

WAVIN India
Product Guide

CPVC Pipes & Fittings



wavin



Introducing WAVIN CPVC Pipes & Fittings



WAVIN lead-free CPVC pipes and fittings are used in a wide range of applications including Hot and Cold water in homes, apartments, hotels, resorts, hospitals, high and low-rise buildings, corporate and commercial houses, academic institutes, public projects, solar heater applications, etc. for pure and hygienic water supply. It is suitable for all up take and down take lines, terrace looping including concealed pipe work applications.

It is deemed safe for the transport and use of potable water meant for drinking, cooking and bathing.

Identification on CPVC Pipes:

For SDR 11 Pipes RED Striper Line is applicable.



For SDR 13.5 Pipes BROWN Striper Line is applicable.



Standards and Codes:

Standards & Codes specify certain requirements, testing methods and marking for chlorinated polyvinyl chloride plastic pipes including Hot & Cold water distribution supplies.

WAVIN CPVC Lead-Free Pipes		
Class of Pipe	Standard	Sizes Available
SDR 11	IS 15778	½" – 2"
SDR 13.5	IS 15778	½" – 2"

WAVIN CPVC Lead-Free Pipes		
Class of Fitting	Standard	Sizes Available
SDR 11	ASTM D 2846	½" – 2"

Brass Standards:

Composition Standard: IS 319.

CPVC Ball Valves:

Mechanical test as per the ASTM F1970, and socket dimensions as per the ASTM D2846 standards.



EPDM Rubber 'O' Ring & EPDM Washer

WAVIN's fittings – Unions, Tank Nipple & Plastics FTA, are equipped with specially designed EPDM 'O' Rings & EPDM Washers. They are highly resistant towards heat, oxidation, ozone and weather aging – making the fittings ideal for potable Hot and Cold water applications.



WAVIN's CPVC Pipes and Fittings Smart Features & Benefits:

1) Cost-effective and easy to install

- WAVIN pipes and fittings are lightweight and cost-effective with low maintenance, labour and shipping cost.
- No electric/heat source is required for installation.
- 100% leak-proof joints.
- Top-notch raw materials to deliver high quality products.
- A simple cutter, chamfering tool and CPVC solvent are the only requirements for 100% leak-proof jointing.

2) Resistance to chemicals, corrosion and abrasion

- WAVIN's pipes and fitting do not break down even under the harshest of water conditions.
- Our pipes and fittings can even be buried directly under concrete slabs as they do not react chemically with concrete.

3) Smooth internal surface

- Absence of scaling, pitting and leaching ensures smooth and full bore flow with no water pressure loss and noise.

4) Energy-efficient

- WAVIN's pipes and fittings are self-insulating with lower thermal conductivity.
- Our pipes are built for tough conditions with minimum offsets/looping.

5) Self-extinguishing

- WAVIN's pipes and fittings come with an integral flame-retarding property with a very high Limiting Oxygen Index (LOI) of 60, and therefore can't support or sustain combustion.

6) Suitable for carrying drinking water

- WAVIN's pipes and fittings are lead-free, and made of food grade material.



Pipe Dimensions and Pressure Rating Chart:

Pipe Dimensions and Pressure Rating Chart for CPVC Pipes as per IS 15778									
Nominal Size (mm)	Nominal Bore (inch)	SDR 11 Wall Thickness (mm)		Working Pressure at kg/cm ²		SDR 13.5 Wall Thickness (mm)		Working Pressure at kg/cm ²	
		Minimum	Maximum	27°C	82°C	Minimum	Maximum	27°C	82°C
15	½	1.7	2.2	28.14	6.93	1.4	1.4	22.23	5.61
20	¾	2.0	2.5	28.14	6.93	1.7	1.7	22.23	5.61
25	1	2.6	3.1	28.14	6.93	2.1	2.1	22.23	5.61
32	1 ¼	3.2	3.7	28.14	6.93	2.6	2.6	22.23	5.61
40	1 ½	3.8	4.3	28.14	6.93	3.1	3.1	22.23	5.61
50	2	4.9	5.5	28.14	6.93	4.0	4.0	22.23	5.61

Temperature Derating Factors at Working Pressures:

Elevated temperature fluid mediums require derating of a thermoplastic pipe with a maximum internal pressure rating of 27°C. To determine the maximum internal pressure rating at an elevated temperature, simply multiply the pipe pressure rating at 27°C by the factor specified for the desired temperature.

Working Pressure of CPVC Pipes			
Working Pressure in (kg/cm ²) for CPVC Pipes (½" to 2")			
Temperature in °C	Derating	SDR 11	SDR 13.5
27	1	28.14	22.23
32	0.91	25.61	20.23
38	0.82	23.08	18.23
43	0.73	20.54	16.23
49	0.65	18.29	14.45
54	0.57	16.04	12.67
60	0.50	14.07	11.11
66	0.45	12.66	10.00
71	0.40	11.26	8.89
77	0.32	9.01	7.11
82	0.25	6.93	5.61
88	0.22	6.19	4.89
93	0.20	5.63	4.45



Burst Pressure Ratings for Pipes:

Size (inch)	Size (mm)	Burst Pressure for Pipes in kg/cm ² for 60 and 70 sec. at 27°C	
		SDR 11	SDR 13.5
½	15	102.95	83.03
¾	20	85.14	71.31
1	25	86.00	68.15
1 ¼	32	86.81	69.22
1 ½	40	87.14	69.79
2	50	85.82	68.80

Burst Pressure Ratings for Fittings:

Size (inch)	Size (mm)	Burst Pressure for Fittings in kg/cm ² for 60 and 70 sec. at 27°C
½	15	87.50
¾	20	70.00
1	25	70.00
1 ¼	32	70.00
1 ½	40	70.00
2	50	70.00

Yellow-Medium Bodied CPVC Solvent Cement:

WAVIN's Yellow-Medium Bodied CPVC Solvent Cement is ideal to fix pipes and fittings together. It meets, or even exceeds, the requirements of the ASTM F493 and is as per the environmental regulations.

Moreover, it is Lo-VOC compliant and NSF approved.

The right solvent cement and its quality will not only help you save a great deal on costs but also ensure 100% leak-proof joints.



Installation Guidelines:

A few simple steps must be followed for 100% leak-proof, efficient and productive joints.

WAVIN pipes and fittings are designed with precise tolerance. They are architected using a system which enables a perfect fit and leak-proof joints.

Step 1: Cutting the Pipe

- WAVIN pipes can be easily cut with a wheel cutter, ratchet cutter or power hacksaw, though our recommended tool would be a wheel cutter.
- Be sure to score the pipe first to get the best results, and to ensure clean square cuts.
- Always use the right cutter wheel.
- Cutter wheels & blades should always be sharp & well maintained.
- Square cuts will ensure full engagement with fittings and maximize the bonding surface within the jointing surface of pipes and fittings.



Step 2: Deburring/Beveling

- A reamer is preferred, though a file or pocketknife may also be used.
- The ID and OD of the pipes should be reamed to remove burrs, filings and flares.



Burrs, filings & flares:

- They prevent proper contact between pipes and fittings during assembly.
- They restrict & disturb the flow of water.
- Score & channel in the socket ID may create leak potential.
- Removing flares will minimize the chances of pushing solvent cement to the bottom of the joints.



Step 3: Fittings Preparation

- Wipe and clean any dirt or moisture from the surface of the fittings & pipes.
- For a dry fit, the contact point between the pipes and fittings should be about 40-80% into the fittings. This is commonly referred to as the interference fit. After applying the solvent cement, the pipe must reach the bottom of the fitting without any resistance for a correct fit.



Step 4: Solvent Cement Jointing & Assembly

- Apply a thin coat of WAVIN Yellow CPVC Solvent Cement into the socket and a full even coat on the pipe to the depth of socket bottom. Do not puddle cement in the socket. Use the dauber applicator supplied with the can.
- Select proper cement, pipe cleaner and primer for the work. Choose a dauber/applicator that is sized properly. Daubers, brushes or applicators should be $\frac{1}{2}$ the diameter of the fittings being joined (1" brush/applicator for 2" pipe). This reduces the time required to apply the cement, resulting in better joints.



- Its proper use prepares the surfaces for fusion in a wide variety of weather conditions.
- Insert the pipe into the socket quickly while the cement is still wet. If it has dried, re-coat the pipe and fitting.
- If possible, twist the pipe a quarter turn. This will allow the cement to cover any dry spot. Make sure the pipe goes all the way to the bottom of the fitting.
- Hold the pipe and fitting together (30 seconds to a minute) to make sure that the pipe does not push out. Allow the cement to set (approx. 15 minutes) before handling the assembly.
- Wipe off any excess cement with a clean dry cloth.
- Allow the WAVIN Yellow CPVC Solvent Cement to cure before applying water (fluid) pressure. The cure time depends on temperature, humidity, etc. Follow the cement recommendation. Under normal conditions, allow it to cure for 24 hours.



Important

While assembling the pipes and fittings, a common failure may occur – “dry joint”. This happens when the assembly is delayed. In this case, the cement will “flash-off” its solvents and fail to weld the plastics.

Delaying the assembly of pipes and fittings can lead to dry joints.



Solvent Cement Consumption:

Solvent cements are at the core of CPVC plumbing and their quality is of vital importance in the strength of the joint. The chart shows the consumption of solvent cements and the approximate number of joints which can be made per liter of WAVIN Yellow Medium CPVC Solvent Cement.

Consumption of Solvent					
Pipe Size (inch)	½	¾	1 ¼	1 ½	2
Pipe Size (mm)	15	20	32	40	50
No. of Joints per liter (pipe & fitting)	1200	750	450	325	225

Solvent Set & Cure Schedule Guidelines:

Average Initial Set Schedule for CPVC Solvent Cement

Set Schedule is the necessary time to be allowed before pressurizing the system.

In damp or humid weather, allow 50% more set time.

Temperature Range	Pipe Size ½" to 1 ¼"	Pipe Size 1 ½" to 2"
16°C to 38°C	2 Minutes	5 Minutes
5°C to 16°C	5 Minutes	10 Minutes
-18°C to 5°C	10 Minutes	15 Minutes

Average Joint Cure Schedule for CPVC Solvent Cement

Joint Cure Schedule is the necessary time to be allowed before pressurizing the system.

In damp or humid weather allow 50% more set time.

Temperature Range	Pipe Size ½" to 1 ¼"		Pipe Size 1 ½" to 2"	
Temperature range during assembly and cure period	Up to 11 kg/cm ²	11 to 22 kg/cm ²	Up to 11 kg/cm ²	11 to 22 kg/cm ²
16°C to 38°C	15 Minutes	6 Hours	30 Minutes	12 Hours
5°C to 16°C	20 Minutes	12 Hours	45 Minutes	24 Hours
-18°C to 5°C	30 Minutes	48 Hours	1 Hour	96 Hours

Horizontal and Vertical Supports:

Pipe clamps are used for anchoring the pipes to the structural element of the building. Proper support spacing is critical to ensure that the deflection is kept to a minimum. Support location and spacing depends on the pipe diameter, operating temperature of the system, and location of any concentrated stress loads (valves, flanges, etc.). Hangers used must have an adequate load-bearing surface, and free from any rough or sharp edges that could damage the pipe during use. Hangers must not restrict linear movement of the system because of thermal expansion and contraction, due to changes in temperature. Furthermore, over-tightening must be avoided.

Recommended Support System for CPVC:

Size (inch)	Recommended Support Spacing in (Ft.)						
	27°C	38°C	49°C	60°C	71°C	82°C	93°C
1/2	3.9	3.9	3.9	3.9	3.6	3.6	3.6
3/4	4.6	4.3	4.3	4.3	4.3	3.9	3.9
1	4.9	4.9	4.9	4.6	4.6	4.3	4.3
1 1/4	5.6	5.2	5.2	5.2	4.9	4.6	4.6
1 1/2	5.9	5.6	5.6	5.6	5.2	4.9	4.9
2	6.6	6.2	6.2	5.9	5.9	5.6	5.6

Thermal Expansion and the Expansion Loop:

A great deal of consideration must be given to the design of the system due to the effects of thermal expansion and contraction. Temperature variations above and below the installation temperature cause CPVC pipes to change in length, just like other pipes. They expand and contract 4.5-5 times more than steel or iron pipes. The extent of the expansion or contraction depends on the co-efficient of linear expansion of the piping material, the length of the pipe between directional changes, and the temperature differential.

However, the resultant stress generated by thermal expansion is lesser for thermoplastic than steel. This is due to CPVC's lower modulus of elasticity in comparisons to metal pipes, and over time, stress relaxation will occur.

CPVC pipes, regardless of their diameters, will expand about 7.5 cm per 30 mtrs. for a 40°C change in temperature. Therefore, provisions must be made for this movement. Using the expansion loop, thermal expansion can be taken care of by changing the direction of supply lines. If not done, cracks may appear in the joint which will ultimately lead to leaks.

Expansion is mainly a concern in hot water lines. As mentioned, thermal expansion can be accommodated with changes in direction. However, a long straight run may require an offset or loop. Generally, the temperature change experienced is not more than 38°C.

Under-Slab Installation Guidelines:

WAVIN's CPVC pipes and fittings are highly flexible in nature, therefore, extra care must be taken to ensure proper burial conditions. The stiffness of the piping system is affected by the sidewall support, soil compaction and the condition of the trench. Trench bottoms must be smooth and regular, in either undisturbed soil or a layer of compacted backfill. Pipes must lie evenly on this surface throughout the entire length of its barrel.

Trenching:

- Excavate the trench, ensuring the sides are stable under all working conditions.
- The trench should be wide enough to provide adequate room for joining the pipes in the trench, by shaking the pipe from side to side, to compensate for expansion and contraction filling, and compacting the side fills.
- The space between the pipe and trench wall must be wider than the compaction equipment used in the compaction of the backfill. Minimum width must not be less than either the pipe's outside diameter 16 inches, or the pipe's outside diameter times 1.25 + 12 inches. The trench width may be different, if approved by the design engineer.
- Install the foundation and bedding as needed by the engineer according to the conditions of the trench bottom to provide firm, stable, and uniform bedding for the pipes. Provide a minimum of 4 inches of bedding. In case any rock or unyielding material is encountered at the bottom of the trench, provide 6 inches.
- Plastic pipes should always be installed at least below the frost level.

Bedding and Backfilling:

- Sub-soil conditions vary from place to place, therefore, the pipe's backfill should be stable and provide protection.
- The pipe should be surrounded with an aggregate material that can easily be worked around the sides of the pipe. Backfilling must be performed in layers of 6 inches, with each layer being sufficiently compacted to 85-95%.
- A mechanical tamper is recommended for compacting a sand and gravel backfill, containing a significant proportion of fine-grained material like slit and clay. If a tamper is not available, it must be done by hand.
- The trench should be completely filled. The backfill should be spread in uniform layers to prevent any unfilled spaces or voids. Large rocks, stones, frozen clods and other debris must be removed.

In-slab Installation:

WAVIN's CPVC pipes can be installed and embedded in concrete slabs as they do not react with concrete or stucco, and are inert to acidic soil conditions.

Pipe Installation:

In air-conditioned buildings, CPVC Hot and Cold water supply lines do not need to be insulated because of their low co-efficient of thermal conductivity.

CPVCs carrying water at 82°C in temperature will have an outside surface temperature of 65°C in air-conditioned rooms. Copper pipes on the other hand will have an outside temperature equal to that of water. Under most conditions, copper pipes drip when water is below 15°C, but CPVC pipes will remain free from condensation.

Evidently, insulation need not be recommended for CPVC pipes, however, designer-recommend insulations can be used for their environmental benefits.

Recommended Insulating Material for CPVC Pipes:

- Expanded rock wools
- Polystyrene gypsum articles
- Slag wool pallets
- Hessian (cloth)
- Glass fibre
- Mineral wools

Recommended Thickness of Insulation:

- CPVC open lines: 7 mm.
- CPVC concealed lines: 5 mm.

Thread Sealant:

Threaded CPVC plastic and trans fittings must be used with a suitable thread sealant to ensure leak-proof joints. Thread sealants must be carefully chosen as some chemicals attack the CPVC material may lead to cracks. Polytetrafluoroethylene (PTFE) tape is the most preferable thread sealant and is widely accepted around the world.

Handling & Storage:

Handling:

- WAVIN's pipes and fittings must be loaded and unloaded with utmost care and effort. They must not come in direct contact with sharp objects like the corners of truck beds, loading docks and buildings, forks and forklift trucks, rocks, etc.
- The impact resistance and flexibility of the CPVC pipes reduces in low temperature conditions. The impact strength of both types of piping material will decrease below 0°C. Extreme care must be taken while unloading and handling pipes in cold water.
- Pipes must never be dragged or pushed from the truck bed.



Storage:

- During storage, choose flat and dry location to minimise dirt and foreign matter accumulation in the bore and belled end. The storage area must be free from sharp objects.
- CPVC pipes need to be stacked in such a way that one set is perpendicular to the other arranged on top of it. Ensure only one size and schedule of pipes is stored in a single complete stack. The pipes should receive proper ventilation and they must be protected from the sun. This will reduce the effects of UV rays and prevent heat build-up.
- If the pipes are stored in racks, they must be continuously supported lengthwise. If this is not possible, the spacing of the supports should not exceed 3 feet.



Do's:

- Use a clean cloth to clean the pipes and fittings before installation.
- In case of any cracks in the pipe, cut off a minimum of 25 mm beyond the edge of the crack.
- Cut the pipe as a square (perpendicular) before making a joint.
- Deburr & bevel – ensure no sharp edges are in contact with the fittings surface while inserting the pipe.
- Take the right precautions for installations in solar water heaters and boilers. Follow WAVIN recommendations and check the dry fitment.
- Apply the recommended WAVIN Yellow CPVC Solvent Cement on the pipe surface before inserting it into the fitting.
- Assemble the pipes and fittings quickly after applying the solvent cement.
- Rotate the pipe 90°-180° to spread WAVIN Yellow CPVC Solvent Cement evenly in the joint while pushing the pipe into the fitting. Hold for 30 seconds.
- Ensure the pipes and fittings are properly aligned to avoid stress on the joints.
- Ensure no air is trapped once the installation is completed.
- Provide vertical and horizontal supports, as recommended.
- Use Teflon tapes only as a thread sealant.
- Before the conceal work is completed, conduct hydraulic pressure testing after installation to detect any leaks or faults with the help of WAVIN Plastic End Plug.
- Before pressure testing, wait for the appropriate cure time, fill the lines slowly and bleed air from the system.
- Keep the solvent cement container closed when not in use.
- Strictly keep the solvent cement away from sparks and open flames while in use as it is volatile in nature and can catch fire easily.
- While using and handling the solvent cement, primer and cleaners, proper ventilation & good work practices will minimise any health risk.

Don't's:

- Don't use dull or damaged cutters for cutting the pipes.
- Don't use metal hooks or nails to support/hold/put pressure on the pipes.
- Don't use straps and hangers with rough/sharp edges or tighten the straps over the pipes.
- Don't expose the pipe to an open flame when trying to bend it.
- Don't drop pipes on their edges or on heavy objects, and don't walk on them.
- Don't use air or gases for pressure testing.
- Don't use any other petroleum or solvent-based sealant, adhesive, lubricant or fire stop material on the CPVC pipes and fittings.
- Don't use the CPVC pipes and fittings for pneumatic applications.
- Don't use CPVC plastic threaded fittings for hot water above 60°C.
- Don't use cotton threads to join the CPVC brass fittings or plastic threaded fittings.
- Don't smoke cigarettes while using the solvent. Its fumes can catch fire and may cause severe injuries. Don't let the solvent cement come in contact with skin or eyes.

Notes

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Notes

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

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