



BHARAT HEAVY ELECTRICALS LIMITED

TRANSMISSION BUSINESS HVDC ENGINEERING & SYSTEMS

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TITLE		NAME	NS	SKS	AG	
Trench Material - Perforated Tray and Cover		DATE	04/08/20	04/08/20	04/08/20	
		GROUP	HVDC	W.O. No	Awaited	

CUSTOMER *POWERGRID FATEHGARH TRANSMISSION LIMITED- A 100% wholly owned subsidiary of Power Grid Corporation of India Limited*

PROJECT Substation Package - SS02 for (i) 765kV Fatehgarh-2 (PG) S/S Extension and (ii) 765kV Bhadla-2 (PG) S/s Extension under Transmission System Associated With LTA applications from Rajasthan SEZ Part-B (Rajasthan SEZ Part-B Project) through Tariff Based Competitive Bidding (TBCB) Route

NOA NO. FTL/765kV/SS02/NOAI/2(I) For Supply of Goods Contract Dated 05-11-19 & FTL/765kV/SS02/NOAI/2(II) For Supply of Service Contract Dated 05-11-2019

Station Fatehgarh-2, Rajasthan and Bhadla-2, Rajasthan

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Rev No.	Date	Altered	Checked	Approved	REVISION DETAILS
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SECTION-1

Scope, Bill of Quantity, Specific Technical Requirements

1.1 Scope

This technical specification covers the requirements of design, manufacture, testing at works, packing and dispatch of Cable Tray Material complete with accessories as listed below.

In case of any conflict between the technical details mentioned in this section and the remaining sections of this document, then Section-1 shall prevail and is to be considered as binding requirement. The order of precedence in case of any conflict shall be section 1, section 2 & section 3 in that order.

Note: The terms used in this specification namely, “Employer/Purchaser” refers to Powergrid, “Contractor” refers to BHEL & “Sub-contractor” refers to successful bidder.

The equipment is required for the following project:

Name of the customer : **POWERGRID FATEHGARH TRANSMISSION LIMITED- A 100% wholly owned subsidiary of Power Grid Corporation of India Limited**

Name of the project : **Substation Package - SS02 for (i) 765kV Fatehgarh-2 (PG) S/S Extension and (ii) 765kV Bhadla-2 (PG) S/s Extension under Transmission System Associated With LTA applications from Rajasthan SEZ Part-B (Rajasthan SEZ Part-B Project) through Tariff Based Competitive Bidding (TBCB) Route**

Site : **Fatehgarh-II, Rajasthan & Bhadla-II, Rajasthan**

Refer Section - III for Project Details and General Specifications.



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1.2 Bill of Quantities

S.No.	Description	Unit	Qty (Fatehgarh II)	Qty (Bhadla II)
1	Perforated type GI cable tray 2.5 m long, 150mm wide, 100 mm high, 2 mm thick, along with 2 Nos. side plate and 16 Nos., M8 bolts with nuts and washers for coupling two trays.	MT	1.1	0.75
2	GI covers (1.2mm thick) for 150mm wide perforated type cable tray alongwith fixing hardware and accessories including nut bolt & washers	MT	0.4	0.3

Notes:

1. Quantity Variation: Total PO value may vary by $\pm 30\%$, however individual items can vary to any extent.
2. 10% extra hardware shall be supplied.
3. Typical drawing of perforated cable tray are enclosed.

1.3 Specific Technical Requirements

Technical Parameters (Cable Tray)

Material of cable trays:	Galvanised Iron
Thickness of sheet metal for trays & fittings etc:	2 mm Min.
Whether Ladder type or perforated type	Perforated type
Accessories:	2 Nos. side plate and 16 Nos., M8 bolts with nuts and washers

1.4 Drawings and Engineering Documents

The successful bidder shall have to extend all possible supports like timely submission/resubmission of drawings, visit to end customer to facilitate documents approval without any commercial implications to BHEL. Acceptance of bidder's documents shall be subject to end customer approval.



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Date of Submission of first lot of drawings will be counted only from the date of submission of reasonably correct drawings. List of drawings required for technical clearance of manufacturing are as follows:

1. Approved Drawing, GTP & BOM.

1.5 Quality Plan

Bidder should have POWERGRID approved and valid SMQP by the date of technical bid opening.

1.6 Deviations

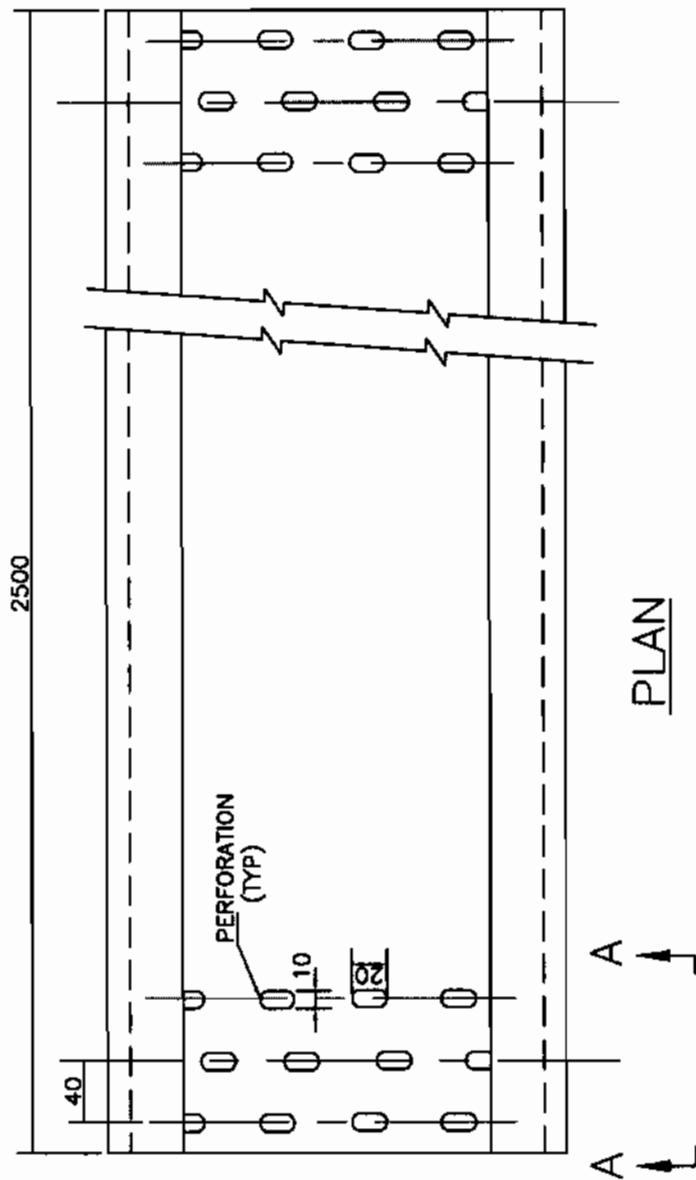
The bidder shall list all the deviation from the specification separately. Offers without specific deviation will be deemed to be totally in compliance with the specification and NO DEVIATION on any account will be entertained at a later date.

TYPICAL PERFORATED TRAY

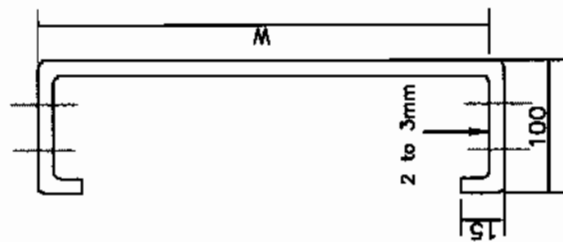
ANNEXURE-1

Doc. No. TB-XXX-316-041

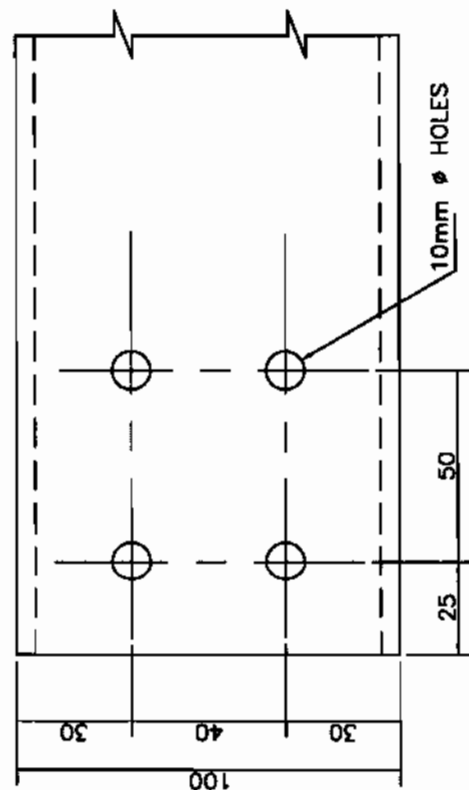
Page 1.4 of 1.6



PLAN



END VIEW

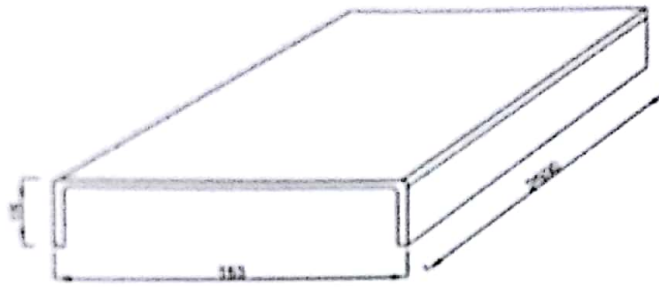


SECTION A-A

WIDTH W = 100 TO 750 MM IN INTERVAL OF 50 MM

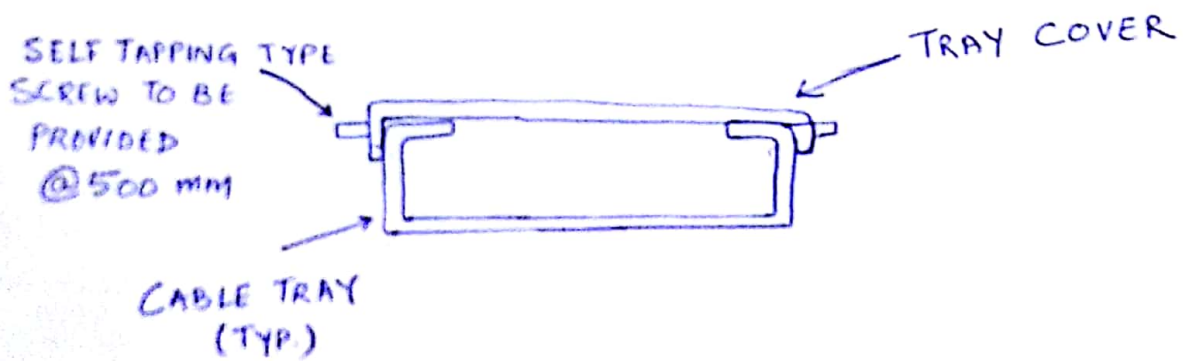
NOTE:

- 1) THE ABOVE DRAWING IS INDICATIVE ONLY.
- 2) BIDDER WILL HAVE TO SUBMIT THE ACTUAL DRAWINGS FOR EACH INDIVIDUAL PROJECT BASED ON THE INPUT FROM BHEL FOR CUSTOMER APPROVAL.



Cable Tray Cover
(1.2mm thick)

WIDTH OF CABLE TRAY	WIDTH OF COVER
150	153



SECTION VIEW



SECTION-2

STANDARD SPECIFICATION

2.1 GENERAL

This section covers the general technical requirements of Cable Tray Material. In case of any discrepancies between the requirements mentioned in this section and those specified in other sections of this specification, the latter shall prevail and shall be treated as binding requirements.

2.1.1 TECHNICAL PARAMETERS

CABLE TRAYS

Material of cable trays:	Galvanised
Thickness of sheet metal for trays & fittings etc:	2 mm thick
Whether Ladder type or perforated type:	Perforated
Mass of Zinc coating:	460 gm/m ²
Accessories:	Coupler Plates & Hardware for Tray interconnection and for fixing to supports

2.2 APPLICABLE STANDARDS

The Cable Trench Material shall conform to the following Indian Standards:

Steel for general structural purpose	IS:2062
Method for testing uniformity : of coating on Zinc coated articles	IS:2633
Recommended practice for hot dip : galvanising on iron & steel	IS:2629
Hot dip Zinc coating on structural : steel and other allied products	IS:4759
Method for determination of mass : of zinc coating on zinc coated iron and steel articles	IS:6745
Rolled steel beams, channel and :	IS:808



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angles

Rolling and Cutting tolerances for :
rolled steel products

IS:1852

Recommended practice for red oxide :
And zinc chromate on iron & steel

IS:2074

2.3 TECHNICAL REQUIREMENTS

- 2.3.1 The cable trays shall be perforated type.
- 2.3.2 The material (Mild Steel) used for the supply shall be in sound condition and of recent manufacture, free from defects, loose mill scale, slag, pitting, rust, etc.
- 2.3.3 The cable trays shall be hot dip galvanised.
- 2.3.4. Galvanising of the trays shall be done. The min. thickness of coating shall be 610 gm/m² for all items thicker than 6mm. For items with thickness lower than 5mm and upto 2mm requirement of coating thickness shall be 460 gm/m² as per relevant IS.
- 2.3.5 The trays shall not have sharp edges cuts, abrasions etc. and the zinc coating shall be adherent, smooth and reasonably bright, continuous and free from such imperfections as flux, ash, bare and black spot, pimples, lumpiness, rust stains, bulky white deposits and blisters.
- 2.3.6 All drilling, cutting, bending etc. of fabricated steel work shall be carried out before galvanising. After galvanising, no drilling or welding shall be performed on the galvanized parts of the equipment excepting that nuts may be threaded after galvanizing. Sodium dichromate treatment shall be provided to avoid formation of white rust after hot dip galvanisation.
- 2.3.7 Bolts and nuts shall be of steel with hexagonal head GWK make or equivalent approved supplier. All bolts shall be galvanised including threaded portions. The threaded portions of all bolts shall be cleared of smear by spinning / brushing. All washers and nuts shall also be galvanised but threading of nuts shall be oiled / greased.
- 2.3.8 All angles / flats etc. shall be cut with shearing machine / power hack-saw, cutting with gas welding is not permitted.
- 2.3.9 The tenderer shall indicate in his offer the final weight of the tray after punching and galvanising.
- 2.3.10 The galvanized steel shall be subjected to six one minutes dip in copper sulphate solution as per IS-2633.
- 2.3.11 Sharp edges with radii less than 2.5mm shall be able to withstand four immersions of the standard Preece test. All other coatings shall withstand six immersions.

2.4 TESTS

Details of tests for Cable Tray Material shall be as follows:

1. Dimensional and visual examination - As per BHEL approved drawing.
2. Mass of Galvanisation - IS: 6745
3. Test for galvanising (Acceptance Test) The test shall be done as per approved standards.



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4. Uniformity of zinc coating - IS: 2633

5. Deflection Test: (Type test)

A 2.5 M straight section of tray shall be simply supported at two ends. A uniform distributed load of 76 kg/M shall be applied along the length of the tray. The maximum deflection at the mid span shall not exceed 7 mm.

6. Adhesion test



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SECTION-3 GENERAL TECHNICAL REQUIREMENTS-SECTION 3 Site Information

S.No.	Particular	Details
a)	Owner	Fatehgarh-II Transco Limited- a 100% wholly owned subsidiary of Power Grid Corporation of India Limited
b)	Customer	Fatehgarh-II Transco Limited- a 100% wholly owned subsidiary of Power Grid Corporation of India Limited
c)	Project Title	Substation Package - SS02 for (i) 765kV Fatehgarh-2 (PG) S/S Extension and (ii) 765kV Bhadla-2 (PG) S/s Extension under Transmission System Associated With LTA applications from Rajasthan SEZ Part-B (Rajasthan SEZ Part-B Project) through Tariff Based Competitive Bidding (TBCB) Route
d)	Location	Fatehgarh-2, Rajasthan Bhadla-2, Rajasthan
e)	Transport Facilities	Road/Train Nearest Rail Head For Fatehgarh-2: Fatehgarh Nearest Rail Head For Bhadla-2: Nokha
SITE CONDITIONS		
a)	Max. ambient air temp.	50°C
b)	Min. ambient air temp.	0°C
c)	Max. design ambient temp.	50°C
d)	Design reference temp.	50°C
e)	Average Humidity	Max. 100%
f)	Special corrosion conditions	No
g)	Solar Radiation	1.2kW/sqmtr
h)	Atmospheric UV radiation	High
i)	Altitude above sea level	Less than 1000 meter above mean sea level (MSL)
j)	Pollution Severity	High Pollution level
k)	Seismic Zone	As per IS 1893 but not less than 0.3g horizontal
WIND DATA		
	Wind velocity	As per IS-875
	Average No. of thunderstorm days per annum	As per IS
Main Electrical Parameters:		
	Fault Levels:	765kV: 40kA for 1 sec
	Creepage Distance	25mm/kV for All Equipment i.e BPI/Bushings, CB, Isolator, CT, CVT, LA, WT, NCT etc. 31mm/kV for string insulators



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SECTION-4

GUARANTEED TECHNICAL PARTICULARS

To be submitted during contract execution stage as per TS requirement:

- 1.0 Name of the Project :
- 2.0 Tenderer's Name and Address :
- 3.0 Manufacturer's Name and Address:
- 4.0 Applicable Standards :
- 5.0 Application :
- 6.0 Material specification :
- 7.0 Thickness of sheet metal :
for cable trays, fittings etc.
- 8.0 Maximum permissible :
loading for a 2.5 m. long
simply supported at both ends
- 9.0 Corresponding deflection :
at centre, for the loading
as in 4.0 above
- 10.0 Weight of Zinc coating :
- 11.0 Length of single cable tray :
piece
- 12.0 Maximum permissible :
loading at another end of
tray.
- 13.0 Weight of Single piece :



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SECTION-5

CHECKLIST

CHECK LIST FOR INFORMATION TO BE FURNISHED WITH OFFER RETURN THIS CHECKLIST AS PART OF THE OFFER DULY SIGNED

The offer may not be considered if the following information and this Checklist are not enclosed with the Offer.

BHEL ENQUIRY. NO:

BIDDER OFFER REFERENCE:

(1) S.No.	(2) Parameter	(3) Requirement	(4) Yes / No	(5) Remarks in case reply in Col (4) is NO
1.	Equipment	Cable tray		
2.	Thickness of Tray	2 mm Min.		
a)	2.0 mm Min.		YES / NO	
3.	Type of cable-tray	Ladder/Perforated		
a)	Ladder type		YES / NO	
b)	Perforated type		YES / NO	
4.	Material certificate	As per Relevant Standard (cl.2.2)	YES / NO	
5.	Weight of zinc coating	460gm/m ²	YES / NO	
6.	Maximum permissible deflection at centre of 2.5m long tray simply supported at both ends after applying the uniformly distributed required load	≤7mm	YES / NO	
7.	Required accessories (as per cl. 1.1 of standard spec.)	Included	YES / NO	
8.	Conformance to the Applicable standard	As specified in Clause 2.2 of Section 2 (Standard Specification)	YES / NO	