



Republic of the Philippines
DEPARTMENT OF ENERGY

In line with the objectives of the Clean Air Act of 1999 and to the implementation of the Biofuels Act of 2006, the Department of Energy's Technical Committee on Petroleum Products and Additives (DOE/TCPPA) reviewed and revised the standard for Anhydrous Bioethanol Specification (DPNS/DOE QS 007:2013).

This standard is an update/review of PNS/DOE QS 007:2005 with revision made primarily in the specification of color, denaturant and updating of the test methods.

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/positions thru mail or email at products@doe.gov.ph on or before August 7, 2013 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 standards.

Thank you for your usual cooperation.

Very truly yours,

A handwritten signature in black ink, appearing to read "Z. Monsada", is written over the printed name.

ZENAIDA Y. MONSADA
Director

ADTL/RSI/ega

DPNS/DOE QS 007:2013
ICS xxxxxxxx

Anhydrous bioethanol fuel – Specification

Foreword

This Philippine National Standard Specification for anhydrous bioethanol fuel was prepared by the Department of Energy through the Technical Committee on Petroleum Products and Additives (DOE/TCPPA).

This standard is an update/review of PNS/DOE QS 007:2005 with revision made primarily in the specification of color, denaturant and updating of the test methods.

This standard was made in line with the goal of the Department for the development and utilization of alternative fuels that is indigenous and provides major benefit to the environment. This goal is in support of the country's sustainable economic growth that would expand opportunities for livelihood. Pursuant to the Bioethanol Program of the government, partnership is established with the ethanol manufacturers and other stakeholders to develop a product quality standard for fuel grade ethanol for blending with gasoline for use as engine fuel.

This standard cancels and replaces PNS/DOE QS 007:2005.

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

Anhydrous bioethanol fuel – Specification**1 Scope**

This standard specifies the requirements for biofuel grade ethanol in pure form and denatured for use as blending component of automotive gasoline suitable for various types of automotive spark ignition engine 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 Definitions

For the purpose of this standard the following definitions apply:

3.1**bioethanol**

refers to the pure ethanol (C_2H_5OH) produced from a variety of feedstock, agricultural wastes, and other biomass resources

3.2**anhydrous bioethanol**

refers to bioethanol wherein almost all water content has been removed

3.3**denaturant**

gasoline intentionally added to bioethanol to make it unsuitable for oral intake (beverage use) but still suitable for engines use.

3.4**fuel bioethanol**

refers to denatured bioethanol for use as blending components to gasoline

4 Classification

4.1 Bioethanol – 99.3 % minimum purity.

4.2 Fuel bioethanol – 96.9 % minimum purity

5 Requirements**5.1 Composition**

Bioethanol shall refer to ethanol (C_2H_5OH) produced from biomass.

5.2 Chemical and physical characteristics

Bioethanol shall conform to the chemical and physical requirements specified in Table 1. Other than methanol, contaminants may be present, such as but not limited to wood naphtha, acetone, pyridine, colouring matter and denatonium benzoate (bitrex).

Table 1 – Chemical and physical requirements for Anhydrous Bioethanol

Property	Limits		Test method
	Bioethanol	Fuel bioethanol	
Appearance	Clear and bright, visibly free of suspended or precipitated contaminants	Clear and bright, visibly free of suspended or precipitated contaminants	Visual
Acidity /Alkalinity, pHe	6.5 – 9.0	6.5 – 9.0	PNS ASTM D6423
Color	Undyed	-	Visual
Copper, as Cu, mg/kg, max.	0.1	0.1	PNS ASTM D1688
Density @ 20 °C, kg/L, max.	0.7915	-	PNS ASTM D4052
Ethanol content, % v/v, min	99.3	96.9	PNS ASTM D5501
Denaturant, %v/v	-	1.96 – 2.44* 2.16 - 2.44**	PNS ASTM D5501 (interim)***
Inorganic chloride content, mass ppm, max.	40	40	PNS ASTM D512-81 (1985) ^{e1}
Methanol, % v/v, max.	0.5	0.5	PNS ASTM D5501
Total acids (as acetic acid), % w/w, max.	0.007	0.007	PNS ASTM D1613
Water content, %v/v, max	0.5	0.5	PNS ASTM E203 PNS ASTM D6304

* Denaturant to be used is base gasoline as defined in the PNS for E-Gasoline
 ** Denaturant to be used is PNS-compliant E10
 *** Test method ASTM D5501 for Denaturant Property specification is used to establish ethanol purity. Level of denaturant in Fuel Bioethanol is net of ethanol content and contaminants.

6 Sampling

Bioethanol and fuel bioethanol shall be sampled in accordance with PNS ASTM D4057 and PNS ASTM E300.

7 Test methods

Bioethanol and fuel bioethanol shall be tested in accordance with the methods specified in Table 1.

References

DPNS/DOE QS 07:2013

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 references document (including any amendments) applies:

PNS ASTM D512-81(1985) ^{e1}, Standard Test Method for Chloride Ion in Water

PNS ASTM D1613-03, Standard Test Method for Acidity in Volatile Solvents and Chemical Intermediates Used in Paint, Varnish, Lacquer, and Related Products

PNS ASTM D1688-02, Standard Test Method for Copper in Water.

PNS ASTM D4052:2012 (ASTM published 2011), Standard Test Method for Density, Relative Density, and API gravity of Liquid by digital Density Meter

PNS ASTM D4057:2012 (ASTM published 2006 reapproved 2011), Standard Practice for Manual Sampling of Petroleum and Petroleum Products

PNS ASTM 4806-04a, Standard Specification for Denatured Fuel Ethanol for Blending with Gasoline for Use as Automotive Spark-Ignition Engine Fuel

PNS ASTM D5501-04, Standard Test Method for Determination of Ethanol Content of Denatured Fuel Ethanol by Gas Chromatography

PNS ASTM D6304:2009 (ASTM published 2007) Standard Test Method for Determination of Water in Petroleum Products, Lubricating Oils, and Additives by Coulometric Karl Fischer Titration

PNS ASTM D6423-99(2004), Standard Test Method for Determination of pHe of Ethanol, Denatured Fuel Ethanol and Fuel Ethanol (Ed75-Ed85)

PNS ASTM E203:2012 (ASTM published 2008), Standard Test Method for Water Using Volumetric Karl Fischer Titration

PNS ASTM E300-03, Standard Practice for Sampling Industrial Chemicals

Abbreviations

PNS - Philippine National Standard

ASTM - American Society for Testing and Materials

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* **Alternate**