

2016 Chevrolet Corvette [1G1YK2D72G5109209] | Corvette Service Manual 8766452 | Document ID: 5181942

#18-NA-355: Shake and/or Shudder During Light Throttle Acceleration Between 25 and 80 MPH (40 and 128 KM/H) at Steady Speed - (Jan 17, 2019)

Subject: Shake and/or Shudder During Light Throttle Acceleration Between 25 and 80 MPH (40 and 128 KM/H) at Steady Speed



Attention: This Bulletin only applies to vehicles sold in the U.S.

Brand:	Model:	Model Year:		VIN:		Engine: (2.0L, 2.5L, 3.0L, 3.6L, 5.3L, 6.2L)	Transmission: (8L45, 8L90 Automatic)
		from	to	from	to		
Cadillac	ATS	2016	2019			LCV, LGX, LTG, LT4, LF4	M5N, M5U
	CTS						
	CT6	2016	2018			LGX, LGW, LTG	M5N, M5X
	Escalade Models	2015	2017			L86	M5U
Chevrolet	Camaro	2016	2019			LGX, LTG, LT1	M5T, M5U
	Colorado	2017	2019			LGZ	M5T
	Corvette	2015	2019			LT1, LT4	M5U
	Silverado Models	2015	2018			L83, L86, L8B	M5U, M5X
GMC	Canyon	2017	2019			LGZ	M5T
	Sierra Models	2015	2018			L83, L86, L8B	M5U, M5X
	Yukon Models	2015	2017			L86	M5U

Involved Region or Country	United States
Condition	<p>Some customers may comment on any of the following conditions:</p> <ul style="list-style-type: none"> • A shake and/or shudder during light throttle acceleration between 25 and 80 mph (40 and 128 km/h) 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. <p>Shudder feeling is evident in both Drive and M7 (MY15-16) and L7 (MY17/MY18) mode.</p>

Diagnosis Instructions

To ensure TCC Shudder is diagnosed correctly, please drive the following schedule on a smooth road with transmission sump temperature between 122°F (50°C) - 158°F (70°C).

Important: For some road conditions, it may be required to apply the brake pedal and throttle simultaneously to stay within desired gear, engine firing mode, engine torque range, and engine/vehicle speed ranges.

For Full Size Trucks/SUVs - Press and hold the tow-haul mode button for 5 seconds to disable grade braking to prevent downshifts during test.

Run the following tests for 3 operational modes:

- Normal Operation (GDS2 for viewing only)
- GDS2 Commanding TCC in Disabled Operation (TCC Open)
- GDS2 Commanding TCC in Enabled Operation (TCC Locked)

Shudder Test

Refer to the table below for conditions pertaining to specific applications. In each vehicle, constant throttle input on a smooth grade is desirable. PicoScope Measured Frequency is the approximate vibration frequency where TCC Shudder can be found, discussed in detail below.

Vehicle Information					Shudder Test Conditions					PicoScope
Make	Application:	Engine Type	Engine RPO	Trans RPO	Gear	Engine Mode (V4, V6, V8)	Transmission Input Speed (rpm)	Vehicle Speed (muff)	Engine Torque (Nm)	Measured Frequency (+/- 2 Hz)
Cadillac	CTS	6 CYL. NA	LGX	M5N	8	V6	1100-1500	42-55	100-250	23
Cadillac	CTS	4 CYL. Turbo	LTG	M5N	8	V4	1100-1500	42-55	100-	23

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Cadillac	CTS-V	8 CYL. Supercharged	LT4	M5U	8	V8	1000-1500	42-62	200-375	28
Cadillac	ATS	4 CYL. NA	LCV	M5T	8	V4	1100-1500	42-55	100-250	23
Cadillac	ATS	6 CYL. NA	LGX	M5N	8	V6	1100-1500	42-55	100-250	23
Cadillac	ATS	4 CYL. Turbo	LTG	M5N	8	V4	1100-1500	42-55	100-250	23
Cadillac	ATS-V	6 CYL. Twin Turbo	LF4	M5U	8	V6	1100-1500	42-55	150-300	26
Cadillac	CT6	6 CYL. Twin Turbo	LGW	M5X	8	V6	1100-1500	42-55	150-300	26
Cadillac	CT6	6 CYL. NA	LGX	M5N	8	V6	1100-1500	42-55	100-250	23
Cadillac	CT6	4 CYL. Turbo	LTG	M5N	8	V4	1100-1500	42-55	100-250	23
Chevrolet	Camaro	6 CYL. NA	LGX	M5T	8	V6	1100-1500	42-55	100-250	23
Chevrolet	Camaro	4 CYL. Turbo	LTG	M5T	8	V4	1100-1500	42-55	100-250	23
Chevrolet	Camaro SS	8 CYL. NA	LT1	M5U	8	V4/V8	1000-1,500	40-55	(V4) 100-200 /(V8) 175-375	28
Chevrolet	Corvette	8 CYL. NA	LT1	M5U	8	V4 (Eco Driving Mode)	1000-1800	40-80	125-250	28
Chevrolet	Corvette Z06	8 CYL. Supercharged	LT4	M5U	8	V4 (Eco)	1000-1800	40-80	125-250	28

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						Driving Mode)				
Chevrolet/GMC	Silverado/Sierra	8 CYL. NA	L83	M5U	8	V8	1050-1500	45-55	200-375	26
Chevrolet/GMC	Silverado/Sierra	8 CYL. NA BAS	L8B	M5X	8	V8	1050-1500	45-55	200-375	26
Chevrolet/GMC/Cadillac	Silverado/Sierra/Yukon Denali/Denali XL/Escalade/ESV	8 CYL. NA	L86	M5U	8	V8	1050-1500	45-55	200-375	26
Chevrolet/GMC	Colorado/Canyon	6 CYL. NA	LGZ	M5T	8	V6	1100-1500	42-55	150-250	25

To confirm TCC Shudder, the vibration concern must be created in normal operation (Mode A) of the test. If the concern is gone with the torque converter clutch disabled (Mode B, TCC Open) and is gone with torque converter clutch enabled (Mode C, TCC Locked), then the vibration root cause is TCC Shudder, and the fluid flush procedure corrective action described below should be performed.

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

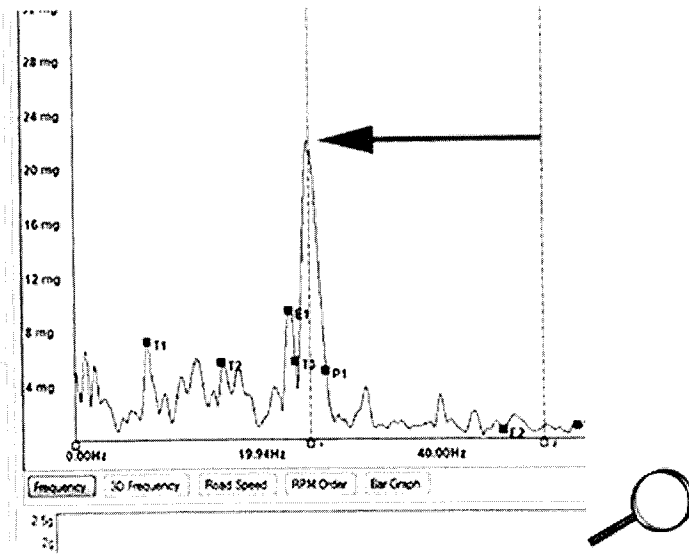
If the concern is still present with the torque converter clutch disabled (Mode B) or with the torque converter clutch enabled (Mode C, TCC slip speed at zero), then the vibration root cause is NOT TCC Shudder.

Vibrations not identified as TCC Shudder should be further investigated using the Vehicle Vibration Diagnosis in SI as a starting point.

Picoscope Test

The PicoScope (CH-51450) essential tool and NVH software or GDS must be used to confirm TCC Shudder, Engine, Tire, or Driveline component related conditions.

To confirm TCC Shudder, record the PicoScope data while driving in 8th gear in the application specific condition above. Minimize extraneous vibration input by testing on a smooth road and correct any other known vehicle vibration issues (tires, brakes, etc.) before conducting test. If TCC Shudder is present, a vibration peak will appear (highlighted by arrow below) within +/-2 Hz of the frequency listed in the table above. TCC Shudder vibration frequency is stationary in 8th gear. If the vibration frequency follows vehicle speed or engine speed, then it is NOT TCC Shudder.



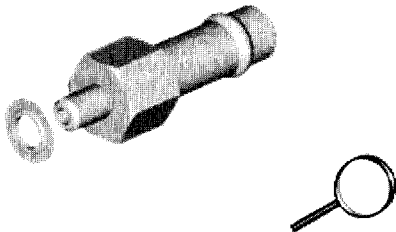
In the above illustration, frequency and default view have been selected.

Important: Obtain a screen print from GDS or PICO Scope that shows the TCC shudder event. This screen print must be attached to the Repair Order hard copy for reference.

Special Tools

DT-52263 Transmission Fluid Exchange Kit:

- DT-52263-1 Block Assembly (includes fluid drain hose, spring clamp)
- DT-52263-2 Cooler Line Plug (qty 3) (use with rear differential cooler)
- DT-52263-3 1/2" Cooler Line Flush Adapter for 2019 Silverado and Sierra
- DT-52263-4 3/8" Hose Adapter (6" long with 2 hose clamps)
- DT-52263-5 Radiator Cooler Drain Adapter



- DT-51190 Transmission Oil Fill Adapter

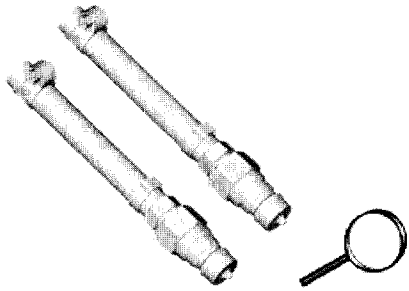
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- GE-47716-2 Graduated Bucket



DT-45096 TransFlow Cooler Flush Machine



DT-45096-31 TransFlow Adapter (one of two pieces from DT-45096-30)

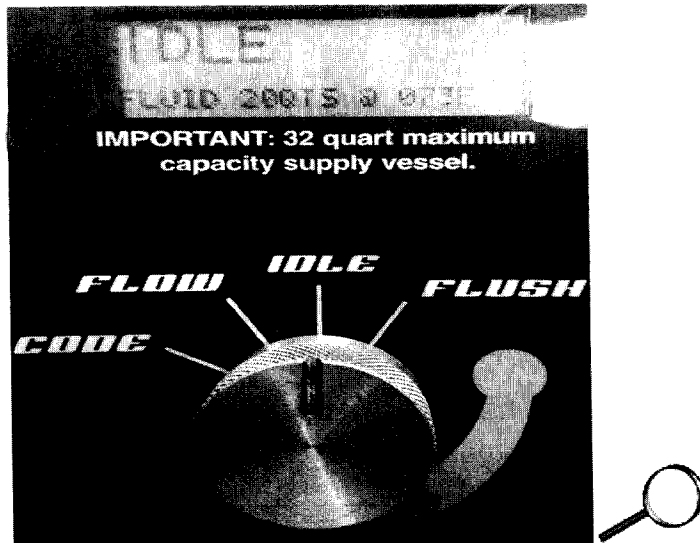
Service Procedure

Initial TransFlow Flush Machine Setup

Important: The prepping procedure only needs to be completed if the DT45096 supply reservoir has DEXRON VI fluid in it and has not been converted to use the new blue label Mobil 1 Synthetic LV ATF HP fluid.

Note: The prepping procedure only needs to be completed if HP is not in the supply reservoir.

1. Connect the TransFlow adapter DT-45096-31 to the supply line of the DT-45096 TransFlow machine.



2. Switch the DT-45096 TransFlow to Idle.
3. Connect power leads to the vehicle 12-volt DC supply.
4. Turn the TransFlow main switch ON.
5. Connect air supply to the DT-45096.
6. Place the TransFlow supply hose with adapter DT-45096-31 into a waste reservoir using care not to spill the expelled fluid.

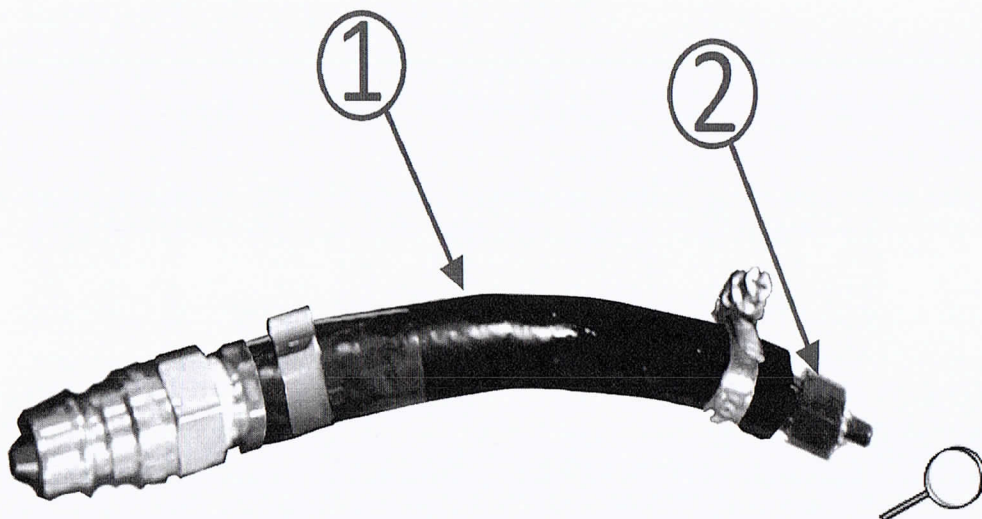
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7. Switch the DT-45096 TransFlow to Flow and allow all the fluid in the supply reservoir to be removed and placed in the waste reservoir.
8. Switch the control switch back to idle.

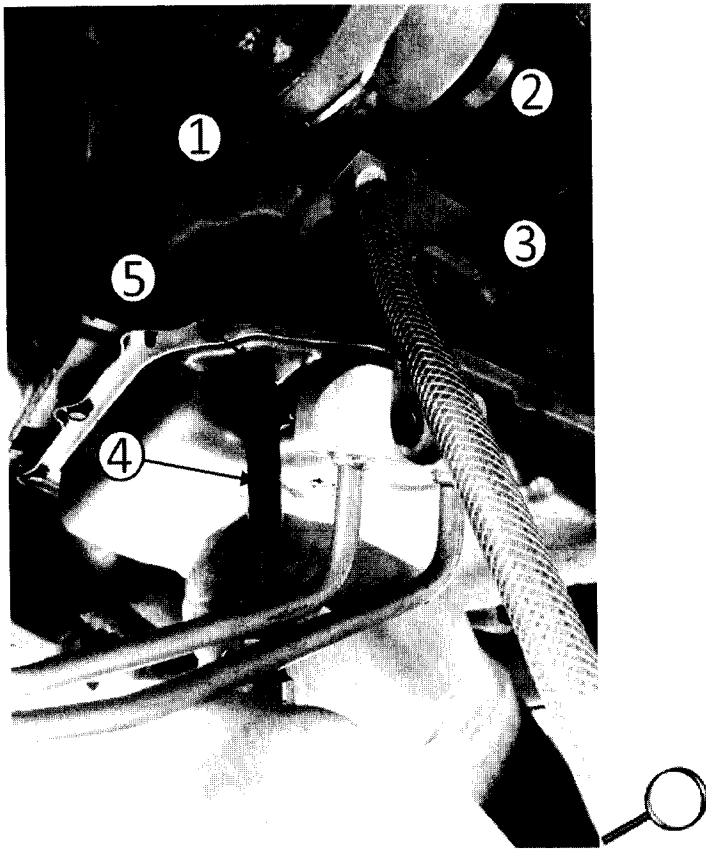
Fluid Exchange Procedure - Colorado, Canyon, Silverado, Sierra, Yukon Denali and Escalade Models with an Accessible Transmission Oil Cooler Line Block Assembly

Important: This procedure must be followed as published. The exchange process is required to obtain proper level of new blue label Mobil 1 Synthetic LV ATF HP fluid. Intermixing of other types of transmission fluid or aftermarket additive packages will result in a low concentration level of new fluid and will not provide satisfactory results.

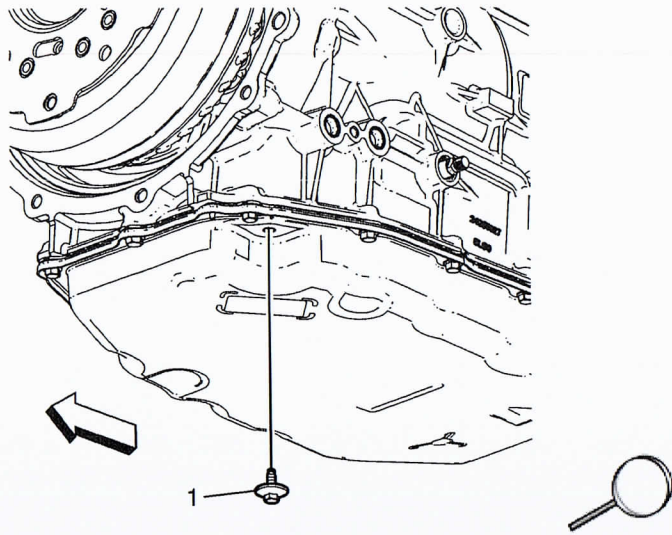
1. Fill the DT-45096 with 20 quarts of HP fluid.
2. Raise the vehicle on a hoist.



3. Install the DT-45096-31 TransFlow adapter (1) to the DT-51190 fluid fill adapter (2).



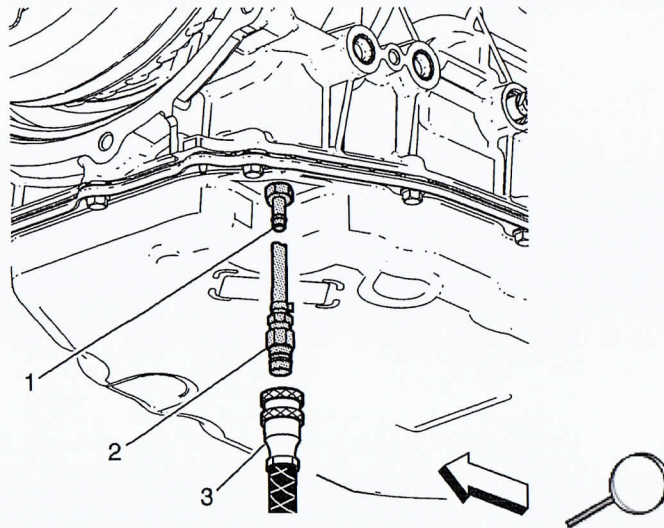
4. Remove the transmission oil cooler pipe assembly from the transmission.
5. Install the DT-52263-1 Adapter Block Assembly (1), reusing the seal from the transmission oil cooler pipe assembly.
6. Tighten the bolt (2) to 22N•m (16 lb ft).
7. Place the hose (3) in the GE-47716-2 Graduated Measuring Bucket, utilizing a Spring Clamp to retain the hose.



8. Remove the level set plug (1) from the transmission.

Important: DO NOT over tighten the DT-51190 as it can be damaged by excessive torque. **DO NOT** exceed 9N•m (80 lb in).

9. Install the DT-51190/DT-45096-31 assembly and hand tighten as shown in the graphic above.



10. Connect the TransFlow fluid feed (supply) line (3) to the DT-45096-31 adapter (2).

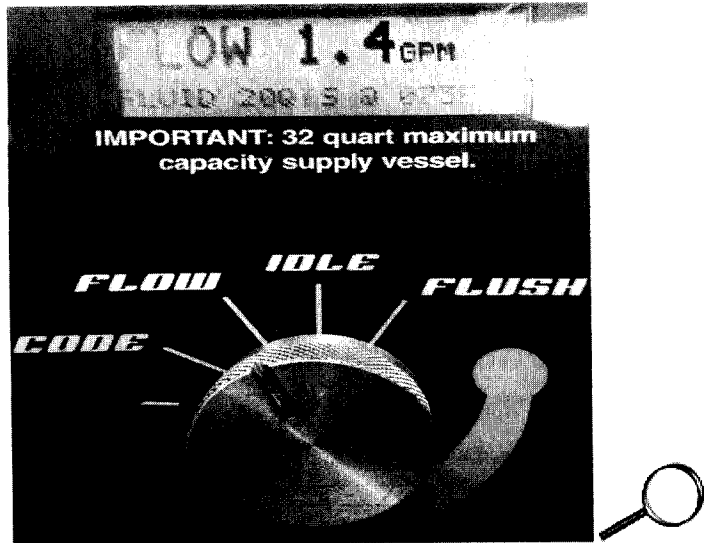
11. Lower the vehicle.

Caution: DO NOT REMOVE MORE THAN 3 QUARTS OF FLUID AS IT COULD CAUSE FLUID PUMP CAVITATION AND POSSIBLY DAMAGE THE TRANSMISSION.

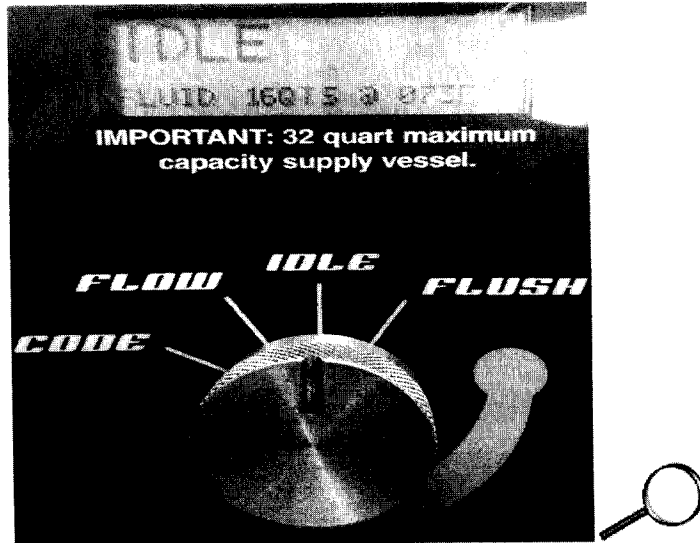
12. Utilizing the graduated bucket, start the engine and run 30- 45 seconds until 3 quarts of fluid is expelled.

13. Shut the engine off immediately.

14. Connect the DT-45096 to the vehicle battery 12 volts and connect shop air to the air connection.



15. Switch the DT-45096 TransFlow to Flow and add 4 quarts of HP to the transmission.



16. Switch the DT-45096 TransFlow to Idle (Reducing fluid level in the TransFlow from 20 - 16).
 17. Switch the TransFlow DT-45096 to Flow and start the engine:

- 17.1. Add a maximum of 4 quarts of HP Fluid to the transmission, turn the TransFlow switch to idle once 4 quarts have been added, while allowing 4 additional quarts of oil to fill the DT-graduated bucket (Reducing fluid level in the TransFlow from 16 - 12).

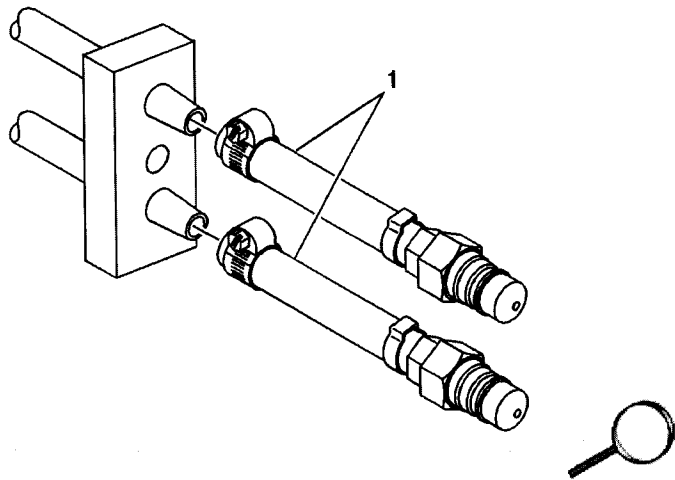
Note: DO NOT add additional transmission fluid until the 4 quarts of oil have been removed from the transmission (Reducing fluid level in the TransFlow from 12 - 8).

- 17.2. Repeat step 17.1.

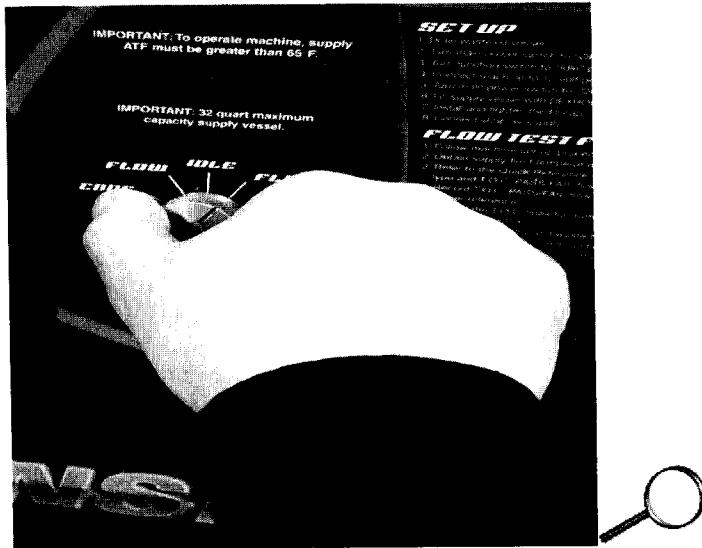
- 17.3. Add a maximum of 5 quarts of HP fluid to the transmission while allowing 5 additional quarts of oil to fill the DT-graduated bucket (Reducing fluid level in the TransFlow from 8 – 3).



- 17.4. Shut the engine off once 16 quarts of fluid have been collected.
- 17.5. Properly dispose of the expelled transmission fluid.
18. Raise the vehicle.
19. Disconnect the DT-45096 TransFlow feed (supply) line from DT-45096-31 TransFlow adapter.
20. Using care, remove DT-45096-31/DT-51190 as an assembly.
21. Remove the DT-51190 fluid fill adapter from DT-45096-31 hose.
22. Install the level set plug.
- Tighten**
Tighten the plug to 9N•m (80 lb in).
23. Remove DT-52263-1 Adapter Block Assembly from the transmission.
24. If equipped, remove the Thermal By-Pass Block from the cooler pipes on the Escalade, Silverado, Sierra and Yukon Models.



25. Install DT-45096-31 adapters (1) to the transmission oil cooler lines.
26. Connect the DT-45096 TransFlow to the DT-45096-31 adapters.



27. Switch the DT-45096 TransFlow to Flush.
28. Flush the vehicle cooler and lines using 2 quarts of HP fluid.
 - ⇒ Flush 1 quart of fluid through the lines, then switch the hose connections and flush 1 quart of fluid in the opposite direction.
29. Remove the DT-51190/DT-45096-31 assembly.
30. If equipped, install the Thermal By-Pass Block from the cooler pipes on the Escalade, Silverado, Sierra and Yukon Models.
31. Install the transmission oil cooler pipe using a new cooler block seal.

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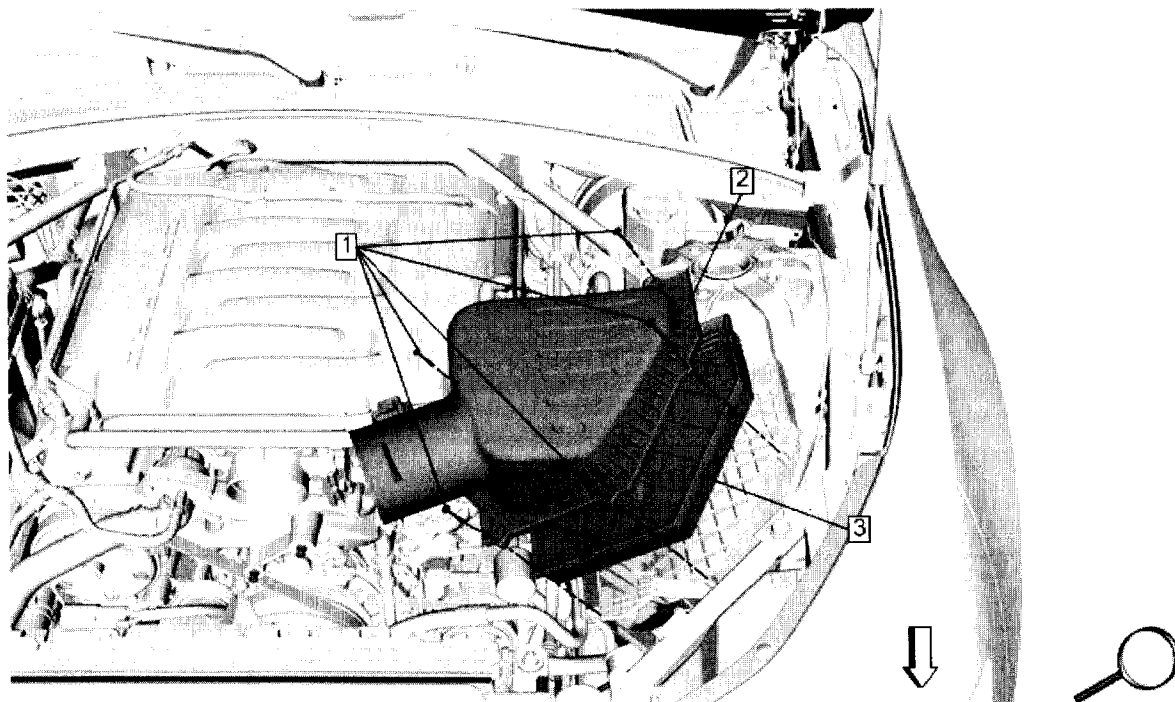
32. Partially lower the vehicle.
33. Start the engine.
34. Using care, shift the transmission through all forward ranges and Reverse.
35. Shift the transmission into Park.
36. Perform the Transmission Fluid Level and Condition Check outlined below in this procedure:
 - 36.1. Get the transmission fluid temperature to the proper temperature.
 - 36.2. Install the level set plug.
 - Tighten**
Tighten Tighten the plug to 9N•m (80 lb in).

The TCC shudder condition should be directional improved immediately after the fluid exchange procedure. It may take up to 200 mi (320 km) for the TCC shudder condition to be eliminated.

Fluid Exchange Procedure - Camaro, CTS and ATS Not Equipped with a Rear Differential Cooler

Important: This procedure must be followed as published. The exchange process is required to obtain proper level of new blue label Mobile 1 Synthetic LV ATF HP fluid. Intermixing of other types of transmission fluid or aftermarket additive packages will result in a low concentration level of new fluid and will not provide satisfactory results.

1. Fill the DT-45096 with 20 quarts of HP fluid.



Note: The MAF sensor must stay connected so that no DTCs will set.

2. Separate the engine upper air filter box (1) from the lower air filter housing to gain access to the upper transmission oil cooler line.



Note: Upper air filter box removed for clarity.

3. Remove the cooler line from the transmission oil cooler.