RAK UNIVERSAL PLASTIC INDUSTRIES

HDPE Pipes & Fittings

PE 100
PE 80
ELECTRO FUSION
WELDING MACHINES
QUALITY
PIPELINE INSTALLATION
ISO 4427
BUTT FUSION

HDPE PE 100 Pipe
Solution Specialists

COMPANY PROFILE

RAK Universal Plastic Industries L.L.C established in 2009 in RAS AL KHAIMAH UAE to supply the local market with HDPE Pipes & Fittings as well as for export.

RAK Universal Plastic Industries L.L.C manufactures high density polyethylene pipes as per international standards such as BS, ASTM, DIN and ISO as well as to specific customer requirements for individual applications. Within the Gulf region, the most common standards specified for high density polyethylene pipes are DIN 8074 and ISO 4427 for potable water applications.

RAK Universal Plastic Industries L.L.C products range in diameters starting from 63 mm to 500mm with various pressure ranges starting from SDR41-PN 4 to SDR7.4-PN25, with length of 12 meters and as per customer requirements.

Our production is from high density polyethylene black or black with blue stripes bimodal technology, it is combination classified as a MRS 10.0 material (PE 100) provides superior in mechanical properties and process ability, in addition, it includes a good dispersion of black carbon pigment and antioxidant to ensure excellent long term in UV resistance and thermal stability. It stands for high safety for water supply and environment friendly.

RAK Universal Plastic Industries L.L.C specialized in HDPE PE 100 fusion welding and pipeline installation works. The company owns a variety of Fusion Welders for any size of HDPE pipes as per project specifications with qualified fusion technicians who have years of experience working in this field.

To have complete products range RAK Universal Plastic Industries L.L.C supplies HDPE PE100 fabricated fittings, electro fusion and butt fusion fittings.

In compliance with Quality Management System we believe in the ultimate performance, quality standards and keeping customers ever satisfied.

About Polyethylene

Polyethylene is a thermoplastic Polyolefin material generated from the polymerization of ethylene. It is manufactured on a petrochemical basis with petroleum as the Raw material. Depending on the polymerization process, different types of polyethylene materials can be produced.

- Low Density Polyethylene (LDPE), has a density of 0.91 - 0.93 g/cm3
- Medium Density Polyethylene (MDPE) has a density of 0.925 – 0.944 g/cm3
- High Density Polyethylene (HDPE), has a density of 0.94 - 0.96 g/cm3

In recent years extended development work has been undertaken by PE Resin manufacturers, which have resulted in materials with better long-term strength and temperature resistance than the old generation grades. The new classification is based on the minimum required strength (MRS), which has to be applied for designing long-term loaded PE pipes operating at a temperature of 20°C for a design life of at least 50 years. A “third-generation” PE Grade was developed and recognized as PE100 which has a MRS of 10MPa and a design tensile stress of 8 MPa. It is especially design for the production of larger diameter and thick-walled pipe, but can be processed for the whole range of diameters. It also shows excellent Resistance to rapid crack propagation and slow crack growth.

HDPE Pipe Application

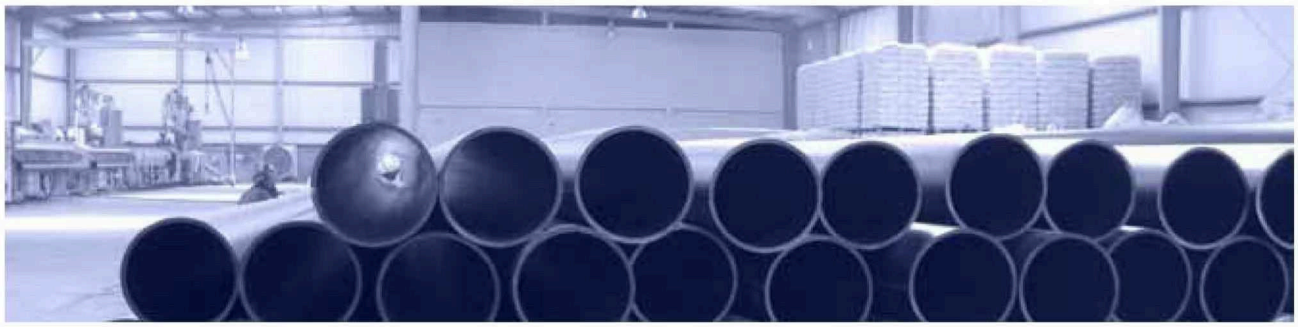
HDPE pipes become widely adopted in a variety of piping systems and are rapidly replacing most conventional pipes. HDPE pipes proved very successful in the main potable water supply and distribution lines, plumbing, drainage & sewerage, sprinkler & drip irrigation systems, fire fighting networks, underwater piping system, relining of old pipelines, laboratories, electrical conduits & fiber-optic ducts and gas distribution. It has a broad variety of industrial applications Including the chemical industry, crude oil, mine slurry transportation and many other applications.

- In networks of spring and drinking water - Sea discharge systems - Sewage discharge systems - Waste water system - Solid waste (litter) drainage systems - Drainage projects. - Agricultural irrigation system - Sports arenas and garden watering - Fire Fighting Nnetworks	- Geothermal system and Mining Establishment. - Chemical Industries - Cement Industries - Oil & gas Industries - Sailing and fishing and Marina - Buildings and many Industrials Systems - Heating and cooling water systems - Telecommunication cable systems and Others - Gas Application Networks

Properties of Polyethylene Pipe

High density polyethylene (HDPE) pipes have been used for more than 40 years and fast becoming the standard in new industries and applications due to the outstanding properties such as:

Corrosion Resistance	Impact Strength
Non Toxicity	Heat Fused
Longevity	Abrasion resistance
Light Weight	Low maintenance cost
Flexibility	Durability
Weather Resistant (UV Radiation)	Readily Installed Small to Big Diameters



Material Properties of HDPE

Property	Test Method	Units	PE 100
Density (Compound)	ISO 1183	Kg/m3	959
Melt Flow Rate (190˚C/5kg)	ISO 1133	g/10min	0.25
Tensile Stress at Yield(50mm/min)	ISO 527-2	MPa	25
Elongation at Break	ISO 527-2	%	>600
Charpy Impact Strength, notched	ISO 179/1eA	kJ/m²	16
Carbon Black Content	ASTM D 1603	%	2
Vicat Softening Point	ASTM D 1525	˚C	122
Brittleness Temperature	ASTM D 746	˚C	<-70
ESCR (10% igepal), F50	ASTM D 1693A	Hrs.	>10,000
Thermal Conductivity	DIN 52612	W/m˚K	0.4

Thermal Properties

PE has a coefficient of linear expansion of approximately 1.5 x 10^{-4} per degree Centigrade, which is in the order of ten times greater than that for iron or steel.
The thermal conductivity of PE is approximately 0.4 W/m˚ K, so PE is a poor conductor of heat. Therefore, the water or any medium contained in PE pipe changes temperature more slowly than any other conventional pipe.

Color of Pipes

Due to the extreme weathering conditions in the Middle East and to counterattack UV radiation, RAK UPI Pipes are normally supplied in black color. A Co-extrusion system is responsible for producing pipe with color stripes depending on pipe application. International norms recommends Blue stripe for potable water, Orange for conduit, and Yellow for gas application. For electrical conduit and fiber optic applications, a two-color double layer pipe is available where the main layer is black and the thin outer layer can be blue, orange, or green depending of customers color specifications. Conduit pipes also has a pulling rope inside pre-installed during production to ensure easy insertion and pulling of fiber optics and electrical cable during installation. Other colors also can be produced depending on customer requirement.

Chemical Resistance

Polyethylene(PE) has a good resistance to a wide range of chemicals. For all practical purposes, PE is chemically inert within its normal temperature range of use. It does not rot, rust, pit, corrode or loose wall thickness through chemical or electrical reaction with the surrounding soil. It does not normally support the growth of algae, bacteria or fungi.

Fracture Resistance of Polyethylene Pipe

POLYETHYLENE pipe is tough and 'brittle type' fracture is difficult to achieve even in laboratory tests at low temperatures. The failure mode in stress rupture testing is ductile unless testing is carried out at low stresses at elevated temperatures for considerably extended periods of time to reproduce slow crack growth. PE pipe have excellent resistance to this mode of failure (demonstrated by tests such as the notched pipe test).

For PE100 pipes, catastrophic failure due to rapid crack propagation (RCP) will not occur under normal service conditions. PE pipes that meet the Rapid Crack Propagation (RCP) test requirements for full resistance are suitable for operation at the nominal pressure rating. The many years of successful installation of polyethylene pipe has shown that PE is a tough and resilient material capable of withstanding the normal rigors of pipe laying and pipeline operation.

Abrasion Resistance of Polyethylene

Pipe rupture caused by the gradual decomposition of the pipe material as a result of corrosion and or abrasion is a problem that deserves prime consideration in the planning of pipe systems and the choice of pipe material. A number of investigations proved that HDPE pipe has a very strong resistance to abrasive media compared to other pipe materials.

Weathering Resistance of Polyethylene Pipe

Weathering due to prolonged outdoor exposure will cause degradation of most natural and plastic materials, particularly by the combined effects of short-wave ultra-violet(UV) rays from sunlight and atmospheric oxygen. HDPE pipes are protected from these effects by the addition of carbon black. Because carbon black is the most effective protection against UV, HDPE pipes are normally supplied in black. This ensures that black pipes made from this material can be stored or used outdoors over the period of time without any fear of a change in properties, which is not available from other thermoplastics.

Resistance of Polyethylene Pipe to Microorganism & Rodents

Research carried out by behavioral scientists shows that rodents (and also gnawing insects such as termites) are compelled to maintain their teeth in good condition by gnawing objects that stand in their way. In the case of HDPE Pipe, there is the additional point that the smooth round surface does not give the teeth sufficient hold to bite properly. Large number of termites inhabited in countries like Australia & Africa have not reported so far any damage in HDPE pipelines. HDPE is not a nutrient medium for bacteria, fungi, spores, parasites, etc. So HDPE pipes are resistant to all forms of microbial attack. Further, it should be noted that sulphate reducing bacteria in the soil have no effect on HDPE pipes since the product is resistant to both sulphurous acid and sulphates.

Dimensions

All Dimension are expresed in metric units. The diameter of pipes are measured in millimeters (mm) and represent the outside diameter of the pipe. A table shown below facilitates comparison of OD in metric and inch.

MM	63	75	90	110	125	140	160	180	200	225	250	280	315	355	400	450	500
Inch	2	2½	3	4	5	5½	6	7	8	9	10	11	12	14	16	18	20

HDPE Polyethylene Pipe Specification

SDR 41-PN 4			SDR 33-PN 5			SDR 26-PN 6			SDR21-PN8			SDR17-PN10			SDR13.6-PN12.5			SDR11-PN16			SDR9-PN20			SDR 7.4-PN 25		
OD	S	KG/M	OD	S	KG/M	OD	S	KG/M	OD	S	KG/M	OD	S	KG/M	OD	S	KG/M	OD	S	KG/M	OD	S	KG/M	OD	S	KG/M
63	-	-	63	-	-	63	2.5	0.50		3.0	0.58		3.8	0.73		4.7	0.89		5.8	1.07		7.1	1.28		8.6	1.58
75	-	-	75	-	-	75	2.9	0.68		3.6	0.84		4.5	1.03		5.6	1.25		6.8	1.49		8.4	1.80		10.3	2.25
90	-	-	90	-	-	90	3.5	0.99		4.3	1.20		5.4	1.48		6.7	1.80		8.2	2.16		10.1	2.59		12.3	3.22
110	-	-	110	-	-	110	4.2	1.45		5.3	1.80		6.6	2.20		8.1	2.66		10.0	3.20		12.3	3.85		15.1	4.83
125		-	125	-	-	125	4.8	1.87		6.0	2.30		7.4	2.81		9.2	3.43		11.4	4.15		14.0	4.98		17.1	6.21
140	-	-	140	-	-	140	5.4	2.36		6.7	2.88		8.3	3.52		10.3	4.30		12.7	5.18		15.7	6.24		19.2	7.80
160	-	-	160	-	-	160	6.2	3.09		7.7	3.78		9.5	4.60		11.8	5.61		14.6	6.80		17.9	8.12		21.9	10.13
180	-	-	180	-	-	180	6.9	3.85		8.6	4.75		10.7	5.82		13.3	7.12		16.4	8.59		20.1	10.28		24.6	12.82
200	-	-	200	-	-	200	7.7	4.77		9.6	5.88		11.9	7.18		14.7	8.73		18.2	10.60		22.4	12.71		27.4	15.86
225	-	-	225	-	-	225	8.6	6.00		10.8	7.43		13.4	9.11		16.6	11.08		20.5	13.41		25.2	16.08		-	-
250	-	-	250	-	-	250	9.6	7.43		11.9	9.10		14.8	11.16		18.4	13.65		22.7	16.49		27.9	19.77		-	-
280	-	-	280	-	-	280	10.7	9.27		13.4	11.48		16.6	14.02		20.6	17.11		25.4	20.68		31.3	24.85		-	-
315	7.7	8.84		9.7	9.53		12.1	11.81		15.0	14.43		18.7	17.76		23.2	21.68		28.6	26.18		35.2	31.43		-	-
355	8.7	11.23		10.9	12.06		13.6	14.92		16.9	18.32		21.1	22.60		26.1	27.49		32.2	33.23		39.7	39.92		-	-
400	9.8	14.23		12.3	15.36		15.3	18.92		19.1	23.36		23.7	28.56		29.4	34.86		36.3	42.19		44.7	50.64		-	-
450	11.0	17.93		13.8	19.34		17.2	23.92		21.5	29.54		26.7	36.19		33.1	44.16		40.9	53.42		50.3	64.12		-	-
500	12.3	22.34		15.3	23.85		19.1	29.51		23.9	36.45		29.7	44.71		36.8	54.49		45.4	65.92		55.8	79.01		-	-

-OD: Outside Diameter
-S: Wall Thickness

-SDR: Standard Dimension Ratio
-PN: Normal Pressure Rating

HDPE Pipe Wall Thickness & Tolerance

Mean Outside Diameter		Ovality	PRESSURE PIPE WALL THICKNESS																	
			SDR 41 - PN 4		SDR 33 - PN 5		SDR 27.7 - PN 6		SDR 21 - PN 8		SDR 17 - PN 10		SDR 13.6 - PN 12.5		SDR 11 - PN 16		SDR 9 - PN 20		SDR 7.4 - PN 25	
Min Dia	Max Dia	Dmax-Dmin	W.T min	W.T max	W.T min	W.T max	W.T min	W.T max	W.T min	W.T max	W.T min	W.T max	W.T min	W.T max	W.T min	W.T max	W.T min	W.T max	W.T min	W.T max
63.0	63.4	1.5	-	-	-	-	2.5	2.9	3.0	3.4	3.8	4.3	4.7	5.3	5.8	6.5	7.1	8.0	8.6	9.6
75.0	75.5	1.6	-	-	-	-	2.9	3.3	3.6	4.1	4.5	5.1	5.6	6.3	6.8	7.6	8.4	9.4	10.3	11.5
90.0	90.6	1.8	-	-	-	-	3.5	4.0	4.3	4.9	5.4	6.1	6.7	7.5	8.2	9.2	10.1	11.3	12.3	13.7
110.0	110.7	2.2	-	-	-	-	4.2	4.8	5.3	6.0	6.6	7.4	8.1	9.1	10.0	11.1	12.3	13.7	15.1	16.8
125.0	125.8	2.5		-	-	-	4.8	5.4	6.0	6.7	7.4	8.3	9.2	10.3	11.4	12.7	14.0	15.6	17.1	19.0
140.0	140.9	2.8	-	-	-	-	5.4	6.1	6.7	7.5	8.3	9.3	10.3	11.5	12.7	14.1	15.7	17.4	19.2	21.3
160.0	161.0	3.2	-	-	-	-	6.2	7.0	7.7	8.6	9.5	10.6	11.8	13.1	14.6	16.2	17.9	19.8	21.9	24.2
180.0	181.1	3.6	-	-	-	-	6.9	7.7	8.6	9.6	10.7	11.9	13.3	14.8	16.4	18.2	20.1	22.3	24.6	27.2
200.0	201.2	4.0	-	-	-	-	7.7	8.6	9.6	10.7	11.9	13.2	14.7	16.3	18.2	20.2	22.4	24.8	27.4	30.3
225.0	226.4	4.5	-	-	-	-	8.6	9.6	10.8	12.0	13.4	14.9	16.6	18.4	20.5	22.7	25.2	27.9	-	-
250.0	251.5	5.0	-	-	-	-	9.6	10.7	11.9	13.2	14.8	16.4	18.4	20.4	22.7	25.1	27.9	30.8	-	-
280.0	281.7	9.8	-	-	-	-	10.7	11.9	13.4	14.9	16.6	18.4	20.6	22.8	25.4	28.1	31.3	34.6	-	-
315.0	316.9	11.1	7.7	8.6	9.7	10.8	12.1	13.5	15.0	16.6	18.7	20.7	23.2	25.7	28.6	31.6	35.2	38.9	-	-
355.0	357.2	12.5	8.7	9.7	10.9	12.1	13.6	15.1	16.9	18.7	21.1	23.4	26.1	28.9	32.2	35.6	39.7	43.8	-	-
400.0	402.4	14.0	9.8	10.9	12.3	13.7	15.3	17.0	19.1	21.2	23.7	26.2	29.4	32.5	36.3	40.1	44.7	49.3	-	-
450.0	452.7	15.6	11.0	12.2	13.8	15.3	17.2	19.1	21.5	23.8	26.7	29.5	33.1	36.6	40.9	45.1	50.3	55.5	-	-
500.0	503.0	17.5	12.3	13.7	15.3	17.0	19.1	21.2	23.9	26.4	29.7	32.8	36.8	40.6	45.4	50.1	55.8	61.5	-	-

Note: This product specification is based on ISO 4427 -2:2007 confirming to DIN 8074

HDPE PIPE JACKET Wall Thickness & Tolerance

Diameter	Mean Outside Diameter		Ovality	JACKET/CASING PIPE WALL THICKNESS	
OD	Min Dia	Max Dia	Dmax-Dmin	W.T min	W.T max
63	63.0	66.0	1.5	3.0	3.5
75	75.0	79.0	1.6	3.0	3.5
90	90.0	95.0	1.8	3.0	3.5
110	110.0	116.0	2.2	3.0	3.5
125	125.0	132.0	2.5	3.0	3.5
140	140.0	147.0	2.8	3.0	3.5
160	160.0	168.0	3.2	3.0	3.5
180	180.0	189.0	3.6	3.0	3.5
200	200.0	206.0	4.0	4.0	4.5
225	225.0	232.0	4.5	4.0	4.5
250	250.0	258.0	5.0	4.0	4.5
280	280.0	289.0	9.8	4.4	4.9
315	315.0	325.0	11.1	5.0	5.5
355	355.0	366.0	12.5	5.6	6.1
400	400.0	412.0	14.0	5.5	6.0
450	450.0	464.0	15.6	6.0	6.5
500	500.0	515.0	17.5	7.0	7.5

NOTE: For Jacket Pipes manufacturing the wall thickness specification will be provided by the customer or EN 253:2009 Standard

Pressure Ratings Of Polyethylene Pipe At Elevated Temperatures

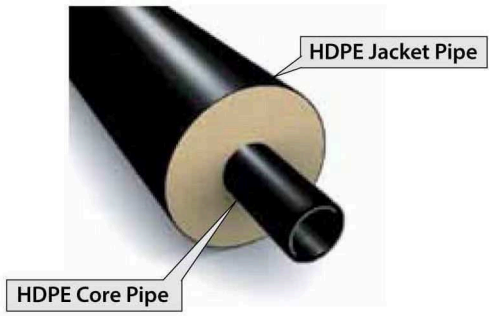
The nominal working pressure has been calculated for operational conditions at 20°C. Since Polyethylene pipe is a thermoplastic material, a loss in mechanical properties is to be expected as the temperature rises. Where the system is to be operated at temperatures above 20 °C, then the allowable working pressure life must be reduced. Details are shown on the following table.

Temp.	Years Of Service	Allowable Working Pressure in Bar, with a Safety Factor of 1.25				Allowable Working Pressure in Bar, with a Safety Factor of 1.6			
°C		PE 100	PE 100	PE 100	PE 100	PE 100	PE 100	PE 100	PE 100
		SDR41	SDR26	SDR17	SDR 11	SDR 33	SDR21	SDR 13.6	SDR 9
20	50	4	6.3	10	16	3.9	6.2	9.9	15.6
30	50	3.3	5.3	8.4	13.5	3.3	5.3	8.4	13.5
40	50	2.9	4.5	7.2	11.6	2.9	4.5	7.2	11.6
50	15	2.3	3.7	5.9	9.5	2.3	3.7	5.9	9.5
60	5	1.9	3.0	4.8	7.7	1.9	3.0	4.8	7.7
70	2	1.5	2.4	3.9’	6.2	1.5	2.4	3.9	6.2

Special Products

HDPE Jacket & Core Pipes

High Density Polyethylene has proven to be the most reliable and structurally strong material available as a standard jacketing and core pipe material. Not only is HDPE the standard protective jacketing material in Europe, it is fast becoming the standard jacket in the world. The tough, rugged nature of HDPE complements its flexibility and structural strength, guarding against cracking, star-crazing or other damage often caused by abuse or rough handling, as observed in other jacket materials. HDPE core pipe and jacketed piping is non-corrosive, requiring no cathode protection or special coatings.



HDPE jacketing has more ultra-violet (UV) inhibitor than any other jacketing material and can be used for aboveground installations.

RAK Universal Plastic Industries manufacture HDPE Jacket Pipes as per EU Standard **EN 253**.

HDPE Duct & Conduit Pipes

RAK Universal Plastic Industries LLC also manufacture duct and conduit pipes used to house and protect fiber optic and metal cable in the Telecommunications, CATV, and Electric Power industries. RAK UNIVERSAL PLASTIC INDUSTRIES HDPE duct and conduit pipes are available in a variety of sizes, dimensions and lengths to meet customer needs.

HDPE conduit is especially suited to installation by HDD (horizontal directional drilling) and plowing methods, but may also be used in open cut. Since HDPE is an inert thermoplastic, it offers unmatched corrosion and chemical resistance. RAK UNIVERSAL PLASTIC INDUSTRIES HDPE conduit is available in a variety of sizes, dimensions and lengths.

CODES OF PRACTICE

Handling

Pipes manufactured in HDPE are strong, durable and easy-to-handle. In common with most construction materials, they should nevertheless be handled with care
to avoid damage being caused to the pipes.

Storage

Pipes should be stored on level, flat ground, free of stones or sharp protrusions. The height of the stacked pipe should not exceed 5 coils. Normal exposure to direct sunlight during the contract will not damage the pipe.

Compression Fittings

This type of jointing is sutiable for small bore pipe connections up to size 125MM OD, The installation process started with the cutting of pipe ends square or 90° in relation to its axis. Fit the collar and clinching ring into the pipe and place the rubber O-ring at the tip of the pipe. Then push the body of the fitting until the pipe ends reaches its full stop. Slide the clinching ring and Collar(Nut) until it catches the fitting and tight fully using a belt or chain wrench.

Flange Adaptor

This is another type of conventional mechanical jointing. HDPE Flange adaptor (Stubend) is butt welded to the pipe with the loose steel backing flange inserted inside. A standard number of bolts will be fitted to tighten the connection. This type of connection is practical for application which requires easy serviceability in the future.

Butt Fusion Welding

The process starts by cutting the pipe ends straight and square to the axis and cleaned carefully by an electric planer. The pipes and fittings are held tight and pressed against a coated heating plate. As soon as the heating time and the required bead are reached, the heating plate is quickly withdrawn from the weld faces and the connection are pressed together to form a permanent joint.

Electrofusion Welding

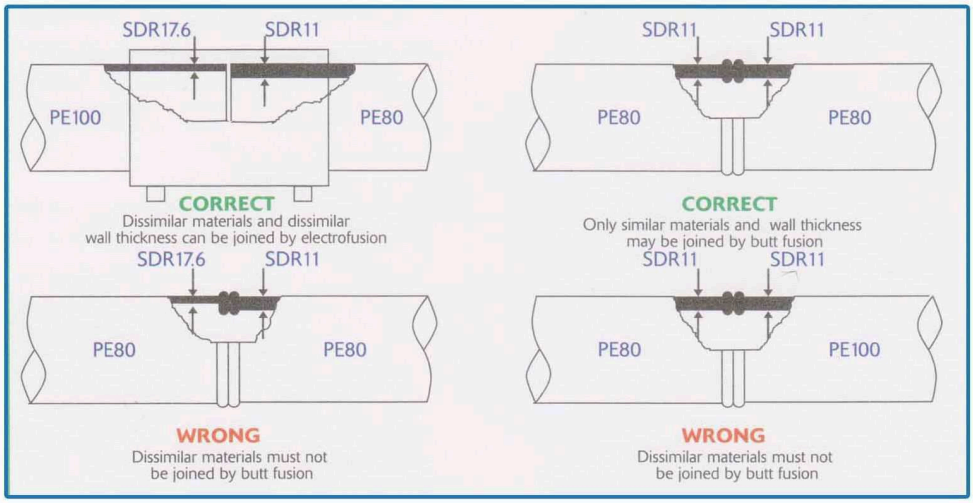
This is an easy system for jointing pipes and fittings of HDPE. A pre-installed resistance wires are embedded in the inside surface of the electrofusion coupling. When the pipes or fittings are inserted in the coupling and the wires are connected to the welding unit, the contact surfaces become warm and consequently melt into each other until it forms a rigid and durable joint. A welding unit is available for this procedure which operates the timing automatically. This makes the whole operation very easy and practical especially in narrow and tight installations.

Jointing Methods

Fusion Jointing

The recommended procedures for fusion jointing are specified in ISO 12176 parts 1/2/3: 1998 - 2001. Materials suitable for the manufactureof pipes and fitings to the above specification may not be compatible for fusion jointing under certain circumtances and guidance should be sought before attempting to join materials with different pressure ratings or with defferent diameters.

The correct procedure for jointing dissimilar materials and wall thickness are outlined below. Only similar materials and similar wall thicknss should be joined by butt fusion.



Butt Fusion Jointing

Pipes and fittings can be jointed by butt fusion using an electrically heated plate. The facility to independently check the face temperature in the field is essential. Butt fusion is suitable for jointing pipes and fittings in the same size range. Howrver, only pipes and fittings with same SDR ratings and material may be jointed together using this technique.

Electrofusion Jointing

Electrofusion fittings have sockets that contain electrical wires which, when connected to the appropriate power source, fuse the socket onto the pipe without the need for additional heating equipment.

It is essential that jointers take special care to ensure that jointing procedures are rigorously respected and, in particular, that:

- The oxidised surface of the pipe over the socket depth is removed using a mechanical peeling tool.
- The peeled area is cleaned with Isoprophy Alcohol (minimum 70%) prior to insertion of pipe into fitting. Clamps are used to ensure that no movement of the joint can take place during the heating and cooling cycle.
- Welding shelters are used to ensure that dust and rain do not comtaminate the joint and to protect it against draughts.

It is possible to joint dissimilar polythylene pipe material and wall thickness. For example, PE80 pipe can joined to a PE100 pipe of the same pressure rating. Electrofusion couplers are available up to size 630mm. but larger sizes are being developed.

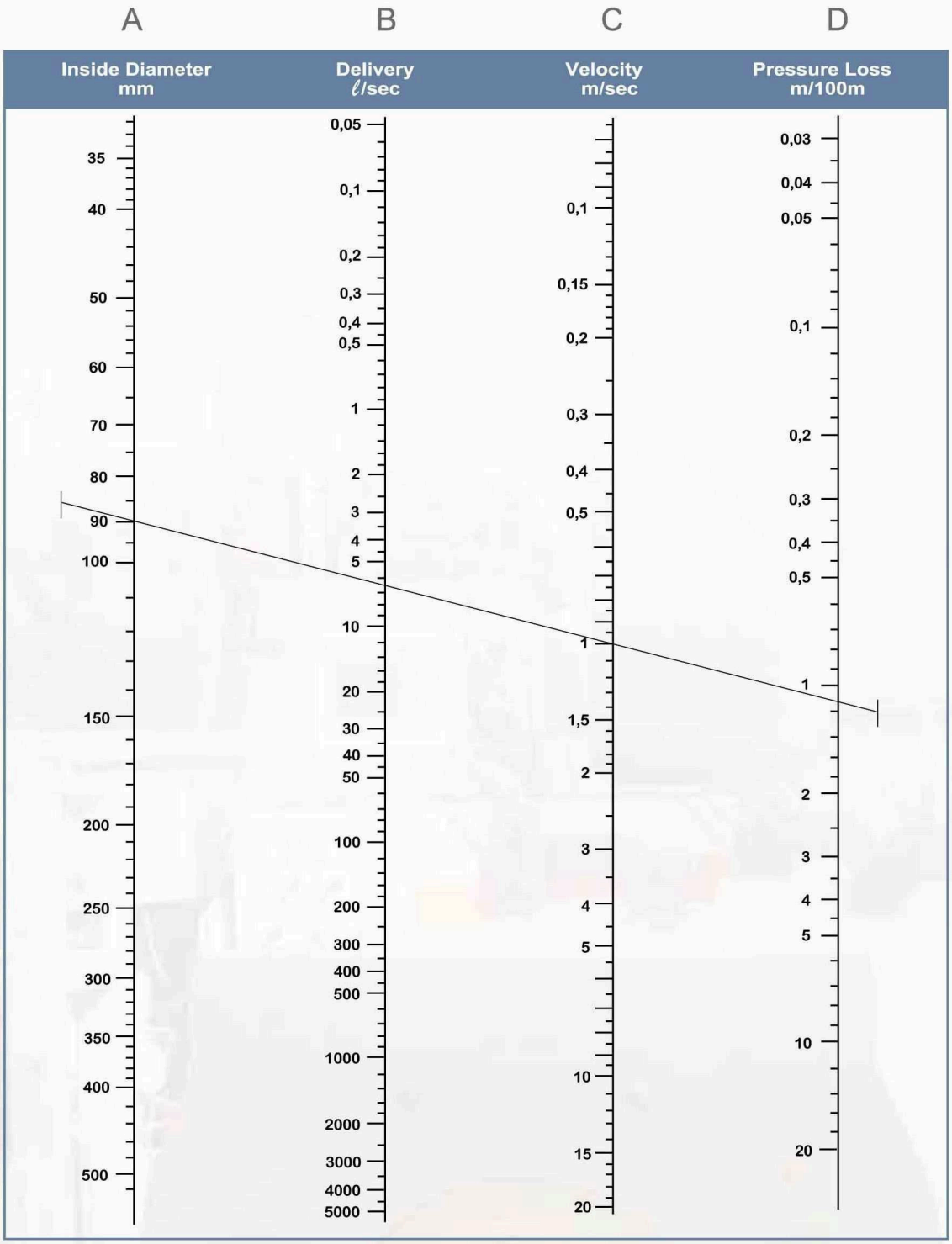
NOTE: Some coiled pipes may be too ovalto fit into couplers, or the bend of the pipe may make alignment of the ends impossible. A number of approaches have been proposed, including:

(i) use a mechanical pipe straightener or reroundingtool.

(ii) fusion joint a straight lenght of pipe onto the end of the coil before jointing.

Flow - Friction Loss Chart

This Chart can be used with PE 63, 80 and 100.



USE OF FLOW CHART

Example: HDPE 110 Class 10 pipe
PE63 (Type IV)

1. Determine inside diameter: DIA - (2 x wall thickness)
   110 - (2 x 10.0) = 90.0mm
2. Select the velocity: Say 1.0 metres per second
3. Method: Place ruler on 90 in Column A and on 1.0 in column C. The delivery and friction loss are read from Columns B and DV

Quality Assurance

RAK Universal Plastic Industries Pipe Factory is an ISO 9001:2008 certified company and has been successfully assessed by BUREAU VERITAS in this respect. The quality system imposes stringent standards of quality control throughout the production and inspection processes. Products are subjected to range of periodic checks and tests like visual check, dimensional control, hydrostatic pressure test and heat reversion test. Our produced Polyethylene pipes are manufactured according to ISO 4427 standards for all sizes and SDR's.

Our Quality Policy

In RAK Universal Plastic LLC, the management and staff are committed to undertake proper monitoring and measurement of our processes including review and evaluation of performance so as to ensure product quality for customer satisfaction.

We develop documented procedures and implement quality management system complying with the requirements of ISO 9001:2008 International Standard. We shall continually improve the effectiveness of the quality management system through the use of the quality policy, quality objectives, audit results, analysis of data, corrective and preventive actions and management review. We provide training to all our employees and encourage them to participate for developing efficient human resources and company's growth.

Our mission is to produce and provide quality products of High Density Polyethylene (HDPE) for our customers that pass through stringent quality control and achieving the desired targets that will result in overall improvement in product costs, customer satisfaction and a greater competitive advantage with the aim of attaining our mission reflected by our vision.

Quality Control

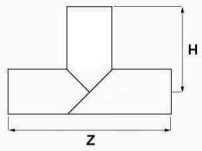
EGPI acquired top of the line laboratory equipment from Germany to ensure highest precision and best reliability of pipe testing. The quality system imposes stringent standards of quality control throughout the manufacturing process from raw material to finish product.

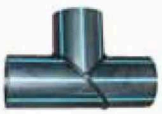
Exova

HDPE PE100 Fabricated Fittings

Segmented Equal Tee 90°

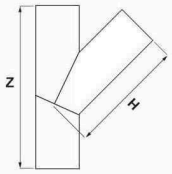
Size (mm)	H (mm)	Z (mm)
110	400	535
125	400	520
140	400	553
160	150	460
180	200	580
200	200	600
225	200	625
250	200	650
280	200	680
315	300	915
355	300	955
400	300	1000
450	300	1050
500	300	1100





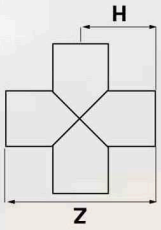
Segmented Tee 45° Elbow

Size (mm)	H (mm)	Z (mm)
110	400	535
125	400	520
140	400	553
160	400	613
180	400	675
200	400	683
225	450	743
250	550	853
280	550	865
315v	600	1030
355	600	1047
400	800	1265
450	800	1065
500	1000	1487



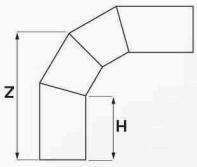
Segmented Cross

Size (mm)	H (mm)	Z (mm)
110	92	338
125	90	355
140	96	390
160	104	427
180	107	450
200	115	500
225	120	540
250	120	540
280	140	680
315	152	707
355	230	1000
400	230	960
450	230	1040
500	230	1060



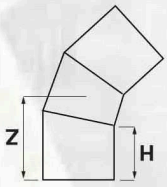
Segmented Bend 90°

Size (mm)	H (mm)	Z (mm)
110	-	-
125	-	-
140	-	-
160	150	427
180	200	473
200	200	467
225	200	490
250	200	507
280	200	545
315	300	688
355	300	737
400	300	790
450	300	1139
500	300	1164



Segmented Bends 45°

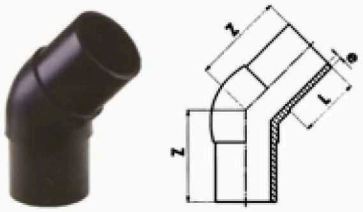
Size (mm)	H (mm)	Z (mm)
110	92	338
125	90	355
140	96	390
160	104	427
180	107	450
200	115	500
225	120	540
250	120	540
280	140	680
315	152	707
355	230	1000
400	230	960
450	230	1040
500	230	1060



HDPE PE100 Butt Welding Fittings

Elbow 45°

Size (mm)	Pressure (Bar)	Z (mm)	L (mm)	e (mm)
63	PN16	95	63	5.8
75	PN16	105	70	6.8
90	PN16	120	81	8.2
110	PN16	130	86	10.0
125	PN16	135	90	11.4
140	PN16	140	98	12.7
160	PN16	160	100	14.6
180	PN10	170	107	10.7
	PN16	170	107	16.4
200	PN10	183	118	11.9
	PN16	200	123	13.4
225	PN10	200	123	20.5
	PN16	220	130	14.8
250	PN10	220	130	22.7
	PN16	230	139	16.6
280	PN10	230	139	25.4
	PN16	250	150	18.7
315	PN10	250	150	28.6
	PN16	250	150	28.6

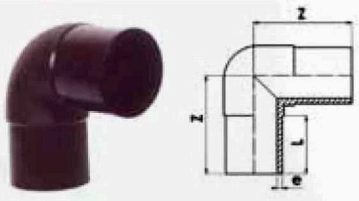


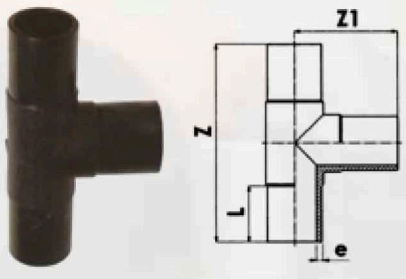
Elbow 90°

Size (mm)	Pressure (Bar)	Z (mm)	L (mm)	e (mm)
63	PN 16	110	65	5.80
75	PN 16	120	70	6.80
90	PN 16	145	80	8.20
110	PN 10	150	86	6.6
	PN 16	150	86	10.0
125	PN 16	155	93	11.4
140	PN 16	170	118	12.7
160	PN 10	179	103	9.5
	PN 16	179	103	14.6
180	PN 10	200	107	10.7
	PN 16	200	107	16.4
200	PN 10	215	117	11.9
	PN 16	215	117	18.2
225	PN 10	230	122	13.4
	PN 16	230	122	20.5
250	PN 10	292	130	14.8
	PN 16	292	130	22.7
280	PN 10	320	139	16.6
	PN 16	320	139	25.4
315	PN 10	300	143	18.7
	PN 16	300	143	28.6

Equal Tee 90°

Size (mm)	Pressure (Bar)	Z (mm)	L (mm)	e (mm)
63	PN 16	230	120	65
75	PN 16	264	130	70
90	PN 10	272	135	82
	PN 16	272	135	82
110	PN 10	320	155	89
	PN 16	320	155	89
125	PN 16	364	180	97
140	PN 16	396	195	100
160	PN 10	425	210	102
	PN 16	425	210	102
180	PN 10	462	230	107
	PN 16	462	230	107
200	PN 10	498	245	115
	PN 16	498	245	115
225	PN 10	519	253	120
	PN 16	519	253	120
250	PN 10	560	280	130
	PN 16	560	280	130
280	PN 10	616	308	139
	PN 16	616	308	139
315	PN 10	690	345	150
	PN 16	690	345	150
355	PN 10	735	368	150
	PN 16	735	368	150
400	PN 10	800	400	150
	PN 16	800	400	150

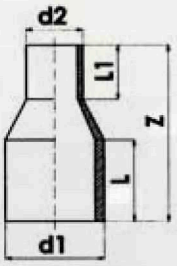




Reducer

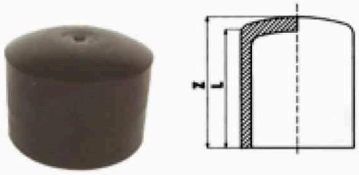
Size d1-d2 (mm)	Pressure (Bar)	Z (mm)	L (mm)	L1 (mm)
90-50	PN 16	187	81	60
90-63	PN16	187	77	60
90-75	PN 16	187	80	66
110-32	PN 16	195	90	60
110-50	PN 16	195	90	60
110-63	PN 16	195	90	60
110-75	PN 16	177	90	70
110-90	PN 16	180	86	80
125-63	PN 16	210	91	60
125-75	PN 16	210	92	66
125-90	PN16	210	92	77
125-110	PN16	210	90	82
140-75	PN16	222	91	71
140-90	PN16	218	92	80
140-110	PN16	217	90	80
140-125	PN 16	217	95	85
160-90	PN10	220	99	69
	PN 16	220	99	69
160-110	PN10	230	100	85
	PN16	230	100	85
160-125	PN 10	227	98	87
	PN 16	227	98	87
160-140	PN 10	230	100	95
	PN16	230	100	95
180-90	PN 10	250	105	84
	PN 16	250	105	84
180-110	PN10	250	105	86
	PN16	250	105	86
180-125	PN10	250	105	86
	PN 16	250	105	86
180-140	PN10	253	105	92
	PN16	253	105	92
180-160	PN10	247	105	94
	PN16	247	105	94
200-110	PN 10	258	115	80
	PN16	258	115	80
200-125	PN 10	265	118	83
	PN 16	265	118	83
200-140	PN10	262	117	102
	PN 16	262	117	102
200-160	PN 10	287	133	120
	PN16	287	133	120
200-180	PN 10	260	115	100
	PN16	260	115	100
225-110	PN 10	285	125	82
	PN 16	285	125	82
225-125	PN 10	285	123	86
	PN16	285	123	86
225-140	PN10	285	123	105
	PN16	285	123	105
225-160	PN10	285	131	105
	PN16	285	131	105

Size d1-d2 (mm)	Pressure (Bar)	Z (mm)	L (mm)	e (mm)
225-180	PN10	270	115	91
	PN 16	270	115	91
225-200	PN 10	275	126	105
	PN16	275	126	105
250-160	PN10	291	113	95
	PN16	291	113	95
250-180	PN10	300	123	100
	PN16	300	123	100
250-200	PN10	305	125	105
	PN 16	305	125	105
250-225	PN10	302	125	117
	PN16	302	125	117
280-200	PN 10	328	140	105
	PN16	328	140	105
280-225	PN 10	330	141	123
	PN16	330	141	123
280-250	PN 10	327	140	125
	PN 16	327	140	125
315-200	PN 10	345	145	108
	PN 16	345	145	108
315-225	PN10	344	145	113
	PN16	344	145	113
315-250	PN10	344	145	128
	PN16	344	145	128
315-280	PN 10	380	153	128
	PN 16	380	153	128
355-200	PN 10	365	178	130
	PN 16	365	178	130
355-250	PN 10	365	178	130
	PN 16	365	178	130
355-280	PN10	365	178	139
	PN 16	365	178	139
355-315	PN 10	390	187	130
	PN 16	390	187	130
400-200	PN 10	390	142	120
	PN 16	390	142	120
400-250	PN 10	390	144	125
	PN 16	390	144	125
400-280	PN 10	390	200	139
	PN 16	390	200	139
400-315	PN 10	390	145	130
	PN 16	390	145	130



End Cap

Size (mm)	Pressure (Bar)	Z (mm)	L (mm)
63	PN 16	75	73
75	PN16	75	73
90	PN16	87	82
110	PN16	96	88
125	PN 16	100	93
140	PN16	100	93
160	PN 16	115	103
180	PN 16	120	119
200	PN 16	124	116
225	PN 16	143	122
250	PN 16	210	180
280	PN 16	210	180
315	PN 16	230	190

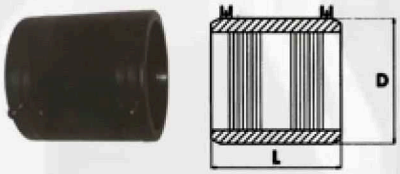


Electro Fusion Coupler

Size mm	Pressure Bar	D mm	L mm
25	PN 16	36	68
32	PN 16	44	72
40	PN 16	54	80
50	PN 16	66	88
63	PN 16	81	96
75	PN 16	97	110
90	PN 16	115	125
110	PN 16	140	145
125	PN 16	155	158
140	PN 16	180	190
160	PN 16	198	180
180	PN 16	222	194
200	PN 16	246	208
225	PN 16	276	224
250	PN 16	308	244
280	PN 16	345	252
315	PN 16	392	220
355	PN 16	437	260
400	PN 16	492	280
450	PN 16	552	300
500	PN 16	614	300
560	PN 16	687	300
630	PN 16	785	400
710	PN 16	880	400
800	PN 16	985	400

Flang Adapter

Size (mm)	Pressure (Bar)	Z (mm)	d1 (mm)	d2 (mm)	L (mm)	L1 (mm)
63	PN 16	100	70	102	69	14
75	PN 16	120	89	122	87	16
90	PN 10	140	102	138	101	17
	PN 16	140	106	138	101	17
110	PN 10	160	124	158	120	18
	PN 16	160	124	158	120	18
125	PN 10	170	130	158	123	25
	PN 16	170	130	158	123	25
140	PN 10	191	150	188	130	25
	PN 16	191	150	188	130	25
160	PN 10	180	170	212	133	25
	PN 16	180	170	212	133	25
180	PN 10	190	180	212	160	30
	PN 16	190	180	212	160	30
200	PN 10	200	225	268	132	32
	PN 16	200	225	268	132	32
225	PN 10	200	235	268	138	32
	PN 16	200	235	268	138	32
250	PN 10	215	280	320	130	35
	PN 16	215	280	320	130	35
280	PN 10	228	291	320	145	35
	PN 16	228	291	320	145	35
315	PN 10	238	335	370	150	35
	PN 16	238	335	370	150	35
355	PN 10	258	373	430	165	40
	PN 16	258	373	430	165	40
400	PN 10	285	427	482	182	46
	PN 16	285	427	482	182	46
450	PN 10	250	460	535	150	60
	PN 16	250	460	535	150	60
500	PN10	270	530	585	170	60
	PN16	270	530	585	170	60
560	PN 10	280	598	685	180	60
	PN 16	280	598	685	180	60
630	PN10	270	642	685	170	60
	PN16	270	642	685	170	60



Handling & Storage

Chains or end hooks not be use. Care should be taken to avoid damage to pipes and pipe end during lifting. Some bending should be allowedfor in the middle of lift when loading and unloading pipe and because of this lifting points should always be well spread and evenly spaced (see Figure 2). Standard bundlepacks, 6m long, may be handledby fork lift trucks and due allowance made for flixible nature of the pipes in the positioning of the forks and the raising of the load.

Bundlepacks greater than 6m long should behandle either by a side loader with a minimum of four supporting forks, or by a crane using a spreader beam and suitable slings. Individual pipes may be handled in the same way. Off loading on site may be made easier by using skid timblers and rope, (Figure 3).

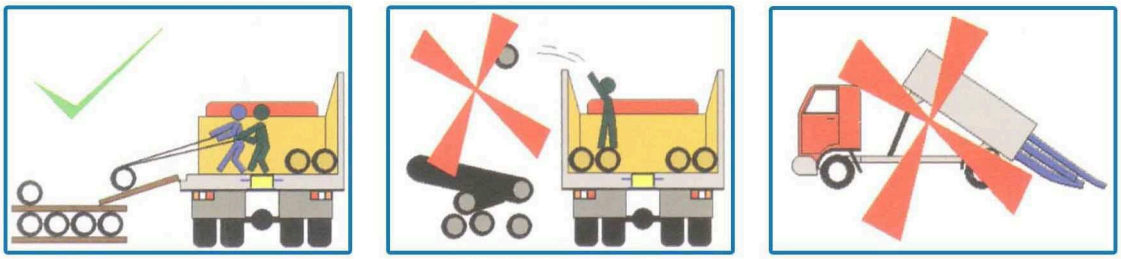


Figure 3- Off Loading Using Timbers

Pipes must never be thrown from delivery vehicles or slid from the tailboard of a moving flat-bed wagon

Coiled Pipes

SAFETY CONSIDERATIONS

It is now well understood that coiled pipe contains a considerable amount of stored energy which has the potential cause injury if handled in an incorrect way. To ensure a safe working environment during the installation of large diameter pipe in coil form it is intended that coils should only be dispensed from an approved coil dispencer. Always ensure that the tail end of coils released in a restraind and controlled manner and never cut all the retaining straps at one time or in oneoperation. The work area should be restricted to essential personel only who should always wear hard hat, gloves, safety shoes and eye protection when carrying-out this type of operation. After completion of the same dispensing operation it is important to ensure that the free tail-end of any party-used coil is `secured` before transporting it from the site. Rainforced adhesive tape at least 2" wide is used for bandling. Complete coils are secured by outer and intermediat bands and individual layers are also independently secured as shown in Fegure 4. These should not be removed until the pipe is required for actual use and the methods of release detailed in Figure 5 MUST ALWAYS be followed.

There should be facilities to securely each coil individually throughout individually unloading process.

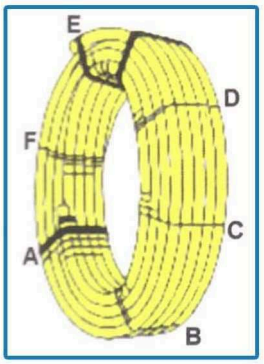


Figure 4-Banding Of Individual Layer Of Coils

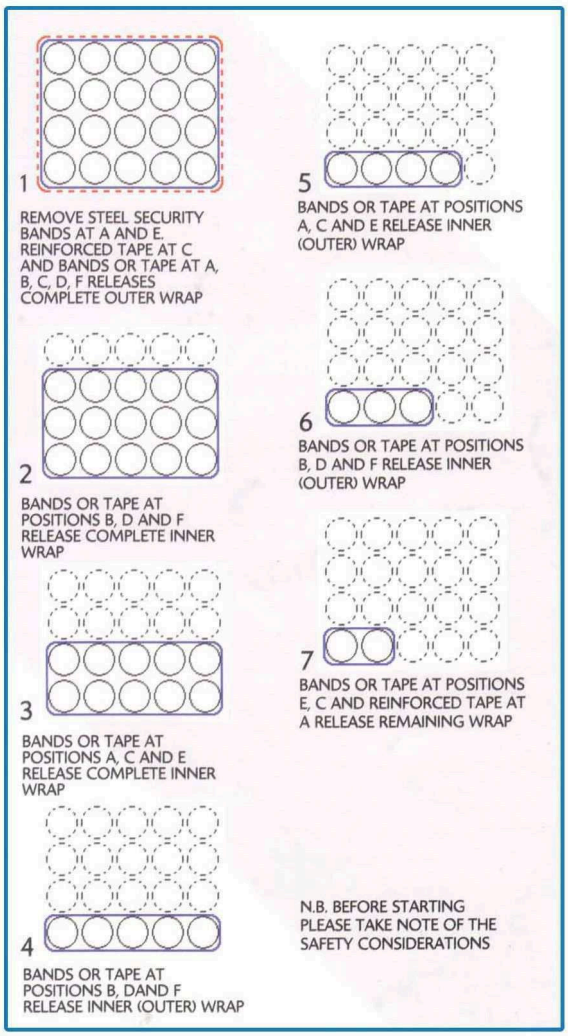


Figure 5-Releasing Instruction For Coiled Retaining Straps

Handling & Storage

The important of good handling and storage of polyethylene pipes and fittings applies equality to all forms of installation. The procedures and recommendations should be followed at all times giving particular attention to handling an storage at site.

General Principles. The recomendations for handling the same for both PE80 and PE100 pipes although, due to the increased stiffness, PE100 pipes may require even greater care in handling pipe coils than PE80 pipes of similar wall thickness. Polyethylene is a tought resilient material which is relatively light and easy to handle although it is prone to damage through scoring by sharp objects. Therefore careful handling is always required and dragging of straight pipe and coils should be avoided whenever possible. The maximum allowable depth of scoring of the external surface of the pipe is 10% of the wall thickness. Pipes and fitting showing obvious defects or excessive scoring should be withdrawn and clearly identified as unsuitable. The general properties of the polyethlene are unaffected by low ambient temperatures but having very smooth surface, the pipes and fitting become slippery in went or frosty weather.

Particular attention should be given to the effective securing and storage under such conditions. Extra care should also be taken when handling large diameter prefabricate fittings during very cold weather. As far as practicable the protective packaging (pallets, strapping, bags etc.) should be kept intact until the material is for use. The temporary capping or plugging of pipes ends is recommended. Pipes and fittings likely to be stored outside for periods longer than 12 months, should be covered by tarpoulin or black polythene sheeting to prevent ultra violet degradation from sunlight. Electrofusion fittings should be stored under cover and in their protective packaging. For hygiene purposes, the pipe ends must beprotected from the ingress of dirt/water etc. This protection should be carefully disposed of the following use.

Transport and Delivery

For Transporting bulk loads the vehicles should be provided with a clean flat bed, free from nails or other projection which may cause damage. If high slided lorries are used, special care must be taken to prevent slippage or excessive bowing of the pipes and extra protection given at all sharp edges. Care should be taken to avoid positioning pipes and fittings near or adjacent to exhaust system or other heat sources and to avoid possible contamination from materials such as diesel oil. Metal chains or slings should not be brought into direct contact with the material. Webbed sling of polypropylene or nylon are recomended. Straight pipes should be fully supported and bound together. Pipesmust not rest on the integral socket if one is incorporateted. When transporting `pupped` fittings, these should not be loaded in a way that could distort the pup end. Both vertical and horizontal deliveries of coiled pipes are permissible, although in the case of horizontal transportation special arrangement may be required. Off loading - Frame Packed Pipes. When lifting by crane, non metalic wide band sling or ropes should be used, and for pipe lengths greater than 6m, load spreading beams of a length at least equivalent to one quarter of the lenght of the pipe or bundlepack should be employed.

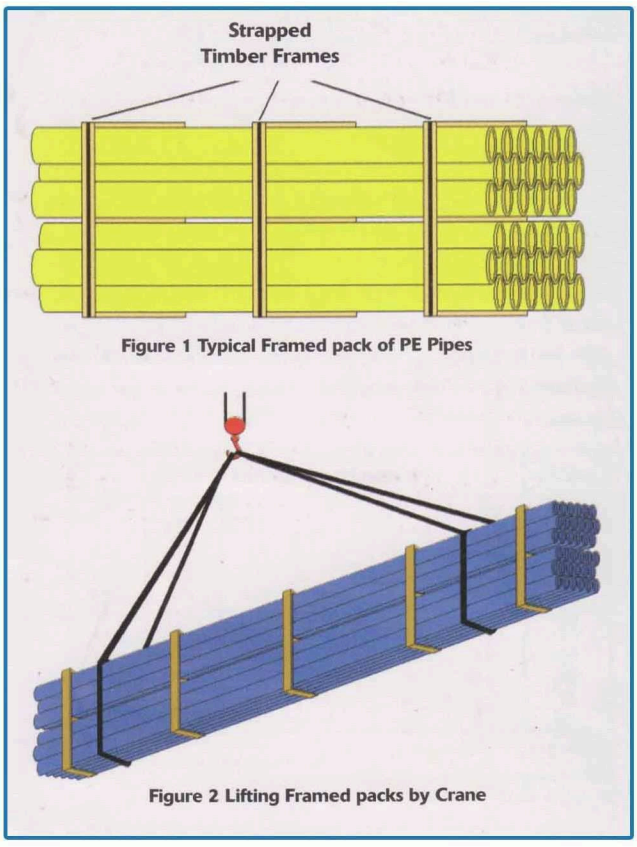


Figure 1 Typical Framed pack of PE Pipes

Figure 2 Lifting Framed packs by Crane

POTABLE WATER NETWORKS

IRRIGATION NETWORKS

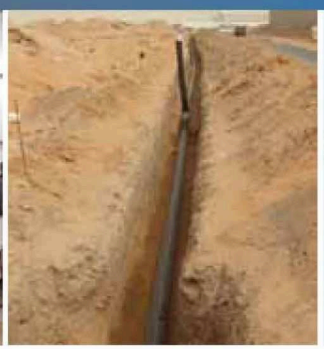
NATURAL GAS NETWORKS

FIRE FIGHTING NETWORKS

DRAINAGE AND SEWERAGE

OIL & CHEMICAL INDUSTRIES

ELECTRICAL CONDUIT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