Manufacturer Name : DENSO International America, Inc.
Submission Date : APR 24,2020
Recall No. : NR
Manufacturer Recall No. : NR

Manufacturer Information :
Manufacturer Name : DENSO International America, Inc.
Address : 24777 Denso Drive, Southfield, Michigan 48086 U.S.A
Company phone : +1 248 350 7500

Population :
Number of potentially involved : 2,020,000
Estimated percentage with defect : NR

Equipment Information :
Brand / Trade : DENSO
Model : Fuel Pump
Part No. : Various part numbers
Size : N/A
Function : Fuel supply
Descriptive Information :
The low-pressure fuel pump is located in the fuel tank and supplies fuel pressure to the fuel injection system.
Production Dates : SEP 1, 2017 – OCT 6, 2018

Description of Defect :
Description of the Defect :
An impeller in some low pressure fuel pumps may become deformed under certain conditions which could render the fuel pump inoperable.

FMVSS 1 : NR
FMVSS 2 : NR

Description of the Safety Risk :
If an impeller deforms to a point that creates sufficient interference with the fuel pump body, the fuel pump becomes inoperative. According to vehicle manufacturer's system evaluation, an inoperative fuel pump may result in the illumination of the check engine light and/or master warning indicators, rough engine running, engine no start and/or vehicle stall while driving at low speed and, in rare instances, a vehicle stall could occur while driving at higher speeds, increasing the risk of a crash.

Description of the Cause :
Under current knowledge, if an impeller is manufactured with a lower density, and contains a lower surface strength or is exposed to production solvent drying for a longer period of time, higher levels of surface cracking may occur which, when excessive fuel absorption occurs, may result in impeller deformation.

Geographic location and vehicle applications influence the potential for deformation resulting in fuel pump inoperability.

Identification of Any Warning that can Occur :
According to vehicle manufacturer's system evaluation, an inoperative fuel pump results in the illumination of the check engine light and/or master warning indicators, rough running, or no start, all of which are indicators that service is required.

Supplier Identification :
Component Manufacturer
Name : DENSO International America, Inc.
Address : 24777 Denso Drive, Southfield, Michigan 48086 U.S.A
Country : US
Name : DENSO CORPORATION
Address : 1-1,Showa-cho,Kariya,Aichi 448-8661,Japan
Country : Japan

Chronology :
June 2019 – August 2019
In early June 2019, Denso received increased information of a vehicle manufacturer's field reports related to low pressure fuel pumps ceasing to function.

In mid-June, Denso began inspection and analysis of fuel pumps collected from the field and observed impeller deformation inside the fuel pump. A further analysis of impellers in the fuel pumps collected from the field was conducted, and it was found that the deformed impellers had a lower density. Generally, impellers with lower density are more susceptible to fuel absorption. As part of the analysis, additional observations were made of cracking on the impeller surface. To understand the relationship between surface cracks and deformation of impeller, Denso began an investigation to attempt to determine what factors potentially contribute to cracking.

September 2019 – December 2019
As part of the investigation, Denso hypothesized that solvent used during the manufacturing process may be a factor causing impeller cracking and began duplication testing. During the testing, some cracks occurred on the surface of the impellers as the solvent dried over time. However, the cracking resulting from the duplication testing was inconsistent with the impeller cracking that was observed in the impellers
collected from the field.
January 2020 – February 2020
While analysis of the exact cause of the impeller deformation is ongoing, Toyota implemented a safety recall for certain Toyota vehicles for a particular period, as described in Toyota's Part 573 report.

Denso continued investigating other factors that could create further cracks. One factor considered was the possibility that longer lead times caused by fuel pump transit to the vehicle assembly plant led to the fuel pump being exposed to drying solvent for a longer period of time. Duplication testing was done with low density impellers under the condition where longer

duration of drying solvent exposure was applied. As a result, higher levels of cracking were observed, and fuel soaking test confirmed the similar level of deformation as observed in the impellers collected from the field.

However, Denso observed that some field reports showed impellers that had low density with similar cracks, even though they had shorter lead times to the vehicle assembly plant (i.e., they were not exposed to drying solvent for the longer period of time as were the pumps investigated above). Thus, Denso investigated the surface strength of the impellers. Analyses were performed on impeller samples with lower densities. These analyses identified that the surface strength was low on one particular impeller type. The impellers of this type can experience higher levels of surface cracking even when exposed to shorter durations of solvent drying.

Based on the above activities, it was concluded that fuel pumps produced with impellers of lower density that also either (1) have a lower surface strength or (2) were exposed to production drying solvent for longer periods of time could experience the impeller cracking at a level that could lead to excessive fuel absorption and could cause impeller deformation. Then, if impeller deformation results in sufficient interference with the fuel pump body, the fuel pump may become inoperative.

In the investigation by Denso the transport time of the specific pump type produced during the period from September 2013 to February 2015 for the specific manufacturer was also long, and cracks due to long-time drying were observed with a lower density impeller.

March 2020 – April 2020
Based on above investigation, Toyota amended Part 573 report filed in January 2020 for certain Toyota and Lexus vehicles with certain fuel pumps and engine configurations.

In addition, Subaru implemented a safety recall for certain Subaru vehicles for a particular period.

Denso sells low pressure fuel pumps of similar but not identical design and construction to other vehicle manufacturers. The vehicles of the other vehicle manufacturers possess different fuel delivery systems, engine configurations, and other variables to those recalled by Toyota and Subaru. Denso is cooperating with other vehicle manufacturers' investigations.

Description of Remedy :
Description of Remedy Program :
The remedy program, if any, will be determined by vehicle manufacturers.

How Remedy Component Differs from Recalled Component :
The impeller of fuel pumps utllized for a remedy component have higher density.
Identify How/When Recall Condition was Corrected in Production :NR

Recall Schedule :
Description of Recall Schedule : The recall schedule will be decided by vehicle manufacturers.
Planned Dealer Notification Date : NR - NR

Planned Owner Notification Date : NR - NR

Purchaser Information :
The following manufacturers purchased this defective/noncompliant equipment for possible use or installation in new motor vehicles or new items of motor vehicle equipment:

Name : American Honda Motor Co., Inc.
Address : 1919 Torrance Blvd.
Torrance CA 90501-2746
Country :US
Company Phone : NR

Name : Ford Motor Company
Address : 1 American Rd, Dearborn, MI 48126
Country : US
Company Phone : 800-392-3673

Name : Mazda North American Operations
Address : 1025 Connecticut Avenue, NW
DC 20036
Country :US
Company Phone : NR

Name : Mitsubishi Motors North America, Inc.
Address : 4015 Aspen Grove Dr, Franklin, TN 37067
Country :US
Company Phone : 865-441-4166

Name : Subaru of America, Inc.
Address : One Subaru Drive Camden NJ 08103
Country :US
Company Phone : 856-488-8500

Name : Toyota Motor North America,Inc.
Address : 6565 Headquarters Drive,
Plano TX 75024
Country : US
Company Phone : 469-292-4000

Name : Magnuson Products, LLC
Address : 1990 Knoll Drive, Building A, Ventura, CA, 93003
Country : US
Company Phone : 805-642-8833

Comment section :
complementary explanation

Number of potentially involved : 2,020,000
This is the number of Toyota and Subaru potentially involved vehicles in the U.S.

Estimated percentage with defect : NR
Denso is unable to provide an estimate of the percentage of vehicles to actually contain the defect. Whether the issue will lead to a vehicle stall while driving at higher speeds depends on many variables, such as the vehicle operating conditions.

Part No. : Various part numbers
Attached file reference.