

Total Dissolved Solids

Total Dissolved Solids (TDS) refers to the dissolved mineral content of the water. The recommended limit for TDS is 500 milligrams per liter (mg/l). This is the concentration where most people will notice a bitter, salty, or medicinal taste in the water. While elevated levels of TDS are not a health hazard, there is also no proof that drinking a highly mineralized water is beneficial to health.

CAUSE:

The TDS concentration in a water is the result of the amounts and types of minerals dissolved into the water from the surrounding earth and rocks. Generally, well water near coastal regions will have an elevated TDS level. This is a result of both the nearness of the ocean and deposits left by the ocean in prehistoric times. “Hard” water will also have a correspondingly high level of TDS.

EFFECTS:

The most noticeable effect of excessive TDS is the taste it gives to water. If a large part of the TDS are chlorides, the water will have a salty taste. Sulfates will produce a bitter taste; while bicarbonates give the water a medicinal taste. When sulfates make up most of

the TDS, visitors to the area will notice a temporary laxative effect after drinking the water. The sulfates occurring in TDS are commonly known as Glauber's Salt and Epsom Salt.

Household plumbing and appliances will deteriorate faster in a mineralized water. Elevated levels of dissolved solids and chlorides increase the ability of the water to conduct an electrical current. The increase in conductivity accelerates corrosion by making it easier for the chemical reactions involved in corrosion to occur.

Total dissolved solids can also be responsible for scaling in water heaters, spotting on dishes, particles forming in ice, rings on cooking utensils, and particles forming in food during cooking.

TREATMENT:

With TDS, the treatment process must deal with a number of different mineral compounds or "salts." The available treatment processes for TDS while effective, are relatively more expensive than treatment for other water quality problems, such as iron removal.

Of the available treatment processes for TDS, reverse osmosis (RO) and deionization (DI) units are the only ones capable of treating the entire household supply. Because deionized water is also corrosive, DI units are not recommended for whole-house use.

Where only the taste of the water is of concern, point-of-use devices are another means for treating TDS. These are small treatment units which use distillation, deionization, reverse osmosis, or ultra filtration to treat only enough water for use in drinking and cooking. They are limited to a production of from 10 to 15 gallons of water per day.

1. **Reverse Osmosis (RO):** RO units remove TDS by forcing the water, under pressure, through a synthetic membrane. The membrane contains microscopic pores which will allow only molecules of a certain size to pass through. Since the molecules of dissolved mineral salts are large compared to the water molecules, the water will squeeze through the membrane leaving the mineral salts behind.

A properly operated RO unit is capable of removing 90 percent of the dissolved mineral salts from a water supply. A pre-filter is usually required to protect the membrane from abrasion. The membrane cartridges require periodic replacement.

2. **Distillation:** Distillation units are better known as "stills." They are manufactured from heat-resistant glass or stainless steel. Stills work by heating small amounts (less than 2 gallons) of water to produce steam. The steam is then collected and condensed back into water. The dissolved mineral salts will not vaporize and are left behind in the heating chamber.

Stills require frequent, rigorous cleaning to remove the baked-on mineral salts. The "flat" taste from boiling the water can be reduced by pouring the water back and forth between two containers to aerate it.

3. **Deionization (DI):** Deionization units are available as small, wall-mounted cartridges containing ion exchange resins. When water passes through the cartridge, the dissolved mineral salts are retained in the resin, producing a mineral-free water.

The DI cartridges have a limited life. They will usually show a color change in the resin to indicate when they should be replaced.

4. **Combination Point-of-Use Devices:** These are multistep treatment systems

designed to fit under the kitchen sink. They use a pre-filter, RO membrane or DI cartridge, and a carbon polishing filter to produce up to 15 gallons of water per day. The treated water is stored in a small pressure tank and piped to a special faucet on the sink. Each of the treatment steps is in a cartridge form.