

## **Automatic Transmission Oil Cooler Flushing/Flow Check**

File In Section: 7 - Transmission

Bulletin No.: 77-71-59

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### **INFORMATION**

**Subject:**

Automatic Transmission Oil Cooler Flushing and Flow Check Procedures

**Models:**

1997 and Prior GM Vehicles with Automatic Transmissions

**Including:**

Jaguar Cars Limited

Rolls-Royce Motor Car

Aston Martin Lagonda Limited

Reumech Ermetek

AM General

Isuzu

GM Brazil

GM Venezuela

GM Holden

Daewoo Motor Company

GM studies indicate that plugged or restricted transmission oil coolers and pipes cause insufficient transmission lubrication and elevated operating temperatures which can lead to premature transmission wearout. Many cases could have been prevented by following published procedures for transmission oil cooler flushing and flow checking. This procedure includes flushing and flow checking the auxiliary transmission oil cooler, if equipped.

GM requires that transmission oil cooler flushing and flow checking be performed whenever a transmission is removed from the vehicle for service within warranty, including:

- Goodwrench SRTA installation
- major overhaul
- torque converter replacement
- oil pump replacement

Only GM Goodwrench DEXRON(R)-III automatic transmission fluid should be used when doing warranty repair on GM transmissions.

Time allowance for performing the cooler flushing and flow checking procedure has been included in the appropriate labor time guide operations since the 1987 model year. The service procedure steps for oil cooler flushing are as follows:

## **Cooler Flushing and Flow Check Steps**

- Equipment needed

- Preparation
- Initial flush
- Back flush
- Flow check
- Clean-up

## Equipment Needed

J 35944 cooler flushing tool

J 35944-22 or J 35944-CSE flushing solution

J 35944-200 cooler flushing adapter (4L60-E and 4L80-E)

J 35944-440 cooler flushing adapter (4T40-E) Measuring cup Funnel Water supply (hot water recommended) Water hose (at least 5/8" I.D.) Shop air supply (with water/oil filters, regulator and pressure gauge) Air chuck (with clip if available) Oil drain container Five gallon pail with lid Eye protection Rubber gloves

\*Do not substitute with solutions that contain alcohol or glycol. Use of solutions that contain alcohol or glycol may damage J 35944, oil cooler components or transmission components.

## Preparation

1. After the repaired or replacement transmission is installed in the vehicle, do not reconnect the oil cooler pipes.
2. Remove the fill cap on J 35944 and fill the can with 0.6 L (20-21 oz.) of flushing solution. Do not overfill.
3. Install the fill cap on J 35944 and pressurize the flusher can using the shop air supply to 550-700 kPa (80-100 psi).
4. Connect the J 35944 discharge hose to the oil cooler return pipe (refer to Table 1). Use J 35944-200 or J 35944-440 if required.
5. Clip the discharge hose onto the oil drain container.
6. Attach J 35944 to the undercarriage of the vehicle with the hook provided and connect the hose from J 35944 to the other (feed) oil cooler pipe. Use J 35944-200 or J 35944-440 if required.
7. With the water valve on J 35944 in the "OFF" position, connect the water hose from the water supply to J 35944.
8. Turn "ON" the water supply at the faucet.

## Initial Flush

1. Turn the water valve on J 35944 to the "ON" position and allow the water to flow through the oil cooler and pipes for 10 seconds to remove any remaining transmission fluid. If water does not flow through the oil cooler and pipes, the cause of the blockage must be diagnosed and the plugged component must be repaired or replaced. Continue with the cooler flushing and flow check procedure once the blockage is corrected.
2. Turn the water valve on J 35944 to the "OFF" position and clip the discharge hose onto the five gallon pail with a lid.
3. Turn the water valve on J 35944 to the "ON" position and depress the trigger to mix cooler flushing solution into the water flow. Use the clip provided on the handle to hold the trigger down. The discharge will foam vigorously when the solution is introduced into the water stream.
4. Flush the oil cooler and pipes with water and solution for two minutes. During this flush, attach the air supply to the air valve located on J 35944 for 3 to 5 seconds at the end of every 15-20 second interval to create a surging action.
5. Release the trigger and turn the water valve on J 35944 to the "OFF" position.

## Back Flush

1. Disconnect both hoses from the oil cooler pipes and then connect them to the opposite oil cooler pipe. This will allow the oil cooler and pipes to be back flushed.
2. Repeat steps 3 and 4 of the INITIAL FLUSH procedure.
3. Release the trigger of J 35944 and allow water only to rinse the oil cooler and pipes for one minute.

4. Turn the water valve on J 35944 to the "OFF" position and turn "OFF" the water supply at the faucet.
5. Attach the air supply to the air valve on J 35944 and blow out the water from the oil cooler and pipes. Continue until no water comes out of the discharge hose.

## **Flow Check**

1. Disconnect both hoses from the oil cooler pipes. Connect the oil cooler feed pipe to the transmission and the return pipe to the discharge hose (refer to Table 1). Clip the discharge hose onto the empty oil drain container.
2. Confirm the transmission is filled with automatic transmission fluid. Refer to SPECIFICATIONS in Section 7 of the appropriate Service Manual for the correct automatic transmission fluid capacity.
3. Start the engine with the transmission in PARK range and run for 30 seconds. A minimum of two (2) quarts (1.9 L) must be discharged during this 30 second run time.

If fluid flow is greater than 2 qt. in 30 seconds, go to step 4.

If fluid flow is less than 2 qt. in 30 seconds, perform the following diagnosis:

Disconnect the oil cooler feed line at the radiator. Connect the discharge hose to the cooler feed line. Clip the discharge hose onto the empty oil drain container. Start the engine with the transmission in PARK range and run for 30 seconds. A minimum of two (2) quarts (1.9 L) must be discharged during this 30 second run time. Do the following according to the flow rate:

Insufficient feed flow:

Inspect the transmission

Sufficient feed flow:

Inspect the oil cooler return pipe and the oil cooler (and auxiliary cooler, if equipped).

4. Remove the discharge hose, reconnect the cooler feed and return pipes to the transmission and refill the unit to the proper fluid level. Inspect the transmission oil cooler pipe connections at the radiator, auxiliary cooler (if equipped) and transmission for leaks. Refer to Section 7 of the appropriate Service Manual.

| Transmission        | Oil Cooler Feed<br>(Exiting<br>Transmission)     | Oil Cooler<br>Return (Entering<br>Transmission) |
|---------------------|--------------------------------------------------|-------------------------------------------------|
| 200-4R              | top connector                                    | bottom connector                                |
| 3L30<br>(180)       | front connector                                  | rear connector                                  |
| 3L80<br>(400)       | bottom connector                                 | top connector                                   |
| 4L30-E              | front connector                                  | rear connector                                  |
| 4L60<br>(700-R4)    | bottom connector                                 | top connector                                   |
| 4L60-E              | bottom connector<br>(may require<br>J 35944-200) | top connector<br>(may require<br>J 35944-200)   |
| 4L80-E              | front connector<br>(may require<br>J 35944-200)  | rear connector<br>(may require<br>J 35944-200)  |
| 3T40                | bottom connector                                 | top connector                                   |
| 4T40-E              | top connector<br>(requires<br>J 35944-440)       | bottom connector<br>(requires<br>J 35944-440)   |
| 4T60<br>(440-T4/F7) | vertical (top)<br>connector                      | horizontal<br>(bottom)<br>connector             |
| 4T60-E              | vertical (top)<br>connector                      | horizontal<br>(bottom)<br>connector             |
| 4T65-E              | vertical (top)<br>connector                      | horizontal<br>(bottom)<br>connector             |
| 4T80-E              | front connector<br>(case cover)                  | rear connector<br>(case)                        |

Table 1: Direction Of Fluid Flow In The Oil Cooler Pipes At The Transmission

## Clean-Up

1. Disconnect the water supply hose from J 35944 and bleed any remaining air pressure from the can.
2. Remove the fill cap from J 35944 and return any unused flushing solution to its container. Rinse J 35944 with water. Do not store J 35944 with flushing solution in it.
3. After every third use, clean J 35944 as described in the instructions included with the tool.
4. Dispose of any waste water/solution/transmission fluid in accordance with local regulations.