

EPA requirements for diesel fuels under the Fuels and Fuel Additive Program, 40 CFR 79

The US EPA regulates diesel fuel under two programs; one is administered under the Office of Pollution Prevention and Toxic Substances (OPPTS) which required that all chemicals produced in the US be registered under the Toxic Substances Control Act (TSCA), and one is administered under the Transportation and Air Quality group as the Fuels and Fuel Additive program (<http://www.epa.gov/otaq/fuels.htm>). In simple terms, this program requires that all fuels sold for ground transportation purposes in the US must be registered with the EPA and the volume produced reported on a quarterly basis. These data are used to conduct emissions estimates. When a diesel fuel is registered, it may also contain additives. These additives must also be registered with the EPA as approved for use in diesel fuels and certified by the manufacturer to not increase the emissions of the fuel.

A list of approved additives for use in diesel fuels can be found at:

<http://epa.gov/otaq/regs/fuels/additive/web-dies.htm>
<http://www.epa.gov/oms/regs/fuels/diesel/diesladd.txt>

When selecting additives for producing commercial synthetic diesel fuel (or any diesel fuel), the additives must be registered with the EPA first or time allotted for completing the registration of the fuel additive. The registration process for fuel with the EPA is not onerous, but the fuel must first be registered under the TSCA act and be on the TSCA inventory and have a CAS number.

Additives Needed for Formulating Diesel Fuels to meet Fit-For-Purpose Requirements

Diesel fuels must meet a wide range of requirements in order to be deemed fit for purpose for use in modern diesel equipment. Besides providing energy for operating the engine, a fuel must also:

- Not foam when fueling
- Not spark and/or cause fires or explosions when fueling
- Be stable to long term storage
- Not form deposits in the fuel injection system
- Provide lubricity to moving parts within the fuel system
- Not form deposits in the injection components including the inside and outside of the fuel injector

To address the above Fit-For-Purpose issues, the industry uses a range of additives. There are several classes of additives, and some perform multiple functions when blended in fuel. The broad class of additives are:

- Foam inhibitor
 - Generally a silicone-based compound that is essentially insoluble in fuel and affects bubble rupture (foam bubble destruction) in the fuel
- Antioxidant
 - Chemical compounds that are either phenolic or aminic based that prevent peroxide formation in fuel during long term or high temperature storage
- Lubricity Improver
 - A polar compound generally derived from fatty acids that provides protection against metal to metal wear within a fuel system. These can be esters, fatty acids, or amines for the most part.
- Corrosion Inhibitor

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- This additive prevents corrosion of fuel system components, mainly exposed reactive metal surfaces such as non-coated steel.
 - Deposit Control Additive
 - This additive is either a detergent or dispersant additive that helps remove deposits that may form during high temperature exposure of fuel to the fuel system. These deposits generally form on or near the injector tip or spray holes.
 - Conductivity Improver
 - Fuels that are hydroprocessed generally do not contain components that conduct static charge from the bulk fuel to the walls of storage tanks. Accumulated charge can cause static discharge and either damage equipment or cause fires.
 - Water Separation Additive
 - Promotes separation of water from fuel.
 - Low Temperature Flow Improver
 - Improved low temperature performance of fuel by modifying wax crystal structure of waxy components of fuel.
 - Cetane improver
 - Additive that raises cetane of fuel by modifying ignition properties of fuel
 - Biocide
 - Inhibits biological growth in fuel that is exposed to water

Additive Suppliers - There are numerous additive suppliers throughout the world although many may only be distributors of additives produced by other companies. EFT can provide guidance support on the selection of additive suppliers.