



Plastic Pipe and Fittings Association

PUBLICATIONS | PVC

PVC Piping Systems: Features and Benefits



Published by the
Plastic Pipe and Fittings Association (PPFA)
800 Roosevelt Road
Building C, Suite 312
Glen Ellyn, IL 60137
www.ppfahome.org

PPFA-53-26
April 2026, Version 2



INTRODUCTION

The Plastic Pipe and Fittings Association (PPFA) is pleased to offer this publication, which outlines the features and benefits of PVC piping systems. PVC pipe is valued around the world for high durability, safe and easy installation, environmental sustainability, and cost-effectiveness.

PVC MATERIAL PROPERTIES

Due to the material properties of PVC piping and its stringent manufacturing standards, a properly installed PVC piping system can last for many generations.



PVC Color and Markings

PVC pipe color is an integral part of the manufacturing process. Most common PVC piping colors are white, blue, green, grey, brown, and purple. Properly purged PVC piping systems are odorless and non-toxic.

Almost all PVC piping products have surface markings that show the country of origin, material type, pipe size, pressure rating, product manufacturer, applicable certification or listing agency, and a manufacturing production code.

Availability

PVC piping manufacturers and local distributors have extensive inventories to ensure timely deliveries. In addition, almost 100 PVC pipe, fitting, and valve manufacturers in North America are a dependable source for projects requiring large volumes of piping products.

There are complete product systems of PVC for both liquids and vapors. This allows PVC to be the only piping material in contact with the fluid being transported. PVC piping can be produced from compounds with many specialized properties including clarity, high impact strength, molecular oriented (PVC-O), heat fusible, high purity, and many others.

Compared to non-plastic pipe products, the light weight of PVC allows for more piping shipped per truck, railcar, or container load, thereby significantly reducing shipping costs.

Resistance to Chemicals, Corrosion, Fungi, Bacteria, and Insects

- PVC is resistant to corrosion from salt water and most acids, bases, plating solutions, salts, and hundreds of other chemicals. It is used in many deionized and other high-purity water systems. In addition, interior or exterior coatings or liners are not needed.
- PVC piping does not rust, scale, pit, or corrode since it is not subject to galvanic or electrolytic corrosion. This means no costly corrosion protection or electric grounding equipment is needed.



- PVC piping is not susceptible to fungi, bacteria, or insect invasion. It can be used in extended outdoor applications with a water-based latex paint coating applied to the surface of the pipe and fittings.

Temperature Tolerance and Safety

PVC can be used at temperatures up to 140°F in pressure applications when following manufacturer guidelines for pressure de-rating.

PVC has a much higher ignition temperature than many other pipe materials. In addition, due to a high limiting oxygen index, PVC does not support combustion. No piping system has a greater breadth of compounds and products than PVC.

The lightweight structure of PVC's piping reduces safety concerns, lessens the need for costly material, equipment handling, and simplifies the installation process of complex piping installations.

Types of Joints Used

In most plumbing applications, solvent-cemented joints (including socketed fittings, bell and spigot, unions and flanges) are used. Gasketed bell and spigot joints are installed for larger underground uses.

PVC is simple to install whether using solvent, cement, or gasketed bell and spigot joints. No heat emitting fusion tools or torches are required and, in most cases, an electrical source is not needed. One-step and two-step (cement and primer) solvent cements are available for PVC installations, making

installations easy.



Leak-Free Performance and Ease of Repair

PVC pipe systems are safe and easy to use, providing unparalleled long-term leak-free performance. Should a leak occur, repairs are relatively easy for PVC pipe installations.

PVC pipe's flexibility allows it to better stand up to earth movements, to be used as a liner to repair failed piping systems. This flexibility also reduces the need for offset fittings.

APPLICATIONS

PVC pipe is useful in many water applications, including water service piping, sanitary sewer, drain waste, vent, and process water systems.



PVC PIPE AVAILABILITY

Range of Diameters and Pressure Ratings

PVC pipe is available in diameters of 1/8 inch to 60 inches with a wide range of pressure ratings. PVC is also available with a minimum of five different pipe end configurations.

PVC pipe's smooth walls provide excellent resistance to wear from abrasive solutions compared to other non-plastic piping. As measured by using the TABOR test, PVC piping has less friction loss during the life of the system than many other non-plastic piping material. This results in the need for less pumping energy and potentially allows the use of smaller diameter pipe.

INSTALLATION

Properly installed PVC pipe installed per a manufacturer's recommended guidelines can expect to see a long service life. PVC water pipes in normal service will last over 100 years.

PVC pipe's light weight, ease of joining, and lack of hot-welding type joining tools make PVC piping installations simple to learn and can reduce on-the-job injuries.



PVC can be easily welded, machined, and heat and

solvent fused. Using these methods, piping, fabricated fittings, and ducting systems can be readily constructed to meet most process designs or drainage applications in water systems.

THERMAL CONDUCTIVITY

PVC's low thermal conductivity results in less temperature loss, less insulation required, and little or no condensation.

Low friction loss, low thermal conductivity, elimination of corrosion protection, and possible elimination for on-site electrical generation or heavy-duty moving equipment are reasons why PVC piping saves on energy usage. PVC pipes have low installation and maintenance costs.

PLUMBING AND MECHANICAL CODES

There are dozens of PVC piping standards referenced in plumbing and mechanical codes making PVC a code acceptable piping material throughout the world.

Many PVC pipe products are **FDA** and **NSF** certified for handling potable water (**NSF/ANSI 14** and **NSF/ANSI/CAN 61**) and also used for beverage and food processing. PVC systems meet the low lead requirements of **NSF 372**. PVC formulations typically **do not** contain any of the six *PFAS chemicals as identified by the EPA* in the 2024 National Primary Drinking Water Regulation Report¹.

¹ Environmental Protection Agency, (April 2024), [*EPA's Final PFAS National Primary Drinking Water Regulation: Monitoring and Reporting*](#).

PVC REUSE AND RECYCLING

Almost all PVC scrap produced during the manufacturing process can be reground and reused. PVC can be melted and reformed maintaining sufficient physical properties making it easy to be totally recycled into a multitude of products.



PVC Manufacture

PVC is made of chlorine, derived from common salt and ethylene made from petroleum, natural gas, or coal.

PVC materials used in pipe and fittings are classified as rigid. The designation PVC-U identifies PVC pipe as being made without plasticizer or “unplasticized”.

Before PVC resin can be used as a piping material it must be combined with additives such as heat stabilizers, lubricants, fillers, processing aids, impact modifiers, and pigments. Each piping product requires different additives and modifiers, which are determined by the performance requirements of the finished product.

For example, in foam core pipe, a popular DWV product, the use of blowing agents is needed to form the foam structure. These can be easily incorporated into the PVC compound.

LIFE CYCLE ASSESSMENT

LCA (Life Cycle Assessment) is a scientific process that analyzes a product from cradle to grave. LCA's have been adopted for use by several green building rating agencies. Preliminary studies show that PVC piping has a light environmental impact on the planet with a low carbon footprint.

The bottom line is that PVC compared to other non-plastic piping systems is easier and less costly to install as calculated by several third-party studies.

When adding together the cost of materials, labor, and low training investment, few piping systems can compare in value.

Disclaimer:

The information herein has been prepared solely from publicly available sources or from consensus positions adopted by manufacturers of these products or other interested parties in the industry. PPFA disclaims warranties, expressed or implied, as to the fitness for any particular purpose or suitability for any specific installation.