



ADDITIVE, DIESEL CORROSION INHIBITOR

WSS-M99C133-A1

1. SCOPE

The material defined by this specification is a fuel corrosion inhibitor additive.

2. APPLICATION

This specification was released originally for materials used as an initial fill diesel fuel corrosion inhibitor additive to provide increased protection against corrosion of injectors (nozzle hole) from acidic condensate (from exhaust gases) generated during frequent key on/off's and vehicles being shunted around in the vehicle plants and at conversion companies (eg. Camper vans). This fuel additive is intended to be blended into the initial fill fuel at vehicle plants (where needed) using an inline injection equipment.

3. REQUIREMENTS

3.1 APPROVED SOURCES

This specification requires the use of approved sources. Only the sources identified on the Ford Approved Source List (ASL) can be used when this specification is listed on the drawing, CAD file, or other documents. The list of approved sources is located within Ford at www.mats.ford.com or available externally through a Ford Materials Engineer.

3.2 PHYSICAL/CHEMICAL PROPERTIES

Dodecenyl succinic anhydride (DDSA) has been proven to be an effective organic corrosion inhibitor and is used in multifunctional fuel additive packs worldwide as well as a pipeline corrosion inhibitor in some markets.

DDSA shall be sourced in a 50/50 solution with a standard aromatic solvent in the diesel boiling range (eg. Aromatic 150). Properties below are defined for the liquid mix of DDSA into an aromatic solvent.

A treat rate of 200 ppm for the total add pack (100 ppm active DDSA concentration) has been tested and proven to be effective at the time of the release of this specification.

3.2.1	Density at 15 °C (ASTM D7042, EN ISO 3675)	950 kg / m ³ max
3.2.2	Viscosity at 40 °C (ASTM D445)	2.0 cSt max
3.2.3	Pour Point (ISO 3016)	5 °C max
3.2.4	Flash point (ASTM D93, EN ISO 2719)	55°C min

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2018 02 19	Released		

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3.3 PERFORMANCE

When added to initial fill diesel (eg. diesel fuel compliant with Ford spec WSS-M4C126-A1), the additive must meet the performance criteria set below, and must have no harmful effect on the engine and vehicle fuel system and no adverse effect on engine exhaust emissions.

- | | | |
|-------|---|-------|
| 3.3.1 | Rust Prevention
(NACE TM0172) | A max |
| 3.3.2 | Rust Prevention
(ASTM D665-B, Proc B) | A max |
| 3.3.3 | Ford vehicle test
(Obtain full test procedure from Ford Fuels & Lubes team, Design Rule 0304_FU-190) | |

Test Method Summary

- Perform the following test daily for 2 weeks (10 working days);
- In the morning, start the vehicle from ambient
- Run engine at 1500 rpm no load and monitor engine coolant temperature
- When coolant temperature is the hotter of either;
 - 5 °C above coolant at the start of the test, or
 - 5 °C hotter than "EGR activation temperature"
- Turn off the vehicle
- After 2 weeks (10 days), remove the injectors and return to the component engineers
- Injector to then be forwarded to the FIE supplier to assess for nozzle flow-only measurement, microscopic analysis of the spray holes and nozzle body for corrosion.

Note - Testing must be performed at the recommended treat rate.

3.4 HOUSEKEEPING

Frequent checks must be performed on the initial fill diesel in the fuel storage tank(s) at the plants implementing blending of this additive in order to ensure that it is free of alkali and alkaline metals (Na, K, Ca, Mg) and also no significant amount of free water accumulates at the bottom of the tank/ near the pick-up point (water bottoms need to be properly managed by maintenance teams).

4. GENERAL INFORMATION

The information given below is provided for clarification and assistance in meeting the requirements of this specification. Contact gmfs@ford.com for questions concerning Engineering Material Specifications.

4.1 VERIFICATION

The affected Materials Engineering activity reserves the right to conduct verification testing. If the test results do not support the originally submitted data, the supplier must re-test the product in coordination with the affected Materials Engineering activity. This re-test must be conducted and certified by a mutually agreed upon test facility.

4.2 FLAMMABILITY

This material represents a potential fire hazard. The Manufacturing Engineering Department or other responsible activity shall notify both the Security and Safety Units of its presence to assure that proper fire precautions are provided. The location in which it is used or stored shall be included in the notifications.