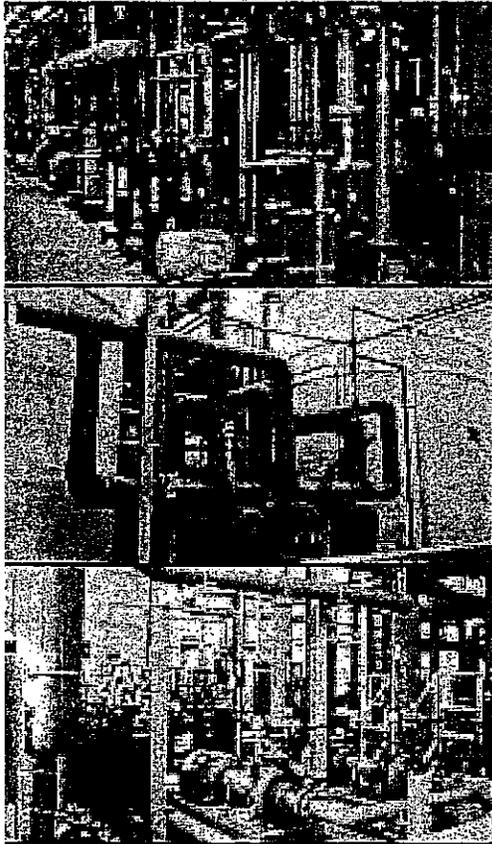


CORZANTM
INDUSTRIAL SYSTEMS

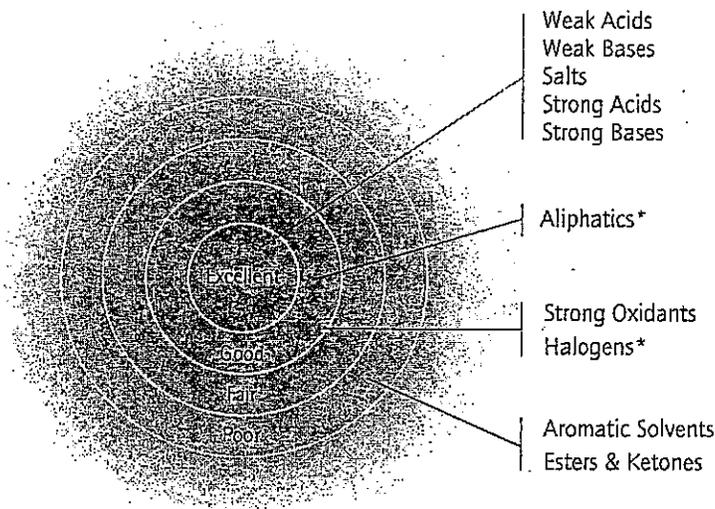
Chemical Resistance Data



noveon
The Specialty Chemicals InnovatorTM

Corzan™ Industrial Systems

One of the key advantages of Corzan® CPVC is its excellent resistance to a broad range of corrosive environments. By replacing traditional materials with Corzan® CPVC, engineers can extend equipment service life and reduce maintenance, while minimizing process life-cycle costs. This technical report is intended to provide engineers and end-users with guidance as to the suitability of Corzan® industrial piping systems in corrosive applications. In general, Corzan® CPVC is inert to most mineral acids, bases, salts, and aliphatic hydrocarbons, and compares favorably to other non-metals in these chemical environments. Specific use conditions must also be considered since these will determine the chemical resistance of any thermoplastic piping system. Variables that can affect chemical resistance include chemical concentration, temperature, pressure, external stress, and final product quality. Since the number of possible use conditions is so large, the final decision regarding material suitability often must be based on in-service testing. The information contained in this report was developed to include conditions that are most often encountered in industry. CPVC samples were immersed in the particular reagent for at least 90 days at 73°F (23°C) and 180°F (82°C). Changes in weight and tensile strength for each sample were reviewed in conjunction with field experience and information gathered from various sources to develop recommendations shown. Note that these recommendations are based on specific use conditions and may not apply to all situations. For this reason, the final decision regarding material suitability must rest with the end-user. The notes following the chemical resistance chart list specific areas where caution must be used when considering Corzan® CPVC. Additional chemical resistance data will become available as testing of Corzan® CPVC continues. Consult with your product supplier or Noveon for the latest Corzan® CPVC chemical resistance information.



Corzan® CPVC
Chemical Resistance

*Consult Noveon for specific data.



N.B. Information presented within this report is based on test data and field experience of CPVC manufactured by Noveon and is not intended to reflect the properties found with other suppliers of CPVC materials. To determine if your supplier is using Corzan CPVC, call the Corzan Marketing Department at 888-234-2436.

Corzan™ is a trademark of Noveon, Inc. and is registered or under application in various countries of the world.

Chemical Compatibility Case Study

An excellent example of an industrial system's performance in a demanding process application is an installation at Kodak's state-of-the-art lithographic plate manufacturing facility in Colorado. At this facility Kodak manufactures more than 8,000 varieties of lithographic offset printing plates in dimensions up to ten feet long.

To manufacture the plates, large coils of aluminum are unrolled, and one side of the aluminum sheet is chemically treated to provide a grained surface, which is then coated with a light-sensitive photopolymer. After this coating step, the aluminum is cut to the appropriate dimensions and packaged.

The Kodak Story

Prior to the construction of the plate manufacturing facility in 1990, Jim Loomis, Senior Plate Manufacturing Engineer, was faced with many important design decisions. Not only would the piping material have to meet Kodak's high quality standards, but it would have to safely handle the aggressive chemicals used in the plate etching process at temperatures up to 180°F (82°C).

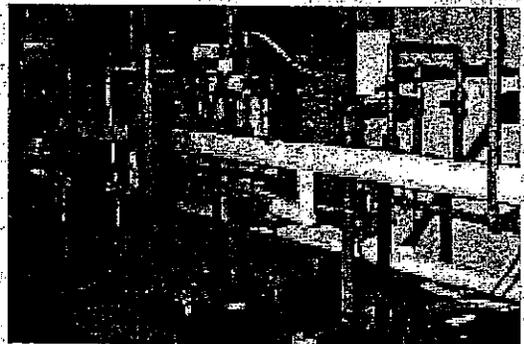
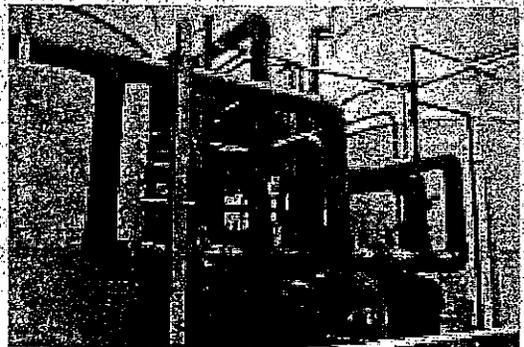
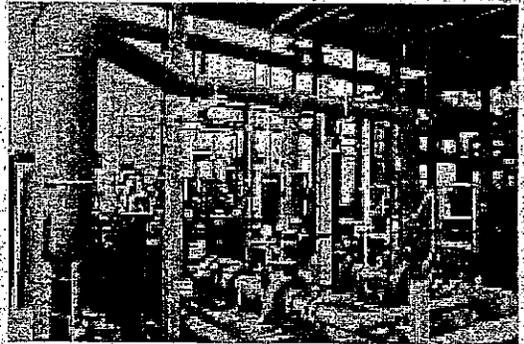
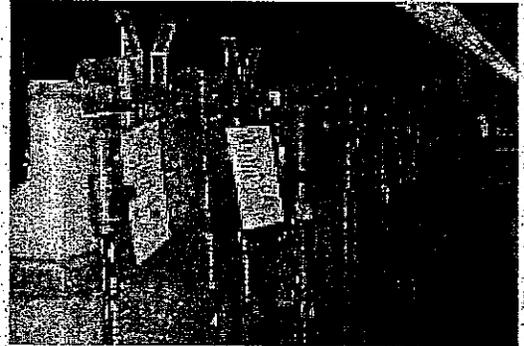
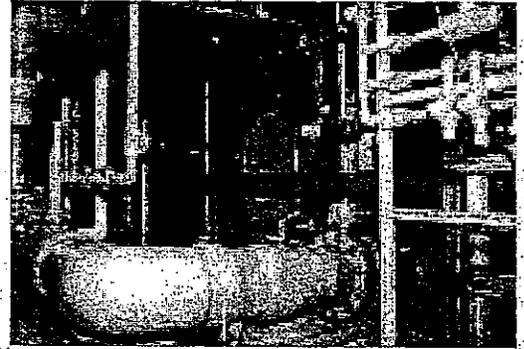
Some of the chemicals used in the process are:

- Caustic Etching Solution
- 30% Nitric Acid
- 50% Sodium Hydroxide

In addition, Jim wanted to specify the system in a single material for design efficiency and quality assurance. The system also had to be available in iron pipe sizes from 1" (25mm) up to 12" (300mm), including a wide variety of piping, fittings and valves.

After a comprehensive materials study, one material, CPVC, was specified for the entire system. Resistance to a variety of harsh chemicals at high temperatures, as well as mechanical strength up to 180°F (82°C) were all key elements in specification decision. Jim was also extremely pleased with the economically-priced process piping and components available from a team of quality manufacturers.

If your next project includes corrosive chemicals, high temperatures, or a wide range of service conditions, think of Corzan Industrial Systems first.



Noted Caution Areas for CPVC

CPVC is not recommended for use with most polar organic materials including various solvents i.e., chlorinated or aromatic hydrocarbons, esters, or ketones.

Resistance of CPVC to certain other fluid mixtures such as fuel oils with moderate aromatic content cannot be determined on basis of immersion testing alone. Actual use data must be obtained.

There are a number of similarities in chemical resistance between PVC and CPVC materials. However, one must exercise caution when comparing the chemical resistance properties of CPVC to those of PVC, which are not always the same.

CPVC test samples exposed while under stress to surfactants, certain oils, or grease have shown signs of environmental stress cracking. Environmental stress cracking is a situation in which the manufactured pipe or fittings are weakened by contact with certain chemicals and cracks are propagated by external stresses. External stresses include not only the known pressure stress on a system but also stresses from sources such as expansion and installation. When CPVC is intended for use in handling such chemicals, special consideration should be taken during design and installation to avoid unusual stresses in the piping system, or advance testing of the chemical in simulated use conditions is strongly suggested.

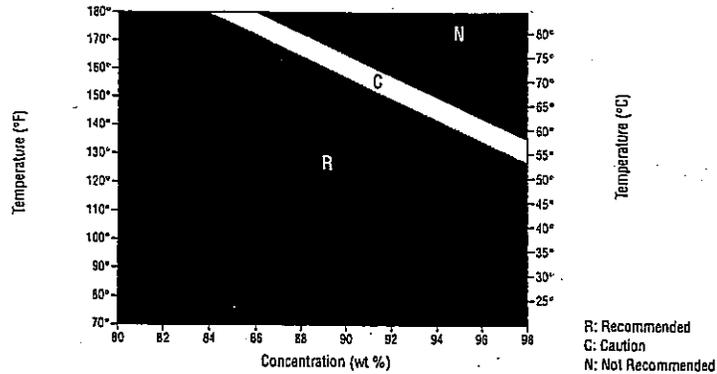
Certain organic solvents which are soluble with water, such as alcohols, may safely be handled below a certain concentration. Many of these limiting concentrations are noted in Table 1. Solvents which are insoluble in water, such as aromatics, will be absorbed by the piping over time, even when they are present at very low levels in the water. This will lead to a decreased service life expectancy for the system.

The full hydrostatic pressure rating of the pipe may not apply to the entire range of temperature and concentration designated as "recommended".

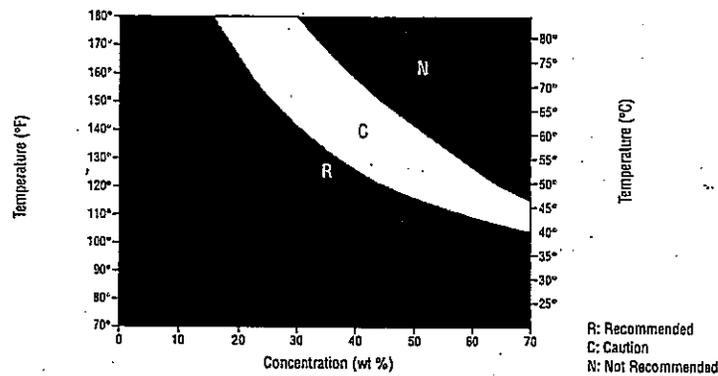
CPVC is not recommended for fuming acid service.

Contact your piping supplier or Noveon for consultation and/or the latest chemical resistance information.

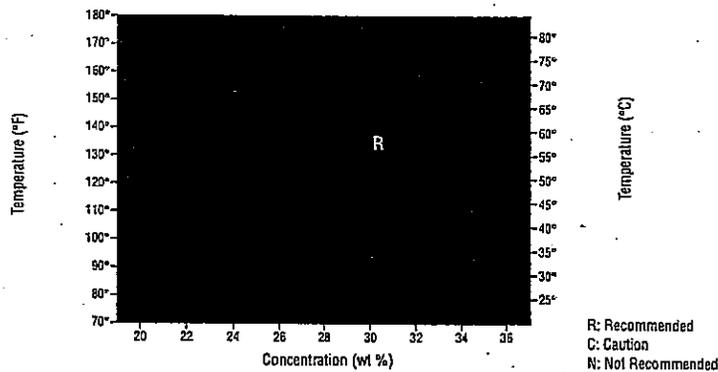
Chemical Resistance of Corzan® CPVC to Sulfuric Acid



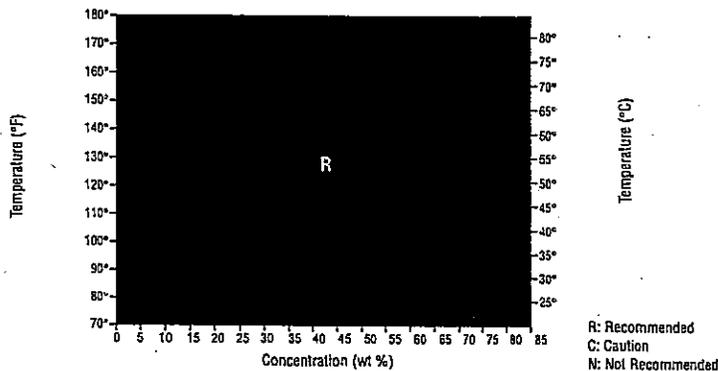
Chemical Resistance of Corzan® CPVC to Nitric Acid



Chemical Resistance of Corzan® CPVC to Hydrochloric Acid



Chemical Resistance of Corzan® CPVC to Phosphoric Acid



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Design, Specification, & Installation

Chemical Compatibility

Updated: November 29

Supersedes: August 16

Corzan® Pipe & Fittings

CPVC domestic water, fire sprinkler, and industrial piping systems have been used successfully for more than 40 years in new construction, re-pipe and repair. CPVC products are ideally suited for applications due to their outstanding corrosion resistance. Occasionally, however, CPVC and PVC can be damaged by contact with chemicals found in some construction products (and site preparation). Reasonable care needs to be taken to insure that products coming into contact with CPVC systems are chemically compatible. Noveon recommends that chemical compatibility with CPVC be confirmed by the manufacturer of the product in contact with CPVC piping systems. If chemical compatibility with CPVC is in question, Noveon recommends isolating the suspect product from contact with CPVC fittings.

The following products have been shown to be **UNACCEPTABLE** for (unprotected use) contact with CPVC systems. Chemically incompatible products are added to this list as they are brought to our attention. A product's absence from this list does not imply or insure CPVC chemical compatibility. **ALWAYS CHECK THE PRODUCT MANUFACTURER'S RECOMMENDATION IN THIS REGARD.**

UNACCEPTABLE PRODUCTS - Do Not Use

CATEGORY	COMPANY	PRODUCT
Caulks	OSI Sealants (Dartworth Company) (Ohio Sealants)	Polyseamseal Tub & Tile Adhesive Caulk Polyseamseal All Purpose Adhesive Caulk Pro Series PC-158 Caulk
	John Wagner Associates	Grabber Acoustical Sealant GSCS
	White Lightning	3006 All Purpose Adhesive Caulk
	Fire Stopping Systems	3M
Flame Stop		Flame Stop V
Proset		Proseal Plug, Black Proseal Plug, Red
		Federal Process Co.

		*Gasoil Leak Tech Gold is FlowGuard Gold®, BlazeMaster®, and Corzan® CPVC compatible.
Miscellaneous	WD40	WD40 lubricant
	Victaulic	Silicone Pipe Lubricant
		Peppermint Oil
		Roofing Tar
		Vaseline
		Vegetable Oils
Pipe Clamp	LSP Specialty Products	Acousto Clamp, Acousto-Plumb System
	Naylon Products	Naylon vinyl-coated wire pipe hangers
Pipe Tape	Christy's	Pipe Wrap Tape
	Pro Pak, Inc.	Pipe wrap tape (black)
	Pasco	All Weather PVC Pipe Wrap
	Wonder	No. 413 Pipe Wrap Tape
Thread Sealants	Allied Rubber & Gasket Company (ARGCO)	Super Dope
	Anti-Seize Technology	TFE Paste
	Devcon	Super Lock Hi-Strength, Stud Lock Grac 2271
	General Sealant	GS-600
	G.F. Thompson Co., Ltd.	Masters™ Pro-Dope™ with Teflon®
	Hercules	Brush-on/Blue Block
	Hernon Mfg. Inc.	Powerseal #932
	JC Whitlam Mfg. Co.	Seal Unyte Thread & Gasket Sealer
	Jet Lube, Inc.	Jet Lube V-2
	Jomar	Tighter-than-Tite
	Loctite	Threadlocker 242
	Lyn-Car Products Ltd.	Proseal
	National Starch & Chemical, Permabond Division	Permabond LH-050 Permabond LH-054
	Permatex Company, Inc.	Permatex 14H
	Rule	High Performance Teflon Thread Sealing Compound
	Saf-T-Lok Chemical	Saf-T-Lok TPS Anaerobic Adhesive/Seal Industrial Grade TPS
Swagelock Company	SWAK	

TERMITICIDES & INSECTICIDES

- When performing installations underslab or where the presence of insecticides or termiticides is likely, care should be taken to isolate CPVC pipe from direct contact with heavy concentrations 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 failure 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 will prevent installation problems. For more information, review your manufacturer installation guide.
- 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 be followed in retreat applications:
 - Remove all the plastic barrier material that was installed prior to the initial concrete pour in 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 holes around the pipe. Do not apply termiticide directly to the retreat area.
 - Termiticides that contain cypermethrin should not be used in retreat applications.
- 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 termiticide spraying.

NOTE:

- Noveon recommends Teflon® tape as the preferred thread sealant.
- Noveon also publishes a more complete listing covering application of individual compounds. This may be found in the Noveon Chemical Resistance Chart for CPVC Piping Products. The user is also encouraged to compare data from the individual product's MSDS to the published Chemical Resistance Chart.
- Prolonged 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.
- 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 line 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 detergent solution to remove incompatible oils prior to pipe installation. A rinse with clean water to completely clean the system is advisable as a final flushing.

- Primers, cleaners, and solvent cements containing appreciable amounts of acetone may cause rapid environmental stress cracking of CPVC metal insert parts during installation at free temperatures. Contact your primer/cleaner/solvent cement manufacturer for more information or recommendation of alternatives.
- 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 contact with grease or oil as well as contact that may occur from airborne grease or oil.
- 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 should be taken to 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.

Please click on the following links for information on specific chemicals.

[Chemical Resistance Table](#)
[Common Acids Only](#)
[Common Bases Only](#)

[Download Corzan® CPVC Chemical Resistance Brochure in PDF](#)

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