

 ISG-BANGALORE	Enquiry Technical Specification For Cable Tray Support Fixing - Hardware & Accessories	Specification No. IS-1-16-2003/060 Rev. No 0
Name of Project: 1X250 MW PP-II EXPANSION AT ROURKELA		
Name of Customer: NTPC SAIL POWER COMPANY LIMITED		

BHARAT HEAVY ELECTRICALS LIMITED
INDUSTRIAL SYSTEMS GROUP, BANGALORE

**ENQUIRY TECHNICAL SPECIFICATION FOR
CABLE TRAY SUPPORT – FIXING HARDWARE & ACCESSORIES
PROJECT: 1 X 250 MW NSPCL ROURKELA PP-II EXPANSION PROJECT**

Prepared by	Checked by	Approved by
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SECTION – I

PROJECT INFORMATION AND POWER SUPPLY SYSTEM

A. PROJECT INFORMATION:

1. Location & Land Availability:

The proposed unit of 1 X 250 MW will be installed on the western side of existing 2 X 60 MW units within the boundary of Rourkela Steel Plant in Sundergarh district of Orissa. Approximately 80 acres of land is available for construction of main plant and accessories. Presently most of land is filled with blast furnace slag. The main power house building of proposed unit of 1 x 250 MW will be located on western side of existing 2 x 60 MW switch yard. The indicative latitude & longitude of the proposed site is as follows:

- Latitude: 22°13'19" N
- Longitude: 84°53'51" E

2. Availability of Infrastructure Facilities

- **Road** - The site is connected by road of NH-23 through a link road from a road junction at Panposh located approx. 10 KM from proposed site.
- **Railway siding** - The nearest railway station Rourkela is situated about one km from the proposed plant site. A new railway siding will be developed for receiving coal from the source.
- **Airport/Air strip** - The nearest airport is at Ranchi which is about 170 KM by rail and 225 KM by road from the proposed site.
- **Seaport** - The nearest seaport is at Paradip (Orissa) which is around 400 Kms from the proposed site.

3. Climatological Data

The following meteorological data shall be taken into account for design of plant and equipment. Site conditions shall be assumed to be as follows for tender purpose.

- | | | |
|------|--|--|
| i. | Average elevation above mean sea level : | 194m |
| ii. | Barometric pressure | : 983 mb |
| iii. | Ambient temperature | |
| | a. Absolute maximum | : 48 deg C |
| | b. Absolute minimum | : 06 deg C |
| iv. | Relative humidity (Maximum) | : 65 % |
| v. | Annual Average Rainfall | : 2656.6 mm |
| vi. | Heaviest in 24 Hrs. | : 257.8 mm |
| vii. | Seismic Zone | : Zone-II (As per latest Revision of IS 1893 /2002) Part-I |

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B. POWER SUPPLY SYSTEM

1. H.T. Supply

- i. Motors above 160 KW for CHP and 200KW for remaining areas and also LT Transformers (6.6KV/415V)

Voltage & Frequency	6600 V AC, 3ph, 3W, 50 Hz
Voltage variation	±10%
Frequency variation	±5%
Combined Voltage & frequency variation	10% (absolute sum)
Fault level	40 KA symm. for 1 sec.
Earthing	non-effectively earthed

2. L.T. Supply

- i. Motors and loads up to 160 KW for CHP and 200KW for remaining areas and lighting transformers (1:1)

Voltage & Frequency	415V AC, 3 phase , 4W, 50 Hz
Voltage variation	±10%
Frequency variation	±5%
Combined Voltage & frequency variation	10% (absolute sum)
Fault level	50 KA symm. for 1 sec.
Earthing	effectively earthed

- ii. Control, Protection & Metering for LT Switchgear/MCC/Control Panel

Voltage & Frequency	110V AC, 1 phase, 50 Hz
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- iii. Motors upto 200W, Lighting, space heaters and A.C. control & protective devices (other than mentioned in point b above)

Voltage & Frequency	240V AC, 1 phase, 2W, 50 Hz
Voltage variation	±10%
Frequency variation	±5%
Combined Voltage & frequency variation	10% (absolute sum)
Earthing	effectively earthed

- iv. UPS power supply for DCS/PLC, control & instrumentation

Voltage & Frequency	240V AC, 1 phase, 2W, 50 Hz stabilized supply through UPS system
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- v. Maintenance Lighting

Voltage	24V AC
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3. DC Supply

- i. D.C. alarm, control & protective devices, DC motors, Emergency lighting

Voltage	220V DC, 2W
Fault level	25 KA
Earthing	unearthed

- ii. Control & Instrumentation

Voltage	24V DC
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For the purpose of design an ambient temperature of 50 deg. C and relative humidity of 95% shall be considered.

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SECTION – II

APPLICABLE STANDARDS

All equipment shall conform to the latest edition of the following standards and codes. Other internationally acceptable standards/codes, which ensure equal or higher performance than those specified, shall also be accepted. Nothing in this specification shall be constructed to relieve the contractor of the required statutory responsibility.

All standards, specifications and codes of practice referred to herein shall be the latest editions including all applicable official amendments and revisions as on date of opening of bid.

The Cable Tray Support – Fixing hardware & accessories shall be manufactured and tested in accordance with following:

1. IS 4759 Hot-dip zinc coatings on structural steel and other allied products
2. IS 1079 Hot Rolled carbon steel sheet & strips
3. IS 1852 Rolling and cutting tolerances for hot rolled steel products
4. IS 1573 Electroplated Coatings of Zinc on Iron and Steel
5. IS 2633 Methods for testing uniformity of coating of zinc coated articles
6. IS 1367 Part-13 Technical supply conditions for threaded Steel fasteners. (Hot dip galvanized coatings on threaded fasteners).
7. IS 2629 Recommended practice for hot-dip galvanizing of iron and steel
8. IS 6745 Methods for determination of mass of zinc coating on zinc coated iron & steel articles.
9. IS 513 Cold rolled low carbon steel sheets and strips
10. IS 3063 Fasteners - Single coil rectangular section spring lock washers
11. IS: 2062 for Structural steel.
12. IS: 1730 for dimensions for steel sheet and strip.
13. IS: 1363 for Hexagon head bolts, screws and nuts.
14. IS: 5 for colours of paint.
15. IS: 6005 for surface pre-treatment.
16. Indian Electricity Rules 1956

Note:

- i. This above list is not exhaustive. Standards not listed above but are applicable also to be followed to meet requirement.
- ii. The material shall comply with all currently applicable safety codes and statutory regulations of India as well as of the locality where the material is to be installed.
- iii. The design, material, construction, manufacture, inspection, testing and performance of Cable Tray Support System (Boltable Type) shall conform to the latest revision of relevant standards and codes of practices.
- iv. In case of conflict between the applicable reference standard and this specification, this specification shall govern.

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SECTION – III
SCOPE OF SUPPLY

The Scope of Supply includes Design, manufacture, Inspection and testing at manufacturer's works, proper packaging and delivery to site of Cable Tray Support – Fixing hardware & Accessories as tabulated below conforming to the specification. **Galvanization to be carried out at NTPC approved Galvanizers only. List of Approved Galvanizers is enclosed as Annexure-B.**

SL NO	ITEM DESCRIPTION	QUANTITY	UNIT	REMARK
1	DOUBLE CHANNEL (DC1) (1PC = 6M LENGTH)	25	PIECES	Refer Annexure-A for drawing
2	BASE PLATE FOR SINGLE CHANNEL (BP1)	6000	Nos	
3	BASE PLATE FOR DOUBLE CHANNEL (BP2)	120	Nos	
4	90 DEGREE ANGLE FITTING (LA1)	11150	Nos	
5	90 DEGREE ANGLE FITTING (HL1)	50	Nos	
6	BEAM CLAMP (BC1)	100	SET	
7	BC1 ACCESSORIES - M10 U-BOLT (110MM)	100	Nos	
8	BC1 ACCESSORIES - PLAIN WASHER SUITABLE FOR M10	100	Nos	
9	BC1 ACCESSORIES - NUT SUITABLE FOR M10	100	Nos	
10	BC1 ACCESSORIES - SET SCREW M10X40	200	Nos	
11	M12 SPRING NUT ASSEMBLY (BELOW THREE ITEMS ARE TO BE ASSEMBLED TOGETHER AS PER DRAWING)			
11.1	M12 BOLT	13000	Nos	
11.2	M12 SPRING NUT	13000	Nos	
11.3	M12 WASHER	13000	Nos	
12	ANCHOR FASTNER	300	Nos	
13	WASHER SET (OD-18MM, ID-8MM)	12000	SET	

NOTE:

- Bidder to quote as per this technical specification and all enclosed annexures. **TECHNICAL DEVIATIONS ARE NOT ACCEPTABLE. BIDDER MAY ASK FOR CLARIFICATIONS BEFORE OFFER SUBMISSION.**
- Bidder to furnish unit price for each item. The unit prices shall be operated in case of addition/deletion in quantity during detail engineering.
- Bidder shall furnish the prices strictly as per the Price format furnished in NIT.
- Bidder to note that the acceptance of the offer is subjected to the "Bidder approval from our customer (NSPCL)/consultant (MECON)" and BHEL/Customer reserves the right to reject offer of any bidder based on their poor/ non-performance in past/ present projects/ orders.
- Incase Bidder is not an approved supplier of NSPCL/NTPC, he has to furnish required information along with credentials/details required for seeking approval of customer. In case customer does not approve the credentials of the bidder, the bidder will be technically rejected.
- The bidder to ensure procurement of steel from main producers like SAIL/TISCO/Rastriya Ispat/Ispat Ind. / Jindal/ Essar/Lloyds/IIS Co. and Zinc from Hindustan Zinc Ltd.**
- Welding shall be done by qualified welders.

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8. Pre-treatment of accessories shall be carried out in seven tank process as per IS: 2629. All the process parameter e.g. Concentration, temperature, density etc. to be maintained and recorded by the Galvaniser.
9. The process of pre-treatment shall be verified by NTPC on surveillance basis during inspection.

SECTION – IV TECHNICAL SPECIFICATION

1. Refer **Annexure-A** for drawings of Cable Tray Support, Fixing hardware & Accessories.
2. Cable Tray Support, Fixing hardware & Accessories shall be hot dip galvanized as per IS 2629, IS:4759 & IS:2633.
3. Galvanizing shall be uniform, clear, smooth and free from acid spots. In case the galvanizing of any of the samples is found defective; the entire batch of steel will be re-galvanize by the Bidder without any extra cost to BHEL/Customer.
4. The amount of zinc deposited shall not be less than 610 gms per square meter of surface area & in addition the thickness of the zinc deposit at any spot whatsoever, shall not be less than 75 microns. Customer reserves the right to measure the thickness of zinc deposit and reject any component which shows thickness of zinc at any location to be less than 75 microns.
5. Removal of extra zinc on threaded portion of bolts, nuts and washers shall be carefully done to ensure that the threads shall have the required zinc coating on them as specified.
6. All fabrication shall be free from sharp edges.
7. Cable Trays Support, Fixing Hardware & Accessories shall be supplied as per this drawings.
8. All finished galvanized MS structural members for Cable Tray Support, Fixing Hardware & Accessories shall be free from sharp edges, corners, burs & unevenness.
9. Necessary fasteners shall be provided as specified in enclosed reference drawings.
10. All welded joints of Cable Tray Support shall be smooth enough to provide a good appearance & shall not cause any injury to working personnel. All welding work shall be done by skilled personnel.
11. All Nuts, bolts, washers etc shall be hot dip galvanized as per IS 1367 for sizes above 12mm and electroplated/electrogalvanized from size below 12mm.

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12. CABLE TRAY SUPPORT, FIXING HARDWARE & ACCESSORIES

12.1 DETAILS

i.	Tray support type	Boltable type
ii.	Material	Hot/ Cold Rolled MS sheet steel for channel SC1 and channel portion of cantilever arms
iii.	Make	SAIL/TISCO/ RINL / JINDAL STEEL/ JINDAL ISPAT/ BHUSHAN STEEL/ ESSAR/ LLOYD/ IISCO or authorized re-rollers of SAIL
iv.	Thickness	2.5mm
v.	Length	Standard length of 6 meters
vi.	Fabrication	At works

12.2 SURFACE TREATMENT (GALVANIZING)

i.	Pre-treatment	As per IS 2629 prior to galvanisation
ii.	Type	Hot dip galvanization
iii.	Applicable Standard	IS 2629
iv.	Minimum thickness	75 microns (minimum), 86 micron (average)
v.	Min. weight of Zinc deposit	610 gms. per square meter
vi.	Tests for galvanizing:	a. Weight of zinc coating as per IS : 6745 b. Thickness of zinc coating as per IS : 4759 c. Uniformity of zinc coating as per IS : 2633 d. Adhesion as per IS: 2629

13. PACKING AND TRANSPORTATION

The material shall be packed to ensure protection against damage during transit, storage for prolonged periods and handling. The customer / inspector shall have the right to insist for completion of works before dispatch of materials for transportation.

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SECTION – V INSPECTION AND TESTING

1. QUALITY/INSPECTION:

- i. REFERENCE QAP is enclosed as **Annexure-E**: Reference QAP for Cable Tray Support System – Fixing hardware & Accessories. BHEL shall provide the already approved copy of the same QAP to the successful bidder. The successful bidder shall submit the same QAP along with endorsement sheet for BHEL/ MECON/NSPCL approval. Bidders to note that the QAP is already approved by MECON/NSPCL for other Cable Tray Support System supplier for this project. There shall be no commercial implication to BHEL on account of QAP approval.
- ii. All materials shall be procured, manufactured, inspected and tested by Bidder as per approved quality plan.
- iii. The supplier shall perform all tests necessary to ensure that the material and workmanship conform to the relevant standards and comply with the requirements of the specification. Charges for all these tests for all the equipment & components shall be deemed to be included in the bid price.
- iv. Inspection shall be witnessed by BHEL/MECON/NSPCL/NTPC. Inspection call shall be given along with internal test certificate at least 2 weeks in advance.

2. TEST CERTIFICATE:

Following Test Certificates shall be submitted during inspection for review:

- i. Welding Test certificate
- ii. Material Test certificate
- iii. Galvanizing Test Certificate

Certified reports of all tests carried out at works shall be furnished for approval of BHEL/MECON/NSPCL.

3. TEST ON CABLE TRAY SUPPORT SYSTEM (BOLTABLE TYPE)

The tests shall be in accordance with appropriate Indian Standards. The extent of the tests to be performed by the bidder shall include but not be limited to the following: -

i. TYPE TEST:

Cable Tray Support System (Boltable Type) shall be of proven type & type tested design conforming to type tests as under:

- a. Load test for Main support channel with cantilever arm fixed on one side
- b. Load test for Main support channel with cantilever arm fixed on both sides
- c. Load test for Channel fixed on Beam/Floor
- d. Load test for channel supported on wall with Cantilever arm
- e. Channel insert test
- f. Channel nut slip characteristics (wherever applicable)
- g. Weld integrity test
- h. Test for galvanizing: Weight, thickness and uniformity of zinc coating shall be determined in accordance with IS: 6745 and IS: 2633 for the values indicated in Data Sheet- A.

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Type testing shall be carried out for tests listed at "(a) through (g)" above in line with Type test procedure attached as **Annexure-D**. The final type test procedure shall be subjected to BHEL/customer approval.

Type tests listed at (a) through (g) shall be conducted once. However, type test listed at (h) shall be conducted on each lot offered for inspection.

In case of non-availability of valid type test report/ non-acceptance of submitted report by NSPCL/MECON, bidder has to conduct the type test without any commercial implication. Further, the material required (Cable tray etc.) for conducting the type test shall be in the scope of bidder. No additional cost shall be payable for this purpose.

ii. ROUTINE TESTS:

- a. Routine tests as per specification and applicable standards shall be carried out on all requirements/items covered in the specification.
- b. Physical & dimensional check on all equipment as per approved drawings/standards.
- c. Check/measurement of thickness of paint/zinc coating/nickel-chrome plating as per specification & applicable standard.

iii. ACCEPTANCE TEST:

- a. Dimension checks
- b. Tests for galvanizing

4. MATERIAL CONSUMPTION:

Any material consumption during inspection and testing shall be to Bidder account. No additional cost shall be payable for this purpose.

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SECTION – VI DOCUMENTATION

1. DOCUMENTS REQUIRED ALONG WITH OFFER:

1.1 The following documents shall be submitted along with the offer

- i. Signed and stamped copy of complete enquiry technical specification including all annexures.
- ii. Unpriced Bid enclosed in NIT shall be duly filled as “QUOTED” against each item with signature and stamp by the bidder. The unpriced bid shall be submitted along with the offer without which the offer is liable for rejection.
- iii. “DEVIATION FORMAT” indicating “NIL DEVIATION” shall be submitted along with the offer.
- iv. Compliance certificate as per **ANNEXURE-F**.

2. DOCUMENTS REQUIRED AFTER AWARD OF ORDER:

2.1 The following Drawings / Documents shall be submitted during the course of detailed engineering / erection / commissioning / testing as applicable.

Sl.No.	Description	Category	Time Schedule
1.	QAP of Cable Tray Support System, Fixing hardware & accessories	For approval	Within 15 days of LOI
2.	GA/ DATASHEET/ BOM of Cable Tray support system (Boltable Type)	For approval	Within 15 days of LOI
3.	Type test procedure including Typical details of type test arrangement	For approval	Within 15 days of LOI
4.	Test Certificates/ Inspection Reports	For review	Along with Inspection Call
5.	Packing List	For information	

Notes:

1. All drawings, documents and catalogues shall be available in soft copy.
2. Manually prepared drawings are not acceptable.
3. Soft copy of all drawings / documents shall be submitted along with final / as-built submission.
4. For all technical tables, diagrams, calculations, results, drawings, test data and scales adopted in the design the standard international unit system (SI) as per International Standardization Organization (ISO) shall be uniformly employed.
5. All engineering documents and drawings shall be of international A series size, i.e., of A0, A1, A2, A3 and A4.

The documents shall show the following particulars:

Name of customer : NTPC SAIL POWER COMPANY LIMITED
Project Title : 1X250 MW PP-II EXPANSION AT ROURKELA
Supplier's reference number :