



AS/NZS 1477:2017 – Pressure Fittings - SCOPE OF USE

Holman PVC-U Pressure Fittings are designed and suitable for use pressure applications. The Holman range of Pressure application fittings are suitable for sustainable pressure pipeline systems and do not contain any compounds based on Lead Cadmium or Mercury.

PVC-U pressure fittings are chemically inert avoiding corrosion, chemical and gas emissions while in normal service life as a public water main or sewer.

Unplasticized Polyvinyl Chloride is a leading material used in pressure pipe and fittings systems in Australia. The economic advantages are publicly documented well accepted by the industry. They are lightweight, resistant to a wide variety of chemicals and do not support combustion.

PVC-U pressure pipes and fittings are impervious to bacterial and fungal attacks and are not subject to electrolytic or galvanic corrosion.

Pressure pipes and fittings are designed with high impact strength, which prevents damage during handling and installation.

All parts assemble easily using either solvent cement or rubber seal rings to accommodate thermal expansion and contraction or ground movement.

Product Limitations

- Pressure PVC-U pipes and fittings are suitable for system operating temperatures ranging from 0° C to 50° C
- For operating temperatures above 20° C provisions must be made for the pressure re-rating in accordance with Table 1.1

Table 1.1 – Thermal re-rating factors

Maximum operational temperature (°C)	Multiplication factor for pressure re-rating
20	1.00
25	0.94
30	0.87
35	0.78
40	0.70
45	0.64
50	0.58

* Based on ISO 1452.3 - fittings in piping systems intended for the supply of water under pressure

Effect of Low Temperature	The impact resistance of PVC-U pipe and fittings decreases with the reduction in ambient temperature; therefore, extra care should be exercised if installations are carried out at ambient temperature near 0° C.
Effect of Elevated Temperatures	PVC-U has a softening point of approximately 80° C. As the material has a low thermal conductivity, pipe and fittings can cope with elevated temperatures. The recommended maximum continuous operational temperature for PVC-U pipe and fittings systems is 50°C. The mechanical properties of PVC are referenced at 20°C. Thermoplastics generally decrease in strength and increase in ductility as the temperature rises and design stresses must be adjusted accordingly.

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Applications

PVC-U pipes and fittings have been in use for pressure applications in Australia since the 1960s supported by a much longer service history elsewhere in the world.

Over this time, the industry has recognised the many benefits of PVC for pressure pipes and fittings.

- material stability
- corrosion resistance
- high strength to weight ratio
- ease of handling and installation
- excellent flow characteristics

SWJ Pressure Fittings	RRJ Pressure Fittings
Pumped sewerage and effluent pipelines	Water supply services
Potable water	Above ground water supply
Irrigation and turf watering	Below ground drainage and sewer
Slurry transport	Watermains
Pressure sewerage	Irrigation
Water supply	
Recycled water	

Product Range

* Refer to Product catalogue for full range

Product Description	Size Range (from)	Size Range (to)	CAT NO
Valve Take Off Adaptor	15mm x ½" Male	80mm x 3" Male	2
Faucet Take Off Adaptor	15mm x ½" Female	80mm x 3" Female	3
Reducing Bush	20mm x 15mm	150mm x 100mm	5
Coupling	15mm	150mm	7
Reducing Coupling	20mm x 15mm	150mm x 100mm	8
Cap	15mm	150mm	6
45° Elbow	15mm	150mm	10
90° Elbow	15mm	150mm	13
90° Faucet Elbow	15mm x ½"	25mm x 2"	15
Side Outlet Elbows	20mm x ½"	25mm x ½"	N/A
Socket Flange	50mm	150mm	16
Vanstone Flange	50mm	150mm	N/A
Valve Socket	15mm x ½"	150mm x 6"	17
Faucet Socket	15mm x ½"	150mm x 6"	18
Tee	15mm	150mm	19
Reducing Tee	20mm x 15mm	150mm x 100mm	19
Faucet Tee	15mm x ½"	50mm x 1"	21
Barrel Union	15mm	100mm	22
Screwed Plugs	15mm	25mm	23
Repair Couplings - Compression	15mm	150mm	30
Repair Coupling – Telescopic	15mm	100mm	N/A
Kwikrepair Coupling	15mm	100mm	N/A
Kwikrepair Tee	15mm	50mm	N/A
Ezy Fittings – 3 Way Joint	15mm	40mm	N/A
Ezy Fittings – 4 Way Joint	15mm	40mm	N/A
Ezy Fittings – 5 Way Joint	15mm	40mm	N/A
Ezy Fittings – 4 Way Cross	15mm	40mm	N/A
Ezy Fittings – PVC Snap Clamp	15mm x 50mm	40mm x 50mm	N/A

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Impact Resistance

The impact resistance of PVC is reduced at lower temperatures. Under impact loading, PVC exhibits a transition between ductile behaviour at room temperature and brittle behaviour as the temperature is reduced. The ductile to brittle transition temperature is dependent on formulation. For some grades, impact strength at -20°C is approximately half that at +20°C.

Provision for expansion and contraction

Consideration must be given to thermal expansion and contraction in situations where the installation temperature differs from the operation temperature, or where thermal variation is likely during operation and maintenance. The coefficient of thermal expansion is $7 \times 10^{-5} / ^\circ\text{C}$ which means that for example, a pipe system which is installed at 20°C, and then cooled down to -10°C during operation, will contract by approximately 2.10mm for every metre in length. Pipe design systems shall ensure that thermal movement does not result in a significant "bending moment" at the rigid connections or to bends and tees. Refer to AS/NZS 2032 – Installation of PVC pipe systems, for guidance on provision for thermal movement.

Chemical resistance

The well documented optimal chemical resistance of PVC-U to acid alkalis, oxidising and reducing agents make it particularly suitable for a wide range of industrial and domestic applications. In general PVC-U is resistant to most oils, fats, alcohols, and aromatic-free petrol, but is unsuitable for use with aromatic and chlorinated hydrocarbons, esters and ketones which can ultimately lead to swelling and softening of the material/s.

Weathering and solar degradation

The effect of "weathering" or surface degradation by radiant energy, in conjunction with the elements, on plastics has been well researched and documented. Solar radiation causes changes in the molecular structure of polymeric materials, including PVC. Inhibitors and reflectants are normally incorporated in the material which limits the process to a surface effect. Loss of gloss and discolouration under severe weathering will be observed. The processes require input of energy and cannot proceed if the material is shielded, e.g., under-ground pipes and fittings.

From a practical point of view, the bulk material is unaffected and performance under primary tests will show no change, i.e., tensile strength and modulus. However, microscopic disruptions on a weathered surface can initiate fracture under conditions of extreme local stress, e.g., impact on the outside surface. Impact strength will therefore show a decrease under test.

Installation requirements

Installation practices are to be with reference to AS/NZS 3500 Plumbing and Drainage and AS/NZS 2032 Installation of PVC Pipe Systems.

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