

**付属書類 Ⅰ: バイオエタノール製品・バイオガソリンの規格**

# PHILIPPINE NATIONAL STANDARD

PNS/DOE QS 007:2005  
ICS 75.160.20

Anhydrous bioethanol fuel – Specification



BUREAU OF PRODUCT STANDARDS

JUN 07 2006

**Foreword**

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

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 Fuel 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 automotive spark ignition engine fuel.

This standard is subject for review when necessary.

## 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, produced from a variety of feedstock including grains, agricultural wastes, and other biomass resources

### 3.2

#### **anhydrous bioethanol**

refers to bioethanol wherein almost all water content has been removed

### 3.3

#### **denaturant**

unleaded gasoline as defined in the PNS intentionally added to bioethanol to make it unsuitable for oral intake (beverage use) but suitable for automotive use

### 3.4

#### **fuel bioethanol**

refers to the bioethanol denatured with unleaded gasoline for use as blending components to unleaded 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 (biurex).

Table 1 – Chemical and physical requirements

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		Dark violet	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**	PNS ASTM D5501
Inorganic chloride content, mass ppm, max.	40	40	PNS ASTM D512-81 (1985) <sup>e1</sup>
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
* only ULG per PNS is allowed.			
** 2 % v/v at the point of denaturing			

## 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 007:2005

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)<sup>e1</sup>, 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 D4052-96(2002)<sup>e1</sup>, Standard Test Method for Density and Relative Density of Liquid by digital Density Meter

PNS ASTM 4057-95(2000), 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 D6423-99(2004), Standard Test Method for Determination of pH<sub>e</sub> of Ethanol, Denatured Fuel Ethanol and Fuel Ethanol (Ed75-Ed85)

PNS ASTM E203-01, 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

B P S

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*your partner in quality*



The use of the PS Certification Mark is governed by the provisions of Department Administrative Order No. 01 series of 1997 - Revised Rules and Regulations Concerning the Philippine Standard (PS) Quality and / or Safety Certification Mark Scheme by the Bureau of Product Standards. This mark on a product/container is an assurance by the manufacturer/producer that the product conforms with the requirements of a Philippine standard. Details of conditions under which a license to use the PS Certification Mark may be granted can be obtained from the Bureau of Product Standards, Department of Trade and Industry, 361 Sen. Gil J. Puyat Avenue, Makati City.





Department of Energy  
Technical Committee on Petroleum Products and Additives

JUN 07 2006

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**Government Agencies:**

**End-Users:**

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| 16 | Hermelina H. Bion<br>Nona I. Pilariza<br>Industrial Technology Development<br>Institute, DOST  |    |   |

**Motorcycle Sector:**

**Invitees:**

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|----|--|----|---|
| 8  | Rolando F. Cruz<br>Rey Irana*<br>Motorcycle Development Program<br>Participants Association Inc.               | 17 | DOE-EUMB- Alternative Fuels and<br>Energy Technology Division                           |
| 9  | Rodolfo H. Tamayo<br>Chris C. Rubiano*<br>Agricultural Machinery Manufacturers<br>and Distributors Association | 18 | Gerard Tee<br>Margarita Esguerra<br>Romy Kehyeng<br>Absolut Chem, Inc./ CARD Foundation |
| 19 | Philippine Sugar Millers Association<br>20 Total (Phils.) Inc.   |    |   |

**Agricultural Machineries Sector:**

**NGO/Consumer Sector:**

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| 10 | Alexander P. Loinaz<br>Filipino Car Foundation |
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**Secretariat**

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| 20 | Oil Industry Standard Monitoring Division,<br>Oil Industry Management Bureau<br>Department of Energy |
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## **付属書類Ⅱ：実証事業に係る覚書（案）**



Minutes of Understanding  
on  
The Implementation  
of  
A Joint Research Project  
for  
The Dissemination and Verification Test  
for  
Commercialization  
of  
Decentralized Bio-ethanol Production Systems  
At the Rural Areas of the Philippines

This Minutes of Understanding (hereinafter referred to as MoU) is made and entered in to force on this \_\_\_ day of December 2013 between:

IB Consultant Co., Ltd. a corporation duly organized and existing under the laws of Japan, with its registered principal office located at Uchinakabara-cho 248-17, Matsue-City, Shimane Prefecture, 690-0873, Japan (hereinafter referred to as "IB"),

PNOC Alternative Fuels Corporation, a corporation duly organized and existing under the jurisdictions of the Department of Energy, the Government of Philippines (hereinafter referred to as "DOE"), with its registered principal office located at 2F PNOC Bldg 5 Energy Center, Rizal Drive, BGC, Taguig City, Philippines (hereinafter referred to as "PNOC-AFC), and

Philippine Agriculture Development and Commercial Corporation, a corporation duly organized and existing under the jurisdiction of the Department of Agriculture of Philippines (hereinafter referred to as "DA"), with its registered principal office located at Elliptical Road, Diliman, Quezon City 1100, Philippines (hereinafter referred to as "PADCC).

WHEREAS, IB has been involved since September 2013 in the Project Formulation Study on the Decentralized Bio-ethanol Production Systems at the Rural Areas of the Philippines which has been conducted along with the Technical Assistance by the Government of Japan. Since IB has confirmed certain prospectus on the proposed scheme in the Philippines through the implementation of the said Study, IB now seeks for potential partners for a joint research activity on the Dissemination and Verification Test for Commercialization of the Decentralized Bio-ethanol Production Systems in the Philippines (hereinafter referred to as the "Joint Research Project");

WHEREAS, PNOC-AFC being an attached agency of the DOE and one of the subsidiary firms of PNOC, has the primary mandate to explore, develop and accelerate the utilization and commercialization of existing and emerging alternative sources of energy, and have declared themselves as a potential partner for undertaking the required tasks for the Joint Research Project,

WHEREAS, PADCC being one of the subsidiary firms under the DA, have declared themselves that they have proven experiences in the development of Agri-business such as Sweet-sorghum in the Philippines and is qualified as a potential partner for undertaking the required tasks for the Joint Research Project,

WHEREAS, the DOE and the DA being functioning as responsible agencies for the policy development and administrative regulatory affairs in the fields of Energy and Agriculture in the

131

Republic of the Philippines respectively, have expressed their interest in extending monitoring and evaluation activities to the implementation of the proposed Joint Research Project,

NOW IT THEREFORE, taking in consideration of the mutual covenants herein contained, it is agreed by and between the parties hereto as follows:

**Article 1: Objective of the Joint Research Project**

The objective of the Project is to verify in general the commercial viability on the production and distribution of Bio-ethanol from various types of materials sourced from Sweet-sorghum, Sugar-cane and Starches which are cultivated in the Philippines through implementation of the proposed Joint Research Project.

**Article 2: Contribution of the parties to the Joint Research Project**

IB, PNOC-AFC and PADCC agree that each party shall contribute toward a successful implementation of the proposed Joint Research Project by extending their knowledge and expertise in such particular fields which may be summarized as follows;

By IB: Provision of technical expertise in the fields of fermentation technology, decentralized bio-ethanol production systems including the technologies for crushing and extraction of the feedstock identified hereinabove and dehydration of Bio-ethanol,

By PNOC-AFC: Provision of technical expertise in the fields of quality control, marketing and distribution of the Bio-ethanol products being produced by the Joint Research Project including logistic systems and blending technology with fossil gasoline,

By PADCC: Provision of technical expertise in the fields of commercial cultivation of the feedstock identified hereinabove and consolidation and organization development for the feedstock growers association by facilitating technical training and capacity building services to the growers.

**Article 3: Validity of the MoU**

This MoU shall become effective upon the signing by all the parties and shall remain in force until such time when an official agreement for the proposed Joint Research Project is signed. Alternatively, the parties may terminate this MoU at any time, with or without cause, giving thirty (30) days prior written notice to the other parties.

**Article 4: Confidentiality of Information**

All the parties involved into this MoU shall keep the information of other parties from inadvertent disclosure to any third party in the same manner as it protects its own confidential information, and use such confidential information only for the purposes of the proposed Joint Research Project.

**Article 5: Limitation of the MoU**

This MoU is a Statement of Intent and is not legally binding upon each party and shall not create any legally enforceable right and cannot be the basis of any legal claim between the parties to this mutual understanding.

**Article 6: Settlement of Dispute**

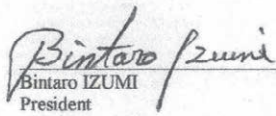
Any problems resulting from or anything unspecified in this MoU shall be resolved through amicable consultation, based on the principles of mutual benefit, equality, cooperation and trust.

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IN WITNESS WHEREOF, the parties have executed this MoU the day and year first written hereinabove and each party shall retain one original copy of this MoU.

IB Consultant Co., Ltd.

PNOC Alternative Fuels Corporation

  
Bintaro IZUMI  
President

\_\_\_\_\_  
Dr. Dante C. Canlas  
President and CEO

Philippine Agriculture Development  
Commercial Corporation

\_\_\_\_\_  
Marriz B. Agbon  
President

Witnessed by:

For PNOC-AFC: \_\_\_\_\_

Daniel A. Arriaso  
Assistant Secretary for Operations  
The Department of Energy

For PADCC: \_\_\_\_\_

The Department of Agriculture



### 付屬書類Ⅲ：面談記録

#### 付属書類Ⅳ：収集資料リスト

フィリピン国 地域分散型バイオエタノール製造システム普及案件化調査 入手資料リスト						
No.	入手日付	分類	資料名	入手先	発行年月	URLなど
1	09月24日	大学	Sweet Sorghum in the Philippines: Status and Future	MMSU (マリアノ・マルコス州立大学)	-----	抜粋要訳by今津
2	10月01日	大学	Proceedings of the 1st Sweet Sorghum Business Summit	UPLB (フィリピン大学ロスバニョス校)	2011年11月1日	抜粋要訳by今津
3	10月01日	政府機関・組織など	A Field Guide in Identifying Diseases infecting Sweet Sorghum	DOST/PCARRD(科学技術省/農業資源研究評議会)	-----	
4	10月02日	大学	Brief Information About Sweet Sorghum	PADCC(農業開発公社)	-----	日本語訳by中田
4	09月29日	大学	フィリピンバイオマス・エネルギー・環境保全のビジネスパートナー	三重大名誉教授法貴誠	環境技術2013年11月号	
5	09月30日	政府機関・組織など	フィリピン概況2013	JETRO マニラ事務所	-----	
6	10月02日	政府機関・組織など	Renewable Energy Laws	DOE	-----	
7	10月03日	政府機関・組織など	フィリピン国家規格/Anhydrous bioethanol fuel-Specification	DTI/BPS	-----	
8	10月03日	政府機関・組織など	フィリピン国家規格/Petroleum Products - E-Gasolin fuel - Specification	DTI/BPS	-----	
9	10月04日	民間企業・NGOなど	Presentation for GFII Bio-Ethanol	GFII社	2011年6月23日	
10	10月07日	政府機関・組織など	BIOFUELPRODUCERS	DOE	2013年9月26日	
11	10月08日	政府機関・組織など	Presentation for GFII Bio-Ethanol	GFII社	2011年6月23日	
12	10月08日	政府機関・組織など	Identified Agribusiness land/suitable to Bioethanol Crops	PADCC(農業開発公社)	-----	
13	10月08日	政府機関・組織など	天水稻作面積統計	NAFC(国家農漁業評議会)	-----	
14	10月10日	政府機関・組織など	Gasoline and Ethanol in the Philippines	NEDA(国家経済開発庁)	-----	
15	12月02日	政府機関・組織など	Affiliated Renewable Energy Center(ARECs) Directory	DOE	-----	
16	12月04日	民間企業・NGOなど	Instant Yeast/Technical Data Sheet	Puratos社	-----	
17	12月04日	民間企業・NGOなど	Sugarcane High-tech Cultivation Practices(Broucher)	Harvest社	-----	
18	12月09日	政府機関・組織など	DOING BUSINESS IN PHILIPPINES	JETRO マニラ事務所	2013年9月	
19	12月10日	政府機関・組織など	PHILIPPINE RICE INDUSTRY PRIMER SERIES/REGION VI Western Visayas	西ビサヤ地域農地事務所	-----	
20	12月11日	政府機関・組織など	Provincial Palay Physical Area	アンティケ州農地事務所	-----	
21	12月11日	大学	The Agro-Economic Competence of Sweet Sorghum: feed, food, forage and fuel	アンティケ大学	-----	
22	12月12日	政府機関・組織など	Major weeds and farmers' weed management practices in rainfed ricefields of Negros Island, Philippines	PhilRiceネグロス事務所	ASIA LIFE SCIENCES 23(1): 137-148, 2014	
23						
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