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## Packaged natural mineral waters — Specification

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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.

### Committee membership<sup>1</sup>

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

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<sup>1</sup> Includes members who were responsible for the development of the first edition of 1999

# Packaged natural mineral waters — Specification

## 1 Scope

This Uganda Standard specifies the requirements and methods of test for packaged natural mineral waters offered for human consumption. This standard applies to natural mineral water packaged in plastic bottles, glass bottles, poly bags and other acceptable packaging material.

## 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 labelling of pre-packaged foods*

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

US 45, *General standards for food additives*

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

US ISO 5664, *Water quality — Determination of ammonium — Distillation and titration method*

US ISO 5666, *Water quality — Determination of mercury*

US ISO 5667-1, *Water quality — Sampling — Part 1: Guidance on the design of sampling programmes*

US ISO 5667-2, *Water quality — Sampling — Part 2: Guidance on sampling techniques*

US ISO 5667-3, *Water quality — Sampling — Part 3: Guidance on preservation and handling of water samples*

US ISO 5667-5, *Water quality — Sampling — Part 5: Guidance on sampling of drinking water from treatment works and piped distribution systems*

US ISO 5667-11, *Water quality — Sampling — Part 11: Guidance on sampling of groundwaters*

US ISO 5961, *Water quality - Determination of cadmium by atomic absorption spectrometry*

US ISO 6333, *Water quality — Determination of manganese — Formaldoxime spectrometric method*

US ISO 6703-1, *Water quality — Determination of cyanide — Part 1: Determination of total cyanide*

US ISO 7393-1-1, *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 7890-3, *Water quality — Determination of nitrate — Part 3: Spectrometric method using sulfosalicylic acid*

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

US ISO 9174, *Water quality — Determination of chromium — 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 9965, *Water quality — Determination of selenium — Atomic absorption spectrometric method (hydride technique)*

US ISO 9390, *Water quality — Determination of borate — Spectrometric method using azomethine-H*

US ISO 10304-1, *Water quality — Determination of dissolved fluoride, chloride, nitrite, orthophosphate, bromide, nitrate and sulfate ions, using liquid chromatography of ions — Part 1: Method for water with low contamination*

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*

US ISO 11885, *Water quality — Determination of 33 elements by inductively coupled plasma atomic emission spectroscopy*

US ISO 11969, *Water quality — Determination of arsenic — Atomic absorption spectrometric method (hydride technique)*

US ISO 6461-2, *Water quality — Detection and enumeration of the spores of sulfite-reducing anaerobes (clostridia) — Part 2: Method by membrane filtration*

US ISO 16266, *Water quality — Detection and enumeration of Pseudomonas aeruginosa — Method by membrane filtration*

### **3 Terms and definitions**

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

#### **3.1**

##### **packaged natural mineral water (containerized natural mineral water)**

natural mineral water that has been packaged sealed and is intended for human consumption.

#### **3.2**

##### **natural mineral water**

water that with regard to the source:

- a) is characterized by its content of certain mineral salts and their relative proportions and the presence of trace elements or other constituents;
- b) is obtained directly from natural or drilled sources from underground water-bearing strata for which 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 natural mineral water ;
- c) has constancy of composition and stability of its discharge and its temperature, taking into account cycles of minor natural fluctuations;

- d) is collected under conditions, which guarantee its original bacteriological purity and chemical composition of essential components;
- e) is not subjected to any treatment; other than physical treatment described in 4.2.2; and
- f) is packaged close to the point of emergence or source with particular hygienic precautions.

### **3.3**

#### **source of natural mineral water**

point at which natural mineral water is tapped

### **3.4**

#### **container**

any bottle, carton, can or other container to be filled with natural mineral water, properly labelled and intended for sale

### **3.5**

#### **adequate**

sufficient to accomplish the intended purpose of this standard

### **3.6**

#### **cleaning**

removal of soil, food residues, dirt, grease or other objectionable matter

### **3.7**

#### **contamination**

occurrence of any objectionable matter in the product

### **3.8**

#### **disinfection**

reduction, without adversely affecting the natural mineral water, by means of hygienically satisfactory chemical agents and/or physical methods, of the number of microorganisms to a level that will not lead to harmful contamination of natural mineral water

### **3.9**

#### **establishment**

any building(s) or areas in which natural mineral water is handled and collected and the surroundings under the control of the same management

### **3.10**

#### **handling of natural mineral water**

any manipulation with regard to collecting, treating, bottling, packaging, storing, transport, distribution and sale of natural mineral water

### **3.11**

#### **food hygiene**

all measures necessary to ensure the safety, soundness and wholesomeness of natural mineral water at all stages from its exploitation and processing until its final consumption

### **3.12**

#### **packaging material**

any containers such as cans, bottles, cartons, boxes, cases or wrapping and covering material such as foil, film, metal paper and wax paper

### **3.13**

#### **pests**

animals capable of directly or indirectly contaminating natural mineral water

**3.14  
aquifers**

solid permeable mass of rocks (layer) containing natural mineral water

**3.15  
spring**

natural mineral water discharging genuinely from the ground

**3.16  
naturally carbonated natural mineral water**

natural mineral water, which is naturally carbonated from source

**3.17  
non-carbonated natural mineral water**

mineral water, which by nature; and after possible treatment and packaging, does not contain free carbon dioxide in excess of the amount necessary to keep the hydrogen carbonate salts present in the water dissolved

**3.18  
decarbonated natural mineral water**

mineral water, which after possible treatment and packaging has less carbon dioxide than at emergence

**3.19  
competent authority**

official authority charged by the government with the control of water hygiene, including setting and enforcing regulatory water hygiene and quality requirements

## **4 General requirements**

### **4.1 Authorization**

Natural mineral water shall be only that which is recognized and authorized as such by the competent authority from the place in which the natural mineral water has emerged.

### **4.2 Treatment of the natural mineral water**

**4.2.1** Natural mineral water shall not be subjected to any treatment other than physical treatment described in this standard.

**4.2.2** Natural mineral water may be treated to separate unsuitable constituents such as compounds containing iron, manganese, sulfur or arsenic, by decantation and/or filtration, if necessary, accelerated by previous aeration including the use of ozone-enriched air provided that such treatment does not have disinfectant action or generate the formation of treatment residues that may have harmful effect on public health.

**4.2.3** Natural mineral water shall not be treated by use of chemical substances and ionizing radiation except the use of UV radiation.

**4.2.4** The treatment referred to under 4.2.1 - 4.2.3 above may only be carried out on condition that the mineral content of the water is not modified in its essential constituents, which give the water its properties.

**4.2.5** Natural mineral waters shall not be transported in bulk containers for packaging or for any other process before packaging.



## 5 Composition and quality requirements

### 5.1 Physical characteristics

5.1.1 Natural mineral water shall not have offensive taste or odour and shall be free of any foreign matter.

5.1.2 The colour of natural mineral water shall not exceed 15 true colour units.

5.1.3 Turbidity of natural mineral water shall not exceed 5 nephelometric turbidity units (NTU).

5.1.4 Natural mineral water shall not have any sediment or suspended matter during its shelf life.

### 5.2 Chemical composition

#### 5.2.1 Health related limits for certain substances

Natural mineral water shall contain not more than the amounts of the substances indicated in Table 1.

**Table 1 — Requirements for limits of inorganic contaminants in mineral water**

Substance	Limit (mg/L)	Methods of test
Ammonia as NH <sub>3</sub> , max.	0.5	US ISO 5664
Antimony, max	0.005	US ISO 11885
Arsenic as As, max.	0.01	US ISO 11969
Barium as Ba <sup>++</sup> , max.	0.7	US ISO 11885
Borate as B, max.	5	US ISO 11885
Cadmium as Cd, max.	0.003	US ISO 5961
Chromium as Cr, max.	0.05	US ISO 9174
Copper as Cu <sup>++</sup> , max.	1.0	US ISO 8288
Cyanide as Cn <sup>-</sup> , max	0.01	US ISO 6703-1
Free Chlorine as Cl <sub>2</sub> , max.	Not detected	US ISO 7393
Lead as Pb, max.	0.01	US ISO 8288
Manganese as Mn <sup>++</sup> , max.	0.5	US ISO 6333
Mercury as Hg, max.	0.001	US ISO 5666
Fluoride as F <sup>-</sup> , max	5.0	US ISO 10359-2
Nitrate as NO <sub>3</sub> <sup>-</sup>	50	US ISO 7890-3
Nitrite as NO <sub>2</sub> <sup>-</sup> , max.	0.02	US ISO 10304-1
Selenium as Se, max.	0.01	US ISO 9965
Nickel as Ni, max.	0.02	US ISO 8288

NOTE There has been increasing recognition that fluoride causes large scale health effects through drinking-water exposure. Exposure to high levels of fluoride, which occurs naturally, can lead to mottling of teeth and, in severe cases, crippling skeletal fluorosis. Contribution from drinking-water to overall intake of fluoride is an important factor in preventing dental caries. Even with very low fluoride content there is a moderate to high risk of dental caries. The most important source of fluoride in drinking water is naturally occurring. In treated water where technology is used to reduce the level of fluoride a level of 1.5 mg/l is set. In natural mineral water where technology may not be deployed to remove fluoride adequate labelling is essential.

**5.2.2 Organic contaminants**

Natural mineral water shall conform to the requirements for organic contaminants indicated in Table 2.

**Table 2 — Requirements for limits of organic contaminants in mineral water**

Substance	Limit
Benzene, max.	0.005 mg/L
Chlorinated hydrocarbons, max.	0.005 mg/L
Dioxin, max	Not detectable
Mineral oil, max	Not detectable
Organic matter, max.	10 mg/L (as O <sub>2</sub> )
Pesticides and PCBs, max	Not detectable
Phenols, max	Not detectable
Polycyclic aromatic hydrocarbons, max.	0.2 µg/L
Polynuclear aromatic hydrocarbons, max.	Not detectable
Surfactants (reacting with methylene blue), max.	0.2 mg/L
Total trihalomethanes, max.	0.1 mg/L

**5.2.3 Radioactive matter**

Natural mineral water shall conform to the requirements of radioactive matter indicated in Table 3.

**Table 3 — Requirements of radioactive matter in natural mineral water**

Substance	Limit, Bq/L
Total Beta activity (except K <sup>40</sup> and H <sup>3</sup> ), max <sup>*</sup>	1
Total Alpha activity, max.	0.5
The contribution of potassium-40 to beta activity shall be calculated using beta activity of 27.6 Bq/g of stable potassium and subtracted from total beta activity. If beta activity levels are higher than 1 Bq/LI after adjusting for potassium-40 beta activity due to tritium shall be determined and shall not exceed 100 Bq/L..	

**6 Water safety plans**

**6.1** Natural mineral 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 source to the consumer.

**6.2** A water safety plan shall consist of three key components:

- a) system assessment to determine whether the natural mineral 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 natural mineral 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.

**6.3** A water safety plan shall include:

- a) measures to protect the source of natural mineral water from risks of pollution
- b) measures to ensure all installations intended for the production of natural mineral water exclude any possibility of contamination. For this purpose and in particular:
  - i) 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;
  - ii) the equipment and its use for production, especially installation for washing and packaging, shall meet hygienic requirements;
- c) 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.
- d) a verification plan to ensure that individual components of the natural mineral water system, and system as a whole is operating safely.
- e) the observance of the above provisions shall be subject to the periodic checks in accordance with national requirements

**6.4** During marketing, natural mineral water shall be of such quality that it will not present a risk to the health of the consumer. Natural mineral water shall conform to the microbiological requirements given in Table 5 below.

**Table 5 — Microbiological requirements for natural mineral water**

Micro-organisms	Limit	Methods of test
Total viable count <sup>a</sup> per mL, at 20 °C -22 °C for 72 h on agar-agar or agar-gelatine mixture, max	100	US ISO 6222
Total coliform bacteria in 250 mL	Shall be absent	US ISO 9308-2
<i>Escherichia coli</i> in 250 mL	Shall be absent	
Spore-forming sulphite reducing anaerobes in 250 mL	Shall be absent	US ISO 6461-2
<i>Pseudomonas aeruginosa</i> , fluorescence in 250 mL	Shall be absent	US ISO 16266
<i>Streptococcus faecalis</i> in 250 mL	Shall be absent	US ISO 7899-2
<sup>a</sup> The sampling for total viable colony count shall be carried out within 12 h of filling or of packaging. Microbiological tests shall be carried out within 12 h of sampling, the samples having been kept at 4 °C ± 1 °C for the period prior to testing.		

Note At source, natural mineral water should not normally exceed 20 cfu/mL at 20 °C -22 °C in 72 h and 5 cfu per mL at 37 °C in 24 h. These may be used only as a guide and not as a requirement.

## 7 Packaging

Natural mineral water shall be packed in hermetically sealed food grade containers suitable for preventing the possible adulteration or contamination of water.

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 plastic 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.

## 8 Labelling

### 8.1 General labelling requirements

8.1.1 In addition to the requirements of US 7, the following provisions shall apply:

- a) the name of the product shall be *natural mineral water*.
- b) the location of the source and the name of the source of natural mineral water shall be declared.
- c) the following designations shall be used where applicable:
  - i) "*Naturally carbonated natural mineral water*" may be used only if the content of carbon dioxide is the same as at emergence;
  - ii) "*Non-carbonated natural mineral water*" may be used only if by nature the natural mineral water does not contain free carbon dioxide;
  - iii) "*Decarbonated natural mineral water*" shall be used if the content of carbon dioxide in the natural mineral water is less than that at emergence;
  - iv) "*Natural mineral water fortified with carbon dioxide from the source*" shall be used if the content of carbon dioxide is more than that at emergence and the added carbon dioxide is from the same source as the natural mineral water.
  - v) "*Carbonated natural mineral water*" shall be used if there has been an addition of carbon dioxide from another origin.

8.1.2 The net contents shall be declared by volume in accordance with the Weights and measures Act.

### 8.2 Additional labelling requirements

8.2.1 The following terms shall appear on the label as part of, or in close proximity, to the name of the product or in an otherwise prominent position where the conditions specified apply:

- a) "May be laxative", where the product contains more than 600 mg/L sulphate other than calcium sulphate; and
- b) "Name" (such as spring water or any other appropriate name, which will convey the true nature of the product) and "Location of the source", where the name and address of the producers is different from the location of the source.

**8.2.2** If a natural mineral water has been submitted to a treatment in 4.2, the treatment shall be declared on the label.

**8.2.3** The analytical composition giving characteristics to the product shall be declared on the labelling.

**8.2.4** If the product contains more than 1 mg/L of fluoride, the following term shall appear on the label as part of, or in close proximity to, the name of the product or in an otherwise prominent position: "Contains fluoride". In addition, the following sentence should be included on the label: "The product is not suitable for infants and children under the age of seven years" where the product contains more than 2 mg/L fluorides.

**8.2.5** If the product contains less than 1000 mg/L total dissolved solids (salts) an appropriate descriptive term in close proximity of the name of the product, which will distinguish the product from those containing more than 1000 mg/L total dissolved solids shall appear on the label as part of, or in close proximity to, the name of the product or in an otherwise prominent position

**8.2.6** If the product contains more than 250 mg/L free carbon dioxide an appropriate descriptive term in close proximity of the name of the product, which will distinguish the product from those containing less than 250 mg/L free carbon dioxide shall appear on the label as part of, or in close proximity to, the name of the product or in an otherwise prominent position.

### 8.3 Labelling prohibitions

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

**8.3.2** The name of the locality, hamlet or specified place shall not form part of the trade name unless it refers to a natural mineral water collected at the place designated by that trade name.

**8.3.3** Any statement or 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 natural mineral waters put on sale shall not be used on the label.

### 8.4 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  $\text{CHO}_3$ ;
- "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 Irons", where the product contains more than 5 mg/L Fe;
- "Contains Iodine", where the product contains more than 1 mg/L I; and

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- "May be Diuretic", where the product contains more than 1 000 mg/L total dissolved solids or 600 mg/L  $\text{HCO}_3$

## **Annex A** (normative)

### **Requirements for hygiene in the packaging of natural mineral waters**

#### **A.1 Sources of natural mineral water**

##### **A.1.1 Authorization**

Any spring, well or drilling intended for the collection of natural mineral water shall be approved by a competent authority having jurisdiction for the region.

##### **A.1.2 Determination of the genesis of natural mineral water**

As far as it is methodologically possible in each case, a precise analysis shall be carried out on the origin of natural mineral waters, the period of their residence in the ground before being collected and their chemical and physical qualities.

##### **A.1.3 Perimeter of protection**

If possible areas wherein natural mineral water might be polluted or its chemical and physical qualities otherwise deteriorated should be determined by a hydrologist. Where indicated by hydrogeological conditions and considering the risks of pollution and physical, chemical and biochemical reactions, several perimeters with separate dimensions may be provided for.

##### **A.1.4 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 natural mineral water

Regulations for the disposal of liquid, solid or gaseous waste, the use of substances that might deteriorate natural mineral water (for example, by agriculture) as well as for any possibility of accidental deterioration of natural mineral water by natural occurrences such as a change in the hydrogeological conditions shall be complied with.

Particular consideration shall be given to the following potential pollutants: bacteria, viruses, fertilizers, hydrocarbons, detergents, pesticides, phenolic compounds, toxic metals, radioactive substances and other soluble organic or inorganic substances. Even where nature provides apparently sufficient protection against surface pollution, potential hazards shall be taken into consideration, such as mining, hydraulic and engineering facilities etc.

#### **A.2 Hygiene prescriptions for collection of natural mineral water**

##### **A.2.1 Extraction**

The withdrawal of natural mineral water (from springs, galleries, genuine or drilled wells) shall be performed in conformity with the hydrogeological conditions in such a manner as to prevent any other than the natural mineral water from entering or, should there be pumping facilities, prevent any extraneous water from entering by reducing the supply. The natural mineral water thus collected or pumped shall be protected in such a way that it will be safe from pollution whether caused by natural occurrence or actions or neglect or ill will.

## **A.2.2 Materials**

The pipes, pumps or other possible devices coming into contact with natural mineral water and used for its collection shall be made of such material as to guarantee that are original qualities of natural mineral water will not be changed.

## **A.2.3 Protection of the extraction area**

In the immediate surroundings of springs and wells, precautionary measures shall be taken to guarantee that no pollutant whatsoever could enter the extraction area. The extraction area shall be inaccessible to non-authorized people by providing adequate devices (for example, enclosure). Any use not aiming at the collection of natural mineral water shall be forbidden in this area.

## **A.2.4 Exploitation of natural mineral water**

The condition of the extraction facilities, areas of extraction and perimeter protection as well as the quality of the natural mineral water shall periodically be checked. To control the stability of the chemical and physical particulars of the natural mineral water derived, besides the natural variations, automatic measurements of the typical characteristics of water shall be carried out and notified (for example, electrical conductance, temperature, content of carbon dioxide) or frequent partial analysis shall be done.

## **A.2.5 Maintenance of extraction facilities**

### **A.2.5.1 Technical aspects**

Methods and procedures for maintaining the extraction facilities shall be hygienic and not be a potential hazard to human health or a source of contamination to natural mineral water. From the hygiene standpoint, servicing of the extraction installations shall meet the same standards as those required for the bottling or treatment.

### **A.2.5.2 Equipment and reservoirs**

Equipment and reservoirs used for extraction of natural mineral water shall be constructed and maintained in order to minimize all hazards to human health and to avoid contamination.

### **A.2.5.3 Storage at the point of extraction**

The quantity of natural mineral water stored at the point of extraction shall be as low as possible. The storing shall furthermore guarantee protection against contamination or deterioration.

## **A.3 Transport of natural mineral water**

### **A.3.1 Means of transport, piping and reservoirs**

Any vehicle, piping or reservoir used in the processing of natural mineral water from its source to the bottling facilities, the latter included, shall conform to the necessary requirements and be made of inert material such as ceramic and stainless steel which prevents any deterioration, be it by water, handling, servicing or disinfection; it shall allow easy cleaning.

### **A.3.2 Maintenance of vehicles and reservoirs**

Any vehicle or reservoir shall be properly cleaned and if necessary disinfected and kept in good repair so as not to present any danger of contamination to natural mineral water and of deterioration of the essential qualities of natural mineral water.



## **A.4 Design and facilities for natural mineral waters processing establishment**

### **A.4.1 Location**

Establishments shall be located in areas, which are free from objectionable odours, smoke, dust or other contaminants and are not subject to flooding.

### **A.4.2 Roadways and areas used by wheeled traffic**

Such roadways and areas serving the establishment, which are within its boundaries or in its immediate vicinity, shall have a hard paved surface suitable for wheeled traffic. There shall be adequate drainage and provision shall be made for protection of the extraction area in accordance with A.4.3.2 where appropriate and to allow for cleaning. Adequate road signals may be provided to call the attention of road users to the existence of natural mineral water extraction area.

### **A.4.3 Building and facilities**

#### **A.4.3.1 General**

**A.4.3.1.1** Buildings and facilities shall be of sound construction in accordance with the provisions of A.2.3 and maintained in good repair.

**A.4.3.1.2** Rooms for recreation, for storing or packaging of raw material and areas for the cleaning of containers to be reused shall be apart from the bottling areas to prevent the end product from being contaminated. Raw and packaging materials and any other additions, which come into contact with natural mineral water, shall be stored apart from other material.

**A.4.3.1.3** Adequate working space shall be provided to allow for satisfactory performance of all operations.

**A.4.3.1.4** The design shall be such as to permit easy and adequate cleaning and to facilitate proper supervision of natural mineral water hygiene.

**A.4.3.1.5** The buildings and facilities shall be designed to provide separation by partition, location or other effective means between those operations, which may cause cross-contamination.

**A.4.3.1.6** Buildings and facilities shall be designed to facilitate hygienic operations by means of a regulated flow in the process from the arrival of the natural mineral water at the premises to the finished product, and shall provide for appropriate temperature conditions for the process and the product.

**A.4.3.1.7** In natural mineral water handling areas all overhead structures and fittings shall be installed in such a manner as to avoid contamination directly or indirectly of natural mineral water and raw materials by condensation and drip, and shall not hamper cleaning operations. They shall be insulated where appropriate and be so designed and finished as to prevent the accumulation of dirt and to minimize condensation, mould development and flaking. They shall be easy to clean.

**A.4.3.1.8** Living quarters, toilets and areas where animals are kept shall be completely separated from and shall not open directly to natural mineral water handling areas.

**A.4.3.1.9** Where appropriate, establishments shall be so designed that access can be controlled.

**A.4.3.1.10** The use of material, which cannot be adequately cleaned and disinfected, such as wood, shall be avoided unless its use would not be a source of contamination.

**A.4.3.2 Handling, storing and bottling areas**

**A.4.3.2.1 Floors**

Where appropriate, floors shall be of waterproof, non-absorbent, washable, non-slip and non-toxic materials, without crevices, and shall be easy to clean and disinfect. Where appropriate, floors should slope sufficiently for liquids to drain to trapped outlets.

**A.4.3.2.2 Walls**

Where appropriate, walls should be of waterproof, non-absorbent, washable and non-toxic materials and should be light coloured. Up to a height appropriate for the operation they should be smooth and without crevices, and should be easy to clean and disinfect. Where appropriate, angles between walls, between walls and floors, and between walls and ceilings should be sealed and smoothed to facilitate cleaning.

**A.4.3.2.3 Ceilings**

These shall be so designed, constructed and finished as to prevent the accumulation of dirt and minimize condensation, mould development and flaking, and shall be easy to clean.

**A.4.3.2.4 Windows**

Windows and other openings shall be so constructed as to avoid accumulation of dirt and those which open should be fitted with screens. Screens should be easily movable for cleaning and kept in good repair. Internal windowsills, if present, should be sloped to prevent use as shelves.

**A.4.3.2.5 Doors**

Doors shall have smooth, non-absorbent surfaces and, where appropriate, be self-closing and close fitting.

**A.4.3.2.6 Stairs, lift cages and auxiliary structures**

Examples of these structures such as platforms, ladders, chutes shall be situated and constructed so as not to cause contamination to food. Chutes shall be constructed with inspection and cleaning hatches.

**A.4.3.2.7 Piping**

Piping for natural water lines shall be independent of potable and non-potable water.

**A.4.3.3 Canalization, drainage lines**

Canalization and drainage and used water lines as well as any possible waste storage area within the protected perimeter shall be built and maintained in such a manner as not to present any risk whatsoever of polluting aquifers and springs.

**A.4.3.4 Fuel storage area**

Any storage area or tank for the storing of fuels such as coal or hydrocarbons shall be designed, protected, controlled and maintained in such a manner as not to present a risk of aquifers and springs being polluted during the storage and manipulation of these fuels.

## **A.4.4 Hygiene facilities**

### **A.4.4.1 Water supply**

**A.4.4.1.1** Ample supply of potable water under adequate pressure and suitable temperature shall be available with adequate facilities for its storage, where necessary, and distribution with adequate protection against contamination.

**A.4.4.1.2** Natural mineral water, potable water, non potable water for steam production or for refrigeration or any other use shall be carried in separate lines with no cross connection between them and without any chance of back siphonage. It would be desirable that these lines be identified by different colours. Steam used in direct contact with natural mineral water and natural mineral water contact surfaces shall contain no substances, which may be hazardous to health or may contaminate the food.

### **A.4.4.2 Effluent and waste disposal**

Establishments shall have an efficient effluent and waste disposal system, which shall at all times be maintained in good order and repair. All effluent lines (including sewer systems) shall be large enough to carry full loads and shall be so constructed as to avoid contamination of potable water supplies.

### **A.4.4.3 Changing facilities and toilets**

Adequate, suitable and conveniently located changing facilities and toilets shall be provided in all establishments. Toilets shall be so designed as to ensure hygienic removal of waste matter. These areas shall be well lighted, ventilated and where appropriate heated, and shall not open directly to natural mineral water handling areas. Hand washing facilities with warm or hot and cold water, a suitable hand-cleaning preparation, and with suitable hygienic means of drying hands, shall be provided adjacent to toilets and in such a position that the employee will have to use them when returning to the processing area. Where hot and cold water are available mixing taps shall be provided. Where paper towels are used, a sufficient number of dispensers and receptacles shall be provided near each washing facility. Care shall be taken that these receptacles for used paper towels are regularly emptied. Taps of a non-hand operatable type are desirable. Notices shall be posted directing personnel to wash their hands after using the toilet.

### **A.4.4.4 Hand washing facilities in natural mineral water processing areas**

Adequate and conveniently located facilities for hand washing and drying shall be provided wherever the process demands. Where appropriate, facilities for hand disinfection shall also be provided. Warm or hot and cold water shall be available and taps for mixing the two shall be provided. There shall be suitable hygienic means of drying hands. Where paper towels are used, a sufficient number of dispensers and receptacles shall be provided adjacent to each washing facility. Taps of a non-hand operatable type are desirable. The facilities shall be furnished with properly trapped waste pipes leading to drains.

### **A.4.4.5 Disinfection facilities**

Where appropriate, adequate facilities for cleaning and disinfection of working implements and equipment shall be provided. These facilities shall be constructed of corrosion resistant materials, capable of being easily cleaned, and shall be fitted with suitable means of supplying hot and cold water in sufficient quantities.

### **A.4.4.6 Lighting**

Adequate natural or artificial lighting shall be provided throughout the establishment. Where appropriate, the lighting shall not alter colours and the intensity shall not be less than:

- 540 lux (50 foot candles) at all inspection points;
- 220 lux (20 foot candles) in work rooms; and

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- 110 lux (10 foot candles) in other areas.

Light bulbs and fixtures suspended over natural mineral water in any stage of production shall be of a safer type and protected to prevent contamination of natural mineral water in case of breakage.

### **A.4.4.7 Ventilation**

Adequate ventilation shall be provided to prevent excessive heat, steam condensation and dust and to remove contaminated air. The direction of the airflow shall never be from a dirty area to a clean area. Ventilation openings shall be provided with a screen or other protecting enclosure of non-corrodible material. Screens shall be easily removable for cleaning.

### **A.4.4.8 Facilities for storage of waste and inedible material**

Facilities shall be provided for the storage of waste and inedible material prior to removal from the establishment. These facilities shall be designed to prevent access to waste or inedible material by pests and to avoid contamination of natural mineral water, potable water, equipment, buildings or roadways on the premises.

## **A.4.5 Equipment and utensils**

### **A.4.5.1 Materials**

All equipment and utensils used in natural mineral water handling areas and which may contact the natural mineral water shall be made of material which

- a) does not transmit toxic substances, odour or taste,
- b) is non-absorbent,
- c) is resistant to corrosion and
- d) is capable of withstanding repeated cleaning and disinfection.

Surfaces shall be smooth and free from pits and crevices. The use of wood and other materials, which cannot be adequately cleaned and disinfected, shall be avoided except when their use would be a source of contamination. The use of different materials is exercised in such a way that contact corrosion that can occur shall be avoided.

### **A.4.5.2 Hygienic design, construction and installation**

All equipment and utensils shall be designed and constructed so as to prevent hazards and permit easy and thorough cleaning and disinfection.

## **A.5 Hygiene requirements for the establishment**

### **A.5.1 Maintenance**

The buildings, equipment, utensils and all other physical facilities of the establishment, including drains, shall be maintained in good repair and in an orderly condition. As far as practicable, rooms shall be kept protected from steam, vapour and surplus water.

### **A.5.2 Cleaning and disinfection**

**A.5.2.1** Cleaning and disinfection shall meet the requirements of this standard.

**A.5.2.2** To prevent contamination of natural mineral water, all equipment and utensils shall be cleaned as frequently as necessary and disinfected, whenever circumstances demand.

**A.5.2.3** Adequate precautions shall be taken to prevent natural mineral water from being contaminated during cleaning or disinfection of rooms, equipment or utensils, by water and detergents or by disinfectants and their solutions. Detergents and disinfectants shall be suitable for the purpose intended and shall be acceptable to the official agency having jurisdiction. Any residues of these agents on a surface, which may come in contact with natural mineral water, shall be removed by thorough rinsing with water, before the area or equipment is again used for handling natural mineral water.

**A.5.2.4** Either immediately after cessation of work for the day or at such other times as may be appropriate, floors, including drains, auxiliary structures and walls of natural mineral water handling areas shall be thoroughly cleaned.

**A.5.2.5** Changing facilities and toilets shall be kept clean at all times.

**A.5.2.6** Roadways and yards in the immediate vicinity of and serving the premises shall be kept clean.

### **A.5.3 Hygiene control programme**

A permanent cleaning and disinfection schedule shall be drawn up for each establishment to ensure that all areas are appropriately cleaned and that critical areas, equipment and material are designated for special attention. An individual, who shall preferably be a permanent member of the staff of the establishment and whose duties shall be independent of production, shall be appointed to be responsible for the cleanliness of the establishment. He shall have a thorough understanding of the significance of contamination and the hazards involved. All cleaning personnel shall be well trained in cleaning techniques.

### **A.5.4 Storage and disposal of waste**

Waste material shall be handled in such a manner as to avoid contamination of natural mineral water or potable water. Care shall be taken to prevent access to waste by pests. Waste shall be removed from the natural mineral water handling and other working areas as often as necessary and at least daily. Immediately after disposal of the waste, receptacles used for storage and any equipment, which has come into contact with the waste, shall be cleaned and disinfected. The waste storage area shall also be cleaned and disinfected.

### **A.5.5 Exclusion of animals**

Animals that are uncontrolled or that could be a hazard to health shall be excluded from establishments.

### **A.5.6 Pest control**

**A.5.6.1** There shall be an effective and continuous programme for the control of pests. Establishments and surrounding areas shall be regularly examined for evidence of infestation.

**A.5.6.2** Shall pests gain entrance to the establishment, eradication measures shall be instituted. Control measures involving treatment with chemical, physical or biological agents shall only be undertaken by or under direct supervision of personnel who have a thorough understanding of the potential hazards to health resulting from the use of these agents, including those hazards which may arise from residues retained in the natural mineral water, such measures shall only be carried out in accordance with the recommendations of the official agency having jurisdiction.

**A.5.6.3** Pesticides shall only be used if other precautionary measures cannot be used effectively. Before pesticides are applied, care shall be taken to safeguard natural mineral water equipment and utensils from contamination. After application, contaminated equipment and utensils shall be thoroughly cleaned to remove residues prior to being used again.

### **A.5.7 Storage of hazardous substances**

**A.5.7.1** Pesticides or other substances, which may present a hazard to health, shall be suitably labelled with a warning about their toxicity and use. They shall be stored in locked rooms or cabinets used only for that purpose and dispersed and handled only by authorized and properly trained personnel or by persons under strict supervision of trained personnel. Extreme care shall be taken to avoid contamination of natural mineral water.

**A.5.7.2** Except when necessary for hygienic or processing purposes, no substance which could contaminate natural mineral water shall be used or stored in natural mineral water handling areas.

### **A.5.8 Personal effects and clothing**

Personal effects and clothing shall not be deposited in natural mineral water handling areas.

## **A.6 Personnel hygiene and health requirements**

### **A.6.1 Hygiene training**

Managers of establishments shall arrange for adequate and continuous training of all natural mineral handlers in hygienic handling of natural mineral water and in personal hygiene so that they understand the precautions necessary to prevent contamination of natural mineral water.

### **A.6.2 Medical examination**

Persons who come into contact with natural mineral water in the course of their work shall have a medical examination prior to employment if the official agency having jurisdiction, acting on medical advice, considers that this is necessary, whether because of epidemiological considerations or the medical history of the prospective natural mineral water handler. Medical examination of natural mineral water handlers shall be carried out at other times when clinically or epidemiologically indicated.

### **A.6.3 Communicable diseases**

The management shall take care to ensure that no person, while known or suspected to be suffering from, or to be a carrier of a disease likely to be transmitted through food or while afflicted with infected wounds, skin infections, sores or with diarrhoea, is permitted to work in any natural mineral water handling area in any capacity in which there is any likelihood of such a person directly or indirectly contaminating natural mineral water with pathogenic micro-organisms. Any person so affected shall immediately report to the management.

### **A.6.4 Injuries**

Any persons who has a cut or wound shall not continue to handle natural mineral water or natural mineral water contact surfaces until the injury is completely protected by a waterproof covering which is firmly secured, and which is conspicuous in colour. Adequate first-aid facilities shall be provided for this purpose.

### **A.6.5 Washing of hands**

Every person, while on duty in a natural mineral water handling area, shall wash his hands frequently and thoroughly with a suitable hand cleaning preparation under running water. Hands shall always be washed before commencing work, immediately after using the toilet, after handling contaminated material and whenever else necessary. After handling any material, which might be capable of transmitting disease, hands shall be washed and disinfected immediately. Notices requiring hand washing shall be displayed. There shall be adequate supervision to ensure compliance with this requirement.

### **A.6.6 Personal cleanliness**

Every person engaged in a natural mineral water handling area shall maintain a high degree of personal cleanliness while on duty, and shall at all times while so engaged, wear suitable protective clothing including head covering and footwear, all of which shall be cleanable, unless designed to be disposed of and shall be maintained in a clean condition consistent with the nature of the work in which the person is engaged. Aprons and similar items shall not be washed on the floor. When natural mineral water is manipulated by hand, any jewellery that cannot be adequately disinfected shall be removed from the hands. Personnel shall not wear any insecure jewellery when engaged in handling of natural mineral water.

### **A.6.7 Personal behaviour**

Any behaviour, which could result in contamination of natural mineral water, such as eating, use of tobacco, chewing (for example, gum, sticks, betel nuts, etc) or unhygienic practices such as spitting, shall be prohibited in natural mineral water handling areas.

### **A.6.8 Visitors**

Precautions shall be taken to prevent visitors to natural mineral water handling areas from contaminating the product. These may include the use of protective clothing. Visitors shall observe the provisions recommended in paragraph A.5.8, A.6.3, A.6.4 and A.6.7.

### **A.6.9 Supervision**

Responsibility for ensuring compliance by all personnel with all requirements of A.6.1 to A.6.8 inclusive shall be specifically allocated to competent supervisory personnel.

## **A.7 Hygienic processing requirements for the establishment**

### **A.7.1 Raw material requirements**

To guarantee a good and stable quality of natural mineral water, certain criteria shall be monitored regularly, namely,

- a) spring discharge, temperature of the natural mineral water.
- b) appearance of the natural mineral water.
- c) odour and taste of the natural mineral water.
- d) conductance of natural mineral water or any other adequate parameter.
- e) microbiological flora.

### **A.7.2 Compliance with the standard**

Shall there be a perceptible lack in meeting the standards, the necessary corrective measures are immediately to be taken.

### **A.7.3 Treatment**

**A.7.3.1** The treatment may include decantation, filtration, airing and where necessary application of off takes of carbon dioxide.

**A.7.3.2** Processing shall be supervised by technically competent personnel.

**A.7.3.3** All steps in the production process, including packaging, shall be performed without unnecessary delay and under conditions which will prevent the possibility of contamination, deterioration, or the development of pathogenic and spoilage micro-organisms.

**A.7.3.4** Rough treatment of containers shall be avoided to prevent the possibility of contamination of the processed product.

**A.7.3.5** Treatment such as necessary controls shall be such as to protect against contamination or development of a public health hazard and against deterioration within the limits of good commercial practice.

#### **A.7.4 Packaging material and containers**

**A.7.4.1** All packaging material shall be stored in a clean and hygienic manner. The material shall be appropriate for the product to be packed and for the expected conditions of storage and shall not transmit to the product objectionable substances beyond the limits acceptable to the official agency having jurisdiction. The packaging material shall be sound and shall provide appropriate protection from contamination. Only packaging material required for immediate use shall be kept in the packing or filling area.

**A.7.4.2** Product containers shall not have been used for any purpose that may lead to contamination of the product. In the case of new containers if there is a possibility that they have been contaminated, they shall be cleaned and disinfected. When chemicals are used for these purposes, the container shall be rinsed as prescribed under A.5.2.3. Containers shall be well drained after rinsing. Used and, when necessary, unused containers shall be inspected immediately before filling.

#### **A.7.5 Filling and sealing of containers**

**A.7.5.1** Packaging shall be done under conditions that preclude the introduction of contaminants into the product.

**A.7.5.2** The methods, equipment and material used for sealing shall guarantee a tight and impervious sealing and shall not damage the containers nor deteriorate the chemical bacteriological and organoleptic qualities of natural mineral water.

#### **A.7.6 Packaging of containers**

The packaging of containers shall protect the latter from contamination and damage and allow appropriate handling and storing.

#### **A.7.7 Lot identification**

Each container shall be permanently marked in code or in clear to identify the producing factory and the lot. A lot is quantity of natural mineral water produced under identical conditions, all packages of which shall bear a lot number that identifies the production during a particular time, interval, and usually from a particular "line" or other critical processing unit.

#### **A.7.8 Processing and production records**

Permanent, legible and dated records of pertinent processing and production details shall be kept concerning each lot. These records shall be retained for a period that exceeds the shelf life of the product. Records shall also be kept of the initial distribution by lot.

#### **A.7.9 Storage and transport of the end product**

The end-product shall be stored and transported under such conditions as will preclude contamination with and/or proliferation of micro-organisms and protect against deterioration of the product or damage to the container. During storage, periodic inspection of the end product shall take place to ensure that only natural



mineral water, which is fit for human consumption, is dispatched and that end-product specifications shall be complied with.

## Annex B (normative)

### Sampling plan for mineral water

#### B.1 General requirements of sampling

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

- a) samples shall be drawn in original sealed bottle/container and kept in protected places not exposed to damp air, dust or soot; and
- b) Each bottle/container in original shall be sealed and marked with full details of sampling.

#### B.2 Scale of sampling

**B.2.1** The quantity of packed mineral water of the same type belonging to the same batch of manufacture and packed in a day, shall constitute a lot.

**B.2.2** For ascertaining the conformity of the material to the requirements of the specification, samples shall be tested from each lot separately.

**B.2.3** The number of bottles to be selected from a lot shall depend on the size of the lot and shall be according to Table B.1.

**Table B.1 — Scale of sampling**

Number of containers in the lot	Sample size
Up to 5000	3
5001 to 10000	5
10001 to 15000	7
15001 and above	9

The bottles shall be chosen at random from the lot. In order to ensure the randomness of selection, procedure given in ISO 4905, *Methods for random sampling*, shall be followed.

**B.2.4** Initially the number of cartons equal to the number of bottles to be taken from the lot (according to Table B.1) shall be chosen at random. These cartons thus selected shall be opened and the bottles in these cartons examined visually for the condition of packing, external appearance and the fill. The lot shall be considered satisfactory for inspection of other characteristics given in the specification, if all the bottles in the cartons opened are found satisfactory for these characteristics.

**B.2.5** In case of any defective bottle is found according to B.2.4, twice the number of cartons shall be opened and the bottle examined for these characteristics. If no defective bottle is found, the lot shall be considered satisfactory of inspection of other characteristics given in the specification.

### **B.3 Preparation of test samples**

**B.3.1** From each of the cartons opened according to B.2.4, three bottles shall be taken from its different layers so as to obtain three times the required number of bottles in the sample (see Table B.1).

**B.3.2** In case the number of cartons to be opened is according to B.2.4, the number of cartons equal to the number of bottles in the sample shall be taken at random from these cartons and then the required number of bottles picked up according to B.3.1.

**B.3.3** The sample bottles selected as in B.3.1 or B.3.2 shall be divided at random into three equal sets and labelled with all the particulars of sampling. One of these sets of sampled bottles shall be for the purchaser, another for the vendor and the third for the referee.

**B.3.4** The referee sample shall consist of a set of sample bottles marked for this purpose and shall bear the deals of the purchaser and the supplier. These shall be kept at a place agreeable to the purchaser and the supplier so as to be used in case of a dispute between the two.

### **B.4 Criteria for conformity**

The lot shall be declared as conforming to the requirements of the relevant specification if all the parameters are satisfied.

## 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 conform to 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.

Further particulars of the terms and conditions of licensing may be obtained from the Director, Uganda National Bureau of Standards.



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