



UPVC - CPVC PIPES



www.ALMUNIFPIPES.com

COMPANY PROFILE

We, Munir Abdullah Al-Munif Factory for Plastic Pipes and Fittings Company, are specialized in producing all types of plastic pipes with all its accessories of fittings. Our company was established 30 years ago.

Al-Munif Factories are located in Riyadh where the solid and flexible polyethylene is being produced as high and low density at diameters starting from 10mm to 1600mm with different lengths and pressure ratings as one of the leading factories in the region in producing such big diameters.

Besides producing Polyethylene Pipes; we are also producing PP-R pipes and Fittings for hot water applications with capacity of about 2000 ton with diameters starting from 20mm up to 160mm. Moreover; we are also producing uPVC and cPVC pipes and fittings for Potable water, drainage and sewerage network, and electrical and telecommunication networks, in addition to GRP pipes and fittings and Rubber products.

Production censorship is done in our laboratories to be sure of specifications compatibility. Our Laboratories has been equipped with all types of necessary systems to do those compatibility tests.

The production capacity is estimated with about 42,000 ton per year which is marketed and sold inside and outside the Kingdom.

 uPVC PIPE 75X3.6mm

 uPVC PIPE 75X

CONTENTS

4	General Advantages UPVC Pipes
6	• Applications of MMP UPVC Pipes
7	• Manufacturing Standards
8	General Properties
8	• Material Technical Data
9	• Thermal de-rating factors for UPVC pressure pipes and fittings
9	• UPVC pipe length variation due to temperature change (°C)
9	• Allowable working pressure for pipes made of UPVC conveying water
10	UPVC Pressure Pipes
11	• UPVC pipes according to (SASO 14, DIN 8062, DIN 19532, ISO 161)
12	• UPVC Pipes According to ASTM D - 1785, Scheule 40 & Schedule 80
12	• UPVC Pressure-rated Pipes According to ASTM D 2241
13	• UPVC Pipes According to BS 3505 / 3506
14	• UPVC Pressure Pipes according to EN 1452
15	UPVC Drainage and Sewerage Pipes
16	• UPVC pipe according to DIN 8062, ISO 161-1
17	• UPVC Sewer Pipes (Gravity) According to DIN 19534.
17	• UPVC Drain Pipes According to DIN 19531.
18	• UPVC Underground Sewer Pipe (Gravity) According to BS 5481
18	• UPVC Underground Drainage & Sewerage Pipes according to BS 4660
18	• UPVC Aboveground Soil & Ventilating Pipes according to BS 4514
19	• UPVC Aboveground Waste Pipes according to BS 5255
19	• UPVC Drain, Waste, Vent Pipes According to ASTM D 2665.
20	• Perforated UPVC Pipes & Slotted UPVC Pipes
21	UPVC Electrical and Telecommunication Duct
22	• UPVC Electrical Conduits according to DIN 8062
22	• UPVC Electrical Conduits according to BS 6099
23	• UPVC Electrical Conduits & Tubing according to NEMA TC-2
23	• UPVC Utilities Duct according to NEMA TC-6 & ASTM F 512
12	• UPVC Utilities Duct according to NEMA TC-8 & ASTM F 512
24	• UPVC Electrical & Telephone Duct
24	• UPVC Telephone Duct (U-Gard)
25	UPVC Fabricated Products
28	CPVC Pipes
29	• Material Technical Data
29	• Thermal de-rating factors for CPVC pressure pipes and fittings
30	• CPVC pipe length variation due to temperature change (°C)
30	• CPVC pipes according to ASTM F 441
30	• CPVC Pipes according to DIN 8079
31	Assembly
32	Storage Recommendations
33	Installation
35	Chemical Resistance

GENERAL ADVANTAGES OF UPVC PIPES

The principal reason for the great economy of MMP pipes is not so much their cost per meter as delivered to site but rather the dramatic reduction in installation costs which can be achieved by intelligent exploitation of their light weight, availability in longer lengths, ease of joining and their immunity from corrosion. These characteristics are of even greater importance to engineers now that the need to carry out water supply and sewerage schemes, industrial plant installations, etc at minimum cost and maximum reliability.



NON-CORROSION

MMP uPVC pipes resist corrosion caused by acid, alkalis, oils, salts, moisture and the media inside and outside the pipe. It is particularly reliable for resistance to the severe climatic and soil conditions in Saudi Arabia.



SANITARY

MMP uPVC pipes are entirely non-toxic. It will not affect the taste, smell or colour of water or liquid not react with any liquid to cause a precipitant.



LOW FLOW LOSS

MMP uPVC pipes have a mirror-smooth surface which minimize resistance and impede the build-up of deposits and corrosive scales.



MECHANICAL STRENGTH

MMP uPVC pipes have great tensile strength yet they are flexible enough to withstand displacement in the pipe line. They will not dent or flatten under pressure.



LIGHT WEIGHT

MMP uPVC pipes are incredibly light. Their specific weight is one fifth of steel pipe. This cuts down transportation costs and facilitates the installation of pipes and reduces its cost.



EASE OF INSTALLATION

MMP uPVC pipes are quick and easy to install, with a complete range of fittings, using solvent cement or rubber joints. Joints are leakproof. uPVC pipes can be cut easily for installation.



EASE OF MAINTAINANCE

MMP uPVC pipes can be quickly repaired with a minimum of complication or cost.



FIRE RESISTANCE

MMP uPVC pipes will not support combustion. In the event of fire, flames are unable to travel along the pipe. It is self extinguishing.



INSULATOR

MMP uPVC pipe are ideal for electric conduits. Because uPVC in itself is an integral insulator, it eliminates the possibility of electrolytic corrosion which so often destroys underground piping.

APPLICATIONS OF MMP UPVC PIPES



Water supplies

Non-toxic uPVC pipes will not affect the taste, color, or smell of drinking water. They will never corrode and are therefore extremely sanitary. Deposits and scales will not build up inside as in the case for conventional steel pipes. Their strength is greater than asbestos pipes.



Irrigation Systems

MMP uPVC pipes are ideal for agricultural irrigation and sprinkler systems. Non-corrosive MMP uPVC pipes are perfect for carrying water which contains chemical fertilizers and insects inhibitors. In thick wall and large diameter MMP uPVC pipes liquids can be transported under high pressure which is convenient for the management of large farms.



Industry

Resistant to most chemicals, MMP uPVC pipes have an important role to play in industrial plants. Light, non-corrosive and easy to assemble they allow more complex piping work than with steel or cast-iron pipes.



Solid, Waste & Drainage System

Waste line for corrosive gases, ventilation for office buildings and factories; drainage systems for private homes and elevated highways - these are a few of the many possibilities for MMP uPVC pipes. A full line of uPVC fittings is available to assure easy installation.



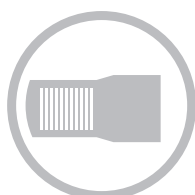
Mining

MMP uPVC pipes particularly are well-suited for draining corrosive liquids found in mines. They make an ideal vent line for pits because they are easily installed in hard to reach places.



Electrical & Telecommunications Cables







MMP uPVC pipes form an integral insulator, hence there is an ever-increasing demand for them as electrical conduit. To facilitate work, a full line of fittings is available and fabricated from the same material as the pipes.



MMP uPVC pipes for Casing and Screen

Engineering difficulties and the probability of adverse chemical reactions make it impractical to overcome corrosion and encrustation through the use of protective coating, chemical treatment or cathodic protection. Thus MMP non-corrosion PVC for water well casing and screens rapidly received approval by the appropriate ministry consultants and engineers.

MANUFACTURING STANDARDS

-  SASO 14
-  DIN 8062, 19531, 19532, 19534
-  ASTM 1785, D-2241, F-512
-  BS 3505, 3506, 5481, 4660, 4514, 5255, 2665, 6099
-  EN 1452
-  NEMA TC-2, TC-6, TC-8V

Range of Production

Pipes from MMP are manufactured according to SASO and or DIN Standards from 20mm, up to 800mm outside diameter in various pressure classes.

uPVC pipes are available with solvent weld Socket joints for diameters less than 63mm. Sizes of outside diameter 63mm and larger are available with both mechanical rubber ring joints or solvent weld Socket joints.

Pipes manufactured in accordance with ASTM are ranging from 1/2 inch up to 8 inches in various pressure (SCH 40, SCH 80) with white and gray colour.

ASTM Pipes are available with plain spigot and Solvent Cement joints only.

MMP pipes are produced in 6 meters standard length (other lengths are available on request), standard colours are grey, white and black (other colours are available on request).

GENERAL PROPERTIES

Material:

Unplasticised Polyvinylchloride.

Standard Length:

Available in the length of 6 Meters or at any other lengths as per customer's request. Pipes are with or without socket. Socket are either solvent cement welding type or rubber ring joining type.

Color:

Black, gray, white, blue, orange or any other colours on request.

Specific Gravity: 1.42 ± 0.02

Flammability: Will not support combustion.

Material Technical Data

Properties	Unit	uPVC	Test Method
Physical Properties			
Specific Gravity (Compound)	g/cm ³	1.4 - 1.42	ASTM D 792
Water Absorption (24 H Boiling Water)	mg/cm ²	< 4	ISO 2508
Water Absorption (24 H at 23 °C)	% weight gain	0.05	ASTM D 570
Flammability	N/A	Self extinguishing	-
Resistance To Burning	Sec	< 5	ASTM D 635
Vicat Softening Temperature (VST 5 Kgf)	°C	> 80	ISO 306
Thermal Conductivity	W k ⁻¹ m ⁻¹	0.15	DIN 52612-1
Co-Efficient Of Thermal Linear Expansion	mm/mm °C	0.8×10^{-4}	ASTM D 696
Specific Heat	Cal/g °C	0.25	-
Mechanical Properties			
Tensile Strength @ 23 °C Minimum	Mpa	50	ASTM D 638
Tensile Modulus Of Elasticity @ 23 °C	Mpa	3000	ASTM D638
Compressive Strength @ 23 °C	Mpa	65	ASTM D 695
Flexural Strength @ 23 °C	Mpa	89	ASTM D 790
Poisson's Ratio @ 23 °C	-	0.38	-
Izod Impact Strength (Notched) @ 23 °C	J/m ft.lbs/in.	53 1.0	ASTM D 256
Hardness Strength @ 23 °C	Durometer "D" R°Ckwell "R"	80 110	ASTM D 2240 ASTM D 785
Electrical Properties			
Volume Resistivity @ 23 °C	Ohm/cm	3×10^{15}	ASTM D 257
Surface Resistivity	Ohm	$> 10^{12}$	DIN IEC60093
Power Factor@ 60 HZ	%	1.255	ASTM D 150
Dielectric Strength	Volts / mm	1400	ASTM D 147
Dielectric Constant 60Hz @ 30 °F	-	3.70	ASTM D 150

Above mentioned values may varied according to compounds and products*

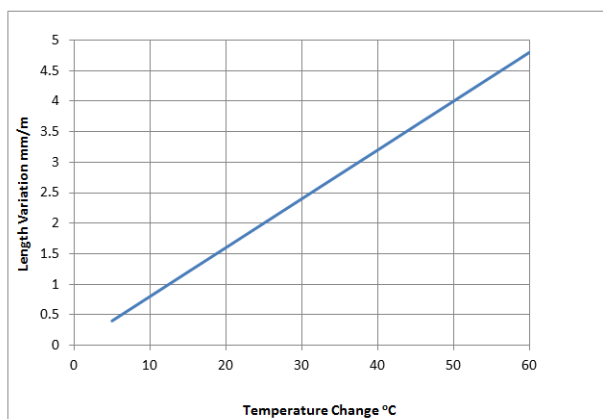
Thermal de-rating factors for UPVC pressure pipes and fittings

Maximum service temperature (°C)	Multiply working pressure at (20 °C) by these factors
20	1
25	0.9
30	0.8
35	0.7
40	0.6

UPVC pipe length variation due to temperature change (°C)

Temperature Change (°C)	Length Variation mm/meter
5	0.4
10	0.8
15	1.2
20	1.6
25	2.0
30	2.4
35	2.8
40	3.2
45	3.6
50	4.0
55	4.4
60	4.8

Coefficient of thermal expansion = 0.08 mm/m/°C



Allowable working pressure for pipes made of UPVC conveying water

Safety factor C = 2.5

Temperature °C	Years of Service	Pipe Series S			
		25	16.7	10	6.3
		Standard dimension ratio (SDR)			
		51	34.4	21	13.6
		Class 2	Class 3	Class 4	Class 5
Allowable working pressure (bar)					
10	5	5.2	7.8	13	20.9
	10	5.1	7.6	12.7	20.4
	25	4.9	7.4	12.3	19.7
	50	4.8	7.2	12.0	19.3
	100	4.7	7.1	11.8	18.8
20	5	4.4	6.6	11.0	17.5
	10	4.3	6.4	10.7	17.1
	25	4.1	6.2	10.3	16.4
	50	4.0	6.0	10.0	16.0
	100	3.9	5.8	9.7	15.6
30	5	3.5	5.3	8.8	14.1
	10	3.4	5.1	8.6	13.7
	25	3.3	4.9	8.2	13.2
	50	3.2	4.8	8.0	12.7
40	5	2.7	4.1	6.8	10.8
	10	2.6	3.9	6.5	10.4
	25	2.5	3.7	6.2	9.9
	50	2.4	3.6	6.0	9.6
50	5	1.9	2.9	4.8	7.6
	10	1.8	2.7	4.6	7.3
	25	1.7	2.6	4.3	6.9
60	5	1.2	1.8	3.0	4.8
	10	1.1	1.7	2.8	5.4
	25	1.1	1.6	2.6	4.2



UPVC PRESSURE PIPES

UPVC pipes according to (SASO 14, DIN 8062, DIN 19532, ISO 161)

Class		Class 1		Class 2		Class 3		Class 4		Class 5	
Nominal Pressure in Bars		2 BAR		4 BAR		6 BAR		10 BAR		16 BAR	
Nom-OD mm	Tolerance on Nom-OD mm	Nom-thick of wall mm	Nom-wt. kg/m	Nom-thick of wall mm	Nom-wt. kg/m	Nom-thick of wall mm	Nom-wt. kg/m	Nom-thick of wall mm	Nom-wt. kg/m	Nom-thick of wall mm	Nom-wt. kg/m
20	+0.2									1.5	0.137
25	+0.2							1.5	0.174	1.9	0.212
32	+0.2							1.8	0.264	2.4	0.342
40	+0.2					1.8	0.334	1.9	0.350	3.0	0.525
50	+0.2					1.8	0.422	2.4	0.552	3.7	0.809
63	+0.2					1.9	0.562	3.0	0.854	4.7	1.29
75	+0.3			1.8	0.642	2.2	0.782	3.6	1.22	5.6	1.82
90	+0.3			1.8	0.774	2.7	1.13	4.3	1.75	6.7	2.61
110	+0.3	1.8	0.950	2.2	1.16	3.2	1.64	5.3	2.61	8.2	3.90
125	+0.3	1.8	1.08	2.5	1.48	3.7	2.13	6.0	3.64	9.3	5.01
140	+0.4	1.8	1.21	2.8	1.84	4.1	2.65	6.7	4.18	10.4	6.27
160	+0.4	1.8	1.39	3.2	2.41	4.7	3.44	7.7	5.47	11.9	8.17
180	+0.4	1.8	1.57	3.6	3.02	5.3	4.37	8.6	6.88	13.4	10.4
200	+0.4	1.8	1.74	4.0	3.70	5.9	5.37	9.6	8.51	14.9	12.8
225	+0.5	1.8	1.96	4.5	4.70	6.6	6.76	10.8	10.8	16.7	16.1
250	+0.5	2.0	2.40	4.9	5.65	7.3	8.31	11.9	13.2	18.6	19.9
280	+0.6	2.3	3.11	5.5	7.11	8.2	10.4	13.4	16.6	20.8	24.9
315	+0.6	2.5	3.78	6.2	9.02	9.2	13.2	15.0	20.9	23.4	31.5
355	+0.7	2.9	4.88	7.0	11.4	10.4	16.7	16.9	26.5	26.3	39.9
400	+0.7	3.2	6.10	7.9	14.5	11.7	21.1	19.1	33.7	29.7	50.8
450	+0.8	3.6	7.65	8.9	18.3	13.2	26.8	21.5	42.7	33.1	
500	+0.9	4.0	9.38	9.8	22.4	14.6	32.9	23.9	52.6	36.8	
560	+1.0	4.2	11.8	11.0	28.1	16.4	41.4	26.7	65.8		
630	+1.1	2.5	14.7	12.4	35.7	18.4	52.2	30.0	83.2		
710	+1.2	5.7	18.9	14.0	45.3	20.7	66.1				
800	+1.3	6.4	23.9	15.7	57.2	23.3	83.9				

Length : 6 meters (Other lengths are available on request.)

Colour : Grey.

Socket Type : Rubber joint (R/J) type supplied from sizes 63mm up to 800mm.
Solvent Cement (SC/J) type supplied from sizes 20mm up to 800mm.

UPVC Pipes According to ASTM D - 1785, Schedule 40 & Schedule 80

Nominal Size Inch.	O.D. (mm)		Schedule 40				Schedule 80			
	min	max	Wall Thickness (mm)		Nominal Weight (kg/m)	PSI	Wall Thickness (mm)		Nominal Weight (kg/m)	PSI
			min	max			min	max		
1/2	21.24	21.44	2.77	3.28	0.24	600	3.73	4.24	0.3	850
3/4	26.57	26.77	2.87	3.38	0.33	480	3.91	4.42	0.43	690
1	33.27	33.53	3.38	3.89	0.48	450	4.55	5.08	0.61	630
1 1/4	42.03	42.29	3.56	4.07	0.65	370	4.85	5.44	0.87	520
1 1/2	48.11	48.41	3.68	4.19	0.77	330	5.08	5.69	1.03	470
2	60.17	60.47	3.91	4.42	1.04	280	5.54	6.2	1.43	400
2 1/2	72.84	73.2	5.16	5.77	1.57	300	7.01	7.85	2.2	420
3	88.7	89.1	5.49	6.15	2.14	260	7.62	8.53	2.91	370
4	114.1	114.5	6.02	6.73	3.05	220	8.56	9.58	4.26	320
5	141.05	141.55	6.22	7.347	4.18	190	9.52	10.67	6.42	290
6	168	168.56	7.11	7.98	5.37	180	10.97	12.29	8.13	280
8	218.7	219.46	8.18	9.17	8.11	160	12.7	14.22	12.4	250

Length : 6 meters (Other lengths are available on request.)

Colour : Schedule 40- White, Schedule 80 - Grey

Socket Type : Plain, solvent cement (SC/I)

UPVC Pressure-rated Pipes According to ASTM D 2241

Nominal Size Inch.	O.D. (mm)		Wall Thickness (mm)											
	min	max	Standard Diameter Ratio (SDR)											
			41		32.5		26		21		17		13.5	
			W.P: 6.9 Bar		W.P: 8.6 Bar		W.P: 11 Bar		W.P: 13.8 Bar		W.P: 17.2 Bar		W.P: 21.7 Bar	
			min	max	min	max	min	max	min	max	min	max	min	max
1/2	21.24	21.44											1.57	2.08
3/4	26.57	26.77							1.52	2.03	1.57	2.08	1.98	2.49
1	33.27	33.53					1.52	2.03	1.60	2.11	1.96	2.46	2.46	2.97
1 1/4	42.03	42.29			1.52	2.03	1.63	2.13	2.01	2.52	2.49	3.00	3.12	3.63
1 1/2	48.11	48.41			1.52	2.03	1.85	2.36	2.29	2.80	2.84	3.35	3.58	4.09
2	60.17	60.47			1.85	2.36	2.31	2.82	2.87	3.38	3.56	4.06	4.47	4.98
3	88.70	89.10	2.16	2.67	2.74	3.25	3.43	3.94	4.24	4.75	5.23	5.87	6.58	7.37
4	114.07	114.53	2.80	3.30	3.51	4.01	4.39	4.90	5.44	6.10	6.73	7.54	8.46	9.47
6	168.00	168.56	4.11	4.62	5.18	5.79	6.48	7.26	8.03	9.00	9.91	11.10	12.47	13.97
8	218.70	219.46	5.33	5.97	6.73	7.54	8.43	9.45	10.41	11.66	12.90	14.45		

Note: The maximum pressure rating given above is based on water at 73 °F/23 °C and for unthreaded pipes.

Length : 6 meters (Other lengths are available on request.)

Colour : White

Socket Type : Plain, solvent cement (SC/I).

UPVC Pipes According to BS 3505 / 3506

Applications: Water supply, irrigation systems, industrial use.

Nominal Size Inch.	O.D. (mm)		Wall Thickness (mm)													
	min	max	Class B		Class C		Class D		Class E		Class O		Class 6		Class 7	
			min	max	min	max	min	max	min	max	min	max	min	max	min	max
3/8	17.0	17.3							1.5	1.9			2.3	2.8	3.2	3.8
1/2	21.2	21.5							1.7	2.1			2.8	3.3	3.7	4.3
3/4	26.6	26.9							1.9	2.5			2.9	3.4	3.9	4.5
1	33.4	33.7							2.2	2.7			3.4	4.0	4.5	5.2
1 1/4	42.1	42.4					2.2	2.7	2.7	3.2			3.6	4.2	4.8	5.5
1 1/2	48.1	48.4					2.5	3.0	3.1	3.7	1.8	2.2	3.7	4.3	5.1	5.9
2	60.2	60.5			2.5	3.0	3.1	3.7	3.9	4.5	1.8	2.2			5.5	6.3
2 1/2	75.0	75.3			3.0	3.5	3.9	4.5	4.8	5.5	1.8	2.2				
3	88.7	89.1	2.9	3.4	3.5	4.1	4.6	5.3	5.7	6.6	1.8	2.2				
4	114.1	114.5	3.4	4.0	4.5	5.2	6.0	6.9	7.3	8.4	2.3	2.8				
5	140.0	140.4	3.8	4.4	5.5	6.4	7.3	8.4	9.0	10.4	2.6	3.1				
6	168.0	168.5	4.5	5.2	6.6	7.6	8.8	10.2	10.8	12.5	3.1	3.7				
8	218.8	219.4	5.3	6.1	7.8	9.0	10.3	11.9	12.6	14.5	3.1	3.7				

Note: Classes B,C,D and E are to BS 3505/3506. Classes O, 6 and 7 are to BS 3506 / 1969. Classes 6 and 7 equivalent to ASTM D-1785, SCH 40 and SCH 80 respectively.

Length : 6 meters (Other lengths are available on request.)

Colour : Dark Grey except class O which is grey.

Socket Type : Plain, solvent cement (SC/I)

Pressure ratings for working pressure at 20 °C

Class

B 6.0 bar

C 9.0 bar

D 12.0 bar

E 15.0 bar

For higher working temperatures, the pressure rating should be reduced.

UPVC Pressure Pipes according to EN 1452

Dimensions in millimeters

Nominal Outside diameter	Nominal (minimum) Wall Thickness							
	Pipe Series S							
	S 20 (SDR 41)	(S 16,7) (SDR 34,4)	S 16 (SDR 33)	S 12,5 (SDR 26)	S 10 (SDR 21)	S 8 (SDR 17)	S 6,3 (SDR 13,6)	S 5 (SDR 11)
	Nominal pressure PN based on service (design) coefficient C=2,5							
		PN 6	PN 6	PN 8	PN 10	PN 12,5	PN 16	PN 20
20	-	-	-	-	-	-	1,5	1,9
25	-	-	-	-	-	1,5	1,9	2,3
32	-	-	-	1,5	1,6	1,9	2,4	2,9
40	-	1,5	1,6	1,6	1,9	2,4	3,0	3,7
50	1,5	1,6	2,0	2,4	3,0	3,7	4,6	5,8
63	1,9	2,0	2,5	3,0	3,8	4,7	5,8	6,8
75	2,2	2,3	2,9	3,6	4,5	5,6	6,8	8,2
90	2,7	2,8	3,5	4,3	5,4	6,7	8,2	
Nominal pressure PN based on service (design) coefficient C=2,0								
	PN 6	PN 7,5	PN 8	PN 10	PN 12,5	PN 16	PN 20	PN 25
110	2,7	3,2	3,4	4,2	5,3	6,6	8,1	10,0
125	3,1	3,7	3,9	4,8	6,0	7,4	9,2	11,4
140	3,5	4,1	4,3	5,4	6,7	8,3	10,3	12,7
160	4,0	4,7	4,9	6,2	7,7	9,5	11,8	14,6
180	4,4	5,3	5,5	6,9	8,6	10,7	13,3	16,4
200	4,9	5,9	6,2	7,7	9,6	11,9	14,7	18,2
225	5,5	6,6	6,9	8,6	10,8	13,4	16,6	-
250	6,2	7,3	7,7	9,6	11,9	14,8	18,4	-
280	6,9	8,2	8,6	10,7	13,4	16,6	20,6	-
315	7,7	9,2	9,7	12,1	15,0	18,7	23,2	-
355	8,7	10,4	10,9	13,6	16,9	21,1	26,1	-
400	9,8	11,7	12,3	15,3	19,1	23,7	29,4	-
450	11,0	13,2	13,8	17,2	21,5	26,7	33,1	-
500	12,3	14,6	15,3	19,1	23,9	29,7	36,8	-
560	13,7	16,4	17,2	21,4	26,7	-	-	-
630	15,4	18,4	19,3	24,1	30,0	-	-	-
710	17,4	20,7	21,8	27,2	-	-	-	-
800	19,6	23,3	24,5	30,6	-	-	-	-

Note: To apply an overall service (design) coefficient of 2.5 (instead of 2.0) for pipes with nominal diameter above 90mm, the next higher pressure rating, PN, shall be chosen.

Length : 6 meters (Other lengths are available on request).

Colour : Grey.

Socket Type : Rubber joint (R/J) type supplied from sizes 63mm up to 800mm.

Solvent Cement (SC/J) type supplied from sizes 20mm up to 800mm.



UPVC DRAINAGE AND SEWERAGE PIPES

UPVC pipe according to DIN 8062, ISO 161-1

Class		Class 1		Class 2		Class 3		Class 4	
Nominal Pressure in Bars		2 BAR		4 BAR		6 BAR		10 BAR	
Nom-OD (mm)	Tolerance on Nom-OD (mm)	Nom-wall thickness (mm)	Nom- wt. kg/m	Nom-wall thickness (mm)	Nom- wt. kg/m	Nom-wall thickness (mm)	Nom-wt. kg/m	Nom-wall thickness (mm)	Nom-wt. kg/m
25	+0.2							1.5	0.174
32	+0.2							1.8	0.264
40	+0.2					1.8	0.334	1.9	0.350
50	+0.2					1.8	0.422	2.4	0.552
63	+0.2					1.9	0.563	3.0	0.854
75	+0.3			1.8	0.642	2.2	0.782	3.6	1.22
90	+0.3			1.8	0.774	2.7	1.13	4.3	1.75
110	+0.3	1.8	0.950	2.2	1.16	3.2	1.64	5.3	2.61
125	+0.3	1.8	1.08	2.5	1.48	3.7	2.13	6.0	3.64
140	+0.4	1.8	1.21	2.8	1.84	4.1	2.65	6.7	4.18
160	+0.4	1.8	1.39	3.2	2.41	4.7	3.44	7.7	5.47
180	+0.4	1.8	1.57	3.6	3.02	5.3	4.37	8.6	6.88
200	+0.4	1.8	1.74	4.0	3.70	5.9	5.37	9.6	8.51
225	+0.5	1.8	1.96	4.5	4.70	6.6	6.76	10.8	10.8
250	+0.5	2.0	2.40	4.9	5.65	7.3	8.31	11.9	13.2
280	+0.6	2.3	3.11	5.5	7.11	8.2	10.4	13.4	16.6
315	+0.6	2.5	3.78	6.2	9.02	9.2	13.2	15.0	20.9
355	+0.7	2.9	4.88	7.0	11.4	10.4	16.7	16.9	26.5
400	+0.7	3.2	6.10	7.9	14.5	11.7	21.1	19.1	33.7
450	+0.8	3.6	7.65	8.9	18.3	13.2	26.8	21.5	42.7
500	+0.9	4.0	9.38	9.8	22.4	14.6	32.9	23.9	52.6
560	+1.0	4.2	11.8	11.0	28.1	16.4	41.4	26.7	65.8
630	+1.1	2.0	14.7	12.4	35.7	18.4	52.2	30.0	83.2
710	+1.2	5.7	18.9	14.0	45.3	20.7	66.1		
800	+1.3	6.4	23.9	15.7	57.2	23.3	83.9		

Length : 6 meters (Other lengths are available on request).

Colour : Grey.

Socket Type : Rubber joint (R/J) type supplied from sizes 63mm up to 800mm.
Solvent Cement (SC/J) type supplied from sizes 20mm up to 800mm.

UPVC Sewer Pipes (Gravity) According to DIN 19534.

Applications : Sewerage Pipe Underground

Nominal Size (mm)	Outside Diameter (mm)		Wall Thickness (mm)		Insertion Depth (mm)	Weight kg/m
	(D)	Tolerance	(S)	Tolerance		
110	110	0.3	3.0	0.5 +	115	1.63
125	125	0.3	3.0	0.5 +	120	1.870
160	160	0.4	3.6	0.6 +	132	2.650
200	200	0.4	4.5	0.7 +	145	4.120
250	250	0.5	6.1	0.9 +	160	7.00
315	315	0.6	7.7	1.0 +	180	11.110
400	400	0.7	9.8	1.2 +	200	17.800
500	500	0.9	12.2	1.5 +	250	27.649
600	630	1.1	15.4	1.8 +	300	43.944

LENGTH : 6 meters (Other lengths are available on request.)

COLOUR : Golden Brown.

SOCKET TYPE : Solvent cement (SC/J) type, Rubber Joint (R/J) type.

UPVC Drain Pipes According to DIN 19531.

Applications : Waste & Soil discharge systems inside buildings

Nominal Size (mm)	Outside Diameter (mm)		Wall Thickness (mm)		Weight kg/m
	Min	Max	Min	Max	
40	40.0	40.2	1.8	2.2	0.381
50	50.0	50.2	1.8	2.2	0.481
75	75.0	75.3	1.8	2.2	0.642
110	110.0	110.3	2.2	2.7	1.160
125	125.0	125.3	2.5	3.0	1.480
160	160.0	160.4	3.2	3.8	2.410

LENGTH : 6 meters (Other lengths are available on request.)

COLOUR : Grey.

SOCKET TYPE : Solvent cement (SC/J) type, Rubber Joint (R/J) type

UPVC Underground Sewer Pipe (Gravity) According to BS 5481

Applications : Gravity Sewerage Underground

Nominal Size	Outside Diameter (mm)		Wall Thickness (mm)		Weight kg/m
	Min	Max	Min	Max	
200 (8")	200.0	200.6	4.9	5.6	4.50
250 (10")	250.0	250.7	6.1	7.0	7.01
315 (12")	315.0	315.9	7.7	8.7	11.07
400 (16")	400.0	401.0	9.8	11.0	17.83

UPVC Underground Drainage & Sewerage Pipes according to BS 4660

Applications : Drainage Under Gardens, Fields, Driveways & Roads

Nominal Size	Outside Diameter (mm)		Wall Thickness (mm)		Weight kg/m
	Min	Max	Min	Max	
110 (4")	110.0	110.4	3.2	3.8	1.64
160 (6")	160.0	160.6	4.1	4.8	3.04

LENGTH : 5.8 & 6 meters (Other lengths are available on request).

COLOUR : Golden Brown.

SOCKET TYPE : Solvent cement (SC/I) type, Rubber Joint (R/I) type

UPVC Aboveground Soil & Ventilating Pipes according to BS 4514

Applications : Soil & Ventilating Pipes Aboveground

Nominal Size	Outside Diameter (mm)		Wall Thickness (mm)		Weight kg/m
	Min	Max	Min	Max	
82 (3")	82.4	82.8	3.2	3.8	1.21
110 (4")	110.0	110.4	3.2	3.8	1.64
160 (6")	160.0	160.6	3.3	3.9	2.47

LENGTH : 5.8 & 6 meters (Other lengths are available on request).

COLOUR : Golden Brown.

SOCKET TYPE : Solvent cement (SC/I) type, Rubber Joint (R/I) type

Non standard lengths & colours available on request.

UPVC Aboveground Waste Pipes according to BS 5255

Applications : Waste Aboveground

Nominal Size	Outside Diameter mm		Wall Thickness (mm)		Weight kg/m
	Min	Max	Min	Max	
32 (1 1/4")	36.15	36.45	1.8	2.2	0.301
40 (1 1/2")	42.75	43.05	1.9	2.3	0.376
50 (2")	55.75	56.05	2.0	2.4	0.519

Nominal Size	(Outside Diameter (mm		(Wall Thickness (mm		Weight kg/m
	Min	Max	Min	Max	
("4/11) 32	36.15	36.45	1.8	2.2	0.301
("2/11) 40	42.75	43.05	2.3	2.8	0.452
("2) 50	55.75	56.05	2.4	2.9	0.620

Note: Table (b) for waste pipes - Cold water

LENGTH : 4, 5.8 & 6 meters (Other lengths are available on request).

COLOUR : Grey.

SOCKET TYPE : Solvent cement (SC/I) type, Rubber Joint (R/I) type
Non standard lengths & colours available on request.

UPVC Drain, Waste, Vent Pipes According to ASTM D 2665.

Applications : Drain, Waste, Vent (DWV)

Nominal Size (inch)	Outside Diameter (mm)		Wall Thickness (mm)		Weight kg/m
	Min	Max	Min	Max	
1 1/4	42.03	42.29	3.56	4.07	0.65
1 1/2	48.11	48.41	3.68	4.19	0.77
2	60.18	60.48	3.91	4.42	1.04
3	88.7	89.1	5.49	6.15	2.14
4	114.07	114.53	6.02	6.73	3.05
6	168.0	168.56	7.11	7.97	5.37
8	218.7	219.46	8.18	9.17	8.11

LENGTH : 5.8 & 6 meters (Other lengths are available on request).

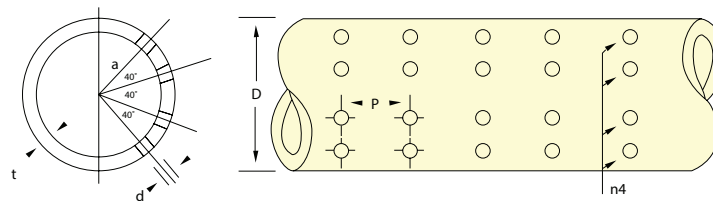
COLOUR : White.

SOCKET TYPE : Plain, Solvent cement (SC/I)
Non standard lengths & colours available on request.

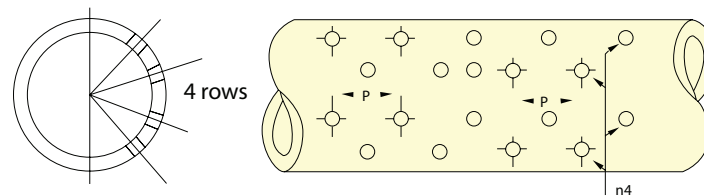
Perforated UPVC Pipes

MMP Perforated uPVC pipes are manufactured upon request depending on the size and class of the pipes, below figures given a general configuration which may vary for each clients requirements.

(Straight rows)



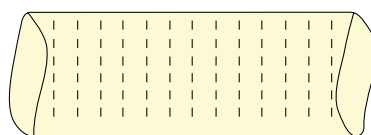
(Staggered rows)



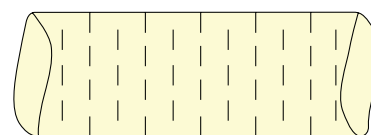
Range of sizes	: 75mm to 500mm
Longitude Pitch of wholes (LP)	: 30mm to 200mm
Hole Diameter	: 05mm to 13mm
Number of rows	: 1 to 6
Angular Pitch of holes	: 40 degree for 3 to 4 rows. 40, 80 or 120 degree for 2 rows.

Slotted UPVC Pipes

MMP slotted pipes are produced according to RDA requirements and for use in lowering the underground water table.



STRAIGHT SLOTS



STAGGERED SLOTS

Slot strength	: Depend on the size
Slot width	: 1/1.1/1.5/2mm
Number of row	: 4,6 & 8 (but according to the size)
Angular pitch	: Tobe recommended by MMP



UPVC ELECTRICAL AND TELECOMMUNICATION DUCT

UPVC Electrical Conduits according to DIN 8062

Applications: Electrical installations.

Nominal OD (mm)	Class 2		Class 3	
	Wall Thickness (mm)	Weight kg/m	Wall Thickness (mm)	Weight kg/m
40	-	-	1.8	0.334
50	-	-	1.8	0.422
63	-	-	1.9	0.562
75	1.8	0.642	2.2	0.782
90	1.8	0.774	2.7	1.13
110	2.2	1.16	3.2	1.64
125	2.5	1.48	3.7	2.13
140	2.8	1.84	4.1	2.65
160	3.2	2.41	4.7	3.44
200	4.0	3.70	5.9	5.37
225	4.5	4.70	6.6	6.76
250	4.9	5.65	7.3	8.31
280	5.5	7.11	8.2	10.4
315	6.2	9.02	9.2	13.2
400	7.9	14.5	11.7	21.1

Length : 6 meters (Other lengths are available on request).

Colour : Grey.

Socket Type : Solvent cement (SC/I) type.

UPVC Electrical Conduits according to BS 6099

Applications: Electrical installations.

Nominal Size (mm)	Minimum Inside Diameter (mm)			Maximum Wall Thickness mm			Weight kg/m		
	Light	Medium	Heavy	Light	Medium	Heavy	Light	Medium	Heavy
16	13.7	13.0	12.2	1.15	1.5	1.9	0.080	0.100	0.125
20	17.4	16.9	15.8	1.3	1.55	2.1	0.120	0.140	0.180
25	22.1	21.9	20.6	1.45	1.8	2.2	0.165	0.200	0.240
32	28.6	27.8	26.6	1.7	2.1	2.7	0.245	0.296	0.370
40	35.8	35.4	34.4	2.1	2.3	2.8	0.352	0.406	0.485
50	45.1	44.3	43.2	2.45	2.85	3.4	0.540	0.622	0.707
63	57.0	-	-	3.0	-	-	0.830	-	-

Length : 3 meters (Other lengths are available on request).

Colour : Black/White.

Socket Type : Plain, Solvent cement (SC/I) type

UPVC Electrical Conduits & Tubing according to NEMA TC-2

Applications:

EPT Electrical plastic tubing for encasement in concrete, EPC 40 Electrical plastic conduit for direct burial underground, EPC 80 Electrical plastic conduit for heavy duty.

Nominal Size inch	Outside diameter (mm)		Wall Thickness (mm)						Weight kg/m		
			EPT		EPC 40		EPC 80		EPT	EPC 40	EPC 80
	min	max	min	max	min	max	min	max			
1/2	21.24	21.44	1.52	2.03	2.77	3.28	3.73	4.24	0.155	0.24	0.3
3/4	26.57	26.77	1.52	2.03	2.87	3.38	3.91	4.24	0.197	0.33	0.43
1	33.27	33.53	1.52	2.03	3.38	3.89	4.55	5.08	0.25	0.48	0.61
1 1/4	42.03	42.29	1.78	2.29	3.56	4.07	4.85	5.44	0.365	0.65	0.87
1 1/2	48.11	48.41	2.03	2.54	3.68	4.19	5.08	5.69	0.47	0.77	1.03
2	60.17	60.47	2.54	3.05	3.91	4.42	5.54	6.2	0.717	1.04	1.43
2 1/2	72.84	73.2	2.79	3.30	5.16	5.77	7.01	7.85	0.952	1.57	2.2
3	88.70	89.1	3.18	3.68	5.49	6.15	7.62	8.53	1.31	2.14	2.91
4	114.1	114.5	3.81	4.32	6.02	6.73	8.56	9.58	2.0	3.05	4.26
5	141.05	141.55	-	-	6.22	7.347	9.52	10.67	-	4.18	6.42
6	168.0	168.56	-	-	7.11	7.98	10.97	12.29	-	5.37	8.13
8	218.7	219.46	-	-	8.18	9.17	12.7	14.22	-	8.11	12.4

UPVC Electrical Conduits & Tubing according to NEMA TC-6 & ASTM F 512

Applications: Type EB for encased burial in concrete, Type DB for direct burial without concrete.

Nominal Size (inch)	Outside Diameter (mm)	PVC type EB 20		PVC type DB 60	
		Wall Thickness (mm)	Weight kg/m	Wall Thickness (mm)	Weight kg/m
2	60.17	1.52	0.465	1.52	0.465
3	88.7	1.55	0.703	2.34	1.000
4	114.1	2.08	1.170	3.07	1.650
5	141.05	2.62	1.170	3.86	2.50
6	168.0	3.18	2.530	4.62	3.570

PVC Electrical Conduits & Tubing according to NEMA TC-8 & ASTM F 512

Applications: Type EB for encased burial in concrete, Type DB for direct burial without concrete.

Nominal Size (inch)	Outside Diameter (mm)	PVC type EB 35		PVC type DB 120	
		Wall Thickness (mm)	Weight kg/m	Wall Thickness (mm)	Weight kg/m
1	33.27	-	-	1.52	0.251
1 1/2	48.11	-	-	1.52	0.369
2	60.17	1.52	0.465	1.96	0.576
3	88.7	1.93	0.847	3.00	1.250
4	114.1	2.54	1.390	3.91	2.050
5	141.05	3.2	2.09	4.85	3.12
6	168.0	3.86	3.020	5.77	4.420

Length : 5.8 & 6 meters (Other lengths are available on request).

Colour : Grey.

Socket Type : Solvent cement (SC/J) type

UPVC Electrical & Telephone Duct

Applications: Electrical and telephone duct.

Duct No.	Outside Diameter (mm)	Wall Thickness (mm)	
		min	max
54D	96.5 + / -0.2	3.25	3.65
56	53.9 + / -0.1	1.55	1.70
57	114.3 + / -0.2	3.4	3.8

Length : 6 meters (Other lengths are available on request).

Colour : Black.

Socket Type : Solvent cement (SC/J) type

UPVC Telephone Duct (U-Gard)

Item Description	Wall Thickness (mm)	No. of Holes/pc	Length (cm/pc)	Weight (kg/pc)
36 U-Gard	2.8	10	150	0.60

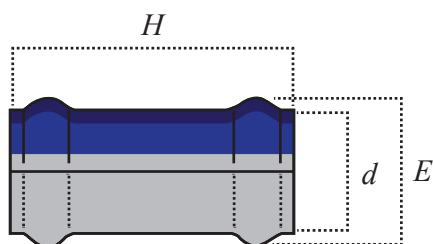
Colour: Yellow.

Note: UV Resistance

UPVC FABRICATED PRODUCTS

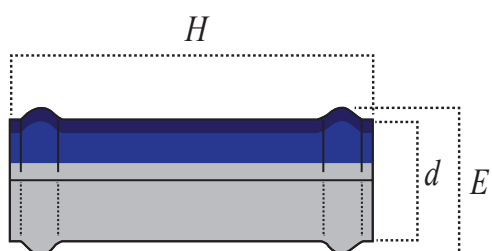


Accessories for Pressure Pipes, Repair Coupling, Long Reduces MMP is manufacturing all kind of long bend and repair coupling fitting which is required in the project during installation. All this fitting is combined with MMP pipe under the Standards DIN 8062/8061 and it is available with single and double rubber joint at the end. Also available for all kind of pressure rating 6-10 and 16 bar.



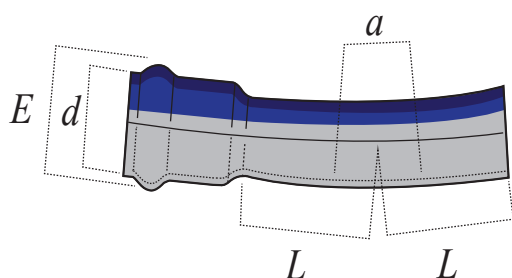
Repair Coupling

d mm	E mm	H mm
63	86	280
75	102	280
90	120	290
110	144	310
125	161	330
140	178	350
160	202	350
180	224	380
200	248	410



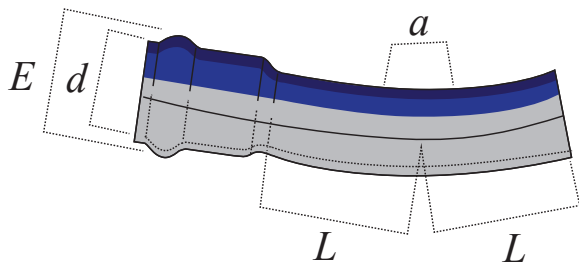
Long Repair Coupling

d mm	E mm	H mm
63	86	500
75	102	500
90	120	500
110	144	500
125	161	500
140	178	500
160	202	500
180	224	600
200	248	650

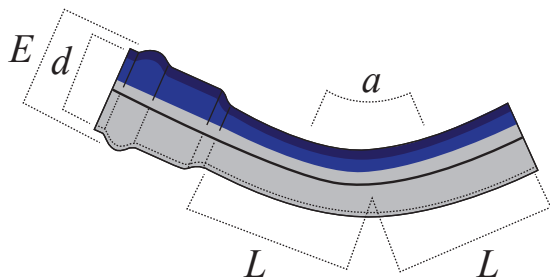


Long Bend 11°

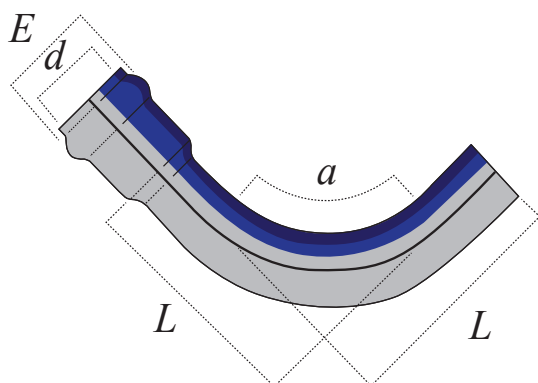
d mm	L mm	angle	E mm
63	235	11°	86
75	260	11°	102
90	292	11°	120
110	384	11°	144
125	413	11°	161
140	430	11°	178
160	464	11°	202
180	535	11°	224
200	530	11°	240


22° 30' Long Bend

d mm	L mm	angle	E mm
63	235	22° 1/2	86
75	260	22° 1/2	102
90	292	22° 1/2	120
110	384	22° 1/2	144
125	413	22° 1/2	161
140	430	22° 1/2	178
160	464	22° 1/2	202
180	535	22° 1/2	224
200	530	22° 1/2	240


45° Long Bend

d mm	L mm	angle	E mm
63	235	45°	86
75	260	45°	102
90	292	45°	120
110	384	45°	144
125	413	45°	161
140	430	45°	178
160	464	45°	202
180	810	45°	224
200	805	45°	240


90° Long Bend

d mm	L mm	angle	E mm
63	377	90°	86
75	401	90°	102
90	462	90°	120
110	504	90°	144
125	533	90°	161
140	595	90°	178
160	614	90°	202
180	1010	90°	224
200	1155	90°	240

CPVC PIPES

FOR HOT AND COLD WATER

Manufacturing Standards



ASTM F441 American Society for Testing & Material



DIN 8079 German Standard

To begin with, MMP cPVC Pipes are manufactured from Chlorinated Polyvinyl Chloride compound and has chemical and physical properties according to USA standard (ASTM F441). So it has been manufactured for many purposes and usages especially to resist hot and cold portable water which is reach sometimes the boiling point. In addition to that, MMP cPVC pipes take an easy usages and installments, and for the same reason it is worldwide used in the internal connection in buildings which is compatible with environment and weather. Hence, MMP always obtain for the sake of quality the best raw-material from the specialist international companies in this field. And at the same time MMP cPVC fittings also available in all sizes and to be connected and completed the globe of MMP cPVC pipes in same quality and same compound.

Material Technical Data

Properties	Unit	CPVC	Test Method
Physical Properties			
Specific Gravity (Compound)	g/cm ³	1.5 - 1.55	ASTM D 792
Water Absorption (24 H - Boiling Water)	mg/cm ²	< 4	ISO 2508
Water Absorption (24 H At 23 °C)	% weight gain	0.03	ASTM D 570
Flammability	N/A	Self extinguishing	-
Resistance To Burning	Sec	< 5	ASTM D 635
Vicat Softening Temperature (VST 5 Kgf)	°C	> 110	ISO 306
Thermal Conductivity	W k ⁻¹ m ⁻¹	0.14	DIN 52612-1
Co-Efficient Of Thermal Linear Expansion	mm/mm °C	0.7x10 ⁻⁴	ASTM D 696
Specific Heat	Cal/g °C	-	-
Mechanical Properties			
Tensile Strength @ 23 °C Minimum	Mpa	55	ASTM D 638
Tensile Modulus Of Elasticity @ 23 °C	Mpa	2500	ASTM D638
Compressive Strength @ 23 °C	Mpa	69	ASTM D 695
Flexural Strength @ 23 °C	Mpa	103	ASTM D 790
Poisson's Ratio @ 23 °C	-	0.27	-
Izod Impact Strength (Notched) @ 23 °C	J/M Ft-Lbs/In	80 1.5	ASTM D 256
Hardness Strength @ 23 °C	Durometer "D" R"Ckwell "R"	- 119	ASTM D 2240 ASTM D 785
Electrical Properties			
Volume Resistivity @ 23 °C	Ohm/cm	3.4x10 ¹⁵	ASTM D 257
Surface Resistivity	Ohm	> 10 ¹²	DIN IEC60093
Power Factor@ 60 HZ	%	0.007 @ 1000 Hz	ASTM D 150
Dielectric Strength	Volts / mil	1250	ASTM D 147
Dielectric Constant 60Hz @ 30 °F	-	3.25 @ 1000 Hz	ASTM D 150

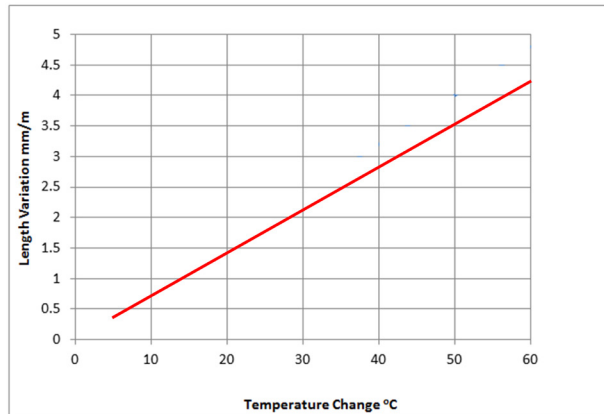
Thermal de-rating factors for CPVC pressure pipes and fittings

Maximum service temperature °F (°C)	Multiply working pressure at 73 °F (23 °C) by these factors
73 (23)	1
80 (27)	1
90 (32)	0.91
100 (38)	0.82
110 (43)	0.77
120 (49)	0.65
130(54)	0.62
140(60)	0.5
150 (65)	0.47
160 (71)	0.4
170 (77)	0.32
180 (82)	0.25
200 (93)	0.2

CPVC pipe length variation due to temperature change (°C)

Temperature Change (°C)	Length Variation mm/meter
5	0.35
10	0.7
15	1.05
20	1.4
25	1.75
30	2.1
35	2.45
40	2.8
45	3.15
50	3.5
55	3.85
60	4.2

Coefficient of thermal expansion = 0.07 mm/m/°C



CPVC pipes according to ASTM F 441

Nominal Size inch	Outside diameter (mm)		Schedule 80 Minimum Wall Thickness		Normal Weight kg/m	Water Pressure Rating	
	Inch	mm	Inch	mm		Psi	Bar
1/4	0.540	13.7	0.119	3.02	0.230	1130	77.8
1/2	0.840	21.34	0.147	3.73	0.337	850	58.6
3/4	1.050	26.67	0.154	3.91	0.457	690	47.6
1	1.315	33.40	0.179	4.55	0.671	630	43.4
1 1/4	1.660	42.20	0.191	4.85	0.928	520	35.9
1 1/2	1.900	48.30	0.200	5.08	1.13	470	32.4
2	2.5375	60.33	0.218	5.54	1.56	400	27.6
3	3.500	88.9	0.300	7.62	2.9	370	25.5
4	4.500	114.3	0.337	9.52	4.3	320	22.1
6	6.625	168.3	0.432	10.97	8.1	280	19.3

pressure rating applies for Water at 23 °C and for unthreaded pipes

CPVC Pipes according to DIN 8079

Nominal Size mm	Pressure Rating at 20 °C					
	PN16		PN20		PN25	
	Wall Thickness (mm)	Weight kg/m	Wall Thickness (mm)	Weight kg/m	Wall Thickness (mm)	Weight kg/m
16	1.2	0.100	1.5	0.118	1.8	0.136
20	1.5	0.151	1.9	0.183	2.3	0.217
25	1.9	0.234	2.3	0.379	2.8	0.326
32	2.4	0.379	3.0	0.455	3.6	0.534
40	3.0	0.582	3.7	0.701	4.5	0.830
50	3.7	0.896	4.6	1.090	5.6	1.290
63	4.7	1.430	5.8	1.720	7.0	2.020
75	5.6	2.020	6.9	2.420	8.4	2.880
90	6.7	2.880	8.2	3.460	10.0	4.100
110	8.2	4.310	10.0	5.130	12.3	6.160

Length: 5.8 and 6 meters | Colour: Beige

Socket Type: Plain *Non standard lengths and colour are available on request.

Types of Joint

MMP Pipes are manufactured in standard length of 6 meters and incorporate various joint systems.



Plain End

Plain ended pipes are to be used with double coupling either solvent cement joint (SCJ) or rubber joint (RS) or fittings available in both types of joint.



Solvent Cement Joint

Solvent cement joint pipes are manufactured with integral socket.



Rubber Ring Types of Joint

(Anger Joint) /3S Anger Joint is formed on wall thickened portion.

Methods of Assembly

- Carefully clean the external surface of pipe: Figure A.
- Mark on outside of the pipe the depth to be inserted into the other pipe socket.
- Lubricate the pipe only by using a suitable lubricant or soapy water, Do not use oil or grease.
- Check the gasket conditions.
- Put the gasket into its specific seat: Figure B.
- Lubricate the internal surface of the gasket in the same way as the pipe: Figure C.
- Align and push the two pipes together up to the depth of insertion as indicated in Figure D.
- Finally you will have a pipe assembly as indicated in Figure E.



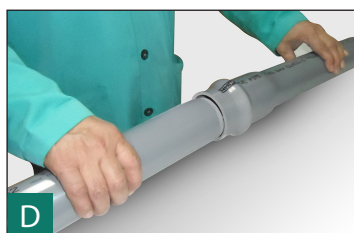
A



B



C



D



E

Storage recommendations

The following procedure is recommended to prevent pipes from damages

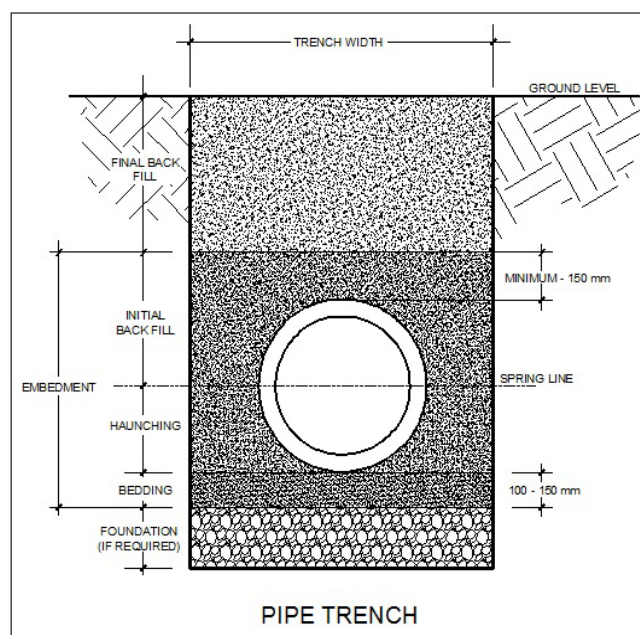
- The area of storage should be cleaned and free from any rocks or stones that may cause damage of pipes.
- Pipes may be placed on wide pieces of wood not less than 10cm width and spaced at intervals of 120cm or less.
- Be sure that pipes Socket ends and chamfer ends are alternately placed.
- Maximum storage height not more than 240cm from the ground.
- Pipes should be protected from direct sun light by storing it in a shaded area or use opaque tarpaulin and always keep space between tarpaulin and pipes to prevent heat accumulation.
- Pipe internal, external surfaces as well as fittings and other accessories should be kept free from dirt.
- Rubber gaskets should be protected from excessive heat, direct sunlight and oil.
- Solvent cement when used should be stored in tight sealed containers away from excessive heat.



Trench construction

General

- Excavate trenches to insure that sides will be stable under all working conditions
- Excavated material should be stockpiled in a manner that will not endanger the work.
- Minimum Trench Width
- The following table shows the relation between Nominal Pipe Size and Minimum Trench Width



Nominal Pipe Size (mm)	Minimum Trench Width (mm)
< 90	300
90 - 630	Pipe OD. Plus 300
630 - 1600	Pipe OD. Plus 600

Preparation of Trench Bottom

- The trench bottom should be constructed to provide a firm, stable, and uniform support for the full length of the pipe.
- When an unstable sub-grade condition is encountered which will provide inadequate pipe support, additional trench depth should be excavated and refilled with suitable foundation material as specified by the engineer.
- The ground water level in the trench should be kept below the pipe.

Bedding

- Bedding is required primarily to bring the trench bottom up to grade.
- Bedding materials should be placed to provide uniform and adequate longitudinal support under the pipe.
- A compacted depth of 4 to 6 inches (100 to 150 mm) is generally sufficient bedding thickness.
- Bedding material should be free of ridges, hollows and lumps.
- The trench bottom should be smooth and free of rock.
- Bedding should consist of free flowing material such as gravel, sand, salty sand or clayey sand that is free of stones or hard particles larger than 1 ½ inch.

Haunching

- The most important factor affecting pipe performance and deflection is the haunching material and its density.
- Material should be placed and consolidated under the pipe haunch to provide adequate side support to the pipe while avoiding both vertical and lateral displacement of the pipe from proper alignment.
- Where coarse materials with voids have been used for bedding, the same coarse material should also be used for haunching and consideration should be given to native soil migration.
- Haunching is placed up to the pipe spring line.

Initial Backfill

- Initial backfill is that portion of the pipe embedment beginning at the spring line of extending some distance over the pipe and the top of the pipe.
- Since little or no additional side support is gained above the spring line, native soils may be used without special compaction efforts.
- The sole purpose of somewhat careful placement of these native trench materials is to protect the pipe from the dropping of large rocks or other impact loads that may occur during final backfill.
- Minimum cover is recommended to be 6 inch (150mm).

Final Backfill

The material used in the final backfilling operation need not be as carefully selected as was the bedding, haunching, and initial backfill. In the final backfill material, exclude boulders, frozen clumps of dirt, and rubble which could damage the pipe.

Embedment Materials

Embedment material including bedding, hunching and initial backfill material, class I and class II material usually used as embedment material.

The following Table shows the maximum particle size for class I and class II materials

Nominal Pipe Size (mm)	Maximum Particle size (inch)
≤ 110	1/2
160 -225	3/4
250 - 355	1
≥ 400	1 1/2

The background image is a monochromatic, blue-tinted photograph of industrial equipment. It features a large, horizontal pipe or vessel in the center, surrounded by various mechanical components, including valves, flanges, and support structures. The scene is complex and technical, typical of a chemical processing plant.

CHEMICAL RESISTANCE

Chemical Resistance of UPVC compound according to ISO/TR 7473

Reactives	Concentration	Temperature	
		20 °C	60 °C
Acetaldehyde	40%	NS	-
Acetaldehyde	100%	NS	-
Acetic Acid	Glacial	NS	NS
Acetic Acid	25%	S	L
Acetic Acid	60%	S	L
Acetic Anhydride	100%	NS	NS
Acetone	100%	NS	NS
Adipic Acid	Sat. sol.	S	L
Allyl Alcohol	96%	L	NS
Aluminum Chloride	Sat. sol.	S	S
Aluminum Potassium Sulphate	Sat. sol.	S	S
Aluminum Sulphate	Sat. sol.	S	S
Ammonia, Dry gas	100%	S	S
Ammonia, Liquid	100%	L	NS
Ammonia, Aqueous	Dil. sol.	S	L
Ammonium Chloride	Sat. sol.	S	S
Ammonium Fluoride	20%	S	L
Ammonium Nitrate	Sat. sol.	S	S
Ammonium Sulphate	Sat. sol.	S	S
Amyl Acetate (1-Pentanol Acetate)	100%	NS	NS
Amyl Alcohol (1-Pentanol)	100%	S	L
Aniline	100%	NS	NS
Aniline	Sat. sol.	NS	NS
Aniline Hydrochloride	Sat. sol.	NS	NS
Antimony (III) Chloride	90%	S	S
Anthraquinone Sulphonic Acid	Sol.	S	L
Arsenic Acid	Dil. sol.	S	-
Arsenic Acid	Sat. sol.	S	L
Benzaldehyde	0.1%	NS	NS
Benzene	100%	NS	NS
Benzoic Acid	Sat. sol.	L	NS
Borax	Sat. sol.	S	L
Boric Acid	Dil. sol.	S	L
Bromic Acid	10%	S	-
Bromine, Liquid	100%	NS	NS
Butadiene	100%	S	S
Butane, Gas	100%	S	-
Butanols	Up to 100%	S	L
Butyl Acetate	100%	NS	NS
Butyl Phenol	100%	NS	NS
Butyric Acid	20%	S	L
Butyric Acid	98%	NS	NS
Calcium Chloride	Sat. sol.	S	S
Calcium Nitrate	50%	S	S
Carbon Dioxide (Aqueous Solution)	Sat. sol.	L	L
Carbon Dioxide, Dry Gas	100%	S	S
Carbon Dioxide, Wet Gas	-	S	S
Carbon Disulphide	100%	NS	NS
Carbon Tetrachloride	100%	NS	NS
Chlorine, Dry Gas	100%	L	NS
Chlorine, Aqueous	Sat. sol.	L	NS
Chloroacetic Acid	Sol.	S	L
Chlorosulphonic Acid	100%	L	NS
Chromic Acid	From 1% to 50%	S	L
Citric Acid	Sat. sol.	S	S
Copper (II) Chloride	Sat. sol.	S	S
Copper (II) Fluoride	2%	S	S
Copper (III) Sulphate	Sat. sol.	S	S
Cresols	Sat. sol.	-	NS
Cresylic Acid (Methyl Benzoic Acid)	Sat. sol.	-	NS
Crotonaldehyde	100%	NS	NS
Cyclohexanol	100%	NS	NS
Cyclohexanone	100%	NS	NS
Developers (Photographic)	Work. sol.	S	S
Dextrin	Sat. sol.	S	L
Dichloroethane	100%	NS	NS
Dichloromethane	100%	NS	NS
Diethyl ether	100%	NS	-
Diglycolic Acid	18%	S	L
Dimethylamine	30%	S	-
Ethanediol (Ethylene-glycol)	Work. sol.	S	S

S - Excellent Resistance L - Limited Resistance

NS - No Resistance

Continue Chemical Resistance of UPVC compound according to ISO/TR 7473

Ethanol	95%	S	L
Ethyl Acetate	100%	NS	NS
Ethyl Acrylate	100%	NS	NS
Fluosilicic Acid	32%	S	S
Formaldehyde	Dil. sol.	S	L
Formaldehyde	40%	S	S
Formic Acid	From 1% to 50%	S	L
Furfuryl Alcohol	100%	NS	NS
Gasoline (Aliphatic Hydrocarbons)	-	S	S
Glucose	Sat. sol.	S	L
Glycerol	100%	S	S
Glycolic Acid	30%	S	S
Hexadecanol	100%	S	S
Hydrobromic Acid	10%	S	L
Hydrobromic Acid	50%	S	L
Hydrobromic Acid	20%	S	L
Hydrobromic Acid	Greater than 30%	S	S
Hydrobromic Acid	40%	L	NS
Hydrobromic Acid	60%	L	NS
Hydrobromic Acid, Gas	100%	L	NS
Hydrogen	100%	S	S
Hydrogen Peroxide	30%	S	S
Hydrogen Sulphide, Gas	100%	S	S
Iron (III) Chloride	Sat. sol.	S	S
Lactic Acid	10%	S	L
Lactic Acid	From 10% to 90%	L	NS
Lead Acetate	Dil. sol.	S	S
Lead Acetate	Sat. sol.	S	S
Lead Tetraethyl	100%	S	-
Magnesium Chloride	Sat. sol.	S	S
Magnesium Sulphate	Sat. sol.	S	S
Maleic Acid	Sat. sol.	S	L
Methanol	100%	S	L
Methyl Methacrylate	100%	NS	NS
Milk	-	S	S
Molasses	Work. sol.	S	L
Nickel Sulphate	Sat. sol.	S	S
Nicotinic Acid	Work. sol.	S	S
Nitric Acid	Up to 45%	S	L
Nitric Acid	From 50 to 98	NS	NS
Oils and Fats	-	S	S
Oleic Acid	100%	S	S
Oleum	10% to 50%	NS	NS
Orthophosphoric Acid, Aqueous	30%	S	L
Orthophosphoric Acid, Aqueous	Greater than 30%	S	S
Oxalic Acid	Dil. sol.	S	L
Oxalic Acid	Sat. sol.	S	S
Oxygen	100%	S	S
Ozone	100%	S	S
Perchloric Acid	10%	S	L
Perchloric Acid	70%	L	NS
Petrol (Aliphatic Hydrocarbons/Benzene)	80/20	NS	NS
Phenol	90%	NS	NS
Phenylhydrazine	100%	NS	NS
Phenylhydrazine Hydrochloride	97%	NS	NS
Phosphine	100%	S	S
Phosphorus (III) Chloride	100%	NS	-
Picric Acid	Sat. sol.	S	S
Potassium Bromide	Sat. sol.	S	S
Potassium Chloride	Sat. sol.	S	S
Potassium Chromate	40%	S	S
Potassium Cyanide	Sol.	S	S
Potassium Dichromate	40%	S	S
Potassium Hexacyanoferrate (II)	Sat. sol.	S	S
Potassium Hexacyanoferrate (III)	Sat. sol.	S	S
Potassium Hydroxide	Sol.	S	S
Potassium Nitrate	Sat. sol.	S	S
Potassium Permanganate	20%	S	S
Potassium Persulphate	Sat. sol.	S	L
Propane, Liquified Gas	100%	S	-
Pyridine	Up to 100%	NS	-

S - Excellent Resistance L - Limited Resistance

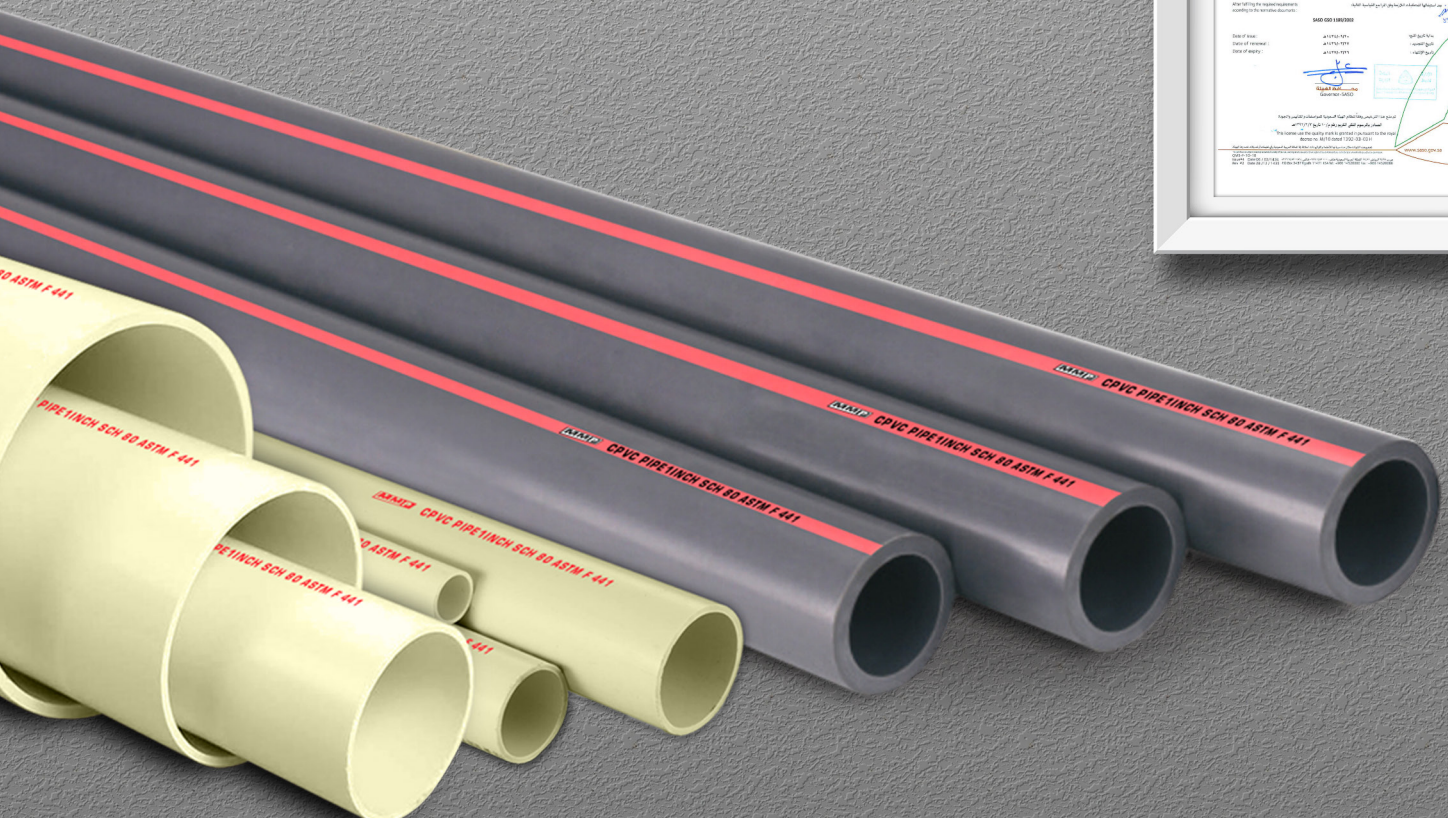
NS - No Resistance

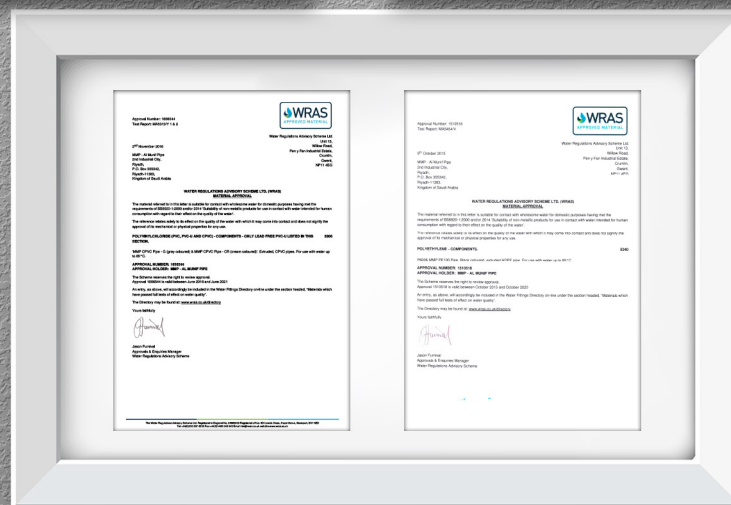
Chemical Resistance of MMP CPVC Plastic Pipes According to PPI TR-19/2007

Reactive	Concentration	CPVC
Acetaldehyde	40%	Not resistant
Acetic Acid	Vapor 25% 60% 85%	Resist to 82 °C Resist to 82 °C Not resistant Not resistant
Acetic Anhydride	-	Not resistant
Acetone	5%	Not resistant
Adipic Acid	Sat'd	Resist to 82 °C
Allyl Alcohol	96%	Limited resistance to 23 °C
Aluminum Chloride Aqueous	Sat'd	Resist to 82 °C
Aluminum Hydroxide	Sat'd	Resist to 82 °C
Aluminum Potassium Sulfate	Sat'd	Resist to 82 °C
Aluminum Sulfate (Alum)	Sat'd	Resist to 82 °C
Ammonia Gas	100%	Not resistant
Ammonia Liquid	100%	Not resistant
Ammonium Chloride	Sat'd	Resist to 82 °C
Ammonium Fluoride	10%	Resist to 82 °C
Ammonium Nitrate	Sat'd	Resist to 82 °C
Ammonium Sulfate	Sat'd	Resist to 82 °C
Ammonium Sulfide	dilute	Resist to 82 °C
Amyl Acetate	-	Not resistant
Amyl Alcohol	-	Not resistant
Aniline	-	Not resistant
Aniline Chlorohydrate	-	Not resistant
Aniline Hydrochloride	Sat'd	Not resistant
Anthraquinone	-	Resist to 82 °C
Anthraquinone Sulfonic Acid	-	Resist to 82 °C
Arsenic Acid	80%	Resist to 82 °C
Asphalt	-	Not resistant
Beer	-	Resist to 82 °C
Benzene	-	Not resistant
Benzoic Acid	ALL	Resist to 82 °C
Borax	Sat'd	Resist to 82 °C
Boric Acid	Sat'd	Resist to 82 °C
Bromic Acid	Sat'd	Resist to 82 °C
Bromine	Liquid Vapor 25%	Not resistant Resist to 82 °C
Butadiene	50%	Resist to 82 °C
Butane	50%	Resist to 82 °C
Butyl Acetate	100%	Not resistant
Butyric Acid	-	Not resistant
Calcium Chloride	Sat'd	Resist to 82 °C
Carbon Dioxide	Dry 100% wet	Resist to 82 °C Resist to 82 °C
Carbon Disulfide	-	Not resistant
Carbon Tetrachloride	-	Not resistant
Chlorine Gas	0-20 PPM moisture content 20-50 PPM moisture content > 50 PPM moisture content	Limited resistance to 23 °C Not resistant Not resistant
Chlorine	liquid	Not resistant
Chloroacetic Acid	50%	Resist to 82 °C
Chlorosulfonic Acid	-	Resist to 82 °C
Chromic Acid	10% 30% 40% 50%	Resist to 82 °C Resist to 82 °C Resist to 82 °C Limited resistance to 60 °C
Citric Acid	Sat'd	Resist to 82 °C
Copper Chloride	Sat'd	Resist to 82 °C
Copper Fluoride	2%	Resist to 82 °C
Copper Sulfate	Sat'd	Resist to 82 °C
Cresol	90%	Not resistant
Cresylic Acid	50%	Resist to 82 °C
Cyclohexanol	-	Not resistant

Continue Chemical Resistance of MMP CPVC Plastic Pipes According to PPI TR-19/2007

Reactive	Concentration	CPVC
Dextrin (Starch Gum)	Sat'd	Resist to 82 °C
Dextrose	Sat'd	Resist to 82 °C
Dichloroethylene	-	Not resistant
Diethyl Ether	-	Not resistant
Diglycolic Acid	Sat'd	Resist to 82 °C
Ether	-	Not resistant
Ethyl Acetate	-	Not resistant
Ethyl Acrylate	-	Not resistant
Ethyl Alcohol (Ethanol)	-	Limited resistance to 60 °C
Fatty Acids	-	Limited resistance to 23 °C
Formaldehyde	Dilute 35% 50%	Resist to 23 °C Limited resistance to 23 °C Limited resistance to 23 °C
Furfural	100%	Not resistant
Gasoline, Leaded*	-	Not resistant
Gasoline, Unleaded*	-	Not resistant
n-Hexane	-	Resist to 23 °C
Hexanol, Tertiary Type I	-	Resist to 82 °C
Hydrobromic Acid	20%	Resist to 23 °C
Hydrochloric Acid	30%	Resist to 82 °C
Hydrofluoric Acid	50% 100%	Not resistant Not resistant
Hydrogen	gas	Resist to 23 °C
Hydrogen Peroxide	50%	Resist to 82 °C
Iodine	10%	Resist to 23 °C
Lactic Acid	25%	Resist to 82 °C
Lead Acetate	Sat'd	Resist to 82 °C
Lead Chloride	-	Resist to 82 °C
Lead Nitrate	Sat'd	Resist to 82 °C
Lead Sulfate	-	Resist to 82 °C
Magnesium Chloride	Sat'd	Resist to 82 °C
Magnesium Citrate	-	Resist to 82 °C
Magnesium Hydroxide	Sat'd	Resist to 82 °C
Magnesium Nitrate	-	Resist to 82 °C
Magnesium Sulfate	-	Resist to 82 °C
Maleic Acid	Sat'd	Resist to 82 °C
Milk	-	Resist to 82 °C
Molasses	-	Resist to 82 °C
Nickel Chloride	Sat'd	Resist to 82 °C
Nickel Sulfate	Sat'd	Resist to 82 °C
Nitric Acid	10% 100%	Resist to 82 °C Not resistant
Oleic Acid	-	Resist to 82 °C
Oleum	-	Not resistant
Oxalic Acid	50%	Resist to 82 °C
Oxygen Gas	-	Resist to 82 °C
Phenylhydrazine	-	Not resistant
Phosphoric Acid	10% 50%	Resist to 82 °C Resist to 82 °C
Potassium Bromide	-	Resist to 82 °C
Potassium Chloride	-	Resist to 82 °C
Potassium Chromate	-	Resist to 82 °C
Potassium Hydroxide	25%	Resist to 82 °C
Potassium Nitrate	-	Resist to 82 °C
Silicone Oil	-	Resist to 82 °C
Soaps	-	Resist to 82 °C
Sodium Chloride	Sat'd	Resist to 82 °C
Sodium Hydroxide	15% 50% 70%	Resist to 82 °C Resist to 82 °C Resist to 82 °C
Tetrahydrofuran	-	Not resistant
Urine	-	Resist to 82 °C
Water, Potable	-	Resist to 82 °C
Water, Salt	-	Resist to 82 °C
Water, Sea	-	Resist to 82 °C
Water, soft	-	Resist to 82 °C
Water, Waste	-	Resist to 82 °C







KINGDOM OF SAUDI ARABIA

Riyadh 11383 K.S.A P.O. Box 355342
Sales & Customer Service: +966 920000357
Fax: +966 112651845



www.ALMUNIFPIPES.com



info@mmppf.com