

# **WATER QUALITY STANDARDS**

Indian Standard for  
Drinking Water - Specification  
IS 10500 : 1991

# Technical Terms

- BIS (Bureau of Indian Standards)
- Desirable limits
- Permissible limit
- PPM
- NTU
- Hazen Units

Colour, Hazen Units	
IS 10500-1991	Desirable : 5 Hz. , Permissible : 25 Hz.
Risks or effects	Visible tint, acceptance decreases
Sources	Tannins, Iron, Copper, Manganese Natural deposits
Treatment	Filtration, Distillation, Reverse osmosis, Ozonisation

Odour	
IS 10500-1991	Unobjectionable
Risks or effects	Rotten egg, Musty, Chemical
Sources	Chlorine, Hydrogen sulfide, Organic matter, Septic contamination, Methane gas
Treatment	Activated carbon, Air stripping, oxidation, Filtration

pH	
IS 10500-1991	Desirable :6.5 – 8.5, Permissible :No relaxation
Risks or effects	Low pH - corrosion, metallic taste High pH – bitter/soda taste, deposits
Sources	Natural
Treatment	Increase pH by soda ash Decrease pH with white vinegar / citric acid

<b>Total Dissolved Solids (TDS)</b>	
IS 10500-1991	Desirable : 500 mg/l , Permissible : 2000 mg/l
Risks or effects	Hardness, scaly deposits, sediment, cloudy colored water, staining, salty or bitter taste, corrosion of pipes and fittings
Sources	Livestock waste, septic system Landfills, nature of soil Hazardous waste landfills Dissolved minerals, iron and manganese
Treatment	Reverse Osmosis, Distillation, deionization by ion exchange

<b>Hardness</b>	
IS 10500-1991	Desirable :300 mg/l , Permissible : 600 mg/l
Risks or effects	Scale in utensils and hot water system, soap scums
Sources	Dissolved calcium and magnesium from soil and aquifer minerals containing limestone or dolomite
Treatment	Water Softener Ion Exchanger , Reverse Osmosis

<b>Alkalinity</b>	
IS 10500-1991	Desirable : 200 mg/l , Permissible : 600 mg/lit
Risks or effects	Low Alkalinity (i.e. high acidity) causes deterioration of plumbing and increases the chance for many heavy metals in water are present in pipes, solder or plumbing fixtures.
Sources	Pipes, landfills Hazardous waste landfills
Treatment	Neutralizing agent



<b>Iron, Fe</b>	
IS 10500-1991	Desirable : 0.3 mg/l , Permissible : 1.0 mg/l
Risks or effects	Brackish color, rusty sediment, bitter or metallic taste, brown-green stains, iron bacteria, discolored beverages
Sources	Leaching of cast iron pipes in water distribution systems Natural
Treatment	Oxidizing Filter , Green-sand Mechanical Filter

## **Manganese, Mn**

IS 10500-1991

Desirable : 0.1 mg/l , Permissible : 0.3 mg/l

Risks or effects

Brownish color, black stains on laundry and fixtures at .2 mg/l, bitter taste, altered taste of water-mixed beverages

Sources

Landfills  
Deposits in rock and soil

Treatment

Ion Exchange , Chlorination, Oxidizing Filter , Green-sand  
Mechanical Filter

## **Sulphate, SO<sub>4</sub>**

IS 10500-1991

Desirable : 200 mg/l, Permissible : 400 mg/l

Risks or effects

Bitter, medicinal taste, scaly deposits, corrosion, laxative effects, "rotten-egg" odor from hydrogen sulfide gas formation

Sources

Animal sewage, septic system, sewage  
By-product of coal mining, industrial waste  
Natural deposits or salt

Sulphate Treatment

Ion Exchange , Distillation , Reverse Osmosis

<b>Nitrate, NO<sub>3</sub><sup>-</sup></b>	
IS 10500-1991	Desirable : 45 mg/l, Permissible : 100 mg/lit
Risks or effects	Methemoglobinemia or blue baby disease in infants
Sources	Livestock facilities, septic systems, manure lagoons, fertilizers Household waste water, fertilizers Fertilizers Natural Deposits
Treatment	Ion Exchange, Distillation, Reverse Osmosis

<b>Chloride, Cl</b>	
IS 10500-1991	Desirable : 250 mg/l , Permissible : 1000 mg/l
Risks or effects	High blood pressure, salty taste, corroded pipes, fixtures and appliances, blackening and pitting of stainless steel
Sources	Fertilizers Industrial wastes Minerals, seawater
Treatment	Reverse Osmosis , Distillation, Activated Carbon

## Fluoride, F

IS 10500-1991

Desirable : 1.0 mg/l, Permissible : 1.5 mg/l

Risks or effects

Brownish discoloration of teeth, bone damage

Sources

Industrial waste  
Geological

Treatment

Activated Alumina, Distillation, Reverse Osmosis, Ion Exchange

<b>Arsenic, As</b>	
IS:10500-1991	Desirable: 0.05 mg/l Permissible: No relaxation
Risks or effects	Weight loss; Depression; Lack of energy; Skin and nervous system toxicity
Sources	Previously used in pesticides (orchards) Improper waste disposal or product storage of glass or electronics, Mining Rocks
Treatment	Activated Alumina Filtration, Reverse Osmosis, Distillation, Chemical Precipitation, Ion exchange, lime softening

<b>Chromium, Cr</b>	
IS 10500-1991	Desirable : 0.05 mg/l, Permissible : No relaxation
Risks or effects	Skin irritation, skin and nasal ulcers, lung tumors, gastrointestinal effects, damage to the nervous system and circulatory system, accumulates in the spleen, bones, kidney and liver
Sources	Septic systems Industrial discharge, mining sites Geological
Treatment	Ion Exchange, Reverse Osmosis, Distillation



<b>Copper, Cu</b>	
IS 10500-1991	Desirable : 0.05 mg/l, Permissible : 1.5 mg/l
Risks or effects	Anemia, digestive disturbances, liver and kidney damage, gastrointestinal irritations, bitter or metallic taste; Blue-green stains on plumbing fixtures
Sources	Leaching from copper water pipes and tubing, algae treatment Industrial and mining waste, wood preservatives Natural deposits
Treatment	Ion Exchange, Reverse Osmosis, Distillation

<b>Cyanide</b>	
IS 10500-1991	Desirable : 0.05 mg/l, Permissible : No relaxation
Risks or effects	Thyroid, nervous system damage
Sources	Fertilizer Electronics, steel, plastics mining
Treatment	Ion Exchange, Reverse Osmosis, Chlorination

<b>Lead, Pb</b>	
IS 10500-1991	Desirable : 0.05 mg/l, Permissible : No relaxation
Risks or effects	Reduces mental capacity (mental retardation), interference with kidney and neurological functions, hearing loss, blood disorders, hypertension, death at high levels
Sources	Paint, diesel fuel combustion Pipes and solder, discarded batteries, paint, leaded gasoline Natural deposits
Treatment	Ion Exchange, Activated Carbon , Reverse Osmosis, Distillation

<b>Mercury, Hg</b>	
IS 10500-1991	Desirable : 0.001 mg/l, Permissible : No relaxation
Risks or effects	Loss of vision and hearing, intellectual deterioration, kidney and nervous system disorders, death at high levels
Sources	Fungicides Batteries, fungicides Mining, electrical equipment, plant, paper and vinyl chloride Natural deposits
Treatment	Reverse Osmosis, Distillation

<b>Zinc, Zn</b>	
IS 10500-1991	Desirable :5 mg/l, Permissible : 15 mg/l
Risks or effects	Metallic taste
Sources	Leaching of galvanized pipes and fittings, paints, dyes Natural deposits
Treatment	Ion Exchange Water Softeners, Reverse Osmosis, Distillation

<b>Total Coliform Bacteria</b>	
IS 10500-1991	95% of samples should not contain coliform in 100 ml 10 coliform / 100ml
Risks or effects	Gastrointestinal illness
Sources	Livestock facilities, septic systems, manure lagoons Household waste water Naturally occurring
Treatment	Chlorination , Ultraviolet, Distillation, Iodination



<b>E.coliform Bacteria</b>	
IS 10500-1991	Nil / 100ml
Risks or effects	Gastrointestinal illness
Sources	Livestock facilities, septic systems, manure lagoons Household waste water Naturally occurring
Treatment	Chlorination , Ultraviolet, Distillation, Iodination