

## BASIC INFORMATION ABOUT CHLORAMINES

### 1) What are chloramines?

**Chloramines are *disinfectants* used to treat drinking water.**

- Chloramines are most commonly formed when ammonia is added to chlorine to treat drinking water.
- The most typical purpose of chloramines is to protect water quality as it moves through pipes.
- Chloramines provide long-lasting protection as they do not break down quickly in water pipes.

**The different types of chloramines are monochloramine, dichloramine, trichloramine, and organic chloramines.**

- When chloramines are used to disinfect drinking water, monochloramine is the most common form.
- Dichloramine, trichloramine, and organic chloramines<sup>1,2</sup> are produced when treating drinking water but at much lower levels than monochloramine.
- Trichloramines<sup>1</sup> are typically associated with disinfected water used in swimming pools.

**The Environmental Protection Agency regulates the safe use of chloramines in drinking water.**<sup>3</sup>

- EPA requires water utilities to meet strict health standards when using chloramines to treat water.
- EPA chloramines regulations are based on the average concentration of chloramines found in a water system over time.
- EPA regulates certain chemicals formed when chloramines react with natural organic matter<sup>4</sup> in water.

*Additional Supporting Information:*

1. Dichloramine is formed when the chlorine to ammonia-nitrogen weight ratio is greater than 5:1, however, this reaction is very slow. Organic chloramines are formed when chlorine reacts with organic nitrogen compounds. Source: *Optimizing Chloramine Treatment*, 2<sup>nd</sup> Edition, AwwaRF, 2004
2. Trichloramine formation does not usually occur under normal drinking water treatment conditions. However, if the pH is lowered below 4.4 or the chlorine to ammonia-nitrogen weight ratio becomes greater than 7.6:1, then trichloramine can form. Trichloramine formation can occur at a pH between 7 and 8 if the chlorine to ammonia-nitrogen weight ratio is increased to 15:1. Source: *Optimizing Chloramine Treatment*, 2<sup>nd</sup> Edition, AwwaRF, 2004
3. The drinking water standard for chloramines is 4 parts per million (ppm) measured as an annual average. More information on water utility use of chloramines is available at <http://www.epa.gov/safewater/disinfection/index.html> and in the 1997-1998 Information Collection Rule, a national survey of large drinking water utilities for the Stage 2 Disinfection Byproducts Rule (DBPR). Information on the Stage 2 DBPR is available at <http://www.epa.gov/safewater/disinfection/stage2/>. More information on EPA's standard setting process may be found at: <http://www.epa.gov/OGWDW/standard/setting.html>.
4. *Natural Organic Matter*: Complex organic compounds that are formed from decomposing plant, animal and microbial material in soil and water. They can react with disinfectants to form disinfection by products. Total organic carbon (TOC) is often measured as an indicator of natural organic matter.