

Request 13

Furnish Ford's assessment of the alleged defect in the subject and peer vehicles, including:

- a. The causal or contributory factor(s);
- b. The failure mechanism(s);
- c. The failure mode(s);
- d. The risk to motor vehicle safety that it poses; and
- e. What warnings, if any, the operator and the other persons both inside and outside the vehicle would have that the alleged defect was occurring, or subject component was malfunctioning; and
- f. The reports included with this inquiry.

Answer

Ford's best assessment is based on teardown analysis completed by the company and the Fuel Delivery Module (FDM) supplier on returned FDMs from warranty repairs on subject and peer vehicles. The FDM includes the low-pressure fuel pump, the jet pump, the fuel reservoir, and other components (see Ford's answer to Request 14 for a more detailed description). The teardown analysis identified that the jet pump orifices on some returned parts were blocked by foreign material, or contamination. The source of the contamination was not confirmed, but the rate of failures decreased significantly after cleanliness corrective actions were put in place at the supplier. With this understanding, it is Ford's determination that contaminants were likely introduced into the manufacturing and assembly process of the FDM at the supplier's facility. Ford reasons that partial or full blockage or plugging of the 0.38 mm reservoir filling jet pump orifice by contamination is the event or condition necessary to produce or contribute to the unwanted loss of motive power. Ford considers the condition of the FDM a failure and not a malfunction due to the introduction of foreign materials of the FDM during part production.

In the subject and peer vehicles, the low-pressure fuel pump pulls fuel from a reservoir, which is packaged in the vehicle's fuel tank. This reservoir has an open top that allows fuel to flow into it when the fuel tank fuel level is above the reservoir. When the fuel tank fuel level is below the top of the FDM reservoir, fuel can enter the reservoir through the umbrella valve and the jet pump. When the fuel tank fuel level is below the umbrella valve on the FDM reservoir, the jet pump keeps fuel in this reservoir. If the jet pump becomes plugged with contaminants, it is possible for the fuel reservoir within the fuel tank to become empty. When the fuel reservoir is empty, the fuel pump can run dry and a DTC will be set, and a check engine light will illuminate.

When the fuel is flowing through the fuel pump, it provides a cooling effect and keeps the operating temperatures of the fuel pump within specification. If the fuel pump runs dry, the impeller and/or the armature of the low-pressure fuel pump can overheat, causing the fuel pump motor to stop operating. If the fuel pump motor fails and stops operating, the driver may experience a loss of motive power or a no start condition.

Based on Ford's assessment of the failure rate and warranty claims, Ford does not believe this presents an unreasonable risk to motor vehicle safety because the risk of loss of motive power while driving is low and progressive in nature. In some cases, customers reported receiving check engine light warnings and experienced a change in vehicle performance (i.e. running rough) prior to a loss of motive power. Ford is not aware of any accidents, fires,

injuries or property damage attributed to failure of the FDM on subject or peer vehicles. In September 2024, Ford conducted a review of available warranty claims for subject and peer vehicles, the majority of claims alleged that the vehicle would not start. Ford identified 4,267 warranty claims (1.66 R/1000) alleging a no start condition at start-up. Ford did find 2,348 warranty claims (0.92 R/1000) alleging loss of motive power.

In review of the reports provided with this inquiry, Ford's determination as to the six vehicle owner questionnaires is that three reports indicate characteristics that may relate to category A1. Two reports describe characteristics similar to A2 and one complaint most closely describes category B1 (see Figure 1 for Response 2).

As a result, Ford and the supplier introduced several corrective actions regarding the manufacturing process to prevent contaminants from entering the jet pump. These corrective actions and their estimated date of effect in vehicles are seen in the table below.

Corrective Action	Estimated Vehicle Production Date Implementation
Flow test each jet pump assembly	January 07, 2022
Add two (2) additional vacuum pumps in orifice laser drill operation	July 13, 2022
Jet pumps are vacuumed while installed into FDM reservoir	October 07, 2022
Implement a cleaning and handling station utilizing a static elimination device	November 26, 2022
Dust each jet pump individually rather than in batches	February 24, 2022

In addition to changes to the suppliers' processes, the design of the jet pump was changed to allow the orifice to be more resistant to the effects of contamination. The diameter of the jet pump orifice was increased from 0.38 mm to 0.45 mm. This change was in place for Ford Bronco vehicles built on and after November 15, 2022, and was in place for Ford F-150, Ford Expedition, Ford Explorer, Ford Ranger, Ford Super Duty, Lincoln Navigator, and Lincoln Aviator vehicles built on or after November 11, 2022. Ford Ranger and Ford Mustang products continue to be produced with jet pumps with a jet pump orifice diameter of 0.38 mm.