

Chapter 9 RELEVANT INDIAN STANDARDS

Table 9.1. Surface Water Quality Standards (as per IS: 2296).

Class A – Drinking water without conventional treatment but after disinfection. Class B – Water for outdoor bathing. Class C – Drinking water with conventional treatment followed by disinfection. Class D – Water for fish culture and wild life propagation. Class E – Water for irrigation, industrial cooling and controlled waste disposal. (Unobj = Unobjectionable).

Sl	Parameter and Unit	A	B	C	D	E
1	Taste	None	--	--	--	--
2	Odour	Unobj	--	--	--	--
3	Colour (True) (Hazen unit)	10	300	300	--	--
4	pH (max) (min : 6.5)	8.5	8.5	8.5	8.5	8.5
5	Conductivity (25oC) uS/cm	--	--	--	1000	2250
6	DO (mg/L) (minimum)	6	5	4	4	--
7	BOD (3d, 27oC) (mg/L)	2	3	3	--	--
8	Total Coliforms (MPN/100 mL)	50	500	5000	--	--
9	TDS (mg/L)	500	--	1500	--	2100
10	Oil and Grease (mg/L)	--	--	0.1	0.1	--
11	Mineral oil (mg/L)	0.01	--	--	--	--
12	Total Hardness (mg/L as CaCO ₃)	300	--	--	--	--
13	Chlorides (mg/L as Cl)	250	--	600	--	600
14	Sulfates (mg/L as SO ₄)	400	--	400	--	1000
15	Nitrates (mg/L as NO ₃)	20	--	50	--	--
16	Free CO ₂ (mg/L)	--	--	--	6	--
17	Free NH ₃ (mg/L as N)	--	--	--	1.2	--
18	Fluorides (mg/L as F)	1.5	1.5	1.5	--	--
19	Calcium (mg/L)	80.10	--	--	--	--
20	Magnesium (mg/L)	24.28	--	--	--	--
21	Copper (mg/L)	1.5	--	1.5	--	--
22	Iron (mg/L)	0.3	--	50	--	--
23	Manganese (mg/L)	0.5	--	--	--	--

Sl	Parameter and Unit	A	B	C	D	E
24	Zinc (mg/L)	15	--	15	--	--
25	Boron (mg/L as B)	--	--	--	--	2
26	Barium (mg/L)	1	--	--	--	--
27	Silver (mg/L)	0.05	--	--	--	--
28	Arsenic Total (mg/L)	0.05	0.2	0.2	--	--
29	Mercury (mg/L)	0.001	--	--	--	--
30	Lead (mg/L)	0.1	--	0.1	--	--
31	Cadmium (mg/L)	0.01	--	0.01	--	--
32	Chromium (VI) (mg/L)	0.05	0.05	0.05	--	--
33	Selenium (mg/L)	0.01	--	0.05	--	--
34	Cyanide (mg/L as CN)	0.05	0.05	0.05	--	--
35	Phenols (mg/L)	0.002	0.005	0.005	--	--
36	Anionic detergents (mg/L as MBAS)	0.2	1	1	--	--
37	PAH (mg/L)	0.2	--	--	--	--
38	Pesticides (ug/L)	0	--	--	--	--
39	Insecticides (ug/L)	--	--	0	--	--
40	Alpha emitters (10^{-6} uCi/mL)	0.001	0.001	0.001	0.001	0.001
41	Beta emitters (10^{-6} uCi/mL)	0.01	0.01	0.01	0.01	0.01
42	Percent Sodium (%)	--	--	--	--	60
43	Sodium Absorption Ratio	--	--	--	--	26

Table 9.2. Drinking Water Quality Standards (IS: 10500)

[* represents essential characteristics of drinking water]

SI	Parameters and Units	Standards
1	Color (True) (Hazen Units)	5 *
2	Taste	Agreeable *
3	Odour	Unobjectionable *
4	Turbidity (NTU)	5 *
5	PH	6.5- 8.5 *
6	Total Coliforms (MPN/100 mL)	0
7	TDS (mg/L)	500
8	Mineral Oil (mg/L)	0.01
9	Total Hardness (mg/L as CaCO ₃)	300 *
10	Alkalinity (mg/L as CaCO ₃)	200
11	Chlorides (mg/L as Cl)	250 *
12	Sulfates (mg/L as SO ₄)	200
13	Nitrates (mg/L as NO ₃)	45
14	Free Residual Chlorine (mg/L)	0.2
15	Fluorides (mg/L as F)	1
16	Calcium (mg/L as Ca)	75
17	Copper (mg/L as Cu)	0.05 *
18	Iron (mg/L as Fe)	0.3 *
19	Manganese (mg/L as Mn)	0.1
20	Zinc (mg/L as Zn)	5
21	Boron (mg/L as B)	1
22	Aluminum (mg/L as Al)	0.03
23	Arsenic (Total) (mg/L as As)	0.05
24	Mercury (mg/L as Hg)	0.001
25	Lead (mg/Las Pb)	0.05
26	Cadmium (mg/l as Cd)	0.01
27	Chromium (mg/L as Cr)	0.05
28	Selenium (mg/L as Se)	0.01
29	Cyanide (mg/L as Cn)	0.05
30	Phenolic Compounds (mg/L as C ₆ H ₅ OH)	0.001
31	Anionic Detergents (mg/L as MBAS)	0.2
32	PAH (mg/L)	0
33	Pesticides (ug/L)	0
34	Alpha Emitters (10 ⁻⁶ uc/mL)	0.0001
35	Beta Emitters (10 ⁻⁶ uc/mL)	0.001
36	Pathogenic Organisms or Virus	0

Table 9.3. General Standards for Discharge of Effluents.

[N1 = shall not exceed 5oC above the receiving water temperature, N2 = all efforts should be made to remove colour and unpleasant odour as far as practicable, N3 = 90% survival of fish after 96 hours in 100% effluent, N4 = applicable to DDT, endosulfan, carbaryl, malathion, phenothoate, methyl parathion, phenitrothion, phorate, pyrethrum and BHC, N5 = floatable solids 3 mm and settleable solids 850 micron]

Sl	Parameter and Unit	Into surface water	Into public sewers	Into irrigation water	Into coastal water
1	Temperature	N1	--	--	N1
2	Odour	N2	--	N2	N2
3	Colour (True) (Hazen unit)	N2	--	N2	N2
4	pH (max) (min : 6.5)	5.5-9.0	5.5-9.0	5.5-9.0	5.5-9.0
5	BOD (3d, 27oC) (mg/L)	30	350	100	100
6	COD (mg/L)	250	--	--	250
7	TSS (mg/L)	100	600	200	*100
8	TDS (mg/L)	2100	--	2100	--
9	Oil and Grease (mg/L)	10	20	10	20
10	Chlorides (mg/L as Cl)	1000	1000	600	--
11	Sulfates (mg/L as SO4)	1000	1000	1000	--
12	Nitrates (mg/L as NO3)	10	--	--	20
13	Total Residual Chlorine (mg/L)	1	--	--	1
14	Free NH3 (mg/L as N)	5	--	--	5
15	Ammoniacal Nitrogen (mg/L N)	50	50	--	50
16	TKN (mg/L as N)	100	--	--	100
17	Fluorides (mg/L as F)	2	15	--	15
18	Sulfide (mg/L as S)	2	--	--	5
19	Dissolved Phosphates (mg/L P)	5	--	--	--
20	Copper (mg/L)	3	3	--	3
21	Iron (mg/L)	3	3	--	3
22	Manganese (mg/L)	2	2	--	2
23	Zinc (mg/L)	5	15	--	15
24	Nickel (mg/L)	3	3	--	5
25	Boron (mg/L as B)	2	2	2	--

Sl	Parameter and Unit	Into surface water	Into public sewers	Into irrigation water	Into coastal water
26	Arsenic Total (mg/L)	0.2	0.2	0.2	0.2
27	Mercury (mg/L)	0.01	0.01	0.01	0.01
28	Lead (mg/L)	0.1	1	--	1
29	Cadmium (mg/L)	2	1	--	2
30	Chromium (VI) (mg/L)	0.1	2	--	1
31	Chromium Total (mg/L)	2	2	--	2
32	Selenium (mg/L)	0.05	0.05	--	0.05
33	Vanadium (mg/L)	0.2	0.2	--	0.2
34	Cyanide (mg/L as CN)	0.2	2	0.2	0.2
35	Phenols (mg/L)	1	5	--	5
36	Pesticides (ug/L) (N4)	10	10	--	10
37	Alpha emitters (10^{-6} uC/mL)	10^{-7}	10^{-7}	10^{-8}	10^{-7}
38	Beta emitters (10^{-6} uC/mL)	10^{-6}	10^{-6}	10^{-7}	10^{-6}
39	Percent Sodium (%)	--	60	60	--
40	Residual Sodium Carbonate(mg/L)	--	--	5	--
41	Bio-assay (% 96 hour survival)	N3	N3	N3	N3
42	SS particle size (pass IS sieve)	850	--	--	N5

* For cooling water effluent 10% above TSS of influent.

Table 9.4. General Standards for Discharge of Effluents (Pesticides)

Sl	Pesticide	Into surface water (ug/L)	Into public sewers (ug/L)	Into Irrigation water(ug/L)	Into coastal water (ug/L)
1	Benzene hexachloride	10	--	10	10
2	Carbaryl	10	--	10	10
3	DDT	10	--	10	10
4	Endosulfun	10	--	10	10
5	Diamethoate	450	--	450	450
6	Penitrothion	10	--	10	10
7	Malathion	10	--	10	10
8	Phorate	10	--	10	10
9	Methyl parathion	10	--	10	10
10	Phenthoate	10	--	10	10
11	Pyrethrums	10	--	10	10
12	Copper oxychloride	9600	--	9600	9600
13	Copper sulphate	50	--	50	50
14	Zirum	1000	--	1000	1000
15	Sulphur	30	--	30	30
16	Paraquat	2300	--	2300	2300
17	Proponil	7300	--	7300	7300
18	Nitrogen	790	--	790	790

Table 9.5. National Ambient Air Quality Standards

[As Notified on 11th April, 1994 by the Central Pollution Control Board in exercise of its power conferred under section 16 (2) (h) of the Air (Prevention and Control of Pollution) Act, 1981 (14 of 1981)]

Pollutant	Time-weighted average	Concentration (ug/m3) in ambient air			
		Industrial area	Residential, Rural and other areas	Sensitive area	
Sulfur Dioxide (SO ₂)	Annual *	80	60	15	
	24 hours #	120	80	30	
Nitrogen Oxides (as NO ₂)	Annual*	80	60	15	
	24 hours #	120	80	30	
Suspended Particulate Matter (SPM)	Annual *	360	140	70	
	24 hours #	500	200	100	
Respirable Particulate Matter (RPM)	Annual *	120	60	50	
	24 hours #	150	100	75	
Lead (Pb) Annual	Annual *	1.00	0.75	0.50	
	24 hours #	1.50	1.00	0.75	
Carbon Monoxide (CO)	8 hours *	5.00	2.00	1.00	
	1 hour	10.00	4.00	2.00	

* Annual Arithmetic Mean of minimum 104 measurements in a year taken twice a week 24-hourly at uniform interval.

24- hourly/ 8- hourly values should be met 98% of the time in a year. However, 2% of the time, it may exceed but not on two consecutive days.

Table 9.6. Ambient Air Quality Standards in respect of Noise
(As adopted in India by Ministry of Environment and Forests)

Area code	Category of Areas	Noise limits in dB(A) as L_{eq}	
		Day Time	Night Time
(A)	Industrial	75	70
(B)	Commercial	65	55
(C)	Residential	55	45
(D)	Silence zone	50	40

Note: 1. Daytime is reckoned in between 6 A.M and 10 P.M.
2. Nighttime is reckoned in between 10 P.M. and 6 A.M.

Silence zone is defined as area up to 100 meters around such premises as hospitals, educational institutions and courts. The silence zones are to be declared by the competent Authority. Use of vehicular horns, loud speakers and bursting of crackers shall be banned in these zones.