PVCu / CPVC / LDPE / HDPE / PB Pipes & Fittings

BP
SYMBOL OF QUALITY

مواسير البحرين ش.م.ب(م)
Bahrain Pipes B.S.C.(c)

it's plastic engineering

UltraTUFF
CPVC for Hot & Cold Applications

FLEXPIPE®
POLYBUTYLINE - 1 HOT & COLD PLUMBING & HEATING SYSTEM

Tested & Certified by

NSF
NSF/ANSI 14 & 61

SKZ
Germany

SASO
QUALITY MARK

WRAS
APPROVED PRODUCT

WRAS
APPROVED MATERIAL

ISO 9001
BUREAU VERITAS
Certification


BP
SYMBOL OF QUALITY

We aim to continually introduce better products and improved services that will enhance the standards of living and the well-being of our society. This will be achieved through the commitment and dedication of our team and the support of our suppliers. Providing our customers with exceptional service, quality and value, will strengthen our position in every business that we are involved.

UltraTUFF
CPVC for Hot & Cold Applications

FLEXPIPE®
POLYBUTYLINE - 1 HOT & COLD PLUMBING & HEATING SYSTEM

A Division of
HAJI HASSAN GROUP

We have annual production storage capacity is approximately 20000MT for pipes and fittings. The main factory shed is spread over an area of 7,000 Sq. Mtrs (75,347 Sq. Foot). Our manufacturing range includes pipes from 15mm dia to 1600 mm and fittings from ½" to 6".

Contents

Quality Standards

"Quality is never an accident; it is always the result of high intention, sincere effort, intelligent direction and skillful execution; it represents the wise choice of many alternatives."

Profile

As the world continues to advance into the future, plastic engineered solutions are becoming an arising need for water cycle, energy, power distribution, telecommunication networks and industrial applications in our economy.

Industrial and residential designs have undergone a progression of an inspired evolution during the past years consequentially in innovative and challenging construction types. Such innovative configurations necessitate evenly innovative plastic engineered solutions.

The versatility of plastic pipe systems has made them the preferred choice for a wide variety of applications for Drinking water, Gas, Sewer, Cable protection or conduit, Hot and Cold water, Heating and cooling and Industrial systems. The economic and environmental benefits achieved by plastic pipe are an outcome of features including: zero corrosion, increased flexibility, durable and tough material, leak-free joint fusion, light weight materials, easy installation and rehabilitation, high flow-rate properties, great lifetime expectancy, hygienic and clean delivery, environmentally sound products, cost-effective components and industry-tailored options. Plastic pipes are the ideal products for today's extensive continuum of commercial, residential and industrial sector applications for withstanding resistance to wide range of chemicals, heat and pressure. This increasing demand led to the instigation of Bahrain Pipes Factory in 1996, at Haji Hassan Industrial Complex, Salmabad, Kingdom of Bahrain.

Bahrain Pipes Factory is the recognised leader in corrosion resistant equipment for water and wastewater treatment and control, specializing in PVC, UPVC, CPVC, HDPE, LDPE pipes & fittings products. Our raw materials are procured from leading global manufacturers of plastic engineered products. Being an ISO 9001:2000 certified pipes manufacturing company for its Quality Management System; we corroborate highest international standards of ASTM, BS, DIN & AS in the manufacturing of our products.

Along with sophisticated standards and a broad range of quality products, Bahrain pipes Factory is the poineer and the only Polybutene-1 hot & cold plumbing and heating systems manufacturer in the Middle East.

Our products reflect international standards, quality, accuracy and durability in every facet. With our commitment to excellence, we have set standards to inspire others to follow. With this aspiration to lead, we have increased our production capacity to manufacture customized pipe sizes and fabricated fitting lines.

With our qualified team of proficient personnel providing technical support and customer service from design to installation, Bahrain Pipes has carved a niche to be the most preferred company by government ministries, esteemed consultants & contractors within the Kingdom & the Middle East.

Bahrain Pipes Factory emphasizes on using the most advanced techniques in manufacturing their products. The continued existence of passion for Quality Control at Bahrain Pipes Factory is the main factor for the high quality standards you see in our products Our certified personnel conduct various tests on every product of our company in a meticulous manner. We see to that our finished product is of superior quality complying with international standards.

The true definition of quality

QUALITY MANAGEMENT

MISSION

We exist to enhance the standard of living by provide quality based finished products and services complying with international standards among the Middle East and Global Pipe Manufacturers.

VISION

We stand to differentiate ourselves as the trusted and ideal pipe manufacturing partner serving the stringent requirements of the global market.

VALUES AND GUIDING PRINCIPLES

Complete customer satisfaction to the changing market needs globally.

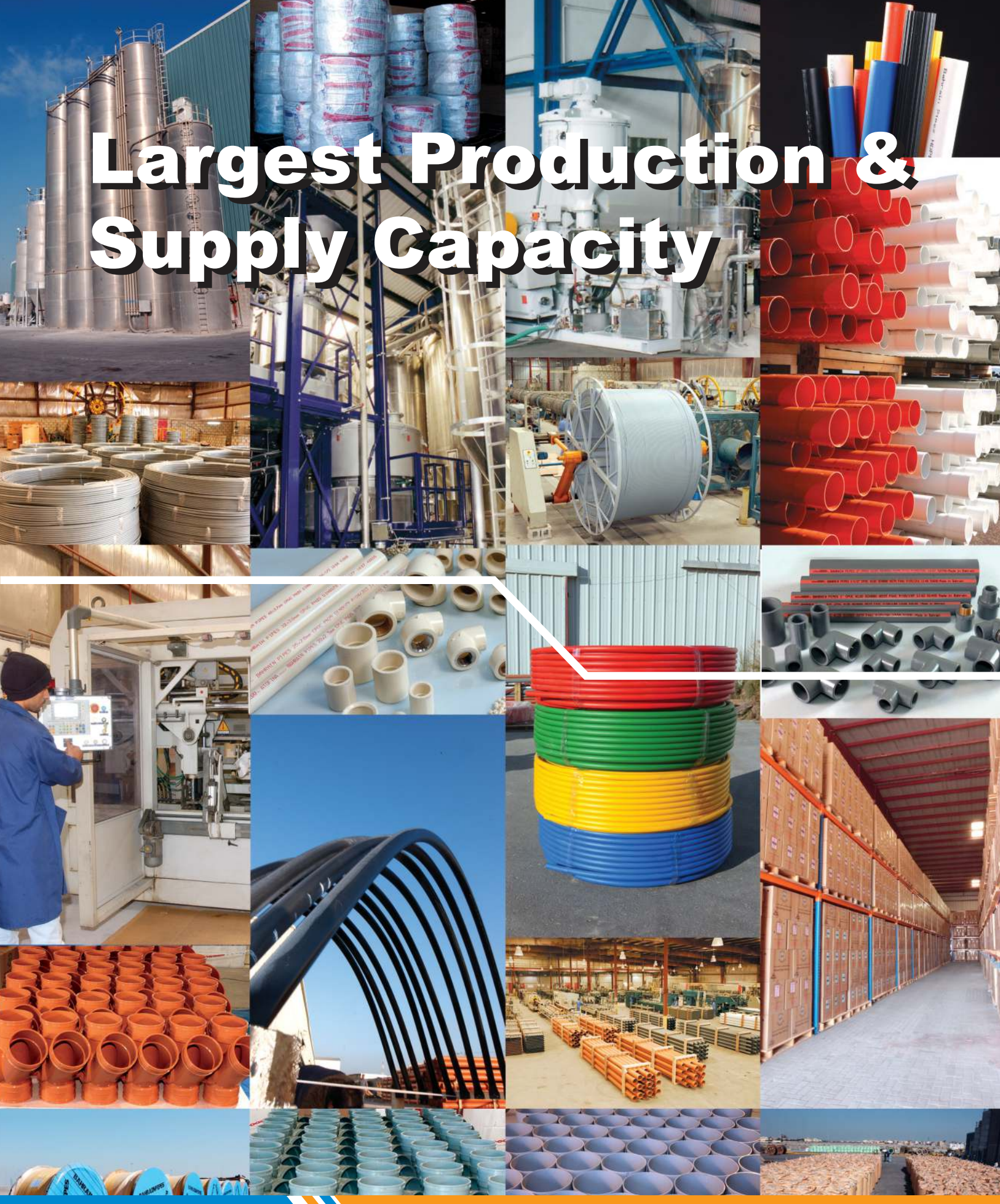
Veracity, Candor and Equality in everything we do.

Excellence is our way of reliability and continuously striving for quality excellence.

Our pecuniary equanimity is cautious planning for potential trends, astute stewardship of resources, eminent products & services at a reasonable cost.

Bahrain Pipes service objective is to continue building its reputation bared on quality of products and services. Our technical support team is committed to working with our customers to provide interlinings that meet the highest international standards. At the same time our staff also understands the importance of meeting customer deadlines and the need to be price competitive. Our aim is to develop long-term business partnerships that allow customers to grow and prosper that guarantee a service with integrity.

ISO 9001
BUREAU VERITAS
Certification


Largest Production &
Supply Capacity

Production Facilites & Manufacturing Capacity

The initial phase of the production program at Bahrain Pipes Factory has concentrated on the manufacturing of plastic pipes with state of the art facilities to accommodate higher capacity of output equilibrium.

The Bahrain Pipes manufacturing premises is equipped with advanced German technology and standards set by Stalwarts Krauss-Maffei, Battenfield of Germany & Toshiba of Japan to name a few. Plastic, being the most important, essential and vital raw material and determinate of high quality pipes is acquired only from those raw material manufacturers that are known for their par excellence. Our raw materials are supplied by internationally reputed manufacturers like SABIC, LG, Shintech, Basell, ARKEMA, Baerlocher etc.

Bahrain Pipes has set-up the most advanced and sophisticated facilities, which are designed and developed to achieve the required level of parameters, specifications & dimensions – crucial standards at its plant. This advanced set up enables us to transform raw granuals in to completely finished products with tremendous ease, flair and smooth flow.

Raw Material Storage

Our storage capacity runs up to 5000MT. Raw material warehouse admeasures aproximately 15000sq.mtrs. Raw materials that require extra precautions are stored with apt protection at the factory.

Finished Products Storage

Warehouse for finished pipe products admeasures about 9,000sq.mtrs can accomadate approximately 15,000MT finished products.

In due course of time, Bahrain Pipes , in order to complement its varied and deep range of product-mix, would be offering co-branded fittings and large/special pipes from approved exclusive sources to complement comprehensive requirements of the potential clientele.

Plastic engineering ...
through global innovation

basell
Polyolefins Netherland

DOMINO U.K.

KRAUSSMAFFEI
GERMANY

NUEVA TERRAIN S.L.
Spain

BOREALIS

SICA

TOSHIBA
JAPAN

Atlas Copco
Belgium

Battenfeld
Extrusionstechnik, Germany

TRANE
U.S.A

ARKEMA
France

BAERLOCHER
Germany

RAY-RAN U.K.

sabic

SCITEQ
Denmark

HITACHI
Japan

coperion
Waeschle GmbH & Co. KG

Product Technical Specifications Index

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To retain the longevity and durability qualities, our finished pipe products are immediately arranged for storage in pallets and the finished fittings are packed in corrugated cartons and shrink wrapped. This kind of precaution facilitates us to keep the product intact for our clients.

uPVC Pipes

An imperative evolution in the world of plastic pipe engineering has given us unplasticised PVC (uPVC).The unparalleled value and pipeline installation reliability of this product can be varied by miniature altering agents who have definite and controlled mechanical properties. They are light, rigid and fabrication friendly for close dimensional forbearance. By using heavy elaborate machinery and extremely precise process of direct extrusion or injection moulding these materials can be converted into pipes and fittings. The major properties of uPVC are resistance of corrosion caused by acid, alkalis, oils, salts, moisture and the media in the interior of the pipe.

It is very reliable for resistance to the severe climatic and soil conditions in the Middle East. uPVC pipes are incredibly light and easy to install with a complete range of fittings/joints which are leak proof.

Incase of fire flames are unable to travel along the pipe because of its extinguishing feature. Being in integral insulator uPVC are also ideal for electric conduits, eliminating the possibility of electrolytic corrosion. They are an ideal application for water supplies, irrigation systems, casing & screen, industrial, soil, waste & drainage sewer system, mining, electrical and telecommunications cables.

Our finished products are stored in a facilitated warehouse. The pipe products and fittings are aligned systematically by their type and size in their respective pallets and cartons. Our storage arrangements assist our staff to provide easy product identification and are ready to be delivered to our clients.

DRAIN, WASTE SOIL & VENTILATION

BS 5255

Note : Can be Manufactured on customer's request out of PVC-Mu

Nominal Size		Mean Outside Diameter		Wall Thickness (mm) THERMOPLASTIC WASTE PIPE	
Inch	DN	MIN.	MAX.	MIN.	MAX.
$1^1/_4$	32	36.15	36.45	1.8	2.2
$1^1/_2$	40	42.75	43.05	1.9	2.3
2	50	55.75	56.05	2.0	2.4

BS 4514

Nominal Size		Mean Outside Diameter		Wall Thickness (mm) SOIL & VENTILATING PIPES	
Inch	DN	MIN.	MAX.	MIN.	MAX.
3	82	82.4	82.8	3.2	3.8
4	110	110.0	110.4	3.2	3.8
6	160	160.0	160.6	3.2	3.8

BSEN 1329

* Supersedes BS 5255 & BS 4514

Nominal Size DN/OD	Nominal outside diameter d_n	Wall Thickness Application Area			
		B		BD	
		$e_{min.}$	$e_{m,\ max.}$	$e_{min.}$	$e_{m,\ max.}$
32	32	3.0	3.5	-	-
40	40	3.0	3.5	-	-
50	50	3.0	3.5	-	-
63	63	3.0	3.5	-	-
75	75	3.0	3.5	3.0	3.5
80	80	3.0	3.5	3.0	3.5
82	82	3.0	3.5	3.0	3.5
90	90	3.0	3.5	3.0	3.5
100	100	3.0	3.5	3.0	3.5
110	110	3.2	3.8	3.2	3.8
125	125	3.2	3.8	3.2	3.8
140	140	3.2	3.8	3.5	4.1
160	160	3.2	3.8	4.0	4.6
180	180	3.6	4.2	4.4	5.0
200	200	3.9	4.5	4.9	5.6
250	250	4.9	5.6	6.2	7.1
315	315	6.2	7.1	7.7	8.7

BSEN 1329 (Series based on inch dimentions)

* Supersedes BS 5255

Nominal Size DN / OD	Nominal outside diameter d_n	Wall Thickness Application Area B	
		$e_{min.}$	$e_{m,\ max}$
36	36	3.0	3.5
43	43	3.0	3.5
56	56	3.0	3.5

Note : B - Inside the building BD - Inside building and buried within the building structure.

DRAIN, WASTE SOIL & VENTILATION

AS / NZS 1260

Nominal Size		Mean Outside Diameter		Wall Thickness (mm)			
				DRAIN , WASTE & VENT PIPES			
				HEAVY SEWER (SH)		EXTRA HEAVY SEWER (SEH)	
Inch	DN	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
$1^1/_4$	32	36.2	36.5	1.9	2.3		
$1^1/_2$	40	42.8	43.1	2.0	2.4		
2	50	55.7	56.0	2.2	2.6		
3	80	82.3	82.7	2.9	3.4		
4	100	110.0	110.4	3.0	3.5	3.6	4.1
6	150	160.0	160.5	4.0	4.5	5.2	6.0
8	175	200.0	200.6	4.9	5.6	6.7	7.7
10	225	250.0	250.7	6.1	7.0	8.2	9.2

Standard Length : 4, 5.8 & 6 meters
Colour : Grey
Socket Type : Solvent Weld
Rubber Seal Ring (Above 75mm)

DIN 19531

Nominal Size	Mean Outside Diameter (mm)		Wall Thickness (mm)	
			DISCHARGE SYSTEM FOR INSIDE BLDG.	
mm	MIN.	MAX.	MIN.	MAX.
40	40.0	40.2	1.8	2.2
50	50.0	50.2	1.8	2.2
75	75.0	75.3	1.8	2.2
110	110.0	110.4	2.2	2.7
125	125.0	125.4	2.5	3.0
160	160.0	160.6	3.2	3.8

UNDER GROUND SEWERAGE APPLICATION

DIN 19534

Nominal Size		Mean Outside Diameter (mm)		Wall Thickness (mm)	
DN	mm	MIN.	MAX.	MIN.	MAX.
100	110	110.0	110.3	3.0	3.5
125	125	125.0	125.3	3.0	3.5
150	160	160.0	160.4	3.6	4.2
200	200	200.0	200.4	4.5	5.2
250	250	250.0	250.5	6.1	7.0
300	315	315.0	315.6	7.7	8.7
400	400	400.0	400.7	9.8	11.0
500	500	500.0	500.9	12.2	13.7

Standard Length : 4, 5.8 & 6 meters
Colour : Golden Brown

Socket Type : Solvent Weld and Rubber Seal Ring (Above 75mm)

BS 4660 & BS 5481

Nominal Size		Mean Outside Diameter (mm)		Wall Thickness (mm)			
				BS 4660		BS 5481	
Inch	mm	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
4	110	110.0	110.4	3.2	3.8		
6	160	160.0	160.6	4.1	4.8		
8	200	200.0	200.6			4.9	5.6
10	250	250.0	250.7			6.1	7.0
12	315	315.0	315.9			7.7	8.7
14	355	355.0	356.0			8.7	9.7
16	400	400.0	401.0			9.8	11.0
18	450	450.0	451.0			11.0	12.2
20	500	500.0	501.0			12.2	13.7

Standard Length : 4, 5.8 & 6 meters
Colour : Golden Brown

Socket Type : Solvent Weld and Rubber Seal Ring (Above 75mm)









it's plastic engineering

UNDER GROUND SEWERAGE APPLICATION

BSEN 1401

* Supersedes BS 4660 & BS 5481

Nominal Size DN/OD[1]	Mean outside diameter (mm)		SN 2 SDR 51[2)]		SN 4 SDR 41		SN 8 SDR 34	
	Min	Max	$e_{min.}$	$e_{m, max.}$	$e_{min.}$	$e_{m, max.}$	$e_{min.}$	$e_{m, max.}$
110	110	110.3	-	-	3.2	3.8	3.2	3.8
125	125	125.3	-	-	3.2	3.8	3.7	4.3
160	160	160.4	3.2	3.8	4.0	4.6	4.7	5.4
200	200	200.5	3.9	4.5	4.9	5.6	5.9	6.7
250	250	250.5	4.9	5.6	6.2	7.1	7.3	8.3
315	315	315.6	6.2	7.1	7.7	8.7	9.2	10.4
(355)	355	355.7	7.0	7.9	8.7	9.8	10.4	11.7
400	400	400.7	7.9	8.9	9.8	11.0	11.7	13.1
(450)	450	450.8	8.8	9.9	11.0	12.3	13.2	14.8
500	500	500.9	9.8	11.0	12.3	13.8	14.6	16.3

1) Non-preferred sizes are indicated in parenthesis.

2) SDR 51 is applicable for application area code "U" only.

Note :

"U" - Inside the building

"D" - Inside building Buried within the building structure.

Your Source for Plastic Pipe Solutions

TELEPHONE DUCT & ELECTRICAL CONDUIT

NEMA TC-2

Nominal Size	Mean Outside Diameter (mm)		WALL THICKNESS (mm)					
			EPT		EPC40		EPC80	
Inch	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
1/2	21.24	21.44	1.52	2.03	2.77	3.28	3.73	4.24
3/4	26.57	26.77	1.52	2.03	2.87	3.38	3.91	4.42
1	33.27	33.53	1.52	2.03	3.38	3.89	4.55	5.08
1 1/4	42.03	42.29	1.78	2.29	3.56	4.06	4.85	5.43
1 1/2	48.11	48.41	2.03	2.54	3.68	4.19	5.08	5.69
2	60.17	60.47	2.54	3.05	3.91	4.42	5.54	6.20
2 1/2	72.84	73.20	2.79	3.30	5.16	5.77	7.01	7.85
3	88.70	89.10	3.18	3.68	5.49	6.15	7.62	8.53
4	114.07	114.53	3.81	4.32	6.02	6.73	8.56	9.58
6	168.00	168.56			7.11	7.98	10.97	12.29
8	218.7	219.46			8.18	9.17	12.7	14.22

Standard Length : 5.8 & 6 meters
Colour : Grey & Black
Socket Type : Solvent Weld

EPT : Electrical Plastic Tubing
EPC : Electrical Plastic Conduit

NEMA TC-6 & TC-8

Nominal Size		Mean Outside Diameter (mm)		WALL THICKNESS (mm)				
Inch	Metric Designators	MIN.	MAX.	EB-20	EB-35	DB-60	DB-100	DB-120
1	27	33.68	33.94					1.52
1 1/2	41	48.11	48.41			1.52		1.65
2	53	60.18	60.48		1.52	1.65		2.11
3	78	88.70	89.10	1.70	2.08	2.54	3.07	3.23
4	103	114.07	114.53	2.26	2.77	3.33	3.94	4.22
6	155	168.00	168.56	3.43	4.17	4.98	5.82	6.20

Standard Length : 5.8 & 6 meters
Colour : Grey & Black
Socket Type : Solvent Weld

EB : Encased Burial (in concrete)
DB : Direct Burial (without encasement in concrete)

TELEPHONE DUCT & ELECTRICAL CONDUIT

BTC / 1006 / DUCT

BTC / 1006 / DUCT - 1994						
Duct No.	Outside Diameter of Duct (mm)	Wall Thickness (mm)	Inside Diameter of Socket at Entry (mm)	Inside Diameter of Socket at shoulder (mm)	Socket Length (mm)	Effective Duct Length Meters
D110	110 ± 0.2	3.25 ± 0.2	111 ± 0.2	109.5 ± 0.2	100	6
D96	96.5 ± 0.2	3.25 ± 0.2	97 ± 0.1	96 ± 0.1	100	6
D56	53.9 ± 0.1	2.0 ± 0.1	54.1 ± 0.1	53.7 ± 0.1	70	3
38mm	38.0 ± 0.1	2.0 ± 0.1	38.2 ± 0.1	37.8 ± 0.1	40	3

ETISALAT

ETISALAT						
Duct No.	Outside Diameter of Duct (mm)	Wall Thickness (mm)	Inside Diameter of Socket at Entry (mm)	Inside Diameter of Socket at shoulder (mm)	Socket Length (mm)	Effective Duct Length Meters
54D	96.5 ± 0.2	3.25 ± 0.4	97 ± 0.1	96 ± 0.1	100	6
56	53.9 ± 0.1	1.55 ± 0.15	54.1 ± 0.1	53.9 ± 0.1	70	3

Q - TEL MAT 1010C

Q - TEL MAT 1010C						
Duct No.	Outside Diameter of Duct (mm)	Wall Thickness (mm)	Inside Diameter of Socket at Entry (mm)	Inside Diameter of Socket at shoulder (mm)	Socket Length (mm)	Effective Duct Length Meters
54D	96.5 ± 0.2	3.25 ± 0.2	97 ± 0.1	96 ± 0.1	100	5.8
56A	56.5 ± 0.2	3.25 ± 0.2	57 ± 0.1	56 ± 0.1	70	3

TELEPHONE DUCT & ELECTRICAL CONDUIT

BP DUCTS

CODE	Nominal Size (in)	Outside Diameter (mm)		Wall Thickness (mm)	
BPDS 2	2	55.7	56	1.8	2.2
BPDS 3	3	82.3	82.7	2	2.4
BPDS 4	4	110	110.4	2.2	2.7
BPDSC 4	4	110	110.4	2	2.5
BPDS 6	6	160	160.6	3	3.5
BPDSC 6	6	160	160.6	2.5	3
BPDS 8	8	200	200.6	4.5	5.2
BPDS 10	10	250	250.6	6.1	6.9
BPDS 12	12	315	315.8	7.7	8.7

Standard Length : 3, 5.8 & 6 meters
Colour : Black
Socket Type : Solvent Weld

BS 6099-2 / BS EN 61386-21

Nominal Size	Minimum Inside Diameter (mm)			Wall Thickness (mm)		
mm	LIGHT	MEDIUM	HEAVY	LIGHT	MEDIUM	HEAVY
20	17.4	16.9	15.8	1.3	1.55	2.1
25	22.1	21.4	20.6	1.45	1.8	2.2
32	28.6	27.8	26.6	1.7	2.1	2.7
40	35.8	35.4	34.4	2.1	2.3	2.8
50	45.1	44.3	43.2	2.45	2.85	3.4
63	57.0			3.0		

Standard Length : 2.9 & 3 meters
Colour : Black or White
Socket Type : Solvent Weld

Decade of Vision

PROPERTIES OF BAHRAIN PIPES uPVC PIPES

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

Properties	Tested Method as per ASTM	Unit	Values
Mechanical			
Tensile Strength @73°F	D-638	PSI	7,500 7,280
Modulus of Elasticity in Tension @73°F	D-638"E"	PSI	420,000
Compressive Strength @73°F	D-695"O"	PSI	9,600
Flexural Strength @73°F	D-790	PSI	12,700
Izod impact @73°F	D-256	Ft-Lbs/in of Notch	0,65
Hardness @73°F	D-2240 D-785	Durometer"D" Rockwell"R"	80±3 110-120
Thermal Properties			
Coefficient of Thermal Linear Expansion per 0°F	D-696	in/in/°F	$2.8x10^{-5}$
Thermal Conductivity	D-177	BTU/hr/ft/°F/in	13
Max. Operating Temp.		°F	140
Heat Deflection Temp. @264 PSI	D-648	°F	158
Electrical Properties			
Dielectric Strength	D-147	Volts/Mil	1400
Dielectric Constant 60Hz @300°F	D-150		325
Specific Volume Resistivity @73°F	D-257	Ohms/cm	$3.5x10^{-5}$
General Properties			
Specific Gravity	D-792	9/cc	1.42
Water Absorption	D-570	%	<0.05%
Cell Designation	D-1784		1245-B
Flame Spread E-84			<25
Poison's Ration @73°F			0.38
Smoke Density			500
Friction Coefficient	Hazen William	Factor C	150

PRESSURE APPLICATION

BS 3505 & BS 3506

Nominal Size	Mean Outside Diameter (mm)		WALL THICKNESS (mm) & PRESSURE RATING (BAR)															
			CLASS `B'		CLASS `C'		CLASS `D'		CLASS `E'		CLASS `O'		CLASS `6'			CLASS `7'		
			6 BAR		9 BAR		12 BAR		15 BAR		NON PRESSURE							
Inch	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN	MAX.	BAR	MIN	MAX.	BAR
1/2	21.2	21.5							1.7	2.1			2.8	3.3	28	3.7	4.3	40
3/4	26.6	26.9							1.9	2.5			2.9	3.4	22	3.9	4.5	32
1	33.4	33.7							2.2	2.7			3.4	4.0	24	4.5	5.2	32
1 1/4	42.1	42.4					2.2	2.7	2.7	3.2			3.6	4.2	20	4.8	5.5	28
1 1/2	48.1	48.4					2.5	3.0	3.1	3.7	1.8	2.2	3.7	4.3	18	5.1	5.9	25
2	60.2	60.5			2.5	3.0	3.1	3.7	3.9	4.5	1.8	2.2				5.5	6.3	22
2 1/2	75.0	75.3			3.0	3.5	3.9	4.5	4.8	5.5	1.8	2.2						
3	88.7	89.1	2.9	3.4	3.5	4.1	4.6	5.3	5.7	6.6	1.8	2.2						
4	114.1	114.5	3.4	4.0	4.5	5.2	6.0	6.9	7.3	8.4	2.3	2.8						
5	140.0	140.4	3.8	4.4	5.5	6.4	7.3	8.4	9.0	10.4	2.6	3.1						
6	168.0	168.5	4.5	5.2	6.6	7.6	8.8	10.2	10.8	12.5	3.1	3.7						
8	218.8	219.4	5.3	6.1	7.8	9.0	10.3	11.9	12.6	14.5	3.1	3.7						
10	272.6	273.4	6.6	7.6	9.7	11.2	12.8	14.8	15.7	18.1	3.1	3.7						
12	323.4	324.3	7.8	9.0	11.5	13.3	15.2	17.5	18.7	21.6	3.1	3.7						
14	355.0	356.0	8.5	9.8	12.6	14.5	16.7	19.2	20.5	23.6	3.6	4.2						
16	405.9	406.9	9.7	11.2	14.5	16.7	19.0	21.9	23.4	27.0	4.1	4.8						
18	456.7	457.7	11.0	12.6	16.3	18.8	21.4	24.6			4.6	5.3						
20	507.5	508.5	12.2	14.1	18.1	20.9					5.1	5.9						

Manufactured to : Class `C', `D' & `E' are to BS 3505
: Class `B', `O', `6' & `7' are to BS 3506
Standard Length : 5.8 & 6 meters
Colour : Dark Grey
: White, Grey (Class `O')
Socket Type : Solvent Weld

PRESSURE APPLICATION

BSEN 1452 (METRIC SIZES) * Supersedes BS 3505

Nominal outside diameter	Nominal (minimum) wall thicknesses							
	Pipe Series S							
	S 20 (SDR 41)	S 16.7 (SDR 34.4)	S 16 (SDR 33)	S 12.5 (SDR 26)	S 10 (SDR 21)	S 8 (SDR 17)	S 6.3 (SDR 13.6)	S 5 (SDR 11)
		Nominal pressure PN based on service (design) coefficient C = 2.5						
d_n	-	PN 6	PN 6	PN 8	PN 10	PN 12.5	PN 16	PN 20
12		-	-	-	-	-	-	1.5
16		-	-	-	-	-	-	1.5
20		-	-	-	-	-	1.5	1.9
25		-	-	-	-	1.5	1.9	2.3
32		-	-	1.5	1.6	1.9	2.4	2.9
40		-	1.5	1.6	1.9	2.4	3.0	3.7
50		1.5	1.6	2.0	2.4	3.0	3.7	4.6
63		1.9	2.0	2.5	2.5	3.8	4.7	5.8
75		2.2	2.3	2.9	2.9	4.5	5.6	6.8
90		2.7	2.8	3.5	3.5	5.4	6.7	8.2
	Nominal pressure PN based on service (design) coefficient C = 2.0							
	PN 6	PN 7.5	PN 8	PN 10	PN 12.5	PN 16	PN 20	PN 25
110	2.7	3.2	3.4	4.2	5.3	6.6	8.1	10.0
125	3.1	3.7	3.9	4.8	6.0	7.4	9.2	11.4
140	3.5	4.1	4.3	5.4	6.7	8.3	10.3	12.7
160	4.0	4.7	4.9	6.2	7.7	9.5	11.8	14.6
180	4.4	5.3	5.5	6.9	8.6	10.7	13.3	16.4
200	4.9	5.9	6.2	7.7	9.6	11.9	14.7	18.2
225	5.5	6.6	6.9	8.6	10.8	13.4	16.6	-
250	6.2	7.3	7.7	9.6	11.9	14.8	18.4	-
280	6.9	8.2	8.6	10.7	13.4	16.6	20.6	-
315	7.7	9.2	9.7	12.1	15.0	18.7	23.2	-
355	8.7	10.4	10.9	13.6	16.9	21.1	26.1	-
400	9.8	11.7	12.3	15.3	19.1	23.7	29.4	-
450	11.0	13.2	13.8	17.2	21.5	26.7	33.1	-
500	12.3	14.6	15.3	19.1	23.9	29.7	36.8	-

Note: The preferred nominal length of pipe is 6m. Other lengths are subject to agreement between manufacturer and purchaser.

PRESSURE APPLICATION

BS EN 1452 (IMPERIAL SIZES) * Supersedes BS 3505

Nominal Size (in)	Mean Outside Diameter (mm)		Nominal wall thicknesses (mm)					
			PN 9		PN 12		PN 15	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
½	21.2	21.5					1.7	2.1
¾	26.6	26.9					1.9	2.5
1	33.4	33.7	-	-	-	-	2.2	2.8
$1^1/_4$	42.1	42.4	-	-	2.2	2.7	2.7	3.3
$1^1/_2$	48.1	48.4	-	-	2.5	3.0	3.1	3.7
2	60.2	60.5	2.5	3.0	3.1	3.7	3.9	4.5
3	88.7	89.1	3.5	4.1	4.6	5.3	5.7	6.6
4	114.1	114.5	4.5	5.2	6.0	6.9	7.3	8.4
6	168	168.5	6.6	7.6	8.8	10.2	10.8	12.5
8	218.8	219.4	7.8	9.0	10.3	11.9	12.6	14.5
10	272.6	273.4	9.7	11.2	12.8	14.8	15.7	18.1
12	323.4	324.3	11.5	13.3	15.2	17.5	18.7	21.6
16	405.9	406.9	14.5	16.7	19.0	21.9	23.4	27.0
18	456.7	457.7	16.3	18.8	21.4	24.7	-	-
20	507.5	508.5	18.1	20.9	-	-	-	-
24	609.1	610.10	21.7	25.0	-	-	-	-

PRESSURE APPLICATION

DIN 8061/8062 : DIN 19532

Nominal Size	Mean Outside Diameter (mm)		WALL THICKNESS (mm) & Pressure Rating (BAR)									
			SERIES 1		SERIES 2		SERIES 3		SERIES 4		SERIES 5	
			VENTILATION		(4 BAR) / PN 4		(6 BAR) / PN 6		(10 BAR) / PN 10		(16 BAR) / PN 16	
mm	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
20	20.0	20.2									1.5	1.9
25	25.0	25.2									1.9	2.3
32	32.0	32.2							1.6	2.0	2.4	2.9
40	40.0	40.2							1.9	2.3	3.0	3.5
50	50.0	50.2					1.5	1.9	2.4	2.9	3.7	4.3
63	63.0	63.3					1.9	2.3	3.0	3.5	4.7	5.4
75	75.0	75.3			1.5	1.9	2.2	2.7	3.6	4.2	5.6	6.4
90	90.0	90.3			1.8	2.2	2.7	3.2	4.3	5.0	6.7	7.6
110	110.0	110.4	1.8	2.2	2.2	2.7	3.2	3.8	5.3	6.1	8.1	9.2
160	160.0	160.5	1.8	2.2	3.2	3.8	4.7	5.4	7.7	8.7	11.8	13.2
200	200.0	200.6	1.8	2.2	3.9	4.5	5.9	6.7	9.6	10.8	14.7	16.4
225	225.0	225.7	1.8	2.2	4.4	5.1	6.6	7.5	10.8	12.1	16.6	18.5
250	250.0	250.8	2.0	2.4	4.9	5.6	7.3	8.3	11.9	13.3	18.4	20.5
280	280.0	280.9	2.2	2.7	5.5	6.3	8.2	9.3	13.4	15.0	20.6	22.9
315	315.0	316.0	2.5	3.0	6.2	7.1	9.2	10.4	15.0	16.7	23.2	25.8
355	355.0	356.1	2.8	3.3	7.0	7.9	10.4	11.7	16.9	18.8	26.1	29.0
400	400.0	401.2	3.2	3.8	7.9	8.9	11.7	13.1	19.1	21.3	29.4	32.6
450	450.0	451.4	3.6	4.2	8.8	9.9	13.2	14.8	21.5	23.9		
500	500.0	501.5	4.0	4.6	9.8	11.0	14.6	16.3	23.9	26.5		

Standard Length : 5.8 & 6 meters
Colour : Grey for Series 1
: Dark Grey for Series 2 to 5
Socket Type : Solvent Weld or Rubber Seal Ring produced on request

Supported by :
coperion
Waeschle GmbH & Co. KG

"Plastic Engineering" the Middle East

PRESSURE APPLICATION

ASTM D 1785 : SCHEDULE 40 & 80

Nominal Size	Mean Outside Diameter (mm)		WALL THICKNESS (mm) PRESSURE RATING (PSI)					
			SCHEDULE 40			SCHEDULE 80		
Inch	MIN.	MAX.	MIN.	MAX.	PSI	MIN.	MAX.	PSI
1/2	21.24	21.44	2.77	3.28	600	3.73	4.24	850
3/4	26.57	26.77	2.87	3.38	480	3.91	4.42	690
1	33.27	33.53	3.38	3.89	450	4.55	5.08	630
1 1/4	42.03	42.29	3.56	4.07	370	4.85	5.43	520
1 1/2	48.11	48.41	3.68	4.19	330	5.08	5.69	470
2	60.17	60.47	3.91	4.42	280	5.54	6.20	400
2½	72.84	73.20	5.16	5.77	300	7.01	7.85	420
3	88.70	89.10	5.49	6.15	260	7.62	8.53	370
4	114.07	114.53	6.02	6.73	220	8.56	9.58	320
6	168.00	168.56	7.11	7.97	180	10.97	12.29	280
8	218.70	219.46	8.18	9.17	160	12.70	14.22	250

Standard Length : 4, 5.8 & 6 meters
Colour : Schedule 40 - White & Schedule 80 - Dark Grey
Socket Type : Solvent Weld
Note : will be Manufactured as PVC-1120.

ASTM D 2241 : SDR Series

Nominal Size	Mean Outside Diameter (mm)		WALL THICKNESS (mm) PRESSURE RATING (PSI)											
			SDR 41		SDR 32.5		SDR 26		SDR 21		SDR 17		SDR 13.5	
			100 PSI		125 PSI		160 PSI		200 PSI		250 PSI		315 PSI	
Inch	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
1/2	21.24	21.44											1.57	2.08
3/4	26.57	26.77							1.52	2.03	1.57	2.08	1.98	2.49
1	33.27	33.53					1.52	2.03	1.60	2.11	1.96	2.46	2.46	2.97
1 1/4	42.03	42.29			1.52	2.03	1.63	2.13	2.01	2.52	2.49	3.00	3.12	3.6
1 1/2	48.11	48.41			1.52	2.03	1.85	2.36	2.29	2.80	2.84	3.35	3.58	4.09
2	60.17	60.47			1.85	2.36	2.31	2.82	2.87	3.38	3.56	4.06	4.47	4.98
2 1/2	72.84	73.2	-	-	2.23	2.74	2.79	3.30	3.48	4.0	4.29	4.80	5.41	6.07
3	88.70	89.10	2.16	2.67	2.74	3.25	3.43	3.94	4.24	4.75	5.23	5.87	6.58	7.37
4	114.07	114.53	2.80	3.30	3.51	4.01	4.39	4.90	5.44	6.10	6.73	7.54	8.46	9.47
6	168.00	168.56	4.11	4.62	5.18	5.79	6.48	7.26	8.03	9.00	9.91	11.10	12.47	13.97
8	218.70	219.46	5.33	5.97	6.73	7.54	8.43	9.45	10.41	11.66	12.90	14.45		

Standard Length : 5.8 & 6 meters
Colour : White
Socket Type : Solvent Weld
Note : will be Manufactured as PVC-1120.

$$SDR = \frac{\text{OUTSIDE DIAMETER}}{\text{MINIMUM WALL THICKNESS}}$$

To retain the longevity and durability qualities, our finished pipe products are immediately arranged for storage in pallets and the finished fittings are packed in corrugated cartons and shrink wrapped. This kind of precaution facilitates us to keep the product intact for our clients.

ULTRA TUFF CPVC for Plumbing Systems

Hot & Cold Water Applications

When it comes to plumbing systems for hot & cold applications, UltraTuff has set a pristine standard in quality and performance. UltraTuff is manufactured using an advance chemical formula which makes it resistant to low pH water, coastal salt air and corrosive soil providing incomparable performance for hassle free installation on the worksite. while giving you with UltraTuff has numerous advantages over copper & conventional CPVC plumbing systems such as UltraTuff cpvc permanent jointing with solvent-weld cement fusing, unobstructed water flow, exceptional heat retention, silent operation and an incomparable value.

Raw materials for UltraTuff plumbing systems are procured from prominent supplier ARKEMA France. The superiority of UltraTuff is certified by an independent laboratory test result. UltraTuff cpvc surpasses both 73°F & 32°F impact resistance.

The mechanical feature of UltraTuff comes with additional chlorine molecules that reinforce the intramolecular bonds limiting the slippage of polymer chains making it superior when compared to PVC properties. Performance test of UltraTuff cpvc capitulate very affirmative water absorption results which show less than 4mg/cm^2 (square) is absorbed after 100hrs in boiling water. Testing out over longer periods under harsh conditions, UltraTuff cpvc provides a significant pressure resistance up to 95°C.

UltraTuff cpvc injected and extruded forms offer equivalently exceptional resistance which is calculated using the appropriate standards. UltraTuff cpvc demonstrate remarkable behavior in comparison with other widely used but more flammable plastics. UltraTuff cpvc demonstrate outstanding resistance to most acids, alkalies and salts. However, physical properties reduce and a swelling occurs when it is used for organic solvents

UltraTuff is provided with a significant, limited lifetime warranty. These features make UltraTuff plumbing systems as the premium choice of builders and plumbers in the market today.

Tested & Certified by

NSF

NSF/ANSI 14 & 61

For

UltraTUFF

CPVC for Hot & Cold Applications

UltraTUFF CPVC for Hot & Cold Applications Metric & Imperial pipes sizes are manufactured in Gray & Cream colour offering excellent performance. They provide remarkable resistance to high pressure and corrosion.

CHLORINATED PVC PRESSURE PIPES FOR HOT WATER APPLICATION

ASTM F441 / F441M : SCHEDULE 40 & 80

Note: "ULTRATUFF certified products are listed in nsf.org"

Nominal Size	Mean Outside Diameter (mm)		WALL THICKNESS (mm) PRESSURE RATING (PSI)							
			SCHEDULE 40				SCHEDULE 80			
Inch	MIN.	MAX.	MIN.	MAX.	Pessure Rating (PSI) at 23°C	Pessure Rating (PSI) at 82°C	MIN.	MAX.	Pessure Rating (PSI) at 23°C	Pessure Rating (PSI) at 82°C
1/2	21.20	21.40	2.77	3.28	600	150	3.73	4.24	850	210
3/4	26.60	26.80	2.87	3.38	480	120	3.91	4.42	690	170
1	33.27	33.53	3.38	3.89	450	110	4.55	5.08	630	155
1 1/4	42.07	42.33	3.56	4.07	370	90	4.85	5.43	520	130
1 1/2	48.15	48.45	3.68	4.19	330	80	5.08	5.69	470	115
2	60.15	60.45	3.91	4.42	280	70	5.54	6.20	400	100
2 1/2	72.82	73.18	5.16	5.77	300	75	7.01	7.85	420	105
3	88.72	89.08	5.49	6.15	260	65	7.62	8.53	370	90
4	114.1	114.5	6.02	6.73	220	55	8.56	9.58	320	80
6	168.02	168.58	7.11	7.97	180	45	10.97	12.29	280	70
8	218.72	219.48	8.18	9.17	160	40	12.7	14.22	250	60

Standard Length : 5.8 & 6 meters
Colour : Schedule 40 - Light Grey or White
: Schedule 80 - Light Grey
Socket Type : Nil

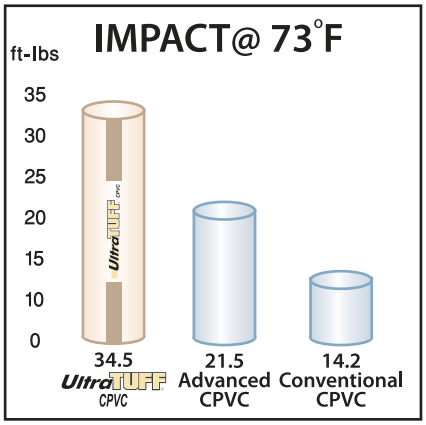
DIN 8079/8080

Note: "ULTRATUFF certified products are listed in nsf.org"

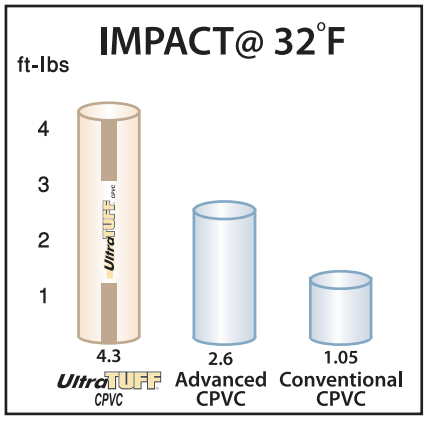
Nominal Size (mm)	Mean Outside Diameter (mm)		WALL THICKNESS (mm) & PRESSURE RATING (BAR)							
			SDR 21		SDR 13.6		SDR 11		SDR 9	
			(10 BAR) / PN 10		(16 BAR) / PN 16		(20 BAR) / PN 20		(25 BAR) / PN 25	
mm	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
20	20.0	20.2			1.5	1.9	1.9	2.3	2.3	2.8
25	25.0	25.2	1.5	1.9	1.9	2.3	2.3	2.8	2.8	3.3
32	32.0	32.2	1.5	1.9	2.4	2.9	2.9	3.4	3.6	4.2
40	40.0	40.2	1.9	2.3	3.0	3.5	3.7	4.3	4.5	5.2
50	50.0	50.2	2.4	2.9	3.7	4.3	4.6	5.3	5.6	6.4
63	63.0	63.2	3.0	3.5	4.7	5.4	5.8	6.6	7.1	8.1
75	75.0	75.3	3.5	4.1	5.6	6.4	6.8	7.7	8.4	9.5
90	90.0	90.3	4.3	5.0	6.7	7.6	8.2	9.3	10.1	11.4
110	110.0	110.3	5.3	6.1	8.1	9.2	10.0	11.2	12.3	13.8
125	125.0	125.3	6	6.9	9.2	10.4	11.4	12.8	14	15.6
140	140.0	140.4	6.7	7.6	10.3	11.6	12.7	14.2	15.7	17.5
160	160.0	160.4	7.7	8.7	11.8	13.2	14.6	16.3	17.9	19.9

Standard Length : 4, 5.8 & 6 meters
Colour : Cream
Socket Type : Nil

IMPACT RESISTANCE



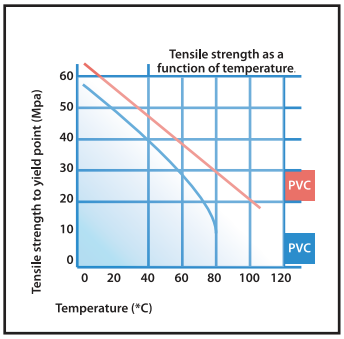
CPVC comes with four decades of impressive track record of reliability and hassle free performance. Nevertheless, it is susceptible to damage during the installation process, especially after sustaining an impact of approximately 17 foot-pounds or more. Conventional CPVC has a very high burst pressure and it is more fragile resulting in damage.



Without pressure testing after installation, this type of damage remains discovered causing unnecessary interruption and aggravation for clients and contractors. To deal with this situation, UltraTuff is manufactured using state of the art chemical formulation providing incomparable performance for hassle free installation on the worksite.

The superiority of UltraTuff is certified by an independent laboratory test results. UltraTuff cpvc surpasses both 73°F & 32°F impact resistance. Greater durability for resistance to knocks and blows during piping installations is one of the major features of UltraTuff.

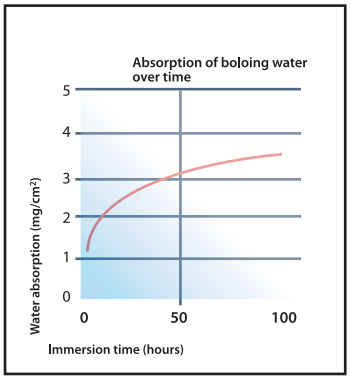
MECHANICAL PROPERTIES



UltraTuff comes with additional chlorine molecules that reinforce the intramolecular bonds limiting the slippage of polymer chains making it superior when compared to PVC properties.

WATER ABSORBTION

Performance test of UltraTuff cpvc capitulate very affirmative water absorption results which show less than 4mg/cm^2 is absorbed after 100hrs in boiling water.



PRESSURE RESISTANCE

Transporting hot, pressurised water for sanitary and industrial usage is one of the key features of UltraTuff cpvc applications. Testing out over longer periods under harsh conditions, UltraTuff cpvc provides a significant pressure resistance up to 95°C. UltraTuff cpvc injected and extruded forms offer equivalently exceptional resistance which is calculated using the appropriate standards.

FLAMMABLE ACTIVITIES

UltraTuff cpvc demonstrate remarkable behavior in comparison with other widely used but more flammable plastics.

MATERIAL	OXYGEN INDEX	SMOKE INDEX	
		AIR	Nitrogen
ABS	15 TO 20	-	-
POLYPROPYLENE	15 to 20	-	-
OAK	-	130	-
RIGID PVC	46 to 64	120 to 140	160
UltraTUFF CPVC	71 to 81	20	0

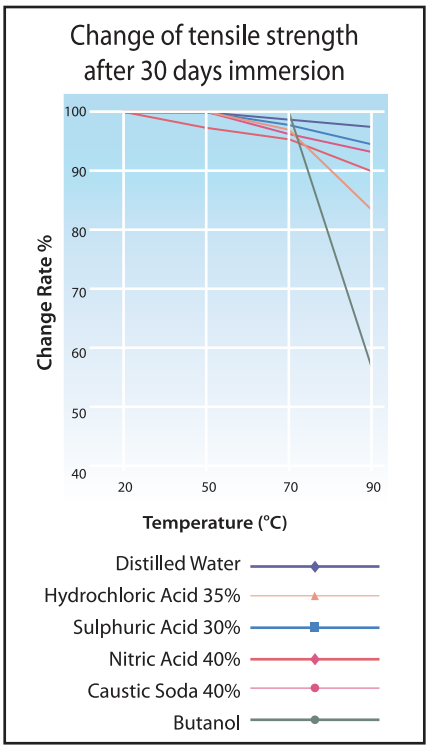
PHYSICAL PROPERTIES

UltraTuff cpvc is manufactured in Crème & Gray colours offering the following major properties :

PROPERTIES	STANDARDS	UNITS	VALUES
Density	NFT 51 063	g/cm^3	1.56
Linear Expansion	ASTM D 696-70	$^oC^{-1}$	6 to 8.10^{-5}
Specific Heat		cal/g.°C	0.29
Thermal Conductivity	ASTM C 117-76	kcal/m.h.°C	0.14
Water Absorption (24 Hours at 100oC)	NFT 54-023 ISO 2508	mg/cm^2	0.4
VICAT Softening Point (load = 5daN)	NFT 51-021 Method B		
* Extruded Pipes		°C	>110
* Injected Parts		°C	>103

CHEMICAL RESISTANCE

UltraTuff cpvc demonstrate outstanding resistance to most acids, alkalies and salts. However, physical properties reduce and a swelling occurs when it is used for organic solvents.



* Please review the tables

Chemicals	Concentration	20oC/68oF	60oC/140oF	80oC/176oF
Hydrochloric Acid	20%	Excellent	Excellent	Good
Hydrochloric Acid	35%	Excellent	Excellent	Good
Nitric Acid	40%	Excellent	Fair	Fair
Nitric Aicd	60%	Good	Fair	Not Good
Sulfuric Acid	30%	Excellent	Good	Good
Sulfuric Acid	50%	Excellent	Good	Good
Sulphurous Acid	100%	Good	Not Good	Not Good
Acetic Acid	60%	Excellent	Fair	Fair
Acetic Acid	95%	Good	Not Good	Not Good
Carbonic Acid	100%	Excellent	Fair	Fair
Caustic Soda	40%	Excellent	Excellent	Good
Caustic Soda	60%	Excellent	Excellent	Good
Sodium Chloride	Saturate	Excellent	Excellent	Good
Sodium Carbonate	Saturate	Excellent	Excellent	Good
Sodium Sulphate	Saturate	Excellent	Excellent	Good
Sodium Peroxide	Less than 30%	Excellent	Good	Not Good
Ammonium Carbonate	Saturate	Excellent	Excellent	Good
Methanol	100%	Excellent	Fair	Unavailable
Ethanol	100%	Excellent	Good	Unavailable
Isopropanol	100%	Excellent	Good	Good
Butanol	100%	Excellent	Good	Fair
Glycerine	100%	Excellent	Excellent	Excellent

FLEXPIPE®

POLYBUTENE-1 HOT & COLD PLUMBING & HEATING SYSTEM

We satisfy the most demanding requirements

FLEXPIPE®
POLYBUTENE-1 HOT & COLD PLUMBING & HEATING SYSTEM

it's plastic engineering

FLEXPIPE Polybutene -1

Hot & Cold Plumbing & Heating System

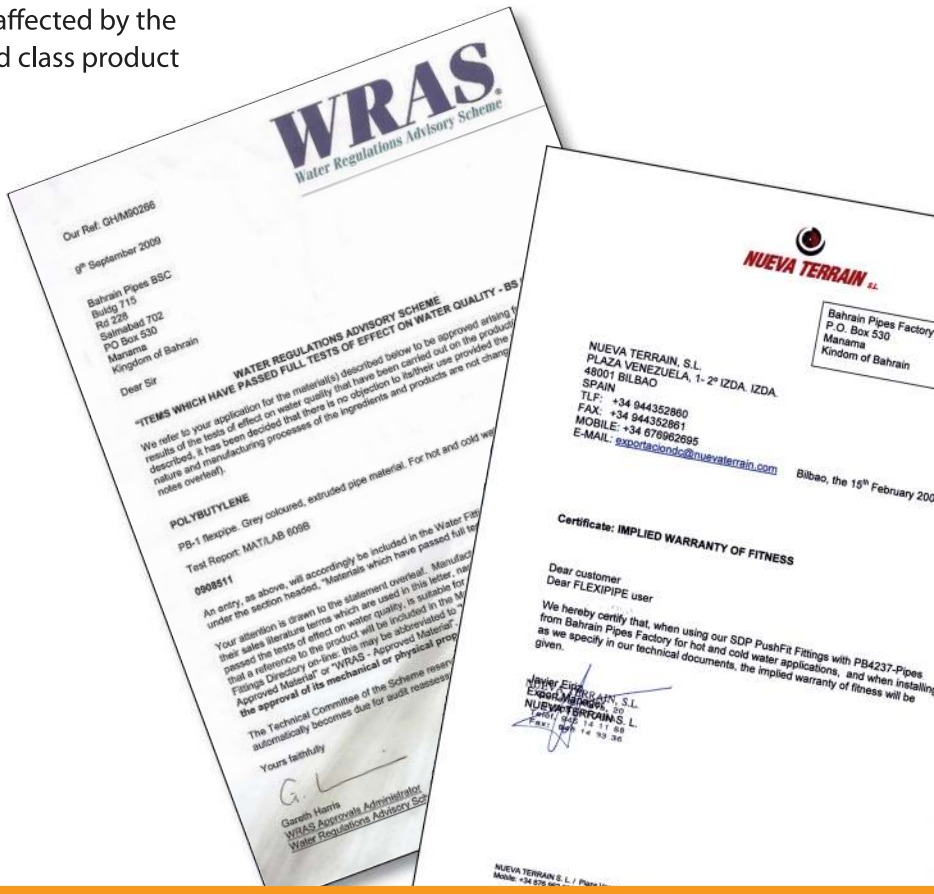
FLEXPIPE is another innovative product of Bahrain Pipes Factory for polybutene-1 hot & cold plumbing and heating system. Polybutene -1 is made of high quality raw material using product specified extrusion parameters and close supervision during the manufacturing process. Basell Polyolefins, Netherlands and Nueva Terrain, Spain have provided technical support to guarantee the quality of FLEXPIPE.

The polybutene -1 product is also certified by a self-regulating certification firm in Germany. The flexible resins and linear polyolefins provide uniquely combined properties which make FLEXPIPE technically superior to the compared. Excellent resistance to creep at room and elevated temperatures, high pressure loading at high temperature, high impact strength, puncture resistance and exceptional resistance to environmentally stressed cracks have been estimated to provide a period of 50 years durability.

Excellent electrical insulation characteristics, non-corrosion, resistance to most chemicals including salt water, low stress build-up upon temperature changes, low thermal conductivity and light weight are the beneficial factors of FLEXPIPE. Longer pipes runs can be accommodated due its exceptional flexibility. Its light weight feature allows it be used for multi-directional and longer pipe run installation reducing the number of fittings.

The non-metallic surface of FLEXPIPE is not affected by the build-up of scale. FLEXPIPE is not just a world class product but an investment in plumbing.

By manufacturing polybutene -1 pipes, Bahrain Pipes Factory joins the elite team of international pipe manufacturers and is the only manufacturer of polybutene -1 in the Middle East.



WRAS
Water Regulations Advisory Scheme

FLEXPIPE®
POLYBUTYLINE - 1 HOT & COLD PLUMBING & HEATING SYSTEM

FLEXPIPE DIMENSIONS : BS7291 -2:2006

Nominal Size		Mean Outside Diameter (mm)		Wall Thickness (mm)	
		MIN.	MAX.	MIN.	MAX.
BS EN 1057	10mm	9.9	10.1	1.5	1.8
	15mm	14.9	15.1	1.5	2.0
	22mm	21.9	22.1	2	2.3
	28mm	27.9	28.1	2.6	2.9
ISO 4065	32mm	32	32.3	2.9	3.3
	40mm	40	40.4	3.7	4.2
	50mm	50	50.5	4.6	5.2
	63mm	63	63.6	5.8	6.5

10-22mm SIZES : 50m COIL LENGTH, ABOVE 22MM SIZES : 6m STRAIGHT LENGTH

Typical Properties

Material Properties	Method	Unit	PB 4267 Grey
Physical Properties			
Melt flow rate MRF 190°C/2.16 kg	ISO 1133	dg/min	0.4
Density	ISO 1183	g/cm^3	0.94
Hardness Shore D	ISO 868	-	60
Mechanical Properties			
Tensile strength at yield	ISO R 527	MPa	20
Tensile strength at break	ISO R 527	MPa	35
Elongation at break	ISO R 527	%	300
Flexural Elastic Modulus	ISO 178	MPa	450
Notched Impact Strength at 20°C	ISO 180	KJ/m^2	20
Notched Impact Strength at 0°C	ISO 180	KJ/m^2	7
Thermal Properties			
Melting point range	DSC[a]	°C	127-129
Vicat Softening Temperature	ISO 306	°C	120
Coefficient of linear thermal expansion	ASTM D696		1.3×10^{-4}
Thermal conductivity (20°C)	ASTM C 177		0.19
Glass transition temperature	DMTA[b]	°C	-6
Specific Characteristics[c]			
Environmental Stress Cracking (at 50°C in 10% aqueous solution of Igepal)	ASTM D-1693	h	15,000 no failure
Wet abrasion (sand slurry test, 23°C, 100h)		%	1

MATERIAL COMPARISON

Tehnical Data

FlexPipe resins are flexible, linear polyolefins that offer a unique combination of properties. They are produced from 1-butene yielding polybutene – homopolymer having high molecular mass. Among its important advantages are : excellent resistance to creep at room and elevated temperatures, very good impact toughness (high impact resistance) and exceptional resistances to environmental stress cracking. From polybutene–1 resins having these characteristics, FLEx pipe is born.

Additional important benefits of FLEXPIPE include excellent electrical insulation characteristics, no corrosion, light weight, resistance to most chemicals (including salt water), low stress build-up upon temperature changes and low thermal conductivity resulting in moderate pipe surface temperatures at hot water application (no skin burn).

Application

Among the most valuable applications of FLEXPIPE are pipe pluming systems for residential and industrial use. Because of its superior properties FLEXPIpe technically out-performs all other pipe alternatives. Perfect for portable water FLEXPIPE can sustain high temperature and stress while maintaining lower wall thickness, thereby saving pipe weight and more internal diameter enabling maximum water flow through the piping network.

Flexibility Comparision

- **High Flexibility**

Polybutene – 1, where FLEXPIPE is made of, has the lowest flexural modulus and allows for the thinnest pipe wall of all polymer resins used for domestic hot and cold water plumbing systems. Because of their outstanding flexibility longer pipe runs can be used to accommodate directional changes.

- **Tensile Strength / Pressure Performace**

Pipes made from PB-1 have low rigidity and very high tensile strength at higher temperature resulting in high pressure resistance and higher design stress than other plastic pipe. this results in proved flexibility and lower wall thickness leading to lighter weight of pipe and larger bore diameter that continuously provides abundant water flow.

Performance Comparison

- **Creep Resistance**

FLEXPIPE has excellent creep resistance that cannot be attained from any other polymer used for plumbing purposes today. Because of excellent creep resistance characteristics FLEXPIPE maintains its unique pressure performance and have been estimated to have long service life of over 50 years.

- **Creep Behavior**

FLEXPIPE manufactured from PB-1 resin has an exceptional combination of properties that makes it technically superior. It is the preferred choice for behind the wall plumbing system applications. The extended service life and durability of FLEXPIPE must not be under-estimated.

Performance Benefits of FLEXPIPE

- **Quick and Easy Installation**

The flexibility of Polybutene – 1 pipes also provides quickest and easiest installation in confined spaces. FLEXPIPE is lightweight and can be used for longer pipe runs and multi-directional installation reducing the number of fittings.

- **Corrosion Free**

FLEXPIPE does not corrode like traditional pipe made of copper or iron. It does not react with ionic species commonly found if water and environment and will not leach thus preventing penetration of harmful and dangerous substances into potable water.

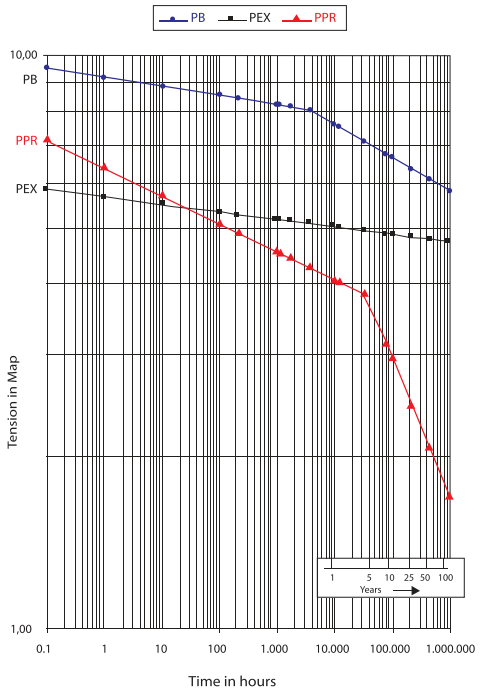
With technical support from :

basell
Polyolefins Netherland

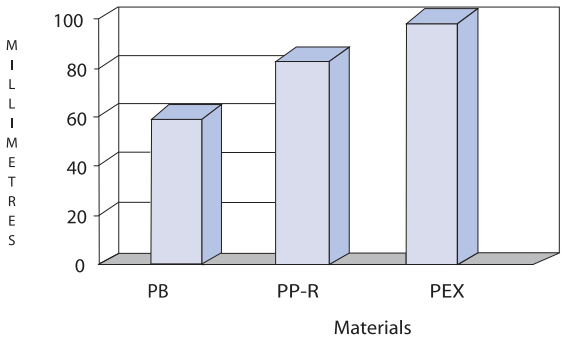
NUEVA TERRAIN S.L.
Spain

We lead where it matters

Regression curve of various material at 80°



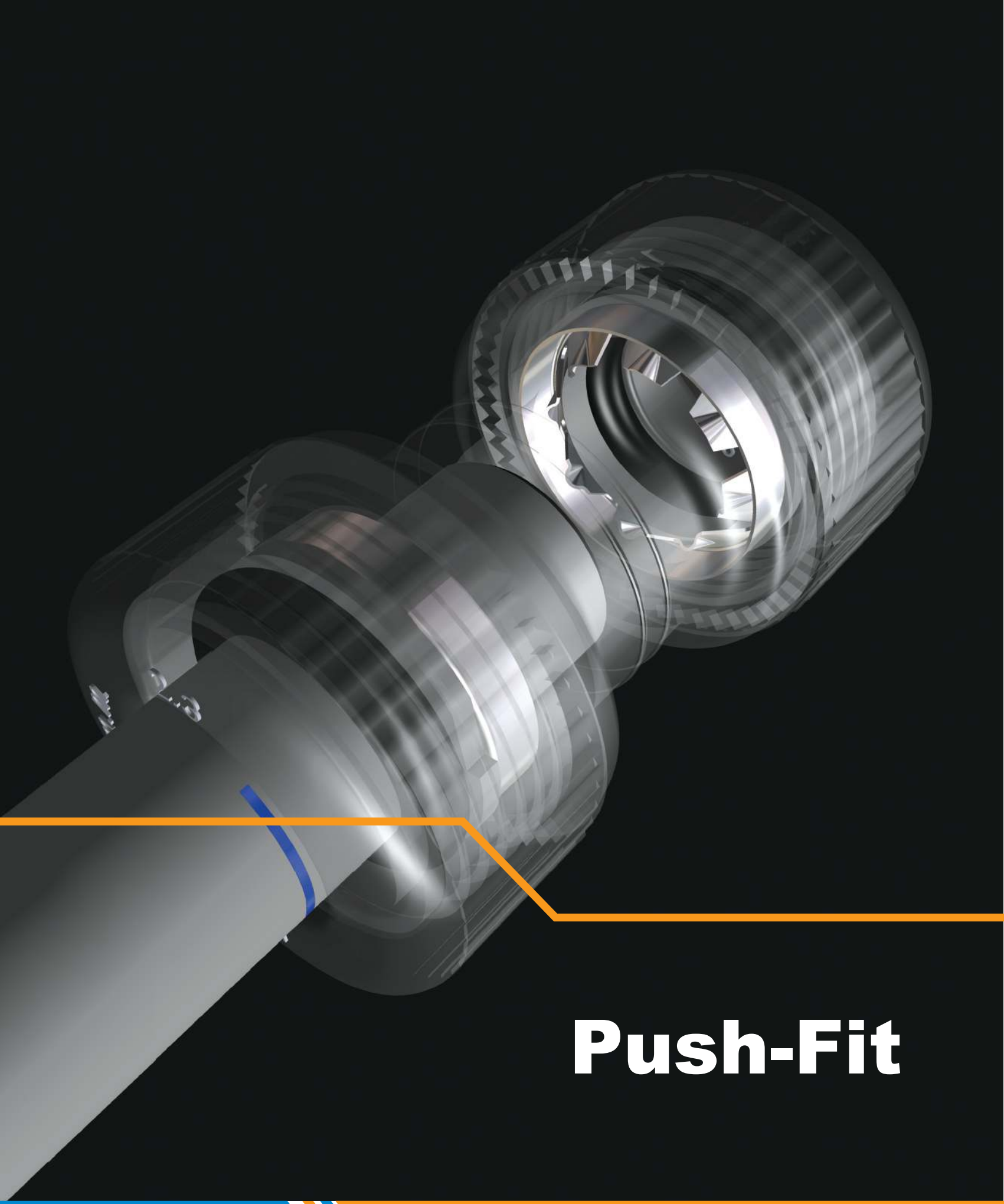
DILATION AND COMPENSATION



COMPARISON OF MATERIAL AND SYSTEM CHARACTERISTICS

Characteristics	Criteria	PB	PP-R	PEX	Remarks
HANDLING ADVANTAGES					
Tools / electricity	Yes/No	NO (Push-Fit)	Yes (Thermo-fusion)	-	For PB No tool investment No electricity requirement
Flexibility of the pipe	Flexibility	High	Low	medium	For PB Easy and comfortable installation
Possibility of fitting detachment and reusing	Yes &No	Yes (PushFit)	NO	Yes but...	PB is Very useful in all situations
Dilation & Compensation	More & Less	Less	more	more	PB is better due to lineal thermic dilation coefficient
Pressure drop with constant flow rate.	More & Less	Less	More	More	more internal ID more in PB pipes (less wall)
No. of supports required for installation	More & Less	Less	More	More	Due to less weight

MATERIAL PROPERTY	Unit Criteria	PB	PP-R	PEX	Remarks
Heat expansion	mm/mK	0,13	0,18	0,20	PB is best
Thermal conductivity	W/mK	0,20	0,24	0,41	PB is best
Heat loss of pipe	W/m	Low	High	Middle	PP-R is high because due to bigger diameter
Sound Velocity in material	m/s	620	1200	800	PB is best
Modulus of elasticity	N/mm^2	350-450	800	600	PB is extreme flexible
Long term behaviour (Residual breaking strength after 50 years at 70 C° continues temperature)	N/mm^2	7,61	3,24	5,34	PB is strongest



Push-Fit

MATERIAL COMPARISON

- **No Scale Build-up**

A commonly and major problem encountered particularly in hard water area in the build-up of water scale on internal walls of metal pipe. water scale gradually reduces the internal bore thereby restricting the flow of water out of the faucet. Being non-metallic, FLEXPIPE is not affected by scale build-up making it an ideal choice for water pipeline systems especially for hot water lines.

- **Silent Operation**

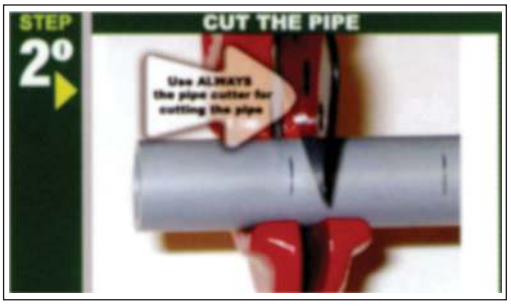
Research shows a strong public demand of noiseless plumbing operation. FELXPIPE plumbing systems greatly reduce noisy operation and water hammering commonly experienced with hard metal pipe systems with quick acting valves. FLEXPIPE is an investment in plumbing highly suitable for consumer needs.

Assembly Method

FLEXPIPE is marked to indicate suitable cutting positions to ensure correct depth of insertion into fittings which contain a molded stop limiting the maximum depth of insertion of the pipe.

1. Tools – Flet-tip pen Template Lubricating Silicone pipe Cutter

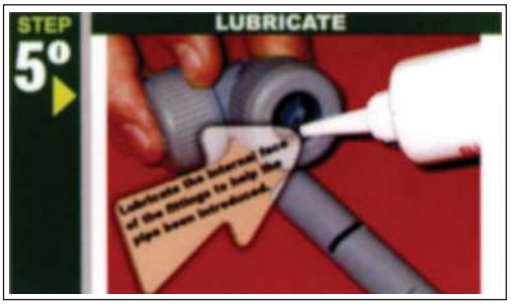
2. Cut the pipe perpendicularly pressing with a circular movement ensuring that the end cut does not have any swarf.



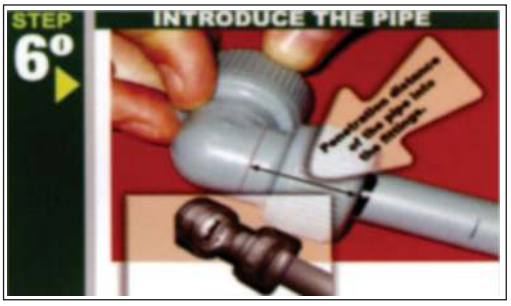
3. Introduce support sleeve inside the pipe, otherwise the pipe could come out of fitting.

4. Mark with felt-tip pen the penetration distance using the template.

5. Lubricate internal wall of the fitting and external of the pipe with lubricating silicone. This will make assembly easier.



6. Push the end of FLEXPIPE firmly into the fitting until the stop. The joint is correctly done if the depth of insertion is in line with the retaining nut.



Our top of the range polybutene-1 product, FLEXPIPE® is produced German technology in pipe manufacturing and is controlled by Zumbach measurement controller.

PIPE PERFORMANCE

Long-term Burst Performance

The resistance of pipes to deformation and burst is determined by testing to international / national standards. The test results are then used to calculate the maximum permitted hoop stress for hot water transportation according to a defined set conditions referred to as temperature classes. These temperature classes are compiled to reflect the likely cross-section of service conditions for a 50-year period for a range of different heating and water supply applications.

Classification of Service Conditions for 50 Years CEN/ISO Classes							
Service Conditions							
Class	Application	Normal		Maximum		Malfunction	
		Temp °C	Time years	Temp °C	Time years	Temp °C	Time hours
1	Hot Water Supply @60 °C	60	49	80	1	95	100
2	Hot Water Supply @ 70 °C	70	49	80	1	95	100
3	Underfloor Heating Low Temp. Heating Systems	40 60	20 25	70	2.5	100	100
4	Underfloor Heating Low Temp. Heating Systems	40 60	20 25	70	2.5	100	100
5	High Temp. Heating Systems	60 80	25 10	90	1	100	100

Benefits and Advantages of Flex Pipe

- Polybutene-1 pipes provide a completely corrosion-free drinking water and heating pipe system. Freedom from corrosion means there is no contamination of the water at the tap by products of corrosion.
- Freedom from scale build-up and encrustation in hard water supply areas is guaranteed. Smooth internal pipe surfaces combined with inert chemical properties leads to the complete elimination of calcium carbonate deposition, thus ensuring long-term efficiency in water heating and circulation.
- Resistance to freezing temperatures – the flexibility and elastic properties of Polybutene-1 ensure that pipes will not burst or be damaged by freeze-ups during cold weather.
- The low thermal conductivity of Polybutene-1 means that hot water pipes are cooler to the touch than conventional metal pipes and the incidence of condensation on the pipes is reduced, providing a safer system.
- Due to low thermal conductivity, combined with the fact that thermal expansion is accommodated by the inherent flexibility of the material, Polybutene-1 piping systems are quiet with no water hammer and minimal system creaking.
- Polybutene-1 piping systems are electrically non-conductive, providing a safer with minimum earthing requirements.
- Polybutene-1 pipes can be installed as a conduit 'pipe in pipe' system through concrete floors and walls. Such a system provides low maintenance security. If there is ever an unexpected need to replace such an installed pipe, this can quickly and easily be accomplished by disconnecting the ends of the pipe, connecting a replacement length to one and pulling the new pipe through the conduit into position. The flexibility of Polybutene-1 pipe makes this an easy task.

We manufacture high grade HDPE telephone com-duct in the required colors and quality set as per authorized telecommunication standards. The rigid exterior feature and quality finishing enables our product to meet the fiber optic cable requirements.

HDPE COM-DUCT SIZES FOR FIBER OPTICAL USE

COM-DUCT SIZES FOR FIBER OPTICAL USE

Nominal Size (DN)	Mean Outer Diameter (mm)	Mean Outer Diameter (mm)	Wall Thickness	Wall Thickness	Pull Tape Strength	Max. Size of the Coil
30	30	30.5	2	2.3	8KN	600
32	32	32.5	2	2.3	8KN	600
36	36	36.7	3	3.3	8KN	500
39	38.9	39.6	3.2	3.5	8KN	500
40	40	40.7	3.7	4.1	8KN	500

On request we will produce longer lengths on bobbins

POLYETHYLENE LOW DENSITY PIPES (LDPE) SPECIAL SIZES

Nominal Size	Mean Outside Diameter (mm)		Wall Thickness (mm)		Standard Coil Length
Inch	MIN.	MAX.	MIN.	MAX.	Meters
1/2 IRRIGATION	15.8	16.0	1.2	1.4	250
3/4 HG	27.5	28.2	3.5	4.0	90
1 HG	33.8	34.6	4.3	4.8	90

HDPE & MDPE - Pipes for Water & Gas

High Density Polyethylene (PE100) & Medium Density Polyethylene (PE80)

Bahrain Pipes Factory manufactures HDPE & MDPE pressure pipes, which range from 20mm outside diameter to 500mm in Metric sizes. Approved worldwide, PE 100 & PE80 are high quality materials with superior physical properties mainly designed for the supply & transporation of water, gas and hazardous fluids.

LDPE is widely used in drip irrigation systems and generally polyethylene pipes are water resistant and non-interaction feature with chemicals makes it ideal for usage in water and chemical applications. The pipes are produced especially in black colour to provide high protection against degradation due to UV radiation. It is non-toxic and odourless.

PE pipes which are up to OD 32mm are available in coils of 1000 and PE pipes ranging from OD 40mm up to 50mm are available in coils of 500mtrs. Even larger diameters from 100 to 180mm can be coiled to minimum 100m and above 180mm diameters are supplied in straight length of 12 mtrs and 11.6mtrs. Different lengths can be supplied as per requirements; longer lengths are supplied on steel bobbins on request.

Polyethylene pipe material contains well dispersed fine particle size carbon black, choice polymer and stabilisers ensuring excellent weather resistance including solar radiation and long term stability lifetime of 50 years.

Polyethylene material shows excellent resistance to rapid crack propagation and slow crack growth both being benefits for pressure pipes. PE100 & PE80 pipes are flexible and offer greater mechanical resistance. When compared to other pipes.

the most important property of PE pipes is it's resistance to hydrostatic pressure. It defines the life expectancy of a pipe under internal pressure. The stress resulting in fracture in PE plastic pipes depends of the test time and temperature.

WRAS
Water Regulations Advisory Scheme

Our expertise in plastic pipe manufacturing & in-house technical strengths, the company has developed a product conforming to modern technology. HDPE COM-DUCT sizes for fibre optical use are designed and engineered to house these sensitive nerves of Information technology i.e. optical fibres thus enabling information transfer across the globe.

POLYETHYLENE MEDIUM DENSITY PIPES (PE - MD)

BS 6730

Nominal Size	Mean Outside Diameter (mm)		Wall Thickness (mm)	
mm	MIN.	MAX.	MIN.	MAX.
20	20.0	20.3	2.3	2.6
25	25.0	25.3	2.3	2.6
32	32.0	32.3	3.0	3.4
50	50.0	50.4	4.6	5.2
63	63.0	63.4	5.8	6.5

PE - MD (Medium Density Polyethylene Pipe) have a strength classification of PE80 i.e. a pipe having 50 years strength of 8MPa, enabling the operation pressure up to12 bar.

POLYETHYLENE LOW DENSITY PIPES (PE - LD)

BS 1972:1967

Nominal Size	Mean Outside Diameter (mm)		Wall Thickness (mm)					
			CLASS B		CLASS C		CLASS D	
mm	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
1/2	21.2	21.5			2.7	3.0	3.4	3.7
3/4	26.6	26.9	2.3	2.6	3.4	3.7	4.3	4.7
1	33.4	33.7	3.0	3.3	4.2	4.6	5.4	5.9
1 1/4	42.1	42.5	3.7	4.1	5.3	5.8	6.8	7.5
1 1/2	48.1	48.5	4.3	4.7	6.1	6.7	7.8	8.6
2	60.1	60.6	5.3	5.8	7.6	8.4		

POLYETHYLENE PIPES

BSEN 12201-2 PE PIPES for Pressure Applications	SDR	SDR 6	SDR 7.4	SDR 9	SDR 11	SDR 13.6	SDR 17	SDR 21	SDR 26	BS EN1519 - 1 PE PIPES for Soil & Waste Discharge within the Bldg Structure			
	PE 80	PN 25	PN 20	PN 16	PN 12.5	PN 10	PN 8	PN 6	PN 5				
	PE 100	-	PN 25	PN 20	PN 16	PN 12.5	PN 10	PN 8	PN 6				
Nominal Size (mm)	Mean Outside Diameter (mm)		Wall Thickness (mm)								PIPE SERIES			
											S 16 *		S 12.5	
	Min	Max	Min	Min	Min	Min	Min	Max	Min	Max	Min	Max	Min	Max
16	16.00	16.30	3.00 [c]	2.30 [c]	2.00 [c]	-	-	-	-	-				
20	20.00	20.30	3.40	3.00 [c]	2.30	2.00 [c]	-	-	-	-				
25	25.00	25.30	4.20	3.50	3.00 [c]	2.30	2.00 [c]	-	-	-				
32	32.00	32.30	5.40	4.40	3.60	3.00 [c]	2.40	2.00 [c]		-	3	3.5	3	3.5
40	40.00	40.40	6.70	5.50	4.50	3.70	3.00	2.40	2.00 [c]	-	3	3.5	3	3.5
50	50.00	50.40	8.30	6.90	5.60	4.60	3.70	3.00	2.40	2.00	3	3.5	3	3.5
63	63.00	63.40	10.50	8.60	7.10	5.80	4.70	3.80	3.00	2.50	3	3.5	3	3.5
75	75.00	75.50	12.50	10.30	8.40	6.80	5.60	4.50	3.60	2.90	3	3.5	3	3.5
90	90.00	90.60	15.00	12.30	10.10	8.20	6.70	5.40	4.30	3.50	3	3.5	3.5	4.1
110	110.00	110.70	18.30	15.10	12.30	10.00	8.10	6.60	5.30	4.20	3.4	4	4.2	4.9
125	125.00	125.80	20.80	17.10	14.00	11.40	9.20	7.40	6.00	4.80	3.9	4.5	4.8	5.5
140	140.00	140.90	23.30	19.20	15.70	12.70	10.30	8.30	6.70	5.40	4.9	5.6	6.2	7.1
160	160.00	161.00	26.60	21.90	17.90	14.60	11.80	9.50	7.70	6.20	6.2	7.1	7.7	8.7
180	180.00	181.10	29.90	24.60	20.10	16.40	13.30	10.70	8.60	6.90	7.7	8.7	9.6	10.8
200	200.00	201.20	33.20	27.40	22.40	18.20	14.70	11.90	9.60	7.70	9.7	10.9	12.1	13.6
225	225.00	226.40	37.40	30.80	25.20	20.50	16.60	13.40	10.80	8.60				
250	250.00	251.50	41.50	34.20	27.90	22.70	18.40	14.80	11.90	9.60				
280	280.00	281.70	46.50	38.30	31.30	25.40	20.60	16.60	13.40	10.70				
315	315.00	316.90	52.30	43.10	35.20	28.60	23.20	18.70	15.00	12.10				
355	355.00	357.20	59.00	48.50	39.70	32.20	26.10	21.10	16.90	13.60				
400	400.00	402.40	-	54.70	44.70	36.30	29.40	23.70	19.10	15.30				

Note: [c] the calculated value of e_{min} (ISO 4065:1996 (5)) is rounded up to nearest value of either 2.0, 2.3 or 3.0.

POLYETHYLENE PIPES

POLYETHYLENE HIGH DENSITY PIPES (PE - HD)
PE 100 ISO 4427, PE 80 ISO 4427 & DIN 8074/8075

Nominal Size	WALL THICKNESS (mm) PRESSURE RATING (BAR)											
	PE 100 ISO 4427					PE 80 ISO 4427			PE100 DIN 8074			
	SDR 17	SDR 13.6	SDR 11	SDR 9	SDR 7.4	SDR 13.6	SDR 11	SDR 9	SDR 26	SDR 17	SDR 11	SDR 7.4
mm	10 BAR	12.5 BAR	16 BAR	20 BAR	25 BAR	10 BAR	12.5 BAR	16 BAR	(s 12.5) 6 BAR	(s 8) 10 BAR	(s 5) 16 BAR	(s 3.2) 25 BAR
20			2.0	2.3	3.0		2	2.3			2	3
25		2.0	2.3	3.0	3.5	2	2.3	3			2.3	3.5
32	2.0	2.4	3.0	3.6	4.4	2.4	3.0	3.6		2	3	4.4
40	2.4	3.0	3.7	4.5	5.5	3	3.7	4.5	1.8	2.4	3.7	5.5
50	3.0	3.7	4.6	5.6	6.9	3.7	4.6	5.6	2.0	3.0	4.6	6.9
63	3.8	4.7	5.8	7.1	8.6	4.7	5.8	7.1	2.5	3.8	5.8	8.6
75	4.5	5.6	6.8	8.4	10.3	5.6	6.8	8.4	2.9	4.5	6.8	10.3
90	5.4	6.7	8.2	10.1	12.3	6.7	8.2	10.1	3.5	5.4	8.2	12.3
110	6.6	8.1	10.0	12.3	15.1	8.1	10.0	12.3	4.2	6.6	10.0	15.1
125	7.4	9.2	11.4	14.0	17.1	9.2	11.4	14.0	4.8	7.4	11.4	17.1
140	8.3	10.3	12.7	15.7	19.2	10.3	12.7	15.7	5.4	8.3	12.7	19.2
160	9.5	11.8	14.6	17.9	21.9	11.8	14.6	17.9	6.2	9.5	14.6	21.9
180	10.7	13.3	16.4	20.1	24.6	13.3	16.4	20.1	6.9	10.7	16.4	24.6
200	11.9	14.7	18.2	22.4	27.4	14.7	18.2	22.4	7.7	11.9	18.2	27.4
225	13.4	16.6	20.5	25.2	30.8	16.6	20.5	25.2	8.6	13.4	20.5	30.8
250	14.8	18.4	22.7	27.9	34.2	18.4	22.7	27.9	9.6	14.8	22.7	34.2
280	16.6	20.6	25.4	31.3	38.3	20.6	25.4	31.3	10.7	16.6	25.4	38.3
315	18.7	23.2	28.6	35.2	43.1	23.2	28.6	35.2	12.1	18.7	28.6	43.1
355	21.1	26.1	32.2	39.7	48.5	26.1	32.2	39.7	13.6	21.1	32.2	48.5
400	23.7	29.4	36.3	44.7	54.7	29.4	36.3	44.7	15.3	23.7	36.3	54.7
450	26.7	33.1	40.9	50.3	61.5	33.1	40.9	50.3	17.2	26.7	40.9	61.5
500	29.7	36.8	45.4	55.8		36.8	45.4	55.8	19.1	29.7	45.4	68.3
560	33.2	41.2	50.8	62.5		41.2	50.8	62.5	21.4	33.2	50.8	
630	37.4	46.3	57.2	70.3		46.3	57.2	70.3	24.1	37.4	57.2	
710	42.1	52.2	64.5	79.3		52.2	64.5	79.3	27.2	42.1	64.5	
800	47.4	58.8	72.6	89.3		58.8	72.6	89.3	30.6	47.4		
900	53.3	66.2	81.7			66.2	81.7		34.4	53.3		
1000	59.3	72.5	90.2			72.5	90.2		38.2	59.3		
1200	67.9	88.2				88.2			45.9			
1400	82.4	102.9				102.9			53.5			
1600	94.1	117.6				117.6			61.2			

Coiling : upto dia 180mm
Pipe Length : 6, 12 meters
Colour : Black

HDPE (High Density Polyethylene Pipe) have a strength classification of PE100 i.e. a pipe having 50 years strength of 10MPa, enabling the operation pressure up to16 bar.

HDPE PROPERTIES

Specific Gravity	0.955 at 20°
Specific Heat	0.55 cal/8/°C
Thermal Conductivity	0.43 W/m/°C
Coefficient of Linear Expansion	17 x 10(-5)/°C
Vicat Softening Point	124°C
Tensile Strength	23 Mpa

PPR PIPES

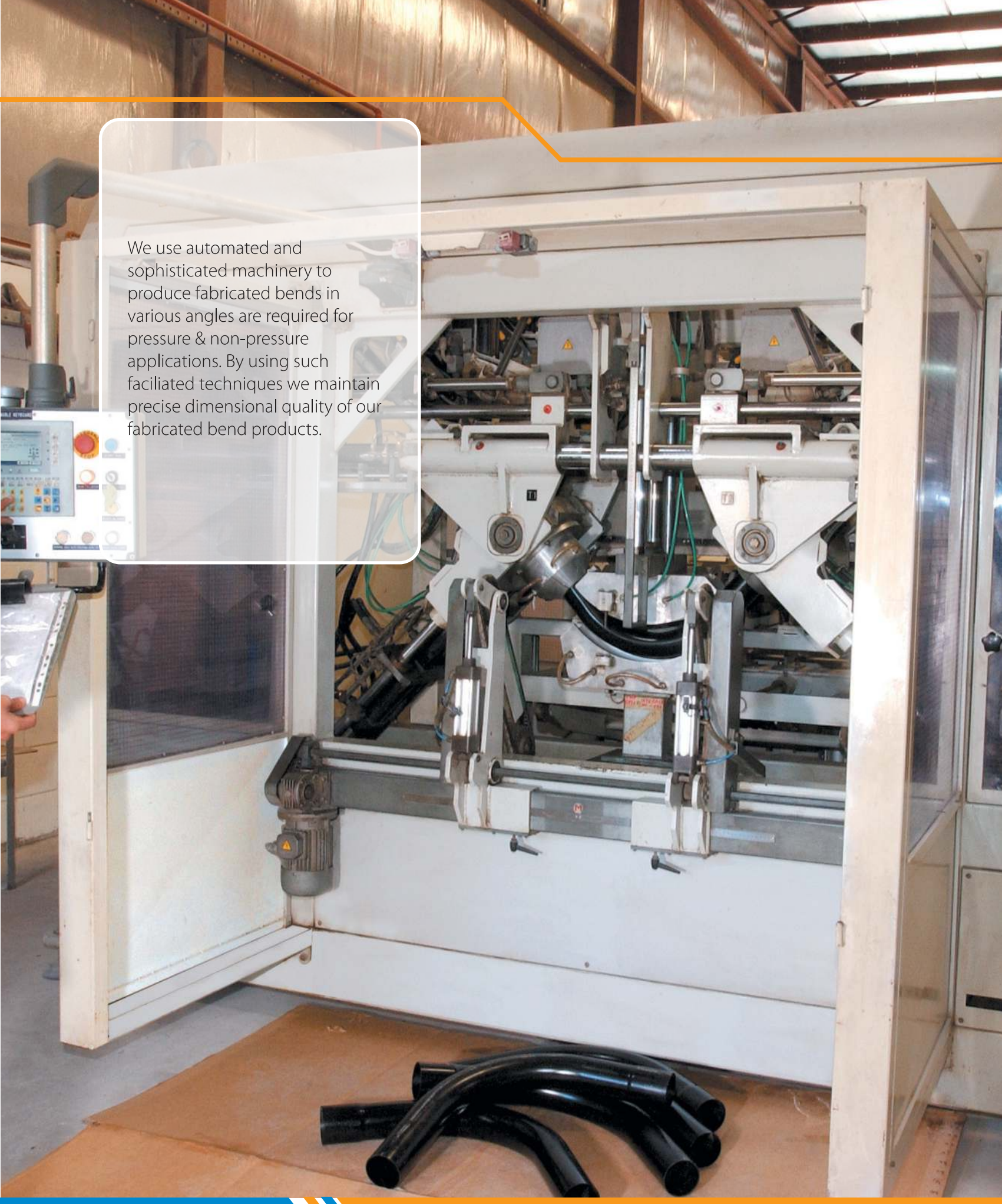
PPR GENERAL PROPERTIES

Mechanical & Thermal Properties of PPR

Properties	Unit	Value	Test Method
Density	g/cm^3	0.90	ISO 1183
Melt Flow Index 230^{O}C/2.16kg	g/10min	0.20 -0.45	ISO 1133
Flexural modulus (2mm/min)@23deg.	MPa	800	ISO 178
Tensile Modulus (1mm/min)	MPa	850	ISO 527
Tensile strain at Yield (50mm/min)	%	13.50	ISO 527 -2
Tensile stress at Yield (50mm/min)	MPa	25	ISO 527 -2
Thermal conductivity (10-60deg.)	W/m.K	0.24	DIN 52612
Coefficient of Thermal Expansion(0deg- 110deg)	m/Mk	$1.5\text{-}1.8x10^{-4}$	DIN 53752
VICAT softening Temperature (VST/A/50)	^{O}C	130	ISO 306
VICAT softening Temperature (VST/B/50)	^{O}C	69	ISO 306

PPR PIPES: DIN 8077 / 8078

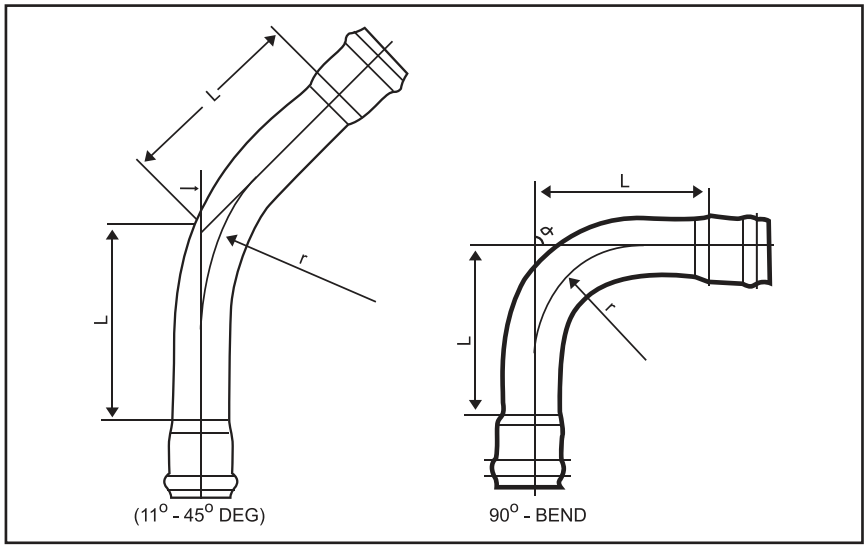
Nominal Size (mm)	Outside Diameter (mm)		WALL THICKESS (S) (MM) Pipe Series 2.5 SDR 6 / PN 20	
	MIN.	MAX.	MIN.	MAX.
20	20.0	20.3	3.40	4.00
25	25.0	25.3	4.20	4.90
32	32.0	32.3	5.40	6.20
40	40.0	40.4	6.70	7.60
50	50.0	50.5	8.30	9.40
63	63.0	63.6	10.50	11.80
75	75.0	75.7	12.50	14.00
90	90.0	90.9	15.00	16.80
110	110.0	110.9	18.30	20.40



We use automated and sophisticated machinery to produce fabricated bends in various angles are required for pressure & non-pressure applications. By using such faciliated techniques we maintain precise dimensional quality of our fabricated bend products.

FABRICATED uPVC LONG RADIUS BENDS

Both Rubber Ring as well as Solvent Cement Joint are offered.



Double & Single Socket Bends are available upon request.

Table 8 - Wall Thickness (Metric Series)

Pipe O.D. mm d	Radius mm r	L oo			
		11.25°	22.5°	45°	90°
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

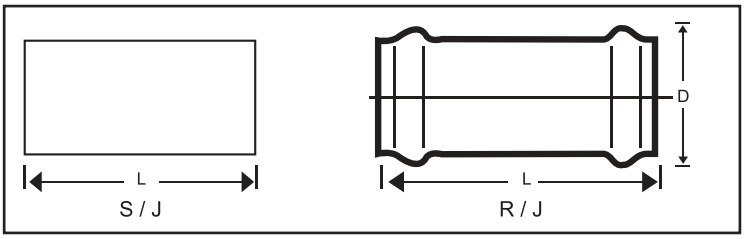
L = Leg Length

Other Angles can be produce on request

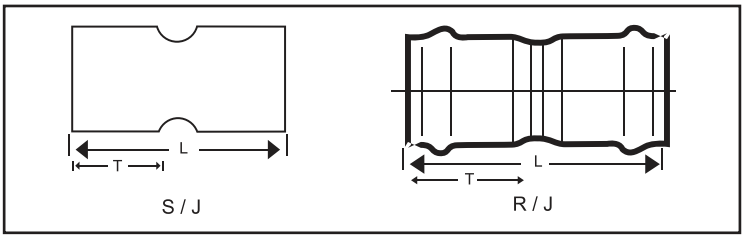
it's plastic engineering

FABRICATED uPVC LONG RADIUS BENDS

A. REPAIR COUPLING :



B. REGISTER COUPLING :



Pipe O.D. mm d	R/J. Coupling			S/J. mm	
	L. mm	D. mm	T. mm	L. mm	T. mm
16				56	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

Dimension stated above are indicative, Detailed specification for design purpose should be obtained from our Technical Sales Dept.

L = Length

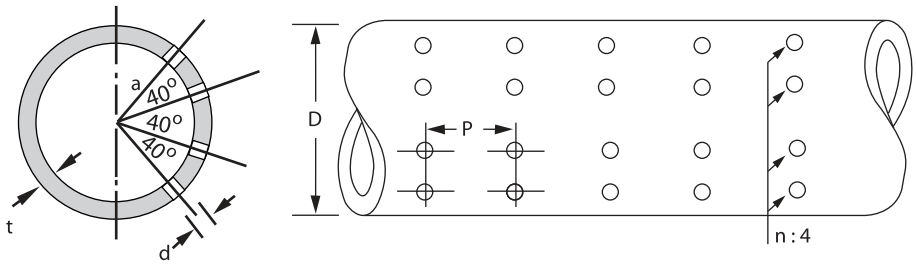
Other lengths can be produced on request.

it's plastic engineering

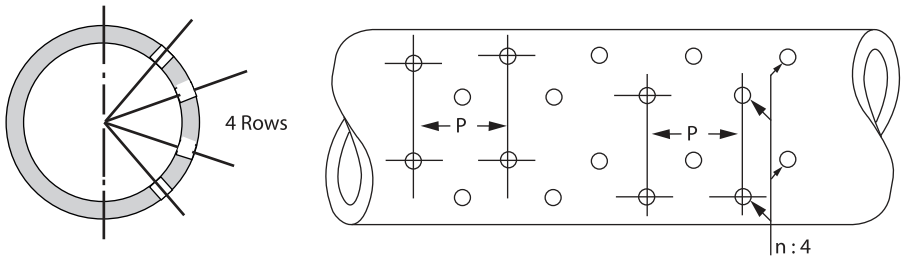
PERFORATED uPVC PIPES

Bahrain Pipes perforated uPVC pipes are manufactured upon request depending on the size and class of the pipes, Below figure given a general configuration which may vary for clients requirements.

(Straight rows)



(Staggered rows)

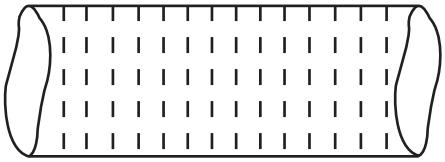


Range of Sizes	**75mm to 500mm**
Longitudinal Pitch of Holes (LP)	**30mm to 200mm**
Hole Diameter	**06mm to 13mm**
Number of Rows	**1 to 6**
Angular Pitch of Holes	**40 degree for 3 or 4 rows**
	40, 80 or 120 degree for 2 rows

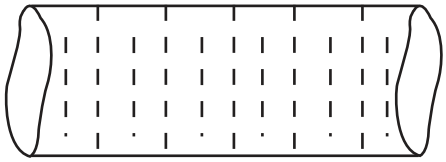
For further details please refer to National Marketing Technical Sales Deaprtment

B. Slotted Pipes

Bahrain Pipes are produced according to RDA requirements and for use in lowering the underground water table.



STRAIGHT SLOTS



STAGGRED SLOTS

- Slot Length : Depends on the size
- Slot Width : 1, 1.½ & 2mm
- No. of Rows : 4, 6 & 8 (but according to the size)
- Angular Pitch : to be recommended by Bahrain Pipes

Horizon of Demand & Supply

MANUFACTURING STANDARDS

Bahrain Pipes uPVC pipes are manufactured in accordance with

- British Standards, BS 5255, BS 4514, BS 4660, BS 5481, BS 3505/6, BS 6099.
- BSEN Standards BSEN 1401, BSEN 1452-2, BSEN 1329.
- ASTM Standards ASTM D-1785, for (Sch. 40, 80), ASTM D-2241 (SDR), ASTM F-441.
- NEMA Standards TC-2, TC-6, and TC-8.
- DIN Standards 19531, 19534, 8061/2, 8074/5, 8079/80.
- ISO (International Organisation for Standardization) 161/1 which conforms to German Standard DIN 8061, 8062 and 19532.

RANGE OF PRODUCTION :

- PIPES from Bahrain Pipes are manufactured according to metric sizes from 20mm upto 500mm, imperial sizes from ½ inch to 20 inch outside diameter in various pressure & classes. Details of which are shown in this catalogue.
- Pipes manufacturing in accordance with BS & ASTM Standards are ranges from ½ inch upto 20 inches in various pressure ratings.
- BS & ASTM PVC Pipes are available with plain spigot and socket joints only.
- Bahrain pipes are produced in 6 meters standard length (other lengths are available on request), standard colours are grey, white and black (other colours are available on request). Such as orange brown & blue.

PRODUCT DEVELOPMENT :

- Bahrain pipes factory has a passion for continuous development, and accurable research as an integral part of its operation.

MARKING :

- 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.

WATER FLOW CHARACTERISTIC

Friction Loss

The friction loss in hydraulic flow can be evaluated through the use of various flow coefficients. One such coefficient is the Hazen-Williams C factor. This factor for PVC & CPVC plastic piping system has been set at C=150. The following formulae express the friction loss in feet of water and the water velocities in feet per second.

Friction loss is based on Hazen-Williams formula

$$f = 0.2083 \times (100/C)^{1.852} \times (Q^{1.852} / di^{4.8655})$$

Where

f = friction head loss in feet of water per 100 feet of pipe

C = constant for inside pipe roughness (C=150 for extruded smooth wall thermoplastic pipe)
Q = flow in US gallons per minute
di = inside diameter of pipe in inches

The value of C = 150 for thermoplastic pipe is based on engineering measurements made with new and used thermoplastic pipe in several laboratories. Thus the value of C = 150 has a conservative bias.
Using C =150 the equation reduces to

$$f = 0.09830 (Q^{1.852} / di^{4.8655})$$

Water velocities in feet per second V may be calculated as follows

$$V = 0.408709 [Q/di^2]$$

Typical values of the Hazen Williams coefficient

Water Hammer _ Pressure surge

Maximum pressure caused by water hammer may be calculated with the following formulae.

$$a = \frac{4460}{\sqrt{1+\frac{K\,di}{Et}}}$$ (Wave velocity for water in pvc pipe)

$$p = \frac{aV}{2.31g}$$ (Pressure surge)

Where,

p = pressure surge (psi)
a = wave velocity (ft/sec)
v = maximum velocity change (ft/sec)
g = acceleration of gravity (32.2 ft/sec^2)
k = fluid bulk modulus (300 000 psi for water)
di = pipe inside diameter (inches)
E = modulus of elasticity of the pipe (420 000 psi for PVC 360 000psi for CPVC)
t = wall thickness (inches).

Pipe Material	C
Very to highly smooth pipes (all metals)	130 – 140
Smooth wood	120
Vitrified clay	110
Cast iron	100
Iron (worn/pitted)	60 – 80
PVC	150
Brick	100

THERMAL MOVEMENT

The coefficient of expansion of plastic materials, are generally much greater than those of metals. Particular care should be taken in the design of pipe work layouts above ground, or where there is considerable fluctuation in temperature, to ensure adequate allowance for expansion and contraction.

Plastic materials have reduced impact strength at low temperatures and this should also be taken in to account in the siting of pipe work to avoid damage under these conditions.

Higher temperatures, either environmental or in the fluids conveyed, soften the materials and thus reduce the internal pressure at which the pipes may safely be used; this should be allowed for in the design of systems. Higher temperatures generally reduce the resistance of plastic to chemicals.

Expansion and contraction can be calculated using the formula.

$$\Delta L = \alpha \times L \times \Delta t$$

where ΔL = Change in length in millimeters
α = 0.08mm/m/C
L = Original length of pipe in meters
Δt = Total temperature range in ^{o}C

Calculation of expansion and contraction should take account of the minimum and maximum foreseeable temperature conditions.

It is normally possible by correct bracket arrangement to direct movement in such a manner that, this is 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.

SUPPORT SPACING FOR PIPING SYSTEMS

Support and spacing requirement for the piping system should be designed in to the system to allow for increase temperature as temperature increases, the tensile strength of the pipes decreases, so the pipe and associated fixtures must be well supported.

Horizontal piping system should be supported on uniform centers which are depending by maximum operating temperatures. These spacing apply to uninsulated lines either in a building or exposed to the atmosphere. The formula use to determine the spacing data takes in to account the heating effect of the sun on low temperature lines.

Do not clamp or anchor the pipe so that it is held absolutely rigid or constricted. Some slight axial movement is necessary.

Quality Proven Technology

HYDROSTATIC TESTING :

After the completion of an installation, it is essential that all piping system be inspected and tested hydraulically to consider the safety and efficiency of the system, except that pipes for gases may be tested pneumatically. if the installation is large one, it may be tested in section of suitable length.

Before the commencement of any testing, the system should be visually inspected to ensure that the recommendation for the correct installation procedure have been complied with, and that the pipe line together with the appliances, vales and fittings are supported in the prescribed manner.

Whilst the testing pressure may vary depending upon the type and duty of the system, this should normally be 1 ½ times the max working pressure at the point of max stress.

Pressure should be applied either by a manually operated hand pump or by a power driven pump. Pressure gauges should be correctly positioned and closely observed to ensure that at no time is the test pressure exceeded. the system should be slowly and carefully filled with water, care being taken to avoid all surging pressure of water hammer. Air vents should be open at all high point so that air may be expelled from the system during filling.

When the system has been fully charged with water and all air displaced from the line, air vents should be closed and the line initially inspected for seepage at joints and a firmness of support under load. Pressure may then be applied until the required test level is obtained.

With the test pump stops, the required pressure should be maintained without loss for a period of 1 hr, or for such shorter time as agreed between supplier and purchaser. any defect revealed by such tests should be made good and the test repeated until a satisfactory result is obtain.

A further test should be made of the entire system at normal service operating pressure. Valves and appliances should be tested for ease of operation and correct working.

Buried pipes should be tested before back filling is completed. Where pipe line contain couplings which permit the pipe to slip, it is essential that consideration be given to restraint of the line before pressure is applied. Partial back filling, leaving joints expose for inspection, is usually found to be satisfactory, although for some high pressure applications additional bracing particularly at changes of direction may be found necessary.

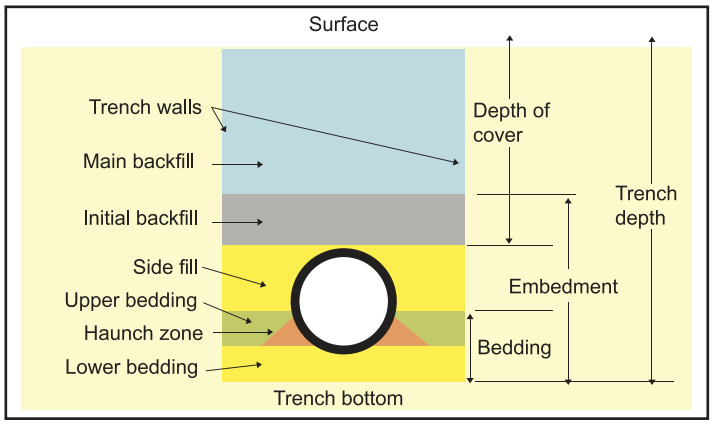
In special cases where hydraulic tests are not practical, pneumatic tests may be substituted, but this should be attempted without consultation with the supplier of the pipe.

Pumping mains should be subjected to a test pressure at least 1 ½ times the line pressure, with a maximum pressure as agreed with the pipe manufacturer.

UNDERGROUND INSTALLATION
TRENCH WIDTH PREPARATION COVER AND BACK FILLING

LAYING BURIED PIPES

The external load imposed on a pipe of brittle material such as verified clay, concrete, asbestos cement or cast iron are supported mainly by virtue of the resistance of the pipe to circumferential bending. However, a plastic pipe, because it is able to deform to a considerable degree without fracture, is able to derive additional supporting strength from the lateral restrain afforded by the passive resistance of the fill material at the sides of the pipe, which opposes any increase of the horizontal diameter of the pipe.



For the lighter gauges of plastic pipe this lateral support is of prime importance in enabling the pipe to carry the external loads without excessive deformation and it is thus important when laying such pipe that adequate precaution be taken to ensure that the lateral support is effective. Because of its softer nature it is also necessary to ensure with plastic pipe that sharp objects such as large flints do not bear directly on it.

The flexible nature of the plastic pipe enables it to accommodate more readily than pipe of brittle material any axial deformations resulting from ground movements or from differential settlements of structures to which the pipe line is connected.

Buried pipes are not normally subjected to large temperature variation, and in cases when positive joints are used the temperature movement can usually be taken up as elastic strain in the pipe. However there may be an exceptionally large change of temperature immediately after backfilling, or on filling the pipe with liquid. Because of the low relative density of the plastics pipes their readiness to float when empty in waterlogged ground is much more obvious. Therefore such pipes require more substantial earth loading immediately after laying than that require by the heavier material.

TRENCH PREPARATION

Since the pipes up to nominal size up to 6" can be jointed on the surface and subsequently 'snaked' into the trench. it is not necessary to dig jointing holes and wide trenches in which men can work. Advantage may also be taken of the lightness, flexibility and smoothness of plastics pipes by adopting the economical mole ploughing technique.

The trench should not be open too far in advance of pipe laying and should be backfilled as soon as possible. The width of the trench at the crown of the pipe should be as narrow as is practicable but not less than the outside diameter of the pipe plus 3000mm to allow proper compaction of the side fill. Above the crown of the pipe the trench may be of any convenient width.

In uniform, relatively soft, fine –grained soils free from large flints or stones or other hard object, and Where the bottom can readily be brought to an even finish providing a uniform support for the pipes over their length it may be permissible, more especially with class C or heavier gauge pipes, to lay them directly on the trimmed bottom of the trench. In other cases the trench should be excavated to a depth below the bottom of the pipe sufficient to allow for the necessary thickness bedding material.

BEDDING AND SIDE FILLING

The care required with the bedding and side filling depends to some extent on the wall thickness of the pipe employed. The following relates particularly to pope thinner than class C, and to pipes of nominal size 3 and above.

Clay is unsuitable as a bedding or side filling material. Some other soils as excavated from the trench, such as free-draining coarse sand, gravel, loam, and soils of a friable nature and of an adequate compaction fraction to provide support for the pipe may be suitable. Soils such as hard chalk, which breakup when wetted should not be used.

If the material excavated from the trench is unsuitable. then granular material should be imported. The most suitable is gravel or broken stones from 10 to 5mm in size since it requires little compaction, but coarse sand, or sand and gravel from 20mm and less in size as it comes from the quarry is acceptable provided it complies with test requirement. An excess of fine particles makes the material more difficult to compact when damp.

The thickness of bedding under the barrel of the pipe should be a minimum of 100mm. In every wet or soft conditions or where the trench bottom is very irregular it may be necessary to increase this thickness. The bedding should be properly compacted to provided a uniform bed for the pipe. Bricks or other hard material should not be placed under the pipe for temporary support.

After the pipes have been laid and tested further material should be placed around the pipe and compacted in 75 mm layers up to a level at least 100mm above the top of the pipe. Any trench sheeting should be partially withdrawn to enable the side fill to be firmly compacted between the sides of the pipe and the soil sides of the trench.

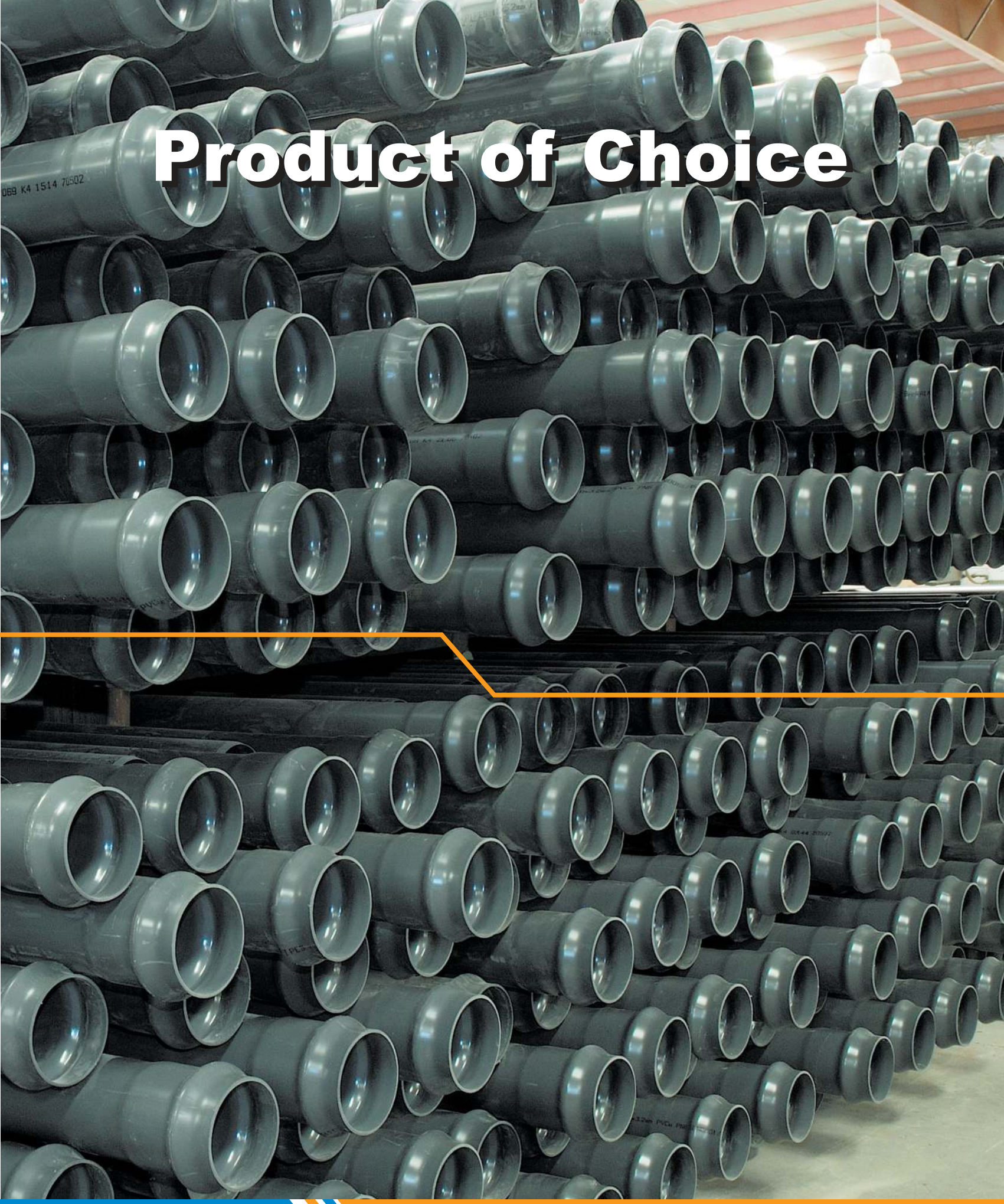
BACKFILL

The material from the trench may be used for the remainder of the backfilling, except that special consideration of its suitability may be necessary where the risk of surface subsidence is a consideration. Under the road, It should be compacted in 300mm layers, or in compliance with any special requirements of a local or other authorities. Heavy mechanical compactors should not be used until the fill has reached a depth of at least 300mm above the top of the pipe.

With less than 450 MM of cover else where than under roads, concrete slabs on cushion of filling material above the pipe should be used as a protection against picks etc. At shallow depths under roads special consideration should be given to all the engineering factors involved, such as the class of road, its construction, the class of pipe being laid, and proximity of other services.

Pipes above natural ground level which are subsequently to be covered with fill should preferably not be until the disposition and compaction of the fill has proceeded up to a height of about 1 meter above the level of the top of the pipe.

Product of Choice



PIPE LAYING WITHOUT TRENCHES

Mole ploughing is a method of pipe laying which eliminates the need for conventional trenching. Ground conditions impose considerable influence on the viability of employing the mole ploughing technique and it is, therefore, essential to carry out a preliminary ground survey before deciding to use it. Conditions that should be avoided are rocks, flints, tree roots, existing buried cables and pipelines, etc. Although little difficulty would be encountered with gently undulating ground, a violently irregular surface would not be suitable. Investigation of sub-soil conditions may be carried out by piercing the ground, at intervals, to the depth at which the pipe will be laid.

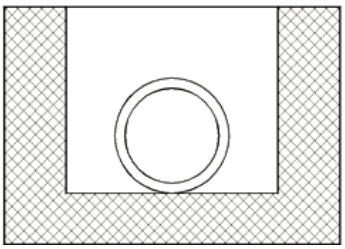
The mole plough is a piece of equipment that cuts turf and sub-soil, at the same time forming an underground channel into which the pipe may be pulled.

In suitable soil, plastic pipe can be pulled into position underground behind the mole plough. Pipe upto at least nominal size 18 have been laid this way. Slit trenches have to be dug for the start and finish of each length pulled in, the length of the slit trenches depending on the flexibility of the pipe. The mole should be followed by an expander, the diameter of which is at least for the length 75 mm greater than the diameter of the pipe which connected to it. This method of pipe laying best carried out in relatively firm clay where the mole channel can be expected to stand up at least for length of time required to pull the pipe in.

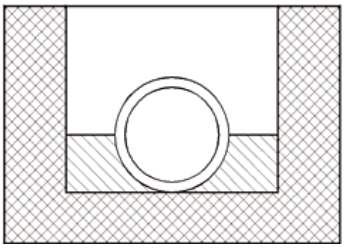
If there is insufficient clay for the mole channel to be self-supporting, it will collapse behind the mole and the friction generated on the sides of the pipe will be such that the pipe may be stretched and there by weakened, sometimes to the point of destruction. In such cases a cable –laying machine may be used. With this machine the pipe is not laid out behind the mole and pulled in by it but, instead, it is laid out in front of the machine, the pipe passing over the machine and down through a wider slit behind the mole blade and into the channel. By this method the pipe is not dragged through the soil but is merely placed in to position by the cable layer.

For smaller diameter pipes the mole plough can be coupled direct to a tractor but mole ploughs for larger diameter pipes, or cable laying machines are best pulled by winch.

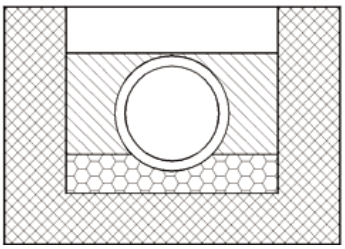
TYPICAL EMBEDMENT TYPES



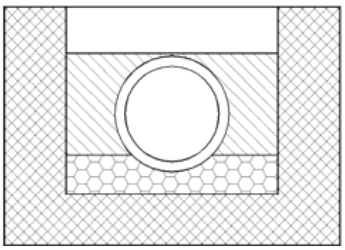
Flat-bottom trench. Loose embedment.



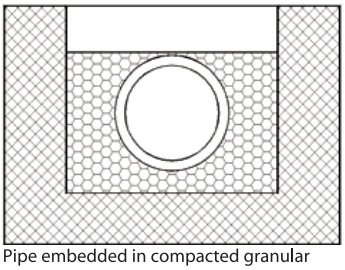
Flat-bottom trench. Embedment lightly



Pipe bedded on 4 in. (100 mm) minimum of loose soil. Embedment lightly



Pipe bedded on sand, gravel, or crushed stone to depth of 1/8 pipe diameter, 4 in. (100 mm) minimum. Emb



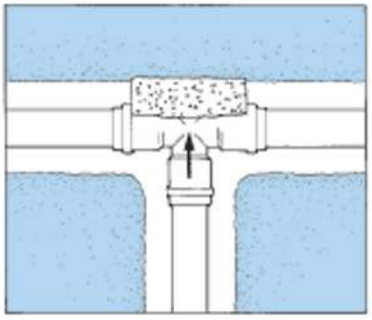
Pipe embedded in compacted granular material to centerline of pipe. Compacted granular or select material.

THRUST BLOCKS

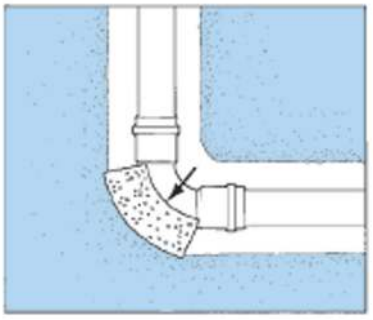
Thrust blocking prevents pipe movement when a pressure system is activated and pressurized. Thrust blocking is required at all points of change of direction in the pipe line. Most blocking is done where a fitting, valve, or hydrant is installed. There may be times when side blocking is necessary because of curvature occurring without the use of fittings.

Usually good compacted backfill will provide the necessary anchor for side thrust. Concrete blocking is the most commonly recommended method of blocking. Concrete is placed directly on the fitting against the line of thrust. The concrete must also pour against undisturbed earth.

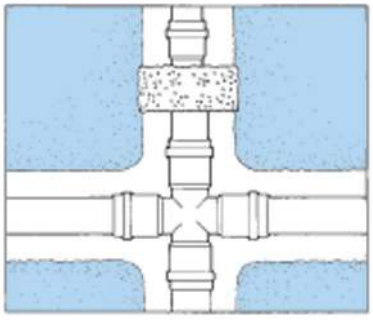
The size of the blocking will vary with the size of pipe, working pressure exerted, type of fitting, degree of flow direction change, and the soil conditions. PVC pipe is flexible and may pulsate under pressure variations. This does not harm the pipe or that part which is enclosed in concrete. It may cause wear at the interface of the concrete block and the backfill. For this reason, pipe and fittings should be wrapped with a one mill or heavier plastic sheeting prior to being embedded in concrete to prevent any possible damage.



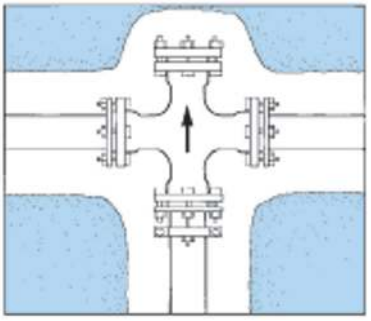
Through line connection, Tee



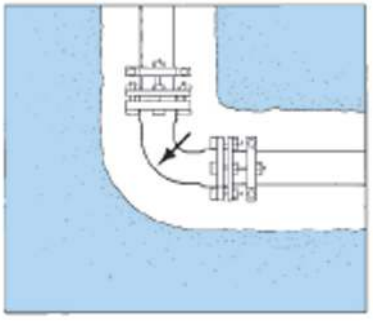
Direction change, Elbow



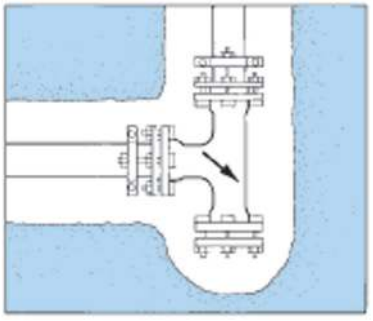
Change line size, Reducer



Through line connection, cross used as Tee



Direction change, Elbow



Direction change, Tee used as Elbow

MISTAKES TO AVOID

Design

Ensure adequate gradient for pipe runs. In certain circumstances oversized pipes may be used at shallower gradients. The depth of the drain is thus reduced, saving on excavation and allowing more economical installation. However, adequate velocities should be maintained and the additional costs of pipework considered.

Make sure that there is adequate depth of ground cover of protection over pipes.

Avoid long lengths of unvented drain. Install junctions so that they continue in the direction of flow.

Space manholes at maximum centers as they are expensive.

uPVC pipes are flexible in concrete unless engineering requirements make it necessary. Although concrete does not harm uPVC, surrounding pipes with concrete is wasteful and changes a flexible pipeline into a rigid beam which may fracture under ground movement.

Construction

Make sure all sockets and spigots are clean before jointing. Before backfilling, make sure that all temporary supports, hard bricks and other objects are removed from the trench. Never leave them under or at the sides of pipes. Always test pipes before backfilling.

Protecting Underground pipes from loads

As uPVC pipes are flexible they can accommodate ground movement and pressure without damage. However, if the pipe needs protection, e.g. when laid with a cover of less than 1.2 meters under roads, concrete may be used above the pipeline as a protective raft, provided a cushion of fill is laid between the pipe crown and the raft. This will prevent unacceptable deflection of the pipe.

Pipes Under Buildings

Do not surround pipes with concrete if they run under of through buildings unless building engineering requirements make it essential as this effectively converts a flexible pipeline into a rigid beam with little flexural strength. Instead, bed the pipe as normal and continue the surround and backfill up to the underside of the oversite concrete or floor slab. Where a pipe passes through a wall, install a suitable pipe sleeve and lintel, complete with two Couplers on either side of the wall. This will compensate for any settlement of the building or made-up ground. Alternatively, form a lintel or relieving arch in the structure to leave 20mm clearance above the crown of the pipe. fill this clearance with suitable material which is compatible with uPVC, non-cracking and resistant to moisture and gas.

Use of Concrete

If pipes must be surrounded with concrete, make sure they do not float when the concrete is poured. Filling the pipes with water will generally provide enough ballast but side restraint may be needed to maintain alignment.

To maintain a certain degree of flexibility, insert 13mm of compressible material, such as fiberboard or polystyrene, around the pipe joints. These boards must be at least the width of the concrete surrounds. Protect pipe joints from the ingress of cement by wrapping them with polyethylene sheet or adhesive tape.

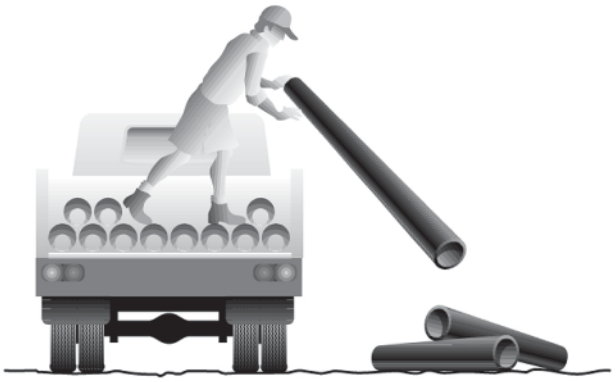
Testing

All lengths of sewer and drain pipe and all manholes and inspection chambers must be inspected for straightness, abstractions and for ground water infiltration.

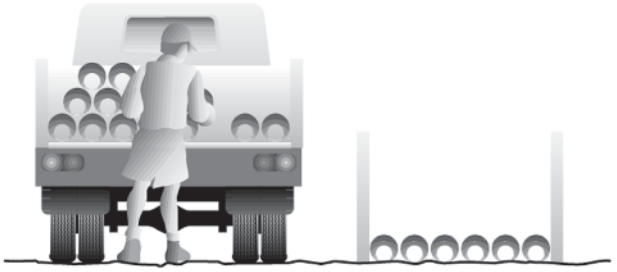
Handling and Storing on Site

Incorrect way to load pipes

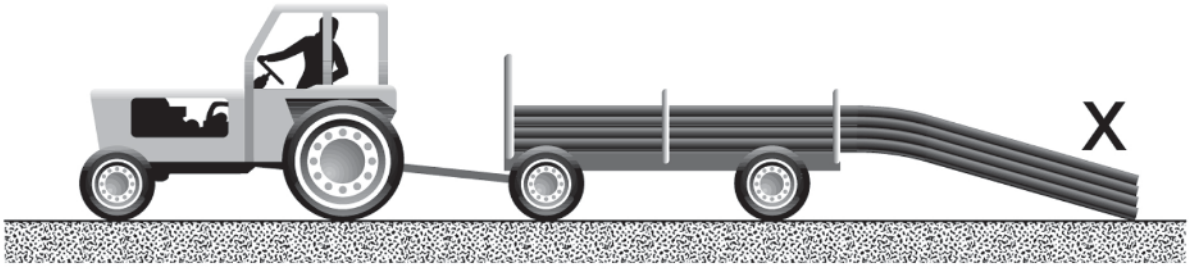
Correct way to load pipes



Incorrect way to off-load



Correct way to off-load



On-site Transport

Individual pipe stacks on site

TRANSPORT, HANDLING & STORAGE

TRANSPORT CRATES

Generally, pipes are delivered prepacked in crates of standard quantities. In these crates, pipes are held by steel bands and timber stretchers.

LOOSE PIPES AND FITTINGS

When vehicles with a flat bed are used for transporting loose pipes, make sure the bed is free of nails and other projections. Support pipes throughout their length.

When loading socket and spigot pipes, place the sockets at alternate ends of each layer. Allow the sockets to protrude so that the pipes are evenly supported along their entire length.

Load pipes so that they do not overhang the vehicle by more than one meter.

Always load pipes with larger diameter and thicker walls before those with smaller diameters and thinner walls.

Make sure vehicles have adequate side supports at approximately 2 meter spacing, and that all uprights are flat, with no sharp edges. Secure pipes during transit.

HANDLING

Always be careful to avoid damage when handling pipe. Cold weather reduces the impact strength of uPVC, so take extra care when handling pipe in wintry conditions.

When unloading crates mechanically, use either nylon belt type slings or fork lift trucks with smooth forks. Metal slings, hooks or chains must not come into direct contact with the pipe.

Load and unload loose pipes by hand and avoid using skids. When loose pipes have been transported one inside the other, always remove the inner pipes first.

Do not drop or drag pipes.

STORAGE

Crates

Store crates on a reasonably flat surface free from sharp projections likely to damage the pipes.

Crates can easily be stored up to three high without extra side supports or bearers.

When 200mm, 250mm and 315mm pipe bundles are cut they must be given side supports at least every 2 meters. These supports should preferably consist of battens at least 75mm wide.

Take care when removing pipes from bundles as the straps are under considerable tension and may fail when cut.

LOOSE PIPES

Store loose pipes on a reasonably flat surface free of sharp projections. Provide side supports at least every 2 meters. These supports should preferably consist of battens at least 75mm wide.

Ideally, loose pipes should be uniformly supported throughout their entire length. If this is not possible, place timber supports at least 75mm wide at 1 meter maximum centers beneath the pipes.

Stack pipes of different size and wall thickness separately. If this is not possible, stack pipes with larger diameters and thicker walls under those with smaller diameters and thinner walls.

Stacking Guideline

Do not stack uncrated pipes more than six layers in height or above a maximum height of 1.8 meters. Always store pipes under shade cloth if periods outdoors exceed 3 months.

PIPE JOINTING PROCEDURES

Preparing Pipe Ends

All spigots on fittings and the ends of standard lengths of pipe are chamfered to approximately 15o. Pipes cut on site must be clean cut at right angles to their horizontal axis. Chamfer the cue end to approximately 15o for half the pipe wall thickness and deburr it with a scraper or knife blade.

All pipes – whether site cut or otherwise and other plain ended fittings must be inserted to the full depth of the socket, marked at the socket face, and then withdrawn at least 12mm.

Jointing 110mm Diameter Pipes

It is necessary with pipes of 110mm diameter to provide lateral support to the socket whilst pushing the spigot end of the pipe home to its depth of entry mark. This is necessary because of the lower longitudinal stiffness of these small pipes and their tendencies to lateral deflection prior to final entry of the spigot into the rubber seal.

Ring Seal Joints

Pipe Couplers and must Bends and Junctions – particularly in the 110mm, 160mm and 200mm sizes – are available with sockets on all ends. These sockets are fitted with ring seals which act as both a sealing and expansion joint.

The correct sequence for ring seal jointing is as follows :

1. Check that the pipe chamfer is correct and that the ring seal is properly seated in its housing.
2. Make sure that both the pipe or fitting spigot and ring socket are dry, clean and free from grit or dust.
3. Lubricate evenly around the spigot (Not the socket) with Lubricant.
4. Make sure that the components to be joined are correctly aligned.

Jointing Pipe

5. Push the spigot fully into the socket. Mark the spigot at the socket face and then withdraw the spigot by a minimum of 12mm. if the spigot is already marked with the depth of entry, push into the socket until the depth of entry mark is just visible.

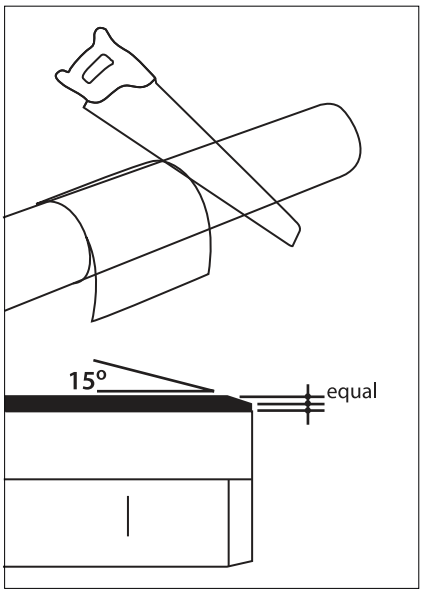


Fig. 1

Fig. 2

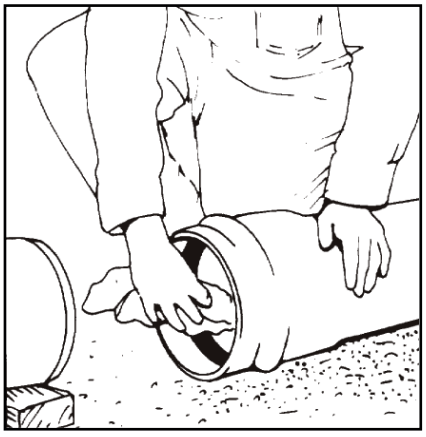


Fig. 3

PIPE JOINTING PROCEDURES

6. Do not cut back the straight leg sections of Long Radius Bends for Channel Bends as only the spigot end provided is suitable for jointing.
7. Make jointing 200, 250mm and 315mm pipes easier by levering them into position. Protect the pipe end (or socket mouth in the case of single socket pipes) from the leaving by placing a block of wood between the pipe and the lever.

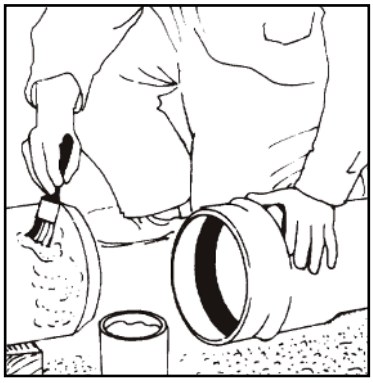


Fig. 4

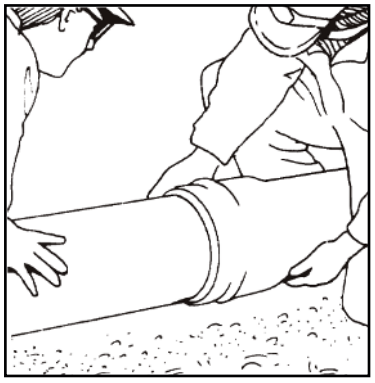


Fig. 5

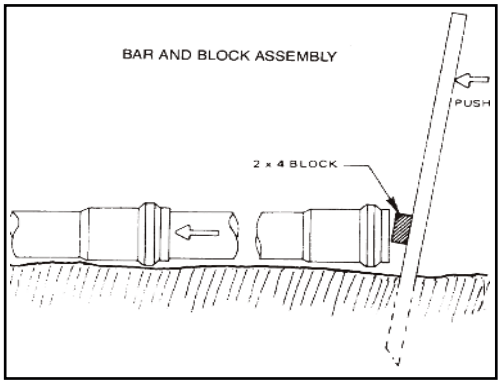


Fig. 6

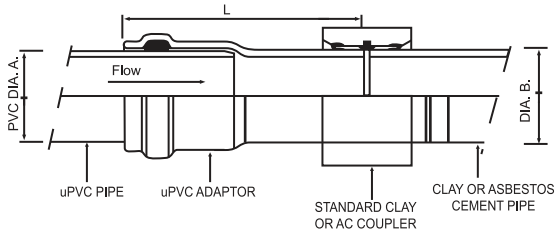
JOINTING TO ALTERNATIVE MATERIALS

This section shows three common jointing configurations for uPVC sewer pipes to asbestos cement or clay sewer pipes. It is possible to have fabricated adaptors for jointing uPVC to any other pipe material and size combination required.

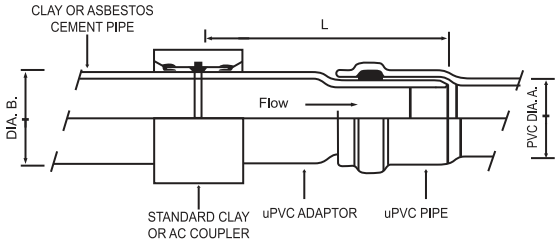
Adaptors are fabricated from unplasticised PVC and when dimentions allow, manufactured from heavy duty.

In the event of a joint being required when the flow direction is opposite to that shown in the diagram, then a plain section of uPVC pipe should be used.

1) **ADAPTOR TYPE - 1**



2) **ADAPTOR TYPE - 2**



PRESSURE TEMPERATURE RELATIONSHIP

Temperature		% of Working Pressure Reduction
°C	°F	
20	68	100
30	86	90
35	95	80
40	104	70
45	113	60
50	122	45
55	131	30
60	140	15

Where the carried in a pipeline is 20°C and the ambient temperature is higher 20°C – the maximum working pressure should be reduced by 1½ per degree above 20°C. The ambient temperature is above 20°C.

Where the carried in a piptine is 20°C and the ambient temperature is 20°C – the maximum working pressure should be reduced by 2% for every degree oC the fluid temperature is above 20°C.

The above pressure reductions apply to maximum operating temperature of 60°C.

GENERAL INFORMATION :

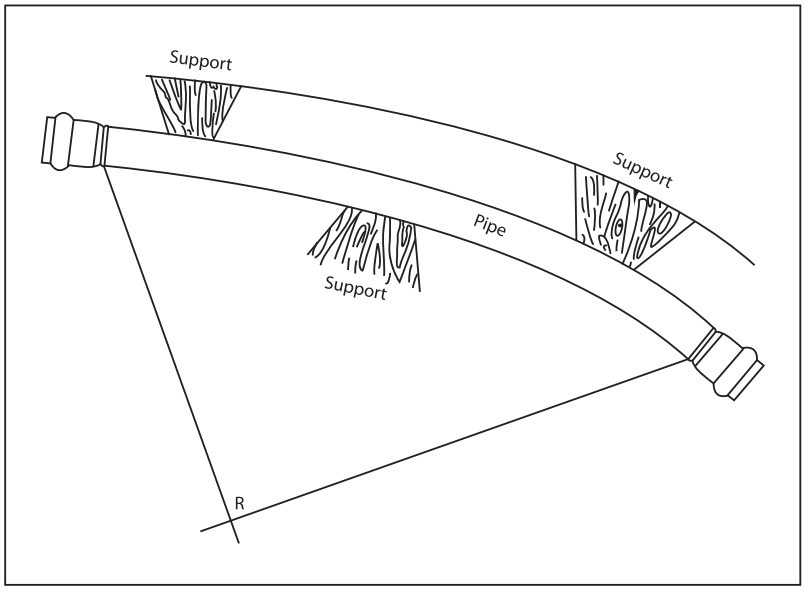
The ring Integral Socket permits as angular deflection at the joint of 2 to 3 degree.

The introduction of joint deflection is however, generally unnecessary in an inherently flexibly 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 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.



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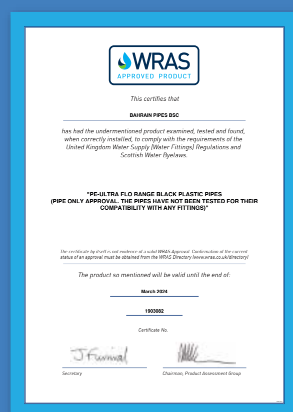

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