



HYUNDAI

Technical Service Bulletin

GROUP	NUMBER
ENGINE	23-EM-007H
DATE	MODEL
DECEMBER 2023	Multiple Models

SUBJECT:	COMBUSTION CHAMBER CLEANING PROCEDURE
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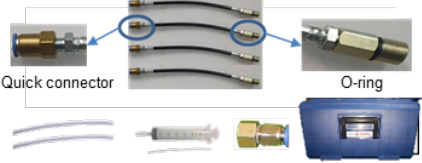





Description:

This bulletin provides the service procedure for Combustion Chamber Cleaning.

APPLICABLE VEHICLES: All Models & All MY equipped with 4-Cylinder Gasoline Engines

Parts Information:

Special Service Tools and Cleaning Fluid Supplies

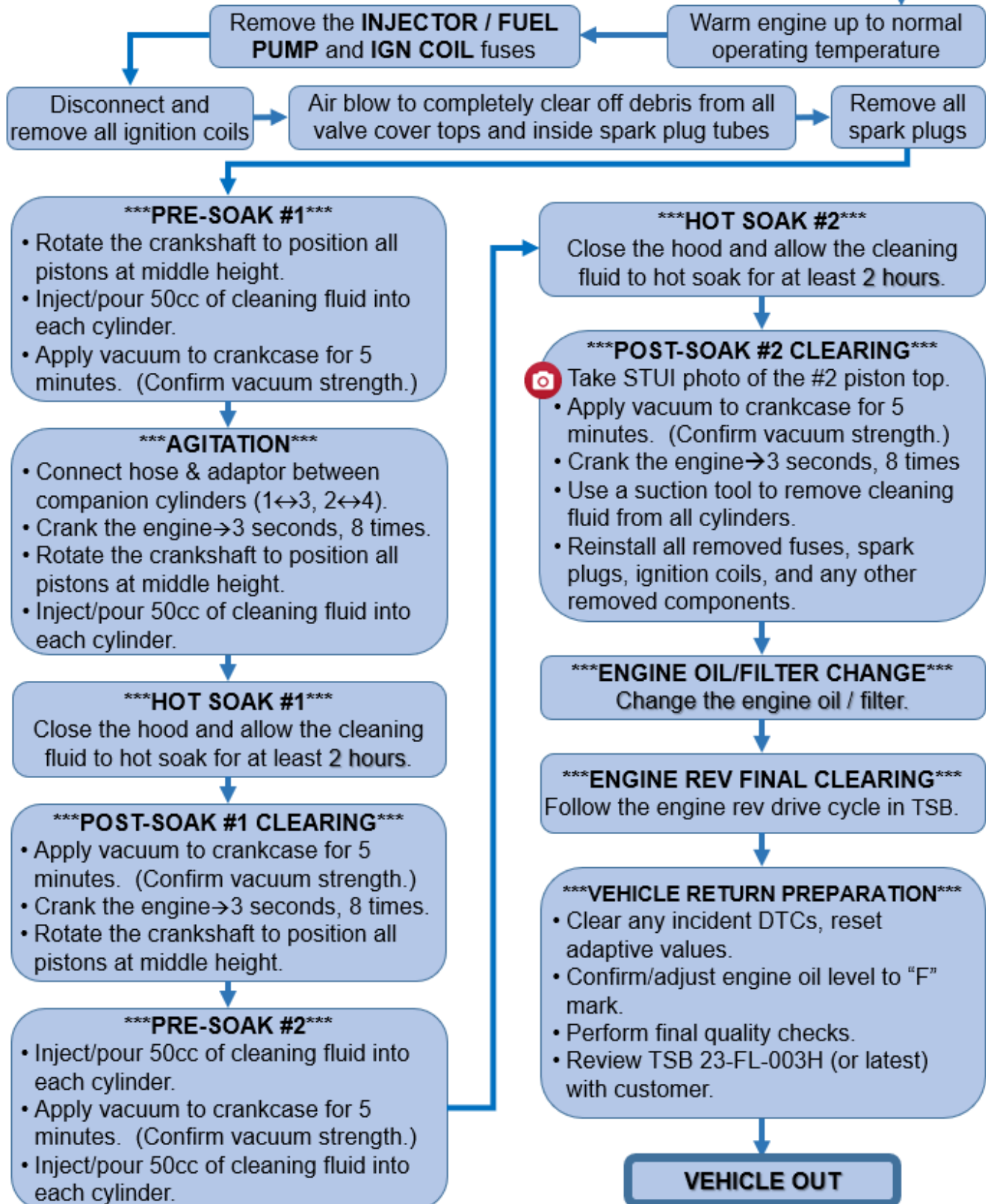
PART NAME	PART NUMBER / DESCRIPTION		NOTES
CLEANING FLUID			<p>** Use either product **</p> <p>P/N 00232-19115 (4 bottles per order) Use (1) 800cc bottle of KD Engine Combustion Chamber Cleaner ECF-1 per vehicle or P/N 00232-19109 (12 x 100cc bottles per order) Use (8) 100cc bottles of HK Technology Engine Cleaning Fluid per vehicle</p>
	00232-19115 Engine Combustion Chamber Cleaner ECF-1	00232-19109 HK Technology Engine Cleaning Fluid	
CLEANING KIT	 <p>Quick connector O-ring</p>		CLEANING KIT Set (All components)
	KQ234-C6100FFF		
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
EVACUATION TOOL (Air-powered)	Commercially Available		To be used to apply vacuum to the crankcase during the pre-soak steps and to evacuate the cleaning fluid afterwards.

Service Procedure Overview:

NOTE: Oil consumption is generally not a condition of TXXI, TXXC, TXXM, or related Warranty Extensions.
 • Follow normal warranty eligibility guidelines.

NOTE: Icon indicates STUI Picture Required.

VEHICLE IN



Service Procedure: [\(Refer to the QR link for additional video information →\)](#)



STUI



This TSB includes Repair validation photos.
Refer to the latest Digital Documentation Policy for requirements.

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.

- ❖ Perform combustion chamber cleaning under warranty after PA approval as instructed per TSB 23-EM-008H “Engine Oil Consumption Inspection and Repair Guidelines”.
- ❖ This procedure can also be performed at every 24,000 miles under customer pay as part of a routine maintenance schedule for continued engine cleanliness.

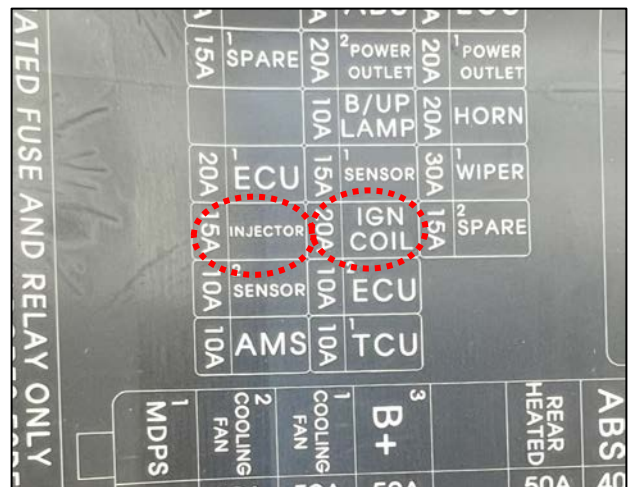
1. Start the engine and allow it to idle until it reaches normal operating temperature, then turn engine off.

NOTICE

To improve cleaning effectiveness, the remaining part of the service procedure **must be performed while the engine is still hot.**

2. Remove the ***INJECTOR** and **IGN COIL** fuses. (Exact location may vary depending on the model.)

***NOTE:** On some models without a separate injector fuse, remove the **FUEL PUMP** fuse.



3. Disconnect and remove all ignition coils from the spark plug tubes, then use an air blow gun to clear out any debris from the valve cover tops and inside each spark plug tubes (before spark plug removal).

NOTICE

Failure to clear off debris can contaminate the cylinder during the cleaning procedure.
Certain engine types may require additional parts to be removed to access the ignition coils and spark plugs of some cylinders. Refer to applicable Shop Manual.

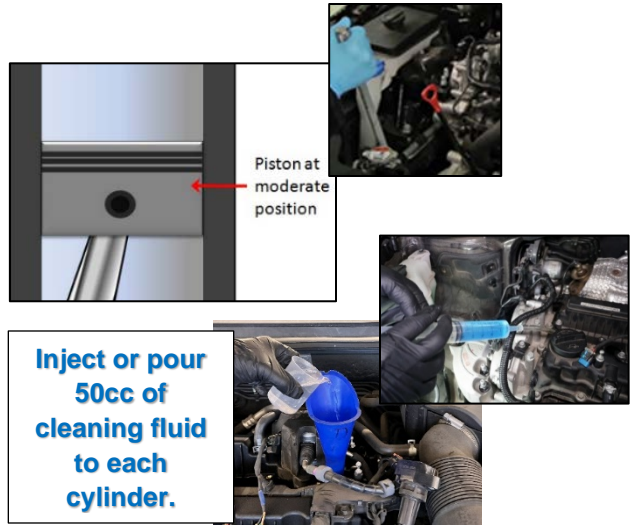


4. Remove all spark plugs.
 - Inspect spark plugs for carbon fouling, and clean as necessary (soak the tips in cleaner).
 - Refer to the maintenance schedule if replacement of spark plugs may be necessary.

***** PRE-SOAK #1 *****

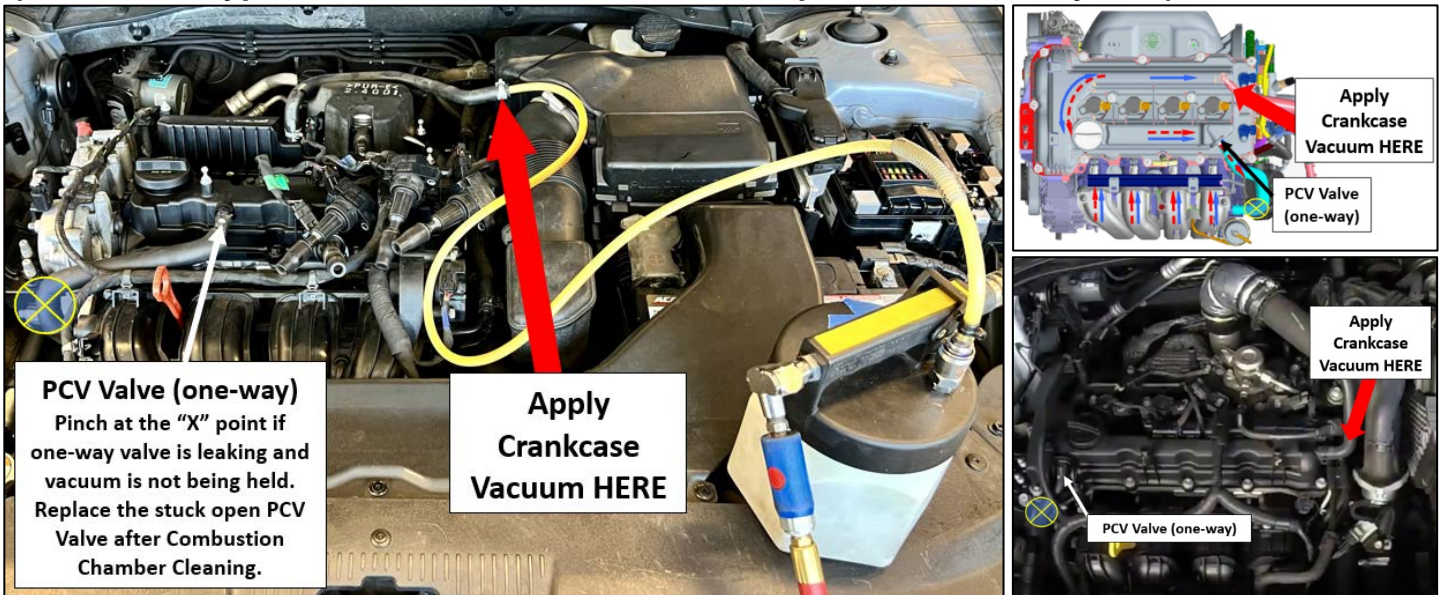
5. Position the crankshaft so that all pistons are midway between top and bottom of the cylinders.

NOTE: Set TDC for Cylinder #1, then rotate the crankshaft 90° (use the crank rotator tool **KQ231-2T102QQH** and rotate clockwise “5 ratchet clicks”) to place all pistons at the moderate position.



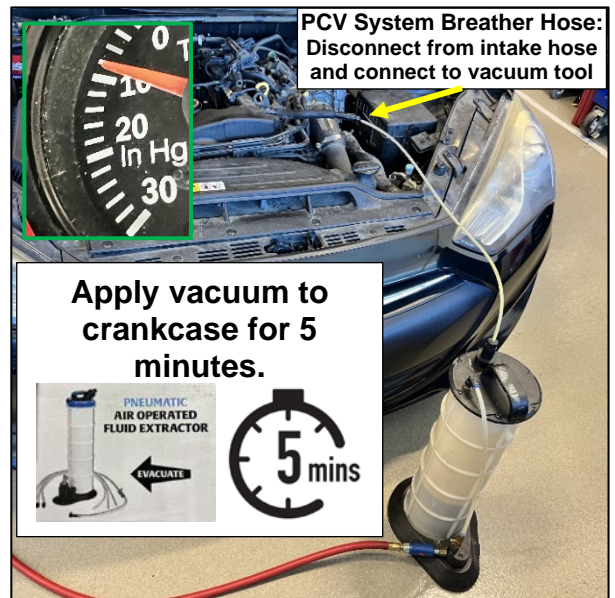
6. Inject (or pour) 50cc of the cleaning fluid into each cylinder through the spark plug hole.

(Overview of typical crankcase vacuum connection point to the PCV system)



7. Apply vacuum to the crankcase through the **PCV fresh air breather hose** by using an air-powered evacuation tool or an air bleed tool.

- Vacuum Force: 8~12 inHg (-4 to -6 PSI)
- Time: **5 minutes**



NOTE: Confirm crankcase vacuum is being applied after a few seconds by briefly pulling the dipstick from the dipstick tube and listen for the air rush noise.

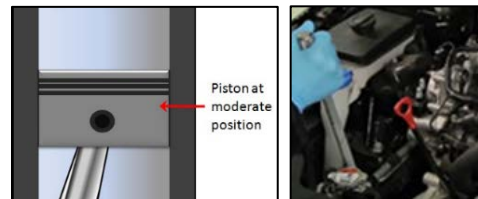
- ❖ If no air rush noise is heard and vacuum is not felt at the dipstick tube, check the vacuum tool and air connection to the crankcase so that vacuum is applied.
- ❖ A leaking one-way check valve of the PCV can also cause loss of crankcase vacuum with tool. Block the PCV Valve (or pinch the hose connected to the valve) to stop air escaping and resume vacuum. Inspect and **replace the PCV Valve at Step 25** if the internal one-way check valve is not sealing.
- ❖ Reinsert the dipstick after checking.



***** AGITATION *****

8. Connect the adaptor (KQ234-C6101FFF) & hose (KQ234-C6102FFF) to each companion cylinder as shown on the right.
 - Connect the #1 and #3 cylinders together.
 - Connect the #2 and #4 cylinders together.
9. Operate the starter (3 seconds / 8 times) to crank the engine for creating agitation to distribute the cleaning fluid within the combustion chambers.
 - Cleaning fluid will circulate between the hoses.
 - Disconnect the adaptor and hoses afterwards.
10. Position the crankshaft so that all pistons are midway between top and bottom of the cylinders.
11. Inject (or pour) 50cc of the cleaning fluid into each cylinder through the spark plug hole.

Connect battery to a charger to assist cranking power.



Inject or pour 50cc of cleaning fluid to each cylinder.

***** Hot Soak #1 *****

12. Close the hood and allow the engine heat to soak the cleaning fluid for at least 2 hours.

⚠ CAUTION

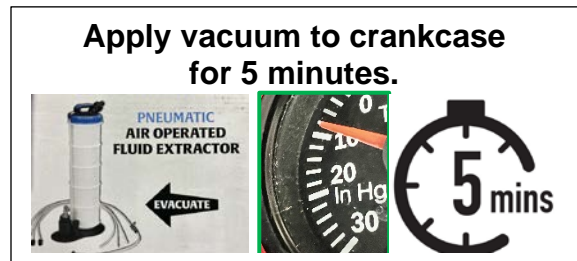
Never turn the engine 'ON' until the cleaning procedure has been fully completed.



***** Post Soak #1 Clearing *****

13. Apply vacuum to the crankcase through the fresh air vent hose of the PCV by using an air-powered evacuation tool or an air bleed tool.

- Vacuum Force: 8~12 inHg (-4 to -6 PSI)
- Time: **5 minutes**



14. Crank the engine (3 seconds / 8 times).

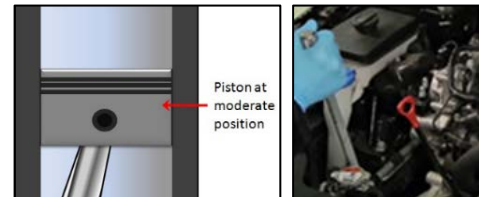
⚠ CAUTION

Residual cleaning fluid may escape out of the spark plug holes during the cranking process.

- To prevent any fluid splatter, use shop towels to cover the spark plug tubes, then hold it down with a suitable long heavy tool when cranking.



15. Position the crankshaft so that all pistons are midway between top and bottom of the cylinders.



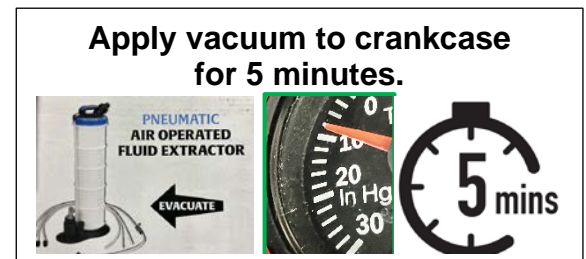
***** PRE-SOAK #2 *****

16. Inject (or pour) 50cc of the cleaning fluid into each cylinder through the spark plug hole.

Inject or pour 50cc of cleaning fluid to each cylinder.

17. Apply vacuum to the crankcase through the fresh air vent hose of the PCV by using an air-powered evacuation tool or an air bleed tool.

- Vacuum Force: 8~12 inHg (-4 to -6 PSI)
- Time: **5 minutes**



18. Inject (or pour) 50cc of the cleaning fluid into each cylinder through the spark plug hole.

Inject or pour 50cc of cleaning fluid to each cylinder.

***** Hot Soak #2 *****

19. Close the hood and allow the engine heat to final soak the cleaning fluid for at least 2 hours.

⚠ CAUTION

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

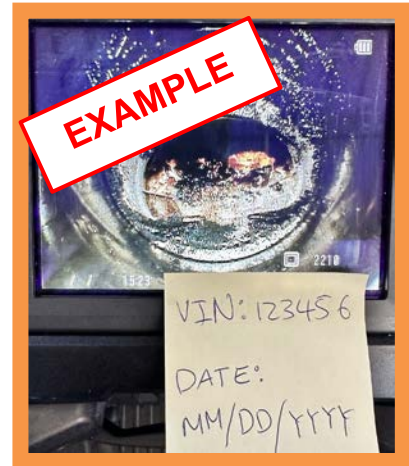


20. After the final hot soak, record borescope image of the cylinder #2 combustion chamber/piston top using the GDS tablet for uploading to STUI.

STUI



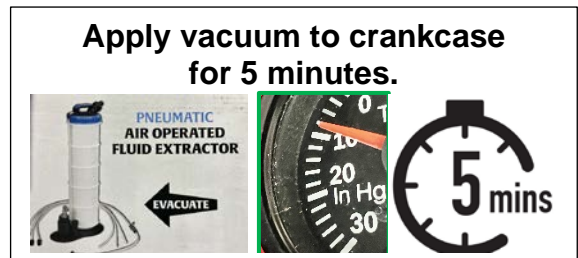
Take a screenshot of the #2 piston top borescope image using your particular tablet's screenshot save method and upload to STUI.



***** Post Soak #2 Clearing *****

21. Apply vacuum to the crankcase through the fresh air vent hose of the PCV by using an air-powered evacuation tool or an air bleed tool.

- Vacuum Force: 8~12 inHg (-4 to -6 PSI)
- Time: **5 minutes**

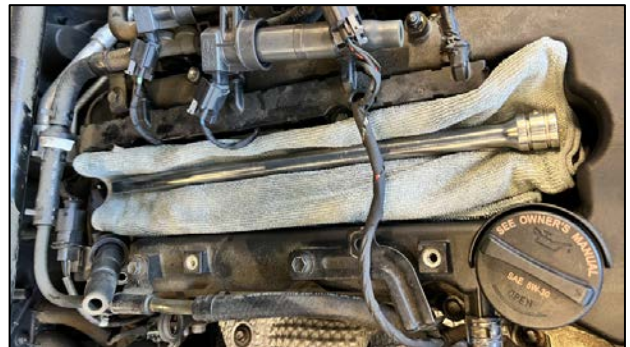


22. Crank the engine (3 seconds / 8 times).

CAUTION

Residual cleaning fluid may escape out of the spark plug holes during the cranking process.

- To prevent any fluid splatter, use shop towels to cover the spark plug tubes, then hold it down with a suitable long heavy tool when cranking.



23. Remove all of the remaining cleaning fluid from the combustion chamber using the air-powered evacuation tool.

24. Reinstall all removed fuses, spark plugs, ignition coils, and any other removed components

NOTICE

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



25. If vehicle is confirmed to have stuck PCV check valve (air escaping to intake manifold when crankcase vacuum is applied with tool), remove the PCV Valve to inspect and replace if necessary.

- Inspect PCV check valve for partial clogging.
- Inspect PCV one-way check valve operation.



*** Engine Oil / Filter Change ***

26. **Change the engine oil with a new engine oil filter** according to the vehicle shop manual.

NOTICE

Oil change must be performed to remove the washed contaminants from the crankcase. Recommended engine oil specification is 5W-30 Full Synthetic Type with a Service Grade of API SN PLUS/SP, ILSAC GF4/GF5 or higher.

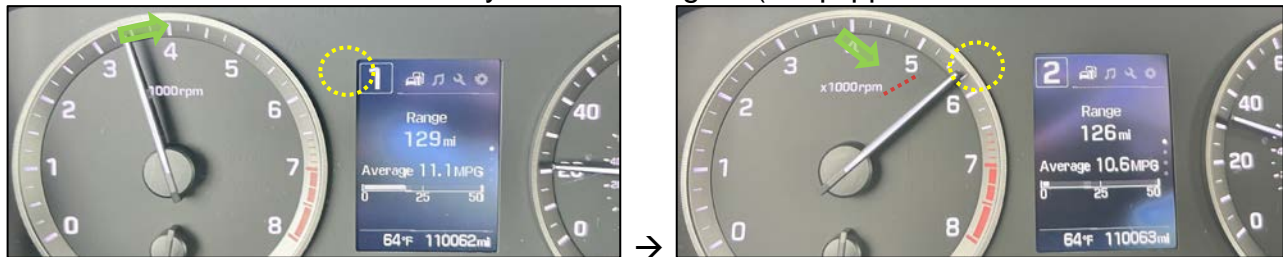
- ✓ FULLY DRAIN THE OIL
- ✓ REPLACE OIL FILTER
- ✓ ADD NEW ENGINE OIL
- ✓ ADJUST TO "FULL"

*** Engine Rev Final Clearing Procedure ***

27. Start the engine and maintain part throttle until engine idles smoothly, then **idle for 3 minutes**.
- Move vehicle to an outdoor area just after initial engine start to idle, whenever possible.
28. Drive in **Manual Mode** to hold low gear to maintain **target engine speed of 2,500 ~ 4,000 RPMs**. Continue to drive with the raised engine RPM for about 5 minutes to increase engine temp.



29. Apply **Heavy Throttle Input** from low gear for the **engine speed to reach nearly 6,000 RPMs**, and allow the ATM to automatically shift to next gear (if equipped w/MT: shift before redline).



- Repeat this step at least 4 ~ 6 times until no visible burn off smoke is seen from the tailpipe.

30. After the test drive in PARK, **briefly** apply heavy throttle input to raise the engine speed from approximately 2,000 RPMs to 5,000 RPMs to help further clear the combustion chambers.



- Repeat this step at least 4 ~ 6 times until no visible carbon is seen exiting the tailpipe.

*** Vehicle Return Preparation ***

- 31. Perform an All Systems Fault Code search and clear any incident DTCs.
 - Reset engine Adaptive Values after DTC checking/clearing.

- 32. Confirm that the engine oil level is at the "F" line on the dipstick.



NOTICE

Adjust the engine oil level exactly to the "F" line of the dipstick.

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

- 33. Check that all removed engine cover and miscellaneous components have been reinstalled.

- 34. Schedule vehicle for next inspection or service return.

- ❖ **If combustion chamber cleaning was performed due to an oil consumption concern,** then refer back to TSB 23-EM-008H "Engine Oil Consumption Inspection and Repair Guidelines" for the additional finalization steps.
- ❖ **If combustion chamber cleaning was performed as a maintenance service under customer pay,** then the service advisor should review with the customer regarding the appropriate oil change interval per their driving habits and schedule a next appointment.

NOTICE

Refer to TSB 23-FL-003H (or latest) for important information regarding:

- Hyundai Fuel System Cleaner Plus – fuel tank additive
- Top Tier Gas Usage – high quality gasoline with detergents
- Engine Oil / Filter Change Service Interval Information for Mixed-Mode driving conditions

<p>HYUNDAI Technical Service Bulletin</p>	GROUP FUEL SYSTEM	NUMBER 23-FL-003H
	DATE JUNE 2023	MODEL(S) ALL MODELS (w/ GASOLINE ENGINES)

SUBJECT: HYUNDAI FUEL SYSTEM CLEANER PLUS ADDITIVE AND TOP TIER GAS USAGE GUIDELINES

This TSB supersedes 10-FL-014 with updated service guideline information.

Description: This bulletin provides vehicle maintenance recommendations and information related to Hyundai Fuel System Cleaner additive and Top Tier Gas usage.

Hyundai Fuel System Cleaner Plus (P/N 00232-19047) fuel tank additive is the approved service product for complete fuel system cleaning as a preventative maintenance and during routine service.

Key Product Features:

- A 20-ounce bottle treats up to 20 gallons of gasoline.
- For use in all gasoline engines (MPI or GDI systems, including hybrid and plug-in hybrid electric powertrains).
- Can be used as often as 2,000 miles between oil changes and at every oil change.
- Cleans fuel injectors, intake valves, and combustion chambers.
- Cleans piston rings and ring lands to maintain proper cylinder compression and control crankcase blowby.
- Neutralizes contaminants and protects fuel level sending units against damage from sulfur content in fuel.
- Cleans and protects critical fuel system components from corrosion.
- Does not harm the emission system or damage combustion chamber surfaces when used as directed.



Regular use of Hyundai Fuel System Cleaner Plus with TECHRON® Technology can help address engine carbon deposit related conditions. By removing these deposits, an engine may experience restored engine performance and efficiency, smoother running idle, and cleaner tailpipe emissions.

Applicable Vehicles:
All models equipped with gasoline engines, including hybrid and plug-in hybrid electric vehicles.

Circulate To: General Manager, Service Manager, Parts Manager, Warranty Manager, Service Advisors, Technicians, Body Shop Manager, Fleet Repair

SUBJECT: HYUNDAI FUEL SYSTEM CLEANER PLUS AND TOP TIER GAS USAGE GUIDELINES

Warranty Information:
The use of the fuel system cleaner is a Customer Pay Item during time of routine maintenance and the cost is not reimbursable under warranty.


Parts Information:

PART NAME	PART NUMBER
FUEL SYSTEM CLEANER PLUS, POUR IN (TECHRON)	00232-19047

Usage Notes:

- A single tank (up to 20 gallons) treated with a 20-ounce bottle is sufficient for cleaning in normal cases. However, a second follow-up treatment on the next consecutive full tank may give additional benefits for engines with heavier accumulated deposit formation.
- Normal use as often as every 2,000 miles can help maintain optimum engine cleanliness and is recommended to be used during every oil change as part of a Comprehensive Maintenance plan.

Top Tier Gas Usage Information:
Hyundai recommends the use of high-quality gasoline, including fuel advertised as Top Tier Detergent Gasoline, as well as periodic use of an approved Fuel System Cleaner. This is especially important for vehicles equipped with gasoline direct injection (GDI) engines with advanced fuel delivery systems.



If use of poor quality gasoline is suspected, customer should be advised to refuel at a different fueling station or switch to a different brand of fuel.

Poor quality gasoline may exhibit one or more of the following characteristics:

- Abnormal color and odor
- Undissolved water
- Sediments and suspended foreign substance
- Cloudy appearance and (after settling) showing signs of separation

NOTE: Refer to TSB# 10-FL-013 for details related to fuel quality testing.

If use of gasoline with a low content of deposit control additives is suspected, then recommend to the customer the exclusive use of high quality gasoline such as TOP TIER Detergent Gasoline. These products help to avoid the build-up of engine deposits and are available in all octane grades.

For latest information and list of retailers of TOP TIER Detergent Gasoline, please go to the official website (www.top-tier-gas.com).

Engine Oil / Filter Change Service Interval Information:
Most vehicles are frequently being operated in a mix of SEVERE and NORMAL driving conditions. For these mixed-mode driving conditions, select the appropriate oil change service interval below.

SEVERE Interval	Mixed-Mode Driving	NORMAL Interval	NOTES
5,000 miles	6,500 miles	8,000 miles	• Use Fuel Additive (At oil change and in between.)
3,750 miles	5,500 miles	7,500 miles	• Use Top Tier gas
3,000 miles	4,500 miles	6,000 miles	• Inspect air intake filter
3,000 miles	4,000 miles	5,000 miles	

NOTE 1: If equipped, set the Service Interval Reminder to the selected interval for next service visit.
NOTE 2: Most vehicles starting from 23MY are equipped with an Oil Life Monitoring System (OLMS). The OLMS calculates remaining oil life based on the actual driving condition. An oil / filter change maintenance service should be performed when the remaining oil life is indicating 15% or below.

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