

Powertrain Secondary Cooling - System Operation and Component Description

System Operation

The secondary cooling system uses coolant flowing in a circuit separate from the primary engine cooling system. This system cools the fuel and the air charge entering the engine. A secondary engine-driven coolant pump provides for coolant flow. A secondary radiator is mounted in front of the primary engine cooling system radiator. A thermostat mounted on LH side of the secondary radiator, operates to regulate the temperature of the coolant flowing to the various components.

The coolant flows from the degas bottle to the coolant pump. The coolant pump delivers the coolant to the tank attached to the LH side of the radiator, via a hose and tube assembly.

The thermostat located the LH side of the radiator controls coolant flow to the CAC and the fuel cooler. When the thermostat is closed, coolant flows from the top tank on the LH side of the engine to the thermostat housing, and then out of the thermostat housing via a single hose. A "Y" connection allows the coolant to flow through separate hoses to the CAC and the fuel cooler. When the thermostat is opened the coolant entering the thermostat housing from the upper tank is blocked, and the coolant flows through the radiator before flowing to the CAC and the fuel cooler. The coolant flows from the CAC and the fuel cooler via separate hoses to a "Y" connection, and then via a single hose to the degas bottle.

Component Description

Fuel Cooler

The fuel cooler is a liquid-to-liquid cooler that cools excess fuel being returned to the fuel control module from the fuel rail. The fuel cooler cools unused fuel that the high pressure fuel system returns to the diesel fuel conditioning module. Two fuel hoses and two coolant hoses connect the fuel cooler with other system components.

Charge Air Cooler

The CAC is a liquid-to-air cooler. The CAC cools and increases the density of the compressed turbocharged air. Two intake air tubes and two coolant hoses connect the CAC with other system components.