

pH is the measure of the hydrogen ion concentration in water. It is measured on a logarithmic scale



pH of drinking water should be between **6.5-8.5**

pH needs to be controlled as it is a major factor in corrosion or scaling of pipes.

Addition of acid or alkaline substances like lime are used to adjust the pH.

Total Dissolved Solids

consists of inorganic salts and small amounts of organic matter.

Commonly Na, Ca, Mg, K, and Cl.

0-600mg/L is considered good

>1200 is unpalatable.

TDS is calculated by measuring Electrical conductivity in $\mu\text{S}\cdot\text{cm}^{-1}$ and multiplying it by 0.64.

TDS can also be measured gravimetrically.

Turbidity is the measure of the light scattering property of the water caused by the presence of fine suspended matter such as clay.

In a laboratory turbidity is measured in (NTU) Nephelometric Turbidity Units.

The drinking water guideline for Turbidity is **>0.2NTU** and not exceed **0.5NTU**.

Metals

Many metals are present in environmental waters.

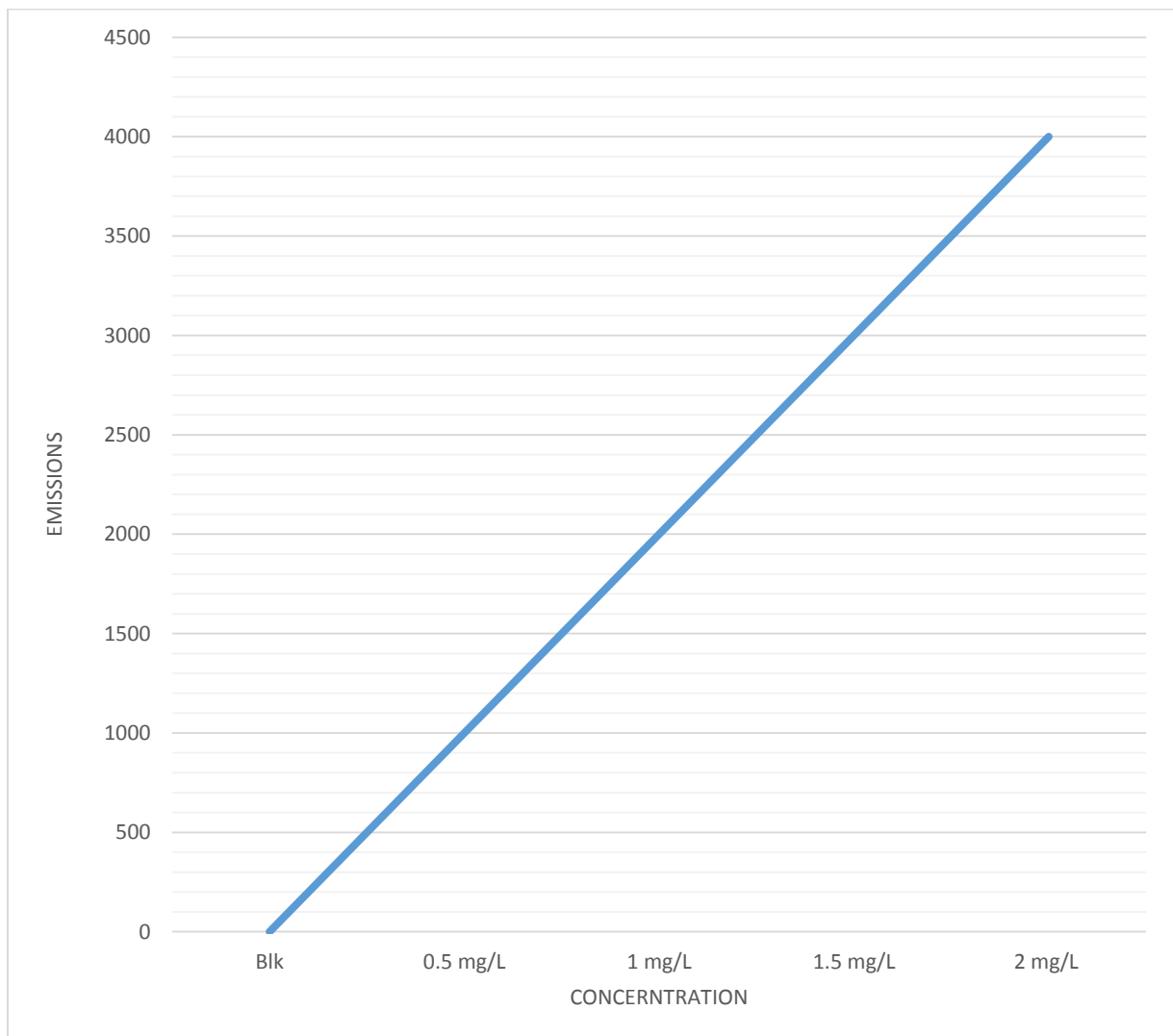
Some impact on human health others have purely aesthetic effects on the water.

Metals analysis is conducted using the Inductively Coupled Plasma emission spectroscopy (ICP)

The ICP measures metal concentrations in aqueous solutions by measuring atomic emissions at a known wavelength. The plasma is the excitation source, it runs at 8000K.

The light emitted by an element in the ICP is converted to an electrical signal that can be measured quantitatively.

Emissions are measured against a calibration curve of known concentrations.



Metals routinely tested for and their guideline values include:

- Aluminium 0.1mg/L (aesthetic)
- Iron 0.3mg/L (taste)
- Manganese 0.1mg/L (taste, staining)
- Ca, Mg (Hardness) 60-200mg/L
Corrosion/ Scaling
- Arsenic 0.01mg/L (health)
- Copper 1 mg/L (taste) 2mg/L(health)
- Cadmium 0.002mg/L (health)
- Lead 0.01mg/L (health)
- Zinc 3 mg/L aesthetic

Biological Oxygen Demand (BOD)

Is used to determine the relative oxygen requirements of waste water, effluents and polluted waters.

This test is of great importance to treatment plants dealing with trade waste and effluent.

The dissolved oxygen of a sample is measured, it is then incubated for 5 days and measured again. From this the oxygen uptake is calculated in mg/L.

Microbiology

Testing drinking water for bacterial contamination is necessary to ensure water is safe for consumption.

Escherichia coli (E. coli) is used as an indicator organism for the contamination of water by faecal matter. E coli is found in the intestines of warm blooded animals and is therefore present in natural water sources such as rivers, dams and creeks. E. coli can be eliminated by chlorination.

E. coli is also often found in water tanks due to contamination from animal faeces. The ANZAC guideline Values for E. coli is <1

Nutrients

The nutrients measured in water are typically Ammonia, Nitrite, Nitrate and Phosphorus and Total Nitrogen.

These analytes are all measured colormetrically.

High levels of nutrients cause problems in natural waters by causing algae blooms and eutrophication of a water body.

Nutrient levels are also very important in the treatment and discharge of waste waters and effluents.

Guideline values for drinking waters:

**Ammonia <0.5 at (1.5mg/L you can
smell ammonia.)**

Nitrate 50mg/L

Nitrite 3mg/L