



# Pressure Piping System



## SPECIFICATION FOR uPVC PRESSURE PIPES AS PER KS ISO 1452-2:2009

		Pipe series(S)						
Nominal outside diameter (mm)	Nominal outside diameter (mm) and tolerance	Nominal wall thickness and= 2.5						
		S 20	S 16	S 12.5	S 10	S 8	S 6.3	S 5
		(SDR 41)	(SDR 33)	(SDR 26)	(SDR 21)	(SDR 17)	(SDR 13.6)	(SDR 11)
		Nominal pressure PN based on design coefficient C = 2.5						
		PN 6	PN 8	PN 10	PN 12.5	PN 16	PN 20	PN 25
12	12-12.2							1.50-1.90
16	16-16.2							1.50-1.90
20	20-20.2						1.50-1.90	1.90-2.30
25	25-25.2					1.50-1.90	1.90-2.30	2.30-2.80
32	32-32.2			1.50-1.90	1.60-2.0	1.90-2.30	2.40-2.90	2.90-3.40
40	40-40.2		1.50-1.90	1.60-2.0	1.90-2.30	2.40-2.90	3.0-3.50	3.70-4.30
50	50-50.2		1.60-2.0	2.0-2.40	2.40-2.90	3.0-3.50	3.70-4.30	4.60-5.30
63	63-63.3		2.0-2.40	2.50-3.0	3.0-3.50	3.80-4.40	4.70-5.40	5.80-6.60
75	75-75.3		2.30-2.80	2.90-3.40	3.60-4.20	4.50-5.20	5.60-6.40	6.80-7.70
90	90-90.3		2.80-3.30	3.50-4.10	4.30-5.0	5.40-6.20	6.70-7.60	8.20-9.30
		Nominal pressure PN based on design coefficient C = 2.0						
		PN 6	PN 8	PN 10	PN 12.5	PN 16	PN 20	PN 25
110	110-110.4	2.70-3.20	3.40-4.0	4.20-4.90	5.30-6.10	6.60-7.50	8.10-9.20	10.0-11.20
125	125-125.4	3.10-3.70	3.90-4.50	4.80-5.50	6.0-6.80	7.40-8.40	9.20-10.40	11.40-12.80
140	140-140.5	3.50-4.10	4.30-5.0	5.40-6.20	6.70-7.60	8.30-9.40	10.30-11.60	12.70-14.20
160	160-160.5	4.0-4.60	4.90-5.60	6.20-7.10	7.70-8.70	9.50-10.70	11.80-13.20	14.60-16.30
180	180-180.6	4.40-5.10	5.50-6.30	6.90-7.80	8.60-9.70	10.70-12.0	13.30-14.90	16.40-18.30
200	200-200.6	4.90-5.60	6.20-7.10	7.70-8.70	9.60-10.80	11.90-13.30	14.70-16.40	18.20-20.30
225	225-225.7	5.50-6.30	6.90-7.80	8.60-9.70	10.80-12.10	13.40-15.0	16.60-18.50	
250	250-250.8	6.20-7.10	7.70-8.70	9.60-10.80	11.90-13.30	14.80-16.50	18.40-20.50	
280	280-280.9	6.90-7.80	8.60-9.70	10.70-12.0	13.40-15.0	16.60-18.50	20.60-22.90	
315	315-316	7.70-8.70	9.70-10.90	12.10-13.60	15.0-16.70	18.70-20.80	23.20-25.80	
355	355-356.1	8.70-9.80	10.90-12.20	13.60-15.20	16.90-18.80	21.10-23.50	26.10-29.0	
400	400-401.2	9.80-11.0	12.30-13.80	15.30-17.10	19.10-21.30	23.70-26.30	29.40-32.60	
450	450-451.4	11.0-12.30	13.80-15.40	17.20-19.20	21.50-23.90	26.70-29.60	33.10-36.70	
500	500-501.5	12.30-13.80	15.30-17.10	19.10-21.30	23.90-26.50	29.70-32.90	36.80-40.70	
560	560-561.7	13.70-15.30	17.20-19.20	21.40-23.80	26.70-29.60			
630	630-631.9	15.40-17.20	19.30-21.50	24.10-26.80	30.0-33.20			

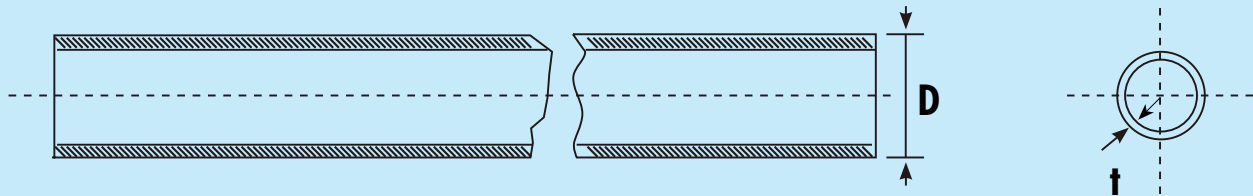
### Colour Coding

	Pressure Rating	Colour
1	PN-6	RED
2	PN-8	YELLOW
3	PN-10	BLUE
4	PN-12.5	GREEN
5	PN-16	BROWN

## uPVC Pressure Pipes and Fittings - Inch Series

Doshi offers comprehensive range of uPVC pressure pipes and fittings as per American standard ASTM D 1785 SCH40 / 80 and ASTM 2241 for pipes and ASTM D 2466 SCH D 2467 SCH 80 for fittings. Pressure pipes and fittings are well offered as per British standard BS 3505 / 06 for pipes and BS 4346 for fittings.

### uPVC pressure pipes specification as per ASTM D 1785 SCH 40 / 80



DIMENSION AND WATER PRESSURE RATING AT 230C FOR UNTHREADED PIPES AS PER ASTM D- 1785  
(PVC Compound Grade Equivalent to PVC 1120 / 2120)

Nominal Bore (Inch)	Outside Diameter (D) (mm)	Schedule 40			Schedule 80		
		Wall thickness (t) (mm)	Working Pressure		Wall thickness (t) (mm)	Working Pressure	
			(MPA)	PSI		(MPA)	PSI
1/2	21.34 ± 0.10	2.77 + 0.51	4.14	600	3.73 + 0.51	5.86	850
3/4	26.67 ± 0.10	2.87 + 0.51	3.31	480	3.91 + 0.51	4.76	690
1	33.40 ± 0.13	3.38 + 0.51	3.10	450	4.55 + 0.53	4.34	630
1 - 1/4	42.26 ± 0.15	3.56 + 0.51	2.55	370	5.85 + 0.58	3.59	520
1 - 1/2	48.26 ± 0.15	3.68 + 0.51	2.28	330	5.08 + 0.61	3.24	470
2	60.32 ± 0.15	3.91 + 0.51	1.93	280	5.54 + 0.66	2.76	400
2 - 1/2	73.02 ± 0.20	5.16 + 0.61	2.07	300	7.01 + 0.84	2.90	420
3	88.90 ± 0.20	5.49 + 0.66	1.79	260	7.62 + 0.91	2.55	370
4	114.30 ± 0.23	6.02 + 0.71	1.52	220	8.56 + 1.02	2.21	320

Mpa = Mega Pascal 1 Mpa = 10 kgf/cm<sup>2</sup> 1 kgf / cm<sup>2</sup> = 14.20 psi

- Note:
1. Pipe are offered in Off White (OW) and Dark Grey (DG) colour in standard length of 3.0 / 5.8 / 6.0 meter
  2. Pipes can be offered with both ends plain or with one end socketed for solvent weld jointing
  3. Non standard wall-thickness, length and colour can be offered, if desired

**BS STANDARD**

**TABLE 2. PIPE DIMENSIONS KSIISO 1452 : 2009 IMPERIAL SERIES**

Nominal Size (in)	Outside Diameter (D)		WALL THICKNESS mm						
			9.0 bar (90m head of water)		12.0 bar (120m head of water)		15.0 bar (150m head of water)		
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
in	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)	mm (in)
3/8	17.0 (0.569)	17.3 (0.681)	-	-	-	-	1.5 (0.059)	1.7 (0.067)	
1/2	21.2 (0.835)	21.5 (0.847)	-	-	-	-	1.7 (0.067)	1.9 (0.075)	
3/4	26.6 (1.047)	26.9 (1.059)	-	-	-	-	1.9 (0.075)	2.1 (0.083)	
1	33.4 (1.315)	33.7 (1.327)	-	-	-	-	2.2 (0.087)	2.4 (0.095)	
1 1/4	42.1 (1.657)	42.4 (1.669)	-	-	2.2 (0.087)	2.4 (0.095)	2.7 (0.106)	3.0 (0.118)	
1 1/2	48.1 (1.894)	48.4 (1.906)	-	-	2.5 (0.098)	2.8 (0.110)	3.1 (0.122)	3.4 (0.134)	
2	60.2 (2.370)	60.5 (2.382)	2.5 (0.098)	2.8 (0.110)	3.1 (0.122)	3.4 (0.134)	3.9 (0.154)	4.3 (0.169)	
2 1/2	75.2 (2.961)	75.5 (2.973)	3.0 (0.118)	3.3 (0.130)	3.9 (0.154)	4.3 (0.169)	4.8 (0.189)	5.3 (0.209)	
3	88.7 (3.492)	89.1 (3.508)	3.5 (0.138)	3.9 (0.154)	4.6 (0.181)	5.1 (0.201)	5.7 (0.224)	6.3 (0.248)	
4	114.1 (4.492)	114.5 (4.508)	4.5 (0.177)	5.0 (0.197)	6.0 (0.236)	6.6 (0.260)	7.3 (0.287)	8.0 (0.315)	
5	140.0 (5.512)	140.4 (5.528)	5.5 (0.217)	6.1 (0.240)	7.3 (0.287)	8.0 (0.315)	9.0 (0.354)	9.9 (0.390)	
6	168.0 (6.614)	168.5 (6.634)	6.6 (0.260)	7.3 (0.287)	8.8 (0.347)	9.7 (0.382)	10.8 (0.425)	11.9 (0.469)	
7	193.5 (7.618)	194.0 (7.538)	7.7 (0.303)	8.5 (0.335)	10.1 (0.398)	11.1 (0.437)	12.4 (0.488)	13.6 (0.535)	
8	218.8 (8.614)	219.4 (8.638)	7.8 (0.307)	8.6 (0.339)	10.3 (0.406)	11.3 (0.445)	12.6 (0.496)	13.9 (0.547)	
9	244.1 (9.610)	244.8 (9.638)	8.7 (0.342)	9.6 (0.378)	11.5 (0.453)	12.7 (0.500)	14.1 (0.555)	15.5 (0.610)	
10	272.6 (10.732)	273.4 (10.764)	9.7 (0.382)	10.7 (0.421)	12.8 (0.504)	14.1 (0.504)	15.7 (0.618)	17.3 (0.681)	
12	323.4 (12.732)	324.4 (12.768)	11.5 (0.453)	12.7 (0.500)	15.2 (0.598)	16.7 (0.657)	18.7 (0.736)	20.6 (0.811)	
14	355.0 (13.976)	356.0 (14.015)	12.6 (0.496)	13.9 (0.547)	16.7 (0.657)	18.4 (0.724)	20.5 (0.807)	22.6 (0.890)	
16	405.9 (15.980)	406.9 (16.019)	14.5 (0.571)	16.0 (0.630)	19.0 (0.748)	20.9 (0.823)	23.4 (0.921)	25.8 (1.015)	
18	456.7 (17.980)	457.7 (18.019)	16.3 (0.642)	17.9 (0.705)	21.4 (0.843)	23.6 (0.929)	-	-	
20	507.5 (19.980)	508.5 (20.019)	18.1 (0.713)	19.9 (0.783)	-	-	-	-	
22	558.3 (21.980)	559.3 (22.019)	19.9 (0.783)	21.9 (0.862)	-	-	-	-	
24	609.1 (23.980)	610.1 (24.019)	21.7 (0.854)	23.9 (0.941)	-	-	-	-	

**Colour Coding**

	Pressure Rating	Colour
1	PN-9	YELLOW
2	PN-12	GREEN
3	PN-16	BROWN

## Standard and Qualification

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### Bell - Mouth Pressure Pipes

The Rubber Ring Joint Pressure Pipe has a watertight joint for use in pressure of 6 to 15 bar applications. The Spigot and socket type joint is formed with a widening of the wall of the pipe on one end. The joint is then sealed with a rubber ring.

The Rubber Ring system is located on the tip of the spigot end of the pipe. When the pipes are joined, the rubbering is compressed from the tip down the barrel. The seal is formed between the Socket and the Spigot end.



### Pipe Marking

- 1: The word "DOSHI" or Doshi Logo with the word "DOSHI"
- 2: KBS Logo
- 3: Standard conformance and year of standard
- 4: Nominal size
- 5: Pressure rating



### Safe & Environmentally Friendly

- Lead Free formulation - Our commitment in contributing to a better environment.

## Joining Method for Rubber Ring Joint

1 Clean dirt and grit from socket



2 Clean the exterior of the pipe before applying the lubricant



3 Apply lubricant on spigot



4 Insert the pipe until the white line



## Assembly of Pipes

### with Rubber Ring Joints

The assembly of one pipe to another may be performed using various methods. One of the most successful methods employs a rubber ring joint. The rubber ring joint may be either of integral socket design (formed as a continuous, homogeneous entity with the pipe) or it may consist of a separate sleeve-type coupling. The joint provides the following advantages:

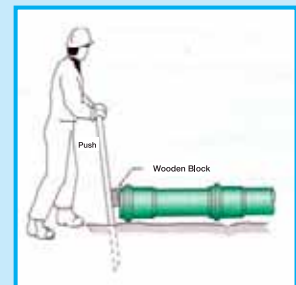
- » Allowance for expansion and contraction.
- » Reliably assembled in poor weather conditions.
- » Consistent reliability.
- » Flexibility and resiliency.
- » Labour saving and overall economical.
- » Ease of installation.



## Joining Method

When the rings are colour coded, be sure to consult the pipe manufacturer or their literature for the difference. In all cases, clean the ring, the socket or the coupling interior, especially the groove (except when the ring is permanently installed) and the spigot with a rag, brush or paper towel to remove any dirt or foreign material before assembling. Inspect the ring, pipe spigot chamber, ring groove and sealing surfaces for damages or deformation. Use only rings which are designed for and supplied with the pipe. Insert them as recommended by the manufacturer.

Lubricant should be applied as specified by the pipe manufacturer. Bacterial growth, damage to gaskets or the pipe, may result from the use of non-approved lubricants. Use only the lubricant supplied by the pipe manufacturer.



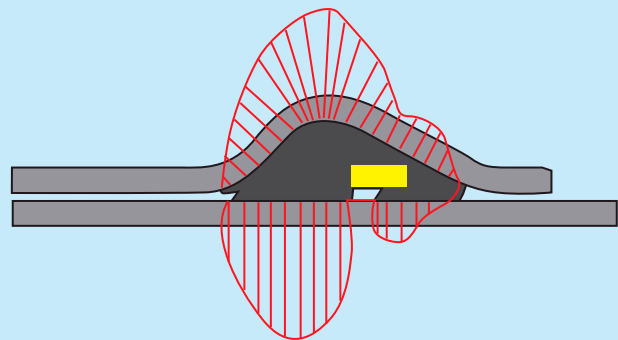
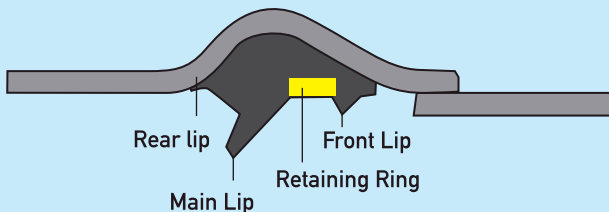
While keeping the lengths in proper alignment, brace the socket and push the spigot into the bell. The spigot should be inserted until the reference mark on the pipe barrel is even with the edge of the socket.

## Advantages of Bell-Mouth

### Joint with Locked-in Pipe Seal

Application advantages of DOSHI Bell-Mouth Rubber Ring Joint (RRJ) piping fitted with the locked-in pipe seal:

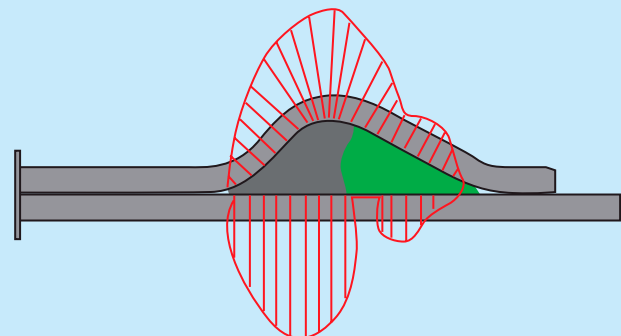
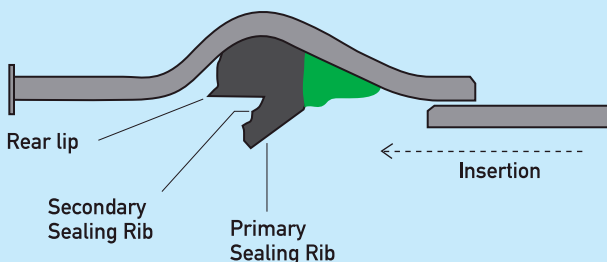
- » High burst strength and high impact strength.
- » Thickened pipe wall at the socket ensures rigidity and circularity are maintained under high external load and internal pressure.
- » The seal is fitted in the pipe socket at the factory, making pipe-laying work easier and faster.
- » Accurately formed seal groove ensures that the locked-in seal is securely positioned in the groove during transport and assembly. Risk of seal displacement during installation is eliminated.
- » Exclusive seal design maximizes the advantages of both sealing principles in a combined lip and compression seal. It reduces the assembly force required and absorbs any permissible variations in the groove.
- » Sealing can withstand extremely high pressure without the seal being dislodged. No risk of pulsation leak due to wide pressure fluctuations in the pipeline.



### Joint with Dual Hardness Pipe Seal

Application advantages of Doshi Bell-Mouth Rubber Ring Joint (RRJ) piping fitted with dual hardness pipe seal:

- » One piece construction seal with Hard and Soft rubber bonded firmly together.
- » Hard rubber for retaining. Soft rubber for sealing.
- » No loose retaining ring of device needed.
- » Designed to be retained tightly in the socket groove and yet, can be removed for cleaning purposes prior to assembly.
- » The exclusive "DOUBLE COMPRESSION LIPS" design gives extra compression, hence provides additional sealing performance against spigot and socket.
- » The sealing lip is designed to prevent sand and / or other foreign particles from penetrating the joint.

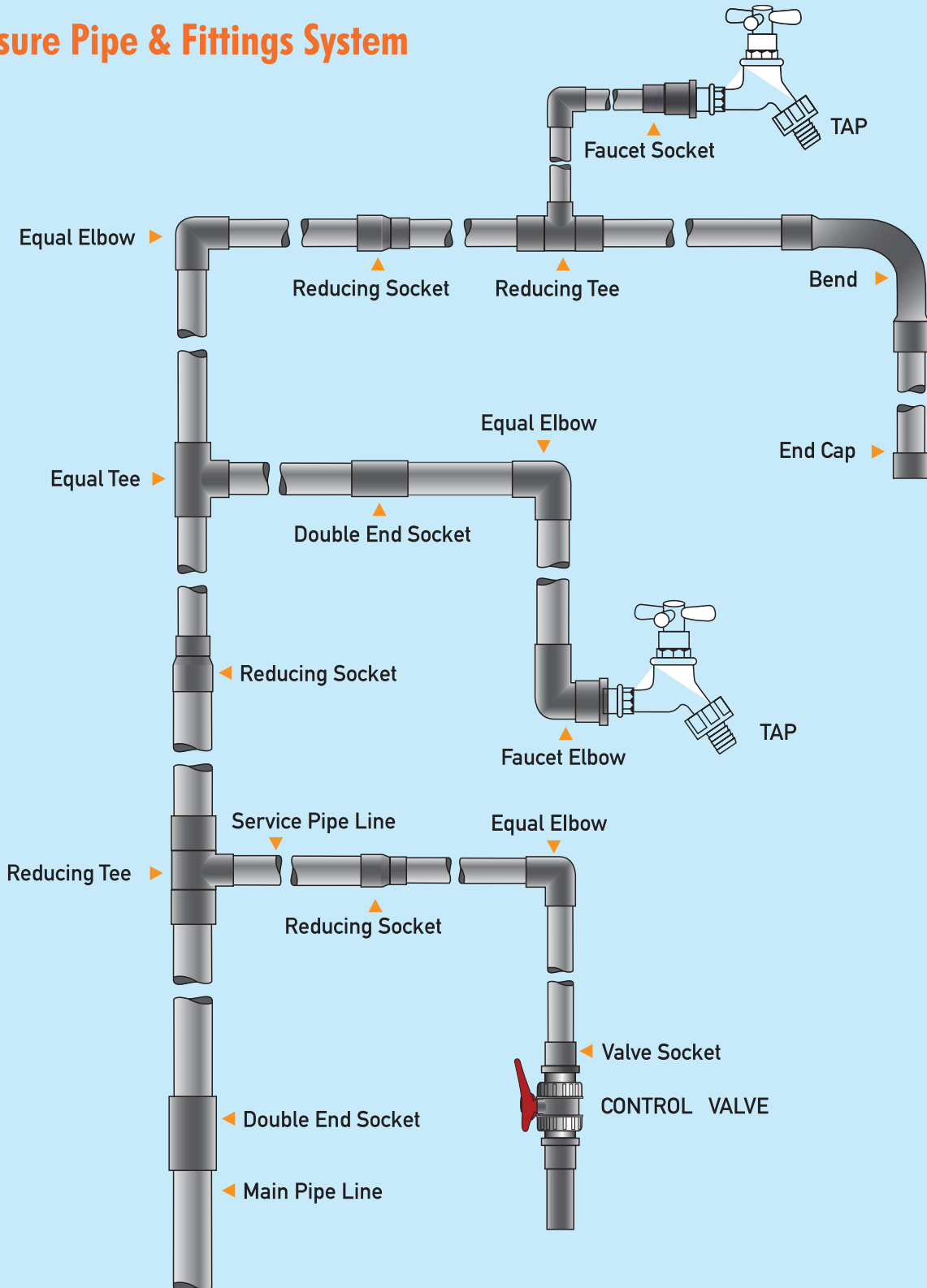


# FITTINGS

# PRESSURE PIPING SYSTEM PLAIN END PIPES (Solvent Cement Joint)

Typical Layout

## Pressure Pipe & Fittings System





### MATERIAL PROPERTIES

<b>Specific Gravity</b>	<b>1.41 – 1.45</b>
<b>Flammability</b>	<b>Self extinguishing, will not support combustion</b>
<b>Water absorption in 24 hours</b>	<b>0.1%</b>
<b>Hygiene</b>	<b>Odourless and Hygienic</b>

### MECHANICAL PROPERTIES

<b>Ultimate tensile strength</b>	<b>450 560 kgf/cm<sup>2</sup></b>
<b>Elongation at break</b>	<b>80%</b>
<b>Modulus of elasticity</b>	<b>3.30 – 3.38 x 10<sup>4</sup> kgf/cm<sup>2</sup></b>
<b>Modulus of rigidity</b>	<b>1 – 1.2 x 10<sup>4</sup> kgf/cm<sup>2</sup></b>
<b>Compressive strength</b>	<b>600 – 700 kgf/cm<sup>2</sup></b>
<b>Flexural strength</b>	<b>600 – 700 kgf/cm<sup>2</sup></b>
<b>Impact strength at 0° C</b>	<b>0.027 – 0.054 m-kg/cm of notch</b>
<b>Impact strength at 20° C</b>	<b>0.054 – 0.108 m-kg/cm of notch</b>
<b>Maximum bending stress</b>	<b>21 kgf/cm<sup>2</sup></b>
<b>Durometer hardness</b>	<b>80</b>

## Technical Details - uPVC piping systems

### THERMAL PROPERTIES

Softening point	72 – 80°C
Coefficient of linear expansion	5.4 x 10 <sup>5</sup> mm/mm/°C
Expansion in 6 meter length	3.2 mm / 10°C (approximate)
Coefficient of heat conductivity	0.14 kcal/kg/°C
Specific heat	0.25 cal/°C
Heat distortion temperature	75 (at 18.5 kg/ cm <sup>2</sup> )

### FLOW CHARACTERISTICS

Hazen William's constant – C Value	150 – remains constant
Cole Brook coefficient	0.00001
Incrustation/Sedimentation	Nil
Biological attack	Immune
Insect attack	Nil
Rodent attack	Nil

## CHEMICAL RESISTANCE CHART

Subject examined	Concentration %	Temperature (0°C)		
Acetaldehyde, aqueous	40	40	0	
Acetaldehyde, concentration	100	20	-	
Acetaldehyde + acetic acid	90/10	20	0	
Acetic acid, aqueous	Upto 25	40	+	
		60	0	
	25-60	60	+	
		80	0	
Acetic acid, crude	95	40	0	
Acetic anhydride	100	20	-	
		40	-	
		60	-	
Acetic ester	100	20	-	
Acetone, aqueous	Traces	20	-	
		100	20	-
		60	-	
Acronal dispersions	Commercial	20	+	
		20	-	
Acrylic acid ethyl ester	100	20	-	

Subject examined	Concentration %	Temperature (0°C)	
Adipic acid, aqueous	Saturated	20	+
	Saturated	60	0
Aktivin, aqueous	1	20	+
Allyl alcohol	96	20	0
		60	-
Aluminum chloride, aqueous	Diluted	40	+
		60	0
		Saturated	60
Aluminum sulphate, aqueous	Diluted	40	+
		60	0
		Saturated	60
Alums, aqueous	Diluted	40	+
		60	0
		Saturated	60
Ammonia, gaseous	100	60	+
Ammonia, liquid	100	20	0
Ammonia water	Warm sat.	40	+
		60	0

## Technical Details - uPVC piping systems

Subject examined	Concentration %	Temperature (0°C)	
Ammonium chloride, aqueous	Diluted	40	+
	Diluted	60	0
	Saturated	60	+
Ammonium fluoride, aqueous	Upto 20	20	+
	Upto 20	60	0
Ammonium nitrate, aqueous	Diluted	40	+
	Diluted	60	0
	Saturated	60	+
Ammonium sulphate, aqueous	Diluted	40	+
	Diluted	60	0
	Saturated	60	+
Ammonium sulphide, aqueous	Diluted	40	+
	Diluted	60	0
	Saturated	60	+
Aniline, aqueous	Saturated	20	-
	Saturated	60	-
	100	20	-
Aniline, pure	100	60	-
	Saturated	20	0
Aniline chloride hydrate, aqu.	Saturated	60	-
	Saturated	20	0
Anone	100	20	-
Anthraquinone sulphonic acid	Suspension	30	+
Antiformin, aqueous	2	20	+
Antimony chloride aqueous	90	20	+
Arsenic acid, aqueous	Diluted	40	+
	Diluted	60	0
	80	40	+
	80	60	0
Asfluid I. Dry (film)	--	20	0
Asfluid I. Liquid	--	20	-
Beef suet emul., Sulphonated	Commercial	20	+
Beer	Commercial	20	+
Benzaldehyde, aqueous	0.1	60	-
Benzene	100	20	--
Benzine	100	60	+
Benzine-benzene mixture	80/20	20	--
Benzoic acid, aqueous	Any	40	+
	Any	60	0
Benzoic acid soda, aqueous	Upto 10	40	+
	Upto 10	60	0
	36	60	0
Bisulphite lye, containing SO <sub>2</sub>	Warm Sat	50	+
	Usual	40	+
Bleaching lye, 12.5% active chlorine	Usual	60	0
Borax, aqueous	Diluted	40	+
	Diluted	60	0
	Saturated	60	0
Brandy, various kinds	Commercial	20	+
Bromine, liquid	100	20	--
Bromine, vapours	Low	20	0
Butadiene	100	60	+
Butandiol	Upto 100	20	0
Butandiol, aqueous	Upto 10	20	+
	Upto 10	40	0
	Upto 10	60	--
Butane, gaseous	50	20	+

Subject examined	Concentration %	Temperature (0°C)	
Butanol	Upto 100	40	+
	Upto 100	60	0
Butindiol	Upto 100	40	0
Butyl acetate	100	20	--
Butylene, liquid	100	-20	+
Butyl phenol	100	20	0
Butyric acid, aqueous	20	20	+
	Concentration	20	--
Calcium nitrate, aqueous	Diluted	40	+
	Diluted	60	0
	Saturated	60	+
Calcium nitrate, aqueous	50	40	+
Caramel	Commercial	60+	
Carbon bisulphide	100	20	0
Carbonic acid, aqueous at			
An over pressure pf 7 bar	Saturated	20	+
Carbonic acid, moist	Any	40	+
	Any	60	0
Carbon tetrachloride, techn	100	20	0
Caustic lye, aqueous	Upto 40	40	+
	Upto 40	60	0
	50/60	60	+
Chloramine, aqueous	Diluted	20	+
Chloric acid, aqueous	1	40	+
	1	60	0
	10	40	+
	10	60	0
	20	40	+
	20	60	0
Chlorine, gaseous, dry	100	20	0
Chlorine, gaseous, moist	0.5	20	+
	1	20	0
	5	20	0
Chlorine water	Saturated	20	0
Chloroacetic acid (mono)	100	40	+
	100	60	0
Chloroacetic acid (mono), aqueous	85	20	0
Chloromethyl	100	20	-
Chlorosulphonic acid	100	20	0
Chromic acid, aqueous	Upto 50	40	+
	Upto 50	60	0
Chromic acid/Sulphuric acid/water	50/15/35	40	+
	50/15/35	60	0
Chromic alum, aqueous	Upto 10	40	+
	Upto 10	60	0
	Saturated	60	+
Clophene	Commercial	20	0
	Commercial	60	--
Coconut oil alcohol	100	20	+
	100	60	+
Copper fluoride, aqueous	2	40	+
Copper sulphate, aqueous	Diluted	40	+
	Diluted	60	0
	Saturated	60	+

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Subject examined	Concentration %	Temperature (0°C)	
Cresol, aqueous	Upto 90	45	0
Crotonaldehyde	100	20	-
Cuprous chloride, Aqueous	saturated	20	+
Cyclanone	Commercial	20	+
	Commercial	60	+
Cyclohexanol	100	20	-
Cyclohexanone	100	20	-
Densodrin W	Commercial	60	+
Dextrin, aqueous	Saturated	20	+
	18	60	0
Digeycolic acid, Aqueous	30	60	0
	Saturated	20	+
Dimethylamine, liquid	100	30	0
Dutch glue	Ind.stand.	60	+
Ethyl alcohol, aqueous	Any	20	+
	96	60	0
Ethyl alcohol, denaturated (with 2% toluene)	96	20	+
Ethyl alcohol (fermentation mash)	Ind.stand.	40	+
	Ind.stand.	60	0
Ethyl alcohol + acetic acid (fermentation mash)	Ind.stand.	20	+
Ethylene chloride	100	20	-
Ethylene oxide, liquid	100	-20	-
Ethyl acetate	100	20	-
	100	60	-
Ethyl ether	100	20	-
Fatty acids	100	60	+
Fermentation yeast wort	Ind.stand.	40	+
	Ind.stand.	60	0
Ferric chloride, aqueous	Upto 10	40	+
	Upto 10	60	0
	Saturated	60	+
Ferric potassium cyanide and Ferrous potass. Cyanide, aqu	Diluted	40	+
	Diluted	60	0
	Saturated	60	+
Formaldehyde, aqueous	Diluted	40	+
	Diluted	60	0
	40	60	+
Formic acid	100	20	+
	100	60	-
Formic acid, aqueous	Upto 50	40	+
	50	60	0
Freon 12	100	20	+
Fruit pulp	Ind.stand.	20	+
Fruit tree carbolineum aqueous	Usual	20	+
Gas water	Usual	40	0
Glacial acetic acid	100	20	0
	100	40	-
Glucose, aqueous	saturated	20	+
	Saturated	60	0
Glycerine, aqueous	Any	60	+
Glycocol, aqueous	10	40	+
Glycol, aqueous	commercial	60	+
Glycolic acid	37	20	+
Hexantriol	Commercial	60	+
Hydrobromic acid, aqueous	Upto 10	40	+
	Upto 10	60	0
	48	60	+

Subject examined	Concentration %	Temperature (0°C)	
Hydrochloric acid, aqueous	Upto 30	40	+
	Upto 30	60	0
	Over 30	20	+
	Over 30	60	+
Hydrofluoric acid, aqueous	Upto 40	20	+
	40	60	0
	60	20	0
	70	20	0
Hydrofluosilicic acid, aqueous	Upto 32	60	+
Hydrogen	100	60	+
Hydrogen peroxide, aqueous	Upto 30	20	+
	Upto 20	50	+
Hydrogen phosphide	100	20	+
Hydrogen sulphide, aqueous	Warm sat.	40	+
	Warm sat.	60	0
Hydrogen sulphide, dry	100	60	+
Hydrodulfite, aqueous	Upto 10	40	+
	Upto 10	60	0
Hydroxylamine sulphate, aqu.	Upto 12	35	+
Lactic acid, aqueous	Upto 10	40	+
	Upto 10	60	0
	90	60	-
Lead acetate, aqueous	Warm sat.	50	+
	Diluted	40	+
	Diluted	60	+
	Saturated	60	+
Lead tetraethyl	100	20	+
Liquors	Commercial	20	+
Magnesium chloride, aqueous	Diluted	40	+
	Diluted	60	0
	Saturated	60	+
Magnesium sulphate, aqueous	Diluted	40	+
	Diluted	60	0
	Saturated	60	+
Maleic acid, aqueous	Saturated	40	+
	Saturated	60	0
	35	40	+
Malic acid, aqueous	1	20	+
Manuring salts, aqueous	Upto 10	40	+
	Upto 10	60	0
	Saturated	60	+
Mersol D	Ind.stand.	40	+
Methyl alcohol	100	40	+
	100	60	0
Methylamine, aqueous	32	20	0
Methylene chloride	100	20	-
Methyl sulphuric acid, aqu.	Upto 50	20	+
	Upto 50	40	0
	100	40	+
	100	60	0
Milk	Commercial	20	+
Mixed acid (sulphuric acid/nitric acid/water)			
	48/49/3	20	+
	48/49/3	40	0
	50/50/0	20	0
	50/50/0	40	-
	10/20/70	50	+
	10/87/3	20	0
	50/31/19	30	+

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Subject examined	Concentration %	Temperature (0°C)	
Molasses	Ind.stand	20	+
	Ind.stand.	60	0
Molasses wort	Ind.stand.	60	+
Mowilith D	Commercial	20	+
Nekal, BK, aqueous	Diluted	40	+
	Diluted	60	0
Nickel sulphate, aqueous	Diluted	40	+
	Diluted	60	0
	Saturated	60	+
Nicotine, aqueous	Usual	20	+
Nicotine preparation. Aqu.	Usual	20	+
Nitric acid, aqueous	Upto 30	50	+
	30/50	50	+
	98	20	-
Nitrous fumes	Concentr.	20	0
	Concentr.	60	-
Oils and fats	Commercial	60	+
Oleic acid	Commercial	60	+
Oleum	10	20	-
Oleum fumes	Lower	20	+
	Higher	20	0
Oxalic acid, aqueous	Diluted	40	+
	Diluted	60	0
	Saturated	60	+
Oxygen	Any	60	+
Ozone	100	20	+
	10	30	+
Palm nut fatty acids	100	60	+
Paraffin emulsion	Commercial	20	+
	Commercial	40	+
Perchloric acid, aqueous	Upto 10	40	+
	Upto 10	60	0
	Saturated	60	+
Phenol, aqueous	Upto 90	45	0
	1	20	+
Phenylhydrazine	100	20	-
	100	60	-
Phenylhydrazine-chlorohydrate, aq.	Saturated	20	0
	Saturated	60	-
Phosgene, gaseous	100	20	+
	100	60	0
Phosgene, liquid	100	20	-
Phosphoric acid, aqueous	Upto 30	10	+
	Upto 30	60	0
	40	60	+
	80	20	+
	80	60	+
Phosphorus pentoxide	100	20	+

Subject examined	Concentration %	Temperature (0°C)	
Phosphorus trichloride	100	20	-
Photo developers	Commercial	40	+
Photo emulsions	Any	40	+
Photo fixing baths	Commercial	40	+
Picric acid, aqueous	1	20	+
Potash, aqueous	Saturated	40	+
Potassium bichromate, aqu.	40	20	+
	1	40	+
Potassium borate, aqueous	1	60	0
	Upto 10	40	+
Potassium bromate, aqueous	Upto 10	60	0
	Diluted	40	+
Potassium bromide, aqueous	Diluted	60	0
	Saturated	60	+
	Diluted	40	+
Potassium chloride, aqueous	Diluted	40	+
	Diluted	60	0
	Saturated	60	+
Potassium chromate, aqueous	40	20	+
Potassium cyanide, aqueous	Upto 10	40	+
	Upto 10	60	0
	Saturated	60	+
Potassium lye, aqueous	Upto 40	40	+
	50/60	60	0
	Diluted	40	+
Potassium nitrate, aqueous	Diluted	60	0
	Saturated	60	+
	1	40	+
Potassium percholate, aqu.	1	60	0
	Upto 6	20	+
	Upto 6	40	+
Potassium permanganate, aqu.	Upto 6	60	+
	Upto 18	40	+
	Diluted	40	+
Potassium persulphate, aqu.	Diluted	60	0
	Saturated	40	+
	Saturated	60	0
Propane, gaseous	100	20	+
	7	60	+
Propargyl alcohol, aqueous	Any	60	+
Roaster gases, dry	-	40	+
Sea water	-	60	0
	Any	60	+
Silicic acid, aqueous	Upto 8	40	+
Silver nitrate, aqueous	Upto 8	60	0
	Concentr.	20	+

## Technical Details - uPVC piping systems

Subject examined	Concentration %	Temperature (0°C)	
Soap solution, aqueous	Concentr.	60	0
	Diluted	40	+
Soda, aqueous	diluted	60	0
	Saturated	60	+
	Upto 10	40	+
Sodium chlorate, aqueous	Upto 10	60	0
	Saturated	60	+
	Diluted	20	
0			
Sodium chloride, aqueous	Saturated	60	+
	Diluted	20	
0			
Sodium chlorite, aqueous	Diluted	60	-
	Diluted	20	
+			
Sodium hypochlorite, aqu.	Diluted	40	+
Sodium sulphide, aqueous	Diluted	60	0
	Saturated	60	+
	Commercial	20	+
Sperm oil alcohol	0.01	52	+
Spin bath acids, containing Cs2	0.02	52	0
	0.07	52	-
	Diluted	40	+
Stannous chloride, aqueous	Diluted	60	0
	Saturated	60	0
	Any	40	+
Starch, aqueous	Any	60	+
	Ind, stand.	60	+
Starch syrup	100	60	+
Starch acid			
Sulphur dioxide, aqueous at an overpressure of 7 bar	Saturated	20	+
	Any	60	+
Sulphur dioxide, dry	Any	60	+
Sulphur dioxide, liquid	100	-10	0
	100	20	0
	100	60	-
Sulphur dioxide, moist and aqu.	Any	40	+
	50	50	+
	Any	60	0
Sulphuric acid, aqueous	Upto 40	40	+
	Upto 40	60	0
	70	20	+
	70	60	+
	80/90	40	+
	96	20	+
Tallow	96	60	0
	100	20	+
Tanigan extra A, aqueous	100	60	+
Tanigan extra B, aqueous	Any	20	+

Subject examined	Concentration %	Temperature (0°C)	
Tanigan extra D, aqueous	Any	20	+
	Saturated	40	0
Tanigan F, aqueous	Saturated	60	-
Tanigan U, aqueous	Saturated	60	+
	Saturated	40	+
Tanning extracts, from cellulose	Saturated	60	0
Tanning extracts, vegetable	Usual	20	+
Tartaric acid, aqueous	Usual	20	+
	Upto 10	40	+
	Upto 10	60	0
Thionyl chloride	Saturated	60	+
Toluol	100	20	-
Trichloroethylene	100	20	-
Triethanolamine	100	20	-
Trilone	100	20	-
Trimethylolpropane, aqueous	Commercial	60	0
	Upto 10	40	+
	Upto 10	60	0
Urea, aqueous	Commercial	40	0
	Commercial	60	0
	Upto 10	40	+
Urine	Upto 10	60	0
	33	60	+
	Normal	40	+
Vinager (wine vinegar)	Normal	60	+
	Commercial	50	+
	Commercial	50	+
Vinyl acetate	100	20	-
Waste gases, cont. carbonic acid	Any	60	+
Waste gases, cont hydrochloric acid	Any	60	+
Waste gases, cont hydrogen fluoride	Traces	60	+
Waste gases, nitrous	Traces	60	+
	Higher	60	-
Waste gases, cont. oleum	Lower	20	+
	Higher	20	-
Waste gases, cont. So2	Lower	60	+
	50	50	+
Waste gases, cont. sulphuric acid, moist	Any	60	+
Water	100	40	+
	100	60	+
Wax alcohol	100	60	+
Wines, red and white	Commercial	20	+
Xylene	100	20	-
Zinc chloride, aqueous	Diluted	40	+
	Diluted	60	0
	Saturated	60	+
Zinc sulphate, aqueous	Diluted	40	+
	Diluted	60	0
	Saturated	60	+