

# **STANDARD TECHNICAL SPECIFICATION COVER SHEET**

**Specification No. : ENG-GEN-4027**

**Specification Name : Technical Specification For GI Channel & Angle, GI Top Bracket**

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### 1. SCOPE:

This specification covers the design, manufacture, testing and supply of GI Structural Items includes Channel, Angles and Top brackets to be used in Structures. Scope also includes transportation & unloading at store / site.

### 2. APPLICABLE STANDARDS:

The equipment covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian, International Standards and shall conform to the regulations of the local authorities:

|         |                                                                                         |
|---------|-----------------------------------------------------------------------------------------|
| IS 2062 | Hot Rolled Medium and High Tensile Structural Steel                                     |
| IS 1852 | Rolling and Cutting Tolerances for Hot Rolled Steel products                            |
| IS 2633 | Methods for testing uniformity of coating of zinc coated articles                       |
| IS 4759 | Hot-dip zinc coatings on structural steel and other allied products                     |
| IS 6745 | Method for determination of mass of zinc coating on zinc coated iron and steel articles |

### 3. CLIMATIC CONDITIONS OF THE INSTALLATION:

| SL. NO. | CONDITONS                                                  | VALUES         |
|---------|------------------------------------------------------------|----------------|
| 1       | Max. altitude above sea level                              | 1200m          |
| 2       | Max. Ambient Temperature                                   | 50 °C          |
| 3       | Max. Daily average ambient temp                            | 35 °C          |
| 4       | Min Ambient Temp                                           | 0 °C           |
| 5       | Maximum temperature attainable by an object exposed to sun | 60 °C          |
| 6       | Maximum Humidity                                           | 95%            |
| 7       | Minimum Humidity                                           | 10%            |
| 8       | Average No. of thunderstorm days per annum                 | 70             |
| 9       | Average Annual Rainfall                                    | 150 cm         |
| 10      | Average No. of rainy days per annum                        | 120            |
| 11      | Thermal Resistivity of soil                                | 150 Deg. Ccm/W |

|                                                                                                                                                                    |                                                                                                                                                                    |                                                                                                                                              |
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| SL. NO. | CONDITIONS                                       | VALUES                                       |
|---------|--------------------------------------------------|----------------------------------------------|
| 12      | Wind Pressure                                    | 126 kg/sq. m up to an elevation of 10 meter. |
| 14      | Earthquakes of intensity in horizontal direction | equivalent to seismic acceleration of 0.3g   |
| 15      | Earthquakes of intensity in vertical direction   | equivalent to seismic acceleration of 0.15g  |
| 16      | Wind velocity                                    | 300 km/hr.                                   |

Environmentally, some of the regions, where the work will take place include coastal areas, subject to high relative humidity, which can give rise to condensation. Onshore winds will frequently be salt laden. On occasions, the combination of salt and condensation may create pollution conditions for outdoor insulators. Some places are in heavily industrial polluted areas. Therefore, Outdoor material and equipment shall be designed and protected for use in exposed, heavily polluted, salty, corrosive and humid coastal atmosphere.

The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months. The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1 g.

#### 4. GENERAL TECHNICAL REQUIREMENTS:

| SL. NO. | TECHNICAL PARTICULARS                        | DESIRED VALUE                                                     |                                        |                                        |                                        |
|---------|----------------------------------------------|-------------------------------------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|
|         |                                              | 100X50X5 mm                                                       | 75X40x4.8 mm                           | 65X65X6 mm                             | 50X50X6 mm                             |
| 1       | Material                                     | Hot-Dip Galvanized Channel                                        | Hot-Dip Galvanized Channel             | Hot-Dip Galvanized Angle               | Hot-Dip Galvanized Angle               |
| 2       | Relevant Standard                            | IS: 2062, IS: 2633, IS: 2629, IS: 4759                            | IS: 2062, IS: 2633, IS: 2629, IS: 4759 | IS: 2062, IS: 2633, IS: 2629, IS: 4759 | IS: 2062, IS: 2633, IS: 2629, IS: 4759 |
| 3       | Make                                         | SAIL, JINDAL, RINL & TATA<br>(Billet with re rolling not allowed) |                                        |                                        |                                        |
| 4       | Grade of Steel                               | E 250 A                                                           | E 250 A                                | E 250 A                                | E 250 A                                |
| 5       | Minimum Tensile Strength in Mpa              | 410                                                               | 410                                    | 410                                    | 410                                    |
| 6       | Yield Stress in Mpa                          | 250                                                               | 250                                    | 250                                    | 250                                    |
| 7       | Percentage Elongation (Min.) at Gauge Length | 23%                                                               | 23%                                    | 23%                                    | 23%                                    |

|                                                                                                                                                                    |                                                                                                                                                                    |                                                                                                                                              |
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| SL. NO. | TECHNICAL PARTICULARS                                 | DESIRED VALUE                              |                                            |                                            |                                            |
|---------|-------------------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|
|         |                                                       | 100X50X5 mm                                | 75X40x4.8 mm                               | 65X65X6 mm                                 | 50X50X6 mm                                 |
| 8       | Bend Test (Internal Dia)                              | Min-2t                                     | Min-2t                                     | Min-2t                                     | Min-2t                                     |
| 9       | Mass of Zinc Coating                                  | Min 705 gm/m <sup>2</sup>                  | Min 705 gm/m <sup>2</sup>                  | Min 705 gm/m <sup>2</sup>                  | Min 705 gm/m <sup>2</sup>                  |
| 10      | Zinc Coating Thickness & No of Dips                   | Min. 100 Micron at every point with 6 Dips | Min. 100 Micron at every point with 6 Dips | Min. 100 Micron at every point with 6 Dips | Min. 100 Micron at every point with 6 Dips |
| 11      | Chemical composition                                  | Grade: E 250 A (As per IS: 2062)           | Grade: E 250 A (As per IS: 2062)           | Grade: E 250 A (As per IS: 2062)           | Grade: E 250 A (As per IS: 2062)           |
| 12      | Standard length of supply For Channel and Angles only | 6 Metre Long                               |                                            |                                            |                                            |
| 13      | Tolerances                                            | As per IS 1852 latest Amendment            |                                            |                                            |                                            |

## 5. GENERAL CONSTRUCTION:

The Chemical composition and Physical properties of the finished material shall be as per the equivalent standards. Chemical Composition and Physical Properties shall conforming to IS: 2062. The approved makes are SAIL, JINDAL, RINL & TATA (Billet with re rolling not allowed). Mass of the Channel and Angles are as follows:-

- 100x50x5 mm:- 9.56kg/m
- 75x40x4.8 mm:- 7.14kg/m
- 65x65x6 mm:- 5.8kg/m
- 50x50x6 mm:-4.5kg/m

### 5.1 CHEMICAL COMPOSITION

Chemical composition for E 250 A Grade

- C - 0.23% Max
- Mn - 1.5% Max
- S - 0.045% Max
- P - 0.045%Max
- SI - 0.40% Max
- CE (Carbon Equivalent)- 0.42%

|                                                                                  |                                                                                                                                                           |
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## 5.2 Galvanization:

All the channels and angles shall be hot dip galvanized, are as following:

- a) All galvanizing shall be carried out by the hot dip process, in accordance with Specification IS 2629.
- b) The zinc coating (Min 705 gms per sq.mt / Min. 100 Micron at every point with 6 Dips) shall be smooth, continuous and uniform. It shall be free from acid spot and shall not scale, blister or be removable by handling or packing.
- c) There shall be no impurities in the zinc or additives to the galvanic bath which could have a detrimental effect on the durability of the zinc coating. Purity of zinc shall be Zn 99.95% or better.
- d) In the event of damage to the galvanizing the method used for repair shall be subject to the approval of the Engineer in Charge or that of his representative. Repair of galvanization at site will not be permitted in any situation.
- e) Partial immersion of the work shall not be permitted and the galvanizing tank must therefore be sufficiently large to permit galvanizing to be carried out by one immersion.
- f) After galvanizing no drilling or welding shall be performed on the galvanized parts. To avoid the formation of white rust galvanized materials shall be stacked during transport and stored in such a manner as to permit adequate ventilation. Sodium dichromate treatment shall be provided to avoid formation of white rust after hot dip galvanization. The galvanized steel shall be subjected to test as per IS-2633.
- g) Quality of Hot Dip Galvanization should comply with IS 2629, ISO 1461 & should be guaranteed for any type of damage due to harsh climatic condition for 5 Years. These channels and angles are to be used in coastal areas of Odisha where climate is hot, humid & saline. These areas are prone to flood & frequent rainfall.

## 6. MARKING:

Following distinct non-erasable embossing is to be made on each Channel and Angles and top Bracket to be supplied to TPCODL/TPNODL/TPWODL/TPSODL under this Tender.

- a) Manufacturer Name/ Trade Mark
- b) E-250 A

Engraved Marking (Punching before galvanization)

- a) "TPCODL/TPNODL/TPWODL/TPSODL"
- b) Year of manufacturing
- c) PO Number

## 7. TESTS:

The bidder shall be required to submit complete set of the following test reports along with the offer:

### 7.1 ACCEPTANCE TESTS

- i) Chemical Composition
- ii) Mechanical Properties
- iii) Dimension Test & Weight (kg/M) Visual Examination,
- iv) Test in respect of Hot Dip Galvanization i.e. Thickness of zinc coating in microns
- v) Mass of Zinc Test

### 7.2 ROUTINE TESTS

Same as Acceptance Test

### 7.3 TYPE TESTS

- i) Chemical Composition
- ii) Mechanical Properties
- iii) Test in respect of Hot Dip Galvanization i.e. thickness of zinc coating in microns

## 8. TYPE TEST CERTIFICATES:

The Bidder shall furnish the type test certificates for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at **CPRI/ERDA** as per relevant IS. However, TPCODL/ TPWODL/ TPNODL/ TPSODL. TATA-POWER reserves the right to allow any other NABL accredited/ Govt. lab report under exceptional circumstances after due diligence/ scrutiny by DISCOM. Type tests should have been conducted during the period not exceeding 5 years from the date of opening the bid. In the event of any discrepancy in the test reports, i.e. any test report not acceptable, same shall be carried out without any cost implication to TPCODL/ TPWODL/ TPNODL/ TPSODL.

## 9. PRE-DISPATCH INSPECTION:

The material shall be subject to inspection by a duly authorized representative of the TPCODL/TPNODL/TPWODL/TPSODL. Inspection may be made at any stage of manufacture at the discretion of the purchaser and the equipment, if found unsatisfactory as to workmanship or material, the same is liable to rejection. Bidder shall grant free access to the places of manufacture to TPCODL/TPNODL/TPWODL/TPSODL's representatives at all times when the work is in progress. Inspection by the TPCODL/TPNODL/TPWODL/TPSODL or its authorized

representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPCODL/TPNODL/TPWODL/TPSODL.

Following documents shall be sent along with material.

- a) Test reports
- b) MDCC issued by TPCODL/TPNODL/TPWODL/TPSODL
- c) TPCODL/TPNODL/TPWODL/TPSODL Invoice in duplicate
- d) Packing list
- e) Drawings & catalogue
- f) Guarantee / Warrantee card
- g) Delivery Challan
- h) Other Documents (as applicable).

#### **10. INSPECTION AFTER RECEIPT AT STORE:**

The material received at TPCODL/TPNODL/TPWODL/TPSODL, Odisha store will be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Engineering department.

#### **11. GUARANTEE:**

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/manufacturing of items under the contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Company up to a period of 54 months from the date of commissioning or 60 months from the date of last supplies made under the contract, whichever is earlier, supplier shall be liable to undertake to replace/rectify such defects at his own costs. within mutually agreed timeframe, and to the entire satisfaction of the Company, failing which the Company will be at liberty to get it replaced/rectified at supplier's risks and costs and recover all such expenses plus the Company's own charges (@ 20% of expenses incurred), from the supplier or from the "Security cum Performance Deposit" as the case may be.

Galvanization Guarantee- Quality of Hot Dip Galvanization should be guaranteed for any type of damage due to harsh climatic condition for 5 Years.

#### **12. PACKING:**

Supplier shall ensure that all material covered by this specification shall be prepared for rail/road transport (local equipment) and be packed in such a manner as to protect it from damage in transit. The bidder shall provide instructions regarding handling and storage precautions to be

taken at site.

**13. TENDER SAMPLE:**

The Bidder shall provide 1 no. sample of the product. The product will be accepted only if it meets all specifications as defined in the document.

**14. QUALITY CONTROL:**

The bidder shall submit QAP indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The Purchaser's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections.

**15. TESTING FACILITIES:**

Supplier/ Manufacturer shall have adequate in house testing facilities for carrying out all routine tests & acceptance tests as per relevant Indian standards.

**16. MANUFACTURING FACILITIES:**

The successful bidder shall submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart should be in line with the Quality assurance plan submitted with the offer.

**17. SPARES, ACCESSORIES AND TOOLS**

Not applicable.

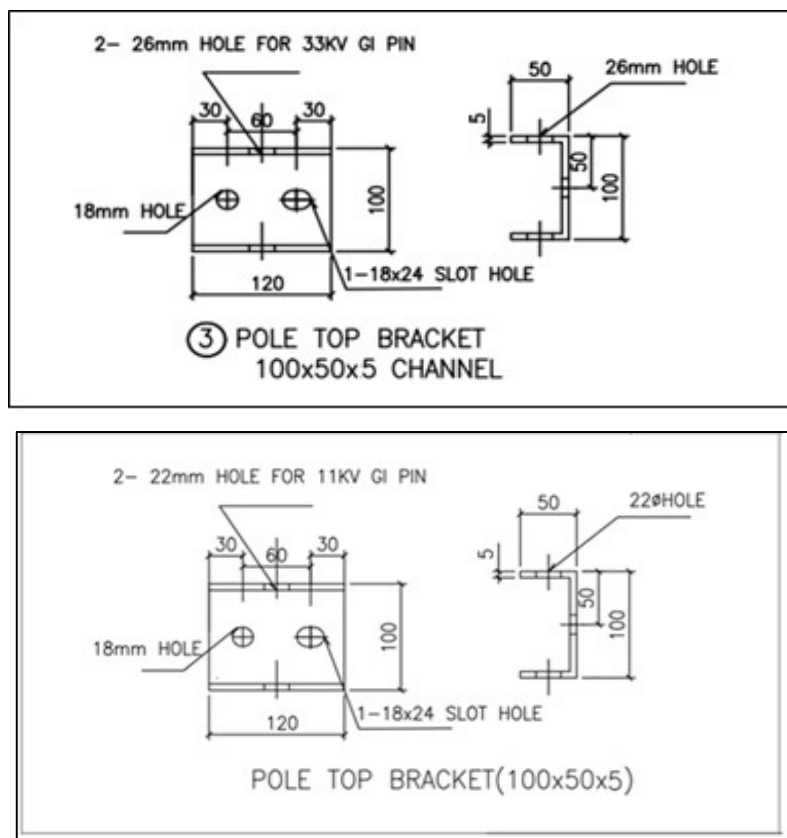
**18. DRAWINGS AND DOCUMENTS:**

Following drawings and documents shall be submitted in line with the requirement of Tender specifications:

- a) Completely filled in Schedule "A" Guaranteed Technical Particulars & Schedule "B" Deviations
- b) Work Experience details
- c) Type test certificates.
- d) Drawing 1 set of Hard Copy & Soft copy PDF File containing complete information about manufacturing.

**Specification Name:**

Technical Specification For GI Channel & Angle,  
GI Top Bracket



**Note:-** The Drawing is for Tender Purpose Only.

**19. SCHEDULE- “A” GUARANTEED TECHNICAL PARTICULARS:**

| SL. NO. | TECHNICAL PARTICULARS                        | To Be Furnished By The Bidder |              |            |            |
|---------|----------------------------------------------|-------------------------------|--------------|------------|------------|
|         |                                              | 100X50X5 mm                   | 75X40x4.8 mm | 65X65X6 mm | 50X50X6 mm |
| 1       | Material                                     |                               |              |            |            |
| 2       | Relevant Standard                            |                               |              |            |            |
| 4       | Make                                         |                               |              |            |            |
| 5       | Grade of Steel                               |                               |              |            |            |
| 6       | Minimum Tensile Strength in Mpa              |                               |              |            |            |
| 7       | Yield Stress in Mpa                          |                               |              |            |            |
| 8       | Percentage Elongation (Min.) at Gauge Length |                               |              |            |            |
| 9       | Bend Test (Internal Dia)                     |                               |              |            |            |
| 10      | Mass of Zinc Coating                         |                               |              |            |            |

| SL. NO. | TECHNICAL PARTICULARS                                 | To Be Furnished By The Bidder |              |            |            |
|---------|-------------------------------------------------------|-------------------------------|--------------|------------|------------|
|         |                                                       | 100X50X5 mm                   | 75X40x4.8 mm | 65X65X6 mm | 50X50X6 mm |
| 11      | Zinc Coating Thickness & No of Dips                   |                               |              |            |            |
| 12      | Standard length of supply for channel and angles only |                               |              |            |            |
| 13      | Tolerances                                            |                               |              |            |            |

## 20. SCHEDULE "B" DEVIATIONS:

### (TO BE ENCLOSED WITH TECHNICAL BID)

All deviations from this specification shall be set out by the Bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the purchaser's specifications:

| SL. No | Clause No. | Details of deviation with justifications |
|--------|------------|------------------------------------------|
|        |            |                                          |

We confirm that there are no deviations apart from those detailed above.

Seal of the Company:

Signature

Designation