

RiskTopics

CPVC sprinkler pipe failures

Zurich Resilience Solutions - Risk Engineering

CPVC sprinkler piping failures have been associated with non-compatible sealants, lubricants, and other related building products.

Introduction

The use of CPVC (chlorinated polyvinyl chloride) sprinkler piping has become commonplace in the construction industry in a variety of residential, commercial, and mixed-use applications. Failures associated with the use of non-compatible sealants, caulks, lubricants, and other products that have resulted in significant construction defect claims can potentially impact General Liability, Builders Risk and Professional Liability policies. Loss exposures are not limited to material incompatibility only but have direct links to inadequate quality assurance and quality control program management.

Discussion

CPVC pipes are manufactured by multiple companies including Tyco, GF Harvel, Charlotte, and Spears. Chemical compatibility issues can lead to degradation and eventual failure with all CPVC pipe manufacturers and compatibility with a variety of ancillary building materials should be verified specific to each CPVC pipe manufacturer's technical data. Pipes bearing the "BlazeMaster®" designation are made from raw product produced by the Lubrizol Corporation and are commonly used for automatic fire sprinkler piping in certain occupancies. For example, failures can occur when Lubrizol manufactured piping has contact Hilti CP 506 Smoke and Acoustic Sealant, although other brands are susceptible to similar failures based on chemical incompatibility. Ancillary building materials includes caulking, thread sealant, pipe tape and fire stopping, but can also include other items that may come into contact with CPVC during or after construction, such as mold cleaners and inhibitors, leak detectors, pipe hangers, waterproofing materials and flexible wires and cable (such as data cabling).

- Literature for the various CPVC products provides a listing of materials by brand that is approved for use with their piping components. Similarly, product literature may also list materials and compounds found through manufacturer or independent testing to degrade CPVC and or cause weakening at connection points and cracking in straight pipe sections from contact. In fact, some pipe manufacturers provide "Do's" and "Don't" guidance that coupled with the technical specifications clearly state the importance of utilizing the correct materials for installation and avoiding contact with non-compatible ones. That stated, there have been instances where packaging for some sealants did not consistently include warnings about incompatibility with certain CPVC pipe types, and there can be conflicting information depending on the reference source.

- Depending on the manufacturer, a partial listing of non-compatible materials and compounds includes; certain cooking oils containing animal fats, solvent or petroleum-based paints / coatings, metal pipe-cutting oils, termiticides and insecticides, mold abating compounds / fungicides, ethylene glycol, propylene glycol and/or contaminated glycerin solutions (anti-freeze), fire stop sealants, non-fire rated expansion and acoustical sealants, certain expanding foam sealants, gasket lubricants, rubber and similar flexible plastic material that may contain certain types of corrosive plasticizers.
- The use of non-compatible materials coupled with inadequate quality controls may contribute to the failure, although other installation defects may contribute as well.

Guidance

- When used for fire protection systems, all CPVC piping and fittings should conform to ASTM F422¹, which is entitled: “Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR).
- Special care must be taken during the design phase to specify compatible piping, fittings, connection adhesives and caulking or sealants that will come into contact with CPVC piping. Design professionals involved with mechanical systems and general construction elements should coordinate their specifications and contact manufacturers if product compatibility data is unclear or lacking. Pipe and fittings should always be sourced from the same manufacturer.
- Additional care is also required during the product submittal stage to assure that specified piping and associated materials meet the design and do not include substitutes that may inadvertently result in a non-compatible combination.
- Ensure CPVC pipe system installers are trained and certified by the specified pipe manufacturer.
- Follow all manufacturer instructions for proper storage and handling of CPVC pipe materials.
- Establishing enhanced field-based QA/QC protocols is very important to eliminating the possibility of tradespersons using incorrect materials. Daily inspection by project management team members to assure that only “approved” materials are available for use by the piping installers and other trades performing sealing or caulking of pipe penetrations should be done. Utilization of daily pre-task planning meetings may be helpful in managing subcontractor compliance.

Conclusion

CPVC sprinkler piping systems may fail due to contact with various incompatible sealants, caulks, or other building products. However, these losses can be mitigated with a thorough understanding of product compatibility, proper selection by the design professionals and proper installation by subcontractors. The development and implementation of enhanced QA/QC protocols is an important key to the process.

For more information on Zurich’s extensive Risk Engineering and Sustainability services, please contact your Risk Engineer or visit us at [Risk Engineering and Sustainability Services | Zurich Resilience Solutions](#).

References

¹ “ASTM F442 / F442M – 20.” ASTM International – Standards Worldwide, www.astm.org/Standards/F442.htm.

Other resources

Lubrizol developed a program to ease the burden associated with researching and selecting accompanying construction products. The first link below also includes a whitepaper which discusses chemical incompatibility with Lubrizol products. However, it is important to review similar compatibility resources specific to the actual pipe manufacturer on each project.

[FBC System Compatible Program by Lubrizol](#)

[“Recommended Practices and Precautions – Do’s and Don’ts Guide” by Lubrizol \(BlazeMaster®\):](#)

[“Chemical Compatibility and Installation Information for CPVC Products” by the Charlotte Pipe and Foundry Company \(FlowGuard Gold® and Corzan®\).](#)

August 2023

The Zurich Services Corporation
Zurich Resilience Solutions | Risk Engineering
1299 Zurich Way, Schaumburg, IL 60196-1056
800.982.5964 www.zurichna.com

This is a general description of (insurance) services such as risk engineering or risk management services by Zurich Resilience Solutions which is part of the Commercial Insurance business of Zurich Insurance Group, and does not represent or alter any insurance policy or service agreement. Such (insurance) services are provided to qualified customers by affiliated companies of Zurich Insurance Company Ltd, including but not limited to Zurich American Insurance Company, 1299 Zurich Way, Schaumburg, IL 60196, USA, The Zurich Services Corporation, 1299 Zurich Way, Schaumburg, IL 60196, USA, Zurich Insurance plc, Zurich House, Ballsbridge Park, Dublin 4, Ireland, Zurich Commercial Services (Europe) GmbH, Platz der Einheit, 2, 60327 Germany, Zurich Management Services Limited, The Zurich Centre, 3000b Parkway, Whiteley, Fareham, Hampshire, PO15 7JZ, UK, Zurich Insurance Company Ltd, Mythenquai 2, 8002 Zurich, Switzerland, Zurich Australian Insurance Limited, ABN 13 000 296 640, Australia.

The opinions expressed herein are those of Zurich Resilience Solutions as of the date of the release and are subject to change without notice. This document has been produced solely for informational purposes. All information contained in this document has been compiled and obtained from sources believed to be reliable and credible but no representation or warranty, express or implied, is made by Zurich Insurance Company Ltd or any of its affiliated companies (Zurich Insurance Group) as to their accuracy or completeness. This document is not intended to be legal, underwriting, financial, investment or any other type of professional advice. Zurich Insurance Group disclaims any and all liability whatsoever resulting from the use of or reliance upon this document. Nothing express or implied in this document is intended to create legal relations between the reader and any member of Zurich Insurance Group.

Certain statements in this document are forward-looking statements, including, but not limited to, statements that are predictions of or indicate future events, trends, plans, developments or objectives. Undue reliance should not be placed on such statements because, by their nature, they are subject to known and unknown risks and uncertainties and can be affected by numerous unforeseeable factors. The subject matter of this document is also not tied to any specific service offering or an insurance product nor will it ensure coverage under any insurance policy.

This document may not be distributed or reproduced either in whole, or in part, without prior written permission of Zurich Insurance Company Ltd, Mythenquai 2, 8002 Zurich, Switzerland. No member of Zurich Insurance Group accept any liability for any loss arising from the use or distribution of this document. This document does not constitute an offer or an invitation for the sale or purchase of securities in any jurisdiction.

In the United States, Risk Engineering services are provided by The Zurich Services Corporation.

Zurich Resilience Solutions

©2023 The Zurich Services Corporation. All rights reserved.

