

Please read the following bulletin with the understanding that GM has acknowledged combustion chamber carbon buildup as a contributing cause of several running problems.

The one issue they don't address yet it is true, carbon buildup can affect the operation of a catalytic converter in many ways.

- First, heavy carbon deposits in the combustion chamber increase compression which will in turn increase internal engine heat. This will likely cause higher production of NOx. When higher levels of NOx are present in the exhaust stream, residual oxygen left over after reduction may trigger false catalyst codes even though the converter is working optimally.
- Second, carbon can act as a sponge. During combustion, trace amounts of fuel may be absorbed by carbon buildup and remain unburned. This unburned fuel is then released on the exhaust stroke, entering the catalytic converter as droplets which will at first unevenly cool the ceramic substrate, then burn hot when ignited. This can cause substrate damage and melt-down of the wash coat.
- Third, as carbon particles are eventually released into the exhaust stream, damage to the oxygen sensors becomes very likely.
- Finally, anything that causes an engine valve to operate poorly allows for incomplete combustion. Damage to a catalyst then becomes more likely.

Even if misfires are not currently present, and no other codes exist, carbon may still be the root cause of a recurring P0420 or P0430 code.

Document ID: 4583678

#PIP5029G: Rough Idle Crank No Start Extended Crank Or Misfire Due to Excessive Carbon On Top of the Valves or Sticking Valves - (Sep 9, 2016)

Subject: Rough Idle Crank No Start Extended Crank Or Misfire Due to Excessive Carbon On Top of the Valves or Sticking Valves



Models: 2000-2015 All Passenger Cars with Gasoline Engines
2000-2015 All Light Duty Trucks with Gasoline Engines

This PI was superseded to update Parts Information. Please discard PIP5029F.

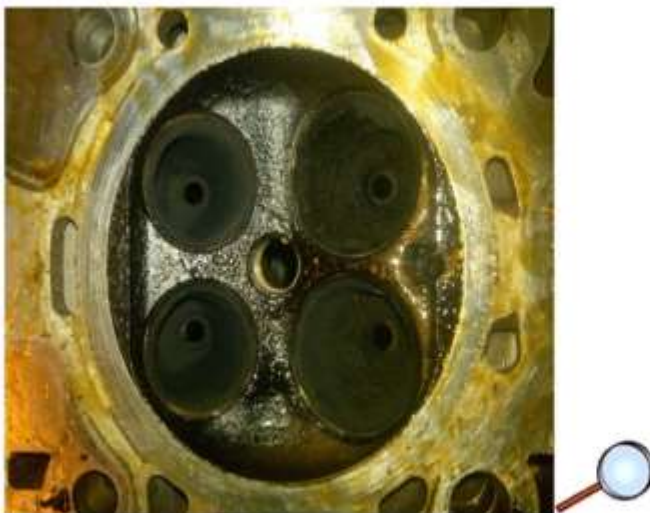
The following diagnosis might be helpful if the vehicle exhibits the symptom(s) described in this PI.

Condition/Concern

Some customers may complain of a MIL and/ or engine misfire, rough idle, extended crank, or crank no start in some cases, the misfire may be more apparent on a cold start and may run rough for up to 5 minutes after starting the engine, may count on a single cylinder or several cylinders, and may or may not be felt by the driver. Upon inspection, the technician will find one or more misfire codes (DTC P0300-P0308) stored in the ECM and SI diagnosis may or may not isolate the cause of the misfire depending on whether the intake/exhaust valves are sticking at the time of the diagnosis.

This may be the result of major carbon build up on the intake and/or exhaust valves due to fuel contamination or incomplete burning of the fuel as shown below so the misfires should not have appeared until accumulating at least 5,000 miles or more.

Note: Fuel oxidation and volatility concerns can often cause these issues as well, however they cannot generally be checked in service. Trying a different, high quality fuel is sometimes the best diagnostic.



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When the engine is cold, the compression on multiple cylinders may be at 0 PSI.

The engine also may pop through the intake or exhaust while cranking and the spark plugs may be fuel fouled when inspected.

Some engines may also experience valve damage or cam followers that are out of position as a result of this.

Note: This condition can occur in specific areas of the country for a period of time and then it will no longer occur after the suspect fuel source has been consumed in that area of the country.

Recommendation/Instructions

If this concern is encountered, perform SI diagnosis.

If the SI Diagnosis leads to a compression loss due to a valve sealing concern and/or eliminates everything else external to the engine, the following information may help:

If there is no sign of valve damage or cam followers that are out of place, perform the following procedure to free up sticking valves and to remove carbon from the valves and pistons.

If valve damage is present or if there are cam followers that are out of place, perform engine mechanical repairs as necessary to correct the concern and then perform the procedure below to prevent the concern from returning.

Perform an upper engine and valve cleaning procedure as outlined below.

Important: Extreme care must be taken not to hydro-lock the engine when inducing the cleaner, especially if it is induced without Kent Moore Tool # J-45076 / J-35800-A or equivalent. If too much cleaner is induced at too low of a RPM, or if you force the engine to stall by inducing too much cleaner at once, the engine may hydro-lock and bend a connecting rod(s).

1. In a well ventilated area with the engine at operating temperature, slowly/carefully induce a bottle of GM Upper Engine and Fuel Injection Cleaner into the engine with RPM off of idle enough to prevent the engine from stalling (typically around 2,000 RPM or so). Depending on the engine configuration, induce the cleaner through the throttle body or an engine vacuum hose/pipe.
***For best results, it is suggested to induce the cleaner through the throttle body with Kent Moore Tool # J-45076 / J-35800-A or equivalent (shown below).
2. Turn the engine off after inducing the cleaner and allow the cleaner to soak with the engine off for 2.5 to 3 hours (Do not let cleaner soak for more than 3 hours as remaining deposits may start to harden back up again).
3. Add a bottle of GM Fuel System Treatment Plus to the fuel tank and fill the vehicle with one of the Top Tier gasolines listed at <http://www.toptiergas.com> and/or in the latest version of 04-06-04-047 (USA) or 05-06-04-022 (Canada). See Bulletin 05-00-89-078 for more details on GM Fuel System Treatment Plus.
4. Test drive the vehicle extensively to circulate the GM Fuel System Treatment Plus.
5. Re-evaluate the concern to determine if it is repaired or improved at all.
If the concern is improved but not repaired, it may be necessary to perform the above decarboning process a 2nd time.
6. To complete the repairs, change the engine oil and filter, and advise the customer to only use one of the Top Tier Gasolines listed at <http://www.toptiergas.com> and/or in the latest version of 04-06-04-047 (USA) or 05-06-04-022 (Canada) to minimize future deposits.
It can also be recommended to add a bottle of GM Fuel System Treatment Plus at every oil change as mentioned in the latest version of 04-06-04-051.

Notice: There is also a related training video on this that is included in the January 2013 Emerging Issues Video that technicians should consider viewing. Because the training video does not mention this, please note that it is acceptable to use equivalent tools as mentioned above/below and the engine oil and filter should also be replaced to complete the repairs as mentioned above in Step 6. The training video is available at the GM Center of Learning Website and can be viewed by following this path: Go to www.centerlearning.com> Enter Training ID>> Click Resources>>> Click Service Know How / Tech Assist>>>> Click Emerging Issues>>>>> Click 10213.01D - January 2013 Emerging Issues (VOD)>>>>>> Click the Topics Tab on Upper Right>>>>>>> Click Link for PIP5029: Decarboning Valves in SIDI Engines

The related training video on this topic for Canadian dealers is included in the March 2013 TAC TALK presentation. The training video is available on the Learning Management System (LMS) Website and can be viewed by selecting the LMS link from the Global Connect Home Page Go to Video On Demand from the Increase My Knowledge section. Once you have selected the March 2013 TAC TALK, click on the Topics tab and then select #7 Feature Topic - Procedure to De-Carbon Valves on Direct Injection Engines.

Kent Moore Tool Kit # J-45076

1. Pressurized Canister from J-45076 is Shown - J-35800-A is Similar (Equivalent Pressurized Canister Acceptable)
2. Throttle Body Cleaning Adapters J-45076-46 and J-45076-55 Shown (Equivalent Adapters Acceptable)



Notice: J-45076 was originally released to Cadillac dealers for decarboning Northstar engines but it has since been discontinued. This kit came with the pressurized canister and throttle body cleaning adapters shown above. As mentioned above, the J-35800-A is another pressurized canister that can be used. It was originally released in the 1990s for cleaning fuel injectors on the 4.3L, 5.0L, and 5.7L truck engines. If these tools are not available, it is also acceptable to use equivalent tools to perform this decarboning procedure.

Parts Information

Part Number	Description	Qty
88861803 FSU 88865595	Upper Engine and Fuel Injector Cleaner	1
(In Canada, use P/N 88861804)		
88861013	Fuel System Treatment Plus	1
(In Canada part is no longer available)		
See Parts Catalog	Engine Oil Filter	1
See Parts Catalog	Engine Oil	6 qt.

Warranty Information

For vehicles repaired under warranty use:

Labor Operation	Description	Labor Time

Labor Operation	Description	Labor Time
4080148*	Decarbon Engine Using Upper Engine Cleaner	0.5 hr
Add	Change Engine Oil and Filter	0.3 hr
* This is an unique labor operation for bulletin use only. This will not be published in the Labor Time Guide.		

Please follow this diagnostic or repair process thoroughly and complete each step. If the condition exhibited is resolved without completing every step, the remaining steps do not need to be performed.

GM bulletins are intended for use by professional technicians, NOT a "do-it-yourselfer". They are written to inform these technicians of conditions that may occur on some vehicles, or to provide information that could assist in the proper service of a vehicle. Properly trained technicians have the equipment, tools, safety instructions, and know-how to do a job properly and safely. If a condition is described, DO NOT assume that the bulletin applies to your vehicle, or that your vehicle will have that condition. See your GM dealer for information on whether your vehicle may benefit from the information.



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