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#PIP5504A: Diagnosing Fishbite Chuggle Misfire Feeling Or Shudder Vibration, With A Light Tip In - (Jan 17, 2018)

Subject: Diagnosing Fishbite Chuggle Misfire Feeling Or Shudder Vibration, With A Light Tip In



Brand:	Model:	Model Year:		VIN:		Engine:	Transmission:
		from	to	from	to		
Chevrolet	Silverado	2016-2018		All	All	L83	MYC
Chevrolet	Suburban	2016-2018		All	All	L83	MYC
Chevrolet	Tahoe	2016-2018		All	All	L83	MYC
GMC	Sierra Models	2016-2018		All	All	L83	MYC
GMC	Yukon Models	2016-2018		All	All	L83	MYC

Involved Region or Country	North America and N.A. Export Regions.
Additional RPO/s:	None
Condition	Some customers may comment on any of the following conditions. A shake and/or shudder during light throttle acceleration between 48 and 104 km/h (30 and 65 mph) steady state driving when transmission is not actively shifting gears. A shudder feeling that may be described as driving over rumble strips or rough pavement. A shudder feeling that is evident in both Drive and M5 mode.
Cause	Please refer to the following information to aid in addressing these types of conditions.

Definitions:

In general if there is insufficient engine firing pulse isolation or combustion instability, vibrations can be transmitted to the driver typically through the steering wheel, seat track, or accelerator pedal.

1. Fishbite: (also called Surge, nudge, jerk and bump) is a jerk or bump which may be transmitted through the Torque Converter Clutch due to insufficient damping or TCC locking and releasing.

2. Chuggle: (often called boom) is induced from engine combustion exciting the driveline due to insufficient isolation. Frequency of the boom is affected by driveline mass, stiffness, damping, and gear.
3. Misfire: or knock is the engine having an irregular combustion event.
4. AFM Disturbances can be mislabeled as any of the definitions above as well as shudder below, but in fact has to do with the imbalance caused by less cylinders firing.
5. Torque Converter Shudder/Vibration: Any vibration induced by the torque converter clutch in normal driving mode (with an expected TCC slip amount). (Most often due to TCC friction material/ATF degradation)

Important: DEXRON 6 is the only approved ATF to be used with 6L (MYA, MYB, MYC, MYD) transmissions at this time.

Diagnosis/Test Instructions:

- Verify and correct any DTC's prior to proceeding with next steps.
 - The use of the PICO scope and NVH software should be used to confirm the Disturbance Frequency and allow the user to see if the disturbance tracks to engine speed (Chuggle, Misfire), road speed (Tire Vibrations), or remains constant across various inputs (TCC Shudder). Place the PICO Scope pick up on a metallic component where vibration can be felt the most (seat track, steering wheel column, accelerator pedal, etc).
 - a. - Evaluate within customer complaint range (note if concern occurs in V4 or V8 mode).
 - b. - Evaluate at Idle (Warm & Cold Start).
 - c. - Evaluate in multiple gears.
 - A smooth road is desirable for evaluations to isolate concerns without introducing road inputs/noise.
 - Minimize extraneous vibration input by testing on a smooth road and correct any other known vehicle vibration issues (tires, brakes, etc.) before conducting test.
1. Fishbite – Condition can be best isolated by placing the transmission in manual range 5th gear to turn off V4 mode and monitoring TCC Slip in GDS2. With engine speed between 1,000 – 1,600 rpm and engine load up to 320 Nm the calibration target is 20 rpm of TCC slip in V8 mode. Under these conditions, slip should not be less than 5 rpm with steady throttle input.
Note: (At 400Nm engine load, the calibration target is 5 rpm of TCC slip.)
 2. Chuggle – Condition can be best isolated in Manual 5th gear while in V8 mode, greater than 320 Nm of engine torque, and engine speeds between 1,200–1,300 rpm when tipping into throttle to load the engine. Can be confirmed by using GDS2 to Command TCC on - condition should be the same with TCC locked. This can be Engine 1st Order Vibration on the PICO Scope as well.
 3. Misfire – Can be viewed in GDS2 under engine control module and then selecting misfire data. This will prompt a screen that will show misfire by each cylinder if the tab Diagnostic Data Display is clicked. This can be Engine 1st Order Vibration on the PICO Scope as well.
 4. AFM Disturbances – While monitoring the Driver Information Center to display V4 or V8 mode, determine if the disturbance only occurs in V4 mode or during the transition between V8 and V4 mode.
 5. Torque Converter Shudder/Vibration – Condition can be best isolated with transmission temperature between 40°C (104°F) - 89°C (192°F). Drive the vehicle in 6th gear, V8 mode, with a transmission input speed of 1,000–1,500 rpms (approximately 64-89 km/h (40–55 mph)), constant throttle input, and engine torque 250-375 Nm.

Important: For some road conditions, it may be required to apply the brake pedal and throttle simultaneously to stay within desired engine torque range.

Press and hold the tow-haul mode button for 5 seconds to disable grade braking to prevent downshifts during test.

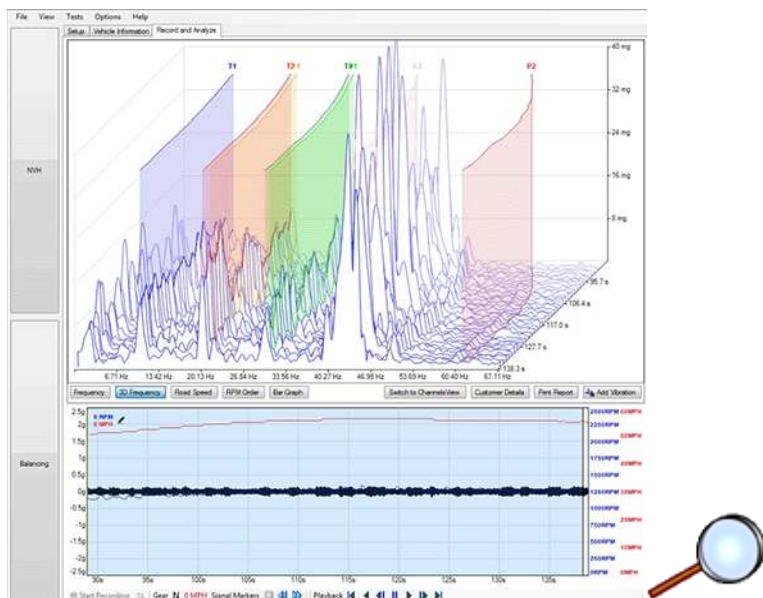
Run the test in 3 operational modes:

- Normal Operation (TEHCM commanding TCC apply. Use GDS2 for viewing only).
- GDS2 Commanding TCC in Disabled Operation. (No TCC Apply).
- GDS2 Commanding TCC in Enabled Operation. (TCC Locked).

To confirm TCC Shudder, the vibration concern must be present in normal operation (Mode A), but not present with the torque converter clutch disabled (Mode B) or with the torque converter clutch locked (Mode C).

If the concern is not present in Mode A, then the vibration concern is NOT TCC Shudder.

If the concern is still present with the torque converter clutch disabled (Mode B) or with the torque converter clutch locked (Mode C), the root cause of vibration is NOT TCC shudder.



If TCC Shudder is present, a vibration peak will appear at approximately 43Hz +/-3Hz as shown in the picture above. If the vibration frequency follows engine, tire, or driveshaft speed, then it is NOT TCC Shudder. TCC Shudder vibration frequency should stay constant per gear while vehicle and engine speeds change.

Vibrations not identified as shudder should be further investigated using the "Vehicle Vibration Diagnosis" in SI as a starting point. Use of the PICO scope and NVH software can be used to confirm TCC Shudder, Engine, Tire or Driveline component related conditions.

If the vibration root cause is determined to be TCC Shudder, the corrective action described below should be performed.

Service Procedure:

Please ensure findings are noted in warranty claim comments.

1. Fishbite (If Confirmed):

1.1 Drop the transmission pan to inspect for debris.

1.2 If you find that the fluid is cloudy, milky, or appears to be contaminated with water or engine coolant, DO NOT proceed with below steps.

Follow both SI Procedures for "Cooling System Leak Testing" and "Engine Coolant/Water in Transmission.")

1.3 If significant metallic debris is found on magnet and fluid smells burnt, flush cooler lines, replace the torque converter, drain, and refill ATF.

1.4 If debris is not found please perform a triple flush:

1.4.1 Step 1: Flush Cooler, Drain, Clean pan/magnet, Replace Filter (If needed), Fill with ATF & Circulate New Fluid

Note: The Transmission Fluid Cooler Flow Test and Flushing procedure can be located by building the vehicle in SI, select Transmission, Transmission Cooling, Diagnostic Information and Procedures. Select the appropriate transmission. DEXRON VI transmission fluid should be used to flow and flush the transmission cooling system. Compressed air should be used to remove any residual fluid from transmission cooler lines.

Important: Operate the vehicle on the hoist for 10 minutes. Cycle through all forward gear ranges, Reverse and Neutral.

Important: Operate the vehicle on the hoist for 10 minutes. Cycle through all forward gear ranges, Reverse and Neutral.

1.4.3 Step 3: Drain, Fill with ATF and Drive to Evaluate, the fishbite should be improved after the completion of this triple flush procedure.

2. Chuggle (If Confirmed):

2.1 If Chuggle is confirmed and the vehicle is a Model Year 2017 vehicle please follow Service Bulletin 17-NA-070 (TEHCM

2.2 If Chuggle is still present with engine torques of 320 – 400 Nm, and may be accompanied by cold idle vibration, refer to bulletin 17-NA-166(grounded engine mount diagnosis).

3. Misfire (If Confirmed):

Follow the appropriate engine mechanical Base Engine Misfire diagnosis procedure.

4. AFM Disturbances (If Confirmed):

4.1 If condition is most prevalent during transition into and out of V4 mode please see Bulletin #PIT5404: (exhaust buffeting, vibration, drone correction).

4.2 If condition is deemed to be not related to above bulletin this may be normal characteristic of active fuel management mode where half of the cylinders are operating to give the customer better fuel economy.

5. Torque Converter Shudder/Vibration (If Confirmed)

5.1. Drop the transmission pan to inspect for debris in transmission.

5.2 If you find that the fluid is cloudy, milky, or appears to be contaminated with water or engine coolant, DO NOT proceed with below steps. Follow Both SI Procedures for "Cooling System Leak Testing" and "Engine Coolant/Water in Transmission."

5.3 Flush cooler lines, replace converter, drain, and refill ATF.

Version	2
Modified	01/17/2018 Updated Model Years

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