CITY of DURANGO

Fluoride Information Sheet

FAQs

Q. What is Fluoride?

A.[1]
- Fluoride is a naturally occurring ion of the periodic element, Fluorine.
- It is the compound used to fluoridate drinking water to promote oral health.
- Fluoride is the thirteenth most common element in the Earth's Crust and has been present as an element since the earth formed.
- Fluoride occurs naturally in water, plants soil and air.
- Fluoride is used in toothpaste to prevent tooth decay.

Q. What is the compound that is used to fluoridate the City's water supply?

A. Sodium Fluoride (NaF), which is a dry additive typically used in small water systems. The sodium fluoride product that the City uses meets ANSI/AWWA standards and is NSF International / ANSI (American National Standards Institute) Standard 60 certified for Fluoride addition to drinking water and other food grade products.

Q. How are fluoride additives produced?

A. 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). The heating process releases hydrogen fluoride (HF) and silicon tetrafluoride (SiF4) gases, which are captured by vacuum evaporators. [2]

The solid sodium fluoride product that the City uses is produced by neutralizing hydrofluoric acid with sodium hydroxide and then drying it to form crystals.

$$HF + NaOH \leftrightarrow NaF + H2O$$

Q. Are fluoride additives required to meet safety and purity standards?

A. Yes. All additives used by water treatment plants, including fluoride additives, must meet strict quality standards that assure the public's safety. These additives are subject to a stringent system of standards, testing, and certificates by AWWA and NSF International. Both of these organizations are nonprofit, nongovernmental organizations.

Fluoridated community water systems adjust fluoride to approximately 0.7 milligrams per Liter (mg/L). Because in some rare locations fluoride is naturally present in water at much higher levels, the EPA established a Maximum Contaminant Level (MCL) for fluoride of 4.0 mg/L.

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[1] *Note*. From "Fluoride & Drinking Water: Facts about oral health & Community Drinking Water", produced by Colorado Department of Public Health and Environment. A joint publication from the Oral Health & Safe Drinking Water Programs.

[2] *Note*. From "Water Fluoridation Additives Fact Sheet," produced by the Centers for Disease Control and Prevention, December 22, 2014.

The AWWA standards for sodium fluoride additives is ANSI/AWWA B701. AWWA standards are reviewed and updated at least every 5 years. AWWA standards stipulate product quality testing requirements and verification.[3]

Q. Do these standards apply to products that are not manufactured domestically?

A. Yes. The NSF/ANSI Standard 60 limits a chemical or product's contribution of contaminants to drinking water applications. Standard 60 provides for product purity and safety assurance that aim to prevent adding harmful levels of contaminants from chemicals and water treatment additives. It includes a detailed audit of the production of the additive products, validation testing of quality, and auditing of all locations for logistic handling. There are also specific criteria for imported products from other countries, and in conjunction with NSF/ANSI Standard 223, there is conformity in quality controls regardless of where certification occurs or which entity performs the certification.

Q. Are there standards for impurities such as arsenic and lead?

A. Fluoride additives are analyzed for potential impurities including arsenic, lead, and radionuclides. Verification of compliance with NSF/ANSI Standard 60 is also be certified.

Members of the public have raised concerns about arsenic in drinking water. Fluoride additives may contain some arsenic. The EPA allowable amount for arsenic in drinking water is 10 parts per billion. NSF quality testing has found that most fluoride additive samples do not have detectable levels of arsenic. [4]

Q. Does the City use pharmaceutical-grade fluoride additives?

A. No. 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. [5]

Given the volumes of chemicals used in water fluoridation, a pharmaceutical grade of sodium fluoride for fluoridation could potentially contain much higher levels of arsenic, radionuclides, and regulated heavy metals than an NSF/ANSI Standard 60-certified product. [6]

Q. How do Fluoride additives differ from naturally occurring fluoride?

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[3] *Note*. From "Water Fluoridation Additives Fact Sheet," produced by the Centers for Disease Control and Prevention, December 22, 2014.

[4] *Note*. From "Water Fluoridation Additives Fact Sheet," produced by the Centers for Disease Control and Prevention, December 22, 2014.

[5] *Note*. From "Water Fluoridation Additives Fact Sheet," produced by the Centers for Disease Control and Prevention, December 22, 2014.

[6] *Note*. From "NSF Fact Sheet on Fluoridation Products," produced by the National Sanitation Foundation, February 15, 2013.

A. Fluoride from natural groundwater sources, such as calcium fluoride, is the same as "artificially" added fluorides, such as FSA or sodium fluoride.[7] The same fluoride ion is present in naturally occurring fluoride that is in fluoride drinking water additives.[8] 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.[9]

Q. Where does the City purchase fluoride from?

A. The City purchases its sodium fluoride from Univar and is packaged under the Solvay Fluorides, LLC brand. Although the product is transported to Durango from a supplier in Farmington, Solvay Fluorides, LLC currently imports its sodium fluoride.

All Solvay Fluorides, LLC's sodium fluoride is certified to meet or exceed the purity required for use in water fluoridation systems. Composition and quality requirements for that use are governed by NSF International / ANSI (American National Standards Institute) Standard 60 and American Water Works Association Standard B701.

Q. What is fluoride's Maximum Contaminant Level for humans?

A. The Maximum Contaminant Level (MCL) for fluoride in drinking water is 4.0 parts per million. An MCL is the legal threshold limit on the amount of a substance that is allowed in public water systems under the Safe Drinking Water Act.

Q. What is the background level of fluoride that exists in the City reservoir prior to the water treatment process?

A. Naturally occurring fluoride concentrations in our raw water supply average 0.24 parts per million (ppm).

Q. What quantity (i.e. how much) fluoride is added as part of the water treatment process?

A. The Colorado Department of Public Health & Environment (CDPHE), Centers for Disease Control and Prevention (CDC), and the US Department of Health and Human Services (HHS) currently recommends a 0.7 ppm Fluoride concentration in drinking water for optimum oral health. Water Treatment Plant staff add fluoride at an average of 0.46 ppm throughout the year (continuously) in

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[7] Finney WF, Wilson E, Callender A, Morris MD, Beck LW. Re-examination of hexafluorosilicate hydrolysis by fluoride NMR and pH measurement. *Environ Sci Technol* 2006; 40:8:2572.

[8] Finney WF, Wilson E, Callender A, Morris MD, Beck LW. Re-examination of hexafluorosilicate hydrolysis by fluoride NMR and pH measurement. *Environ Sci Technol* 2006; 40:8:2572.

[9] G.M. Whitford, F.C. Sampaio, C.S. Pinto, A.G. Maria, V.E.S. Cardoso, M.A.R. Buzalaf. Pharmacokinetics of ingested fluoride: Lack of effect of chemical compound., Archives of Oral Biology, 53 (2008) 1037–1041.

order to achieve the 0.7 ppm standard. This means that for every 1,000,000 parts of treated water, there are 0.7 parts of Fluoride in the City's drinking water.

Q. How much does it cost the City to fluoridate the public water supply?

A. The total cost to fluoridate City of Durango water in 2016 was $34,500. That includes chemical (NaF), laboratory analysis/QC, feed system repair parts/materials, and labor to operate and maintain the system.

- NaF - $16,000
- Laboratory analysis chemicals / QC -$7,000
- Feed system repair parts and materials - $1,500
- Labor - $10,000

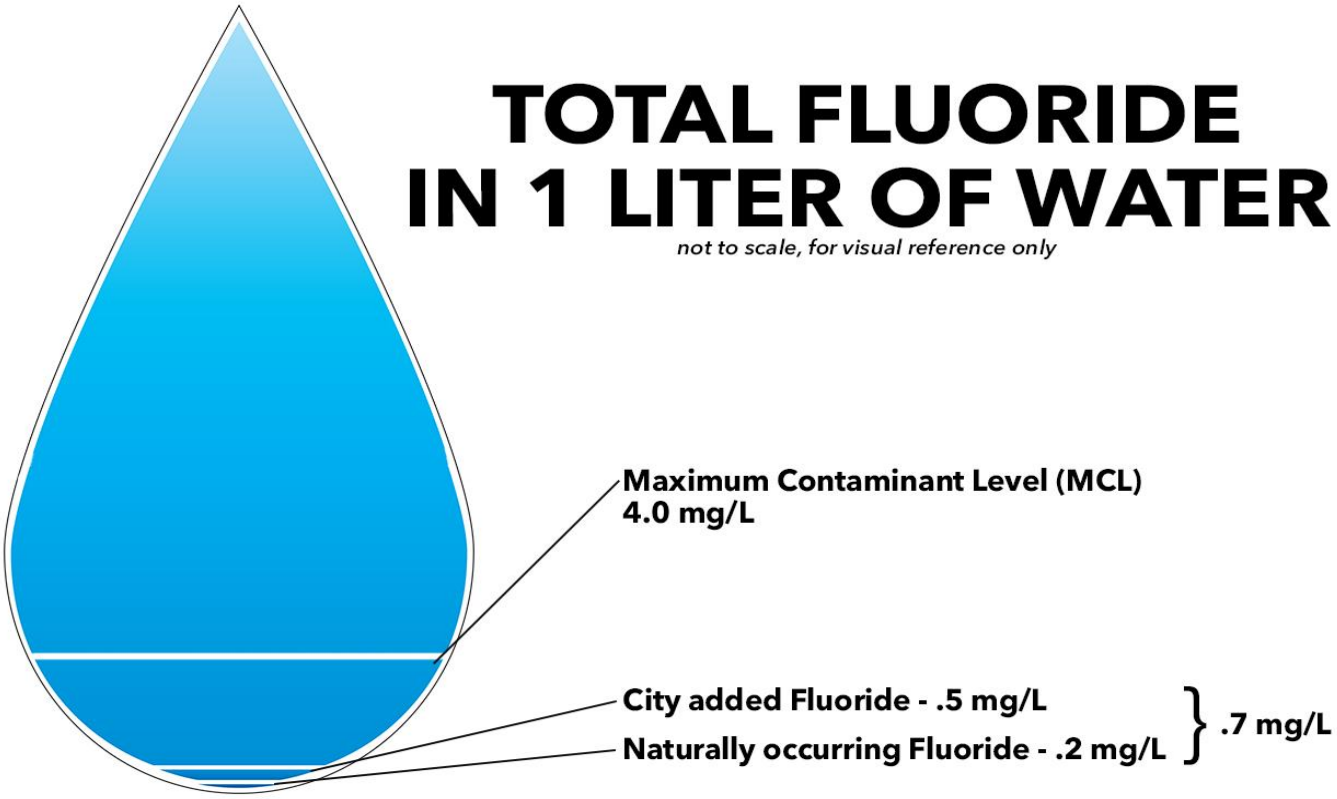
Q. How can consumers be assured that the City consistently fluoridates its drinking water to current standards and regulations?

A. The City has invested in redundant instrumentation and analytical methods to measure fluoride concentrations at various treatment stages. In-house laboratory analysis of Fluoride concentration levels are monitored daily for process control purposes and reported to CDPHE's, Oral Health Unit. The City of Durango receives the "Excellence in Fluoridation" award from the CDPHE, CDC, and HHS on an annual basis dating back to 2012.

Q. What other Colorado Communities participate in CDPHE's voluntary Community Water Fluoridation Program?

A. In Colorado, over 50 Public Water systems service approximately 74% of the state's population participate in CDPHE's Community Water Fluoridation Program. In 2015 only 14 water systems, including the City of Durango, received the CDC Water Fluoridation Quality Award and the 2015 Colorado Excellence Award. These communities are:

- The City of Arvada
- The City of Boulder
- Clifton Water District
- Evergreen Metro District
- The City of Fort Collins
- The City of Fort Morgan
- Left Hand Water
- The City of Lafayette
- The City of Longmont
- The City of Louisville
- The City of Loveland
- Ute WCD


TOTAL FLUORIDE
IN 1 LITER OF WATER
not to scale, for visual reference only
Maximum Contaminant Level (MCL)
4.0 mg/L
City added Fluoride - .5 mg/L
Naturally occurring Fluoride - .2 mg/L
.7 mg/L