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Reporting of Fuel Properties When Testing Diesel Engines with Alternative Fuels Derived from Plant Oils and Animal Fats

STANDARD

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1 Purpose and Scope

1.1 This Engineering Practice establishes a minimum set of fuel properties that shall be included with the report of diesel engine performance on alternative fuels derived from plant oils, animal fats and other bio-based feedstocks including blends of these bio-based fuels with petroleum-derived diesel fuel. While this Engineering Practice focuses on methyl and ethyl esters (biodiesel), various other alternative fuels from many plant and animal sources may have applications as diesel engine fuels, including straight vegetable oil (not transesterified), algal biofuels, thermochemical biofuels, and various other advanced diesels. These alternative fuels are collected and processed using a variety of methods, which can influence their physical and chemical properties. In addition, they are tested in diesel engines using a range of procedures. To facilitate comparison of test data, it is essential that some reference point or baseline be established. This Engineering Practice is designed to provide a consistent set of data for these alternative fuels when used as diesel fuel replacements, and it will help to identify deviations from normal expected fuel characteristics that have been established for petroleum-derived fuels.

1.2 This Engineering Practice specifies which fuel properties shall be reported and lists the procedure that shall be used to measure these properties. It does not establish a requirement for any fuel property. The minimum documentation of every engine test should include those items listed in clause 4, with a few exceptions as noted below. The total data set should be reported whenever possible, although it is recognized that some data are difficult to obtain on every batch of fuel. In some cases, specific fuel properties listed below may not be relevant for a specific category of fuel. Two examples are the fatty acid composition and glycerol composition of thermochemical biofuels that are not processed from a fat or oil and thus do not include these components. It should be clearly indicated whether the batch of fuel was specifically tested for the data being reported, and whether a listed property is not relevant for the particular class of fuel.

1.3 This Engineering Practice does not specify an engine test procedure; however, it is expected that a complete description of the test procedure will be provided with the test report.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ASTM D93 *Standard Test Method for Flash Point by Pensky-Martens Closed Cup Tester*

ASTM D97 *Standard Test Method for Pour Point of Petroleum Products*

ASTM D130 *Standard Test Method for Detection of Copper Corrosion from Petroleum Products by the Copper Strip Tarnish Test*

ASTM D240 *Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter*