**Conventional methods for testing water**

**Testing procedures**

* [Physical tests](https://www.fao.org/3/x5624e/x5624e05.htm" \l "2.2.1 physical tests)
* [Chemical tests](https://www.fao.org/3/x5624e/x5624e05.htm" \l "2.2.2 chemical tests)
* [Bacteriological tests](https://www.fao.org/3/x5624e/x5624e05.htm" \l "2.2.3 bacteriological tests)

Testing procedures and parameters may be grouped into physical, chemical, bacteriological and microscopic categories.

Bacteriological tests show the presence of bacteria, characteristic of faecal pollution.

**Physical tests**

Physical tests indicate properties detectable by the senses.

Colour, turbidity, total solids, dissolved solids, suspended solids, odour and taste are recorded.

**Colour**in water may be caused by the presence of minerals such as iron and manganese or by substances of vegetable origin such as algae and weeds.

**Turbidity**in water is because of suspended solids and colloidal matter. It may be due to eroded soil caused by dredging or due to the growth of micro-organisms. If sewage solids are present, pathogens may be encased in the particles and escape the action of chlorine during disinfection.

**Odour** and taste are associated with the presence of living microscopic organisms; or decaying organic matter including weeds, algae; or industrial wastes containing ammonia, phenols, halogens, hydrocarbons. This taste is imparted to fish, rendering them unpalatable.

**Chemical tests**

Chemical tests determine the amounts of mineral and organic substances that affect water quality.

pH, hardness, presence of a selected group of chemical parameters, biocides, highly toxic chemicals, and B.O.D are estimated.

**pH**is a measure of hydrogen ion concentration. It is an indicator of relative acidity or alkalinity of water. Values of 9.5 and above indicate high alkalinity while values of 3 and below indicate acidity. Low pH values help in effective chlorination but cause problems with corrosion. Values below 4 generally do not support living organisms in the marine environment. Drinking water should have a pH between 6.5 and 8.5. Harbour basin water can vary between 6 and 9.

**B.O.D.**: It denotes the amount of oxygen needed by micro-organisms for stabilization of decomposable organic matter under aerobic conditions. High B.O.D. means that there is less of oxygen to support life and indicates organic pollution.

**Bacteriological tests**

For technical and economic reasons, analytical procedures for the detection of harmful organisms are impractical for routine water quality surveillance. It must be appreciated that all that bacteriological analysis can prove is that, at the time of examination, contamination or bacteria indicative of faecal pollution, could or could not be demonstrated in a given sample of water using specified culture methods. In addition, the results of routine bacteriological examination must always be interpreted in the light of a thorough knowledge of the water supplies, including their source, treatment, and distribution.

**Parameters measured while testing**

Parameters that are frequently sampled or monitored for water quality include,

* temperature
* dissolved oxygen
* pH
* conductivity
* turbidity

However water monitoring may also include measuring

* Total algae
* ISEs (ammonia, nitrate, chloride)
* BOD
* Titration

**Benchmark values for each parameter**

**Temperature**

Most people find water at temperatures of 10–15°C most palatable

**PH**

pH ranges from 0 to 14, with 7 being neutral. pH of less than 7 indicates acidity, whereas a pH of greater than 7 indicates a base solution [[2](https://www.intechopen.com/chapters/69568" \l "B2), [24](https://www.intechopen.com/chapters/69568" \l "B24)]. Pure water is neutral, with a pH close to 7.0 at 25°C. Normal rainfall has a pH of approximately 5.6 (slightly acidic) owing to atmospheric carbon dioxide gas [[10](https://www.intechopen.com/chapters/69568" \l "B10)]. Safe ranges of pH for drinking water are from 6.5 to 8.5 for domestic use and living organisms need

**Dissolve oxigen**

Healthy water should generally have dissolved oxygen concentrations above 6.5-8 mg/L and between about 80-120 %.

**Turbidity**

Turbidity should ideally be kept below 1 NTU because of the recorded impacts on disinfection. This is achievable in large well-run municipal supplies, which should be able to achieve less than 0.5 NTU before disinfection at all times and an average of 0.2 NTU or less, irrespective of source water type and quality.

**Ammonia**

Environmental limits for ammonia in surface water in the US range from 0.25 to 32.5 mg/l (ppm). The National Academy of Science recommends, and many European nations have adopted, a drinking water standard of 0.5 mg/l (ppm).

**Nitrate**

The U.S. Environmental Protection Agency (EPA) standard for nitrate in drinking water is 10 milligrams of nitrate (measured as nitrogen) per liter of drinking water (mg/L). \* Drinking water with levels of nitrate at or below 10 mg/L is considered safe for everyone.

**Chloride**

EPA has identified 250 mg/L as a concentration at which chloride can be expected to cause a salty taste in drinking water. Water users typically notice the presence of high chloride before an equal amount of sodium.

**BOD**

Drinking water has a BOD level of 1 - 2 ppm. When the BOD value of water is in the range 3 - 5 ppm, the water is moderately clean. Polluted water has a BOD value in the range of 6 - 9 ppm. In polluted water, some organic waste is present.