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Packaged mineral water — Specification

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Table of contents

Foreword

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Packaged mineral water — Specification

1 Scope

This draft African standard specifies requirements, sampling and test methods for packaged mineral water for human consumption.

This standard applies to natural mineral water, mineral water, natural spring water, spring water and carbonated mineral water.

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.

ARS 53, *General principles of food hygiene — Code of practice*

ARS 56, *Pre-packaged Foods — Labelling*

ASTM D 3866-12, *Standard test methods for silver in water*

ASTM D 3871-84, *Standard test methods for purgeable organic compounds in water using headspace sampling*

ASTM D 5907-13, *Standard test methods for filterable matter (total dissolved solids) and non-filterable matter (total suspended solids) in water*

ASTM D 6239-9, *Standard test method for uranium in drinking water by high-resolution alpha –liquid-scintillation*

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

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

ISO 6222, *Water quality — Enumeration of culturable microorganisms — Colony count by inoculation in nutrient agar culture medium*

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

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

ISO 6461 (all parts), *Water quality — Detection and enumeration of the spores of sulfite reducing anaerobes (clostridia) —*

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

ISO 6777, *Water quality — Determination of nitrite — Molecular absorption spectrometric method*

ISO 6888-1, *Microbiology of the food chain — Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species) — Part 1: Technique using Baird-Parker agar medium*

ISO 7027 (all parts), *Water quality — Determination of turbidity*

ISO 7393-3, *Water quality — Determination of free chlorine and total chlorine — Part 3: Iodometric titration method for the determination of total chlorine*

ISO 7875 (all parts), *Water quality — Determination of surfactants*

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

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

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

ISO 7899-2, *Water quality — Detection and enumeration of intestinal enterococci — Part 2: Membrane filtration method*

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

ISO 8165 (all parts), *Water quality — Determination of selected monovalent phenols*

ISO 8245, *Water quality — Guidelines for the determination of total organic carbon (TOC) and dissolved organic carbon (DOC)*

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

ISO 9174, *Water quality — Determination of chromium — Atomic absorption spectrometric methods*

ISO 9297, *Water quality — Determination of chloride — Silver nitrate titration with chromate indicator (Mohr's method)*

ISO 9308-1, *Water quality — Enumeration of Escherichia coli and coliform bacteria — Part 1: Membrane filtration method for waters with low bacterial background flora*

ISO 9308-2, *Water quality — Enumeration of Escherichia coli and coliform bacteria — Part 2: Most probable number method*

ISO 9696, *Water quality — Gross alpha activity — Test method using thick source*

ISO 9697, *Water quality — Gross beta activity — Test method using thick source*

ISO 9964 (all parts), *Water quality — Determination of sodium and potassium*

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

ISO 10301, *Water quality — Determination of highly volatile halogenated hydrocarbons — Gas chromatographic methods*

ISO 10304-1, *Water quality — Determination of dissolved anions by liquid chromatography of ions — Part 1: Determination of bromide, chloride, fluoride, nitrite, nitrate, phosphate and sulphate*

ISO 10359 (all parts), *Water quality — Determination of fluoride*

ISO 10523, *Water quality — Determination of pH*

ISO 10530, *Water quality — Determination of dissolved sulfide — Photometric method using methylene blue*

ISO 10566, *Water quality — Determination of aluminium — Spectrometric method using pyrocatechol violet*

ISO 11423 (all parts), *Water quality — Determination of benzene and some derivatives*

ISO 11731, *Water quality — Enumeration of Legionella*

ISO 11732, *Water quality — Determination of ammonium nitrogen — Method by flow analysis (CFA and FIA) and spectrometric detection*

ISO 11885, *Water quality — Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES)*

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

ISO 12020, *Water quality — Determination of aluminium — Atomic absorption spectrometric method*

ISO 12846, *Water quality — Determination of mercury — Method using atomic absorption spectrometry (AAS) with and without enrichment*

ISO 15089, *Water quality — Guidelines for selective immunoassays for the determination of plant treatment and pesticide agents*

ISO 15553, *Water quality — Isolation and identification of Cryptosporidium oocysts and Giardia cysts from water*

ISO 16265, *Water quality — Determination of the methylene blue active substances (MBAS) index — Method using continuous flow analysis (CFA)*

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

ISO 18073, *Water quality — Determination of tetra- to octa-chlorinated dioxins and furans — Method using isotope dilution HRGC/HRMS*

ISO 19250, *Water quality — Detection of Salmonella spp.*

ISO 21567, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of Shigella spp*

ISO 24153, *Random sampling and randomization procedures*

ISO 28540, *Water quality — Determination of 16 polycyclic aromatic hydrocarbons (PAH) in water — Method using gas chromatography with mass spectrometric detection (GC-MS)*

3 Terms and definitions

For the purpose of this standard the following terms and definitions apply:

3.1
natural mineral water
water clearly distinguishable from ordinary drinking water because:

a) it is characterized by its content of certain mineral salts and their relative proportions and the presence of trace elements or of other constituents;

b) it is obtained directly from natural or drilled sources from underground water bearing strata for which all possible precautions should 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) of the constancy of its composition and the stability of its discharge and its temperature, due account being taken of the cycles of minor natural fluctuations;

d) it is collected under conditions which guarantee the original microbiological purity and chemical composition of essential components;

e) it is packaged close to the point of emergence of the source with particular hygienic precautions; and

f) it is not subjected to any treatment other than those permitted by this standard.

3.2
mineral water
water as defined in 3.1 that may include permitted treatment such as ozonation, UV sterilization, decantation filtration and permitted selective removal of fluoride

3.3
spring water
water derived from an underground formation from which water flows naturally to the surface of the earth through a natural orifice

3.4
packaged natural mineral water
water from a natural source that has been filled and, sealed into containers at the source or close to the source, and intended for human consumption

3.5
mineral waters
natural mineral water, mineral water, spring water, natural carbonated mineral water, artificial carbonated mineral water

3.6
naturally carbonated natural mineral water/naturally carbonated mineral water
natural mineral water which, after possible treatment in accordance with 5.1 and re-incorporation of gas from the same source and after packaging taking into consideration usual technical tolerance, has the same content of carbon dioxide spontaneously and visibly given off under normal conditions of temperature and pressure

3.7
non-carbonated natural mineral water /non-carbonated mineral water
natural mineral water which, by nature and after possible treatment in accordance with 5.1 and after packaging taking into consideration usual technical tolerance, does not contain free carbon dioxide in excess of the amount necessary to keep the hydrogen carbonate salts present in the water dissolved

3.8
decarbonated natural mineral water/decarbonated mineral water
natural mineral water which, after possible treatment in accordance with 5.1 and after packaging, has less carbon dioxide content than that at emergence and does not visibly and spontaneously give off carbon dioxide under normal conditions of temperature and pressure

3.9
natural mineral water fortified with carbon dioxide from the source /mineral water fortified with carbon dioxide from the source
natural mineral water which, after possible treatment in accordance with 5.1 and after packaging, has more carbon dioxide content than that at emergence

3.10
carbonated natural mineral water /carbonated mineral water
natural mineral water which, after possible treatment in accordance with 5.1 and after packaging, has been made effervescent by the addition of carbon dioxide from another origin

3.11
contamination
occurrence of any objectionable matter in the product

3.12
establishment
any building or area in which natural mineral water is handled and collected, together with the surroundings under the control of the same management

3.13
handling of mineral water
any manipulation with regard to collecting, treating, bottling, packaging, storing, transporting, distributing and selling natural mineral water

3.15
packaging material
any container such as cans, bottles, cartons, boxes, cases or wrapping and covering material such as foil, film, metal paper and wax paper

3.16
pest
any animal capable of, directly or indirectly, contaminating natural mineral waters

3.17
aquifer
any solid permeable mass of rocks (layer) containing natural mineral water

3.18
contaminant
any substance not intentionally added to mineral waters, which is present in such mineral waters as a result of the production, processing, preparation, treatment, packing, packaging, transport or holding of such mineral waters, or as a result of environmental contamination.

4 Treatment and handling

4.1 General

4.1.1 Treatments permitted include separation from unstable constituents, such as compounds containing iron, manganese, sulphur or arsenic, by decantation, filtration and permitted selective removal of fluoride, if necessary, accelerated by previous aeration.

4.1.2 The treatments provided for in 3.6, 3.7,3.8, 3.9, 3.10 and 4.1.1 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.

4.1.3 Transportation of natural mineral waters in bulk containers for packaging or for any other process before packaging is prohibited.

4.2 Permitted treatment

Permitted treatment of mineral water includes ozonation, UV sterilization, decantation, filtration and permitted selective removal of fluoride. These treatments may only be carried out on condition that the mineral content of the water is not modified in its essential constituents, which gives the water its properties. If ozonation treatment is applied, it shall be declared on the label.

5 Requirements

5.1 General requirements

5.1.1 Packaged mineral waters shall:

a) not have objectionable taste or odour to the consumers;

b) be free from any foreign matter; and

c) not have any sediment or suspended matter during its shelf life.

5.1.2 The source of mineral waters shall be authorized by relevant national authority from which the mineral emerges.

5.1.3 The distance from the source to the establishment shall be determined by the relevant National authority.

5.1.4 The water safety plan shall be established and implemented.

NOTE An example of water safety plan is given in Annex C.

5.2 Specific requirements

Packaged mineral waters shall comply with the physico-chemical requirements given in Table 1 when tested in accordance with the test methods specified therein.

Table 1 — Physico-chemical requirements for packaged mineral water

S/N	Parameter	Limit	Test method
i.	Colour, TCU, max.	15	ISO 7887
ii.	Turbidity, NTU, max.	1	ISO 7027 (all parts)
iii.	pH[a, b]	5.5 - 8.5	ISO 10523
iv.	Aluminium as Al^{3+}, mg/l, max.	0.2	ISO 10566 ISO 12020
v.	Calcium as Ca^{2+}, mg/l, max.	250	ISO 6059; ISO 7980
vi.	Chloride as Cl^-, mg/l, max.	250	ISO 9297
vii.	Fluoride as F^-, mg/l, max.	4[c,d]	ISO 10359 (all parts)
viii.	Iron as Fe^{2+}, mg/l, max.	0.3	ISO 6332
ix.	Magnesium as Mg^{2+}, mg/l, max.	100	ISO 6059; ISO 7980
x.	Nitrate as NO_3^-, mg/l, max.	50	ISO 7890
xi.	Potassium as K^+, mg/l, max.	50	ISO 9964
xii.	Sodium as Na^+, mg/l, max.	200	ISO 9964
xiii.	Sulphate as SO_4^{2-}, mg/l, max.	400[e]	ISO 10304-1
xiv.	Sulphide as H_2S, mg/l, max.	0.05	ISO 10530
xv.	Total dissolved solids, mg/l, max.	1000	ASTM D5907-13
xvi.	Total suspended solids	Not detectable	ASTM D5907-13

[a] For artificial carbonated mineral water, the pH range shall be 4 – 5.9.

[b] For natural carbonated mineral water, the pH range shall be 5.5 – 6.5.

[c] Packaged mineral waters containing between 1.5 mg/l and 4 mg/l fluoride shall have a labelling declaration “Mineral waters contains fluoride” included.

[d] If the product contains more than 1.5 mg/l “The product is not suitable for infants and children under the age of seven years” shall be declared on the label.

[e] Packaged mineral waters containing between 200 mg/l and 400 mg/l sulphate shall have a labelling declaration “Mineral waters contains sulphate” included.

6 Contaminants

6.1 Inorganic contaminants

Packaged mineral waters shall not contain inorganic contaminants in excess of limits given in Table 2 when tested in accordance with the test methods specified therein.

Table 2 — Limits for inorganic contaminants in packaged mineral water

S/N	Inorganic contaminant	Maximum limit mg/L	Test method
i.	Ammonia (NH_3)	0.5	ISO 11732
ii.	Arsenic (As)	0.01	ISO 11969
iii.	Barium (Ba)	0.7	ISO 11885
iv.	Borate (B)	5	ISO11885
v.	Cadmium (Cd)	0.003	ISO 5961
vi.	Total chromium (Cr)	0.005	ISO 9174
vii.	Copper (Cu)	1	ISO 8288
viii.	Cyanide (CN^-)	0.07	ISO 6703-1
ix.	Free Chlorine (Cl_2)	Nil	ISO 7393-3
x.	Iodine as (I^-)	1.0	ASTM D3869-15
xi.	Lead (Pb)	0.01	ISO 8288
xii.	Manganese (Mn)	0.4	ISO 6333
xiii.	Mercury (Hg)	0.001	ISO 12846
xiv.	Nitrites (NO^-_2-N)	0.1	ISO 6777
xv.	Selenium (Se)	0.01	ISO 9965
xvi.	Silver (Ag)	0.5	ASTM D3866-12
xvii.	Zinc (Zn)	5	ISO 8288
xviii.	Antimony (Sb)	0.005	ISO 11885
xix.	Nickel (Ni)	0.02	ISO 8288
xx.	Bromate (BrO_3^-) [a]	0.01	ISO 15061
xxi.	Uranium	0.03	ASTM D6239-9

[a] In case of ozonation, bromate shall be tested and confirmed to be within the limits.

6.2 Organic contaminants

Packaged mineral waters shall comply with the limits for organic contaminants given in Table 3 when tested in accordance with the test methods specified therein.

Table 3 — Limits for organic contaminants in packaged mineral water

S/N	Organic contaminant	Limit	Test method
i.	Benzene, mg/l, max.	0.005	ISO 11423 (all parts)
ii.	Chlorinated hydrocarbons, mg/l, max.	0.005	ISO 10301
iii.	Dioxin	Absent	ISO 18073
iv.	Organic matter (as O_2), mg/l, max.	3	ISO 8245
v.	Pesticides and PCBs	Absent	ISO 15089
vi.	Phenols	Absent	ISO 8165 (all parts)
vii.	Polycyclic aromatic hydrocarbons, µg/l, max.	0.2	ISO 28540
viii.	Polynuclear aromatic hydrocarbons	Absent	ISO 28540
ix.	Surfactants (reacting with methylene blue), mg/l, max.	0.2	ISO 16265
x.	Total trihalomethanes, mg/l, max.	0.1	ASTM D3871-84
xi.	Anionic surfactant (reacting with methylene blue)	Absent	ISO 7875 (all parts)

6.3 Radioactive materials

Packaged mineral waters shall comply with the limits for radioactive materials given in Table 4 when tested in accordance with the test methods specified therein.

Table 4 — Limits for radioactive materials in packaged mineral waters

S/N.	Radioactive material	Maximum limit Bq/L	Test method
i.	Gross alpha activity	0.5	ISO 9696
ii.	Gross beta activity	1	ISO 9697

6.4 Microbiological limits

Packaged mineral waters shall comply with the microbiological limits given in Table 5 when tested in accordance with the test methods specified therein.

Table 5 — Microbiological limits for packaged mineral water

S/N.	Microorganism	Limit	Test method
i.	Total viable counts at 22 ºC in mL, max. [a]	100	ISO 6222
	Total viable counts at 37 ºC, in mL, max. [a]	50	
ii.	Total Coliforms, CFU/100 ml	Not detectable	ISO 9308-1 ISO 9308-2
iii.	*Escherichia coli,* CFU/100 ml	Not detectable	ISO 9308-1 ISO 9308-2
iv.	*Staphylococcus aureus,* CFU/100 ml	Not detectable	ISO 6888-1
v.	Sulphite reducing anaerobes, CFU/100 ml	Not detectable	ISO 6461 (all parts)
vi.	*Pseudomonas aeruginosa* fluorescence, CFU/100 ml	Not detectable	ISO 16266
vii.	*Enterococcus faecalis,* CFU/100 ml	Not detectable	ISO 7899-2
viii.	*Shigella,* CFU/100 ml	Not detectable	ISO 21567
ix.	*Salmonella,* CFU/100 ml	Not detectable	ISO 19250
x.	*Cryptosporidium,* CFU/100 ml	Not detectable	ISO 15553
xi.	*Giardia,* CFU/100 ml	Not detectable	
xii.	*Legionella spp.,* CFU/100 ml	Not detectable	ISO 11731

[a] This parameter is for monitoring the system at source/processing facility. Determination of total viable counts shall start within 6 h of collection. If this is not practical, the sample shall be preserved at 4 ºC for not more than 6 h and analysed within 12 h from the time of collection.

7 Hygiene

7.1 Packaged mineral waters shall be collected, processed, packaged and marketed under hygienic conditions in accordance with Annex A.

7.2 The source of packaged mineral waters shall be protected from risks of pollution.

8 Packaging

8.1 Packaged mineral water shall be packaged in sealed retail containers suitable for preventing the possible adulteration or contamination of water and shall be in accordance with environmental regulations of partner states.

8.2 The package shall be made from food grade material and strong enough to withstand normal handling and transportation.

8.3 Packaged mineral water should not be packaged in opaque containers.

9 Labelling

9.1 General

In addition to the requirements given in CXS 1, the following specific labelling requirements shall apply and shall be legibly and indelibly labelled on the package:

a) name of the product as provided in 3.5;

b) composition of the product with at least the following: Na+, K+ Ca++, Mg++, Fe++, Cl-, SO42-F-, NO3;

c) pH;

d) total dissolved solids (TDS); and

e) net content in metric units.

9.2 Additional labelling requirements

If packaged natural mineral water has been subjected to ozonation treatment, the treatment shall be declared on the label.

9.3 Labelling prohibitions

9.3.1 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 properties of the product covered by the standard.

9.3.2 The name of the locality, hamlet or specified place may not form part of the trade name unless it refers to a mineral waters collected at the place designated by that trade name.

9.3.3 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 mineral waters put on sale, is prohibited.

10 Parameters required for minimum monitoring

10.1 Analysis of the parameters given in Table 6 may be deemed acceptable for the purpose of indicating ongoing levels of operational efficiency in a water treatment plant. However, a relevant authority may require additional tests.

Table 6 — Parameters required for minimum monitoring

S/N	Property	Test method
i.	Taste	Organoleptic test
ii.	Odour	
iii.	Turbidity	Table 1
iv.	Colour	
v.	pH value	
vi.	Fluoride as F-	
vii.	Nitrates (NO_3^--N)	
viii.	Aluminium	
ix.	Iron(total)	
x.	Total dissolved solids/Conductivity	Table 1/ISO 7888
xi.	Nitrites (NO_2^--N)	Table 2
xii.	Ammonia	
xiii.	Residual chlorine	
xiv.	Faecal coliform bacteria or E. coli	Table 5
xv.	Total viable count	

10.2 If abnormal results are encountered in any of these analyses, sampling frequency shall be increased and/or additional analyses carried out.

10.3 A consumer complaints register for the aesthetic qualities of the water shall be maintained.

11 Sampling

Sampling plan shall be done in accordance with Annex B.

Annex A
(normative)

Recommended hygienic practices

A.1 Field of application

This annex prescribes appropriate general techniques for collecting mineral waters, its treatment, bottling, packaging, storage, transport, distribution and sale for direct consumption, so as to guarantee a safe, healthy and wholesome product.

A.2 Prescriptions of the resources of mineral water

A.2.1 Protection of alimentary reservoirs and aquifers

A.2.1.1 Authorization

Packaged mineral water shall be recognized and approved as such by the relevant Authority having jurisdiction in the place of collection.

A.2.1.2 Determination of the genesis of mineral waters

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

A.2.1.3 Perimeter of protection

If possible areas wherein mineral waters might be polluted or its chemical and physical qualities otherwise deteriorated should be determined by a relevant authority. 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.

A.2.1.4 Protective measures

All possible precautions should be taken within the protected perimeters to avoid any pollution, or external influence on, the chemical and physical qualities of mineral waters.

It is recommended that regulations be established for the disposal of liquid, solid or gaseous waste, the use of substances that might deteriorate mineral waters (e.g. by agriculture) as well as for any possibility of accidental deterioration of mineral waters by natural occurrences such as a change in the hydrogeological conditions. Particular consideration should 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 should be taken into consideration, such as mining, hydraulic and engineering facilities etc.

A.2.2 Hygiene prescriptions for collection of mineral waters

A.2.2.1 Extraction

The withdrawal of mineral waters (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 mineral waters from entering or, should there be pumping facilities, prevent any extraneous water from entering by reducing the supply. The mineral waters thus collected or pumped should 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.2.2.2 Materials

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

A.2.2.3 Protection of the extraction area

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

A.2.2.4 Exploitation of natural mineral water

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

A.2.3 Maintenance of extraction facilities

A.2.3.1 Technical aspects

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

A.2.3.2 Equipment and reservoirs

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

A.2.3.3 Storage at the point of extraction

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

A.2.4 Transport of mineral waters within an establishment and from the source

Packaging at the source is preferred.

A.2.4.1 Means of transport, piping and reservoirs

Any vehicle, piping or reservoir used in the processing of mineral waters from its source to the bottling facilities, the latter included, should comply with 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 should allow easy cleaning.

A.2.4.2 Maintenance of vehicles and reservoirs

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

A.3 Establishment for processing mineral waters — Design and facilities

A.3.1 Location

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

A.3.2 Roadways and areas used by wheeled traffic

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

A.3.3 Building and facilities

A.3.3.1 Type of construction

Buildings and facilities should be of sound construction and maintained in good condition.

A.3.3.2 Disposition of holding facilities

Rooms for recreation, for storing or packaging of raw material and areas for the cleaning of containers to be reused should 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 mineral waters, should be stored apart from other material.

A.3.3.3 Working space

Adequate working space should be provided to allow for satisfactory performance of all operations.

A.3.3.4 Design

A.3.3.4.1 The design should be such as to permit easy and adequate cleaning and to facilitate proper supervision of mineral waters hygiene.

A.3.3.4.2 The buildings and facilities should be designed to provide separation by partition, location or other effective means between those operations, which may cause cross-contamination.

A.3.3.4.3 Buildings and facilities should be designed to facilitate hygienic operations by means of a regulated flow in the process from the arrival of the mineral waters at the premises to the finished product, and should provide for appropriate temperature conditions for the process and the product.

A.3.3.5 Mineral waters handling, storing and bottling areas

A.3.3.5.1 Floors

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

A.3.3.5.2 Walls

Where appropriate, 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 smoothened to facilitate cleaning.

A.3.3.5.3 Ceilings

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

A.3.3.5.4 Windows

Windows and other openings should 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.3.3.5.5 Doors

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

A.3.3.5.6 Stairs, lift cages and auxiliary structures

Such as platforms, ladders, chutes; should be so situated and constructed as not to cause contamination to food. Chutes should be constructed with inspection and cleaning hatches.

A.3.3.5.7 Piping

Piping for mineral waters lines should be independent of potable and non-potable water.

A.3.3.6 Overhead structures and fittings

In mineral waters handling areas all overhead structures and fittings should be installed in such a manner as to avoid contamination directly or indirectly of mineral waters and raw materials by condensation and drip, and should not hamper cleaning operations. They should 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 should be easy to clean.

A.3.3.7 Other structures

Living quarters, toilets and areas where animals are kept should be completely separated from and should not open directly to mineral waters handling areas.

A.3.3.8 Accessibility

Where appropriate, establishments should be so designed that access can be controlled.

A.3.3.9 Selection of construction materials

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

A.3.3.10 Canalization, drainage lines

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

A.3.3.11 Fuel storage area

Any storage area or tank for the storing of fuels such as coal or hydrocarbons should 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.3.4 Hygienic facilities

A.3.4.1 Water supply

A.3.4.1.1 Ample supply of potable water under adequate pressure and suitable temperature should be available with adequate facilities for its storage, where necessary, and distribution with adequate protection against contamination.

A.3.4.1.2 Mineral waters, potable water, non-potable water for steam production or for refrigeration or any other use should 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 mineral waters and mineral waters contact surfaces should contain no substances, which may be hazardous to health or may contaminate the food.

A.3.4.2 Effluent and waste disposal

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

A.3.4.3 Changing facilities and toilets

A.3.4.3.1 Adequate, suitable and conveniently located changing facilities and toilets should be provided in all establishments.

A.3.4.3.2 Toilets should be so designed as to ensure hygienic removal of waste matter. These areas should be well lighted, ventilated and where appropriate heated, and should not open directly to mineral waters handling areas.

A.3.4.3.3 Hand washing facilities with warm or hot and cold water, a suitable hand-cleaning preparation, and with suitable hygienic means of drying hands, should 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 should be provided.

A.3.4.3.4 Where paper towels are used, a sufficient number of dispensers and receptacles should be provided near each washing facility. Care should be taken that these receptacles for used paper towels are regularly emptied.

A.3.4.3.5 Taps of a non-hand operatable type are desirable. Notices should be posted directing personnel to wash their hands after using the toilet.

A.3.4.4 Hand washing facilities in mineral water processing areas

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

A.3.4.5 Disinfection facilities

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

A.3.4.6 Lighting

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

a) 540 lux (50 foot candles) at all inspection points;

b) 220 lux (20 foot candles) in work rooms; and

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

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

A.3.4.7 Ventilation

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

A.3.4.8 Facilities for storage of waste and inedible material

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

A.3.5 Equipment and utensils

A.3.5.1 Materials

All equipment and utensils used in mineral water handling areas and which may contact the natural mineral water should be made of material which does not transmit toxic substances, odour or taste, is non-absorbent, is resistant to corrosion and is capable of withstanding repeated cleaning and disinfection. Surfaces should be smooth and free from pits and crevices. The use of wood and other materials, which cannot be adequately cleaned and disinfected, should be avoided especially 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 should be avoided.

A.3.5.2 Hygienic design, construction and installation

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

A.4 Hygiene requirements for the establishment

A.4.1 Maintenance

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

A.4.2 Cleaning and disinfection

A.4.2.1 To prevent contamination of mineral water, all equipment and utensils should be cleaned as frequently as necessary and disinfected, whenever circumstances demand.

A.4.2.2 Adequate precautions should be taken to prevent 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 should be suitable for the purpose intended and should be acceptable to the official agency having jurisdiction. Any residues of these agents on a surface, which may come in contact with mineral water, should be removed by thorough rinsing with water, before they are or equipment is again used for handling mineral water.

A.4.2.3 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 mineral water handling areas should be thoroughly cleaned.

A.4.2.4 Changing facilities and toilets should be kept clean at all times.

A.4.2.5 Roadways and yards in the immediate vicinity and serving the premises should be kept clean.

A.4.3 Hygiene control programme

A permanent cleaning and disinfection schedule should 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 should preferably be a permanent member of the staff of the establishment and whose duties should be independent of production, should be appointed to be responsible for the cleanliness of the establishment. He/she should have a thorough understanding of the significance of contamination and the hazards involved. All cleaning personnel should be well trained in cleaning techniques.

A.4.4 Storage and disposal of waste

Waste material should be handled in such a manner as to avoid contamination of mineral water or potable water. Care should be taken to prevent access to waste by pests. Waste should be removed from the 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, should be cleaned and disinfected. The waste storage area should also be cleaned and disinfected.

A.4.5 Exclusion of animals

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

A.4.6 Pest control

A.4.6.1 There should be an effective and continuous programme for the control of pests. Establishments and surrounding areas should be regularly examined for evidence of infestation.

A.4.6.2 Should pests gain entrance to the establishment, eradication measures should be instituted. Control measures involving treatment with chemical, physical or biological agents should 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 mineral water, such measures should only be carried out in accordance with the recommendations of the official agency having jurisdiction.

A.4.6.3 Pesticides should only be used if other precautionary measures cannot be used effectively. Before pesticides are applied, care should be taken to safeguard mineral water equipment and utensils from contamination. After application, contaminated equipment and utensils should be thoroughly cleaned to remove residues prior to being used again.

A.4.7 Storage of hazardous substances

A.4.7.1 Pesticides or other substances, which may present a hazard to health, should be suitably labeled with a warning about their toxicity and use. They should 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 should be taken to avoid contamination of mineral water.

A.4.7.2 Except when necessary for hygienic or processing purposes, no substance which could contaminate mineral water should be used or stored in mineral water handling areas.

A.4.8 Personal effects and clothing

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

A.5 Personnel hygiene and health requirements

A.5.1 Hygiene training

Managers of establishments should arrange for adequate and continuing straining of all mineral handlers in hygienic handling of mineral water and in personal hygiene so that they understand the precautions necessary to prevent contamination of mineral water.

A.5.2 Medical examination

Persons who come into contact with natural mineral water in the course of their work should have a scheduled medical examination 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 mineral water handlers should be carried out at other times when clinically or epidemiologically indicated.

A.5.3 Communicable diseases

The management should 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 mineral water handling area in any capacity in which there is any likelihood of such a person directly or indirectly contaminating mineral water with pathogenic micro-organisms. Any person so affected should immediately report to the management.

A.5.4 Injuries

Any persons who has a cut or wound should not continue to handle mineral water or 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 should be provided for this purpose.

A.5.5 Washing of hands

Every person, while on duty in a natural mineral water handling area, should wash his hands frequently and thoroughly with a suitable hand cleaning preparation under running water. Hands should 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 should be washed and disinfected immediately. Notices requiring hand washing should be displayed. There should be adequate supervision to ensure compliance with this requirement.

A.5.6 Personal cleanliness

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

A.5.7 Personal behavior

Any behavior, which could result in contamination of mineral water, such as eating, use of tobacco, chewing (e.g. gum, sticks, betel nuts, etc) or unhygienic practices such as spitting, should be prohibited in mineral water handling areas.

A.5.8 Visitors

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

A.5.9 Supervision

Responsible for ensuring compliance by all personnel with all requirements of A.5.1 to A.5.8 inclusive should be specifically allocated to competent supervisory personnel.

A.6 Hygienic processing requirements for the establishment

A.6.1 Raw material

To guarantee a good and stable quality of mineral water, certain criteria should be monitored regularly:

a) spring discharge;

b) appearance;

c) odour and taste;

d) conductance;

e) microbiological flora; or

f) any other adequate parameter.

In case of non-compliance to the standard, necessary corrective measures should immediately be taken.

A.6.2 Treatment

A.6.2.1 The treatment may include decantation, filtration, airing and where necessary decarbonation.

A.6.2.2 Processing should be supervised by technically competent personnel.

A.6.2.3 All steps in the production process, including packaging, should 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.6.2.3 Rough treatment of containers should be avoided to prevent the possibility of contamination of the processed product.

A.6.2.4 Controls should be put in place to protect against contamination or development of a public health hazards and against deterioration within the limits of good commercial practice.

A.6.3 Packaging material and containers

A.6.3.1 All packaging material should be stored in a clean and hygienic manner. The material should be appropriate for the product to be packed and for the expected conditions of storage and should not transmit to the product objectionable substances beyond the limits acceptable to the official agency

having jurisdiction. The packaging material should be sound and should provide appropriate protection from contamination. Only packaging material required for immediate use should be kept in the packing or filling area.

A.6.3.2 Product containers should not have been used for any purpose that may lead to contamination of the product. In case of new containers if there is a possibility that they have been contaminated, should be cleaned and disinfected. When chemicals are used for these purposes, the container should be rinsed as prescribed under A.4.2.3. Containers should be well drained after rinsing. Used and, when necessary, unused containers should be inspected immediately before filling.

A.6.4 Filling and sealing of containers

A.6.4.1 Packaging should be done under conditions that preclude the introduction of contaminants into the product.

A.6.4.2 The methods, equipment and material used for sealing should guarantee a tight and impervious sealing and should not damage the containers nor deteriorate the chemical bacteriological and organoleptic qualities of mineral water.

A.6.5 Packaging of containers

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

A.6.6 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 mineral water produced under identical conditions, all packages of which should 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.6.7 Processing and production records

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

A.6.8 Storage and transport of the end product

The end-product should 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 should take place to ensure that only mineral water, which is fit for human consumption, is dispatched and that end-product specifications should be complied with.

Annex B
(informative)

Sampling plan for packaged mineral water

B.1 Requirements of sampling

B.1.1 General

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

a) sample shall be drawn in original sealed bottle/container and kept in protected place not exposed to damp air, dust or soot; and

b) each bottle/container shall be sealed and marked with full details of sampling.

B.1.2 Scale of sampling

B.1.2.1 The quantity of packaged mineral waters of the same type belonging to the same batch of manufacture and packed in a day, shall constitute a lot.

B.1.2.2 For ascertaining the conformity of the material to the requirements of the specification, samples shall be tested from each lot separately.

B.1.2.3 The number of containers 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 (L)	Sample size (2)
L ≤ 5000	3
5000 < L ≤ 10000	5
10000< L ≤ 15000	7
L> 15000	9

B.1.2.3.1 The containers shall be chosen at random from the lot. In order to ensure the randomness of selection, procedure given in ISO 24153;" Random sampling and randomization procedures shall be followed.

B.1.2.4 Initially the number of cartons equal to the number of containers to be taken from the lot (according to column 2 of Table B.1) shall be chosen at random. These cartons thus selected shall be opened and the containers 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 containers in the cartons opened are found satisfactory for these characteristics.

B.1.2.5 In case of any defective container is found according to B.1.2.4, twice the number of cartons shall be opened and the container examined for these characteristics. If no defective container is found, the lot shall be considered satisfactory of inspection of other characteristics given in the specification.

B.1.3 Preparation of test samples

B.1.3.1 From each of the cartons opened according to B.1.2.4, three containers shall be taken from its different layers so as to obtain three times the required number of containers in the sample (see col. 2 of Table B.1).

B.1.3.2 In case the number of cartons to be opened is according to B.1.2.4, the number of cartons equal to the number of containers in the sample shall be taken at random from these cartons and then the required number of containers picked up according to B.1.3.1.

B.1.3.3 The sample bottles selected as in B.1.3.1 or B.1.3.2 shall be divided at random into three equal sets and labeled with all the particulars of sampling. One of these sets of sampled containers shall be for the purchaser, another for vendor and the third for referee.

B.1.3.4 Referee sample shall consist of a set of sample containers marked for this purpose and shall bear the details 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.1.4 Criteria for conformity

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

Annex C
(informative)

Guidelines of water safety plan

C.1 General

Packaged mineral waters operators should develop, implement and maintain a water safety plan taking into consideration the potential risks to the safety of the water from the supply catchment area up to the consumer.

C.2 Key components of water safety plan

A water safety plan should consist of three key components:

a) system assessment to determine whether the mineral waters 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 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, documenting the system assessment (including upgrade and improvement), monitoring, communication plans and supporting programmes.

C.3 Water safety plan

A water safety plan should include:

a) measures to protect the source of drinking water from risks of pollution;

b) measures to ensure all installations intended for the production of drinking water exclude any possibility of contamination. For this purpose and in particular:

   (i) the installation for collection, the pipes and the reservoirs should 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 shall meet hygienic requirements;

c) measures to ensure an appropriate treatment such as pre-treatment processes, 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 should stop all operations until the cause of pollution is eliminated; and

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

C.4 Surveillance

C.4.1 Mineral waters producers should ensure, at all times, the quality and safety of the water that they produce. Public health surveillance (that is, surveillance of health status and trends) contributes to verifying drinking-water safety.

C.4.2 Adequate infrastructure, proper monitoring and effective planning and management; and a system of independent surveillance are basic and essential requirements to ensure the safety of mineral waters.

C.4.3 Surveillance should cover the total supply network from the source of untreated water to the consumer delivery points.

C.4.4 A sampling programme that takes into consideration appropriate international standards should be established and implemented. The sampling should be regular and its frequency should mainly depend on the following factors:

a) quality of water harnessed including effects on the water from climatic, human and industrial activities;

b) type of treatment for drinking worthiness;

c) volume of water processed;

d) risks of contamination;

e) background of public water supply network;

f) population served; and

g) capabilities of the analytical facility (both in terms of capacity and in terms of analytical performance).

Bibliography

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[2] WHO, *Guidelines for drinking water quality,* fourth edition 2011.

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