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DRAFT EAST AFRICAN STANDARD

Carbon dioxide for beverage industry — Specification

DRAFT FOR PUBLIC REVIEW

EAST AFRICAN COMMUNITY

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.

In order to achieve this objective, the Community established an East African Standards Committee mandated to develop and issue East African Standards.

The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the private sectors and consumer organizations. 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 procedures of the Community.

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.

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Carbon dioxide for beverage industry – Specification

1 Scope

This draft East African Standard prescribes the requirements methods of test and sampling for carbon dioxide used for the carbonation of beverages.

It does not apply to the following:

- a) carbon dioxide used for fire extinguishers, refrigeration, inflation rafts, welding applications and other general commercial purposes.
- b) material intended for medical 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.

EAS 123, *Distilled water — Specification*.

EAS 150, *Methods for analysis of purity of carbon dioxide*.

3 Terms and definitions

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

3.1

carbon dioxide

Carbon dioxide is a colorless, odorless, non-combustible gas with a formula CO_2 , liquifiable to a heavy, volatile, colorless liquid or solid.

3.2

carbonation

The addition of carbon dioxide into beverages through dissolving the gas in potable water/beverages under controlled conditions of temperature and pressure to get the required gas volume.

4 General requirements

4.1 The carbon dioxide may be derived from, fermentation of carbohydrates or from natural sources.

4.2 A carbonated solution of the product in distilled water shall be free from any objectionable taste or odour.

4.3 When tested according to the methods prescribed in EAS 150, the product shall comply with the requirements listed in Table 1.

5 Packaging

Carbon dioxide shall be shipped and handled as a solid or liquid product in either steel cylinders conforming to appropriate East African Standards or in insulated trucks.

6 Sampling

The product shall be sampled using the method described in Annex A.

7 Quality of reagents

For the analysis of the carbon dioxide, unless otherwise specified, analytical grade reagents and distilled water complying with EAS 123 (see clause 2) shall be used in all tests.

Table 1 – Quality requirements for carbon dioxide

S/N	Characteristic	Requirement	Test method, EAS 150
1	Carbon dioxide, % by volume, min.	99.9	Part 1
2	Carbon monoxide, ppm, max.	10	Part 2
3	Oil, ppm, max.	0.003	Part 4
4	Water ppm, max	20	Part 5
5	Volatile hydrocarbons for example, methane, ppm, max.	50	Part 6
6	Arsenic, mg/m ³ , max.	0.5	Part 7
7	Hydrogen phosphide, hydrogen sulphide and other reducing organic substances.	To pass test	Part 8
8	Total residual gases, % v/v, max, (when completely vaporised at 20 °C and 101.3 kPa pressure)	0.2	Part 9
9	Nitric oxide (NO) and nitrogen dioxide (NO ₂), ppm, max.	2.5	Part 10
10	Sulphur compounds, ppm, max.	0.2	Part 11

Annex A (normative)

Methods of sampling

A.1 General

Samples of carbon dioxide needed to perform all the tests required by the standard shall be taken from the same manufacturing lot, using identical sampling procedures. Rigid metal connections or flexible reinforced nylon hose shall be used throughout the sampling equipment and shall be kept as short as possible. All components shall have a design pressure of not less than 2×10^4 kPa.

A.2 Principle of sampling methods

Two methods are given as follows:

- a) direct sampling, in which the sample is passed to an evaporator and then directly to the analytical apparatus.
- b) sampling in a cylinder in which case the sample is transferred in a cylinder to a laboratory.

A.3 Direct sampling

Connect the sample valve (see A.1) to an evaporating device and then via a control valve to the analytical apparatus. Thoroughly purge the connections, valves and the evaporating device with the sample.

A.4 Sampling in a cylinder

A.4.1 Requirements for the cylinder

A.4.1.1 The cylinder, of water capacity 1.4 kg or 2.0 kg, shall comply with the relevant East African Standard and be fitted with a valve at each end.

A.4.1.2 An internal copper syphon tube of at least 5 mm diameter, and a length equal to one third of the length of the cylinder shall be brazed to the base of one valve. This valve shall be clearly identified.

A.4.1.3 The cylinder shall be coated internally with tin (containing 1 % (m/m) lead) applied by hot dipping the cylinder after the walls have been descaled. Alternatively, stainless steel cylinders designed for the purpose may be used. The stainless-steel cylinders shall have a valve fitted at each end. An internal stainless steel syphon tube of at least 5 mm diameter, and of length equal to one

third of the length of the cylinder, shall be fitted to the base of one valve and this valve shall be clearly identified.

A.4.2 Procedure

A.4.2.1 Flush both cylinder valves with liquid carbon dioxide and thoroughly purge the sample point with the liquid carbon dioxide to be sampled. Connect the non-syphon valve to the sample point using suitable connections (see A.1). Hold the cylinder vertically with the syphon valve uppermost and open the non-syphon valve to pressurise the cylinder.

A.4.2.2 Slowly open the syphon valve and fill the cylinder with liquid carbon dioxide by blowing off first gas and then carbon dioxide snow. Disconnect the cylinder and blow off approximately one fifth of the carbon dioxide from the gas phase through the non-syphoned valve in the uppermost position. Shake the cylinder and blow off the remaining carbon dioxide through the non-syphoned valve in the lower position until only carbon dioxide gas is discharged from it.

A.4.2.3 Allow the sample to equilibrate to room temperature, prior to analysis. Analyse the sample as soon as is practicable after this thermal equilibrium is attained.

A.4.2.4 To withdraw the sample for analysis, support the sampling cylinder vertically with the syphoned valve uppermost. Connect the non-syphoned valve of the sampling cylinder (liquid carbon dioxide) to an evaporating device and then via a control valve to the analytical apparatus. Thoroughly purge the connections, valves, and the evaporating device before starting the analysis.

NOTE For the determination of oil content the liquid carbon dioxide should be solidified by isenthalpic expansion.

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