



شركة المصنع الوطني لصناعة البلاستيك
National Factory For Plastic Industry



U-PVC

UNPLASTICIZED POLYVINYL CHLORIDE



شركة المصنع الوطني لصناعة البلاستيك
National Factory For Plastic Industry



*We make pipelines rigid & durable
for generations to come.*

Experience more than 30 years

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National Factory For Plastic Industry



NFP

Introduction

PG 1

NATIONAL Factory for Plastic (NFP) is one of the pioneers in the plastic industry in Saudi Arabia. In view of the encouragement and support King Fahad's Government to the national industries, **NFP** had been established in 1982, and it is located in the third phase in industrial city in Jeddah for total area of 25,000 m². Then become one of the leaders in manufacturing U-PVC & CPVC pipes in the region.

NFP manufactures U-PVC (unplasticized polyvinyl chloride) and CPVC (Chlorinated Polyvinyl Chloride) pipes which being used for various applications such as potable water distribution system, irrigation networks, ventilation, sewage, electrical and telecom network. According to the Saudi Arabian SASO (14_15/1998) (DIN 8061 & 8062)(DIN19534 & 19531) (ASTM D-1785) (BS 3505 & BS 3506) (ASTM D 2241 SDR series) (NEMA TC-2 , NEMA TC -6 & NEMA TC -8)

NFP was found large starting from the beginning and was able to support and supply Kingdom-wide market and the foreign market as well.

NFP Using the best European technology and testing methods, produces all sizes with the best quality from 16 mm up to 710 mm diameter with licensed annual production output of 45,000 metric tons.

NFP U-PVC pipes are manufactured in accordance with:

- Saudi Arabian Standard (SASO 14 & 15/1998 for Potable Water), ISO (International Organization for Standardization) 161/1 which conforms to German Standard DIN 8061, 8062 and 19532.
- Saudi Arabian Standards (SASO 255, 254/(1981) Conforming to BS 6099 for UPVC Conduits.
- ASTM Standards ASTM D-1785, for (SCH.40, 80), ASTM D 2665, ASTM D 2241 (SDRS), ASTM F 441.
- DIN Standards 19534 & 19531.
- (NEMA TC-2, NEMA TC-6 & NEMA TC-8).

Physical, Mechanical, Electrical & Toxicity Properties of NFP U-PVC Pipes.

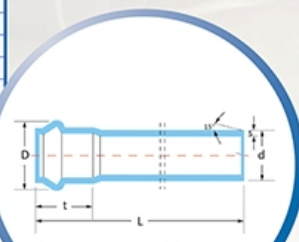
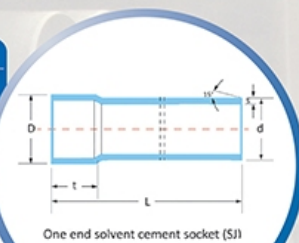
	Properties at 23°C / 73 °F	Standard	Values	Unit
Physical Properties	Density	ASTM D 792	1.40	g/cm ³
	Flammability	ASTM D 635	Resistance	Self Extinguishing
	Burning Rate	-	Self Extinguishing	in/min
	Vicat Softening Point	ASTM D 1525	> 80	°C
	Thermal Conductivity	ASTM D 177	0.14	Wm ² /k/m ²
	Co-efficient of Linear Expansion	ASTM D 696	6.0 x 10 ⁻⁵	cm/(cm°C)
	Specific Heat	-	0.25	Kcal/kg/°C
	Maximum Operating Temperature	-	60	°C
Mechanical Properties	Hardness	ASTM D 2240	80 ± 3	Shore "D"
	Tensile Strength	ASTM D 638 Type 1	> 50	Mpa
	Izod Impact	ASTM D 256 / notch	0.65	ft-lbs / inch of notch
	Modulus of Elasticity in Tension	ASTM D 639 Type 1	> 2700	Mpa
	Compressive Strength	ASTM D 695	62	Mpa
	Flexural Strength	ASTM D 790 proc.B	100	Mpa
	Elongation at break	ASTM D 638	> 125	%
Electrical Properties	Yield Stress	ISO R 527	> 400	kp/cm ²
	Dielectric Strength	ASTM D 149	1100	Volts/mm
	Power Factor	ASTM D 150	1.93	60cps @30°C
	Dielectric Constant	ASTM D 150	4.00	60cps @20°C
Toxicity	Specific Volume Resistivity	ASTM D 257	> 10 ¹⁴	ohm (Ω) cm
	Lead (pb)	SAS 14 / 1396H	< 0.3	mg/L
	Tin (Sn)	SAS 14 / 1396H	< 0.02	mg/L
	Zinc (Zn) & BARRIUM (Br)	SAS 14 / 1396H	< 0.01	mg/L
	Cadmium (Cd)	SAS 14 / 1396H	< 0.01	mg/L



NFP U-PVC Pipes

According to SASO14-15/1998 Equivalent to DIN 8061, 8062 & ISO 161/1

Class		Class 1		Class 2		Class 3		Class 4		Class 5	
Nominal Pressure (Bar)		2 Bar		4 Bar		6 Bar		10 Bar		16 Bar	
Nominal Outside Diameter (mm)	Tolerance on Nominal Diameter (mm)	Nominal Wall Thickness (mm)	Nominal Weight (kg/m)	Nominal Wall Thickness (mm)	Nominal Weight (kg/m)	Nominal Wall Thickness (mm)	Nominal Weight (kg/m)	Nominal Wall Thickness (mm)	Nominal Weight (kg/m)	Nominal Wall Thickness (mm)	Nominal Weight (kg/m)
16	+0.2	-	-	-	-	-	-	-	-	1.20	0.090
20	+0.2	-	-	-	-	-	-	-	-	1.50	0.137
25	+0.2	-	-	-	-	-	-	1.50	0.174	1.90	0.212
32	+0.2	-	-	-	-	-	-	1.80	0.264	2.40	0.342
40	+0.2	-	-	-	-	1.80	0.334	1.90	0.35	3.00	0.525
50	+0.2	-	-	-	-	1.80	0.422	2.40	0.552	3.70	0.809
63	+0.2	-	-	-	-	1.90	0.562	3.00	0.854	4.70	1.29
75	+0.3	-	-	1.80	0.642	2.20	0.782	3.60	1.22	5.60	1.82
90	+0.3	-	-	1.80	0.774	2.70	1.130	4.30	1.75	6.70	2.61
110	+0.3	1.80	0.95	2.20	1.160	3.20	1.640	5.30	2.61	8.20	3.90
125	+0.3	1.80	1.08	2.50	1.48	3.70	2.130	6.00	3.34	9.30	5.01
140	+0.4	1.80	1.21	2.80	1.84	4.10	2.650	6.70	4.18	10.40	6.27
160	+0.4	1.80	1.39	3.20	2.41	4.70	3.440	7.70	5.47	11.90	8.17
180	+0.4	1.80	1.57	3.60	3.02	5.30	4.370	8.60	6.88	13.40	10.40
200	+0.4	1.80	1.74	4.00	3.70	5.90	5.370	9.60	8.51	14.90	12.80
225	+0.5	1.80	1.96	4.50	4.70	6.60	6.760	10.80	10.80	16.70	16.10
250	+0.5	2.00	2.40	4.90	5.65	7.30	8.310	11.90	13.20	18.60	19.90
280	+0.6	2.30	3.11	5.50	7.11	8.20	10.40	13.40	16.60	20.80	24.90
315	+0.6	2.50	3.78	6.20	9.02	9.20	13.20	15.00	20.90	23.40	31.50
355	+0.7	2.90	4.88	7.00	11.40	10.40	16.70	16.90	26.50	26.30	39.90
400	+0.7	3.20	6.10	7.90	14.50	11.70	21.10	19.10	33.70	29.70	50.80
450	+0.8	3.60	7.65	8.90	18.30	13.20	26.80	21.50	42.70	-	-
500	+0.9	4.00	9.38	9.80	22.40	14.60	32.90	23.90	52.60	-	-
560	+1.0	4.50	11.80	11.00	28.10	16.40	41.40	26.70	65.80	-	-
630	+1.1	5.00	14.70	12.40	35.70	18.40	52.20	30.00	83.20	-	-
710	+1.2	5.70	18.90	14.00	45.30	20.70	66.10	-	-	-	-



NOTES

- The standard length is 6 meters or as required.
- Pipe color is grey.
- Rubber (R/J) type is supplied from size: 63mm up to 710mm.
- Solvent cement (S/J) type is supplied from size 16mm up to 710mm.

NFP U-PVC Pipes according to ASTM D - 1785 Schedule 80



Nominal Size (Inch)	Outside Diameter (mm)		Wall Thickness (mm)		Nominal Weight (kg /m)	Max Pressure Rating (Bar @ 23° C)
	Min.	Max.	Min.	Max.		
1/2"	21.24	21.44	3.73	4.24	0.31	58.60
3/4"	26.57	26.77	3.91	4.42	0.41	47.57
1"	33.27	33.53	4.55	5.08	0.61	43.43
1 1/4"	42.03	42.29	4.85	5.43	0.85	35.85
1 1/2"	48.11	48.41	5.08	5.69	1.03	32.40
2"	60.17	60.47	5.54	6.20	1.43	27.57
2 1/2"	72.84	73.20	7.01	7.85	2.18	28.95
3"	88.70	89.10	7.62	8.53	2.91	25.51
4"	114.07	114.53	8.56	9.58	4.26	22.06
6"	168.00	168.56	10.97	12.29	8.13	19.30
8"	218.70	219.46	12.70	14.22	12.40	17.23



NOTES

- The Standard length of pipe is 6 meters or as required.
- Pipes color is grey



NFP Standard

NFP U-PVC Pipes according to ASTM D 1785 Schedule 40 & ASTM D 2665

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Nominal Size (Inch)	Outside Diameter (mm)		Wall Thickness (mm)		Nominal Weight (kg / m)	Max Pressure Rating (Bar @ 23° C)
	Min.	Max.	Min.	Max.		
1/2"	21.24	21.44	2.77	3.28	0.24	41.38
3/4"	26.57	26.77	2.87	3.38	0.33	33.10
1"	33.27	33.53	3.38	3.89	0.48	31.03
1 1/4"	42.03	42.29	3.56	4.07	0.65	25.51
1 1/2"	48.11	48.41	3.68	4.19	0.77	22.75
2"	60.17	60.47	3.91	4.42	1.04	19.31
2 1/2"	72.84	73.20	5.16	5.77	1.65	20.68
3"	88.70	89.10	5.49	6.15	2.14	17.93
4"	114.07	114.53	6.02	6.73	3.05	15.17
6"	168.00	168.56	7.11	7.97	5.37	12.41
8"	218.70	219.46	8.18	9.17	8.11	11.03

NOTES

- The Standard length of pipe is 6 meters or as required.
- Pipes color is white
- Pipes with one solvent cement socket or plain end.

NFP U-PVC pipes according to British Standard BS 3505/3506

Nominal Size (Inch)	Class		Class O	Class B	Class C	Class D	Class E	Class 6	Class 7		
	Pressure		Non Pressure	6 Bar	9 Bar	12 Bar	15 Bar				
	Outside Diameter		Minimum Wall Thickness (mm)								
	Min (mm)	Max (mm)									
1/2"	21.20	21.50	—	—	—	—	1.70	2.80	3.70		
3/4"	26.60	26.90	—	—	—	—	1.90	2.90	3.90		
1"	33.40	33.70	—	—	—	—	2.20	3.40	4.50		
1 1/4"	42.10	42.40	—	—	—	2.20	2.70	3.60	4.80		
1 1/2"	48.10	48.40	1.80	—	—	2.50	3.10	3.70	5.10		
2"	60.20	60.50	1.80	—	2.50	3.10	3.90	—	5.50		
2 1/2"	75.00	75.30	1.80	—	3.00	3.90	4.80	—	—		
3"	88.70	89.10	1.80	2.90	3.50	4.60	5.70	—	—		
4"	114.10	114.50	2.30	3.40	4.50	6.00	7.30	—	—		
6"	168.00	168.50	3.10	4.50	6.60	8.80	10.80	—	—		
8"	218.80	219.40	3.10	5.30	7.80	10.30	12.60	—	—		

- The Standard Length of pipe is 6 meters or as required

- Pipes with solvent cement socket or plain end.



NFP U-PVC Pipes according to ASTM D 2241 SDR series

Standard Dimensional Ratio (SDR)			SDR 32.5	SDR 26	SDR 21	SDR 17	SDR 13.5
Working Pressure @ 23°C / 73°F			125 psi	160 psi	200 psi	250 psi	315 psi
			8.6 bar	11.0 bar	13.8 bar	17.2 bar	21.7 bar
Nominal Size (inch)	Outside Diameter (mm)		Min. Wall Thick (mm)	Min. Wall Thick (mm)	Min. Wall Thick (mm)	Min. Wall Thick (mm)	Min. Wall Thick (mm)
	Min.	Max.					
1/2"	21.24	21.44	-	-	-	-	1.60
3/4"	26.57	26.77	-	-	1.50	1.60	2.00
1"	33.27	33.53	-	1.50	1.60	2.00	2.50
1 1/4"	42.03	42.29	1.50	1.60	2.00	2.50	3.10
1 1/2"	48.11	48.41	1.50	1.90	2.30	2.90	3.60
2"	60.17	60.47	1.90	2.30	2.90	3.60	4.50
3"	88.70	89.10	2.70	3.40	4.20	5.20	6.60
4"	114.07	114.53	3.50	4.40	5.40	6.70	8.50
6"	168.00	168.56	5.20	6.50	8.00	9.90	12.50
8"	218.70	219.46	6.70	8.40	10.40	12.90	-

The Standard Length of pipe is 6 meters or as required

NFP U-PVC Conduits according to NEMA TC - 2 (EPC 40 and EPC 80)



Nominal Pipe Size (inch)	Average Outside Diameter (mm)	EPC 40		EPC 80	
		Minimum Wall thickness (mm)	Nominal Weight (kg / m)	Minimum Wall thickness (mm)	Nominal Weight (kg / m)
1/2"	21.34	2.77	0.248	3.73	0.309
3/4"	26.67	2.87	0.329	3.91	0.418
1"	33.40	3.38	0.483	4.55	0.614
1 1/4"	42.16	3.56	0.652	4.85	0.850
1 1/2"	48.26	3.68	0.779	5.08	1.030
2"	60.32	3.91	1.040	5.54	1.430
2 1/2"	73.02	5.16	1.650	7.01	2.180
3"	88.90	5.49	2.160	7.62	2.900
4"	114.30	6.02	3.070	8.56	4.260
6"	168.28	7.11	5.41	10.97	8.130
8"	219.07	8.18	8.143	12.70	12.400

Note:

EPC 40 - Electrical Plastic Conduit for normal duty applications

EPC 80 - Electrical Plastic Conduit for heavy duty applications

The Standard Length of pipe is 3 m or 6 m



NFP U-PVC utilities ducts according to NEMA TC - 6 for Underground Installation

Nominal Pipe Size (inch)	Average Outside Diameter (mm)	TYPE EB 20		TYPE DB 60	
		Minimum Wall thickness (mm)	Nominal Weight (kg / m)	Minimum Wall thickness (mm)	Nominal Weight (kg / m)
2"	60.32	1.52	0.465	1.52	0.465
3"	88.90	1.55	0.702	2.34	1.000
4"	114.30	2.08	1.170	3.07	1.650
5"	141.30	2.62	1.710	3.86	2.500
6"	168.28	3.18	2.530	4.62	3.570

Note:

Type EB for Encased Burial in Concrete
Type DB for Direct Burial without Concrete
Standard pipe length - 6m

NFP U-PVC extra strength utilities ducts according to NEMA TC - 8 for Underground Installation

Nominal Pipe Size (inch)	Average Outside Diameter (mm)	TYPE EB 35		TYPE DB 100		TYPE DB 120	
		Minimum Wall thickness (mm)	Nominal Weight (kg / m)	Minimum Wall thickness (mm)	Nominal Weight (kg / m)	Minimum Wall thickness (mm)	Nominal Weight (kg / m)
1"	33.40	-	-	-	-	1.52	0.251
1 1/2"	48.26	-	-	-	-	1.52	0.369
2"	60.32	1.52	0.465	-	-	1.96	0.576
3"	88.90	1.93	0.847	2.84	1.160	3.00	1.290
4"	114.30	2.54	1.390	3.68	1.930	3.91	2.050
5"	141.30	3.20	2.090	4.55	2.940	4.85	3.120
6"	168.28	3.86	3.020	5.41	4.170	5.77	4.420

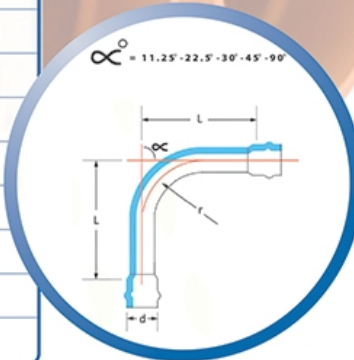
Note:

Type EB for Encased Burial in Concrete
Type DB for Direct Burial without Concrete
Standard pipe length - 6m

Figures 20, 35, 60, 100 & 120 represent the minimum stiffness of the pipes.
The above table confirms to Saudi Electrical Company (SEC) specification 23 - TMSS 01 Rev.1

NFP U-PVC long radius bend with rubber sealed socket or solvent cement, single & double socket.

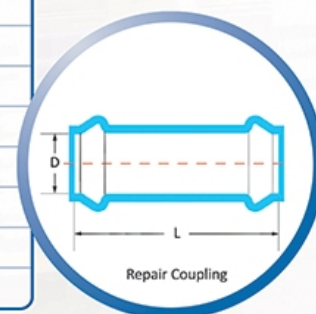
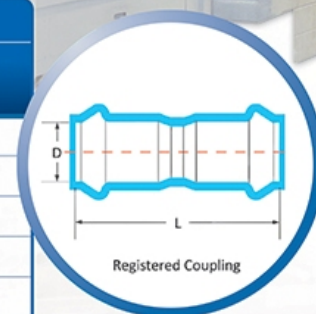
d (mm)	r (mm)	11.25° L (mm)	22.5° L (mm)	30° L (mm)	45° L (mm)	90° L (mm)
63	221	185	190	195	210	190
75	263	205	210	215	230	210
90	315	245	250	255	270	250
110	385	295	300	310	315	300
125	438	370	375	380	390	375
140	490	375	380	385	405	380
160	560	375	380	390	430	380
200	700	500	510	520	540	510
225	788	630	650	665	700	650
250	825	630	650	665	700	650
280	960	835	840	855	885	840
315	1103	890	940	955	995	940
400	1400	920	1180	1200	1250	1180



NFP Standard

NFP U-PVC couplings with rubber ring sealed socket

Registered Coupling			Repair Coupling		
D (mm)	Series 3 & 4 6 & 10 Bar L (mm)	Series 5 16 Bar L (mm)	D (mm)	Series 3 & 4 6 & 10 Bar L (mm)	Series 5 16 Bar L (mm)
63	240	245	63	227	240
75	240	255	75	240	255
90	265	285	90	255	273
110	280	305	110	277	298
125	295	320	125	295	320
140	306	333	140	306	333
160	328	359	160	328	356
200	357	390	200	357	390
225	390	434	225	390	434
250	406	455	250	406	455
280	446	502	280	446	502
315	478	572	315	478	542
400	546	625	400	546	625



**NFP CPVC DEVELOPED BY THE
COMPANY'S OWN TECHNOLOGY**

NFP CPVC is heat-resistant PVC developed by NFP Company, a leading manufacture of PVC and other polymers headquartered in Saudi Arabia. The main feature of the product is enhanced heat- Resistance without deteriorating of the basic mechanical and chemical Properties of the base PVC.

NFP CPVC is used in wide variety of applications including Piping for hot-water supply lines, industrial waste- water, and fire sprinklers. NFP CPVC is also used for fittings, sheets, plates, and a Wide variety of end-users, which take advantage of the product's superior properties.

NFP CPVC is used in both industrial and everyday life applications. By utilizing our accumulated know-how, continued development of NFP CPVC will allow us to better serve society in the 21 st century.

**NFP PLASTIC CPVC PIPE'S
PRODUCT INFORMATION**

This is a Thermoplastic piping material which can be used for higher temperature applications. It is a special polymer with a higher glass transition point, which means advantages over regular UPVC pipes and fittings. It is designed to last longer than metallic systems. Its superior endurance and physical integrity are attribute to a number of inherent characteristics.

In contrast to other commercial hot and cold water distribution plumbing materials, CPVC pipes has no corrosion problems because it is totally non-metallic.

CPVC pipes doesn't break down even under the harshness of water conditions. So there are none of the purity worries from corrosion of metal pipe or soldered joints. It is quieter than metal systems with less water hammer. In addition, NFP plastic CPVC pipes offers superior heat retention and virtually eliminates condensation.

CPVC retains its mechanical strength at higher temperatures.
CPVC =93° C Max UPVC=59° C



NFP CPVC is used in both industries and everyday-life applications

Practical Heat Resistance

The temperature at which **NFP** CPVC begins to soften is higher than conventional PVC by 20 to 40 degrees (C). Owing to this enhanced heat-resistant property, **NFP** CPVC, used in such applications as hot water supply pipes and industrial clean tanks, which are usually exposed to high temperatures, provides better toughness and creep resistance than ordinary PVC.

Chemical and Corrosion Resistance

NFP CPVC has better corrosion-resistance properties than many metallic pipes, provides chemical resistance as good as ordinary PVC, especially at high temperatures.

Excellent Flame Resistance

Low Smoke Generation

NFP CPVC is self-extinguishing, and is superior compared to ordinary PVC in its resistance to flame, owing to its much lower smoke generation and limiting oxygen index. Overall **NFP** CPVC offers superior properties as a flame-resistance plastic.

Handling and Fabrication

NFP provides adhesion equal to that of PVC and easy handling property in such applications as piping. Additionally, work such as welding, bending, sleeving, and vacuum molding are possible with **NFP** CPVC.

NFP has an integrated system for CPVC production to chlorination. **NFP** also boasts advanced polymer-designing capability and high-quality chlorination technology.

NFP also possesses a world-wide technical service network. This allows **NFP** to develop new products by closely working with customers and markets around the world.



PROPERTIES FOR NFP CPVC PIPES

MATERIAL:

CHLORINATED POLYVINYL CHLORIDE

GENERAL PROPERTIES:

- a.) Specific Gravity.....1.54 g / cm³
- b.) Water Absorption.....7 mg / cm²
- c.) Flammability.....Self extinguishing

THERMAL PROPERTIES:

- a.) Softening point 1 kgs. Load.....126° C
- b.) Coefficient of Linear Expansion..... 8.310×10^{-5} cm/(cm°c)

MECHANICAL PROPERTIES:

- a.) Ultimate Tensile Strength.....575 kgf/ cm²
- b.) Flexural Strength.....1018 kgf/ cm²
- c.) Impact Strength.....11 kg.cm/cm²

ELECTRICAL PROPERTIES:

- a.) Volume Resistivity.....10¹⁴ ohm. cm
- b.) Surface Resistivity.....10¹² ohm
- c.) Power Factor (at 10 cycles).....3.0

CPVC is a non-conductor of electricity and also non subject to galvanic or electrolytic attack. Electrical equipment should not be earthened to CPVC pipes.

COLOUR:

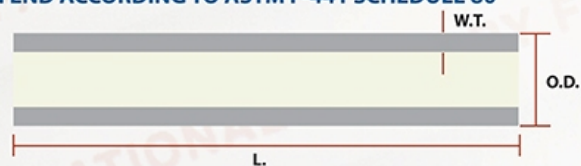
Light Grey - Ivory



PROPERTIES FOR NFP CPVC PIPES

NFP PLASTIC CPVC PIPES WITH PLAIN END ACCORDING TO ASTM F-441 SCHEDULE 80

STANDARD LENGTH (L) 6 meters



NOMINAL SIZE (Inch)	OUTSIDE DIA. (mm)	WALL THICKNESS (mm)	NOMINAL WEIGHT (Kg/m)	PRESSURE RATING (bar)
1/2"	21.34	3.73	0.323	5.86
3/4"	26.67	3.91	0.453	4.76
1"	33.40	4.55	0.673	4.34
1 1/4"	42.16	4.85	0.918	3.59
1 1/2"	48.26	5.08	1.060	3.24
2"	60.33	5.54	1.56	2.76
3"	88.90	7.62	3.18	2.55
4"	114.30	8.556	4.65	2.21
6"	168.28	10.97	8.87	1.93

- Shaded size are only manufactured on special request.
- Other lengths on request.
- The maximum pressure rating given above is based on water at 23° C(73° F) and for unthreaded pipe only.
- 1MPa= 1000KPa = 14.5 psi = 10 BAR = 10.2Kg/cm² = 1N/mm

NAME OF THE TEST	TEST METHOD	VALUE	UNIT
Stress Test	SASO 15/1998	No Balloon } @ 20 °C, 1 Hour No Burst } No Weep } @ 60 °C, 1000 Hour	-
Impact Test	SASO 15/1998	No Crack No Split	-
Opacity Test	SASO 1177/1997	≤ 0.2	%
Extrusion Test (Methyl Chloride)	SASO 15/1998	No Attack (20 min)	-
Heat Reversion	SASO 15/1998	No Delamination No Crack No Blister	-
Water Absorption	SASO 1179/1997	< 40	g/m ²
Sulphuric Acid Resistance	SASO 15/1998	0.316 (Increases) } @ 55°C 0.013 (Decreases) }	g /14 days
Toxic Matters Test	SASO 15/1998	Pb (1 st Extraction) < 1 Pb (3 rd Extraction) < 0.3 Sn (3 rd Extraction) < 0.02 Ba,Cd,Zn (3rd Extraction) < 0.01	mg / ltr
Density	ASTM D-792	1.40 – 1.50	g/cm ³
Tensile Strength	ASTM D-638	7500	psi
Hardness	ASTM D-2240	80 ± 3	shore "D"
Vicat Softening Point	ASTM D-1525	>80 @ 5 Kgf	°C
Heat Deflection	ASTM D- 648	78 @ 264 psi	°C



Certificates

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U-PVC



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