

Revisions to this document are noted by a stripe in the left-hand margin

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SUBJECT: Water and/or Ethylene Glycol in Transmission Fluid

MODELS AFFECTED: AT/MT/HT/1000/2000/3000/4000/H 40/50 EP™

The presence of water and/or ethylene glycol coolant mixtures in the transmission fluid is detrimental to the reliability and durability of the internal components. Contaminated fluid has a deteriorating effect on transmission components. Frictional capacity of drive clutch plates can be greatly reduced as a result of surface film or impregnation by water and/or ethylene glycol. Glycol contamination will physically deteriorate clutch plate material.

If the user suspects contamination, a fluid sample should be obtained when the transmission fluid is at normal operating temperature to ensure that the contaminate, if present, is thoroughly dispersed in the fluid. The analysis of the fluid sample (by the fluid supplier or any qualified laboratory) will provide the degree of contamination and possible clue of its source.

The presence of a minimal amount of water may be due to uncovered oil drums or an open transmission filler tube; or, in the case of ethylene glycol, the use of an all-purpose fill container or a defective transmission fluid cooler.

H 40/50 EP Drive Units™ use oil-to-air coolers; therefore, it is not possible for a cooler failure to contaminate the fluid with ethylene glycol. On H 40/50 EP Drive Units™, the only way that ethylene glycol can contaminate the fluid is by accidentally adding it to the transmission or by using a contaminated fill bucket.

Transmission fluid containing greater than 0.2% water by volume, regardless of whether it contains glycol or not, is considered contaminated and should not be used.

Any trace of glycol, or greater than 0.2% water contamination, requires complete disassembly and cleanup of the transmission and replacement of seals, gaskets, clutch plates, and bearings. In the case of AT or 1000/2000 Series transmissions, the torque converter must also be replaced since it cannot be completely drained or disassembled.

If the transmission is equipped with solenoids, measure the solenoid resistance and compare to specification. Solenoids not within specification must be replaced. Transmission components that exhibit rust must be replaced. The vehicle cooling system should be pressure tested to locate the possible source of contamination.

In the case of H 40/50 EP Drive Units™, ethylene glycol that has contaminated one or both of the stator assemblies can produce a short to ground, causing isolation codes to set in the Transmission Control Module (TCM) and could cause damage to the Dual Power Inverter Module (DPIM).

In the event that the drive unit becomes contaminated (i.e., water, coolant or metal), the stator housing can be cleaned for service. The stator housing should be sent to a motor shop to have the stator assemblies electrically qualified (Refer to SIL 16-EP-10). In the event that the stator does not meet these guidelines, the stator should be replaced.

Cleaning Requirements for H 40/50 EP Drive Unit™ Stators:



NOTE: Chemicals used in the cleaning process must not contain silicone. Silicone contamination of the stator assembly will result in reduced Drive Unit fluid life.



NOTE: Be sure the stator is cool (room temperature) before cleaning.

1. Rinse the stator a couple of times in isopropyl alcohol to remove glycol and/or water.
2. Rinse the stator in hexane (high purity mineral spirits) a couple of times to remove the isopropyl alcohol.

Allow solvents to evaporate at room temperature and then slowly warm the unit in a safety oven to about 100°C (212°F) to completely evaporate the solvents.

After Drive Unit reassembly, install new high voltage lugs onto the lead wires. Refer to SIL 6-EP-10 for service instructions and component part numbers for the new high voltage lug assembly.

Conditions That May Indicate Water and/or Glycol in the Oil:

- Rusty or pitted transmission parts.
- Oil spewing out of transmission breather.
- Oil in radiator (Except H 40/50 EP Drive Unit™).
- Gaskets blistered or wrinkled in uncompressed areas.
- Discoloration of oil. Presence of water in oil when dispersed is a cloudy or gray, pink, or strawberry color.
- Steam from breather.

Reference Material:

For additional information on field analysis refer to:

- Automatic Transmission Fluid Technician's Guide (GN2055EN).

GN2055EN can be used to reference testing methods and limits for water/glycol content.

Nelco Company offers a kit that detects the presence of ethylene glycol in oil. The kit is identified as "Gly-Tek TestKit" and can be obtained from:

Nelco Company
1047 McKnight Road South
Saint Paul, MN 55119
651.738.2014