

VOLUME II

TECHNICAL SPECIFICATION

FOR

CABLE TRAYS & ACCESSORIES

SPECIFICATION NO: PE-TS-421-507-E021

REVISION: 00



BHARAT HEAVY ELECTRICALS LIMITED

POWER SECTOR

PROJECT ENGINEERING MANAGEMENT

NOIDA, UP (INDIA) – 201301



TECHNICAL SPECIFICATION FOR CABLE TRAYS & ACCESSORIES

SPECIFICATION NO. PE-TS-421-507-E021

REVISION 00

DATE: 07.12.2017

SHEET 1 OF 1

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TOTAL SHEETS INCLUDING COVER SHEET, CONTENT/SEPARATOR SHEET = 24



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SECTION – I

SPECIFIC TECHNICAL REQUIREMENTS



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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



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1.0 PURPOSE

This specification is intended for finalization of contract between BHEL PEM and Bidder for Cable trays & Accessories. Standard technical detail as indicated in the specification shall be agreed upon between BHEL PEM and Bidder.

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.

4.0 DRAWINGS & DOCUMENTS TO BE SUBMITTED

4.1 Following documents/drawings shall be submitted after placement of order 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-V0-421-507-E011	Primary	Within 1 week of award of contract	Within 1 week of comments
2	GA drawings of Cable Trays & Accessories	PE-V0-421-507-E012	Primary	Within 1 week of award of contract	Within 1 week of comments
3	Quality Plan for Cable Trays & Accessories	PE-V0-421-507-E02	Primary	Within 1 week of award of contract	Within 1 week of comments
4	BOQ of Coupler plates, Bolts, Washers & Nuts for lot wise ordered quantity.	PE-V0-421-507-E021	Secondary	Within 1 week of lot clearance	Within 1 week of comments

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



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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.
(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 |

Note: "*" Wherever Indian standard is mentioned, equivalent IEC/International standard (if available) should be followed else Indian standard can be followed.

2.0 CABLE TRAYS & ACCESSORIES

- | | | | |
|-----|---|---|---|
| 2.1 | Material | : | Hot Rolled Mild Steel |
| 2.2 | Type | : | Ladder Type
Perforated Type |
| 2.3 | Standard Length of
Straight Length of
Cable Trays | : | 2.5 meters |
| 2.4 | Standard Width (mm) | : | 600 300 150 (Ladder)
600 300 150 100 50 (Perforated) |
| 2.5 | Construction | : | Conforming to enclosed drawing |
| 2.6 | Bending Radius
of Accessories (in mm) | : | 600 mm |
| 2.7 | Tolerance in length/
Width / Height | : | + /- 2 mm |
| 2.8 | Marking | : | Following shall be engraved/punched on each standard length
of cable tray at the centre of both side of runner: "PEM"
(length of letter shall be 90mm & height shall be 30mm) |
| 2.9 | Thickness of the finished product (Cable trays & accessories) shall not be less than 2.0 mm.
Thickness of finished coupler plates shall not be less than in 3.0mm. | | |

3.0 FITTINGS

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



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4.0 SHEET THICKNESS before Hot Dip Galvanisation

- a) For cable trays & Accessories : 2.0 mm
- b) For Coupler plate : 3.0 mm
- c) Tolerance in Thickness : As per IS: 1852
- d) Make : SAIL/TISCO/RINL/BHUSAN/JINDAL
STEEL/JINDAL ISPAT/ESSAR/LLOYD/IISCO/ SAIL
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 1.6 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 1.6 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.

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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SECTION-II

STANDARD TECHNICAL REQUIREMENTS



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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-01) 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

Packing shall be seaworthy complying with technical specification for seaworthy packing (PE-TS-888-100-A001). The material shall be packed to ensure protection against damage during transit, storage for prolonged periods and handling.



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STANDARD QUALITY PLAN

		QUALITY PLAN SHEET 1 OF 2		CUSTOMER : BIFPCL		PROJECT TITLE : 2X660MW MAITREE STPP		SPECIFICATION NO. : PE-TS-421-507-E021				
				BIDDER/ VENDOR :		STANDARD QP NO. : PE-QP-999-507-E005, REV. 01		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
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 STEEL/JINDAL ISPAT/ESSAR/ LLOYD/ IISCO / authorised SAIL Re Rollers.
		2.DIMENSIONS	MA	MEASUREMENT	100%	IS-1730/ APPD. DATA SHEET IS-1079	IS-1730/ APPD. DATA SHEET IS-1079	QC RECORD	3/2	-	-	
		3.SURFACE FINISH	MA	VISUAL	100%			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

		QUALITY PLAN		CUSTOMER : BIFPCL		PROJECT TITLE : 2X660MW MAITREE STPP			SPECIFICATION NO PE-TS-421-507-E021			
				BIDDER/ VENDOR		STANDARD QP NO. : PE-QP-999-507-E005, REV. 01			SPECIFICATION TITLE:			
		SHEET 2 OF 2		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
2.3	GALVANISING	1.TEMPERATURE OF ZINC BATH	MA	TEMPERATURE INDICATOR	CONTINUOUS	IS-2629	IS-2629	QC RECORD	2/3	-	-	Galvanization is to be done at galvanisation plant listed in annexure-2 to quality plan.
		2.DROSS	MA	VISUAL	PERIODIC	IS 2629	IS 2629	QC RECORD	2/3	-	-	
		3.RATE OF IMMERSION	MA	VISUAL	100%	IS 2629/ MFR'S PRACTICE	IS2629/ MFR'S PRACTICE	QC RECORD	2/3	-	2	
		4.SURFACE QUALITY	MA	VISUAL	100%	IS 2629	FREE FROM BURRS ROUGHNESS, SLAG FLUX. STAIN. ETC.	QC RECORD	2/3	-	-	
3.0	FINISHED ITEMS											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.
3.1	(CABLE TRAY, ACCESSORIES & HARDWARES)	1.DIMENSIONS	MA	MEASUREMENT	IS-2500 (PART 1) LEVEL S-4	APPD. DRG	APPD. DRG	INSP.REPORT	2	1	-	
		2,SURFACE FINISH	MA	VISUAL	IS-2500 (PART 1) LEVEL S-4	APPD. DRG	FREE FROM BURRS, SLAG, ROUGHNESS, FLUX. STAIN.ETC.	INSP.REPORT	2	1	-	
		3.RIGIDITY (FOR TRAYS)	MA	DEFLECTION TEST	2 No./ LOT/TYPE	APPD. DRG	APPD. DRG	INSP.REPORT	2	1	-	
		4.MASS OF ZINC COATING	MA	CHEM. TEST	IS-4759	IS-6745	610 gms/ Sq m (for 2.0mm thick product) 460 gms/ Sq m (for 1.6 mm thick product)	INSP.REPORT	2	1	-	
		5.UNIFORMITY OF ZINC COATING	MA	CHEM. TEST	IS-4759	IS-2633	IS-2633	INSP.REPORT	2	1	-	
		6.THICKNESS OF ZINC COATING	MA	ELCOMETER	IS-4759	75 MICRONS (MINIMUM), 86 MICRONS (AVERAGE) for 2.0mm thick product 55 MICRONS (MINIMUM), 65 MICRONS (AVERAGE) for 1.6mm thick product	75 MICRONS (MINIMUM), 86 MICRONS (AVERAGE) for 2.0mm thick product 55 MICRONS (MINIMUM), 65 MICRONS (AVERAGE) for 1.6mm thick product	INSP.REPORT	2	1	-	
		7.ADHESION	MA	MECH.TEST	IS-4759	IS-2629	IS-2629	INSP.REPORT	2	1	-	
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

ANNEXURE-2 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, Too pran(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.

TYPICAL DETAILS OF

CABLE TRAYS AND ACCESSORIES

(MILD STEEL & FIBRE REINFORCED PLASTIC TYPE)

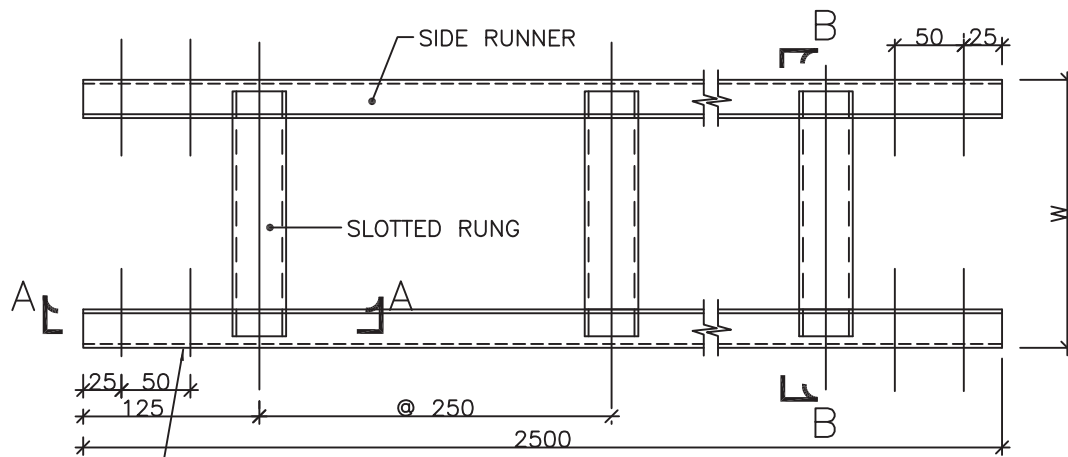
REV	DATE	ALT	CHD	APP
01	16.09.17	MKM	AbA	SL

Drawing revised in line with customer comments dated 09.08.17
Revised portion is marked with cloud ^

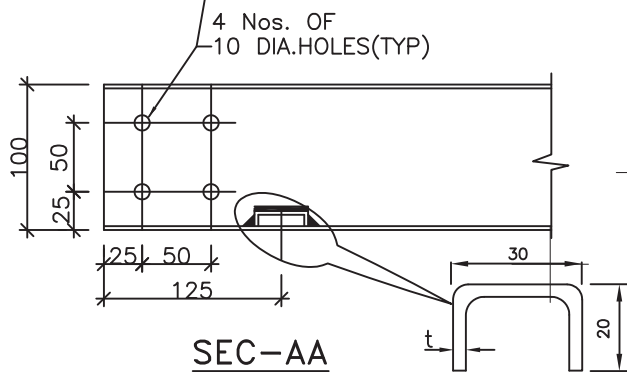
On 13

R1

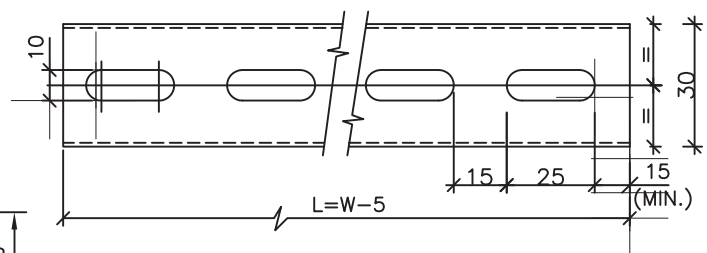
PROJECT 2X660MW BIPPCL MAITREE KHULNA STPP (BANGLADESH)							
		OWNER	BANGLADESH-INDIA FRIENDSHIP POWER CO. (Pvt.) LIMITED (BIPPCL)				
		OWNER'S CONSULTANT	FICHTNER GmbH & Co KG GERMANY				
		EPC CONTRACTOR	BHARAT HEAVY ELECTRICALS LIMITED POWER SECTOR PROJECT ENGINEERING MANAGEMENT NOIDA(U.P.) INDIA				
DOCUMENT TITLE: TECHNICAL SPECIFICATIONS OF CABLE TRAYS AND ACCESSORIES			DPT CODE —E		NAME	SIGN	DATE
				DRN	MKM	—SD—	19.07.17
				CHD	AbA	—SD—	19.07.17
				APP	SL	—SD—	19.07.17
DOCUMENT NO: Maitree-00-BTW-EDB-421507E005-PEM-01							
SHT. 01 OF 11 OF 28 REV.01							



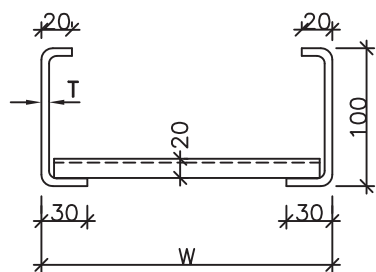
LADDER TYPE CABLE TRAY



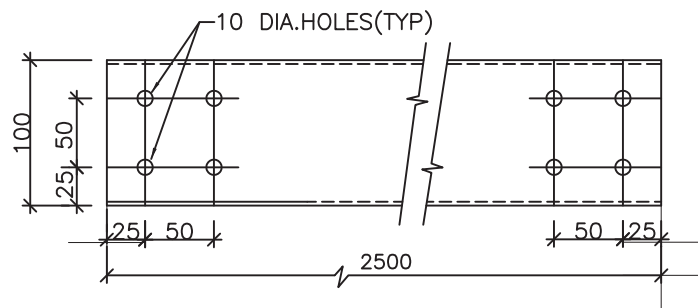
SEC-AA



SLOTTED RUNG



SEC-BB



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 10

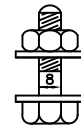
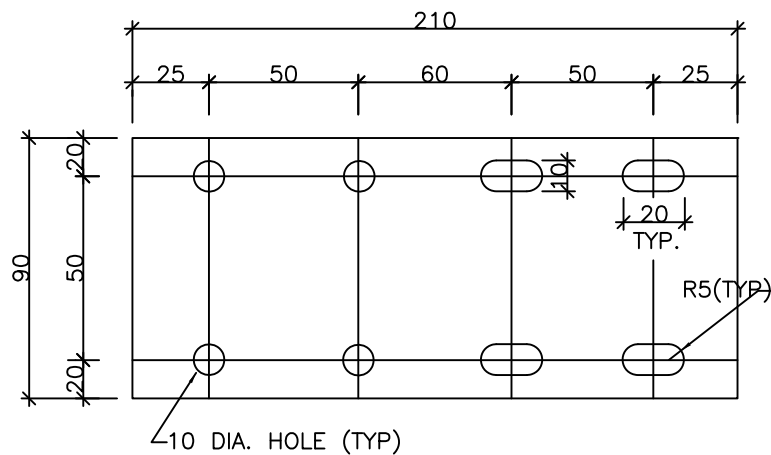


TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES

DWG. NO.
Maitree-00-BTW-EDB
-421507E005-PEM-01

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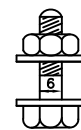
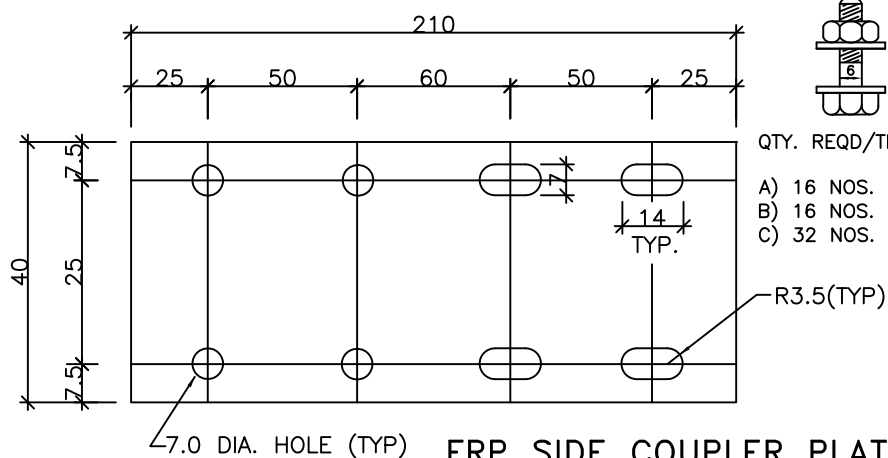


QTY. REQD/TRAY SECTION

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

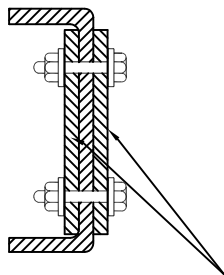
SIDE COUPLER PLATE FOR LADDER/PERFORATED TYPE TRAYS (600/450/300/150W TRAYS)

QTY. REQUIRED/TRAY SECTION : 4 NOS.



QTY. REQD/TRAY SECTION

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

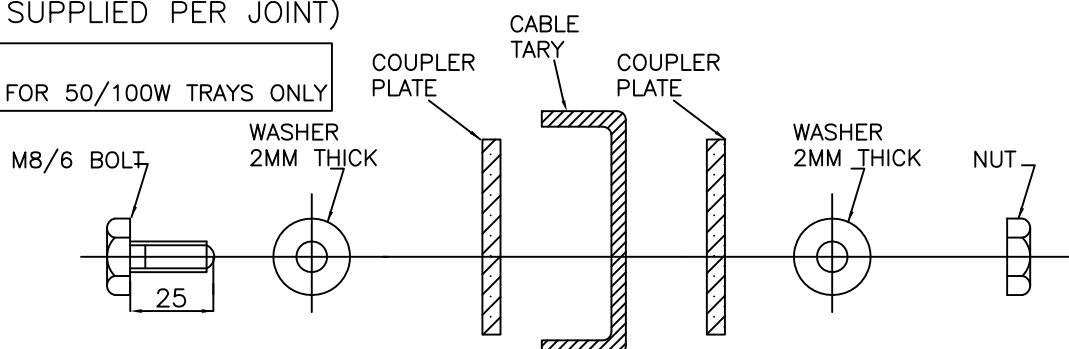


(2 NOS. COUPLER PLATES
OF 3 MM THICKNESS TO
BE SUPPLIED PER JOINT)

FRP SIDE COUPLER PLATE FOR FRP PERFORATED TYPE TRAYS (50/100W TRAYS)

QTY. REQUIRED/TRAY SECTION : 4 NOS.

NOTE:
M6 BOLT FOR 50/100W TRAYS ONLY



SEQUENCE OF M8/6 BOLT, WASHER, NUT, COUPLER PLATE & CABLE TRAY
FOR TYPICAL CABLE TRAY JOINT

FOR GENERAL NOTES REFER SHEET 10 OF 24



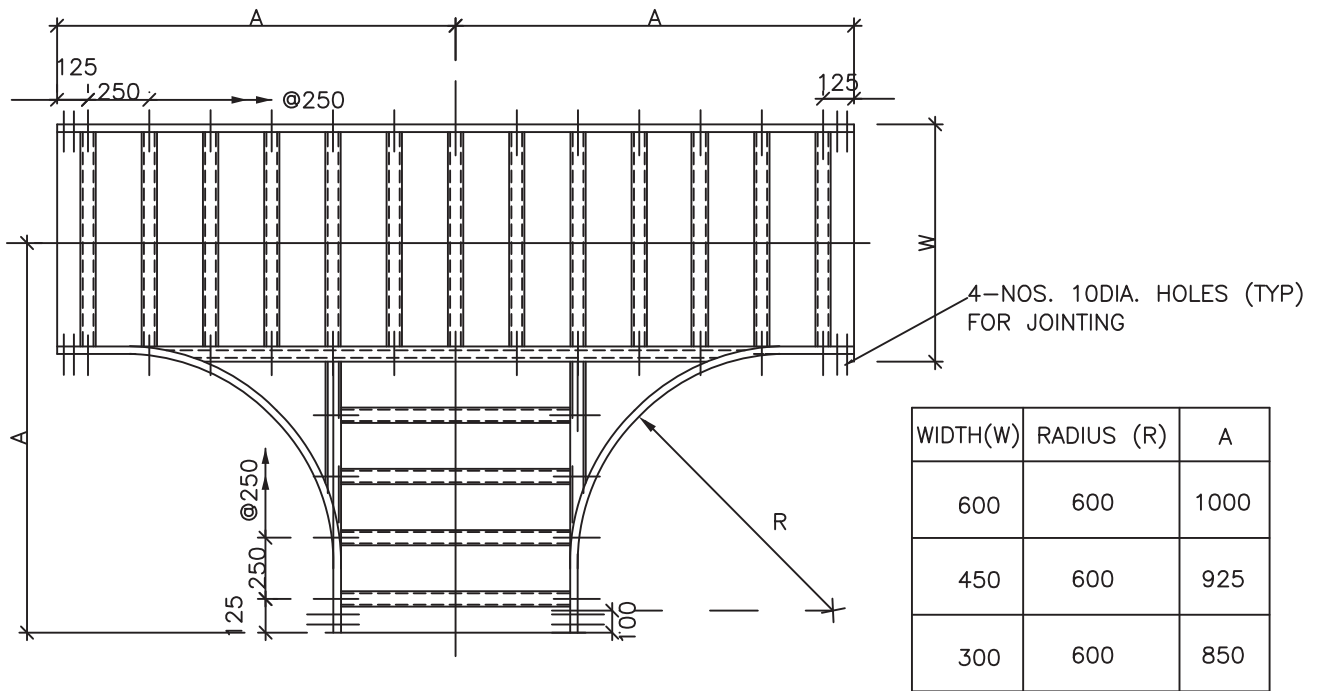
TYPICAL DETAILS OF CABLE TRAYS AND
ACCESSORIES

DWG. NO.

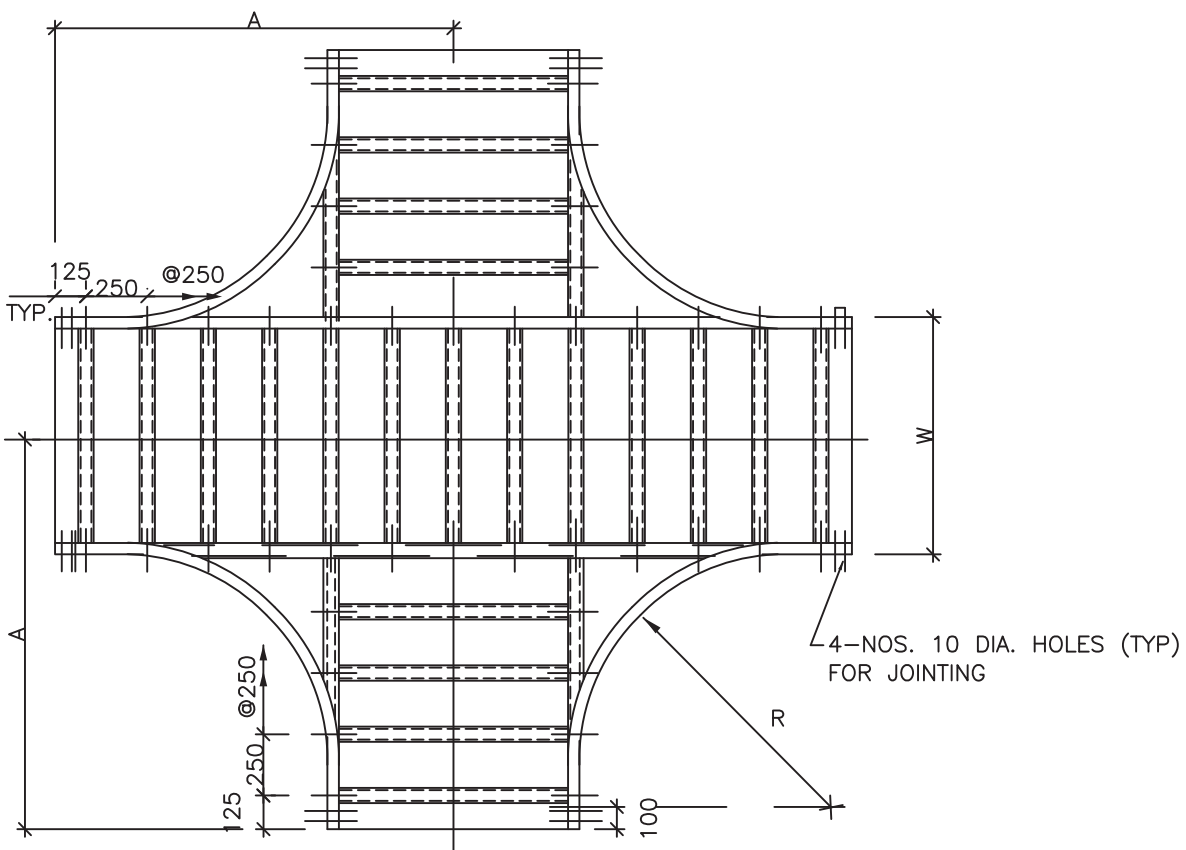
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HORIZONTAL TEE-PLAN



HORIZONTAL CROSS-PLAN

LADDER TYPE ACCESSORIES

FOR GENERAL NOTES REFER SHEET 10

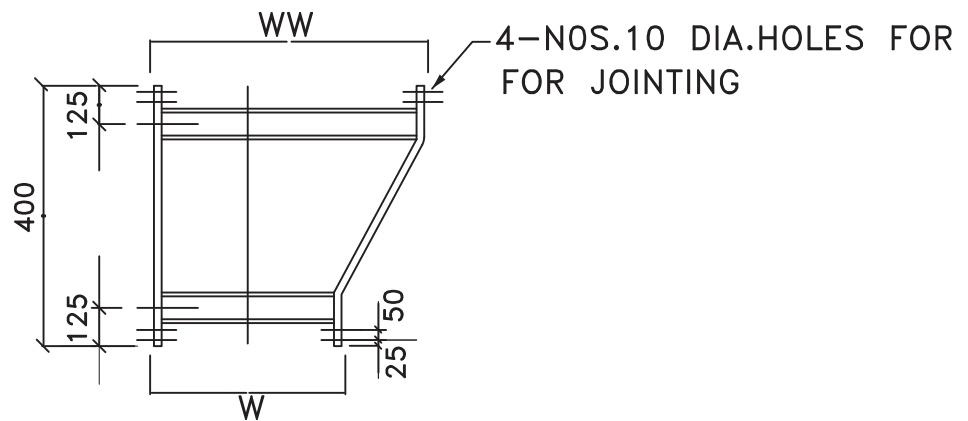


TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES

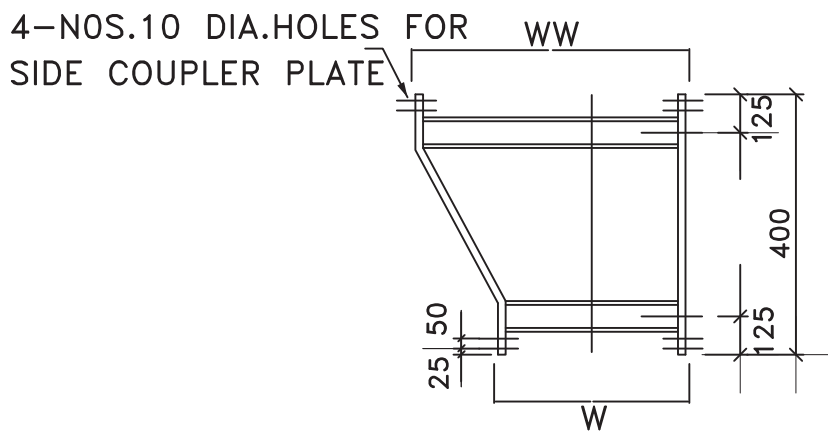
DWG. NO.
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LEFT HAND REDUCER-PLAN



RIGHT HAND REDUCER-PLAN

WIDTH	WW	600	600	450
	W	450	300	300

LADDER TYPE ACCESSORIES

FOR GENERAL NOTES REFER SHEET 10

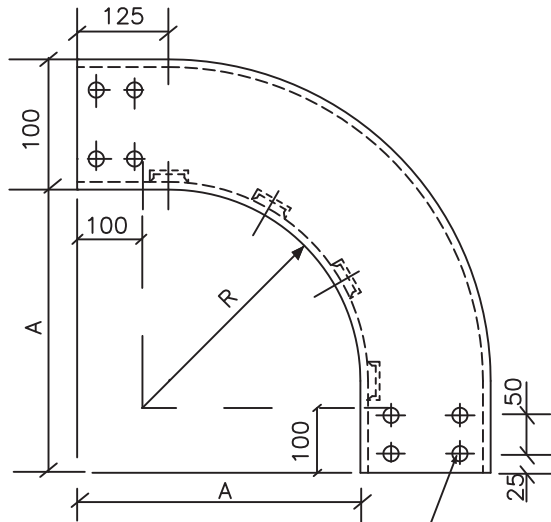


TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES

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Maitree-00-BTW-EDB
-421507E005-PEM-01

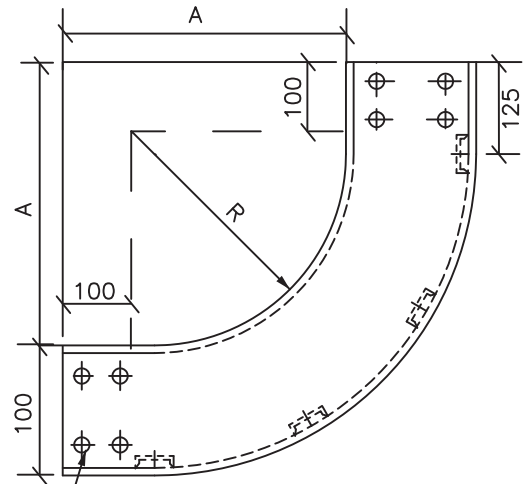
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ELEVATION
90° VERTICAL BEND
(OUTSIDE)

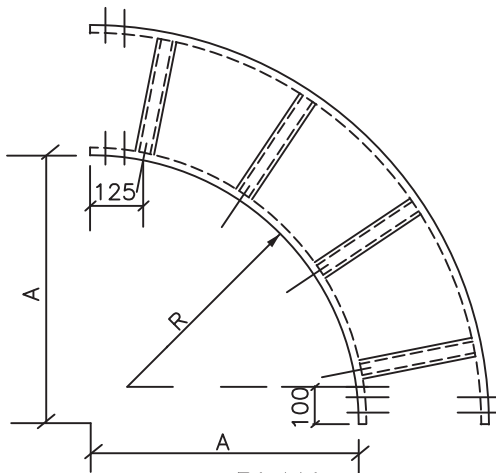
4 NOS. 10 DIA. HOLES
FOR JOINTING



ELEVATION
90° VERTICAL BEND
(INSIDE)

LADDER TYPE TRAYS

WIDTH(W)	RADIUS (R)	A
600	600	700
450	600	700
300	600	700



PLAN
90° HORIZONTAL BEND

LADDER TYPE ACCESSORIES

FOR GENERAL NOTES REFER SHEET 10

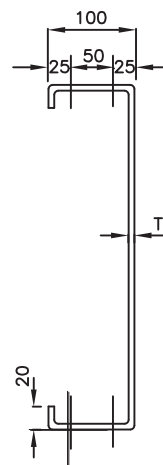
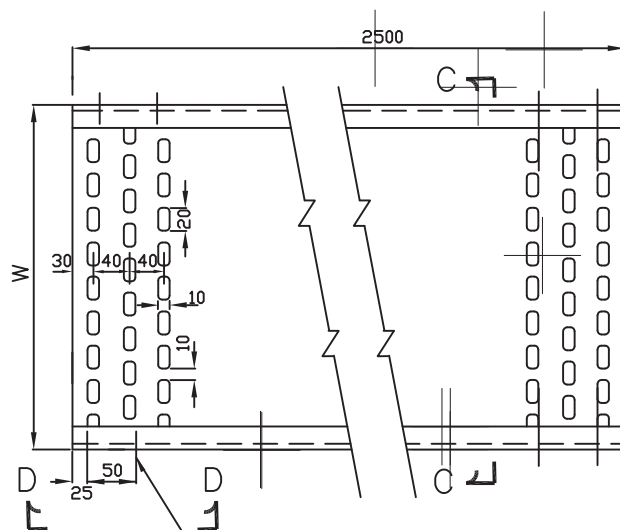


TYPICAL DETAILS OF CABLE TRAYS AND
ACCESSORIES

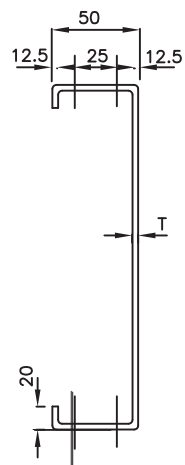
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-421507E005-PEM-01

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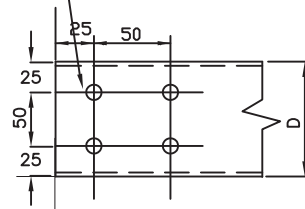


SECTION-C-C
(600/450/300/150
TRAYS)



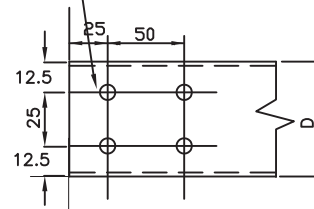
SECTION-C-C
(100/50 TRAYS)

4 HOLES 10mm DIA.

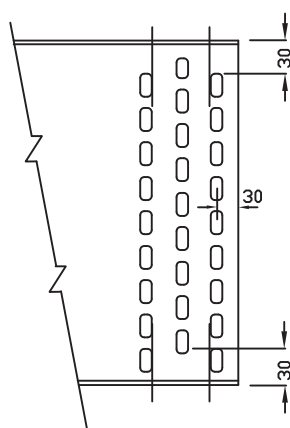


VIEW-DD
(600/450/300/
150W TRAYS)

4 HOLES 10mm DIA.



VIEW-DD
(100W TRAYS)



ARRANGEMENT OF
PERFORATIONS

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 10



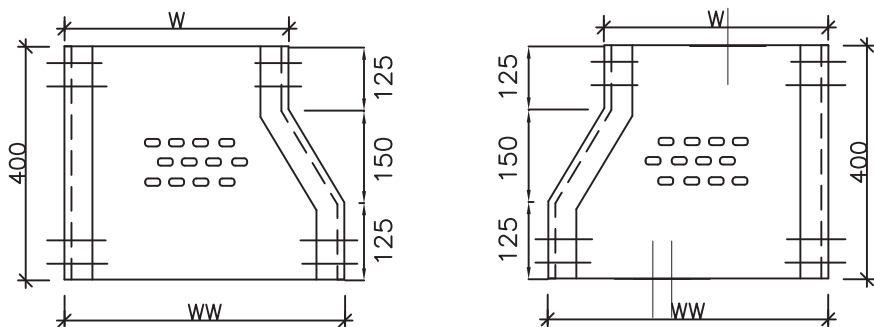
TYPICAL DETAILS OF CABLE TRAYS AND
ACCESSORIES

DWG. NO.
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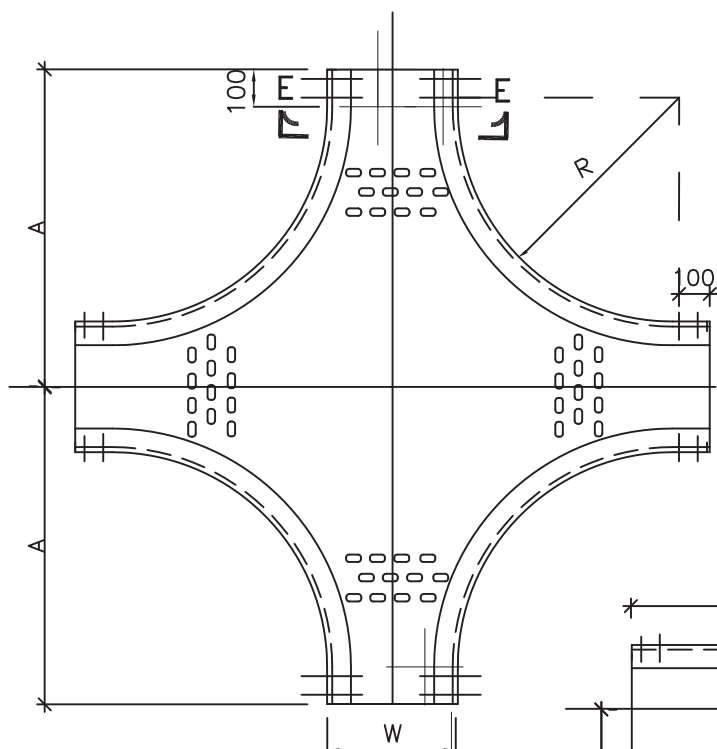


WW	W	DEPTH	THICKNESS
600	450	100	2
600	300	100	2
450	300	100	2

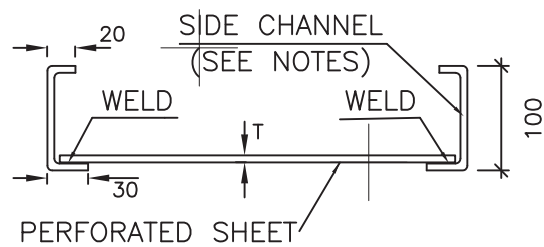
LEFT HAND REDUCER

RIGHT HAND REDUCER

PERFORATED TYPE



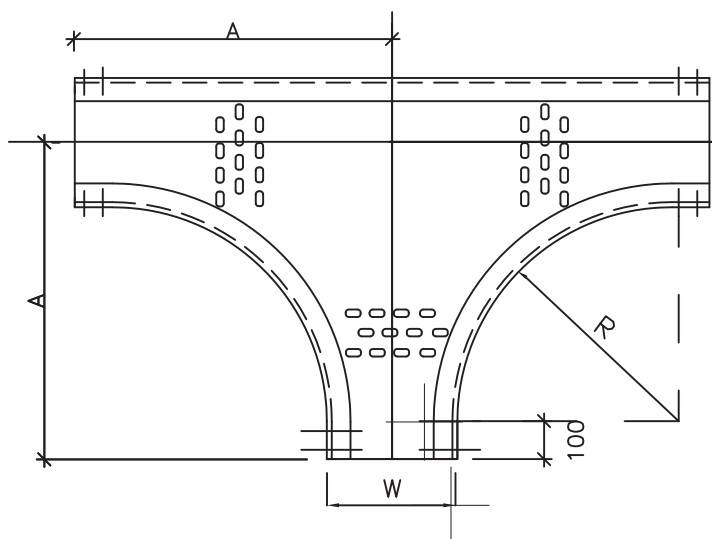
CROSS



SECTION-EE

PERFORATED TYPE

WIDTH(W)	RADIUS (R)	A	T
600	600	1000	2
450	600	925	2
300	600	850	2



TEE

PERFORATED TYPE ACCESSORIES

FOR GENERAL NOTES REFER SHEET 10

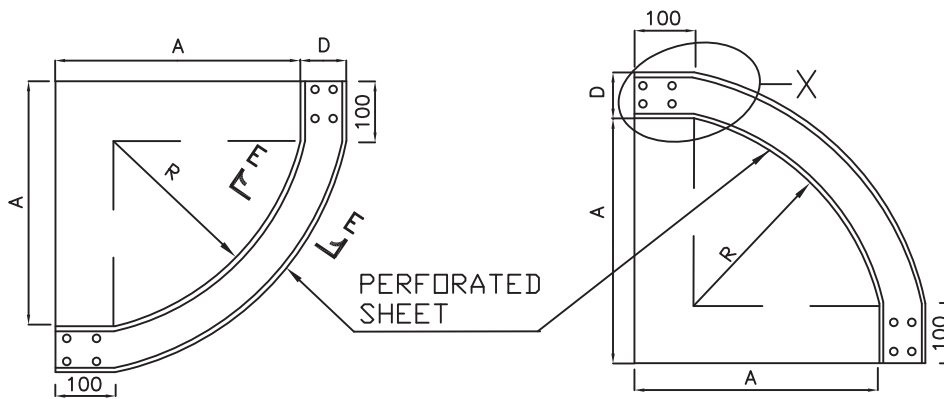


TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES

DWG. NO.
Maitree-00-BTW-EDB
-421507E005-PEM-01

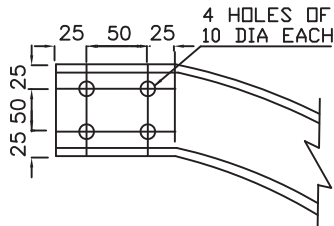
SHT. 08 OF 10

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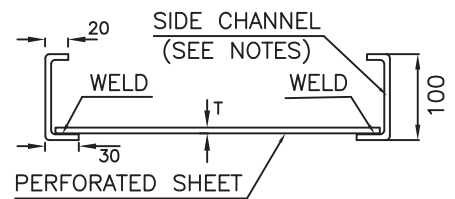


INSIDE TYPE

OUTSIDE TYPE

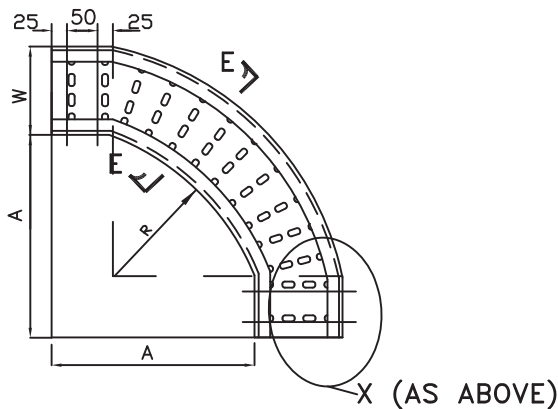


ENLARGED VIEW OF "X"



SECTION-EE

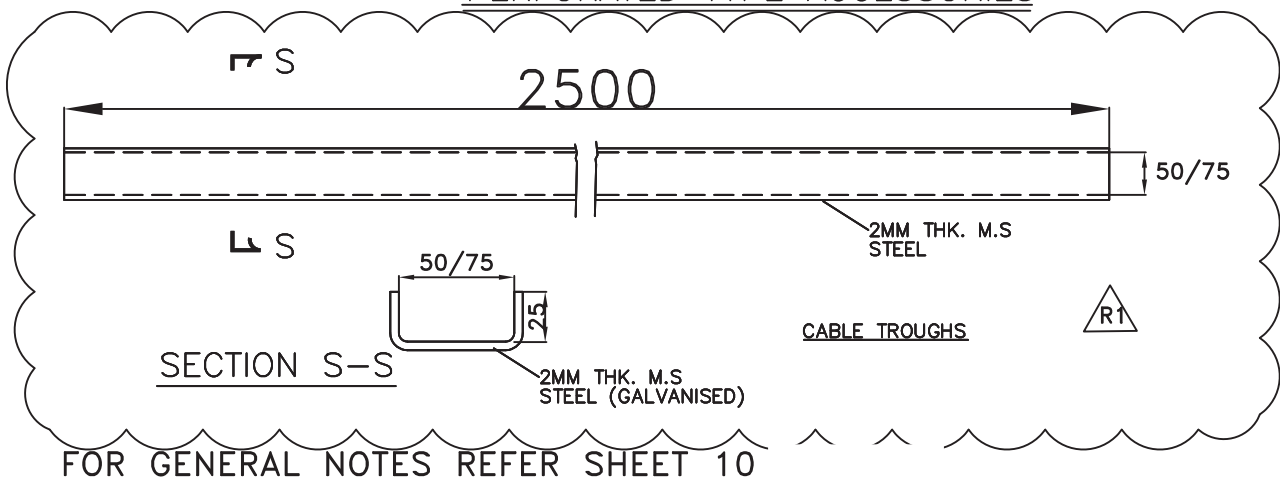
90° VERTICAL BEND - PERFORATED TYPE



90° HORIZONTAL BEND - PERFORATED TYPE

WIDTH(W)	RADIUS (R)	A	T
600	600	700	2
450	600	700	2
300	600	700	2

PERFORATED TYPE ACCESSORIES



TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES

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NOTES:-

1. THE LADDER AND PERFORATED TYPE CABLE TRAYS AND ACCESSORIES (INCLUDING SIDE RUNNERS OF LADDER TYPE TRAYS & ACCESSORIES) SHALL BE MADE OF 2MM HOT ROLLED M.S. SHEET. ALL THE COUPLER PLATE SHALL BE 3 MM THICK.
 2. THE CABLE TRAYS & ACCESSORIES SHALL BE HOT DIP GALVANISED AS PER IS 2629.
- 
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. SIDE CHANNELS OF PERFORATED TYPE CABLE TRAY ACCESSORIES SHALL BE WELDED WITH THE PERFORATED SHEET AT INTERVALS OF 100mm.
 7. LENGTH OF WELDING SHALL NOT BE LESS THAN 25mm FOR CABLE TRAYS. THE THICKNESS OF WELDING SHALL BE AS PER IS 9595.
 8. ALL TRAY CORNERS SHALL BE SMOOTH AND FREE OF SHARP EDGES.
 9. 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.
 10. THE THICKNESS OF THE FINISHED GALVANISED PRODUCT SHALL NOT BE LESS THAN 2MM.
 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 UPTO 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. 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.
 17. THE DEPTH OF 600W, 450W, 300W, 150W TRAYS & ACCESSORIES SHALL BE 100MM. THE DEPTH OF 100W, 50W TRAYS & ACCESSORIES SHALL BE 50MM.
 18. 600MM WIDE TYPE CABLE TRAYS SHALL BE SUITABLE FOR A CABLE WEIGHT OF 100 Kg PER METRE (INCLUDING LIVE LOAD) OF RUNNING LENGTH OF TRAY.
 19. PEM SHALL BE MARKED ON SIDE RUNNER OF EACH TRAY SECTION.



TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES

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