

Fluoride Additives

Types of Fluoride Additives:

1. Hydrofluorosilicic Acid (FSA)
2. Sodium Fluorosilicate
3. Sodium Fluoride

Community water systems in the United States use one of three additives for water fluoridation. Decisions on which additive to use are based on cost of product, product-handling requirements, space availability, and equipment.

The above products undergo stringent testing to assure that they meet the strict requirements of the Environmental Protection Agency (EPA) to be added to our water supply. The tests are carried out by NSF International and the American Water Works Association. The additives must meet the rigid requirements of Standard 60 of the NSF/ANSI rule. All these products conform to these rigid standards and meet or exceed them.



Fluoride Additives are Not Different From Natural Fluorides

Some consumers have questioned whether fluoride from natural groundwater sources, such as calcium fluoride, is better than fluorides added "artificially," such as FSA or sodium fluoride. Two recent scientific studies, listed below, demonstrate that the same fluoride ion is present in naturally occurring fluoride or in fluoride drinking water additives and that no intermediates or other products were observed at pH levels as low as 3.5. In addition, the metabolism of fluoride does not differ depending on the chemical compound used or whether the fluoride is present naturally or added to the water supply.

Sources of Fluoride Additives

Most fluoride additives used in the United States are produced from phosphorite rock. Phosphorite is mainly used for manufacturing phosphate fertilizer. Phosphorite contains calcium phosphate mixed with limestone (calcium carbonates) minerals and apatite—a mineral with high phosphate and fluoride content. It is refluxed (heated) with sulfuric acid to produce a phosphoric acid-gypsum (calcium sulfate-CaSO₄) slurry.

The heating process releases hydrogen fluoride (HF) and silicon tetrafluoride (SiF₄) gases, which are captured by vacuum evaporators. These gases are then condensed to a water-based solution approximately 23% Hydrofluorosilicic Acid (FSA).

Approximately 95% of FSA used for water fluoridation comes from this process. The remaining 5% of FSA is produced in manufacturing hydrogen fluoride or from the use of hydrogen fluoride to etch silicates and glasses when manufacturing solar panels and electronics.

Since the early 1950s, FSA has been the main additive used for water fluoridation in the United States. The favorable cost and high purity of FSA make it a popular additive. Sodium fluorosilicate and sodium fluoride are dry additives that come from FSA.

United States Pharmacopeia (USP) Grade Fluoride Products

Some have suggested that pharmaceutical grade fluoride additives should be used for water fluoridation. Pharmaceutical grading standards used in formulating prescription drugs are not appropriate for water fluoridation additives. If applied. Those standards could actually exceed the amount of impurities allowed by AWWA and NSF/ANSI in drinking water.