

The root-cause analysis of premature shut off during refueling at hot ambient

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Refuel during hot ambient premature shut off occurred before fuel tank filled. Many reasons including temperature, fuel characteristic and fuel dispenser nozzle mechanism may affect to shut off earlier than expected. The purpose of this study is to research the root-cause analysis of premature shut off at hot ambient. Furthermore, suggest robust fuel system to prevent occurrence of premature shut off.

The fuel system consists of several components to perform the functions of filling, storing, and supplying fuel to the engine. Among them, filler necks, structures and shapes of retainers, and valves outside/inside the tank are involved in fuel injection. In the gasoline fuel system, when refueling at ordinary temperature, the fuel is normally filled, but when refueling at high temperature, the fuel tank cannot be filled and the fuel injection is stopped intermittently. In order to analyze the root cause of premature shut off problem and improve it, it is necessary to analyze the contribution of each factor by selecting the generating factor for each part of the fuel system that affects fuel supply. In particular, since it occurs only in summer, the outside air temperature, fuel temperature, and seasonal fuel characteristics at the time of refueling should also be considered.

Since fuel characteristics are supplied differently depending on the season or region, differences in each fuel may have a significant effect on the occurrence of abnormalities during injection. In severe cases, normal fuel may occur after more than 10 premature shut offs, so consumers can immediately recognize system problems. In addition, vehicles with one or two premature shut offs will be recognized as cluster problems or defects inside the fuel tank by instructing the gauge differently from the previously recognized mileage due to the injection of less fuel than capacity. The purpose of this paper is to develop a test method by analyzing the contribution of each factor to the occurrence of premature shut off during injection of such high temperature state, and to present an improvement plan by identifying the root cause of the premature shut off phenomenon.

Fig.1 Dispenser Nozzle Shut Off Mechanism off by fuel



Fig.2 Boiling characteristics and premature shut

