PHILIPPINE NATIONAL STANDARD

DPNS _____:_____
ICS _____

Natural Gas Quality Specification

DEPARTMENT OF TRADE AND INDUSTRY PHILIPPINES

BUREAU OF PRODUCTS STANDRADS

Foreword

Natural gas is made up of a mixture of "predominantly methane" hydrocarbon gases and this mixture can vary widely between sources. Current natural gas supply in the country is mainly based on Malampaya gas. To prepare for the time when the decline in Malampaya gas resources, gas supply will be supplemented by importation in the form of Liquefied Natural Gas (LNG) and/or another indigenous natural gas resource, establishing a natural gas quality standard specification will ensure safe use of gas, ensure supply security as well as maximize cost efficiency of the natural gas value chain.

To support its economic growth, the Philippines will need other sources of energy and will require additional production from indigenous sources as well as imported LNG. Since natural gas comes in different forms such as LNG and CNG, the country will need to expand its sources to meet the growing demand for natural gas and as the option for the country's gas supply expands; e.g. indigenous or LNG imports, there will be the need to develop quality standards in order to have more efficient supply acquisition and distribution of natural gas.

In order for the DOE to achieve setting the natural gas quality standard specification, a Technical Working Group (TWG) was created. The TWG was tasked to identify the relevant parameters and range of values that should be in the gas quality standard with consideration to internationally accepted quality standards as well as compliance to local laws such as the Clean Air Act of 1999.

This standard would be applicable to all natural gas to be commercially used and sold in the Philippines, be it from imported LNG or indigenous natural gas, i.e., natural gas would have to be treated first to conform to the standard before being commercially sold in the Philippines if necessary[1].

Certain exemptions are allowable in case natural gas does not conform to this standard such as "own-use" purchases of imported LNG and "bilateral agreements" between two parties, i.e., as long as the end-user in a bilateral party agrees to use the natural gas provided by the supplier.

A separate Department Circular will be issued by the DOE on the Policy Guidelines on the Standardization of Natural Gas for commercial use and sale in the Philippines.

"ISO/FDIS 13686: Natural gas – Quality designation" was used as the main reference document for the drafting of this standard.

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

[1] Following the Policy Direction of the Downstream Oil Industry in the Philippines.

1 Scope

This standard specifies the requirements for all natural gas that will be commercially sold in the Philippines.

2 References

The titles of the standard publications referred to in this standard are listed on the Annexes.

3 Definition of Terms

For the purposes of this standard, the terms and definitions given in ISO 14532 apply.

4 Requirements

4.1 Chemical and Physical Properties

Natural Gas that will be allowed to be used in the Philippines shall conform to the chemical and physical requirements specified in Table 1.

Table 1 – Chemical and Physical Properties with corresponding Test Methods

Parameters	Units	Department of Energy Proposal		
		Min	Max	Test method
Superior Calorific Value	MJ/m^3	36.50	43.75	**ASTM D 3558 ISO 6976**
Wobbe Index	MJ/m^3	45.60	53.90	**ISO 6976**
Methane	% mol	80		**ASTM D1945 ISO 6974**
Relative Density		0.555	0.680	**ASTM D 3558 – ISO 6976**
Total Sulfur	mg/m^3		30	**ASTM D 5504 ISO 6326**
Hydrogen Sulfide	mg/m^3		6[A]	**ASTM D 5504 ISO 6326**
Oxygen	% mol		0.005	**ASTM D1945 ISO 6974**
Total Inerts (N_2 + CO_2)	% mol		10	**ASTM D1945 ISO 6974**

NOTES:

[1] The numerical figures for Gross Heating Value, Gross Wobbe Index, Methane % and Relative Density are inter-connected and were derived based on Standard Temperature and Pressure (STP) of 288.15°K (15°C) and 1.01325 bars (1 atm) as required by ISO 13443 for Natural Gas. A separate "Reference Document" was made for the computation of the derived values.

[1] Water Dewpoint (H_2O DP at -6°C) and Hydrocarbon Dewpoint (HC DP at -2°C) at a specified pressure will be taken into consideration for natural gas pipeline operational requirements.

[1] Mercaptan will not be required for natural gas supply-side. Applicable only if natural gas use is defined for residential, commercial and transport sector. A separate end-use policy will address Mercaptan requirements through another PNS.

[1] Methane Number (MN) will not be a mandatory specification for natural gas quality. Applicable only if natural gas is defined for reciprocating engine use. A separate end-use policy will address Methane Number (MN) requirements through another PNS. Methane Number (MN) can be computed based on ISO 15403, page 19. *Notes:* (A) As per Article 3, Section 19 of the Philippine Clean Air Act of 1999, maximum permissible Hydrogen Sulfide is 7 mg/Nm^3.

5 Review of Literature

References **PNS __:___**

ASTM D 3558: Procedure for Calculating Calorific Value and Specific Gravity of Gaseous Fuels

ASTM D1945: Standard Method for constituents of gases by gas chromatography

ASTM D 5504: Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Cheminumilescence.

ISO 6974: Natural Gas – Determination of composition from C1 to C8 with defined uncertainty by gas chromatography.

ISO 6976: Natural Gas – Calculation of Calorific Values, Density, Relative Density, and Wobbe Index from composition.

ISO 6326: Natural Gas – Determination of Sulfur Compounds.

ISO/FDIS 13686: Natural Gas – Quality designation

ISO 14532: Natural Gas - Vocabulary

ISO 15403: Natural Gas – Designation of the quality of natural gas for use as a compressed fuel for vehicles.

Over-all Chair
Ms. Zenaida Y. Monsada
Director, OIMB

Chair
Natural Gas Management Division (NGMD)
Ms. Ma. Laura L. Saguin
Chief

Co-Chair
Oil Industry Standards & Monitoring Division (OISMD)
Engr. Alvin David T. Lim
Chief

Members

Natural Gas Suppliers/Traders

Shell Philippines Exploration B.V
Ms. Birthe M. van Vliet
Engr. Russel Manoto

Shell Gas and Energy Philippines
Dr. Kit Chan
Ms. Valarie S. Ku
Engr. Benito Aganda

Energy World Corporation Ltd
Engr. Diana T. Dabu
Engr. Aidenn C. Ranas

Philippine National Oil Company
Atty. Charo S. Barcinas
Atty. Antonio G. Buenviaje

Mitsui & Co.
Mr. Toru Ukishima
Mr. Masaki Shimomura

Philippine National Oil Company-Exploration Corporation
Ms. Samantha Hilado

Power Generators/Users

First Gen Corporation
Atty. Julie Ann S. Terrado-Acosta
Engr. Darryl D. Valderueda

National Power Corporation IPPCM/APD/PPPA
Engr. Jonas Q. Evangelista

KEPCO Philippines
KEPCO Ilijan Corporation
Engr. Joel D. Girado
Engr. Jaybee L. Perez

MERALCO PowerGen Corporation
Engr. Arthur Jerome R. Go
Engr. Dexter I. Raquel

DESCO, Inc.
Engr. Andrew L. Licup

Siemens, Inc. Philippines
Engr. Emmanuel G. Gesmundo
Engr. Ronald C.Suiza

Trans-Asia Oil and Energy Development Corporation
Engr. Michael Alexander C. Soriano

Wartsila Philippines
Engr. Rajagopalan Markandan
Engr. Bing P. Tomas

General Electric (G.E.) Philippines
Engr. Carlos S. Clement III
Engr. Dennis M. Villasper

Gas Turbine/Engines/OEM

Mitsubishi Heavy Industries Phils., Inc (MHIP)
Mr. Toyoaki Komori
Mr. Takeshi Watanabe

Siemens, Inc. Philippines
Engr. Emmanuel G. Gesmundo
Engr. Ronald C. Suiza

Observers

Department of Energy (DOE)
Ms. Letty S. Pangilinan, GRTLS
Ms. Anne Marie Sabino, GRTLS
Engr. Federico G. Domingo Jr., AFETD
Engr. Jeannie T. Dy, AFETD

TWG-Secretariat: Department of Energy
Engr. Jessol M. Salvo
Mr. Jose Danilo E. Arcellana
Engr. Don Honor B. Jacob
Engr. Rea E. Cortezano