



Republic of the Philippines  
**DEPARTMENT OF ENERGY**

In line with the objectives of the Clean Air Act of 1999 and in support to the biofuels program of the government, the Department of Energy's Technical Committee on Petroleum Products and Additives (DOE/TCPPA) reviewed and revised the standard for Unleaded Motor Gasoline Specification (PNS/DOE QS 001:2005).

This revision is made to update and provide clear guidance on fuel classification for conventional gasoline distinct from the Ethanol-blended gasoline (E-10). Specifically, the option on the use of ethanol as a blending component in conventional gasoline is deleted in this revision. Within this standard, gasoline in the Philippines shall either be conventional gasoline (PNS/DOE QS 001:2009) or Ethanol-blended gasoline (PNS/DOE QS 008:2009)

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](mailto:products@doe.gov.ph) on or before March 13, 2009 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,

**ZENAIDA Y. MONSADA**  
Director

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**Petroleum Products – Unleaded Motor Gasoline –  
Specification**

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**Foreword**

This Philippine National Standard Specification for Unleaded Motor Gasoline was prepared by the Department of Energy's Technical Committee on Petroleum Products and Additives (DOE/TCPPA).

This standard is a revision of PNS/DOE QS 001:2005 and was made to update and provide clear guidance on fuel classification for conventional gasoline distinct from the Ethanol-blended gasoline (E-Gasoline). Specifically, the option on the use of ethanol as a blending component in conventional gasoline is deleted in this revision. With this standard, gasoline in the Philippines shall either be conventional gasoline (PNS/DOE QS 001:2009) or Ethanol-blended gasoline (PNS/DOE QS 008:2009).

This standard was made in-step with the continuing fuel quality improvement goals of the Department by endeavoring to harmonize international/regional environmental standards for fuel quality, to promote the use of efficient technologies, and to alleviate country's energy security concern.

This entire standard is subject for review when necessary.

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## 1 Scope

This standard specifies the requirements for unleaded motor gasoline used in spark-ignition internal combustion engines. This standard does not include aviation gasoline and ethanol-blended motor gasoline.

## 2 References

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

## 3 Definitions

For the purpose of this standard, **gasoline** is defined as a volatile mixture of liquid hydrocarbons, generally containing small amounts of additives, suitable for use as a fuel in spark-ignition internal combustion engines.

## 4 Requirements

Unleaded motor gasoline shall conform to the chemical and physical requirements specified in Table 1.

## 5 Sampling

Unleaded motor gasoline shall be sampled in accordance with PNS ASTM D 4057.

## 6 Marking/Labeling

The dispensing pump for Regular grade gasoline shall carry the following consumer advisory:

“Not Recommended for Vehicles with Four ~~or~~ More Wheels”.

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Table 1 – Chemical and physical requirements for Unleaded Motor Gasoline

Property	Unleaded gasoline limit			Test Method
	Premium Plus	Premium	Regular <sup>a</sup>	
Color	Blue	Green. Red if w/ anti-valve seat recession (AVSR) additive <sup>g</sup>	Orange	Visual
Copper corrosion, 3 hr @ 50°C, max.	1	1	1	PNS ASTM D 130
Distillation temperature, °C at:				PNS ASTM D 86
10% recovered, max.	70	70	70	
50% recovered	75-121	75-121	75-121	
90% recovered, max.	180	180	180	
End point, max.	221	221	221	
Residue, % volume, max.	2	2	2	
Existent gum, mg/100 mL, max.	4	4	4	PNS ASTM D381
Hydrocarbons <sup>b</sup> :				
Aromatics, % volume, max	35	35	35 <sup>f</sup>	PNS ASTM D5580 or PNS ASTM D5986 or PNS ASTM D5443 or PNS ASTM D5769 or PNS ASTM D6293 or PNS ASTM D6729 or PNS ASTM D6730
Benzene, % volume, max	2	2	2 <sup>f</sup>	PNS ASTM D3606 or PNS ASTM D4053 or PNS ASTM D5580 or PNS ASTM D5986 or PNS ASTM D5769 or PNS ASTM D6277 or PNS ASTM D5443 or PNS ASTM D6293 or PNS ASTM D6729 or PNS ASTM D6730
Ethanol (C2), % volume, max <sup>c</sup>	1	1	1	PNS ASTM D4815 or PNS ASTM D5845 or PNS ASTM D5986 or PNS ASTM D6293 or PNS ASTM D6729 or PNS ASTM D6730
Ethers (e.g. MTBE <sup>d</sup> ), % volume, max.	2	2	2	PNS ASTM D4815 or PNS ASTM D5986 or PNS ASTM D5845 or PNS ASTM D5599 or PNS ASTM D6293 or PNS ASTM D6729 or PNS ASTM D6730
Lead content, (not added) <sup>c</sup> g/L, max.	0.005	0.005	0.005	PNS ASTM D3237 or PNS ASTM D5059 or PNS ASTM D3348
Octane rating, min.				
Research Octane Number (RON)	95	93	81	PNS ASTM D2699
Anti-knock index (AKI) <sup>e</sup>	-	87.5	-	PNS ASTM D4814
Sulfur, % mass max.	0.05	0.05	0.05	PNS ASTM D1266 or PNS ASTM D2622 or PNS ASTM D4294 or PNS ASTM D5453
Vapor Pressure at 37.8 °C, kPa(psi), max.	62 (9)	62 (9)	85 (12)	PNS ASTM D4953 or PNS ASTM D5190 or PNS ASTM D5191 or PNS ASTM D5482
Density at 15 °C, kg/L, max.	0.783	0.783	0.783	PNS ASTM D1298 or PNS ASTM D4052

<sup>a</sup> Not recommended for vehicles with four (4) or more wheels  
<sup>b</sup> Based on certificate from production site. The product shall not have more than 2.7% by mass oxygen if it contains ether and/or alcohol. The product shall not contain methanol  
<sup>c</sup> Intentional addition not permitted.  
<sup>d</sup> Methyl Tertiary Butyl Ether.  
<sup>e</sup> To be reported quarterly with Motor Octane Number (MON) using ASTM D27000 except for regular grade gasoline  
<sup>f</sup> To be reported quarterly  
<sup>g</sup> To be reported quarterly

**References:**

The following standards contain provisions, which through reference in the text form part of this national standard:

PNS ASTM D 86-08, Standard Test Method for Distillation of Petroleum Products at Atmospheric Pressure

PNS ASTM D 130-04e1, Standard Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test

PNS ASTM E 203-08, Standard Test Method for Water Using Volumetric Karl Fischer Titration

PNS ASTM D 381-04e1, Standard Test Method for Gum Content in Fuels by Jet Evaporation

PNS ASTM D 1266-07, Standard Test Method for Sulfur in Petroleum Products (Lamp Method)

PNS ASTM D 1298-99(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 2622-08, Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry

PNS ASTM D 2699-08, Standard Test Method for Research Octane Number of Spark-Ignition Engine Fuel

PNS ASTM D 2700-08, Standard Test Method for Motor Octane Number of Spark-Ignition Engine Fuel

PNS ASTM D 3237-06e1, Standard Test Method for Lead in Gasoline by Atomic Absorption Spectroscopy

PNS ASTM D 3348-07, Standard Test Method for Rapid Field Test for Trace Lead in Unleaded Gasoline (Colorimetric Method)

PNS ASTM D 3606-07, Standard, Test Method for Determination of Benzene and Toluene in Finished Motor and Aviation Gasoline by Gas Chromatography

PNS ASTM D 4052-96(2002)e1, Standard Test Method for Density and Relative Density of Liquids by Digital Density Meter

PNS ASTM D 4053-04, Standard Test Method for Benzene in Motor and Aviation Gasoline by Infrared Spectroscopy

PNS ASTM D 4057-06, Standard Practice for Manual Sampling of Petroleum and Petroleum Products

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PNS ASTM D 4294-08a, Standard Test Method for Sulfur in Petroleum and Petroleum Products by Energy-Dispersive X-Ray Fluorescence Spectrometry

PNS ASTM D 4814-08b, Standard Specification for Automotive Spark-Ignition Engine Fuel

PNS ASTM D 4815-04, Standard Test Method for Determination of MTBE, ETBE, TAME, DIPE, tertiary-Amyl Alcohol and C<sub>1</sub> to C<sub>4</sub> Alcohols in Gasoline by Gas Chromatography

PNS ASTM D 4953-06, Standard Test Method for Vapor Pressure of Gasoline and Gasoline-Oxygenate Blends (Dry Method)

PNS ASTM D 5059-07, Standard Test Methods for Lead in Gasoline by X-Ray Spectroscopy

PNS ASTM D 5190-01, Standard Test Method for Vapor Pressure of Petroleum Products (Automatic Method)

PNS ASTM D 5191-07, Standard Test Method for Vapor Pressure of Petroleum Products (Mini Method)

PNS ASTM D 5443-04, Standard Test Method for Paraffin, Naphthene, and Aromatic Hydrocarbon Type Analysis in Petroleum Distillates Through 200°C by Multi-Dimensional Gas Chromatography

PNS ASTM D 5453-08b, 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 ASTM D 5482-07, Standard Test Method for Vapor Pressure of Petroleum Products (Mini-Method-Atmospheric)

PNS ASTM D 5580-02(2007), Standard Test Method for Determination of Benzene, Toluene, Ethylbenzene, p/m-Xylene, o-Xylene, C<sub>9</sub> and Heavier Aromatics, and Total Aromatics in Finished Gasoline by Gas Chromatography

PNS ASTM D 5599-00(2005), Standard Test Method for Determination of Oxygenates in Gasoline by Gas Chromatography and Oxygen Selective Flame Ionization Detection

PNS ASTM D 5769-04, Standard Test Method for Determination of Benzene, Toluene, and Total Aromatics in Finished Gasolines by Gas Chromatography/Mass Spectrometry

PNS ASTM D 5845-01(2006), Standard Test Method for Determination of MTBE, ETBE, TAME, DIPE, Methanol, Ethanol, and Tertiary-Butanol in Gasoline by Infrared Spectroscopy

PNS ASTM D 5986-96(2006), Standard Test Method for Determination of Oxygenates, Benzene, Toluene, C<sub>8</sub>-C<sub>12</sub> Aromatics and Total Aromatics in Finished Gasoline by Gas Chromatography/Fourier Transform Infrared Spectroscopy

PNS ASTM D 6277-07, Standard Test Method for Determination of Benzene in Spark-Ignition Engine Fuel Using Mid-Infrared Spectroscopy

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PNS ASTM D 6293-98(2003)e1, Standard Test Method for Oxygenates and Paraffin, Olefin, Naphthene, Aromatic (O-PONA) Hydrocarbon Types in Low –Olefin Spark Ignition Engine Fuels by Gas Chromatography

PNS ASTM D 6304-07, Standard Test Method for Determination of Water in Petroleum Products, Lubricating Oils, and Additives by Coulometric Karl Fischer Titration

PNS ASTM D 6729-04e1, Standard Test Method for Determination of Individual Components in Spark Ignition Engine Fuels by 100-Metre Capillary High Resolution Gas Chromatography

PNS ASTM D 6730-01(2006)e1, Standard Test Method for Determination of Individual Components in Spark Ignition Engine Fuels by 100-Metre Capillary (With Precolumn) High Resolution Gas Chromatography.

#### **Abbreviations**

ASTM - American Society for Testing and Materials

PNS - Philippine National Standard

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