

FLOWGUARD® PLUS PIPE AND FITTINGS INSTALLATION GUIDE



HOW TO QUICKLY
AND EFFECTIVELY
**INSTALL CPVC
PIPING
SYSTEMS**

FLOWGUARD® PLUS
CPVC PLUMBING SYSTEMS™



FLOWGUARD® PLUS PIPE AND FITTINGS INSTALLATION GUIDE

FlowGuard® Plus plumbing pipe is made from a specialty thermoplastic called chlorinated polyvinyl chloride (CPVC). Aside from being proven reliable with more than 50 years of successful service history, FlowGuard® Plus piping is also safe, durable, chlorineresistant, antimicrobial, and recyclable.

Furthermore, FlowGuard® Plus CPVC systems are assembled with readily available, inexpensive tools that require no heat or electricity. Solvent welded joints assure the reliability of a FlowGuard® Plus system.

WHERE TO USE FLOWGUARD® SYSTEMS

FlowGuard® Plus CPVC is used in hot and cold water plumbing systems and meets the typical potable water piping requirements in today's residential homes, apartments, hotels and commercial buildings.

FlowGuard® Plus CPVC pipe and fittings are also capable of operating at the temperature and pressures commonly found in commercial hydronic systems and can meet HVAC system requirements.

CPVC plumbing systems are approved for contact with potable water around the world, including: India, USA, Saudi Arabia, Canada, UK, and Germany, amongst others.



INSTALLING FLOWGUARD® PLUS PIPE AND FITTINGS

1. CUT THE PIPE TO THE DESIRED LENGTH.

A wheel cutter is the preferred tool for cutting FlowGuard® Plus piping, but it can be easily cut with a hacksaw or other fine-toothed hand or power saws. Cutter wheels and/or cutter blades should always be sharp and well maintained.

Cut the piping as squarely as possible to maximize the bonding surface within the joint. When cutting with a saw, a miter box is recommended to ensure a straight edge.

Use of ratchet cutters for new pipes is permitted, but make sure the blade is sharp and well maintained, and that you score the pipe before cutting. As you cut, apply light pressure to handles while rotating the pipe away from you. Complete the cut by squeezing cutter handles.

If there's any evidence of damage or cracking at the tubing end, make another cut 5 cm beyond any visible cracks



INSTALLING FLOWGUARD® PLUS PIPE AND FITTINGS

2. DEBURR AND BEVEL THE PIPE.

Burrs, filings, and flares can prevent proper contact between pipe and fitting, weakening the joint and potentially disrupting water flow. For these reasons, they should be removed from the outside and inside of the piping before assembling the joint.

Sand paper is preferred, but a pocket knife or file is suitable as long as the pipe edge is free of debris.

Make sure to add a slight bevel on the end of the pipe. This will help ease the pipe into the fitting socket, and ensure even application of the solvent cement.

3. PREPARE THE PIPE AND FITTING TO BE JOINED.

Use a cleaner to remove any dirt or moisture from the fitting socket and pipe ends. Insert the pipe into the fitting and ensure the pipe makes contact with the socket wall 1/3 to 2/3 of the way into the fitting. At this stage, tubing should not bottom out in the socket.

The pipe's tapered end allows for a snug fit between the pipe and fitting. If the fit is too loose or tight, it can lead to a weak joint.



INSTALLING FLOWGUARD® PLUS PIPE AND FITTINGS



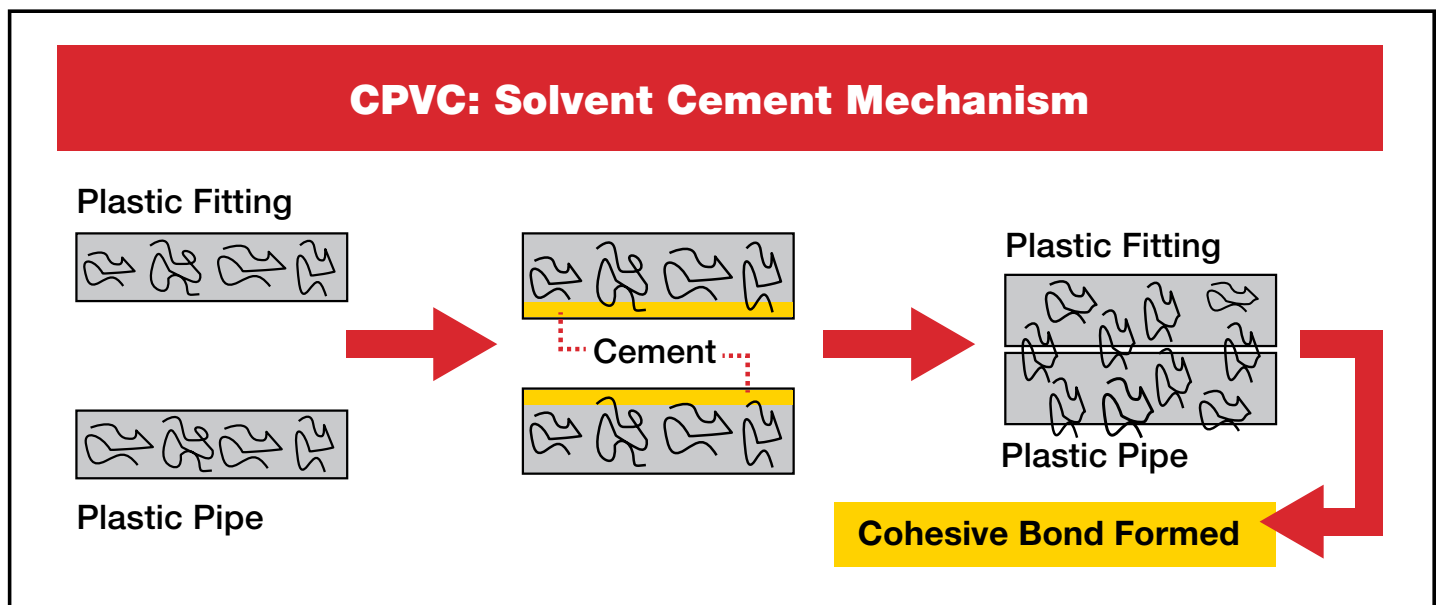
WHAT IS SOLVENT CEMENT, AND HOW DOES IT WORK?

FlowGuard® Plus CPVC recommends joining pipes and fittings with solvent cement. Solvent cement is not glue. Instead, it's a safe, reliable way to chemically fuse the pipe and fittings together, creating one continuous piece of plastic. This allows for strong, reliable joints that won't break apart.

4. APPLY THE SOLVENT CEMENT.

Use an applicator no larger than 1/2 the pipe or fitting diameter. A dauber or natural bristle paint brush is appropriate for applying solvent cement and primer.

Apply a thin, even film of primer around the inside of the fittings and the pipe end. Next, immediately apply a heavier, even coat of solvent cement on the pipe end and fitting socket. Do not allow the primer or solvent cement to puddle within the fitting.



INSTALLING FLOWGUARD® PLUS PIPE AND FITTINGS

5. ASSEMBLE THE PIPE AND FITTING.

Immediately after applying solvent cement, insert the pipe into the fitting socket and rotate the pipe 1/4 to 1/2 turn. This motion ensures an even distribution of cement within the joint. Properly align the fitting.

Hold the assembly for approximately 10 seconds to allow the joint to set. Give extra time when installing in cold or humid environments.

An even bead of cement should appear around the joint. If this bead is not continuous around the socket edge, it may indicate that insufficient cement was applied. In this case, remake the joint to avoid potential leaks.

Wipe excess cement from the seam surfaces for an attractive, professional appearance.



INSTALLING FLOWGUARD® PLUS PIPE AND FITTINGS

6. ALLOW PIPE TO CURE

Solvent cemented joints must adequately cure before pressure testing the plumbing system. Cure times are determined by pipe size, temperature, and relative humidity. Curing is faster for drier environments, smaller sizes, and higher temperatures.

The following table lists recommended minimum cure times before pressure testing can begin. (Note: Time indicated starts after the last joint has been created.)

Minimum Cure Prior to Pressure Testing at 10 bar

Ambient Temperature During Cure Period	Pipe Size	
	Up to 32 mm	40 mm and Above
Ambient 15°C	1 hour	2 hours
4 - 15°C	2 hours	4 hours
Below 4°C	4 hours	8 hours

Special care should be exercised when assembling CPVC systems in extremely low temperatures (below 4°C) or extremely high temperatures (above 38°C):

- Frozen cement cannot be recovered and should be discarded.
- In hot temperatures, solvent cement can evaporate too quickly. Make sure the joint surfaces are still wet with cement when putting them together.

INSTALLING FLOWGUARD® PLUS PIPE AND FITTINGS

7. TEST THE PIPING SYSTEM.

Once an installation is completed and cured, the systems should be pressure tested. FlowGuard® Plus Pipe and Fittings recommends testing at 10 bar (150 PSI) for one hour.

When pressure testing, the system should be filled with water and all air bled from the highest and farthest points in the run.

If a leak is found, the joint must be cut out and discarded. A new section can be installed using couplings.

Air testing is not recommended.

SOLVENT CEMENT WELDING

- 1) Cut the pipe.
- 2) Deburr and bevel the pipe.
- 3) Prepare the pipe and fitting to be joined.
- 4) Apply the solvent cement.
- 5) Assemble the pipe and fitting.
- 6) Allow the pipe to cure.
- 7) Test the piping system.



INSTALLING FLOWGUARD® PLUS PIPE AND FITTINGS HANDLING AND STORAGE

FlowGuard® Plus CPVC is a tough, corrosion resistant material, but requires reasonable care when handling pipe and fittings.

Avoid dropping, stepping on, or forcibly placing objects on top of piping.

If piping is cracked, split, or gouged, the damaged section should be discarded.

FlowGuard® Plus piping should be covered with a non-transparent material when stored outdoors for long periods of time. Long term exposure to sunlight on the job site will not affect physical properties or ultimate performance.

HANGERS AND SUPPORTS

Because FlowGuard® Plus piping is rigid, it requires fewer supports than flexible plastic systems.

For vertical runs, provide a support at each floor level, plus a midstory guide.

For horizontal runs, support at 90 cm intervals for diameters of 32 mm and below, and at 1.2 m intervals for larger sizes.

Piping should not be anchored tightly to supports, but rather secured with smooth straps or hangers that allow for movement caused by expansion and contraction. Most hangers designed for metal pipe are suitable for FlowGuard® piping systems. Hangers should not have rough or sharp edges that come in contact with the tubing.

INSTALLING FLOWGUARD® PLUS PIPE AND FITTINGS

WATER HEATER HOOKUPS

When connecting electrical water heaters to a CPVC plumbing system, use a suitable flexible hose (braided or non-braided) with union-style end couplings to connect both the inlet cold water and outlet hot water CPVC lines. The flexible connector should be in accordance with the water heater manufacturer's specifications.

When connecting gas water heaters to a CPVC plumbing system, use at least 50 cm of a suitable metal nipple or flexible metal connector so that the CPVC piping system cannot be damaged by the build-up of excessive radiant heat from the water heater flue.

Always verify code requirements prior to installation.

THERMAL EXPANSION

CPVC, like all piping materials, expands and contracts with changes in temperature. CPVC piping of all diameters typically expands about 7.5 cm per 30 meters length for a 40 °C temperature change.

Expansion loop requirements for CPVC are not significantly different than those recommended for copper piping. Generally, thermal expansion can be accommodated with changes in pipe direction; however, a long, straight run may require an offset or loop.

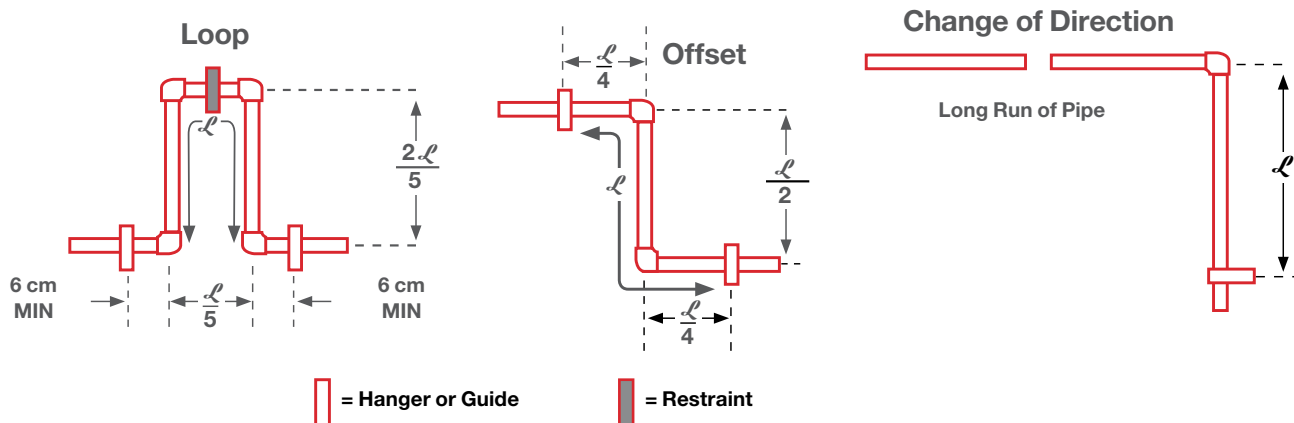
For convenience, loop (or offset) lengths have been calculated for different pipe sizes and different run lengths with a temperature increase of 50 °C . The results are in the table below.

Expansion Loop Length (L) for 50°C Temperature Change					
Pipe Size	Length of Run				
	6 Meters	12 Meters	18 Meters	24 Meters	30 Meters
1/2 inch	58 cm	81 cm	101 cm	115 cm	130 cm
3/4 inch	64 cm	92 cm	113 cm	130 cm	144 cm
1 inch	73 cm	103 cm	124 cm	144 cm	161 cm
1-1/4 inch	78 cm	110 cm	135 cm	156 cm	173 cm
1-1/2 inch	86 cm	122 cm	150 cm	173 cm	193 cm

INSTALLING FLOWGUARD® PLUS PIPE AND FITTINGS HOW TO USE THE TABLE

The following example uses data from the table on the previous page to show three methods of compensating for thermal expansion.

In the diagrams below, assume: Pipe size = 20 mm, length of run = 18 m,
 $L = 101 \text{ cm}$ (from table).



TRANSITIONS FROM FLOWGUARD® CPVC TO OTHER MATERIALS

On lines where normal water temperatures are 65°C or higher, you can use metal threaded adapters, or specialty transitions incorporating rubber seals at the plastic to-metal interface. Male CPVC threaded adapters for connecting valves and appurtenances on cold water lines can also be used, but CPVC female threaded adapters should not be used.

TFE (Teflon®) thread tape is always safe for making CPVC threaded connections. To avoid straining or damaging the connector, make sure that the threads between Flowguard® Plus CPVC metal connectors and other materials are compatible and from the same standard.

When making a transition connection to metal threads, do not over torque plastic threaded connections. Hand tighten plus one half turn should be adequate, with a maximum of two turns.

Some paste-type sealants contain solvents that may be damaging to CPVC. If you prefer to use a paste or pipe dope, always check with the manufacturer regarding its compatibility with CPVC.



INSTALLING FLOWGUARD® PLUS PIPE AND FITTINGS

FLOWGUARD® PLUS PIPE AND FITTINGS RESOURCES

FlowGuard® Plus Pipe and Fittings are the most established and top performing polymer piping products in the market. When you need technical support or on-site training, contact the experts at FlowGuard® Plus Pipe and Fittings.

RELIABILITY TESTED FOR LIFE



FLOWGUARD[®] PLUS
CPVC PLUMBING SYSTEMS™

Visit **FlowGuard.com**
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Inventors and Pioneers of CPVC
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