

Technical Information:

Date: February 2006
Subject: Water Treatment Fluoridation
Topic : Fluoride

Fluoridation

In North America, many water treatment plants add Fluoride to drinking water. Studies have shown that by adding Fluoride ions to water, tooth decay is reduced. This is especially the case with children who up until 7 or 8 years of age still have developing teeth so the Fluoridated water will help strengthen the tooth enamel against bacteria's which cause tooth decay.

A Fluoride concentration of between 0.8 PPM to 1.2 PPM is added to water depending on the climate, in warmer regions people drink more water and so a lower value is added as compared to a colder region where a higher value is added. Here in Guelph, Ontario, we see the value pretty constant at 0.8 PPM measured at the tap.

In some locations the addition of Fluoride is a controversial topic, in Germany it is not allowed as it is classified as enforced medication. It is not intentionally added to the water in many countries for this reason.

In North America it is a common occurrence. There are a number of ways Fluoride is added to water.

Hydrofluorosilicic Acid (H_2SiF_6) referred to as HFS

This comes as a liquid in concentrations of 20 – 35% and is pumped directly into the water.

Sodium Fluoride (NaF)

This comes as a dry powder / crystals of various sizes. It is dissolved in a tank and fed as a liquid. The tank is called a Fluoride saturator and due to the solubility of Sodium Fluoride a solution of approx. 4% is produced regardless of tem. The water used for dilution has to meet some requirements, and may have to be softened. With levels of > 10 PPM of hardness Calcium and Magnesium Fluorides will precipitate out causing scaling in the tank, pump and piping.

Sodium Fluorosilicate (Na_2SiF_6)

Comes as a white crystalline powder and has to be either added directly to water or dissolved in water and subsequently pumped. Unlike Sodium Fluoride, its solubility changes with temperature and so a measured volume or weight is added to a volume of water and subsequently pumped.

General

The MAC (Maximum Allowable Concentration) in drinking water is 1.5 PPM.

In some cases the natural level of Fluoride in the water may exceed the MAC, in these cases a removal of Fluoride (Defluoridation) from the water is necessary.

Too much Fluoride in drinking water can lead to health problems, a mottling of teeth which shows as white specs to brown stains, other long term health effects are also attributed to Fluoride.

A search on the Internet on this topic will reveal numerous articles on the pros and cons of Fluoridation.

Mostly we see HFS being used. The use of powder can create dust problems and need for some special requirement for handling.

The Fluoride pump is normally flow proportionally paced into the water, there is no Fluoride demand or consumption from the water so a stable concentration will exist.

In conjunction with a flow proportionally paced Fluoride pump, our D1C Fluoride monitors are an excellent way to continuously monitor and be able to record the Fluoride value. Since our Fluoride monitor uses a direct measurement Fluoride sensor, no reagents or sample conditioning is necessary.