

Water pollution 2

Pure water -- tasteless, colorless, and odorless -- is often called the universal solvent ■

What Are Total Dissolved Solids - TDS?

Dissolved solids" refer to any minerals, salts, metals, cations or " .
anions dissolved in water. This includes anything present in water
other than the pure water (H₂O) molecule and suspended solids.
(Suspended solids are any particles/substances that are neither
(.dissolved nor settled in the water, such as wood pulp

In general, the total dissolved solids concentration is the sum of the .
cations (positively charged) and anions (negatively charged) ions in
.the water

Parts per Million (ppm) is the weight-to-weight ratio of any ion to .
.water

Conductivity is usually about 100 times the total cations or anions .
expressed as equivalents. Total dissolved solids (TDS) in ppm
usually ranges from 0.5 to 1.0 times the electrical conductivity

?Where do Dissolved Solids come from

Some dissolved solids come from organic sources such as leaves, silt, plankton, and industrial waste and sewage. ■

Dissolved solids also come from inorganic materials such as rocks and air that may contain calcium bicarbonate, nitrogen, iron phosphorous, sulfur, and other minerals. ■

Many of these materials form salts, which are compounds that contain both a metal and a nonmetal. Salts usually dissolve in water forming ions. Ions are particles that have a positive or negative charge

Why Should You Measure the TDS ?level in your Water

a maximum contamination level of 500mg/liter (500 parts per million (ppm)) for TDS.. When TDS levels exceed 1000mg/L it is generally considered unfit for human

Most often, high levels of TDS are caused by the presence of potassium, chlorides and sodium. These ions have little or no short-term effects, but

toxic ions

(cadmium, nitrate and others) may also be dissolved in the .water

High TDS results in undesirable taste which ■
could be salty, bitter, or metallic. It could
also indicate the presence of toxic minerals

Aim....to determine dissolved solids(TDS) in water sample

Materials..... ■

Evaporating dish

Weithing balnce

Filter paper

Dessicator

Water bath

Hot air oven

procedure

Take an evaporating dish dry it and weigh it (w1)

Filter the the water sample through whatmans paper
(filtrate is as much clear as possible)

The minimum sample volume should be 100ml (add deioised water to make up the volume if required)

Evaporate the clear filtrate in dish in a water bath

Heat at 105°C for 24 hours

Cool in dessicator and take the final weight(w2)

Calculate (TDS) as follow ■

Total dissolved solids (TDS) as mg \L =

$$\frac{W_2 - w_1 \times 1000 \times 1000}{V}$$

Chloride (Cl) ■

is one of the major anions found in water ■
and are generally combined with calcium,
magnesium, or sodium. Since almost all
chloride salts are highly soluble in water, the
chloride content ranges from 10 to 100 mg/l

Chloride itself in drinking water is generally not harmful to human beings but at high concentrations, the sodium associated with chloride can be of concern to people suffering from heart or kidney disease ■

Aim....to measure the chlorides in natural waters

Material.. ■

White porcealin dish ■

Burette ■

Dropper ■

Glass rod ■

Beaker ■

Reagents ■

Standerd silver nitrate ■

Potasium chromate indicator ■

procedure

- Add 50ml of water sample in a porcelian dish
- To this now add 1ml of potastium chromate indicator
- The indicator gives a yellow colour to the sample
- This is titrated against silver nitrate until brick red colour develops
- Note the amount of silver nitrate consumed

Calculation ■

Amount of cl in water = ■

volume of silver nitrate consumed ■

$$\frac{\text{volume of silver nitrate consumed}}{\text{volume of sample}} \times \text{m of silver nitrate} \quad -$$