uPVC PIPES

NEPROPLAST

NEW PRODUCTS INDUSTRIES CO. LTD

Distributed by
National Marketing Est. Co .Ltd

Certificate of Registration

Intertek

MOODY INTERNATIONAL

This is to certify that the Quality Management System of

New Product Industries Co. Ltd.(NEPROPLAST)

P.O. Box 460, Jeddah 21411, Kingdom of Saudi Arabia

has been assessed and registered by MICL as conforming to the requirements of

ISO 9001: 2008

The Quality Management System is applicable to

The manufacture of upvc & cpvc plastic pipes & fittings and hdpe plastic pipes

Certificate Number: 27050
Initial Certification Date: 20 September 2012
Certificate Expiry Date: 19 September 2015

UKAS

014

Colin Middleman, President
Moody International Certification Ltd T/A Intertek – Meridn House,Stanier Way, Wyvernbusiness Park, Derby DE21 6BF, United Kingdom
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NSF International

RECOGNIZES

NEW PRODUCTS INDUSTRIES CO., LTD.
(NEPROPLAST)
SAUDI ARABIA

AS COMPLYING WITH NSF/ANSI 61 AND ALL APPLICABLE REQUIREMENTS.
PRODUCTS APPEARING IN THE NSF OFFICIAL LISTING ARE
AUTHORIZED TO BEAR THE NSF MARK.

NSF

ANSI

January 12, 2018
Certificate# C0020983 - 01

David Perkins, General Manager
Water Distribution Systems

بسم الله الرحمن الرحيم

SASO

تشهد الهيئة السعودية للمواصفات والمقاييس والجودة بأنها رخصت
لـ شركة صناعات المنتوجات الجديدة المحدودة
باستعمال علامة الجودة على المنتجات التالية :
أنابيب عديد كلوريد الفينيل غير اللدن لمياه الشرب فقط
لمطابقتها للمواصفات القياسية السعودية
رقم ١٩٩٨/١٤م
ولمدة عام واحد ابتداءً من ١/٧/١٤٣٠هـ الموافق ٢٤/٦/٢٠٠٩م
والله الموفق

محافظ الهيئة
نبيل بن أمين ملا

FOREWARD

NEPROPLAST (New Products Industries) was established in the 1969 as the first manufacturing facility to introduce the uPVC piping systems to the market in Saudi Arabia. Since its establishment, NEPROPLAST has followed a strict policy in producing high quality pipes. Using state of the art equipment and tools in its production facilities, hiring a highly trained professional staff, and working with a very experienced team of consultants in the industry. The initial production of NEPROPLAST uPVC pipes were manufactured according to British Standard Specifications BS 3505/3506. At a later stage, NEPROPLAST started to manufacture pipes and fittings according to International Specifications ISO. NEPROPLAST actively participated with Saudi Arabia Standard Organization SASO to set the Saudi Arabian Standard SAS 14/15/1396. In the mid 80s, NEPROPLAST started the production of PVC pipes and fittings according to ASTM standards for schedule 40, schedule 80, and CPVC pipes for sch80.
By producing a wide range of pipes and fittings according to different standards, NEPROPLAST has established for itself a strong position in the market to serve the construction industry in the fields of water network pressure lines, sewerage and drainage non-pressure lines, and electrical & telecommunication conduits . NEPROPLAST made its pipes and fittings available in both options of Rubber Ring or Solvent Cement jointing systems.

In 2009, NEPROPLAST made a significant move into modern, heavy metal free stabilizers for all its uPVC & cPVC products. A move which ensured total elimination of toxicological content throughout the entire NEPROPLAST product range.Organic stabilizers pipes and fittings ensure a safe drinking water supply, free of any possible toxic traces which can develop through the use of heavy metal uPVC stabilizers.

All NEPROPLAST drinking water products are now accreditised through NSF, proof of its excellent health safety factor.

NEPROPLAST added to its products portfolio the production of Polyethylene pipes (HDPE) in 2009. NEPROPLAST HDPE products range covers pipes and ducts to serve the water, gas, electrical, and telecommunication applications. NEPROPLAST recently introduced to the market the Polyethylene Corrugated-Optic-Ducts (COD) as a unique product for fiber optic and electrical cabling installations.

All NEPROPLAST products are marketed and sold through National Marketing Est. Co LTD. which has more than 23 branches covering all cities and urban areas across the Kingdom of Saudi Arabia. National Marketing has an export department responsible for exporting NEPROPLAST products to Middle East and North African (MENA) markets. In addition to NEPROPLAST products, National Marketing Est. Co. imports a wide range of fittings, valves, solvent cements, and other accessory components. Nowadays, National Marketing Est. Co LTD. is considered the largest trading company in Saudi Arabia that has all kinds of plastic pipes, fittings, valves, and cements available in its stocks for all traders and contractors in the Saudi market.
Both NEPROPLAST and NATIONAL MARKETING strive to be the largest quality leader in the supply of plastic piping systems to serve the water, gas, electrical & telecommunication sectors across the Middle East.

Isam K.Kabbani
Chairman
IKK Group of Companies

CATALOGUES

NEPROPLAST uPVC PIPES CATALOGUE
DIN, BS STANDARDS

NEPROPLAST uPVC ORANGE COLOR DRAINAGE FITTINGS CATALOGUE
For Drainage System

NEPROPLAST RIGID PVC PIPES ASTM STANDARD CATALOGUE
For potable Water and Sewage Systems
SCHEDULE 40 AND 80

NEPROPLAST FLOWGUARD ™ (CPVC) PIPES CATALOGUE
Quality Pipe with Stripe For Potable Water Network
SCHEDULE 80

NEPROPLAST PVC AND CPVC ASTM FITTINGS CATALOGUE
For potable Water and Sewage Systems
SCHEDULE 40 AND 80

NEPROPLAST PVC DRAIN-WASTE-VENT (DWV) ASTM FITTINGS CATALOGUE
For Drainage Systems

NEPROPLAST RIGID PVC CONDUIT PIPES AND FABRICATED FITTINGS CATALOGUE
For Electrical and Telecommunication Networks

NEPROPLAST CASING AND SCREEN PIPES CATALOGUE

NEPROPLAST HDPE WATER, GAS AND SEWAGE SYSTEMS CATALOGUE

NEPROPLAST POLYETHYLENE CORRUGATED OPTICAL DUCT (COD) & SUB DUCT

GALLERY

INDEX

MANUFACTURING STANDARDS

NEPROPLAST uPVC PIPES ARE MANUFACTURED IN ACCORDANCE WITH

- Saudi Arabian Standard (SSA 14 & 15 / 1998 for Potable water) ISO (International Organization for Standardization) 161/1 which conforms to German Standard DIN 8061, 8062 and 19532 & 19534.

- Saudi Arabian Standards (SSA 255, 254 / (1981) Conforming to BS EN 50086 - 1:1994 for Electrical Conduits replaces BS 6099 : Part 1 : 1981

- British Standards, BS 3505, BS 4660, BS 5481.

- ASTM Standards ASTM D-1785, For (Sch. 40, 80) ASTM D-2241 (SDR), ASTM D-2665,ASTM F-441, F-439.

- NEMA Standards TC-2, TC-6 and TC-8, TC-3/TC-9.

- EN Standard Pr EN 1401, Pr EN 1452-2.

- DIN 4925 for Well Casing & Screen.

RANGE OF PRODUCTION:

PIPES from NEPROPLAST are manufactured according to SSA and or DIN Standards from 16mm up to 710 mm outside diameter in various pressure & classes, details of which are shown in this catalogue on page No . 6 Table-1

SSA uPVC pipes are available with spigot and 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 BS & ASTM Standards range from 1/2 inch up to 8 inches in various pressure ratings.

BS & ASTM PVC pipes are available with plain spigot and socket joints only.

NEPROPLAST pipes are produced in 6 meters standard length (other lengths are available on request), standard colors are grey, white and black (other colors are available on request). Such as orange, brown & blue.

PRODUCT DEVELOPMENT:

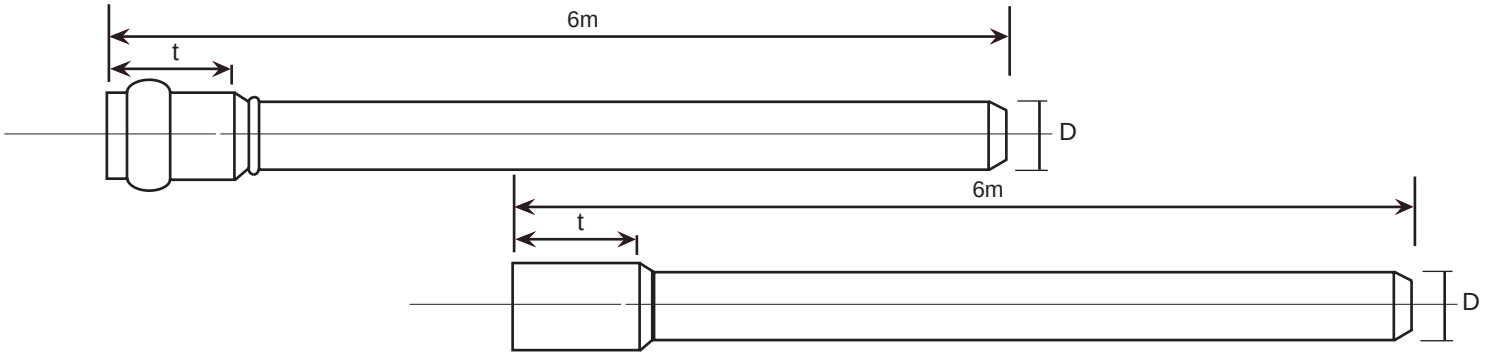
NEPROPLAST is adopting a policy of continuous development and research, as an integral part of its operation. Future plans are to widen its Range of PVC & cPVC fittings. For further details please contact our technical sales Dept.

MARKING:

NEPROPLAST uPVC pipes are marked automatically during the process of production. Each pipe is marked according to its relevant standard classifications. Special marking can be added on request.

STANDARDS TABLES

NEPROPLAST uPVC PIPES ACCORDING TO SSA 14 & 15/1998,ISO 161/1 AND DIN 8061/62 STANDARD, NOMINAL OUTSIDE DIAMETERS & NOMINAL WALL THICKNESS



Nominal Outside Diameter mm	Socket Depth for R/J mm(t)	Socket Depth for S/J mm(t)	CLASS I 2 BAR		CLASS II 4 BAR		CLASS III 6 BAR		CLASS IV 10 BAR		CLASS V 16 BAR	
			Nom.wt kg/m	Nom.thick.of the wall mm	Nom.wt kg/m	Nom.thick.of the wall mm	Nom.wt kg/m	Nom.thick.of the wall mm	Nom.wt kg/m	Nom.thick.of the wall mm	Nom.wt kg/m	Nom.thick.of the wall mm
16											0.090	1.2
20		20									0.137	1.5
25		25							0.174	1.5	0.212	1.9
32		32							0.264	1.8	0.342	2.4
40		40					0.334	1.8	0.350	1.9	0.525	3.0
50		50					0.422	1.8	0.552	2.4	0.809	3.7
63	117	63					0.562	1.9	0.854	3.0	1.289	4.7
75	119	70			0.642	1.8	0.782	2.2	1.220	3.6	1.820	5.6
90	124	79			0.774	1.8	1.130	2.7	1.750	4.3	2.610	6.7
110	129	91	0.950	1.8	1.160	2.2	1.640	3.2	2.610	5.3	3.900	8.2
125	132	100	1.080	1.8	1.480	2.5	2.130	3.7	3.340	6.0	5.010	9.3
140	135	109	1.210	1.8	1.840	2.8	2.650	4.1	4.100	6.7	6.270	10.4
160	142	121	1.390	1.8	2.410	3.2	3.440	4.7	5.470	7.7	8.170	11.9
200	150	145	1.740	1.8	3.700	4.0	5.370	5.9	8.510	9.6	12.800	14.9
225	162	160	1.960	1.8	4.700	4.5	6.760	6.6	10.800	10.8	16.100	16.7
250	162	175	2.400	2.0	5.650	4.9	8.310	7.3	13.200	11.9	19.900	18.6
280	170	193	3.110	2.3	7.110	5.5	10.400	8.2	16.600	13.4	24.900	20.8
315	180	214	3.780	2.5	9.020	6.2	13.100	9.2	20.900	15.0	31.500	23.4
355	189		4.870	2.9	11.400	7.0	16.700	10.4	26.500	16.9	39.900	26.3
400	200		6.100	3.2	14.500	7.9	21.100	11.7	33.700	19.1	50.800	29.7
450	213		7.650	3.6	18.300	8.9	26.800	13.2	42.700	21.5	-----	-----
500	253		9.370	4.0	22.400	9.8	32.900	14.6	52.600	23.9	-----	-----
630	315		14.700	5.0	35.700	12.4	52.200	18.4	83.200	30.0	-----	-----
710	450		18.900	5.7	45.300	14.0	66.100	20.7	-----	-----	-----	-----

STANDARDS TABLES

NEPROPLAST uPVC PIPES ACCORDING TO DIN 19534

Table - 2

Nominal Dia.(mm)	Outside Diameter (mm)	Wall Thickness(mm) (S)
100	110	3.00
125	125	3.00
150	160	3.60
200	200	4.50
250	250	6.10
300	315	7.70
400	400	9.80
500	500	*12.20
600	630	15.40

* For a Transitory period for this existing wall thickness S 1 = 13.4 mm may still be used. Special reference must be made to this when ordering.

NEPROPLAST uPVC PIPES ACCORDING TO BRITISH STANDARD BS 3505 / 3506

Table - 3

Nominal Size	Out Dia Mm	Class C (9 Bar)		Class D (12 Bar)		Class E (15 Bar)	
		Thickness mm	Nominal weight kg/m	Thickness mm	Nominal weight kg/m	Thickness mm	Nominal weight kg/m
1/2”	21.2 - 21.5					1.7	0.158
3/4”	26.6 - 26.9					1.9	0.225
1”	33.4 - 33.7					2.2	0.350
1/4”	42.1 - 42.4			2.2	0.434	2.7	0.508
1/2”	48.1 - 48.4			2.5	0.534	3.1	0.667
2”	60.2 - 60.5	2.5	0.683	3.1	0.850	3.9	1.042
3”	88.7 - 89.1	3.5	1.417	4.6	1.834	5.7	2.250
4”	114.1-114.5	4.5	2.350	6.0	3.050	7.3	3.700
6”	168.0-168.5	6.6	5.084	8.8	6.720	10.8	8.134
8”	218.8-219.4	7.8	7.086	10.3	10.170	12.6	12.280

NEPROPLAST uPVC PIPES FOR NON PRESSURE, SOIL,
WASTE AND VENT APPLICATIONS

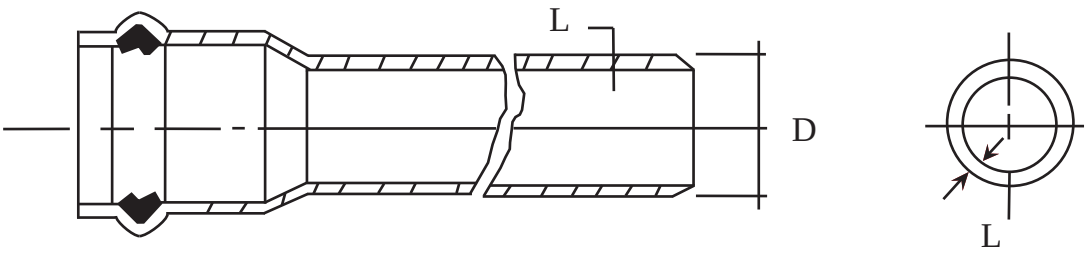


Table - 4 For Below Ground Gravity Drainge and Sewerage.

EN 1401 - 1				
Nominal Size	Outside Diameter (D) mm		Wall Thickness (L) mm	
mm	Minimum	Maximum	Minimum	Maximum
110 (4”)	110.0	110.4	3.2	4.0
460 (6”)	160.0	160.6	4.1	4.8

Table - 5 For Gravity Sewer.

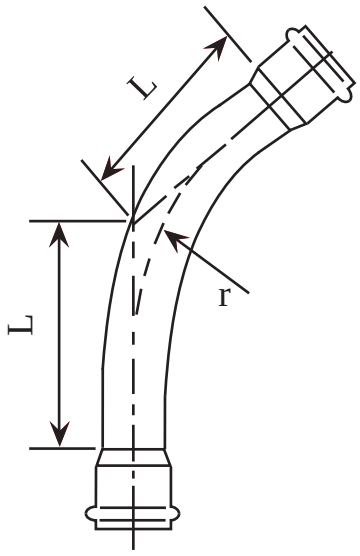
BS 5481			
Nominal Size	Mean Outside Diameter (D) mm		Wall Thickness (L) mm
mm	Minimum	Maximum	Minimum
200	200.0	200.6	4.9
250	250.0	250.7	6.1
315	315.0	315.9	7.7
400	400.0	401.0	9.8
500	500.0	501.0	12.2

Table - 6 For Soil & Ventilation.

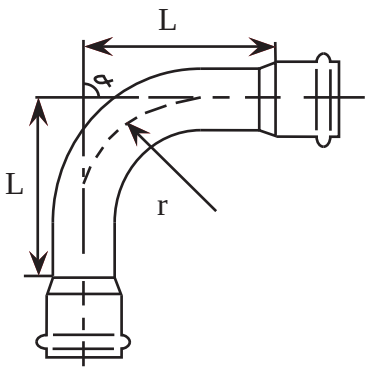
BS 4514			
Nominal Size	Outside Diameter	Nominal weight	Nominal Wall Thickness
Inc	mm	Kg/m	mm
3”	82.6	1.20	3.2
4”	110.2	1.62	3.2
6”	160.3	2.38	3.2

FABRICATED uPVC LONG RADIUS BENDS NP, NP 10 AND NP 16 BARS

Both rubber ring as well as Solvent cement Joint are of o ffered



(11^0 - 45^{0}DEG)



90^{0}BEND

Double & Single Socket Bends are available upon request.

Table - 7

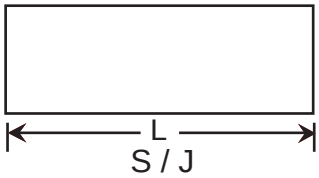
Pipe O.D mm/d	Radius mm r	L			
		11.25 ^{0}	22.5 ^{0}	45 ^{0}	90 ^{0}
63	221	165	187	235	364
75	263	177	204	260	414
90	315	192	224	292	476
110	385	212	251	334	559
125	438	227	271	365	622
140	490	243	292	397	684
160	729	303	373	524	934
225	788	329	408	578	1039
250	852	350	435	595	1240
280	980	385	483	694	1268
315	1103	420	531	768	1414
355	1243	860	1110	1200	1840
400	1400	910	1160	1300	1940
450	1575	960	1210	1400	2090
500	1750	1110	1410	1500	2190

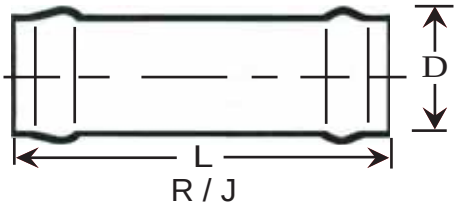
L = Leg Length

Other Angles can be produced on request

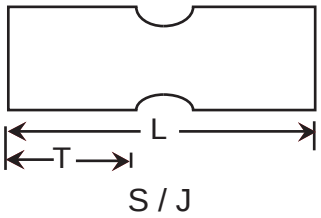
FABRICATED COUPLERS NP6, NP10 AND NP 16 BAR

A) Repair Coupling:





B) Register Coupling:



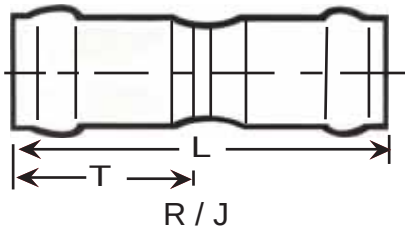


Table - 8

Pipe O.D mm	R/J Coupling			S/J mm	
	L.mm	D.mm	T.mm	L.mm	T.mm
16				59	25
20				58	27
25				66	30
32				74	34
40				94	39
50				96	45
63	240	90	100	126	53
75	250	105	103	140	60
90	270	125	111	160	69
110	290	150	116	185	81
140	330	192	125	230	99
160	350	211	135	250	111
200	375	247	144	300	135
225	430	290	154	360	150
250	445	310	162	380	165
280	495	360	172	425	183
315	545	403	185	478	204
355	588	434	194	520	224
400	612	485	205	570	246

Dimensions stated above are indicative, Detailed specification for design purposes should be obtained from our Technical Sales Department.

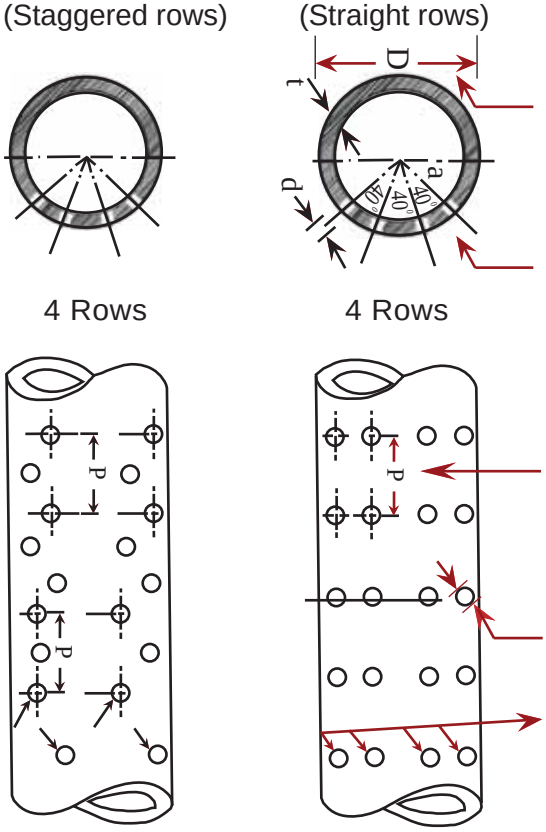
L = Length.

PERFORATED AND SLOTTED uPVC PIPES

NEPROPLAST Perforated or Slotted 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 clients requirements.

A) Perforated Pipe:

(Staggered rows) (Straight rows)



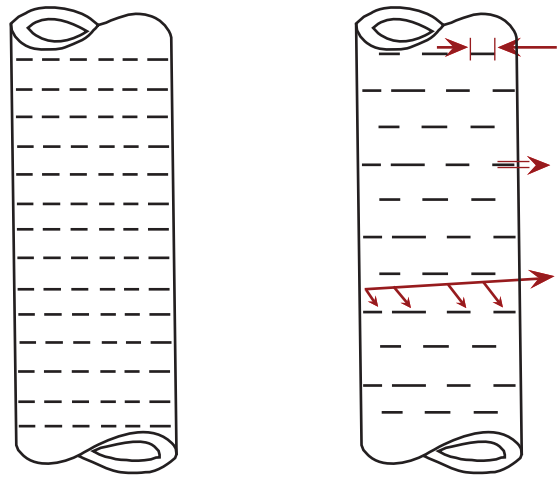
4 Rows 4 Rows

Range of sizes	75mm to 500mm
Angular pitch of holes	40^{o} for 3 or 4 rows 40^{o}, 80^{o} or 120^{o} for 2 rows
Longitudinal pitch of holes (LP)	30mm to 200mm
Hole Diameter	06mm to 13mm
Number of rows	1 to 6

B) Slotted Pipe:

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

(Straight Slots) (Staggered Slots)



Slot length	Depends on the size
Slot width	1, 1. 1/2 2 mm & 3 mm
No.of Row	4, 6 & 8 (but according to the size)
Angular pitch	Recommended by NeproPlast.

For further details please refer to National Marketing Technical Sales Department

PROPERTIES OF NEPROPLAST uPVC PIPES

All values are registered at 23 °C(73 °F)

Table - 10

Properties		
Mechanical	**Unit**	**Values**
Tensile Strength Ultimate	kgf/cm^2 MPa	492 min 48.0 min
Modulus of Elasticity in Tension	kgf/cm MPa	28123 min 2758 min
Compressive Strength	kgf/cm^2 MPa	638 min 62.0 min
Flexural Strength	kgf/cm^2 MPa	1020 100.0 min
Izod Impact Strength	j/m of notch	34.7 min
Hardness	Durometer"D" Rockwell "R"	>70±3 110 - 120
Thermal Properties	**Unit**	**Values**
Coefficient of Thermal Linear Expansion	mm/m °k	5.6
Thermal Conductivity	Wm / °k / m^2	0.18
Specific Heat	cal / °C Kcal /kg °C	0.23 0.23
Vicat Softening Temperature	°C	>80
DeflectionTemperature	°C	>70 min
Elongation at Break	%	>40 min
Electrical Properties.	**Unit**	**Values**
Dielectric Strength	Volts / Mil	1100
Dielectric Constant	60 cps @ 30 °C	4
Specific Volume Resistivity	Ohm/cm	$>10^{14}$
Power Factor	at 10 cycles	3
General Properties.	**Unit**	**Values**
Specific Gravity		1.42
Water Absorption	mg/cm^2	<4
Cell Designation	ASTM 1784	12454-B
Flame Spread E - 84		<25
Poison's Ratio @73 °F		0.35 - 0.38
Smoke Density		500
Friction Coefficient	Factor "C"	150

uPVC is a non - conductor of electricity and also not subject to galvanic or electrolytic attack. Electrical equipements should not be earthened to (uPVC) pipes

CHEMICAL RESISTANCE OF NEPROPLAST uPVC PIPES

NeproPlast uPVC & cPVC pipe and fittings have excellent chemical resistance to most mineral acids, bases, salts, and aliphatic hydrocarbons. When they are used within their allowable pressure and temperature ranges, they will provide a good alternative to metallic piping which corrodes when exposed to the same aggressive chemical solutions. The information contained in the following chemical resistance tables are based on data supplied to us by our raw material manufacturers and some actual field experience gathered from various sources. You must take into consideration the specific use conditions that will apply to your project. There will be variables that will affect the chemical resistance such as: temperature, pressure, chemical concentration, and external stresses that may exist in the design and construction of the system. Because of the wide variety and numerous use conditions that are found in the process chemical industry, the final decision to use thermoplastic piping should be based on in-service testing and evaluation by the responsible engineer and end-user.

INTERPRETATION OF THE DATA:

It is important to understand that an “R” rating does not necessarily imply that pipe, fittings, and joints can be used at their water pressure rating and be expected to have the same longevity when used with a particular chemical other than water. Generally, the chemical resistance of uPVC and CPVC will decrease with an increase in temperature and concentrations. This is also true for all other components in the system that will come in contact with the flow. Solvent cements, valves, instrumentation, o-rings, gaskets, and other such components should be evaluated and approved by their respective manufacturers.

R = *Recommended For Use*

NR = *Not Recommended*

• • = *No Data Available, Check With Factory.*

Chemical	uPVC		Chemical	uPVC		Chemical	uPVC	
	23°F	60°F		23°F	60°F		23°F	60°F
Acetaldehyde	NR	NR	Alum	R	R	Ammonium Phosphate	R	R
Acetamide	••	••	Alum, Ammonium	R	R	Ammonium Sulfamate	••	••
Acetic Acid, 10%			Alum, Chrome	R	R	Ammonium Sulfate	R	R
Acetic Acid, 20%	R	R	Alum, Potassium	R	R	Ammonium Sulfide	R	••
Acetic Acid, 50%	R	*	Aluminum Acetate	••	••	Ammonium Thiocyanate	R	R
Acetic Acid, 80%	R	*	Aluminum Chloride	R	R	Ammonium Tartrate	••	••
Acetic Acid, Glacial	*	NR	Aluminum Fluoride	R	NR	Amyl Acetate	NR	NR
Acetic Anhydride	NR	NR	Aluminum Hydroxide Solution	R	R	Amyl Chloride	NR	NR
Acetone, up to 5%	••	••	Aluminum Nitrate	R	R	Aniline	NR	NR
Acetone, greater than 5%	••	••	Aluminum Oxychloride	R	R	Aniline Chlorohydrate	NR	NR
Acetophenone	NR	NR	Aluminum Sulfate Solution	R	R	Aniline Hydrochloride	NR	NR
Acetyl Chloride	••	••	Amines	••	••	Anthraquinone	R	R
Acetylene			Ammonia	••	••	Anthraquinone Sulfonic Acid	R	R
Acetyl Nitrile	NR	NR	Ammonia, Gas (Non-Pressure; Vent Only)	R	R	Antimony Trichloride	R	R
Acrylic Acid	NR	NR	Ammonia, Aqua, 10%	R	NR	Aqua Regia	*	NR
Acrylonitrile	NR	NR	Ammonia, Liquid	NR	NR	Aromatic Hydrocarbons	NR	NR
Adipic Acid, sat’d			Ammonium, Acetate	R	R	Arsenic Acid	R	R
Alcohol, Allyl	*	*	Ammonium Benzoate	••	••	Aryl Sulfonic Acid	R	R
Alcohol, Amyl	NR	NR	Ammonium Bifluoride	R	R	Asphalt Emulsion	NR	NR
Alcohol, Benzyl	NR	NR	Ammonium Bisulfide	R	R	Barium Carbonate	R	R
Alcohol, Butyl, Primary	R	R	Ammonium Carbonate	R	R	Barium Chloride	R	R
Alcohol, Butyl, Secondary	R	NR	Ammonium Chloride	R	R	Barium Hydroxide	R	R
Alcohol, Diacetone	••	••	Ammonium Citrate	••	••	Barium Nitrate	R	••
Alcohol, Ethyl	R	R	Ammonium Dichromate	R	••	Barium Sulfate	R	R
Alcohol, Hexyl	R	R	Ammonium Fluoride, 10%	R	R	Barium Sulfide	R	R
Alcohol, Isopropyl	R	R	Ammonium Fluoride, 25%	R	*	Beer	R	R
Alcohol, Methyl	R	R	Ammonium Hydroxide	R	*	Beet Sugar Liquors	R	R
Alcohol, Propargyl	R	R	Ammonium Metaphosphate	R	R	Benzaldehyde	NR	NR
Alcohol, Propyl	R	R	Ammonium Nitrate	R	R	Benzalkonium Chloride	NR	NR
Allyl Chloride	NR	NR	Ammonium Persulphate	R	R	Benzene	NR	NR

CHEMICAL RESISTANCE OF NEPROPLAST uPVC PIPES

Chemical	uPVC 23°F	uPVC 60°F
Black Sulfate Liquor	R	R
Bleach, Household (5% Cl)	R	R
Bleach, 12.5% Active Cl_2	R	R
Bleach 5.5% Active Cl_2	R	R
Bleach, Industrial (15% Cl)	••	••
Borax	R	R
Boric Acid	R	R
Boric Acid, Saturated	••	••
Brine, Acid	R	••
Bromic Acid	R	R
Bromine	••	••
Bromine, Liquid	NR	NR
Bromine, Vapor 25% (Non-Pressure; Vent Only	R	R
Bromine, Water	R	R
Bromobenzene	NR	NR
Bromotoluene	NR	NR
Butadiene	R	R
Butane	R	R
Butanol	NR	NR
Butyl Acetate	NR	NR
Butyl Alcohol	R	R
Butyl Carbitol	••	••
Butyl Cellosolve	R	••
Butyl Phthalate	NR	NR
Butylene	R	R
Butyl Phenol	R	NR
Butyl Stearate	R	••
Butyne Diol	R	NR
Butyric Acid, up to 1%	R	NR
Butyric Acid, greater than 1%	••	••
Cadmium Acetate	••	••
Cadmium Chloride	••	••
Cadmium Cyanide	R	R
Cadmium Sulfate	••	••
Caffeine Citrate	R	••
Calcium Acetate	••	••
Calcium Bisulfide	••	••
Calcium Bisulfite Solution	R	R
Calcium Carbonate	R	R
Calcium Chlorate	R	R
Calcium Chloride	R	R
Calcium Hydroxide	R	R
Calcium Hypochlorite	R	R
Calcium Nitrate	R	R
Calcium Oxide	R	R
Calcium Sulfate	R	R
Camphor Crystals	R	••
Cane Sugar Liquors	R	R
Caprolactam	••	••
Caprolactone	••	••
Carbitol	R	••
Caprylic Acid	••	••
Carbon Dioxide, Wet (Non-Pressure; Vent Only)	R	R
Carbon Dioxide, Dry (Non-Pressure; Vent Only)	R	R
Carbon Disulfide	NR	NR
Carbon Monoxide	R	R
Carbon Tetrachloride	NR	NR
Carbonic Acid	R	R
Castor Oil	R	R
Caustic Potash	R	R
Caustic Soda	••	••
Cellosolve	R	NR
Cellosolve Acetate	R	••
Chloracetic Acid	R	R
Chloral Hydrate	R	R
Chloramine	R	••
Chloric Acid	R	R
Chlorinated Solvents	NR	NR
Chlorinated water, (hypochlorite)	••	••
Chlorine Gas, Dry	NR	NR
Chlorine Gas, Wet	NR	NR
Chlorine, Liquid	NR	NR
Chlorine, trace in air (Non-Pressure; Vent Only)	••	••
Chlorine dioxide, aqueous, sat'd	••	••
Chlorine Water, Saturated	R	R
Cloracetic Acid	R	NR
Chloroacetyl Chloride	R	••
Chlorobenzene	NR	NR
Chlorobenzyl Chloride	NR	NR
Chloroform	NR	NR
Chloropicrin	NR	NR
Chlorosulfonic Acid	R	NR
Chromic Acid, 10%	R	R
Chromic Acid, 30%	R	*
Chromic Acid, 40%	R	*
Linoleic Oil	R	R
Linseed Oil	R	R
Linseed Oil, Blue	••	••
Liqueurs	R	R
Lithium Bromide (Brine)	R	R
Lithium Chloride	R	R
Lithium Sulfate	R	R
Lubricating Oil, ASTM #1	R	R
Lubricating Oil, ASTM #2	R	R
Lubricating Oil, ASTM #3	R	R

Chemical	uPVC 23°F	uPVC 60°F
Chromic Acid, 50%	NR	NR
Chromium Nitrate	••	••
Citric Acid	R	R
Citric Acid, 10%	••	••
Citrus Oils	••	••
Coconut Oil	R	R
Coke Oven Gas (Non-Pressure; Vent Only)	NR	NR
Copper Acetate	••	••
Copper Carbonate	R	R
Copper Chloride	R	R
Copper Cyanide	R	R
Copper Fluoride	R	R
Copper Nitrate	R	R
Copper Sulfate (Blue Vitriol Solution)	R	R
Corn Oil	*	*
Corn Syrup	*	*
Cottonseed Oil	R	R
Creosote	••	••
Cresol	NR	NR
Cresylic Acid, 50%	R	R
Crotonaldehyde	NR	NR
Crude Oil	R	*
Cumene	••	••
Cupric Fluoride	R	R
Cupric Sulfate	R	R
Cuprous Chloride	R	R
Cyclohexane	NR	NR
Cyclohexanol	NR	NR
Cyclohexanone	NR	NR
D-Limonene	••	••
Desocyephedrine Hydrochloride	R	••
Detergents	R	R
Detergent Solution (Heavy Duty)	R	R
Dextrin	R	R
Dextrose	R	R
Diazo Salts	R	R
Dibutoxy Ethyl Phthalate	NR	NR
Dibutyl Phthalate	NR	NR
Dibutyl Sebacate	R	NR
Dichlorobenzene	NR	NR
Dichloroethylene	NR	NR
Diesel Fuels	*	NR
Diethylamine	NR	NR
Diethyl Cellosolve	••	••
Diethyl Ether	R	••
Diglycolic Acid	R	R
Dill Oil	••	••
Dimethylamine	R	R
Dimethylformamide	NR	NR
Dimethyl Hydrazine	NR	NR
Dioctyl Phthalate	NR	NR
Dioxane	NR	NR
Dioxane, 1, 4	NR	NR
Disodium Phospate	R	R
Distilled Water	R	R
Divinylbenzene	NR	NR
Dursban TC	••	••
EDTA, Tetrasodium	••	••
Epsom Salt	R	••
Esters	NR	NR
Ethanol, up to 5%	••	••
Ethanol, greater than 5%	••	••
Ethers	NR	NR
Ethyl Acetate	NR	NR
Ethyl Acetoacetate	NR	NR
Ethyl Acrylate	NR	NR
Ethyl Benzene	••	••
Ethyl Chloride	NR	NR
Ethyl Chloroacetate	NR	NR
Ethyl Ether	NR	NR
Ethylene Bromide	NR	NR
Ethylene Chloride	NR	NR
Ethylene Chlorohydrin	NR	NR
Ethylene Diamine	••	••
Ethylene Dichloride	NR	NR
Ethylene Glycol, up to 50%	R	R
Ethylene Glycol, greater than 50%	R	R
Ethylene Oxide	NR	NR
Fatty Acids	R	R
Ferric Acetate	R	NR
Ferric Chloride	R	R
Ferric Hydroxide	R	R
Ferric Nitrate	R	R
Ferric Sulfate Solution	R	R
Ferrous Chloride	R	R
Palmitic Acid, 70%	R	NR
Paraffin	R	R
Peanut Oil	••	••
Peracetic Acid, 40%	R	NR
Perchloric Acid, 10%	R	*
Perchloric Acid, 70%	R	NR
Perphosphate	R	••
Petroleum Oils, Sour	R	*
Petroleum Oils, Refined	R	R
Phenol	*	NR

Chemical	uPVC 23°F	uPVC 60°F
Ferrous Hydroxide	R	••
Ferrous Nitrate	R	••
Ferrous Sulfate (Green Couperas Solution)	R	R
Fish Solubles	R	R
Fluorine Gas	NR	NR
Fluoroboric Acid	R	R
Fluorosilicic Acid, 30%	R	R
Formaldehyde, 35%	R	R
Formaldehyde, 37%	R	R
Formaldehyde, 50%	R	R
Formic Acid, up to 25%	R	NR
Formic Acid, greater than 25%	••	••
Freon F-11	R	R
Freon F-12	R	R
Freon F-21	NR	NR
Freon F-22	NR	NR
Freon F-113	R	R
Freon F-114	R	R
Fructose	R	R
Fruit Juices, Pulp	R	R
Furfural	NR	NR
Gallic Acid	R	R
Gasoline, Leaded	*	NR
Gasoline, Unleaded	*	NR
Gasoline, Sour	*	NR
Gelatin	R	R
Gin	••	••
Glucose	R	R
Glycerine	R	R
Glycerine, Glycerol	R	R
Glycolic Acid	R	R
Glycols Ether	R	R
Grape Sugar (Juice)	R	R
Green Liquor	R	R
Halocarbons Oils	••	••
Heptane	R	R
Hexane	R	*
Hydraulic Oil	*	*
Hydrazine	NR	NR
Hydrobromic Acid, 20%	R	R
Hydrobromic Acid, 50%	R	R
Hydrochloric Acid, 18%	R	*
Hydrochloric Acid, Conc. 37% (Muriatic Acid	R	••
Hydrocyanic Acid	R	R
Hydrocyanic Acid, 10%	R	R
Hydrofluoric Acid, Dilute	R	NR
Hydrofluoric Acid, 3%	••	••
Hydrofluoric Acid, greater than 3%	••	••
Hydrofluoric Acid, 30%	R	NR
Hydrofluoric Acid, 40%	R	NR
Hydrofluoric Acid, 50%	R	NR
Hydrofluosilicic Acid, 30% (12OF-R)	R	R
Hydrogen	R	R
Hydrogen Cyanide (Non-Pressure; Vent Only)	R	R
Hydrogen Fluoride, Anhydrous	NR	NR
Hydrogen Peroxide, 30%	R	••
Hydrogen Peroxide, 50%	R	R
Hydrogen Peroxide, 90%	*	*
Hydrogen Phosphide	R	R
Hydrogen Sulfide, Dry (Non-Pressure; Vent Only)	R	R
Hydrogen Sulfide, Aqueous Sol.	R	R
Hydroquinone	R	R
Hydroxylamine Sulfate	R	R
Hydrochlorous Acid	R	R
Hypochlorous Acid	••	••
Iodine	NR	NR
Iodine Solution, 10%	NR	NR
Iron Salts	••	••
Isopropanol	*	*
Isopropyl Ether	NR	NR
Isooctane	••	••
Jet Fuel, JP-4	*	NR
Jet Fuel, JP-5	*	NR
Kerosene	R	*
Ketones	NR	NR
Kraft Liquor	R	R
Lactic Acid, 25%	R	R
Lactic Acid, 85%	R	••
Lard Oil	R	R
Lauric Acid	R	R
Lauryl Chloride	R	R
Lead Acetate	R	R
Lead Chloride	R	R
Lead Nitrate	R	R
Lead Sulfate	R	R
Silicone Oil	R	NR
Silver Chloride	••	••
Silver Cyanide Solut ion	R	R
Silver Nitrate	R	R
Silver Sulfate	R	R
Soaps	R	R
Sodium Acetate	R	R
Sodium Aluminate	••	••
Sodium Arsenate	••	••
Sodium Alum	R	R

CHEMICAL RESISTANCE OF NEPROPLAST uPVC PIPES

Chemical	uPVC 23°F	uPVC 60°F
Machine Oil	R	R
Magnesium Carbonate	R	R
Magnesium Chloride	R	R
Magnesium Citrate	R	R
Magnesium Fluoride	••	••
Magnesium Hydroxide	R	R
Magnesium Nitrate	R	R
Magnesium Oxide	••	••
Magnesium Salts, inorganic	••	••
Magnesium Sulfate (Epsom Salts)	R	R
Manganese Sulfate	R	R
Maleic Acid	R	R
Maleic Acid, 50%	••	••
Malic Acid	R	R
Mercuric Acid	••	••
Mercuric Chloride	R	R
Mercuric Cyanide	R	R
Mercuric Sulfate	R	R
Mercurous Nitrate	R	R
Mercury	R	R
Methane (Non-Pressure; Vent Only)	R	R
Methane Sulfonic Acid	••	••
Methanol, up to 10%	••	••
Methanol, greater than 10%	••	••
Methylene Chlorobromide	NR	NR
Methoxyethyl Oleate	R	••
Methylamine	NR	NR
Methyl Bromide	NR	NR
Methyl Cellosolve	NR	NR
Methyl Chloride	NR	NR
Methyl Chloroform	NR	NR
Methyl Formate	••	••
Methyl Ethyl Ketone	NR	NR
Methyl Isobutyl Ketone	NR	NR
Methyl Methacrylate	R	••
Methyl Sulfate	R	*
Methyl Sulfuric Acid	R	R
Methylene BromideNR	NR	NR
Methylene Chloride	NR	NR
Methylene Iodine	NR	NR
Methylisobutyl Carbinol	••	••
Milk	R	R
Mineral Oil	R	R
Molasses	R	R
Monoethanolamine	NR	NR
Motor Oil	R	R
Muriatic Acid (see Hydrochloric Acid)	R	••
Naphtha	R	R
Naphthalene	NR	NR
Natural Gas (Non-Pressure; Vent Only)	R	R
Nickel Acetate	R	••
Nickel Chloride	R	R
Nickel Nitrate	R	R
Nickel Sulfate	R	R
Nicotine	R	R
Nicotinic Acid	R	R
Nitric Acid, up to 25%	••	••
Nitric Acid, 25-35%	••	••
Nitric Acid, greater than 35%	••	••
Nitrobenzene	NR	NR
Nitroglycerine	NR	NR
Nitrous Acid, 10%	R	NR
Nitrous Oxide (Non-Pressure; Vent Only)	R	*
Nitroglycol	NR	NR
1-Octanol	••	••
Oils, Edible	••	••
Oils, Vegetable	*	*
Oils, Sour Crude	••	••
Oleic Acid	R	R
Oleum	NR	NR
Olive Oil	••	••
Oxalic Acid, Saturated	R	R
Oxalic Acid, 20%	••	••
Oxalic Acid, 50%	R	R
Oxygen (Non-Pressure; Vent Only)	R	R
Sulfuric Acid, 100%	NR	NR
Sulfurous Acid	*	NR
Tall Oil	R	R
Tannic Acid, 10%	R	R
Tannic Acid, 30%	••	••
Tanning Liquors (Vegetable)	R	R
Tar	NR	NR
Tartaric Acid	R	R
Terpenes	••	••
Tetraethyl Lead	R	*
Tetrahydrodurane	NR	NR
Tetrahydrofuran	NR	NR
Tetrasodiumpyrophosphate	R	R
Texanol	••	••
Thionyl Chloride	NR	NR
Thread Cutting Oils	R	••
Tirpineol	*	*
Titanium Tetrachloride	*	NR
Toluene	NR	NR
Toluene, Toluol	NR	NR

Chemical	uPVC 23°F	uPVC 60°F
Phenylhydrazine	NR	NR
Phenylhydrazine Hydrochloride	*	NR
Phosgene, Liquid	NR	NR
Phosgene, Gas (Non-Pressure; Vent Only)	R	*
Phosphoric Acid, 10%	R	R
Phosphoric Acid, 25%	R	R
Phosphoric Acid, 45%	R	R
Phosphoric Acid, 70%	R	R
Phosphoric Acid, 85%	R	R
Phosphorus, Yellow	R	*
Phosphorus, Red	R	R
Phosphorus Pentoxide	R	*
Phosphorus Trichloride	NR	NR
Photographic Solutions	R	R
Picric Acid	NR	NR
Pine Oil	••	••
Plating Solutions, Brass	R	*
Plating Solutions, Cadmium	R	*
Plating Solutions, Chrome	R	*
Plating Solutions, Copper	R	*
Plating Solutions, Gold	R	*
Plating Solutions, Lead	R	*
Plating Solutions, Nickel	R	*
Plating Solutions, Rhodium	R	*
Plating Solutions, Silver	R	*
Plating Solutions, Tin	R	*
Plating Solutions, Zinc	R	*
Polyethylene Glycol	*	*
Polypropylene Glycol	*	*
Potash	R	R
Potassium Acetate	••	••
Potassium Alum	R	R
Potassium Aluminum Sulfate	R	••
Potassium Amyl Xanthate	R	NR
Potassium Bicarbonate	R	R
Potassium Bichromate	R	R
Potassium Bisulfate	R	R
Potassium Borate	R	R
Potassium Bromate	R	R
Potassium Bromide	R	R
Potassium Carbonate	R	R
Potassium Chlorate	R	R
Potassium Chloride	R	R
Potassium Chromate	R	R
Potassium Cyanate	R	R
Potassium Cyanide	R	R
Potassium Dichromate	R	R
Potassium Ethyl Xanthate	R	NR
Potassium Ferricyanide	R	R
Potassium Ferrocyanide	R	R
Potassium Fluoride	R	R
Potassium Hydroxide	R	R
Potassium Hypochlorite	R	••
Potassium Iodide	R	••
Potassium Nitrate	R	R
Potassium Perborate	R	R
Potassium Perchlorate, sat'd	R	R
Potassium Permanganate, 10%, sat'd	R	R
Potassium Permanganate, 25%, sat'd	••	••
Potassium Persulfate, sat'd	R	R
Potassium Phosphate	••	••
Potassium Sulfate	R	R
Potassium Tripolyphosphate	••	••
Propane (Non-Pressure; Vent Only)	R	R
Propanol, up to 0.5%	••	••
Propanol, greater than 0.5%	••	••
Propionic Acid, up to 2%	••	••
Propionic Acid, greater than 2%	••	••
Propylene Dichloride	NR	NR
Propylene Glycol, up to 25%	R	••
Propylene Glycol, greater than 25%	R	••
Propylene Oxide	NR	NR
Pyridine	NR	NR
Pyrogallicia Acid	R	NR
Quaternary Ammonium Salts	••	••
Tributyl Citrate	R	••
Trichloroacetic Acid	R	R
Trichloroethane	NR	NR
Trichloroethylene	NR	NR
Triethanolamine	R	*
Triethylamine	R	R
Trimethylpropane	R	NR
Trisodium Phosphate	R	R
Turpentine Oil	R	R
Urea	R	R
Urine	R	R
Vaseline	NR	NR
Vegetable Oils	*	*
Vinegar	R	R
Vinegar, White	••	••
Vinyl Acetate	NR	NR
Water	R	R
Water, Acid Mine	R	R
Water, Deionized	••	••
Water, Demineralized	R	R

Chemical	uPVC 23°F	uPVC 60°F
Sodium Benzoate	R	R
Sodium Bicarbonate	R	R
Sodium Bichromate	R	R
Sodium Bisulfate	R	R
Sodium Bisulfite	R	R
Sodium Borate	R	••
Sodium Bromide	R	R
Sodium Carbonate Solution	R	R
Sodium Chlorate	R	••
Sodium Chloride	R	R
Sodium Chlorite	NR	NR
Sodium Chromate	••	••
Sodium Cyanide	R	*
Sodium Dichromate	R	R
Sodium Ferricyanide	R	R
Sodium Ferrocyanide	R	R
Sodium Fluoride	R	••
Sodium Formate	••	••
Sodium Hydroxide, 10%	R	R
Sodium Hydroxide, 15%	R	R
Sodium Hydroxide, 25%	R	*
Sodium Hydroxide, 30%	R	*
Sodium Hydroxide, 50%	R	*
Sodium Hydroxide, 70%	R	*
Sodium Hypobromite	••	••
Sodium Hypochloride, 15%	R	*
Sodium Hypochlorite	R	••
Sodium Iodide	••	••
Sodium Metaphosphate	R	••
Sodium Nitrate	R	R
Sodium Nitrite	R	R
Sodium Palmitrate Solution, 5%	••	••
Sodium Perborate	R	R
Sodium Perchlorate	R	R
Sodium Peroxide	R	R
Sodium Phosphate, Alkaline	R	••
Sodium Phosphate, Acid	R	••
Sodium Phosphate, Neutral	R	••
Sodium Silicate	••	••
Sodium Sulfate	R	R
Sodium Sulfide	R	R
Sodium Sulfite	R	R
Sodium Thiosulfate	R	R
Sodium Tripolyphosphate	••	••
Sour Crude Oil	R	R
Soybean Oil	••	••
Stannic Chloride	R	R
Stannous Chloride, 15%	R	R
Stannous Sulfate	*	*
Starch	R	R
Stearic Acid	R	R
Stoddard's Solvent	NR	NR
Strontium Chloride	*	*
Styrene	••	••
Succinic Acid	R	R
Sugar	••	••
Sulfamic Acid	NR	NR
Sulfated Detergents	••	••
Sulfate Liquors	••	••
Sulfite Liquor	R	R
Sulfur	R	R
Sulfur Chloride	••	••
Sulfur Dioxide, Dry (Non-Pressure; Vent Only)	R	R
Sulfur Dioxide, Wet (Non-Pressure; Vent Only)	R	*
Sulfur Trioxide (Non-Pressure; Vent Only)	R	*
Sulfur Trioxide, Gas (Non-Pressure; Vent Only)	R	R
Sulfuric Acid, 10%	R	R
Sulfuric Acid, 20%	R	R
Sulfuric Acid, 30%	R	R
Sulfuric Acid, 50%	R	R
Sulfuric Acid, 60%	R	R
Sulfuric Acid, 70%	R	R
Sulfuric Acid, 80%	R	*
Sulfuric Acid, 85%	R	NR
Sulfuric Acid, 90%	R	NR
Water, Distilled	R	R
Water, Potable	R	R
Water, Salt	R	R
Water, Sea	R	R
Water, Sewage	R	R
Water, Swimming Pool	••	••
WD-40	••	••
Whiskey	R	R
White Liquor	R	R
Wines	R	R
Xylene	NR	NR
Zinc Acetate	R	R
Zinc Bromide	R	R
Zinc Carbonate	••	••
Zinc Chloride	R	R
Zinc Nitrate	R	R
Zinc Phosphate	••	••
Zinc Sulfate	R	R

QUALITY CONTROL EQUIPMENTS

Tensile Strength
Measures the strength of material (Resistance) being pulled apart

Modulus of Elasticity
Measures the stiffness of the material

Elongation at Break
Measures the extension length of the sample until it breaks.

Longitudinal Reversion or Effects of Heating
Measures the change in length of the sample after exposure to high temperature and the ability to resist heat without showing delamination, cracks or blisters.

Hydrostatic Strength

Determines the capability of the sample to withstand internal pressure for both long and short periods of time.

Extrusion Quality / Methylene Chloride / Acetone

Determines if the plastification of the material is adequate.

Brabender
Used for quality control testing and evaluation of raw materials for optimization of production process.

Vicat Softening Temperature
Determines the softening temperature of material when penetrated by a flattened needle to 1.0 mm. depth under a specific load.

Flattening / Stiffness
Measures the ability of sample to resist deformation under load. This test is particularly useful for buried installation of pipes.

Density / Specific Gravity
Determines the specific gravity and density to help in material identification

Impact Strength
Measures the toughness of the sample against impact or the ability of the sample to absorb applied energy.

Bulk Density
Measures the degree of compactness of a given volume of the material, indicating processing properties

Flow Time
Measure the pourability of powder materials and useful indication of the ability of the material to pass through hoppers to deliver uniform weight.

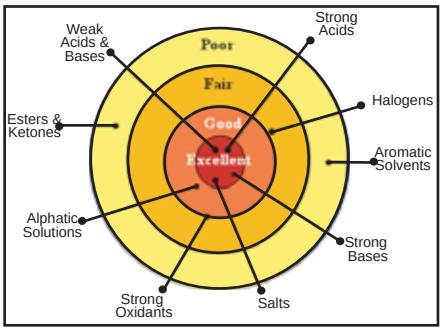
GENERAL ADVANTAGES OF NEPROPLAST uPVC PIPES

Corrosion Resistance & Scale Build up:

NeproPlast uPVC pipes are chemically resistant to nearly all acids, alkalis, alcohols, halogens as well as many other corrosive fluids. Being non- conductor of electricity, it eliminates galvanic or electrolytic corrosion which is the cause of expensive repairs. NeproPlast uPVC non-corroding properties ensure improved flow, lower maintenance costs and longer performance life.

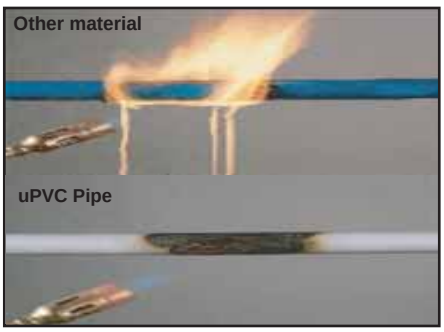
Chemical Resistance:

NeproPlast uPVC pipe inhibit excellent chemical resistance against most acids, alcohols, alkalis, salt solutions and halogens. NeproPlast uPVC pipes are also not adversely affected by atmospheric conditions and are well suited for outdoor installations. For specific applications see the NeproPlast chemical resistance guide.



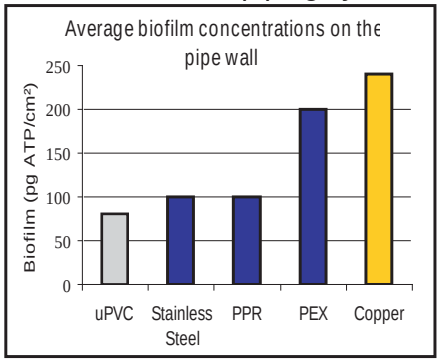
Fire Proof:

NeproPlast uPVC pipes do not support combustion and are self extinguishing. Pipes will not burn unless an external flame source is applied. NeproPlast uPVC pipes are non-toxic and will not affect taste, smell or color of drinking water or any other liquid. Extensive tests on uPVC compounds prove their outstanding fire performance.



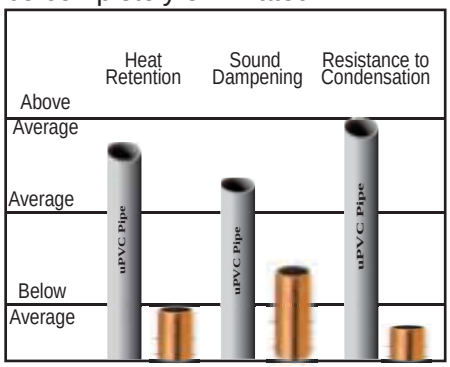
Low Bacteria Build up:

Studies shows that bacteria build up with NeproPlast uPVC pipes are far lower than with alternative piping materials. NeproPlast uPVC piping systems are resistant to fungi and bacterial growth, particularly those which cause corrosion in metal piping systems.



Thermal Conductivity:

NeproPlast uPVC pipes have lower thermal conductivity than for metal which reduces heat losses and offer better uniform fluid temperature, prevent "sweating" formation of condensation on the pipe wall. Insulation in certain instances, may be completely eliminated.



EASE of Handling, Installation & Maintenance:

NeproPlast uPVC pipes are quick and easy to install and maintained with complete range of solvent cement fittings saving time, effort and money as it is light in weight, and easy to handle.

Reduced Additive Migration:

NeproPlast uPVC pipes do not allow migration of additives into water supply and hence no bad odor or taste of drinking water.

Mechanical Strength:

NeproPlast uPVC pipes are light in weight having a specific weight which is about one fifth of steel pipes. This will cut down on transportation costs and facilitate pipes installation.

Fluid Friction:

NeproPlast uPVC pipes being a mirror-smooth inner surface has lower friction loss as compared to metals, i.e Lower pressure losses.

APPLICATION OF NEPROPLAST uPVC PIPES

WATER SUPPLIES:
Non-toxic NEPROPLAST 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 that of asbestos pipes. NEPROPLAST obtained SASO Certification and NSF 61 for drinking water use.

IRRIGATION SYSTEMS:
NEPROPLAST uPVC pipes are ideal for agricultural irrigation and sprinkler systems. Non-corrosive NEPRO uPVC pipes are perfect for carrying water which contains chemical fertilizers and insect inhibiters. In thick wall and large diameter NEPROPLAST uPVC pipes liquids can be transported under high pressure, which is convenient for the management of large volumes.

NEPROPLAST UPVC PIPES CASING & 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, NEPRO non-corrosion PVC pipes for water well casing and screens rapidly received approval by the appropriate ministry consultants and engineers.

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

SOIL, WASTE & DRAINAGE SEWER SYSTEM:
Waste lines 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 NEPROPLAST uPVC pipes. A full line of uPVC fittings is available to ensure easy installation.

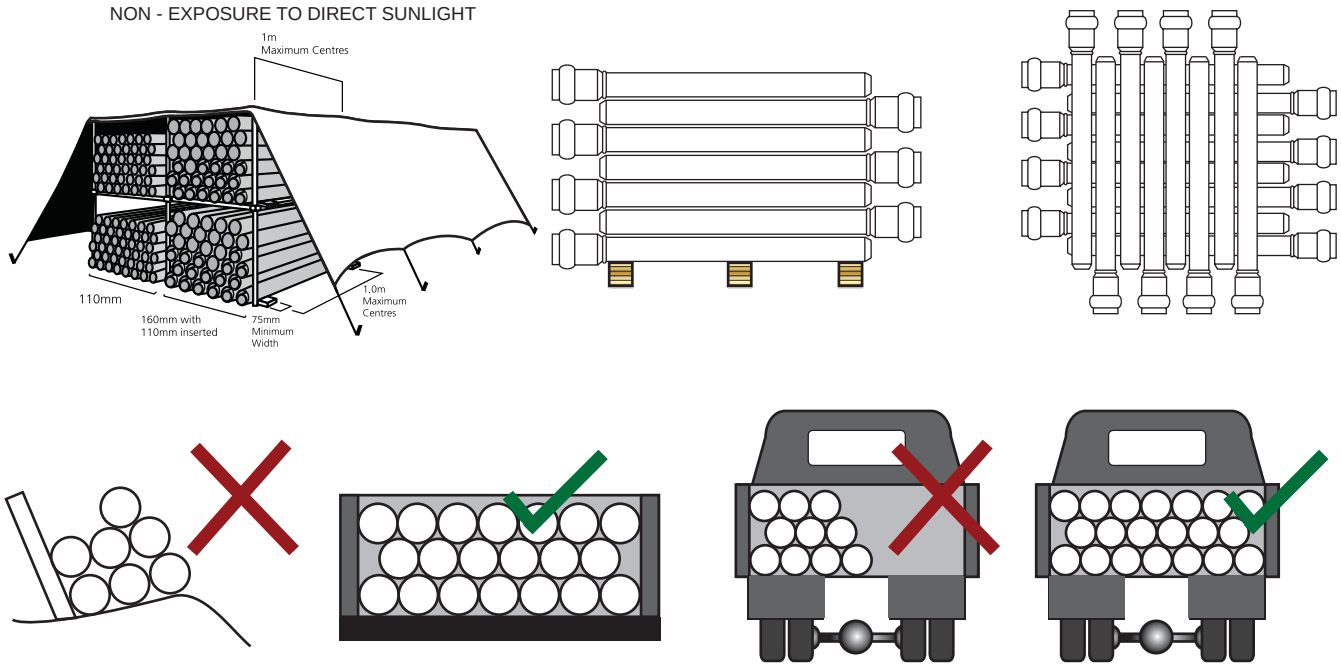
MINING:
NEPROPLAST uPVC pipes particularly are well suited for draining corrosive liquids found in mines. They make an ideal vent line for pits because they are easily installed in hard to reach places.

ELECTRICAL & TELECOMMUNICATIONS CABLES:
NEPROPLAST 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.

TRANSPORT , HANDLING & STORAGE

Unplasticized PVC pipes are strong but light, its specific gravity being approximately one-fifth that of cast iron. As a result, these pipes are more easily handled than their metal counterparts. Reasonable care, however, should be exercised at all times, and when off loading, pipes should be lowered, not dropped to the ground.

Pipe should be given adequate support at all times. Pipes should not be stacked in large piles especially in warm temperature conditions, as the lower layers may distort: resulting in difficulties when joining and for pipe alignment. Any pipe with ends prepared for joining (socket and spigot joints, RR joints, etc.) should be stacked in layers with the socket, placed at alternate ends of the stack and with sockets protruding to avoid lop-sided stacks and the Imparting of permanent set to pipes. Particularly in the case of Ring pipe, rubber rings should not be exposed to solar radiation for any length of time if they are not coated. It is recommended to stock them in a cool and shady place. Rubber rings should not come in touch with chemicals, grease, oil and to be stored for too long a time.



For long-term storage, pipe racks should provide continuous support, but if this is not possible, timber of at least 75 mm bearing width at spacing not greater than 1 m centers for pipe sizes 150 mm and above, should be placed beneath the pipes and at 2 m centers at the side, if the stacks are rectangular. These spacing apply to pipe size 160 mm and above. Closer supports will be required for sizes below 160 mm. In such pipe racks, pipes may be stored not more than seven layers or 1.5 m high, whichever is the lesser, but if different classes of pipe are kept in the same racks, then the thickest classes must always be at the bottom.

For temporary storage in the field, where racks are not provided, the ground should be level and free from coarse stones. Pipes stored thus should not exceed three layers high and should be staked to prevent movement.

Stack heights should be reduced if pipes are nested, i. e. pipes stored inside pipes of larger diameters. Reductions in height should be proportional to the weight of the nested pipe compared to the weight of the pipes normally contained in such stowage's.

TRANSPORT , HANDLING & STORAGE

Since the soundness of any joint depend on the condition of the spigot and the socket, special care must be taken in transit, handling and storage to avoid damage to the ends.

When loading pipes on the vehicles, care must be taken to avoid their coming into contact with any sharp corners such as cope irons, loose nail-heads, etc., as pipes may be damaged by being rubbed against these during transit whilst in transit pipes shall be well secured over their entire length and not allowed to project unsecured over the tailboard of the lorry. Pipes may be off loaded from lorries and or by rolling them gently down timbers, care being taken to ensure that pipes do not fall one upon another nor on any hard or uneven surfaces. Fork-lift trucks will have to be used for bundles and large unit loads.

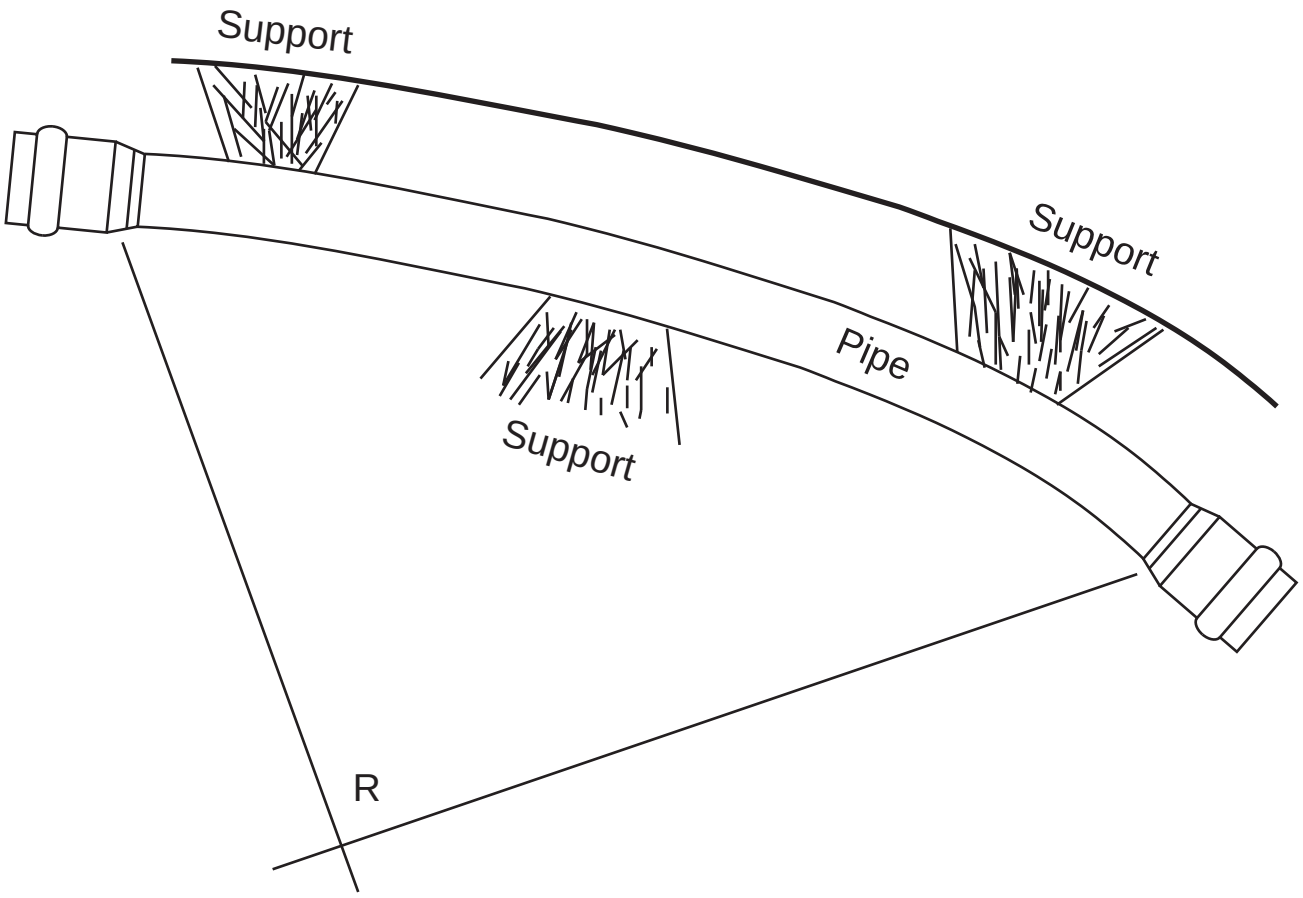
DEFLECTION:

The ring integral socket permits an angular deflection at the joint of 2 to 3 degree The introduction of joint deflection is however, generally unnecessary in an inherently flexible uPVC pipeline. Sufficient flexibility is provided by individual pipe lengths to enable gentle curves to be negotiated without imparting deflection at the joints.

As a general guide the cold bending radius R of a uPVC pipe length can be calculated as follows”

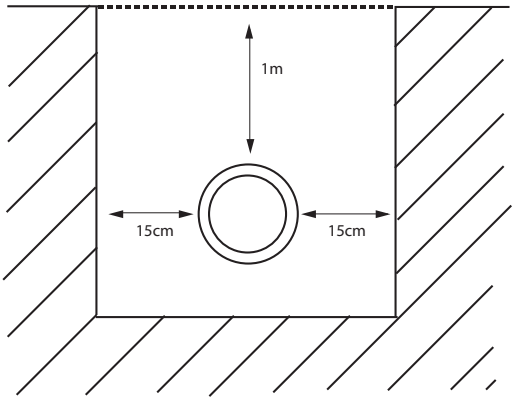
R = 300 x External Diameter

Where a shorter radius of curvature is required, then uPVC formed bends must be introduced



INSTALLATION

UNDERGROUND INSTALLATION TRENCH WIDTH PREPARATION COVER AND BACKFILLING



The width of trench for most purposes is enough to be 30 cm wider than the diameter of the pipe to allow enough room for jointing. Depth of cover should be at least 1 m from top of pipe to ground surface (it is wise to consider in early planning stages how future road widening plans could affect this depth of cover and to consider the frosting depth according to the local climate).

When laying NEPROPLAST water mains piping the usual recommendations relating to sound pipe laying practice should be followed. However, in view of the greater flexibility of PVC than most traditional materials,some of the procedures attain special importance.

To avoid possible damage or deformation of the pipe, its support by the ground in which it is laid should be made as uniform as possible, and materials in contact with the pipe must be free from large stones, sharp edged flints or other hard objects. The trench bottom should be carefully examined for irregularities and any hard projections removed. In good uniform conditions, where the trench bottom can be readily brought to an even finish so as to support the pipes uniformly over their length no underbedding will be necessary.Elsewhere and especially in rock or variable soils containing large stones, boulders,flints,tree roots or soft pockets a prepared bed is necessary. This bed should consist of suitable well compacted selected granular material.

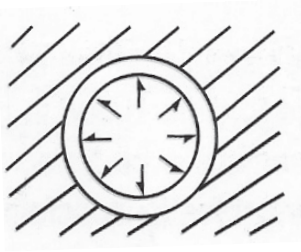
The ideal material for the trench bed and for compacting is one that will pass through a tin sieve but which is free from very fine particles which may impede drainage. The thickness of bed should be a minimum of 150mm.

In all cases, care should be taken to remove any leveling pegs or temporary packing such as wooden wedges, bricks or stones. Selected granular materials similar to the material used for bedding should then be carefully placed and compacted in uniform layers alongside and under the pipe up to a height of 150mm or more above the crown. Any trench sheeting if used should be partially withdrawn so as to ensure that the spaces between the pipes and soil faces of the trench are completely filled with well compacted granular materials in order to provide the necessary side support for the pipes and prevent excessive deformation under load. It may be helpful especially when thin wall piping is being laid if the pipe can be full of water during this operation.

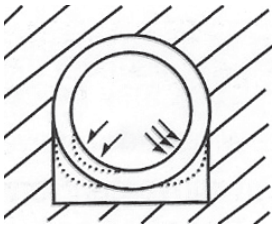
Under roads or verges, or where mechanical plant is to be used for the placing and or compacting of the backfill, the remainder of the first 300 mm depth of fill above the crown of the pipe should be compacted by hand and should consist of selected, uniform, readily compactable material, placed and compacted in uniform layers. The remaining fill should then be placed in layers of 300 mm. or more, depending on the compactors used.

If piping is laid in hot weather, precautions should be taken to allow for the contraction of the line which will occur when it cools to its normal working temperature. The best method is to allow the pipe to fill with cold water from its normal supply when the trench has only been partially backfilled. This will result in the reduction of the overall length of the pipe due to shrinkage and it will therefore be necessary, before final back filling, to carefully examine any detachable or other joints to see that sufficient reserve of draw is still available and that they have not become subject to any undue stress.

INSTALLATION



With uncompacted backfill



With compacted backfill

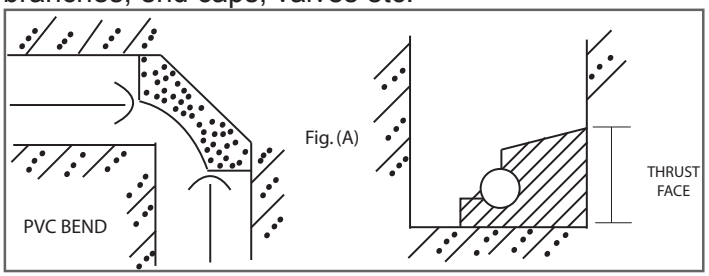
The ideal material should be free from large clay lumps (retained on a 3 in. sieve) from stones (retained on a 1 in. sieve) and sharp edged stones or flints, vegetable matter and from soil.

Above ground installation:

The jointing procedure for above-ground pipelines is identical to that for underground pipe lines. Above-ground installations should be fully supported, firmly enough to avoid strain on all joints but flexible enough to allow for a certain amount of thermal expansion in a pipeline. All flanged joints should be supported on both sides. Rubber ring joints should be anchored against end trust. Pipelines should be protected from abrasion by metal supports with felt or foam rubber strips.

THRUST FORCES

When a pipeline is constructed using push-fit joints, joint separation due to internal pressure and resulting thrust forces must be prevented. This is achieved using concrete trust blocks at directional changes, branches, end caps, valves etc.



The design of uPVC pipes provides a safety factor of 2.1 after a life of 50 years at maximum working pressure. In designing thrust blocks it is logical to apply a similar factor of safety after calculating thrust forces on the maximum foreseable line pressure.

In view of the flexible nature of uPVC it is desirable in thrustblock to install a design to permit the largest possible area of contact between the fitting concerned and the concrete block so that a restraint against excessive flexing, as well as thrust, is provided (Fig.A). This feature, in certain soil conditions, may also be applied to Solvent Welded pipelines which need no support against thrust but which can benefit by flexing restraint at abrupt directional changes.

Thrust block should not be allowed to encase the fitting as the external diameter of a uPVC pipe must be left free to distend due to pressure fluctuation. The block may be designed as shown in (Fig.A) or if total encasement is preferred the fitting should first be wrapped in several layers of heavy gauge Polythene film prior to concreting to provide freedom of movement and a barrier against abrasion.

This work should be carried out in accordance with the following conditions:

B. Piping Along Bridge:

This work should be carried out in accordance with the following conditions:
1) When the bridge itself is of curving construction expansion or flexible fitting such as RR joint and dresser joint, The dresser joint should be used.
2) Air valve should be fixed.
3) At the both ends of pipe, concrete protection should be given to protect disconnection of fitting.
4) Metal hanger of pipe may or may not be required depending on the structure of bridge. However, in any case, the pipe itself should be fixed firm to the bridge not to sway or shake.

C. Pipe under railway:

Piping work under railway tracks should be carried out in the following conditions:
1) Such work should be started after due understanding with railway companies or authorities.
2) Piping work should be carried without any interruption against railway operation.
3) At night work, alarming yellow lamp should be provided for traffic safety purpose.
4) Proper protection work or device such as protective concrete or metal casing should be given to pipe to avoid shaking.

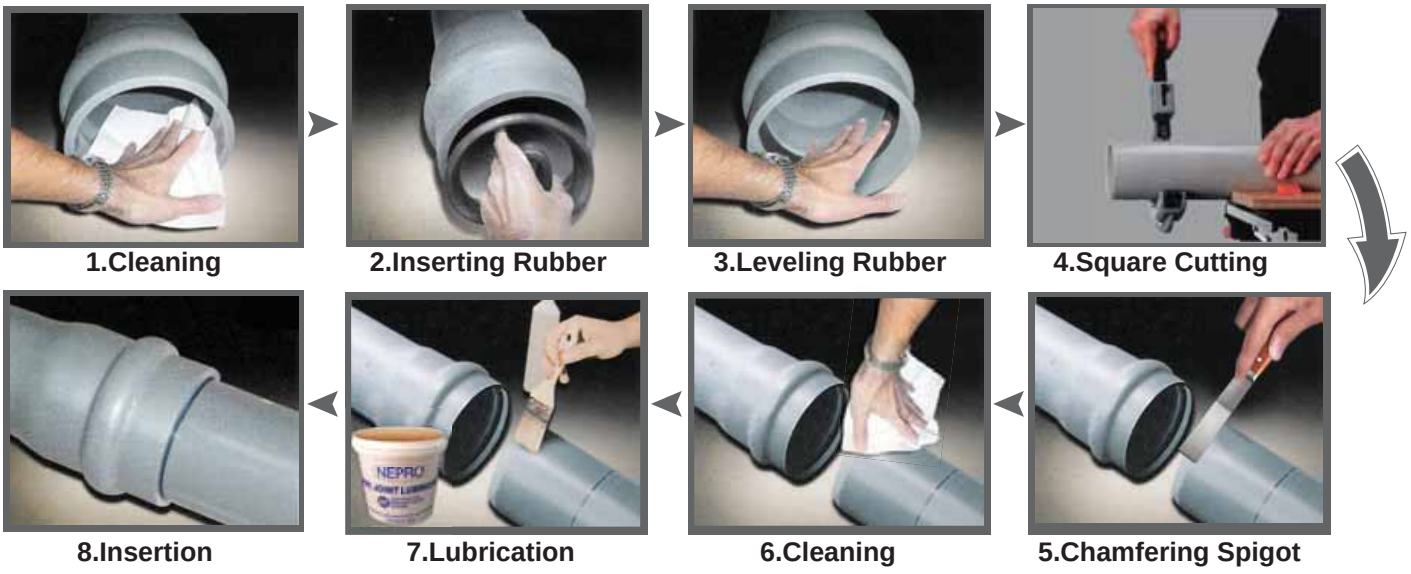
INSTALLATION METHODS

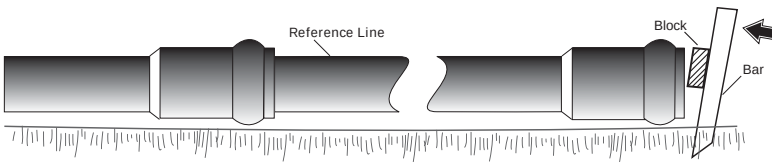
The following information are intended to assist Engineers and Contractors to take full advantages of the physical and mechanical properties of uPVC pipes and to achieve the desired results:

A) Method for rubber ring joint installation:

1. Ensure that the mating areas of spigot and socket are throughly clean.
2. Setting the rubber ring in grove.
3. Assess the full socket depth by simple measurement and mark spigot accordingly.
4. Apply lubricant to the spigot side and to the inside of the joint on rubber.
5. Accurate axial alignment of the spigot and socket prior to jointing is important, hand feed spigot into rubber joint until resistance from the inner sealing section is felt.
6. Bar and block assembly is recommended because a worker is able feel the amount of force being used and whether the joint goes together smoothly.
7. If undue resistance to pipe insertion is encountered , disassemble the joint and check the position of the rubber ring

Rubber Ring Jointing





Bar and block assembly

important notice:

If pipes are cut on site, make sure that the new spigot ends are cut square with a find toothed saw and are chamfered to half pipe thickness with a coarse file before jointing.

Table : 12

Pipe outside Diameter DN	Dia. / mm	Kg. Of Lubricant
DN 50	63	0,5
DN 80	90	0,85
DN 100	110	1,10
DN 125	125/140	1,35
DN 150	160	1,80
DN 200	200/225	2,40
DN 250	280	3,15
DN 300	315	3,85
DN 400	400	5
DN 450	450	6
DN 500	500	7

For 100 joints use the following amounts of lubricant:

INSTALLATION METHODS

B) Method of solvent welded joint installation:

1.Joint Preparation - Cut Pipe square with the axis, using a fine - tooth saw with a miter box or guide. Remove all burrs and break the sharp lead edges.

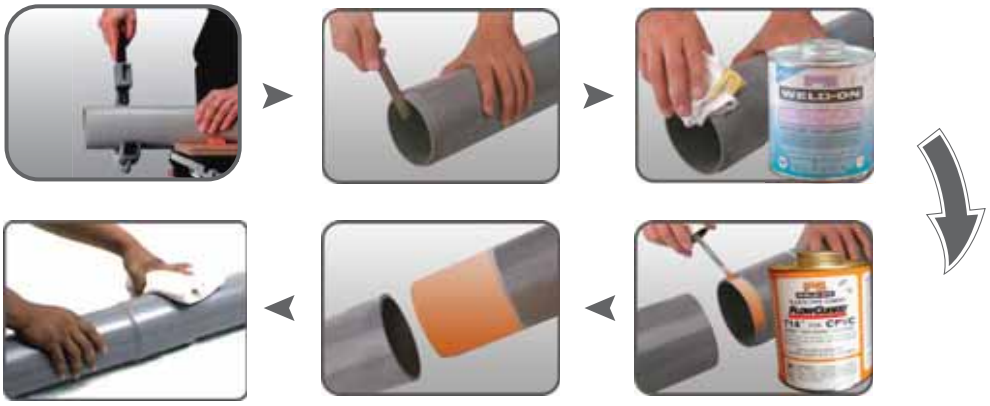
2. Cleaning & Priming-Surface to be joined must be cleaned and free of dirt , Moisture ,Oil ,and other FOREIGN material Applying Weld-On primer.

3.Mark on spigot the full length of the socket side to make sure that the spigot will fit exactly the socket length.

4. Application of solvent cement - PVC solvent cement is fast drying and should be applied as quickly as possible , consistent with good workmanship , Follow up the manufacturer's recommendation to both spigot and socket side with an adequate quantity of cement.

5. Joint Assembly - While both the inside socket surface and the outside surface of the spigot of the pipe are WET with solvent cement ,forcefully bottom the spigot in the socket .Turn the pipe or fittings 1/4 turn during assembly (but not after the pipe is bottomed) to distribute the cement evenly.Hold for a while until handling strength is developed. Assembly should be completed within 30 seconds after the last application of solvent cement.

6. After Assembly -Wipe excess cement from the pipe at the end of the socket.Gaps in the cement bead around the pipe perimater may indicate a defective assembly. Handle the newly assembled joints carefully after 1 hour.



Importance Points of Pipe Installation with Solvent Cement Joints

1. The joining surfaces must be clean and dry
2. Sufficient cement must be applied to fill the gap between male and female ends
3. The Assembly must be made while the surfaces are still wet and fluid.
4. Completed joints should not be disturbed until they have cured sufficiently to withstand handling.
5.Keep the solvent cement closed and shaded when not actually in use. Discard the solvent cement when a noticeable change in viscosity occurs, when the cement does not flow freely from the brush, or when the cement appears lumpy and stringy.

Although Nepro cement joints achieve initial setting in a very short time the joints does not reach its full strength for about 24 hours. Therefore, cemented joints must be left overnight before pressure testing is carried out.

For 100 Joints use the Following Amounts of adhesive and primer

Table : 13

Pipe outside Nominal Diameter DN	O.D Dia. / mm	Primer kg	Adhesive Kg
25	32	Approx. 0.5	Approx. 08
32	40	Approx. 0.7	Approx. 1.1
40	50	Approx. 0.9	Approx. 1.6
50	63	Approx. 1.7	Approx. 1.7
60	75	Approx. 1.3	Approx. 2.2
80	90	Approx. 1.4	Approx. 4.0
100	110	Approx. 1.7	Approx. 8.0
125	125 / 140	Approx. 2.1	Approx. 13.0
150	160	Approx. 2.5	Approx. 19.0
200	200 / 225	Approx. 4.5	Approx. 26.0
250	280	Approx. 6.5	Approx. 38.0
300	315	Approx. 10.2	Approx. 52.0
400	400	Approx. 12.9	Approx. 62.0
450	450	Approx. 14.4	Approx. 69.75
500	500	Approx. 16.0	Approx. 77.50

HYDROSTATIC TESTING

The length of test section will be determined by practical reasons such as availability of water, or the number of pipes, fittings and joints to be tested. Long pipelines should be tested in sections as main laying progresses.

The pipe length to be tested may be blanked off using a blank iron or Steel flange previously drilled and tapped for test equipment connection and strutted as necessary against end thrust. The blank flange may be attached to the pipeline by a Viking Johnson Flange Adapter or similar.

Testing should be preferably not be carried out against closed valves. All charging and testing should preferably be carried out from the lowest point of the under test section and all testing equipment should be located at this point. The pressure gauge also should be located at the lowest point or adjustment must be made for the level of the pressure gauge relative to the pipe's position.

Prior to testing, care should be taken to ensure that all anchor blocks have attained adequate maturity and that any solvent welded joints included in the pipe system have developed full strength. Correct support and anchorage of any above ground section of the pipeline is also necessary. Underground pipelines should be back-filled, taking particular care to consolidate around lengths which may have been deflected to negotiate curves. All joints may be left exposed until testing is completed.

With the stand pipe, valves and pressure gauge assembled, filling of the main can begin. The main should be charged slowly, preferably from the lowest point with any air cock in the open position. They should be closed in sequence from the lowest point only when water, visibly free from aeration, is being discharged through them.

Satisfactorily charged, the main should be allowed to stand overnight to allow any residual air to 'settle-out' and percolate to the pipe soffit. Re-venting is then necessary and any water deficiency should be made-up.

Pressure testing can then begin by pumping slowly until the required test pressure is attained. A single or double cylinder hand pump should be used for this purpose. Mechanical pumps are not recommended unless incorporating a pre-set blow-off mechanism.

The hydrostatic test specification will be at the discretion of the responsible Engineer but should not exceed 11/2 times the designed working pressure of the lowest rated component in the system and a time duration of 24 hours.

A permissible water loss of 3 liters per kilometer of pipe per 25mm nominal bore, per 3 bar of test pressure, per 24 hours,may be considered reasonable.

Air testing is not recommended If, however, for practical reasons, pneumatic testing is necessary, this should be limited to a maximum pressure of 1.5 bar.

Air leakage can be detected by applying soap solution to the joints or by pre-odourising the air with Ethyl Mercaptan.This will reduce the time duration of an otherwise long term pneumatic test.

During any air-pumping operations no one should be working on, or near, the test section and precautions should be taken to avoid heavy objects striking the main whilst under pneumatic pressure.

FLOW & FRICTION

Friction Losses:

The smooth bores of uPVC pipes have better flow characteristics than those of metal pipes. The following is the coefficient of Friction given when using the Hazen-Williams formula:

$$f = 0.2083 \left(\frac{100}{C}\right)^{1.85} \frac{Q^{1.85}}{di^{4.87}}$$

Q = Flow in gallons/min
di = inside dia of pipe in inches
C = constant for inside roughness of pipe
f = friction head in feet of water/100 feet of pipe

Values of C
up to 315 mm C = 137 - 150
over 315 mm C= 151

Head losses attributable to fittings can be found by applying :

$$h = \frac{KV^2}{2g}$$

h = Head loss (m).
K = Constant
V = Velocity of fluid (m/s).
g = Acceleration due to gravity (m/s^2)

Values of K
Elbow 90^O - 1.00
Elbow 45^O - 0.40
Moulded Bends 90^{O}C – 0.75
Formed Bends 90^O – 0.20
Formed Bends 22½^O - 0.10
Flow in Line - 0.35
Flow in the line to branch or branch to line – 1.20

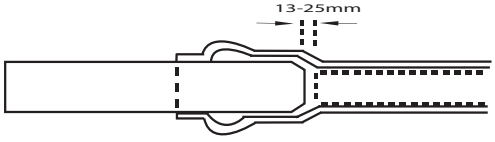
Surge Pressures:

Surge pressures commonly termed as “Water Hammer” are generated in any piping system when a flow changes its velocity.

$$P = \frac{4660\ V}{2.3g\sqrt{\dfrac{1+K\,(DR-2)}{E}}}$$

P = Surge pressure in PSI
V = Maximum velocity change in Ft/Sec.
g = Acceleration due to gravity 32.2 Ft. Sec^2 or Sec/Sec.
K = friction head in feet of water /100 feet of pipe
DR = Pipe outside diameter/wall thickness.
E = Modules of elasticity of the pipe in PSI. (420,000 PSI for PVC)

Expansion Gap:
To be sure that the spigot enters the socket to within 13 – 23 MM of the bottom of the socket dimension, the depth of chamber should be one third of the wall thickness of the pipe.



Calculation of pipe diameter based on required flow an velocity.

$$ID = 10\sqrt{\frac{40\ .\ Q}{\pi\ .\ V}}$$

ID : Inside diameter (mm)
Q : Flow rate in L/S orm /F
V : Velocity of Flow (M/S)

***Determination of the length changes caused by difference in temperature.**

$\Delta L = L\ \Delta T\ \delta$
ΔL = IN^{o}C, ΔL = MM
δ for uPVC = 0.05

THERMAL MOVEMENT

Where the temperature of a uPVC pipeline is likely to vary due to atmospheric temperature,it is important to plan the variations in pipeline length which may arise as a result of temperature differences. Expansion and contraction can be calculated using the formula.

dl = ∞ x L x dt

Where, **dl** = Change in length in millimeters
∞ = 0.08mm/m/C.
L = Original length of pipe in meters
dt = Total temperature range in 0C.

Calculation of expansion and contraction should take account of the minimum and maximum foreseeable temperature conditions.
When the total length variation of the pipeline has been established, the positioning of both support and anchor brackets can be determined.
Anchor brackets, can be so arranged to sub-divide the total length variation and to control movement in a specific direction. Support brackets must allow the pipeline to move freely.
It is normally possible by correct bracket arrangement to direct movement in such a manner that this is a accommodated by directional changes in the line.
Expansion bellows may be used to accommodate excessive movement but in such instances the pipes so connected must be restrained against possible separation.
Any line valves must be firmly anchored and independently supported so that no stresses are transmitted to the pipeline.

Pipe Brackets:
Standard or purpose made metal pipe brackets are normally employed. These should be of the maximum possible bearing width and should have no sharp edges likely to cause pipe damage.
The brackets may be plastic coated but where this is not practical a layer of rubber felt , or similar soft, non abrasive membrane must be fixed to the bearing face prior to installation.

Pipe Supports:
UPVC pipes must be adequately supported. The following table shows the recommended support intervals for horizontal pipes conveying water. Where liquids of greater density are being conveyed the intevals of support should be reduced proportionately.
For vertical pipe runs, the support intervals may be increased to double those shown except in exposed situations where wind loading, etc., may dictate adherence to the intervals tabulated below.

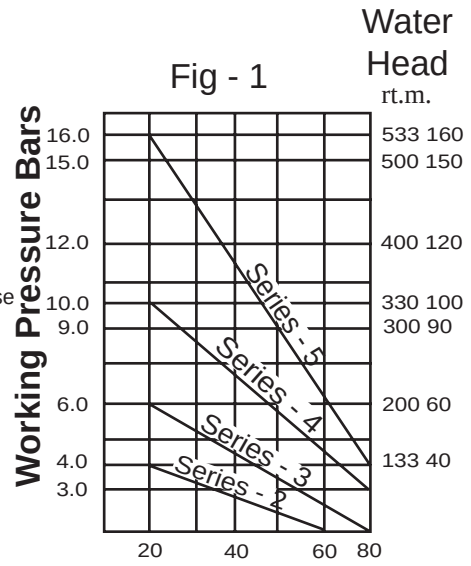
Classes II & III			Classes IV & V	
Nom. Size	20^{o} C m	40^{o} C m	20^{o} C m	20^{o} C m
12	.	.	0.70	0.60
20	.	.	0.77	0.70
25	.	.	0.85	0.80
32	.	.	0.90	0.85
40	.	.	1.07	0.90
50	1.07	0.92	1.15	1.00
63	1.22	1.07	1.30	1.15
75	1.30	1.15	1.37	1.22
90	1.34	1.18	1.45	1.26
110	1.37	1.22	1.52	1.30
140	1.52	1.37	1.67	1.45
160	1.60	1.45	1.82	1.60
180	1.75	1.52	2.00	1.75
200	1.82	1.60	2.05	1.82
205	1.90	1.67	2.20	1.90
250	2.05	1.75	2.37	2.05
315	2.30	2.05	2.52	2.20
355	2.37	2.20	2.67	2.42
400	2.60	2.45	2.75	2.60
450	2.90	2.75	2.97	2.82
500	3.20	3.05	.	.
.	.	.	.	.
.	.	.	.	.

uPVC PIPE AT ELEVATED TEMPERATURE

When uPVC pressure pipe operates at temperature other then the temperature at which the pipe is rated (20 or 23^{o}C) pressure rating should be established on thermal design factors. Examples given below are for guidance only.

Pressure Temp. Relationship
Ambient Variable
Internal Temp 20^{o}C

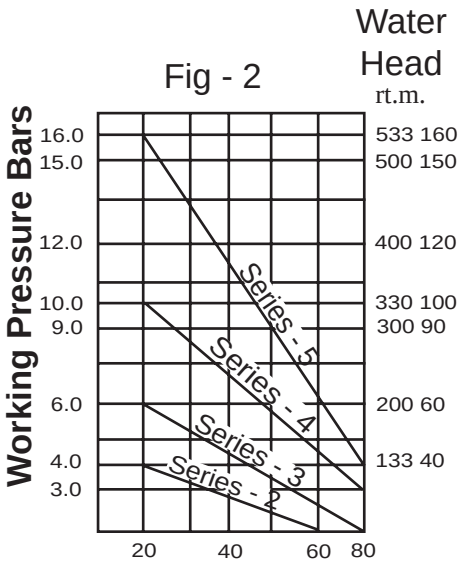
Fig - 1



AMBIENT TEMPERATURE OF 40^{o}C a required working pressure of 6.0 bars use a 10 bar rated pipe.

Pressure Temp. Relationship
Internal Variable
Ambient Temp. 20^{o}C.

Fig - 2



AMBIENT TEMPERATURE OF 40^{o}C a required working pressure of 6.0 bars use a 10 bar rated pipe.

TEMPERATURE CONVERSION

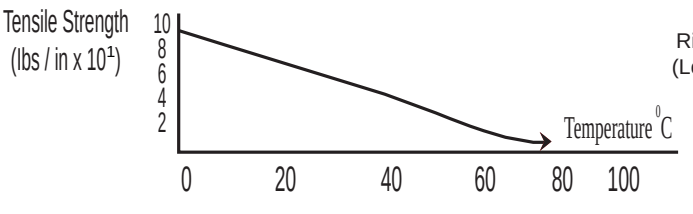
F = 9/5(C+32) ***C = (F - 32)5/9***

Pressure Temperature relationship

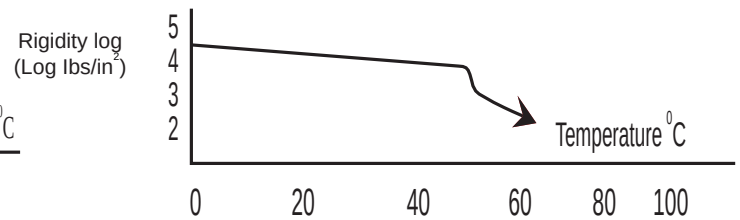
Temperature		Temperature Correction Factors
^{o}C	^{o}F	
21	70	1.00
27	80	0.90
32	90	0.75
38	100	0.62
43	110	0.50
46	115	0.45
49	120	0.40
52	125	0.35
54	130	0.30
60	140	0.22

Where the liquid carried in a pipeline is 20 ^{o}C and the ambient temperature is higher than 20 ^{o}C – the maximum working pressure should be reduced by 1 ½ % per degree above 20 ^{o} C.

Where liquid carried in a pipeline is 20 ^{o}C and the ambient temperature is 20 ^{o} C – the maximum working pressure should be reduced by 2% for every degree ^{o}C the fluid temperature is above 20 ^{o}C.
The above pressure reductions apply to maximum operating temperature of 60 ^{o} C.



Relationship between tensile strength and temperature



Relationship between Rigidity and temperature

REFERENCES
MAJOR CLIENTS FOR NATIONAL MARKETING CO.(NEPROPLAST uPVC PIPES AND FITTINGS)

List of Major Projects	Name of the Contractor	Name of the Client
King Abdul Aziz University project in Jeddah	KAAU	*MHE
Immam University project in Riyadh		*MHE
Petroleum and Mineral University Project in Dammam		*MHE
SCHOOLS		*MHE
Dammam New Hospital		*MHE
2ND & 3RD Phase for Industrial Estate Projects in Riyadh		*MI
Industrial Estate in Jeddah, Dammam and Al Qassim		*MI
Saudi Archirodon (Steam Power Plant – Shoaiba)		*MI
CONSTRUCTION OF UNDER AGE JAIL FOR EASTRN AREA		*MOI
Irrigation Project		*MOIRR
Al Haram Extension projects		*MPE
Madina Haram extension.		*MPE
Petromin Head Office project in Riyadh		*MPM
Mahad Al Dahad Project		*MPM
Different projects in Riyadh, Dammam and Jeddah		*MPM
Naval BASE INFRASTRUCTURE	AL MANAR	*NB
Derab, Al Khasim Alaan, Jeddah, Dammam		*NG
Conduits & cable duct Throughout the Kingdom		*P.T.T
Duct for P.T.T project Tep.6		*P.T.T
King Abdul Aziz Port Project in Jeddah		*PA
Dammam Sea Port		*PA
Kindasa Water Services (Development of Islamic Port).		*PA
AL MADA VILLAS (90 V)		*PO
Compound 90 V		*PO
King Fahad Stadium project in Riyadh		*PYW
Prince Jalawi Sport City Project in Dammam		*PYW
Al Shahab Club Stadium in Riyadh		*PYW
Sports Club Projects throughout the Kingdom		*PYW
R.C (3-BUILDINGS)		*R.C
R.C HOUSING PROJECT C 12 400V		*R.C
JUBAIL HOUSING PROJECT 378 VILLAS C-13		*R.C
137 C01R INFRASTRUCTURE	AL HARBI	*RC
RC 028-C26 P& C OF JTI	AZMEEL	*RC
Hadeed and petrokemya, Housing Projects,		*RC
Diplomatic Quarters Project in riyadh		*RDA
Makkah Road Project in Riyadh		*RDA
Kasr M Hokom project in Riyadh		*RDA
Aramco Projects in Eastern Region & Hotat Bani Tamim.		*SA
SAUDI ARAMCO ISUP PROJECT PR 4075	NESMA	*SA
JUBAIL EXPORT REFINERY PROJECT	AL OSAIS	*SA
JUBAIL EXPORT REFINERY PROJECT	CCE	*SA
Manifa Project Refinery	MEDECO	*SA
Manifa Project Refinery	AL MOJIL GROUP	*SA
King Abdullah University for science and Technology (KAUST)	SBG, Saudi Oger, Nesma & Salco	*SA
King Abdullah University for science and Technology (KAUST)	Salem Saleh Al Hareth	*SA
King Abdullah culture center	SAUDI OGER	*SA
SHEBA refinery		*SA
WASIT GAS PLANT PROJECT (ELECTRICAL)		*SA
SAUDI ARAMCO HOUSING PROJECT - DAMMAM 400 VILLAS		*SA
WASIT GAS PLANT PROJECT (TELECOMMUNCATION)		*SA
Sub station		*SEC
STF (QUREAH)		*SEC
PP 10	Bemco	*SEC
Riyadh, Jeddah, Al-Khobar, Makkah, Al-Qassim and Yanbu.		*SWCC
Rabigh & Jeddah saline water station project.		*SWCC
King Abdullah economic city (KAEC) RTV Villa & Baylasun	Bin Laden PBAD	EMAAR
King Abdullah economic city (KAEC) Baylasun	Saudi Oger	EMAAR
King Abdullah economic city (KAEC) Industrial complex	Al SAAD General Co	EMAAR
King Abdu Aziz university	SAAD, BK1, ALLIA, Muhaidib, Bemco...	KAAU
King Abdullah International Airport (KAIA)	SBG	KAIA
Knowledge Economic city – Medinah (KEC) Villas	Al Dar Al Arabia	KEC
Knowledge Economic city – Medinah Infrastructure	Al Rajhi	KEC
KFU-AL-HASA HOPITAL INFRASTRUCTURE	FEMCO	KFU

REFERENCES

MAJOR CLIENTS FOR NATIONAL MARKETING CO.(NEPROPLAST uPVC PIPES AND FITTINGS)

List of Major Projects	Name of the Contractor	Name of the Client
King Abdul Aziz Int. Airport Jeddah	KAIA	*CAIAA
King Khalid Int. Airport in Riyadh	KKIA	*CAIAA
King Fahad Int. Airport in Dammam	KFIA	*CAIAA
Airport in Arar, Tabouk, Qassim & Madina		*CAIAA
School & Colleges projects		*DGE
KING ABULLA CENTER		*DM
Dewatering		*DM
Dammam coastal Bridge		*DM
KFU hospital		*DM
KFU Student Housing		*DM
GOSSI HOUSING PROJECT 450VILLAS WITH APERTMENTS		*GOSSI
Ghurnata Village	Al Latifia	*GOSSI
GOSSI HOUSING PROJECT	AZMEEL	*GOSSI
Refugee housing project	RTCC	*KAFHD
Refugee housing project	Rajhi	*KAFHD
Refugee housing project	Beijing Emirates	*KAFHD
TECHNO-VALLEY (KFUPM)		*KFUPM
KFUPM STUDENT HOUSING PROJECT PHASE -5		*KFUPM
KFUPM HOUSING 200VILLAS PROJECT		*KFUPM
KFU DOCTOR"S HOUSING PROJECT		*KFUPM
MAADEN RAS AL-ZAWAR HOUSING 2200 VILAS		*MAADEN
RAZ AL ZOWER POWER SUB STATION	NASER AL HAJRI	*MADDEN
MARAFIQ HOUSING PROJECT 815-C12		*MARAFIQ
Different projects in Central & Eastern Province		*MAW
Perforated uPVC pipes various areas of Kingdom.		*MAW
Riyadh water Treatment & Dist.System – 3rd stage. Part 1		*MAW
Extension of Riyadh Dist. System Stage Two – Part 3		*MAW
Extension of Riyadh Water Supply – Riyadh East – West		*MAW
Extension of Riyadh Water Supply – Riyadh Scattered Line		*MAW
Riyadh Scattered line and house connection.		*MAW
Riyadh East. West. South, North Areas.		*MAW
Neighboring and surrounding villages		*MAW
Dawadmi Dist. System		*MAW
Jeddah Water Supply & Dist. System, Third Stage, Part 1,2,&3		*MAW
Jeddah Water Supply & Dist. System, Fifth Stage, Part 2		*MAW
Jeddah Water Supply & Dist. System, Six Stage, Part 1		*MAW
Creek and Relocation of Khylais Lines		*MAW
Extension of Jeddah Water Supply, Seven Stage, Parts 2,3 & 4		*MAW
Supply of Maintenance Materials for Jeddah Water Works.		*MAW
Riyadh, and Al Qassim Ring Road		*MC
Riyadh Al Qassim Express way project		*MC
Riyadh Al-Dammam Express way project		*MC
Green Silos at Riyadh, Tabouk Jeddah		*MCOM
Security Borders Project – Northern Borders	RTCC	*MD
SSSP Projects		*MDA
ABF Projects		*MDA
Al Bayadh Air Base Projects in Al-Kharj		*MDA
Peace Shield Projects		*MDA
King Abdul Aziz Military Academy in Tabouk	KAMA	*MDA
King Khalid Military city in Riyadh	KKAMC	*MDA
Royal Saudi Air Force Project		*MDA
ISF Housing Project		*MDA
Military Factory Housing Project		*MDA
Al Yamamah Project		*MDA
ABV ROCK GROUP Area: Jeddah,Riyadh,Abha,Madina and Yemen		*MDA
MODA HOUSING		*MDA
CONSTRUCTION OF KING ABDULAH MULITARY ACADIMY		*MDA
Princess Noura University	SBG, Saudi Oger,& CCC	*MF
Shamiah Infrastructure project (Mekkah)	Inma Utility	*MG
5 Hospitals project		*MH
Saudi German Hospital (hospital Projects)		*MH
Water system & sewage for schools and colleges		*MHE
King Saud University – Riyadh	SBG, Saudi Oger, RTCC & ABV	*MHE

REFERENCES

MAJOR CLIENTS FOR NATIONAL MARKETING CO.(NEPROPLAST uPVC PIPES AND FITTINGS)

List of Major Projects	Name of the Contractor	Name of the Client
King Saud University	SBG, Mododi, Habbal	KSU
MODA HOUSING PROJECT	AL YAMAMA	MODA
MODA-17TH LIGHTT INFANTRY BRIGADE DAHRAN (external)	AL YAMAMA	MODA
Industrial City 2 Phase 1	Mastoor Bin Merfaa	Modon
Industrial City 2 Phase 2	Al Rajhi	Modon
MOI Lodging center	Bin Laden PBAD	MOI
SABIC HOUSING PROJECT - Haii al Jalmudh (KAYAN SECTION)	AL KHONINI	SABIC
SASREF INFRASTRUCTURE	AL KHONINI	SABIC
SABIC HOUSING PROJECT - JUBAIL 600 VILLAS		SABIC
SASREF HOUSING PROJECT - JUBAIL - 300 VILLAS		SABIC
SABIC HOUSING PROJECT - JUBAIL 1200 VILLAS		SABIC
King Abdulaziz University for Health Sciences	SBG	SANG
TASNEE HOUSING PROJECT (211 UNITS)		TASNEE
SAP/TASNEE SD /008/SD/11	AL KHONINI	TASNEE

*CAIAA	Civil Aviation and International Airport Authority
*KAFHD	King Abdullah Foundation for housing development
*MAW	Ministry of Agricultural and water
*MDA	Ministry of Def nse and Aviation
*P.T.T	Ministry of P.T.T & Saudi Telephone
*MOIRR	Ministry Of Irrigation
*MOI	Ministry of Interior
*MPM	Ministry of Petroleum&Minerals
*MPE	Ministry of Pilgrimage & Endowments
*PYW	Presidency of Youth Welfare
*RDA	Riyadh Development Authority
*SWCC	Saline Water Conversion Corporation
*SA	SAUDI ARAMCO
*MARAFIQ	Power and Water utility Co for jubail and yanbu
*R.C	Royal commision
*SEC	Saudi Electricity Co
*MDIAC	Ministry of Defence/International American Co
*MAGLC	Ministry of Agricultural Green Line Contractors
*MHO	Ministry of Housing
*MM	Ministry of Municipality
*MS	Ministry of Sports
*MT	Ministry of Tourisim
*MWM	Ministry of Water And Municipality

*PA	Ports Authority
*MHE	Ministry of Higher Education
*MI	Ministry of Industry
*MC	Ministry of Communication
*MD	Ministry of Defense
*MF	Ministry of Finance
*MH	Ministry of Health
*DGE	Directorate of Girls Education
*MG	Mekkah governorate
*MCOM	Ministry of Commerce
*NG	National Guard
*NB	NAVIL BASS
*DM	Dammam Municipality
*PO	PRIVATE OWNER
*GOSSI	General Organization of Secial Insurance
*KFUPM	KING Fahad university of Petroleum
*MAADEN	Saudi Arabian Mining Co

MAJOR EXPORT PROJECTS EXECUTED BY NATIONAL MARKETING EST. CO.LTD

(NEPROPLAST uPVC PIPES AND FITTINGS)

CLIENTS	COUNTRY	PROJECTS
A.A. Nass Company	Bahrain	Golf Course, Bahrain
Abu Dhabi Municipality	UAE	Al-Ain Parking
Abu Dhabi Municipality	UAE	Abu Dhabi Water Network
Abu Dhabi Municipality	UAE	Al-Ain Water Dis. Network
Advanced Agriculture Co.	UAE	Five Parks Projects in UAE
Akbar Tech. Services Co.	UAE	Gantoot Palace Proj. Abu Dhabi
Al-Anaam Trading Co.	Sudan	Sudanese Free Zone & Mktg. Sud
Al-Anaam Trading Co.	Sudan	Sudanese Free Zone & Mktg. Sud
Al-Attiyah contr. & trdg	Qatar	Extension of Salwa Ind. Area Qatar
Al-Fao Universal Co.	Yemen	Hadramout University Project.
Al-Habtoor Engr.Ent.Co.	UAE	Site 254 Private Palace at Ghantoot
Al-husam gen.contr.co	UAE	Hypochirination Piants in Umm Al Nar
Al-kharafiq National Co.	Ethiopia	Addis Ababa Int'l. Airport
Al-Mobty Contracting Co.	Yemen	Sana'a Drainage Project
Al-Ramizya Agr.Est	UAE	Water Well Casing & Screen
Al-Ramizya Agr.Est	UAE	Al-Ain Abu Dhabi Water Line
Al-roaidhi Well Drilling Est.	UAE	Water Well Cas. & Scr. In UAE
Al-Waha Agr Ser.	Qatar	Cp 646 Dist. Main from T6-T7 Qtr.
Amber food ind.Co.	Egypt	Farm Project
Amin y.Al-Hashedi Est.	Yemen	Hodeidah Water & Drng. Local Auth. Ph. 1
Amin y.Al-Hashedi Est.	Yemen	Sana'a Water Distribution Project
Anas for enggr Co.	Yemen	Al-Ghaydah Potable Water
Arabian Agr Co.	Sudan	Farm Project, sudan
Arenco	Bahrain	Bahrain Airport Extension
Bayhan trdg.&Agencies	Yemen	Sana'a Water Network PH. III
Bayhan trdg.&Agencies	Yemen	Water Well in Mukallah, Yem.
C.C.C	Qatar	Al-Shoyeba Project
Dahdal contracting co.	Jordan	Nawflah Tourism City, Jordan
Dar Al –ImanCharitable	Madagascar	Portable Water Network
East African Trd House ltd	Ethiopia	Cas. & Scr. For Ethiopian Project.
East African Trd House ltd	Ethiopia	Cas. & Scr. For Tender # OWECE
East African Trd House ltd	Ethiopia	Casing & Screen for Tender No. TWWCE
EBD Lebanon s.a.r.l	Sudan	uPVC Casing & Screen Project
Eritrean core Well Co.	Eritrea	55 Water Well Project
E.C.W.Drilling .Co.	Eritrea	92 Water Well Cas. & Screen
Hitachi Zosen Co.	Oman	Al-Baraka Project
Hydrotofof Co.	UAE	Dubai Municipality
Jamjoom contractors	Sudan	Madani Project
Laid & sons Co.	Pakistan	Commercial Project
MANCO Contracting Co.	Qatar	Ras Lafan LNG-JGC Corp.
MAGLC	Kuwait	Kuwait Airport Landscaping Phase II
MAW	UAE	55 Water Well Project
MAW	Yemen	Agriculture Project
MDIAC		U.S. Army Cap / Kuwait
MHE	Yemen	Sana'a University Project
MHO	Kuwait	Wafra Housing Projects
MM	Kuwait	Drainage Projects
MPM	Qatar	Oil Plants
MS	Bahrain	Gulf Cours
MT	Jordan	Aqaba Movenpick Hotel
MT	Syria	Damuscus Sheraton Hotel – (Maintenances)
MWM	Sudan	Khatoum Water Network
MM	Lebanon	Sayda Drainage System
Modern Maintanence Co	Jordan	Movenpik Dead Sea. Aqaba
Natinal Marketting Co.	Lebanon	City Center Project
Oxfam Co.	Eritrea	Irrigation Work, Eritrea
Fast Services Contr	Bahrain	Durat Al-Bahrain Project
Rabya Qatar	Qatar	Qatar Foundation / Landscaping
Rama agri.Euipt.Agn.	Jordan / Iraq	Min. of Agri. Contr. No. M/695/2001
Safir for Gen.Trdg. & Agn	Yemen	Hodeidah Water Dist. Phs-2

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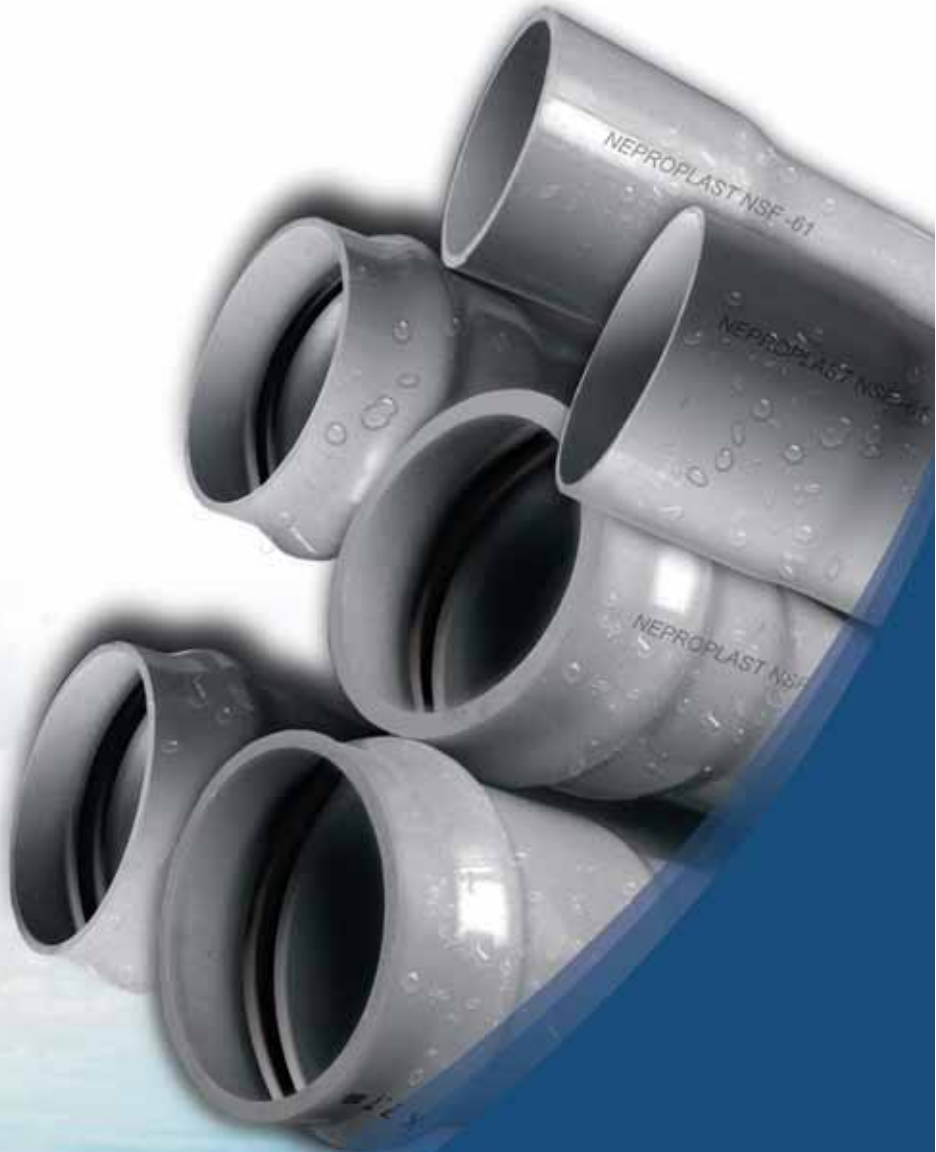
نيبروبلاست

شركة صناعات المنتوجات الجديده المحدودة

انابيب يو بي في سي



التوزيع الحصري

شركة المؤسسة الوطنية للتسويق المحدودة

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www.namat-plasticwelding.com

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