



Why Do PVC & CPVC Pipes Occasionally Fail?

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Preface

PVC and CPVC pipes and fittings are excellent products and have been used successfully for decades. There is a low failure rate and the use of PVC/CPVC materials offer significant advantages over metal piping materials including ease of installation and very low failure rates. I am not aware of any health cautions regarding the usage of PVC/CPVC pipes and fittings other than the need to install them properly without using incompatible materials during the installation. However, as with all plumbing products including metal piping, occasionally a pipe or fitting may fail. When a failure does occur, our experience indicates that most often the failure can be linked to improper installation practices. The intent of this article is to provide assistance regarding installation errors to avoid and thereby reduce the occurrence of a failure in PVC and CPVC plumbing. Again, let me emphasize that by teaching about the main causes of occasional failure of PVC and CPVC pipes and fittings, I am in no way suggesting that these plumbing products are less reliable or more prone to failure than any other plumbing material. Further, I am outraged by the misuse of my teachings by some to attack PVC and CPVC plumbing products as being inherently unsafe. If I were to build a home for my own family, I would use as much plastic plumbing in my home as possible to keep the costs to a minimum while providing my family with a safe living environment.

Most of the Main Causes of CPVC/PVC Pipe Failure Listed Below are Discussed in this Article

- I. Improper System Engineering/Installation
 - A. Inadequate provision for linear thermal expansion
 - B. Excess use of Cement
 - C. Insufficient amount of Cement
 - D. Wrong Clamps used or Clamps too tight
 - E. Incompatible fire caulk used
 - F. Contact of outside of pipe with incompatible material (e.g., solder flux)

- II. Improper Operation
 - A. Exposure to freezing temperatures without freeze protection
 - B. Over-pressurization
 - C. Pulsating water pressure
 - D. Use of incompatible materials around pipes

- III. Contamination
 - A. Internal
 1. Use of contaminated antifreeze
 2. Contaminants from metal water supply piping; e.g., antimicrobial (MIC inhibitor) linings, corrosion inhibitors, phthalate plasticizers from pump seals/gaskets, refrigeration system lubricants

B. External

1. Incompatible Fire Caulk
2. Use of incompatible (black Proset) grommets to seal pipe against hole in concrete
3. Contact with incompatible plastic coated wires
4. Exposure to hot solder flux
5. Exposure to hot polyurethane foam insulation

IV. Manufacturing defects

- A. Dirty extrusion die
- B. Incomplete resin consolidation
- C. High stresses in pipe wall due to rapid cooling

V. Resin Defects

- A. Occlusions, char particles, voids
- B. Filler/pigment not well distributed

IV. Abuse by Distributor

- A. Store in sun
- B. Damage during transport

This article is being written to help educate installers about installation errors to watch out for.

To request copy of Dr. Priddy's complete article (16 pages), please email article2@plasticfailure.com

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