

UGANDA STANDARD

Second Edition
2008-09-08

Packaged water other than natural mineral water — Specification



Reference number
US 42: 2008

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Foreword

Uganda National Bureau of Standards (UNBS) is a parastatal under the Ministry of Tourism, Trade and Industry established under Cap 327, of the Laws of Uganda. UNBS is mandated to co-ordinate the elaboration of standards and is

- (a) a member of International Organisation for Standardisation (ISO) and
- (b) a contact point for the WHO/FAO Codex Alimentarius Commission on Food Standards, and
- (c) the National Enquiry Point on TBT/SPS Agreements of the World Trade Organisation (WTO).

The work of preparing Uganda Standards is carried out through Technical Committees. A Technical Committee is established to deliberate on standards in a given field or area and consists of representatives of consumers, traders, academicians, manufacturers, government and other stakeholders.

Draft Uganda Standards adopted by the Technical Committee are widely circulated to stakeholders and the general public for comments. The committee reviews the comments before recommending the draft standards for approval and declaration as Uganda Standards by the National Standards Council.

The competent authority mentioned in 4.1 is the Directorate of Water Development (DWD).

This standards US 42 was first declared a national standard in 1999. It is now being technically revised.

This standard has been prepared to guide manufacturers, importers and consumers on the quality requirements for packaged waters other than natural mineral waters.

Committee membership¹

The following organisations were represented on the Technical Committee TC 2 on Agricultural and Food Products during the preparation of this standard:

- Britania Foods (U) Ltd.
- Dairy Corporation
- Department of Food science and Technology Makerere University
- Department of Paediatrics and Child Health Makerere University
- Directorate of Water Development
- Food Science and Research Institute/National Agriculture Research Organisation (NARO)
- Government Chemist
- Ministry of Tourism, Trade and Industry
- NC Beverages Ltd.
- National Water and Sewerage Corporation
- Rwenzori Beverages
- Seven Falls Mineral Water
- UMA Industries Ltd.
- Uganda Consumer Protection Association
- Uganda Klere Industries

¹ Includes members who were responsible for the development of the first edition of 1999

Packaged water other than natural mineral water — Specification

1 Scope

This Uganda Standard specifies requirements for packaged water offered as non-carbonated (still) water or as carbonated (sparkling) water, with or without added minerals or other permitted additives.

This standard does not apply to non packaged drinking water, natural mineral waters or other soft drinks for which other standards apply.

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.

US 7, *General standards for the labelling of pre-packaged foods*

US 28, *Code of practice for hygiene in the food and drink manufacturing industries*

US 43, *Packaged natural mineral waters — Specification*

US 45, *General standard for food additives*

US 201, *Drinking (potable) water — Specification*

US 500, *General requirements for nutrition labelling*

US 508, *General requirements for nutrition and health claims*

US 566, *Use of nutrition terms — Requirements*

US ISO 6222, *Water quality — Enumeration of culturable micro-organisms — Colony count by inoculation in a nutrient agar culture medium*

US/ISO 6332, *Water quality - Determination of iron - Spectrometric method using 1,10-phenanthroline*

US ISO 6058, *Water quality — Determination of calcium content — EDTA titrimetric method*

US ISO 6059, *Water quality — Determination of the sum of calcium and magnesium — EDTA titrimetric method*

US ISO 7027, *Water quality — Determination of turbidity*

US ISO 7393-1, *Water quality — Determination of free chlorine and total chlorine — Part 1: Titrimetric method using N,N-diethyl-1,4-phenylenediamine*

US ISO 7887, *Water quality — Examination and determination of colour*

US ISO 7888, *Water quality — Determination of electrical conductivity*

US ISO 7980, *Water quality — Determination of calcium and magnesium — Atomic absorption spectrometric method*

US ISO 8288, *Water quality — Determination of cobalt, nickel, copper, zinc, cadmium and lead — Flame atomic absorption spectrometric methods*

US ISO 9308-2, *Water quality — Detection and enumeration of coliform organisms, thermotolerant coliform organisms and presumptive Escherichia coli — Part 2: Multiple tube (most probable number) method*

US ISO 9964-1, *Water quality — Determination of sodium and potassium — Part 1: Determination of sodium by atomic absorption spectrometry*

US ISO 10359-2, *Water quality — Determination of fluoride — Part 2: Determination of inorganically bound total fluoride after digestion and distillation*

US ISO 10523, *Water quality — Determination of pH*

3 Terms and definitions

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

3.1 batch
quantity of packaged water that is processed during a specified period of production in a single packaging plant

3.2 package
container that is made of glass, plastics material, tin plate or other suitable food grade material, and that (in each case) is capable of being sealed with a closure

3.3 lot
quantity of packaged water of the same type belonging to the same batch of manufacture or packaged during the same production period

3.4 carbonated/sparkling/fizzling water
water that, after possible treatment, is effervescent due to the presence of carbon dioxide

3.5 flavoured water
water that has had flavouring added to the water to give a particular taste

3.6 non-carbonated/still water
water that does not contain free carbon dioxide or other gases in excess of the amount necessary to keep dissolved the hydrogen bicarbonate salts that are present in the water

3.7**packaged water**

water that is filled into sealed containers

3.8**artesian/artesian well water**

water from a well tapping in a confined aquifer in which the water level stands at some height above the top of the aquifer

3.9**glacial water**

water which is derived from a source originating from and collected within a watershed containing a glacier, and is not derived from a public water system

3.10**spring water**

water derived from an underground formation from which water flows naturally to the surface of the earth

3.11**well water**

water from a hole bored, drilled, or otherwise constructed in the ground which taps the water of an aquifer

3.12**purified/demineralized water**

water which has been processed by distillation, deionization, reverse osmosis, or other suitable process, and contains no added substance

3.13**reverse osmosis water**

water that has been processed by reverse osmosis

3.14**deionized water**

water that has been processed by deionization

3.15**sterile/sterilized water**

water that has been processed to meet the "Test for sterility"

3.16**distilled water**

water that has been processed by distillation

3.17**mineral water**

water that has minerals

3.18**approved water supply**

source of water that has been inspected and approved by the competent authority for the intended purpose

3.19**water distribution system**

public or private water systems providing consumer with tap water suitable for direct consumption

**3.20
establishment**

building(s) area(s), or surroundings, in which water intended for bottling is collected, processed, or bottled

4 Requirements for the untreated water and water sources used as the base for the product

4.1 Approval of the source

Water supply derived from a source other than a water distribution system shall be approved by a competent authority basing upon a field inspection of the source and the recharge zone to demonstrate the integrity of the source and safety of the catchment operations consistent with the requirements of this standard.

4.2 Water used as the base for the product

The water that is used as the base for the product shall conform to the organoleptic, physical, chemical and biological requirements specified in US 201.

The untreated water to be used in the final product shall be tested for the constituents and parameters in US 201.

The manufacturer shall determine the appropriate water treatment required (if any) to achieve the required limits.

Where the untreated water is received from a source of potable water (for example, from a municipal supply), the manufacturer may not perform the tests provided the manufacturer is satisfied that its source can consistently deliver potable water.

5 Handling and treatment of water

5.1 Water collection

5.1.1 Collection of ground waters

The conditions in which ground waters such as Artesian, spring and well water are collected shall not expose the water to direct influence of the surface water or modify the physical properties, composition or quality of the water prior to the treatments.

5.1.2 Collection of Artesian water

Artesian water may be collected with the assistance of external force to enhance the natural underground pressure as long as such measures do not alter the physical properties, composition and quality of water.

5.1.3 Collection of glacial water

Glacial water shall be collected in such a way that it contains an amount of total dissolved solids, which does not significantly differ from that of the glacier.

5.1.4 Collection of spring water

Spring water shall be collected only at the spring or through a borehole tapping the underground formation feeding the spring. The location of the spring shall be identifiable and a natural force shall cause the water to flow to the surface.

If spring water is collected with the use of an external force, the spring water collected shall be from the same underground stratum as the spring as shown by a measurable hydraulic connection using a hydro geologically valid method between the borehole and the natural spring, and shall have all the physical properties, before treatment, and be of the same composition and quality, as the water that flows naturally to the surface of the earth.

If spring water is collected with the use of an external force, water in the spring shall continue to flow naturally to the surface of the earth through the spring's natural orifice.

Spring water packers shall demonstrate, on request, to the competent authority, using a hydro geologically valid method that an appropriate hydraulic connection exists between the natural orifice of the spring and the borehole.

5.2 Transportation of waters

Transportation of water from extraction or collection points to packaging facilities shall be conducted in a way that does not have any significant adverse effect on the safety and the characteristic composition of the transported water.

To avoid microbial and chemical contamination, water ready for packaging shall be transported, stored or packaged in such a way that the safety and quality of the water shall not be affected.

5.3 Water treatment

5.3.1 Treatments for the waters defined by origin

5.3.1.1 General

Waters defined by origin shall not, prior to packaging, be modified or subjected to treatments other than those described in 5.3.2 with the provision that these modifications or treatments and the processes used to achieve them do not change the essential physicochemical characteristics nor compromise the chemical, radiological and microbiological safety of these waters when packaged.

5.3.1.2 Types of treatment

The following treatments may be used to modify the original composition of water defined by origin:

- a) reduction and/or elimination of dissolved gases (and resulting possible change in pH);
- b) addition of carbon dioxide (and resulting change in pH) or re-incorporation of the original carbon dioxide present at emergence;
- c) reduction and/or elimination of unstable constituents such as iron, manganese, sulfur compounds and carbonates in excess, under normal conditions of temperature and pressure, of the calco-carbonate equilibrium;
- d) addition of air, oxygen or ozone on condition that the concentration of by-products resulting from the ozone treatment conforms to the requirements of this standard;

- e) decrease and/or increase in temperature; and
- f) reduction and/or separation of elements originally present in excess of the requirements of this standard.

Antimicrobial treatments may be used singly or in combination solely in order to conserve the original microbiological fitness for human consumption, original purity and safety of waters defined by origin.

5.3.3 Treatments for prepared waters

5.3.3.1 General

Prepared waters may be subjected to any microbial treatments and any treatments that, singly or in combination, modify the physical and chemical characteristics of the original water provided that such treatments result in prepared waters that conform to the requirements of this standard.

5.3.3.2 Addition of minerals and other additives

Minerals and other additives may be added to prepared water before packaging in accordance with US 45.

6 Essential composition and quality of the finished product

6.1 Freedom from defects

The product shall conform to the test for turbidity (US 201) under normal conditions of storage. The product shall be free from dust, fibre particles, surface film or scum, sediment, suspended matter or other foreign matter.

6.2 Sensory attributes

The product shall have a well-balanced, pleasant, characteristic palatable flavour. Off-flavours and off-odours shall not be present. The flavour of the product shall be in accordance with any claim made or implied.

6.3 Physical and chemical characteristics

The colour of packaged water shall not exceed 15 true colour units.

The product shall be tested for the parameters given in Table 1. The product shall conform to the physical and chemical parameter limits indicated in Table 1 with the exclusion of the requirements for pH value in the case of a carbonated product.

Packaged water may contain safe and suitable anti-microbial agents. Fluoride may be added within the limitations indicated in Table 1.

Table 1 — Requirements for factors affecting organoleptic and physical characteristics

Characteristic	Requirement levels, maximum and range	Method of test
Colour (apparent)	15 true colour units (TCU)	US ISO 7887
Taste	Acceptable to consumers and no abnormal changes	-
Odour	Acceptable to consumers and no abnormal changes	Annex B
Electrical conductivity	1500 μ S/cm	US ISO 7888
pH at 25 °C	Non carbonated 6.5 to 8.5 Carbonated not applicable	US ISO 10523
Turbidity	1 Nephelometric Turbidity Units	US ISO 7027
Total dissolved solids (TDS)	1 000	Annex B
Sodium as Na, mg/L, max.	200	US ISO 9964-1
Potassium as K, mg/L, max.	50	US ISO 9964-1
Copper (as Cu), mg/L, max.	1.0	US ISO 8288
Iron (as Fe), mg/L, max.	0.3	US ISO 6332
Calcium as Ca, mg/L, max.	75	US ISO 6058 US ISO 7980
Magnesium as Mg, mg/L, max.	30	US ISO 6059 US ISO 7980
Sulphate, mg/L, max.	300	US ISO 9280
Chloride as Cl ⁻ mg/L, max.	250	US ISO 7393-1
Fluoride, mg/L, max.	1.5	US ISO 10359-2

6.4 Carbonation (and the addition of other gases)

If carbonated, the packaged water shall be carbonated in accordance with the claimed product type stipulated on the label. Carbon dioxide and other gases shall be of acceptable food grade.

6.5 Net volume of the product

The net volume of the product shall comply with the Weights and measures Act.

6.6 Microbiological requirements

The product shall conform to the microbiological requirements in Table 2.

Table 2 – Microbiological requirements for packaged water

Microorganism	Requirement ^{a)}	Method of test
Total viable count ^{b)} , cfu/mL	100	US/ISO 6222
Total coliform bacteria count ^{c)} , cfu/100 mL	Not detected	US/ISO 9308-2
<i>E. coli</i> count ^{c)} cfu/100 mL	Not detected	
^{a)} Microbiological tests shall be carried out within 24 h of sampling, the samples having been kept at 4 °C ± 3 °C for the period prior to testing. ^{b)} The total viable colony count shall be determined within 24 h of filling or of packaging. ^{c)} In most instances it will not be necessary to conduct both these tests; one or the other will normally suffice as the required indicator.		

7 Water safety plans

7.1 Drinking-water systems operators shall develop, implement and maintain a water safety plan taking into consideration the potential risks to the safety of the water from the supply catchments to the consumer.

7.2 A water safety plan shall consist of three key components:

- a) system assessment to determine whether the drinking-water supply chain (up to the point of consumption) as a whole can deliver water of a quality that meets health-based targets;
- b) identifying control measures in a drinking-water system that will collectively control identified risks and ensure that the health-based targets are met; and
- c) management plans describing actions to be taken during normal operation or incident conditions and documenting the system assessment (including upgrade and improvement), monitoring and communication plans and supporting programmes.

7.3 A water safety plan shall include the following:

- a) measures to protect the source of drinking from risks of pollution; as minimum the measures indicated in Annex A shall be implemented.
- b) measures to ensure all installations intended for the production of drinking water exclude any possibility of contamination. For this purpose and in particular:
 - the installation for collection, the pipes and the reservoirs shall be made from materials suited to the water and in such a way as to prevent the introduction of foreign substances in water; and
 - the equipment and its use for production, especially installation for washing and packaging, shall meet hygienic requirements;
- c) measures to ensure an appropriate treatment such as pretreatment coagulation, flocculation, sedimentation, filtration and disinfection are undertaken to assure the safety of water for the consumers;
- d) appropriate operational monitoring system including monitoring parameters that can be measured and for which limits have been set to define the operational effectiveness of the activity; frequency of

monitoring and procedures for corrective action that can be implemented in response to deviation from limits. If, during production it is found that the water is polluted, the producer shall stop all operations until the cause of pollution is eliminated; and

- e) a verification plan to ensure that individual components of a drinking-water system, and system as a whole is operating safely.

8 Packaging

The product shall be packaged in sealed retail containers suitable for preventing the possible adulteration or contamination of water.

The quantity of packaged drinking water stored at the point of bottling shall be as low as possible. The storing shall furthermore guarantee protection against contamination or deterioration.

The containers shall not contaminate or adulterate the product. In addition, the containers shall not impart foreign flavours or foreign odours to the product. The containers shall be delivered to the filling plant in sealed packaging.

At the time of filling, all containers shall be clean and sound. Bottles shall be free from chips, cracks and other defects. Metal containers shall be free from corrosion and internal scratches and other lacquer imperfections. Closures shall be clean at the time of capping or sealing. Crown caps shall be fitted internally with a solid cork or composition cork disc or with an acceptable plastics disc.

Containers to be used for the product shall not be used to store ingredients, raw materials or other products or preparations, and such containers shall not be used by workers for drinking purposes.

All containers shall be sealed immediately after they have been filled.

Unfilled and filled containers shall be inspected on a continuous basis, either by means of electronic equipment maintained in perfect working order, or by means of appropriately trained and supervised personnel.

9 Labelling

9.1 General

The requirements of US 7, US 500, US 508 and US 566 shall apply in addition to the provisions in 9.2 and 9.3.

9.2 The name of the product

The name of the product shall conform to the appropriate terms and definitions in Clause 3.

Water containing carbon dioxide that emerges from the source and is packaged directly with its entrapped gas or from which the gas is mechanically separated and later reintroduced at a level not higher than naturally occurring in the water, may bear on its label the words "Naturally carbonated" or "Naturally sparkling".

Packaged water which contains carbon dioxide at levels higher than those naturally occurring in the source of the product shall be labelled with the words "Carbonated", "Carbonation added", or "Sparkling".

9.3 Additional labelling requirements

9.3.1 Mineral content

If the content of total dissolved substances of the water is below 500 mg/L, the statement "Low mineral content", or a similar term may appear on the principal display panel following the statement of identity.

If the content of total dissolved substances of the water is greater than 1500 mg/L, the statement "High mineral content", or a similar term may appear on the principal display panel following the statement of identity.

The composition of the product may be declared on the label. If labelling indicates the amount of specific minerals present in the product, the label shall describe the amount in mg/L.

9.3.2 Additives

Any additives such as flavour, used in the water shall be declared on the label as list of ingredients.

9.3.3 Fluoride content

Packaged water containing added fluoride shall be labelled "Fluoridated water". Any water that is called fluoridated water shall contain not less than 0.8 mg/L fluoride ion. The product shall not contain more than 1.5 mg/L of fluoride.

9.3.4 Geographic location

The geographic location may be indicated on the label for artesian, spring or well water.

9.3.5 Water from water distribution system

When drinking water is supplied by a public or private tap water distribution system, the wording "From a public or private distribution system" shall appear along with the name of the product on the front of the main label.

9.4 Labelling prohibitions

No claims concerning medicinal (preventive, alleviative or curative) or other beneficial effects relating to the health of the consumer shall be made in respect of the compositional properties of the product covered by the standard.

The way in which labels on the packaged water are presented shall not cause confusion with other categories of water, particularly natural mineral water, as defined in US 43.

The use of any statement or of any pictorial device which may create confusion in the mind of the public or in any way mislead the public about the nature, origin, composition and properties of packaged drinking water put on sale is prohibited.

9.5 Optional labelling

The following terms, descriptive of the particular properties of the product, may appear on the label as part of, or in close proximity to, the name of the product or in an otherwise prominent position, provided that conditions specified are adhered to:

- "Alkaline", where the product contains more than 600 mg/L CHO_3^- ;

- "Acidulous", where the product contains more than 250 mg/L free carbon dioxide;
- "Saline", where the product contains more than 1000 mg/L NaCl;
- "Contains Fluorine", where the product contains more than 1 mg/L F;
- "Contains Iodine", where the product contains more than 1 mg/L I; and
- "May be Diuretic", where the product contains more than 1 000 mg/L total dissolved solids or 600 mg/L HCO₃

Nutritional or health claims shall conform to US 508.

The following are also examples of optional labelling:

- trade name;
- date of the authorisation to commence collection and production; and
- results of analysis of the water whether it emerges at the source, including a statement of any treatment, or of the results of analysis of the water in the container.

10 Sampling

10.1 General requirements

In drawing, preparing, storing and handling samples, the following precautions and directions shall be observed as much as possible:

- the sample shall be drawn in original sealed bottle/container and kept in a protected place not exposed to damp air, dust or soot; and
- each bottle/container in original shall be sealed and marked with full details of sampling.

10.2 Scale of sampling

10.2.1 For ascertaining the conformity of the material to the requirements of the specification, samples shall be tested from each lot separately.

10.2.2 The number of bottles to be selected from a lot shall depend on the size of the lot and shall be according to Table 3.

Table 3 — Sampling plan for containers/bottles

No. of containers (bottles) in the lot	Sample size
Up to 5000	3
5001 to 10000	5
10001 to 15000	7
15001 and above	9

11 Methods of test

11.1 General

In addition to the test methods given in Table 1, Table 2 and the methods prescribed in Annex B, any method that can offer the required accuracy, at the limit prescribed in the standard may be used.

When the determinant is a metal, the method used shall determine the total metal present.

11.2 Expression of results

In view of the importance of uniformity in the methods of expressing the results of physical, chemical and bacteriological examination of water, it is recommended that the results should be expressed as described below.

- a) The results of chemical analysis, in general, should be expressed in milligrammes per litre, since this method of expression is well-known and widely used, except for organic constituents of health interest which are expressed as microgrammes per litre. Furthermore, the units as given in the relevant tables or clauses shall be used in expressing the results of test for other parameters.
- b) Wherever possible, chemical components should be expressed in terms of ions; volumes should be expressed in millilitres (mL), and temperature should be measured in degrees Celsius ($^{\circ}\text{C}$). In bacteriological examinations, the total number of microorganisms developing on solid media should be expressed as colonies counted per 100 mL of water, the medium, the duration and the temperature of incubation being stated. Estimates of the number of coliform organisms, faecal coliforms, and other organisms indicative of pollution should be given in terms of most probable number (MPN) per 100 mL, when counted by a multiple-tube method, or as colonies per examination, radioactivity should be expressed in picocuries per litre (pCi/L or Bq/L).

Annex A

(normative)

Protection of alimentary reservoirs and aquifers for packaged water

A.1 Authorisation

Any spring, well or drilling intended for the collection of packaged drinking water, shall be approved by the Directorate of Water Development.

A.2 Determination of the genesis of packaged drinking water

As far as it is methodologically possible in each case, a precise analysis shall be carried out on the origin of bottled/packageged drinking water, the period of its residence in the ground before being collected and its chemical and physical qualities.

A.3 Perimeter of protection

If possible areas wherein packaged drinking water be polluted or its chemical and physical qualities otherwise deteriorated shall be determined by a hydrologist. Where indicated by hydro-geological conditions and considering the risks of pollution and physical, chemical and biochemical reactions, several perimeters with separate dimensions may be provided for.

A.4 Protective measures

All possible precautions shall be taken within the protected perimeters to avoid any pollution, of or external influence on, the chemical and physical qualities of packaged drinking water.

Annex B (normative)

Recommended test methods

B.1 General

The test methods listed in Tables 1 - 7 are recommended

B.2 ASTM standard test methods

All the determinants for which the requirements are listed in Tables 1-7 may be evaluated with the required accuracy, using ASTM test methods (see bibliography).

B.3 APHA-AWWA-WPCF test methods

All the determinants for which the requirements are listed in Tables 1 - 7 may be evaluated with the required accuracy, using the test methods given in the latest edition of *Standard methods for the examination of water and wastewater* (see bibliography).

Bibliography

- [1] Annual book of ASTM standards 2003 – Section 11: *Water and Environmental Technology* – Volume 11.01: *Water* (I).
- [2] Annual book of ASTM standards 2003 – Section 11: *Water and Environmental Technology* – Volume 11.02: *Water* (II).
- [3] *Standards methods for the examination of water and wastewater*. 17th Ed., 1989, Washington, DC: American Public Health Association (APHA), American Water Works Association (AWWA), Water Pollution Control Federation (WPCF).
- [4] *Guidelines for Drinking-water Quality* [electronic resource]: incorporating first addendum. Vol. 1, Recommendations. – 3rd ed., 2006, World Health Organization
- [5] SANS 241:2001, *Drinking Water – Specification*. South African Bureau of Standard

Certification marking

Products that conform to Uganda standards may be marked with Uganda National Bureau of Standards (UNBS) Certification Mark shown in the figure below.

The use of the UNBS Certification Mark is governed by the Standards Act, and the Regulations made thereunder. This mark can be used only by those licensed under the certification mark scheme operated by the Uganda National Bureau of Standards and in conjunction with the relevant Uganda Standard. The presence of this mark on a product or in relation to a product is an assurance that the goods comply with the requirements of that standard under a system of supervision, control and testing in accordance with the certification mark scheme of the Uganda National Bureau of Standards. UNBS marked products are continually checked by UNBS for conformity to that standard.

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