



# HYUNDAI

## Technical Service Bulletin

GROUP

ENGINE

NUMBER

21-EM-003H

DATE

MARCH, 2021

MODEL

Multiple Models

**SUBJECT:**

ENGINE OIL CONSUMPTION INSPECTION  
AND REPAIR GUIDELINES

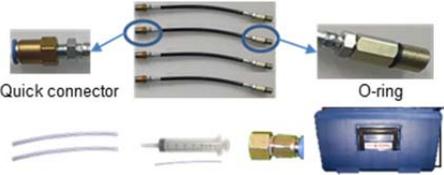
**Description:**

This bulletin provides the inspection procedure and repair guidelines for certain vehicles listed below.

**APPLICABLE VEHICLES:** All Model & All MY equipped with 4-Cylinder Gasoline Engine

**Parts Information:**

Special Service Tools and Cleaning Fluid Supplies

PART NAME	PART NUMBER / DESCRIPTION		NOTES
CLEANING FLUID	<b>00232-19103</b> Valvoline Professional Series Intake Cleaner #884526 (18oz)		P/N 00232-19103 (12 bottles per order)  Use (1) 18oz bottle of Valvoline Intake Cleaner per 1 vehicle.
CLEANING KIT	 Quick connector      O-ring <b>KQ234-C6100FFF</b>		CLEANING KIT Set (All components)
CLEANING KIT (Individual components)	KQ234-C6101FFF		Adaptor 4EA
	KQ234-C6102FFF		Hose 2EA
	KQ234-C6103FFF		Syringe & Hose 2EA
	KQ234-C6104FFF		Pressurization Adaptor 1EA
	KQ234-C6105FFF		KIT case 1EA
SECURITY SEAL	 <b>00232-19083</b> Steelman Security Seal		P/N 00232-19083 (10 pack)  Each (1) tube can be used for at least 20 vehicles.  Dealer may claim .20 in sublet amount for each use.

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Engine Long-Block (Applicable Vehicles up to 18MY and prior)

PART NAME	PART NUMBER		NOTES
ENGINE LONG BLOCK Sonata 2.4/2.0T (11-14MY)	2.4 GDI	21101-2GK50QQHRM	YFa 11-14MY (ULEV) YFa 11-13MY (SULEV)
		21101-2GK70QQHRM	YFa 11-14MY (ULEV) YFa 14MY (SULEV)
	2.0 T-GDI	21101-2GK60QQHRM	YFa 11-13MY
		21101-2GK80QQHRM	YFa 14MY
ENGINE LONG BLOCK Santa Fe Sport (13-18MY)	2.4 GDI	21101-2GK01QQHRM	AN 13MY
		21101-2GK02QQHRM	AN 14-16MY
	2.0 T-GDI	21101-2GK03QQHRM	AN 13MY
		21101-2GK04QQHRM	AN 14-16MY
	2.4 GDI	21101-2GK31QQH/RM	AN 17-18MY
	2.0 T-GDI	21101-2GK32QQH/RM	AN 17-18MY
ENGINE LONG BLOCK Sonata 2.4/2.0T (15-18MY)	2.4 GDI	21101-2GK31QQH/RM	LFa 15MY
		21101-2GK33QQH/RM	LFa 16MY (no ATF Warmer)
		21101-2GK34QQH/RM	LFa 16-18MY (w/ ATF Warmer)
	2.0 T-GDI	21101-2GK32QQH/RM	LFa 15-18MY
ENGINE LONG BLOCK Tucson (14-15MY /18MY)	2.4 GDI	21101-2GK36QQH/RM	LM 14-15MY
	2.4 GDI	21101-2GK52QQH	TL 18MY
ENGINE LONG BLOCK Veloster 1.6 (11-16MY)	1.6 GDI	21101-2BK04FFF/FFHRM	FS w/MT
		21101-2BK05FFF/FFHRM	FS w/DCT

**NOTE:** Pay attention to the unique part numbers for specific year, engine type, and emission level. Reman Engines must be ordered whenever it is available. Reman Engine: P/N(QQHRM or FFHRM)

Service Kit (Required if ordering Engine Long-Block P/N's listed above)

PART NAME	ENGINE SPEC	PART NUMBER
SERVICE KIT 1 (YFa 11-14MY)	2.4 GDI	21111-2GK50QQH
	2.0 T-GDI	21111-2GK60QQH
SERVICE KIT 2 (YFa 11-14MY)	2.4 GDI / 2.0 T-GDI	21111-2GK70QQH
SERVICE KIT 1 (AN 13-16MY)	2.4 GDI	21111-2GK50QQH
	2.0 T-GDI	21111-2GK60QQH
SERVICE KIT 2 (AN 13-16MY)	2.4 GDI	21111-2GK70QQH
	2.0 T-GDI	21111-2GK80QQH
SERVICE KIT 1 (AN 17-18MY)	2.4 GDI	21111-2GK51QQH
	2.0 T-GDI	21111-2GK52QQH
SERVICE KIT 2 (AN 17-18MY)	2.4 GDI	21111-2GK71QQH
	2.0 T-GDI	21111-2GK73QQH
SERVICE KIT 1 (LFa 15-18MY)	2.4 GDI	21111-2GK51QQH
	2.0 T-GDI	21111-2GK52QQH
SERVICE KIT 2 (LFa 15-18MY)	2.4 GDI	21111-2GK71QQH
	2.0 T-GDI	21111-2GK72QQH
SERVICE KIT 1 (LM 14-15MY)	2.4 GDI	21111-2GK50QQH
SERVICE KIT 2 (LM 14-15MY)	2.4 GDI	21111-2GK70QQH
SERVICE KIT 1 (TL 18MY)	2.4 GDI	21111-2GK51QQH
SERVICE KIT 2 (TL 18MY)	2.4 GDI	21111-2GK71QQH

**Engine Sub-Assembly (Applicable 19MY Vehicles)**

PART NAME	PART NUMBER		REMARK
SUB ENGINE Sonata (LFa 19MY)	2.4 GDI	21101-2GK18HRM	Service Kit Not Applicable
	2.0 T-GDI	21101-2GK16HRM	
SUB ENGINE Tucson (TL19MY)	2.4 GDI	1T20G-2GA13FHRM	
SUB ENGINE Santa Fe (TMa 19MY)	2.4 GDI	21101-2GK18HRM	
	2.0 T-GDI	21101-2GK17HRM	
SUB ENGINE Veloster N (JSN 19MY)	2.0 T-GDI	1T05T-2GA14FHRM	

**NOTE:** For all other vehicles not listed above, refer to EPC for applicable engine part numbers.

**Warranty Information:**

OP CODE	OPERATION	OP TIME	NATURE	CAUSE
21000F00	Engine Oil Inspection (Initial Vehicle Preparation)	0.6 M/H	E71	ZZ1
21000F01	Engine Oil Inspection (After Mileage Accumulation), Combustion Chamber Cleaning and Tamper Sealing	2.3 M/H		
21000F02	Engine Oil Inspection (After Any Mileage Accumulation) Inspection Test Result: OK (No Engine R&R)	0.6 M/H		
21000F03	Engine Oil Inspection (After Cleaning and Retest) Inspection Test Result: NG (Requires Engine R&R)	0.6 M/H		

**NOTE:** For **Causal P/N** on all claims, use the applicable engine short block P/N listed in the EPC.

**Engine Replacement Op Codes:** Applicable only for vehicles listed below when engine replacement is required. Refer to Shop Manual for the latest engine R&R procedure.

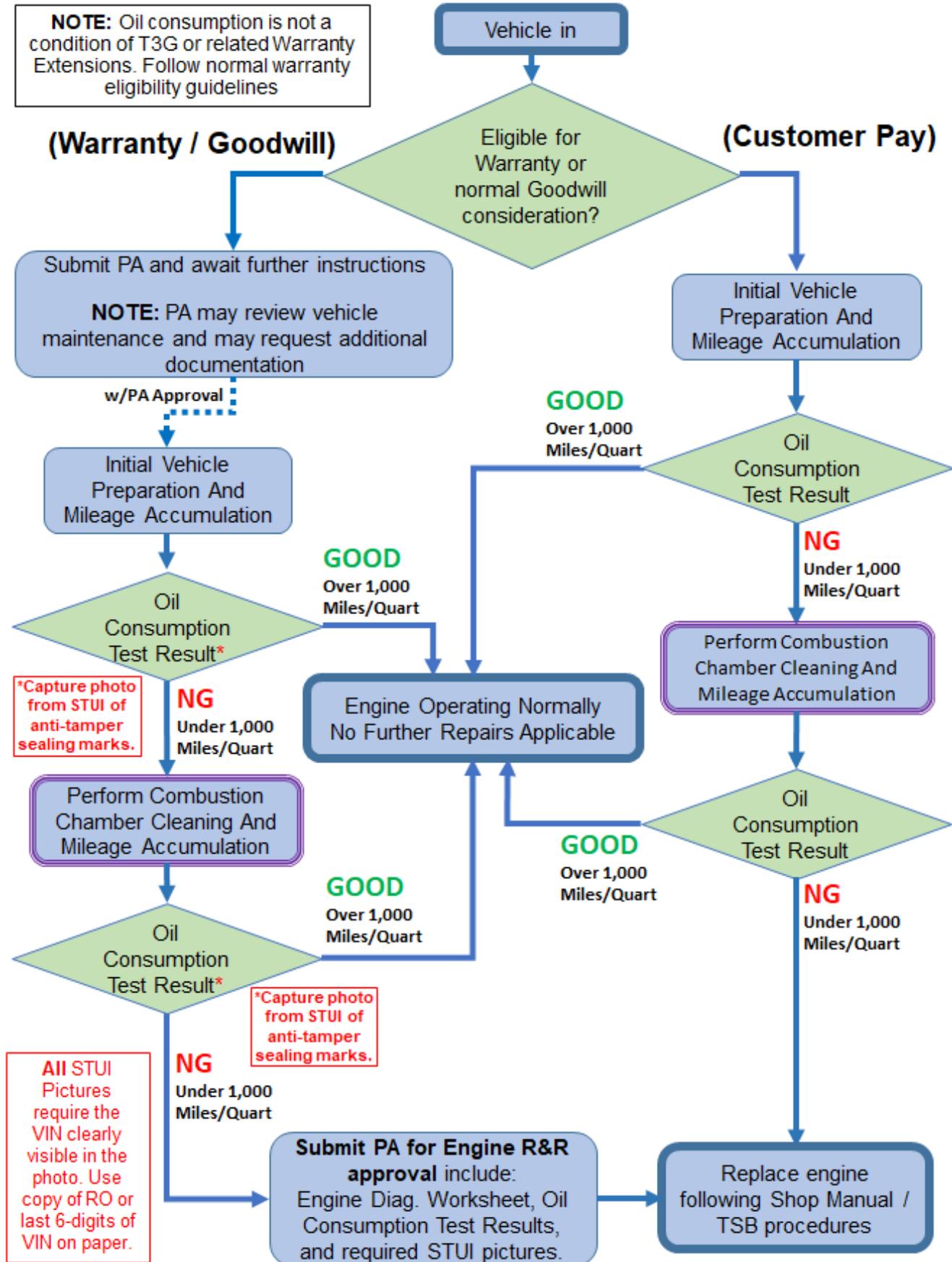
OP CODE	Model	ENGINE	Smart Cruise Control*	2WD/4WD	OP TIME	OPERATION	NATURE	CAUSE
21000F04	YF	2.0 T-GDI	NON-SCC	2WD	5.6	Engine Replacement	E71	ZZ1
21000F05	11-14MY	2.4 GDI	NON-SCC	2WD	5.3			
21000F06	LF	2.0 T-GDI	NON-SCC	2WD	6.3			
21000F07	15-18MY	2.4 GDI	NON-SCC	2WD	5.4			
21000F08	AN 13-18MY	2.0 T-GDI	NON-SCC	2WD	6.1			
21000F09		2.0 T-GDI	NON-SCC	4WD	6.3			
21000F10		2.4 GDI	NON-SCC	2WD	5.3			
21000F11		2.4 GDI	NON-SCC	4WD	5.6			
21000F12	LM	2.4 GDI	NON-SCC	2WD	5.2			
21000F13	14-15MY	2.4 GDI	NON-SCC	4WD	5.7			
21000F14	TL	2.4 GDI	NON-SCC	2WD	5.1			
21000F15	18MY	2.4 GDI	NON-SCC	4WD	5.5			

**NOTE\*:** For models equipped with Smart Cruise Control (SCC), submit additional Op Code below.

**Smart Cruise Control Adjustment Op Code:**

OP CODE	MODEL	OPERATION	OP TIME	NATURE	CAUSE
21000F17	Vehicles equipped with SCC	RADAR ADJUSTMENT	0.5 M/H	E71	ZZ1

**Service Procedure Overview:**

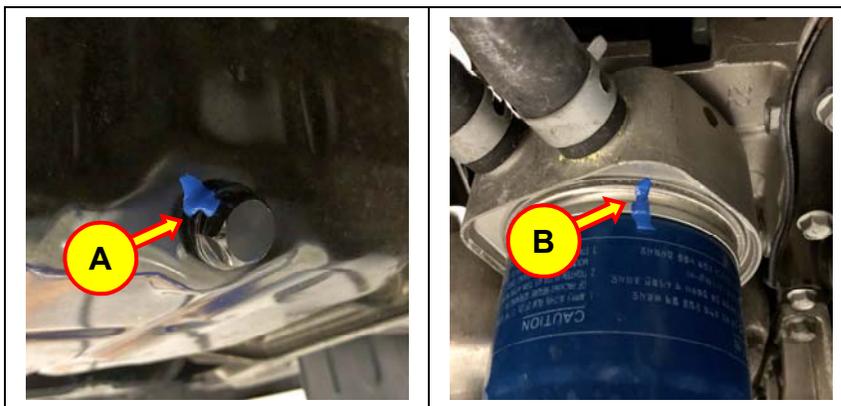


**NOTICE**

The procedure outlined in this **TSB does not apply if the engine is exhibiting abnormal noise or showing signs of internal damage.** Diagnose the existing condition and repair accordingly.

**Inspection Procedure:**

1. **Check vehicle service records and review the maintenance history.**  
For applicable warranty repair eligibility, confirm that the vehicle has received proper engine oil/filter change maintenance services within the intervals recommended by the applicable Owner's Manual. **(Not applicable if service is to be performed under customer pay.)**
  - Poor engine maintenance may cause insufficient or depleted engine oil, deteriorating its lubricating and cooling function. As a result, main engine parts can be damaged such as (A) excessive deposit of carbons, (B) oil sludge, and/or (C) abnormal wear on engine parts.
2. Perform the **"Engine Oil Inspection (Initial Vehicle Preparation)"** operation.
  - a) Check if there is sufficient engine oil in the engine prior to initial inspection.
    - If oil level is below "L", then record the observed level.
    - Inspect for any external oil leaks prior to initial inspection.
    - Add initial amount to above "L" as necessary.
  - b) Start the engine and allow it to idle for about 10 minutes, or until it reaches normal operation temperature.
  - c) Turn the engine 'OFF' and open the oil filler cap and allow the engine oil to settle down to the oil pan for at least 15 minutes.
  - d) Check the engine oil level using the oil level dipstick and refill the oil to the "F" line of the oil level dipstick. (5W-30 viscosity engine oil with API Service Grade of SN Plus or newer is recommended.)
  - e) Seal the oil drain plug and oil filter. **(Not applicable if service is done under customer pay.)**
    - Use of an anti-tamper marking product such as Steelman Security Seal (P/N 00232-19083) or equivalent is recommended to apply a marking line between two break points.
 
      - Apply a marking line (A) aligning the drain plug position to the oil pan.
      - Apply a marking line (B) aligning the oil filter position to the housing.
- f) From this point, vehicle must accumulate at least 1,000 miles of driving prior to next steps.
  - ❖ Use **Op Code 21000F00** "Engine Oil Inspection (Initial Vehicle Preparation)" for this visit.
    - **(Not applicable if service is to be performed under customer pay.)**



3. Perform the “**Engine Oil Inspection (After Mileage Accumulation)**” operation.
  - a) Check the sealing (oil filler cap, oil filter, oil level gauge, oil drain plug) and check if the engine oil has leaked/removed from the Initial Vehicle Preparation.
    - If the anti-tamper sealing is damaged (N/A if service is done under customer pay) or the engine oil has leaked, repeat (2) Engine Oil Inspection (Initial Vehicle Preparation) steps and repeat mileage accumulation.
    - If there were any oil leaks, it must be repaired prior to repeating the inspection.
  - b) Start the engine and allow it to idle for about 10 minutes, or until it reaches normal operation temperature.
  - c) Turn the engine ‘OFF’ and open the oil filler cap and allow the engine oil to settle down to the oil pan for at least 15 minutes.
  - d) Check the engine oil level using the oil level dipstick and refill the oil to the “F” line of the oil level dipstick while noting the amount being added. (5W-30 viscosity engine oil with API Service Grade of SN Plus or newer is recommended.)
  - e) Calculate the oil consumption amount according to the below.

$$\frac{\text{Driving Distance (Miles)}}{\text{Engine Oil Amount Added After Mileage Accumulation (Quart)}} = \text{Oil Consumption Amount (Miles/Quart)}$$

- If the oil consumption amount is **above 1,000 Miles/Quart**, then vehicle passes the oil consumption inspection test and repair is complete.
  - ❖ Use **Op Code 21000F02** “Engine Oil Inspection (After Any Mileage Accumulation), Inspection Test Result: OK (No Engine R&R)” for this visit.
    - **(Not applicable if service is to be performed under customer pay.)**
- If the oil consumption amount is **under 1,000 Miles/Quart**, then perform the **Combustion Chamber Cleaning** service procedure from the next page.

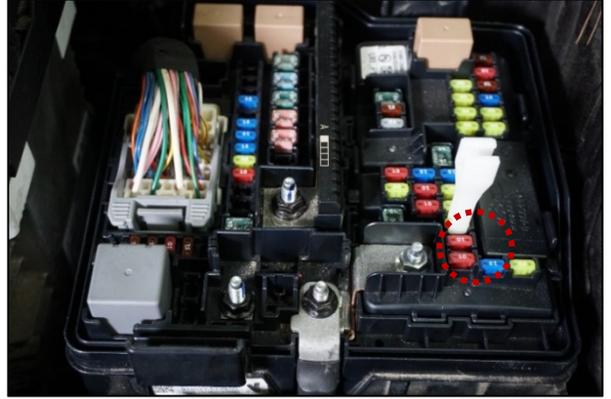
**Service Procedure:**

Perform **Combustion Chamber Cleaning** if vehicle did not pass the oil consumption inspection test.

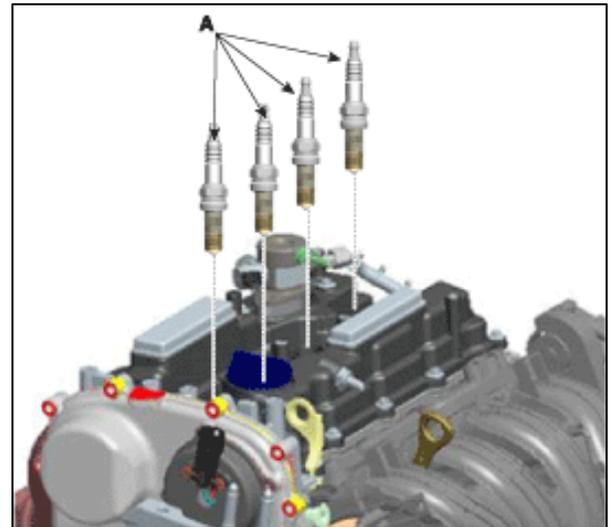
**NOTICE**

The following Combustion Chamber Cleaning procedure can also be at every 36,000 miles as part of a routine maintenance schedule for continued engine cleanliness.

1. Start the engine and allow it to idle for about 10 minutes, or until it reaches normal operation temperature.
2. Remove the fuel pump relay on fuse box. Exact location may vary depending on the model.



3. Disconnect the fuel control connector & ignition coil connector and remove the 4 spark plugs (A) according to the vehicle shop manual.



**NOTICE**

Use an air blow gun to clear out any debris from each spark plug tube before removing each of the spark plugs.

4. Inject the cleaning fluid into the cylinders through the spark plug hole.

➤ Add at least 50cc\* to each cylinder.

\*Specification: Minimum 50cc / Maximum 66.5cc

**NOTICE**

❖ When using **Valvoline Intake Cleaner**, use up to 66.5cc for each fluid injection.



5. Pressurize each cylinder through the spark plug hole using the air bleeding tool (09580-3D100) or a pressurized cylinder leak-down testing tool.
  - Pressure: 30 - 45 PSI
  - Time: 3 minutes per each cylinder

**NOTICE**

Before pressurizing each cylinder by firing order 1-3-4-2, rotate the crank by hand to **TDC on the compression stroke** for each cylinder. This will contain the pressure so that the cleaning fluid can reach the piston ring lands.

6. Connect the hose & adaptor to each cylinder as shown on the right.
  - Connect the #1 and #3 cylinders together.
  - Connect the #2 and #4 cylinders together.

Then operate the starter (3 seconds / 3 times) to crank the engine and to create agitation of the cleaning fluid within the combustion chambers.

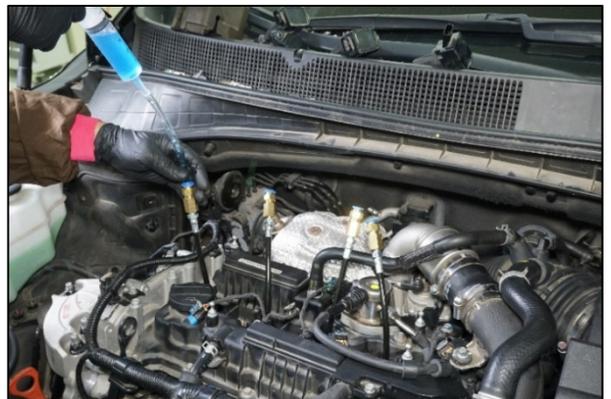
- Cleaning fluid will circulate between the hoses.

7. Remove the hose & adaptor from each cylinder. Then inject the cleaning fluid into the cylinders.
  - Add at least 50cc\* to each cylinder.

\*Specification: Minimum 50cc / Maximum 66.5cc

**NOTICE**

❖ When using **Valvoline Intake Cleaner**, use up to 66.5cc for each fluid injection.



8. Allow the cleaning fluid to soak in the combustion chamber for at least 8 hours.

**⚠ CAUTION**

Never turn the engine 'ON' until the cleaning procedure has been fully completed.



9. Remove all of the remaining cleaning fluid from the combustion chamber using a suction tool, a suitable pneumatic air operated fluid evacuator (as shown below), or a syringe



10. Crank the engine for 3 seconds. Repeat the process 2 more times after waiting 5 seconds in between.

**⚠ CAUTION**

Any residual cleaning fluid may escape out of the spark plug holes during the initial cranking process.

- To prevent any fluid splatter, insert shop towels onto each of the spark plug tubes when cranking.
- Immediately wipe any splashed residue from the vehicle.



11. Replace the engine oil with the filter according to the vehicle shop manual.

**NOTICE**

Recommended engine oil specification is 5W-30 Full Synthetic Type with a Service Grade of API SN PLUS/SP, ILSAC GF4/GF5 or higher.



12. Reinstall the fuel control connector & ignition coil connector and the 4 spark plugs.

**NOTICE**

Be sure to secure the lock tabs of each ignition coil connector.

13. Reinstall the fuel pump fuse in the fuse box.
14. Start the engine and maintain idle for about 10 minutes. While idling, briefly increase the engine speed to 3,000rpm for about 3 times to help further clear the combustion chambers.
15. Top off the engine oil level to “F”.
- Turn the engine ‘OFF’ and open the oil filler cap and allow the engine oil to settle down to the oil pan for at least 15 minutes.
  - Check the engine oil level using the oil level dipstick and refill the oil to the “F” line of the oil level dipstick. (5W-30 viscosity engine oil with API Service Grade of SN Plus or newer is recommended.)
  - Seal the oil drain plug and oil filter as described in Step 2e in Page 3.
  - Combustion Chamber Cleaning for this visit.
    - **(Not applicable if service is to be performed under customer pay.)**
16. From this point, vehicle must accumulate more than 1,000 miles of driving to determine the effectiveness of the combustion chamber cleaning repair .
- Use **Op Code 21000F01** “Engine Oil Inspection (After Mileage Accumulation), Combustion Chamber Cleaning and Tamper Sealing” for this visit.
    - **(Not applicable if service is to be performed under customer pay.)**
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17. Perform the “**Engine Oil Inspection (After Mileage Accumulation)**” operation again.
  - Check the sealing (oil filler cap, oil filter, oil level gauge, oil drain plug) and check if the engine oil has leaked/removed from the Initial Vehicle Preparation.
  - If the anti-tamper sealing is damaged (N/A if service is done under customer pay) or the engine oil has leaked, then the mileage accumulation has to be repeated after topping off the engine oil level back to “F”.
  - If there were any oil leaks, it must be repaired prior to repeating the inspection.
  - Start the engine and allow it to idle for about 10 minutes, or until it reaches normal operation temperature.
  - Turn the engine ‘OFF’ and open the oil filler cap and allow the engine oil to settle down to the oil pan for at least 15 minutes.
  - Check the engine oil level using the oil level dipstick and refill the oil to the “F” line of the oil level dipstick while noting the amount being added. (5W-30 viscosity engine oil with API Service Grade of SN Plus or newer is recommended.)
  - Calculate the oil consumption amount according to the below.

$$\frac{\text{Driving Distance (Miles)}}{\text{Engine Oil Amount Added After Mileage Accumulation (Quart)}} = \text{Oil Consumption Amount (Miles/Quart)}$$

- If the oil consumption amount is **above 1,000 Miles/Quart**, then vehicle passes the oil consumption inspection test and repair is complete.
  - ❖ Use **Op Code 21000F02** “Engine Oil Inspection (After Any Mileage Accumulation), Inspection Test Result: OK (No Engine R&R)” for this visit.
    - (Not applicable if service is to be performed under customer pay.)
- If the oil consumption amount is **under 1,000 Miles/Quart**, then replace the engine according applicable part number listed under the Part Information section of this TSB.
  - ❖ For repairs covered under warranty, submit PA with the completed Engine Diagnostic Worksheet required for engine R&R approval.
  - ❖ Use **Op Code 21000F03** “Engine Oil Inspection (After Cleaning and Retest), Inspection Test Result: NG (Requires Engine R&R)” for this visit and then additional Op Code(s) for the R&R portion of the engine.
  - ❖ Be sure to follow latest revised engine R&R procedure from the corresponding Shop Manual and this TSB (or updated LTS) for the appropriate Warranty Op Code.