

Kiwi Cylinder Heads Ltd.



# Installation Instructions

## Toyota 2TRFE Cylinder Head Kit Part Number 11081249



**This instruction manual contains important installation and assembly instructions. Read these instructions carefully before use. Please contact us directly if you have any questions or concerns. Remember...  
"Prevention is Better than Cure"**

Kiwi Cylinder Heads (NZ) Ltd.

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Call: 0800-549-429, email: [info@kch.co.nz](mailto:info@kch.co.nz)

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Kiwi Cylinder Heads Pty Ltd

14 Waler Crescent, Smeaton Grange, NSW, 2567

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## Kiwi Cylinder Heads 12 Month, Unlimited Kilometer, Parts & Labor Warranty

This new cylinder head is subject to a **12 Month** (from date of purchase), **unlimited kilometer, parts & labor warranty**. This means in the rare event this product fails due to either a manufacturing or physical fault the purchaser is covered by this warranty for a period of 12 months from date of purchase, and it includes replacement parts & labor at a fair and reasonable rate to re-instate the vehicle to its pre-failure state. This excludes service items such as but not limited to, oil, coolant, filters etc. as well as any vehicle recovery costs and the cost of any replacement vehicle.

**Responsibilities:** To maintain this warranty the product is to be professionally installed & serviced in accordance to the vehicle manufacturers guidelines & service intervals. Ensure the vehicle is not used in an inappropriate manner for which it is designed or intended for. To minimize any further unnecessary damage once a fault is suspected or detected in the vehicles operation. To contact the installer or Kiwi Cylinder Heads Ltd at the very earliest opportunity after detecting or suspecting a fault. Proof of Purchase & service records will be requested in an event of a claim. The warranty will be voided if the vehicle to which it is fitted is used in off-road, competition or modified beyond the vehicle manufacturers original design.

**How to make a claim:** If there is a suspected warranty fault, Kiwi Cylinder Heads Ltd must be contacted before any repair work can commence. (Contact details below) A warranty claim form and claim number will be made available and must be completed & returned to Kiwi Cylinder Heads Ltd, along with any requested related documents and/or parts. The suspected failed parts supplied by Kiwi Cylinder Heads Ltd must be returned to a pre-determined location for inspection and analysis of the suspected failure. The cost of returning parts & documents is the responsibility of the claimant. Failure to adhere to these procedures may void any warranty.

**This warranty does not exclude any rights to the claimant under the N.Z Consumer Guarantees Act 1993 or the Australian Consumer Law 2011.**

**Kiwi Cylinder Heads Ltd, PO Box 132-189 Sylvia Park, Mt Wellington, Auckland 1644. 0800-549-429, [info@kch.co.nz](mailto:info@kch.co.nz)  
Kiwi Cylinder Heads (Pty) Ltd, 14 Waler Crescent, Smeaton Grange, NSW 2567. Ph.1800-786-987, Fax 1800-786-535**

### **IMPORTANT**

**If this product is being fitted as a replacement for an item, which has failed in service? It is critical that the “real cause” of the failure has been identified and rectified. Failure to do so may result in this product also failing for the same reasons, which will not be covered under any warranty.**

If the purchaser chooses to fit parts other than those supplied, this does not invalidate the Kiwi Cylinder Heads warranty other than to the extent that the replacement parts carry no warranty unless purchased from Kiwi Cylinder Heads. Additionally, any consequential damage to Kiwi Cylinder Heads products as a result of using these alternative parts is not covered by the Kiwi Cylinder Heads warranty.

### Foreign Material / Debris Removal Procedure

Whilst every attempt is made to remove unwanted machining material, such as aluminum shavings or casting material at time of assembly. It is possible you may encounter some remaining material.

In most cases it can be cleaned by carefully standing the cylinder head on its end and using a compressed air gun and appropriate personal safety equipment, apply compressed air to the galleries to eliminate the foreign material. You may need to move the cylinder head around to assist in the removal. If this is not acceptable please contact us directly.

NZ- 0800-549-429

AUST- 1800-786-987

[info@kch.co.nz](mailto:info@kch.co.nz)



# Seven Steps to Success

- 1. Ensure both mating surfaces are **CLEAN** and **FREE OF DIRT AND OIL**.
- 2. **DO NOT** clean block threads with a thread **TAP**. Best use an old head bolt with “cleaning” grooves cut the length of the thread to “chase” the block threads.
- 3. Ensure **NEW** head bolts are used where applicable
- 4. Ensure the correct torque settings and sequence are employed.
- 5. For engines that use a **MLS (Multi Layer Steel)** Head gasket, flush block of any remaining “anti freeze”. When fitment is completed only use water (preferably distilled water) for the first 600kms. This is to insure the head gasket has the best possible chance to seal correctly.
- 6. **FUEL INJECTORS** must always be checked and /or serviced to be sure of correct operation.
- 7. If this is a “Fully Assembled” head kit which includes new camshafts? Then the correct “Start-up Procedure” **MUST** be followed. Otherwise premature camshaft wear **WILL** occur and will **NOT** be covered by warranty.

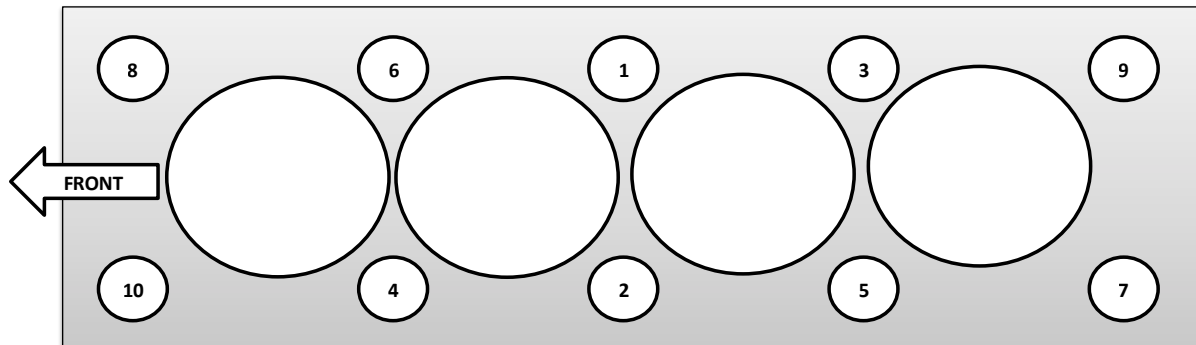


# Start-Up Procedure

- **Diesel Cam Shaft.** With rocker cover & glow plugs removed & fuel solenoid de-activated. Apply the “Z Paste” to the camshaft lobes. Using the starter motor, crank the engine until oil is present from ALL oil galleries & across the entire cam shaft and valve train area. This may take several minutes. It is now safe to complete the assembly and start the engine.
- **Petrol Cam Shaft.** With the rocker cover & spark plugs removed & the ignition dis-connected. Apply “Z Paste” to the camshaft lobes. Using the starter motor, crank the engine until oil is present at ALL oil galleries & across the entire cam shaft & valve train area. This may take several minutes. It is now safe to complete the assembly. Ensure the ignition timing is as close as possible to correct setting before firing the engine. Also ensure there is adequate cooling for the engine, air flow & ventilation. DO NOT let the engine idle, run engine at approx. 1800RPM for 15 - 20 minutes. ANY unusual noises shut down & inspect.
- **Failure to follow this exact procedure can & will lead to premature camshaft wear which will NOT be covered by KCH Warranty.**

## Toyota 2TR-FE Torque Sequence

- HEAD BOLT P/N 30086006 QUANTITIES: 10 @ 104/52mm M11 x 1.25mm
- STEP ONE: 20Nm
- STEP TWO: 40Nm
- STEP THREE: Loosen all bolts
- STEP FOUR: 40Nm
- STEP FIVE: +90 Degrees
- STEP SIX: +90 Degrees
- IMPORTANT: ALL BOLT THREADS, BOLTHEADS AND WASHERS MUST BE LIGHTLY OILED.
- USING AN OLD HEADBOLT WITH GROOVE CUT DOWN THREAD, CLEAN THE BLOCK THREADS.



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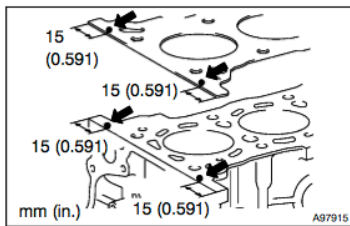
**0800-549-429**

## IMPORTANT NOTE

### Installing MLS (Multi-Layer Steel) Head Gaskets

NEVER employ any abrasive cleaning methods to the engine block or cylinder head mating surfaces. Such as sandpapering, scouring discs etc.

Use ONLY proper gasket scrapers and appropriate solvents. The surface finish of the mating surfaces is absolutely critical to the successful sealing of the MLS head gaskets.



#### 67. INSTALL CYLINDER HEAD GASKET

- (a) Apply a continuous bead (seal width: 4 to 7 mm (0.15 to 0.28 in.)) of seal packing to the cylinder block upper side and cylinder head gasket upper side as shown in the illustration.

**Seal packing: Part No. 08826-00100 or equivalent**  
**Seal width: 4 to 7 mm (0.15 to 0.28 in.)**

#### NOTICE:

- Remove any oil from the contact surface.
- Install the cylinder head gasket within 3 minutes after applying the seal packing.
- Install the cylinder head bolt within 15 minutes after applying the seal packing.
- Do not put into engine oil within 4 hours of installation.

- (b) Install a new cylinder head gasket on the cylinder block surface with the Lot No. stamp upper side facing upward.

#### NOTICE:

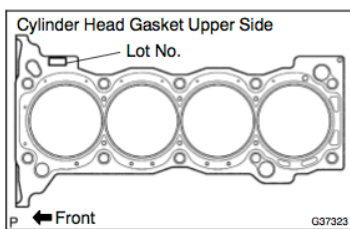
- Make sure that the installation direction is correct.
- Place the cylinder head gently to avoid damaging the gasket with the bottom part of the head.

#### 68. INSTALL CYLINDER HEAD SUB-ASSY

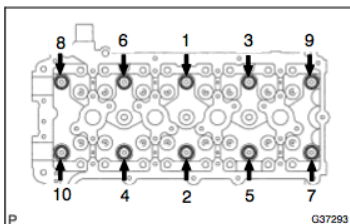
#### HINT:

The cylinder head bolts are tightened in 3 progressive steps.

- (a) Place the cylinder head on the cylinder block.  
 (b) Apply a light coat of engine oil to the threads and under the heads of the cylinder head bolts.



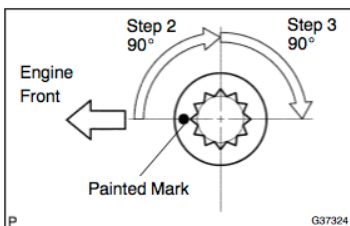
#### ENGINE MECHANICAL - PARTIAL ENGINE ASSY (2TR-FE)



#### (c) Step 1

- (1) Install and uniformly tighten the 10 cylinder head bolts with the plate washers, in several steps, in the sequence shown.

**Torque: 39 N·m (398 kgf·cm, 29 ft·lbf)**

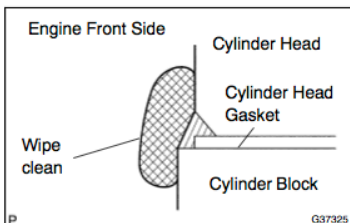


#### (d) Step 2

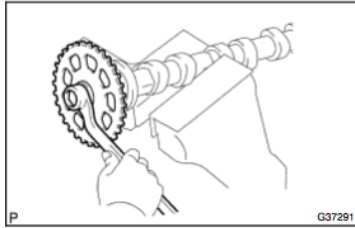
- (1) Mark the cylinder head bolt head with paint as shown in the illustration.  
 (2) Retighten the cylinder head bolts by 90°.

#### (e) Step 3

- (1) Retighten the cylinder head bolts by an additional 90°.  
 (2) Check that the painted mark is now facing rearward.



- (f) Seal packing will seep out on the engine's front side. Thoroughly wipe clean any seal packing.

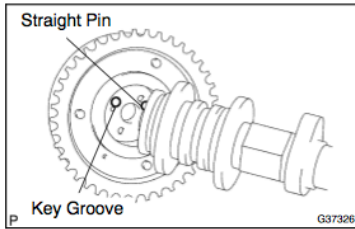


#### 69. INSTALL CAMSHAFT TIMING SPROCKET

- Clamp the camshaft in a vise and then install the camshaft timing sprocket to the camshaft with the sprocket bolt.  
**Torque: 78 N·m (795 kgf·cm, 58 ft·lbf)**

#### NOTICE:

Be careful not to damage the camshaft in the vise.



#### 70. INSTALL CAMSHAFT TIMING GEAR ASSY

- Put the camshaft timing gear and camshaft together by aligning the key groove and straight pin.
- Lightly press the gear against the camshaft, and turn the gear. Push further at the position where the pin enters the groove.

#### CAUTION:

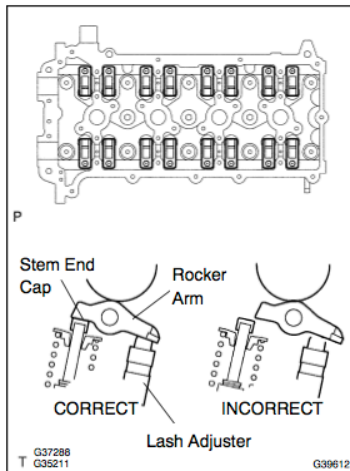
Be sure not to turn the camshaft timing gear in the retard direction (the right angle).

2TR-FE ENGINE REPAIR MANUAL (RM1152E)

14-30

ENGINE MECHANICAL - PARTIAL ENGINE ASSY (2TR-FE)

- Check that there is no clearance between the gear's fringe and the camshaft.
- Tighten the fringe bolt with the camshaft timing gear fixed.  
**Torque: 78 N·m (795 kgf·cm 58 ft·lbf)**
- Check that the camshaft timing gear can move in the retard direction (the right angle), and is locked at the most retarded position.

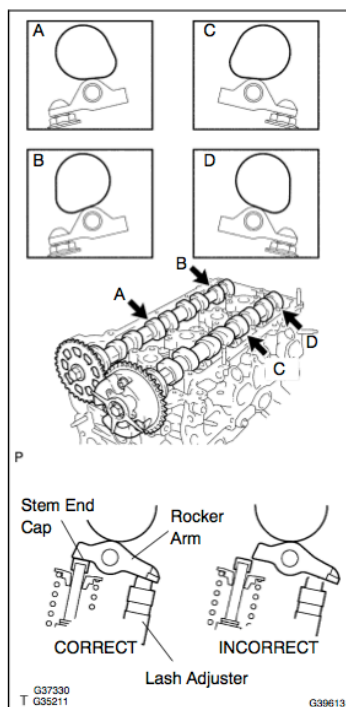


#### 71. INSTALL VALVE ROCKER ARM SUB-ASSY NO.1

- Set the 16 rocker arms to the lash adjusters.

#### NOTICE:

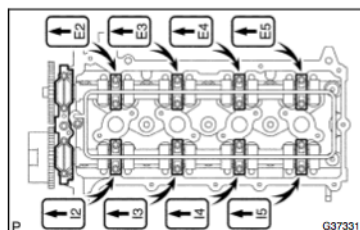
Before and after setting the camshaft and No.2 camshaft, firmly set the rocker arm to the lash adjuster.

**72. INSTALL CAMSHAFTS**

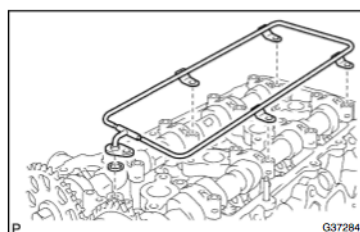
- Apply clean engine oil to the camshaft's cam portion and the cylinder head journals.
- Set the camshaft and No.2 camshaft as shown in the illustration.

**NOTICE:**

Before and after setting the camshaft and No.2 camshaft, firmly set the rocker arm to the lash adjuster.

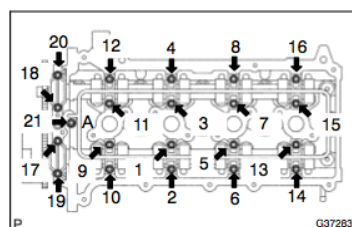
**73. INSTALL CAMSHAFT BEARING CAP**

- Temporarily install the camshaft bearing cap No.1.
- Check the proper location of each camshaft bearing cap No.2 and install them.



- Install a new O-ring to the camshaft bearing cap No.1.
- Temporarily install the oil delivery pipe.

2TR-FE ENGINE REPAIR MANUAL (RM1152E)



- Tighten the 21 bolts and 20 washers in the order shown in the illustration.

**Torque:**

12 N·m (122 kgf·cm, 9 ft·lbf) for bolt A

16 N·m (160 kgf·cm, 11 ft·lbf) for except bolt A

## **Importance of Testing Diesel Fuel Injectors**

“Improper Fuel Delivery” is a leading cause of Diesel Cylinder Head failure.

Faulty fuel injectors can & do cause serious engine damage! Never assume they are “ok”, always have them tested, serviced or replaced. They are critical to a healthy diesel engine.

- (d) Apply seal packing in a continuous bead to the timing chain cover as shown in the following illustration.

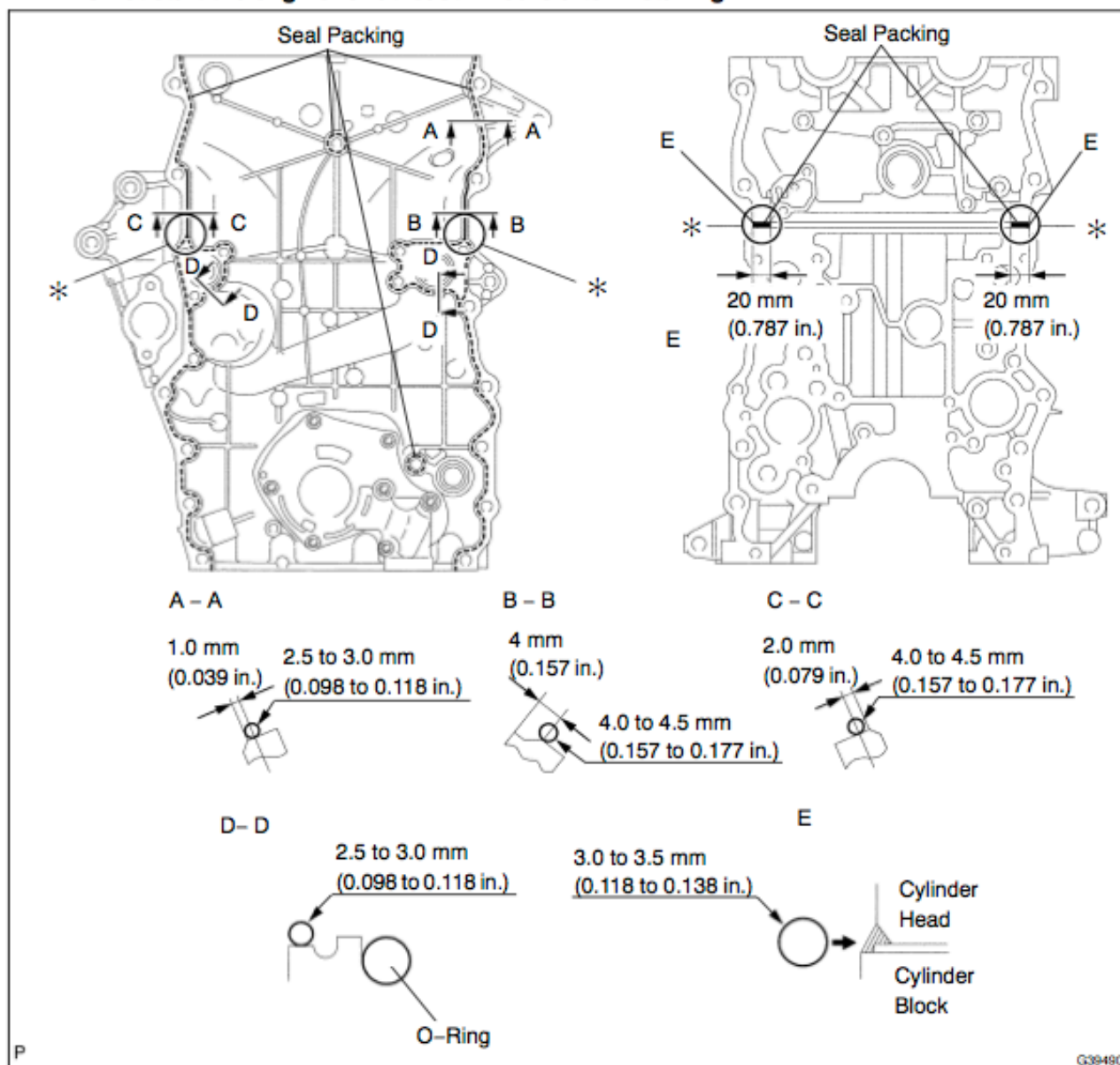
**Seal packing: Part No. 08826-00080 or equivalent**

**Seal width:**

Position	Specified Condition
A - A,	2.5 to 3.0 mm (0.098 to 0.118 in.)
B - B, C - C	4.0 to 4.5 mm (0.157 to 0.177 in.)
D - D	2.5 to 3.0 mm (0.098 to 0.118 in.)
E	3.0 to 3.5 mm (0.118 to 0.138 in.)

**NOTICE:**

- Be sure to clean and degrease the contact surfaces, especially 4 areas indicated by \* in the illustration.
- When the contact surfaces are wet, wipe off with an oil-free cloth before applying seal packing.
- Install the crankcase within 3 minutes and tighten the bolts within 15 minutes after applying seal packing.
- Do not start the engine for at least 4 hours after installing.



# Do you have ANY questions?

Please feel free to contact Kiwi Cylinder Heads if you have any questions or comments regarding any of our quality componants.

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## **Other Products Available from Kiwi Cylinder Heads**

- ☒ Head Gaskets
- ☒ Head Sets (VRS)
- ☒ Head Bolt Sets
- ☒ Rocker Cover Sets
- ☒ Manifold Sets
- ☒ Bottom Sets
- ☒ Timing Belt Kits
- ☒ Timing Chain Sets

- ☒ Water Pumps
- ☒ Thermostats
- ☒ EGR Coolers
- ☒ Engine Valves
- ☒ Cam Shafts
- ☒ Valve Shims
- ☒ Valve Train Components
- ☒ Hydraulic Lifters