HYUNDAI **Technical Service Bulletin**	GROUP **FUEL SYSTEM**	NUMBER **19-FL-001H**
	DATE **FEBRUARY, 2019**	MODEL(S) **All Theta GDI Engines**

SUBJECT: SPECIAL SERVICE INFORMATION AND SPECIFICATIONS FOR GDI HIGH PRESSURE FUEL SYSTEMS

This bulletin supersedes TSB 10-FL-019 to include updates to the Applicable Vehicles and revisions to the Service Information.

Description:
In a gasoline direct injection (GDI) engine, highly pressurized gasoline is injected via a common rail fuel line and injectors that deliver fuel directly into the combustion chamber of each cylinder. In comparison, in a conventional multi-point fuel injection (MPI) engine, relatively low pressure gasoline is injected into the intake port of each cylinder. Due to high fuel pressures in a GDI system, servicing the GDI system requires special attention and handling procedures. This bulletin provides special service information and specification for the GDI fuel system components. The following aspects of the GDI fuel system will be outlined:

- **A. Fuel Pressure Specifications**
- **B. High Pressure Fuel System Tightening Torque**
- **C. SST For Tightening High Pressure Fuel Pipe Flare Nuts**
- **D. High Pressure Fuel System Residual Pressure Warning**
- **E. High Pressure Fuel Pump Installation**
- **F. High Pressure Fuel Rail and Fuel Injector Installation**
- **G. High Pressure Fuel Pipe Installation**

Applicable Vehicles:
- All models equipped with Theta 2.0T / 2.4L Gasoline Direct Injection engines listed below.
  - 2011-2014MY Sonata (YF) 2.0T and 2.4L
  - 2015-2019MY Sonata (LF) 2.0T and 2.4L
  - 2013-2018MY Santa Fe Sport (AN) 2.0T and 2.4L
  - 2019MY-current Santa Fe (TM) 2.0T and 2.4L
  - 2014-2015MY Tucson (LM) 2.4L
  - 2018MY-current Tucson (TL) 2.4L
  - 2019MY-current Veloster N (JSN) 2.0T

Service Information:

A. Fuel Pressure Specifications

MPI (Theta 2.0L/2.4L)	GDI (Theta 2.0T/2.4L)
42 ~ 64 PSI (Regulated by Fuel Pressure Regulator)	290 ~ 3,626 PSI* (High Pressure Fuel Line)

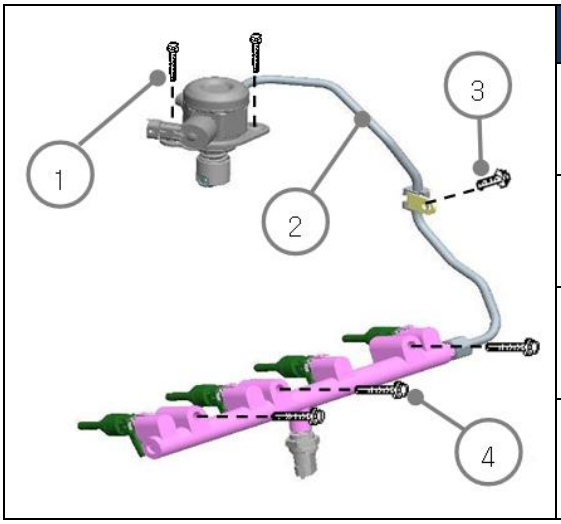
NOTE: The GDI high pressure fuel system operates at considerably higher fuel pressures than the conventional MPI fuel system. (*Maximum operating pressure varies depending on model.)

B. High Pressure Fuel System Tightening Torque

⚠ CAUTION

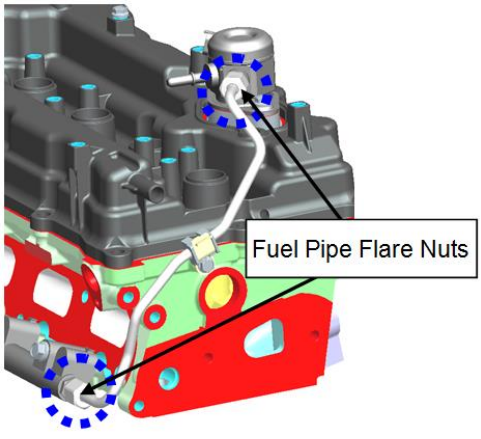
When installing the high pressure fuel pump, fuel pipe, fuel rail, or any fuel injectors, be sure to follow the tightening torque specifications listed in the table below using a torque wrench. This is important since these are the main components of the high pressure fuel system.

- **Initially, hand-thread the fasteners fully without a tool.**
- **During this time, check the proper positioning of the fittings and components.**
- **Afterwards, tighten using the specified sequence and final torque using a torque wrench.**
- **If the fasteners are not tightenened in a straight line with the mating bolt holes or fittings, fuel leaks may result due to broken fasteners or damaged threads.**



	Component Item / Description	Tightening Torque
1	High Pressure Fuel Pump Mounting Bolts	**13.7 Nm (10.1 lb-ft)**
2	High Pressure Fuel Pipe and Flare Nuts	**29.5 Nm (21.8 lb-ft)**
3	High Pressure Fuel Pipe Bracket Clamp Bolt	**10.8 Nm (8 lb-ft)**
4	High Pressure Fuel Rail Mounting Bolts	**21 Nm (15.5 lb-ft)**

C. SST For Tightening High Pressure Fuel Pipe Flare Nuts

Tool Name	Tool Part Number	Use	Location of Flange Nuts
Flare Nut Tool	09314-3Q100	 For tightening the flare nuts on both ends of the high pressure fuel pipe.	

Figure

(SST available through Bosch at 1-866-539-4248)

D. High Pressure Fuel System Residual Pressure Warning

⚠WARNING

Whenever the high pressure fuel pump, fuel pipe, fuel rail, or any fuel injectors are removed immediately after shutting off the engine, an injury may be caused by the release of highly pressurized fuel. Therefore, release the residual pressure in the high pressure fuel line by referring to the "Fuel System – Fuel Delivery System" section in the appropriate shop manual before removing the high pressure fuel system.

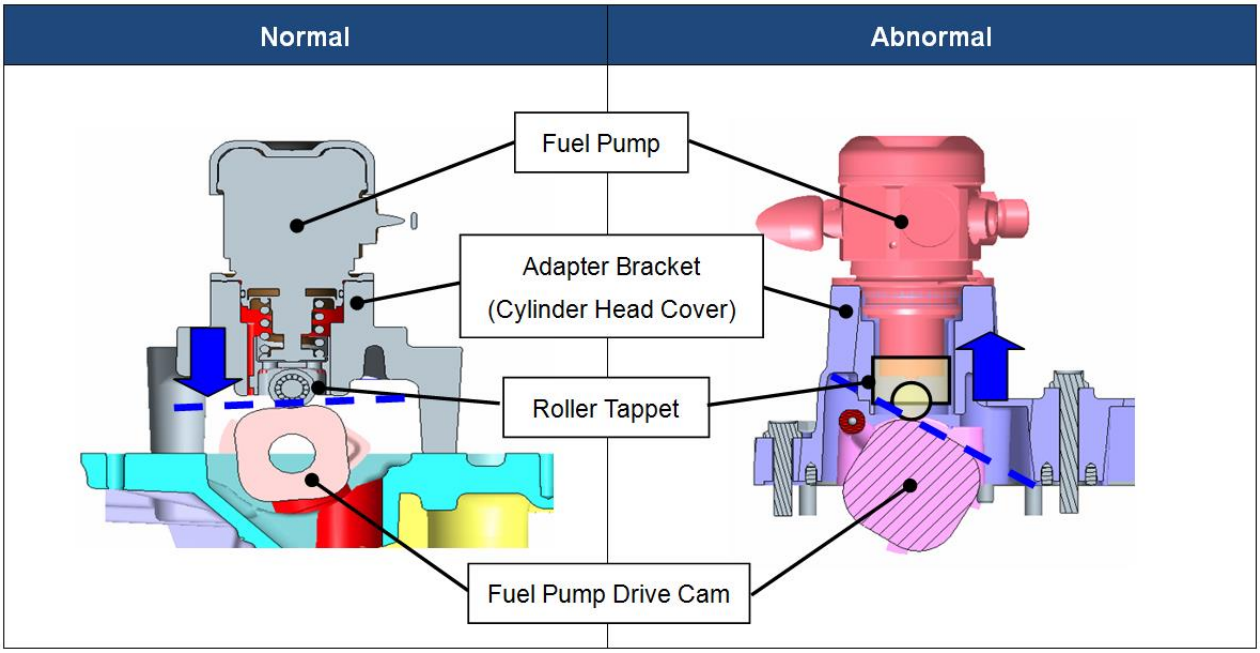
[Summary of Residual Fuel Pressure Release Procedure]
1) Remove the fuel pump relay.
2) Start the engine and let it idle until the engine stops.
3) Turn the ignition to OFF and then reinstall the fuel pump relay.
4) Prior to repair completion, clear any DTC's related to disconnecting the fuel pump relay.

E. High Pressure Fuel Pump Installation

Before installing the high pressure fuel pump:
1) Place the roller tappet to the lowest position.
2) Rotate the crankshaft to position the fuel pump drive cam to the flat part of the lobe (see below).

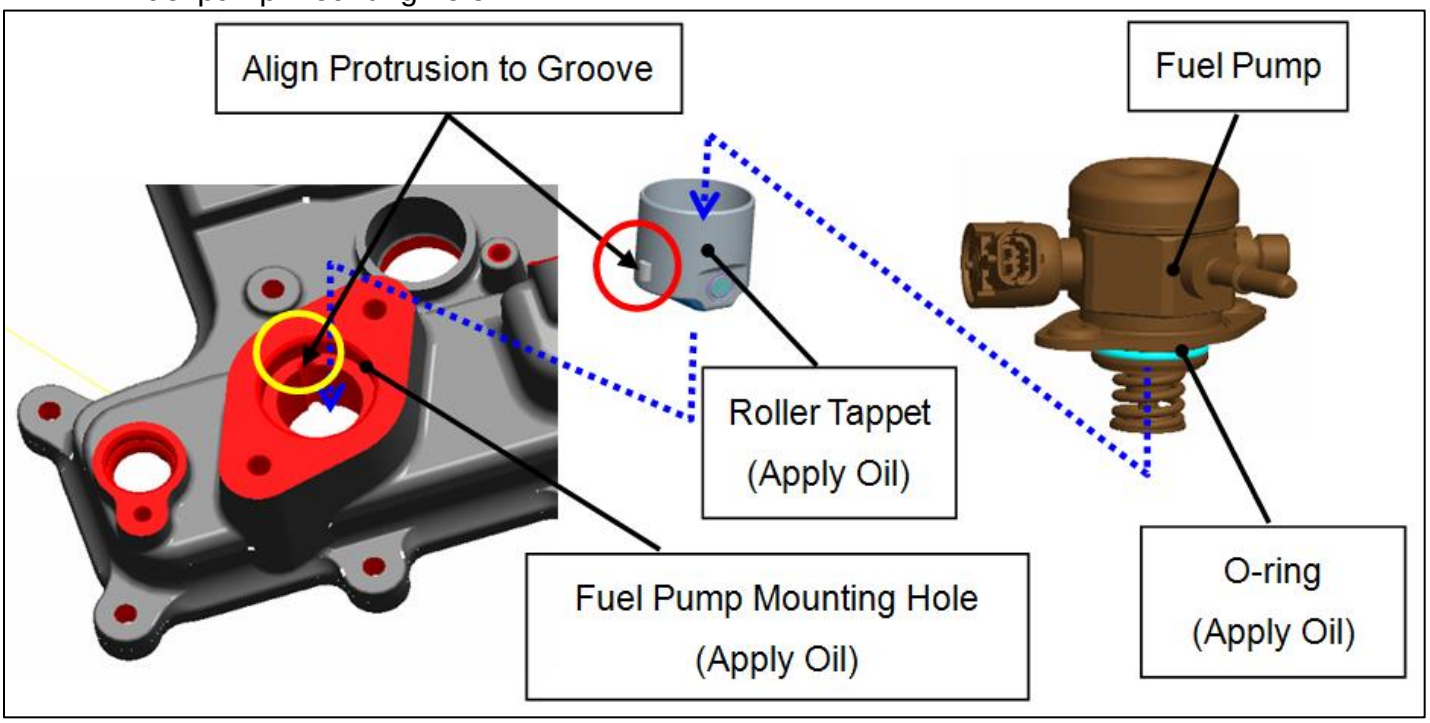
⚠CAUTION

If the roller tappet of the fuel pump is not placed in the lowest position during installation, the fuel pump may be positioned improperly, which may result in fuel pump piston damage, broken bolt threads, O-ring tear, etc.



- During a repair requiring fuel pump removal, cover the exposed fuel pump mounting hole in the adapter bracket to prevent any foreign substance or debris contamination.
- Do not reuse the fuel pump mounting bolts.
  - Once the fuel pump is removed, the removed bolts must be replaced with new ones.

- Do not drop the fuel pump.
  - External impacts may damage the internal components of the fuel pump.
  - If this has occurred, confirm proper operation through performance tests prior to reuse.
- Before installing the fuel pump into the adapter bracket, be sure to apply clean engine oil evenly over the entire surface of the O-ring, roller tappet and fuel pump mounting hole. When installing the fuel pump, align the protrusion on the roller tappet to the groove in the fuel pump mounting hole.



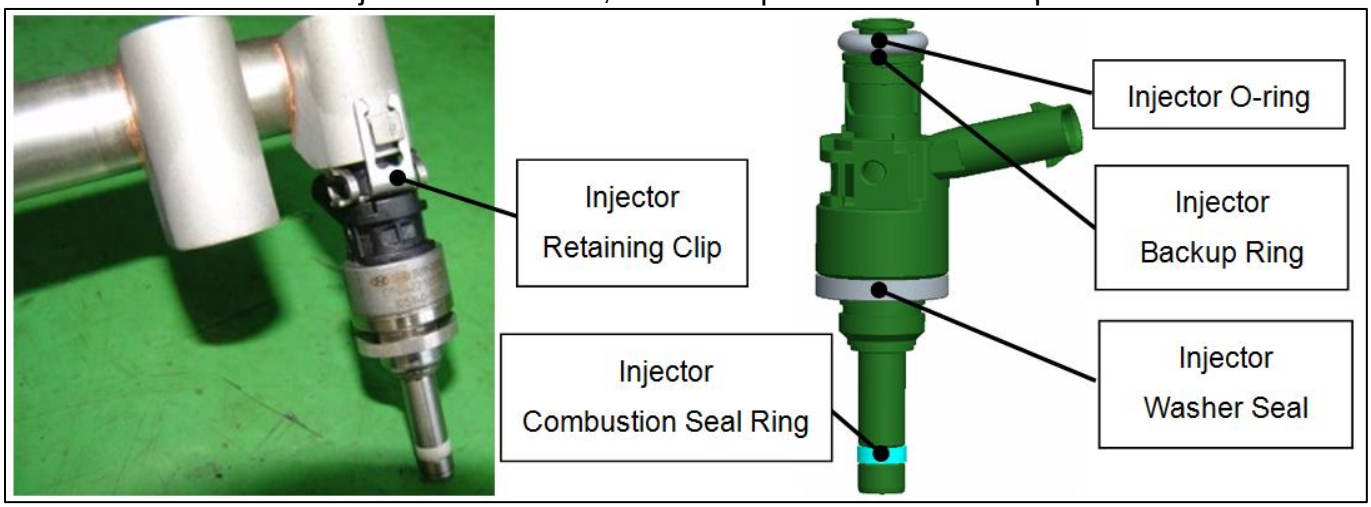
- When fastening the fuel pump mounting bolts:
  - Hand-thread the fasteners first.
  - Then gradually tighten 1/2 turn at a time while alternating between the two bolts in several cycles using a torque wrench to the specified torque of 13.7 Nm (10.1 lb-ft).

⚠ CAUTION

Failure to follow this procedure will cause misalignment to the assembly due to internal spring tension of the fuel pump and can result in damage to the adapter bracket.

F. High Pressure Fuel Rail and Fuel Injector Installation

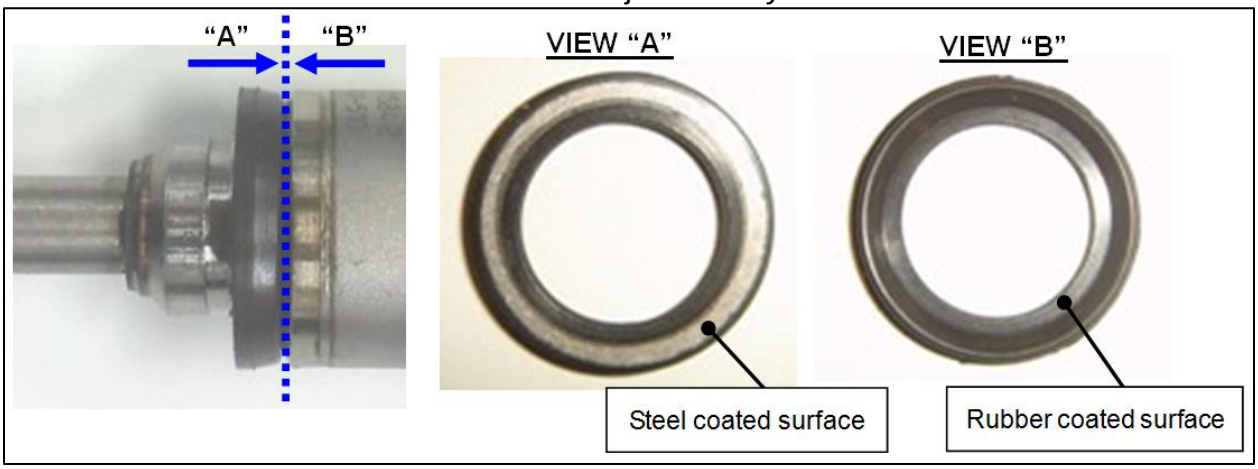
- Do not reuse the high pressure fuel rail mounting bolts.
  - Once the fuel rail is removed, the bolts must be replaced with new ones.
- Do not reuse the injector retaining clip, O-ring, backup ring, washer seal and combustion seal ring.
  - Once an injector is removed, the 5 components must be replaced with new ones.



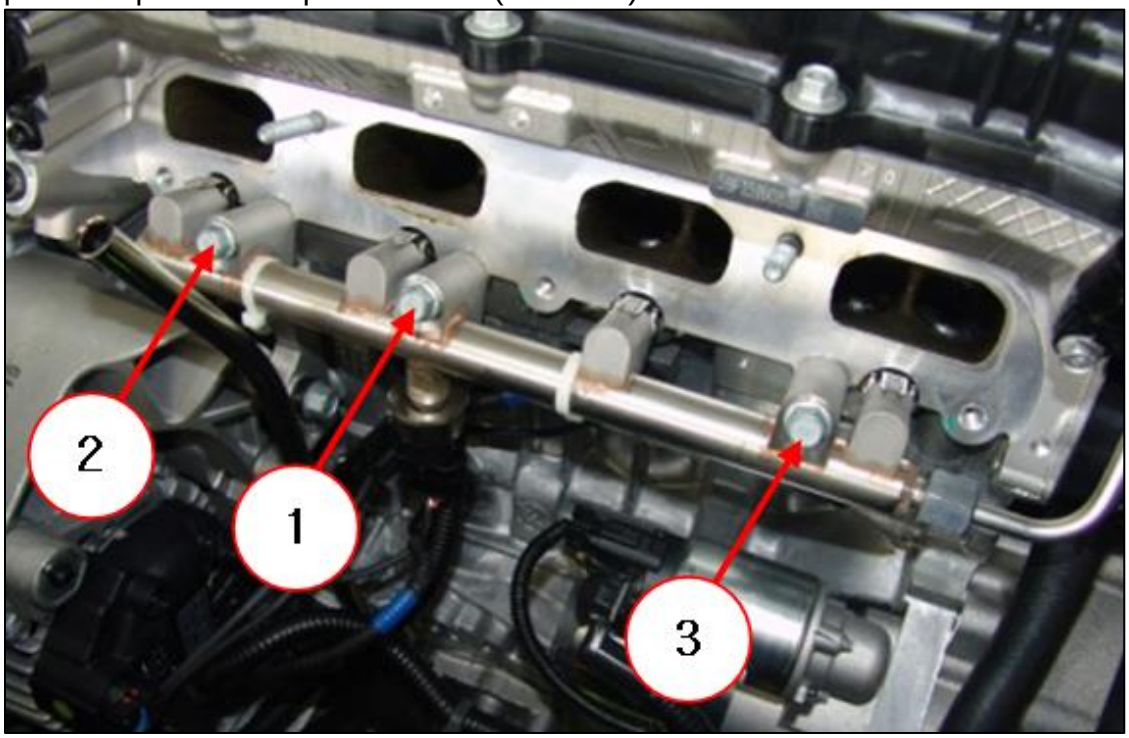
- When installing the combustion seal ring into the injector, use the SST 09353-2B000 (shown below) and refer to the "Fuel System - Engine Control System - Injector" section in the appropriate shop manual.

Tool Name	Tool Number	Components	
Injector Combustion Seal Ring Installer	**09353-2B000** (Essential tool available through Bosch at 1-866-539-4248)		① Sizing Tool ② Guide ③ Pushing Tool

- When installing the washer seal into the injector, the rubber coated surface of the washer seal should come into contact with the injector body.



- Before installing the injectors into the fuel rail, be sure to apply clean engine oil evenly over the entire surface of the injector O-ring.
    - Be careful not to apply engine oil over the combustion seal ring.
- Avoid dropping the fuel rail (including the injectors) or bumping it into any hard objects since damage to the internal components may occur.
    - If necessary, visually inspect and confirm proper operation with performance tests prior to reuse.
- Before installing the injector into the injector hole in the cylinder head, clean the injector hole and avoid contaminants from depositing inside the injector hole.
    - When inserting the injector, avoid bumping the injector tip into any of the surrounding components since the tip may become damaged from the impact.
- When fastening the high pressure fuel rail mounting bolts, first hand-tighten them fully and then tighten the 3 bolts in sequence (1-2-3 order shown below) gradually in several cycles up to the specified torque of 21 Nm (15.5 lb-ft).

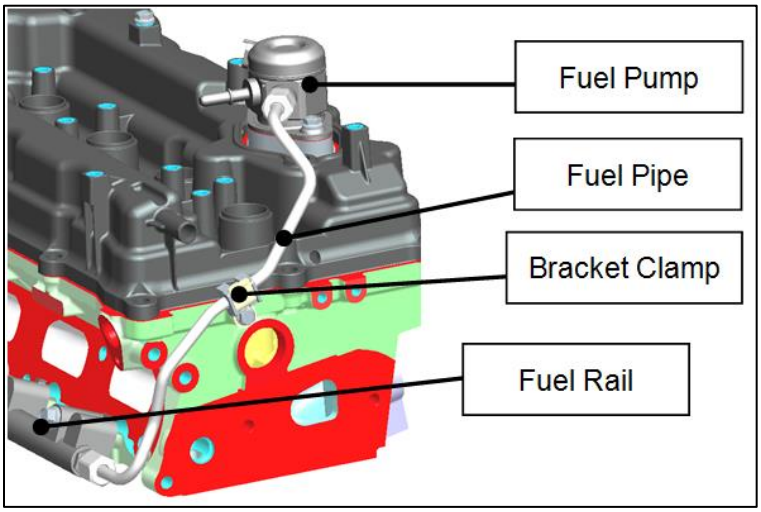


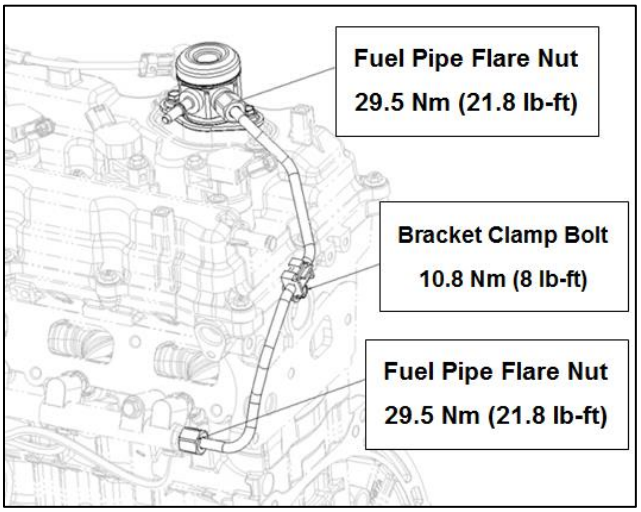
⚠ CAUTION

Do not tighten the bolts completely all at once to prevent damage to the injectors. Fasten the bolts gradually in the above order. The fuel rail should move less than 3 mm, whenever each bolt is tightened.

G. High Pressure Fuel Pipe Installation

- Do not reuse the fuel pipe.
  - Once the fuel pipe is removed, it must be replaced with a new one.
- There are protective caps on both ends of the replacement fuel pipe to prevent foreign substances from flowing into the fuel pipe.
  - Remove the caps prior to installing the fuel pipe to the fuel pump and the fuel rail.
- **Install the high pressure fuel pipe using the correct sequence**.
  1) Sufficiently hand-tighten the fuel pipe flare nuts to connect the fuel pipe ends onto the fuel pump and fuel rail.
  2) After attaching the bracket clamp to the high pressure fuel pipe, hand-tighten the clamp bolt onto the cylinder head and then completely tighten it to 10.8 Nm (8 lb-ft).
  3) Use a torque wrench and flare nut tool to completely tighten the fuel pipe flare nuts positioned at both ends of the fuel pump and the fuel rail to **29.5 Nm (21.8 lb-ft)**.





⚠ CAUTION

Be careful not to tilt the flare nut tool socket when tightening the flare nuts. Keep the tool in line with the flare nut while applying final tightening torque.