

GENERAL PROCEDURES

TRANSMISSION FLUID COOLER BACKFLUSHING AND CLEANING

Material

Item	Specification
MERCON® SP Automatic Transmission Fluid XT-6-QSP (US); CXT-6-LSP12 (Canada)	MERCON® SP

CAUTION: When internal damage occurs in the transmission, metal particles and clutch plate material can travel into the torque converter and the transmission fluid cooler. These contaminants are a major cause of recurring transmission concerns. To prevent further concerns, remove these contaminants from the transmission fluid cooler tubes and install a new transmission fluid cooler before placing the transmission in use.

CAUTION: Do not attempt to install an in-line transmission fluid filter on this vehicle, damage to the transmission fluid cooling system or transmission could occur.

1. Install a new transmission fluid cooler if any transmission fluid leaks are indicated or a major metallic failure is indicated.
2. Using a suitable torque converter/fluid cooler cleaner, flush the transmission fluid cooler and tubes.

NOTE: Rubber hoses must be attached to the ends of the transmission fluid cooler tubes, to aid in connecting them to the cleaner.

3. Connect the cleaner pressure and return lines appropriately in the following sequence.
 1. Connect the pressure line to the transmission fluid cooler inlet tube.
 2. Connect the return line to the transmission fluid cooler outlet tube.
 3. Place the outlet end of the return line in the transmission fluid tank reservoir.






NOTE: Cycling the fluid pump ON and OFF will help dislodge contaminants in the cooler system.

4. Switch the fluid pump ON. Allow the transmission fluid to circulate a minimum of 5 minutes.
5. Switch the fluid pump OFF.
6. Disconnect the cleaner pressure line at the transmission fluid cooler tube.
7. Using compressed air, blow through the transmission fluid cooler inlet tube until all transmission fluid is removed.
8. Remove the rubber hoses from the transmission fluid cooler tubes.

TRANSMISSION FLUID DRAIN AND REFILL

Special Tools

Illustration	Tool Name	Tool Number

 ST2834-A	Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool	
 ST2933-A	Transmission Fluid Fill Tube	307-570
 ST2715-A	Transporter Fluid Evacuator/Injector	307-D465 or equivalent
 ST1299-A	Vacuum Pump Kit	416-D002 (D95L-7559-A) or equivalent
 ST2457-A	Rubber Tip Air Nozzle	100-D009 (D93L-7000-A)

Material

Item	Specification
MERCON® SP Automatic Transmission Fluid XT-6-QSP (US); CXT-6-LSP12 (Canada)	MERCON® SP

Drain

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to **JACKING AND LIFTING**.

NOTE: Some fluid leakage may occur when removing the fluid fill plug.

2. Remove the fluid fill plug fluid level indicator assembly located on the passenger side front portion of the transmission case. Removal of the plug will relieve any vacuum that might have built up in the transmission. This will aid in allowing the fluid pan to be easily removed when the bolts are removed.

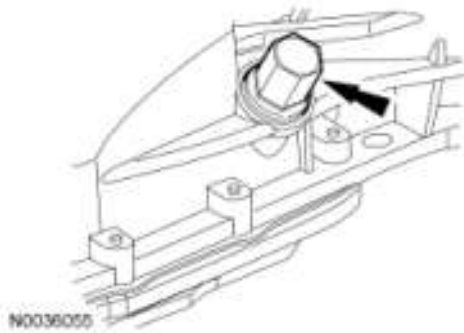


Fig. 8: Locating Fluid Fill Plug
Courtesy of FORD MOTOR CO.

3. Remove the transmission fluid pan and allow the fluid to drain.

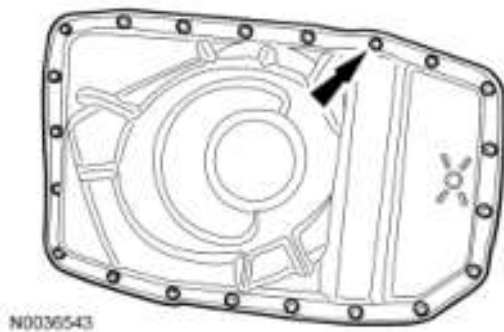


Fig. 9: Locating Transmission Fluid Pan Bolts
Courtesy of FORD MOTOR CO.

NOTE: The fluid pan gasket can be reused if not damaged.

4. Install a new transmission fluid pan gasket, if required.

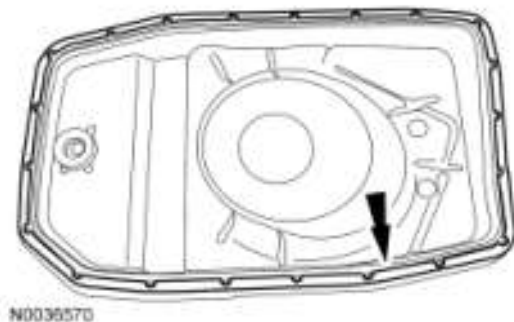


Fig. 10: Locating Transmission Fluid Pan Gasket
Courtesy of FORD MOTOR CO.

5. Install the transmission fluid pan.
 - Tighten to 14 Nm (10 lb-ft).

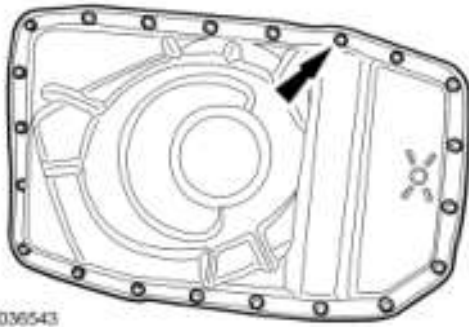


Fig. 11: Locating Transmission Fluid Pan Bolts
Courtesy of FORD MOTOR CO.

Transmission Fluid Refill

CAUTION: This procedure contains the air purge steps required to purge air from the cooling system. This procedure is NOT intended for use with the Transmission Fluid Level Check.

CAUTION: The vehicle should not be driven if the fluid level is low as internal failure could result.

CAUTION: The fluid fill plug is located near the exhaust system. The exhaust will be extremely hot during this procedure.

CAUTION: The use of any other transmission fluid than specified, can result in the transmission failing to operate in a normal manner or transmission failure.

NOTE: If the transmission starts to slip, shifts slowly or shows signs of fluid leaking, the fluid level should be checked.

NOTE: Here is an overview of the Transmission Fluid Drain and Refill procedure.

- Adding 3.3L (3.5 qt) of clean automatic transmission fluid to the transmission is an initial fill enabling you to start the engine.
- The cold level range shown in the procedure allows the vehicle to be driven.
- The vehicle should be driven to allow the transmission fluid temperature to reach 85°C-88°C (185°F-190°F) in order to purge the air from the transmission cooling system.
- Fill the transmission fluid to the fill range on the fluid level indicator at the normal operating range 80°C-85°C (175°F-185°F).

NOTE: The transmission will need 3.3L (3.5 qt) of clean automatic transmission fluid added to the transmission as an initial fill if:

- the transmission has been overhauled.
- a new mechatronic assembly has been installed.
- the transmission fluid pan or fluid filter have been removed.

1. Using the special tool, add 3.3L (3.5 qt) of clean automatic transmission fluid to the transmission through the fluid fill hole. For additional information, refer to Adding Additional Transmission Fluid in this procedure.
2. Check the transmission fluid level cold.
 1. The vehicle is safe to drive if the transmission fluid is in the cold level range 32°C-43°C (90°F-110°F).
 2. Using the scan tool and the engine running, place the transmission selector lever in each gear position and hold approximately 5 seconds. Place the transmission selector lever in PARK, with the engine at idle (600-750 rpm).
3. Separate the fluid level indicator from the fill plug.



Fig. 12: Locating Fluid Level Indicator And Fill Plug
 Courtesy of FORD MOTOR CO.

4. Wipe the fluid level indicator clean. Reinstall the fluid level indicator only back into the fill plug hole to check the fluid level. Repeat this until a consistent reading is established.

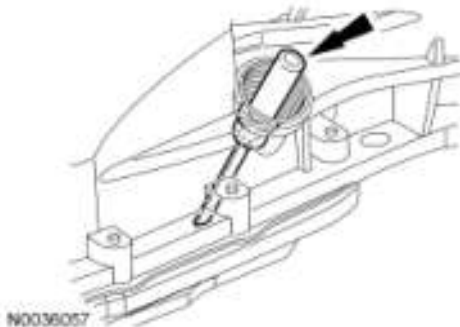
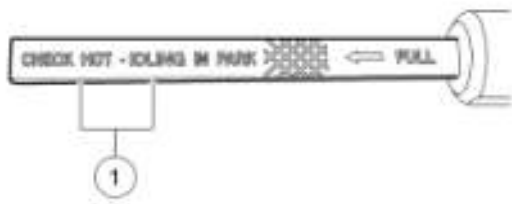


Fig. 13: Locating Fluid Level Indicator
 Courtesy of FORD MOTOR CO.

5. Add clean transmission fluid to the cold level location as shown in the illustration.



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Fig. 14: Identifying Cold Level Location
 Courtesy of FORD MOTOR CO.

6. Install the fluid fill plug.
 - Tighten to 35 Nm (26 lb-ft).

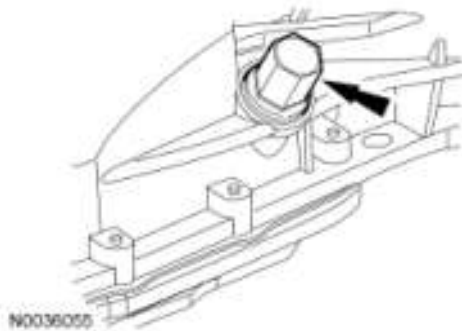


Fig. 15: Locating Fluid Fill Plug
 Courtesy of FORD MOTOR CO.

7. While driving the vehicle, use the scan tool to verify that the transmission fluid temperature has reached a temperature of 88°C (190°F). This will circulate the transmission fluid through the torque converter and the cooling system, eliminating any trapped air in the cooling system.
 - With the engine idling (600-750 rpm) in PARK, verify that the transmission fluid temperature is between 80°C-85°C (175°F-185°F).
8. Remove the fluid fill plug fluid level indicator assembly located on the passenger side front portion of the transmission case.

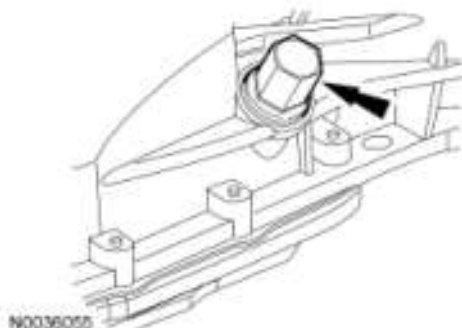


Fig. 16: Locating Fluid Fill Plug
 Courtesy of FORD MOTOR CO.

9. Separate the fluid level indicator from the fill plug.



Fig. 17: Locating Fluid Level Indicator And Fill Plug
 Courtesy of FORD MOTOR CO.

10. Wipe the fluid level indicator clean. Reinstall the fluid level indicator only back into the fill plug hole to check the fluid level. Repeat this until a consistent reading is established.



Fig. 18: Locating Fluid Level Indicator
 Courtesy of FORD MOTOR CO.

11. Using the scan tool verify that the transmission fluid temperature is between 80°C-85°C (175°F-185°F). The fluid level must be at the upper level of the crosshatch mark.

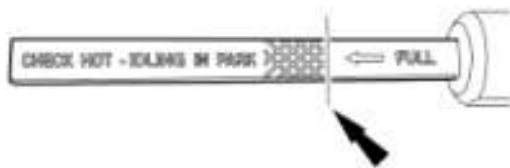


Fig. 19: Identifying Transmission Fluid Level Crosshatch Mark
 Courtesy of FORD MOTOR CO.

NOTE: If the transmission fluid is not at the correct level, follow the steps for Adding Additional Transmission Fluid or Removing Transmission Fluid in this procedure.

12. Install the fluid fill plug.
 - Tighten to 35 Nm (26 lb-ft).

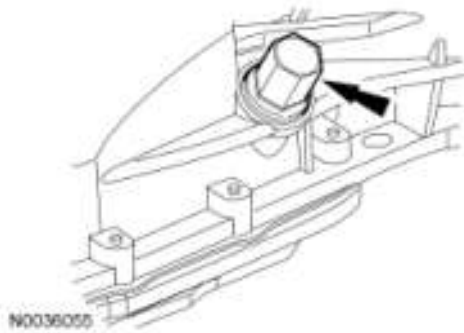


Fig. 20: Locating Fluid Fill Plug
 Courtesy of FORD MOTOR CO.

Adding Additional Transmission Fluid

NOTE: To get an accurate fluid level reading the engine should be idling (600-750 rpm) in PARK.

1. Install the special tool into the fluid fill hole.

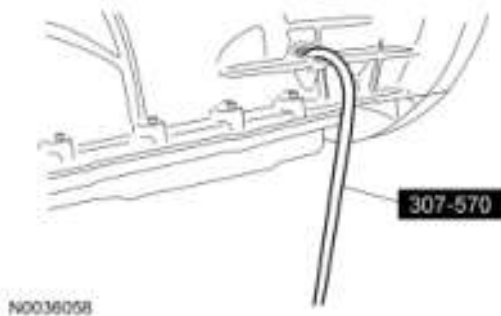


Fig. 21: Installing Special Tool (307-570) Into Fluid Fill Hole
 Courtesy of FORD MOTOR CO.

2. Fill the special tool with approximately 0.47L (1 pt) of clean automatic transmission fluid.

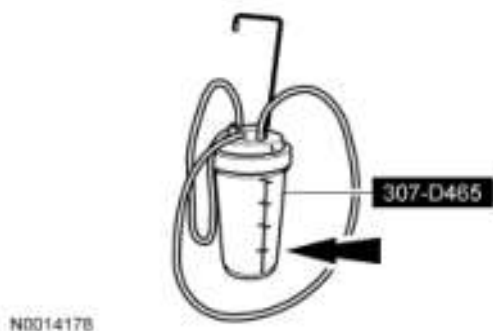


Fig. 22: Filling Special Tool 307-D465 With Clean Automatic Transmission Fluid
 Courtesy of FORD MOTOR CO.

3. Hang the special tool under the vehicle, upright and close to the transmission.



Fig. 23: Hanging Special Tool (307-D465) Under Vehicle, Upright & Close To Transmission
 Courtesy of FORD MOTOR CO.

4. Connect the special tools.
 - Connect the open end of the fluid hose from the special tool onto the special tool from the transmission case.

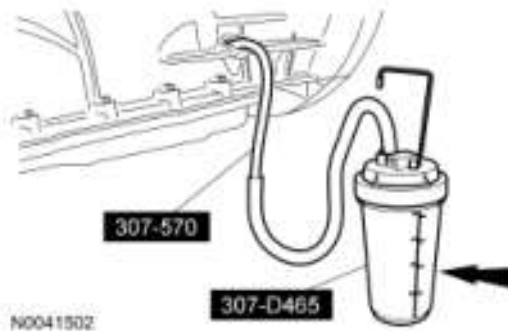


Fig. 24: Connecting Open End Of Fluid Hose From Special Tool Onto Special Tool From Transmission Case
 Courtesy of FORD MOTOR CO.

5. Apply a maximum of 206.85 kPa (30 psi) to the open end of the vacuum/pressure hose from the special tool. Fluid will immediately start flowing out of the special tool into the transmission.

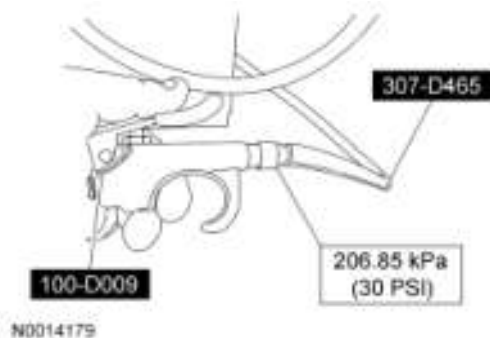


Fig. 25: Identifying Special Tools (100-D009) And (307-D465)
 Courtesy of FORD MOTOR CO.

NOTE: Do not overfill the transmission. The fluid level must be at the upper level of the crosshatch mark.

6. Reinstall the fluid level indicator only back into the fill plug hole to check the fluid level. Repeat this

until a consistent reading is established.

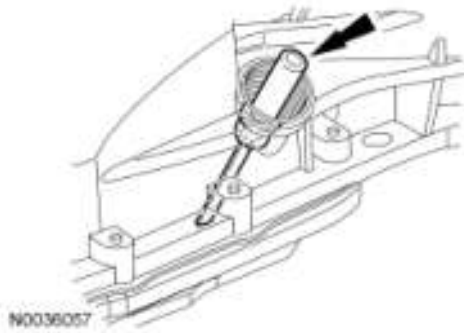


Fig. 26: Locating Fluid Level Indicator
Courtesy of FORD MOTOR CO.

7. Using the scan tool verify that the transmission fluid temperature is between 80°C-85°C (175°F-185°F). The fluid level must be at the upper level of the crosshatch mark.

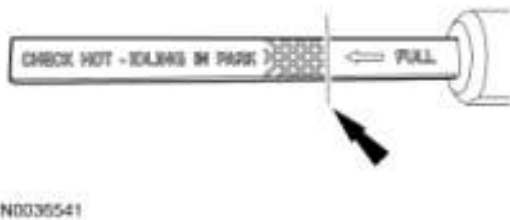


Fig. 27: Identifying Transmission Fluid Level Crosshatch Mark
Courtesy of FORD MOTOR CO.

NOTE: If the transmission fluid is over full, follow the steps for Removing Transmission Fluid in this procedure.

8. Install the fluid fill plug.
 - Tighten to 35 Nm (26 lb-ft).

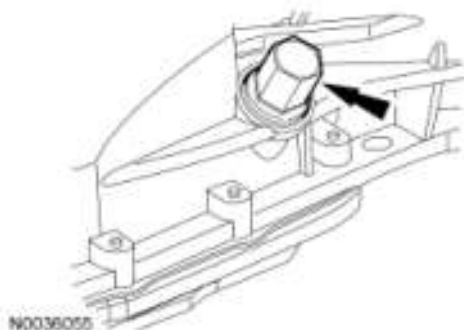


Fig. 28: Locating Fluid Fill Plug
Courtesy of FORD MOTOR CO.

NOTE: To get an accurate fluid level reading the engine should be idling (600-750 rpm) in PARK.

1. If the transmission is overfilled, fluid must be removed to the correct level. Use the special tools to extract any excessive fluid.



Fig. 29: Identifying Special Tools (416-D002) And (307-D465)
Courtesy of FORD MOTOR CO.

2. Using the scan tool, verify that the transmission fluid temperature is between 80°C-85°C (175°F-185°F). The fluid level must be at the upper level of the crosshatch mark. Reinstall the fluid level indicator only back into the fill plug hole to check the fluid level. Repeat this until a consistent reading is established.

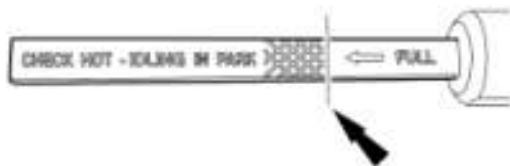


Fig. 30: Identifying Transmission Fluid Level Crosshatch Mark
Courtesy of FORD MOTOR CO.

3. Install the fluid fill plug.
 - Tighten to 35 Nm (26 lb-ft).

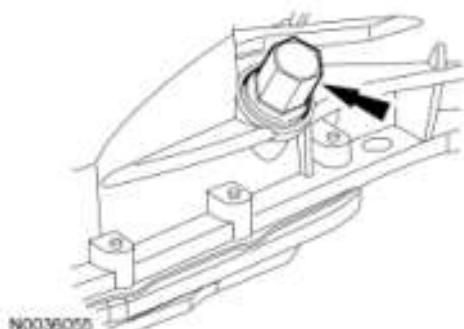



Fig. 31: Locating Fluid Fill Plug

Courtesy of FORD MOTOR CO.

TRANSMISSION FLUID LEVEL CHECK

Special Tools

Illustration	Tool Name	Tool Number
 ST2834-A	Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool	

Material

Item	Specification
MERCON® SP Automatic Transmission Fluid XT-6-QSP (US); CXT-6-LSP12 (Canada)	MERCON® SP

CAUTION: The vehicle should not be driven if the transmission fluid level is low as internal failure could result.

CAUTION: The transmission fluid fill plug is located near the exhaust system. The exhaust will be extremely hot during this procedure.

NOTE: If the vehicle has been operated for an extended period at high highway speeds, in city traffic, during hot weather or while pulling a trailer, the transmission fluid must cool down to obtain an accurate reading.

NOTE: If the transmission starts to slip, shifts slowly or shows signs of transmission fluid leaking, the transmission fluid level should be checked.

NOTE: Do not overfill the transmission. The transmission fluid level must be at the upper level of the crosshatch mark.

NOTE: If the installation of a new transmission fluid cooler, cooler tubes have been carried out the vehicle must be driven to get the transmission fluid to a temperature of 88°C (190°F) in order to purge the air from the transmission fluid cooling system.

1. With the engine running, place the transmission selector lever in each gear position and hold approximately 5 seconds. Place the transmission selector lever in PARK.
2. With the engine idling (600-750 rpm) in PARK, position it on a hoist. For additional information, refer to **JACKING AND LIFTING**.
3. Remove the transmission fluid fill plug transmission fluid level indicator assembly, located on the passenger side front portion of the transmission case.

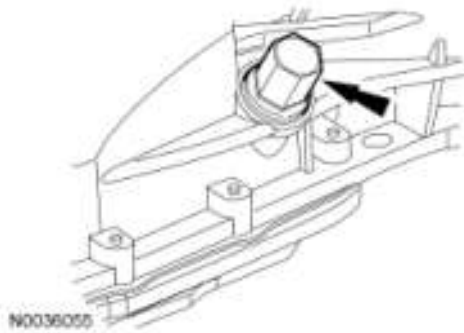


Fig. 32: Locating Fluid Fill Plug
Courtesy of FORD MOTOR CO.

4. Separate the transmission fluid level indicator from the transmission fluid fill plug.



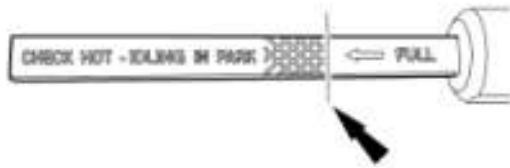
Fig. 33: Locating Fluid Level Indicator And Fill Plug
Courtesy of FORD MOTOR CO.

5. Wipe the transmission fluid level indicator clean. Reinstall the transmission fluid level indicator only back into the transmission fluid fill plug hole to check the transmission fluid level.



Fig. 34: Locating Fluid Level Indicator
Courtesy of FORD MOTOR CO.

6. Using the scan tool, verify that the transmission fluid temperature is between 80°C-85°C (175°F-185°F). Do not overfill the transmission. The transmission fluid level must be at the upper level of the crosshatch mark.



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Fig. 35: Identifying Transmission Fluid Level Crosshatch Mark
 Courtesy of FORD MOTOR CO.

NOTE: If the transmission fluid is not at the correct level, follow the steps for **Adding Additional Transmission Fluid or Removing Transmission Fluid**. For additional information, refer to **Transmission Fluid Drain and Refill**.

7. Install the transmission fluid fill plug.
 - Tighten to 35 Nm (26 lb-ft).

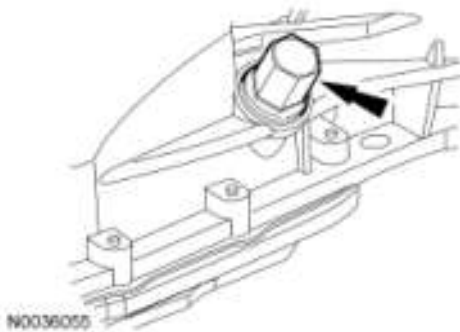


Fig. 36: Locating Fluid Fill Plug
 Courtesy of FORD MOTOR CO.

TORQUE CONVERTER

1. A new or remanufactured torque converter must be installed if one or more of the following statements is true:
 - A torque converter malfunction has been determined based on complete diagnostic procedures.
 - Converter rivets, impeller hub or bushing are damaged.
 - Discoloration (due to overheating).
 - Evidence of transmission assembly or fluid contamination due to the following transmission or converter failure modes:
 - Major metallic failure.
 - Multiple clutches or clutch plate failures.
 - Sufficient component wear which results in metallic contamination.
 - Internal torque converter contamination present. For additional information, refer to **Torque Converter Contamination Inspection**.

TORQUE CONVERTER CONTAMINATION INSPECTION

Material

Item	Specification
MERCON® SP Automatic Transmission Fluid XT-6-QSP (US); CXT-6-LSP12 (Canada)	MERCON® SP

CAUTION: Do not use water-based cleaners or mineral spirits to clean or flush the torque converter or transmission, damage will occur. Use only clean automatic transmission fluid designated for the transmission and converter being serviced.

1. If a new or remanufactured torque converter is not being installed, the following steps must be completed.
2. With the torque converter on a bench, pour a small amount of transmission fluid from the torque converter onto an absorbent white tissue or through a paper filter and examine the fluid.

NOTE: The factory fill fluid is red.

3. Observe the color and odor of the fluid. The fluid should be red, not brown or black. Odor may indicate an overheating condition such as clutch disc or band failure.
4. Examine the stain on the tissue for evidence of particles (specks of any kind). Examine the transmission fluid level indicator for signs of antifreeze (gum or varnish). If particles are present in the transmission fluid, a new torque converter must be installed.
5. If there are no particles or contamination present, drain the remainder of the transmission fluid from the torque converter.
6. Add 1.9L (2 qt) of clean transmission fluid into the converter and agitate by hand.
7. Thoroughly drain the transmission fluid.