

**INVITATION TO COMMENT ON THE DRAFT PHILIPPINE NATIONAL
STANDARDS FOR FATTY ACID METHYL ESTER (B100) SPECIFICATION
(DPNS/DOE QS 002:2007)**

Notice is hereby given to all parties to comment on the draft Philippine National Standard for Fatty Acid Methyl Ester Specification (DPNS/DOE QS 002:2007).

All comments and suggestion must be received on or before May 17, 2007. Any proposed change to the specifications must be supported with technical explanation/justification and e-mailed to products@doe.gov.ph.





Republic of the Philippines
DEPARTMENT OF ENERGY

In line with the objectives of the Clean Air Act of 1999, the Department of Energy's Technical Committee on Petroleum Products and Additives (DOE/TCPPA) developed and drafted a standard for Fatty Acid Methyl Esters (B100) Specification (DPNS/DOE QS 002:2007) which provides the chemical and physical specification for biodiesel to ensure effectiveness when used as a blending component to conventional diesel.

This standard was made in line with the Department's thrust for the continuing development and utilization of various alternative fuels from indigenous and renewable energy sources towards energy independence consistent with the country's sustainable economic growth plan. This standard also supports the R. A. No. 9367, otherwise known as the "Biofuels Act of 2006".

Enclosed is a copy of the draft standard for your comments. It is suggested that any proposed change to the specifications be supported with explanations/ justifications.

We appreciate receiving your comments on or before May 17, 2007 thru mail, email (products@doe.gov.ph) or fax at numbers 840-2155/840-2095 for it to be considered in the finalization of the standard. Non- receipt of your comments on the specified date shall be construed as an approval of the draft standard.

Thank you for your usual cooperation.

Very truly yours,


ZENAIDA Y. MONSADA
Director


ADL/RSI/ega

DPNS/DOE QS 002:2007
ICS XXXXXXX

Fuels - Fatty acid methyl ester (B100) - Specification

Foreword

This Philippine National Standard specification for fatty acid methyl ester (FAME) was prepared by the Department of Energy's Technical Committee on Petroleum Products and Additives (DOE/TCPPA).

This standard supersedes PNS 2020:2003/DOE 002:2003.

This standard was made in line with the Department's thrust for the continuing development and utilization of various alternative fuels from indigenous and renewable energy sources towards energy independence consistent with the country's sustainable economic growth plan. This standard also supports the R. A. No. 9367, otherwise known as the "Biofuels Act of 2006", that complements initiatives in environmental protection and expands opportunities for livelihood.

Further, this is in line with the DOE's policy and program of updating the fuel quality specification of biodiesel in terms of the current requirements of the industry, its users and manufacturers and also by endeavoring to harmonize international/regional environmental standards for fuel quality. As a type of fuel, there is a need to standardize its quality to ensure its effectiveness when used whether in its pure state or as a blend.

This entire standard is subject for review and/or revision when necessary.

In this edition the following improvements are made:

1. Inclusion of new properties :

- Appearance, clear
- Density @ 15°C, range @ 0.86-0.90 kg/L
- FAME content @ 96.5 % mass, minimum;
- Methanol content @ 0.20 % mass, maximum
- Glyceride content (Monoglyceride, diglyceride and triglyceride) @ 0.80, 0.20 and 0.20 % mass, maximum respectively;
- Group metals for (Group I & II) @ 5 mg/kg, maximum;
- Methyl laurate (C12 ME) @ 45 % mass, minimum;
- Oxidation stability (110°C) @ 6 hrs. minimum
- Water @ 0.05 % volume, maximum

2. Cetane number from 42 to 51 minimum

Fatty acid methyl ester – Specification

1 Scope

This standard specifies the requirements for fatty acid methyl ester suitable for blending to diesel fuel for use in various types of compression ignition engines and other similar types of engines.

2 References

The titles of the standard publications referred to in this standard are listed on the inside back cover.

3 Definition

For the purpose of this standard, fatty acid methyl ester or FAME, also known as biodiesel (B100), is defined as mono-alkyl esters derived from vegetable oils or animal fats and other biomass-derived oils.

4 Requirements

Fatty acid methyl ester shall conform to the chemical and physical requirements specified in Table 1.

5 Sampling

Fatty acid methyl ester shall be sampled in accordance with PNS ASTM D 4057.

6 Test methods

Fatty acid methyl ester shall be tested in accordance with the methods specified in Table 1.

Table 1 – Chemical and physical requirements for fatty acid methyl ester

Property	Limit	Test method
Appearance	Clear	
Acid number, mg KOH/g, max	0.50	PNS ASTM D 664 PNS ASTM D 974 PNS EN 14104
Carbon residue on 100% sample, % mass, max.	0.050	PNS ASTM D 4530 or PNS ISO 10370
Cetane number, min	51	PNS ASTM D 613 or PNS ASTM D 6890 or PNS ISO 5165 or PNS IP 498/03
Cloud point, °C, min	Report	PNS ASTM D 2500
Copper strip corrosion 3 hrs@ 50°C, max.	No. 1	PNS ASTM D 130 or PNS ISO 2160
Density @ 15°C, kg/L	0.86 – 0.90	PNS ASTM D 1298 or PNS ISO 3675
Distillation AET 90% recovered °C, max.	360	PNS ASTM D 1160 or PNS ASTM D 86
FAME content, % mass, min	96.5	PNS EN 14103 modified
Flash point, Pensky-Marten, °C, min.	100	PNS ASTM D 93
Glycerin, % mass max. Free glycerin	0.02	PNS AOCS Ea 6-94 (1997) PNS ASTM D 6584 modified
Total glycerin	0.24	PNS AOCS Ca 14-56 (1997) PNS ASTM D 6584 modified
Glyceride content, % mass, max. Monoglyceride	0.80	PNS EN 14105 modified
di-glyceride	0.20	
tri-glyceride	0.20	
Group Metals, mg/kg, max. Group I metals (Na+K)	5	PNS EN 14108 PNS EN 14109
Group II metals (Ca+Mg)	5	PNS EN 14538
Methanol content, % m/m, max.	0.20	PNS EN 14110
Methyl Laurate*, % mass, min..	45	PNS EN 14331 modified
Oxidation stability, 110 °C, hours, min.	6	PNS EN 14112
Phosphorus, % mass, max.	0.001	PNS ASTM D 4951
Sulfated ash, % mass, max	0.020	PNS ASTM D 874
Sulfur, % mass, max.	0.050	PNS ASTM D 2622 PNS ASTM D 5453 PNS ASTM D 4294
Viscosity, Kinematic @ 40°C, mm ² /s	2.0-4.5	PNS ASTM D 445
Water, % volume, max	0.05	PNS ASTM D 6304 PNS ISO 12937
Water & sediments, % volume, max.	0.05	PNS ASTM D 2709

* interim

References:

The following standards contain provisions, which, through reference in the text form part of this national standard. At the time of publication of this PNS, the edition indicated were valid:

- PNS ASTM D 93-06, Standard Test Methods for Flash-Point by Pensky-Martens Closed Cup tester
- PNS ASTM D130-04e1, Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test
- PNS ASTM D445-06, Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity)
- PNS ASTM D613-05, Standard Test Method for Cetane Number of Diesel Fuel Oil
- PNS ASTM D664-06a, Standard Test Methods for Acid Number of Petroleum Products by Potentiometric Titration
- PNS ASTM D874-06, Standard Test Method for Sulfated Ash from Lubricating Oils and Additives
- PNS ASTM D974-06, Standard Test Methods for Acid and Base Number by Color-Indicator Titration
- PNS ASTM D1160-06, Standard Test Methods for Distillation of Petroleum Products at Reduced Pressure
- PNS ASTM D1266-98 (2003) e1, Standard Test Method for Sulfur in Petroleum Products (Lamp Method)
- PNS ASTM D1298-99 (2005), Standard Test Method for Density, Relative Density (Specific gravity) or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method
- PNS ASTM D 2500-05, Standard Test Method for Cloud Point of Petroleum Products
- PNS ASTM D 2622-05, Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry
- PNS ASTM D2709-96 (2006), Standard Test Method for Water and Sediment in Middle Distillate Fuels by Centrifuge
- PNS ASTM D 4057-06, Standard Practice for Manual Sampling of Petroleum and Petroleum Products
- PNS ASTM D 4294-03, Standard Test Method for Sulfur in Petroleum Products by Energy-Dispersive X-Ray Fluorescence Spectrometry
- PNS ASTM D 4530-06e1, Standard Test Method for Determination of Carbon Residue (Micro Method)
- PNS ASTM D4951-06, Standard Test Method for Determination of Additive Elements in Lubricating Oils by Inductively Coupled Plasma Atomic Emission Spectrometry
- PNS ASTM D5453-06, Standard Test Method for the Determination of Total Sulfur in Light Hydrocarbons, Spark Ignition Engine Fuel, Diesel Engine Fuel, and Engine Oil by Ultraviolet Fluorescence
- PNS ASTM D6304-04ae1, Standard Test Method for Determination of Water in Petroleum Products, Lubricating Oils, and Additives by Coulometric Karl Fisher Titration
- PNS ASTM D6584-07, Standard Test Methods for Determination of Free and Total Glycerin in B100 Biodiesel Methyl Esters by Gas Chromatography
- PNS ASTM D6890-06, Standard Test Method for Determination of Ignition Delay and Derived Cetane Number (DCN) of Diesel Fuel Oils by Combustion in a Constant Volume Chamber

- PNS ISO 2160:1998: Petroleum Products – Corrosiveness to Copper - Copper strip Test
- PNS ISO 3675:1998: Crude petroleum and liquid petroleum products – Laboratory determination of density – Hydrometer method
- PNS ISO 5165:1998: Petroleum products – Determination of the ignition quality of diesel fuels – Cetane engine method
- PNS ISO 10370:1993/Cor 1:1996: Petroleum products – Determination of the carbon residue – Micro method – Technical Corrigendum 1
- PNS ISO 12937:2000: Petroleum Products – Determination of water – Coulometric Karl Fisher titration method
- PNS EN 14103:2003: Fat and oil derivatives. Fatty acid methyl esters (FAME). Determination of ester and linolenic acid methyl ester contents
- PNS EN 14104:2003: Fat and oil derivatives. Fatty acid methyl esters (FAME). Determination of acid value
- PNS EN 14105:2003: Fat and oil derivatives. Fatty acid methyl esters (FAME). Determination of free and total glycerol and mono-, di-, triglyceride contents (Reference Method)
- PNS EN 14108:2003: Fat and oil derivatives. Fatty acid methyl esters (FAME). Determination of sodium content by atomic absorption spectrometry
- PNS EN 14109:2003: Fat and oil derivatives. Fatty acid methyl esters (FAME). Determination of potassium content by atomic absorption spectrometry
- PNS EN 14110:2003: Fat and oil derivatives. Fatty acid methyl esters (FAME). Determination of methanol content
- PNS EN 14112:2003: Fat and oil derivatives. Fatty acid methyl esters (FAME). Determination of oxidation stability (accelerated oxidation test)
- PNS EN 14331:2004: Liquid petroleum products. Separation and characterisation of fatty acid methyl esters (FAME) from middle distillates. Liquid chromatography (LC)/gas chromatography (GC) Method
- PNS EN 14538:2006: Fat and oil derivatives. Fatty acid methyl esters (FAME). Determination of Ca, K, Mg and Na content by optical emission spectral analysis with inductively coupled plasma (ICP OES)
- PNS AOCS Ea 6-94 (1997), Test Method of Crude Glycerin, Titrimetric Method
- PNS AOCS Ca 14-56 (1997), Test Method for Determination of Total, Free and Combined Glycerol Iodometric-Periodic Acid Method
- PNS IP 498-03, Ignition Quality Tester

Abbreviations

PNS	-	Philippine National Standard
ASTM	-	American Society for Testing and Materials
ISO	-	International Standard Organization
EN	-	Euro Norm (Regional Standard of European Countries)

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