

MULTI-TENANT BUILDING OWNERS' **GUIDE TO CPVC**



WHY CPVC IS THE
BEST CHOICE FOR
**MULTI-TENANT
BUILDINGS**

FLOWGUARD[®]
PIPE & FITTINGS



INTRODUCTION

Installation and labor expenses can make up 50% of the total cost of a plumbing system.

For multi-tenant building owners concerned with the cost and reliability of their plumbing system, as well as the quality of the water supplied to tenants, piping material selection is especially important.

Inadequate plumbing systems can result in costly repairs, unhappy tenants and even liabilities if unsafe water is supplied to tenants.

Fortunately, building owners can avoid these issues with an affordable and dependable plumbing system. In this guide, you will discover the advantages chlorinated polyvinyl chloride (CPVC) has over other piping materials, as well as how FlowGuard® CPVC:

- Saves you money on installation and labor.
- Ensures long-term reliability when it comes to service life.
- Delivers safe, clean water for tenants.



CPVC SAVES YOU MONEY

Installation and labor costs make up a considerable portion of the total plumbing system cost. With FlowGuard CPVC, it is easy and safe to quickly assemble a strong, leak-free plumbing system. This speed and reliability allow for cost savings, improved safety and long-term joint strength.

INSTALLATION EXPENSES AND SAFETY

CPVC piping systems are very cost-effective compared to other materials. In fact, FlowGuard CPVC can be installed at least 25% quicker than any other piping system, and many contractors reported saving up to 50% on labor compared to green pipe (PPR) systems.

This speed of installation gives multi-tenant building owners increased cost savings with CPVC compared to other piping materials because:

- CPVC is installed with simple, inexpensive hand tools. These tools are easy to obtain and typically don't require a great deal of space on a job site—nor special permits.

- CPVC installation tools are also very safe. No torches or welding machines are needed. This significantly reduces the potential for injuries, particularly burns, which can limit liability costs.
- CPVC does not require costly repairs or maintenance when installed properly.
- CPVC is more rigid than many other plastics, like PPR, meaning it sags less, requires fewer hangers, and results in quicker installation.

UTILITY EXPENSES

Thermal conductivity of a copper system is 2,500 times that of a FlowGuard CPVC system, and FlowGuard CPVC thermal conductivity is about 30% better than other plastic pipes.

The improved insulating characteristics associated with FlowGuard CPVC may generate substantial long-term savings for an energy-conscious homeowner. FlowGuard CPVC will keep hot water hotter and cold water cooler compared to copper and may reduce energy loss.



CPVC OFFERS LONG-TERM RELIABILITY

Long-term reliability is vital when it comes to plumbing systems in multi-tenant buildings. Every time a pipe leaks, there's a greater chance another building component will need a repair as a result of damaged plumbing pipes.

For example: If a sink drain starts to leak on the third floor, it can ruin the ceiling on the second floor unit. If unnoticed or unfixed, the leak could then start to damage the first floor. This chain of events results in high maintenance costs and multiple unsettled tenants.

However, FlowGuard CPVC is backed by more than 50 years of proven performance and a history of reliable installations. Our material continues to be the ideal choice for multi-tenant building applications because of its long service life. This means less future maintenance and a system you can trust.

INSTALLATION

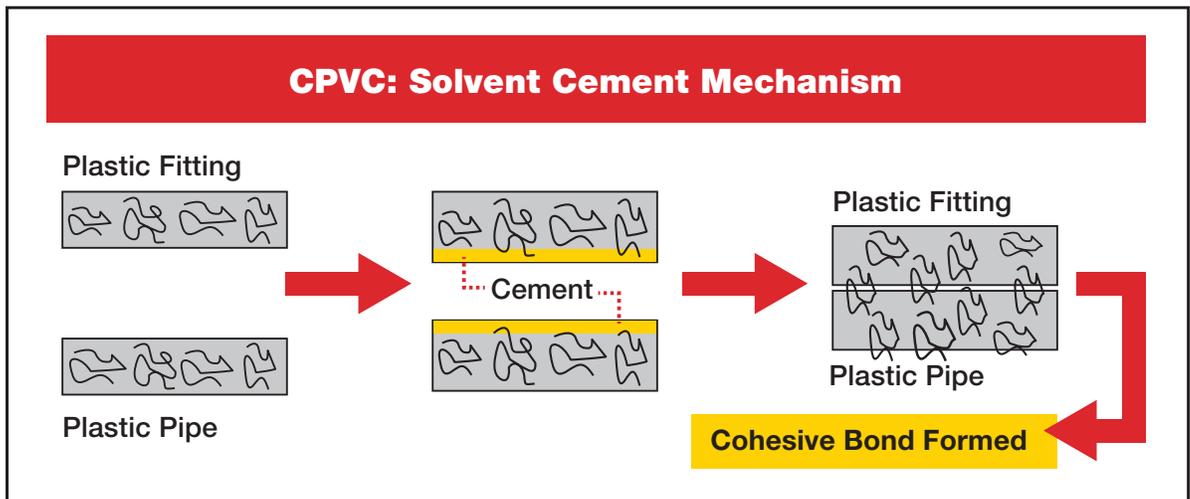
Installation has a direct impact on the service life of a plumbing system. In many cases, plumbing systems fail as a result of weak joints. This is especially true for piping systems, like PPR, that use heat fusion for joining. Heat actually breaks down the pipe surface of the pipe, resulting in weak seams and costly repairs.

FlowGuard CPVC pipes are joined with solvent cement—not heat.

Solvent cement is not glue. It chemically fuses the material at the molecular level and creates a long-lasting seam that becomes the strongest part of the system. (See Figure 1)

Solvent cement does not break down the material like heat. Nor does it stick to materials together like glue. Instead, solvent cement softens the molecules of both the pipe and fitting. Once the solvent cement begins to evaporate, the molecules intertwine with each other. Upon drying, the pipe and the fitting become one seamless material.

FIGURE 1



CHLORINE RESISTANCE

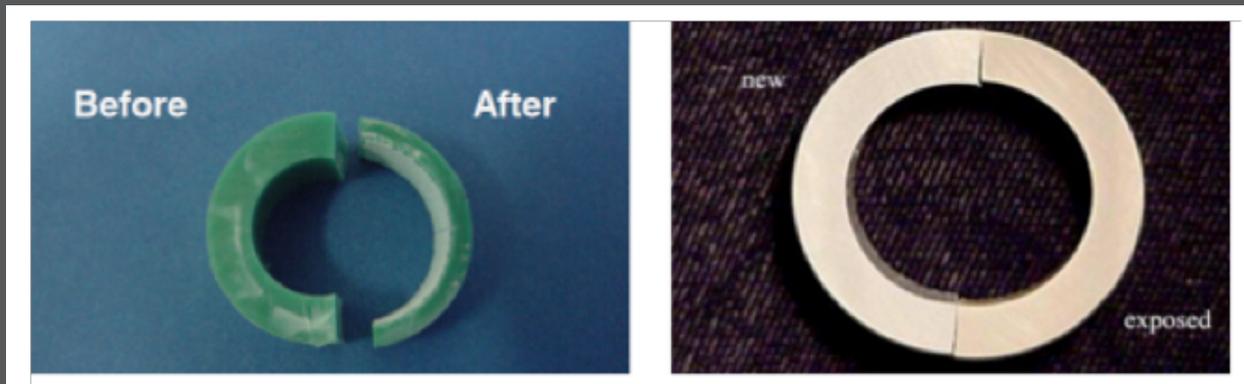
Chlorination is the most common method used for disinfecting drinking water.

When chlorine and water mix, they form hypochlorous acid, which is known to break down polyolefins such as PPR, PEX, and polybutylene (PB).

CPVC is unaffected by the hypochlorous acid and chlorine dioxide present in the building's potable water supply. This results in longer service-life for greater cost savings.

When other materials, like PPR, are exposed to hypochlorous acid, oxidation occurs. This causes stress cracking inside the pipes and erosion of the pipe wall, which results in a thinner, weaker material.

FIGURE 2



**PPR Erosion (After 10 months
at 5 ppm Chlorine)**

**CPVC: Real Life testing after
24 years**

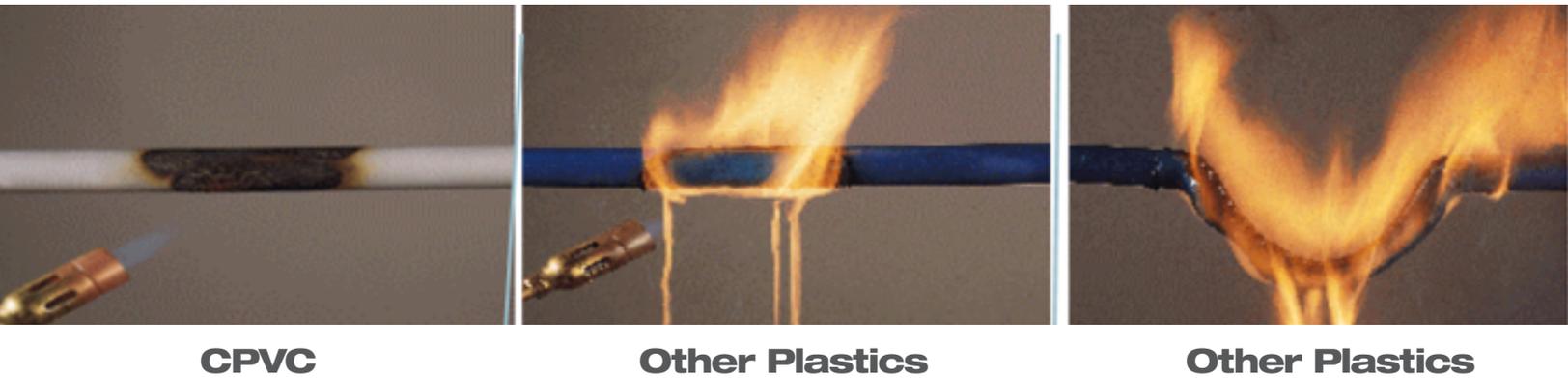
FIRE RESISTANCE

Residential fires become deadly in less than two minutes. An entire building unit can become engulfed in flames in just five minutes. For multi-tenant building owners who want to minimize the flame spread in the event of a building fire, piping material must be carefully considered.

While some thermoplastics, like PPR, can't withstand heat or fire, FlowGuard CPVC:

- Is self-extinguishing and will not support combustion, meaning it won't spread a fire after being exposed to a flame. FlowGuard CPVC has been tested in accordance with EN 13501-1:2002 (a test of how well a material will react to fire) and earned the best fire resistance rating for a non-metal material.
- Meets the ASTM E84 (UL 723) standard and has a flame smoke rating of 25/50, which allows for pipe installation in plenums and open spaces.
- Limits the amount of smoke produced. The low smoke development of CPVC piping won't significantly add to the damage from a fire or increase exposure to toxic smoke and gases.

FIGURE 3



FlowGuard CPVC has a flash ignition temperature of 482°C, whereas PPR has a flash ignition temperature of 340°C. For reference, many other ordinary materials, like wood, ignite at 260°C or less.

TEMPERATURE RESISTANCE

All plastic piping have a maximum allowable operating pressure rating at which the piping system may be operated for 50 years, and it is related to the water temperature. As the temperature increases, the maximum allowable pressure rating decreases to a point where the pipe can not handle the water temperature anymore, and this temperature is called maximum allowable operating temperature.

PPR's maximum allowable operating temperature is 70°C for 50 years, which is around the same temperature that hot water reaches in most homes. When PPR is subjected to water above 70°C, the service life of the pipe drops significantly as the temperature increases.

Schedule 80 FlowGuard® CPVC, on the other hand, has a higher allowable operating temperature of 93°C. This means that FlowGuard CPVC will keep its strength and appearance and last longer well beyond the temperature most pipes are exposed to in residential home.

QUALITY ASSURANCE

A single material brand is often made by a number of manufacturers. You should have confidence that pipes and fittings will deliver the same performance and reliability regardless of by whom, when and where it is produced.

The Lubrizol Corporation produces FlowGuard CPVC compounds for licensed manufacturers, who must each participate in a quality assurance program and receive on-site technical assistance. This program assures FlowGuard products continually meet the highest international standards.



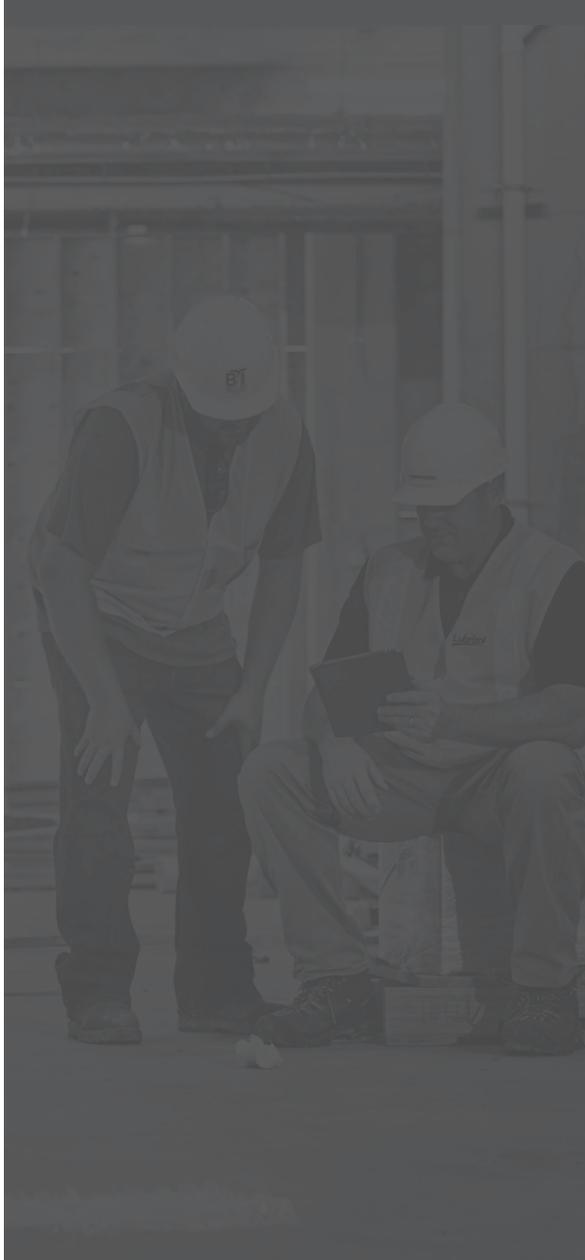
WATER QUALITY

FlowGuard CPVC has been tested for performance capabilities and international water standards at the following reputable organizations:

NSF International: the Public Health and Safety Company™, a non-profit, non-governmental organization, is the world leader in standards development, product certification, education, and risk-management for public health and safety. While focusing on food, water, indoor air, and the environment, NSF develops national standards and provides third-party conformity assessment services.

Water Regulation Advisory Scheme (WRAS) (UK): The purpose of WRAS is to contribute to the protection of public health by preventing contamination of public water supplies and encouraging the efficient use of water by promoting and facilitating compliance with the Water Supply (Water Fittings) Regulations and Byelaws in Scotland.

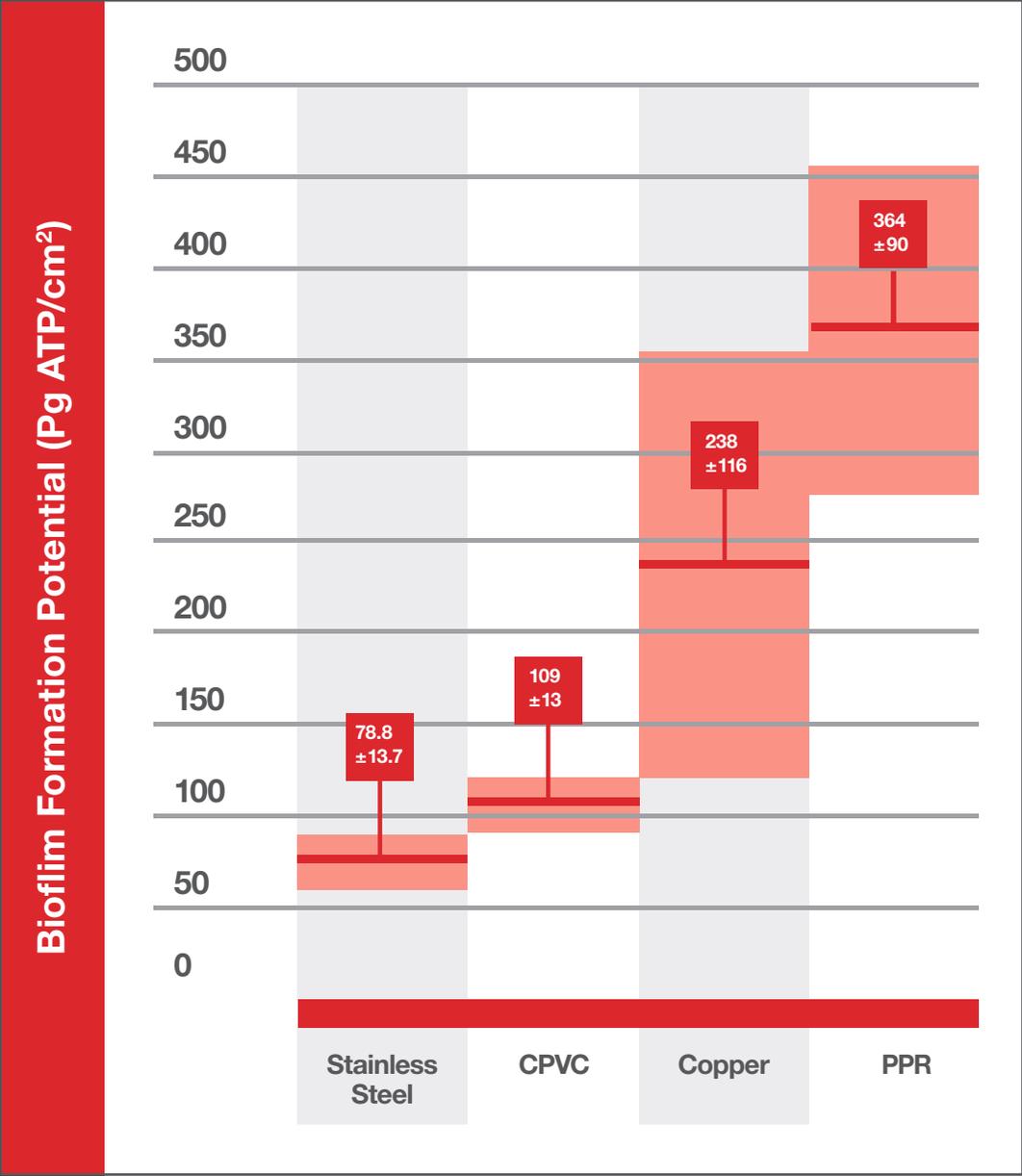
Fédération Île-de-France de Recherche sur l'Environnement (Fire ex- CRECEP) (FRANCE): The Federation Ile-de-France for Research on the Environnement, aims to promote interdisciplinary researches in environmental sciences. It mainly focuses on researches relating to surfaces connecting with human activities (catchment areas and large watersheds, living area, hydrographic network, farm plot and forest, small agricultural region, urban and rural landscapes).



BIOFILM RESISTANCE

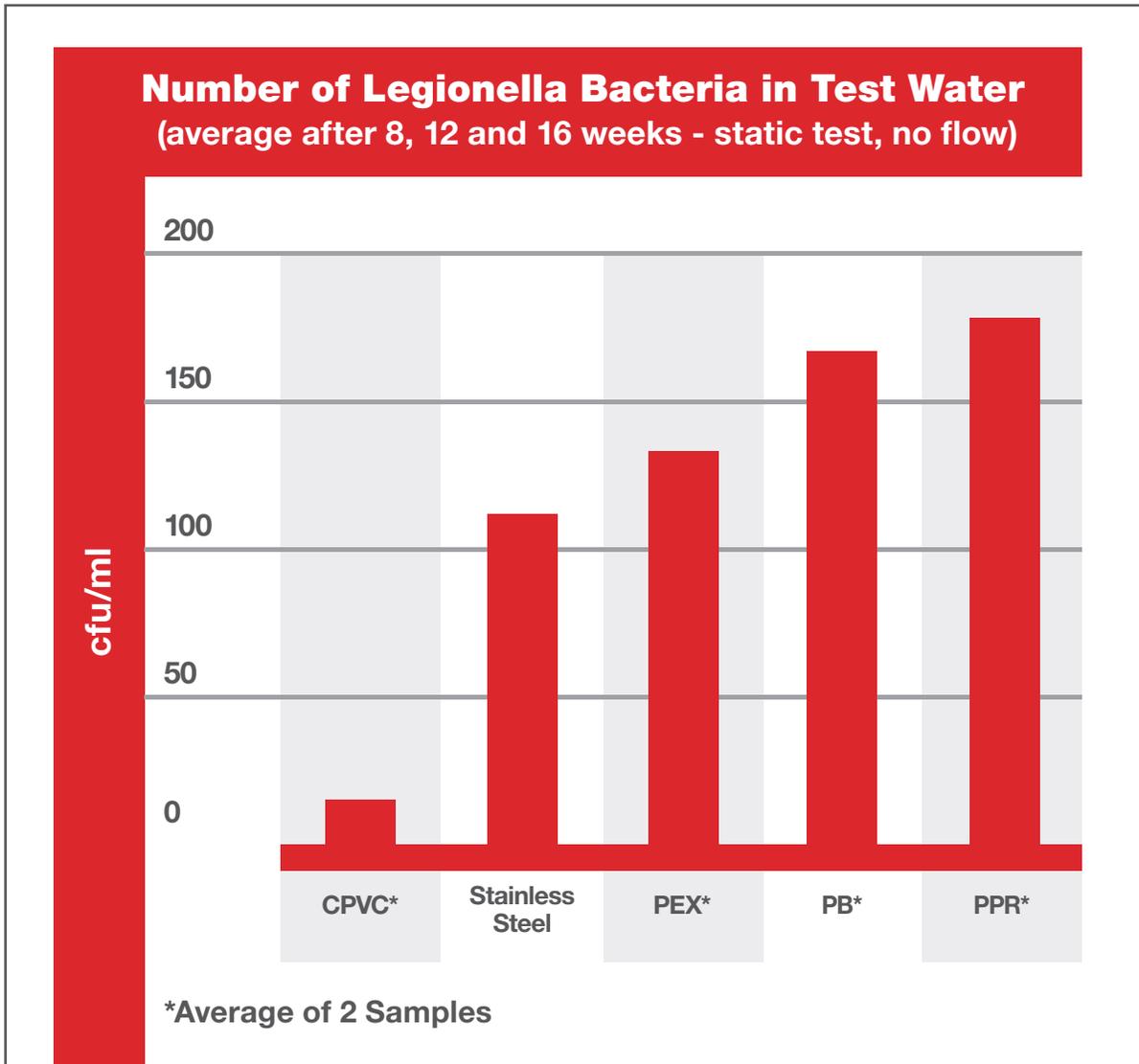
Biofilm forms when biomass such as bacteria, fungi, algae and mold adhere to surfaces in wet environments. Results from the Kiwa Water Assessment confirms PPR has the greatest potential for biofilm formation compared to other piping materials.

FIGURE 4



The study also shows that the number of Legionella bacteria in the water flowing through a CPVC piping system was significantly lower than that of PPR.

FIGURE 5



Study: Biofilm Formation Potential of Pipe Materials in internal installations by H.R. Veenendaal / D. Van de Kooij – KIWA - 1999
(KIWA is the approvals agency for potable water piping systems in The Netherlands)

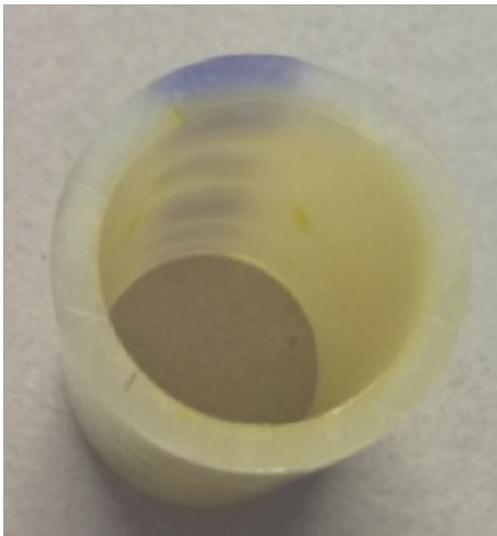
Compared to other piping materials, it's harder for bacteria to form within CPVC because of several qualities, including:

- The chemical makeup and smoothness of the interior pipe surface, which makes it difficult for bacteria to latch onto the material.
- The absence of plasticizers, which act as a nutrient source for fungi.
- CPVC's resistance to scaling and corrosion.
- CPVC resists biofilm formation. Chlorine and chlorine dioxide don't deteriorate CPVC, which would create small gouges along the pipe's surface where biofilm can easily grow.



CHEMICAL RESISTANCE

Chemical permeation occurs when a substance or material comes in contact with the outside of a pipe and transmits contaminants through the pipe wall into water.



The ink from the print line on this PEX pipe has permeated almost completely through the pipe after less than 10 years.

CPVC is not subject to chemical permeation. Thanks to its chlorine content, additives and chemical makeup, CPVC is resistant to permeation of many common chemicals that can pollute water.

RELIABLE PLUMBING PIPE FOR MULTI-TENANT BUILDINGS

As the pioneer in CPVC technology, FlowGuard Pipe and Fittings has developed a reputation of being reliable, cost-effective and problem free.

With 60 years of proven performance, our material has established itself as the most reliable hot and cold water plumbing systems in the world. For technical support or on-site training, [contact our team of piping specialists.](#)

RELIABILITY. FOR LIFE



FLOWGUARD[®]
PIPE & FITTINGS

Visit Flowguard.com or call
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to learn more.

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