



Since 1979

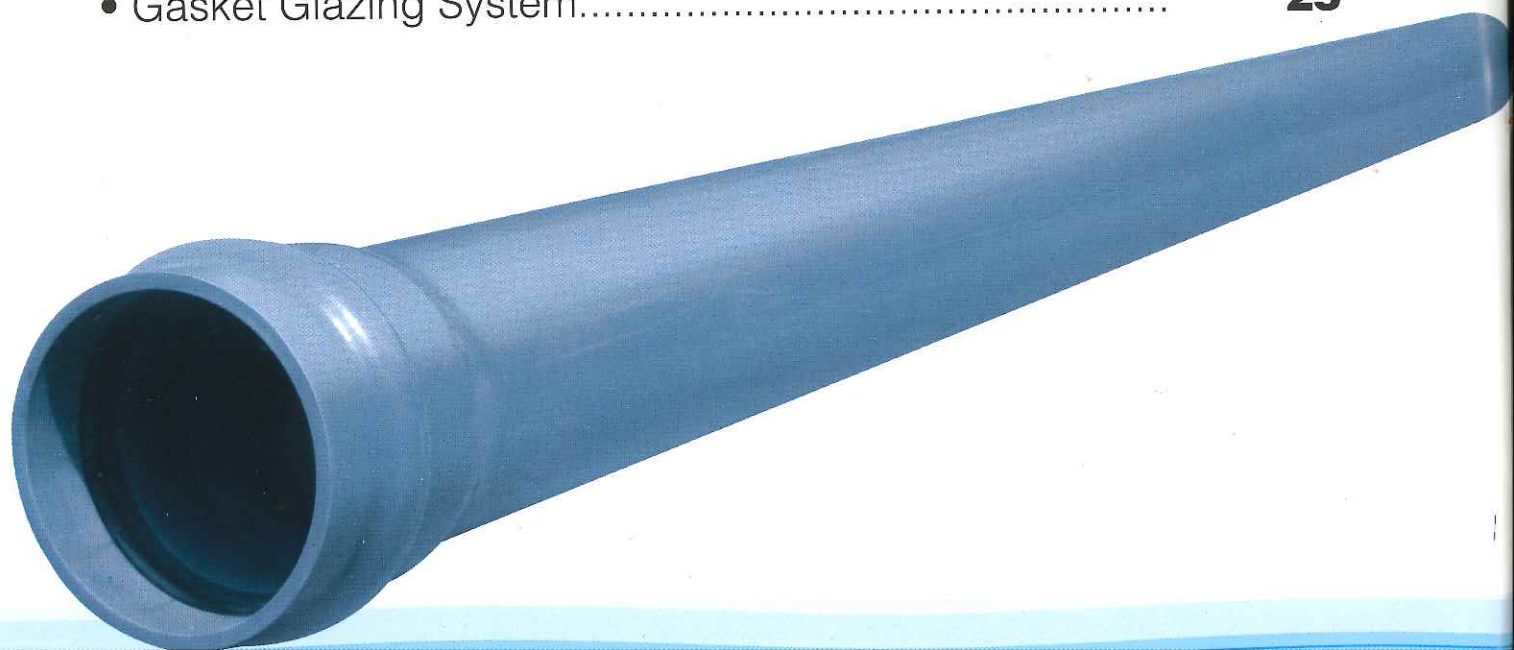
CHIN LEAN PLASTIC FACTORY SDN BHD

(49922-V)



your total solution for pipes system

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Since 1979



Chin Lean Plastic Factory Sdn. Bhd. was incorporated in the year 1979. The company starts with a humble beginning producing PVC hose and small diameter uPVC pipes for commercial use to a more sophisticated manufacturing facility producing a range of uPVC pipes, PVC Hose, Insert Tubes and uPVC fittings both for projects as well as for commercial usage. Chin Lean Plastic Factory Sdn Bhd is located on a well planned, modern facilities with ample local workforce of more than 100 workers in a small town of Langkap in the state of Perak Darul Ridzuan.

The company involved in the manufacturing of quality uPVC pipes during the early 90's with the receipts of Sirim approval for its product. The company's major market covers the whole of Peninsular Malaysia as well as Sabah and Sarawak, dealing with major hardware shop and also exports to neighboring Singapore and Brunei. Recently, the company has been award contract to supply quality uPVC pipes to water authority like Lembaga Air Perak (L.A.P) and SAJ Holding Sdn Bhd for the water reticulation projects. With our own fleet of lorry transport, the company is able to deliver its product to any corner of peninsular Malaysia at the shortest possible time



We produces uPVC pipes of consistent quality product continuity as the company received certified Quality System and product certifications as listed below:

- **Year 1993** : received product approval from Sirim
- **Year 2002** : received ISO MS 9001:2000 from Sirim QAS International Sdn. Bhd.



MS ISO9001 Reg. No : AR2643

Polyvinylchloride (PVC)

PVC stand for Polyvinylchloride has the oldest and most common with a much wider range of use as compared to any other plastic, The term of uPVC or unplasticised PVC means without the use plasticizing agents. It belong to the thermoplastic group which can be formed and re-formed repeatedly, they soften when heated and harden when cooled.

PVC is resistant to most chemical and excellent properties of the versatile and economical as listed in the table 1 bellow:

uPVC requires small processing additives for use in extruding and injection moulding such as:

Stabilisers - The formulation of some plastics to assist in maintaining the properties of the material at or near their initial values during processing and working life.

Lubricant - Added in small proportions to the formulation of a plastic to facilitate processing or to prevent sticking.

Pigment - As producing the required colour.

Fillers - Solid material added to a plastic and evenly mixed with it to improve its strength, stability, aid processing, for instance to reduce lip deposits.

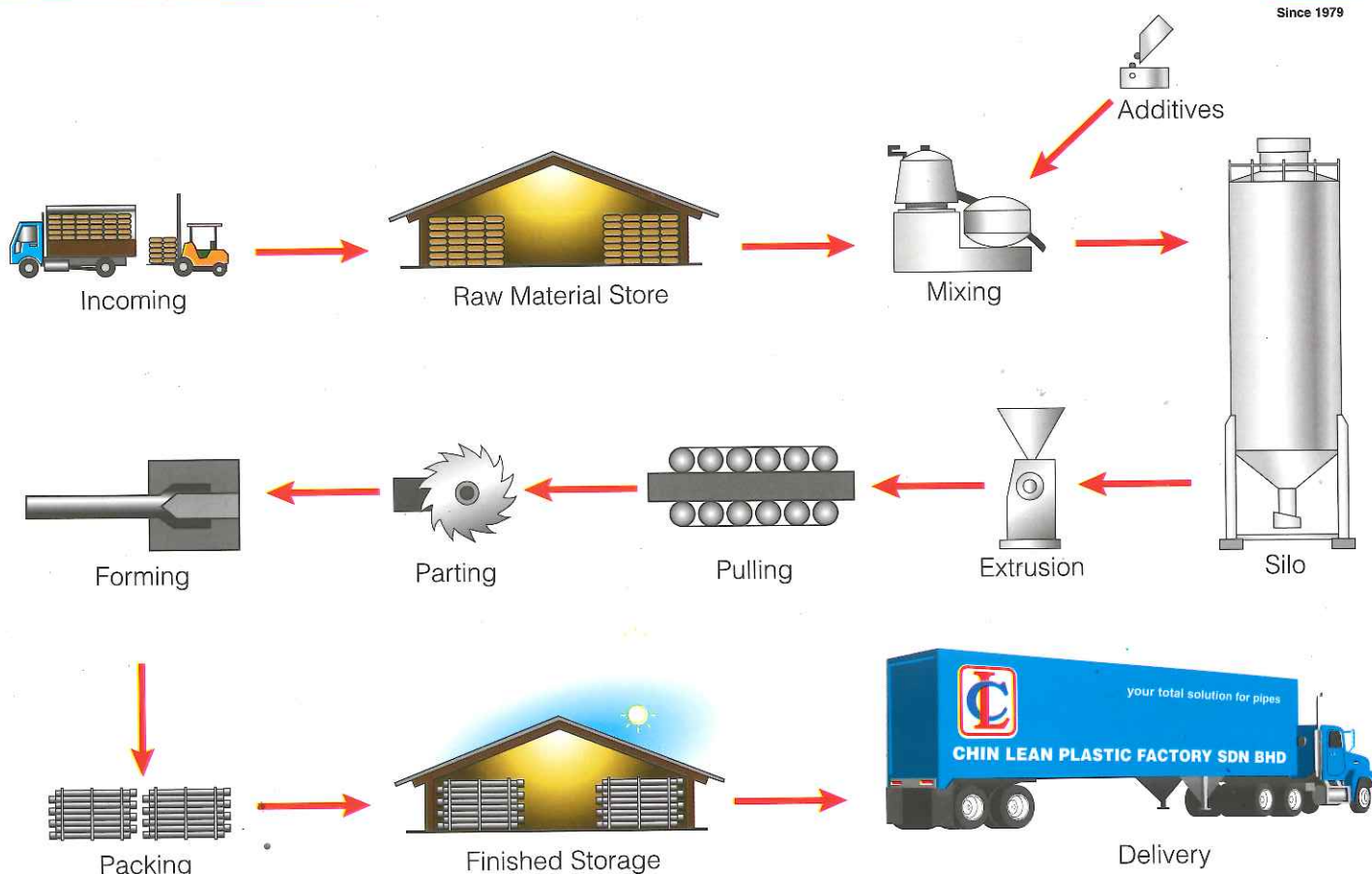


Properties of PVC

Property	Value
Density	1.4 – 1.5 g/cm ³
Tensile strength	52 MPa
Impact strength (Izod)	8 MPa
Elongation at break	80 %
Vicat softening	> 75 °C
Poisson's Ratio	0.4

(table 1)

Manufacturing process flow



Typical of test requirement



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TESTING - Generally two categories of testing are carried out: **Routine test** & **Type test**.

1) ROUTINE TESTS

These tests are carried out on pipes, or pieces cut from pipes at least once in every 8 hours production run.

Heat reversion

To determine the amount of residual extrusion stress in pipes by use an air circulating oven. No changes of length exceed 5% at temperature of 150°C and the sample shall show no cracks, cavities of blisters.

Method: MS628, MS762, MS978, MS979, MS1034 & MS1063.



Impact strength

The pipe sample must withstand either single or multiple drop of strikes weight for true impact rate (TIR) below 10% at a confidence level of 90% at temperature of 20°C. Mass of striker for this test is showed in table 3.

Method: MS628, MS762, MS978, MS979, MS1034 & MS1063.



Resistance to acetone

To determine the pipe shall be free from delamination or disintegration after immersed in acetone complying with BS 509.



Short term hydrostatic

To ensure that the pipe strength can stand at least 1 hour at 20°C without failure of pressure 3.6 times working pressure as stated in table 2.

Method: MS628 and MS762.

Short-term hydrostatic pressure test

Class of pipes	Min 1 h internal hydrostatic pressure		
	(MPa)	Bar	PSi
B	2.16	21.6	310
PN 9	3.24	32.4	470
PN 12	4.32	43.2	620
PN 15	5.40	54.0	780
Class 7			
15 mm	14.40	144.0	2090
20 mm	11.52	115.2	1670
25 mm	11.52	115.2	1670
32 mm	10.08	100.8	1460
40 mm	9.00	90.0	1300
50 mm	7.92	79.2	1150

(table 2)

Mass Of Striker For Impact Test

Type of pipes	Nominal size (mm)	Nominal mass of weighted striker (kg)	Type of pipes	Nominal size (mm)	Nominal mass of weighted striker (kg)
Pressure pipe	15	0.75	SWV Pipe	32 to 50	1.25
	20	1.0		82 to 160	2.00
	25	1.25		100 & 155	2.50
	32	1.375	Sewerage Pipe	200	4.0
	40	1.5		250	5.75
	50	1.75		315	7.5
	65	2.0	Telecommunication Cable	107	2.75

(table 3)

2) TYPE TESTS

These tests are carried out for each size and type of pipe whenever a change in the formulation of material, process use or design.

Vicat softening point or deformation temperature

To determine the deformation temperature of the material under given load shall not be lower than: 75°C for Pressure pipe, 79°C for Sewerage pipe and 81°C for SWV pipe and Telecommunication cable.

Method: BS 2782: Method 120B

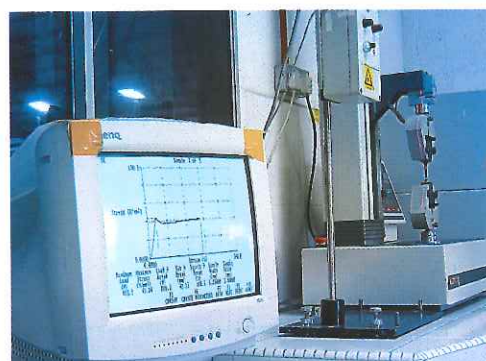


Tensile strength

To determine the strength over elongation characteristics of pipe material when applied tension force to the sample pieces. The pipe sample should not lower than 80% elongation at break and tensile strength as stated below:

- 45 MPa for SWV and Sewerage pipe
- 44.1 MPa for Telecommunication cable.

Method: BS 2782 / M320A



Long term hydrostatic strength

To determine a stress over time regression characteristic for the pipe material when applied at different internal hydrostatic pressures to obtain burst points at various time intervals.

Method: MS 628



Negative pressure

To ensure the joint of pipe and fitting should be freed from leakage at the pressure of 25KN/m² below atmospheric (vacuum) for 1h with load distorting applied at the outside of pipe.

Method: MS 628

Opacity

To make sure not light can penetrate the wall of pipe to water supply could lead to the possible growth of algae. Transmit not more than 0.2% of the luminous flux.

Method: MS 628

Effect of materials on water quality

Not detrimental effect on the composition of water flow and the content shall not exceed the quantity as stated: Lead (as Pb) 0.3mg/L, Chromium (as Cr) 0.01mg/L, Tin (as Sn) 0.02mg/L & Arsenic (as As) 0.01mg/L.

Method: MS 628 & BS 6920

Elevated temperature cycling

The joint of pipe and fitting must withstand the flow of alternate hot and cold water for 2500 cycles.

Method: MS978, MS979 & MS1063.



Fracture toughness

To determine the characteristic uPVC which influence the ability of the pipe to withstand brittle failure emanating from minor flaws in the pipe matrix.

Method: MS 628

Chemical resistance data



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The followings are the marks for the technical terms of chemical resistance

Δ : Fine Resistance, no action, usable.

• : Usable with care.

x : Unusable.

References standard BSCP 312-1

CHEMICAL	23°C	60°C	CHEMICAL	23°C	60°C	CHEMICAL	23°C	60°C	CHEMICAL	23°C	60°C
Acetaldehyde	X	X	Barium salts	Δ	Δ	Caustic soda (sodium hydroxide)	Δ	Δ	Dibutyl sebacate	•	X
Acetaldehyde, aq 40%	•	X	Beer	Δ	Δ	Cellosolve	Δ	•	Dichlorobenzene	X	X
Acetamide	-	-	Beet sugar liquor	Δ	Δ	Cellosolve acetate	Δ	-	Dichloroethylene	X	X
Acetic acid, vapor	Δ	Δ	Benzaldehyde, 10%	Δ	X	Chloral hydrate	Δ	Δ	Ethers	X	X
Acetic acid, glacial	Δ	X	Benzaldehyde, above 10%	X	X	Chloramine	Δ	-	Ethyl esters	X	X
Acetic acid, 20%	Δ	Δ	Benzene (Benzol)	X	X	Chloric acid, 20%	Δ	Δ	Ethyl halides	X	X
Acetic acid, 80%	Δ	•	Benzene sulfonic acid, 10%	Δ	Δ	Chlorine, gas, dry	•	X	Ethylene halides	X	X
Acetic anhydride	X	X	Benzene sulfonic acid	X	X	Chlorine, gas, wet	X	X	Ethylene glycol	Δ	Δ
Acetone	X	X	Benzoic acid	Δ	Δ	Chlorine, liquid	X	X	Ethylene oxide	X	X
Acetylene	•	•	Black liquor-paper	Δ	Δ	Chlorine water	Δ	Δ	Fatty acids	Δ	Δ
adipic acid	Δ	Δ	Bleach, 12.5% active chlorine	Δ	Δ	Chloracetic acid	Δ	Δ	Ferric salts	Δ	Δ
Alcohol, allyl	Δ	•	Bleach, 5.5% active chlorine	Δ	Δ	Chlorobenzene	X	X	Fluorine, dry gas	•	X
Alcohol, butyl benzyl	X	X	Borax	Δ	Δ	Chlorobenzyl chloride	X	X	Fluorine, wet gas	•	X
Alcohol, butyl (n-butanol)	Δ	Δ	Boric acid	Δ	Δ	Chloroform	X	X	Fluoboric acid, 25%	Δ	Δ
Alcohol, butyl (2-butanol)	Δ	X	Boron trifluoride	Δ	Δ	Chlorosulfonic acid	Δ	X	Fluosilicic acid	Δ	Δ
Alcohol, ethyl	Δ	Δ	Bromic acid	Δ	Δ	Chromic acid 10%	Δ	Δ	Formaldehyde	Δ	Δ
Alcohol, hexyl	Δ	Δ	Bromine, liquid	X	X	Chromic acid 30%	Δ	•	Formic acid	Δ	X
Alcohol, isopropyl (2-propanol)	Δ	Δ	Bromine, gas, 25%	Δ	Δ	Chromic acid 40%	Δ	•	Freon-F11, F12, F113, F114	Δ	Δ
Alcohol, methyl	Δ	Δ	Bromine, aq	Δ	Δ	Chromic acid 50%	X	X	Freon-F21, F22	X	X
Alcohol, propyl (1-propanol)	Δ	Δ	Butadine	Δ	Δ	Citric acid	Δ	Δ	Fruit juices and pulps	Δ	Δ
Allyl chloride	X	X	Butantetrol (erythritol)	Δ	X	Coconut oil	Δ	Δ	Fuul oil	•	X
Alums	Δ	Δ	Butanediol	Δ	Δ	Coke oven gas	Δ	Δ	Furfural	X	X
Ammonia, gas	Δ	Δ	Butyl acetate	X	X	Copper salts, aq	Δ	Δ	Gas, coal, manufactured	X	X
Ammonia, liquid	X	X	Butyl phenol	Δ	X	Corn oil	Δ	Δ	Gas, natural, methane	Δ	Δ
Ammonia, aq	Δ	Δ	Butylene	Δ	Δ	Corn syrup	Δ	Δ	Gasolines	•	•
Ammonium salts, except fluoride	Δ	Δ	Butyric acid	Δ	X	Cottonseed oil	Δ	Δ	Gelatin	Δ	Δ
Ammonium fluoride, 25%	Δ	•	Calcium salts, aq	Δ	Δ	Cresol	X	X	Glycerine (glycerol)	Δ	Δ
Amyl acetate	X	X	Calcium hypochlorite	Δ	Δ	Cresylic acid, 50%	Δ	Δ	Glycols	Δ	Δ
Aniline	X	X	Calcium hydroxide	Δ	Δ	Croton aldehyde	X	X	Glue, animal	Δ	Δ
Aniline chlorohydrate	X	X	Cane sugar liquors	Δ	Δ	Crude oil	Δ	Δ	Glycolic acid	Δ	Δ
Aniline hydrochloride	X	X	Carbon bisulfide	X	X	Cyclohexane	X	X	Green liquor, paper	Δ	Δ
Aniline dyes	X	X	Carbon dioxide	Δ	Δ	Cyclohexanol	X	X	Gallic acid	Δ	Δ
Anthraquinone	Δ	Δ	Carbon dioxide, aq	Δ	Δ	Cyclohexanone	X	X	Heptane	Δ	Δ
Anthraquinone sulfonic acid	Δ	Δ	Carbon monoxide	Δ	Δ	Diazo salts	Δ	Δ	Hexane	Δ	•
Antimony trichloride	Δ	Δ	Carbon tetrachloride	Δ	X	Diesel fuels	Δ	Δ	Hydrobromic acid, 20%	Δ	Δ
Aqua regia	•	X	Casein	Δ	Δ	Diethyl amine	X	X	Hydrochloric acid	Δ	Δ
Arsenic acid, 80%	Δ	Δ	Castor oil	Δ	Δ	Diethyl phthalate	X	X	Hydrofluoric acid 10%	Δ	•
Aryl-sulfonic acid	Δ	Δ	Cautic potash (potassium hydroxide)	Δ	Δ	Disodium Phosphate	Δ	Δ	Hydrofluoric acid 60%	Δ	•
						Diglycolic acid	Δ	Δ	Hydrofluoric acid 100%	Δ	•
						Dioxane-1.4	X	X	Hydrocyanic acid	Δ	Δ
						Dimethylamine	Δ	Δ	Hydrogen	Δ	Δ
						Dimethyl formamide	X	X	Hydrogen peroxide, 50%	Δ	Δ
						Detergents, aq	Δ	Δ	Hydrogen peroxide, 90%	Δ	Δ
						Dibutyl phthlate	X	X	Hydrogen sulfide, aq	Δ	Δ
									Hydrogen sulfide, dry	Δ	Δ
									Hydroquinone	Δ	Δ

CHEMICAL	23°C	60°C	CHEMICAL	23°C	60°C	CHEMICAL	23°C	60°C	CHEMICAL	23°C	60°C
Hydroxylamine sulfate	Δ	Δ	Methylene iodine	X	X	Phenol	•	X	Sulfur dioxide, dry	Δ	Δ
Hydrazine	X	X	Milk	Δ	Δ	Phenylcarbinol	X	X	Sulfur dioxide, wet	Δ	•
Hypochlorous acid	Δ	Δ	Mineral oil	Δ	Δ	Phenylhydrazine	X	X	Sulfur trioxide, gas, dry	Δ	Δ
Iodine, in KI, 3%, aq	•	X	Mixed acids (sulfuric & nitric)	•	X	Phenylhydrazine HCl	•	X	Sulfur trioxide, wet	Δ	•
Iodine, alc	X	X	Mixed acids (sulfuric & phosphoric)	Δ	Δ	Phosgene, liquid, gas	Δ	•	Sulfuric acid, up to 70%	Δ	Δ
Iodine, aq, 10%	X	X	Molasses	Δ	Δ	Phosgene, liquid	X	X	Sulfuric acid, 70 to 90%	Δ	•
Jet fuels, JP-4 and JP-5	Δ	Δ	Monochlorobenzene	X	X	Phosphorus, acid	Δ	Δ	Sulfuric acid, 90 to 100%	•	X
Kerosene	Δ	Δ	Monoethanolamine	X	X	Phosphorus, yellow	Δ	•	Sulfurous acid	•	X
Ketones	X	X	Motor oil	Δ	Δ	Phosphorus, red	Δ	Δ	Tall oil	Δ	Δ
Kraft paper liquor	Δ	Δ	Naphtha	Δ	Δ	Phosphorus, pentoxide	Δ	•	Tannic acid	Δ	Δ
Lacquer thinners	•	X	Naphthalene	X	X	Phosphorus, trichloride	X	X	Tanning liquors	Δ	Δ
Lactic acid, 25%	Δ	Δ	Nickel salts	Δ	Δ	Photographic chemicals, aq	Δ	Δ	Tartaric acid	Δ	Δ
Lard oil	Δ	Δ	Nicotine	Δ	Δ	Phthalic acid	•	•	Tetrachloroethane	•	•
Lauric acid	Δ	Δ	Nicotinic acid	Δ	Δ	Picric acid	X	X	Tetraethyl lead	Δ	•
Lauryl chloride	Δ	Δ	Nitric acid, 0 to 50%	Δ	•	Plating solutions, metal	Δ	•	Tetrahydrofuran	X	X
Lauryl sulfate	Δ	Δ	Nitric acid, 60%	Δ	•	Potassium salts, aq	Δ	Δ	Thionyl chloride	X	X
Lead salts	Δ	Δ	Nitric acid, 70%	Δ	•	Potassium permanganate, 25%	•	•	Thread cutting oils	Δ	-
Lime sulfur	Δ	Δ	Nitric acid, 80%	•	•	Potassium alkyl xanthates	Δ	X	Terpineol	•	•
Linoleic acid	Δ	Δ	Nitric acid, 90%	•	X	Propane	Δ	Δ	Titanium tetrachloride	•	X
Linseed oil	Δ	Δ	Nitric acid, 100%	X	X	Propylene dichloride	X	X	Toluene	X	X
Liqueurs	Δ	Δ	Nitric acid, fuming	X	X	Propylene glycol	Δ	Δ	Tributyl phosphate	X	X
Liquors	Δ	Δ	Nitrobenzene	X	X	Propylene oxide	X	X	Tributyl citrate	Δ	-
Lithium salts	Δ	Δ	Nitroglycerine	X	X	Pyridine	X	X	Tricresyl phosphate	X	X
Lubricating oils	Δ	Δ	Nitrous acid	Δ	•	Pyrogalllic acid	•	•	Trichloroacetic acid	Δ	Δ
Machine oil	Δ	Δ	Nitrous oxide, gas	Δ	•	Rayon coagulation bath	Δ	Δ	Trichloroethylene	X	X
Magnesium salts	Δ	Δ	Nitroglycol	X	X	Sea water	Δ	Δ	Triethanolamine	Δ	•
Maleic acid	Δ	Δ	Nitropropane	•	•	Salicylic acid	Δ	Δ	Triethylamine	Δ	Δ
Malic acid	Δ	Δ	Oils, vegetable	Δ	Δ	Salicylaldehyde	•	•	Trimethyl propane	Δ	•
Manganese sulfate	Δ	Δ	Oils and fats	Δ	Δ	Selenic acid	Δ	Δ	Turpentine	Δ	Δ
Mercuric salts	Δ	Δ	Oleic acid	Δ	Δ	Sewage, residential	Δ	Δ	Urea	Δ	Δ
Mercury	Δ	Δ	Oleum	X	X	Silicic acid	Δ	Δ	Urine	Δ	Δ
Mesityl oxide	X	X	Olive oil	•	-	Silicone oil	Δ	X	Vaseline	X	X
Metallic soaps, aq	Δ	Δ	Oxalic acid	Δ	Δ	Silver salts	Δ	Δ	Vegetable oils	Δ	Δ
Methane	Δ	Δ	Oxygen, gas	Δ	Δ	Soaps	Δ	Δ	Vinegar	Δ	Δ
Methyl acetate	X	X	Ozone, gas	Δ	•	Sodium salts, aq, except	Δ	Δ	Vinyl acetate	X	X
Methyl bromide	X	X	Palmitic acid, 10%	Δ	Δ	Sodium chlorite	Δ	Δ	Water, distilled	Δ	Δ
Methyl cellosolve	X	X	Palmitic acid, 70%	Δ	X	Sodium chlorate	Δ	•	Water, fresh	Δ	Δ
Methyl chloride	X	X	Paraffin	Δ	Δ	Sodium dichromate, acid	Δ	Δ	Water, mine	Δ	Δ
Methyl chloroform	X	X	Pentane	•	•	Sodium perborate	Δ	Δ	Water, salt	Δ	Δ
Methyl cyclohexanone	X	X	Peracetic acid, 40%	Δ	X	Stannic chloride	Δ	Δ	Water, tap	Δ	Δ
Methyl methacrylate	Δ	-	Perchloric acid, 10%	Δ	•	Starch	Δ	Δ	Whiskey	Δ	Δ
Methyl salicylate	Δ	Δ	Perchloric acid, 70%	Δ	X	Stearic acid	Δ	Δ	Wines	Δ	Δ
Methyl sulfate	Δ	•	Perchloroethylene	•	•	Stoddard solvent	X	X	Xylene	X	X
Methyl sulfonic acid	Δ	Δ	Petroleum, sour	Δ	Δ	Sulfite liquor	Δ	Δ	Zinc salts	Δ	Δ
Methylene bromide	X	X	Petroleum, refined	Δ	Δ	sulfur	Δ	Δ			
Methylene chloride	X*	X				Sugars, aq	Δ	Δ			

LOW HYDROLIC RESISTANCE;

The smooth bore of uPVC pipe means reduces frictional losses, having no clogging, improve flow characteristics and decreased pumping house power. Its roughness coefficient is only 0.0009, much less than other pipes.

LOW WEIGHT, EASE OF HANDLING AND MAINTENANCE;

uPVC pipe very light weight, convenient to handle, easy to cut and joints. May save installation cost and even unskilled labour can install them. It is also noted that the ease of maintenance or repairs on uPVC pipes.

CHEMICAL RESISTANCE;

uPVC pipes are very good chemical and physical properties, which provides resistance to wide range of chemical such as acids and alkaline.

WEATHER & CORROSION RESISTANCE;

uPVC pipes are resistance to weathering, chemical rotting, corrosion, shock and abrasion.

FLAMMABILITY;

PVC is inherently difficult to ignite and stops burning once the source of flame is removed. Compared to its common plastic alternatives uPVC performs better in terms of lower combustibility, flammability, flame propagation and heat release.

NON QUALITY WATER EFFECTED;

uPVC is non-toxic, non-corrosive and does not allow any bacterial growth. It meets will all international standards for safety and health for both products and applications for which it is used.

HIGH ELECTRIC RESISTANCE;

uPVC is non-conduct electricity and electrolytic action. It is therefore an excellent material to use for electrical applications and laying telephone cables.



- Water supplier engineering
- Drainage & Sewerage Engineering
- Electric Engineering
- Telecommunication Engineering
- Gas supply Engineering
- Paper Mill
- Chemical Factory.
- Agricultural Ground
- Construction Engineering
- Irrigation Engineering
- Golf Course Engineering
- Fishery use for plastics raft
- Mining Plant Free
- Mining Plant
- Free Way Engineering
- Well drilling Engineering
- Ground Water Engineering



uPVC PRESSURE PIPES

MS628. Part 1 & MS762 (BS3505 & BS3506)

- Specification for uPVC pipes for cold water supply Pipes MS628 Part 2 (BS4346)
- Specification for uPVC pipes for cold water supply; Joints and Fittings for use with uPVC pipes

uPVC NON-PRESSURE PIPES

MS1063 & MS978 (BS4514 & BS 5255)

- uPVC soil, waste and ventilating pipes.
- MS979: Part 1 & 2 (BS4660 & BS5481)
- uPVC sewerage underground pipes.

uPVC CABLES PIPES

MS1034

- uPVC conduit for underground telecommunication cables.

uPVC PRESSURE FITTINGS

MS628 Part 2 (BS4346)

- Specification for PVC (uPVC) pipes for cold water supply; Joints and fittings for use with uPVC pipes

uPVC NON-PRESSURE FITTINGS

MS1063 & MS978 (BS4514 & BS5255)

- uPVC soil, waste and ventilating fittings.
- MS979 Part 1 & 2 (BS4660 & BS5481)
- uPVC sewerage underground fittings.

PVC GAS HOSE

AS/NZS1869

- Hose for liquefied petroleum gases (LP gas), Natural gas and town gas.

PVC GARDEN HOSE & TUBING

BS3746

- PVC Reinforcing hose & PVC flexible hose.

PVC INSERT TUBE (GASKET) GLAZING

uPVC PRESSURE PIPE

uPVC pressure pipes application for water supply or industrial use with pressure rating from 6 bar to 40 bar. Generally standard colour is grey can be made other colour e.g blue and white if client's request This product. complied with standard of MS628 part 1 (BS3505). uPVC pipe for water supply & MS762 (BS3506) uPVC pipe for industrial use.

This pressure pipe are specified by 3 categories:

1. Nominal sizes

uPVC pressure pipes are specified the nominal diameter in millimeter unit, and the measurement actually base on out-side diameter of pipes. These products ranges are from sizes of 15mm to 300mm and now we will developing until size of 400mm.

2. Class of pipes

Classifications of pipes are according with the maximum working pressure in unit MPa./ Bar & PSI as state in table 4.

3. Type of joint

uPVC pipe is provided two types of joint. pressure pipe as below:

- Bell-mouth joint
- Solvent cement joint

Dimension

Pipes supplied in standard length 6m or may be other lengths can be made to meet the customer request. The diameter and wall thickness of pipe as showed in table 5.

Testing Requirement

Routine test

- Heat reversion
- Impact strength
- Short term hydrostatic
- Resistance to acetone



Classification Of Pipes

Pipes Class	Maximum working pressure					
	20°C			30°C		
	MPa	Bar	Psi	MPa	Bar	Psi
B	0.6	6	87.0	0.48	4.8	69.6
PN 9	0.9	9	130.5	0.72	7.2	104.4
PN 12	1.2	12	174.0	0.96	9.6	139.2
PN 15	1.5	15	217.5	1.20	12.0	174.0
Class 7						
15 mm	4.0	40	580.0	3.2	32.0	464.0
20 mm	3.2	32	464.0	2.6	25.6	371.2
25 mm	3.2	32	464.0	2.6	25.6	371.2
32 mm	2.8	28	406.0	2.2	22.4	324.8
40 mm	2.5	25	362.5	2.0	20.0	290.0
50 mm	2.2	22	319.0	1.8	17.6	255.2

(table 4)

Type test:

- Deformation temperature (Vicat softening point)
- Long term hydrostatic pressure
- Fracture toughness

Dimension of uPVC Pipes

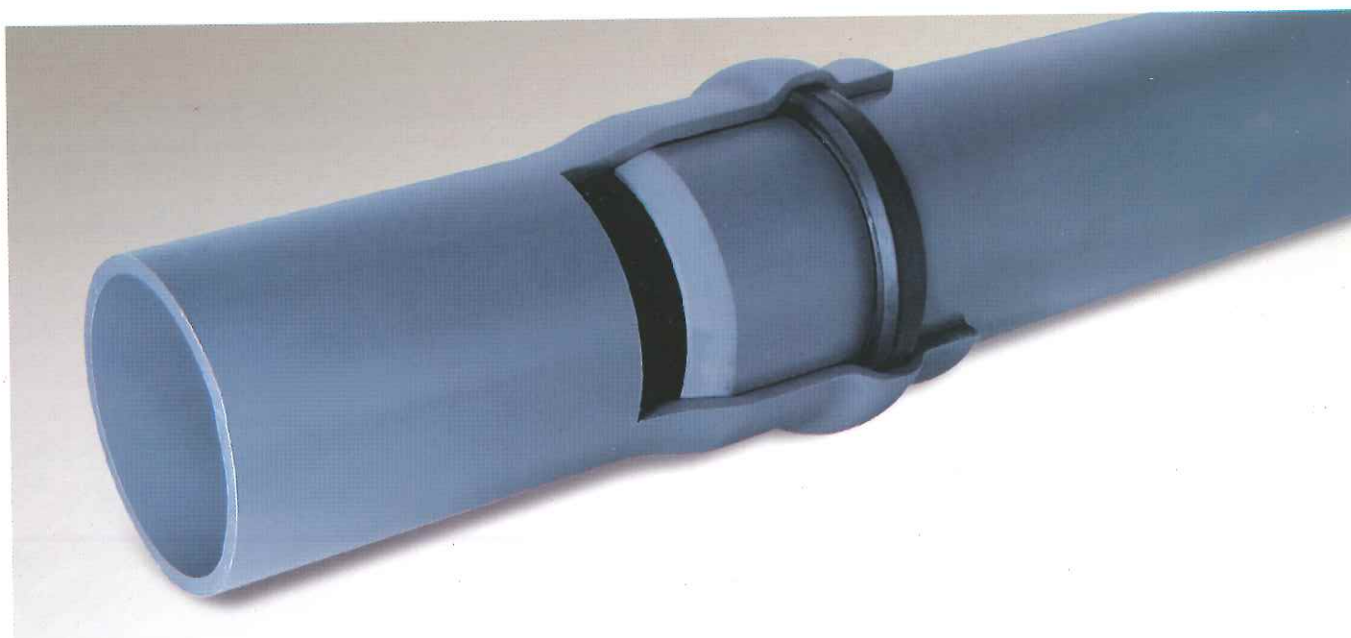
			WALL THICKNESS (mm)				
NOMINAL SIZE (in.) (mm)	OUTSIDE DIAMETER (mm)	CLASS O (NON-PRESS)	CLASS B	PN 9	PN 12	PN 15	CLASS 7
			MS762	MS628			MS762
1/2 15	21.2 / 21.5					1.7 / 2.1	3.7 / 4.3
3/4 20	26.6 / 26.9					1.9 / 2.5	3.9 / 4.5
1 25	33.4 / 33.7					2.2 / 2.7	4.5 / 5.2
1 1/4 32	42.1 / 42.4				2.2 / 2.7	2.7 / 3.2	4.8 / 5.5
1 1/2 40	48.1 / 48.4	1.8 / 2.2			2.5 / 3.0	3.1 / 3.7	5.1 / 5.9
2 50	60.2 / 60.5	1.8 / 2.2		2.5 / 3.0	3.1 / 3.7	3.9 / 4.5	5.5 / 6.3
* 2 1/2 65	75.0 / 75.3	1.8 / 2.2		3.0 / 3.5	3.9 / 4.5	4.8 / 5.5	
3 80	88.7 / 89.1	1.8 / 2.2	2.9 / 3.4	3.5 / 4.1	4.6 / 5.3	5.7 / 6.6	
4 100	114.1 / 114.5	2.3 / 2.8	3.4 / 4.0	4.5 / 5.2	6.0 / 6.9	7.3 / 8.4	
* 5 125	140.0 / 140.4	2.6 / 3.1	3.8 / 4.4	5.5 / 6.4	7.3 / 8.4	9.0 / 10.4	
6 155	168.0 / 168.5	3.1 / 3.7	4.5 / 5.2	6.6 / 7.6	8.8 / 10.2	10.8 / 12.5	
8 200	218.8 / 219.4	3.1 / 3.7	5.3 / 6.1	7.8 / 9.0	10.3 / 11.9	12.6 / 14.5	
10 250	272.6 / 273.4	3.1 / 3.7	6.6 / 7.6	9.7 / 11.2	12.8 / 14.8	15.7 / 18.1	
12 300	323.4 / 324.3	3.1 / 3.7	7.8 / 9.0	11.5 / 13.3	15.2 / 17.5	18.7 / 21.6	
14 350	355.0 / 356.0	3.6 / 4.2	8.5 / 9.8	12.6 / 14.5	16.7 / 19.2	20.5 / 23.6	
* 16 375	405.9 / 406.9	4.1 / 4.8	9.7 / 11.2	14.5 / 16.7	19.0 / 21.9	23.4 / 27.0	
18 400	456.7 / 457.7	4.6 / 5.3	11.0 / 12.7	16.3 / 18.8	21.4 / 24.6		

* Uncommon sizes made to special orders.

(table 5)

uPVC BELL-MOUTH JOINT

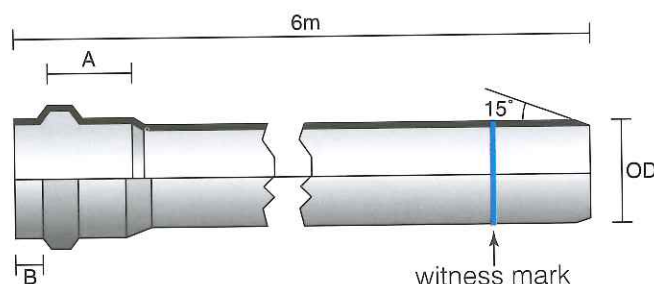
This joint complies with MS628 Part 2 (BS4346) and product range covers sizes from 80mm to 300mm. The principals of joint are use of rubber sealing ring for good sealing purpose, easy and quickly to install. Rubber ring joint in which an elastomeric sealing component is automatically compressed to form an effective seal when the spigot ends is insert into the socket.



Insertion length (A) is defined as the distance between the sealing plane and the register in the root of socket. The minimum lengths shall be not less than the appropriate length as shown in table 6 or calculated by formulation as stated:

$$50 + 0.22D$$

Where: D is the mean outside diameter.



Dimension Of Bell-Mouth Joints

Nominal size (mm)	Pipe outside diameter (mm)	A Insertion length	B
80	88.7 / 89.1	87	43
100	114.1 / 114.5	95	46
155	168.0 / 168.5	110	52
200	218.8 / 219.4	127	59
250	272.6 / 273.4	142	66
300	323.4 / 324.3	158	73

(table 6)

Rubber Sealing Ring

Rubber sealing rings comply to BS 2494 or AS 1646 with dual hardness for one piece construction, good retained inside the bell, easy and safe installation procedure. The dimension of rubber scaling ring as state in table 7.

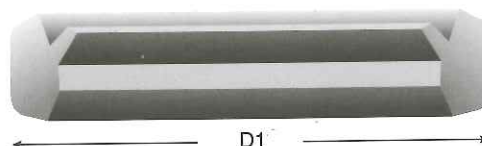
Test requirement

Routine test:

- Short term hydrostatic pressure

Type test:

- Negative pressure test
- Long term hydrostatic pressure
- Forming quality



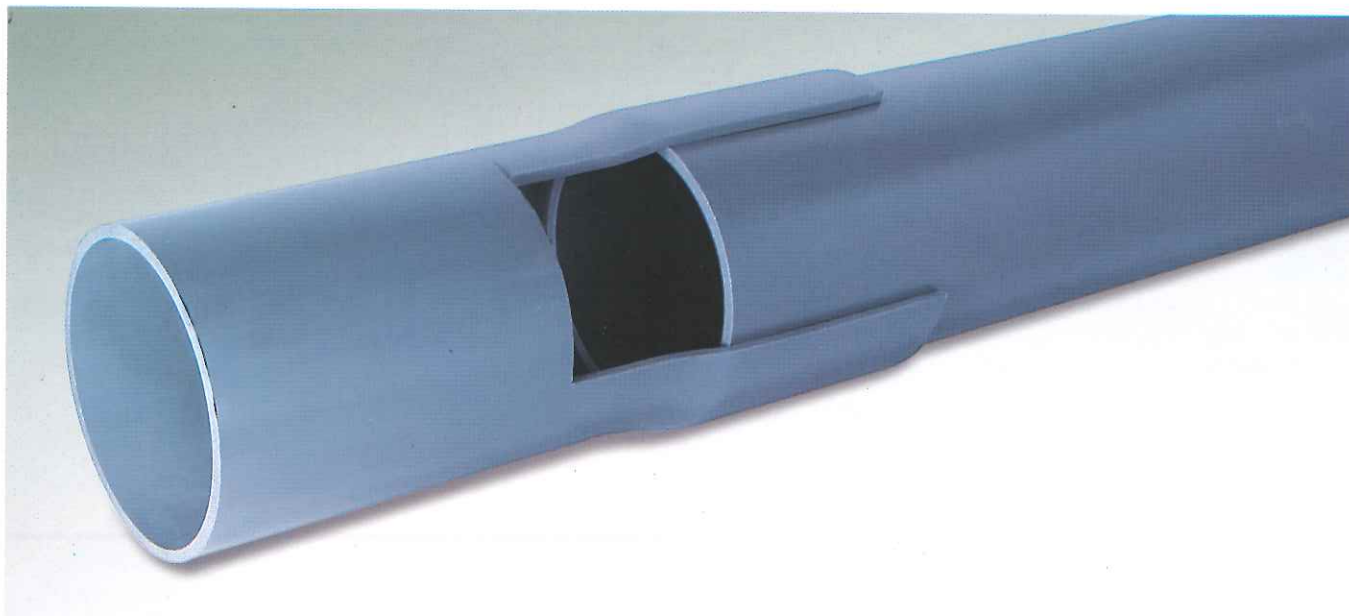
Rubber Sealing Ring Dimensions

Nominal size (mm)	Bell O/D (D1)
80	108.50
100	137.20
155	197.00
200	253.30
250	312.40
300	368.80

(table 7)

SOLVENT CEMENT WELD JOINT

This joint according to MS 628 Part 2. (BS4346) To achieve the strong leak free joint in a pressure pipe. Solvent cement is a solution of resin in a mixture of solvents which soften the surfaces when applied to spigot and socket of uPVC pipes. The principal of this solvent welding is simple, which solvent cement is applied to the both surfaces spigot and socket to be mated. The solvent causes spigot and socket soften and swell, the two surfaces are quickly brought together and held firmly in place whilst drying and setting takes place.

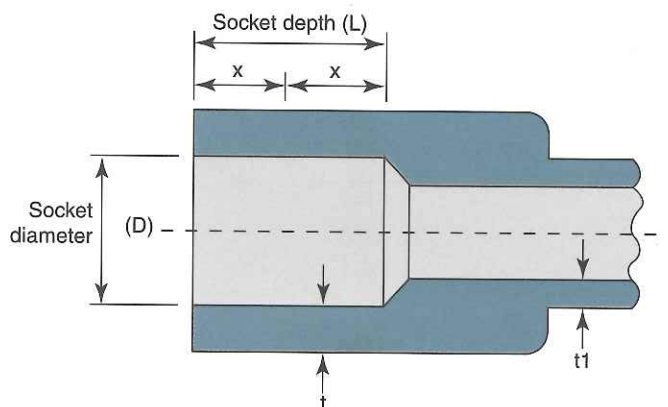


Dimension

Dimension of internal diameter and depth of socket are important for good results for joints as stated in table 8.

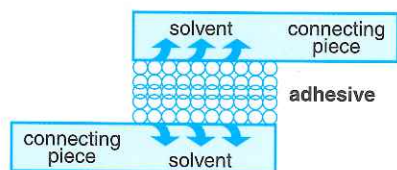
Joins Bonding

The principal of cement joint are show below:

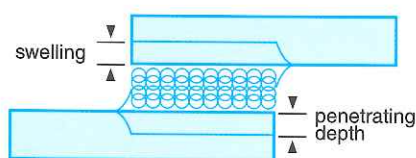


DIFFUSION ADHESIVE

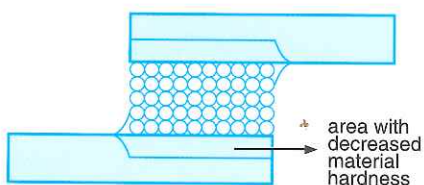
1) Diffusion Phase



2) Swelling Phase



3) Penetration Phase



Dimension of socket

Nominal diameter DN/OD (mm)	Mean socket diameter (D) at mid point (X) of socket (mm)		Minimum socket depth (mm) depth (L)
	Min.	Max.	
15	21.3	21.5	16.5
20	26.7	26.9	19.5
25	33.5	33.7	22.5
32	42.2	42.4	27.0
40	48.2	48.4	30.0
50	60.3	60.5	36.0
65	75.1	75.3	43.5
80	88.8	89.1	50.5
100	114.2	114.5	63.0
155	168.2	168.5	90.0
200	219.0	219.4	115.0
250	272.8	273.4	142.5
300	323.7	324.3	168.0

(table 8)

uPVC S.W.V PIPES

S.W.V are abbreviated from **Soil, Waste and Ventilating** pipes with complied to MS 1063 (BS 4514) and MS 978 (BS 5255), which intended to use for soil and waste discharge pipe-work for conveyance waste water, ventilation pipe-work associated and rainwater pipe-work within the building structures. Pipes available in the sizes range from 32mm to 315mm as in table 9.



Colour - SWV pipes are manufacturer in White colours

Dimension

Pipes are supplied with lengths 4m & 6m

Type of joint

This pipe normally use Solvent cement welds for jointing.

Testing Requirement

Routine test:

- Heat reversion
- Impact strength

Type test:

- Vicat softening temperature for size 82mm and above
- Tensile properties for size 82mm and above
- Elevated temperature cycling

Dimension of Soil, Waste & Ventilating pipes

Nominal diameter DN/OD (mm)	Mean outside diameter (mm)		Wall thickness (mm)	
	Min.	Max.	Min.	Max.
32	36.15	36.45	1.8	2.2
40	42.75	43.05	1.9	2.3
50	55.75	56.05	2.0	2.4
82	82.40	82.8	3.0	-
110	110.0	110.4	3.2	-
160	160.0	160.6	3.2	-
200	200.0	200.5	4.9	5.6
250	250.0	250.5	6.2	7.1
315	315.0	315.6	7.7	8.7

(table 9)

uPVC SEWERAGE PIPES

uPVC sewerage pipes manufacturer with comply to MS 979:Part 1 and Part 2 (BS4660 & BS5481)

Pipes application for the conveyance of normal domestic effluents Including foul and surface water sewers.



Colour - Generally manufacturer in golden brown, but can made other colour if client request.

Dimension

The pipes are supplied with Standard length of 6m.
Pipe dimension as showed in table 10.

Type of joint

The joint of pipes are available of two type:

- Bell-mouth joint
- Solvent cement weld joint.

Testing Requirement

Routine test:

- Heat reversion
- Impact strength
- Resistance to acetone

Type test:

- Vicat softening temperature (Deformation temperature)
- Tensile properties for size up to 155mm
- Elevated temperature cycling for size up to 155mm
- Stress rupture for size 200mm and above
- Negative pressure for bell-mouth joint



Dimension Of Sewerage Pipes

Nominal diameter DN/OD (mm)	Mean outside diameter (mm)		Wall thickness (mm)
	Min.	Max.	Min.
100	110.0	110.4	3.2
155	160.0	160.6	4.1
200	200.0	200.6	4.9
250	250.0	250.7	6.1
315	315.0	315.9	7.7
400	400.0	401.0	9.8
450	450.0	451.0	11.0

(table 10)

uPVC TELECOMMUNICATION CONDUIT

Application

uPVC conduits are constructed to ensure reliable mechanical protection to the telecommunication cables contained therein a wide range of underground installation. These conduits are complied with standard of MS1034.



Colour

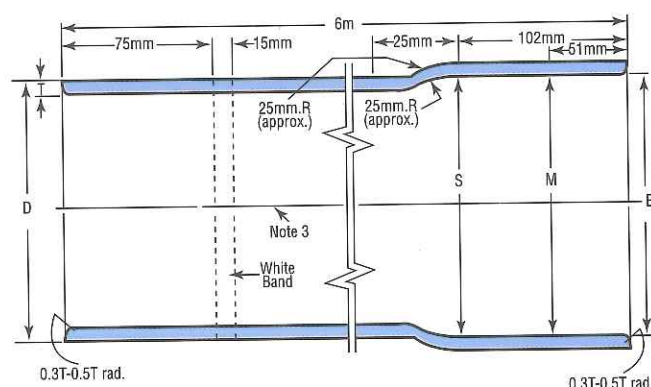
The colours of conduit are black.

Type Of Joint

All conduit is supplied in spigot and socket form with integral the solvent cement weld joint.

Dimension

Conduits are supplied in length of 6 meters.
The table 11 is show the dimension of conduit.



Dimensions of uPVC Conduit

Nominal size	Mean outside diameter (D)		Wall thickness (T)		Internal diameter					
	Min.	Max.	Min.	Max.	S		M		E	
					Min.	Max.	Min.	Max.	Min.	Max.
107	107.0	108.0	2.6	3.0	106	107	108.5	109.0	109.0	109.5

(table 11)

Testing Requirement

Routine test :



- Heat reversion
- Impact strength
- Resistance to acetone



Type test :



- Vicat softening temperature / deformation temperature
- Tensile properties





uPVC INJECTION FITTING FOR PRESSURE PIPES

DOUBLE END (D/E) SOCKET		Nominal. Size (mm)	Unit price (RM)	EQUAL TEE		Nominal. Size(mm)	Unit price (RM)
		15				15	
		20				20	
		25				25	
		32				32	
		40				40	
		50				50	
		65				65	
		80				80	
		100				100	
		155				155	
				200			
				250			

90° EQUAL ELBOW		Nominal. Size (mm)	Unit price (RM)	45° BEND		Nominal. Size(mm)	Unit price (RM)
		15				50	
		20				65	
		25				80	
		32				100	
		40				155	
		50				200	
		65				250	
		80					
		100					
		155					
	200						
	250						

END CAP		Nominal. Size (mm)	Unit price (RM)	REDUCING ELBOW		Nominal. Size(mm)	Unit price (RM)
		15				20x15	
		20				25x15	
		25				25x20	
		32					
		40					
		50					
		65					
		80					
		100					
		155					
	200						
	250						

REDUCING BUSH		Nominal. Size (mm)	Unit price (RM)	REDUCER				Nominal. Size(mm)	Unit price (RM)	Nominal. Size(mm)	Unit price (RM)
		20x15						20x15		65x40	
		25x15					25x15		65x50		
		25x20					25x20		80x50		
		32x25					32x15		80x65		
		40x25					32x20		100x50		
		40x32					32x25		100x80		
		50x25					40x15		155x80		
		50x32					40x20		155x100		
		50x40					40x25		200x100		
		100x80					40x32		200x155		
							50x15		250x100		
							50x20		250x155		
							50x25		250x200		
							50x32				
							50x40				

uPVC INJECTION FITTING FOR PRESSURE PIPES

REDUCING TEE		Nominal. Size (mm)	Unit price (RM)	Nominal. Size(mm)	Unit price (RM)
		20x15		65x50	
		25x15		80x25	
		25x20		80x32	
		32x15		80x40	
		32x20		80x50	
		32x25		100x40	
		40x15		100x50	
		40x20		100x80	
		40x25		155x80	
		40x32		155x100	
		50x15		200x100	
		50x20		200x155	
		50x25		250x100	
		50x32		250x155	
		50x40		250x200	
		65x40			

VALVE SOCKET	Nominal. Size (mm)	Unit price (RM)	P/T SOCKET	Nominal. Size(mm)	Unit price (RM)
	15 x 1/2"			15 x 1/2"	
	20 x 3/4"			20 x 3/4"	
	25 x 1"			25 x 1"	
	32 x 1 1/4"			32 x 1 1/4"	
	40 x 1 1/2"			40 x 1 1/2"	
	50 x 2"			50 x 2"	
	65 x 2 1/2"			65 x 2 1/2"	
	80 x 3"			80 x 3"	
	100 x 4"			100 x 4"	
	155 x 6"				

P/T ELBOW	Nominal. Size (mm)	Unit price (RM)	TANK CONNECTOR	Nominal. Size(mm)	Unit price (RM)
	15 x 1/2"			15 x 1/2"	
	20 x 3/4"			20 x 3/4"	
	25 x 1"			25 x 1"	
	32 x 1 1/4"			32 x 1/4"	
	40 x 1 1/2"			40 x 1 1/2"	
	50 x 2"			50 x 2"	

FLANGE	Nominal. Size (mm)	Unit price (RM)	PLUG	Nominal. Size(mm)	Unit price (RM)
	50			15	
	65			20	
	80			25	
	100			32	
	155			40	
	200			50	
	250			80	
				100	

uPVC SOIL, WASTE & VENTILATING FITTING

SWEEP BEND 92°	Nominal. Size (mm)	Unit price (RM)	Code	SWEEP BEND 92° with INSPECTION HOLE	Nominal. Size(mm)	Unit price (RM)	Code
	32		C92SB32		50		C92SBH50
	40		C92SB40		82		C92SBH82
	50		C92SB50		110		C92SBH110
	82		C92SB82		160		C92SBH160
	110		C92SB110				
	160		C92SB160				

90° ELBOW	Nominal. Size (mm)	Unit price (RM)	Code	135° BEND	Nominal. Size(mm)	Unit price (RM)	Code
	110		C90E110		32		C135B32
					40		C135B40
					50		C135B50
					82		C135B82
					110		C135B110
					160		C135B160

135° BEND with INSPECTION HOLE	Nominal. Size (mm)	Unit price (RM)	Code	EQUAL SINGLE BRANCH	Nominal. Size(mm)	Unit price (RM)	Code
	50		C135BH50		32		CESB32
	82		C135BH82		40		CESB40
	110		C135BH110		50		CESB50
	160		C135BH160		82		CESB82
					110		CESB100
					160		CESB160
					160x110		CESB160110

EQUAL SINGLE BRANCH with INSPECTION HOLE	Nominal. Size (mm)	Unit price (RM)	Code	135° Y BRANCH	Nominal. Size(mm)	Unit price (RM)	Code
	40		CESBH40		50		C135YB50
	50		CESBH50		82		C135YB82
	82		CESBH82		110		C135YB110
	110		CESBH110		160x110		C135YB160110
	160		CESBH160				
	160x110		CESBH160110				

135° Y BRANCH with INSPECTION HOLE	Nominal. Size (mm)	Unit price (RM)	Code	DOUBLE Y BRANCH	Nominal. Size(mm)	Unit price (RM)	Code
	50		C135YBH50		160x110		CBYB160110
	82		C135YBH82				
	110		C135YBH110				
	160x110		C135YBH160110				

uPVC SOIL, WASTE & VENTILATING FITTING

2-WAY JUNCTION	Nominal. Size (mm)	Unit price (RM)	Code	STRAIGHT COUPLING	Nominal. Size(mm)	Unit price (RM)	Code
	50		C2WJ50		32		CSC32
	110		C2WJ110		40		CSC40
	160x110		C2WJ160110		50		CSC50
					82		CSC82
					110		CSC110
					160		CSC160
BUSH SOCKET REDUCER (m/f)	Nominal. Size (mm)	Unit price (RM)	Code	LEVEL INVERT REDUCER (m/f)	Nominal. Size(mm)	Unit price (RM)	Code
	40x32		CBS4032		50x32		CIR5032
	50x32		CBS5032		82x50		CIR8250
	50x40		CBS5040		110x50		CIR11050
	82x50		CBS8250		110x82		CIR11082
	110x50		CBS11050		160x110		CIR160110
	110x82		CBS11082				
	160x110		CBS160110				
CONCENTRIC REDUCER (m/f)	Nominal. Size (mm)	Unit price (RM)	Code	P' TRAP	Nominal. Size(mm)	Unit price (RM)	Code
	50x32		CCR5032		50		CPTR50
	82x50		CCR8250		82		CPTR82
	110x82		CCR11082		110		CPTR110
	160x110		CCR160110				
P' TRAP with VENT	Nominal. Size (mm)	Unit price (RM)	Code	S' TRAP	Nominal. Size(mm)	Unit price (RM)	Code
	50x32		CPTRV5032		110		CSTR110
	110x50		CPTRV11050				
FLOOR GULLY with BOTTOM SCREW CAP	Nominal. Size (mm)	Unit price (RM)	Code	VENT COWL	Nominal. Size(mm)	Unit price (RM)	Code
	110x50		CFG11050		50		CVC50
	110x82		CFG11082		82		CVC 82
					110		CVC 110
					160		CVC 160
90° WC CONNECTING BAND	Nominal. Size (mm)	Unit price (RM)	Code	90° WC CONNECTING BAND INSPECTION HOLE	Nominal. Size(mm)	Unit price (RM)	Code
	110		C90WCB110		110		C90WCBH110

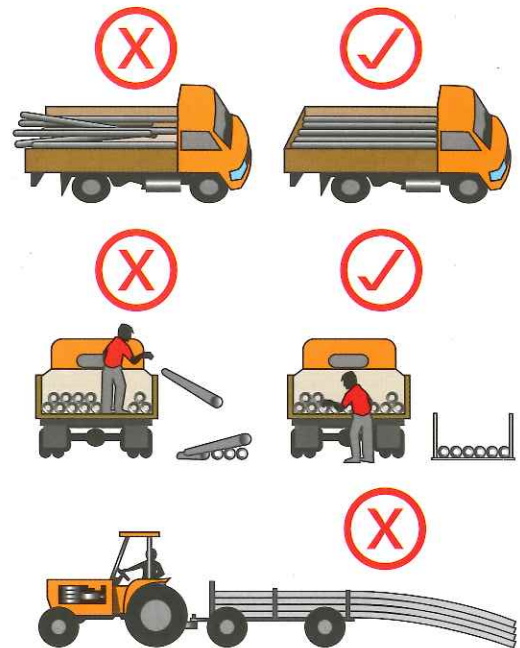
HANDLING AND STORAGE:

The installation guide line according to standard of MS: 628: Part 3.

uPVC pipes are strong lightweight than metal pipe, the result easily to handling. More care should be taken to avoid unnecessary damage to the pipes or for the safety of the workers and during transporting, handling and storage.

Do not dropped or thrown onto hard surfaces which are free from surface irregularities such as stones, branches or other sharp projections during storage.

Separately keep away the from petroleum product, solvent, greases and avoids to direct sunlight or high temperature.

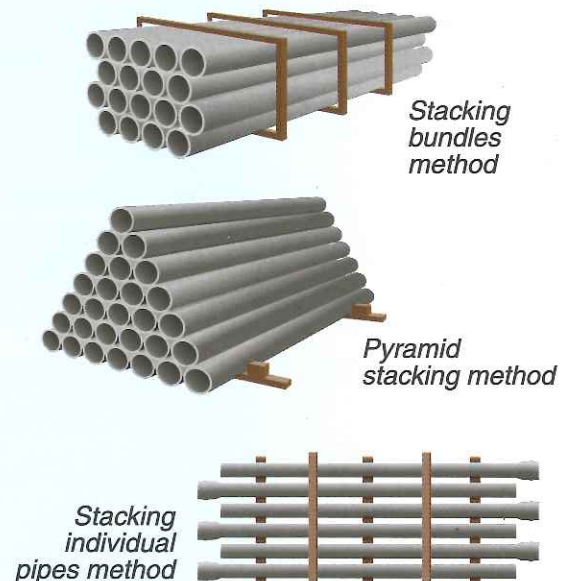


Stacking

Acceptable stacking height and distance between stack is usually depend on site condition. Adequate space should be allowed for transport equipment to manoeuvre without causing damage.

Stacking bundles – Timber crate containing pipes may be in stack up to 2m high and should be stacked timber to timber.

Stacking individual pipes – Stack should not exceed 7 layers in height with maximum 1.5 meters and not more than 3 meters width of the bottom layer. When using pyramid stacking the maximum height should not be more than 1 meter.



Laying

Before laying, the pipes should be checked to ensure that:

- The pipe free from cut or scratches, (if the surface layer with cut depth more than 1mm should not be used in pressure applications)
- The inside of pipe is free from foreign matter.
- The diameter and pressure rating (class) match with what is required.



INSTALLATION OF uPVC PIPE BELOW GROUND

Trenching and Bedding

uPVC pipe may be laid with the same as pipe of other material, detail of trenching and embedment will vary depending on the soil condition, authorities body or type of project. The trench should be as narrow as practical, but should be still sufficient to allow the proper placing and compaction of bedding material to fill at the side of the pipes. Recommended minimum trench width by standard is 200 mm wider than outside diameter of pipes as showed in table 12.

Trench depth should be enough to allow for the bedding/underlay, pipes diameter and the minimum recommended pipes cover as showed in table 13. Particular attention should be given when the pipe passed under roadway or other load bearing structure.

Pipe Embedment Material

The material of embedment should be free from sharp edges to avoid scratch of pipe, sand or granular material are strongly recommended.

The embedment divided by three zone:
(as showed in following typical cross-section figure)

1. Bedding or underlay - The material directly under the pipe usually recommended 75mm to 150mm the thickness layer.

2. Side support - The material directly beside the pipes and top of bedding with minimum 100mm width are recommended.

3. Pipe overlay - The material directly the top of the pipes the minimum 150mm.

Recommended trench width

Nominal pipe (mm)	Trench width (mm)	
	minimum	maximum
80 - 100	300	700
150 - 200	450	800
225 - 400	600	900

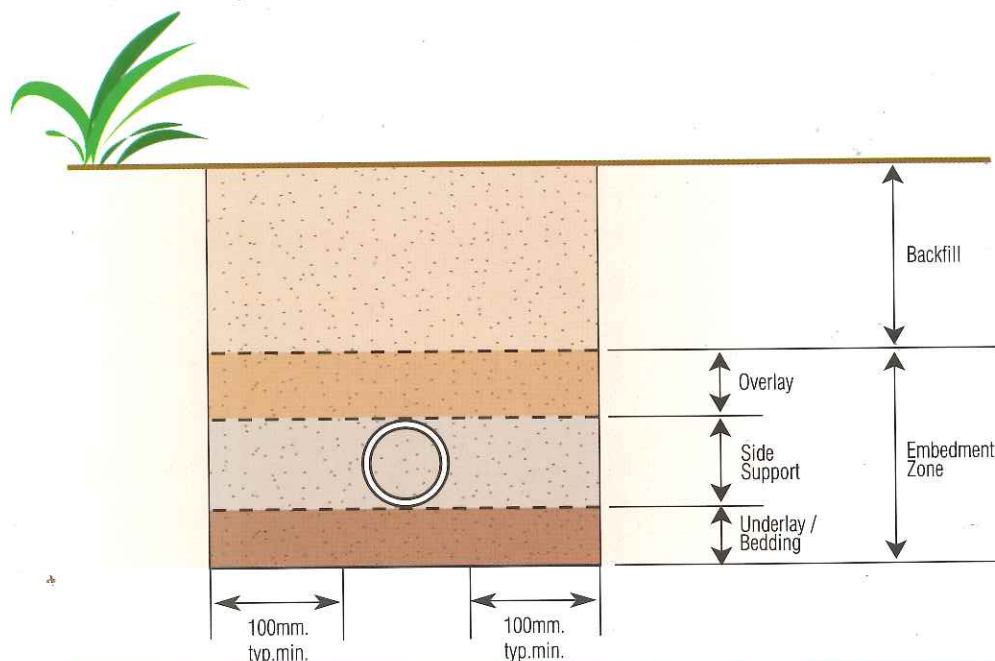
(table 12)

Recommended cover depth

Loading	Cover (mm)
No vehicle loading	300
Vehicle loading:	
Not a roadway	450
Sealed roadway	600
Under undersealed roadway	750
Construction equipment loading	750
Embankment conditions	750

(table 13)

Typical cross-section of trenching pipe installation

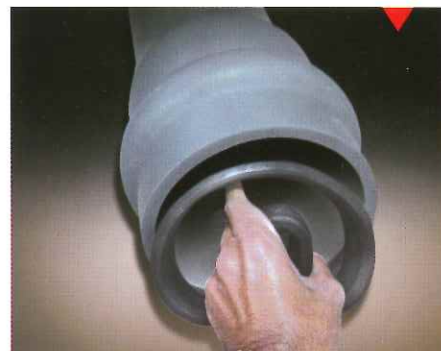


JOINTING

Rubber Ring Joint

When install a pipeline the following steps should be taken:

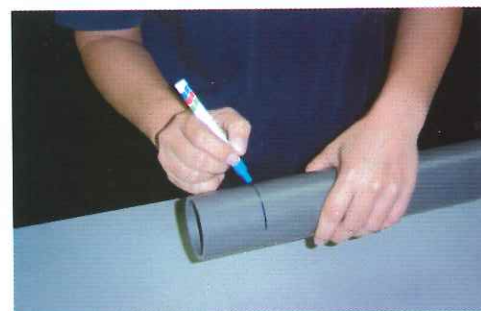
- Each pipes should be Checked to make sure free from scratch or other damage.
- Clean the spigot and socket end of pipes. For good clean socket end remove the rubber ring from the groove and wipe clean to make sure free from the sand, mud or any foreign matter)
- Refitted the rubber ring to the groove and check position of ring by running the finger around of rubber ring. Make sure the spigot have the chamfer and witness mark.
- Lubricate the spigot by using correct lubricant, and do not lubricate the ring or the groove.
- Carefully align the pipes before attempting to thrust home. Push the spigot into the socket until the witness mark remains just visible. In this position clearance is automatically allowed for expansion and contraction, so do not push the pipe pass the witness mark. Jointing may be assisted by the use of a crowbar and block.
- Deflections at the joint should be carried out after the joint is made. Always joint the pipes in a straight line.



Solvent Cement Weld Joints

To make good solvent weld joints, the following steps are recommended:

- Before jointing check that the spigot has been cut square and all deburr at the both inner and outer edges should be remove with a knife or suitable device.
- Mark the spigot with a pencil or marker at a distance equal to the internal depth of the socket.
- Using the clean cloth, wipe away all loose dirt and moisture from bonding surfaces, if necessary use recommended cleaning fluid for successful joint. Do not attempt to solvent weld wet surfaces.
- The solvent cement should be thoroughly stirred before use.
- Using a clean brush apply a thin, uniform coat of solvent cement to the both internal surface of socket, and then to the external surface of the spigot up to the mark.
- Immediately push the spigot straight (no twisting) into the socket as far as the mark. Hold the jointing in this position for 20 to 30 seconds depending upon ambient temperature.
- Allow at least 30 minutes for each joint to set without disturbance. Allow up to 4 hours, before subjecting the joint to stress.
- Do not pressure test the joint for at least 24 hours.



CLEAR REINFORCED PVC GAS HOSE (CLP-HP GAS)

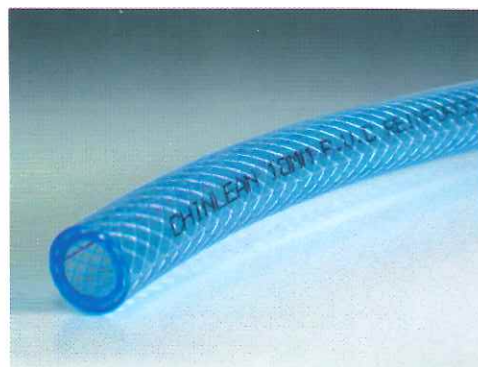
Descriptions: Two layers PVC reinforced hose with polyester yarns.

Applications: For conveyance of LP Gas, natural gas, town gas form oil product tempered LP-gas stimulated natural gas in transport, automotive industrial and domestic use.

Maximum Working Pressure: 7.0 kPa

Colour: Transparent blue

Temperature: from -20°C to 65°C.



REINFORCE PVC GARDEN HOSE

(CLP-HP GARDEN)

Descriptions: Two layers PVC reinforced hose with polyester yarns.

Applications: Intended to use for transfer cold water service.

Maximum Working Pressure: 7.0bar.

Colour:

- Lining - Black
- Cover - 1. Transparent Blue / Green
2. Green / Yellow

Temperature: Ambient.



FLEXIBLE PVC GARDEN HOSE (CLP-FX GARDEN)

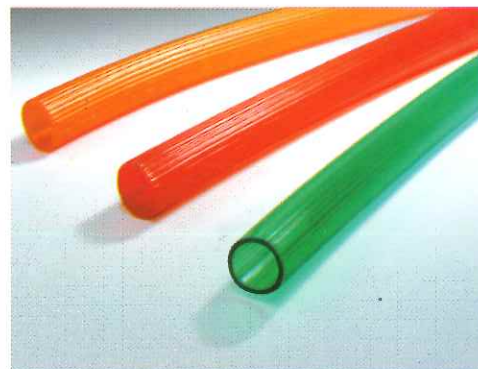
Descriptions: One layer flexible PVC hose.

Applications: Intended to use for transfer cold water service.

Maximum Working Pressure: 7.0 bar.

Colour: Orange, green, red & blue.

Temperature: Ambient.



CLEAR PVC TUBING FOR INDUSTRIAL USER

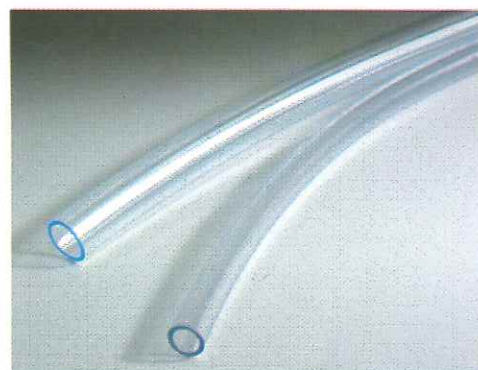
Descriptions: Crystal clear of flexible PVC tubing.

Applications: Can be used in the transmission of water, air conveyance and other low pressure liquid handling.

Maximum Working Pressure: 50 PSI.

Colour: Transparent white or blue

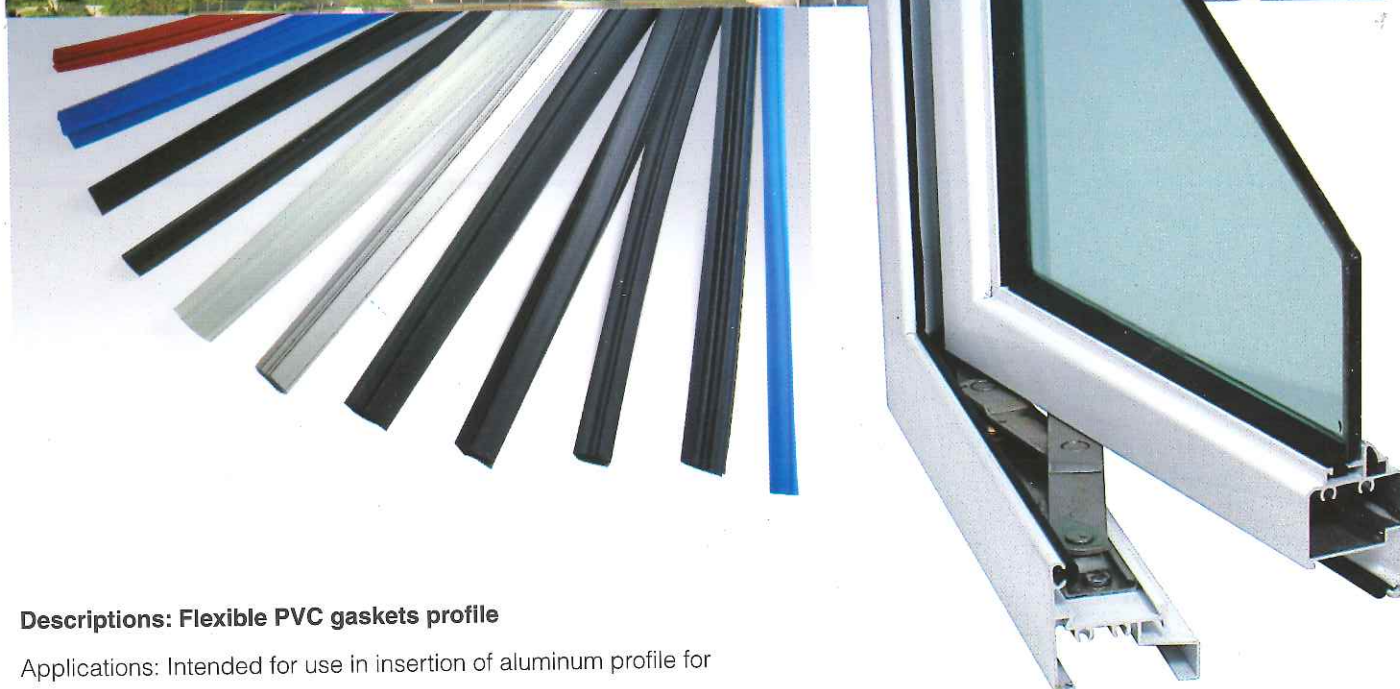
Temperature: Ambient.



PVC insert tube (gasket) glazing system



Since 1979

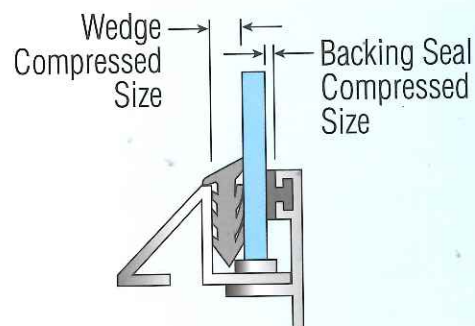


Descriptions: Flexible PVC gaskets profile

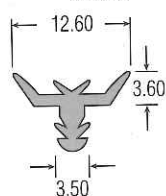
Applications: Intended for use in insertion of aluminum profile for resistance to air and water penetration of window and door gasket glazing systems.

Colour: Generally manufactured in black, but can be made to other colours upon client request.

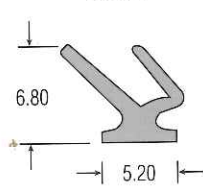
Temperature: up to 70°C



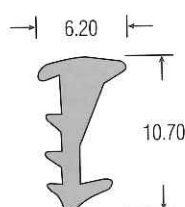
PVC backing seals



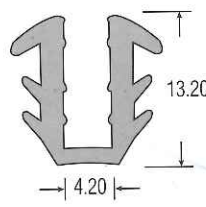
PVC specialist seals



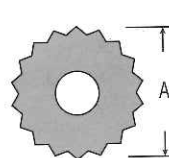
PVC wedges



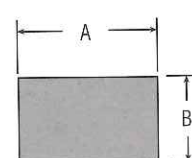
PVC channel



PVC SP lines



PVC setting block



All dimensions in mm.