MERCURY MARINER

Service Bulletin

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2011 Low Permeation and Diurnal Requirements for Portable Fuel Systems and New Fuel Demand Valve

Models Affected

Models Covered
Mercury/Mariner/Force All portable fuel system products produced after January 1, 2011

Scope

United States

Situation

EPA Fuel Tank Requirements for 2011

On January 1, 2011 regulation 40 CFR part 1060 went into effect for the Portable Outboard Marine Tank (OMT) and Components regulation.

OMTs are used to supply fuel to outboard marine engines. Primarily constructed of plastic, the fuel tank is connected to the engine by use of a fuel line. A primer bulb is used to prime the engine and start the flow of fuel. Because the container is constructed of plastic, it is possible for gasoline to seep through the material and permeate into ambient air.

The requirement for outboard marine tanks to be sold with self-sealing caps found in the Portable Outboard Marine Tank and Components regulation becomes effective January 1, 2011, which is one year after the Federal requirements found in 40 CFR §1060.105(c). All self-sealing caps sold after January 1, 2011, are required to be certified. All certified components must include markings that indicate the date of manufacture (month, day, and year).

- The regulation (40 CFR part 1060) requires manufacturers to produce tanks and components that comply with the following standards by the indicated date.
  - By January 1, 2011 produce:
    - Primer bulbs that do not exceed a permeation rate of 15 grams/m²/day
    - Tanks that do not exceed an emission rate of 1.5 grams/m²/day and do not have a manual vent
    - All equipment (fuel tanks) must have a tethered fuel cap. Fuel caps must also include an audible or other physical indication that they have been properly sealed.
    - All equipment (fuel tanks) must be self-sealing (without any manual vents) when not attached to an engine. The tanks may not vent to the atmosphere when attached to an engine.
    - Tank caps may vent above 34.4 kPa (5.0 psi).
    - All equipment (fuel tanks) must remain sealed to a minimum of 24.5 kPa (3.5 psi). They may contain air inlets that open when there is vacuum pressure inside of the tank.

Solution

Mercury Marine has created a new portable fuel tank system that meets the requirements above with a product line of low permeation tanks with; a diurnal fuel cap, a low permeation fuel line, and a primer bulb. This system also includes a new fuel demand valve (FDV) that will not allow any pressurized fuel to the primer bulb or the engine. The engine must demand the fuel through vacuum created by the engine fuel pump.

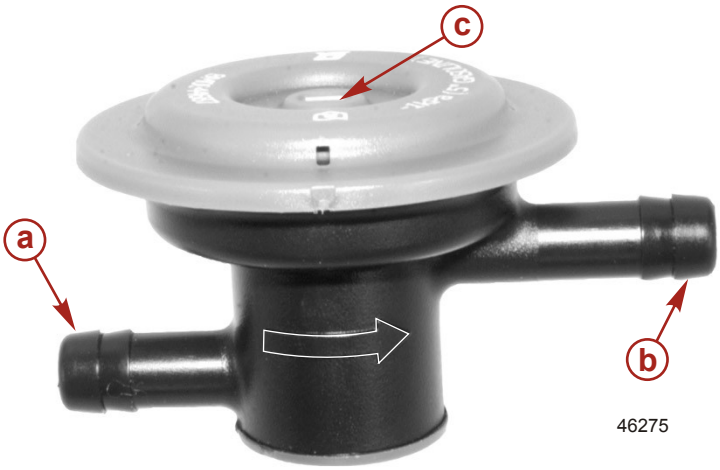
To mitigate the likelihood of pressurized fuel spilling from under cowl components, Mercury Marine recommends a fuel demand valve for all outboard engines with EPA compliant portable fuel tanks or pressurized fuel systems.

NOTE: *Mercury Marine 75–350 HP 4-stroke product, requires a fuel demand valve for proper engine operation with any pressurized boat fuel system. Fault code 220 and/or 221 will be activated without a fuel demand valve.*

Fuel Demand Valve

Fuel demand valve (FDV) provides a unique solution for managing pressurized fuel lines and fuel tanks that are required due to EPA regulatory requirements for portable fuel system evaporative emission controls. The fuel demand valve eliminates pressurized fuel from reaching downstream fuel lines and your engine, ensuring that fuel is provided to the engine on demand rather than as a result of a pressure in the tank.

- Installs in-line between your fuel tank and primer bulb/fuel pump
- Eliminates fuel fitting spray when connecting and disconnecting fittings at the engine
- Eliminates fuel spill due to pressurized fuel tanks and fuel lines
- Eliminates potential service and warranty issues related to pressurized fuel lines
- Available individually or as part of a fuel line assembly



a - FDV lower fuel inlet
b - FDV upper fuel outlet
c - Manual release

System Testing and Vacuum Readings

To test total fuel system restriction on pressurized fuel systems, remove the fuel fill cap to remove any pressure on the system. Pressure on the system can change the total restriction on the system and give varying readings based on different system pressures. To normalize data, the pressure on the system should be zero. The cap must be replaced just before the measurement is taken to ensure the cap restriction is also included in the measurement. There is an added restriction to the replacement air (replaces the fuel used) through new diurnal cap designs. The cap restriction can vary depending on the cap manufacture and must be measured as a system.

All Mercury outboard engines will see an added restriction of up to 2 kPa (0.6 in. Hg) through the fuel demand valve (FDV). The 75–350 HP 4-stroke engines may see an additional 3 kPa (0.9 in. Hg) restriction for a total of 5 kPa (1.5 in. Hg).

Portable fuel systems on Mercury 75–350 HP 4-stroke engines utilizing a FDV may have a total restriction of 12 kPa (3.5 in. Hg). If the FDV in the system causes a restriction higher than 12 kPa (3.5 in. Hg), the system vacuum should be reduced.

In extreme cases where vapor lock in the fuel system is an issue, the FDV may be located closer to the engine to allow the fuel system pressure to assist in lifting of the fuel.

Boats utilizing portable fuel tanks should be designed to prevent the need for anti-siphon requirements through compliance with ABYC H24 hose routing and restraint guidelines.

Portable tank pressures should not exceed 41 kPa (6 psi) with a running engine.

For FDVs that have the anti-siphon feature, the restriction will be the stated anti-siphon valve for Mercury outboards.

Follow the vacuum measurement procedure as described in the specific engine model service manual.

Part Interchangeability

Fuel system assemblies; fuel tank, cap, primer bulb, fuel line are interchangeable to the engine as an assembly.

The fuel line for the new low permeation system will not directly interchange with the previous noncontrolled systems because the fuel fitting at the fuel tank is now a female connection on the low permeation fuel tank assembly containing the new fuel demand valve. The new low permeation fuel line assembly needs a male connection at the fuel tank end.

Engines 8–30 HP are supplied with a portable fuel tank, fuel line, an in-line fuel demand valve, and primer bulb. Engines 8–15 HP have a quick disconnect at the engine only. For engines 25 and 30 HP, a quick disconnect is supplied at both the engine and fuel tank.

40–60 HP tiller engines will be supplied with a new fuel line with a quick disconnect at the engine end only. The customer will have to purchase the proper quick disconnect for the portable fuel tank.

40–60 HP remote control engines will be supplied with a fuel line without a connector on the fuel tank end. For integral fuel tanks, connect the fuel line to the integral fuel tank fitting. If the integral fuel tank is pressurized, Mercury Marine recommends an integral fuel demand valve or an in-line fuel demand valve.

For portable fuel tank systems, an appropriate fuel connector must be purchased for connection to the fuel tank. For any pressurized portable fuel system, Mercury Marine recommends an in-line fuel demand valve.

Engines 75 HP and above are not supplied with a fuel line or fuel tank.

OptiMax engines with integral fuel tanks connect the fuel line to the integral fuel tank fitting. If the integral fuel tank is pressurized, Mercury Marine recommends an integral fuel demand valve or an in-line fuel demand valve.

For portable fuel tank systems, an appropriate fuel connector must be purchased for connection to the fuel tank. For any pressurized portable fuel system, Mercury Marine recommends an in-line fuel demand valve.

Dealer Parts Inventory or Dealer Outboard Inventory

The EPA has allowed Mercury Marine to use up stock of the standard product.

Dealer inventory can be used up without a time limit.