

CHLORINE DIOXIDE AND PLASTIC HOT- AND COLD- WATER PLUMBING DISTRIBUTION PIPES

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Foreword

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The purpose of this technical note is to provide information regarding chlorine dioxide (ClO₂) and plastic hot- and cold-water plumbing distribution pipes.

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1.0 INTRODUCTION

This PPI Technical Note focuses on the application of chlorine dioxide within buildings and its potential effects on the following plastic hot- and cold-water plumbing distribution pipe materials:

- CPVC: *chlorinated polyvinyl chloride*
- PEX: *crosslinked polyethylene*
- PE-RT: *polyethylene of raised temperature resistance*
- PP-R: *polypropylene random copolymer*
- PP-RCT: *polypropylene random copolymer with modified crystallinity & temperature resistance*

Currently, limited North American industry data is publicly available to predict the impact that chlorine dioxide may have on specific plumbing distribution pipe materials. This Technical Note addresses this topic based on data that has been collected through an extensive analysis of published research combined with the experience and expertise of PPI members.

2.0 POTABLE WATER DISINFECTION METHODS

The majority of public water systems in North America use one or more chemical disinfectants to treat raw surface or groundwater for potable use. In the United States and Canada, the two disinfectants most commonly used in public potable water systems are free chlorine and chloramines and they have proven to be safe and effective methods for keeping our water safe.

Chlorine is typically supplied in a liquid form as sodium hypochlorite, the same chemical found in bleach. It is also available in gas form. Chloramine is formed when ammonia is added to water that has been first treated with chlorine.

Approximately 99% of disinfected potable water systems in the US use free chlorine or chloramine as the disinfectant. Industry research, as published in PPI documents¹ and various research papers², indicates that, when used in hot- and cold-water plumbing distribution applications, water services, building supply lines, and other related applications, the plastic piping materials listed in Section 1.0 have proven resistance to exposure to these disinfectants even under hot-water operating conditions.

¹ [TN-53 - Guide to Chlorine Resistance Ratings of PEX Pipes and Tubing for Potable Water Applications \(plasticpipe.org\)](#)

² *ASTM F2023 White Paper - Jana Laboratories Oct. 30, 2009*