

VOLUME II

TECHNICAL SPECIFICATION

FOR

CABLE TRAYS & ACCESSORIES

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

REVISION: 01



BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA, UP (INDIA) – 201301



TECHNICAL SPECIFICATION FOR CABLE TRAYS & ACCESSORIES

SPECIFICATION NO. PE-RC-999-507-E021

REVISION 01

DATE: 02.05.2017

SHEET 1 OF 1

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TOTAL SHEETS INCLUDING COVER SHEET, CONTENT/SEPARATOR SHEET = 29



**TECHNICAL SPECIFICATION FOR
CABLE TRAYS & ACCESSORIES**

SPECIFICATION NO. PE-RC-999-507-E02I

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SECTION – I

SPECIFIC TECHNICAL REQUIREMENTS

	TECHNICAL SPECIFICATION FOR CABLE TRAYS & ACCESSORIES		SPECIFICATION NO. PE-RC-999-507-E021
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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 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, against specific project requirement following information shall be furnished by BHEL:-

- a.) Updated list of BHEL-PEM approved Galvanizers (Refer Annexure-2 to Quality Plan)
- b.) Bill of Quantity

4.2 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-XXX-507-E011	Primary	Within 1 week of award of contract	Within 1 week of comments
2	GA drawings of Cable Trays & Accessories	PE-V0-XXX-507-E012	Primary	Within 1 week of award of contract	Within 1 week of comments
3	Quality Plan for Cable Trays & Accessories	PE-V0-XXX-507-E902	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-XXX-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 |

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 shall not be less than 2.0 mm.

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) |
|-----------------|---|---|

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 1.6 mm.

5.0 SHEET THICKNESS before Hot Dip Galvanisation

- a) For cable trays &
Accessories : 2.0 mm
- b) For cable tray cover : 1.6 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/ 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.



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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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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

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		CUSTOMER :		PROJECT TITLE :		SPECIFICATION NO. : PE-RC-999-507-E021					
SHEET 1 OF 2		BIDDER/ VENDOR		STANDARD QP NO. : PE-QP-999-507-E005, REV. 01		SPECIFICATION TITLE :					
SYSTEM		CABLING		ITEM : CABLE TRAYS & ACCESSORIES		DOC. NO. :					
S/L 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	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
		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
		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											
NAME											
SIGNATURE											
DATE											
BIDDER/VENDOR											
BIDDER'S/VENDORS COMPANY SEAL											
LEGEND : 1 - BHEL/CUSTOMER 2 - VENDOR 3 - SUB-VENDOR P - PERFORM W - WITNESS V - VERIFICATION											

[illegible]

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
- Column 11- Remarks - Any special remarks shall be given here.

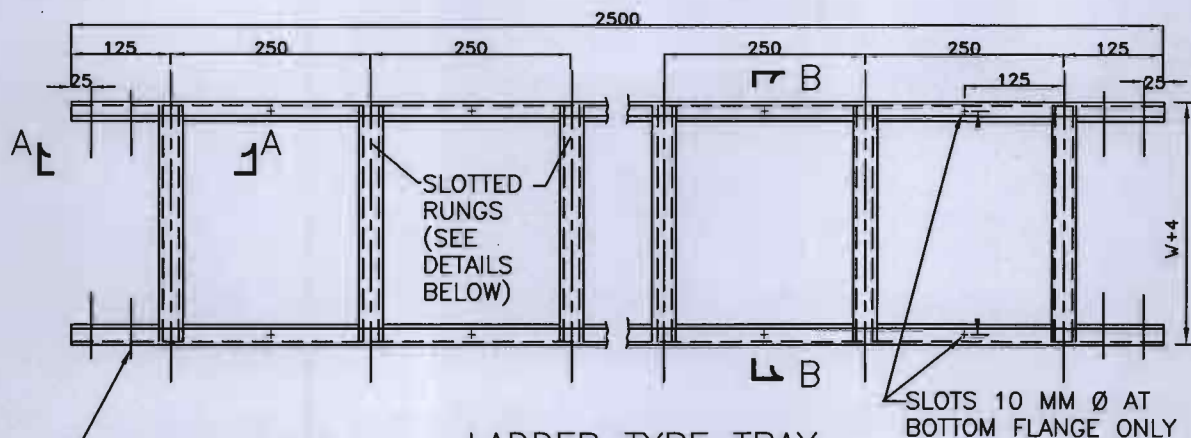
NOTES :

1. 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.
2. 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.
3. 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.
4. 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.
5. 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.
6. Wherever inspection by BHELs Purchaser/Third Party/Statutory authorities are mandatory, this shall be complied with.
7. 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.
8. This Quality Plan is also applicable to spares, if any, under scope of supply of Vendor.
9. The quality plan shall be submitted in minimum 4 copies with a soft copy of the same or in line with contract requirements.

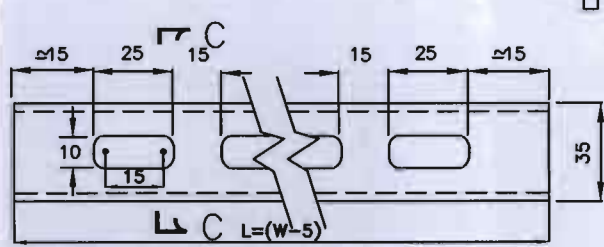
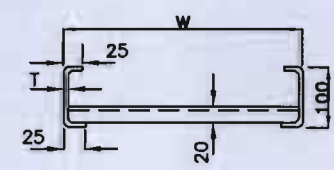
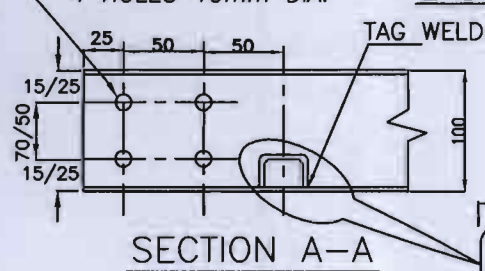
ANNEXURE-2 to Quality Plan		
(LIST OF APPROVED GALVANIZERS)		
SL. NO.	Vendor Name	Remarks
1	M/s B.G. Shirke Construction Technology Pvt. Ltd, Pune	
2	M/s B.P. Projects PVT LTD, Kolkata	
3	M/sBrahampuri Steels Limited, Jaipur	
4	M/s DMP Projects Pvt.Ltd., Kolkata	
5	M/s Indmark Formtech Pvt. Ltd., Pune	
6	M/s Jamna Metal Company, Delhi	
7	M/s National Galvanizer Company,Kolkata	
8	M/s Neha Galvaniser, Kolkata	
9	M/s Passive Infra Projects Pvt. Ltd, Hasangarh	
10	M/s Patny Systems (P) Ltd.,Medhak	
11	M/s Sigma Galvanising Pvt. Ltd.,Mumbai	
12	M/s Unitech Fabricators & Engineers Pvt. Ltd., Kolkata	
13	M/s Anand Udyog, Mumbai	
14	M/s A.V. Engg, Kolkata	
15	M/s Bajaj Pune	
16	M/s Electrocure Industries, Mumbai	
17	M/s Gurpreet Galvaniser, Hyderabad	
18	M/s Inar Profiles, Vishakapatnam	
19	M/s Karamtara Mumbai	
20	M/s M J Engg, Delhi	
21	M/s Radhakrishnan Shetty, Chennai	
22	M/s Poona Galvanizers Pune	
23	M/s Steelite Engg, Mumbai	
24	M/s Techno Engg, Chandigarh	
25	M/s Unitstar Galvanizer, kolkata	

TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES

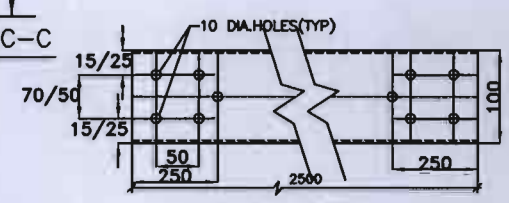
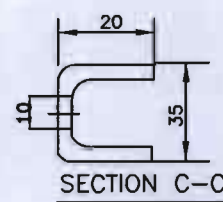
CUSTOMER							
PROJECT							
JOB NO.	 BHARAT HEAVY ELECTRICALS LIMITED POWER SECTOR PROJECT ENGINEERING MANAGEMENT NOIDA(U.P) INDIA	DPT CODE-E	DRN	NAME	SIGN	DATE	
			DSN	MKM			
			CHD	VY/AKR			
			APP	MK			
		DWG. NO. PE-DG-999-507-E007					
		SHT. 01 OF 13 REV. 0					



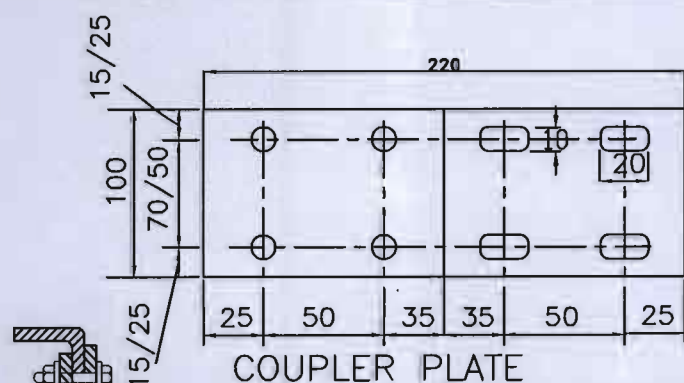
LADDER TYPE TRAY



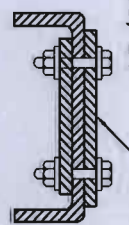
SLOTTED RUNGS
(TO SUIT TRAY WIDTH)



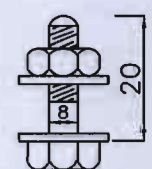
LADDER TYPE TRAY



(600/300/150W LADDER/PERFORATED TRAYS)



COUPLER PLATE
(3mm THICK)



8 NUMBERS BOLTS
8mm DIA 20mm LONG
WITH NUTS AND
WASHERS ARE TO BE
SUPPLIED WITH EACH
COUPLER PLATE



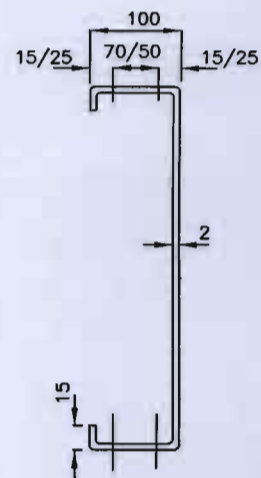
TYPICAL DETAILS OF
CABLE TRAYS AND ACCESSORIES

DRAWING NO.

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600/450/300/150 TRAYS

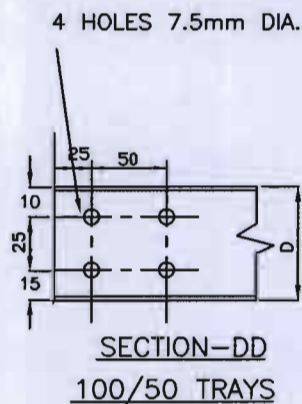
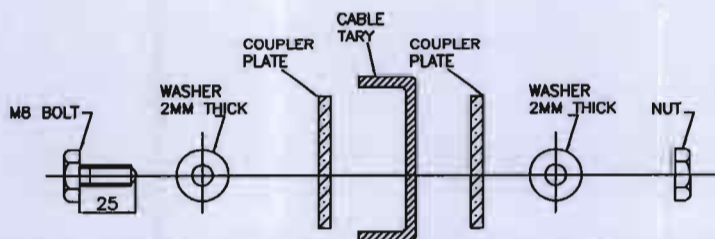


Diagram of a C-channel section with dimensions: total width 50, flange width 10, web width 25, and lip width 15. A shear force T is applied to the web.

SECTION-CC
(100/50 TRAYS)

PERFORATED TYPE TRAY



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

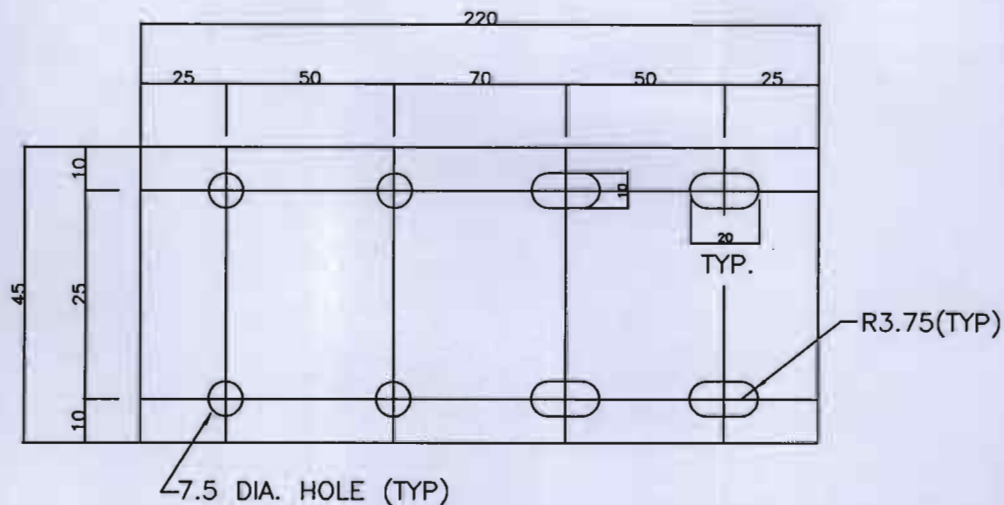
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DRAWING NO.

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

QTY. REQUIRED/TRAY SECTION : 4 NOS.

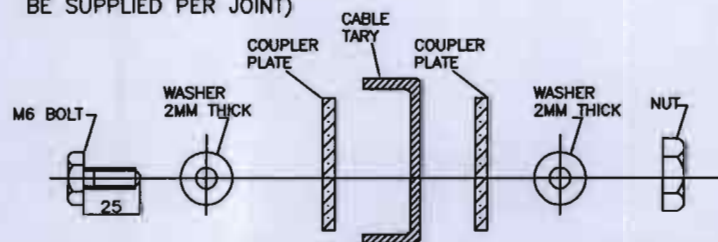


(2 NOS. COUPLER PLATES
OF 3 MM THICKNESS TO
BE SUPPLIED PER JOINT)



QTY. REQD/TRAY SECTION

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



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

SEE GENERAL NOTES IN SHEET 13.



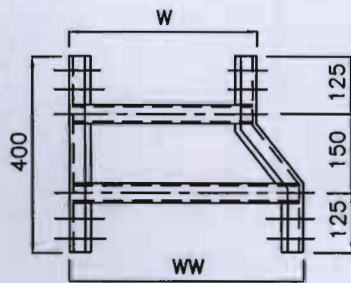
**TYPICAL DETAILS OF
CABLE TRAYS AND ACCESSORIES**

DRAWING NO.

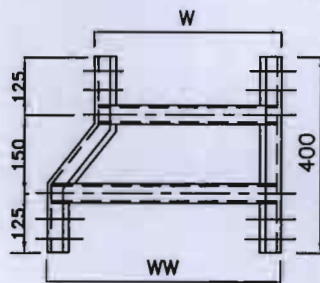
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REV 00



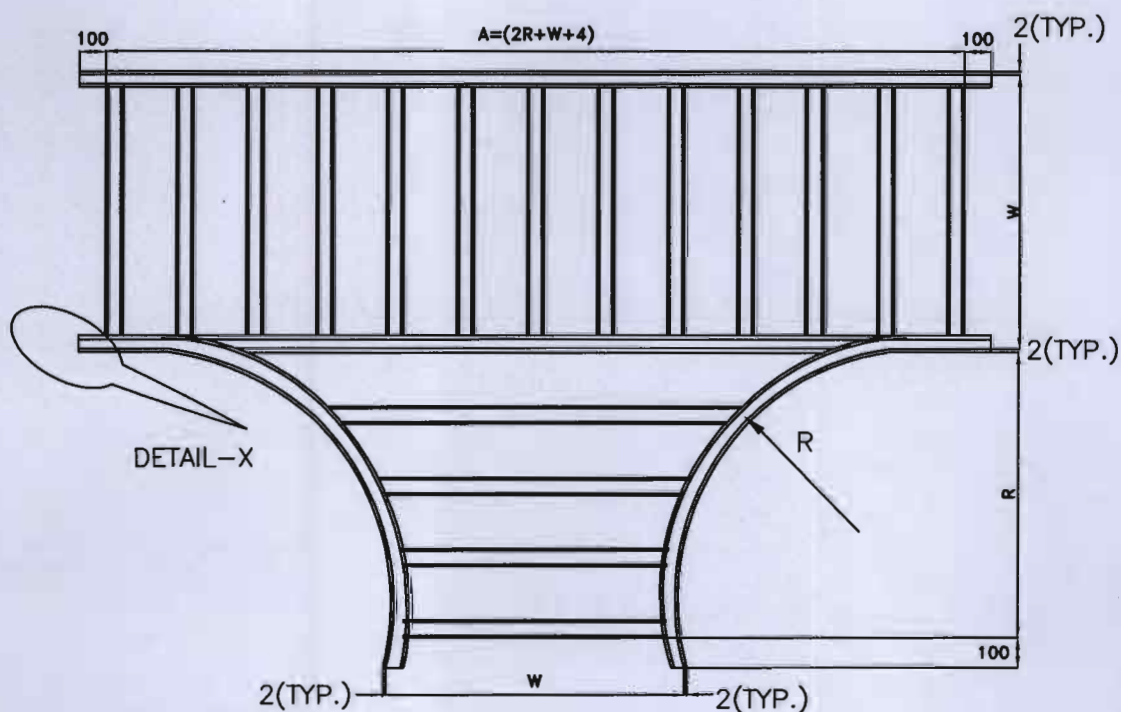
LEFT HAND REDUCER



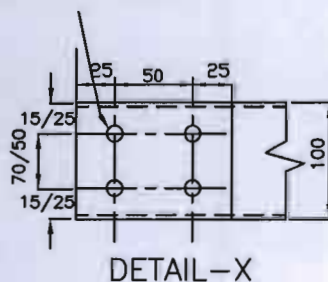
RIGHT HAND REDUCER

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

LADDER TYPE



10mm DIA. HOLES



DETAIL-X

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

SEE GENERAL NOTES IN SHEET 13.

LADDER TYPE



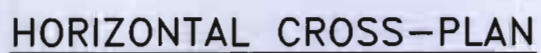
TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES

DRAWING NO.

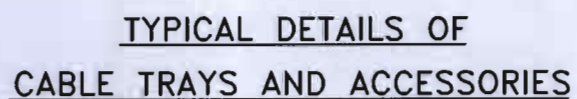
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REV 00

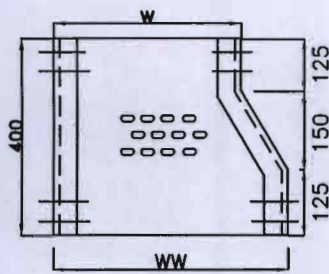


SEE GENERAL NOTES IN SHEET 13.

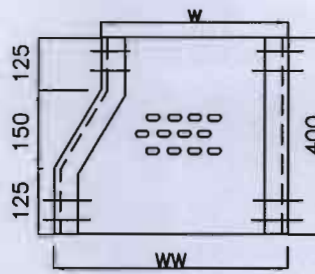


PE-DG-999-507-E007

REV 00



LEFT HAND REDUCER



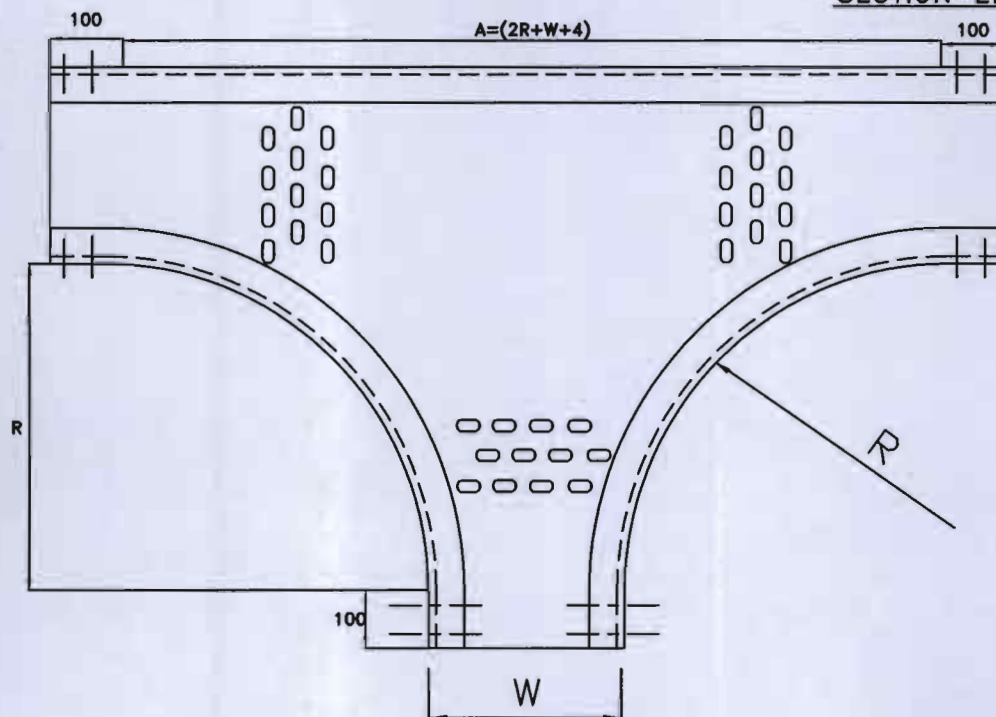
RIGHT HAND REDUCER

PERFORATED TYPE

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



SECTION-EE



TEE

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

SEE GENERAL NOTES IN SHEET 13.

PERFORATED TYPE



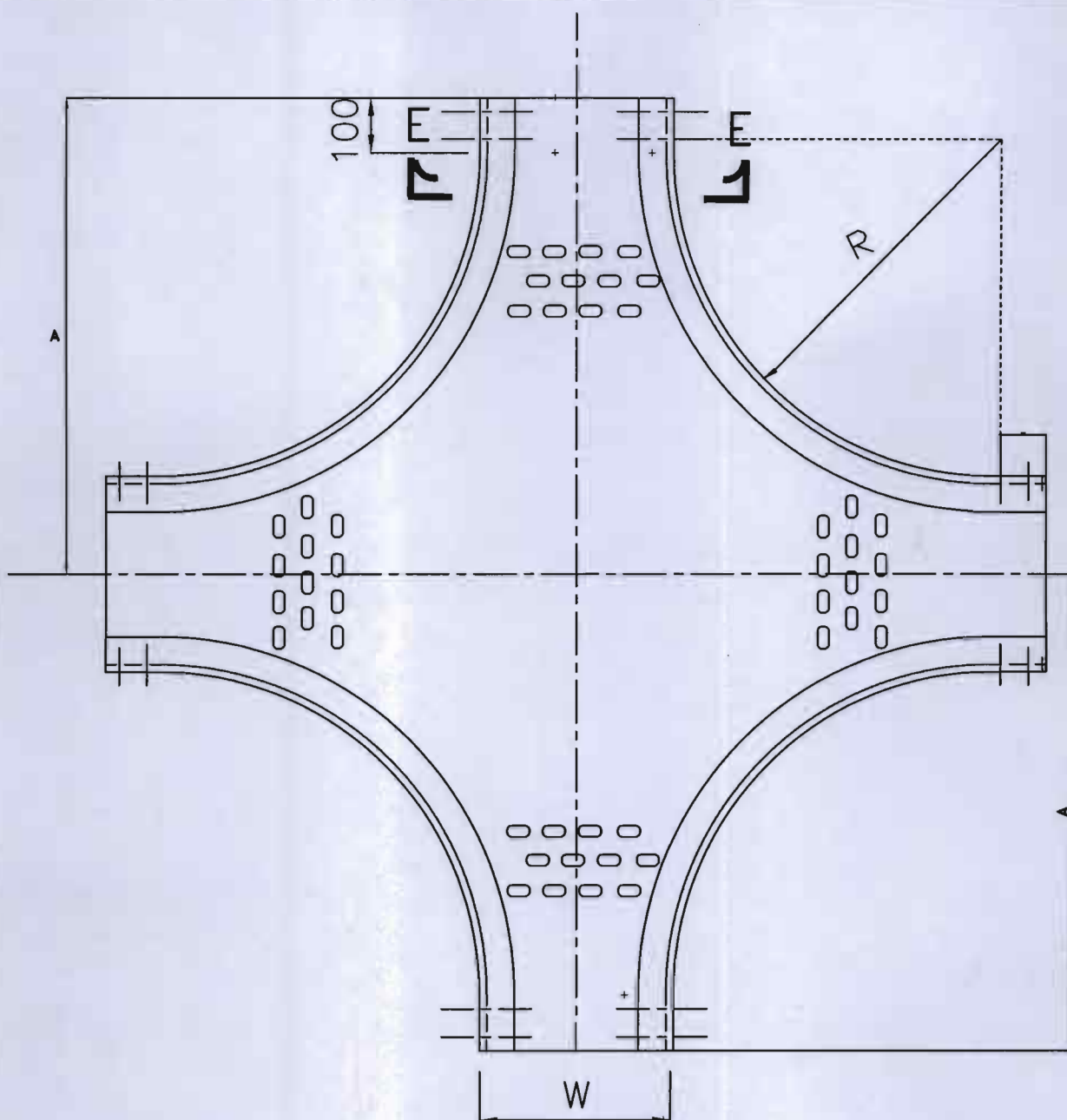
TYPICAL DETAILS OF
CABLE TRAYS AND ACCESSORIES

DRAWING NO.

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REV 00



CROSS

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

SEE GENERAL NOTES IN SHEET 13.



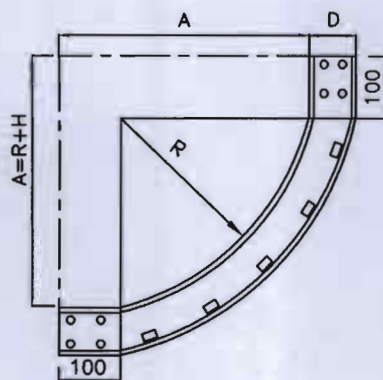
TYPICAL DETAILS OF
CABLE TRAYS AND ACCESSORIES

DRAWING NO.

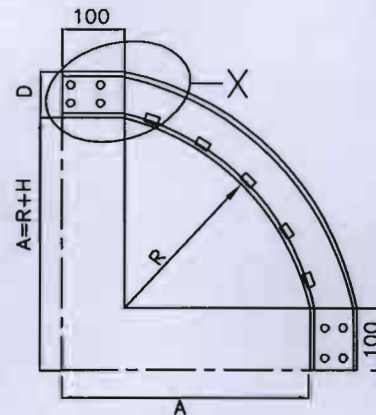
PE-DG-999-507-E007

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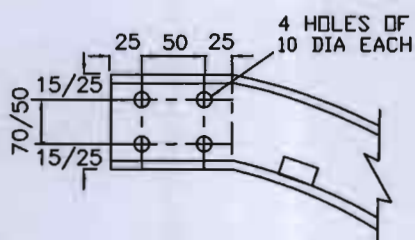
REV 00



INSIDE TYPE



OUTSIDE TYPE

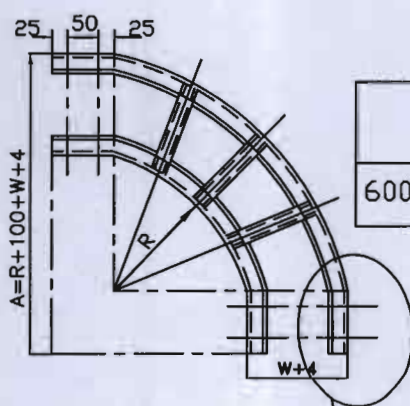


ENLARGED VIEW OF "X"

VERTICAL ELBOW 90 DEG UP/DOWN

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

90° HORIZONTAL BEND - LADDER TYPE

SEE GENERAL NOTES IN SHEET 13.



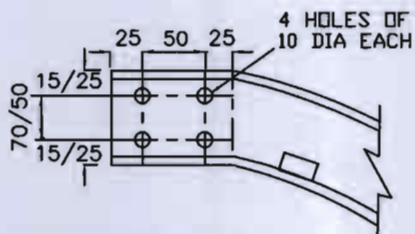
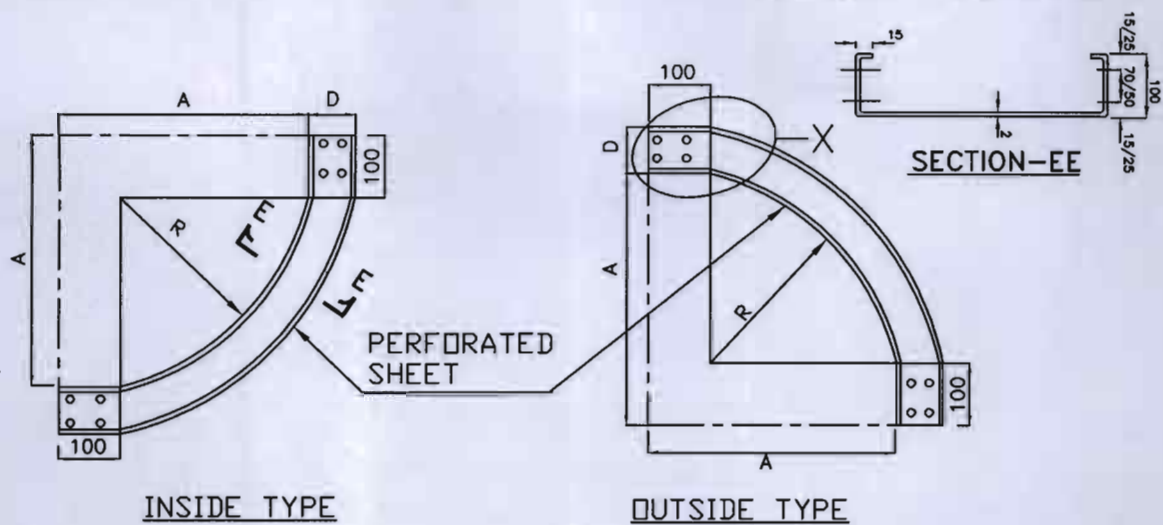
TYPICAL DETAILS OF
CABLE TRAYS AND ACCESSORIES

DRAWING NO.

PE-DG-999-507-E007

SH 9 OF 13

REV 00

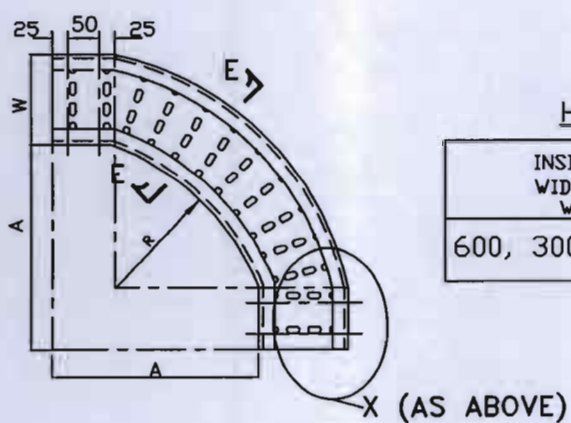


ENLARGED VIEW OF "X"

VERTICAL ELBOW 90 DEG UP/DOWN

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

90° VERTICAL BEND - PERFORATED TYPE



HORIZONTAL ELBOW 90 DEG

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

90° HORIZONTAL BEND - PERFORATED TYPE

SEE GENERAL NOTES IN SHEET 13.



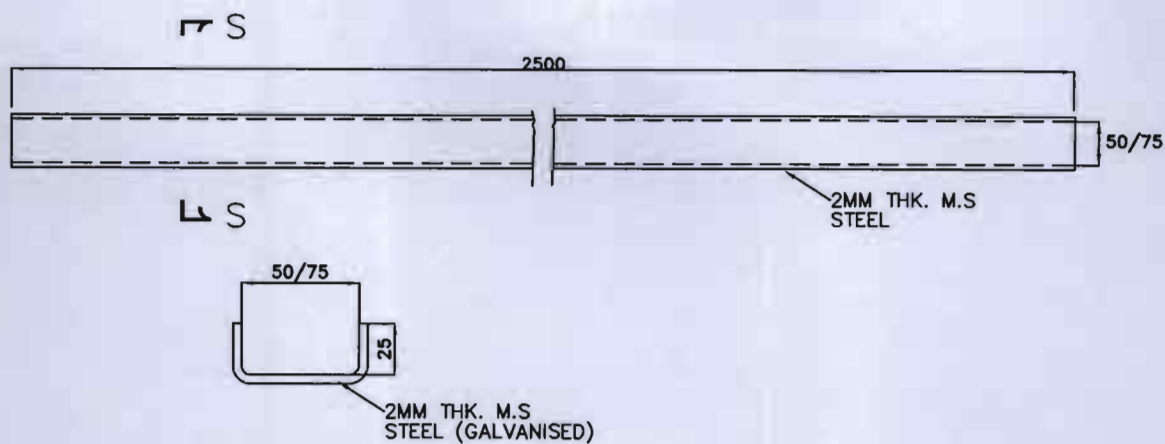
TYPICAL DETAILS OF
CABLE TRAYS AND ACCESSORIES

DRAWING NO.

PE-DG-999-507-E007

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REV 00



SECTION S-S

CABLE TROUGHS

SEE GENERAL NOTES IN SHEET 13.

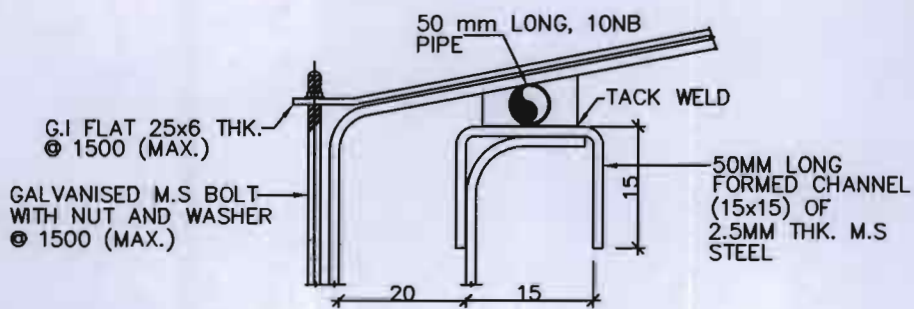
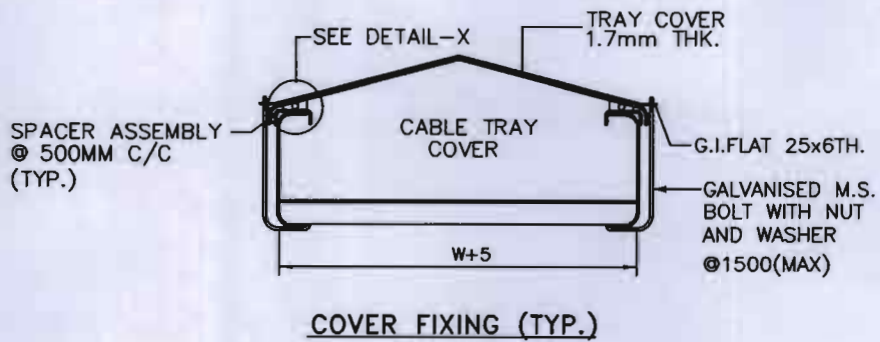


TYPICAL DETAILS OF
CABLE TRAY AND ACCESSORIES

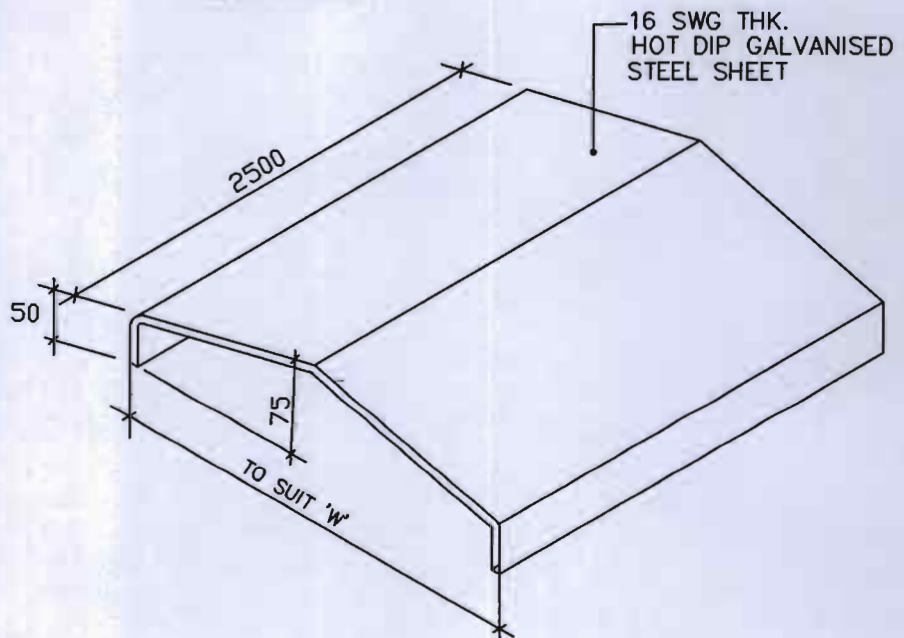
BHEL DRAWING NO.
PE-DG-999-507-E007

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REV 00



DETAIL-X



CABLE TRAY COVER

SEE GENERAL NOTES IN SHEET 13.



TYPICAL DETAILS OF
CABLE TRAYS AND ACCESSORIES

DRAWING NO.

PE-DG-999-507-E005

SH 12 OF 13

REV 00

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.
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 FOR SIZES UPTO 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) : 600,300 & 150.
PERFORATED TYPE CABLE TRAY (MM) : 600,300,150,100 & 50.
16. 600MM WIDE CABLE TRAY SHALL BE SUITABLE FOR WEIGHT OF 100KG/M INCLUDING LIVE LOAD OF RUNNING LENGTH OF CABLE TRAY.
17. MAKE OF ALL ITEMS SHALL BE AS PER BHEL/CUSTOMER APPROVAL.
18. CABLE TROUGHS OR 50/100MM WIDE PERFORATED TYPE SHALL BE USED FOR LOCAL CABLING/BRANCHING OUT FEW CABLES FROM MAIN ROUTE.



TYPICAL DETAILS OF CABLE TRAYS AND ACCESSORIES

DRAWING NO.

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REV 00