

# **Water in Fuel / Non-Warrantable Fuel System Repair Job Aid**

## **Introduction**

Returned 6.4L fuel system components have shown that water in fuel is a major contributor to metal debris in the high and low pressure fuel systems. Water in fuel may cause rust and corrosion to form within the fuel systems. Fuel system failure due to water is not eligible for warranty coverage. Water may enter the fuel system for a variety of reasons, some of which are listed below:

- Insufficient fuel filter maintenance
- Use of filters that do not meet or exceed Ford Motor Company specifications
- Insufficient Water in Fuel (WIF) separator maintenance (Refer to Owner Guide, Diesel Supplement)
- Failure to act upon WIF warning light/message in the instrument cluster
- Use of non-approved fuels (e.g. bio-diesel exceeding 5%)
- Use of aftermarket fuel additives that do not meet or exceed Ford Motor Company specifications
- Water in fuel content that exceeds American Society for Testing of Materials (ASTM) standards

## **Preliminary Inspection Points**

The following are recommended system inspection points for evidence of water in fuel. These preliminary inspections cannot be used as a sole indicator to determine fuel system warranty eligibility.

- Secondary fuel filter housing—filter removed (Figures 1-4)
- Visual appearance of fuel from the secondary filter housing
  - Standing water (Figure 5)
  - Cloudy—emulsified water and fuel (Figure 6)
- Primary and Secondary fuel filters

Insufficient fuel filter maintenance may affect the ability of the fuel system to separate water from fuel.

The WIF warning lamp/message function is based on water accumulation within the Horizontal Fuel Conditioning Module (HFCM) water reservoir triggering the WIF sensor.

## Rust and Corrosion in Secondary Fuel Filter Housing

Figure 1



Figure 2



Figure 3



Figure 4



## Water-in-Fuel Contamination

Figure 5

Figure 6



## Primary and Secondary Fuel Filters – Insufficient Maintenance

Figure 7

Figure 8



## **Inspection of the Internal Transfer Pump**

The Internal Transfer Pump (ITP) is located inside the High Pressure Fuel Injection Pump. Physical inspection of the ITP for rust or corrosion is required to determine fuel system warranty eligibility. Rust/corrosion within the ITP is confirmation of fuel system damage due to water/contaminated fuel. Fuel system damage due to water/contaminated fuel is not eligible for warranty coverage. Refer to Warranty and Policy Manual for additional information.

### **ITP Inspection Procedure**

1. Remove the High Pressure Fuel Injection Pump. Refer to WSM, Section 303-04.
2. Place the pump assembly on a bench with the ITP cover facing up. (Figure 9)
3. Remove the 3 fasteners (6mm hex) and the ITP cover.

Figure 9



**NOTE:** The ITP cover should only be removed for inspection when the high pressure fuel injection pump has been confirmed to be failed and the high pressure fuel system contaminated with debris, per Powertrain Control/Emissions Diagnosis (PC/ED) manual, Hard Start/No Start diagnostic procedure, step 28.

4. Inspect surfaces under the ITP cover for evidence of rust/corrosion to determine if pump has been damaged by water contamination. (Figures 10-13)

## Corrosion under the Internal Transfer Pump Cover

Figure 10

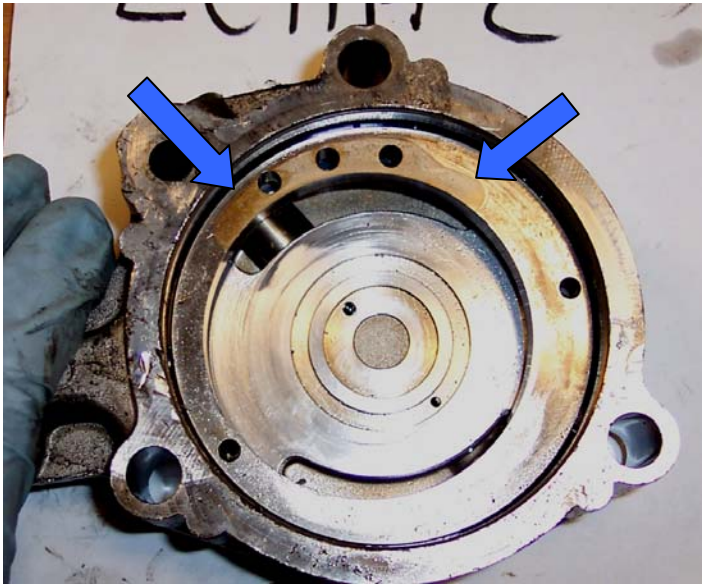


Figure 11

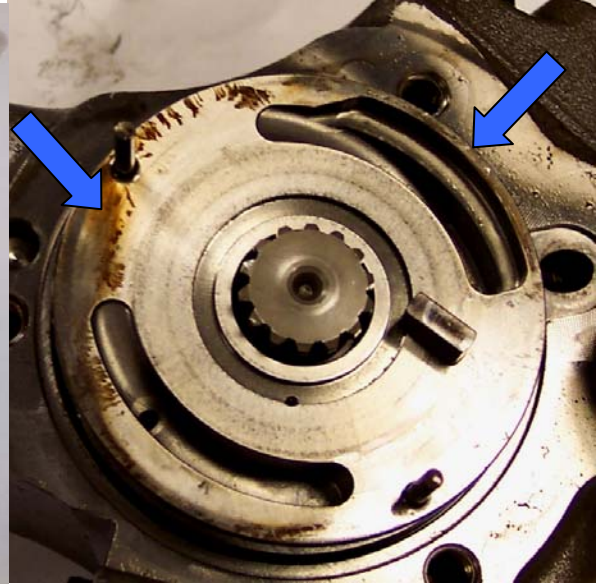


Figure 12

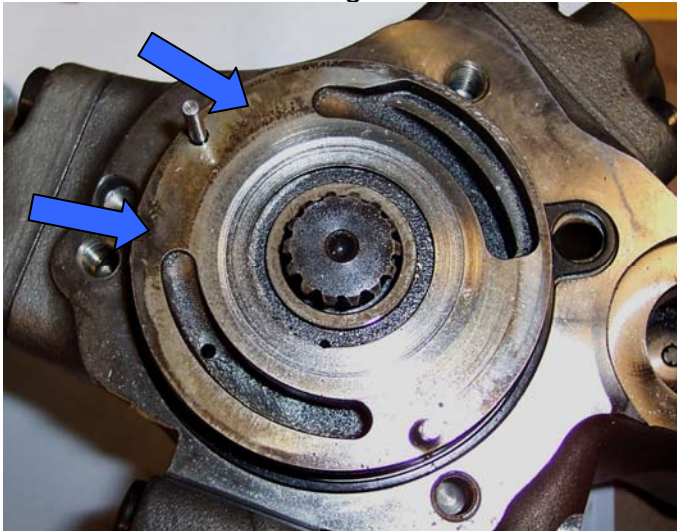


Figure 13



Fuel system components to be replaced when rust/corrosion is found in the ITP inspection:

Part Number (Qty)	Part Common Name	* Kit contains
9A543 (1)	High Pressure Pump assy	N/A
9G805 * (1)	High Pressure Pump gasket kit	<ul style="list-style-type: none"> <li>▪ High pressure pump gaskets</li> <li>▪ High pressure pump-to-fuel rail manifold fuel lines</li> </ul>
9N103 (1)	Fuel Cooler assy	N/A
9H529 * (8)	Fuel Injector kit	<ul style="list-style-type: none"> <li>▪ Fuel injector</li> <li>▪ Jumper tube</li> <li>▪ Fuel injector gaskets</li> </ul>
8C3Z- 9T287-CA * (1)	LH and RH Fuel Rail Manifold kit	<ul style="list-style-type: none"> <li>▪ LH fuel rail manifold</li> <li>▪ RH fuel rail manifold</li> </ul>
9N184 * (1)	Fuel Filter kit	<ul style="list-style-type: none"> <li>▪ Primary fuel filter</li> <li>▪ Secondary fuel filter</li> </ul>
9G756 (1)	Fuel Pressure Sensor	N/A
9C330 (1)	Fuel supply line	N/A
9C148	Secondary fuel filter housing	N/A

**9G282 HFCM to be inspected and replaced** if there is visible metal debris in the HFCM during filter replacement or visible metal debris in the fuel tank.

Fuel system components to be flushed and re-used when rust/corrosion is found in the ITP inspection:

**NOTE:** Low pressure lines are to be flushed unless rust is found within the line. Rust inside a low pressure line requires line replacement.

Part Number	Part Common Name	* Kit contains
9B337 A/B	Low pressure return lines	N/A
9N104	Low pressure return lines	N/A
9C273	Low pressure return lines	N/A
9002	Fuel Tank (Inspect interior)	N/A

## **Water in Fuel Light/Message Operation**

### **Overview**

The Water in Fuel warning monitors a level of water accumulated in the Horizontal Fuel Control Module (HFCM) using the Water in Fuel sensor. Water is separated within the HFCM by the primary fuel filter. The indication of an amount of water in the HFCM can take the form of a Water in Fuel light in the instrument cluster, or Water in Fuel warning message – depending on vehicle build level. The actual activation of the Water in Fuel warning (light or message) is controlled by the Powertrain Control Module (PCM) through an integrated strategy to prevent false Water in Fuel warnings due to normal fuel slosh in the HFCM.

### **Vehicles with calibrations before IDS release 71.04**

- The PCM monitors the Water in Fuel sensor and other inputs to determine that an amount of water is present in the HFCM.
- The PCM communicates with the instrument cluster to activate the Water in Fuel warning (light/message), and stores a P2269 code in continuous memory.
- There are no PCM directed changes to vehicle driveability if a Water in Fuel monitor condition is met.

### **Vehicles with calibrations from IDS release 71.04 and greater**

For vehicles with updated calibrations, there are new Water in Fuel fault detection capabilities added that will be noticeable to owners.

- If a Water in Fuel monitor condition is met and not addressed (within 60 minutes or 60 miles) by draining the HFCM, the vehicle will exhibit the following:
  - Wrench Light Illumination
  - Engine power will be reduced
  - Instrument Cluster Displays "Reduced Engine Power"
  - Once the Water in Fuel monitor condition is corrected, the vehicle will return to normal operation.
- A Water in Fuel monitor has been added to detect water build-up during extended idle (2-4 hours).
  - If a Water in Fuel monitor condition is met, a visible warning (Water in Fuel light/Water in Fuel message/Wrench Light) will be displayed. The vehicle will then operate in a reduced Engine Power (reduced torque) mode.
  - Once the Water in Fuel monitor condition is corrected, the vehicle will return to normal operation.