



## Preliminary Information

### PIP5504E Diagnosing Fishbite Chuggle Misfire Feeling Or Shudder Vibration, With A Light Tip In

#### Models

Brand:	Model:	Model Years:	VIN:		Engine:	Transmissions:
			from	to		
Chevrolet	Express	2016 - 2020	All	All	L20, L96, LC8, LGH	MYD
Chevrolet	Silverado	2016 - 2018	All	All	L83	MYC
Chevrolet	Silverado New Model	2019	All	All	L82 L84	MYC
Chevrolet	Silverado 1500	2020	All	All	L82 L84	MYC
Chevrolet	Silverado 2500/3500	2016 - 2020	All	All	L8T, L96, LC8	MYD
Chevrolet	Suburban	2016 - 2020	All	All	L83	MYC
Chevrolet	Tahoe	2016 - 2020	All	All	L83	MYC
GMC	Savana	2016 - 2020	All	All	L20, L96, LC8, LGH	MYD
GMC	Sierra Models	2016 - 2018	All	All	L83	MYC
GMC	Sierra New Model	2019	All	All	L82 L84	MYC
GMC	Sierra 1500 Models	2020	All	All	L82 L84	MYC
GMC	Sierra 2500/3500	2016 - 2020	All	All	L8T, L96, LC8	MYD
GMC	Yukon Models	2016 - 2020	All	All	L83	MYC

Involved Region or Country	North America and N.A. Export Regions.
Condition	<p>Some customers may comment on any of the following conditions.</p> <p>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.</p> <p>A shudder feeling that may be described as driving over rumble strips or rough pavement.</p> <p>A shudder feeling that is evident in both Drive and M5 mode.</p>
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 5<sup>th</sup> 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 5<sup>th</sup> 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 1<sup>st</sup> 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 1<sup>st</sup> 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 6<sup>th</sup> 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:*

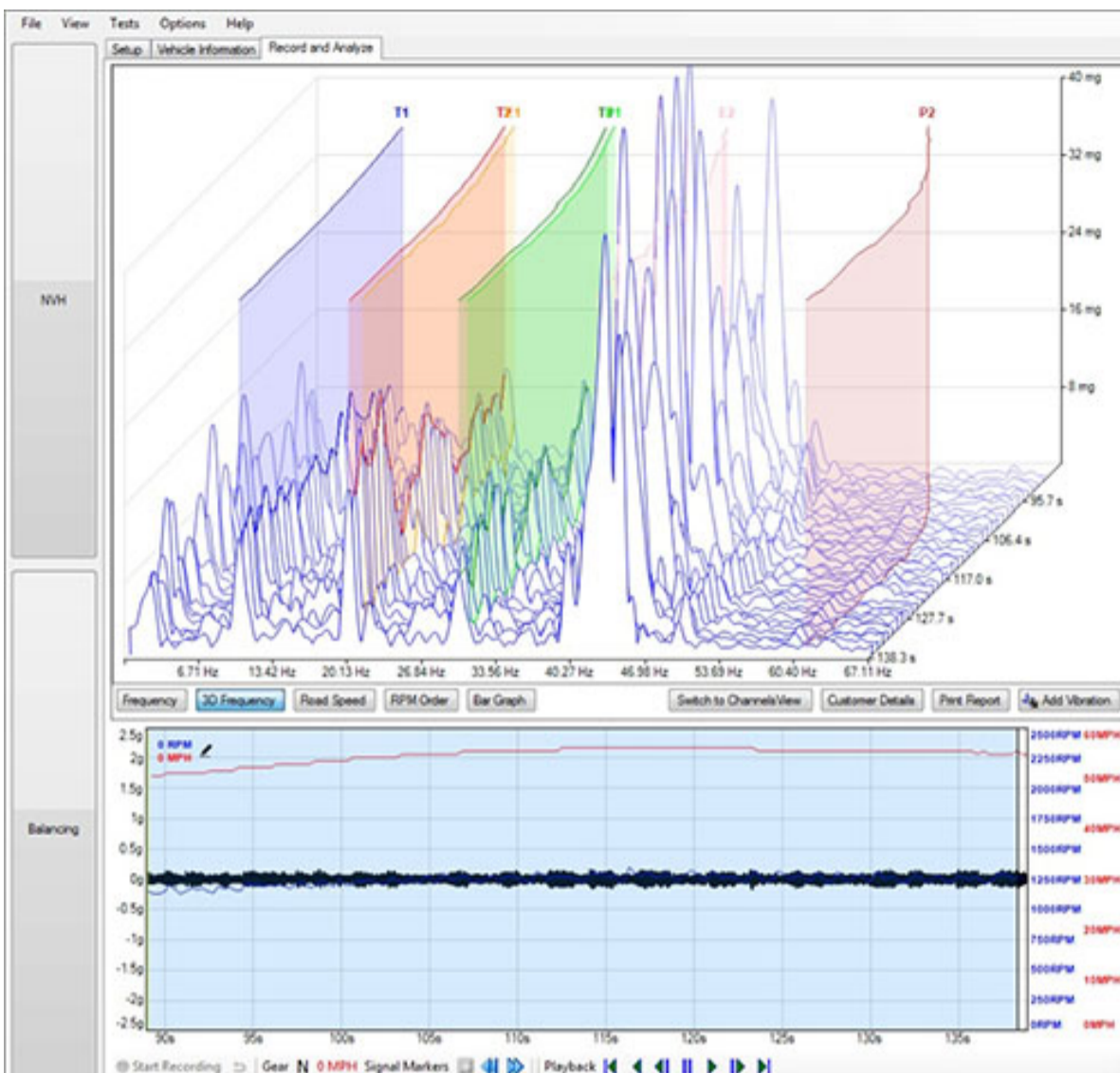
- Normal Operation (TEHCM commanding TCC apply. Use GDS2 for viewing only).
- GDS2 Commanding TCC in Disabled Operation. (No TCC Apply).
- GDS2 Commanding TCC in Enabled Operation. (TCC Locked).

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.

Perform TCC slip control test within this procedure.



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.

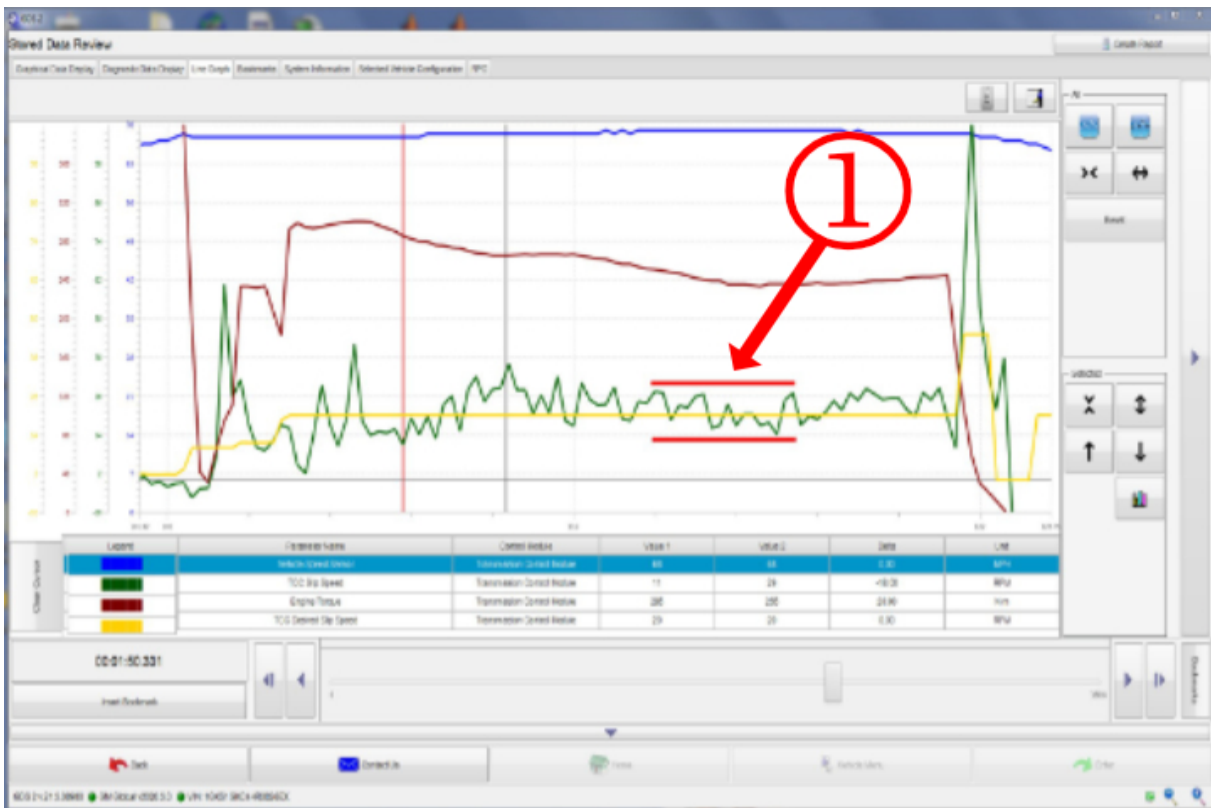
Use of the PICO scope and NVH software can be used to confirm TCC Shudder, Engine, Tire or Driveline component related conditions.

Vibrations identified as shudder should be further investigated using the "Torque Converter Diagnosis" in SI as a starting point.

An alternative diagnostic for TCC shudder is to road test the vehicle and monitor commanded and actual TCC slip speeds.

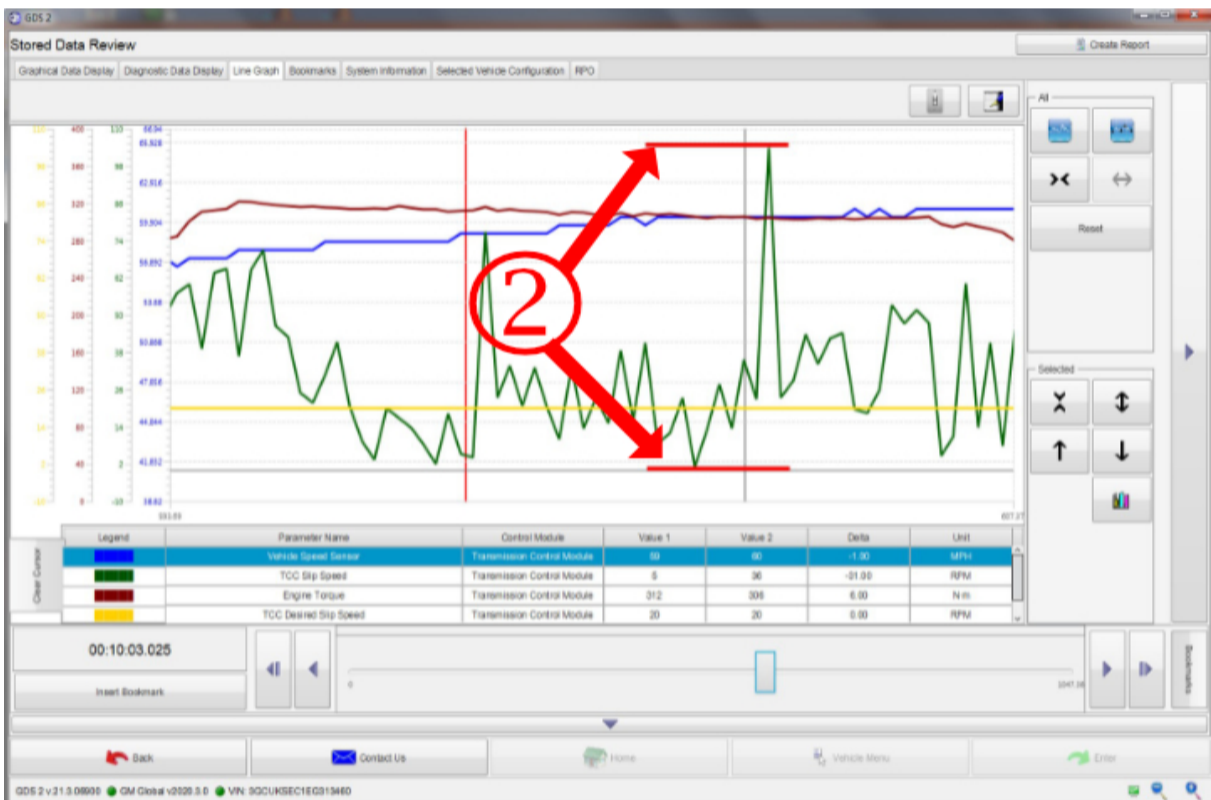
Road test the vehicle under light throttle acceleration between 88 and 104 km/h (55 and 65 MPH) steady state driving when the transmission is not actively shifting gears and monitor the following GDS2 parameters.

Parameters Minimum and Maximum Values		
Parameter Name	Min	Max
Vehicle Speed Sensor	0.0	70
TCC Slip Speed	-10.0	110.0
Engine Torque	0.0	400.0
TCC Desired Slip Speed	-10.0	110.0



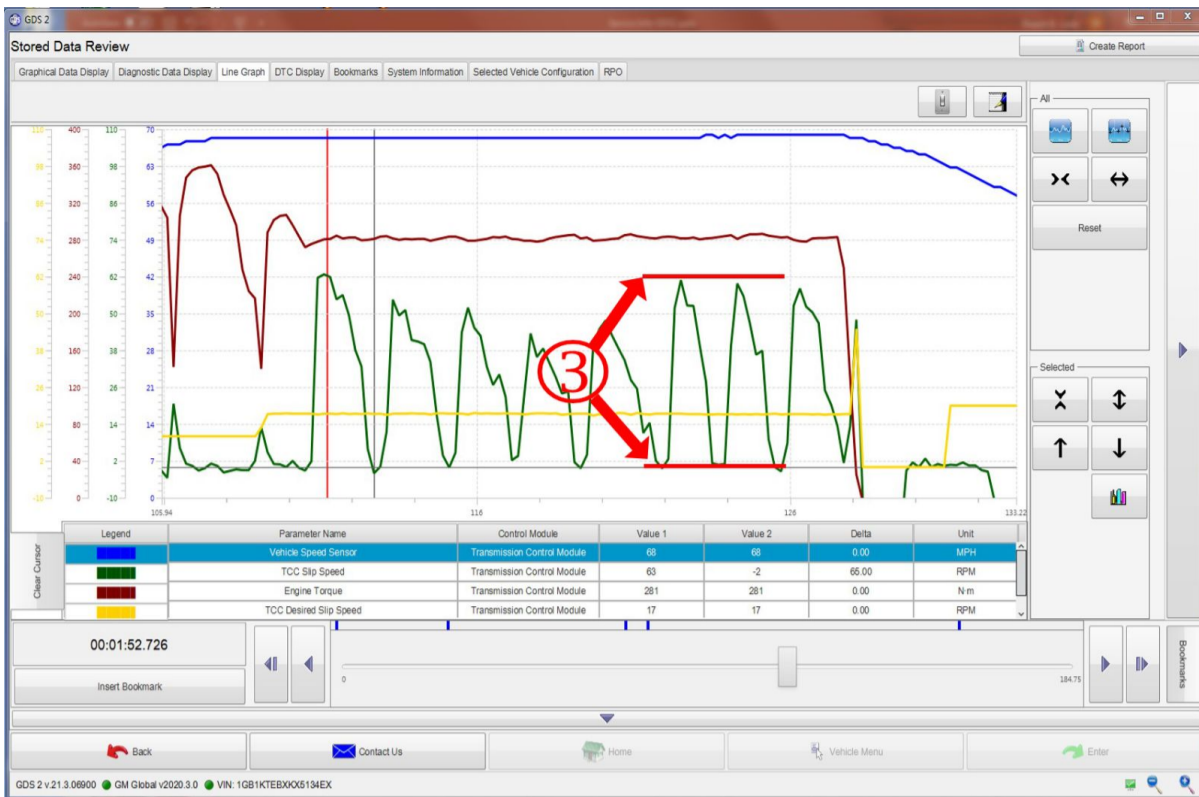
**Callout 1**

GDS2 data showing TCC slip peak to peak below 20 RPM is an example of normal TCC operation.



**Callout 2**

GDS2 data showing TCC slip peak to peak erratic near 0 RPM to over 100 RPM in a short time is an example of a damaged torque converter clutch.



### Callout 3

GDS2 data showing TCC slip peak to peak repeating near 60 RPM or less is an example of degraded fluid.

Perform TCC slip control test within this procedure. Compare service tool collected data results to normal, damaged and degraded operation.

TCC SLIP CONTROL TEST RESULT	TCC rpm slip peak to peak (at steady throttle)	ACTION	Note
Normal (Callout 1)	Below 20 rpm.	Do nothing.	
Damaged (Callout 2)	Near 0 to 100 rpm - erratic.	Inspect transmission further	Inspect transmission pan magr for excessive metal accumulati
Degraded (Callout 3)	Near 60 rpm - repeating.	Flush transmission fluid.	Shudder, surge, fish bite likely.

### Version History

Version	5
Modified	<p><b>06/19/2017 - Created on.</b></p> <p><b>01/17/2018 Updated Model Years</b></p> <p><b>10/03/2019 - Added the 2019 model year and removed the repair recommendation if TCC shudder is confirmed. Added to refer to Torque Converter Diagnosis in SI if TCC shudder is confirmed.</b></p> <p><b>01/17/2020 - Added the 2020 model year.</b></p> <p><b>05/06/2020 - Added engine RPOs L82 and L84 and more diagnostic information.</b></p> <p><b>06/25/2020 - Added the 6L90 transmission RPO MYD. Added Chevrolet Express and GMC Savana. Added engine RPOs L20, L96, LC8 and LGH.</b></p>



GENERAL MOTORS