



July 1, 2016

Subject: REVISION OF THE CHEMICAL COMPATIBILITY LIST

The following category and information was updated on the “**Other Chemical Compatibility Topics**” web page between January 1, 2016 and July 1, 2016:

Insulation

- **Tubing insulation** for use with CPVC should be fiberglass, foamed polyolefin (polyethylene), foamed polyisocyanurate or phenolic. **Foamed rubber tubing insulation** may contain incompatible plasticizers and is not preferred. **Foamed polyolefin, foamed polyisocyanurate and phenolic insulations** should not have any oil lubrication applied to the interior surface.

Other Compatibility Topics

Updated: March 4, 2016

Supersedes: August 4, 2015

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Acetone in Primers, Cleaners and Solvent Cements

- **Primers, cleaners, and solvent cements** containing appreciable amounts of **acetone** may cause rapid environmental stress cracking of CPVC metal insert parts during installation at freezing temperatures. Contact your **primer/cleaner/solvent cement** manufacturer for more information or recommendation of alternatives.

Antifreeze: Glycerin from Biodiesel

- **Crude glycerin from biodiesel manufacturing is not recommended for use as an antifreeze or heat transfer fluid in BlazeMaster, FlowGuard Gold, or Corzan CPVC piping systems.** Crude glycerin from biodiesel manufacturing may be contaminated with the biodiesel, its intermediary chemicals, and/or waste products from the biodiesel manufacturing process. NFPA 13D calls for the use of USP (United States Pharmacopoeia) or CP (Chemically Pure) grades when glycerin is used as an antifreeze in fire sprinkler systems. For a listing of glycerin products that have been determined to be compatible with Lubrizol brand CPVC, refer to FBC System Compatible Program.

Cleaning CPVC Pipe

- While common ordinary soaps are not detrimental to CPVC, most modern **dishwashing liquids** contain synthetic detergents, some of which may cause environmental stress cracking of fittings. A mild ionic detergent solution to remove incompatible oils or chemicals is recommended. A rinse with clean water to completely clean the system is advisable as a final flushing. Contact your dishwater detergent manufacturer for more information or a recommendation of alternatives. For a listing of ancillary products that are compatible to Lubrizol CPVC, refer to FBC System Compatible Program.

Drains

- CPVC should not be used to connect a dishwasher drain to the sanitary drain due to incompatibility with food oils and surfactants in the dishwasher wastewater. This incompatibility could lead to premature failure in the CPVC.

Flexible Wiring & Cable

- Direct contact with **flexible wire** and **cable** that utilize insulation containing **plasticizers** is not recommended. Section 334.30 of the National Electric Code (2002 Edition) requires **wire and cable** to be secured by staples, cable ties, straps, or hangers. Air ducts, pipes and ceiling grid are not acceptable supports for **wire and cable**. Also see section titled "Rubber & Flexible Materials containing plasticizers."

Fragrances - Perfumes

- Scented products such as cologne, perfume, or essential oils (peppermint oil, orange oil, spearmint oil, etc.) should not be put into a CPVC piping system for the purpose of being able to detect leaks by odor. Most fragrance chemicals and essential oils are strong solvents and/or environmental stress cracking agents for CPVC.

Fungicides & Mold Inhibitors

- When performing repairs to leaks in existing systems, care should be taken to isolate CPVC pipe from direct contact with heavy concentrations of **fungicide** products which may be applied during cleanup of water damage. Vinyl piping materials such as PVC or CPVC may be damaged by fungicides when fungicides are sprayed on surrounding drywall and wood framing to prevent the growth of mold and mildew in the affected area. Common sense precautions will prevent problems with repairs to existing systems. When repairs are made to an existing system, and the possibility exists that **fungicides** will be applied to treat damp drywall and wood framing surrounding the repair site, exposed piping should be sleeved with a compatible plastic sleeving or pipe insulation material to prevent direct contact of the **fungicide** with the plumbing system.

Gap Filling

- General-Purpose Gap Filling: For general-purpose filling of small gaps around FlowGuard Gold, BlazeMaster, or Corzan pipes in wall or floor penetrations (not fire-rated constructions), either RTV silicone sealant or polyurethane "foam-in-a-can" may be used. Other types of general purpose sealants may or may not be compatible. Always check with the product's manufacturer for recommendations. See also Lubrizol's list of caulks and sealants known to be incompatible.
- If spaces larger than small gaps in wall or floor penetrations are anticipated to be filled with polyurethane foam around FlowGuard Gold, BlazeMaster, or Corzan pipes and fittings, see also Lubrizol's published information concerning foamed-in-place polyurethane insulation. For sealing gaps in fire-rated constructions, a compatible firestopping product must be used.

Grease & Cooking Oils

- When CPVC pipe is installed in kitchen areas the pipe must be protected from contact with **grease or cooking oils**. Consideration must be given to not only protecting the pipe from direct contact **with grease or oil** but also contact that may occur from airborne **grease or oil**.

Heat Trace

- It is acceptable to heat trace FlowGuard Gold, BlazeMaster, and Corzan pipe and fittings provided the temperature of the heat tracing material does not exceed 180°F (82°C). Steam heat tracing should not be used. Chemical compatibility of the heat tracing material with CPVC should be confirmed with the product manufacturer. The heat tracing material should comply with all applicable codes and be installed per manufacturer's instructions.

Insulation

- **Tubing insulation** for use with CPVC should be fiberglass, foamed polyolefin (polyethylene), foamed polyisocyanurate or phenolic. **Foamed rubber tubing insulation** may contain incompatible plasticizers and is not preferred. **Foamed polyolefin, foamed polyisocyanurate and phenolic insulations** should not have any oil lubrication applied to the interior surface.

Leak Detectors

- If it is necessary to use **leak detectors** on CPVC systems, only **leak detectors** that are included in the FBC System Compatible Program should be used. While common ordinary soaps are not detrimental to CPVC, most modern dishwashing liquids contain synthetic detergents, some of which may cause environmental stress cracking of fittings. For a listing of ancillary products that are compatible to Lubrizol CPVC, refer to FBC System Compatible Program.
- Scented products such as cologne, perfume, or essential oils (peppermint oil, orange oil, spearmint oil, etc.) should not be put into a CPVC piping system for the purpose of being able to detect leaks by odor. Most fragrance chemicals and essential oils are strong solvents and/or environmental stress cracking agents for CPVC.

Metal Piping Connected to or Installed Alongside CPVC Piping

- CPVC may be damaged by torches and/or chemicals used to install metal piping. When metal piping is installed in proximity to CPVC piping systems, care should be taken to protect the CPVC from burning with torches or contact with **molten solder and solder flux**, as well as incompatible thread sealants, leak detectors, lubricants, or other chemical products which may be used on metal piping.
- Transitions from steel pipe to CPVC pipe can be made through a variety of methods such as threaded connections, flanges, and grooved adapters. Occasionally the steel pipe may contain **residual oils** that were used to aid in the cutting process. Some of the **oils** used for this purpose, especially those marketed as "environmentally friendly" or "vegetable based" may be incompatible with CPVC. These **cutting oils** should be removed from the steel pipe prior to connecting to CPVC pipe. If a **cutting oil** is used, consult with the manufacturer of the **cutting oil** for a specific recommendation as to compatibility with CPVC. Those **cutting oils** which are listed in the FBC System Compatible program have been tested and confirmed to be compatible with FlowGuard Gold®, BlazeMaster®, and Corzan® CPVC.
- Dye penetrants used to test the quality of welds in metal piping may contain plasticizers or other chemicals incompatible with CPVC. Dye penetrants left on the inside surface of welded metal pipes may later wash into CPVC piping connected to it. This situation could create environmental stress cracking in CPVC wherever collections of the penetrant chemical might lodge. These penetrants should be removed from the steel pipe prior to connecting to CPVC pipe or the manufacturer of dye penetrant should be consulted with regarding recommending proper penetrant for use with steel / CPVC piping systems.

Paint

- If paint must be used on CPVC, water-based latex paint is the recommended type of paint to use on pipe and fittings manufactured from Lubrizol CPVC. Two-part epoxy paint should not be used. Other types of paint have not been known to be detrimental to CPVC provided that it is applied in a light coating that dries quickly. Paint should not be allowed to puddle on or around CPVC pipe or fittings.

Polyurethane (Spray-On) Foams

- In understanding spray polyurethane foams there are two general areas of concern for CPVC pipe and fittings: (1) chemical compatibility and (2) potential damage to pipes and fittings due to high exothermic temperatures during installation. These spray polyurethane foams have different cell structures, different flame retardants, reach different curing temperatures and require different installation thicknesses to obtain the required R-value. All of these factors must be considered when using spray foams.

In 2009, Lubrizol assisted the Spray Polyurethane Foam Alliance (SPFA) to determine if chemical compatibility issues exist with FlowGuard Gold®, BlazeMaster® and Corzan® CPVC pipe and fittings. SPFA findings, although not comprehensive, conclude that those spray polyurethane foams tested did not pose a chemical compatibility problem. In addition, Lubrizol is unaware of a CPVC failure that was the result of chemical incompatibility with properly mixed and applied spray polyurethane foams. When two-component foams are improperly mixed and there is an excess of either component present on the piping, compatibility problems may arise from the unreacted excess. For more information on the SPFA testing, please contact them at (800) 523-6154 or visit their web site at www.sprayfoam.org. With respect to chemical compatibility, one must always check with the spray foam manufacturer to have them provide assurance that the formulation that they are manufacturing is not incompatible with CPVC.

In a separate, unrelated study also in 2009, Lubrizol conducted testing with a manufacturer of spray polyurethane foam to better understand the effects of high exothermic temperatures on FlowGuard Gold and BlazeMaster CPVC pipe and fittings. These findings demonstrated that temperatures can exceed the softening point of dry CPVC pipe and fittings.

This study found that, for the products tested, the spray pass thickness of the manufacturer's nominal two pound density spray polyurethane closed cell foam should not exceed a maximum of two inches per single pass. Lubrizol also found in this study that repeated two inch passes (layers) separated by 10 minute intervals provided sufficient time for the spray polyurethane foam to cool. For the manufacturer's nominal half pound density spray polyurethane open cell foam, Lubrizol found that spray pass thickness should not exceed a maximum of six inches per single pass. Heat generated and trapped inside foam layers applied too thickly may cause ballooning of pipe or excess flexural stresses on pipe and fittings due to thermal expansion.

Because polyurethane spray foams' resulting exothermic temperatures and chemical compatibility characteristics can vary to some extent, Lubrizol recommends that you consult with the manufacturer of the polyurethane spray foam to be installed.

- **California State Fire Marshal Information Bulletin 14-004**
Non-Metallic Piping Systems, Fire Sprinklers And Spray Polyurethane Foam Applications

Residual Oils with HVAC Applications

- Some heat exchangers or condenser coils may contain **residual oils** from the manufacturing process which can cause cracking of CPVC. Caution should be exercised when installing CPVC in combination hot water/air heating units or as condensate drain lines for air conditioning systems. Confirm the compatibility of CPVC with the residual oils prior to installation. The interior of heat exchangers or the exterior of condenser coils may be thoroughly flushed with mild ionic detergent solution to remove incompatible **oils** prior to piping installation. A rinse with clean water to completely clean the system is advisable as a final flushing.

Rubber & Flexible Materials Containing Plasticizers

- CPVC is not compatible with some **rubber and flexible plastic materials** containing certain types of **plasticizers**. Incompatible **plasticizers** include, but are not limited to, **phthalates, adipates, trimellitates, dibenzoates, etc.** Compatibility should be confirmed before selecting rubber or flexible vinyl materials for direct contact with CPVC. Examples of materials which may contain incompatible **plasticizers** include, but are not limited to, caulks; rubbery hanger padding, vinyl dip coating on metal parts, rubber gaskets, electrical wire jacketing, electrical tape, flexible hoses or tubes, etc. Further, **plasticizers** may leach from rubber or flexible vinyl materials, such as hoses or tank linings, into the process fluid which contacts them. **Plasticizer** contamination in the process fluid may also cause environmental stress cracking of CPVC used elsewhere in the system. This can include both CPVC process piping, through which the contaminated fluid may flow, or CPVC ducting drawing fumes from contaminated fluid. Also see section titled "Flexible Wiring & Cable."

Sleeving Material

- In situations where sleeving is required, the pipe should be protected with a compatible sleeving material extending at least 12" above and below the soil. The top of the sleeving should be securely taped to the pipe with a compatible tape product. Backfill over underground piping prior to **termite** spraying. Also see section titled "Termiticides & Insecticide."

Spray-On Coatings

- Certain types of **spray-on coatings** which form a peelable film to protect fixtures during construction may be incompatible with CPVC. Care should be used to protect exposed piping from overspray when this type of protective coating is applied.

Steel Piping with Antimicrobial Coating

- **August 6, 2013 Update**
Lubrizol's position regarding the chemical compatibility of antimicrobial coated steel pipe when used with BlazeMaster® CPVC pipes and fittings has been that before using any coated steel pipes with an antimicrobial coating, installers should check with the manufacturers of the steel pipe and/or the manufacturers of the antimicrobial coating for compatibility with CPVC.. In response to numerous industry inquiries, Factory Mutual (FM) modified their nonmetallic (FM 1635) and steel pipe (FM 1630) standards to include testing that demonstrates the chemical compatibility of nonmetallic fire sprinkler pipe with coated steel sprinkler pipe. This evaluation is a requirement for both types of pipe that are FM approved. Installers should look for results of testing in accordance with the FM protocols to ensure the compatibility of any coated steel pipes they might use with BlazeMaster® CPVC pipes and fittings. Additionally, **Lubrizol recommends that Allied Steel pipe coated with ABF II not be used in BlazeMaster CPVC systems.**

This has been Lubrizol's position for years. Beginning in 2008, Lubrizol noted that industry concerns were being expressed about antimicrobial coatings, and at that time Lubrizol stated that the Allied ABF II antimicrobial coating "would not be classified as compatible with CPVC if it were applied directly to the CPVC." But Lubrizol began at that time to conduct testing that tried to duplicate a real world level of migration of the ABF II coating to CPVC. The testing did not show a consistent pattern which would indicate a pervasive problem. Nevertheless, in January 2009, Lubrizol said: "Lubrizol recommends that only non-

coated steel piping be used with BlazeMaster® fire sprinkler systems and that aftermarket coating not be used, unless the coating being used, whether applied by the manufacturer or otherwise, has been added to the FGG/BM/CZ™ System Compatible Program." Lubrizol's recommendation has continued from that time to the present. Lubrizol has never recommended the use of ABF II coated pipe with BlazeMaster® CPVC pipe and fittings.

Teflon® Tape

- Teflon® tape is recommended as a preferred thread sealant.

Termiticides & Insecticides

- When performing installations underslab or where the presence of **insecticides** or **termiticides** are likely, care should be taken to isolate CPVC pipe from direct contact with large quantities of these chemicals. Vinyl piping materials such as PVC or CPVC may be damaged when **termiticides** or **insecticides** are injected into the annular space between the pipe wall and sleeving material trapping the **termiticide** against the pipe wall. **Termiticide** applications per label instructions in an open-air environment, such as slab pretreat applications, should not pose a problem. However, puddling of **termiticides** on or near CPVC pipe may cause failures. In areas where puddling is more likely, such as areas near tub boxes and retreat applications, extra care should be taken to avoid puddling of **termiticides**. Exercising caution and common sense should prevent installation problems. Before using an **insecticide** or **termiticide**, be sure to consult the manufacturer's installation guide for proper application instructions.
- Additional precautions need to be taken when retreat applications are required. **Termiticide** retreatment is usually required when the concrete slab has been broken to relocate a pipe. The following recommendations should followed in retreat applications:
 - Remove all the plastic barrier material that was installed prior to the initial concrete pour from the area to be retreated. Do not reinstall the plastic barrier material.
 - After the pipe has been relocated, the soil should be pretreated before it is placed in hole around the pipe. Do not apply **termiticide** directly to the retreat area. Also see section titled "Sleeving Material."

Legal Disclaimer

The FBC™ System Compatible Program is a resource made available to manufacturers of ancillary products intended to be used with CPVC to help determine whether a product is chemically compatible with Lubrizol's FlowGuard®, BlazeMaster®, and Corzan® CPVC piping systems. Other manufacturers and/or brands of CPVC piping have not been tested as part of the FBC™ System Compatible Program. The FBC™ System Compatible program is, therefore, only applicable to the chemical compatibility of ancillary products with the Lubrizol brands of FlowGuard, BlazeMaster, and Corzan CPVC piping systems. This distinction is made because every brand of CPVC piping is made with unique compounds, some of which may contain resins with different molecular weights and varying chlorine content. These characteristics directly impact the performance of the resulting product. Similarly, various CPVC products contain different performance additives. This too affects the performance characteristics of the ancillary product. For these reasons, Lubrizol has no responsibility for any failures occurring as a result of using products in the FBC System Compatible Program with CPVC products other than FlowGuard, BlazeMaster, and Corzan.