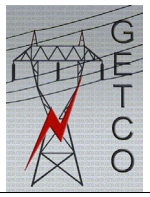


**GUJARAT ENERGY TRANSMISSION CORPORATION LTD.**

**Sardar Patel Vidyut Bhavan, Race Course,**

**Vadodara: 390 007**

# TECHNICAL SPECIFICATIONS

# OF

# SUB STATION STRUCTURES

**GETCO/E/TS-STR/R12 Dtd.11.03.2024**

# TECHNICAL SPECIFICATIONS FOR DESIGN, FABRICATION, GALVANISING, FABRICATED STRUCTURE MATERIALS, BOLTS – NUTS, ANCHOR BOLTS AND ACCESSORIES & ATTACHMENTS.

## 1.0 SCOPE:

### 1.1 The scope for supply work covered under this section consists of:

(i) Preparation of fabrication sketches and get their approvals,

(ii) Procurement of raw-materials like steel, zinc, etc. required for fabrication and galvanizing,

(iii) Procurement of bolts-nuts, accessories and attachments for insulator string, earth wire clamp etc., (for gantry structures)

(iv) Preparation of 'PROTO-MODEL' assembly based on its approved structural drawings, bills of materials and fabrication sketches.

(v) Mass fabrication of structure members as per approved fabrication sketches and their galvanizing, after necessary PROTO/PROTO Waiver Approval.

(vi) Inspection of finished structure materials.

(vii) Inspection of bolts-nuts, accessories and attachments at manufacturer's works.

(viii) Dispatch of all materials to destination, including transit insurance.

(ix) Guarantee of all above activities carried out from (i) to (viii).

1.2 The steel shall confirm to IS 2062 (latest rev.) grade-A.

1.3 All the work shall be carried out in accordance with the revised and latest provisions under respective Indian Standard.

1.4 The contractor shall be fully responsible for supply of complete structure inclusive of bolts-nuts, accessories and attachments for the final quantities ordered.

1.5 The contractor shall make his own arrangement for procurement of required Bolt-Nuts, accessories, attachments like 'D' shackles. 'U' bolts, anchor bolts,

step bolts etc. well in advance and supply as per scheduled completion period along with the inspection at sub vender's premises.

1.6 The bolt nuts shall be procured from the GETCO approved vender.

**2.1 DRAWINGS AND BILLS OF MATERIALS:**

2.1.1 The successful bidder has to submit copies of drawings and documents as stated in 1.1 (i) for GETCO's approval before commencing the mass production.

2.1.2 Proto-Model shall be prepared and got inspected for the approval along with fabrication sketches, structural drawings and bills of material.

**2.2 DESIGN, FABRICATION, STAMPING AND GALVANISING OF MATERIALS:**

2.2.1 Two sets of anchor bolt setting templates should be designed, fabricated, and supplied for each type of column and equipment support structure.

2.2.2 Any extension or other type of structure, if required, to be supplied against this Tender the successful contractor shall design and prepare Proto - Model at no extra cost to the GETCO.

2.2.3 All the activities like straightening, cutting, drilling punching, bending, notching, stamping galvanizing etc. shall be carried out according to technical part of this Specification.

2.2.4 The structural member fabricated must have a minimum thickness of 5mm.

2.2.5 All the galvanized steel structures shall be bolted type however, welding may be considered for following cases (If it is specifically mentioned in the drawing).

1. Base plate of 400kV gantry Structures and equipment structures.
2. Base plate of 220kV Equipment structures.
3. Base plate of 132kV Equipment structures.
4. Base plate of 66kV Gantry Structures (Ph-ph distance 1.8m).
5. Base plate of 11kV out door structures.
6. Base plate of 11kV LT Yard structures.

**3.0 <u>TYPE OF STRUCTURES:</u>**

**3.1 All the structures shall be lattice type, fully galvanized using only structural mild steel sections for members. The use of high tensile steel is**

**not permitted. Hexagonal head bolts with nuts and spring washers shall be used for connections.**

**3.2 The 400/220/132/66kV structures are required for the switch yard of S/S referred in schedule /drawings. The successful bidder will have to match these structure drawings with the existing structures of the switch yard.**

**3.3 WEIGHTS :**

3.3.1 The unit weights of each type of structure, including bolt-nuts, accessories, attachments and anchor bolts shall be furnished and / or to be approved by the GETCO. The weight of structure shall mean the weight calculated by using the black sectional (i.e. ungalvanized) weights of a steel members of the sizes indicated in the fabrication drawings and bills of materials without taking into consideration the reduction in weight due to drilling of bolts, holes, skew cuts, chambering etc. or increase in weight due to galvanizing, but taking into consideration the weight of the special fitting, bolts, nuts, washers and other accessories. The unit weight of structures shall be as per cl.no.3.14 of the specification. However, change in unit weight with respect to design calculation may be submitted and got approved from GETCO.

**3.4 MATERIAL:**

3.4.1 The steel required for fabrication of structure member shall conform to IS: 2062 (latest rev.) - Grade A.

3.4.2 The zinc required for galvanizing shall be of Zn-99.95% and shall conform to IS: 209 (latest rev.).

3.4.3 The bolts and nuts shall conform to IS: 6639-(latest rev.) or IS: 12427-(latest rev.). The bolts and nuts shall be of minimum class 5.6.

3.4.4 The plain washers shall conform to IS: 2016-(latest rev.). Heavy washers shall conform to IS: 6610-(latest rev.). Spring washers for bolts and nuts shall conform to IS: 3063-(latest rev.).

3.4.5 All bolts and nuts shall have hexagonal heads. The heads, being forged out of the solid, truly concentric and square with the shanks, must be perfectly straight.

3.4.6 Fully threaded bolts shall not be used. The length of bolts shall be such that the threaded portion will not extend into the place of contact of the member.

3.4.7 All bolts shall be threaded as per IS: 1363 (latest rev.) to take full depth of the nut and be threaded enough to permit firm gripping of the member, but no further threaded portion of each bolt shall project through the nut at least 6mm. when fully tightened. All nuts shall fit hand tight to the point where the shank, of the bolt connects to the head. Flat and tapered washers shall be pro-vided where necessary.

3.4.8 The diameter of bolts shall be 12 mm, 16mm and 20mm. The thickness of spring washers shall be 2.5 mm, 3.5 mm and 4 mm respectively. Spring washers shall be provided under all nuts. These washers shall be positive lock type electro-galvanized.

3.4.9 Each structure shall be provided with step-bolt of not less than 16mm diameter. The step-bolt shall be fixed on one leg up to top of structure as indicated in approved drawing. Each step-bolt shall be provided with two nuts and one washer.

3.4.10 The attachments like 'U' bolt, 'D' shackle, strain plate etc. shall be as per approved drawings.

## 3.5 FABRICATION WORKMANSHIP:

3.5.1 The details of fabrication shall conform to IS:802 (Part-II) - (latest rev.).

3.5.2 All the structure members shall be accurately fabricated to bolt together easily at site without any undue strain on the bolts.

3.5.3 The diameter of the bolt-hole shall be equal to the diameter of bolt plus 1.5 mm.

3.5.4 All similar parts of structure shall be made strictly inter-changeable.

3.5.5 All steel sections before any work is done on them, shall be carefully, leveled, straightened and made true to detailed drawings by methods which will not injure the materials so that when assembled the adjacent matching surfaces are in close contact throughout. No rough edges shall be permitted in the entire structure.

3.5.6 Welding shall be done as per IS:816 (latest rev.) Or electric welding. Edge preparation of welding shall be done as per IS:623 (latest rev.)

## 3.6 PROTO-MODEL ASSEMBLY:

Before proceeding with mass fabrication the contractor shall fabricate one structure of each type (i.e. superstructure) for the purpose of checking accuracy

and workmanship. This structure should be strictly according to the respective structural drawing and bills of material provided and approved by the GETCO. The contractor shall be solely responsible for preparation and inspection of such PROTO-MODEL assembly.

## 3.7 DRILLING AND PUNCHING:

3.7.1 Holes for bolts shall be drilled or punched with a jig but drilled holes shall be preferred. The following maximum tolerance of accuracy of punched holes is permissible.

a) Holes must be perfectly circular and no tolerance in this respect is permissible.

b) The maximum allowable difference in diameter of the holes on the two sides of plates or angle is 0.8 mm i.e. the allowable taper in punched holes should not exceed 0.8mm of diameter.

c) Holes must be square with the plates or angles and have their walls parallel.

3.7.2 All burs left by drills or punch shall be removed completely. When the structure members are in positions, the holes shall be truly opposite to each other. Drilling or ramming to enlarge defective holes shall not be permitted.

## 3.8 ERECTION MARK:

3.8.1 Each individual structure member shall carry a code number conforming to the component number given to it in the bills of material and fabrication drawing. This code number shall be marked with marking dies, having 16 mm size-letter before galvanizing and shall be legible after galvanizing. The letters indicated for different types of structure shall only be used.

Erection mark shall be "AAA - BB-CCCC-DDD" where,

AAA = Contractor's own Code-Numerical/Alphanumeric

B = '11' for 11kV, '06' for 66kV,'1' for 132kV '2' for 220kV & '4' for 400kV -Numerical

CCCC = Structure type (as per respective table of weights) -Alphanumerical

DDD = Member number -Numerical.

**This mark shall be got approved from the GETCO**.

3.8.2 Each structure member shall also be marked with indelible ink through stencil of 16 mm size alphabet /numerical.

## 3.9 BENDING:

3.9.1 Mild steel angle sections up to 75 x 75 mm (up to 6 mm thick) shall be bent cold up to and including bend angle of 10 Deg. angles above 75x75 mm (thickness up to 6 mm) and up to and including 100 x 100 mm (thickness up to 8 mm) may also be bent cold up to the bend angle of 5 Deg. All other angle sections and bend angles not covered above shall be bent hot.

3.9.2 All plates up to 12 mm thickness shall be bent cold up to a maximum bend angle of 15 Deg. Greater bends and other thicknesses shall be bent hot.

3.9.3 All hot bent material shall be air cooled. The bends shall be of even profile and free from any surface damages.

## 3.10 GALVANIZING:

3.10.1 The galvanizing shall be done to all the structure members after the fabrication work is completed. The nuts may be tapped or re-run after galvanizing. Threads of bolts and nuts shall have neat fit and can be turned with finger throughout the length of the threads of bolts and they shall be capable of developing full strength of bolts.

3.10.2 The zinc deposition should not be less than specified per galvanized surface area of the fabricated structure member.

3.10.3 The galvanizing of the structure members shall conform to IS: 2629-(latest rev.) & IS: 4759-(latest rev.). All galvanized members shall withstand tests as per IS: 2633-(latest rev.). The weight of zinc coating shall be determined as per the method stipulated in IS: 2633-(latest rev.). Spring washers shall be electro galvanized as per IS:1573-(latest rev.)

3.10.4 Unless otherwise specified the fabricated structures shall have a minimum overall Zinc coating of 610 gm per sq. m of surface except for plates & sections below 5mm which shall have Zinc coating of 460 gm per sq. m of surface. The average zinc coating for all sections & plates 5mm & above shall be maintained minimum 87 microns and that for sections below 5mm shall be maintained minimum 65 microns.

3.10.5 **For specified Marine Environment or 31mm creepage distance in BOQ, under marine environment, the fabricated structures shall**

**have a minimum overall Zinc coating of 900 gm/sq. m of surface are except for plates and sections below 5 mm which shall have a minimum overall Zinc coating 610 gm/sq. m of surface area. The average Zinc coating for all sections and plates 5 mm and above shall be maintained minimum 127 microns and that for plates and sections below 5 mm shall be maintained minimum 87 microns.**

3.10.6 **Zinc coating for 11kv Outdoor structures shall be carried out as per cl. 3.10.5 irrespective of location.**

3.10.7 The foundation bolt shall be galvanized as per IS 1367(Part-XIII)- (latest rev.). i.e. 375gms/sqMtr (54 Microns). The weight of zinc coating shall be determined as per the method stipulated in IS: 2633-(latest rev.).

3.10.8 All the stubs, cleats and stub-setting templates shall be fully galvanized.

## 3.11 CONFORMITY:

3.11.1 The contractor shall ensure that the specified materials and workmanship of all structures actually supplied strictly conform to drawings/data supplied by the GETCO. In case any deviation is detected during the process of supply or even after erection, the Contractor shall replace such defective structure free of cost to the GETCO. All expenditure or losses incur-red in erection to and fro transportation and any other expenditure or losses incurred by the GETCO on this account shall be borne by the Contractor. No extensions in delivery period shall be allowed on this account.

## 3.12 GENERAL GUIDE-LINE FOR INSPECTION:

3.12.1 Fabricated Structure Members:

(i) Visual examination and quantity verification of offered lot.

(ii) Sample selection from the offered lot at a ratio of 40 MT (or part thereof) 1 no. for all tests.

(iii) Dimension, fabrication and trueness verification of structure member from fabrication sketch.

(iv) Galvanizing test of each sample i.e. dip test, hammer test and mass of zinc test.

(v) Random verification Zinc coating over galvanized surface by Elcometer.

(vi) Tensile test and bend test of each sample.

(vii) Chemical composition test of at least one sample per lot offered for inspection.

(viii) Verification of manufacturer's test certificate for mild steel used in structure members.

3.12.2 Bolts-Nuts, Washers, Accessories, and Attachments etc.: (To be carried out at manufacture's works.)

(i) Visual examination and quantity verification of offered lot.

(ii) Sample selection from the offered lot as per relevant IS for each item.

(iii) Dimension, fabrication and trueness verification from fabrication sketch.

(iv) Galvanizing test of each sample.

(v) Other acceptance tests for respective item as per relevant Indian Standard.

## 3.13 STANDARDS:

The design, fabrication, galvanizing and testing of material used for manufacture of structures shall conform to the latest edition of the following standards (as mentioned up-to-date) except where otherwise specified in the Specification.

| | | |
|---|---|---|
| 1. | Specification for zinc | IS : 209-1992 |
| 2. | Code of practice for use of structural steel in general Building Construction. | IS : 800-2007 |
| 3. | Code of practice for use of structural steel in overhead transmission line towers. | IS : 802-2016 (Part-1/Sec. 2) |
| 4. | Hexagon head bolts, screws and nuts of product grade 'C'. | IS : 1363-2002 (Part 3) |
| 5. | Technical supply conditions for threaded fasteners | IS : 1367-2002 (Part 3) |
| 6. | Plain washers | IS : 2016-1967 |
| 7. | Hot rolled medium and high tensile structural steel — Specification | IS : 2062-2011 |
| 8. | Recommended practice for hot-dip galvanizing of iron and steel. | IS : 2629-1985 |
| 9. | Methods for Testing Uniformity of coating on Zinc Coated Articles. | IS : 2633-1986 |
| 10. | Single Coil Rectangular Section spring washers for bolts, nuts, screws. | IS : 2063-1972 |

| | | |
|---|---|---|
| 11. | Specification for hot-dip zinc containing on structural steel and other allied products. | IS : 4759-1996 |
| 12. | Specification for hot-dip galvanized coating on fasteners. | IS :5358-1969 |
| 13. | Code of practice for design, installation and maintenance of overhead power lines. | IS : 5613-1985 (Part 2 /Sec 2) |
| 14. | Heavy washers for steel structures. | IS : 6610-1972 |
| 15. | Hexagonal bolts for steel structures. | IS : 6639-1972 |
| 16. | Methods for determination of weight of zinc coating of zinc coated iron and steel articles. | IS : 6745-1972 |
| 17. | Fasteners—threaded steel fasteners — hexagon head transmission tower bolts— specification | IS : 12427-2001 |

## 3.14 STRUCTURE DETAILS

**WEIGHT OF GANTRY STRUCTURES FOR 400 KV SWITCHYARD WITH TWO BUS WITH ONE AND HALF CB SCHEME**

| SR.NO. | STRUCTURE | STEEL KG | B/N KG | A/B KG | TOTAL KG |
|---|---|---|---|---|---|
| 1 | COLUMN TM | 6199.70 | 683.70 | 409.92 | 7293.32 |
| 2 | COLUMN TN | 8242.67 | 871.60 | 738.00 | 9852.27 |
| 3 | COLUMN TJ | 6959.95 | 734.60 | 1182.50 | 8877.05 |
| 4 | COLUMN TI | 4759.01 | 445.20 | 316.26 | 5520.47 |
| 5 | COLUMN TC | 2482.03 | 339.10 | 172.49 | 2993.62 |
| 6 | BEAM BH | 3286.20 | 101.00 | 0.00 | 3387.20 |
| 7 | BEAM BM | 3159.21 | 93.90 | 0.00 | 3253.11 |

**WEIGHT OF GANTRY STRUCTURES FOR 400 KV SWITCHYARD WITH DOUBLE MAIN TRANSFER BUS SCHEME**

| SR.NO. | STRUCTURE | STEEL KG | B/N KG | A/B KG | TOTAL KG |
|---|---|---|---|---|---|
| 1 | COLUMN C2 | 6936.38 | 239.40 | 288.05 | 7463.83 |
| 2 | COLUMN C3 | 8051.04 | 295.89 | 576.10 | 8923.03 |
| 3 | COLUMN C7 | 2299.83 | 93.92 | 144.06 | 2537.81 |
| 4 | COLUMN C8 | 2246.65 | 90.73 | 144.10 | 2481.48 |
| 5 | COLUMN C9 | 3673.81 | 162.28 | 288.00 | 4124.09 |
| 6 | COLUMN C11 | 6217.97 | 217.60 | 400.50 | 6836.07 |
| 7 | BEAM B1 | 3289.05 | 96.66 | 0.00 | 3385.71 |
| 8 | BEAM B2 | 3327.04 | 103.76 | 0.00 | 3430.80 |
| 9 | BEAM B3 | 3072.70 | 114.06 | 0.00 | 3186.76 |
| 10 | BEAM B4 | 3593.38 | 151.73 | 0.00 | 3745.11 |

| | | | | | |
|---|---|---|---|---|---|
| 11 | BEAM B5 | 3142.80 | 138.03 | 0.00 | 3280.83 |
| 12 | LM 50 mtr | 5429.37 | 388.60 | 215.85 | 6033.82 |
| **THE STRUCTURES REQUIRED FOR QUAD MOOSE CONDUCTOR (LINE PURPOSE) AND AL59 CONDUCTOR (FOR TRANSFER BUS & BUS COUPLER)** | | | | | |
| 1 | COLUMN C2Q | 10503.64 | 311.97 | 1477.15 | 12292.76 |
| 2 | COLUMN C3Q | 11220.24 | 346.78 | 1477.15 | 13044.17 |
| 3 | COLUMN C4QT | 11286.26 | 364.17 | 1477.15 | 13127.58 |
| 4 | COLUMN C7Q | 2969.68 | 107.11 | 295.04 | 3371.83 |
| 5 | COLUMN C9Q | 4890.08 | 154.38 | 699.84 | 5744.30 |
| 6 | BEAM B1Q | 6074.12 | 182.15 | 0.00 | 6256.27 |
| 7 | BEAM B2Q | 3627.26 | 132.34 | 0.00 | 3759.60 |
| 8 | BEAM B4Q | 4830.22 | 151.44 | 0.00 | 4981.66 |
| **GAS INSULATED SUBSTATION (GIS) GANTRY STRUCTURES FOR 400KV SWITCHYARD** | | | | | |
| 1 | 4GT1 | 4745.80 | 218.57 | 370.91 | 5335.28 |
| 2 | 4GT2 | 12281.80 | 495.07 | 898.27 | 13675.14 |
| 3 | 4GB1 | 4224.04 | 179.07 | 0.00 | 4403.11 |
| 4 | 4GB2 | 4879.24 | 228.65 | 0.00 | 5107.90 |

**WEIGHT OF EQUIPMEMNT STRUCTURES FOR 400 KV SWITCHYARD**

| SR.NO. | STRUCTURE | STEEL KG | B/N KG | A/B KG | TOTAL KG |
|---|---|---|---|---|---|
| 1 | 400 KV LA | 206.13 | 9.90 | 70.16 | 286.19 |
| 2 | 400 KV CT | 242.37 | 8.90 | 39.47 | 290.74 |
| 3 | 400 KV CVT | 176.56 | 10.90 | 39.47 | 226.93 |
| 4 | 400 KV PI | 207.67 | 9.90 | 12.69 | 230.26 |

Details of Unit Weights (Approx.) for structures for 220kV Switchyard with Two Main (with ACSR Quadruple Moose) and Transfer Bus (ACSR Twin Moose) scheme. (Please refer GETCO'S Schedule/drawing for quantities)

**WEIGHT OF GANTRY AND EQUIPMENT STRUCTURES FOR 220 KV SWITCHYARD**

| SR.NO. | STRUCTURE | STEEL KG | B/N KG | A/B KG | TOTAL KG |
|---|---|---|---|---|---|
| **(I) GANTRY STRUCTURES (3-BUS SCHEME)** | | | | | |
| 1 | 2CPA2 | 2156.26 | 97.70 | 128.00 | 2381.96 |
| 2 | 2CPA3 | 2116.84 | 95.81 | 96.95 | 2309.59 |
| 3 | 2CPA4 | 2411.04 | 108.09 | 128.00 | 2647.13 |
| 4 | 2CB1 | 1237.60 | 47.65 | 128.00 | 1413.25 |
| 5 | 2CB2 | 1008.18 | 35.78 | 58.31 | 1102.27 |
| 6 | 2BB1 | 1561.91 | 75.73 | 0.00 | 1637.64 |
| 7 | 2BB2 | 1267.79 | 54.71 | 0.00 | 1322.50 |

| | | | | | |
|---|---|---|---|---|---|
| 8 | 2BA2 | 1125.34 | 49.08 | 0.00 | 1174.41 |
| **Other structure as per existing layout** | | | | | |
| 9 | 2BA1(18mtr) | 981.28 | 47.41 | 0.00 | 1028.69 |
| 10 | LM 25 mtr | 3290.62 | 108.36 | 120.82 | 3519.80 |

Details of Unit Weights (Approx.) for structures for 220kV Switchyard with Two Bus (with ACSR Twin Moose) scheme.

(Please refer the requirement of structure from GETCO'S drawing)

**WEIGHT OF GANTRY AND EQUIPMENT STRUCTURES FOR 220 KV SWITCHYARD**

| SR.NO. | STRUCTURE | STEEL KG | B/N KG | A/B KG | TOTAL KG |
|---|---|---|---|---|---|
| **(I) GANTRY STRUCTURES** | | | | | |
| 1 | CPA1X | 1828.19 | 88.29 | 114.27 | 2030.76 |
| 2 | CPB1X | 1004.80 | 63.62 | 70.16 | 1138.58 |
| 3 | CPC1X | 1417.64 | 77.62 | 70.16 | 1565.42 |
| 4 | BA1(14.6M) | 946.30 | 47.84 | 0.00 | 994.13 |
| 5 | 2CPL1 | 5348.83 | 275.92 | 513.24 | 6137.99 |
| 6 | 2CPL2 | 5834.80 | 294.99 | 652.42 | 6782.20 |
| 7 | 2CMB | 2395.15 | 148.79 | 352.00 | 2895.94 |
| 8 | 2BMB (16M) | 1947.73 | 190.58 | 0.00 | 2138.31 |
| 9 | 2BL (16M) | 2193.83 | 190.58 | 0.00 | 2384.41 |
| **(II) GAS INSULATED SUBSTATION (GIS) GANTRY STRUCTURES** | | | | | |
| 1 | 2GT1 | 2885.91 | 176.63 | 236.35 | 3298.89 |
| 2 | 2GT2 | 7479.00 | 331.82 | 598.27 | 8409.09 |
| 3 | 2GB1 | 2050.32 | 135.87 | 0.00 | 2186.18 |
| 4 | 2GB2 | 2347.62 | 138.59 | 0.00 | 2486.21 |
| **(III) 220 KV EQUIPMENT STRUCTURES** | | | | | |
| 1 | 220 KV LA | 164.63 | 9.50 | 9.23 | 183.36 |
| 2 | 220 KV CT | 194.47 | 8.50 | 9.23 | 212.20 |
| 3 | 220 KV ISO with E/S | 946.66 | 28.60 | 12.70 | 987.96 |
| 4 | 220 KV ISO without E/S/TANDEM | 907.09 | 27.40 | 12.70 | 947.19 |
| 5 | 220 KV PT | 194.47 | 8.50 | 9.23 | 212.20 |
| 6 | 220 KV PI | 153.00 | 9.26 | 9.23 | 171.50 |
| 7 | 220 KV HBPI | 237.96 | 11.41 | 9.23 | 258.60 |
| 8 | 220 KV CVT | 196.83 | 11.40 | 22.44 | 230.67 |

**WEIGHT OF GANTRY AND EQUIPMENT STRUCTURES FOR 132 KV AND 66KV SWITCHYARD**

| SR.NO. | STRUCTURE | STEEL KG | B/N KG | A/B KG | TOTAL KG |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| **(I) GANTRY STRUCTURES** | | | | | |
| 1 | 06/1CPA2 | 917.30 | 47.25 | 71.56 | 1036.11 |
| 2 | 1CPB2 | 629.17 | 28.30 | 53.70 | 711.17 |
| 3 | 06/1CPC2 | 839.97 | 50.95 | 53.70 | 944.62 |
| 4 | 1BA2 | 566.00 | 34.37 | 0.00 | 600.37 |
| 5 | 1BC2 | 374.75 | 18.70 | 0.00 | 393.45 |
| | | | | | |
| **(II) 132 KV EQUIPMENT STRUCTURES** | | | | | |
| 1 | 132 KV LA | 148.70 | 8.00 | 9.23 | 165.93 |
| 2 | 132 KV CT | 137.00 | 8.00 | 9.23 | 154.23 |
| 3 | 132 KV ISO without E/S | 527.00 | 27.00 | 26.28 | 580.28 |
| 4 | 132 KV PT | 147.00 | 8.00 | 9.23 | 164.23 |
| 5 | 132 KV PI | 135.21 | 4.32 | 9.23 | 148.76 |
| | | | | | |
| **(I) 66KV GANTRY STRUCTURES (PH-PH DISTANCE 2.15M)** | | | | | |
| 1 | 6CPA3 | 636.98 | 37.93 | 57.47 | 732.39 |
| 2 | 6CPB3 | 526.21 | 27.88 | 71.52 | 625.61 |
| 3 | 6BA3 | 334.11 | 25.02 | 0.00 | 359.13 |
| 4 | 6FB1 | 397.51 | 34.01 | 0.00 | 431.53 |
| 5 | 6FB2 | 420.83 | 30.73 | 0.00 | 451.57 |
| 6 | 6FC | 566.55 | 26.74 | 68.54 | 661.83 |
| 7 | 6'S' (S-Type) | 680.64 | 19.13 | 35.41 | 735.18 |
| **(II) 66 KV EQUIPMENT STRUCTURES.** | | | | | |
| 1 | 66 KV LA | 135.40 | 4.45 | 9.23 | 149.08 |
| 2 | 66 KVCT | 149.61 | 7.98 | 9.23 | 166.82 |
| 3 | 66 KV ISO with E/S | 300.12 | 8.20 | 9.23 | 317.55 |
| 4 | 66 KV ISO without E/S | 281.08 | 8.20 | 9.23 | 298.51 |
| 5 | 66 KV PT | 149.48 | 7.98 | 9.23 | 166.69 |
| 6 | 66 KV PI | 139.73 | 4.32 | 9.23 | 153.28 |
| 7 | 66 KV HBPI | 181.54 | 8.20 | 9.23 | 198.97 |
| 8 | LM 15 MTR | 1502.48 | 67.84 | 36.92 | 1607.24 |
| **(III) 66KV GANTRY STRUCTURES (PH-PH DISTANCE 1.80M)** | | | | | |
| 1 | 6CPA2A | 1425.53 | 96.87 | 215.20 | 1737.60 |
| 2 | 6CPB3A | 693.75 | 62.20 | 94.32 | 850.27 |
| 3 | 6BA3A | 500.72 | 48.09 | 0.00 | 546.82 |

**VHF MAST (FOR 220 KV, 132 KV, 66 KV SUB STATION)**

| SR.NO. | STRUCTURE | STEEL | B/N | A/B | TOTAL KG |
|---|---|---|---|---|---|
| 1 | MAST | 1420.82 | 52.19 | 0.00 | 1473.00 |

**SIGNATURE AND**
**SEAL OF THE BIDDER**

| | | | | | |
|---|---|---|---|---|---|
| 2 | STUB | 85.37 | 0.50 | 0.00 | 85.87 |
| 3 | STUB TEMPLATE | 148.22 | 3.55 | 0.00 | 151.78 |

**11KV OUTDOOR STRUCTURE**

| SR. NO. | STRUCTURE | STEEL | B/N | A/B | TOTAL KG |
|---|---|---|---|---|---|
| 1 | 11 KV DP STRUCTURE - GETCO (FOR OUT GOING FEEDER) -A1 | 338.80 | 6.80 | 10.70 | 356.30 |
| 2 | 11KV SIDE CONNE.ARRA.FOR 66-11KV TRANSFOR.-A2 | 228.63 | 4.82 | 10.70 | 244.16 |
| 3 | STRUCTURE FOR 11KV/415KV DISTRIBUTION TRANSFORMER-A3 | 408.90 | 11.05 | 10.70 | 430.65 |
| 4 | 11KV DP STRUCTURE - DISCOM (FOR CROSS BOUNDARY PROTECTION)- A4 | 338.40 | 6.80 | 10.70 | 355.90 |

**LT YARD EQUIPMENT STRUCTURES**

| SR. NO. | STRUCTURE | STEEL | B/N | A/B | TOTAL KG |
|---|---|---|---|---|---|
| 1 | 11 KV PT EQUIPMENT STRUCTURE FOR LT YARD | 135.34 | 9.00 | 0.00 | 144.34 |
| 2 | 22 KV BPI EQUIPMENT STRUCTURE FOR LT YARD | 195.70 | 17.07 | 0.00 | 212.77 |
| 3 | 22 KV CT EQUIPMENT STRUCTURE FOR LT YARD | 136.78 | 9.00 | 0.00 | 145.78 |
| 4 | 22 KV HDB ISO WITH/WITHOUT EB EQUIPMENT STRUCTURE FOR LT YARD | 223.42 | 11.58 | 0.00 | 235.00 |
| 5 | 11KV DP STRUCTURE FOR LT YARD | 382.28 | 9.52 | 0.00 | 391.81 |
| 6 | 11KV SINGLE CABLE SUPPORT STRUCTURE FOR LT YARD | 116.58 | 1.45 | 0.00 | 118.03 |

## 4.0 SUBMISSION OF DRAWINGS AND DOCUMENTS

The GETCO will provide one set of available drawings of respective structure, to the successful Bidder on award of contract.

Proto-Model (if required) shall be prepared and got inspected for the approval along with fabrication sketches, structural drawings and bills of material at no extra cost to the GETCO. Soft copy of shop sketches of Structure in AutoCAD format must be submitted to Engineering Cell, Corporate Office, GETCO-Vadodara.

**SIGNATURE AND**
**SEAL OF THE BIDDER**

The approved copies of structural drawings and bills of materials shall be distributed as under:

i ) CE (Projects), GETCO , Corp Off, Vadodara - 2 sets

ii) Supdt. Engineer (Trans), GETCO, Circle Office in-charge of work - 1 set

iii) Each consignee - 3 sets

**The approved copies of fabrication sketches shall be submitted in duplicate only to the CE (Engg), GETCO, Vadodara.**

## 5.0 Matching of Base Plan

Supply of equipment structures shall be strictly in accordance to the standard base plan attached with this Technical Specifications. No deviation in this regard will be acceptable.

**SIGNATURE AND**
**SEAL OF THE BIDDER**