

SL. NO.	ITEM CODE	ITEM DESCRIPTION	UOM	HSN CODE	QUANTITY	Quoted/ Not Quoted	Freight %	GST Type	GST Rate
<b>1.0</b>		<b>HOT DIP GALVANISED LADDER TYPE CABLE TRAY</b>							
a)	507-21101-A	CABLE TRAY 2MM THK LAD TYPE 150W	MTR	7308	700				
b)	507-21102-A	CABLE TRAY 2MM THK LAD TYPE 300W	MTR	7308	1750				
c)	507-21104-A	CABLE TRAY 2MM THK LAD TYPE 600W	MTR	7308	23800				
<b>2.0</b>		<b>HOT DIP GALVANISED PERFORATED TYPE CABLE TRAY</b>							
a)	507-21204-A	CABLE TRAY 2MM THK- PERFORATED TYPE 50W	MTR	7308	350				
b)	507-21005-A	CABLE TRAY 2MM THK- PERFORATED TYPE 100W	MTR	7308	500				
c)	507-21109-A	CABLE TRAY 2MM THK PER TYPE 150W	MTR	7308	700				
d)	507-21110-A	CABLE TRAY 2MM THK PER TYPE 300W	MTR	7308	700				
e)	507-21112-A	CABLE TRAY 2MM THK PER TYPE 600W	MTR	7308	7700				
<b>3.0</b>		<b>HOT DIP GALVANISED CABLE TRAY ACCESSORIES</b>							
<b>3.1</b>		<b>LADDER TYPE HORIZONTAL 90 DEG. BEND-600mm RADIUS</b>							
a)	507-21020-A	LAD HOR 90DEG BEND 600 RAD 150W	NOS	7308	2				
b)	507-21117-A	LAD HOR 90D BEND 2MM THK 600R 300W	NOS	7308	30				
c)	507-21119-A	LAD HOR 90D BEND 2MM THK 600R 600W	NOS	7308	375				
<b>3.2</b>		<b>LADDER TYPE VERTICAL 90 DEG. BEND-600mm RADIUS (INSIDE)</b>							
a)	507-21123-A	LAD VER 90D BEND 2MM THK 600R I/S 300W	NOS	7308	2				
b)	507-21125-A	LAD VER 90D BEND 2MM THK 600R I/S 600W	NOS	7308	103				
<b>3.3</b>		<b>LADDER TYPE VERTICAL 90 DEG. BEND-600mm RADIUS (OUTSIDE)</b>							
a)	507-21129-A	LAD VER 90D BEND 2MM THK 600R O/S 300W	NOS	7308	6				
b)	507-21131-A	LAD VER 90D BEND 2MM THK 600R O/S 600W	NOS	7308	85				
<b>3.4</b>		<b>LADDER TYPE TEES-600mm RADIUS</b>							
a)	507-21135-A	LAD TEES 600R 2MM THK 300W	NOS	7308	6				
b)	507-21137-A	LAD TEES 600R 2MM THK 600W	NOS	7308	275				
<b>3.5</b>		<b>LADDER TYPE CROSS-600mm RADIUS</b>							
a)	507-21141-A	LAD CROSS 600R 2MM THK 300W	NOS	7308	2				
b)	507-21143-A	LAD CROSS 600R 2MM THK 600W	NOS	7308	4				
<b>3.6</b>		<b>LADDER TYPE REDUCERS</b>							
a)	507-21148-A	LAD RED (50% LHS/RHS) 2MM THK 600-300W	NOS	7308	6				
<b>3.7</b>		<b>PERFORATED TYPE HORIZONTAL 90 DEG. BEND-600mm RADIUS</b>							
a)	507-21041-A	PER HOR 90DEG BEND 600 RAD. 150W	NOS	7308	2				
b)	507-21153-A	PER HOR 90D BEND 2MM THK 600R 300W	NOS	7308	18				
c)	507-21155-A	PER HOR 90D BEND 2MM THK 600R 600W	NOS	7308	145				
<b>3.8</b>		<b>PERFORATED TYPE VERTICAL 90 DEG. BEND-600mm RADIUS (INSIDE)</b>							
a)	507-21159-A	PER VER 90D BEND 2MM THK 600R I/S 300W	NOS	7308	2				
b)	507-21161-A	PER VER 90D BEND 2MM THK 600R I/S 600W	NOS	7308	26				
<b>3.9</b>		<b>PERFORATED TYPE VERTICAL 90 DEG. BEND-600mm RADIUS (OUTSIDE)</b>							
a)	507-21165-A	PER VER 90D BEND 2MM THK 600R O/S 300W	NOS	7308	21				
b)	507-21167-A	PER VER 90D BEND 2MM THK 600R O/S 600W	NOS	7308	21				
<b>3.10</b>		<b>PERFORATED TYPE TEES-600mm RADIUS</b>							
a)	507-21171-A	PER TEES 600R 2MM THK 300W	NOS	7308	3				
b)	507-21173-A	PER TEES 600R 2MM THK 600W	NOS	7308	105				
<b>3.11</b>		<b>PERFORATED TYPE CROSS-600mm RADIUS</b>							
a)	507-21177-A	PER CROSS 600R 2MM THK 300W	NOS	7308	2				
b)	507-21179-A	PER CROSS 600R 2MM THK 600W	NOS	7308	2				
<b>3.12</b>		<b>PERFORATED TYPE REDUCERS</b>							
a)	507-21184-A	PER RED (50% LHS/RHS) 2MM THK 600-300W	NOS	7308	3				
<b>3.13</b>		<b>HOT DIP GALVANISED CABLE TRAY COVER COMPLETE WITH FORMED CHANNEL, PIPE, GI FLAT, BOLTS WITH NUTS &amp; WASHERS &amp; FIXING HARDWARES ETC. (1.7mm THICK GALVANISED MS SHEET)</b>							
a)	507-21203-A	COVER 1.7 MM THK-NON PER GALV MS 600W	MTR	7308	1750				
<b>3.14</b>		<b>CABLE TROUGH</b>							
a)	507-21199-A	CABLE TROUGH 2MM THK 50W	MTR	7308	700				
<b>3.15</b>									
a)	507-21939-A	Coupler Plate	NOS	7308	60816				
b)	507-21940-A	NUT	NOS	7308	254848				
c)	507-21941-A	BOLT	NOS	7308	254848				
d)	507-21942-A	WASHER	NOS	7308	509696				

inclusive



**VOLUME II**

**TECHNICAL SPECIFICATION**

**FOR**

**CABLE TRAYS & ACCESSORIES**

**2X660 MW KHURJA TG TPS**

**SPECIFICATION NO: ~~PE-RC-999-507-E021~~**

**PE-TS-475-507-E021**

**REVISION: 0**



**BHARAT HEAVY ELECTRICALS LIMITED**

**POWER SECTOR**

**PROJECT ENGINEERING MANAGEMENT**

**NOIDA, UP (INDIA) – 201301**



**TECHNICAL SPECIFICATION FOR  
CABLE TRAYS & ACCESSORIES**

SPECIFICATION NO. **PE-TS-475-507-E021**

REVISION **0** DATE: **07.04.2022**

SHEET 1 OF 1

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<b>Sl. No.</b>	<b>DESCRIPTION</b>	<b>NO. OF SHEETS</b>
1.0	SECTION – I	
	COMPLIANCE CERTIFICATE	01
	SPECIFIC TECHNICAL REQUIREMENT	01
	DATA SHEET -A	03
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2.0	SECTION- 'II'	
	STANDARD TECHNICAL REQUIREMENTS	03
	QUALITY PLAN	07
	TYPICAL DETAILS OF CABLE TRAYS & ACCESSORIES TYPE-A	14
	<del>TYPICAL DETAILS OF CABLE TRAYS &amp; ACCESSORIES TYPE-B</del>	<del>09</del>
TOTAL SHEETS INCLUDING COVER SHEET, CONTENT/SEPARATOR SHEET =		94

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REVISION **0** DATE: 07.04.2022**SECTION – I****SPECIFIC TECHNICAL REQUIREMENTS**

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## TECHNICAL SPECIFICATION FOR CABLE TRAYS & ACCESSORIES

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### COMPLIANCE CERTIFICATE

The bidder shall confirm compliance to the following by signing/ stamping this compliance certificate and furnishing same with the offer.

1. The scope of supply, technical details, construction features, design parameters etc. shall be as per technical specification & there are no exclusion/ deviation with regard to same
2. There are no deviation with respect to specification other than those furnished in the 'schedule of deviations'
3. Only those technical submittals which are specifically asked for in NIT to be submitted at tender stage shall be considered as part of offer. Any other submission, even if made, shall not be considered as part of offer.
4. Any comments/ clarifications on technical/ inspection requirements furnished as part of bidder's covering letter shall not be considered by BHEL, and bidder's offer shall be construed to be in conformance with the specification.
5. Any changes made by the bidder in the price schedule with respect to the description/ quantities from those given in 'BOQ-Cum-Price schedule' of the specification shall not be considered (i.e., technical description & quantities as per the specification shall prevail).

-----  
BIDDER'S STAMP & SIGNATURE



## TECHNICAL SPECIFICATION FOR CABLE TRAYS & ACCESSORIES

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SECTION I

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### 1.0 PURPOSE

~~This specification is intended for finalization of rate contract between BHEL PEM and Bidder. Standard technical detail as indicated in the specification shall be agreed upon between BHEL PEM and Bidder. Project specific technical detail shall be made available to the bidder along with project enquiry.~~

### 2.0 SCOPE OF ENQUIRY

2.1 Manufacture, Inspection and Testing at Manufacturer's works, proper packing and delivery to site of cable trays & accessories conforming to this specification.

2.2 It is not the intent to specify herein all the details of design & manufacture of material. However, the material shall, conform in all respects to high standard of design, engineering and workmanship and shall be capable of performing in continuous commercial operation at site conditions.

2.3 Technical requirements of cable trays & accessories are indicated in Data Sheet-A & Section-II.

2.4 The stipulation of Data Sheet-A shall prevail in case of any conflict between the stipulations of Data Sheet-A & Section-II.

### 3.0 BILL OF QUANTITIES

The bidder to quote for items as per 'BOQ-cum-Price Schedule' attached with NIT. ~~The quantity as mentioned in the BOQ is only for evaluation purpose. However actual ordered quantity may vary from project to project throughout the contract.~~

### 4.0 DRAWINGS & DOCUMENTS TO BE SUBMITTED

4.1 ~~After rate contract, after issuance of purchase order against specific project requirement following information shall be furnished by BHEL:-~~

a.) ~~Project information~~

a.) ~~Applicable list of Galvanizers (Refer Annexure 2A/2B to Quality Plan)~~

b.) ~~Bill of Quantity~~

4.2 Following documents/drawings shall be submitted after placement of order (for specific project) for BHEL & customer's approval:-

Sl. No.	Drawings / Document Description	Document Number	Document Type	First Submission	Re submission
1	Technical Data Sheet for Cable trays & Accessories	PE-V0-XXX-507-E011 <b>475</b>	Primary	Within 1 week of issuance of purchase order for specific project	Within 1 week of comments
2	GA drawings of Cable Trays & Accessories	PE-V0-XXX-507-E012 <b>475</b>	Primary	Within 1 week of issuance of purchase order for specific project	Within 1 week of comments
3	Quality Plan for Cable Trays & Accessories	PE-V0-XXX-507-E902 <b>475</b>	Primary	Within 1 week of issuance of purchase order for specific project	Within 1 week of comments
4	BOQ of Coupler plates, Bolts, Washers & Nuts for lot wise ordered quantity.	PE-V0-XXX-507-E021 <b>475</b>	Secondary	Within 1 week of lot clearance	Within 1 week of comments

4.3 Drawings/ documents shall be submitted through Document Management System (DMS).



## TECHNICAL SPECIFICATION FOR CABLE TRAYS & ACCESSORIES

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### DATASHEET-A

#### 1.0 APPLICABLE STANDARDS

- |    |          |                                                                        |
|----|----------|------------------------------------------------------------------------|
| a) | IS: 1079 | For hot rolled carbon steel sheet and strip.                           |
| b) | IS: 1730 | For dimensions for steel sheet and strip.                              |
| c) | IS: 1363 | Hexagon head bolts, screws and nuts.                                   |
| d) | IS: 2629 | For hot dip galvanising of steel & surface pre treatment.              |
| e) | IS: 2633 | For testing of uniformity of zinc coating.                             |
| f) | IS: 6745 | For determination of mass of zinc coating.                             |
| g) | IS: 1367 | Galvanised Coating on threaded Fasteners.<br>(Part-XIII)               |
| h) | IS: 1852 | For Rolling and Cutting Tolerances of hot rolled steel products.       |
| i) | IS: 9595 | For Thickness of Welding.                                              |
| j) | IS: 4759 | For Hot Dip Zinc coating on structural steel and other allied products |

#### 2.0 CABLE TRAYS & ACCESSORIES

- |     |                                                                         |   |                                                                                                                                                                                     |
|-----|-------------------------------------------------------------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2.1 | Material                                                                | : | Hot Rolled Mild Steel                                                                                                                                                               |
| 2.2 | Type                                                                    | : | Ladder Type<br>Perforated Type                                                                                                                                                      |
| 2.3 | Standard Length of<br>Straight Length of<br>Cable Trays                 | : | 2.5 meters                                                                                                                                                                          |
| 2.4 | Standard Width (mm)                                                     | : | 600 300 150 (Ladder)<br>600 300 150 100 50 (Perforated)                                                                                                                             |
| 2.5 | Construction                                                            | : | Conforming to enclosed drawing                                                                                                                                                      |
| 2.6 | Bending Radius<br>of Accessories (in mm)                                | : | 600 mm                                                                                                                                                                              |
| 2.7 | Tolerance in length/<br>Width / Height                                  | : | + /- 2 mm                                                                                                                                                                           |
| 2.8 | Marking                                                                 | : | Following shall be engraved/punched on each standard length<br>of cable tray at the centre of both side of runner: "PEM"<br>(length of letter shall be 90mm & height shall be 30mm) |
| 2.9 | <b>Thickness of the finished product shall not be less than 2.0 mm.</b> |   |                                                                                                                                                                                     |

#### 3.0 FITTINGS

- |                 |   |                                                                                                                                               |
|-----------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------|
| End connections | : | Through Coupler plates<br>(Side Coupler Plates shall be provided as part of cable tray &<br>accessories supply with bolts, nuts, washers etc) |
|-----------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------|

#### 4.0 TRAY COVERS

- |             |   |                        |
|-------------|---|------------------------|
| a) Type     | : | Non-Perforated type.   |
| b) Material | : | Hot Rolled Mild Steel. |



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- c) Width : Suitable for width of cable trays.
- d) Tolerance in length/  
Width / height : Same as cable trays.
- e) Thickness of the finished product shall not be less than 1.7mm.

**5.0 SHEET THICKNESS before Hot Dip Galvanisation**

- a) For cable trays &  
Accessories : 2.0 mm
- b) For cable tray cover : 1.7 mm
- c) For Coupler plate : 3.0 mm
- d) Tolerance in Thickness : As per IS: 1852
- e) Make : SAIL / TISCO / RINL / BHUSAN / JINDAL STEEL /  
JINDAL ISPAT / ESSAR / LLOYD / IISCO /  
Authorized re-rollers of SAIL

**6.0 SURFACE TREATMENT**

- a) Pre-treatment : IS 2629 before galvanisation
- b) Type : Hot dip galvanisation
- c) Applicable Standard : IS 2629
- d) Minimum thickness : 75 microns (minimum), 86 microns (average) for 2.0 mm  
thick product  
55 microns (minimum), 65 microns (average) for 1.7 mm  
thick product
- e) Min. weight of  
Zinc deposit : 610 grams per square meter for 2.0 mm thick product  
460 grams per square meter for 1.7 mm thick product
- f) Tests for galvanizing : (i) Weight of Zinc Coating as per IS 6745.  
(ii) Thickness of Zinc Coating as per IS 4759.  
(iii) Uniformity of Zinc Coating as per IS 2633.  
(iv) Adhesion Test as per IS 2629.



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**7.0 NUMBER OF COUPLER PLATES, BOLTS, WASHERS & NUTS REQUIRED FOR EACH CABLE TRAY SECTION (2.5 MTRS)**

Sl. No.	NAME OF ITEM	COUPLER PLATE (nos.)	NUTS (nos.)	WASHERS (nos.)	BOLTS (nos.)
1	Cable tray of standard length 2.5 meters	4	16	32	16

*NOTE: - Based on above table, no. of coupler plates, bolts, washers & nuts shall be calculated for the offered lot. Over & above the calculated quantity, additional 5% coupler plates & 10% bolts, washers & nuts shall be supplied by the bidder.*

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REVISION **0** | DATE **07.04.2022****SECTION-II****STANDARD TECHNICAL REQUIREMENTS**



## TECHNICAL SPECIFICATION FOR CABLE TRAY & ACCESSORIES

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### 1.0 CODES & STANDARDS

- 1.1 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.
- 1.2 The design, material, construction, manufacture, inspection, testing and performance of Cable Trays & Accessories shall conform to the latest revision of relevant standards and codes of practices as per Data Sheet-A
- 1.3 In case of conflict between the applicable reference standard and this specification, this specification shall govern.

### 2.0 TECHNICAL REQUIREMENTS

- 2.1 Cable trays & accessories shall be of two types, namely ladder type and perforated type. Technical particulars are specified in Data Sheet-A and drawings enclosed with this specification. Minor fabrication detail changes which do not affect the material /dimensional aspect of the equipment, shall be subject to BHEL/owner's approval without any commercial implication.
- 2.2 Coupler plates shall be provided for connecting tray ends to other straight trays, horizontal elbows, vertical elbows, tees, cross, reducers etc. The number of coupler plates, washers, nuts & bolts to be supplied shall be as per Data Sheet-A.
- 2.3 Necessary fasteners shall be provided along with each length of cable tray as specified in drawings enclosed.
- 2.4 The width of the tray covers (where provided) shall be suitable for the width of trays. Suitable bolting arrangement shall be supplied for attaching the cover to the cable trays, elbows, reducers, tees etc. as per the drawing enclosed.
- 2.5 All welded joints shall be smooth enough to provide a good appearance and shall not cause any injury to working personnel or any damage to the cable laid directly on it. All welding work shall be done by skilled personnel.

### 3.0 QUALITY ASSURANCE, TESTING AND INSPECTION

- 3.1 Bidder shall confirm compliance with BHEL'S standard Quality plan (PE-QP-999-507-E005, Rev-02) as attached with the specification. At contract stage, the successful bidder shall submit the QP for BHEL/ ultimate customer's approval. In case bidder has reference QP agreed with ultimate customer, same can be submitted for specific project after award of contract for BHEL/ ultimate customer's approval. There shall be no commercial implication to BHEL on account of minor changes in Quality plan during contract stage.
- 3.2 All materials shall be procured, manufactured, inspected and tested by vendor/ sub-vendor as per approved quality plan.
- 3.3 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.

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**4.0 PACKING**

- 4.1 The material shall be packed to ensure protection against damage during transit, storage for prolonged periods and handling.
- 4.2 Refer packing details of 'TECHNICAL SPECIFICATION FOR SEAWORTHY PACKING FOR EXPORT JOBS' DOC. NO. PE-TS-888-100-A001 for packing of seaworthy packing.

Note:

Sea Worthy packing is applicable for export jobs only. Applicability of sea worthy packing shall be informed to the successful bidder during placement of project specific order.

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REVISION **0** DATE: **07.04.2022****STANDARD QUALITY PLAN**

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**PE-TS-475-507-E021**

		<b>QUALITY PLAN</b> SHEET 1 OF 3			CUSTOMER :		PROJECT TITLE :		SPECIFICATION NO. :			
					BIDDER/ VENDOR :		STANDARD QP NO. : PE-QP-999-507-E005, REV. 02		SPECIFICATION TITLE:			
		SYSTEM CABLING		ITEM : CABLE TRAYS & ACCESSORIES		DOC. NO. :						
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
									P	W	V	
1	2	3	4	5	6	7	8	9	10			11
1.0	RAW MATERIAL											
1.1	ROLLED SHEET	1.CHEM.& PHY. PROPERTIES	MA	VERIFICATION OF TC'S	100%	IS1079	IS1079	MILL TC	3/2	-	1/2	Steel shall be procured from SAIL/TISCO/RINL/BHUSAN/JINDAL <b>STEEL/JINDAL</b> ISPAT/ESSAR/LLOYD/ <b>IISCO</b> / authorised SAIL Re Rollers.
		2.DIMENSIONS	MA	MEASUREMENT	100%	IS-1730/ APPD. DATA SHEET	IS-1730/ APPD. DATA SHEET	QC RECORD	3/2	-	-	
		3.SURFACE FINISH	MA	VISUAL	100%	IS-1079	IS-1079	QC RECORD	3/2	-	-	
1.2	ZINC	CHEM.COMP.	MA	CHEM TEST	EACH HEAT	IS-209	IS-209	TC	3/2	-	1/2	
2.0	IN-PROCESS											
2.1	FABRICATION	1.DIMENSIONS	MA	MEASUREMENT	100%	APPD.DRG.	APPD.DRG.	QC RECORD	2	-	1	Welding is to be done by qualified welders in accordance with ASME SEC. IX article III. WPS , PQR & WPQ to be reviewed during inspection.
		2.WELDING QUALITY	MA	VISUAL	100%	GOOD WELDING PRACTICE	FREE FROM DEFECTS & SLAG	QC RECORD	2	-	1	
		3.SURFACE FINISH	MA	VISUAL	100%	FREE FROM DEFECTS & SLAG	FREE FROM DEFECTS & SLAG	QC RECORD	2	-	1	
2.2	SURFACE PREPARATION	1.CLEANING PICKLING & RINSING & FLUXING	MA	VISUAL	PERIODIC IN EACH SHIFT	IS:2629	IS:2629	QC RECORD	2	-	-	
		2. SURFACE QUALITY	MA	VISUAL	100%	IS:2629	IS:2629	QC RECORD	2	-	-	
BHEL			PARTICULARS			BIDDER/VENDOR						
			NAME									
			SIGNATURE									
			DATE									BIDDER'S/VENDORS COMPANY SEAL
LEGEND : 1 - BHEL/ CUSTOMER 2 - VENDOR 3 - SUB- VENDOR P - PERFORM W - WITNESS V - VERIFICATION												


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		QUALITY PLAN		CUSTOMER :			PROJECT TITLE :			SPECIFICATION NO. :		
		SHEET 2 OF 3		SYSTEM CABLING			ITEM : CABLE TRAYS & ACCESSORIES			SPECIFICATION TITLE:		
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
1	2	3	4	5	6	7	8	9	P	W	V	11
2.3	GALVANISING	1.TEMPERATURE OF ZINC BATH 2.DROSS 3.RATE OF IMMERSION 4.SURFACE QUALITY	MA MA MA MA	TEMPERATURE INDICATOR VISUAL VISUAL VISUAL	CONTINUOUS PERIODIC 100% 100%	IS-2629 IS 2629 IS 2629/ MFR'S PRACTICE	IS-2629 IS 2629 IS2629/ MFR'S PRACTICE	QC RECORD QC RECORD QC RECORD QC RECORD	2/3 2/3 2/3 2/3	- - - -	- - 2 -	Galvanization is to be done at galvanisation plant listed in annexure-2 to quality plan.
3.0	FINISHED ITEMS											
3.1	(CABLE TRAY, ACCESSORIES & HARDWARES)	1.DIMENSIONS 2.SURFACE FINISH 3.RIGIDITY (FOR TRAYS) 4.MASS OF ZINC COATING 5.UNIFORMITY OF ZINC COATING 6.THICKNESS OF ZINC COATING 7.ADHESION	MA MA MA MA MA MA MA	MEASUREMENT VISUAL DEFLECTION TEST CHEM. TEST CHEM. TEST ELCOMETER MECH.TEST	IS-2500 (PART 1) LEVEL S-4 IS-2500 (PART 1) LEVEL S-4 2 No./ LOT/TYPE IS-4759 IS-4759 IS-4759 IS-4759	APPD. DRG APPD. DRG APPD. DRG IS-6745 IS-2633 75 MICRONS (MINIMUM), 86 MICRONS (AVERAGE) for 2.0mm thick product IS-2629	APPD. DRG FREE FROM BURRS, SLAG, ROUGHNESS, FLUX. STAIN.ETC. APPD. DRG 610 gms/ Sq m (for 2.0mm thick product) 460 gms/ Sq m (for 1.6 mm thick product) IS-2633 75 MICRONS (MINIMUM), 86 MICRONS (AVERAGE) for 2.0mm thick product 55 MICRONS (MINIMUM), 65 MICRONS (AVERAGE) for 1.6mm thick product IS-2629	INSP.REPORT INSP.REPORT INSP.REPORT INSP.REPORT INSP.REPORT INSP.REPORT INSP.REPORT	2 2 2 2 2 2 2	1 1 1 1 1 1 1	- - - - - - -	Overall thickness of finished product shall not be less than the thickness of cable tray & accessories defined in technical datasheet. Following shall be engraved/ punched on each standard length of cable tray at the center of both sides of runner:'PEM' (length of letter 90mm & height 30mm). Fasteners shall be of good quality as per IS 1363  600MM wide cable tray to be tested. Maximum deflection shall not exceed 7MM on mid span on uniform loading of 100KG/M.
<b>BHEL</b>			<b>PARTICULARS</b>			<b>BIDDER/VENDOR</b>						
			NAME									
			SIGNATURE									
			DATE									BIDDER'S/VENDORS COMPANY SEAL
<b>LEGEND :</b> 1 - BHEL/CUSTOMER    2 - VENDOR    3 - SUB-VENDOR    P - PERFORM    W - WITNESS    V - VERIFICATION												

**REV. 0, 07.04.2022**  
**PE-TS-475-507-E021**

		<b>QUALITY PLAN</b>			CUSTOMER :			PROJECT TITLE :			SPECIFICATION NO. :		
		SHEET 3 OF 3			BIDDER/ VENDOR :			STANDARD QP NO. : PE-QP-999-507-E005, REV. 02			SPECIFICATION TITLE :		
		SYSTEM CABLING			ITEM : CABLE TRAYS & ACCESSORIES			DOC. NO. :					
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS	
1	2	3	4	5	6	7	8	9	P	W	V	11	
		8. COUPLER PLATE	MA	VISUAL	100%	BHEL APPD. DOCUMENT	BHEL APPD. DOCUMENT	INSP.REPORT	2	1	-	INSPECTOR TO MENTION THE TOTAL NUMBER OF GUNNY BAGS/BUNDLES OF COUPLER PLATES,NUTS, BOLTS & WASHER IN THE INSPECTION REPORT.  FURTHER MANUFACTURER SHALL ATTACH THE DETAIL OF TOTAL NUMBER OF GUNNY BAGS/BUNDLES OF THE RESPECTIVE ITEMS WITH PACKING LIST.	
		9. NUT & BOLT	MA	VISUAL	100%	BHEL APPD. DOCUMENT	BHEL APPD. DOCUMENT	INSP.REPORT	2	1	-		
		10. WASHER	MA	VISUAL	100%	BHEL APPD. DOCUMENT	BHEL APPD. DOCUMENT	INSP.REPORT	2	1	-		
BHEL			PARTICULARS			BIDDER/VENDOR							
			NAME										
			SIGNATURE										
			DATE						BIDDER'S/VENDORS COMPANY SEAL				
<b>LEGEND :</b> 1 - BHEL/ CUSTOMER    2 - VENDOR    3 - SUB- VENDOR    P - PERFORM    W - WITNESS    V - VERIFICATION													

**ANNEXURE-1****INSTRUCTIONS FOR QUALITY PLAN**

The Quality Plan shall include all the Quality Control Measures and Checks adopted by the Vendor to ensure that the material/component/assembly/services supplied by him meet/will meet the requirements as per specifications and good practices. They shall include all stages of operation such as materials, processes, manufacture, assembly, packing and despatch. The following guide lines may be noted:

- Column 1- Serial Number
- Column 2- Component/Operation- The component and/or operation being checked shall be given here.
- Column 3- Characteristics check- The characteristics being checked shall be given here, e.g., chemical composition, mechanical properties, leak tightness, surface defects etc..
- Column 4- Category -'CR' stands for critical characteristic - affecting safety of equipment and personnel  
'MA' stands for major Characteristic - affecting safety of equipment and personnel  
'MI' stands for minor characteristic - affecting appearance etc.
- Column 5- Type/Method of check e.g. chemical analysis tensile testing, hydraulic test, visual examination radiography etc.
- Column 6- Extent of check, such as, 100, 10, 1 percent etc.
- Column 7- Reference Documents - Documents, such as technical specification, drawings, standard specifications (IS, BS ETC.) procedure, etc. according to which check is done.
- Column 8- Acceptance Norms - Standards etc. according to which acceptability or otherwise of the characteristics being checked is decided.
- Column 9- Format of Record - Formats, log sheets, reports, etc. in which the observations are recorded. Standard log sheets, reports, formats etc. of the Vendors shall be numbered and such reference numbers shall be included here.
- Column 10- Agency - The agency which performs the test/instruction shall be written in sub-column 'W'  
The agency which verifies test certificates/inspection records and carries out audit check of the components/operation shall be written in sub-column 'V'

The agencies are codified as 1,2 & 3

'1' stands for (BHEL)

'1' \* means the operation shall be cleared by BHEL before the start of the next operation.

'2' Stands for Vendor

'3' stands for sub-Vendor of the Vendor and so on.

Example :

Entry '3' in column 'P' means test./inspection to be performed by sub-Vendor's QC

Entry '2' in column 'W' means test./inspection to be witnessed by Vendor's QC

Entry '1' in column 'V' means verification shall be done by BHEL and next stage to be started only after the hold point is cleared by BHEL

Column11- Remarks - Any special remarks shall be given here.

NOTES :

- In absence of correlation with the test certificate(s) (e.g. material identification) samples shall be drawn by BHEL and all tests as per relevant specifications shall be carried out in their presence or in recognized Government Laboratory.
- When materials and components are initially identified and stamped by BHEL QS engineer, the identification marks shall be preserved till despatch. Wherever this is not possible, the identification mark shall be transferred to the components in the presence of BHEL QS Engineer unless otherwise agreed.
- For castings and forgings integral test specimens shall be provided, When this is not possible for casting, they shall be poured in the presence of BHEL QS Engineer unless otherwise, if witnessing of test by BHEL is called for.
- When welders qualified by reputed inspection agencies or statutory bodies are not available, qualification tests shall be conducted in the presence of BHEL QS Engineer.
- This Quality Plan is liable to be modified as per the requirements of approved drawings and changes in technical specifications/drawings. If there are contradictions in respect of column 7 & 8 between this Quality Plan and the approved drawings specifications, the latter shall prevail.
- Wherever inspection by BHELs Purchaser/Third Party/Statutory authorities are mandatory, this shall be complied with.
- Inspection reports, log sheets, test reports/certificate. etc. shall be furnished to BHEL at the appropriate stages or at the time of final inspection, as required.
- This Quality Plan is also applicable to spares, if any, under scope of supply of Vendor.
- The quality plan shall be submitted in minimum 4 copies with a soft copy of the same or in line with contract requirements.

## ANNEXURE-2A to Quality Plan

## (LIST OF BHEL- PEM APPROVED GALVANIZERS)

SL. NO.	ITEM	VENDOR NAME	ADDRESS
1	Galvanising	Jenco Industrial Corporation	Chincholi Bunder Khkar Road Near Link Road Devruwadi Malad (W) Mumbai 400064
2	Galvanising	National Galvanizing Company	66, Barrackpore Kamarhatt Trunck Road Calcutta-700058
3	Galvanising	Sigma Galvanising Pvt. Ltd.	Plot No.C-169, TTC, MIDC Ind Area Navin Mumbai-400705
4	Galvanising	B.P. Projects PVT LTD	167A, Vivekananda Road Kolkata-700006
5	Galvanising	Standard Galvanisers	Makardah Road, Kabar Para, Bankra, Howarah -711403
6	Galvanising	Steel Products	National Highway No. 6, Chamrail, Kona, Howrah-711114
7	Galvanising	Unitech Fabricators & Engineers Pvt. Ltd.	Village- Ajab Nagar, P.O. -Molla Simlla, P.S. - Singur, Dist - Hoogly, Pin-712223
8	Galvanising	Shivam Engineers & Fabricators	A0-282-284, Industrial Area, South Side of G.T. Road, Ghaziabad, U.P.
9	Galvanising	B.G. Shirke Construction Technology Pvt. Ltd	72-76, Mundhawa, Pune - 401 036
10	Galvanising	Galbro Ispat Galvanizers Pvt. Ltd.	GUT 11 AND 12, OPP. Kudus Steel,Rolling Mill, Wada, Thane , Mumbai
11	Galvanising	Eros Metals	G-97, MIDC, Bhutibori , Nagpur
12	Galvanising	Industrial Perforation (India) Pvt. Ltd.	Ganganagr, Katakhal, Kolkata-700132
13	Galvanising	Indmark Formtech Pvt. Ltd.	Phase - 3, E - 11 / 1, M. I. D. C., Chakan, Pune - 410 501, Maharashtra, India.
14	Galvanising	Namdhari Industrial Traders Pvt. Ltd.	Village Latton Dana, Chandigarh Road, Ludhiana
15	Galvanising	Neha Galvaniser	Jalan Industrial Estate, Gate No-1, 1st Right Choise Lane, Near N.G-6, Jangalpur, PO Domjur Howrah - 700071, West Bengal, India
16	Galvanising	Patny Systems (P) Ltd.	Unit-IV, Sy No. -228/9, Plot No. 6, IP Kuchavaram, Toopran(M) Dist.- Medak, Telegana - 502336
17	Galvanising	Parmar Metal Company	Survey No.207,Veraval (Shapar) Dist. Rajkot, India.
18	Galvanising	Passive Infra Projects Pvt. Ltd	8th KM Stone, Sampla Kharkhoda Road, Hassangarh, Rohtak, Haryana
19	Galvanising	Rukmani Electrical & Fabricators Pvt. Ltd.	Urla Industrial Area, Urla Sarora Road, Raipur- 493 221 (Chhattisgarh) Shankharidaha Baniyarah, Jalan Industrial Complex, Gate no.3, Lane no. 4, Domjur, Howrah , W.B. - 71141
20	Galvanising	DMP Projects Pvt.Ltd.	Dulagarh Industrial Park , PS-Sankrail , Howrah -711302
21	Galvanising	Vinfab Engineers India Private Limited	Gut no. 224/1 &2 Bhiwandi Wada State Highway, Village khupri, Dist. Thane, Maharashtra -421303
22	Galvanising	Saral Projects & Processors	B-1, Industrial Area, Site-II, Amawan Road Rae Bareli
23	Galvanising	Jamna Metal Company	D - 1513, DSIDC, Narela Industrial Area Delhi - 110040, India
24	Galvanising	Brahampuri Steels Limited	172 (F) Industrial Area, Jhotwara, Jaipur-302013
25	Galvanising	Indiana Gratings PVT. LTD	F-5, MIDC Jejuri, Pune-412 303

## NOTES:

1. ANY CHANGE IN THE ABOVE LIST SHALL BE INFORMED AT THE TIME OF SPECIFIC PROJECT REQUIREMENT AND NO COMMERCIAL IMPLICATION SHALL BE ALLOWED ON THIS ACCOUNT.

2. IT SHALL BE THE RESPONSIBILITY OF THE VENDOR TO GET THE MATERIAL GALVANIZED FROM THE ABOVE LIST WITHOUT ANY COMMERCIAL IMPLICATION TO BHEL.


**ANNEXURE-2B to Quality Plan****LIST OF NTPC APPROVED GALVANIZERS (FOR NTPC PROJECTS)**

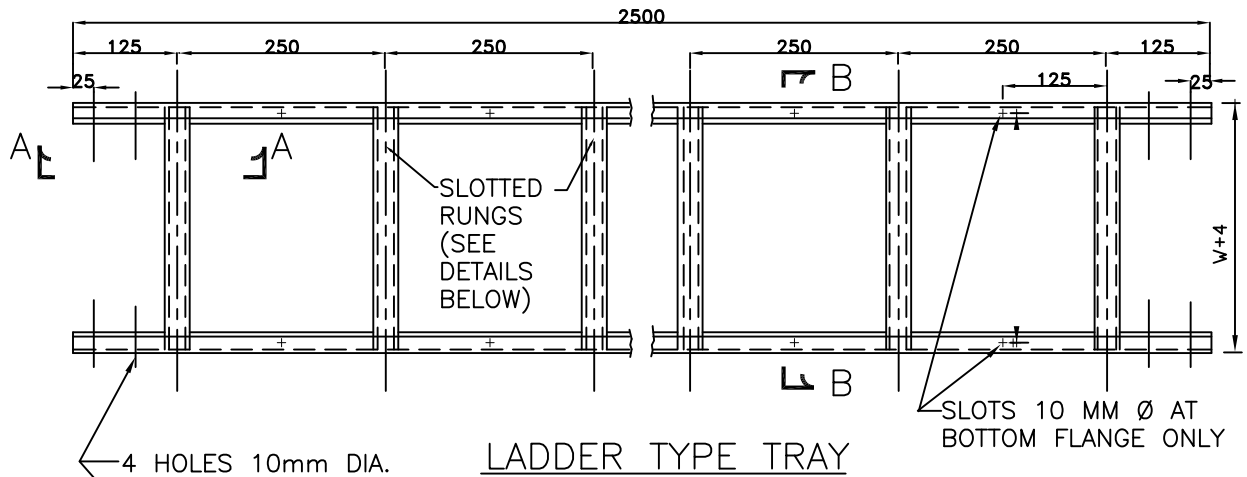
<b>S. NO.</b>	<b>ITEM</b>	<b>VENDOR NAME</b>
1	Galvanising	MJ Engg., Delhi
2	Galvanising	Jamna Metal, Delhi
3	Galvanising	A.V. Engg., Kolkata
4	Galvanising	Inar Profiles, Vishakapatnam
5	Galvanising	Anand Udyog, Mumbai
6	Galvanising	Techno Engg., Chandigarh
7	Galvanising	Steelite Engg., Mumbai
8	Galvanising	National Galvanizer, Kolkata
9	Galvanising	Unistar Galvanizer, Kolkata
10	Galvanising	B.P. Projects, Kolkata
11	Galvanising	Bajaj, Pune
12	Galvanising	Electrocare Industries, Mumbai
13	Galvanising	B.G. Shirke, Pune
14	Galvanising	Gurpreet Galvanizer, Hyderabad
15	Galvanising	Sigma, Mumbai
16	Galvanising	Radhakrishnan Shetty, Chennai
17	Galvanising	Karamtara, Mumbai
18	Galvanising	Poona Galvanizers, Pune
19	Galvanising	Neha Galvanizer, Kolkata
20	Galvanising	Unitech Galvanizers, Hoogly
21	Galvanising	DMP projects, Kolkata
22	Galvanising	Patny Systems, Medhak

**NOTES:**

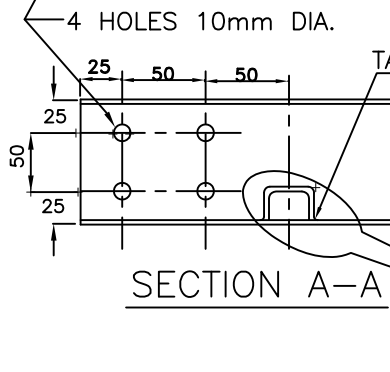
- 1 **ANY CHANGE IN THE ABOVE LIST SHALL BE INFORMED AT THE TIME OF SPECIFIC PROJECT REQUIREMENT AND NO COMMERCIAL IMPLICATION SHALL BE ALLOWED ON THIS ACCOUNT.**
- 2 **IT SHALL BE THE RESPONSIBILITY OF THE VENDOR TO GET THE MATERIAL GALVANIZED FROM THE ABOVE LIST WITHOUT ANY COMMERCIAL IMPLICATION TO BHEL.**

# TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES TYPE - A

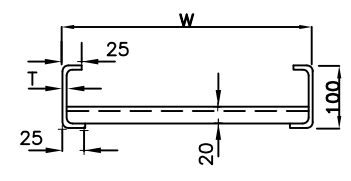
CUSTOMER						
PROJECT						
JOB NO.	 BHARAT HEAVY ELECTRICALS LIMITED POWER SECTOR PROJECT ENGINEERING MANAGEMENT NOIDA(U.P) INDIA	DPT CODE--E	DRN	NAME	SIGN	DATE
			DSN	SKS		
			CHD	VY		
			APP	SL		
		DWG. NO. PE-DG-999-507-E005				
		SHT. 01 OF 14 REV. 0				



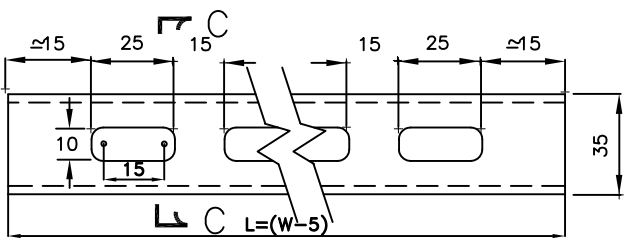
LADDER TYPE TRAY



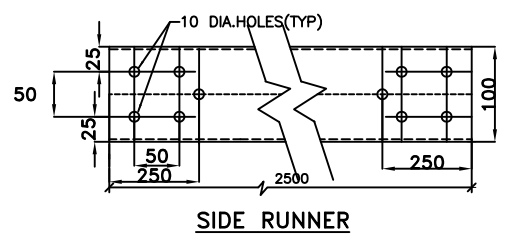
SECTION A-A



SECTION B-B



SLOTTED RUNGS  
(TO SUIT TRAY WIDTH)



SIDE RUNNER

W	150	300	450	600
L	145	295	445	595
T	2	2	2	2
t	2	2	2	2

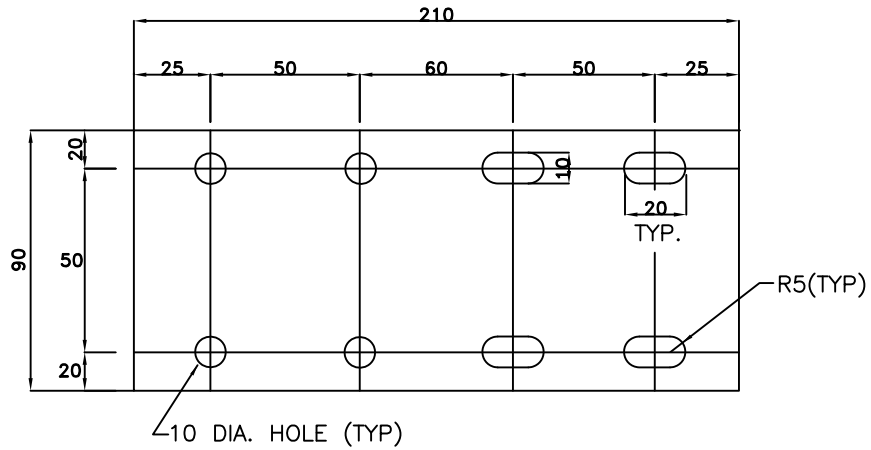
FOR GENERAL NOTES REFER SHEET 14 OF 34



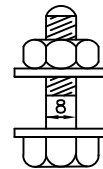
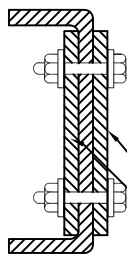
TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES (TYPE-A)

DWG. NO.  
PE-DG-999-507-E005

SHT. 02 OF 14 REV. 0



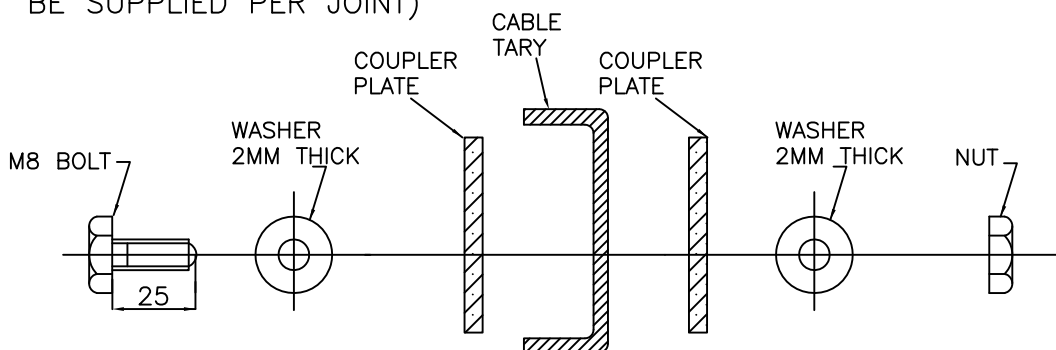
**SIDE COUPLER PLATE FOR  
LADDER/PERFORATED TYPE TRAYS**  
(600/450/300/150W TRAYS)  
QTY. REQUIRED/TRAY SECTION : 4 NOS.



QTY. REQD/TRAY SECTION

- A) 16 NOS. M8 BOLTS
- B) 16 NOS. NUTS
- C) 32 NOS. WASHERS

(2 NOS. COUPLER PLATES  
OF 3 MM THICKNESS TO  
BE SUPPLIED PER JOINT)



SEQUENCE OF M8 BOLT, WASHER, NUT, COUPLER PLATE & CABLE TRAY  
FOR TYPICAL CABLE TRAY JOINT

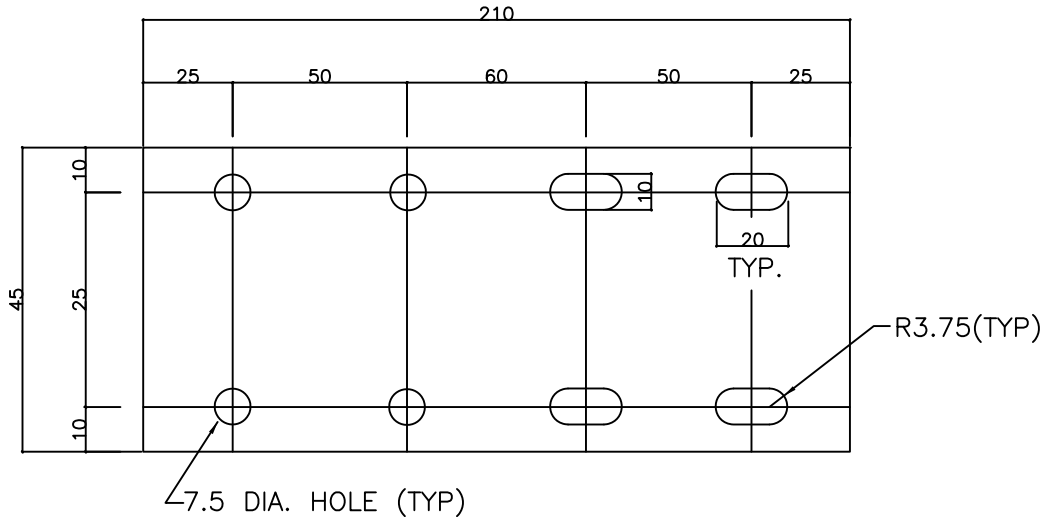
FOR GENERAL NOTES REFER SHEET 14 OF 34



TYPICAL DETAILS OF CABLE TRAYS AND  
ACCESSORIES (TYPE-A)

DWG. NO.  
PE-DG-999-507-E005

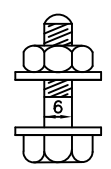
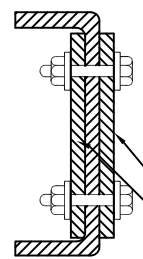
SHT. 03 OF 14      REV. 0



**SIDE COUPLER PLATE FOR PERFORATED TYPE TRAYS**

(100/50W TRAYS)

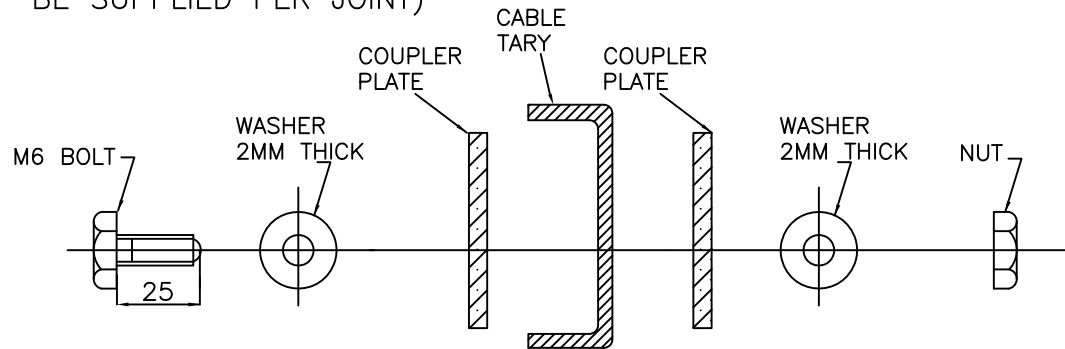
QTY. REQUIRED/TRAY SECTION : 4 NOS.



QTY. REQD/TRAY SECTION

- A) 16 NOS. M6 BOLTS
- B) 16 NOS. NUTS
- C) 32 NOS. WASHERS

(2 NOS. COUPLER PLATES OF 3 MM THICKNESS TO BE SUPPLIED PER JOINT)



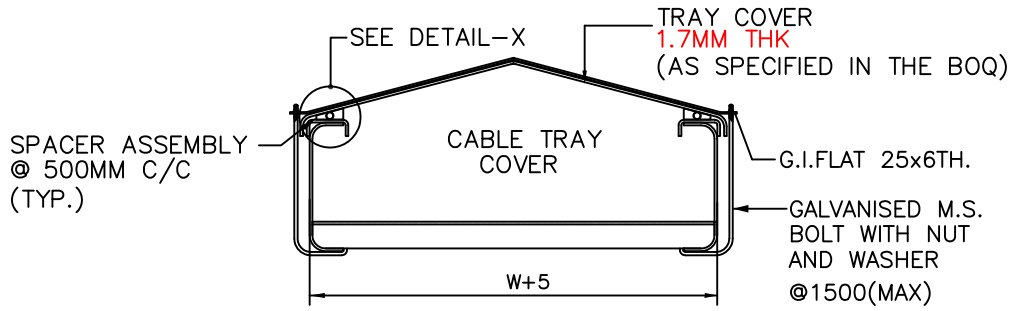
SEQUENCE OF M6 BOLT, WASHER, NUT, COUPLER PLATE & CABLE TRAY FOR TYPICAL CABLE TRAY JOINT

FOR GENERAL NOTES REFER SHEET 14 OF 34

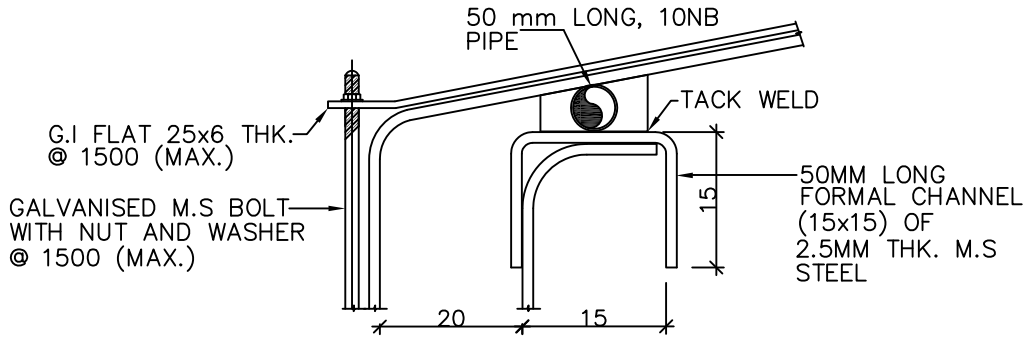


TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES (TYPE-A)

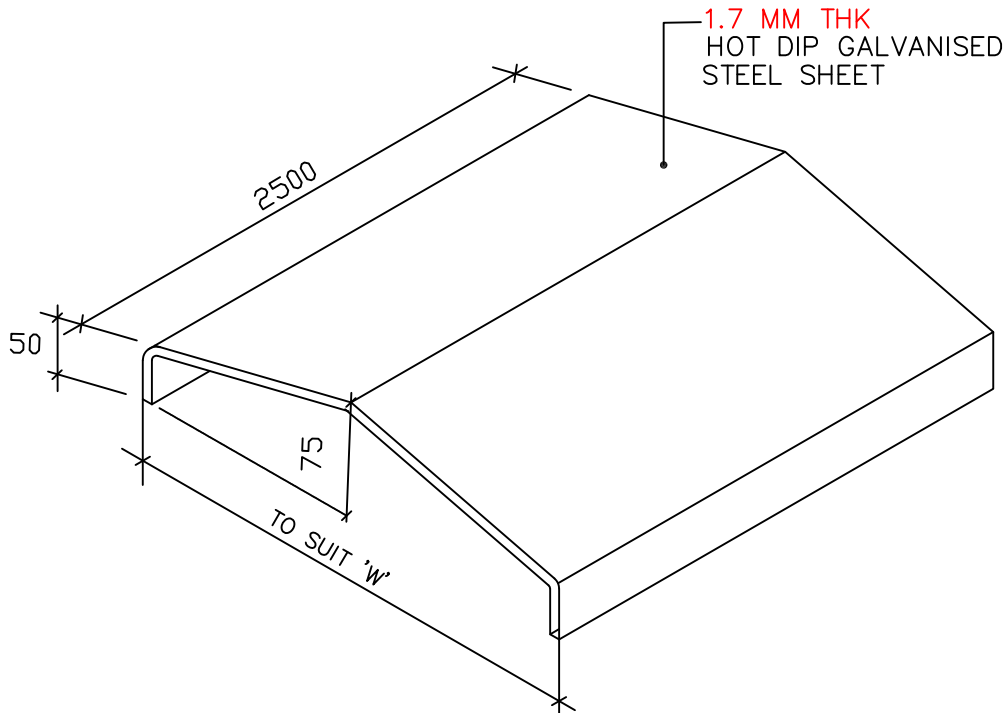
DWG. NO. PE-DG-999-507-E005
SHT. 04 OF 14      REV. 0



COVER FIXING (TYP.)



DETAIL-X



### CABLE TRAY COVER

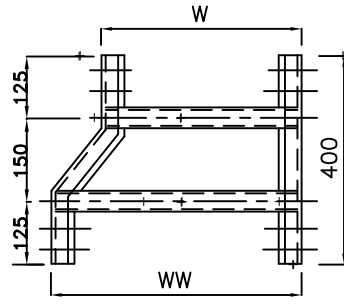
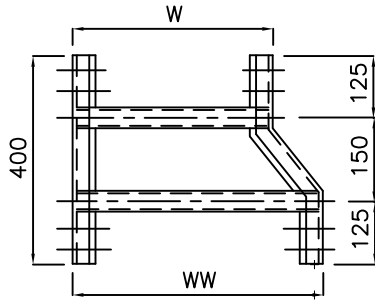
FOR GENERAL NOTES REFER SHEET 14 OF 34



TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES (TYPE-A)

DWG. NO.  
PE-DG-999-507-E005

SHT. 05 OF 14      REV. 0

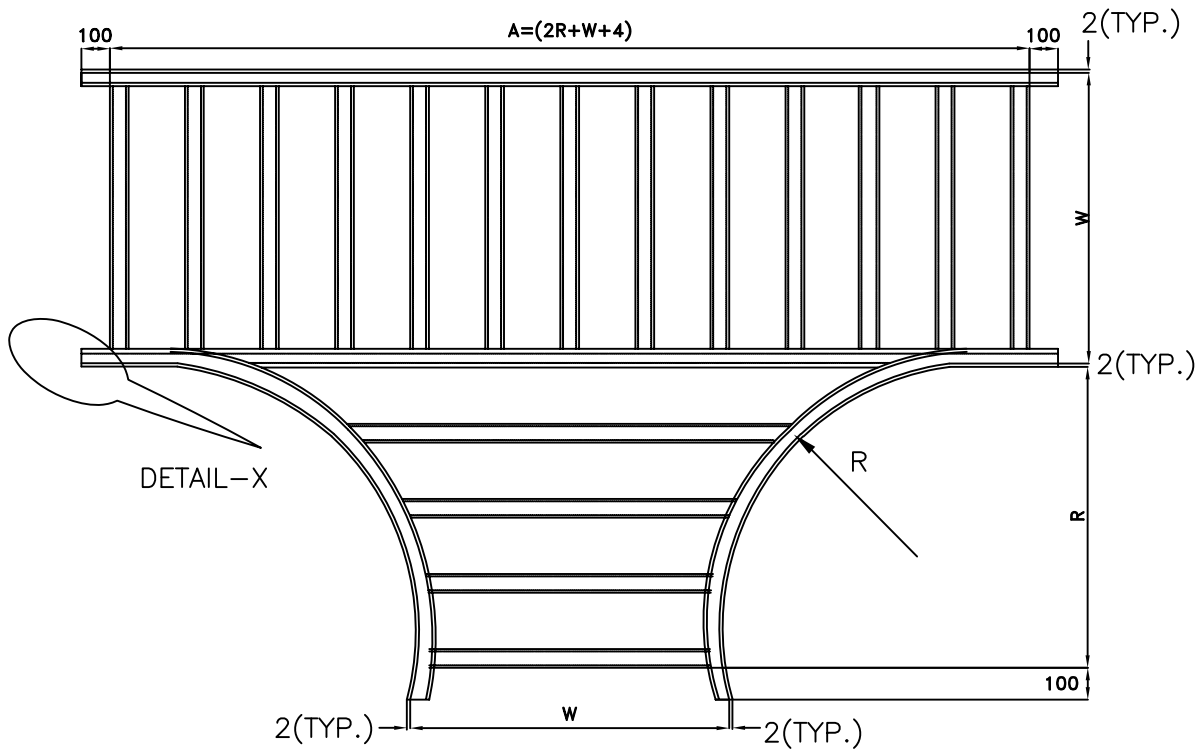


WW	W	DEPTH
600	450	100
600	300	100
600	150	100
450	300	100
300	150	100

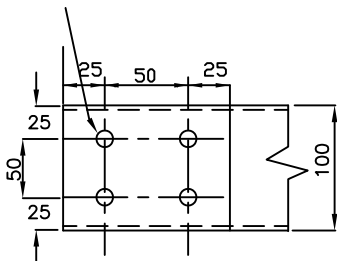
LEFT HAND REDUCER

RIGHT HAND REDUCER

LADDER TYPE



10mm DIA. HOLES



WIDTH W	BENDING RADIUS R	DEPTH	A			
			W			
			150	300	450	600
150, 300, 450 & 600	600	100	1354	1504	1654	1804

LADDER TYPE

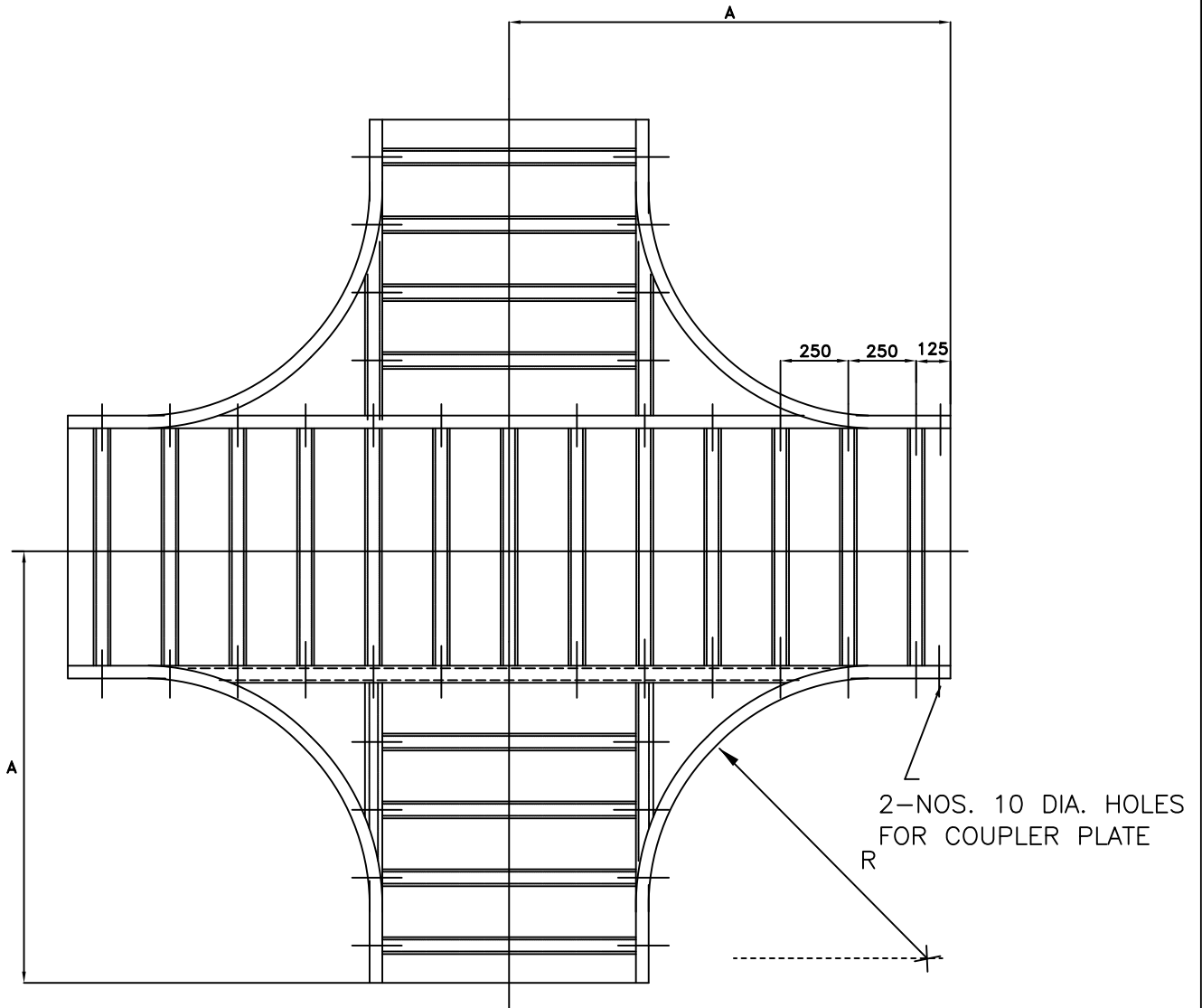
FOR GENERAL NOTES REFER SHEET 14 OF 34



TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES (TYPE-A)

DWG. NO.  
PE-DG-999-507-E005

SHT. 06 OF 14 REV. 0



HORIZONTAL CROSS-PLAN

WIDTH W	BENDING RADIUS R	$A=R+W/2+100$
600	600	1000
450	600	925
300	600	850

FOR GENERAL NOTES REFER SHEET 14 OF 34

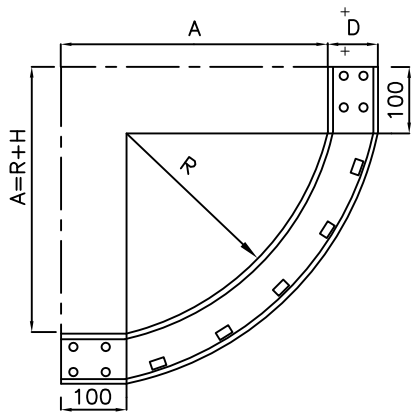


TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES (TYPE-A)

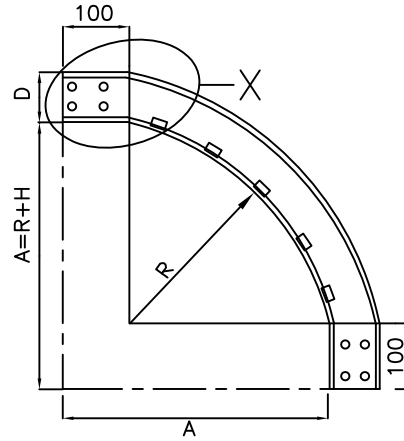
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PE-DG-999-507-E005

SHT. 07 OF 14

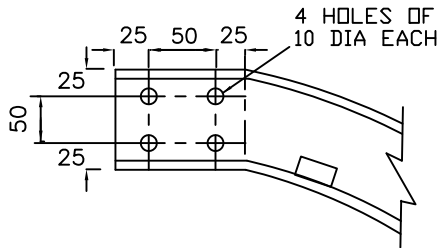
REV. 0



INSIDE TYPE



OUTSIDE TYPE

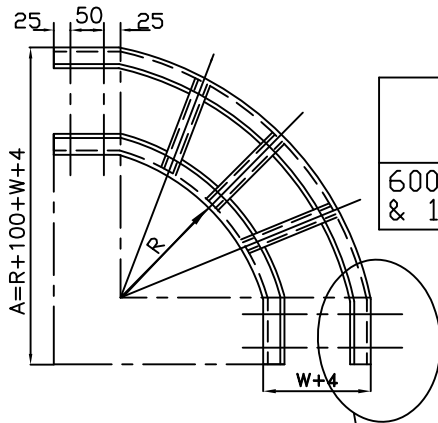


ENLARGED VIEW OF "X"

VERTICAL ELBOW 90 DEG UP/DOWN

INSIDE WIDTH W	BENDING RADIUS R	DEPTH	A
600, 450, 300 & 150	600	100	700

90° VERTICAL BEND - LADDER TYPE



LADDER TYPE

X (AS ABOVE)

HORIZONTAL ELBOW 90 DEG

INSIDE WIDTH W	BENDING RADIUS R	DEPTH	A			
			W			
600, 450, 300 & 150	600	100	150	300	450	600
			854	1004	1154	1304

90° HORIZONTAL BEND - LADDER TYPE

LADDER TYPE ACCESSORIES

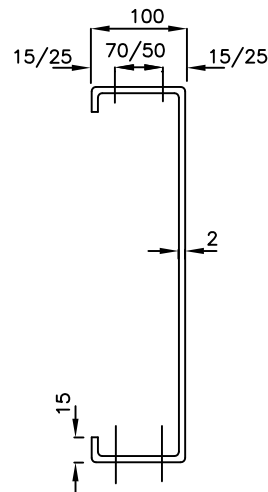
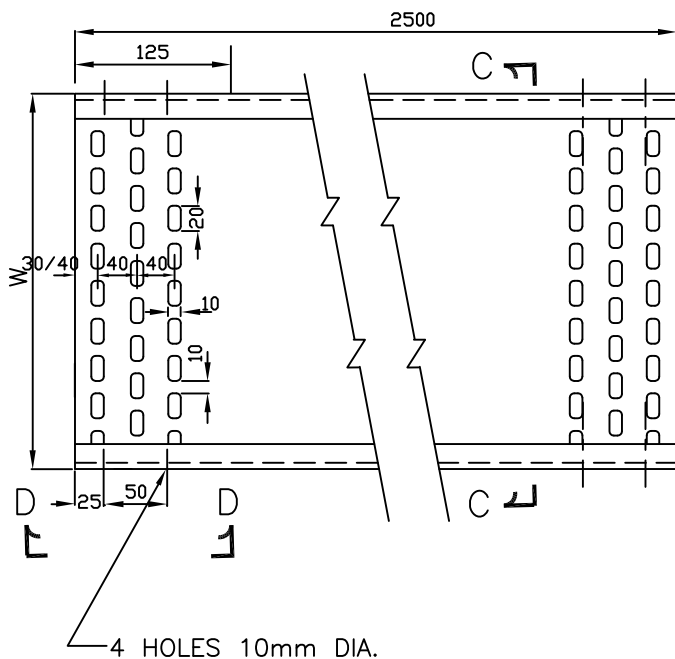
FOR GENERAL NOTES REFER SHEET 14 OF 34



TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES (TYPE-A)

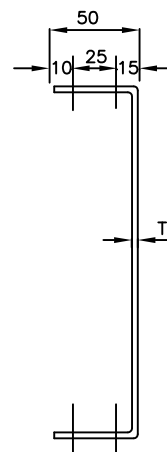
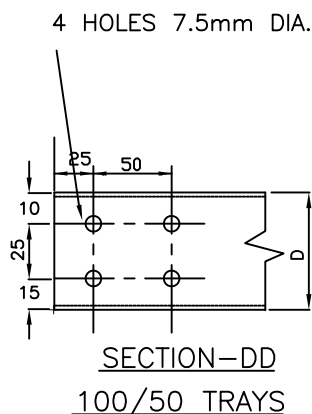
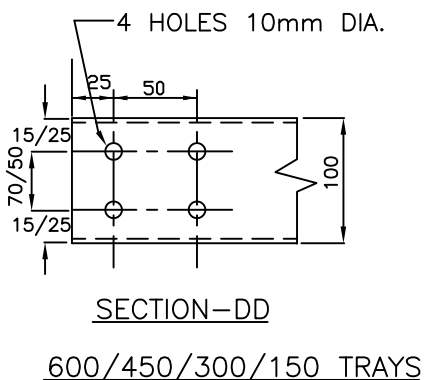
DWG. NO.  
PE-DG-999-507-E005

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SECTION-CC

600/450/300/150 TRAYS



SECTION-CC

(100/50 TRAYS)

TRAY WIDTH W (mm)	600	450	300	150	100	50
TRAY DEPTH D (mm)	100	100	100	100	50	50
T (mm)	2	2	2	2	2	2

PERFORATED TYPE TRAY

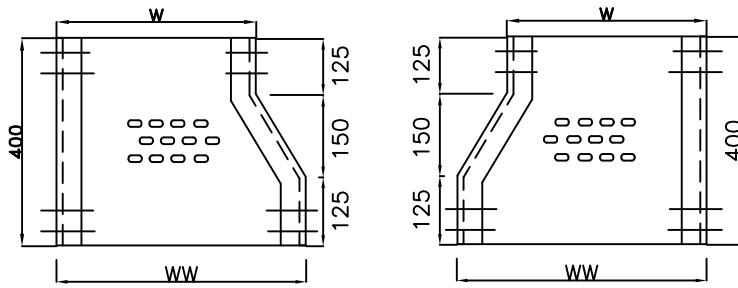
FOR GENERAL NOTES REFER SHEET 14 OF 34



TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES (TYPE-A)

DWG. NO.  
PE-DG-999-507-E005

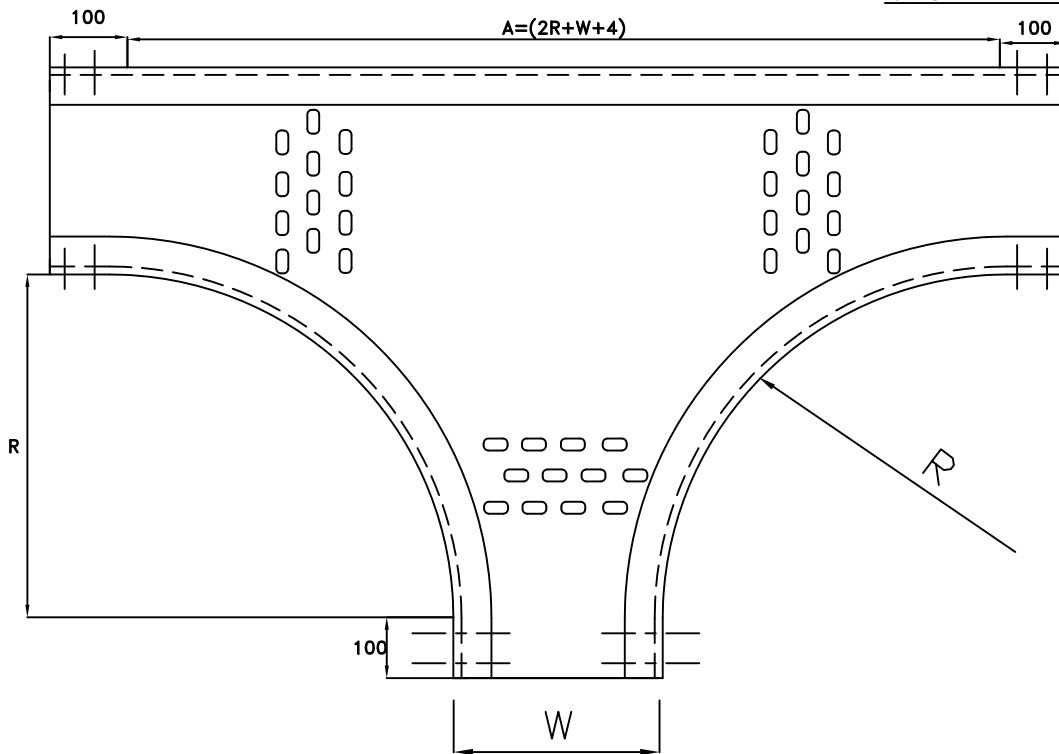
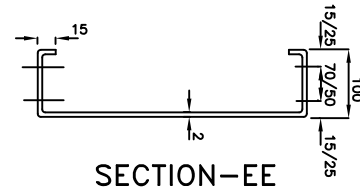
SHT. 09 OF 14 REV. 0



WW	W	DEPTH
600	450	100
600	300	100
600	150	100
450	300	100
300	150	100

LEFT HAND REDUCER      RIGHT HAND REDUCER

PERFORATED TYPE



TEE

WIDTH W	BENDING RADIUS R	DEPTH	A			
			W			
			150	300	450	600
150, 300, 450 & 600	600	100	1354	1504	1654	1804

PERFORATED TYPE

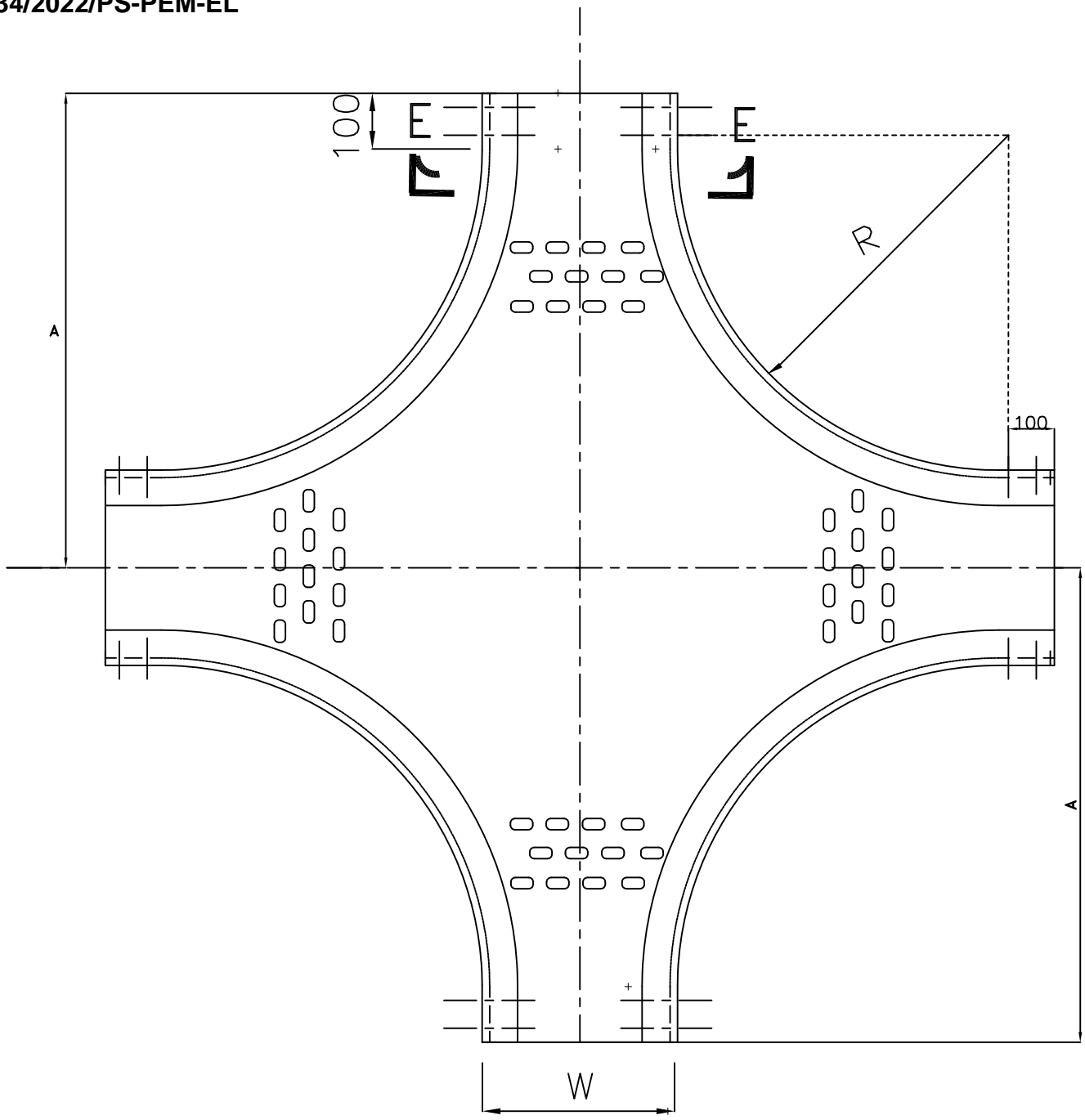
FOR GENERAL NOTES REFER SHEET 14 OF 34



TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES (TYPE-A)

DWG. NO.  
PE-DG-999-507-E005

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CROSS

WIDTH W	BENDING RADIUS R	$A=R+W/2+100$
600	600	1000
450	600	925
300	600	850

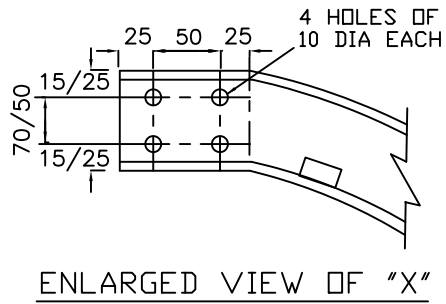
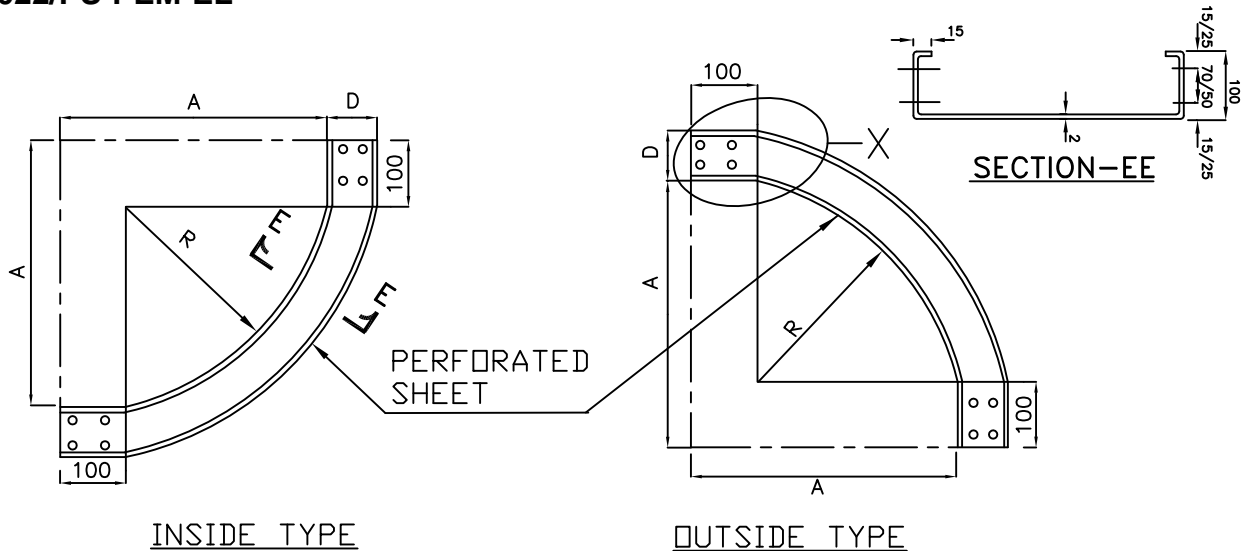
FOR GENERAL NOTES REFER SHEET 14 OF 34



TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES (TYPE-A)

DWG. NO.  
PE-DG-999-507-E005

SHT. 11 OF 14 REV. 0



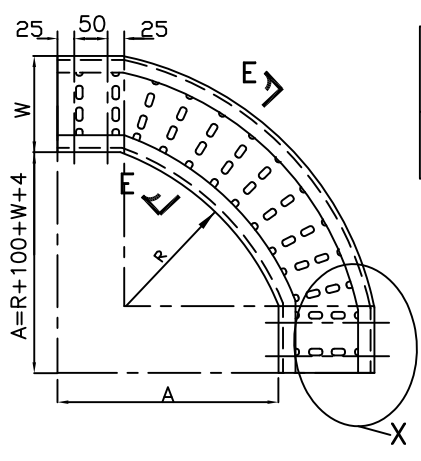
ENLARGED VIEW OF "X"

VERTICAL ELBOW 90 DEG UP/DOWN

INSIDE WIDTH W	BENDING RADIUS R	DEPTH	A
600, 450, 300 & 150	600	100	700

90° VERTICAL BEND - PERFORATED TYPE

HORIZONTAL ELBOW 90 DEG



INSIDE WIDTH W	BENDING RADIUS R	DEPTH	A			
			150	300	450	600
150, 300, 450 & 600	600	100	854	1004	1154	1304

90° HORIZONTAL BEND - PERFORATED TYPE

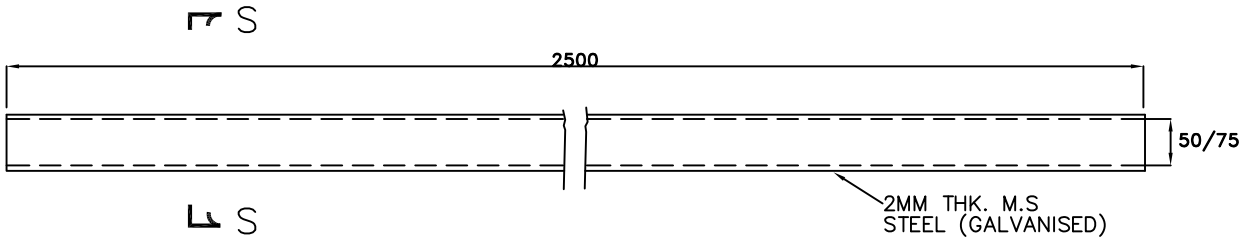
FOR GENERAL NOTES REFER SHEET 14 OF 34



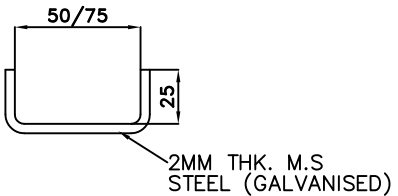
TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES (TYPE-A)

DWG. NO.  
PE-DG-999-507-E005

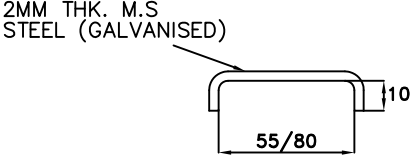
SHT. 12 OF 14 REV. 0



SECTION S-S



SECTION S-S



COVER FOR CABLE TROUGHS

CABLE TROUGHS

FOR GENERAL NOTES REFER SHEET 14 OF 34



TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES (TYPE-A)

DWG. NO.  
PE-DG-999-507-E005

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NOTES:—

1. THE CABLE TRAYS AND ACCESSORIES SHALL BE MADE OF 2mm HOT ROLLED M.S.SHEET CONFIRMING TO IS:1079. ALL THE COUPLER PLATE SHALL BE OF 3 MM THICK.
2. THE CABLE TRAYS AND ACCESSORIES SHALL BE HOT DIP GALVANISED AS PER IS 2629. THE MASS OF ZINC COATING SHALL BE 610 gm/m AND THICKNESS SHALL BE 75 MICRONS (MINIMUM).
3. FOR LADDER TYPE CABLE TRAYS AND ACCESSORIES, ALL RUNGS SHALL BE SLOTTED.
4. PERFORATED TRAYS SHALL BE FABRICATED OUT OF A SINGLE M.S. SHEET.
5. THE DIMENSIONS OF ALL BENDS, TEES, CROSSES, ETC. FOR PERFORATED CABLE TRAYS SHALL BE THE SAME AS FOR LADDER TYPE TRAY FITTINGS.
6. SIDE CHANNELS OF PERFORATED TRAY ACCESSORIES SHALL BE WELDED WITH THE PERFORATED SHEET AT INTERVALS OF 100mm.
7. LENGTH OF WELDING SHALL NOT BE LESS THAN 25mm. WELDING SHALL BE AS PER IS 9595.
8. PREFERABLY SINGLE MS PERFORATED SHEET SHALL BE USED AS BASE OF ALL PERFORATED TYPE TRAY ACCESSORIES. HOWEVER, IF USE OF PIECES OF PERFORATED SHEET IS UNAVOIDABLE FOR BASE, PIECES SHALL BE WELDED WITH EACH OTHER IN LINE WITH THE ABOVE.
9. ALL TRAY CORNERS SHALL BE FREE OF SHARP EDGES & SMOOTH.
10. THE DEPTH, WIDTH AND LENGTH OF TRAYS AND ACCESSORIES SHALL BE WITHIN A TOLERANCE AS PER RELEVANT IS
11. TO FACILITATE ASSEMBLY, ALL ACCESSORIES AT ENDS SHALL HAVE 100mm STRAIGHT PORTION.
12. ALL NUTS, BOLTS, WASHERS ETC., SHALL BE HOT DIP GALVANISED AS PER IS 1367 FOR SIZES ABOVE 12MM AND ELECTROPLATED/ELECTROGALVANISED FROM SIZE BELOW 12MM.
13. ALL DIMENSIONS ARE IN mm UNLESS NOTED OTHERWISE.
14. TRAY ACCESSORIES SHOWN IN THIS DRAWING SHALL BE FACTORY FABRICATED FOR USE AT SITE AS PER APPROVED LAYOUT DRAWINGS. FOR SPECIFIC SITE REQUIREMENTS (E.G. IRREGULAR ANGLE BENDS SUCH AS 30°/60° BENDS, ETC) AS PER SITE LAYOUT CONDITIONS, TRAY ACCESSORIES SHALL BE FABRICATED AT SITE FROM THE STRAIGHT LENGTH OF RESPECTIVE SIZES AS REQUIRED. GALVANISATION DAMAGED DURING CUTTING/WELDING OPERATIONS SHALL BE BRUSHED AND RED LEAD PRIMER, OIL PRIMER AND ALUMINIUM PAINT SHALL BE APPLIED BEFORE INSTALLATION OF THE ACCESSORIES.
15. WIDTH OF CABLE TRAYS PROPOSED TO BE USED FOR PROJECT ARE AS UNDER :  
LADDER TYPE CABLE TRAY (MM) : 600,450,300 & 150.  
PERFORATED TYPE CABLE TRAY (MM) : 600,450,300,150,100 & 50.
16. 600MM WIDE CABLE TRAY SHALL BE SUITABLE FOR WEIGHT OF 100KG/M INCLUDING LIVE LOAD OF RUNNING LENGTH OF CABLE TRAY.
17. CABLE TROUGHS SHALL BE USED FOR BRANCHING OUT FEW CABLES FROM MAIN CABLE ROUTE.
18. MAKE OF ALL ITEMS SHALL BE AS PER BHEL/CUSTOMER APPROVAL.
19. CABLE TROUGHS OR 50/100MM WIDE PERFORATED TYPE TRAY SHALL BE USED FOR LOCAL CABLING/BRANCHING OUT FEW CABLES FROM MAIN ROUTE.




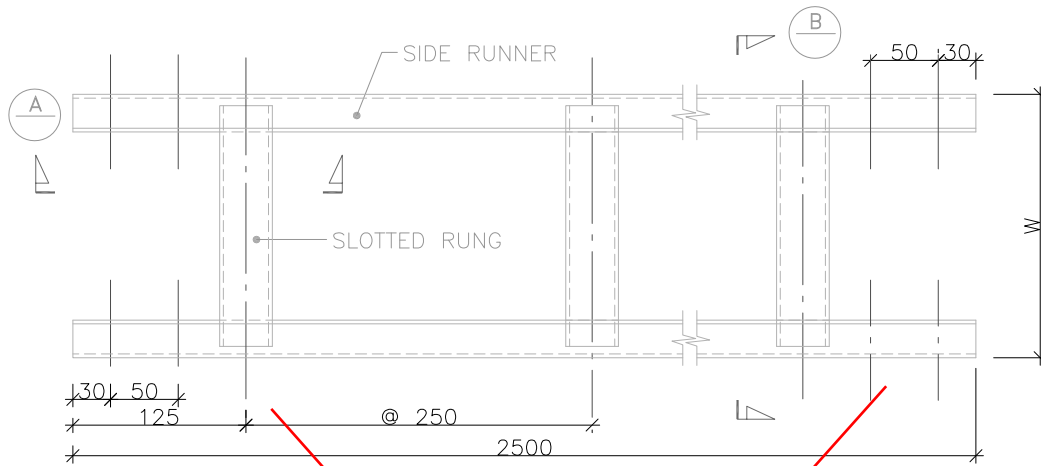
TYPICAL DETAILS OF CABLE TRAYS AND  
ACCESSORIES (TYPE-A)

DWG. NO.  
PE-DG-999-507-E005

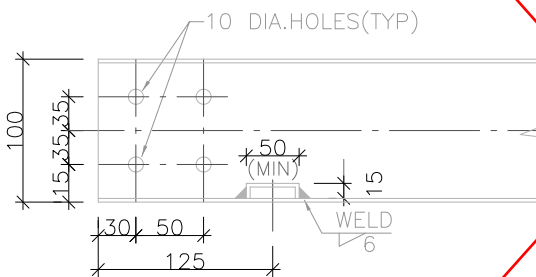
SHT. 14 OF 14 REV. 0

# TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES TYPE-B

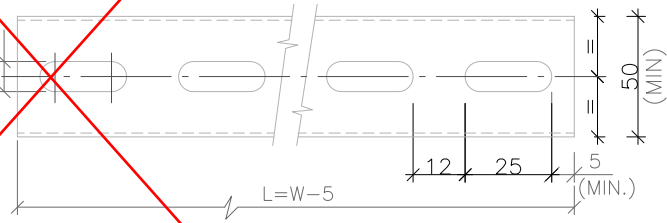
CUSTOMER						
PROJECT						
JOB NO.	 BHARAT HEAVY ELECTRICALS LIMITED POWER SECTOR PROJECT ENGINEERING MANAGEMENT NOIDA(U.P) INDIA	DPT CODE--E	DRN	NAME SKS	SIGN	DATE
			DSN	SKS	CHD	VY
			APP	SL		
		DWG. NO. PE-DG-999-507-E006				
		SHT. 01 OF 9		REV. 0		



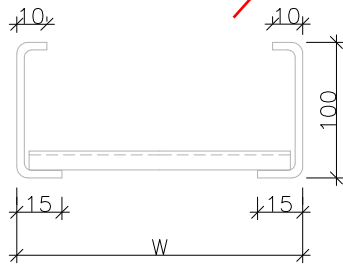
LADDER TYPE CABLE TRAY



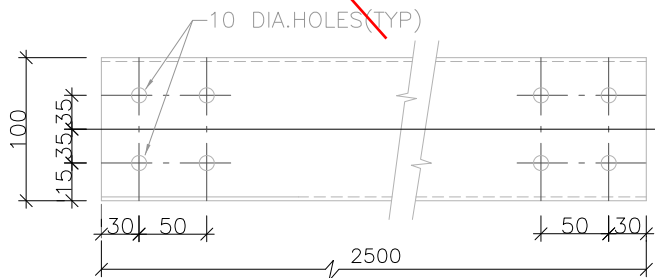
SEC - A



SLOTTED RUNG



SEC - B



SIDE RUNNER

MATERIAL : M.S. SHEET 14 SWG.(2mm.THK.)  
FINISH : HOT DIP GALVANISED

W	300	450	600
L	295	445	595

**NOTE :-**

1. ALL DIMENSIONS ARE IN MM.

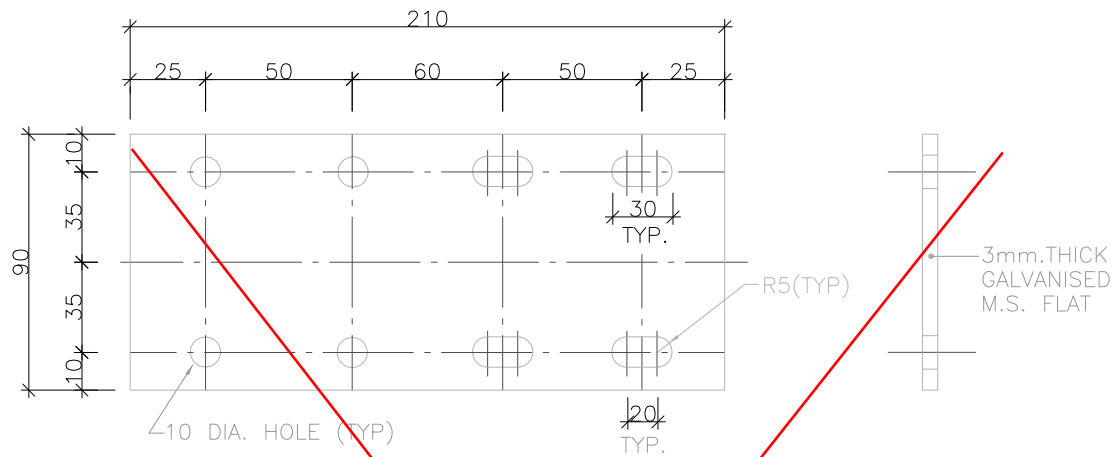
TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES (TYPE -B)



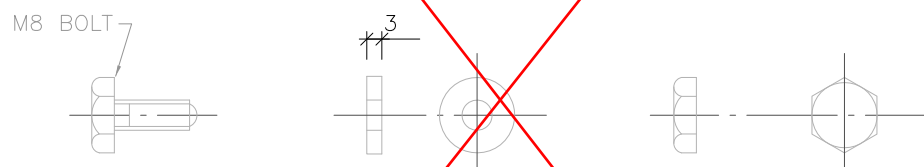
DWG. NO.

PE-DG-999-507-E006

REV.00 SHT. 02 OF 9



SIDE COUPLER PLATE



M8 BOLT, WASHER & NUT  
(FOR CABLE TRAY JOINT)

NOTE :-

1. ALL DIMENSIONS ARE IN MM.

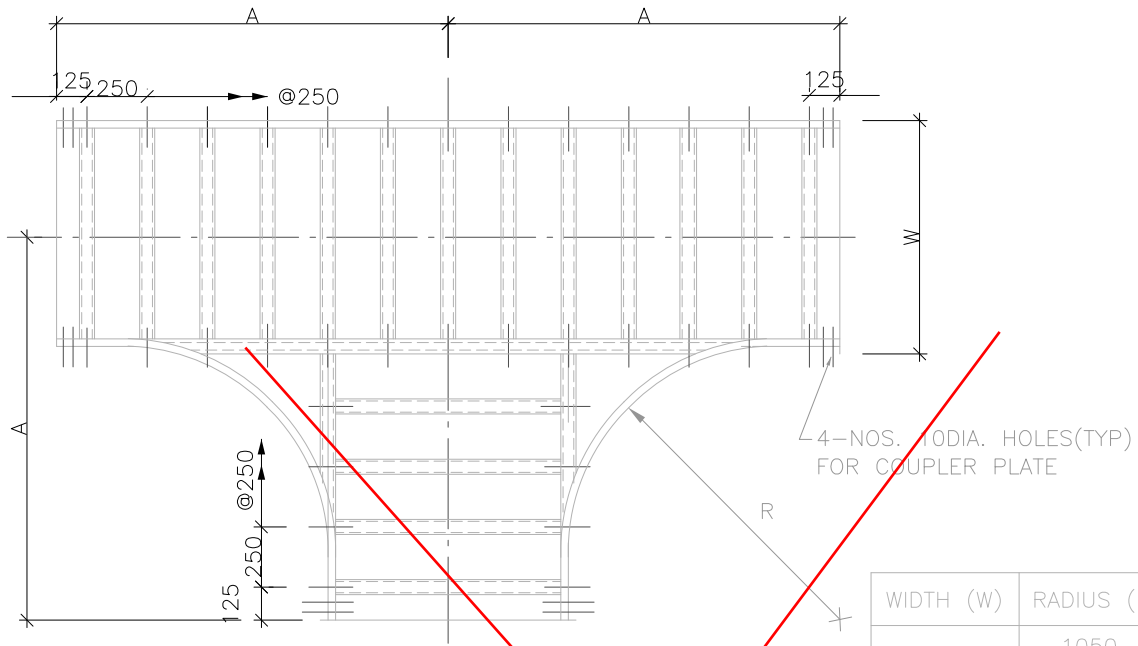
TYPICAL DETAILS OF CABLE TRAYS AND  
ACCESSORIES (TYPE -B)



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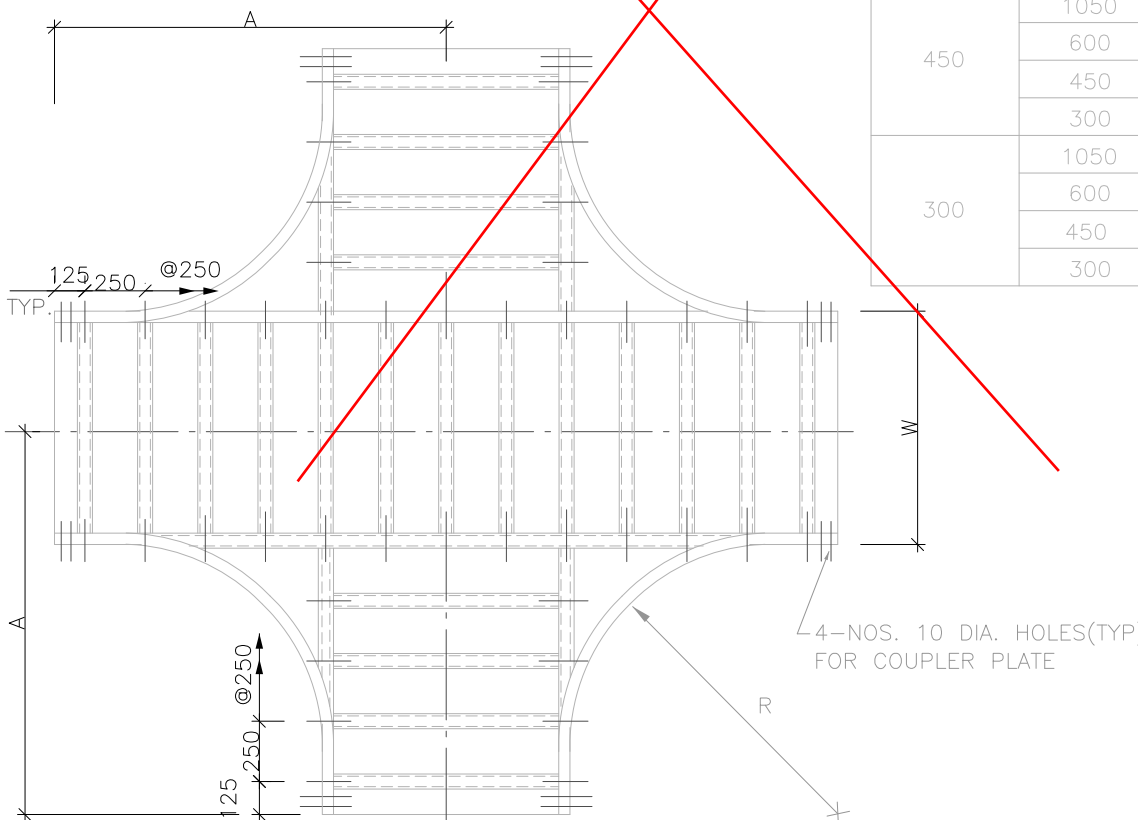
PE-DG-999-507-E006

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PLAN  
HORIZONTAL TEE

WIDTH (W)	RADIUS (R)	A
600	1050	1475
	600	1025
	450	875
	300	725
450	1050	1400
	600	950
	450	800
	300	650
300	1050	1325
	600	875
	450	725
	300	575



PLAN  
HORIZONTAL CROSS

**NOTES :-**

1. ALL DIMENSIONS ARE IN MM.
2. FOR MULTITIER CABLE TRAY, THE BENDING RADIUS AT THE BENDS SHALL BE SAME FOR ALL TRAYS AND THIS RADIUS SHALL BE AS PER THE RECOMMENDED BENDING RADIUS OF LARGEST CABLE IN THE ROUTE.

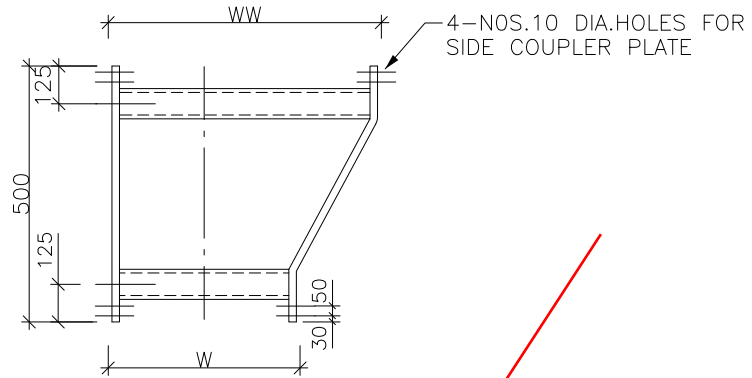
TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES (TYPE -B)



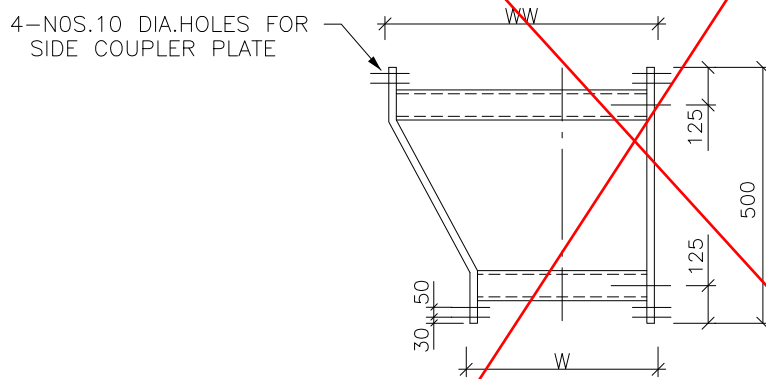
DWG. NO.

PE-DG-999-507-E006

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PLAN  
LEFT HAND REDUCER



PLAN  
RIGHT HAND REDUCER

WIDTH	WW	600	600	450
	W	450	300	300
DEPTH	D	100	100	100

**NOTE :-**

1. ALL DIMENSIONS ARE IN MM.

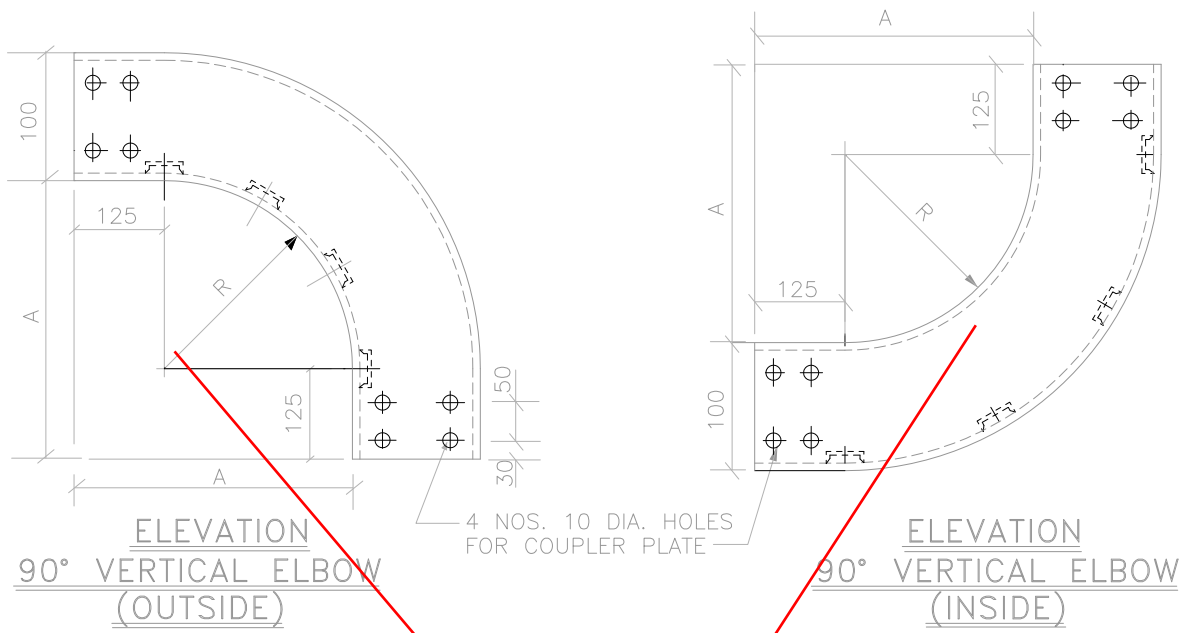
TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES (TYPE -B)



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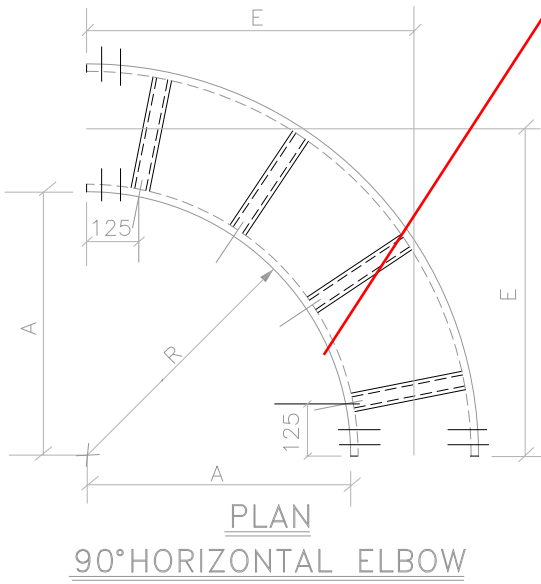
PE-DG-999-507-E006

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VERTICAL ELBOW		
WIDTH (W)	RADIUS (R)	A
600 450 & 300	1050	1175
	600	725
	450	575
	300	425

HORIZONTAL ELBOW			
WIDTH (W)	RADIUS (R)	A	E
600	1050	1175	1475
	600	725	1025
	450	575	875
450	300	425	725
	1050	1175	1400
	600	725	950
300	450	575	800
	300	425	650
	1050	1175	1325
	600	725	875
	450	575	725
	300	425	575



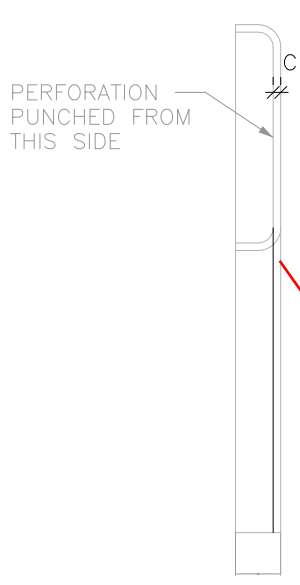
**NOTES :-**

1. ALL DIMENSIONS ARE IN MM.
2. FOR MULTITIER CABLE TRAY, THE BENDING RADIUS AT THE BENDS SHALL BE SAME FOR ALL TRAYS AND THIS RADIUS SHALL BE AS PER THE RECOMMENDED BENDING RADIUS OF LARGEST CABLE IN THE ROUTE

TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES (TYPE -B)

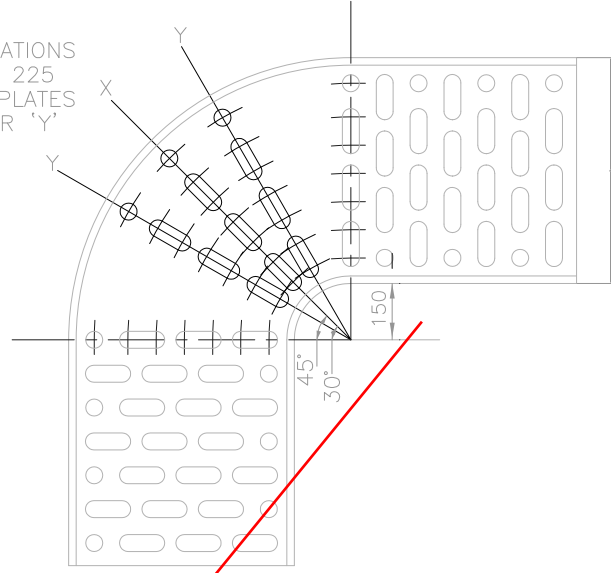


DWG. NO.  
PE-DG-999-507-E006  
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END ELEVATION

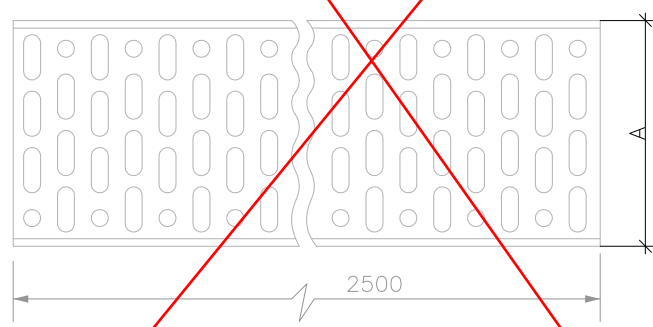
ADDITIONAL PERFORATIONS  
REQUIRED ON 100, 225  
& 300 MM WIDTH PLATES  
ALONG LINES 'X' OR 'Y'



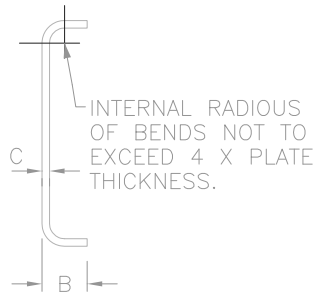
PLAN

DIMENSIONS IN MM	
WIDTH-A	DEPTH-B
100	50
50	
300	100
450	100
600	100

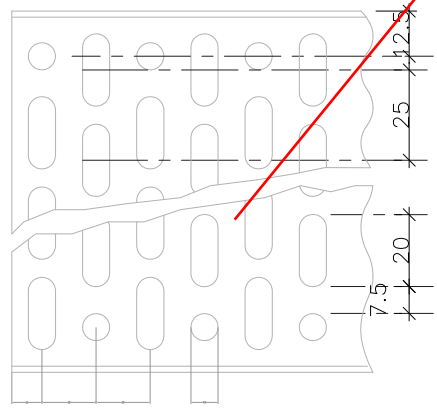
90° HORIZONTAL ELBOW



PLAN



END ELEVATION



DETAILS OF PERFORATION

STRAIGHT LENGTH

NOTES :

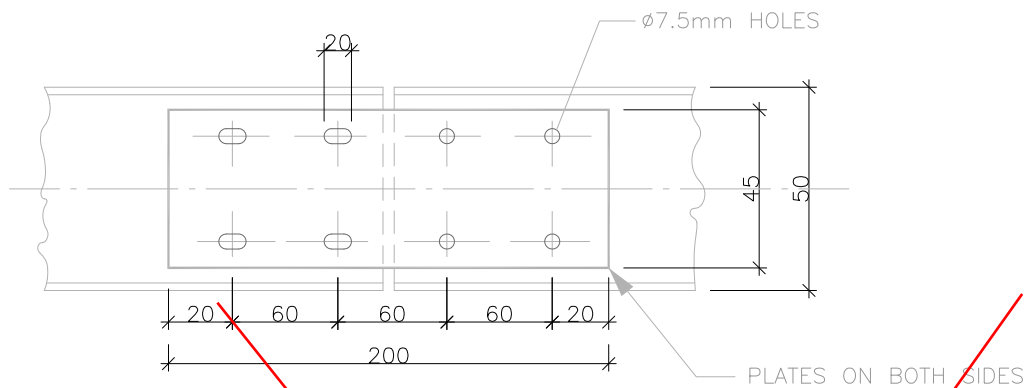
1. ALL CUTTING & FORMING OPERATIONS TO BE COMPLETED PRIOR TO GALVANIZING.
2. FINISHED TRAYS TO BE FREE FROM BURRS AND SHARP EDGES.
3. ALL DIMENSIONS ARE IN MM.

PERFORATED TYPE CABLE TRAY

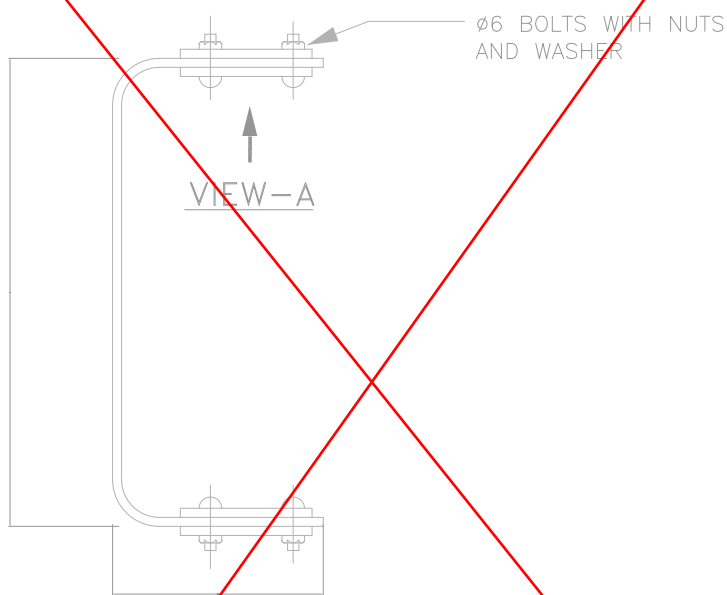
TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES (TYPE -B)



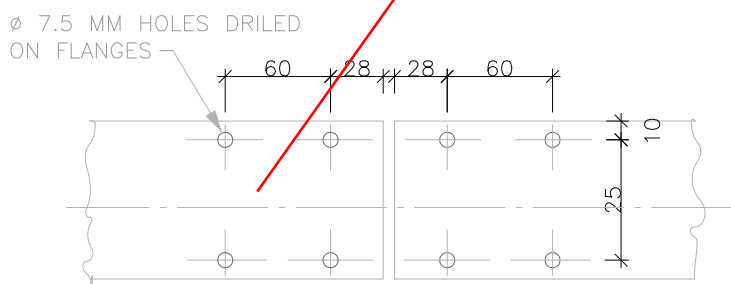
DWG. NO.  
PE-DG-999-507-E006  
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VIEW-A



END ELEVATION



COUPLING PLATE

PERFORATED TRAY JOINING BY  
COUPLING PLATES

NOTES:-

1. COUPLING PLATES 3 MM THICK M.S.
2. ALL DIMENSIONS ARE IN MM.

TYPICAL DETAILS OF CABLE TRAYS AND  
ACCESSORIES (TYPE -B)



DWG. NO.  
PE-DG-999-507-E006  
REV.00 SHT. 08 OF 9

NOTES:-


1. THE LADDER AND PERFORATED TYPE CABLE TRAYS AND ACCESSORIES (INCLUDING SIDE RUNNERS OF LADDER TYPE CABLE TRAYS), SIDE COUPLER PLATE AND CABLE TRAY COVER SHALL BE MADE OF HOT DIP GALVANISED AS PER IS 1079. THICKNESS OF CABLE TRAYS & ACCESSORIES, SIDE COUPLER PLATE AND TRAY COVERS SHALL BE 2MM, 3MM AND 1.7MM RESPECTIVELY.
2. THE CABLE TRAYS ACCESSORIES AND TRY COVERS SHALL BE SHALL BE HOT DIP AS PER IS 2629. GALVANIZATION SHALL BE UNIFORM & THICKNESS OF GALVANIZATION SHALL NOT BE LESS THAN 610 GRAMS/ SQ.MTR. ALSO ZINC DEPOSIT THICKNESS AT ANY POINT SHALL NOT BE LESS THAN 75 MICRONS.
3. FOR LADDER TYPE CABLE TRAYS AND ACCESSORIES, ALL RUNGS SHALL BE SLOTTED.
4. PERFORATED TRAYS SHALL BE FABRICATED OUT OF A SINGLE M.S. SHEET.
5. STANDARD TRAY ACCESSORIES SHALL BE WITH THE RADIUS INDICATED IN THIS DRAWING.
6. THE DIMENSIONS OF ALL BENDS, TEES, CROSSES, ETC. FOR PERFORATED CABLE TRAYS SHALL BE THE SAME AS FOR LADDER TYPE TRAY FITTINGS.
7. SIDE CHANNELS OF PERFORATED TRAY ACCESSORIES SHALL BE WELDED WITH THE PERFORATED SHEET AT INTERVALS OF 100mm.
8. LENGTH OF WELDING SHALL NOT BE LESS THAN 25mm.
9. ALL TRAY CORNERS SHALL BE SMOOTH AND FREE OF SHARP EDGES.
10. THE DEPTH, WIDTH AND LENGTH OF TRAYS SHALL BE WITHIN A TOLERANCE OF (+/-) 2 mm. THE THICKNESS TOLERANCE IS OF (+/-) 0.2 mm. AS PER IS:1852
11. TO FACILITATE ASSEMBLY, ALL ACCESSORIES AT ENDS SHALL HAVE 100mm STRAIGHT PORTION.
12. ALL NUTS, BOLTS, WASHERS ETC., SHALL BE HOT DIP GALVANISED AS PER IS:1367 PART XIII FOR SIZES 12 MM & ABOVE AND ELECTROPLATED/ZINC PASSIVATED FOR SIZES BELOW 12 MM.
13. ALL CUTTING & FORMING OPERATIONS SHALL BE COMPLETED PRIOR TO GALVANIZING.
14. FINISHED TRAYS SHALL BE FREE FROM BURRS AND SHARP EDGES.
15. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
16. TOP MOST CABLE TRAY OF A HORIZONTAL RUN AND FRONT CABLE TRAY OF A VERTICAL RUN IN ALL OUTDOOR AREAS SHALL BE PROVIDED WITH REMOVABLE TRAY COVER.
17. THE PORTION OF GALVANIZED STEEL, WHICH, IF REQUIRED, UNDERGOES ANY WELDING AT SITE, SHALL BE COATED WITH TWO COATS OF COLD GALVANIZING ANTI-CORROSIVE PAINT AFTER WELDING.
18. WIDTH OF CABLE TRAYS PROPOSED TO BE USED FOR THE PROJECT ARE AS UNDER:
  - A) LADDER TYPE: 600W, 450W, 300W, 150W.
  - B) PERFORATED TYPE: 600W, 450W, 300W, 150W, 100W, 50W
19. THE DEPTH OF 600W, 450W, 300W & 150W TRAYS & ACCESSORIES SHALL BE 100MM AND DEPTH OF 100W & 50W TRAY SHALL BE 50MM.



TYPICAL DETAILS OF CABLE TRAYS AND  
ACCESSORIES (TYPE -B)

DWG. NO.  
PE-DG-999-507-E006

REV. 00 SHT. 09 OF 9

	<b>2X660 MW KHURJA TG TPS</b>	PE-PQ-475-507-E001
	<b>PRE-QUALIFICATION REQUIREMENTS FOR CABLE TRAYS &amp; ACCESSORIES</b>	REVISION NO. 00    DATE 08/04/2022
		Page 1 of 2


<b>ITEMS: Cable trays &amp; Accessories</b>	
<b>SCOPE: Supply: YES;    Erection &amp; Commissioning: NO;</b>	
1	Vendor should have in-house fabrication & manufacturing facility.
2	Capability of manufacturing cable trays & accessories for 20 km per month.
3	Vendor has his own galvanization plant.  OR Vendor should get galvanization of cable trays & accessories to be done from any of the BHEL-PEM approved galvanizers.
4	Manufactured & supplied at least 30 km of cable trays & accessories in one or more orders and at least 15 km in a single order.
5	Minimum two (2) nos. purchase orders for cable trays & accessories shall be submitted which should not be more than five (5) years old from date of techno-commercial bid opening for establishing continuity in business.

**Notes (General points of PQR):**




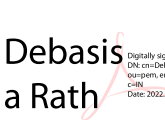
1. Offers of the JV companies/ Joint Bidders/ bidders having collaboration/ licensing agreement/ MOU/ Indian subsidiaries shall be evaluated as follows:
  - a. If bidder happens to be an Indian subsidiaries of foreign OEM, then the credentials of the foreign OEM can also be considered for meeting PQR.
  - b. If bidder happens to be the Joint Venture Company, then the credentials of any of JV partners can be also considered for meeting PQR.
  - c. If bidder happens to bid jointly with their partner, then credentials of both the partners will be considered for meeting PQR as per distribution of the work. In all such cases, lead bidder as specified in bid documents shall be responsible for overall execution of the contract and all guarantee/ warranty.
  - d. If bidder happens to be the having valid collaboration agreement/ MOU/ licensing agreement with some other company, then the credentials of collaborator/ MOU partner/ licensing company can also be considered for meeting PQR.

Note: If bidder(s) qualifies on the basis of credentials of his principal/ JV partner/ Collaborator/ joint bidder etc., then the principal/ JV partner/ Collaborator/ MOU partner/ joint bidder shall be responsible for overall design vetting and warranty/ guarantee of the package. The scope matrix clearly defining their respective roles including design vetting, manufacturing of critical component, E&C etc. etc. and warranty/ guarantee shall be submitted along with the offer.

<b>PREPARED BY</b>	<b>CHECKED BY</b>	<b>REVIEWED BY</b>	<b>APPROVED BY</b>
 <b>AJAY VERMA</b> <small>Digitally signed by AJAY VERMA DN: cn=AJAY VERMA, o=BHEL, ou=PEM, email=ajayverma@bhel.in, c=IN Date: 2022.04.08 17:09:47 +05'30'</small>	 <b>KAVITA GUPTA</b> <small>Digitally signed by KAVITA GUPTA DN: cn=KAVITA GUPTA, o=BHEL, ou=BHEL-PEM, email=kavitagupta@bhel.in, c=IN Date: 2022.04.08 17:15:56 +05'30'</small>	 <b>okumar</b> <small>Digitally signed by okumar DN: cn=okumar, o=bhel, ou=bhel, email=okumar@bhel.in, c=IN Date: 2022.04.08 17:34:12 +05'30'</small>	 <b>Debasisa Rath</b> <small>Digitally signed by Debasisa Rath DN: cn=Debasisa Rath, o=bhel, ou=peem, email=debasisa@bhel.in, c=IN Date: 2022.04.08 17:53:08 +05'30'</small>
<b>AJAY VERMA, SR. ENGINEER</b>	<b>KAVITA GUPTA, MANAGER</b>	<b>OMKAR KUMAR, DGM</b>	<b>DEBASISA RATH, AGM (DH)</b>

	2X660 MW KHURJA TG TPS	PE-PQ-475-507-E001
	PRE-QUALIFICATION REQUIREMENTS FOR CABLE TRAYS & ACCESSORIES	REVISION NO. 00    DATE 08/04/2022 Page 2 of 2

2. Bidder to note that the arrangement of bidding (joint bid partners/ collaborator/ MOU partner/ licensing company etc.) once offered to BHEL as a part of bidding documents cannot be changed till the execution of the project.
3. Consideration of offer shall be subject to customer's approval of bidders, if applicable
4. Bidder to submit all supporting documents in English. If documents submitted by bidder are in language other than English, a self- attested English translated document should also be submitted.
5. Notwithstanding anything stated above, BHEL reserves the right to assess the capabilities and capacity of the bidder to perform the contract, should the circumstances warrant such assessment in the overall interest of BHEL.
6. After satisfactory fulfilment of the above criteria/ requirement, offer shall be considered for further evaluation as per NIT and all the other terms of tender.

<b>PREPARED BY</b>   <b>AJAY VERMA</b>  <b>AJAY VERMA,</b> <b>SR. ENGINEER</b>	<b>CHECKED BY</b>   <b>KAVITA GUPTA</b>  <b>KAVITA GUPTA,</b> <b>MANAGER</b>	<b>REVIEWED BY</b>   <b>okumar</b>  <b>OMKAR KUMAR,</b> <b>DGM</b>	<b>APPROVED BY</b>   <b>Debasis a Rath</b>  <b>DEBASISA RATH,</b> <b>AGM (DH)</b>
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To,  
M/s Bharat Heavy Electricals Ltd.,  
Project Engineering Management,  
Power Project Engineering Institute,  
HRD & ESI Complex,  
Plot No 25, Sector-16 A, Noida-201301

Dear Sir,

This has reference to:

1. Our offer for CABLE TRAYS & ACC. for 2X660 MW THDC KHURJA TG., Tender No. PE/PG/THD/E-6969/2022.
2. Order no. F.No. 6/18/2019-PPD dt. 23.07.2020 issued by Ministry of Finance, Department of Expenditure Public Procurement Division.

I have read the clause regarding restriction on procurement from a bidder of a country which shares a land border with India; I certify that M/s (Company Name \_\_\_\_\_) is not from such a country,

or,

*if from such a country, has been registered with the competent authority. (Strike through if not applicable)*

I hereby certify that M/s (Company Name \_\_\_\_\_) fulfil all requirements in this regard and is eligible to be considered for procurement.

[where applicable, evidence of valid registration by the competent authority shall be attached]

Thanking You,  
Yours faithfully,

Director/Properiter/Partner  
M/s \_\_\_\_\_

**LOCAL CONTENT CERTIFICATE**

To,  
Bharat Heavy Electricals Limited  
PEM, PPEI Building, Plot No 25,  
Sector 17 A, Noida (U.P)-201301

**Subject: - Certification regarding local content**

Reference: Tender Enquiry No.: PE/PG/THD/E-6969/2022  
Name of Package: CABLE TRAYS & ACC.  
Project Name: 2X660 MW THDC KHURJA TG

Dear Sir,

We hereby certify that items offered by us for above cited Tender Enquiry ref. has local content of \_\_\_\_%


Further, it is also certified that the local content % certified above is in line with definition of local content given in Public Procurement (Preference to Make in India), Order 2017-revision, having ref no. P45021/2017/-PP (BE-II) dtd. 04.06.20 & 16.09.20 and we qualify as Class \_\_\_\_\_ supplier.

We further confirm that address of the location at which the local value addition is made will be as follows:


Thanking You,  
Yours faithfully,

M/s \_\_\_\_\_

Format for Credentials for Vendor Approval from end-Customer

	<b>CORPORATE QUALITY ASSURANCE/ कॉर्पोरेट गुणवत्ता आश्वासन</b> <b>SUB-VENDOR QUESTIONNAIRE/ सब-वेंडर प्रश्नावली</b>		
<b>i.</b>	<b>Item/Scope of Sub-contracting</b> उप-संविदा(अनुबंध) का मद/ दायरा		
<b>ii.</b>	<b>Address of the registered office</b> पंजीकृत कार्यालय का पता	<b>Details of Contact Person</b> संपर्क व्यक्ति का विवरण (Name, Designation, Mobile, Email) (नाम, पदनाम, मोबाइल, ईमेल)	
<b>iii.</b>	<b>Name and Address of the proposed Sub-vendor's works where item is being manufactured</b> प्रस्तावित उप-विक्रेता के कार्यों का नाम और पता, जहां मद का निर्माण किया जा रहा है	<b>Details of Contact Person:</b> संपर्क व्यक्ति का विवरण (Name, Designation, Mobile, Email) (नाम, पदनाम, मोबाइल, ईमेल)	
<b>iv.</b>	<b>Annual Production Capacity for proposed item/scope of sub-contracting</b> उप-संविदा(अनुबंध) के प्रस्तावित मद / दायरे के लिए वार्षिक उत्पादन क्षमता		
<b>v.</b>	<b>Annual production for last 3 years for proposed item/scope of sub-contracting</b> उप-संविदा(अनुबंध) के प्रस्तावित मद / दायरे के लिए पिछले 3 वर्षों का वार्षिक उत्पादन		
<b>vi.</b>	<b>Details of proposed works</b> प्रस्तावित कार्यों का विवरण		
1.	<b>Year of establishment of present works</b> वर्तमान फैक्टरी की स्थापना का वर्ष		
2.	<b>Year of commencement of manufacturing at above works</b> उपरोक्त फैक्टरी में निर्माण कार्य शुरू होने का वर्ष		
3.	<b>Details of change in Works address in past (if any)</b> पूर्व में फैक्टरी स्थल में परिवर्तन का विवरण (यदि कोई हो)		
4.	<b>Total Area</b> कुल क्षेत्र <b>Covered Area</b> शामिल क्षेत्र		
5.	<b>Factory Registration Certificate</b> फैक्टरी पंजीकरण प्रमाण पत्र	<b>Details attached at Annexure – F2.1</b> विवरण अनुलग्नक- एफ 2.1 पर संलग्न है	
6.	<b>Design/ Research &amp; development set-up</b> डिजाइन / अनुसंधान और विकास सेटअप (No. of manpower, their qualification, machines & tools employed etc.) (श्रमिकों की संख्या, उनकी योग्यता, मशीन और उपलब्ध उपकरण आदि)	<b>Applicable / Not applicable if manufacturing is as per Main Contractor/purchaser design)</b> <b>Details attached at Annexure – F2.2</b> (if applicable) लागू / लागू नहीं, अगर विनिर्माण मुख्य संविदाकार / खरीददार के डिजाइन के अनुसार है) विवरण अनुलग्नक -एफ 2.2 पर संलग्न है। (यदि लागू हो)	
7.	<b>Overall organization Chart with Manpower Details</b> (Design/Manufacturing/Quality etc) मैनपावर विवरण के साथ समग्र संगठन का चार्ट (डिजाइन / विनिर्माण / गुणवत्ता आदि)	<b>Details attached at Annexure – F2.3</b> विवरण अनुलग्नक – F2.3 में संलग्न है।	
8.	<b>After sales service set up in India, in case of foreign sub-vendor</b> (Location, Contact Person, Contact details etc.) भारत में बिक्री सेवा की स्थापना के बाद, विदेशी उप-विक्रेता के मामले में( स्थल, संपर्क व्यक्ति, संपर्क विवरण आदि)	<b>Applicable / Not applicable</b> लागू / लागू नहीं <b>Details attached at Annexure – F2.4</b> विवरण अनुलग्नक -2.4 पर संलग्न है।	
9.	<b>Manufacturing process execution plan with flow chart</b> indicating various stages of manufacturing from raw material to finished product including outsourced process, if any फ्लोचार्ट सहित विनिर्माण प्रक्रिया निष्पादन योजना, जिसमें आउटसोर्स प्रक्रिया, यदि कोई हो, सहित कच्चे माल से तैयार उत्पाद तक विनिर्माण के विभिन्न चरणों को दर्शाया गया हो,	<b>Details attached at Annexure – F2.5</b> विवरण अनुलग्नक - F2.5में संलग्न है।	

10.	<b>Sources of Raw Material/Major Bought Out Item कच्चे माल के स्रोत / खरीदे हुए मुख्य मद</b>			Details attached at Annexure – F2.6 विवरण अनुलग्नक - F2.6में संलग्न है।		
11.	<b>Quality Control exercised during receipt of raw material/BOI, in-process, Final Testing, packing कच्चे माल / खरीदे हुए मद, प्रक्रियाबद्ध, अंतिम परीक्षण, पैकिंग करते समय गुणवत्ता नियंत्रण</b>			Details attached at Annexure – F2.7 विवरण अनुलग्नक - F2.7 पर संलग्न है		
12.	<b>Manufacturing facilities (List of machines, special process facilities, material handling etc.) विनिर्माण सुविधा( मशीनों की सूची , विशेष प्रक्रिया सुविधाएं, सामग्री रख-रखाव आदि)</b>			Details attached at Annexure – F2.8 विवरण अनुलग्नक - F2.8में संलग्न है।		
13.	<b>Testing facilities (List of testing equipment) परीक्षण सुविधाएं( परीक्षण उपकरण की सूची )</b>			Details attached at Annexure – F2.9 विवरण अनुलग्नक – F2. 9 में संलग्न है।		
14.	If manufacturing process involves fabrication then- यदि निर्माण प्रक्रिया में फेब्रिकेशन की गई है तो- List of qualified Welders पात्र वेल्डर की सूची List of qualified NDT personnel with area of specialization विशेषज्ञता के क्षेत्र सहित पात्र एनडीटी कार्मिकों की सूची			Applicable / Not applicable लागू / लागू नहीं Details attached at Annexure – F2.10 विवरण अनुलग्नक - F2.10में संलग्न है। (if applicable) लागू / लागू नहीं		
15.	List of out-sourced manufacturing processes with Sub-Vendors' names & addresses सब-वेंडर द्वारा बाह्य स्रोतों (उनके नाम और पते सहित) से करवाए गए निर्माण प्रक्रियाओं की सूची			Applicable / Not applicable लागू / लागू नहीं Details attached at Annexure. -F2.11 विवरण अनुलग्नक - F2.10में संलग्न है। (if applicable) (यदि लागू हो)		
16.	Supply reference list including recent supplies नवीनतम आपूर्ति सहित आपूर्ति संदर्भ सूची			Details attached at Annexure – F2.12 विवरण अनुलग्नक - F2.12 में संलग्न है। (as per format given below) (नीचे दिए गए प्रारूप के अनुसार)		
	Project/ package परियोजना /पैकेज	Customer Name ग्राहक का नाम	Supplied Item (Type/Rating/Model /Capacity/Size etc) आपूर्ति की गई वस्तु (प्रकार / रेटिंग / मॉडल / क्षमता / आकार आदि)	PO ref no/date पीओ संदर्भ सं. / तिथि	Supplied Quantity आपूर्ति की मात्रा	Date of Supply आपूर्ति की तारीख
17.	Product satisfactory performance feedback letter/certificates/End User Feedback उत्पाद के संतोषजनक प्रदर्शन संबंधी फीडबैक पत्र / प्रमाण पत्र / अंतिम उपयोगकर्ता फीडबैक			Attached at annexure - F2.13 अनुलग्नक F2. 3पर संलग्न है		
18.	Summary of Type Test Report (Type Test Details, Report No, Agency, Date of testing) for the proposed product (similar or higher rating) प्रस्तावित उत्पाद (एक समान या उच्च रेटिंग वाले) के लिए टाइप टेस्ट रिपोर्ट (टाइप टेस्ट विवरण, रिपोर्ट संख्या, एजेंसी, जांच की तारीख) का सारांश नोट:- रिपोर्ट प्रस्तुत करने की आवश्यकता नहीं है Note:- Reports need not to be submitted			Applicable / Not applicable लागू / लागू नहीं Details attached at Annexure – F2.14 विवरण अनुलग्नक - F2.1 4में संलग्न है (if applicable) (यदि लागू हो)		
19.	Statutory / mandatory certification for the proposed product प्रस्तावित उत्पाद के लिए वैधानिक / अनिवार्य प्रमाणीकरण			Applicable / Not applicable लागू / लागू नहीं Details attached at Annexure – F2.15 (if applicable) (यदि लागू हो)		
20.	Copy of ISO 9001 certificate आईएसओ 9001 प्रमाण पत्र की प्रति (if available (यदि उपलब्ध हो))			Attached at Annexure – F2.16 अनुलग्नक में संलग्न - F2.1 6 है		
21.	Product technical catalogues for proposed item (if available) प्रस्तावित मद के लिए उत्पाद तकनीकी कैटलॉग (यदि उपलब्ध हो)			Details attached at Annexure – F2.17 विवरण अनुलग्नक - F2.1 7 में संलग्न है		
Name: नाम:		Desig: पद:		Sign: हस्ता क्षर:		Date: तिथि:

Company's Seal/Stamp: - कंपनी की मुहर / मोहर: -

Format No.: QS-01-QAI-P-04/F2-R0 DATED 19.01.18

Engg. div./QA&I

## Guidelines for Remote Inspection of PEM BOIs

### 1) OBJECTIVE:

To lay down the procedure for carrying out Remote Inspection of Bought-out Items (BOIs) for PEM suppliers wherever applicable.

### 2) SCOPE:

It will cover suppliers for packages of PEM BOIs for various project requirements.

Invitation is sent to the suppliers for remote inspection on applications like MS Teams, Webex, etc. by BHEL.

### 3) MINIMUM REQUIREMENTS AT SUPPLIER'S WORKS:

- i. Uninterrupted internet services
- ii. Good internet bandwidth (Min 100 Mbps)
- iii. Good resolution camera (2 nos) – one preferably CCTV (static at one place) and one hand hold (moving)
- iv. Smart phone with minimum 8MPi camera front and back both with optical zoom facility suitable for using web applications like Webex, MicroSoft (MS) Teams, etc.
- v. Computer and Scanner with good resolution
- vi. Digital signatures of supplier's Quality Engineer
- vii. Availability of web applications like Webex, MicroSoft (MS) Teams, as required.
- viii. All Test certificates, internal test reports, calibration reports, etc. for the items offered for inspection.
- ix. Availability of the above to be submitted to BHEL two days in advance before inspection.
- x. Dedicated team from supplier side for facilitating inspection requirements.
- xi. For ensuring proper visibility, the suggested Portable lighting sources (torch/ electric LED bulb of minimum 15 W) with no glare is to be ensured at offered job, location for remote inspection/testing. This is to be verified before start of the inspection.
- xii. The GPS location co-ordinates or any method to locate inspection location shall be captured indicating the location of the Vendor-Premises of remote inspection/testing.

### 4) MINIMUM REQUIREMENTS AT BHEL and CUSTOMER LOCATION :

- i. Uninterrupted internet services
- ii. Suitable internet bandwidth
- iii. Digital signatures wherever required.
- iv. Availability of web applications like Webex, MS Teams, etc. as required.
- v. Clearance from customer for conducting remote inspection

### 5) PROCEDURE:

- i. Supplier will raise the inspection call in BHEL - CQIR portal.
- ii. Supplier shall ensure availability of minimum requirements at supplier's works as mentioned above at point 3.

- iii. Before starting the inspection, the supplier shall submit the documents (TCs, internal test reports and calibration certificates as per approved QAP) two days before the date of inspection for review by BHEL and supplier shall coordinate with BHEL and if found satisfactory, inspection shall be considered for remote.
  - iv. Prior to commencement of remote inspection a pre inspection meeting shall be organised by BHEL inspector with supplier to ascertain the readiness for remote inspection.
- 6) During inspection, supplier shall share the location on Google maps for verifying the address of the manufacturer. Location may be captured by BHEL as screenshot.
- i. Inspection shall be on the basis of approved Quality Plans and associated reference documents mentioned.
  - ii. For witnessing inspection, supplier shall bring the mobile video camera near to the surface of the equipment or as per requirement of the inspector for clarity in viewing the test/ equipment which shall be the responsibility of supplier. Supplier shall ensure that proper lighting is available during live video streaming.
  - iii. Before start of the inspection, inspector shall ensure that all instruments shall have valid calibration report. Supplier shall ensure use of digital instruments preferably for inspection to the extent possible.
  - iv. Details of suppliers's dedicated team handling the remote inspection shall also be incorporated in the CQIR.
  - v. All details of inspection/ testing referred documents shall be mentioned in the CQIR. Recording of remote inspection shall be maintained by the BHEL inspector and this recording (unedited) shall be maintained at BHEL system for a minimum period of 3 years or till the warranty period whichever is later.
  - vi. PEM (Engineering) shall accord final technical clearance, in case of any deviation in inspected item noticed during inspection.
  - vii. Inspection shall be conducted by PEM-Q&BE assigned inspector along with PEM-Engg (if required). CQIR shall be prepared and maintained by PEM-Q&BE.
  - viii. PG will issue MDCC on the basis of acceptance of inspected items along with accepted packing photographs as per contract provisions.
- 7) **UNDERTAKING BY VENDOR:** Material inspected through remote inspections is meeting all technical requirements of BHEL. In case of any discrepancy from the above procedure/ material inspected, if found later, vendor will replace the materials without any cost implication to BHEL.
- 8) Vendor shall provide the signed and stamped of the above guidelines to BHEL as a token of acceptance.



PEM / PG-III, BHEL, Noida

**SPECIAL CONDITIONS OF CONTRACT (SCC) Rev-00**

**2X660 MW THDC Khurja STPP- TG & Associated Packages (Job No. 475)**

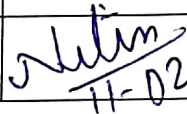
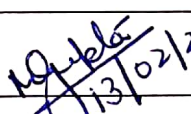
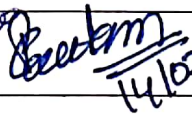
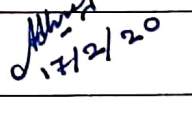
These Conditions shall be read and construed along with General Conditions of Contract (GCC) rev.07 to be enclosed along with the tender enquiry. In case of any conflict or inconsistency, the conditions given in SCC shall prevail over the GCC and its corrigendum.

Sl No.	Title	Description
1.	Project Name	2X660 MW THDC Khurja STPP- TG & Associated Packages
2.	Nature of project & Type of Bidding	Non-Mega & ICB
3.	Customer Order Ref No	THDC-RKSH-CC-9915-371-FC-NOA-3115 dated 03.10.2019 THDC-RKSH-CC-9915-371-SC-NOA-3116 dated 03.10.2019
4.	BHEL's Customer	THDC India Limited (Formerly Tehri Hydro Development Corporation) is a joint venture of Govt. of India & Govt. of Uttar Pradesh
5.	THDC GST No.	09AAACT7905Q1ZO
6.	Customer Consultants	NTPC
7.	Consignee Address (Bill To)	For supply package: BHEL, Power Sector-Project Engineering Management, Power Project Engineering Institute, Plot No. 25, Sector-16A, Noida, Uttar Pradesh-201301. <b>GSTIN: 09AAACB4146P2ZC</b>  For turnkey packages (where BHEL-PEM will issue only the LOA and Purchase Order shall be issued by BHEL-PSNR): Construction Manager, Bharat Heavy Electricals Limited, Khurja Super Thermal Power Project, Khurja, Distt. Bulandshahar, Uttar Pradesh <b>BHEL PSNR GSTIN No.- 09AAACB4146P2ZC</b>
8.	Delivery Address (Ship To)	Construction Manager, Bharat Heavy Electricals Limited, Khurja Super Thermal Power Project, Khurja, Distt. Bulandshahar, Uttar Pradesh
9.	BHEL Site Office Address	Construction Manager, Bharat Heavy Electricals Limited, Khurja Super Thermal Power Project, Khurja, Distt. Bulandshahar, Uttar Pradesh
10.	Location of Plant	Khurja Super Thermal Power Project is located in Bulandshahar district of Uttar Pradesh, between 28°08'35" to 28°10'25" Northern latitude and 77°53'47" to 77°55'22" Eastern longitude. The site is situated near villages Dushhara-kherli, Jahanpur, Naiphal (Unchagaon) and Rukunpur. The district Headquarters Buland Shahar is about 32 kms. The nearest railway station Danwar on Delhi-Kolkata Section (via Aligarh) is approximately 5 km away from the project site. The nearest major railway station is Khurja at a distance of about 11 kms.
11.	Mode of Dispatch	For indigenous supplies: By Rail/Road on door delivery and freight pre-paid basis. For imported supplies: On C&F basis.
12.	BHEL GSTIN Details	For supply packages: BHEL-PEM is registered in the State of Uttar Pradesh with GSTIN 09AAACB4146P2ZC <b>For Turnkey packages: BHEL PSNR GSTIN No.- 09AAACB4146P2ZC</b>
13.	Transit Insurance	In BHEL Scope.  For each dispatch, vendor shall inform the following to the Underwriter under intimation to BHEL-PEM and BHEL Site office:  (i) Policy No. (ii) Consignee Name. (iii) Consignment Details (items with their weights and value (in INR). (iv) Project Name and P.O. No.

		(v) LR No. and date, Dispatch origin and destination details, Invoice No.  Vendors to intimate the underwriters quoting the insurance Policy No. as mentioned in Purchase Order.
14.	Dispatch intimation	Yes, in writing, Not less than 30 (Thirty) days prior to date of shipment and dispatch details to be sent to: BHEL Site office (As mentioned in Sl. No. 9) BHEL PEM Noida (As mentioned in NIT for POs issued by PEM) BHEL PSNR Noida (For POs issued by BHEL PSNR)
15.	Document required for Vendor's payment.	For claiming the payment, documents as mentioned in GCC rev 07 shall be submitted by vendor to BHEL.  <b>Packing List</b> must comply to Clause No. 19.3 of General Commercial Terms & Conditions of GCC rev.07. Description of items in packing list shall be as per PO such that proper correlation between PO & packing list must be furnished.  Soft copy of documents for claiming payment shall be submitted by vendor as advance copy.
16.	Buyer and Paying Authority	For packages where PEM will issue the Purchase Order: BHEL PEM will be the paying authority. For packages where BHEL-PEM will issue only the LOA and Purchase Order shall be issued by BHEL-PSNR: BHEL Khurja Site will be the paying Authority.
17.	Demurrage charges	Demurrage charges shall be paid by supplier/ vendor only to the transporter. No claim shall be acceptable to BHEL in this regard.
18.	Unloading, Storage & Movement of material at site	a.) By BHEL site office for supply packages (where only supply is in vendor's scope). b.) By vendors for Turnkey (where supply and E&C is in vendor scope)  <b>Note:</b> The Supplier shall furnish LR wise Gross Wt. of the consignment for the purpose of handling the consignment by BHEL Site Contractor. Please note that unloading of materials at Site shall sometimes may take 3-4 days. As such, transporters to be advised suitably before dispatch of materials in this regards. Also, no claim on a/c of delay in unloading before this period shall be entertained. Prior intimation as mentioned in sl. no. 14 above is solicited
19.	Concessional custom duty against Essentiality certificate (EC)	The project has been qualified through Project Import route. Accordingly, the benefits applicable to PI project would be granted for this project In this regard applicable documents such as Essentiality certificate will be issued by Customer. Under this, Concessional rate of Customs Duty shall be applicable on the Import Contents of the supplier respectively. Based on the above EC, Customs Duty Benefits will be passed on to the vendor. The Bidder to indicate the Import contents i.e. list of the item, Currency of Import and Country of Import including CIF value in their offers. BHEL shall inform, the availability of CIF value for a particular package, if any, at the time of NIT. The benefits availed in Concessional Customs Duty must be passed on to BHEL in their offer.  Vendor shall inform BHEL and provide the necessary documents to obtain required certificates from BHEL to avail exemption. Obtaining custom duty benefit in line with the Essentiality Certificate issued shall be in vendor's scope.
20.	Taxes & Duties (For Domestic Vendor)	As per General Conditions of Contract (GCC rev 07).
21.	Taxes & Duties (For Order Directly to Foreign Bidders)	In case of foreign vendors, quoted prices & Dispatches shall be on C & F (Port-Mumbai) basis and the Taxes & duties in the country of dispatch shall be borne by Foreign vendor. All the Taxes & duties and other charges applicable in India shall be borne by BHEL-PEM for the direct order placed by PEM to the foreign bidder and by BHEL-PSNR for the orders placed by PSNR.
22.	Inspection Agency	Inspection of packages shall be carried out by agency as per below Inspection category of packages: 1) Cat-I: Inspection shall be done jointly or separately by NTPC/THDC and BHEL or BHEL's TPIA 2) Cat-II: Inspection shall be done by BHEL only. 3) Cat-III: Certificate of Compliance shall be furnished by Vendor.  <b>Note:</b> Please note, for Cat I & II items BHEL reserve the right to carry inspection by themselves or through nominated third party inspection agency (TPIA). For Inspecting Agency for various items, vendor may refer to Quality Plan. Third party inspection agency, if any, shall be informed after award of contract.

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23.	Inspection procedure	<p><u>For Domestic supplies</u></p> <p>Please refer clause no. 14.0 of GCC Rev 07. Vendor to furnish photographs pertaining to packing of materials before despatch. MDCC shall be issued on the basis of clear inspection report (CQIR).</p> <p><u>For Foreign supplies</u></p> <p>In case of Foreign supplies, if THDC approved 3rd party inspection agency does not participate in the inspection, test certificates &amp; inspection reports duly accepted by the agreed Inspection agency shall be submitted in soft copy to BHEL-PEM. The same shall be reviewed by PEM and then, sent to THDC/NTPC for clearance. The dispatch clearance (MDCC) by THDC (NTPC)/ BHEL as applicable shall be given to the foreign supplier or representative in India after acceptance of above test certificates.</p>
24.	Material Dispatch Clearance Certificate (MDCC) Issuing Agency	<p><b>For Cat-I item</b>, MDCC shall be issued by NTPC/THDC and it's the responsibility of vendor to arrange MDCC from them and furnish <b>original MDCC to BHEL</b>. Copy of NTPC/THDC MDCC shall be attached with Invoice by Vendor for claiming payment from BHEL.</p> <p><b>For Cat- II &amp; Cat-III items</b>, MDCC shall be issued by BHEL, which shall be valid for the vendor payment. However, the vendor shall furnish all requisite documents like Material Test Certificates, Inspection Reports etc. required for obtaining of NTPC/THDC MDCC by BHEL.</p>
25.	Submission of Final Drgs/Docs alongwith O&M Manual, Type Test Certificates (if any)	<p>No. of O&amp;M Manuals</p> <p>As per GCC rev.07/ Technical Specification/Kick-off meeting.</p> <p>If not specified anywhere, Vendor to submit final approved O&amp;M Manual in 12 Hard copies and 4 No of CD ROMs/DVDs/Portable Hard Disk.</p>

	Prepared by	Checked by	Reviewed by	Approved by
Designation	Dy. Mgr/ PG III	Manager/ PG III	SDGM/PG-III	AGM & DH/ PG III
Signature	 11-02-2020	 13/02/2020	 14/02/2020	 17/2/20