TECHNICAL SPECIFICATION – HIGH MAST EMBLEM

TECHNICAL SPECIFICATION AND DATA SHEET FOR 17 M FIXED HEAD HIGHMAST FOR SIGNAGE SUITABLE FOR 50 M /SEC AND 62.5M/SEC WIND SPEED

1.00 SCOPE

The scope of this specification covers the design, manufacture, transportation, installation, testing and commissioning of the complete Signage, using fixed type of High Mast Towers, including the Civil Foundation Works. The mast shall be designed as per TR. NO-7 High Masts for Lighting and CCTV (2000 edition) - 2000, published by the The Institution of Lighting Engineers, United Kingdom.

2.00 HIGHMAST

2.01 Structure

The High mast shall be of continuously tapered, polygonal cross section, 20 sided, presenting a good and pleasing appearance, assured performance, and reliable service. The top height of mast and signage shall be at 17 m, with A/F dimensions of 200mm at the top and 540 mm at the bottom for wind speed 50m/sec AND 200mm at the top and 610mm at the bottom for wind speed 62.5m/sec.. The plate thickness shall be 5 mm for bottom and 4 mm for top section for wind speed 50m/sec AND 6 mm for bottom and 4 mm for top section for wind speed 62.5m/sec. The mast flange shall have PCD 650 mm, outer diameter 730 mm and thickness 30 mm for 50m/sec AND PCD 730 mm, outer diameter 840 mm and thickness 30 mm for 62.5 m/sec

2.02 Construction

The mast shall be capable of safely withstanding the wind speed of 180 KMPH (50 m/sec) for Inland and 225 KMPH (62.5m/sec) for coastal locations. The mast shall be fabricated from steel plates confirming to BS EN 10025 or equivalent having minimum yield strength of 355 N/Sq. mm and silicon content in steel shall be less than 0.06%, cut and folded to form 20 sided polygonal sections and welded with automatic sub merged arc welding machine.

The 17 metre high mast shall be delivered only in two sections, and shall be joined together by slipstressed-fit method at site. No site welding or bolted joint shall be done on the mast. The High mast shaft shall have only one longitudinal weld without any circumference weld. The minimum overlap distance shall be 1.5 times the diameter at penetration.

The mast shall be provided with full-penetrated flange, which shall be free from any laminations or inclusions. The welded connection of the base flange shall be fully developed to the strength of the entire section. The base flange shall be provided with supplementary gussets between the bolt holes to ensure elimination of helical stress concentration. For the environmental protection of the mast, the entire fabricated mast shall be hot dip galvanized, internally and externally as per BS EN ISO 1461.

The deflection of the mast is to be limited to 1/40 of the height at 2/3 of the design wind speed. There is no need of providing door opening as there is no lowering mechanism to be provided.

3.00 Dynamic Loading for the Mast

The mast structure shall be suitable to sustain an assumed maximum reaction arising from a wind speed of 180 kilometres per hour (50 m/sec) (three second gust) for Inland location AND 225 kilometres per hour (62.5 m/sec) (three second gust) for coastal location, as laid down by IS: 875/1987 (Part III) and shall be measured at a height of 10 metres above ground level. The design life of the mast shall be

minimum of 25 years. Wind excited oscillations shall be damped by the method of construction and adequate allowance shall be made for the related stresses.

4.00 Sign Board

4.01 Fabrication

BPCL Logo Sign will be made using 3 mm. Thick aluminum composite sheets as sign substrate. 2 nos. sheet of size 10ft. x 4 ft. each with vertical butt joint together to form required size.

BPCL logo sign will have 2 side display of BPCL logo and made in retro reflective prismatic grade sheeting confirming to ASTM Type VIII. All letter and emblems will be made on overlay films as specified by original sheeting manufacturer.

All BPCL Logo signboards shall carry a joint warranty in Original duly signed by reflective sheeting manufacturer or it's Indian subsidiary and sign fabricator. The warranty shall specify that the sign would retain 75% of its original reflectivity after 7 years.

Labels would have to be stuck on the back side off all the signs at a convenient place giving the following details:

- Name of manufacturer
- Date of manufacture
- Code of reflective sheeting used.

Logo sign should have a hot dip galvanized back support frame made of 40x40x5 & 37x37x3 angle. The Sign will be permanent fixed on the top of High Mast Pole with the help of galvanized clamps and nuts / bolts and sign board to angle frame with 5 mm diameter stainless steel CSK bolt with nuts.

5.00 Foundations & Foundation Bolts

Foundation bolts set comprising 12 nos. 30 mm diameter for 50m/sec AND 39mm diameter for 62.5m/sec, 850 mm long for 50m/sec AND 1000mm long for 62.5m/sec, 6.8 grade bolts, anchor plate 8 mm thick and template. The exposed portion of the bolts and nuts washers shall be hot dip galvanized. Foundation shall be designed for the reaction arising out of the dynamic loading of the high mast for the actual safe soil bearing at site. RCC foundation shall be with M 20 grade concrete.

6.00 Lightening Finial, Earthing and Earthing Terminals

Suitable earthing terminals using 12 mm diameter galvanised bolts shall be provided at a convenient location on the base of the Mast. One earth pit pipe type as per IS 3043 shall be provided for each mast for lightening protection. One lightening finial is to be provided on top of mast.

7.00 Signage specification:

1. Size of Logo Sign Display : 8 ft x 10 ft each side
2. Display Side : Two Sided Display (BPCL Hindi & English)
3. Type of Display : Full Cube Polycarbonate Retro-reflective Prismatic Lens Type.
4. Reflective Sheeting : Full Cube micro prismatic

5. Sign Substrate : 3mm Thick –ACP
6. Back Support Frame : 40x40x5 & 37x37x3 Angle Frame
7. Warranty of Signs : 7 Yrs -75 % Performance Warranty

The reflective high mast design shall include a two sided logo panel of size 8ft X 10ft each side (as per design) on the top of the high mast. Each of the logo panels shall be fully reflective with retro reflective sheeting pasted on a 3 mm thick Aluminum Composite Panel. The background of the signage elements shall be white retro reflective sheeting and the signage elements shall be as per the design in BPCL approved colors. The signage logo/graphics/letters shall be formed by overlay film of the specified colour i.e. Blue /Yellow.

The retro reflective sheeting shall be *Full Cube* polycarbonate prismatic lens elements retro reflective sheeting with pressure sensitive adhesive and meeting the minimum initial performance requirement for the coefficient of retro reflection as per Values in the Tables below.

Table 1-Minimum coefficient of retro-reflectance (Cd/lux/sq.mtr.)

Table for Minimum Coefficient of Retroreflection-(Candelas / foot candle / square foot)

Type VIII

Observation Angle (In Degrees)	Entrance Angle (In Degrees)	White	Yellow	Green	Red	Blue
0.1º	- 4º	1000	750	100	150	60
0.1º	+30º	460	345	46	69	28
0.2º	- 4º	700	525	70	105	42
0.2º	+30º	325	245	33	49	20
0.5º	- 4º	250	190	25	38	15
0.5º	+30º	115	86	12	17	7

For overlay areas, the coefficient of retro reflection shall be minimum 50% of the performance values mentioned in Table 1 for the respective color.

The above Full Cube polycarbonate prismatic lens elements retro reflective sheeting must carry a 7 year field performance warranty with at least 75% retention of the coefficient of retro reflectance given in Table 1 (all colors and angles mentioned) at the end of 7 years.

The bidders must ensure that the technical bids contain the following documents. Non submittal of all or either of the documents shall lead to disqualification of the bid:

1. Authorised Convertor Certificate issue by the Full Cube polycarbonate prismatic lens elements retro reflective sheeting manufacturer or its Indian subsidiary certifying that the bidder is an Authorized Convertor and has the capability with Dedicated Sign Shop and equipments like CNC Plotter Cutter, Hand Squeeze Roller Applicator, trained Manpower to manufacture retro reflective signages using Full Cube polycarbonate prismatic lens elements retro reflective sheeting. In case the bidder intends to source the signboard from an Authorized Convertor, the same shall be mentioned on the certificate. The certificate must be in original and specific to the tender/work.

2. A certificate from the Full Cube polycarbonate prismatic lens elements retro reflective sheeting manufacturer or its Indian subsidiary of having got the offered Full Cube polycarbonate prismatic lens elements retro reflective sheeting tested at an independent laboratory for various parameters such as coefficient of retro reflection, daytime color and luminance, shrinkage, flexibility, adhesion, outdoor weathering, fungus resistance etc as per various ASTM Test Methods.

3. A copy of the above mentioned test report, signed and stamped by Full Cube polycarbonate prismatic lens elements retro reflective sheeting manufacturer or its Indian subsidiary. The tests should have been conducted within the past 3 years and the report obtained. The test report should mention the offered Type Full Cube polycarbonate prismatic lens elements retro reflective sheeting having passed/failed the tests. Test reports obtained from the internal test labs and on the letterhead of the Full Cube polycarbonate prismatic lens elements retro reflective sheeting manufacturer shall be rejected.

4. A certificate by the Full Cube polycarbonate prismatic lens elements retro reflective sheeting manufacturer or its Indian subsidiary stating that the offered sheeting meets the minimum coefficient of retro reflectance values given in Table 1 (entire table to be mentioned in the certificate) and that the same shall carry a 7 year field performance warranty with at least 75% retention of the coefficient of retro reflectance given in Table 1 (all colours and angles mentioned) at the end of 7 years. The Overlay Film i.e. Blue and Yellow Colour should also carry the above Performance Warranty.

8.00 Documents:

The following documents are to be uploaded with the offer:

1. Structural calculations and foundation bolt calculation for the high mast.
2. Foundation design and drawing for the high mast.
3. Sample and test report of the signage material being used.
4. Authorised converter certificate.
5. Signed copy of the tender documents.

TECHNICAL DATA SHEET (17M HIGH MAST SIGNAGE)

Sr. No.	Description	INLAND (50m/sec)	COASTAL (62.5m/sec)
1.	**HIGH MAST STRUCTURE**		
a.	Height of the polygonal Mast pole .	17 Meters In Two Sections	17 Meters In Two Sections
b.	MAKE	Any make of HMS pole fulfilling the specification	Any make of HMS pole fulfilling the specification
c.	Material Construction	High Tensile Steel. As per BS-EN 10025 Grade S 355	High Tensile Steel. As per BS-EN 10025 Grade S 355
d.	Material Construction of base plate and other stiffners	IS 2062	IS2062
e.	Minimum plate thickness	Top : 4 mm Bottom : 5 mm	Top : 4 mm Bottom : 6 mm
f.	Cross section of mast in polygon (No. of sides)	20 sides	20 sides
g.	Length of Individual sections (approx.)	Top section : 6620 mm, Bottom section : 10980 mm	Top sections: 6670 mm ,Bottom : 10980 mm
h.	Minimum base dia and top diameter	Top diameter : 200 mm Bottom diameter : 540 mm	Top diameter : 200 mm Bottom diameter : 610 mm
i.	Type of Joints	Telescopic Slip Joint	Telescopic Slip Joint
j.	Metal protection treatment for mast section	Hot dipped galvanized (single dip)	Hot dipped galvanized (single dip)
k.	Thickness of galvanization	As per BS EN ISO 1461	As per BS EN ISO 1461
l.	Base Flange diameter/thickness/PCD	740mm/30 mm/650mm	840mm/30 mm/740mm
m.	Lightening protection finial	As per IS 2309	As per IS 2309
2.	**DYNAMIC LOADING AS PREVAILING AT SITE**		
a.	Max. wind speed (as per (IS 875-Part III	50 m/sec	62.5 m/sec

	1987)		
b.	Max. gust speed time	3 seconds	3 seconds
c.	Height above ground level at which these two factors are measure	10 mtrs	10 mtrs
d.	Factor of safety for wind load	1.25	1.25
e.	Factor of safety for other load	1.15	1.15
3.	**FOUNDATION DETAILS**		
a.	Type of foundation	RCC RAFT footing (M-20)	RCC RAFT footing (M-20)
b.	Size of foundation	As per design and Site Condition	As per design and Site Condition
c.	Design Safety factor	AS PER IS 456	AS PER IS 456
d.	Considered wind pressure	AS PER IS 875	AS PER IS 875
e.	Considered wind speed	50 M/ SEC	62.5 M/ SEC
f.	No. of foundation bolts	12 Nos.	12 Nos.
g.	PCD of foundation bolts	650 mm	740 mm
h.	Type of foundation bolts	6.8 Grade Steel	6.8 Grade Steel
i.	Bolt diameter and length	Dia 30 mm and length 850 mm exposed portion hot dip galvanized	Dia 39 mm and length 1000 mm exposed portion hot dip galvanized
j.	Nuts and Washers	Exposed hot dip galvanized	Exposed hot dip galvanized
k.	Anchor Plate - Thickness/PCD/Finish	8mm/650mm/Red Oxide Primer Coated	8mm/740mm/Red Oxide Primer Coated
4	**SIGN BOARD**		
a.	Size of Logo Sign Display	10 ft X 8ft	10 ft X 8ft
b.	Display Side	Two Sided Display	Two Sided Display

c.	Reflective Sheeting	Full Cube polycarbonate prismatic lens elements retro reflective sheeting (confirming to ASTM D4956, Type VIII)	Full Cube polycarbonate prismatic lens elements retro reflective sheeting (confirming to ASTM D4956, Type VIII)
d	Approved Makes for retro reflective sheet and transparent overlay sheet:	3M, USA and Avery Dennison, USA	3M, USA and Avery Dennison, USA
e	Sign Substrate	3mm thick aluminium composite material (Eurobond / Alstrong / Fujibond or equivalent).	3mm thick aluminium composite material (Eurobond / Alstrong / Fujibond or equivalent).
f	Side Cover	3mm thick pvdf ACM (Alcoa/Mtsubushi/Alcan)	3mm thick pvdf ACM (Alcoa/Mtsubushi/Alcan)
g	Back Support frame	40x40x5 & 37x37x3 Angle iron frame Hot dip Galvanized.	40x40x5 & 37x37x3 Angle iron frame Hot dip Galvanized.
h	Protection of Frame	Hot dip Galvanized.	Hot dip Galvanized.
i	Fixing of Frame with Pole	Through hot dip galvanized clamps & 12 mm dia Nuts/Bolts	Through hot dip galvanized clamps &12 mm dia Nuts/Bolts
j	Fixing of board with Frame	Through Stainless Steel AISI 304 Grade 5mm CSK Nuts/Bolts	Through Stainless Steel AISI 304 Grade 5mm CSK Nuts/Bolts
k	Warranty of Signs	7 Years As per MORT&H	7 Years As per MORT&H

Following certificates shall be submitted:

1. The O.E.M Test Certificates for the bought out items and the material at the time of inspection of the mast.

2. Structural Stability Certificate duly certified by an independent agency like Indian Institute of Technology (IIT) or renowned Engineering Institute / Body.

3. In case, the tenderer is not a manufacturer of the High Mast, they shall indicate in their bid the names of the High Mast manufacturers from whom they would source the Mast for this tender and shall also provide a certificate from the Manufacturer that the manufacturer would provide all the technical assistance, to the tenderer, for assembling & erection of the mast supplied by

them. Any change in the source of the supply of high mast, during the execution of the contract, shall be with the prior approval of BPCL.