### General Service Bulletin (GSB): 6.7L Diesel Fuel Conditioning Module (DFCM) GSB

| This GSB references the inspection and bleed procedure for the 6.7L diesel low pressure fuel system. | Some 6.7L diesel vehicles may experience drivability concerns due to low fuel pressure. The most common cause of excess noise and/or low fuel pressure is a restricted primary fuel filter. |

**NOTE:** This information is not intended to replace or supersede any warranty, parts and service policy, Work Shop Manual (WSM) procedures or technical training or wiring diagram information.

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### 6.7L Diesel Fuel Conditioning Module (DFCM) GSB

#### A Guide to Understanding Diesel Fuel Conditioning Modules (DFCM)
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Overview
A Guide to understanding Diesel Fuel Conditioning Modules (DFCM)

The Diesel Fuel Conditioning Module (DFCM) performs the following functions:
• Separates water from fuel
• Stores water that was separated from the fuel
• Senses when the water separator has reached it’s capacity
• Filters debris as small as 10 micron from the fuel when using Motorcraft filters
• Pressurizes fuel from the tank to feed the High Pressure (HP) fuel system
• Routes returned fuel to the tank or engine based on fuel temperature

NOTICE: A certain level of Fuel pump noise is normal due to pressure and volume requirements for the Diesel HP fuel system. Externally mounted fuel pumps like the DFCM will make more noise than in-tank fuel pumps because of the extra insulation from fuel that in-tank pumps have.

NOTE: The most common cause of excess noise and/or low fuel pressure is a restricted primary fuel filter. Be sure to follow the PC/ED when diagnosing the DFCM and the Workshop Manual when replacing the fuel filters.

NOTE: Fuel filter replacement is considered a normal maintenance item and is not covered under warranty.
Overview - Cause

There are two main causes for excessive DFCM noise and/or low pressure:

1. **Air in the fuel system** - May be caused by damage to the DFCM lower bowl stops, damage to the lower bowl O-ring, a loose (not fully seated) lower filter bowl, the drain valve not fully closed, low fuel level or air trapped in the system after performing maintenance or repairs.

2. **Inlet Restriction** – Is commonly caused by a restricted primary fuel filter. The primary fuel filter may become restricted due to normal filtering operation or fuel gelling when operating in cold ambient temperatures. Fuel filter life is very dependent on the quality of fuel used. Poor fuel quality may require the fuel filters to be replaced more often than the recommended scheduled maintenance interval. Other causes of inlet restriction could be restriction in the fuel tank, plugged or damaged fuel lines.

**NOTE:** The most common sources of poor fuel quality are:

- Vehicle-mounted auxiliary fuel tanks
- Municipal/Fleet storage tanks
- Infrequently used fuel sources

**NOTE:** The best course of action to avoid fuel system concerns is to ensure the vehicle is only fueled from sources with a known quality of diesel fuel verified to be free of water and other contaminants.
Inspection

**Inspections to Perform on the DFCM:** (see WSM section 310-01 – Fuel Tank and Lines – Removal and Installation – Fuel filter, for further information)

1. **Water-In-Fuel (WIF) Drain** - Check to ensure the WIF drain is tight. If the drain is loose or the O-ring is damaged, air will be drawn into the DFCM resulting in excess fuel pump noise and possible drivability concerns.

2. **Lower Fuel Bowl** – The lower filter bowl is not tightened to a torqued value; there are stopping tabs on the lower and upper housings that should contact each other when the lower bowl is fully tightened (Figure 1). If the lower bowl is over-tightened or if pneumatic tools are used for service, these tabs may break and cause O-ring damage allowing air to enter the system. If the tabs are broken, then that part of the DFCM will need to be replaced. Damage to the DFCM stopping tabs not warrantable.

![Figure 1](image)

**Note:** If the lower bowl is not fully seated, air can be drawn past the lower bowl O-ring. Lubricating the lower bowl O-ring with clean diesel fuel will help ensure proper lower bowl installation and avoid O-ring damage.

*NOTE:* Inspect how the DFCM header and bowl stopping tabs are touching and not damaged.
Understanding Noise

Understanding DFCM Noise: (See the PC/ED section 4 – Diagnostic Procedures – Sufficient Clean Fuel Test, for further information)

1. **Fuel Level** – When operating at ¼ tank of fuel or less, there may be a vibration/buzzing/growl type noise from the DFCM. This noise is caused by a slight amount of air entering the fuel system. This is a normal condition and no repairs should be attempted.

2. **Fuel Gelling** – Diesel fuel may gel when operating in cold ambient temperatures. Fuel gelling will occur at different ambient temperatures depending on fuel quality, additives used and bio-diesel concentration. Low quality and/or bio-diesel fuel will gel quicker at higher temperatures than good quality diesel fuel. In winter months it is recommended that customers use Motorcraft anti-gel PM-23-A (US), PM-23-B (CAN).

3. **Fuel Filter** – When diagnosing the DFCM per the PC/ED Pin Point Tests, the fuel filter gets replaced WSM section 310-01 before any recommendation of DFCM replacement. Discolored and/or deformed filters are signs of a restriction that could cause noise from the DFCM. However, even filters that look good could still be restrictive.
Inspection - Fuel Filters

Ford Motorcraft fuel filters are manufactured to meet very specific standards in order for the entire fuel system to operate properly. Ford has found that the majority of aftermarket fuel filters are not made of the same quality material, do not meet the OE filtration specifications or are not sized correctly and may cause damage to the DFCM. To ensure that the fuel system operates properly it is highly recommended to only use genuine Ford Motorcraft fuel filters. Refer to the Sufficient Clean Fuel Test located in the PC/ED section 4.

The filter on the left is an aftermarket filter noted by the metal strip within the filter element (Fig 2). When installed, this filter does not fit properly in the DFCM noted by the gap between the filter and the housing (Fig 3). Installing this type of filter could damage the DFCM housing and/or pump. Damage to the DFCM due to aftermarket fuel filters is non-warrantable.

NOTICE: If aftermarket filters are found during inspection, replace them with Motorcraft filters per the WSM before proceeding with further diagnosis.

NOTE: The most common cause of excess noise and/or low fuel pressure is a restricted primary fuel filter. Be sure to follow the PC/ED when diagnosing the DFCM and the Workshop Manual when replacing the fuel filters.
NOTE: The most common cause of excess noise and/or low fuel pressure is a restricted primary fuel filter. Be sure to follow the PC/ED when diagnosing the DFCM and the Workshop Manual when replacing the fuel filters.
Fuel Filter Replacement

If no issues are found during DFCM and system inspections, the fuel filters should be replaced per the WSM. The filters should be replaced when diagnosing excessive noise and/or fuel pressure related concerns. When following the PC/ED for fuel pressure related concerns, the fuel filter is replaced prior to replacing a DFCM. If an aftermarket fuel filter is found, it must be replaced with a Motorcraft fuel filter in order to properly diagnose the fuel system per the WSM.

When installing the primary fuel filter, refer to WSM section 310-01 – Removal and Installation. Be certain to replace and lubricate the lower bowl O-ring with clean diesel fuel (Figure 6 and 7). Install the lower bowl and twist until the stops are fully seated (Figure 1). Once the fuel filter is replaced, purge the air from the fuel system using the DFCM air bleeding procedure listed in the Workshop Manual Section 310-00 Fuel System – General Information – General Procedures.
If the fuel system has been serviced (including fuel filter replacement) then the fuel system must be purged of any air that may have entered. The Fuel system bleeding procedure is found in the Workshop Manual Section 310-00 Fuel System – General Information – General Procedures - Fuel System Bleeding. Be sure to follow all warnings and precautions. If the fuel system is not bled properly, drivability concerns such as noise, lacks power and/or hard starting may persist until the air has been properly purged from the system.
Frequently Asked Questions

Q. How often should the 6.7L Diesel Fuel Conditioning Module (DFCM) water separator be drained?
A. Monthly at minimum if the WIF light or messages do not appear. When the WIF light turns on or a message appears (whichever occurs first). Refer to the 6.7L Owner Manual Diesel Supplement for DFCM draining intervals/procedures. Fuel quality plays a large part in how often the WIF needs to be drained.

Q. When should the fuel filters be replaced?
A. At normal maintenance intervals stated in the owners guide, if the DFCM is making excessive noise or if there is a low fuel pressure concern. Using poor quality fuel, incorrect fuel, bio-diesel or other fuel additives may decrease the filter replacement interval. Restricted fuel filters are the most common cause of DFCM noise complaints and drivability concerns related to low fuel pressure.

Q. What are the effects of not changing fuel filters per the recommended maintenance intervals or when directed by the vehicle message center?
A. Degradation in filter performance and water separation performance, which can result in damage to the fuel system. Fuel filters not meeting OEM specifications may not properly separate the water resulting in undetected water entering the High Pressure fuel system.

Q. What do the Water In Fuel (WIF) indicators (lights) or Message Center messages mean?
A. This means that the 6.7L Diesel Fuel Conditioning Module (DFCM) should be drained as soon as safely possible. The WIF light or message appears when enough water has been detected in the reservoir. Water in excess of the DFCM reservoir capacity will be passed through to the fuel system resulting in damage to the High Pressure fuel system. Refer to the 6.7L Owner Manual Diesel Supplement for DFCM capacities.
Frequently Asked Questions

Q. Will the DFCM separate other contaminants in the fuel besides water?
A. The DFCM separates water from the fuel. Water droplets in the fuel are grouped and removed by the various system components and collected in the DFCM reservoir. The DFCM is not designed to separate organic growth, oxidized fuel, acidic fuel, or other chemicals. Fuel additives that emulsify water reduce the effectiveness of the DFCM to separate water and must not be used. Using an aftermarket fuel filter may reduce the effectiveness of the DFCMs capabilities to separate water and could allow water to enter the HP fuel system.

Q. How does water affect the low pressure fuel system?
A. DFCM is designed to remove water from the diesel fuel. All diesel fuel contains some amount of water. Poor quality diesel fuel can have water in excess of the industry standard and cause the water/fuel separator to fill up quickly requiring that it be drained more frequently than if using good quality diesel fuel meeting specification. Using an aftermarket fuel filter may reduce the effectiveness of the DFCMs capabilities to separate water and could allow water to enter the HP fuel system.

Q. What are the potential effects of Biodiesel concentration above specifications?
A. Biodiesel concentrations above the specified amounts may cause fuel filter restrictions, which may result in a lack of power and or damage to fuel system components. Biodiesel not meeting 6.7L Owner Manual Diesel Supplement specifications can cause bacterial/fungus growth, increased water content, chemical attack of fuel system, and premature fuel filter plugging/fuel starvation due to cold temperature fuel gelling.
Frequently Asked Questions

Q. What is poor quality or contaminated fuel?

A. Diesel Fuel or Biodiesel Fuel not meeting the specifications listed in the 6.7L Owner Manual Diesel Supplement. Some examples of fuel contamination are:

- Water content exceeding specification
- DEF (Diesel Exhaust Fluid)
- Fuel with High TAN (Total Acid Number) – Acidic Fuel
- Aged/Oxidized Fuel
- Organic Growth (Bacteria, Fungus)
- Unapproved fuel additives

Q. What are some sources of poor quality or contaminated fuel?

A. Sources of poor quality or contaminated fuel may include:

- Fuel stations with fuel outside of ASTM specifications or contaminated fuel (improperly formulated, Biodiesel percentage too high or improperly produced Biodiesel, aged fuel, etc.)
- Auxiliary fuel tanks or above ground storage tanks (improper venting, aged fuel, temperature extremes)
- In ground tanks (flooding, leaking tanks, etc.)
- Non-recommended fuel additives (alcohol based, water emulsifiers, etc.)
- Incorrectly adding DEF to the fuel tank