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**SAE J1422 NOV89**

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**Fuel Warmer —  
Diesel Engines**

**SAE Recommended Practice  
Issued November 1989**

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# OFF-HIGHWAY MACHINERY PRACTICE

SAE J1422

Issued November 1989

Submitted for recognition as an American National Standard

## FUEL WARMER - DIESEL ENGINES

### 1. SCOPE:

This document establishes performance requirements for devices used to warm diesel fuel before entering the fuel filter(s).

### 2. PURPOSE:

This document applies to all off-road, self-propelled, diesel-powered work machines described in SAE J1116. This document may be applied to other diesel equipment.

### 3. DEFINITION:

A fuel warmer in the scope of this document will be defined as a heat source utilized to warm diesel fuel prior to entering the fuel filter(s).

### 4. GENERAL REQUIREMENTS:

4.1 Performance Requirements: A fuel warmer must produce a 33°C (60°F) heat rise at -29°C (-20°F) ambient at any fuel flow rate up to the maximum for full rated horsepower. The final fuel temperature delivered to the fuel filters must not be higher than 38°C (100°F).

4.2 Design: The fuel warmer must be constructed to withstand extreme shock and vibration present in off-road machinery. The fuel warmer shall be built so no chemical reaction will take place from road salts, fuel, fuel additives, coolant, and coolant additives, or other chemicals in the fuel. The fuel warmer must remain functional under the ambient and underhood temperature variations of at least -40 to +125°C (-40 to 257°F).

4.3 Installation: Units shall be installed to use few or no restrictive fittings. Total fuel system restriction must not exceed engine manufacturers' limits.

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- 4.3.1 Installation Instructions: The manufacturer shall provide clear instructions for the installation of the fuel warmer. These instructions should provide guidance in proper electrical power hookup, grounding, and other precautions if an electrical type unit is used.
- 4.4 Identification: A label shall be provided giving the device manufacturer's name, address, and model number. If the device is an original equipment manufacturer installation, then it shall be covered in the O.E.M. operating manual.
- 4.5 Limitations: Fuel jelling in the tank, lines, and fittings may occur after prolonged shutdown periods.

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RATIONALE:

Waxing and jelling of diesel fuel have always been a problem. The waxing or cloud point varies from refinery to refinery and may range anywhere from  $-14^{\circ}\text{C}$  ( $6.8^{\circ}\text{F}$ ) to  $4^{\circ}\text{C}$  ( $39.2^{\circ}\text{F}$ ). Jelling will normally occur at approximately  $9^{\circ}\text{C}$  ( $15.8^{\circ}\text{F}$ ) below the cloud point.

It, therefore, has become apparent that a methodology must be devised to solve this problem.

There are numerous units on the market with many variations to achieve fuel warming. It has become apparent that a set of parameters should be publicized so the average user may have a bench mark to work with.

RELATIONSHIP OF SAE STANDARD TO ISO STANDARD:

Not applicable.

REFERENCE SECTION:

SAE J1116, Categories of Off-Road Self-Propelled Work Machines

APPLICATION:

This document applies to all off-road, self-propelled, diesel-powered work machines described in SAE J1116. This document may be applied to other diesel equipment.

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