

**BELIZE NATIONAL STANDARD**

**BZS 21: 2012**

**BELIZE NATIONAL STANDARD  
SPECIFICATION FOR  
LIQUEFIED PETROLEUM GAS (LPG)**

**(BZS 21: 2012)**

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**BELIZE NATIONAL STANDARD**  
**SPECIFICATION FOR LIQUEFIED PETROLEUM GAS**

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**Committee Representation**

The preparation of this standard for the Standards Advisory Council established under the Standards Act 1992 (Revised Edition 2000), was carried out under the supervision of the Bureau's Technical Committee for LIQUEFIED Petroleum Gas (LPG), which at the time comprised the following members:

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**0 FOREWORD**

- 0.1 Liquefied petroleum gas products are composed of those readily liquefied hydrocarbon compounds that are produced in the course of processing natural gas and also in the course of the conventional refining of crude oil. The composition of liquefied gases can vary widely depending upon the source and the nature of the treatment to which the products have been subjected.
- 0.2 There are many uses for liquefied petroleum gases as follows:
- (a) as domestic, commercial and industrial fuels;
  - (b) as a carbon source material in metal treating operations;
  - (c) as refinery raw materials for synthesis of gasoline components; and
  - (d) as petrochemical raw materials.
- 0.3 The nature of the needs dictates the required composition characteristics in these various applications. Since the last three uses of those listed are in the category of specialty applications, which involves special requirements, they are excluded from consideration.
- 0.4 In substance this specification is designed to properly define acceptable products for domestic, commercial and industrial uses.
- 0.5 In the formulation of this standard considerable assistance was derived from the following standards:
- ISO 9162:1998(E) - Petroleum Products-Fuels (Class F)-Liquefied petroleum gases-Specifications – International Organization for Standardization.
  - ASTM D 1835-05 - Standard Specification for Liquefied Petroleum (LP) Gases – American Standard Test Method.
  - SLNS 76: 2011 - Specification for Liquefied Petroleum Gases – Saint Lucia Bureau of Standards.

- TTS 59: 1995 - Standard Specification for Liquefied Petroleum Gas – Trinidad and Tobago Bureau of Standards.
- JS 28: 1973 - Standard Specification for Commercial Butane and Commercial Propane – Butane Mixture –Bureau of Standards Jamaica.

## 1 SCOPE

- 1.1 This specification covers those products commonly referred to as liquefied petroleum gases consisting of propane, propene (propylene), butane and mixtures of those materials. Three basic types of liquefied petroleum gases are provided to cover the common use applications.
- 1.2 This specification is applicable to products intended for use as domestic, commercial and industrial heating and engine fuels.
- 1.3 The values stated in SI units are to be regarded as the standard. The imperial values are given for information.
- 1.4 This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate health and safety practices and determine the applicability of regulatory limitations prior to use.

## 2 NORMATIVE REFERENCES

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 referenced document (including any amendments) applies.

- |                       |  |
|-----------------------|--|
| ASTM D1267-02(2007)   | Standard Test Method for Gage Vapor Pressure of Liquefied Petroleum (LP) Gases (LP-Gas Method);  |
| ASTM D1837-02a (2007) | Standard Test Method for Volatility of Liquefied Petroleum (LP) Gases;   |
| ASTM D2163-07         | Standard Test Method for Determination of Hydrocarbons in Liquefied Petroleum (LP) Gases and Propane/Propene Mixtures by Gas Chromatography; |
| ASTM D2158-05         | Standard Test Method for Residues in Liquefied Petroleum (LP) Gases;   |

ASTM D1838-07	Standard Test Method for Copper Strip Corrosion by Liquefied Petroleum (LP) Gases;
ASTM D6667-04	Standard Test Method for Determination of Total Volatile Sulfur in Gaseous Hydrocarbons and Liquefied Petroleum Gases by Ultraviolet Fluorescence;
ASTM D 2420-07	Standard Test Method for Hydrogen Sulfide in Liquefied Petroleum (LP) Gases (Lead Acetate Method); and
ASTM D3700 - 07	Standard Practices for Obtaining LPG Samples Using a Floating Piston Cylinder.
ISO 4257:2001	Liquefied petroleum gases -- Method of sampling;
ISO 4259:2006	Petroleum products -- Determination and application of precision data in relation to methods of test;
ISO 3993:1984	Liquefied petroleum gas and light hydrocarbons -- Determination of density or relative density -- Pressure hydrometer method;
ISO 8973:1997	Liquefied petroleum gases -- Calculation method for density and vapour pressure; and
ISO 7941:1988	Commercial propane and butane -- Analysis by gas chromatography.

### 3 DEFINITIONS

For the purpose of this standard the following definitions apply.

- 3.1 Commercial butane** means a hydrocarbon product composed predominantly of butane and/or butanes; the remaining part may consist mainly of propane/propene and pentane/pentane isomers.
- 3.2 Commercial PB mixtures** means mixtures of propane and butane for use where intermediate volatility is required.
- 3.3 Commercial propane** means a hydrocarbon product composed predominantly of propane and/or propene; the remaining part may consist mainly of ethane/ethane and butane/butane isomers.

- 3.4 Liquefied petroleum gas** means a by-product from the processing of natural gas or petroleum gas or from petroleum refining, consisting of a mixture of low-boiling hydrocarbons that exists in a liquid state at ambient temperature and includes commercial butane, commercial propane, commercial butane-propane mixtures and special duty propane blends.
- 3.5 Special duty propane** means a high quality product composed primarily of propane, which exhibits superior anti-knock characteristics when used in an internal combustion engine

## 4 REQUIREMENTS

### 4.1 General

When determined in accordance with the methods in Table 1, the properties of liquefied petroleum gas shall be in accordance with the limiting requirements given in that table.

NOTE: Individual contractual agreements, national standards, national safety codes and/or requirements of distribution systems may prescribe other limits.

**Table 1 – Specifications for liquefied petroleum gases**

<b>Characteristics</b>	<b>Method of Test(s)</b>	<b>Commercial propane</b>	<b>Commercial butane</b>	<b>Commercial PB mixture</b>	<b>Special Duty Propane</b>
Composition of LPG	ASTM D 2597	More than 70% by liquid volume of commercial propane	More than 70% by liquid volume of commercial butane	Mixture of butane and/or propane containing not more than 70% commercial propane	Not less than 90% liquid volume percent propane
Gauge vapour pressure at 37.8°C kPa, max (psig) (max)	ASTM D1267	1434  208	483  70	1434  208	1434  208



<b>Characteristics</b>	<b>Method of Test(s)</b>	<b>Commercial propane</b>	<b>Commercial butane</b>	<b>Commercial PB mixture</b>	<b>Special Duty Propane</b>
Volatile residue :					
Evaporated temperature, 95%, max °C	ASTM D1837	-38.3	2.2	2.2	-38.3
Butane and heavier, max, vol %	ASTM D2163	2.5	Not applicable	Not applicable	2.5
Pentane and heavier, max, vol %	ASTM D2163	Not applicable	2.0	2.0	Not applicable
Residue on evaporation 100ml, max ml	ASTM D2158	0.05	0.05	0.05	0.05
Oil stain observation	ASTM D2158	Pass	Pass	Pass	Pass
Corrosion copper, strip	ASTM D1838	No. 1	No. 1	No. 1	No. 1
Sulphur	ASTM D6667	185	140	140	185
Hydrogen sulphide	ASTM D2420	Pass	Pass	Pass	Pass
Free water content	Visual Inspection	Not applicable	None	None	Not applicable
Moisture Content	ASTM D 2713	Pass	Not applicable	Not applicable	Pass
Stenching Limit (mercapen sulphur concentration, ppm)	ASTM D 5305	10 - 50			

## 4.2 Composition of LPG

- 4.2.1 Commercial butane shall be more than 70% by liquid volume of commercial butane and/or butanes; the remaining part may consist mainly of propane/propene and pentane/pentane isomers.
- 4.2.2 Commercial propane/butane mixture shall be a hydrocarbon mixture consisting of not more than seventy percent (70 %) by liquid volume of commercial propane or commercial butane as the other hydrocarbon.
- 4.2.3 Commercial propane shall be more than 70% by liquid volume of propane and/or propene; the remaining part may consist mainly of ethane/ethane and butane/butane isomers.
- 4.2.4 Special duty propane shall be a product comprising propane of not less than ninety percent (90 %) liquid volume.
- 4.2.5 The requirements for the commercial butane, commercial propane, commercial propane/butane mixtures and special duty propane shall meet the limits specified in Table 1 when tested in accordance with the relevant test methods in Table 1.
- 4.2.4 Commercial butane and commercial propane/butane shall have the compositions stated in Table 1 and shall not contain free or suspended water detectable by visual inspection. (See Table 1).
- 4.2.5 Commercial propane and special duty propane shall have moisture content as measured by ASTM D 2713 in Table 1.

## 4.3 Stenching of LPG

All LPG gases shall be odorised by the addition of a stenching agent that is rendered distinctive and unpleasant, prior to the delivery to a distributing plant. Such a stenching agent shall be detectable, by a distinct odour, down to a concentration in air of not over 20 % of the lower limit of flammability when tested in accordance with ASTM D 5305.

## 4.4 Precision and interpretation of test results

Most of the methods of tests given in Table 1 contain a statement of the precision, i.e. the repeatability and reproducibility, to be expected from them but, in cases of dispute, the procedure described in ISO 4259, which uses precision data in the interpretation of test results shall be used.

#### **4.5 Additional information to be supplied by the vendor to the purchaser (in writing).**

The vendor of the LPG shall supply the purchaser with the following additional information:

- a) Density: The density, in kilograms per cubic meter at 27 °C, determined by the method in ISO 3993/ISO 8973;
- b) C2 hydrocarbon content: The molar percentage of C2 hydrocarbons and the method used to carry out the determination;
- c) Unsaturated hydrocarbons: The molar percentage of unsaturated hydrocarbons, determined in accordance with ISO 7941;
- d) Residual matter: The residual matter, in milligrams per kilogram, and the method used to carry out the determination.

NOTE: The attention of the user of this standard is directed to the introductory discussion and proposed test method given in Annex A.

### **5 DOCUMENTATION**

The documentation supplied to the purchaser by the vendor shall include at least the following:

- a) A reference to this National Standard;
- b) The type of Liquefied Petroleum Gas supplied, i.e. commercial propane, commercial butane or commercial PB mixture;
- c) Precautionary and safety advice.

NOTE: If a transportable container is supplied with the liquefied petroleum gas, it shall also be clearly marked with this information.

### **6 SAMPLING**

Proper sampling of liquefied gases is extremely important if the test results are to be significant. Representative sample shall be taken in accordance with the procedure given in ISO 4257 or ASTM 3700.

**END OF DOCUMENT!**