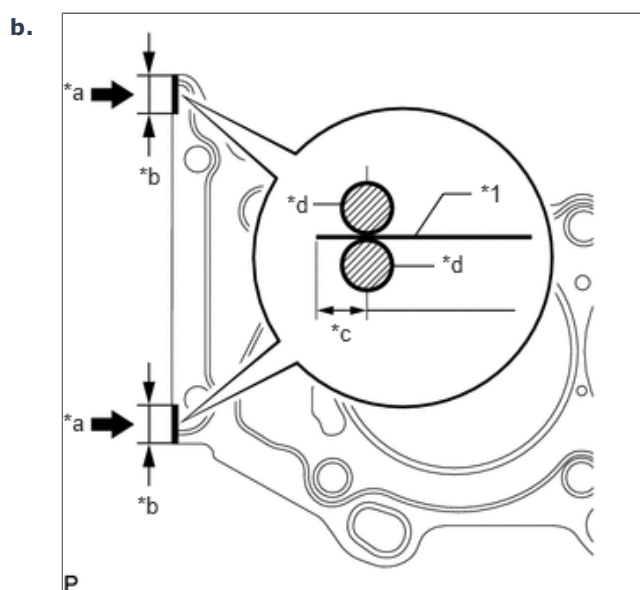
11101

Click here [Engine / Hybrid System>1GR-FE ENGINE MECHANICAL>CYLINDER HEAD>INSPECTION](#)

3.INSTALL NO. 2 CYLINDER HEAD GASKET

11116

- a. Remove any old packing (FIPG material) and be careful not to drop any oil on the contact surfaces of the cylinder head LH and cylinder block.



*1	No. 2 Cylinder Head Gasket
*a	Seal Packing Application Range
*b	10 to 15 mm (0.394 to 0.591 in.)
*c	1.25 to 1.5 mm (0.0492 to 0.0591 in.)
*d	Seal Packing

Apply seal packing to a new No. 2 cylinder head gasket as shown in the illustration.

Seal packing:

Toyota Genuine Seal Packing Black, Three Bond 1207B or equivalent

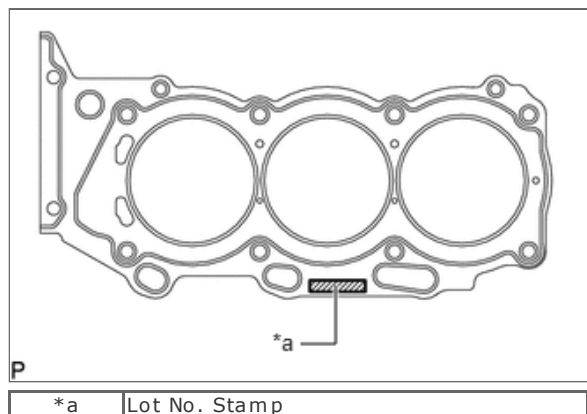
Standard seal diameter:

2.5 to 3.0 mm (0.0984 to 0.118 in.)

NOTICE:

- Install the No. 2 cylinder head gasket within 3 minutes after applying the seal packing.
- Do not add engine oil within 2 hours of installation.

c.



Place the No. 2 cylinder head gasket on the cylinder block sub-assembly surface with the front face of the Lot No. stamp upward.

NOTICE:

Pay attention to the installation direction.

4.INSTALL CYLINDER HEAD LH

11102

a. Clean and remove any oil from the cylinder head installation surface.

b. Place the cylinder head LH on the No. 2 cylinder head gasket.

NOTICE:

- Make sure that no oil is on the mounting surface of the cylinder head LH.
- Do not damage the cylinder head LH and No. 2 cylinder head gasket.

c. Apply a light coat of engine oil to the threads and under the heads of the cylinder head set bolts.

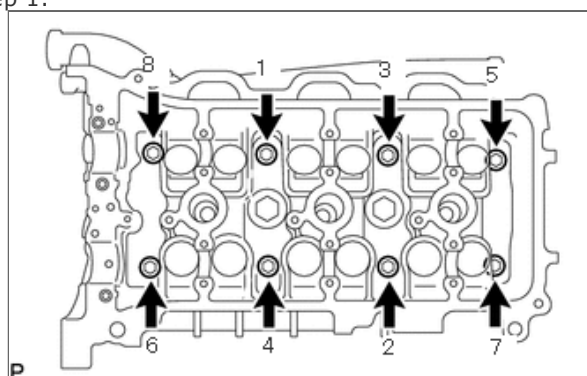
d. Install the 8 cylinder head set bolts and 8 plate washers.

NOTICE:

- Install the cylinder head set bolts to their original positions.
- Do not drop the plate washer for the cylinder head set bolt into the cylinder head LH.
- The cylinder head set bolts are tightened in 2 progressive steps.
- If any cylinder head set bolt is broken or deformed, replace it.

e. Step 1:

i.



Using a 10 mm bi-hexagon wrench, install and uniformly tighten the 8 cylinder head set bolts with plate washers in several steps in the sequence shown in the illustration.

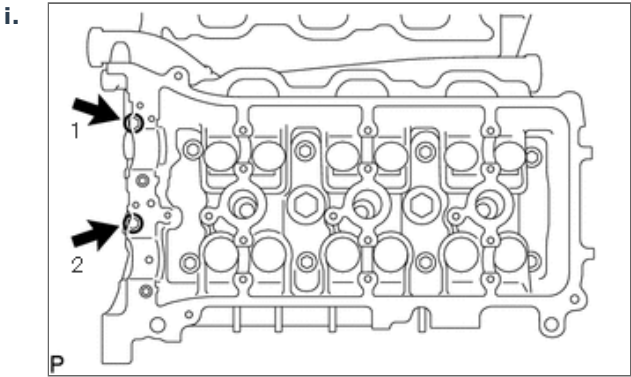
Torque:

36 N*m (367 kgf*cm, 27 ft.*lbf)

If any one of the cylinder head set bolts does not meet the torque specification, replace the cylinder head set bolt.

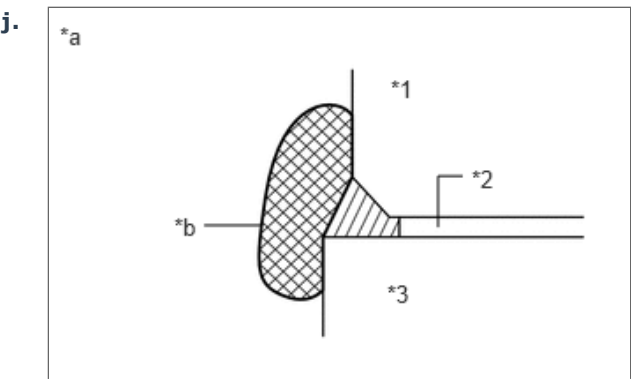
- f. Step 2:
 - i. Mark the engine front side of each cylinder head set bolt head with paint.
 - ii. Tighten the cylinder head set bolts 180° in the sequence shown in step 1.

- g. Check that the painted marks are now facing rearward.
- h. Apply a light coat of engine oil to the threads of the bolts.



Install the 2 bolts. Using several steps, tighten the bolts uniformly in the sequence shown in the illustration.

Torque:
30 N*m (306 kgf*cm, 22 ft.*lbf)



*1	Cylinder Head LH
*2	No. 2 Cylinder Head Gasket
*3	Cylinder Block Sub-assembly
*a	Engine Front Side
*b	Wipe Clean

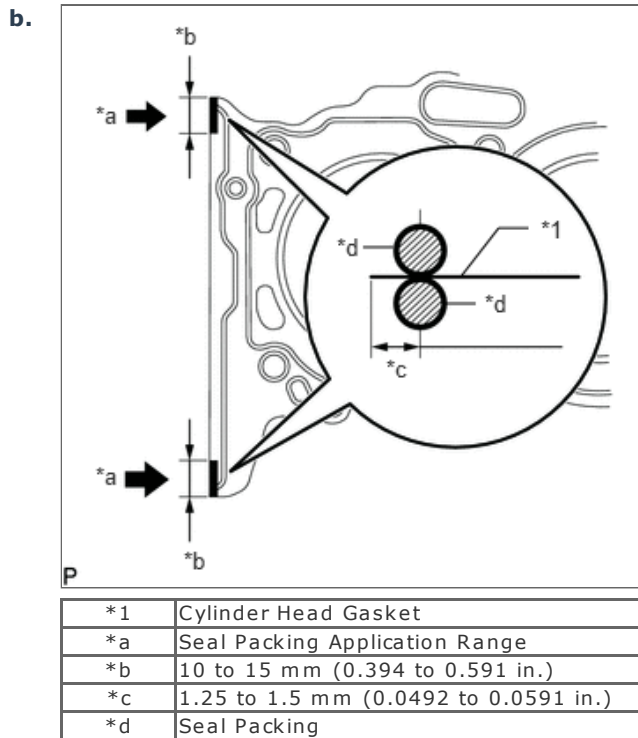
Seal packing will seep out from the front side of the engine. Thoroughly wipe off the seal packing that seeps out.



5.INSTALL CYLINDER HEAD GASKET

11115

- a. Remove any old packing (FIPG material) and be careful not to drop any oil on the contact surfaces of the cylinder head sub-assembly and cylinder block sub-assembly.



Apply seal packing to a new cylinder head gasket as shown in the illustration.

Seal packing:

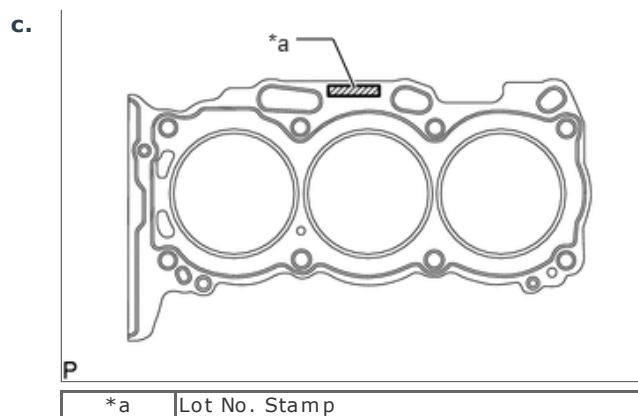
Toyota Genuine Seal Packing Black, Three Bond 1207B or equivalent

Standard seal diameter:

2.5 to 3.0 mm (0.0984 to 0.118 in.)

NOTICE:

- Install the cylinder head gasket within 3 minutes after applying the seal packing.
- Do not add engine oil within 2 hours of installation.



Place the cylinder head gasket on the cylinder block sub-assembly surface with the front face of the Lot No. stamp upward.

NOTICE:

Pay attention to the installation direction.

6.INSTALL CYLINDER HEAD SUB-ASSEMBLY

11101

a. Clean and remove any oil from the cylinder head installation surface.

b. Place the cylinder head sub-assembly on the cylinder head gasket.

NOTICE:

- Make sure that no oil is on the mounting surface of the cylinder head sub-assembly.
- Do not damage the cylinder head sub-assembly and cylinder head gasket.

c. Apply a light coat of engine oil to the threads and under the heads of the cylinder head set bolts.

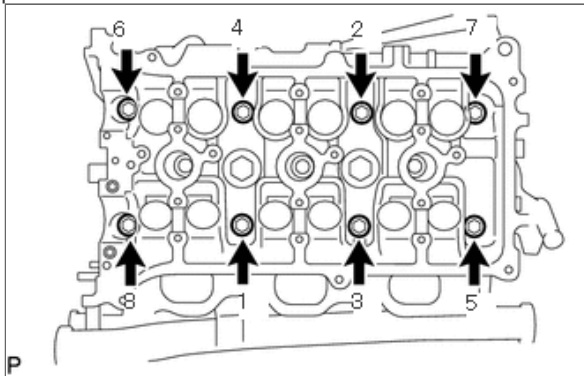
d. Install the 8 cylinder head set bolts and 8 plate washers.

NOTICE:

- Install the cylinder head set bolts to their original positions.
- Do not drop the plate washer for the cylinder head set bolt into the cylinder head sub-assembly.
- The cylinder head set bolts are tightened in 2 progressive steps.
- If any cylinder head set bolt is broken or deformed, replace it.

e. Step 1:

i.



Using a 10 mm bi-hexagon wrench, install and uniformly tighten the 8 cylinder head set bolts with plate washers in several steps in the sequence shown in the illustration.

Torque:

36 N*m (367 kgf*cm, 27 ft.*lbf)

If any one of the cylinder head set bolts does not meet the torque specification, replace the cylinder head set bolt.

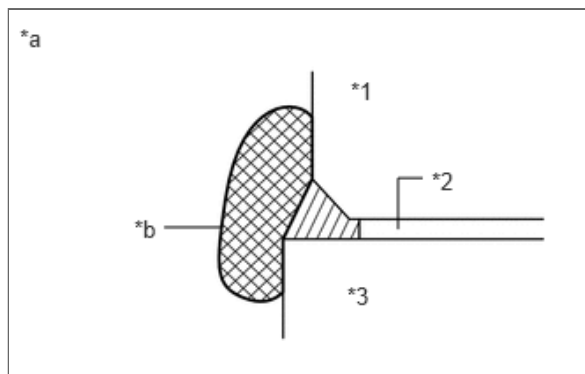
f. Step 2:

i. Mark the engine front side of each cylinder head set bolt head with paint.

ii. Tighten the cylinder head set bolts 180° in the sequence shown in step 1.

g. Check that the painted marks are now facing rearward.

h.



*1	Cylinder Head Sub-assembly
*2	Cylinder Head Gasket
*3	Cylinder Block Sub-assembly
*a	Engine Front Side
*b	Wipe Clean

Seal packing will seep out from the front side of engine. Thoroughly wipe off the seal packing that seeps out.

	7.INSTALL NO. 4 CAMSHAFT SUB-ASSEMBLY	13054
Click hereEngine / Hybrid System>1GR-FE ENGINE MECHANICAL>ENGINE UNIT>REASSEMBLY		
	8.INSTALL NO. 3 CAMSHAFT SUB-ASSEMBLY	13053
Click hereEngine / Hybrid System>1GR-FE ENGINE MECHANICAL>ENGINE UNIT>REASSEMBLY		
	9.INSTALL CAMSHAFT BEARING CAP (for Bank 2)	
Click hereEngine / Hybrid System>1GR-FE ENGINE MECHANICAL>ENGINE UNIT>REASSEMBLY		
	10.INSTALL NO. 2 CAMSHAFT BEARING	11821
Click hereEngine / Hybrid System>1GR-FE ENGINE MECHANICAL>ENGINE UNIT>REASSEMBLY		
	11.INSTALL NO. 1 CAMSHAFT BEARING	11811
Click hereEngine / Hybrid System>1GR-FE ENGINE MECHANICAL>ENGINE UNIT>REASSEMBLY		
	12.INSTALL NO. 2 CAMSHAFT	13512
Click hereEngine / Hybrid System>1GR-FE ENGINE MECHANICAL>ENGINE UNIT>REASSEMBLY		
	13.INSTALL CAMSHAFT	13511
Click hereEngine / Hybrid System>1GR-FE ENGINE MECHANICAL>ENGINE UNIT>REASSEMBLY		
	14.INSTALL CAMSHAFT BEARING CAP (for Bank 1)	
Click hereEngine / Hybrid System>1GR-FE ENGINE MECHANICAL>ENGINE UNIT>REASSEMBLY		
	15.INSTALL NO. 3 CHAIN TENSIONER ASSEMBLY	13560A
Click hereEngine / Hybrid System>1GR-FE ENGINE MECHANICAL>ENGINE UNIT>REASSEMBLY		
	16.INSTALL CAMSHAFT TIMING GEARS AND NO. 2 CHAIN (for Bank 2)	
Click hereEngine / Hybrid System>1GR-FE ENGINE MECHANICAL>ENGINE UNIT>REASSEMBLY		
	17.INSTALL NO. 2 CHAIN TENSIONER ASSEMBLY	13550
Click hereEngine / Hybrid System>1GR-FE ENGINE MECHANICAL>ENGINE UNIT>REASSEMBLY		
	18.INSTALL CAMSHAFT TIMING GEARS AND NO. 2 CHAIN (for Bank 1)	
Click hereEngine / Hybrid System>1GR-FE ENGINE MECHANICAL>ENGINE UNIT>REASSEMBLY		
	19.INSTALL NO. 1 CHAIN VIBRATION DAMPER	13561
Click hereEngine / Hybrid System>1GR-FE ENGINE MECHANICAL>ENGINE UNIT>REASSEMBLY		
	20.INSTALL CRANKSHAFT TIMING SPROCKET	13521
Click hereEngine / Hybrid System>1GR-FE ENGINE MECHANICAL>ENGINE UNIT>REASSEMBLY		
	21.INSTALL CHAIN TENSIONER SLIPPER	13559
Click hereEngine / Hybrid System>1GR-FE ENGINE MECHANICAL>ENGINE UNIT>REASSEMBLY		
	22.INSTALL NO. 1 CHAIN TENSIONER ASSEMBLY	13540
Click hereEngine / Hybrid System>1GR-FE ENGINE MECHANICAL>ENGINE UNIT>REASSEMBLY		
	23.SET NO. 1 CYLINDER TO TDC/COMPRESSION	

[Click here](#)Engine / Hybrid System>1GR-FE ENGINE MECHANICAL>ENGINE UNIT>REASSEMBLY

 24.INSTALL CHAIN SUB-ASSEMBLY	13506
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 25.INSTALL NO. 2 CHAIN VIBRATION DAMPER	13562
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[Click here](#)Engine / Hybrid System>1GR-FE ENGINE MECHANICAL>ENGINE UNIT>REASSEMBLY

 26.INSTALL IDLE SPROCKET ASSEMBLY	13530
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 27.INSTALL TIMING CHAIN COVER SUB-ASSEMBLY	11302
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[Click here](#)Engine / Hybrid System>1GR-FE LUBRICATION>OIL PUMP>INSTALLATION