

**Indian Standard**  
**PACKAGED NATURAL MINERAL WATER- SPECIFICATION**  
**IS 13428:2005**  
**(Second Revision)**

### 1. SCOPE

This standard prescribes the requirements, methods of sampling and test for natural mineral waters offered for sale in packaged form for human consumption.

NOTE- It does not apply to natural mineral water sold or used for other purposes.

### 2. REFERENCES

The standards listed in Annex A contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated at Annex A.

### 3. DEFINITION

For the purpose of this standard the following definitions shall apply.

- 3.1 Natural Mineral Water – Water clearly distinguishable from ordinary drinking water because
- a) It is obtained directly from natural or drilled sources from underground water-bearing strata for which all possible precaution perimeters to avoid any pollution of, or external influence on the chemical and physical qualities.
  - b) It is characterized by its content of certain mineral salts and their relative proportions and the presence of trace elements or of other constituents.
  - c) Constancy of its compositions which guarantee the original microbiological purity and chemical composition of essential components.
  - d) It is packaged close to the point of emergence of the source with particular hygienic precautions
  - e) It is not subjected to any treatment other than those permitted by this standard.
- 3.1.1 Naturally Carbonated Natural Mineral Water – Natural mineral water which, after possible treatment in accordance with 4.1 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.
- 3.1.2 Non-carbonated Natural Mineral Water – Natural mineral water which, after possible treatment in accordance with 4.1 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.
- 3.1.3 Decarbonated Natural Mineral Water - Natural mineral water which, after possible treatment in accordance with 4.1 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.
- 3.1.4 Natural Mineral Water Fortified with Carbon Dioxide from the Source - Natural mineral water which, after possible treatment in accordance with 4.1 and after packaging, has more carbon dioxide content than that at emergence.

- 3.1.5 Carbonated Natural Mineral Water - Natural mineral water which, after possible treatment in accordance with 4.1 and after packaging, has been made effervescent by the addition of carbon dioxide from another origin.

NOTE – Mineral water means natural mineral water as defined in 3.1

- 3.2 Packaged Natural Mineral Water – Natural mineral water filled into hermetically sealed containers of various compositions, forms and capacities that is suitable for direct consumption without further treatment.

#### **4. TREATMENT AND HANDLING**

Treatments permitted include separation from unstable constituents, such as compounds containing iron, manganese, sulphur or arsenic, by decantation and/or simple filtration up to 0.5 microns, if necessary, accelerated by previous aeration.

The treatments provided in 3.1.1 to 3.1.5 and 4.1 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.

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

#### **5. HYGIENIC CONDITIONS**

Natural mineral water shall be collected; processed, handled, packaged and marketed in accordance with the hygienic practices given in Annex B. A check-list for good hygienic practices and food safety system for packaged natural mineral water processing units given at the end of Annex B.

#### **6. REQUIREMENTS**

'Escherichia coli' (or Thermotolerant bacteria) shall be absent in any 250 ml sample when tested in accordance with the method given in IS 5887 (Part1)\* or IS 15185.

Coliform, bacteria shall be absent in any 250 ml sample when tested in accordance with the method given in IS 5401 (Part 1)\* or IS 15185.

Faecal streptococci and Staphylococcus aureus, shall be absent in any 250 ml sample when tested in accordance with the method given in IS 5887 (Part 2)\* Streptococci (Enterococci) may also be tested by the method specified in IS 15186.

Sulphite reducing anaerobes, shall be absent in 50 ml sample when tested in accordance with the method given in Annex C.

Pseudomonas aeruginosa, shall be absent in 250 ml sample when tested in accordance with the method given in Annex D.

Yeast and Mould, shall be absent in 250 ml sample when tested in accordance with the method given in IS 5403.

Salmonella and Shigella, shall be absent in 250 ml sample when tested in accordance with the method given in IS 5887 (Part 3)\* and IS 5887 (Part 7) respectively. Salmonella may also be tested by the method specified in IS 15187.

Fibrio cholera and V parahaemolyticus, shall be absent in 250 ml sample when tested in accordance with the method given in IS 5887 (Part 5).

The membrane filtration technique outlined in IS 15188 may be used to pass the sample of water to be tested through membrane before the microbiological tests specified from 6.1.1 to 6.1.8 are carried out.

NOTE – In case of dispute, the method indicated by ‘\*’ in 6.1.1 to 6.1.3 and 6.1.7 shall be the reference method.

Natural mineral water shall also comply with the requirements given in Table 1, Table 2, Table 3 and Table 4.

Residues of pesticides for pesticides as given in Annex N shall be below the detectable limits. The analysis of pesticide shall be conducted by a recognized laboratory using internationally established test methods as given in Annex N.

## 7. PACKING

Natural mineral water shall be packed in clean, hygienic, colourless, transparent and tamperproof bottles/containers, made of polyethylene (PE) conforming to IS 10146 or polyvinyl chloride (PVC) conforming to IS 10151 or polypropylene conforming to IS 10910 or polyalkylene terephthalate (PET and PBT) conforming to IS 12252 or polycarbonate conforming to IS 14971 or polystyrene conforming to IS 10142 or sterile glass bottles suitable for preventing possible adulteration or contamination of the water. Plastic containers shall be conforming to IS 15410.

**Table 1: Organoleptic and Physical Parameters**

(Clause 6.2)

Sl.No.	Characteristic	Requirement	Method of Test. Ref to IS
1	2	3	4
i)	Colour, true colour unit, Max	2	3025 (Part 4)
ii)	Odour	Agreeable	3025 (Part 5)
iii)	Taste	Agreeable [Action tendency scale (a) or (b) or (c)]	3025 (Part 8)
iv)	Turbidity, NTU, Max	2	3025 (Part 10)
v)	Total dissolved solids, mg/l	150 to 700	3025 (Part 16)
vi)	pH value	6.5 to 8.5	3025 (Part 11)

Table 2 : General Parameters Concerning Substances Undesirable in Excessive Amounts

(Clause 6.2)

Sl. No.	Characteristic	Requirement	Method of Test, Ref to	
			Annex of this Standard	Other Standards
1	2	3	4	5
i)	Nitrate (as NO <sub>3</sub> ), mg/l, Max	50	-	3025 (Part 34)
ii)	Nitrite (as NO <sub>2</sub> ), mg/l, Max	0.02	-	3025 (Part 34)
iii)	Sulphide (as H <sub>2</sub> S), mg/l, Max	0.05	-	3025 (Part 29)
iv)	Manganese (as Mn), mg/l, Max	2.0	-	35 of IS 3025

Sl. No.	Characteristic	Requirement	Method of Test, Ref to	
			Annex of this Standard	Other Standards
v)	Copper (as Cu), mg/l, Max	1.0	-	3025 (Part 42)
vi)	Zinc (as Zn), mg/l, Max	5	-	3025 (Part 49)
vii)	Fluoride (as F), mg/l, Max	1.0	-	23 of IS 3025
viii)	Barium (as Ba), mg/l, Max	1.0	F* or IS 15302	-
ix)	Antimony (as Sb), mg/l, Max	0.005	G* or IS 15303	-
x)	Borate (as B), mg/l, Max	5	H	-
xi)	Silver (as Ag), mg/l, Max	0.01	J	-
xii)	Chloride (as Cl), mg/l, Max	200	-	3025 (Part 32)
xiii)	Sulphate (as SO <sub>2</sub> ), mg/l, Max	200	-	3025 (Part 24)
xiv)	Magnesium (as Mg), mg/l, Max	50	-	3025 (Part 46)
xv)	Calcium (as Ca), mg/l, Max	100	-	3025 (Part 40)
xvi)	Sodium (as Na), mg/l, Max	150	-	3025 (Part 45)
xvii)	Alkalinity (as HO <sub>3</sub> ), mg/l, Max	75 to 400	-	3025 (Part 23)
xviii)	Selenium (as Se), mg/l, Max	0.05	-	3025 (Part 56) or IS 15303*
xix)	Mineral oil, mg/l, Max	Absent	-	3025 (Part 39)
xx)	Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH)	Absent	-	3025 (Part 43)
xxi)	Anionic surface active agents	Not detectable	K	-

**NOTE – In case of dispute, the method indicated by “\*” shall be the reference method.**

Table 3 : Parameters Concerning Toxic Substances

**(Clause 6.2)**

Sl. No.	Characteristic	Re-quiremet	Method of Test, Ref to	
			Annex of this Standard	Other Standards
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
i)	Arsenic (as As), mg/l, Max	0.05	-	3025 (Part 37)
ii)	Cadmium (as Cd), mg/l, Max	0.003	-	3025 (Part 41)
iii)	Cyanide (as CN), mg/l, Max	Absent	-	3025 (Part 27)
iv)	Chromium (as Cr), mg/l, Max	0.05	J	-
v)	Mercury (as Hg), mg/l, Max	0.001	-	3025 (Part 48)
vi)	Lead (as Pb), mg/l, Max	0.01	-	3025 (Part 47)
vii)	Nickel (as Ni), mg/l, Max	0.02	L	-

Sl. No.	Characteristic	Re-quiremet	Method of Test, Ref to	
			Annex of this Standard	Other Standards
viii)	Polychlorinated biphenyle (PCB)	Not detectable	M	-
ix)	Polynuclear aromatic hydrocarbons	Not dettable	APHA 6440 1	

Table 4 : Parameters Concerning Radio Active Residues

**(Clause 6.2)**

Sl. No.	Characteristic	Requirement	Method of Test, Ref to IS
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
i)	Alpha emitters, Bq/l, Max	0.1	14194 (Part 2)
ii)	Beta emitters, Bq/l, Max	1	14194 (Part 1)

NOTE – In case of non-conformity of radio active residues, the source of water shall be abandoned and water shall be recalled immediately.

All packaging materials of plastic origin shall pass the overall migration and colour migration limits as laid down in the relevant Indian Standards for products for respective packaging materials when tested as per method given in IS 9845.

**8. MARKING**

The following particulars shall be marked legibly and indelibly on the label of the bottle/container ;

- a) Name of the product (that is packaged natural mineral water),
- b) Supplementary designations, if any,
- c) Name and address of the processor;
- d) Brand name, if any;
- e) Batch or Code number;
- f) Date of processing/packing;
- g) Best for consumption upto ... (date/ month/year in capital letters); or Best for consumption within days or months from the date of processing/packing.
- h) Net volume;
- i) Location and name of the source of natural mineral water;
- j) Direction for storage; and
- k) Any other markings required under the Standards of Weights and Measure (Packaged Commodities) Rules, 1977 and the Prevention of Food Adulteration Act, 1954 and the Rules framed there under.

**Labelling Prohibitions**

No claims concerning medicinal (preventative, alleviative or curative) effects shall be made in respect of the properties of the product covered by the standard. Claims of other beneficial effects related to the health of the consumer shall not be made.

The name of the locality, hamlet or specified place may not form part of the brand name unless it refers to packaged natural mineral water collected/processed at the place designated by that brand name.

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 natural mineral waters put on sale is prohibited.

#### **BIS Certification Marking**

The product may also be marked with the Standard Mark.

The use of the Standard Mark is governed by the provisions of Bureau of Indian Standards Act, 1986 and the Rules and Regulations framed thereunder. The details of the conditions under which the licence for use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

### **9. SAMPLING**

Representative samples of natural mineral water shall be drawn and the criteria for conformity to this standards shall be established, according to the method given in Annex E.

### **10. QUALITY OF REAGENTS**

Unless specified otherwise, pure chemicals and distilled water (see IS 1070) shall be employed in tests.

NOTE : 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

**ANNEX A**

**(Clause 2)**

**LIST OF REFERRED INDIAN STANDARDS**

<b>IS No.</b>	<b>Title</b>
1070 : 1992	Reagent grade water (third revision)
3025 : 1964	Methods of sampling and test (physical and chemical) for water used in industry.
3025	Methods of sampling and test (physical and chemical) for water and wastewater;
(Part 4) : 1983	Colour (first revision)
(Part 5) : 1983	Odour (first revision)
(Part 8) : 1984	Taste rating (first revision)
(Part 10) : 1984	Turbidity (first revision)
(Part 11) : 1983	pH value (first revision)
(Part 16) : 1984	Filterable residue (total dissolved solids) (first revision)
(Part 23) : 1986	Alkalinity (first revision)
(Part 24) : 1986	Sulphates (first revision)
(Part 27) : 1986	Cyanide (first revision)
(Part 29) : 1986	Sulphide (first revision)
(Part 32) : 1988	Chloride (first revision)
(Part 34) : 1988	Nitrogen (first revision)
(Part 37) : 1988	Arsenic (first revision)
(Part 39) : 1988	Oil and grease
(Part 40) : 1991	Calcium
(Part 41) : 1992	Cadmium (first revision)
(Part 42) : 1992	Copper (first revision)
(Part 43) : 1992	Phenols (first revision)
(Part 45) : 1993	Sodium and potassium (first revision)
(Part 46) : 1994	Magnesium (first revision)
(Part 47) : 1994	Lead (first revision)
(Part 48) : 1994	Mercury (first revision)
(Part 49) : 1994	Zinc (first revision)
(Part 56) : 2003	Selenium (first revision)
4905 : 1968	Methods for random sampling
5401 (Part 1) : 2002	Microbiology – General guidance for enumeration of coliforms; Part 1 Colony count technique (first revision)
5402 : 2002	Microbiology – General guidance for the enumeration of micro-organisms – Colony count technique at 30°C (first revision)

IS No.	Title
5403 : 1999	Method for yeast and mould count of foodstuffs and animal feeds (first revision)
5887	Method for detection of bacteria responsible for food poisoning;
(Part 1) : 1976	Isolation, identification and enumeration of Escherichia coli (first revision)
(Part 2) : 1976	Isolation, identification and enumeration of Staphylococcus aureus and faecal streptococci (first revision)
(Part 3) : 1999	General guidance on methods for detection of Salmonella (second revision)
(Part 5) : 1976	Isolation, identification and enumeration of Vibrio cholerae and V parahaemolyticus (first revision)
(Part 7) : 1999	General guidance on methods for isolation and identification of Shigella
9845 : 1998	Determination of overall migration of constituents of plastic materials and articles intended to come in contact with foodstuffs – Method of analysis (second revision)
10142 : 1999	Polystyrene (crystal and high impact) for its safe use in contact with foodstuffs, pharmaceuticals and drinking water (first revision)
10146 : 1982	Polyethylene for its safe use in contact with food stuffs, pharmaceuticals and drinking water.
10151 : 1982	Polyvinyl chloride (PVC) and its copolymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
10500 : 1991	Drinking water (first revision)
10910 : 1984	Polypropylene and its co-polymers for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
12252 : 1987	Polyalkylene terephthalates (PET and PBT) for their safe use in contact with foodstuffs, pharmaceuticals and drinking water
14194	Radionuclides in environmental samples – Methods of estimation :
(Part 1) : 1994	Gross beta activity measurement
(Part 2) : 1994	Gross alpha activity measurement
14971 : 2001	Polycarbonate resins for its safe use in contact with foodstuffs, pharmaceuticals and drinking water
15185 : 2002	Water quality – Detection and enumeration of Escherichia coli and coliform bacteria – Membrane filtration method
15186 : 2002	Water quality – Detection and enumeration of intestinal enterococci – Membrane filtration method
15187 : 2002	Water quality – Detection of salmonella species
15188 : 2002	Water quality – General guide to the enumeration of micro-organisms by culture
15302 : 2002	Determination of aluminium and barium in water by direct nitrous oxide-acetylene flame atomic absorption spectrometry
15303 : 2002	Determination of antimony, iron and selenium in water by electrothermal atomic absorption spectrometry method
15410 : 2003	Containers for packaging of natural mineral water and packaged drinking water – Specification.



## **ANNEX B**

### **(Clause 5)**

#### **HYGIENIC PRACTICES**

##### **B-1 FIELD OF APPLICATION**

The hygienic practices cover appropriate general techniques for collecting natural mineral water, its treatment, bottling, packaging, storage, transport, distribution and sale for direct consumption, so as to guarantee a safe, healthy and wholesome product.

##### **B-2 PRESCRIPTIONS OF THE RESOURCES OF NATURAL MINERAL WATER**

###### **B-2.1 Protection of Alimentary Reservoirs and Aquifers**

###### **B-2.1.1 Authorization**

Any spring, well or drilling intended for the collection of natural mineral water should be approved by the Local Health Authority or any other agency having jurisdiction for the region.

###### **B-2.1.2 Determination of the Genesis of Natural Mineral Water**

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

###### **B-2.1.3 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.

###### **B-2.1.4 Protective Measures**

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.

It is recommended that regulations be established for the disposal of liquid, solid or gaseous waste, the use of substances that might deteriorate natural mineral water as well as any possibility of accidental deterioration of natural mineral water by natural occurrences such as a change in the hydrogeological conditions. Particular consideration should be given to the following potential pollutants such as 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 arising out of mining, hydraulic and engineering facilities etc. should be taken into consideration.

###### **B-2.2 Hygiene Prescriptions for Collection of Natural Mineral Water**

###### **B-2.2.1 Extraction**

The withdrawal of natural mineral water shall be performed in conformity with the hydrogeological conditions in such a manner as to prevent any water other than the natural mineral water from entering or, should there be pumping facilities, prevent any extraneous water from entering. The natural mineral water thus collected or pumped should be protected in such a way that it is not polluted (whether caused by natural occurrence or actions or neglect or ill will).

###### **B-2.2.2 Materials**

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

### **B-2.2.3 Protection of the Extraction Area**

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

### **B-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 natural mineral water should 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 should be carried out and recorded (for example, electrical conductance, temperature, content of carbon dioxide) or frequent partial analysis should be done.

## **B-2.3 Maintenance of Extraction Facilities**

### **B-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 natural mineral water. From the hygiene standpoint, servicing of the extraction installations should meet the same requirements as those required for the bottling or for treatment.

### **B-2.3.2 Equipment and Reservoirs**

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

### **B-2.3.3 Storage at the Point of Extraction**

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

## **B-2.4 Transport of Natural Mineral Water**

### **B-2.4.1 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, 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 by disinfection; it should allow easy cleaning.

### **B-2.4.2 Maintenance of Vehicles and Reservoirs**

Any vehicle or reservoir should 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.

## **B-3 ESTABLISHMENT FOR PROCESSING NATURAL MINERAL WATERS – DESIGN AND FACILITIES**

### **B-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.

### **B-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 in accordance with B-2.2 where appropriate. Adequate road signals may be provided to call the attention of road users to the existence of natural mineral water extraction area.

### **B-3.3 Building and Facilities**

#### **B-3.3.1 Type of Construction**

Buildings and facilities should be of sound construction in accordance with the provisions of B-2.2 and maintained in good repair.

#### **B-3.3.2 Disposition of Holding Facilities**

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

**B-3.3.3** Adequate working space should be provided to allow for satisfactory performance of all operations.

**B-3.3.4** The design should be such as to permit easy and adequate cleaning and to facilitate proper supervision of hygiene of natural mineral water.

**B-3.3.5** 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.

**B-3.3.6** Buildings and facilities should 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 should provide for appropriate temperature conditions for the process and the product.

#### **B-3.3.7 Natural Mineral Water Handling. Storing and Bottling Areas**

##### **B-3.3.7.1 Floors**

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

##### **B-3.3.7.2 Walls**

Where appropriate, should be of water-proof, non-absorbent, washable and non-toxic material 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 smoothen to facilitate cleaning.

##### **B-3.3.7.3 Ceilings**

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

##### **B-3.3.7.4 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 condition. Internal window sills, if present, should be sloped to prevent use as shelves.

##### **B-3.3.7.5 Doors**

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

##### **B-3.3.7.6 Stairs, lift cages and auxiliary structures**

Platforms, ladders, chutes, should be so situated and constructed as not to cause contamination. Chutes should be constructed with provision of inspection and cleaning hatches.

##### **B-3.3.7.7 Piping**

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

**B-3.3.8** In natural s should 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 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.

**B-3.3.9** Living quarters, toilets and areas where animals are kept should be completely separated from and should not open directly on to natural mineral water handling areas.

**B-3.3.10** Where appropriate, establishments should be so designed that access can be controlled.

**B-3.3.11** 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.

#### **B-3.3.12 Canalization, Drainage Lines**

Canalization, 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.

#### **B-3.3.13 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.

### **B-3.4 Hygienic Facilities**

#### **B-3.4.1 Water Supply**

**B-3.4.1.1** Ample supply of potable water under adequate pressure and of suitable temperature should be available with adequate facilities for its storage, where necessary, and distribution with adequate protection against contamination. The potable water should conform to the standard for drinking water (see IS 10500).

**B-3.4.1.2** Natural mineral water, 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 natural mineral water and also natural mineral water contact surfaces should contain no substances which may be hazardous to health or may cause contamination.

#### **B-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.

#### **B-3.4.3 Changing Facilities and Toilets**

Adequate, suitable and conveniently located changing facilities and toilets should be provided in all establishments. Toilets should be so designed as to ensure hygienic removal of waste matter. These areas should be well lighted, ventilated and should not open directly on 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, 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. 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. Taps of a non-hand operatable type are desirable. Notices should be posted directing personnel to wash their hands after using the toilet.

#### **B-3.4.4 Hand Washing Facilities in Natural 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.

#### **B-3.4.5 Disinfection Facilities**

Where appropriate, adequate facilities for 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.

#### **B-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 natural mineral water in any stage of production should be of a safer type and protected to prevent contamination of natural mineral water in case of breakage.

#### **B-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 air flow 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.

#### **B-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 natural mineral water, potable water, equipment, buildings or roadways on the premises.

### **B-3.5 Equipment and Utensils**

#### **B-3.5.1 Material**

All equipment and utensils used in natural 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 can not be adequately cleaned and disinfected should be avoided except when their use would not 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.

#### **B-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.

## **B-4 ESTABLISHMENT : HYGIENE REQUIREMENTS**

### **B-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.

## **B-4.2 Cleaning and Disinfection**

**B-4.2.1** Cleaning and disinfection should meet the requirements of this standard.

**B-4.2.2** To prevent contamination of natural mineral water, all equipment and utensils should be cleaned as frequently as necessary and disinfected, whenever circumstances demand.

**B-4.2.3** Adequate precautions should 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 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 natural mineral water should be removed by through rinsing with water, before the area or equipment is again used for handling natural mineral water.

**B-4.2.4** 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 should be thoroughly cleaned.

**B-4.2.5** Changing facilities and toilets should be kept clean at all times.

**B-4.2.6** Roadways and yards in the immediate vicinity of and serving the premises should be kept lean.

## **B-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 should have a thorough understanding of; the significance of contamination and the hazards involved. All cleaning personnel should be well-trained in cleaning techniques.

## **B-4.4 Storage and Disposal of Waste**

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

## **B-4.5 Exclusion of Animals**

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

## **B-4.6 Pest Control**

**B-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.

**B-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 through 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 should only be carried out in accordance with the recommendations of the official agency having jurisdiction.

**B-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 natural 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.

## **B-4.7 Storage of Hazardous Substances**

**B-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 natural mineral water.

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

#### **B-4.8 Personal Effects and Clothing**

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

### **B-5 PERSONNEL HYGIENE AND HEALTH REQUIREMENTS**

#### **B-5.1 Hygiene Training**

Managers of establishments should arrange for adequate and continuing training of all natural mineral water handlers in hygienic handling of natural mineral water 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.

#### **B-5.2 Medical Examination**

Persons who come into contact with natural mineral water in the course of their work should 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 should be carried out periodically and when clinically or epidemiologically indicated.

#### **B-5.3 Communicable Diseases**

The management should take care to ensure that no person, whether known or suspected to be suffering from, or to be a carrier of a disease likely to be transmitted or afflicted with infected wounds, skin infections, sores or 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 should immediately report to the management.

#### **B-5.4 Injuries**

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

#### **B-5.5 Washing of Hands**

Every person, while on duty in a natural mineral water handling area, should wash hands frequently and thoroughly with a suitable hand cleaning preparation under running warm 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.

#### **B-5.6 Personal Cleanliness**

Every person engaged in a natural 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 natural 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 natural mineral water.

#### **B-5.7 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, should be prohibited in natural mineral water handling areas.

#### **B-5.8 Visitors**

Precautions should be taken to prevent as far as possible visitors from visiting natural water handling areas. If unavoidable, visitors should observe the provisions recommended in B-4.8, B-5.3, B-5.4 and B-5.7.

#### **B-5.9 Supervision**

Responsible for ensuring compliance by all personnel with all requirements of B-5.1 to B-5.8 and the responsibility should be specifically allocated to competent supervisory personnel.

### **B-6 ESTABLISHMENT: HYGIENIC PROCESSING REQUIREMENTS**

#### **B-6.1 Raw Material Requirements**

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

**B-6.1.1** Spring discharge, temperature of the natural mineral water.

**B-6.1.2** Appearance of the natural mineral water.

**B-6.1.3** Odour and taste of the natural mineral water.

**B-6.1.4** The conductance of natural mineral water or any other adequate parameter.

**B-6.1.5** The microbiological flora.

**B-6.2** Should there be a perceptible lack in meeting the requirements, the necessary corrective measures are immediately to be taken.

#### **B-6.3 Treatment**

The treatment may include decantation, filtration, airing and where necessary application of off take of carbon dioxide.

**B-6.3.1** Processing should be supervised by technically competent personnel.

**B-6.3.2** 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 development of pathogenic and, spoilage micro-organisms.

**B-6.3.3** Rough treatment of containers should be avoided to prevent the possibility of contamination of the processed product.

**B-6.3.4** Treatment are necessary controls and should be such as to protect against contamination or development of a public health hazard. It also protect against deterioration within the limits of good commercial practice.

#### **B-6.4 Packaging Material and Containers**

**B-6.4.1** 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 specified. 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 of filling area.



**B-6.4.2** 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 B-4.2.3. Containers should be well drained after rinsing. Used and, when necessary unused containers should be inspected immediately before filling.

#### **B-6.5 Filling and Sealing of Containers**

**B-6.5.1** Packaging should be done under conditions that preclude the introduction of contaminants into the product.

**B-6.5.2** The methods, equipment and material used for sealing should guarantee a tight and impervious sealing and should not damage the containers, nor deteriorate the physical, chemical, microbiological and organoleptic qualities of natural mineral water.

#### **B-6.6 Packaging of Containers**

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

#### **B-6.7 Lot Identification**

Each container shall be permanently marked with code to identify the producing factory and the lot. A lot is quantity of natural 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 processing line or other critical processing unit.

#### **B-6.8 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 or longer if required. Records should also be kept for the initial distribution by lot.

#### **B-6.9 Product Durability**

Product durability shall be declared on the container as per 8.1(g). It shall be based on in house self life study and proper checks and records be maintained for the conformity of the declared product durability.

#### **B-6.10 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 natural mineral water which is fit for human consumption is dispatched and that end-product specifications are complied with.

CHECKLIST FOR GOOD HYGIENE PRACTICES AND FOOD SAFETY SYSTEMS FOR PACKAGED NATURAL MINERAL WATER PROCESSING UNITS.

ANNEX C (Clause 6.1.4)  
DETECTION AND ENUMERATION OF THE SPORES OF SULPHITE-REDUCING ANAEROBES (CLOSTRIDIA)

ANNEX D (Clause 6.1.5)  
DETECTION AND ENUMERATION OF PSEUDOMONAS AERUGINOSA

ANNEX 2D (Clauses D-1 and D-10)  
FURTHER INFORMATION ABOUT PSEUDOMONAS AERUGINOSA

ANNEX E (Clause 9)  
SAMPLING PLAN FOR PACKAGE NATURAL MINERAL WATER

ANNEX F [Table 2, Sl. No. (viii)]  
DETERMINATION OF BARIUM CONTENT

ANNEX G [Table 2, Sl. No. (ix)]  
DETERMINATION OF ANTIMONY BY SPECTROPHOTOMETRIC METHOD

ANNEX H [Table 2, Sl. No.(x)]  
DETERMINATION OF BORATE

ANNEX J [Table 2, Sl. No. (xi) and Table 3, Sl. No. (iv)]  
DETERMINATION OF SILVER AND CHROMIUM CONTENTS

ANNEX K [Table 2, Sl. No. (xxi)]  
METHOD OF TEST FOR ANIONIC SURFACE ACTIVE AGENT

ANNEX L [Table 3, Sl. No. (vii)]  
DETERMINATION OF NICKEL BY FLAME ATOMI ABSORPTION SEPCTROMETRIC METHOD

ANNEX M [Table 3, Sl. No. (viii)]  
TEST FOR POLYCHLOROBIPHENYLES (PCB)

ANNEX N (Clause 6.3)  
STANDARDS ON METHODS OF RESIDUE ANALYSIS

ANNEX E (Clause 7.1)  
Guidelines for Handling of Polyethylene Flexible Film Meant for Packing of Packaged Drinking Water in Pouches