# GUJRAT ENERGY TRANSMISSION CORPORATION LTD.

STANDARD APPROVAL

STANDARD MANUFACTURING QUALITY PLAN

GETCO/CE(Engg)/III/D/O-006499
Date:06.04.2021

## MATERIAL DESCRIPTION : STANDARD MQP GALVANIZED STEEL STRUCTURES FOR GETCO SUPPLY

| QAP No. | GETCO STANDARD APPROVAL | Rev. No | Date | Page No |
|---|---|---|---|---|
| GETCO/MQP/20-21/TOWER&SS STRUCTURES | STANDARD MQP HDG TOWER & SS STRUCTURES UPTO 400KV | 0 | 20.11.2020 | 1 of 13 |

### 1. RAW MATERIAL INSPECTION

| S.No | Component / Operation & Description of Test | Sampling Plan with basis | Ref. Doc & Acceptance norm | Record Format | Testing Agency | | | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | | M | C | TPIA | |
| 1<br>1.1 | Raw Materials<br>Structural Steel<br>(Angles, Flats, Plates , Channels and Bars) as per IS 2062<br>Pipe – IS 1161 /1239 | | IS 2062 E-350 For HT<br>IS 2062 E-250 A For MS | | | | | Steel to be procured from prime producers such as SAIL,TISCO,RINL,JINDAL etc. or GETCO approved reroller. |
| 1.1.1 | Physical Properties/ Mechanical properties | | IS 2062 : 2011 | | | | | |
| (a) | Tensile strength | 1 Sample/ 40 MT for each type. | Annexure-A | MTC | P | R | - | MTC review at the time of final inspection |
| (b) | Test For Yield Stress | - Do - | - Do - | MTC | P | R | - | - Do - |
| (c) | Percentage Elongation | - Do - | - Do - | MTC | P | R | - | - Do - |
| (d) | Bend Test | - Do - | - Do - | MTC | P | R | - | - Do - |
| (e) | Impact Test | - Do - | For HT Material(BR,B0 and C Grades) as per GETCO approved Structure Drawing/BOM or GETCO approval Letter. | MTC | P | R | - | Min 27J.at Room Temp.25 ±2$^0$C as per IS 2062-2011 |
| 1.1.2 | CHEMICAL COMPOSITION<br>(Product Analysis) | - Do - | Annexure-A | MTC | P | R | P* | MTC review at the time of final inspection |
| 1.1.3 | ZINC<br>Chemical composition of Zinc Ingot | - Do - | IS 209<br>Zinc purity min 99.99% | TC | P | R | P* | MTC to be reviewed at the time of Final Inspection (Zinc Procured from Prime producer or prior approval from GETCO is required) |
| 1.1.4 | VISUAL CHECKS FOR SURFACE FINISH | IS 2500,Level II, AQL-1.5 | Material shall be reasonably free from surface flaws; laminations; rough/jagged and imperfect edges and all other harmful defects | IR | P | R | - | MTC review at the time of final inspection |
| 1.1.5 | DIMENSIONAL CHECKS | IS 2500 Level II, AQL-1.5 | IS 1852, IS 808 | IR | P | R | - | MTC review at the time of final inspection |

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|---|---|---|---|---|
| GETCO/MQP/20-21/TOWER&SS STRUCTURES | STANDARD MQP HDG TOWER & SS STRUCTURES UPTO 400KV | 0 | 20.11.2020 | 2 of 13 |

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| | | | | | M | C | TPIA | |
| 1.1.6 | TOLERANCES FOR LEG LENGTH OF ANGLES EQUAL / UN EQUAL | IS 2500 Level II, AQL-1.5. | For ≤45mm = ± 1.5mm<br>For 45 to 100 = ± 2.0mm<br>For >100 = ± 2.0% of leg length<br>**For unequal leg**: +2,-1.5mmfor longer leg length for shorter leg length as per 1.1.7 | IR | P | R | - | MTC review at the time of final inspection |
| 1.1.7 | OUT OF SQUARE NESS | IS 2500 Level II, AQL-1.5. | Perpendicular to each other<br>± 1° | IR | P | R | - | |
| 1.1.8 | CAMBER or SWEEP | IS 2500 Level II, AQL-1.5. | For <100= ±0.3 % of length<br>For ≥100= ±0.2 % of length Max. | IR | P | R | - | |
| 1.1.9 | WEIGHT TOLERANCE FOR ANGLE SECTIONS & FLAT | 1 Sample/ 40 MT for each type. | For < 3mm thick ±5 %<br>For > 3mm thick +5 % / -3% | IR | P | R | - | |
| 1.2.0 | WEIGHT TOLERANCE FOR PLATES | 1 Sample/ 40 MT for each type. | + 5/-2.5 % | IR | P | R | - | |
| 1.2.1 | THICKNESS TOLERANCE FOR PLATES | IS 2500 Level II, AQL-1.5. | < 8 mm thick : + 12.5 %, - 5 %<br>8 mm - 12 mm : + 7.5 %, - 5 %<br>over 12 mm : ± 5 % | IR | P | R | - | |
| 1.2.2 | ROOT RADIOUS | IS 2500 Level II, AQL-1.5. | IS 808 (As per Table 5.1) | IR | P | R | - | |
| 1.2.3 | WIDTH TOLERANCE FOR FLAT<br><br>THICKNESS TOLERANCE FOR FLAT | IS 2500 Level II, AQL-1.5. | IS 1730/1852<br><50mm ±1.0mm, >50<75mm ±1.5mm, >75<100mm ±2.0mm, >100< ±2.0% ,Max 6.0mm<br>Thickness Upto & including 12mm ± 5mm,Over 12mm ± 4% Max.1.5mm. | IR | P | R | - | |

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|---|---|---|---|---|
| GETCO/MQP/20-21/TOWER&SS STRUCTURES | STANDARD MQP HDG TOWER & SS STRUCTURES UPTO 400KV | 0 | 20.11.2020 | 3 of 13 |

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| | | | | | M | C | TPIA | |
| 1.2.4 | **ROUND BARS**<br>a. Diameter(d) Tolerance | IS 2500 Level II, AQL-1.5. | IS 1852<br>d<25mm ±0.5mm, 25<d<35mm ±0.6mm, 35<d<50mm ±0.8mm, 50<d<80mm ±1.0mm, 80<d<100mm ±1.3mm , 100<d< ±1.6 % of Diameter or side width. | IR | P | R | - | MTC review at the time of final inspection |
| | b. Ovality & out-of-Square | - Do - | IS 1852<br>The permissible ovality for round bars measured as the difference between the maximum and minimum diameters and the out-of-square of square bars measured as the distance between parallel faces across any cross section shall be 75% of total tolerance (plus & minus) specified on the size. | IR | P | R | - | |
| | c. Weight Tolerance | - Do - | IS 1852<br>Up to and including 10mm ±7%, above 10 to 16mm ±5% & above 16mm ±3% | IR | P | R | - | |

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## 2. IN PROCESS INSPECTION

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| | **INPROCESS INSPECTION**<br>FABRICATION OF TOWER PARTS | | IS 802 Part II/ IS 7215/ approved Drwg., | Routine Sheet | P | R | - | |
| (a) | **STRAIGHTENING** | 100% | | Routine Sheet | P | R | - | |
| (b) | **CROPPING (CUTTING TO LENGTH)** | 1st Piece and every 40th Piece | Length Tolerance ± 2 mm The cut surface to be clean, reasonable square & free from distortion | Routine Sheet | P | R | - | |
| (c) | **SECTION SIZE** | 1 piece at random for each item | IS 802 Part II/ IS 7215/ approved Drwg., | Routine Sheet | P | R | - | |

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|---|---|---|---|---|
| GETCO/MQP/20-21/TOWER&SS STRUCTURES | STANDARD MQP HDG TOWER & SS STRUCTURES UPTO 400KV | 0 | 20.11.2020 | 4 of 13 |

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| | | | | | M | C | TPIA | |
| (d) | **STAMPING / MARKING** | 1st Piece and every 40th Piece | 9X16 MM & 0.45 MM Depth (Easily to be seen) | Routine Sheet | P | R | - | |
| (e) | **PUNCHING / DRILLING** | - Do - | Punching to be done for thickness up to 12 mm and Drilling to be done for thickness more than 12 mm. Holes near bends to be punched/ drilled after bending. Hole should be perpendicular to surface & difference in dia on both sides of flange should not be more than 0.8mm, Hole Ovality not acceptable. | Routine Sheet | P | R | - | |
| (f) | **EDGE SECURITY** | 1st Piece and every 40th Piece | IS 802 PART II/ IS 7215 / approved drwg.<br>**For 13.5 mm Dia Hole**<br>Sheared Edge 20 MM & Rolled Edge 16 MM<br>**For 17.5 mm Dia Hole**<br>Sheared Edge 23 MM & Rolled Edge 20 MM<br>**For 21.5 mm Dia Hole**<br>Sheared Edge 28 MM & Rolled Edge 25 MM<br>**For 25.0 mm Dia Hole**<br>Sheared Edge 38 MM & Rolled Edge 33 MM /As per Approved Drawing. | Routine Sheet | P | R | - | |
| (g) | **DRILLING & PUNCHING**<br>Hole to Hole Distance/Spacing/Gauge distance | 1st Piece and every 40th Piece | Tolerance cumulative and between consecutive Hole shall be within ±2 mm & ±1 mm respectively & ± 0.5 mm Gauge distance. | Routine Sheet | P | R | - | |
| (h) | **NOTCHING,FLANGE,CORNER,BEVEL CUT** | 1st Piece and every 40th Piece | + 5.0 mm on specified length of cut operation by shearing upto 12 mm thick and by Gas Cutting for material above 12mm. | Routine Sheet | P | R | - | |

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| (i) | **HEEL CUTTING** | - Do - | For Member > 12 mm thick. Gas cutting to be adopted followed by grinding/Machine cutting. Tolerance on heel cutting length + 10 MM. | Routine Sheet | P | R | - | |
| (j) | **BENDING** | 100% | **(i)Angle Sections :**<br>Upto 75x75x6 (Upto 10deg)- Cold Bend<br>Upto 100x100x8 (Upto 5deg)- Cold Bend<br>Above 75x75x6 (above 10deg)- Hot Bend<br>Above 100x100x8 (above 5deg)- Hot Bend<br>All HT sections and plates shall be Hot bend.<br>**(ii) MS Plates**<br>Upto 12mm thick (upto 15 degree)-Cold Bend<br>Others (Any degree) - Hot Bend | Routine Sheet | P | R | - | |
| (k) | **Welding /Fitting/**<br>a)Marking,Cutting,Edge Preparation<br>b)Fit Up, Dimensional Control | 100%<br>100% | IS 9595<br>a) As per Drawing/Specification of GETCO<br>b) As per Drawing/ Specification of GETCO | Routine Sheet | P | R | - | |

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| I | **PROTO ASSEMBLY**<br>**Visual & Dimensional Inspection** | One Structure of each Tower Type. | As per GETCO approved Drawings & BOM. All parameters from (a) to (k) above are checked and record maintained shall be verified by GETCO Inspector before releasing the materials for galvanizing. | Proto Inspection Report | P | W | - | Proto Corrected BOM must be verified and signed by GETCO Inspector & Manufacturer. Deviation in tower member must be clearly indicated in BOM & MOM with tech'cal justification and same shall be thoroughly inspected by GETCO Inspector |

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