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(पहला पुनरीक्षण)

Indian Standard

DRINKING WATER — SPECIFICATION

(First Revision)

(Incorporating Amendment No. 1)

UDC 628.1.033

BUREAU OF INDIAN STANDARDS
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Price Group 4

Water Sectional Committee, CHD 13

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Water Sectional Committee had been approved by the Chemical Division Council.

This standard was originally published in 1983. The current revision has been undertaken to take into account the uptodate information available about the nature and effect of various contaminants as also the new techniques for identifying and determining their concentration. In this revision based on experience gained additional requirements for alkalinity, aluminium and boron have been incorporated and the permissible limits for dissolved solids, nitrate and pesticides residues have been modified.

A report prepared by the World Health Organization in cooperation with the World Bank showed that in 1975, some 1 230 million people were without safe water supplies. These appalling facts were central to the United Nations decision to declare an International Drinking Water Supply and Sanitation decade, beginning in 1981. Further, the VI Five-Year Plan of India had made a special provision for availability of safe drinking water for the masses. Therefore, this standard was prepared with the following objectives:

a) To assess the quality of water resources, and

b) To check the effectiveness of water treatment and supply by the concerned authorities.

During VII Five-Year Plan, 55 mini mission districts were identified with a view to meet supply of water to all the problem villages. The VIII Five-Year Plan intends to provide safe drinking water to the rural mass. It also propose to ensure supply of desired quality land required quantity of drinking water.

While preparing this standard, the Committee had taken note of the limited testing facilities available in the country. This standard, therefore, categories various characteristics as essential or desirable. The standard also mentions the desirable limit and indicates its background so that the implementing authorities may exercise their discretion, keeping in view the health of the people, adequacy of treatment, etc. All essential characteristics should be examined in routine. Besides, all desirable characteristics should be examined either when a doubt arises or the potability of water from a new source is to be established.

It has been recognised that often it is necessary to relax the specifications, especially when no alternate resources are available and therefore, to enable the experts to exercise their discretion a maximum permissible limit has also been given.

In the case of virological examination, if not even one plaque-forming unit (PFU) of virus can be found in 1 litre of water, it can reasonably be assumed that the water is safe to drink. It would, however, be necessary to examine a sample of the order of 10 litres to obtain a proper estimation of the PFUs at this level. Such examinations cannot be made in ordinary control laboratories but there should be at least one laboratory in the country or region capable of carrying out virus examinations and also of pursuing further research on this subject.

The methods of test for various characteristics mentioned in this standard are currently under revision and their latest revision shall be used in testing.

In the formulation of this standard, assistance has been derived from the following publications:

a) International Standards for Drinking Water issued by World Health Organization, 1984 Geneva;

b) Manual of Standards of Quality for Drinking Water Supplies. Indian Council of Medical Research, 1971, New Delhi; and

c) Manual on Water Supply and Treatment (*third revision*), Ministry of Urban Development, 1989, New Delhi.

This edition 2.1 incorporates Amendment No. 1 (January 1993). Side bar indicates modification of the text as the result of incorporation of the amendment.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard
DRINKING WATER — SPECIFICATION
(First Revision)

1 SCOPE

The standard prescribes the requirements for the essential and desirable characteristics required to be tested for ascertaining the suitability of water for drinking purpose.

2 REFERENCES

The Indian Standard listed in Annex A are necessary adjuncts to this standard.

3 CHARACTERISTICS

3.1 The test characteristics are given in Table 1.

3.2 Bacteriological Examination

3.2.1 *Water in Distribution System*

Ideally, all samples taken from the distribution system including consumers' premises, should be free from coliform organisms. In practice, this is not always attainable, and the following standard for water collected in the distribution system is therefore recommended when tested in accordance with IS 1622 : 1981.

a) Throughout any year, 95 percent of samples should not contain any coliform organisms in 100 ml;

b) No sample should contain E. Coli in 100 ml;

c) No sample should contain more than 10 coliform organisms per 100 ml; and

d) Coliform organisms should not be detectable in 100 ml of any two consecutive samples.

3.2.1.1 If any coliform organisms are found the minimum action required is immediate resampling. The repeated finding of 1 to 10 coliform organisms is 100 ml or the appearance of higher numbers in individual samples suggests that undesirable material is gaining access to the water and measures should at once be taken to discover and remove the source of the pollution.

3.2.2 *Unpiped Water Supplies*

Where it is impracticable to supply water to consumers through a piped distribution network and where untreated sources, such as wells, boreholes and springs which may not be naturally pure, have to be used, the requirements for piped supplies may not be attainable. In such circumstances, disinfection although desirable is not always practicable, and considerable reliance has to be placed on sanitary inspection and not exclusively on the results of bacteriological examination. Everything possible should be done to prevent pollution of the water. Obvious sources of contamination should be removed from the immediate catchment area, special attention being given to the safe disposal of excrement. Wells and storage tanks should be protected by lining and covering, surface drainage should be diverted, erosion prevented and the surrounding area paved. Access of man and animals should be restricted by fencing, and should be so designed that fouling is prevented when drawing water. Although not supplied through pipes, water from such sources is likely to undergo further deterioration in quality during transport or storage before drinking. Containers used for water should be kept clean, covered and clear of the floor. The most important factor in achieving these objectives is to ensure the cooperation of the local community, and the importance of education in simple sanitary hygiene should be strongly stressed. In hospitals or medical clinics with such supplies, the value of some form of treatment is stressed.

3.2.2.1 Bacteriologically, the objective should be to reduce the coliform count to less than 10 per 100 ml, but more importantly, to ensure the absence of faecal coliform organisms. If these organisms are repeatedly found, or if sanitary inspection reveals obvious sources of pollution which cannot be avoided, then an alternative source of drinking water would be sought, whenever possible. Greater use should be made of protected ground-water sources and rain-water catchment which are more likely to meet requirements for potable water quality.

3.2.2.2 Although private sources of drinking water may be outside the jurisdiction of public health and water supply authorities, such supplies should still be of potable quality. The results of bacteriological tests and those of sanitary surveys should therefore be used to encourage improvement. Partial treatment may be necessary to remove turbidity even when coliform counts are low; and other quality criteria may dictate the need for treatment processes.

3.3 Virological Examination

3.3.1 It is theoretically possible that virus disease can be transmitted by water free from coliform organisms, but conclusive evidence, that this has occurred, is lacking.

Table 1 Test Characteristics For Drinking Water

(*Clause* 3.1)

Sl No.	Substance or Characteristic	Requirement (Desirable Limit)	Undesirable Effect Outside the Desirable Limit	Permissible Limit in the Absence of Alternate Source	Methods of Test (Ref to IS)	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Essential Characteristics						
i)	Colour, Hazen units, *Max*	5	Above 5, consumer acceptance decreases	25	3025 (Part 4) : 1983	Extended to 25 only if toxic substances are not suspected, in absence of alternate sources
ii)	Odour	Unobjectionable	—	—	3025 (Part 5) : 1983	a) Test cold and when heated b) Test at several dilutions
iii)	Taste	Agreeable	—	—	3025 (Part 7 and 8) : 1984	Test to be conducted only after safety has been established
iv)	Turbidity, NTU, *Max*	5	Above 5, consumer acceptance decreases	10	3025 (Part 10) : 1984	—
v)	*p*H value	6.5 to 8.5	Beyond this range the water will affect the mucous membrane and/or water supply system	No relaxation	3025 (Part 11) : 1984	—
vi)	Total hardness (as $CaCO_3$) mg/l, *Max*	300	Encrustation in water supply structure and adverse effects on domestic use	600	3025 (Part 21) : 1983	—
vii)	Iron (as Fe) mg/l, *Max*	0.3	Beyond this limit taste/appearance are affected, has adverse effect on domestic uses and water supply structures, and promotes iron bacteria	1.0	**32** of 3025 : 1964	—
viii)	Chloride (as Cl) mg/l, *Max*	250	Beyond this limit, test, corrosion and palatibility are affected	1 000	3025 (Part 32) : 1988	—
ix)	Residual, free chlorine, mg/l, *Min*	0.2	—	—	3025 (Part 26) : 1986	To be applicable only when water is chlorinated. Tested at consumer end. When protection against viral infection is required, it should be *Min* 0.5 mg/l.
x)	Fluoride (as F) mg/l, *Max*	1.0	Fluoride may be kept as low as possible. High fluoride may cause fluorosis	1.5	**23** of 3025 : 1964	—
Desirable Characteristics						
xi)	Dissolved solids mg/l, *Max*	500	Beyond this palatability decreases and may cause gastro intestinal irritation	2 000	3025 (Part 16) : 1984	—
xii)	Calcium (as Ca) mg/l, *Max*	75	Encrustation in water supply structure and adverse effects on domestic use	200	3025 (Part 40) : 1991	—

Table 1 Test Characteristics for Drinking Water (*Contd*)

Sl No.	Substance or Characteristic	Requirement (Desirable Limit)	Undesirable Effect Outside the Desirable Limit	Permissible Limit in the Absence of Alternate Source	Methods of Test (Ref to IS)	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
xiii)	Magnesium (as Mg), mg/l, *Max*	30	Encrustation to water supply structure and adverse effects on domestic use	100	**16**, **33**, **34** of IS 3025 : 1964	—
xiv)	Copper (as Cu) mg/l, *Max*	0.05	Astringent taste, discoloration and corrosion of pipes, fitting and utensils will be caused beyond this	1.5	**36** of 3025 : 1964	—
xv)	Manganese (as Mn) mg/l, *Max*	0.1	Beyond this limit taste/appearance are affected, has adverse effect on domestic uses and water supply structures	0.3	**35** of 3025 : 1964	—
xvi)	Sulphate (as SO_4) mg/l, *Max*	200	Beyond this causes gastro intenstinal irritation when magnesium or sodium are persent	400 (*see* col 7)	3025 (Part 24) : 1986	May be extended up to 400 provided (as Mg) does not exceed 30
xvii)	Nitrate (as NO_2) mg/l, *Max*	45	Beyond this metha-emoglobinemia takes place	100	3025 (Part 34) : 1988	—
xviii)	Phenolic compounds (as C_6H_5OH) mg/l, *Max*	0.001	Beyond this, it may cause objectionable taste and odour	0.002	**54** of 3025 : 1964	—
xix)	Mercury (as Hg) mg/l, *Max*	0.001	Beyond this, the water becomes toxic	No relaxation	(*see* Note) Mercury ion analyser	To be tested when pollution is suspected
xx)	Cadmium (as Cd), mg/l, *Max*	0.01	Beyond this, the water becomes toxic	No relaxation	(*see* Note)	To be tested when pollution is suspected
xxi)	Selenium (as Se), mg/l, *Max*	0.01	Beyond this, the water becomes toxic	No relaxation	**28** of 3025 : 1964	To be tested when pollution is suspected
xxii)	Arsenic (as As), mg/l, *Max*	0.05	Beyond this, the water becomes toxic	No relaxation	3025 (Part 37) : 1988	To be tested when pollution is suspected
xxiii)	Cyanide (as CN), mg/l, *Max*	0.05	Beyond this limit, the water becomes toxic	No relaxation	3025 (Part 27) : 1986	To be tested when pollution is suspected
xxiv)	Lead (as Pb), mg/l, *Max*	0.05	Beyond this limit, the water becomes toxic	No relaxation	(*see* Note)	To be tested when pollution/plumbo-solvency is suspected
xxv)	Zinc (as Zn), mg/l, *Max*	5	Beyond this limit it can cause astringent taste and an opalescence in water	15	**39** of 3025 : 1964	To be tested when pollution is suspected
xxvi)	Anionic detergents (as MBAS) mg/l, *Max*	0.2	Beyond this limit it can cause a light froth in water	1.0	Methylene-blue extraction method	To be tested when pollution is suspected
xxvii)	Chromium (as Cr^{6+}) mg/l, *Max*	0.05	May be carcinogenic above this limit	No relaxation	**38** of 3025 : 1964	To be tested when pollution is suspected

(*continued*)

Table 1 Test Characteristics for Drinking Water (*concluded*)

Sl No.	Substance or Characteristic	Requirement (Desirable Limit)	Undesirable Effect Outside the Desirable Limit	Permissible Limit in the Absence of Alternate Source	Methods of Test (Ref to IS)	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
xxviii)	Polynuclear aromatic hydrocarbons (as PAH) g/l, *Max*	—	May be carcinogenic	—	—	—
xxix)	Mineral oil mg/l, *Max*	0.01	Beyond this limit undesirable taste and odour after chlorination take place	0.03	Gas chromatographic method	To be tested when pollution is suspected
xxx)	Pesticides mg/l, *Max*	Absent	Toxic	0.001	—	—
xxxi)	Radioactive materials:				**58** of 3025 : 1964	
	a) Alpha emitters Bq/l, *Max*	—	—	0.1	—	—
	b) Beta emitters pci/l, *Max*	—	—	1	—	—
xxxii)	Alkalinity mg/l, *Max*	200	Beyond this limit taste becomes unpleasant	600	**13** of 3025 : 1964	—
xxxiii)	Aluminium (as Al), mg/l, *Max*	0.03	Cumulative effect is reported to cause dementia	0.2	**31** of 3025 : 1964	—
xxxiv)	Boron, mg/l, *Max*	1	—	5	**29** of 3025 : 1964	—

NOTE — Atomic absorption spectrophotometric method may be used.

3.3.2 None of the generally accepted sewage treatment methods yield virus-free effluent. Although a number of investigators have found activated sludge treatment to be superior to trickling filters from this point of view, it seems possible that chemical precipitation methods will prove to be the most effective.

3.3.3 Virus can be isolated from raw water and from springs. Enterovirus, reovirus, and adenovirus have been found in water, the first named being the most resistant to chlorination. If enterovirus are absent from chlorinated water, it can be assumed that the water is safe to drink. Some uncertainty still remains about the virus of infectious hepatitis, since it has not so far been isolated but in view of the morphology and resistance of enterovirus it is likely that, if they have been inactivated hepatitis virus will have been inactivated also.

3.3.4 An exponential relationship exists between the rate of virus inactivation and the redox potential. A redox potential of 650 mV (measured between platinum and calomel electrodes) will cause almost instantaneous inactivation of even high concentrations of virus. Such a potential can be obtained with even a low cencentration of free chlorine, but only with an extremely high concentration of combined chlorine. This oxidative inactivation may be achieved with a number of other oxidants also, for example, iodine, ozone, and potassium permanganate, but the effect of the oxidants will always be counteracted if reducing components, which are mainly organic, are present. As a consequence, the sensitivity of virus towards desinfectants will depend on the *milieu* just as much as on the particular disinfectant used.

3.3.5 Thus, in a water in which free chlorine is present, active virus will generally be absent if coliform organisms are absent. In contrast, because the difference between the resistance of coliform organisms and of virus to disinfection by oxidants increases with increasing concentration of reducing components, for example, organic matter, it cannot be assumed that the absence of viable coliform organisms implies freedom from active virus under circumstances where a free chlorine residual cannot be maintained. Sedimentation and slow sand filtration in themselves may contribute to the removal of virus from water.

3.3.6 In practice, 0.5 mg/l of free chlorine for one hour is sufficient to inactivate virus, even in water that was originally polluted.

3.4 Biological Examination

3.4.1 Biological examination is of value in determining the causes of objectionable tastes and odours in water and controlling remedial treatments, in helping to interpret the results of various chemical analysis, and in explaining the causes of clogging in distribution pipes and filters. In some instances, it may be of use in demonstrating that water from one source has been mixed with that from another.

3.4.2 The biological qualities of a water are of greater importance when the supply has not undergone the conventional flocculation and filtration processes, since increased growth of methane-utilizing bacteria on biological slimes in pipes may then be expected, and the development of bryozoal growths such as *Plumatella* may cause operational difficulties.

3.4.3 Some of the animalcules found in water mains may be free-living in the water, but others such as *Dreissena* and *Asellus* are more or less firmly attached to the inside of the mains. Although these animalcules are not themselves pathogenic, they may harbour pathogenic organisms or virus in their intestines, thus protecting these pathogens from destruction by chlorine.

3.4.4 Chlorination, at the dosages normally employed in waterworks, is ineffective against certain parasites, including amoebic cysts; they can be excluded only by effective filtration or by higher chlorine doses than can be tolerated without subsequent dechlorination. *Amoebiasis* can be conveyed by water completely free from enteric bacteria; microscopic examination after concentration is, therefore, the only safe methods of identification.

3.4.5 Strict precautions against back-syphonage and cross-connections are required if amoebic cysts are found in a distribution system containing tested water.

3.4.6 The *cercariae of schistosomiasis* can be detected by similar microscopic examination, but there is, in any case, no evidence to suggest that this disease is normally spread through piped water supplies.

3.4.7 The cyclops vector of the embroys of *Dracunculus medinensis* which causes dracontiasis or Guinea-worm disease can be found in open wells in a number of tropical areas. They are identifiable by microscopic examination. Such well supplies are frequently used untreated, but the parasite can be relatively easily excluded by simple physical improvements in the form of curbs, drainage, and apron surrounds and other measures which prevent physical contact with the water source.

3.4.8 The drinking water shall be free from microscopic organisms such as algae, zooplanktons, flagillates, parasites and toxin-producing organisms. An illustrative (and not exhaustive) list is given in Annex B for guidance.

4 SAMPLING

Representative samples of water shall be drawn as prescribed in IS 1622 : 1981 and IS 3025 (Part 1) : 1987.

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
1622 : 1981	Methods of sampling and microbiological examination of water (*first revision*)
3025 : 1964	Methods of sampling and test (physical and chemical) for water used in industry
3025 (Part 1) : 1987	Methods of sampling and test (physical and chemical) for water and waste water : Part 1 Sampling (*first revision*)
3025 (Part 4) : 1983	Methods of sampling and test (physical and chemical) for water and waste water : Part 4 Colour (*first revision*)
3025 (Part 5) : 1983	Methods of sampling and test (physical and chemical) for water and waste water : Part 5 Odour (*first revision*)
3025 (Part 7) : 1984	Methods of sampling and test (physical and chemical) for water and waste water : Part 7 Taste threshold (*first revision*)
3025 (Part 8) : 1984	Methods of sampling and test (physical and chemical) for water and waste water : Part 8 Taste rating (*first revision*)

IS No.	Title
3025 (Part 10) : 1984	Methods of sampling and test (physical and chemical) for water and waste water : Part 10 Turbidity (*first revision*)
3025 (Part 11) : 1983	Methods of sampling and test (physical and chemical) for water and waste water : Part 11 *p*H value (*first revision*)
3025 (Part 16) : 1984	Methods of sampling and test (physical and chemical) for water and waste water : Part 16 Filterable residue (total dissolved solids) (*first revision*)
3025 (Part 21) : 1983	Methods of sampling and test (physical and chemical) for water and waste water : Part 21 Total hardness (*first revision*)
3025 (Part 24) : 1986	Methods of sampling and test (physical and chemical) for water and waste water : Part 24 Sulphates (*first revision*)
3025 (Part 26) : 1986	Methods of sampling and test (physical and chemical) for water and waste water : Part 26 Chlorine residual (*first revision*)
3025 (Part 27) : 1986	Methods of sampling and test (physical and chemical) for water and waste water : Part 27 Cyanide (*first revision*)
3025 (Part 32) : 1988	Methods of sampling and test (physical and chemical) for water and waste water : Part 32 Chloride (*first revision*)
3025 (Part 34) : 1988	Methods of sampling and test (physical and chemical) for water and waste water : Part 34 Nitrogen (*first revision*)
3025 (Part 37) : 1988	Methods of sampling and test (physical and chemical) for water and waste water : Part 37 Arsenic (*first revision*)

ANNEX B

(*Clause* 3.4.8)

ILLUSTRATIVE LIST OF MICROSCOPIC ORGANISMS WHICH MAY BE PRESENT IN WATER

Classification of Microscopic Organism	*Group and Name of the Organism*	*Habitat*	*Effect of the Organisms and Significance*
(1)	(2)	(3)	(4)
1. *ALGAE*	a) *Chlorophyceae*		
	Species of *Coelastrum, Gomphospherium, Micractinium, Mougeotia, oocystis, Euastrum, Scenedesmus, Actinastrum, Gonium, Eudorina Pandorina, Pediastrum, Zygnema, Chlamydomonas, Careteria, Chlorella, Chroococcus, Spirogyra, Tetraedron, Chlorogonium, Stigeoclonium*	Polluted water, impounded sources	Impart colouration
	Species of *Pandorina, Volvox, Gomphospherium, Staurastrum, Hydrodictyon, Nitella*	Polluted waters	Produce taste and odour
	Species of *Rhizoclonium, Cladothrix, Ankistrodesmus, Ulothrix, Micrasterias, Chromulina*	Clean water	Indicate clean condition
	Species of *Chlorella, Tribonema, Closterium, Spirogyra, Palmella*	Polluted waters, impounded sources	Clog filters and create operational difficulties

Classification of Microscopic Organism	*Group and Name of the Organism*	*Habitat*	*Effect of the Organisms and Significance*
(1)	(2)	(3)	(4)
	b) *Cyanophyceae*		
	Species of *Anacystis and Cylindrospermum*	Polluted waters	Cause water bloom and impart colour
	Species of *Anabena, Phormidium, Lyngbya, Arthrospira, Oscillatoria*	Polluted waters	Impart colour
	Species of *Anabena, Anacystis, Aphanizomenon*	Polluted waters, impounded sources	Produce taste and odour
	Species of *Anacystis, Anabena, Coelospherium, Gleotrichina, Aphanizomenon*	Polluted waters	Toxin producing
	Species of *Anacystis, Rivularia, Oscillatoria, Anabena*	Polluted waters	Clog filters
	Species of *Rivularia*	Calcareous waters and also rocks	Bores rocks and calcareous strata and causes matted growth
	Species of *Agmenellum, Microcoleus, Lemanea*	Clean waters	Indicators of purification
	c) *Diatoms* (*Bacillariophyceae*)		
	Species of *Fragillaria, Stephanodiscus, Stauroneis*	—	Cause discoloration
	Species of *Asterionella, Tabellaria*	Hill streams high altitude, torrential and temperate waters	Taste and odour producing clog filters
	Species of *Synedra* and *Fragillavia*	Polluted waters	Taste and odour producing
	Species of *Nitzchia, Gomphonema*	Moderately polluted waters	Cause discoloration
	Species of *Cymbela, Synedra, Melosira, Navicula, Cyclotella, Fragillaria, Diatoma, Pleurogsigma*	Rivers and streams impounded sources	Clog filters and cause operational difficulties
	Species of *Pinmularia, Surinella, Cyclotella, Meridion, Cocconeis*	Clean waters	Indicators of purification
	d) *Xanthophyceae*		
	Species of *Botryococcus*	Hill streams, high altitudes and temperate waters	Produces coloration
2. *ZOOPLANKTON*	a) *Protozoa*		
	Amoeba, Giardia Lamblia Arcella, Difflugia, Actinophrys	Pollted waters	Pollution indicators
	Endamoeba, Histolytica	Sewage and activated sludge	Parasitic and pathogenic
	b) *Ciliates*		
	Paramoccium, Vorticella, Carchesium, Stentor, Colpidium, Coleps, Euplotes, Colopoda, Bodo	Highly polluted waters, sewage and activated sludge	Bacteria eaters
	c) *Crustacea*		
	Bosmina, Daphnia	Stagnant polluted waters	Indicators of pollution

Classification of Microscopic Organism	*Group and Name of the Organism*	*Habitat*	*Effect of the Organisms and Significance*
(1)	(2)	(3)	(4)
	Cyclops	Step wells in tropical climate	Carrier host of guinea worm
3. *ROTIFERS*	a) *Rotifers*		
	Anurea, Rotaria, Philodina	Polluted and algae laden waters	Feed on algae
	b) *Flagellates*		
	Ceratium, Glenodinium, Peridinium Dinobryon	Rocky strata, iron bearing and acidic waters	Impart colour and fishy taste
	Euglena, Phacus	Polluted waters	Impart colour
	c) *Miscellaneous Organisms Sponges, Hydra*	Fresh water	Clog filters and affect purification systems
	Tubifex, Eristalis, Chironomids	Highly polluted waters, sewage and activated sludge and bottom deposits	Clog filters and render water unaesthetic
	d) *Plumatella*	Polluted waters	Produces biological slimes and causes filter operational difficulties
	Dreissena, Asellus	Polluted waters	Harbour pathogenic organisms

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Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards : Monthly Additions'.

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Amendments Issued Since Publication

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