

# FACT SHEET



# SILICA

In response to concerns regarding water quality issues, the City of Longview has asked a team of health science experts to review water quality data and determine whether some of the components of Longview's drinking water might have health impacts. This fact sheet was prepared by Intertox, Inc.\* for City of Longview customers to address commonly asked questions.

## What is silica?

Silica (silicon dioxide) is a naturally occurring compound found in sand and quartz. Silica is used to make glass, fiber optic cables, and concrete.

Silica is commonly found in all types of soil. As water moves through soil and rock, silica is picked up by the water and can eventually end up in the water supply.

## How is silica measured?

Silica in water can exist as a particulate, as a group of suspended fine particles (a colloid), or in a dissolved form.<sup>1</sup> It is measured in milligrams (mg) of silica per liter (L), or mg/L.

Silica in freshwater sources is found at concentrations ranging from 1 to about 100 mg/L, with groundwater concentrations typically at the higher end of that range.<sup>2</sup>

## How small is one part per million?

One part per million is equal to:

- One ounce in 32 tons
- One drop in 10 gallons
  - One mg /L

## What is the silica concentration in drinking water in Longview?

Data from water sampling from August 2013 to March 2014 at 23 locations in Longview show an average silica concentration of 59 mg/L. Silica concentrations ranged from 38 mg/L to 92 mg/L. Some bottled waters contain up to 92 mg/L silica.

Ontario Great Lake Region Water contains 3 mg /L of silica, same as a cup of vegetables

LEaC Shield uses 6 mg /L of silica, same as a bowl of cereal

## What does the government say about how much silica is acceptable in drinking water?

The U.S. EPA establishes Primary Drinking Water Standards based on health considerations, and Secondary Drinking Water Standards based on aesthetics such as taste, odor, color, or corrosivity. U.S. EPA has no Primary or Secondary Standards for silica.

Canada has identical standards to the US EPA

## How much silica am I exposed to?

Given that silica is naturally occurring, it is found in foods and beverages and is generally recognized as safe (GRAS) by the FDA for use as a food additive.<sup>3</sup> It is also found in many beauty products.

While the US does not have standards for silica consumption. The Food Standards Agency of Great Britain derived a safe upper level for daily consumption of silica over a lifetime of 25 mg per kilogram (kg) body weight per day (equivalent to about 1500 mg/day for an average adult).<sup>4</sup>

Approved Food Additive – Health Canada

### Average Amount of Silica in Milligrams (mg) per 100 grams<sup>5</sup>

FOOD OR BEVERAGE (SERVING)	MG PER SERVING
Dried fruits (1/4 cup)	8
Breakfast cereals (1 cup)	6
Mineral and spring waters (12 oz)	4
Vegetables (3/4 cup)	3
Nuts (1 oz)	0.4

A person drinking (1) 8-ounce glass of water containing the highest level of silica measured by the City of Longview would receive at most 22 mg of silica, less than the amount received by eating 3 servings of dried fruit.

## What can I do about silica?

While silica does not pose any health risks at the levels found in drinking water, it can be a nuisance for customers. Silica may result in the appearance of a scale or film on glassware, shower doors, sinks, and faucets. Here are some helpful hints for dealing with silica:

### In Longview, WA - water

- Leave a squeegee in the shower to clean the walls and shower door after each use.
- Remove scaling from glass and plumbing fixtures using baking soda, warm water, and a soft cloth.
- To prevent scaling on glassware and cookware, use a product containing citric acid or acetic acid (vinegar) as a rinse aid in dishwashers.

## What happens to silica when it enters the body?

About 20-75% of silica is absorbed in the digestive tract and is used to build bones and tendons.<sup>4</sup> Silica is rapidly excreted from the body, primarily in urine.<sup>4</sup> Silica may improve the appearance and strength of skin, hair, and nails.<sup>6</sup> Some studies suggest that silica may help build bones and decrease the risk of osteoporosis.<sup>6</sup>

## What type of health effects can be caused by exposure to silica?

No adverse health effects have been reported in laboratory animals fed large amounts of silica (equivalent to an adult eating about 3.5 g of silica) per day over periods of several weeks to 2 years.

The route of exposure is important in understanding possible health effects. Exposure to silica in drinking water has not been reported to cause human health effects. Studies in humans have shown that breathing certain forms of silica dust (for example, when working in a factory) can cause lung damage.<sup>4</sup> Residents of Longview are not exposed to airborne silica from drinking water.

## Are any health effects expected from the silica in Longview's water?

Based on the data analyzed for Longview's water, no adverse health effects are expected from silica, even at the maximum concentration measured. The maximum silica concentration in water is equivalent to 9.2 mg silica per 100 g (about 3.5 oz) of water, less than the amount found in dried fruits and breakfast cereals.

An infant (up to 12 months of age) would have to drink about (11) 8-ounce glasses of water a day containing the highest level of silica measured by the City of Longview to ingest an amount equal to the Food Standards Agency's safe upper limit for daily consumption over a lifetime of about 250 mg/day for an infant.<sup>4</sup> The number of glasses is greater for adults (68) and children (34) due to their substantially greater size.



## Where can I get more information?

The U.S. EPA has a searchable website for Frequently Asked Questions regarding water quality at <http://safewater.supportportal.com/ics/support/KBSplash.asp>

## References

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\* Intertox is a health science research firm headquartered in Seattle, Washington. Intertox consists of a multidisciplinary team of experts in the medical and environmental sciences who work with clients to evaluate risks posed by chemicals and biological agents affecting human health.