

INSTALLATION INSTRUCTIONS

SUBJECT: FIRE RING HEAD GASKET MACHINING SPECIFICATIONS FOR 5.9L / 6.7L COMMON RAIL CUMMINS

FPE-2024-125
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Page 1 of 3

PRODUCT PN's: FPE-CUMM-H6-59-FR and FPE-CUMM-H6-67-FR

FLATNESS SPECIFICATIONS:

Measure and verify that the mating surfaces of the block and cylinder head are flat within the following tolerance:

- (+/-) 0.002" front to back
- (+/-) 0.001" side to side

FIRE RING SPECIFICATIONS:

- Outside fire ring diameter: 4.550 inches
- Inside fire ring diameter: 4.340 inches
- Fire ring center line diameter: 4.445 inches
- Wire diameter: 0.105 inches

MACHINING SPECIFICATIONS:

Fire ring groove width: 0.125 inches

Fire ring must be concentric to the injector bore in the cylinder head and/or cylinder bore in the engine block. For reference, the bore spacing is 120mm (4.72441 inches).

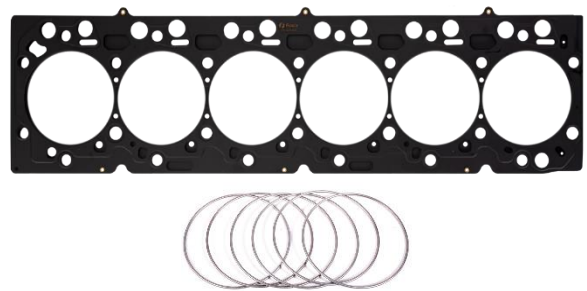
Use the center line of the fire ring to match to the mating fire ring groove in the cylinder head and/or the engine block.

Cylinder head only fire ring groove depth:

- 0.038-0.040 inches

Split fire ring groove (1/2 in the cylinder head, 1/2 in the engine block):

- 0.019- 0.020 inches in the engine block
- 0.019- 0.020 inches in the cylinder head



GROOVE RECOMMENDATIONS:

- Fleece Performance recommends the use of a radius groove for optimal performance of this gasket.
- For the highest horsepower applications Fleece Performance recommends splitting the machining of the fire ring groove (1/2 in the cylinder head, 1/2 in the engine block) for optimal performance.

STUD REQUIREMENTS:

- Head studs are **REQUIRED** for **ALL** fire ring applications.
- Fleece Performance requires the use of H11, 625 custom aged, or similar oversized stud that will allow for greater clamp load than the OEM cylinder head fastener.
- This fire ring head gasket is not intended to be used with OEM cylinder head fasteners or 12mm ARP 2000 head studs.

INSTALLATION INSTRUCTIONS

FIRE RING HEAD GASKET AND CYLINDER HEAD INSTALLATION PROCEDURE:

STEP 1: Clean and prepare the engine block deck surface. Ensure flatness is within Cummins published tolerances. Place the head gasket on the engine block surface.

STEP 2: Place the fire rings inside the head gasket and orient the fire ring weld seams as shown at right. Front and rear cylinder ring seams should face directly outward (Front and Back). Cylinders 2-5 should face sideward, within the lines shown in green. NEVER glue or adhesive the fire rings to the cylinder head.

STEP 3: Inspect all alignment dowels in the block. Replace all dowels with FPE-CUMM-CYLHD-KIT or Cummins P/N 3902343. Carefully set the head onto the block, ensuring that the head is fully seated onto the engine block.

Inspect all stud holes in the block. Use compressed air to remove any oil or coolant prior to installing the cylinder head and head studs.

STEP 4: Install studs into the block per the manufacturer's guidelines.

Links to stud manufacturer's instructions:

[ARP 625 Installation Instructions](#)

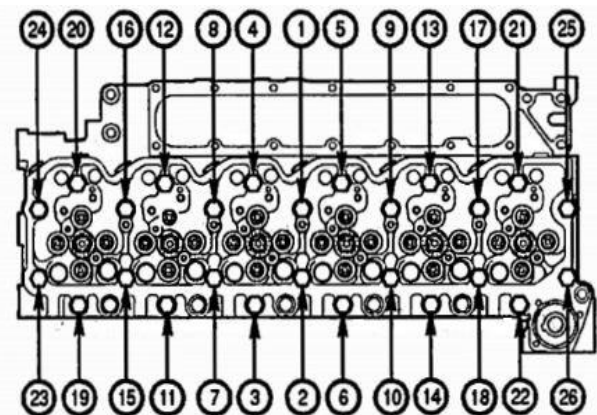
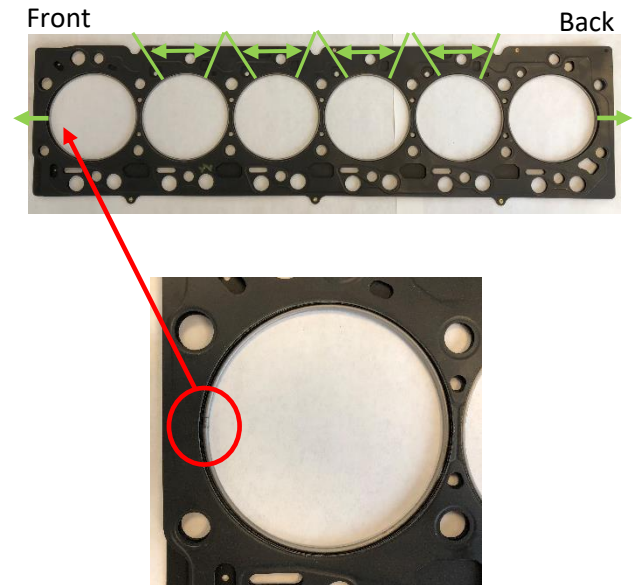
[Haisley Machine L19 Installation Instructions](#)

Using an ARP thread lubricant, such as ultra-torque, lubricate the top side of the washer, bottom of the nut, and threads of the studs. Install washes and nuts onto each of the studs.

STEP 5: Torque in the proper sequence as shown at right. Torque as recommended by the stud manufacturer.

STEP 6: Install all injectors, starting the with the two bolts that hold the injector down first, but do not tighten them. Install the crossover torque to 39 ft-lbs. Torque the injector hold-downs to 89 in-lbs.

STEP 7: Lubricate both ends of the push tubes and install them, making sure they are fully seated into the tappet.



INSTALLATION INSTRUCTIONS

STEP 8: Lubricate the tops of the valves and re-install the OEM rocker bridges with the indicating marks (dots) facing the exhaust side OR install Fleece Performance rocker bridges (FPE-BRAB-C1).

STEP 9: Prior to rocker arm installation ensure all valve lash adjusters are COMPLETELY backed off by loosening the adjusting nut and backing off the adjusting screw (see image at right). Lubricate the tops of the bridges and install the rocker arm assemblies, torque OEM bolts to 27 ft-lbs.

STEP 10: Lash valves per guidance from your cylinder head manufacturer.

STEP 11: Install lower valve cover and injector harness.

NOTE: The rear of the lower valve cover will require modification for the stud clearance. Reference ARP instructions included with the studs.

STEP 12: Prepare to start and run the engine. This will be performed without coolant in the system.

Start the engine and allow it to idle until the oil temperature reaches 180F. Shut off the engine.

NOTE: Oil temperature is most easily measured using an infrared thermometer on the oil filter housing.

STEP 13: Remove injector harness and lower valve cover. Remove exhaust rockers.

STEP 14: Re-torque all studs. Start at 100 ft-lbs, then increase to the stud manufacturer's hot torque spec.

STEP 15: Re-install exhaust rockers. Torque to 27 ft-lbs.

STEP 16: Re-lash valves per guidance of your cylinder head manufacturer. Valve lash will have changed due to compression of the fire rings.

STEP 17: Install lower valve cover, injector wiring, and upper valve cover. Add clean coolant and check for leaks.

