



DRAFT EAST AFRICAN STANDARD

Liquefied petroleum Gas (LPG) — Specification

EAST AFRICAN COMMUNITY

Copyright notice

This EAC document is copyright-protected by EAC. While the reproduction of this document by participants in the EAC standards development process is permitted without prior permission from EAC, neither this document nor any extract from it may be reproduced, stored or transmitted in any form for any other purpose without prior written permission from EAC.

Requests for permission to reproduce this document for the purpose of selling it should be addressed as shown below or to EAC's member body in the country of the requester:

© East African Community 2022 — All rights reserved
East African Community
P.O. Box 1096,
Arusha
Tanzania
Tel: + 255 27 2162100
Fax: + 255 27 2162190
E-mail: eac@eachq.org
Web: www.eac-quality.net

Reproduction for sales purposes may be subject to royalty payments or a licensing agreement. Violators may be prosecuted.

Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in the East African Community. It is envisaged that through harmonized standardization, trade barriers that are encountered when goods and services are exchanged within the Community will be removed.

The Community has established an East African Standards Committee (EASC) mandated to develop and issue East African Standards (EAS). The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the public and private sector organizations in the community.

East African Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the Principles and procedures for development of East African Standards.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

The committee responsible for this document is Technical Committee EASC/TC 068, *Petroleum and petroleum products*.

Attention is drawn to the possibility that some of the elements of this document may be subject of patent rights. EAC shall not be held responsible for identifying any or all such patent rights.

Liquefied Petroleum Gas (LPG) — Specification

1 Scope

This Draft East African Standard specifies the requirements, sampling and test methods for liquefied petroleum gases (LPG) intended for use as domestic, commercial, and industrial heating and engine fuels.

This standard covers LPG consisting of commercial propane, commercial butane and commercial propane butane (PB) mixture.

2 Normative references

The following referenced documents referred to in the text in such a way that some or all of their content constitutes requirements 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, *Standard Test Method for Gauge Vapor Pressure of Liquefied Petroleum (LP) Gases (LP-Gas Method)*

ASTM D1657, *Standard Test Method for Density or Relative Density of Light Hydrocarbons by Pressure Hydrometer*

ASTM D1837, *Standard Test Method for Volatility of Liquefied Petroleum (LP) Gases (Withdrawn 2017)*

ASTM D1838, *Standard Test Method for Copper Strip Corrosion by Liquefied Petroleum (LP) Gases*

ASTM D1945, *Standard Test Method for Analysis of Natural Gas by Gas Chromatography*

ASTM D1946, *Standard Practice for Analysis of Reformed Gas by Gas Chromatography*

ASTM D2158, *Standard Test Method for Residues in Liquefied Petroleum (LP) Gases*

ASTM D2163, *Standard Test Method for Determination of Hydrocarbons in Liquefied Petroleum (LP) Gases and Propane/Propene Mixtures by Gas Chromatography*

ASTM D 2504, *Standard Test Method for Non-condensable Gases in C2 and Lighter Hydrocarbon Products by Gas Chromatography*

ASTM D 2598, *Standard Practice for Calculation of Certain Physical Properties of Liquefied Petroleum (LP) Gases from Compositional Analysis*

ASTM D3244, *Standard Practice for Utilization of Test Data to Determine Conformance with Specifications*

ASTM D 6667, *Standard Test Method for Determination of Total Volatile Sulphur in Gaseous Hydrocarbons and Liquefied Petroleum Gases by Ultraviolet Fluorescence*

IP 235, *Determination of density of light hydrocarbons – Pressure hydrometer method*

IP 272, *Determination of mercaptan sulfur and hydrogen sulfide content of liquefied petroleum gases (LPG) - Electrometric titration method*

IP 317, *Determination of residues in liquefied petroleum gases — Low temperature evaporation method*

ISO 4257, *Liquefied petroleum gases — Method of sampling*

ISO 4259-3, *Petroleum and related products — Precision of measurement methods and results — Part 3: Monitoring and verification of published precision data in relation to methods of test*

ISO 6326-3, *Natural gas — Determination of sulfur compounds — Part 3: Determination of hydrogen sulfide, mercaptan sulfur and carbonyl sulfide sulfur by potentiometry*

ISO 7941, *Commercial propane and butane — Analysis by gas chromatography*

ISO 8973, *Liquefied petroleum gases — Calculation method for density and vapour pressure*

ASTM D1265, *Standard Practice for Sampling Liquefied Petroleum (LP) Gases (Manual Method)*

ASTM D3700, *Standard Practice for Obtaining LPG Samples Using a Floating Piston Cylinder*

ISO 13758, *Liquefied petroleum gases — Assessment of the dryness of propane — Valve freeze method*

ASTM D 2784, *Standard Test Method for Sulfur in Liquefied Petroleum Gases (Oxy-Hydrogen Burner or Lamp)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

Liquefied Petroleum Gas (LPG)

flammable mixture of hydrocarbon gases of commercial propane, commercial butane and mixture of propane and butane that can be stored and/or handled in the liquid phase under moderate conditions of pressure and at ambient temperature.

3.2

commercial propane

hydrocarbon product consisting mainly of propane gas for use where high volatility is required.

commercial butane

hydrocarbon product consisting mainly of butane gas for use where low volatility is required.

3.4

commercial PB mixtures

mixtures of mainly propane and butane gases for use where intermediate volatility is required.

4 Requirements

4.1 General requirements

4.1.1 LPG shall have a characteristic odour, and an appearance that is clear and free from suspended particles on visual inspection.

4.1.2 LPG shall be odourized prior to delivery to a bulk plant by the addition of a warning agent of such character that it is detectable by a distinctive odour.

4.2 Specific requirements

LPG shall comply with the requirements given in Table 1 when tested in accordance with the test methods prescribed therein.

Table 1 — Specific Requirements for LPG

S/N	Characteristic	Requirements			Test method
		Commercial butane	Commercial Propane	Commercial PB mixture	
i.	Density at 20°C kg/m ³	To report	To report	To report	ASTM D1657 ASTM D 2598 IP 235 ISO 8973
ii.	Vapour pressure at 37.8° C kPa, max.	485	1434	1050	ASTM D1267 ASTM D2598 ASTM D 6897
iii.	Volatile residue 95% evaporated temperature °C, at 760 mm Hg, max.	2.2	-38.3	2.2	ASTM D1837
	Or butane and heavier %, v/v, max.	-	2.5	-	ASTM D2163 IP 405 ISO 7941
	Or pentane and heavier per cent v/v, max.	2.0	0	2.0	ASTM D2163 IP 405 ISO 7941
v	Nitrogen	Nil	Nil	Nil	ASTM D1945 ASTM D1946
vi	Oxygen	Nil	Nil	Nil	ASTM D 2504
vii.	Residue on evaporation of 100 ml, max.	0.05	0.05	0.05	ASTM D2158 IP 317
viii	Oil stain observation	pass	pass	pass	ASTM D2158 IP 317
ix	Corrosion, copper strip (1h at 37.8° C, max.	No.1	No.1	No.1	ASTM D1838
x	Total sulphur mg/kg, max.	140	140	140	ASTM D 6667

					ASTM D 5453 ASTM D 7813 EN 20846 ASTM D 2784
xi	Moisture content	To be reported	To be reported	To be reported	ASTM 7995 ISO 13758
xii	Free water content	None	None	None	Visual inspection
xiii	Odour stenching mercaptan sulphur content as ethyl mercaptan, mg/kg	15-50	15-50	15-50	ASTM D 5305
xiv	Hydrogen Sulphide ^a	Negative	Negative	Negative	ISO 8819 ASTMD 2420
xv	Hydrogen sulphide (H ₂ S) mg/kg max.	2	2	2	ASTMD4810 ASTM D4084 IP 272
^a If negative, no need to carry out Hydrogen sulphide (H ₂ S) mg/kg test. NOTE mercaptan sulphur odour should be detectable (organoleptic)					

5 Packaging

5.1 The LPG shall be packed in certified gas containers, that conform to relevant international or regional standards.

5.2 The containers shall be acceptably sealed.

6 Labelling

6.1 The following information shall be clearly marked on the container, or on a label affixed to the container:

- supplier's name or brand name or trade mark;
- Product name as "LPG";
- type of liquefied petroleum gas;
- serial number;
- net weight in Kilograms (kg);
- water capacity in litres;
- Date of manufacture of the container;
- Manufacturer of the container;
- standard to which the container was manufactured;
- gross/ tare weight of the container in kg;

- k) date of last pressure test of the container; and
- l) precautionary labels that apply to safety and proper handling of LPG in accordance to ISO 7225

6.2 For bulk transportation the above information shall be in the documentation accompanying the product.

7 Sampling

Sampling of LPG shall be done in accordance with ISO 4257 or ASTM D1265 or ASTM D3700

DEAS 1105:2023- For Public Review Only

Bibliography

- [1] *KS 91:2022, Petroleum and petroleum products- Liquefied petroleum Gas (LPG) — Specification*
- [2] *TZS 818:2021, Liquefied petroleum Gas (LPG) — Specification*
- [3] *US 971 :2019, Liquefied petroleum Gas (LPG) — Specification*
- [4] *RS 140:2012, Liquefied petroleum Gas (LPG) — Specification*

DEAS 1105:2023- For Public Review Only