



MEMORANDUM

LEGISLATIVE REFERENCE BUREAU

WWW.MILWAUKEE.GOV/LRB

To: Ald. Jim Bohl
From: Aaron Cadle – Legislative Fiscal Analyst
Date: September 1, 2016
Subject: Milwaukee Water Works Treatment Additives

Per your request, this memo lists the additives used by the Milwaukee Water Works during water treatment and the concentrations of these additives in water at the tap. Concentration levels come from the utility's 2015 Distribution System Water Quality report filed with the federal Environmental Protection Agency and the state Department of Natural Resources.

In answer to your 3 direct questions:

1. Chloramine is one of the additives used, and has been used since the Water Works began treating water at its current treatment plants (Linnwood – 1938 and Howard – 1962).
2. The fluoride additive is hydrofluorosilicic acid, not sodium chloride.
3. The orthophosphate used is phosphoric acid.

Milwaukee Water Works' Water Treatment Additives

- **Ozone gas** is bubbled through incoming lake water to destroy disease-causing microorganisms including Cryptosporidium. Also, ozone serves to control taste and odor, and to impede the formation of chlorinated disinfection byproducts. The gas is removed after this first step in the treatment process so none remains in water at the tap.
- **Aluminum sulfate** is added to neutralize the charge on microscopic particles suspended in the water. This encourages these particles to clump together so they can be more easily removed during the sedimentation process.
- **Chlorine** is added after sedimentation and filtration as a secondary disinfectant to provide extra protection from potentially harmful microorganisms.
- **Hydrofluorosilicic acid** is added as a fluoride treatment to help prevent tooth decay.
- **The orthophosphate phosphoric acid** is added to retard water pipe corrosion in order to limit or prevent the leaching of lead and copper into

the water as it passes through water service lines and user plumbing to the customer's tap.

- **Chloramine**, the final additive, is added as a disinfectant to maintain bacteriological protection in the distribution system.

Additive Concentrations

The following table lists concentrations of water treatment additives used by the Milwaukee Water Works at the customer's tap according to the utility's 2015 Distribution System Water Quality report. It should be noted chlorine is the residual substance remaining in the water, and measured for concentration levels, after both chlorine and chloramine (chlorine plus ammonia) treatments.

2015 Water Treatment Additive Concentrations (parts per million)				
	Chlorine	Hydrofluorosilicic Acid	Phosphoric Acid	Aluminum Sulfate
EPA/DNR Standards				
Maximum	4.0	4.0	Unregulated	Unregulated
Sample Concentrations				
Maximum	2.08	0.64	2.10	0.69
Minimum	0.23	0.06	0.95	< 0.002
Median	1.26	0.49	1.58	0.049