

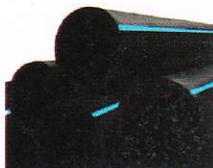
**Beta PE-100
Pressure Pipes
& Fittings**



**Flexible
Non-Corrosive
Reliable & Durable
Environment Friendly**

Beta PE - 100 Pressure Pipes & Fittings

Polyethylene pipes & fittings have a proven high reliability record across a wide range of industries and applications. PE also provides a long maintenance free lifetime with low whole life costs, compared to many other conventional materials.



A commitment to using only the highest standard of raw materials and the latest manufacturing technology has established Beta Pipes with a reputation as a quality supplier of thermoplastic pipe systems and solutions for PVC-U, PPRC and now Polyethylene (PE-100).

Piping made from polyethylene is a cost effective solution for a broad range of piping problems in municipal, industrial, marine, mining, landfill, duct and agricultural applications. It has been tested and proven effective for above ground, surface, buried and sub-surface marine applications. Beta PE 100 can carry potable water, waste water, slurries, chemicals and hazardous wastes.

1.0 Features and Benefits of Beta PE-100 Pipes

High Impact Strength

Abrasion resistance: Beta PE pipes have excellent abrasion resistance providing long life in abrasive slurry applications.

Chemical Resistance: Outstanding resistance to a wide range of chemical reagents.

Flexibility: Resiliency allows the pipe to absorb surge pressures, vibration and stresses caused by soil movement.

Ease of installation: PE is easy to install with light weights and long lengths, minimizing jointing requirements.

High flow Capacity: Low friction compared with materials such as fibre reinforced cement and resistance to material deposit buildup give PE pipes long lived high flow capacity.

Weathering Resistance: Black PE pipes are stabilized against UV light degradation so are suitable for above ground installations.

Long Life: PE pipes have proven reliability across a range of applications, around 50 years.

Cost saving with faster installation: Leak tight, fully fused joints.

2.0 Product Characteristics

2.1 Molecular Structure

The properties of polyethylene are primarily determined by density, molecular weight and its distribution. When density increases, the following properties also increase:

- Yield stress (tensile strength)
- Modulus of Elasticity
- Solvent resistance
- Hardness
- Impermeability to gases and vapours

2.2 Raw Material Colour

Pipe colour is as per the applications for which they are to be used, globally as a standard norm black and blue coloured pipes are for potable water applications (in our case, we manufacture black solid wall pipes with blue stripe).

2.3 Pipe Material Classification

Materials used for pressure pipes are classified according to international standards such as the ISO, EN and ASTM. Classification is based on the minimum required strength (MRS) given as the minimum tensile circumferential stress in the pipe wall, for which the pipe can be subjected during at least 50 years when transporting clean water at 20 °C.

HDPE pipe grade material is classified as PE 80 and PE 100. The classification number for a thermoplastic material is 10 times the minimum strength of the material (MRS) as shown in the following table:

Designation of Material	Classification of Number	MRS at 50 Years & 20°C (MPa)	Maximum allowable Hydrostatic Design Stress (MPa)
PE 80	80	8	6.3
PE 100	100	10	8

Note: Shafisons Engineering (Pvt) Ltd. manufactures PE-100 pipe system only.

For example, PE 100 material has MRS value of up to 10 MPa. Such a rating represents the material science capability within the PE sector by offering most superior material available in the market today.

3.0 Product Range

3.1 Pipes

Shafisons Engineering Private Limited (SSEPL) has state of the art production lines and can deliver extensive range of pipes, as well an outstanding range of fittings and accessories. The product range includes:

- PE-100 solid wall pipe with an outside diameter from 20mm to 160mm.
- Pipes with pressure rating from PN 8 to PN 16.
- Diameters of up to 90 mm can be supplied in coils.

*Shafisons Engineering Private Limited will be soon launching up to 315 mm.

3.2 Fittings and Accessories

Fittings are available as injection-moulded, electro fusion, segment-welded or compression mechanical coupling parts and include:

- Tees/Reducer tees/Wyes
- Bends/Elbows
- Saddles/tapping tees/valves
- Reducers
- Cross

Quality Assurance

Beta Pipes delivers high quality products and services. We produce PE, PVC-U and PPRC pipes with the strictest manufacturing specifications from high strength resin. SSEPL maintains a complete quality control from raw material to finished pipe product by establishing strict manufacturing specifications and by verifying them daily, for example using precise dimensional controls and accelerated long term hydrostatic testing on samples taken from production run.

All PE pipe production in Beta Pipes factory is done in accordance with defined product standards where internal quality control system is also supervised by independent external test institutes.

4.0 Underground Installations

PE-100 pipes are tough, flexible, lightweight and offer many cost saving advantages in both above ground and below ground installations. Whilst they are robust and resistant to site damage normal care and sensible handling practices are necessary to ensure trouble free operations. Installation is as much a part of the costing equation as ease of maintenance and the cost of the pipe system itself.

4.1 Procedures and Techniques for Pipe Laying:

A major advantage of PE-100 is that pipe lengths can be butt fused or electro fusion jointed to form a continuous string of pipe and normally no thrust blocks are required. This

together with the materials inherent flexibility makes polyethylene ideally suited to a full range of new and innovative installation techniques.

General points on trench excavation are as follows:

4.1 (a) Trenching and Bed Preparation:

Installation of PE systems requires minimal trench width therefore considerable savings can be made in terms of both reduced labour costs and less waste spoil to be removed from the site. Additionally, reinstatement costs are cut and smaller quantities of back fill are needed. The opening dimension of the trench is determined by the pipe diameter, method of jointing and site conditions. Normal minimum depth of cover for mains should be 900 mm from ground level to the crown of the pipe. The width of the trench should be as narrow as possible but typically not less than the outside diameter of the pipe plus 250mm to allow for adequate compaction of side fill unless specialized narrow trenching techniques are used.

4.1 (b) Trench construction and dimensions:

In some instances it may be acceptable to lay PE pipe directly on the bottom of the trench but only where the soil is uniform, relatively soft and fine grained and free from any hard object which may cause point loading on the pipe. The trench bottom should have even finish, providing consistent support for pipes along their whole length. After installation, the ground can be back filled and consolidated.

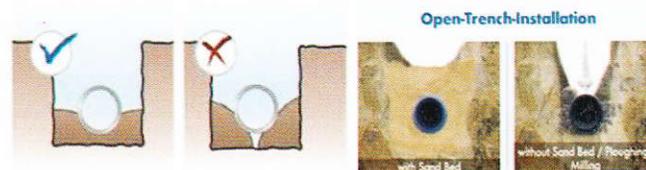


Figure: Pictorial presentation of trench installation.

4.1 (c) Backfilling:

Unless special procedures apply, suitable excavated material may be returned to the trench and compacted in layers of an appropriate thickness as specified in the specification but not exceeding a layer height of 150mm. Heavy compaction equipment should not be used until the fill over the crown of the pipe is more than 300mm. It is very important that the back filling and compaction are done in the right way.

Reduced Installation costs due to following:

- Fewer fittings are needed due to pipe flexibility
- Light weight and longer lengths allow for significant cost savings in labour and equipment
- Eliminates the need of thrust blocks

5.0 Pipe Jointing:

Polyethylene piping systems may not be joined together using solvent cement or adhesives. The welding process requires a heat source to melt the surfaces of the items to be joined together. Once melted, the items are brought together under pressure and the subsequent cooling bonds together with a joint equal to or exceeding the strength of pipe itself.

Installed correctly, a thermoplastic piping system will give many years of trouble-free life. However a badly installed system will fail to perform satisfactorily, and in the worst case, may leak.

Experience has shown that it is the installation of systems that most frequently cause problems, with poor jointing being the most likely reason. This section provides a detailed account of the various methods that may be used to fabricate and install PE-100 plastic piping systems. These following instructions should be followed carefully at all times.

5.1 Butt-fusion welding process

Butt welding (or butt fusion) is the most common jointing method for PE pipes. It is made by inserting a heater-plate between the ends of two pipes, which are then brought together under pressure – this softens the ends of the pipe. The heater-plate is then removed and the pipes are brought together again and allowed to cool under pressure, this results in a high-tensile, leak tight homogeneous joint



Fig 5.1.1: Butt Fusion Joint

5.2 Electro fusion welding Process

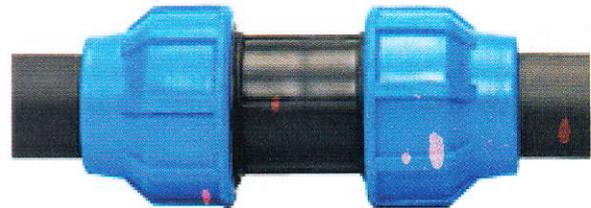
Electro fusion jointing is used for both the jointing of pipes and pipes to fittings. The electro fusion fitting is supplied with a "heating coil" pre-installed during the manufacturing process. By applying an electrical charge to the fitting, the wires of the coil heat up to a pre-determined temperature, which causes the PE to melt and form a high-tensile, leak tight joint. Modern electro fusion boxes are designed to set

time and power requirements automatically for each different fitting.



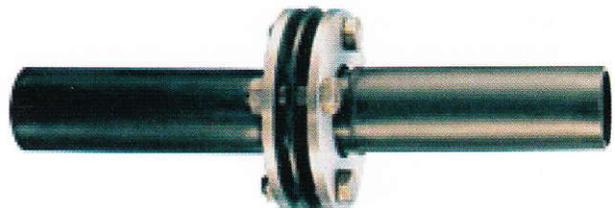
5.3 Compression Coupling Joint

Compression fittings are normally available only in relatively small diameters. The pipes are connected to each other by means of coupling adaptor. Having been cut vertical to its axis, the pipe is inserted into the coupling up to the raised point. When both pipes are in position, the bolts are tightened by hand and the connection thus achieved. If the pipe diameter is 40mm or higher, the bolts should be tightened using a special wrench rather than by hand. Thus joining method is not recommended for pipes with diameters exceeding 110 mm.



5.4 Flange Connection Joint

A flange joint connection is used for combining PE pipes with equipment such as steel plates, valves, pumps and condensers. It is also used in where pipe line needs to be dismantled at a later stage or for connecting PE pipes to different pipe materials. Flange joints are made by welding a "stub-end" to a piece of pipe and by using "loose-flanges", nuts and bolts. The finished joint offers a high tensile strength and ease of assembly.



6.0 Handling, Unloading and Storage

HDPE material is flexible, light weight and easy to handle. Nevertheless, care should be taken not to cause scuffing or gouging of the surface. PE's flexibility allows cost savings during installation, and PE can be coiled to be supplied in long lengths, reducing the cost required for joints and fittings. Cost saving installation techniques take advantage of its flexibility and low weight, reducing disturbance to the public and environment. Trench less technology can use PE by pulling long lengths through holes below ground bored by mechanical moles, avoiding the need for open trenches. PE is often used in renovation of old pipelines as it can be readily inserted as a lining into an old leading pipeline.

Do's

- Ⓞ Store pipes on flat, firm ground, able to with stand the weight of the pipe/fittings and lifting apparatus.
- Ⓞ Use non-metallic slings like nylon or polypropylene.
- Ⓞ Keep pipe/fittings away from sharp objects
- Ⓞ Keep pipes/fittings under protective packaging until required for use.
- Ⓞ Keep pipes/fittings away from intense heat, except when jointing.

Don'ts

- Ⓞ Drag or roll individual pipes or bundles.
- Ⓞ Throwing away pipes and fittings from delivery vehicles.
- Ⓞ Use metal slings, hooks or chains when handling
- Ⓞ Expose pipe/fitting for a long time
- Ⓞ Stack more than three meters or three bundles high.
- Ⓞ Place pipes or fittings in contact with aggressive chemicals.

BETA PE Cable Duct system:

The Information and Communication Technology (ICT) sector is booming and has long converted from traditional materials to PVC-U and now to PE for majority of new installations for continuous data transmission. The quality of duct systems, in which these vital links are encased, must be reliable and durable.

The cable ducts and fittings used in the cable routes are employed to protect both power and telecommunication cables (glass fibre or copper cable) against mechanical damage, chemical corrosion and rodent damage.

At SSEPL, we have the privilege to partner with leading players for land mark projects throughout Pakistan. Taking this reputation into future, we are delighted to offer our product range covering BETA PE Duct in dimensions (25, 32, 50 & 90mm) available in coils along with complete range of PE compression fittings.

7.0 Dimensions and Standards:

Beta PE-100 pipes for potable water application are manufactured according to International Standard(s), DIN 8074, PS 3580 & ISO 4427. The nominal pressure (PN) corresponds to the maximum allowable working pressure in bar for pipe at 20°C.

DN	SDR 11 (PN 16)	SDR 13.6 (PN 12.5)	SDR 17 (PN 10)	SDR 21 (PN 8)
O.D (MM)	e (mm)	e (mm)	e (mm)	e (mm)
20	1.9	1.8	-	-
25	2.3	2.0	1.8	-
32	2.9	2.4	1.9	-
40	3.7	3.0	2.4	1.9
50	4.6	3.7	3.0	2.4
63	5.8	4.7	3.8	3.0
75	6.8	5.6	4.5	3.6
90	8.2	6.7	5.4	4.3
110	10.0	8.1	6.6	5.3
125	11.4	9.2	7.4	6.0
140	12.7	10.3	8.3	6.7
160	14.6	11.8	9.5	7.7
180	16.4	13.3	10.7	8.6
200	18.2	14.7	11.9	9.6
225	20.5	16.6	13.4	10.8
250	22.7	18.4	14.8	11.9

*Shafisons Engineering Private Limited will be soon launching up to 315 mm.

For any further information, please feel free to contact us on enquiries@betapipes.com.pk or +92-42-35172409.



BETA[®] PIPES

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