RWANDA STANDARD

DRS 14

Third edition

Yyyy-mm-dd

Carbonated soft drinks — Specification

ICS 67.160.20

Reference number

DRS 14: 2023

In order to match with technological development and to keep continuous progress in industries, standards are subject to periodic review. Users shall ascertain that they are in possession of the latest edition

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Foreword

Rwanda Standards are prepared by Technical Committees and approved by Rwanda Standards Board (RSB) Board of Directors in accordance with the procedures of RSB, in compliance with Annex 3 of the WTO/TBT agreement on the preparation, adoption and application of standards.

The main task of technical committees is to prepare national standards. Final Draft Rwanda Standards adopted by Technical committees are ratified by members of RSB Board of Directors for publication and gazettment as Rwanda Standards.

RS 14 was prepared by Technical Committee RSB/TC 001, *Non-alcoholic beverages.*

This thirdedition cancels and replaces thesecondedition (RS 14: 2018), which has been technically revised.

Committee membership

The following organizations were represented on the Technical Committee on *Non-alcoholic beverages* (RSB/TC 001) in the preparation of this standard.

BRALIRWA

La pervenche Ltd

MINIMEX Ltd

Mwezi Co.Ltd,

National Industrial Research and Development Agency (NIRDA)

Nyabihu TVET

Nyarutarama Business Incubation Center

Rwanda Food and Drugs Authority

SPIC Ltd

Rwanda Standards Board (RSB) – Secretariat

Carbonated soft drinks— Specification

1 Scope

This Draft Rwanda Standard specifies the requirements, sampling and test methods for carbonated soft drinks.

2 Normative references

The following documents are 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.

AOAC 950.29, *Sucrose in non alcoholic soft drinks*

AOAC 979.08, *Benzoate, caffeine, and Saccharin in carbonated soft drinks.Liquid chromatographic method*

AOAC 980.19, *Tin in food. Atomic absorption spectrophotometric method*

AOAC 990.31, *Sulfites in foods and soft drinks Ion Exclusion chromatographic method*

AOAC 999.10, *Lead, Cadmium, Copper, Iron, and Zinc in foods, Atomic Absorption Spectrophotometry after microwave digestion*

RS CXC 1, *General Principles of Food Hygiene*

RS CXS 192, *General standard for food additives*

RS EAS 35, *Fortified food grade salt — Specification*

RS EAS 38, *Labeling of prepackaged foods—Requirements*

RS ISO 21527-2, *Microbiology of food and animal feeding stuffs — Horizontal method for the Enumeration of yeasts and moulds — Part 2: Colony Count technique in products with water activity less than or equal to 0,95*

RS ISO 4833-1, *Microbiology of the food chain — Horizontal method for the enumeration of microorganisms— Part 1: Colony count at 30 degrees C by the pour plate technique*

RS ISO 6579-1, *Microbiology of the food chain — Horizontal method for the detection, enumeration and serotyping of Salmonella — Part 1: Detection of Salmonella spp*.

RS ISO 6888-1, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of coagulase — positive staphylococci (Staphylococcus aureus and other species) — Part 2: Technique using rabbit plasma fibrinogen agar medium*

3 Terms and definitions

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

3.1

carbonated soft drinks

non-alcoholic drinks containing dissolved carbon dioxide packed in hermetically sealed containers to ensure freedom from spoilage

3.2

non-flavoured carbonated soft drinks

carbonated soft drinks with no added flavouring agents

3.3

flavoured carbonated soft drinks

carbonated soft drinks in which natural or synthetic flavouring agents have been added

3.3

one volume of carbonation

gas volume at 15.560 ºC under atmospheric pressure, when water will absorb a quantity of carbon dioxide equal to its own volume. By lowering the temperature and/or increasing the pressure, the volume of dissolved carbon dioxide may be increased

3.4

flavouring

products that are added to food to impart, modify, or enhance the flavour of food with the exception of flavour enhancers considered as food additives. Flavourings do not include substances that have an exclusively sweet, sour, or salty taste (e.g. sugar, vinegar, and table salt).

3.5

natural flavouring agents

flavouring substances obtained by physical processes that may result in unavoidable but unintentional changes in the chemical structure of the components of the flavouring (e.g. distillation and solvent extraction), or by enzymatic or microbiological processes, from material of plant or animal origin. Such material may be unprocessed, or processed for human consumption by traditional food-preparation processes (e.g. drying, torrefaction (roasting) and fermentation). This means substances that have been identified / detected in a natural material of animal or vegetable origin.

3.6

synthetic flavouring substances

flavouring substances formed by chemical synthesis

3.7

food grade packaging material

packaging material, made of substances which are safe and suitable for their intended use and which will not impart any toxic substance or undesirable odour or flavour to the product

4 Types of carbonated soft drinks

Carbonated soft drinks shall be of the following types:

a) non-flavoured carbonated soft drinks (carbonated water or soda water);

b) flavoured and sweetened, with nutritive sweeteners, non-nutritive sweeteners singly or in combination, carbonated soft drinks; and

c) flavoured carbonated soft drinks.

5 Requirements

5.1 Ingredients

5.1.1 Essential ingredients

The following essential ingredients shall be used in carbonated soft drinks and shall comply with relevant standards:

a) potable water complying with RS EAS 12;

b) carbon dioxide conforming to the following:

1) be odorless, non-toxic and non-combustible; and

2) have the characteristics of carbonic acid (the odour and flavour of the gas, as well as the odour and flavour of the distilled water saturated with it).

5.1.2 Optional ingredients

The following optional ingredients may be used in carbonated soft drinks and shall comply with relevant standards:

a) **nutritive sweetening agents**: Any food grade nutritive sweetener may be used, consistent with Good Manufacturing Practice (GMP) and if used shall comply with relevant standards. These may include but not limited to dry or liquid forms of sugar, invert sugar, dextrose, fructose, lactose, mannitol, honey, glucose syrup, sorbitol and intense sweeteners or any combination of two or more of the said sugars and/or sweeteners;

b) **non-nutritive sweeteners**: In addition to non nutritive sweeteners specified in CODEX STAN 192, Acelsulfame K may be used in carbonated soft drinks and shall be used following Good Manufacturing Practices (GMP);

c) **flavouring agents**: may be "natural or synthetic" used at levels determined by GMP, with the exception of quinine and caffeine that have to be in quantity as specified in Table 1;

Table 1 — Limits for quinine and caffeine in carbonated soft drinks

Content	Maximum limits mg/l	Test method
Quinine salt	100	Annex A
Caffeine	200	Annex B

d) edible common salt complying with RS EAS 35;

e) nutrients such as vitamins and minerals; and

f) fruit juice, fruit pulp, vegetable extracts, herbal extracts or extracts from other plant parts complying with relevant standards.

5.2 General requirements

Carbonated soft drinks shall:

a) have a well-balanced and pleasant flavour;

b) be free from off-flavour and off-odours;

c) be free from insect and rodent contamination;

d) be sparkling clear and remain so when stored under normal conditions; and

e) not contain extraneous matter.

5.3 Specific requirements

Carbonated soft drinks shall comply with the specific requirements indicated in Table 2 when tested in accordance with test methods specified therein.

Table 2 — Specific requirements for carbonated soft drinks

S/N	Characteristics	Limits	Test method
i.	Brix at 20 ºC in sugar sweetened carbonated soft drinks [a], min.	5.0	AOAC 950.29
ii.	Ethyl alcohol, %, max.	0.5	ISO 2448
iii.	Volume of carbonation, (for carbonated soft drinks)[b], min.	1	Annex C
iv.	Sulphur dioxide & sulphites, mg/l, max.	60	AOAC 990.31
v.	Benzoic or sorbic acids or their alkalines salts, mg/l, max.	400	AOAC 979.08

[a] The brix limit does not apply to carbonated water and zero sugar carbonated drinks

[b] 1 volume of carbonation equals to 1.97667 g/l

6 Food additives

Food additives to be used in carbonated soft drinks shall be those permitted by RS CXS 192.

7 Hygiene

Carbonated soft drinks shall be produced and handled under hygienic conditions in accordance with RS CXC 1.

8 Microbiological limits

Carbonated soft drinks shall not exceed microbiological limits in Table 3 when tested with test methods specified therein.

Table 3 — Microbiological limits for Carbonated soft drinks

S/N	Microorganism	Maximum limits	Test method
i.	Total Viable Counts, CFU / ml	10^2	RS ISO 4833-1
ii.	Yeast and mould counts, CFU/ml	10	RS ISO 21527-2
iii.	*E. coli*, CFU/ml	absent	RS ISO 16649-2
iv.	*Salmonella spp* in 25 ml	absent	RS ISO 6579-1
v.	*Staphylococcus aureus*, CFU/ml	absent	RS ISO 6888-1

9 Heavy metals

Carbonated soft drinks shall not contain heavy metal in excess of the limits indicated in Table 4when tested with test methods specified therein.

Table 4 — Limits for heavy metals in carbonated soft drinks

S/N	Heavy metal	Maximum limits (mg/kg)	Test method
i.	Lead	0.03	AOAC 999.10
ii.	Tin	150	AOAC 980.19

10 Packaging

Carbonated soft drinks shall be packaged in food grade packaging materials that ensure the integrity and safety of the product.

11 Labelling

In addition to the requirements in RS EAS 38, the following labelling requirements shall apply and shall be legibly and indelibly marked:

a) name of the product as “carbonated soft drinks”;

b) the name and address of the manufacturer/ packer/ distributor/, importer/ exporter/ vendor;

c) list of ingredients in descending order;

d) declaration of allergens, for example sulphites;

e) date of manufacture;

f) best before;

g) batch/lot number;

h) statutory warnings;

i) storage conditions;

j) net content;

k) country of origin.

12 Sampling

Sampling shall be done in accordance with Annex D

Annex A
(normative)

Determination of quinine

A.1 Principle

Carbon dioxide is removed from the sample by passing through it dry air or dry nitrogen. An extraction with ether is performed on the decarbonated sample. By means of a graph of concentration of a series of standard quinine sulphate solutions against fluorescence, the content of quinine in the test solution is determined.

A.2 Reagents

During the analysis, unless otherwise stated, use only reagents of recognized analytical grade and only distilled water or water of equivalent purity. The following reagents should be free from fluorescing impurities:

a) sulphuric acid, 0.05 M;

b) ammonia solution, concentrated;

c) diethyl ether;

d) quinine sulphate, standard stock solution (Dissolve 0.10 g of quinine sulphate in 0.05 M sulphuric acid and make up to 1 L with 0.05 M sulphuric acid. This solution contains 100 micrograms of quinine sulphate per milliliter); and

e) quinine sulphate, standard working solution (Dilute 10 ml of the quinine sulphate stock solution to 200 ml with 0.05 m sulphuric acid. This solution contains 1 microgram of quinine sulphate per milliliter).

A.3 Apparatus

An instrument capable of measuring fluorescence. Note that glassware should completely be free from stopcock lubricant as this usually contains fluorescence substances. No detergents shall be used in washing glassware.

A.4 A.4 Procedure

A.4.1 Transfer 100 g of the decarbonated sample to a separating funnel.

A.4.2 Make the sample distinctly alkaline with ammonia solution and extract with the same 10 ml of water contained in a second separating funnel.

A.4.3 Extract the wash water once with 10 ml of diethyl ether.

A.4.4 Combine the ether extracts and remove the ether by distillation.

A.4.5 Dry the residue in an air oven at 100 ºC for a few minutes.

A.4.6 Dissolve it in 0.05 M sulphuric acid and make up to 100 ml in a volumetric flask with 0.05 m sulphuric **acid.**

A.4.7 Dilute 10 ml of this solution to 200 ml with 0.05 m sulphuric acid.

A.4.8 Measure the fluorescence of the solution by means of a suitable instrument.

A.4.9 Prepare a series of standards containing 0.1, 2.5 and 10 micrograms of quinine sulphate per millilitre and measure the fluorescence

A.5 Expression of results

Plot the fluorescence results of the series of standards to obtain a curve from which the concentration of quinine in the test solution can be read. Calculate the concentration of quinine as mg/l quinine sulphate in the original sample.

Annex B
(normative)

Determination of caffeine content

B.1 Principle

Carbon dioxide is removed from the sample by means of dry air or dry nitrogen. An extraction with chloroform is performed on the decarbonated sample.By means of a graph of absorbance against concentration of standards, the content of caffeine of the sample is determined.

B.2 Reagents

During analysis, use only the following reagents of recognized analytical grade and only distilled water or water of equivalent purity.

a) chloroform;

b) ammonia solution, concentrated;

c) hydrochloric acid, approximately molar: Take 100 ml of concentrated hydrochloric acid (sp. gr. 1.184) and dilute to a litre; and

d) standard caffeine solution. Prepare a solution containing 10 ml using molar hydrochloric acid as solvent.

B.3 Apparatus

A spectrophotometer or photoelectric colorimeter, capable of measuring optical density at a wavelength of 227 nm.

B.4 Procedure

B.4.1 Transfer 25 g of decarbonated sample into a small separating funnel.

B.4.2 Make distinctly alkaline with ammonia solution and chloroform.

B.4.3 Wash each extract with the same 10 ml of water contained in a second separating funnel, and finally with the extract once with 10 ml of chloroform.

B.4.4 Filter into a small flask

B.4.5 Evaporate or distil the combined extracts and dry the residue in molar hydrochloric acid and make up to volume in a 50-ml volumetric flask with the same acid.

B.4.6 Prepare a series of standards and read the absorption at 272 nm using approximately molar hydrochloric acid for setting the instrument.

B.4.7 Set the instrument by means of a blank prepared from water treated in exactly the same manner with the test solution and read absorption of the test solution.

B.5 Expression of results

Plot a graph of concentrations of standard caffeine solutions against their absorbance. From this graph determine the concentration of the alkaloid (caffeine) in the original sample. Report the results as mg/l of anhydrous caffeine in the original sample.

Annex C
(normative)

Determination of measuring gas volume (Volume of carbonation)

C.1 Apparatus

The apparatus consists of pressure gauge having a hallow spike with holes in this side. The bottle is inserted from the side into the slot provided in the neck of carbon dioxide tester and is secured in place by tightening with a threaded system. The pressure gauge is inserted until the needle point touches the crown cork. There is a shiff valve on the gauge stem which is kept closed until the needle point of the pressure gauge is force through the crown cork. The reading on the gauge is noted.

C.2 Procedure

Clamp the bottle in the frame of the gas volume tested. Pierce the crown cork but do not shake the bottle. Sniff off the top gas quickly until the reading drops to zero. Make certain to close the valve the instant the needle touches zero in the pressure gauge. Shake the bottle vigorously until the gauge gives a reading that additional shaking does not change. Record the pressure. Note the temperature and record it.

Annex D
(normative)

Sampling methods for carbonated soft drinks

D.1 D.1 Scale of sampling

D.1.1 Lot all bottles in a consignment belonging to the same batch of manufacture shall constitute a lot. If the consignment is declared to consist of different batches of manufacture, bottles of the same batch shall be grouped together and each group so formed shall constitute a separate lot. Sample shall be tested from each lot for ascertaining conformity to the requirements of the standard.

D.1.2 The number of bottles to be selected from a lot for testing for microbiological and other requirements shall depend on the size of the lot and shall be in accordance with Table D.1.

Table D.1 — Number of bottles to be selected for sampling

No. of bottles in the lot (L)	No. of bottles to be selected	
	Microbiological testing	Other tests
L ≤ 1 300	12	18
1 300 < L ≤ 3 200	18	24
L > 3 200	24	30

D.1.3 The bottle to be selected for testing shall be chosen at random from the lot by the following procedure. Starting from any bottle, count them as 1, 2, 3... up to r. Every rth bottle thus counted shall be withdrawn r being the integral part of N/n, where N is the total number of bottles in the lot and n is the total number of bottle to be chosen.

D.2 Test samples and reference samples

D.2.1 Samples for microbiological tests

The sample bottle selected for microbiological tests (see Table D.1) shall be divided at random into three equal sets and labeled with all particulars of sampling. One of these sets of sample bottles shall be for the purchaser, another for the vendor and the third set is the reference.

D.2.2 Samples for other tests

The sample bottles selected for other tests (see Table D.1) shall be divided at random into three equal sets and labeled with all the particulars of sampling. One of these sets of sample bottles shall be for the purchaser, another for the vendor and third is the reference.

Bibliography

[1] RS 14: 2018, Carbonated soft drinks—Specification (Second edition)

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