

about: pvc-c

Post-chlorinated Polyvinylchloride (PVC-C) is a highly versatile material that is used for both pressure and drainage piping systems for above and below ground applications. It is a rigid thermoplastic material with good tensile, flexural and mechanical strength, low moisture absorption, good flammability characteristics, exceptional dimensional stability and good tenacity.

PVC-C also has excellent chemical resistance across its operating temperature range of 0°C to 90°C, with a broad band of operating pressures. In addition, because of its long-term strength characteristics, high stiffness and cost effectiveness, PVC-C systems are suitable for a wide diversity of thermoplastic piping installations.

PVC-C systems feature a broad range of pipe sizes, fitting configurations, valve choices and ancillary items.

PVC-C piping systems are joined by solvent cement welding, whilst transition joints can be made using flanges, threaded connections, mechanical fittings, and compression fittings.

IPS supplies a comprehensive range of PVC-C piping systems in both inch and metric dimensions, according to ASTM and DIN standards. Systems are available in inch sizes up to 24" for use as both pressure and ventilation piping systems, and in metric sizes up to 160mm.



General properties of PVC-C

PVC-C is thermally stable in the temperature range 5°C to 100°C, however at low temperatures the impact strength of PVC-C decreases. It is therefore not recommended for use at very low temperatures unless there is no likelihood of the piping materials being disturbed or subjected to impact damage. PVC-C is free from toxic metals thus ensuring that it is physiologically harmless for drinking water and foodstuffs applications.

Some important advantages of PVC-C are:

- Low Specific weight 1.5 g/cm³
- Wide range of applications
- Good chemical and corrosion resistance
- Safe for potable water applications
- Low friction loss
- Self extinguishing
- High mechanical strength
- Low coefficient of thermal expansion
- Rigid and requires less support

Properties of PVC-C (Average values)	
Property	Value
Density	1.55 g/cm ³
Tensile Strength	55 N/mm ²
Elongation at Break	3%
Impact Strength	80 J/m (23°C)
Modulus of Elasticity (Young's Modulus)	2500 N/mm ²
Coefficient of Linear Expansion	0.07 mm/m°C
Maximum Operating Temperature	90°C
Minimum Operating Temperature	0°C
Vicat Softening Point	> 105°C (VST/B 50)
Water Absorption	0.03%
Surface Resistance	Approx. 10 ¹³ Ω
Thermal Conductivity	0.066 W/m · K
Flammability	V-0 UL94
Colour	Light Grey

Characteristics

Chemical resistance

PVC-C has excellent chemical resistance to common industrial chemicals, such as acids, bases and salt solutions. Resistance to sodium hypochlorite solutions is also very good. PVC-C is not resistant to aromatic and chlorinated hydrocarbons, solvents, esters and ketones. The chemical resistance of PVC-C should be checked with our technical department for applications involving varnish, oils or fats, and PVC-C is not recommended for use with compressed air or gases.

Chemical resistance of solvent cement welded joints

The chemical resistance of the joints in a solvent welded piping system are the same as the material itself. However, PVC-C solvent welded joints in systems handling the following chemicals can be degraded and require the use of Weld On 724 solvent cement to ensure chemical compatibility:

Hydrochloric Acid 25%+ concentration
 Nitric Acid 20%+ concentration
 Sulphuric Acid 70%+ concentration
 Hydrofluoric Acid in any concentration

Weathering resistance

With the use of additives such as ultraviolet absorbers, PVC-C systems display excellent weathering resistance to the long-term effects of sunlight, wind and rain. Over time, grey PVC-C will lose some of its colour because of exposure to UV light and it will have slightly reduced impact strength. In extreme cases, the use of insulation or an application of UV absorbent coating such as AGRU Coat or the use of a water based paint will help to minimise the effects of solar radiation.

Electrical characteristics

PVC-C is non-conductive, therefore systems will remain free from electrolytic corrosion. Precautions should be taken to avoid static discharge should any part of a PVC-C piping system pass through an area where explosive gases may be present.

Physiological characteristics

PVC-C piping systems from IPS are free from lead, cadmium or other poisonous heavy metals. They are suitable for use in contact with cold potable water, and are WRAS listed for this application.

Pressure ratings for pvc-c systems

Maximum continuous pressure ratings

Pipes, fittings and valves are designed to operate continuously for 50 years at their maximum rated pressure at 20°C as follows, unless otherwise stated.

Inch sizes - ASTM Standard

PVC-C piping systems manufactured in accordance with ASTM requirements use a 'schedule' system of pressure ratings. Pipes are produced in two different 'schedules', 40 & 80. Under this system the pressure rating of the pipe changes according to the pipe nominal bore size. Reference should be made to the pipe availability guide to verify the pressure ratings available for the sizes required.

Unlike pipe, there is presently no industry standard that specifies a working pressure for fittings. Moulded pipe fittings are manufactured to meet the minimum burst pressure requirements to that of the pipe. In common with the pipe, the pressure rating of the fittings decreases as the nominal pipe sizes increases. The advisory pressure ratings for ASTM fittings is as follows:-

Moulded Fittings	Size Range	Max. Operating Pressure
	1/4" to 8"	16 Bar
	10" to 12"	10 Bar
Fabricated Fittings	4" to 16"	10 Bar
SR Threaded Fittings	1/4" to 4"	16 Bar
	6"	12 Bar
Unreinforced Threaded Fittings	1/4" to 6"	10 Bar

Metric sizes

The pressure ratings for PVC-C pipes according to DIN 8079 and PVC-C fittings according to DIN 8063 are defined by the 'nominal pressure' method, **whereby** pipes, fittings and valves are grouped together according to a single nominal pressure rating. The PN rating is the maximum permitted operational pressure in bars calculated at 20°C, for example PN6 indicates a maximum working pressure of 6 bars. According to this method the pressure ratings of metric sized PVC-C pipes and fittings according to the nominal pressure system is as follows:-

Pipe	Size Range	Max. Operating Pressure
PN16	16mm to 110mm	16 Bar
PN10	160mm	10 Bar
Fittings PN16	16mm to 160mm	16 Bar
Threaded Fittings	3/8" to 2"	16 Bar