FIBREGLASS POLE

EPP/TC/FRPpole/02/2010/Rev.00

Poles are a classic application of fibreglass that can withstand heavy mechanical loadings and the harshest atmospheric conditions. The major factors now encouraging the uptake of GRP are their inherent corrosion resistance, environmental safety and low installation costs. The lightweight also means installation is faster and achievable with less manpower.





We i.e. **EPP,** have been in the field of composites since over a decade and our expertise & professionalism is proven in **design & manufacture of GRP Pipes**
We are able to excel since we have / are,

- Relevant supportive software, machinery & equipment.
- Experience in all relevant National, International Standards & Specifications.

In tapered or cylindrical geometry, the **EPP** poles are suitable for a wide variety of applications such as; general lighting, traffic light poles, sign posts, urban fixtures, electrical power transmission poles, telephone poles, flagpoles, advertising poles, and protective fencing poles.

Engineering and Design Principles

The **EPP** poles are designed, as per;

- ANSI C 136. 20-1990
- BS EN 40 – 7: 2002
- AASHTO LTS-2 1985
- IS 875 (part 3) 1987

for wind speeds of 180 km/hr. However on request, we can also design for wind speeds upto 250 km /hr.

The structural design with GRP materials is more complex than with conventional materials such as steel and timber. This is mainly due to the fact that GRPs are neither homogenous nor isotropic. That is, they do not exhibit the same material structure throughout the bulk of the material and they do not have the same properties in different axis. This implies that in-depth design calculations and analysis is required to account for the varying material properties and direction of loading.

There are four main properties that are considered when designing an **EPP** fibreglass pole:
· **Deflection**
· **Strength**
· **Shear**
· **Fatigue**
Deflection is controlled with preferential orientation and volume of fibre reinforcement. The strength must be sufficient to resist loading and compressive buckling, and is benefited by off-angle reinforcement, as is shear. Resistance to fatigue is increased by balancing the laminate structure to minimize internal stresses and fibre interactions. An additional design consideration is Fatigue. Wind poses a significant fatigue load of varying frequency to poles and masts, which must be accounted for. In general, the selection of a compatible resin and reinforcement system, with the service conditions in mind, is essential to obtain a quality product.

Manufacturing Processes

The filament winding process is the most common for the manufacture of GRP poles. The filament winding process involves impregnating reinforcing fibres with catalyzed resin, then winding them onto a solid, rotating mandrel.
Successive layers of reinforcement are built up on the mandrel until the required thickness is achieved. Winding of the reinforcement can be adjusted to vary the strength of the tube between the axial and circumferential directions according to the loading requirements and other specifications of the application. Void free winding is possible to maximize the electrical properties i.e. eliminate the air content, of the component for high voltage.



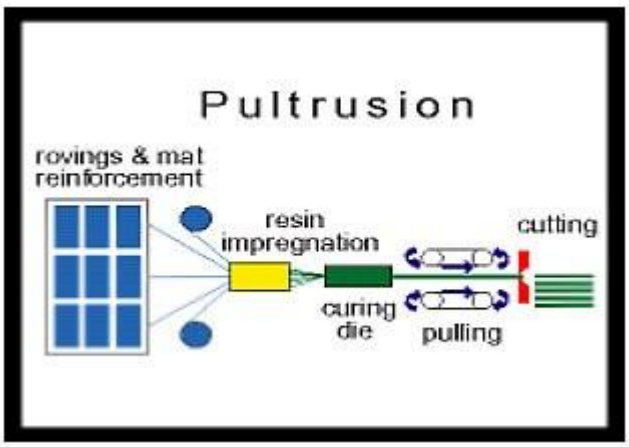


Conical Poles of following dimensions are made by the Filament winding process:

- **Length: 4 mtrs to 13 mtrs**
- **Base O.D.: min. 143 mm Ø – max. 315 mm Ø**
- **Top O.D.: 105 mm Ø**

The EPP poles are constructed of Polyester/Epoxy Resin Systems & fibreglass woven rovings with more than 65% of the reinforcing fibreglass in the axial vertical plane which gives the designed stiffness & axial strength.

The pole lengths have a tolerance of not exceeding 0.3 mtr per 10 mtrs.





The Pultrusion process is also used for making circular poles / tubes. A pultruded composite consists of reinforcing materials, such as unidirectional glass fibers, otherwise called rovings, continuous fibreglass mat and a thermoset resin that binds the composite together. A polyester surfacing veil to improve the external appearance of the composite and chemical resistance or weatherability may also be added. A variety of ancillary materials may be added to the resin formulation, such as pigment for color, accelerators to speed the curing of the thermoset resin, internal release agents, and several various types of inert fillers, each having its own functionality. A pultruded profile can be uniquely designed to meet any custom application.

Circular Poles of following dimensions are made by the Pultrusion process:

- **Length: max. 4 mtrs**
- **O.D.: 75mm Ø & 100mm Ø**

Properties

Properties	Standards	Value
Specific Gravity	ASTM D 792	1.65 kg / dm³
Glass Content (% age by weight)	ASTM D 2584	55 % - 65 %
Tensile Strength	DIN 53455 / ASTM D 638	~250 N/mm^2 / 400 ± 50 MPa
Water Absorption	ASTM D 570	0.5 %
Flexural Strength	DIN 53452 / ASTM D 790	~170N/mm^2 / 350 ± 50 MPa
Compressive Strength	ASTM D 695	200 ± 50 MPa
Impact Strength	DIN 53453 / UNI 6062 / 67	~ 5N/mm² / > 180 KJ / m²
Dielectric Strength	DIN 53481 / ASTM D 149	about 3 KV/mm / 3-7 KV /mm
Thermal Conductivity	ASTM D 177	0.2 – 0.3 Kcal /mH °C
Coefficient of Linear Expansion	ASTM D 696	15 – 17 °C x 10^{-8}

Colours



Poles are supplied in different colors: green, grey, blue, white, black (or others upon request). The material surface is scratch resistant and UV protected.

Advantages



- NON-CORROSIVE - No above-or below-ground corrosion in salty climates or alkali /acidic soil conditions.
- MAINTENANCE FREE - No corrosion or decay occurs thereby ensuring that the surface coat of the pole will not require any form of maintenance.
- LIGHT WEIGHT - The low mass saves handling, transport and erection costs during installation.
- LONGEVITY - Over time, EPP fibreglass poles outlasts wood, concrete, steel and aluminium under similar climatic conditions.
- NON-CONDUCTIVE - Perfect electrical insulation prevents accidental electrocution by faulty wiring.
- LOW INERTIA - A reduction in personal injury and less damage to vehicles in road accidents.
- HIGH BENDING STRENGTH - Engineered to withstand a wind pressure of 500 Pa inclusive of 0.20 m^2 luminaries' area with less than a 5% deflection of the mounting height.
- VERSATILITY - A wide range of spigots, floodlight mountings, base plates and decorative arrangements ensure a product for almost every application.
- VANDAL RESISTANT - High impact strength of polyester gel coat and glass filament wound structure.
- HIGH STRENGTH – Since it is a single piece (joint less) of length 4mtrs – 13 mtrs.

Applications

















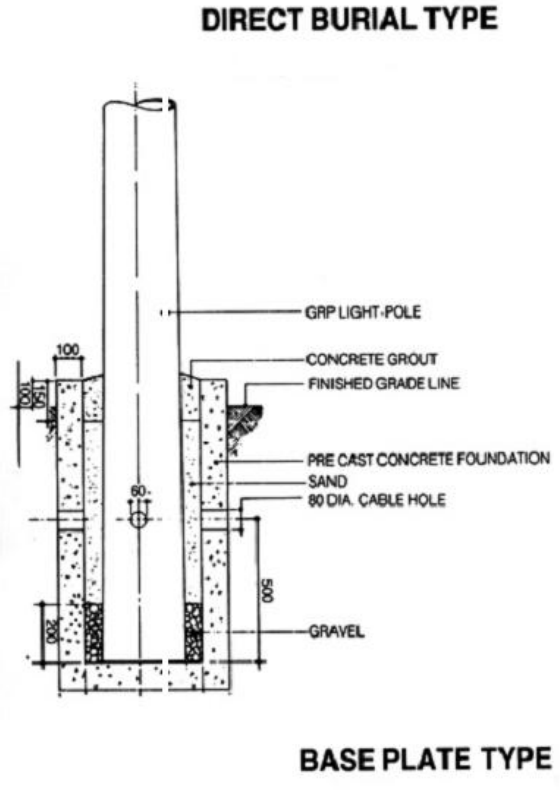




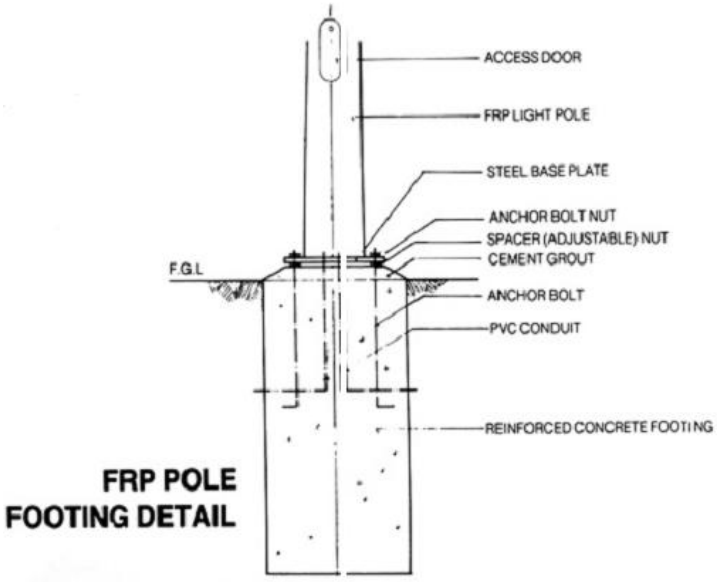
- Installation of telephone lines
- Installation of electric power lines
- Installation of overhead line or lighting in chemical plants, ports, jetties, etc.
- Traffic lights
- Directional Sign Systems
- Road lighting
- Lighting of small and large leisure areas and sport complexes
- Sports equipment (goal posts) etc.
- Lighting of parks and other open spaces
- Advertising signs and standard Poles
- Poles for protective barriers

The poles are available with two types of bases;

a. Direct Burial type pole



b. Base Plate type pole



Accessories

All accessories are in fibreglass / GRP, otherwise indicated.

- JUNCTION BOXES



Internal Junction Box



External Junction Box

- BRACKETS

(lengths of 1000/ 1500/ 2000 mm)

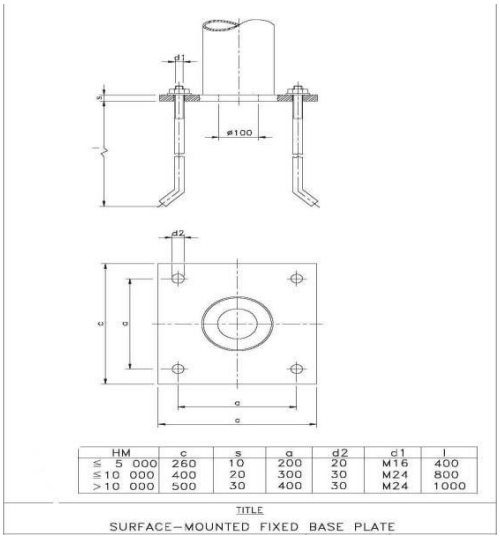


Single Arm Bracket



Double Arm Bracket

- BASE PLATE & ANCHOR BOLTS + NUTS



HM	c	s	a	d2	d1	l
≤ 5 000	260	10	200	20	M16	400
≤10 000	400	20	300	30	M24	800
>10 000	500	30	400	30	M24	1000

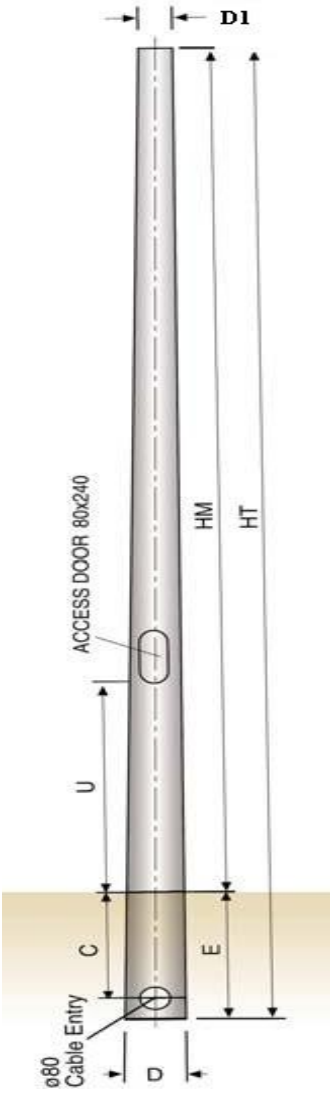
TITLE
SURFACE–MOUNTED FIXED BASE PLATE

Hot dipped galvanised Base Plate + Anchor bolts & nuts

Poles for direct embedment in the ground can be provided with a 300 x 300 x1.6 mm hot dipped galvanised base plate complete with 2 x hot dipped galvanised steel hook bolts and nuts. Base mounted poles have a hot dipped galvanised flange plate that can be bolted to a foundation which is designed to withstand the forces the pole will experience in service. The Base plate is moulded to the GRP Pole.

- **<u>Direct Burial Type Pole Models & Dimensions</u>: (all dimensions are in mm & approximate) (designed for Wind Speeds of 180 km / hr)**

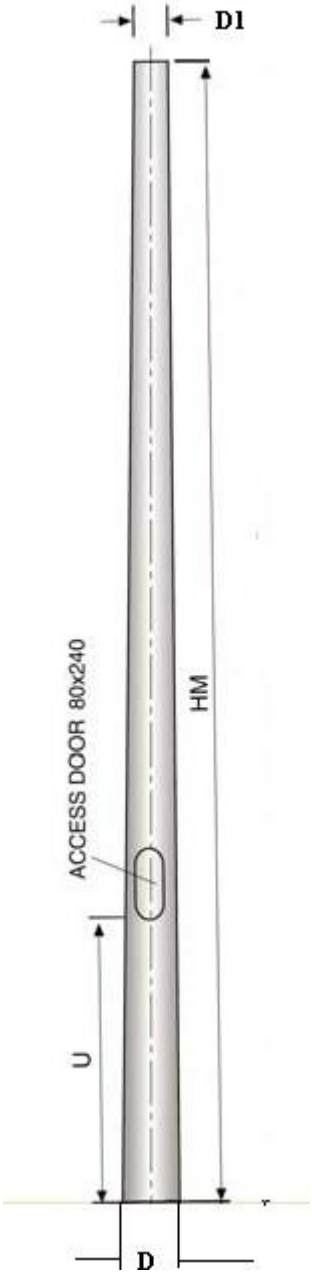
Model No.	D1	D	HT	HM	C	E	U
EPP BT 7530	75	75	3000	2250	400	750	500
EPP BT 7540	75	75	4000	3250	400	750	500
EPP BT 10030	100	100	3000	2250	400	750	500
EPP BT 10040	100	100	4000	3250	400	750	500
EPP BT 14340	105	143	4000	3400	397	600	500
EPP BT 15746	105	157	4600	4000	400	600	500
EPP BT 16852	105	168	5200	4500	400	700	500
EPP BT 17757	105	177	5700	5000	400	700	1000
EPP BT 18063	105	180	6300	5500	400	800	1000
EPP BT 18469	105	184	6900	6000	400	900	1000
EPP BT 19274	105	192	7400	6500	400	900	1000
EPP BT 20280	105	202	8000	7000	400	1000	1000
EPP BT 21086	105	210	8600	7500	400	1100	1000
EPP BT 22092	105	220	9200	8000	500	1200	1000
EPP BT 23098	105	230	9800	8500	600	1300	1000
EPP BT 230104	105	230	10400	9000	600	1400	1000
EPP BT 240110	105	240	11000	9500	700	1500	1000
EPP BT 250116	105	250	11600	10000	800	1600	1000
EPP BT 300122	105	300	12200	10500	800	1700	1000
EPP BT 310128	105	300	12800	11000	800	1800	1000
EPP BT 315130	105	315	13000	11200	800	1850	1000



D1 = Top Diameter
HT = Total Pole Length
HM = Mounting Height
D = Base Diameter
C = Depth of cable entry
E = Buried Depth
U = Access Door Height

- **<u>Base Plate Type Pole Models & Dimensions</u> : (all dimensions are in mm & approximate)**
  (designed for Wind Speeds of 180 km / hr)

Model No.	D1	D	HM	U
EPP AT 7522	75	75	2250	500
EPP AT 7532	75	75	3250	500
EPP AT 10022	100	100	2250	500
EPP AT 10032	100	100	3250	500
EPP AT 14334	105	143	3400	500
EPP AT 15740	105	157	4000	500
EPP AT 16845	105	168	4500	500
EPP AT 17750	105	177	5000	1000
EPP AT 18055	105	180	5500	1000
EPP AT 18460	105	184	6000	1000
EPP AT 19265	105	192	6500	1000
EPP AT 20270	105	202	7000	1000
EPP AT 21075	105	210	7500	1000
EPP AT 22080	105	220	8000	1000
EPP AT 23085	105	230	8500	1000
EPP AT 23090	105	230	9000	1000
EPP AT 24095	105	240	9500	1000
EPP AT 250100	105	250	10000	1000
EPP AT 300105	105	300	10500	1000
EPP AT 310110	105	300	11000	1000
EPP AT 315112	105	315	11200	1000



D1 = Top Diameter
HM = Mounting Height
D = Base Diameter
U = Access Door Height