



The Technical Committee on Petroleum Products and Additives (TCPPA) chaired by the Department of Energy Oil Industry Management Bureau (DOE-OIMB) is mandated to set the fuel quality specifications in the downstream oil industry and ensure effective implementations. The fuel quality standards development is in line with the objectives of the Philippine Clean Air Act of 1999 (RA8749), the Biofuels Act of 2006 (RA9367), the continuing improvements of the emission requirements, and the evolving clean fuel initiatives and environmental policies relating to fuel quality.

The DOE, as chair and co-chair with DENR, through the Technical Committee on Petroleum Products and Additives (TCPPA) proposed and developed the Philippine National Standard for Petroleum products – E-Gasoline fuel (E15) – Specification as well as reviewed and updated the Philippine National Standard for Biofuels – Anhydrous bioethanol & bioethanol fuel – Specifications (E100).

Code	Title
DPNS/DOE QS 007:2026	Biofuels – Anhydrous bioethanol & bioethanol fuel – Specifications
DPNS/DOE QS 020:2026	Petroleum products – E-Gasoline fuel (E15) – Specification

The DPNS/DOE QS 020:2026 was made in line with the DOE's thrust for the continuing development and utilization of various alternative fuels. Said standard will support the future energy policies towards integration of higher bioethanol blends in petroleum/fuel sector and promoting the use of indigenous and renewable energy resources with the end view of reducing dependence on imported oil.

The DPNS/DOE QS 007:2026 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.

Enclosed are copies of the draft PNS for your comments. It is suggested that any proposed changes to the specifications be supported with explanations/justifications.

We appreciate receiving your comments/positions through mail or email at tcppa.oismd@doe.gov.ph on or before **27 September 2026**, for it to be considered in the finalization of the standards. Non- receipt of your comments on the specified date shall be construed as approval for finalization and endorsement for promulgation of the standards.

Thank you for your usual cooperation.

Very truly yours,

Atty. RINO E. ABAD

Director

Oil Industry Management Bureau

DPNS/DOE QS 007:2026
ICS 75.160.20;xxxxxxx

**Biofuels – Anhydrous bioethanol & bioethanol
fuel – Specifications**

Foreword

This Philippine National Standard PNS/DOE QS 007:2026, Biofuels – Anhydrous bioethanol & bioethanol fuel – Specifications, was prepared by the Department of Energy (DOE) through the Technical Committee on Petroleum Products and Additives (DOE/TCPPA) and was approved for adoption as Philippine National Standard by the Bureau of Philippine Standards.

This standard is an update/review of PNS/DOE QS 007:2014 with revision made on the properties of water content, prescribes ratio of denaturants 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 007:2014.

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

The provisions in this PNS are voluntary in nature and may be used as reference by any interested party. Compliance to this Standard or part/s thereof is voluntary unless otherwise imposed or referred into by law, public policy or in a contract. Existing laws or regulations shall prevail when there is conflict with this PNS.

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 Normative references

The following referenced documents are indispensable for the application of this document.

EN 15769 - Ethanol as a blending component of petrol – Determination of Appearance – Visual Method

EN 15938 - Automotive fuels - Ethanol blending component and ethanol (E85) fuel - Determination of Electrical Conductivity

PNS ASTM D512-23 - Standard Test Methods for Chloride Ion In Water

PNS ASTM D1125-23 - Standard Test Methods for Electrical Conductivity and Resistivity of Water

PNS ASTM D1613-17(2023) - Standard Test Method for Acidity in Volatile Solvents and Chemical Intermediates Used in Paint, Varnish, Lacquer, and Related Products

PNS ASTM D1688-17(2025) - Standard Test Methods for Copper in Water

PNS ASTM D4052-22 - Standard Test Method for Density, Relative Density, and API Gravity of Liquids by Digital Density Meter

PNS ASTM D5501-20(2024)e1 - Standard Test Method for Determination of Ethanol and Methanol Content in Fuels Containing Greater than 20 % Ethanol by Gas Chromatography

PNS ASTM D6304-25 - Standard Test Method for Determination of Water in Petroleum Products, Lubricating Oils, and Additives by Coulometric Karl Fischer

PNS ASTM D6423-25 - Standard Test Method for Determination of pH of Denatured Fuel Ethanol and Ethanol Fuel Blends

PNS 2237:_____ (ASTM E203-24) Standard Test Method for Water Using Volumetric Karl Fischer Titration

PNS ASTM D4806-25 - Standard Specification for Denatured Fuel Ethanol

JIS K0130:2008, General Rules for Electrical Conductivity Measuring Method

PNS ASTM E300-03(2022) - Standard Practice for Sampling Industrial Chemicals

PNS 2241:2023 (ASTM D4057-22) Standard Practice for Manual Sampling of Petroleum and Petroleum Products

3 Definitions

For the purpose of this standard, the following definitions apply:

3.1

anhydrous

refers to the bioethanol and bioethanol fuel that have almost no water

3.2

bioethanol

refers to ethanol (C_2H_5OH), produced from a variety of feedstock such as grains, agricultural wastes, and other biomass resources

3.3

bioethanol fuel

refers to the bioethanol denatured with unleaded gasoline for use as blending component to unleaded gasoline

3.4

denaturant

refers to prescribed gasoline to be added to bioethanol to make it unsuitable for oral intake (beverage use) but still suitable for engines use

4 Classification

4.1 Bioethanol – 99.0 % minimum purity

4.2 Bioethanol fuel – 96.9 % minimum purity

5 Requirements

5.1 Composition

Bioethanol shall be ethanol (C_2H_5OH) produced from biomass.

Bioethanol fuel shall be denatured ethanol (C_2H_5OH) produced from biomass for use as gasoline blending components

5.2 Chemical and physical characteristics

Bioethanol and bioethanol fuel shall conform to the specifications in table 1. Other than methanol, contaminants may be present, such as but not limited to wood naphtha, acetone, pyridine, and denatonium benzoate (Bitrex).

Table 1 – Chemical and physical requirements for bioethanol and bioethanol fuel

Property	Limits		Test Methods
	Bioethanol	Bioethanol fuel	
Appearance	Clear and bright, visibly free of suspended or precipitated contaminants	Clear and bright, visibly free of suspended or precipitated contaminants	EN 15769
Acidity/Alkalinity, pHe	6.5 – 9.0	6.5 – 9.0	PNS ASTM D6423
Color	Colorless, water-like	-	Visual
Copper, as Cu, mg/kg, max.	0.1	0.1	PNS ASTM D1688
Density at 20°C, kg/L, max.	0.7915	-	PNS ASTM D4052
Electrical conductivity, $\mu\text{S/m}$, max.	500	500	PNS ASTM D1125 JIS K0130 EN 15938
Ethanol (C2) *, % vol, min.	99.0	96.9	PNS ASTM D5501
Denaturant ^a %v/v	-	1.96 – 2.14 ^b	PNS ASTM D5501 (interim) ^c
Inorganic chloride content, mass ppm, max.	20	20	PNS ASTM D512
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	1.0	1.0	PNS 2237: _____ PNS ASTM D6304

^a Prescribed denaturants:

1. Base gasoline as defined in the PNS for E-Gasoline
2. PNS-compliant E10 (2.18 - 2.35 %, v/v)
3. PNS-compliant E15 (2.31 - 2.49 %, v/v)

^b Denaturant content expressed as pure base gasoline

^c Test method ASTM D5501 for Denaturant Property specification is used to establish ethanol purity. Level of denaturant in Bioethanol Fuel is net of ethanol content and contaminants.

6 Sampling

Bioethanol and bioethanol fuel shall be sampled in accordance to PNS 2241:2023 and PNS ASTM E300

7 Test methods

Bioethanol and bioethanol fuel shall be tested in accordance with the methods specified in Table 1. Test results shall be subject to the reproducibility limits of the corresponding test method.

DPNS/DOE QS 020:2026
ICS 75.160.20;xxxxxxx

**Petroleum products – E-Gasoline fuel (E15) –
Specification**

Foreword

This Philippine National Standard PNS/DOE QS 020:2026, Petroleum products – E-Gasoline (E15) - Specification, was prepared by the Department of Energy (DOE) through the Technical Committee on Petroleum Products and Additives (DOE/TCPPA) and was approved for adoption as Philippine National Standard by the Bureau of Philippine Standards.

This standard addresses the technical requirement of gasoline containing 15% v/v bioethanol or E-Gasoline (E15) and suitable test methods.

This standard was made in line with the DOE's thrust for the continuing development and utilization of various alternative fuels. Said standard will support the future energy policies towards integration of higher bioethanol blends in petroleum/fuel sector and promoting the use of indigenous and renewable energy resources with the end view of reducing dependence on imported oil.

Further, this is also consistent with the continuing program of the government towards the use of cleaner fuels by considering the regional / global thrust towards harmonization of fuel quality standard specification, vehicle technology and emission standards with due regard to the environment, vehicle performance, health and safety of the public as well as ensuring supply availability.

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

The provisions in this PNS are voluntary in nature and may be used as reference by any interested party. Compliance to this Standard or part/s thereof is voluntary unless otherwise imposed or referred into by law, public policy or in a contract. Existing laws or regulations shall prevail when there is conflict with this PNS.

1 Scope

This standard specifies the requirements for 15% v/v bioethanol-blended gasoline, otherwise referred to as E-gasoline (E15), suitable for use as fuel in spark-ignition internal combustion engines. This standard does not include aviation gasoline.

2 Normative references

The following referenced documents are indispensable for the application of this document.

PNS 2205: _____ (ASTM D86-23ae2) Standard Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure

PNS 2206: _____ (ASTM D130-26) Standard Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test

PNS 2207: _____ (ASTM D381-25) Standard Test Method for Gum Content in Fuels by Jet Evaporation

PNS 2208: _____ (ASTM D525-12a(2025)) Standard Test Method for Oxidation Stability of Gasoline (Induction Period Method)

PNS 2210: _____ (ASTM D1298-24) Standard Test Method for Density, Relative Density, or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method

PNS _____: _____ (ASTM D1319-25) Standard Test Method for Hydrocarbon Types in Liquid Petroleum Products by Fluorescent Indicator Adsorption

PNS 2211: _____ (ASTM D2622-26) Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry

PNS 2212: _____ (ASTM D2699-26) Standard Test Method for Research Octane Number of Spark-Ignition Engine Fuel

PNS 2214:2023 (ASTM D3237-22) Standard Test Method for Lead in Gasoline by Atomic Absorption Spectroscopy

PNS 2215: _____ (ASTM D3606-26) Standard Test Method for Determination of Benzene and Toluene in Spark Ignition Fuels by Gas Chromatography

PNS 2216:2023 (ASTM D4052-22) Standard Test Method for Density, Relative Density, and API Gravity of Liquids by Digital Density Meter

PNS ____: ____ (ASTM D4176-22e1) Standard Test Method for Free Water and Particulate Contamination in Distillate Fuels (Visual Inspection Procedures)

PNS 2217: ____ (ASTM D4294-24) Standard Test Method for Sulfur in Petroleum and Petroleum Products by Energy Dispersive X-ray Fluorescence Spectrometry

PNS 2218:2023 (ASTM D4815-22) Standard Test Method for Determination of MTBE, ETBE, TAME, DIPE, tertiary-Amyl Alcohol and C1 to C4 Alcohols in Gasoline by Gas Chromatography

PNS 2219: ____ (ASTM D4953-26) Standard Test Method for Vapor Pressure of Gasoline and Gasoline-Oxygenate Blends (Dry Method)

PNS 2220: ____ (ASTM D5059-26) Standard Test Methods for Lead and Manganese in Gasoline by X-Ray Fluorescence Spectroscopy

PNS 2221:2023 (ASTM D5191-22) Standard Test Method for Vapor Pressure of Petroleum Products and Liquid Fuels (Mini Method)

PNS 2222:2023 (ASTM D5443-23) Standard Test Method for Paraffin, Naphthene, and Aromatic Hydrocarbon Type Analysis in Petroleum Distillates Through 200 °C by Multi-Dimensional Gas Chromatography

PNS 2223: ____ (ASTM D5453-25) Standard Test Method for Determination of Total Sulfur in Light Hydrocarbons, Spark Ignition Engine Fuel, Diesel Engine Fuel, and Engine Oil by Ultraviolet Fluorescence

PNS 2224: ____ (ASTM D5482-26) Standard Test Method for Vapor Pressure of Petroleum Products and Liquid Fuels (Mini Method-Atmospheric)

PNS 2225: ____ (ASTM D5580-26) Standard Test Method for Determination of Benzene, Toluene, Ethylbenzene, p/m-Xylene, o-Xylene, C9 and Heavier Aromatics, and Total Aromatics in Finished Gasoline by Gas Chromatography

PNS 2226:2023 (ASTM D5599-22) Standard Test Method for Determination of Oxygenates in Gasoline by Gas Chromatography and Oxygen Selective Flame Ionization Detection

PNS 2227: ____ (ASTM D5769-25) Standard Test Method for Determination of Benzene, Toluene, and Total Aromatics in Finished Gasolines by Gas Chromatography/Mass Spectrometry

PNS 2228:2023 (ASTM D5845-21) Standard Test Method for Determination of MTBE, ETBE, TAME, DIPE, Methanol, Ethanol and tert-Butanol in Gasoline by Infrared Spectroscopy

PNS 2229: ____ (ASTM D5986-23) Standard Test Method for Determination of Oxygenates, Benzene, Toluene, C8-C12 Aromatics and Total Aromatics in Finished Gasoline by Gas Chromatography/Fourier Transform Infrared Spectroscopy

PNS 2230:2023 (ASTM D6277-07(2022)) Standard Test Method for Determination of Benzene in Spark-Ignition Engine Fuels Using Mid Infrared Spectroscopy

PNS 2231: _____ (ASTM D6304-25) Standard Test Method for Determination of Water in Petroleum Products, Lubricating Oils, and Additives by Coulometric Karl Fischer Titration

PNS 2232: _____ (ASTM D6729-25) Standard Test Method for Determination of Individual Components in Spark Ignition Engine Fuels by 100 Metre Capillary High Resolution Gas Chromatography

PNS 2233: _____ (ASTM D6730-26) Standard Test Method for Determination of Individual Components in Spark Ignition Engine Fuels by 100-Metre Capillary (with Precolumn) High-Resolution Gas Chromatography

PNS 2234: _____ (ASTM D6839-25) Standard Test Method for Hydrocarbon Types, Oxygenated Compounds, Benzene, and Toluene in Spark Ignition Engine Fuels by Multidimensional Gas Chromatography

PNS 2235: _____ (ASTM D7039-24) Standard Test Method for Sulfur in Gasoline, Diesel Fuel, Jet Fuel, Kerosine, Biodiesel, Biodiesel Blends, and Gasoline-Ethanol Blends by Monochromatic Wavelength Dispersive X-ray Fluorescence Spectrometry

PNS 2236: _____ (ASTM D7777-24) Standard Test Method for Density, Relative Density, or API Gravity of Liquid Petroleum by Portable Digital Density Meter

PNS 2237: _____ (ASTM E203-24) Standard Test Method for Water Using Volumetric Karl Fischer Titration

PNS 2241:2023 (ASTM D4057-22) Standard Practice for Manual Sampling of Petroleum and Petroleum Products

3 Definitions

For the purpose of this standard, the following definitions apply:

3.1

base gasoline

refers to unleaded gasoline that shall be blended with fuel bioethanol to produce E-gasoline

3.2

bioethanol

refers to ethanol, produced from a variety of feedstock such as grains, agricultural wastes, and other biomass resources

3.3

E-gasoline (E15)

refers to base gasoline blended with 15% v/v fuel bioethanol

3.4**fuel bioethanol**

refers to the bioethanol denatured with unleaded gasoline for use as blending component to unleaded gasoline, as provided in the PNS for Anhydrous Bioethanol Fuel.

4 Requirements

4.1 E-gasoline (E15) shall conform to the chemical and physical requirements specified in Table 1.

Table 1 – Chemical and physical requirements for E15 E-Gasoline (Euro 4-PH)

Property	Regular	Premium	Premium Plus	Test Methods
Appearance	Clear and bright, visibly free of suspended or precipitated contaminants			ASTM D4176
Color	Green	Red	Blue	Visual
Copper corrosion, 3 hr at 50°C, max.	1	1	1	PNS 2206: ____
Density at 15°C, kg/L, max.	0.783	0.783	0.783	PNS 2210: ____ PNS 2216:2023 PNS 2236: ____
Distillation temperature, °C at: 10% recovered, max. 50% recovered 90% recovered, max. End point, max. Residue, % volume, max.	65 65-110 180 215 2	65 65-110 180 215 2	65 65-110 180 215 2	PNS 2205: ____
Existent gum, mg/100 mL, max.	4	4	4	PNS 2207: ____
Hydrocarbons: Aromatics, % volume, max	35	35	35	ASTM D1319 PNS 2222:2023 PNS 2225: ____ PNS 2227: ____ PNS 2229: ____ PNS 2232: ____ PNS 2233: ____ PNS 2234: ____
Benzene, % volume, max	1	1	1	PNS 2215: ____ PNS 2222: 2023 PNS 2225: ____ PNS 2227: ____ PNS 2229: ____ PNS 2230:2023 PNS 2232: ____ PNS 2233: ____ PNS 2234: ____

Table 1 (continued)				
Property	Regular	Premium	Premium Plus	Test Methods
Oxygenates:				PNS 2229: ____ PNS 2232: ____ PNS 2233: ____
Ethanol (C2) *, % vol,	14 - 15	14 - 15	14 - 15	
Methanol (C1), % vol, max	0.2	0.2	0.2	PNS 2218:2023 PNS 2226:2023 PNS 2229: ____
Ethers (e.g. Methyl Tertiary Butyl Ether) (not added), % volume, max.	2	2	2	PNS 2218:2023 PNS 2226:2023 PNS 2228:2023 PNS 2229: ____ PNS 2232: ____ PNS 2233: ____ PNS 2234: ____
Oxygen content, % mass, max.	Report	Report	Report	PNS 2234: ____
Oxidation stability, minutes, min	360	360	360	PNS 2208: ____
Lead content, (not added), g/L, max.	0.005	0.005	0.005	PNS 2214:2023 PNS 2220: ____
Octane rating, min. Research Octane Number (RON) Anti-knock Index (AKI)	91	95 87.5	97	PNS 2212: ____
Sulfur, % mass max.	0.005	0.005	0.005	PNS 2211: ____ PNS 2217: ____ PNS 2223: ____ PNS 2235: ____
Vapor Pressure at 37.8 °C, kPa, max.	68	62	62	PNS 2219: ____ PNS 2221:2023 PNS 2224: ____
Water content, % v/v	0.2	0.2	0.2	PNS 2237: ____ PNS 2231: ____
* As per specification for Fuel Bioethanol in PNS QS 007:2026 Biofuels - Anhydrous Bioethanol and Bioethanol Fuel – Specifications				

4.2 Annex 1 provides minimum reference specification for base gasoline oil.

4.3 The use of organo-metallic additives, e.g. MMT shall only be allowed in recommended dosages as approved in the issued Certificate of Fuel Additive Registrations.

5 Sampling

E-gasoline (E15) shall be sampled in accordance with PNS 2241:2023.

6 Marking/Labeling

The dispensing pump for E-gasoline (E15) shall carry the following consumer advisory:
“This E-gasoline contains 15% Bioethanol”.

7 Test methods

E-Gasoline (E15) shall be tested in accordance with the methods specified in Table 1. Test results shall be subject to the reproducibility limits of the corresponding test method.

Annex A
Minimum Reference Specification for Base Gasoline
(informative)

Property	Limit	Test Methods
Color	Undyed	Visual
Copper corrosion, 3 hr at 50°C, max.	1	PNS 2206: _____
Density at 15 °C, kg/L, max.	0.783	PNS 2210: _____ or PNS 2216:2023 or PNS 2236: _____
Distillation temperature, °C at: 10% recovered, max. 50% recovered 90% recovered, max. End point, max. Residue, % volume, max.	70 85-121 180 221 2	PNS 2205: _____
Existent gum, mg/100 mL, max.	4	PNS 2207: _____
Hydrocarbons: Aromatics, % volume, max	38.5	ASTM D1319 PNS 2222:2023 PNS 2225: _____ PNS 2227: _____ PNS 2229: _____ PNS 2232: _____ PNS 2233: _____ PNS 2234: _____
Benzene, % volume, max	1	PNS 2215: _____ PNS 2222:2023 PNS 2225: _____ PNS 2227: _____ PNS 2229: _____ PNS 2230:2023 PNS 2232: _____ PNS 2233: _____ PNS 2234: _____
Lead content, (not added) g/L, max.	0.005	PNS 2214:2023 PNS 2220: _____
Oxygen Content, % mass	0	PNS 2218:2023
Research Octane Number (RON), min	87	PNS 2212: _____
Sulfur, % mass max.	0.005	PNS 2211: _____ PNS 2217: _____ PNS 2223: _____ PNS 2235: _____
Vapor Pressure at 37.8 °C, kPa, max.	62	PNS 2219: _____ PNS 2221:2023 PNS 2224: _____
Water content, % v/v	0	PNS 2237: _____ PNS 2231: _____