

uPVC Pressure Pipe and Fittings Technical Information

Temperature Considerations

For uPVC pipes and fittings under pressure and in continuous service at any temperature in the range 20-60°C, the maximum allowable static pressure shall be reduced in accordance with the values in Table 3. For any pipe material temperature or any pressure outside this range, the maximum allowable static pressure should be established by reference to our office.

Table 5. Rating for pressure pipes for temperature.

Note: Pipes of higher rating than Class 18 should be rated in the same proportions as for Class 18.

Table 6. Recommended spacing of supports in metres.

uPVC pipe should be supported at intervals depending on the density of the fluid being conveyed and the maximum temperature likely to be reached by the pipe material. Table 6 shows recommended maximum spacing of support for all classes of pipe where water is the fluid being conveyed.

Table 5

Pipe Mat. temp.	Maximum allowable static pressure - Mpa					
	Class 4.5	Class 6	Class 9	Class 12	Class 15	Class 18
20°C	0.45	0.60	0.90	1.20	1.50	1.80
30°C	0.36	0.48	0.72	0.96	1.20	1.44
40°C	0.27	0.36	0.54	0.72	0.90	1.08
50°C	0.18	0.24	0.36	0.48	0.60	0.72
60°C	0.09	0.12	0.18	0.24	0.30	0.36

Table 6

Nom. Size	Horizontal or graded pipes	Vertical pipes
15	0.30	0.60
20	0.35	0.70
25	0.38	0.75
32	0.43	0.85
40	0.45	0.90
50	0.50	1.05
65	0.60	1.20
80	0.67	1.35
100	0.75	1.50
125	0.85	1.70
150	1.00	2.00
200	1.15	2.30
225	1.25	2.50
250	1.30	2.60
300	1.50	3.00

Where ambient temperatures or the temperature of piped fluids are such that the temperature of the material is likely to be greater than 20°C, the support distances should be reduced accordingly.

Where material temperatures are likely to approach 60°C and the pipe is horizontal, continuous support of the pipe is recommended; for vertical installations the values at Table 6 for horizontal support should be used.

Heavy fittings such as valves should be supported independently, and large plastic fittings (e.g. flanges, particularly those with metal backing rings) should be supported on each side. Where pipes are continuously supported, flanged connections and other protrusions should be allowed room for movement.

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Thermal Linear Expansion of uPVC Pipe

The co-efficient of thermal expansion of uPVC is much greater than other materials and must be considered when installing above or below ground. The co-efficient may be taken for reference as $7 \times 10^{-5}/^{\circ}\text{C}$ and represents approximately 1 mm/m/ 15°C .

Earthing

uPVC is a non-conductor of electricity and must not be used for earthing purposes.

Storage and Handling

Because of its light weight uPVC is more liable to be thrown about, so reasonable care should be taken during storage and handling.

Each pipe should have continuous or evenly spaced supports. Pipes should not be stacked in large piles, particularly in warm conditions. Store away from direct sunlight whenever possible.

uPVC Pressure Fittings

The uPVC system is a comprehensive range of pressure pipes and fittings - well suited to domestic, commercial and industrial applications.

All basic components are manufactured in PVC, and subject to the most rigorous quality controls. The result is a light, robust system of a consistently high standard.

Injection moulded fittings suitable for solvent weld jointing are available in 15 mm - 150 mm and long radius post formed bends to 195 mm.

GFR can custom manufacture PVC fittings to your requirements.

C.I./D.I. Pressure Fittings

A comprehensive range of Cast Iron and Ductile Iron fittings are available for use with Hardiseal R.

R.J. pressure pipes.

Socketed all around fittings manufactured to suit AS1477 pressure pipe dimensions are recommended.

Hydraulic Testing

Pipe line should be cool and, if buried, all joints left exposed. All air should be eliminated before applying full test pressure. Test pressure is normally 1.2 to 1.5 times working pressure and should be no greater than twice maximum working pressure. Test ends and any changes in direction must be properly restrained during testing to avoid movement of the pipe and fittings.

Solvent weld systems must not be subjected to any hydraulic pressure for at least 24 hours when using high bond or 48 hours when using slow setting cement.

Rubber ring joint systems must not be subjected to any hydraulic pressure until concrete thrust blocks have set.

Jointing Methods - Solvent Weld Joint

Solvent weld joints are a simple trouble free method of jointing uPVC pressure pipe and fittings, provided only high bond or slow setting solvent cement is used and these jointing instructions are carefully followed. Before applying the solvent cement, it is essential to use priming fluid for successful jointing, as the fluid not only cleans and degreases, but removes the glazed surface from uPVC which allows the solvent cement to permeate into the pipe or fitting.

Solvent cement is a solution of resin in a mixture of solvents which soften the surfaces when applied to uPVC pipe and fittings. It is NOT a glue.

A thin uniform coat is applied to both spigot and socket and the joint assembled while the surfaces are still and fluid. The cement layers intermingle and become one. The strength of the joint develops as the solvent permeates the PVC and the volatile constituents evaporate.

uPVC Pressure Pipe and Fittings: Joining Instructions



1. Cut the spigot as square as possible using a mitre box and handsaw or power saw. Remove all swarf and burrs from both inside and outside edges with a knife, file, reamer or sandpaper. Swarf and burrs if left, will wipe off the solvent cement and prevent proper joining. Also swarf inside pipes can become dislodged and jam taps and valves.
2. Check the pipe and spigot or fittings for proper alignment. The time for any adjustments is NOW, not later.
3. Mark the spigot with a pencil or marker at a distance equal to the internal depth of the socket. Do NOT score or damage the surface of the pipe or fitting.
4. Dry fit the joint. An interference fit must be reached before the spigot is inserted fully to the pencil mark.
5. Thoroughly clean the inside of the socket and the area between the pencil mark and the spigot end with a clean cotton, lint free cloth (do NOT use synthetic material), dipping in priming fluid. This removes dirt and grease and softens the PVC surface. Do NOT brush or pour the priming fluid on.
6. Apply a THIN, uniform coat of solvent cement to the socket. Note that a pool of cement at the foot of the socket will severely weaken the pipe or fitting. Apply a uniform coat of solvent cement to the external surface of the spigot up to the pencil mark.
7. Assemble the joint quickly before the cement dries by pushing the spigot firmly into the socket as far as the pencil mark, ending with a quarter turn in this position for at least thirty seconds without movement.
8. Wipe off the excess solvent cement from the outside of the joint and where possible from the inside of the joint. Do NOT disturb for at least a further five minutes.

Cure time is the time taken for the solvent weld joint to reach the pressure rating of the pipe.

For pressure pipes do NOT pressure test the joint for at least 24 hours when using high bond or 48 hours when using slow setting.

By following these steps EXACTLY you should be able to make strong, leak-free joints with solvent cements. But remember, correct pipe and fitting selection is also important. Consult the GFR catalogue for correct selection.

uPVC Pressure Pipe and Fittings: Joining Methods

Joining Methods - Rubber Ring Joint

Rubber ring joint pipe is supplied with a sealing ring which fits easily into the integral socket of each 6 metre length, and is available in sizes 50 mm to 300 mm.

Pressure pipe rings are embossed with the letter 'PR' and the nominal diameter of pipe, e.g. 'PR100' for joining 100 mm diameter pipe.

Unless otherwise requested Natural Rubber (NR) rings are supplied. However, rings are available in other polymers and colour identified on the rear outer circumference as follows:

Polymer	Colour Code
Natural Rubber (NR)	White
Polychloroprene (CR)	Red
Butyl (AIR)	Yellow
Styrene Butadiene (SBR)	Blue

Caution: Rings with two colour flashes contain root inhibitor and are for sewer use only.

If it is necessary to cut pipes on site use a fine toothed handsaw. The cut position should be measured to allow the penetration depth of the spigot into the socket shown in Table 7. A mitre box is recommended to ensure the cut is square to the pipe axis and all burrs removed with a file.

A chamfer similar to the factory produced chamfer on the pipes supplied is essential before attempting to joint the pipes. Maximum length of chamfer is also shown in Table 7. The witness mark should then be made, using a soft pencil, at the required penetration depth.

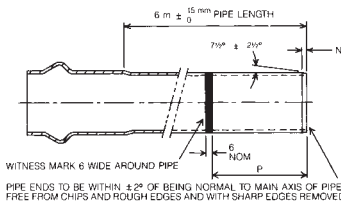


Table 7 Chamfer and Witness Mark Details.

Nom. Pipe Size	P (mm)	N (mm)	Nom. Pipe Size	P (mm)	N (mm)
50	90	12	195	150	30
65	95	15	200	155	30
80	100	15	225	165	35
100	110	20	250	175	35
150	120	25	300	185	40

P = Penetration depth N = Chamfer depth

Table 8 Average Number of Joints per Litre of Lubricant

Nom. Pipe Size per Litre	Approx. Joints	Nom. Pipe Size	Approx. Joints
50	130	195	42
65	120	200	40
80	100	225	35
100	75	250	30
150	50	300	25

Coverage of Solvent Cements for PVC Jointing

Coverage of Solvent Cements

Table 9

9 FAST SET UP TO 50 mm - VX8 SLOW SET FOR LARGE BORE AND HOT CONDITIONS

	PRESSURE PIPE										SEWER PIPE			
PIPES (mm)	15	20	25	32	40	50	80	100	155	195	100	150	225	300
APPROX N° OF JOINTS PER LITRE	600	350	260	190	140	75	60	40	25	17	50	30	15	10

Elevated Service Temperature

Table 10

SERVICE TEMP	CLASS 4.5 (PA)			CLASS 6 (PB)			CLASS 9 (PC)			CLASS 12 (PD)			CLASS 15 (PE)			CLASS 18 (PF)			
	Mtr	Hd	Mpa	PSI	Mtr	Hd	Mpa	PSI	Mtr	Hd	Mpa	PSI	Mtr	Hd	Mpa	PSI	Mtr	Hd	Mpa
20°C	45	0.45	65	60	0.60	87	90	0.90	130	120	1.20	173	150	1.50	216	180	1.80	260	
30°C	36	0.36	52	48	0.48	69	72	0.72	104	96	0.90	139	120	1.20	173	144	1.44	208	
40°C	27	0.27	39	36	0.36	52	54	0.54	78	72	0.72	104	90	0.90	130	108	1.08	156	
50°C	18	0.18	26	24	0.24	35	36	0.36	52	48	0.48	69	60	0.60	87	72	0.72	104	
60°C	0	0.09	13	12	0.12	17	18	0.18	26	24	0.24	35	30	0.30	44	36	0.36	52	

Thermal Linear Expansion of PVC Pipe

