

## WATER QUALITY STANDARDS FOR COASTAL WATERS MARINE OUTFALLS

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In a coastal segment marine water is subjected to several types of uses. Depending of the types of uses and activities, water quality criteria have been specified to determine its suitability for a particular purpose. Among the various types of uses there is one use that demands highest level of water quality/purity and that is termed a "designed best use" in that stretch of the coastal segment. Based on this, primary water quality criteria have been specified for following five designated best uses:

<b>Class</b>	<b>Designated best use</b>
SW-I (see Table 1.1)	Salt pans, Shell fishing, Mariculture and Ecologically Sensitive Zone.
SW-II (see Table 1.2)	Bathing, Contact Water Sports and Commercial fishing.
SW-III(see Table 1.3)	Industrial cooling, Recreation (non contact) and Aesthetics. I
SW-IV (see Table 1.4)	Harbour.
SW-V (see Table 1.5)	Navigation and Controlled Waste Disposal.

The standards along with rationale/remarks for various parameters, for different designated best uses, are given in Table 1.1 to 1.5.

**Table 1.1**  
**Primary Water Quality Criteria For Class**

**SW-I Waters**  
**(For Salt pans, Shell fishing, Mariculture and Ecologically Sensitive Zone)**

S.No.	Parameter	Standards	Rationale/Remarks
1.	pH range	6.5-8.5	General broad range, conducive for propogation of aquatic lives, is given. Value largely dependant upon soil water interaction.
2.	Dissolved Oxygen	5.0 mg/l or 60 percent saturation value, which	Not less than 3.5 mg/l at any time of the year for protection of

		ever is higher.	aquatic lives
3.	Colour and Odour	No noticeable colour or offensive odour.	Specially caused by chemical compounds like creosols, phenols, naphtha, pyridine, benzene, toluene etc. causing visible colouration of salt crystal and tainting of fish flesh.
4.	Floating Matters	Nothing obnoxious or detrimental for use purpose.	Surfactants should not exceed an upper limit of 1.0 mg/l and the concentration not to cause any visible foam.
5.	Suspended Solids	None from sewage or industrial waste origin	Settleable inert matters not in such concentration that would impair any usages specially assigned to this class.
6.	Oil and Grease (including Petroleum Products)	0.1 mg/l	Concentration should not exceed 0.1 mg/l as because it has effect on fish eggs and larvae.
7.	Heavy Metals: Mercury (as Hg) Lead (as Pb) Cadmium (as Cd)	0.01 mg/l 0.01 mg/l 0.01 mg/l	Values depend on: (i) Concentration in salt, fish and shell fish. (ii) Average per capita consumption per day. (iii) Minimum ingestion rate that induces symptoms of resulting diseases.

**Note :**

SW-1 is desirable to be safe and relatively free from hazardous chemicals like pesticides, heavy metals and radionuclide concentrations. Their combined (synergistic or antagonistic) effects on health and aquatic lives are not yet clearly known. These chemicals undergo bio accumulation, magnification and transfer to human and other animals through food chain. In areas where fisheries, salt pans are the governing considerations, and presence of such chemicals apprehended/reported, bioassay test should be performed following appropriate methods for the purpose of setting case specific limits.

**Table 1.2**  
**Primary Water Quality Criteria For Class SW-II Waters**  
**(For Bathing, Contact Water Sports and Commercial Fishing)**

S.No.	Parameter	Standards	Rationale/Remarks
1.	pH range	6.5-8.5	Range does not cause skin or eye irritation and is also conducive for propagation of aquatic life.
2.	Dissolved Oxygen	4.0 mg/l or 50 percent saturation value, whichever ever is higher.	Not less than 3.5 mg/l at any time of the year for protection of aquatic lives
3.	Colour and Odour	No noticeable colour or offensive odour.	Specially caused by chemical compounds like creosols, phenols, naphtha, pyridine, benzene, toluene etc. causing visible colouration of salt crystal and tainting of fish flesh.
4.	Floating Matters	Nothing obnoxious or detrimental for use purpose.	None in concentration that would impair usages specially assigned to this class.
5.	Turbidity	30 NTU (Nephelo Tur- bidity Unit)	Measured at 0.9 depth..
6.	Fecal Coliform	100/100 ml (MPN)	The average value not exceeding 200/100 ml. in 20 percent of samples in the year and in 3 consecutive samples in monsoon months.
7.	Biochemical Oxygen Demand (BOD) (3 days at 27°C)	3 mg/l	Restricted for bathing (aesthetic quality of water). Also prescribed by IS:2296 1974..

**Table 1.3**  
**Primary Water Quality Criteria for Class SW-III Waters**  
**[For Industrial cooling, Recreation (non-contact) and Aesthetics]**

S.No.	Parameter	Standards	Rationale/Remarks
1.	pH range	6.5-8.5	The range is conducive for propagation of aquatic species and restoring natural system
2.	Dissolved Oxygen	3.0 mg/l or 40 percent saturation value, which ever is higher.	To protect aquatic lives
3.	Colour and Odour	No noticeable colour or offensive odour.	None in concentration that would impair usages specially assigned to this class.
4.	Floating Matters	Nothing obnoxious or detrimental for use purpose.	None in concentration that would impair usages specially assigned to this class.
5.	Fecal Coliform	500/100 ml (MPN)	Not exceeding 1000/100 ml in 20 percent of samples in the year and in 3 consecutive samples in monsoon months.
6.	Turbidity	30 NTU	Reasonably clear water for Recreation, Aesthetic appreciation and Industrial cooling purposes.
7.	Dissolved Iron	0.5 mg/l or less	It is desirable to have the (as Fe) collective concentration of dissolved Fe and Mn less or equal to 0.5 mg/l to avoid scaling effect.
8.	Dissolved Manganese (as Mn)	0.5 mg/l or less	

- Standard included exclusively for Industrial Cooling purpose. Other parameters same.

**Table 1.4**  
**Primary Water Quality Criteria for Class SW-IV Waters (For Harbour Waters)**

S.No.	Parameter	Standards	Rationale/Remarks
1.	pH range	6.5-9.0	To minimize corrosive and scaling effect. .
2.	Dissolved Oxygen	3.0 mg/l or 40 percent saturation value, which ever is higher.	Considering bio-degradation of oil and inhibition to is oxygen production through photosynthesis.
3.	Colour and Odour	No noticeable colour or offensive odour.	None from reactive chemicals which may corrode paints/metallic surfaces.
4.	Floating Matters Oil, grease and scum (including Petroleum products)	10 mg/l	Floating matter should be free from excessive living organisms, which may clog or coat operative parts of marine vessels/equipment. .
5.	Fecal Coliform	500/100 ml (PAN)	Not exceeding 1000/100 ml in 20 percent of samples in the year and in 3 consecutive samples in monsoon months.
6.	Biochemical Oxygen Demand (3 days at 27°C)	5 mg/l	To maintain water relatively free from pollution caused by sewage and other decomposable wastes
7.	Biochemical Oxygen Demand (BOD) (3 days at 27°C)	3 mg/l	Restricted for bathing (aesthetic quality of water). Also prescribed by IS:2296 1974.

**Table 1.5**  
**Primary Water Quality Criteria for Class SW-V Waters**  
**(For Navigation and Controlled Waste Disposal)**

<b>S.No.</b>	<b>Parameter</b>	<b>Standards</b>	<b>Rationale/Remarks</b>
1.	pH range	6.5-9.0	As specified by New England Interstate Water Pollution Control Commission.
2.	Dissolved Oxygen	3.0 mg/l or 40 percent saturation value, which ever is higher.	To protect aquatic lives
3.	Colour and Odour	None is such concentration that would impair any usages specifically assigned to this class.	As specified by New England Interstate Water Pollution Control Commission.
4.	Sludge deposits, Solid refuse floating oil, grease & scum.	None except for such small solids, amount that may result from discharge of appropriately treated sewage and/or individual waste effluents.	As in(1) above
5.	Fecal Coliform	500/100 ml (MPN)	Non exceeding 1000/100 ml in 20 percent of samples in the year and in 3 consecutive samples in monsoon months

**Source : EPA, 1986 [GSR 7, dated Dec. 22, 1998**