1261698/2023/PS-PEM-EL

	PRE-QUALIFICATION REQUIREMENTS FOR CABLE TRAY SUPPORT SYSTEM- BOLTABLE OF 3X800MW NTPC PATRATU STPP	PE-PQ-434-507-E003
		REVISION NO. 0 DATE 23/07/2022
		Page **1** of **2**

ITEMS: Single channel, double channel, cantilever arms, clamps & fittings **SCOPE: Supply: YES; Erection & Commissioning: NO;**	
1.	Availability of type test certificates as per GDCD standard.
2.	Vendor should have in-house fabrication, manufacturing & testing facility (as per GDCD standard).
3.	Capability of manufacturing channels & cantilever arms for 20km per month.
4.	Vendor has his own galvanization plant. OR Galvanizers as mentioned in annexure-1 of Quality plan, part of Technical specification.
5.	Manufactured & supplied at least 40 km of channels (SC1 & DC1) & cantilever arms in one or more orders and at least 20 km in a single order.
6.	Minimum two (2) nos. purchase orders for cable tray support system- boltable type shall be submitted which should not be more than five (5) years old from the 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.

PREPARED BY	CHECKED BY	REVIEWED BY	APPROVED BY
23/07/22	23/7/2022	23/7/2022	25/7/22
GIRISH CHANDRA DY. ENGINEER	HEMA KUSHWAHA, SR. MANAGER	PRAVEEN DUTTA, AGM	DEBASISA RATH, AGM (DH)

	PRE-QUALIFICATION REQUIREMENTS FOR CABLE TRAY SUPPORT SYSTEM- BOLTABLE OF 3X800MW NTPC PATRATU STPP	PE-PQ-434-507-E003
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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.

PREPARED BY	CHECKED BY	REVIEWED BY	APPROVED BY
23/07/22	23/7/2022	23/7/2022	25/7/2
GIRISH CHANDRA DY. ENGINEER	HEMA KUSHWAHA, SR. MANAGER	PRAVEEN DUTTA, AGM	DEBASISA RATH, AGM (DH)

Item Number	Item Title	Item Description	Item Quantity	Unit of Measure	Consignee ID	Delivery Period (In number of days)
1	90 deg. Angle Fitting LA1 (COMPLETE WITH REQUIRED HARDWARES (Spring nuts or washers etc. as required for complete installation))-As per Tech. Specifications Sl. No.-4.5	90 deg. Angle Fitting LA1 (COMPLETE WITH REQUIRED HARDWARES (Spring nuts or washers etc. as required for complete installation))-As per Tech. Specifications Sl. No.-4.5	4550	NOS	PATRATU_CON1	540
2	Base Plate for Double Channel BP2 (COMPLETE WITH REQUIRED HARDWARES (Spring nuts or washers etc. as required for complete installation)) -As per Tech. Specifications Sl. No.-4.4	Base Plate for Double Channel BP2 (COMPLETE WITH REQUIRED HARDWARES (Spring nuts or washers etc. as required for complete installation)) -As per Tech. Specifications Sl. No.-4.4	1200	NOS	PATRATU_CON1	540
3	Base Plate for Single Channel BP1 (COMPLETE WITH REQUIRED HARDWARES (Spring nuts or washers etc. as required for complete installation))-As per Tech. Specifications Sl. No.-4.3	Base Plate for Single Channel BP1 (COMPLETE WITH REQUIRED HARDWARES (Spring nuts or washers etc. as required for complete installation))-As per Tech. Specifications Sl. No.-4.3	3050	NOS	PATRATU_CON1	540
4	Beam Clamp BC1 (COMPLETE WITH REQUIRED HARDWARES (Spring nuts or washers etc. as required for complete installation))-As per Tech. Specifications Sl. No.-4.6	Beam Clamp BC1 (COMPLETE WITH REQUIRED HARDWARES (Spring nuts or washers etc. as required for complete installation))-As per Tech. Specifications Sl. No.-4.6	2000	NOS	PATRATU_CON1	540
5	Clamp for Single Channel CC1 (COMPLETE WITH REQUIRED HARDWARES (Spring nuts or washers etc. as required for complete installation))-As per Tech. Specifications Sl. No.-4.1	Clamp for Single Channel CC1 (COMPLETE WITH REQUIRED HARDWARES (Spring nuts or washers etc. as required for complete installation))-As per Tech. Specifications Sl. No.-4.1	7210	NOS	PATRATU_CON1	540
6	Clamp for Double Channel CC2 (COMPLETE WITH REQUIRED HARDWARES (Spring nuts or washers etc. as required for complete installation))-As per Tech. Specifications Sl. No.-4.2	Clamp for Double Channel CC2 (COMPLETE WITH REQUIRED HARDWARES (Spring nuts or washers etc. as required for complete installation))-As per Tech. Specifications Sl. No.-4.2	4350	NOS	PATRATU_CON1	540
7	Double Channel DC1 (In Standard Length of 6M per piece) -As per Tech. Specifications Sl. No.-2	Double Channel DC1 (In Standard Length of 6M per piece) -As per Tech. Specifications Sl. No.-2	4450	MTR	PATRATU_CON1	540
8	Single Channel SC1 (In Standard Length of 6M per piece) -As per Tech. Specifications Sl. No.-1	Single Channel SC1 (In Standard Length of 6M per piece) -As per Tech. Specifications Sl. No.-1	13350	MTR	PATRATU_CON1	540
9	Cantilever arm for 600mm wide cable trays (750mm) - Each Complete With 2 Nos. - M12 Hex. Bolt and Washer, 2 Nos.- M12 Spring Nuts , 2 Nos. - M6 Pan Head Screws and Washer, 2 Nos.- M6 Spring Nuts -As per Tech. Specifications Sl. No.-3.1	Cantilever arm for 600mm wide cable trays (750mm) - Each Complete With 2 Nos. - M12 Hex. Bolt and Washer, 2 Nos.- M12 Spring Nuts , 2 Nos. - M6 Pan Head Screws and Washer, 2 Nos.- M6 Spring Nuts -As per Tech. Specifications Sl. No.-3.1	500	NOS	PATRATU_CON1	540
10	Cantilever arm for 600mm wide cable trays (620mm)- Each Complete With 2 Nos. - M12 Hex. Bolt and Washer, 2 Nos.- M12 Spring Nuts , 2 Nos. - M6 Pan Head Screws and Washer, 2 Nos.- M6 Spring Nuts -As per Tech. Specifications Sl. No.-3.2	Cantilever arm for 600mm wide cable trays (620mm)- Each Complete With 2 Nos. - M12 Hex. Bolt and Washer, 2 Nos.- M12 Spring Nuts , 2 Nos. - M6 Pan Head Screws and Washer, 2 Nos.- M6 Spring Nuts -As per Tech. Specifications Sl. No.-3.2	9000	NOS	PATRATU_CON1	540
11	Cantilever arm for 300mm wide cable trays (320mm)- Each Complete With 2 Nos. - M12 Hex. Bolt and Washer, 2 Nos.- M12 Spring Nuts , 2 Nos. - M6 Pan Head Screws and Washer, 2 Nos.- M6 Spring Nuts -As per Tech. Specifications Sl. No.-3.3	Cantilever arm for 300mm wide cable trays (320mm)- Each Complete With 2 Nos. - M12 Hex. Bolt and Washer, 2 Nos.- M12 Spring Nuts , 2 Nos. - M6 Pan Head Screws and Washer, 2 Nos.- M6 Spring Nuts -As per Tech. Specifications Sl. No.-3.3	4900	NOS	PATRATU_CON1	540
12	Cantilever arm for 150mm wide cable trays (170mm) - Each Complete With 2 Nos. - M12 Hex. Bolt and Washer, 2 Nos.- M12 Spring Nuts , 2 Nos. - M6 Pan Head Screws and Washer, 2 Nos.- M6 Spring Nuts -As per Tech. Specifications Sl. No.-3.4	Cantilever arm for 150mm wide cable trays (170mm) - Each Complete With 2 Nos. - M12 Hex. Bolt and Washer, 2 Nos.- M12 Spring Nuts , 2 Nos. - M6 Pan Head Screws and Washer, 2 Nos.- M6 Spring Nuts -As per Tech. Specifications Sl. No.-3.4	3800	NOS	PATRATU_CON1	540

1261698/2023/PS-PEM-EL

CABLE TRAY SUPPORT SYSTEM- PATRATU PROJECT

CABLE TRAY SUPPORT SYSTEM - BOLTABLE QTY

Item No.	Item Code	Item Description	Unit	Indented qty.
1	**507-34016-A**	**SINGLE CHANNEL SC1** (IN STANDARD LENGTH OF 6M PER PIECE)	Metres	13350
2	**507-34012-A**	**DOUBLE CHANNEL DC1** (IN STANDARD LENGTH OF 6M PER PIECE)	Metres	4450
3		**CANTILEVER ARM** EACH COMPLETE WITH 2 NOS. - M12 HEX. BOLT & WASHER		
		2 NOS. - M12 SPRING NUTS 2 NOS. - M6 PAN HEAD SCREWS & WASHER		
		2 NOS. - M6 SPRING NUTS		
3.1	**507-34027-A**	Cantilever arm for 600mm wide cable trays (750mm)	Nos.	500
3.2	**507-34028-A**	Cantilever arm for 600mm wide cable trays (620mm)	Nos.	9000
3.3	**507-34029-A**	Cantilever arm for 300mm wide cable trays (320mm)	Nos.	4900
3.4	**507-34030-A**	Cantilever arm for 150mm wide cable trays (170mm)	Nos.	3800
4		**CLAMPS AND FITTINGS** COMPLETE WITH REQUIRED HARDWARES (Spring nuts/ washers etc. as required for complete installation)		
4.1	**507-34010-A**	CLAMP FOR SINGLE CHANNEL CC1	Nos.	7210
4.2	**507-34011-A**	CLAMP FOR DOUBLE CHANNEL CC2	Nos.	4350
4.3	**507-34004-A**	BASE PLATE FOR SINGLE CHANNEL BP1	Nos.	3050
4.4	**507-34003-A**	BASE PLATE FOR DOUBLE CHANNEL BP2	Nos.	1200
4.5	**507-34002-A**	90˚ ANGLE FITTING LA1	Nos.	4550
4.6	**507-34005-A**	BEAM CLAMP BC1	Nos.	2000

NOTES:

1.Total Quantity indicated above shall be known as Order Quantities. The total quantity variation shall be as per NIT.

2.The unit prices shall apply for adjustment of variation in quantity.

VOLUME-II

TECHNICAL SPECIFICATION

FOR

GALVANISED CABLE TRAY SUPPORT SYSTEM (BOLTABLE TYPE)

SPECIFICATION NO: PE-TS-434-507-E013

***REVISION:* 00**

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

	TECHNICAL SPECIFICATION FOR CABLE TRAY SUPPORT SYSTEM (BOLTABLE TYPE)	SPECIFICATION NO. PE-TS-434-507-E013
		REVISION 00 | DATE: 19.07.2022
		SHEET 1 OF 1

CONTENTS

TOTAL SHEETS INCLUDING COVER SHEET, CONTENT/SEPARATOR SHEET = 40

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 deviations 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 GALVANISED CABLE TRAY SUPPORT SYSTEM (BOLTABLE TYPE)	SPECIFICATION NO. PE-TS-434-507-E013
		VOLUME-II
		SECTION I
		REVISION 00 / DATE: 20.07.2022
		SHEET 1 of 3

SECTION – I

SPECIFIC TECHNICAL REQUIREMENTS

	TECHNICAL SPECIFICATION FOR GALVANISED CABLE TRAY SUPPORT SYSTEM (BOLTABLE TYPE)	SPECIFICATION NO. PE-TS-434-507-E013	
		VOLUME-II	
		SECTION I	
		REVISION 00	DATE: 20.07.2022
		SHEET 2 of 3	

1.0 SCOPE OF ENQUIRY

1.1 This enquiry covers Manufacture, Inspection and Testing at Manufacturer's works, proper packing and delivery to site of **Cable Tray Support System (Boltable Type)** conforming to this specification.

1.2 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.

1.3 General technical requirements of the Cable Tray Support System (Boltable Type) are indicated in Section-I. Project specific technical/ quality requirements / changes are listed in Data Sheet-A & Section-II.

1.4 The stipulations of Section-I, followed by those of Data Sheet-A shall prevail in case of any conflict between the stipulations of Section-I, Data Sheet - A & Section-II.

2.0 BILL OF QUANTITIES:

2.1 Quantity requirements shall be as per **Annexure-I (Bill of Quantities (BOQ))** of NIT.

3.0 SPECIFIC REQUIREMENTS:

3.1 Technical:

Sr. No.	Reference Clause No. of Section II (if any)	Specific Requirement/ Change
1	NIL	NIL

3.2 Quality/ Inspection:

Sr. No.	Reference Clause No. of Section II (if any)	Specific Requirement/ Change

3.3 Bill of Material & Packing List

3.3.1 Supplier to submit detailed 'Bill of Material' (BoM) at the time of drawing/document submission after placement of PO. Each item of the BoM to be uniquely identified with item code no. or item serial no.

3.3.2 Supplier to ensure that all items which will find separate mention in the packing list are covered in this detailed BoM.

ANNEXURE – A
LIST OF DRAWINGS / DOCUMENTS
(REQUIRED TO BE FURNISHED BY SUCCESSFUL BIDDER AFTER AWARD OF CONTRACT)

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

4.2 Drawing/Documents required to be submitted shall be as per NIT.

4.3 Bidder to submit drawing/document submission schedule at contract stage.

	TECHNICAL SPECIFICATION FOR GALVANISED CABLE TRAY SUPPORT SYSTEM (BOLTABLE TYPE)	SPECIFICATION NO. PE-TS-434-507-E013
		VOLUME II
		SECTION I
		REVISION 01 / DATE: 23.04.2022
		SHEET 1 OF 1

DATASHEET A

1.0 APPLICABLE STANDARDS:

a)	IS: 2062	For structural steel
b)	IS: 1079	For hot rolled carbon steel sheet and strip.
c)	IS: 513	For cold rolled low carbon steel sheet & strips
d)	IS: 1730	For dimensions for steel sheet and strip.
e)	IS: 1363	Hexagon head bolts, screws and nuts.
f)	IS: 5	For colours of paint.
g)	IS: 2629	For hot dip galvanising of steel & surface pre-treatment
h)	IS: 2633	For testing uniformity of zinc coating
i)	IS: 6745	For determination of mass of zinc coating
j)	IS: 1852	For rolling and cutting tolerances of hot rolled steel products
k)	IS: 4759	For Hot dip zinc coating on structural steel & other allied products

2.0 CABLE TRAY SUPPORT

a)	Tray support type:	Boltable type
b)	Material:	Hot/ Cold Rolled MS sheet steel for channel SC1/ DC1 and channel portion of cantilever arms
c)	Thickness:	2.5 mm
d)	Length:	Standard length of 6 meters
e)	Fabrication :	At works
f)	Construction:	Conforming to enclosed drg. [PE-DG-999-507-E013]

3.0 SURFACE TREATMENT:

Galvanizing:

a)	Pre-treatment:	As per IS 2629 prior to galvanisation
b)	Type	Hot dip galvanization
c)	Applicable Standard:	IS 2629
d)	Minimum thickness:	75 microns (minimum), 86 microns (average)
e)	Min. wt. of Zinc deposit:	610 gms. per square meter
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 as per IS: 2629

4.0 TYPE TEST, ROUTINE TEST AND ACCEPTANCE TEST

For details of routine test, acceptance test and type test, please refer to Annexure 4 (Type test procedure) and QP no. PED-507-00-Q-013/01.

	TECHNICAL SPECIFICATION FOR GALVANISED CABLE TRAY SUPPORT SYSTEM (BOLTABLE TYPE)	SPECIFICATION NO. PE-TS-434-507-E013	
		VOLUME II	
		SECTION II	
		REVISION 01	DATE: 23.04.2022

SECTION-II

STANDARD TECHNICAL REQUIREMENTS

	TECHNICAL SPECIFICATION FOR GALVANISED CABLE TRAY SUPPORT SYSTEM (BOLTABLE TYPE)	SPECIFICATION NO. PE-TS-434-507-E013
		VOLUME II
		SECTION II
		REVISION 01 / DATE: 23.04.2022
		Sheet 1 of 2

1.0 CODES AND STANDARDS

2.1 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.

2.2 The design, material, construction, manufacture, inspection, testing and performance of cable tray support system (boltable type) shall conform to the latest revision of relevant standards as per Datasheet-A.

2.3 In case of conflict between the applicable reference standard and this specification, this specification shall govern.

2.0 TECHNICAL REQUIREMENTS

3.1 Cable Trays Support (boltable type) shall be supplied as per technical particulars specified in Data Sheet – A.

3.3 All finished galvanised MS structural members for cable tray supports shall be free from sharp edges, corners, burs & unevenness.

3.4 Necessary fasteners shall be provided with each cable tray support accessory as specified in enclosed drawings.

3.5 All welded joints of cable tray support accessories shall be smooth enough to provide a good appearance & shall not cause any injury to working personnel. All welding work shall be done by skilled personnel.

4.0 QUALITY ASSURANCE, TESTING & INSPECTION

4.1 Bidder shall confirm compliance with the BHEL's Standard Quality Plan (PE-QP-999-507-E007, Rev. 0) as attached with the specification without any deviations. After issuance of purchase order for specific project, the successful bidder shall submit the Quality Plan for BHEL/ ultimate customer's approval. In case bidder has reference Quality Plan 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.

4.2 All materials shall be procured, manufactured, inspected and tested by vendor/ sub-vendor as per approved quality plan.

4.3 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.

5.0 **TESTING:**

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

5.1 Type tests :

Cable tray support system (Boltable Type) shall be of proven type & type tested design conforming to type tests as under:

a) Load test for Main support channel with cantilever arm fixed on one side

b) Load test for Main support channel with cantilever arm fixed on both sides

c) Load test for Channel fixed on Beam/Floor

d) Load test for channel supported on wall with Cantilever arm

e) Channel insert test

f) Channel nut slip characteristics (wherever applicable)

g) Weld integrity test

h) Test for galvanizing: Weight, thickness and uniformity of zinc coating shall be determined in accordance with IS: 6745 and IS: 2633 for the values indicated in Data Sheet- A.

Type testing shall be carried out for tests listed at “(a) through (g)” above in line with Type test procedure and drawings attached in Annexure-4. The final type test procedure shall be subjected to BHEL/customer approval.

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

5.2 Routine Tests:

a) Dimension checks

5.3 Acceptance Test:

a) Dimension checks

b) Tests for galvanizing

6.0 **PACKING**

The material shall be packed to ensure protection against damage during transit, storage for prolonged periods and handling.

एनटीपीसी NTPC	ITEM: (MATERIAL, CLASS, GRADE, RATING, SIZE ETC.) GALVANISED FLEXIBLE CABLE TRAYS SUPPORT SYSTEM	STANDARD QUALITY PLAN CONFORMING TO CODE: Design as per NTPC Specification	QP NO. 0000-999-QOE-S-38 REV.:00 DATE : 01.09.04 PAGE 1 OF 2 VALID UPTO:31.08.07	REVIEWED BY S.D.SINGH O.P.NIRANJAN I.J.SINGH	APPROVED BY ANIL GUPTA

SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
					M	C/N					M	C	N	
1.	2.	3.	4.	5.	6.		7	8	9	D*	**	10		11
	Flexible cable trays Support Structure	1. In Black Condition a) Weld Quality	Major	Visual	100%	Random	Manufacturer's Plant Std	Manufacturer's Plant Std	Inspection Report		P	V	V	o
		b) Burs	Major	Visual	Rando m	-	No Burs	No Burs	-do-		P		-	
2.	Finished Galvanized	2. After Galvanising												
		2.1 General physical inspection including Galvanizing Quality/Defects, Dicromating, White Rusting etc.	Major	Visual	100%	5 Sample/L ot	IS-2629-1985 IS-4759-1996	IS-2629-1985 IS-4759-1996	-do-		P	W	W	
		2.2 Dimensional Check & Thickness Check	Major	Measurem ent	-do-	-do-	NTPC/Main Supplier Approved Drg.	NTPC/Main Supplier Approved Drg.	-do-		P	W	W	
		2.3 Galvanizing Tests												
		a) Coating thickness measurement survey by Elcometer	Critical	Measurem ent	IS-4759-1996	-do-	IS-4759-1996 IS-3203-1982	IS-4759-1996 IS-3203-1982	-do-		P	W	W	
		b) Mass of zinc coating	Critical	Measurem ent	-do-	1 coupon sample of each thickness	IS-6745-1972 IS-4759-1996	IS-6745-1972 IS-4759-1996	-do-		P	W	W	
		c) Uniformity of zinc coating/dip test	Critical	Measurem ent	-do-	-do-	IS-2633-1986 IS-4759-1996	IS-2633-1986 IS-4759-1996	-do-		P	W	W	
		d) Adhesion Test	Critical	Visual	-do-	-do-	IS-2629-1985	IS-2629-1985	-do-		P	W	W	

LEGEND: RECORDS IDENTIFIED WITH "TICK" SHALL BE ESSENTIALLY INCLUDED BY THE CONTRACTOR IN QA DOCUMENTATION

M: MANUFACTURER/SUB-SUPPLIER, C: **Main Supplier: NTPC, N: NTPC. INDICATE "P" PERFORM "W" WITNESS AND "V" VERIFICATION AS APPROPRIATE "CHP" BY NTPC SHALL BE IDENTIFIED IN COLUMN "N" AS "W"

एनटीपीसी NTPC	ITEM: (MATERIAL, CLASS, GRADE, RATING, SIZE ETC.)	STANDARD QUALITY PLAN CONFORMING TO CODE: Design as per NTPC Specification	QP NO. 0000-999-QOE-S-38 REV.:00 DATE : 01.09.04 PAGE 2 OF 2 VALID UPTO: 31.08.07	REVIEWED BY S.D.SINGH O.P.NIRANJAN I.J.SINGH	APPROVED BY ANIL GUPTA QUALITY ASSURANCE APPROVED NTPC, New Delhi

SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY		
					M	C/N					M	C	N
1.	2.	3.	4.	5.	6.		7	8	9	D*	**	10	
		Proof Load Test as per note 6 Followed by Die Penetration Test (For 600 mm and above cable tray support system)	A	Meas/Visual	One Sample from each offered lot	One Sample from each offered lot	NTPC Technical Specification/ No visible cracks should develop on the weld part	NTPC Technical Specification/ No visible cracks should develop on the weld part	Inspection Report		P	W	W

Note :

1. The supplier to ensure procurement of steel from main producers like SAIL/TISCO, Rastriya Ispat/Ispat Ind. Jindal/Esser/Lloyds/IIS Co. and Zinc from Hindustan Zinc Ltd.
2. Welding shall be done by qualified welders as per supplier system.
3. Material shall be galvanized at NTPC approved sources only.
4. Pre-treatment of cable trays support system shall be carried out in seven tank process as per IS-2629. All the process parameters e.g. Concentration, temperature, density etc. to be maintained and recorded by the galvaniser.
5. The process of pre-treatment shall be verified by NTPC on surveillance basis during inspection of Galvanised Flexible Cable Trays support system.
6. (i) Test on Main support Channel shall be done if only CI channel are in scope of supply and cantilever arms shall be fitted on one side. This test shall be same as test 4 of type test as per tech. Spec.

   (ii) Test on Main Support Channel shall be done with C2 Channel and cantilever arms fitted on both sides, if C2 channels are in scope of supply. This test shall be same as test 2 A of type tests. Then test at (i) above shall not be repeated.

   (iii) Nut slip characteristic test (It shall support minimum load of 350 Kg. Before Nut Slips with bolt torque of 65 NM). This test shall be same as test 5 B of type tests.

   (iv) The procedure for carrying out above test shall be as per details given in Type Tests Specification.

LEGEND: RECORDS IDENTIFIED WITH "TICK" SHALL BE ESSENTIALLY INCLUDED BY THE CONTRACTOR IN QA DOCUMENTATION
M: MANUFACTURER/SUB-SUPPLIER, C: **Main Supplier, N: NTPC. INDICATE "P" PERFORM "W" WITNESS AND "V" VERIFICATION AS APPROPRIATE
"CHP" BY NTPC SHALL BE IDENTIFIED IN COLUMN "N" AS "W"

1261698/2023/PS-PEM-EL

ANNEXURE- A to Quality Plan

LIST OF NTPC APPROVED GALVANIZERS (FOR NTPC PROJECTS)

S. NO.	ITEM	VENDOR NAME
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.***~~ Any issue specific to Manufacturer and BHEL shall be taken up separately with BHEL. This should not be made a part of QP.

ANNEXURE-B

3X800 MW NTPC PARTRATU STPP

QUALITY PLAN FOR CABLE TRAY SUPPORT SYSTEM-BOLTABLE

NOTES:

1. BHEL reserves the right for conducting repeat test, if required.
2. The latest revisions/year of issue of all the Standards indicated in the QP shall be referred at the time of inspection.

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 shets, 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

Column11I- 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 bgy BHEL and all tests as per relevent 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 presserved till despatch. Wherever this is not possible, the identification mark shall be transferred to the components in the presence of BHEL QS Engineer unless other wise 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 compiled with.
7. Inspection reports, log sheets, test reports/certificate. etc. shall be furnished to BHEL at the approproate 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-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-3

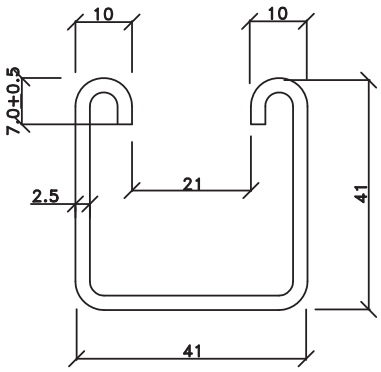
TYPICAL DETAILS OF BOLTABLE TYPE CABLE TRAY SUPPORT MATERIAL & ACCESSORIES

REVISIONS				
	NAME	DATE		

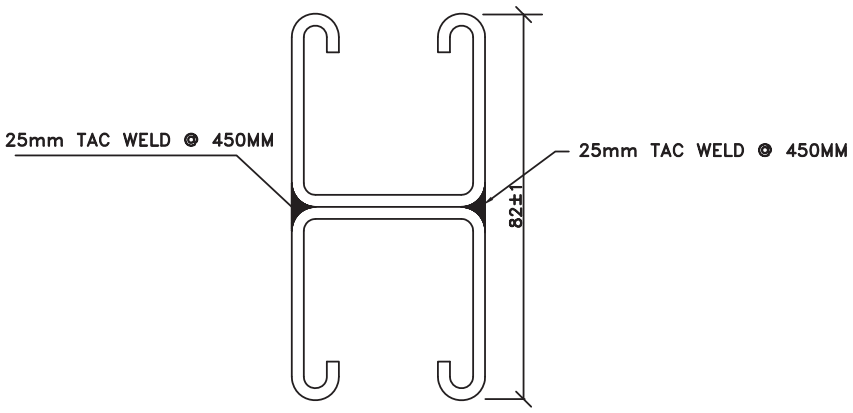
TITLE:	TYPICAL DETAILS OF BOLTABLE TYPE CABLE TRAY SUPPORT MATERIAL & ACCESSORIES		NAME	DATE
		DRAWN		
		DSGN		
DRG. NO.	PE-DG-999-507-E013	CHKD		
		APPD		

BHARAT HEAVY ELECTRICALS LTD.
PROJECT ENGINEERING MANAGEMENT
NOIDA

SH 1 OF 12



SINGLE CHANNEL SC1



DOUBLE CHANNEL DC1

TWO LENGTHS OF SINGLE CHANNEL

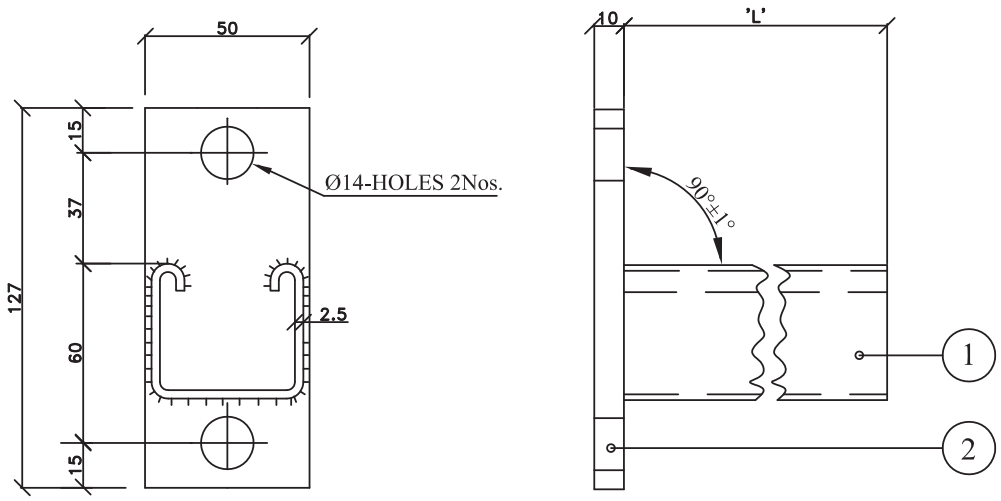
SPOT WELDED BACK TO BACK

AT 75MM C/C

NOTE:

1. ALL DIMENSIONS ARE IN mm.
2. MATERIAL : 2.5MM THICK HOT/ COLD ROLLED M.S. AS PER IS:1079.
3. FINISH : HOT DIP GALVANISED AS PER IS 2629
4. TOLERANCE ON THICKNESS IS AS PER IS 1852
5. ALL FABRICATION TOLERANCE AS PER RELEVANT IS.
6. ZINC COATING SHALL BE MIN. 75 MICRONS/ 610 G/SQ. M.

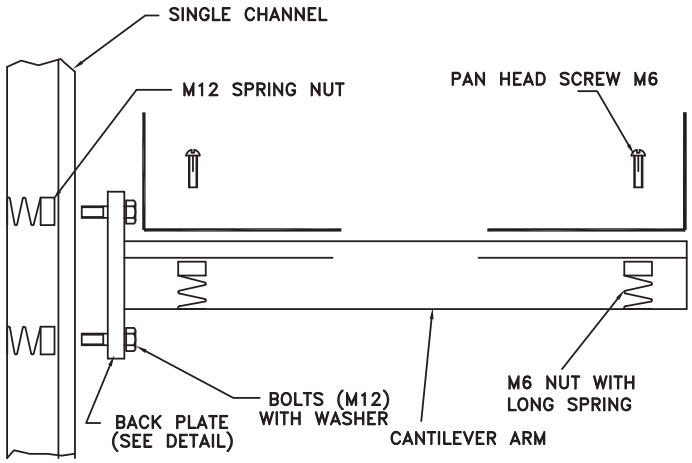
बीएचईएल BHEL	TITLE: TYPICAL DETAILS OF BOLTABLE TYPE CABLE TRAY SUPPORT MATERIAL & ACCESSORIES	DRG. NO. PE-DG-999-507-E013
		SH 2 OF 12



CANTILEVER ARMS

TRAY WIDTH IN MM	CANTILEVER ARM LENGTH (L) IN MM
150	170/200 (FOR OVERHEAD TRAYS)*
300	320/350 (FOR OVERHEAD TRAYS)*
450	500 (FOR OVERHEAD TRAYS)
600	620/650 (FOR OVERHEAD TRAYS)*
600	750 (FOR TRENCH)

* :- AS SPECIFIED IN BOQ



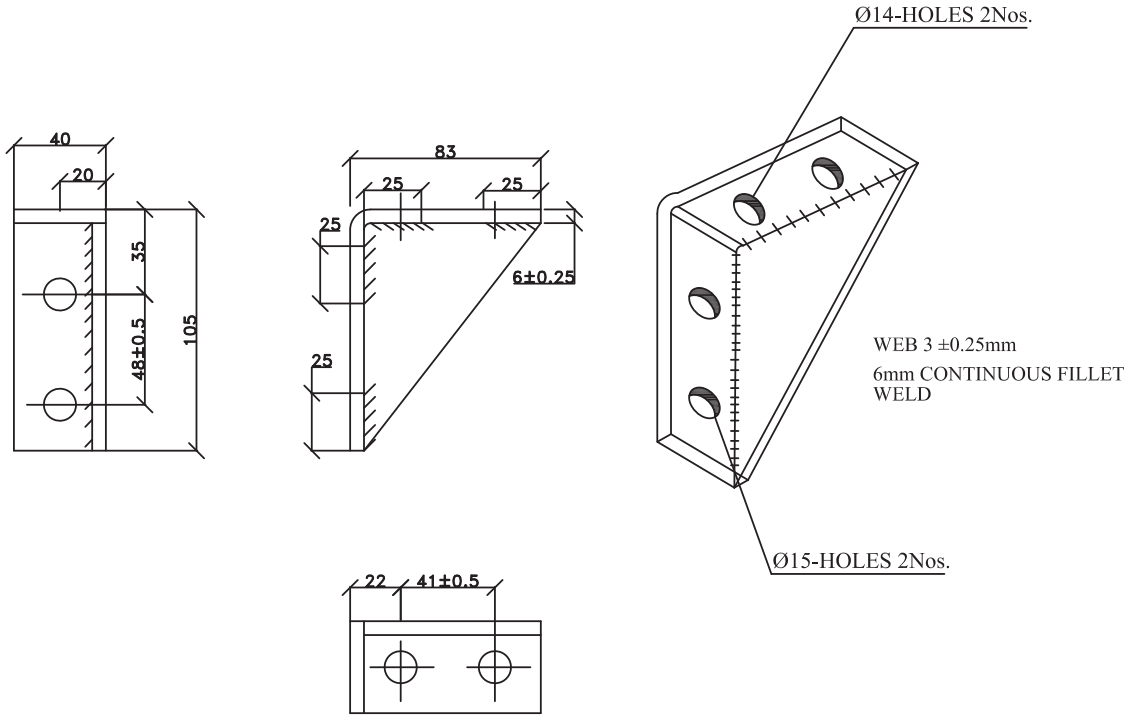
TYPICAL ASSEMBLY OF CHANNEL SUPPORTS AND CABLE TRAY

M12 HEX BOLT & WASHER–2NOs.
M12 SPRING NUTS–2NOs.
M6 PAN HEAD SCREWS & WASHER–2NOs.
M6 SPRING NUTS–2NOs.

NOTES :

1. ALL DIMENSIONS ARE IN mm.
2. ITEM NO.1 MATERIAL : HOT/ COLD ROLLED M.S. AS PER RELEVANT IS.
3. ITEM NO.2 MATERIAL : M.S AS PER IS-2062
4. FINISH : HOT DIP GALVANISED AS PER IS:2629
5. TOLERANCE ON THICKNESS IS AS PER IS:1852
6. ALL FABRICATION TOLERANCE AS PER RELEVANT IS.
7. ZINC COATING SHALL BE MIN. 75 MICRONS/ 610 G/SQ. M.

BHEL	TITLE: TYPICAL DETAILS OF BOLTABLE TYPE CABLE TRAY SUPPORT MATERIAL & ACCESSORIES	DRG. NO. PE–DG–999–507–E013
		SH 3 OF 12



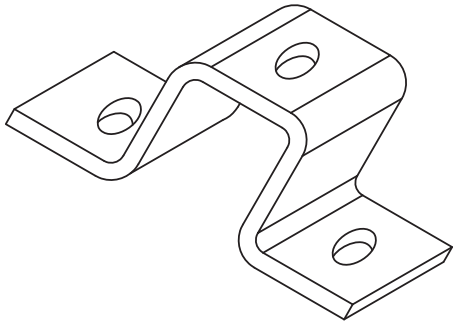
90 ANGLE FITTING HL1 (HEAVY DUTY TYPE)

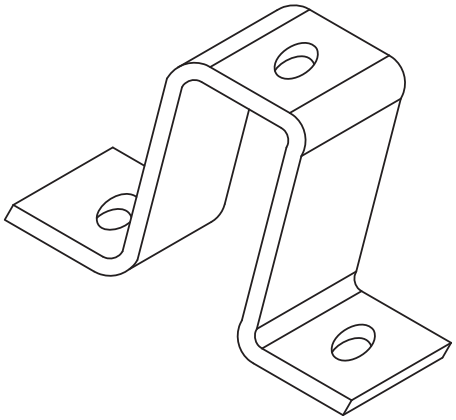
ANCHOR FASTENER–2NOs.
SPRING NUT & WASHER–2NOs.

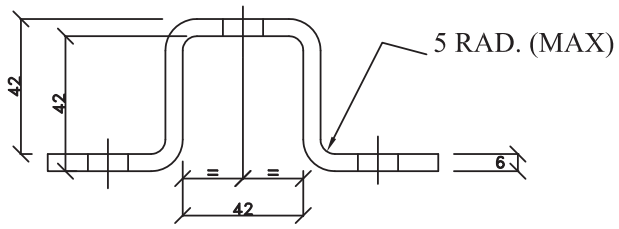
NOTES :

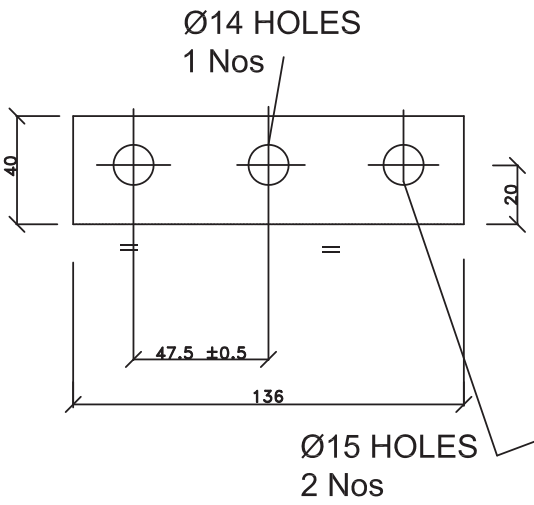
1. ALL DIMENSIONS ARE IN mm.
2. MATERIAL :MILD STEEL AS PER IS-2062
3. FINISH : HOT DIP GALVANISED AS PER IS:2629
4. TOLERANCE ON THICKNESS AS PER IS:1852
5. ALL FABRICATION TOLERANCE AS PER RELEVANT IS.
6. ZINC COATING SHALL BE MIN. 75 MICRONS/ 610 G/SQ. M.

बीएचईएल BHEL	TITLE: TYPICAL DETAILS OF BOLTABLE TYPE CABLE TRAY SUPPORT MATERIAL & ACCESSORIES	DRG. NO. PE–DG–999–507–E013
		SH 4 OF 12

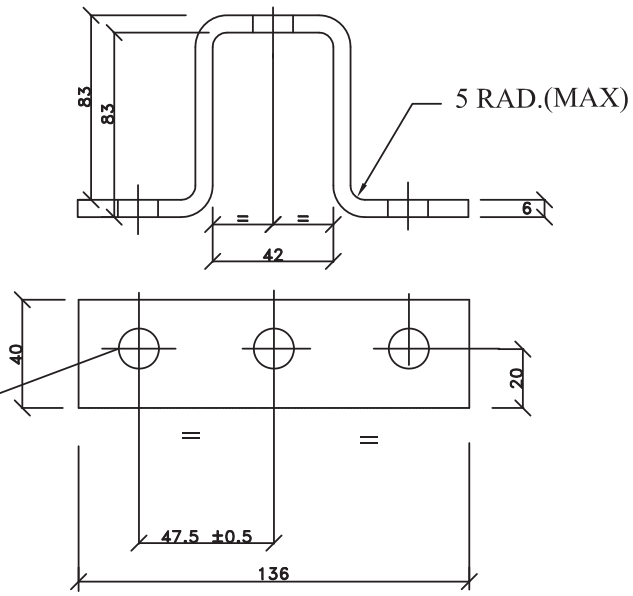








CLAMP FOR SINGLE CHANNEL CC1



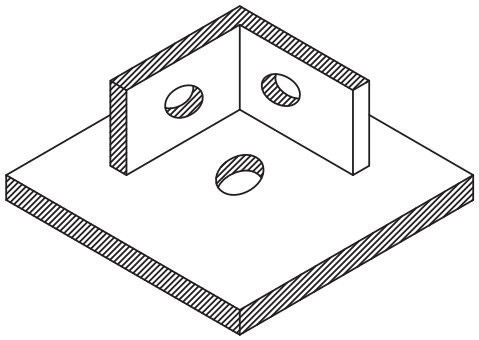
CLAMP FOR DOUBLE CHANNEL CC2

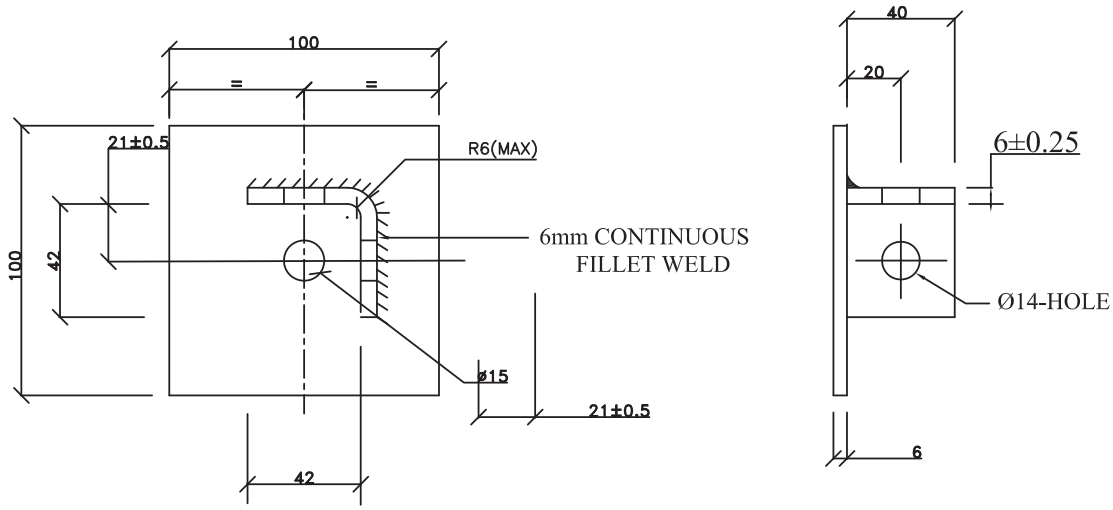
NOTES

1. ALL DIMENSIONS ARE IN mm.
2. MATERIAL :MILD STEEL AS PER IS-2062
3. FINISH : HOT DIP GALVANISED AS PER IS:2629
4. TOLERANCE ON THICKNESS AS PER IS:1852
5. ALL FABRICATION TOLERANCE AS PER RELEVANT IS.
6. ZINC COATING SHALL BE MIN. 75 MICRONS/ 610 G/SQ. M.

ANCHOR FASTENER–2NOs.
SPRING NUT & WASHER–1NO.

BHEL	TITLE: TYPICAL DETAILS OF BOLTABLE TYPE CABLE TRAY SUPPORT MATERIAL & ACCESSORIES	DRG. NO. PE–DG–999–507–E013
		SH 5 OF 12





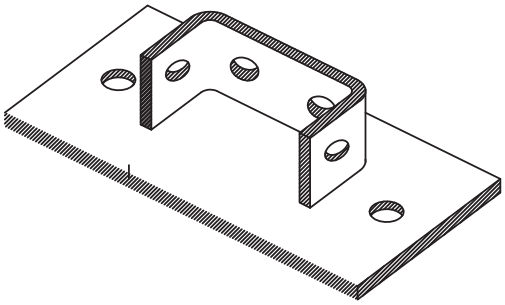
BASE PLATE FOR SINGLE CHANNEL BP1

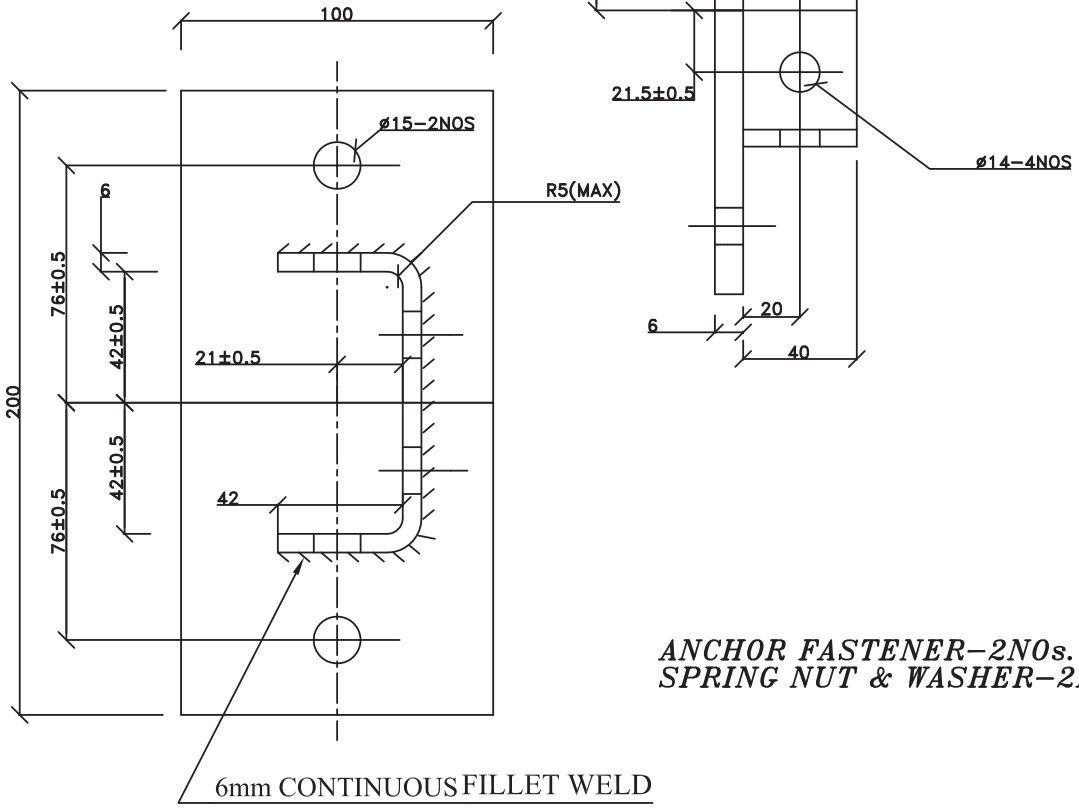
NOTE

ANCHOR FASTENER–1NO.
SPRING NUT & WASHER–1NO.

1. ALL DIMENSIONS ARE IN mm.
2. MATERIAL :MILD STEEL AS PER IS-2062
3. FINISH : HOT DIP GALVANISED AS PER IS:2629
4. TOLERANCE ON THICKNESS AS PER IS:1852
5. ALL FABRICATION TOLERANCE AS PER RELEVANT IS.
6. ZINC COATING SHALL BE MIN. 75 MICRONS/ 610 G/SQ. M.

भेल BHEL	TITLE: TYPICAL DETAILS OF BOLTABLE TYPE CABLE TRAY SUPPORT MATERIAL & ACCESSORIES	DRG. NO. PE–DG–999–507–E013
		SH 6 OF 12





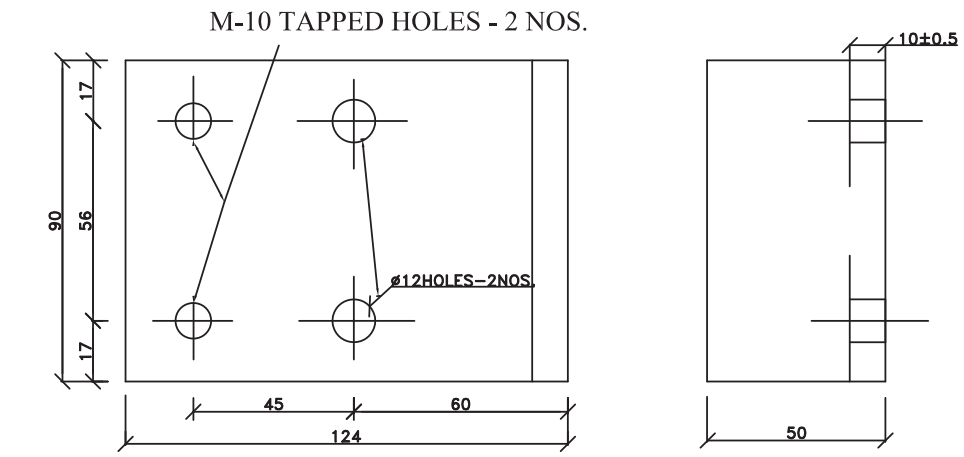
ANCHOR FASTENER–2NOs.
SPRING NUT & WASHER–2NOs.

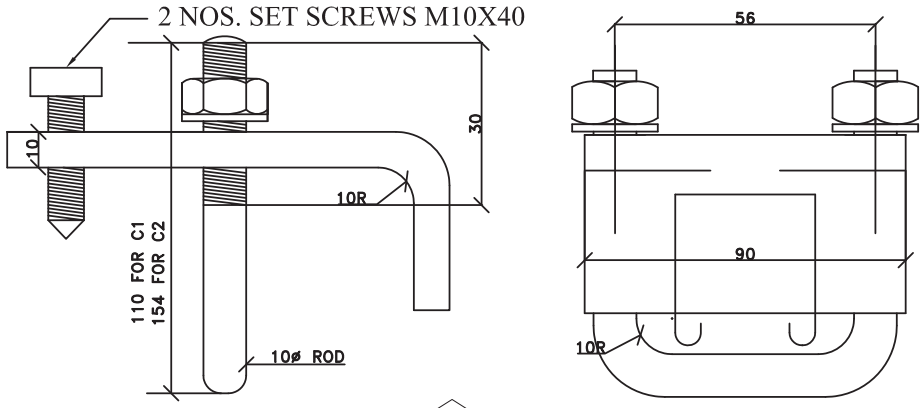
BASE PLATE FOR DOUBLE CHANNEL BP2

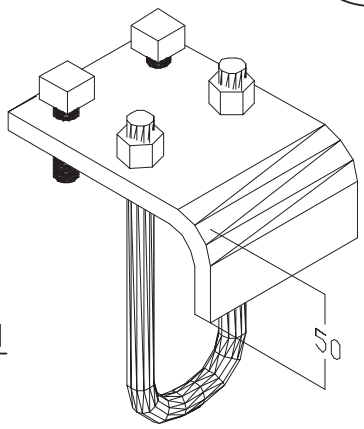
NOTE

1. ALL DIMENSIONS ARE IN mm.
2. MATERIAL :MILD STEEL AS PER IS-2062
3. FINISH : HOT DIP GALVANISED AS PER IS:2629
4. TOLERANCE ON THICKNESS AS PER IS:1852
5. ALL FABRICATION TOLERANCE AS PER RELEVANT IS.
6. ZINC COATING SHALL BE MIN. 75 MICRONS/ 610 G/SQ. M.

भेल BHEL	TITLE: TYPICAL DETAILS OF BOLTABLE TYPE CABLE TRAY SUPPORT MATERIAL & ACCESSORIES	DRG. NO. PE–DG–999–507–E013
		SH 7 OF 12







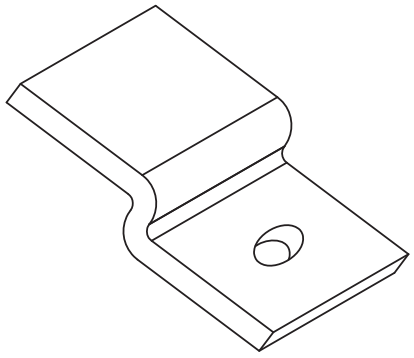
BEAM CLAMP - BC1

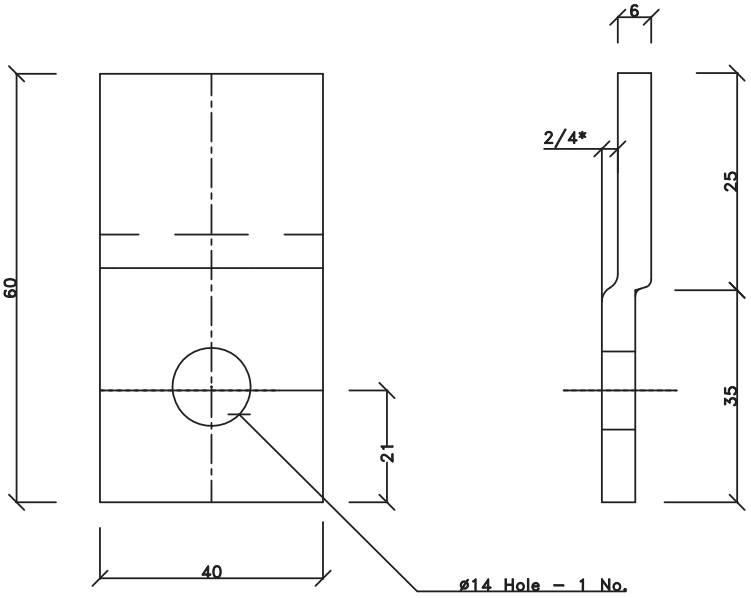
M–10 U–BOLT WITH
2Nos PLAIN WASHERS & NUTS
110 mm FOR SC 1
154 mm FOR DC1
2 NOs. SET SCREWS M10X40

NOTES

1. ALL DIMENSIONS ARE IN mm.
2. MATERIAL :MILD STEEL AS PER IS-2062
3. FINISH : HOT DIP GALVANISED AS PER IS:2629
4. TOLERANCE ON THICKNESS AS PER IS:1852
5. ALL FABRICATION TOLERANCE AS PER RELEVANT IS.
6. ZINC COATING SHALL BE MIN. 75 MICRONS/ 610 G/SQ. M.

भेल BHEL	TITLE: TYPICAL DETAILS OF BOLTABLE TYPE CABLE TRAY SUPPORT MATERIAL & ACCESSORIES	BHEL DRAWING NO. PE–DG–999–507–E013
		SH 8 OF 12





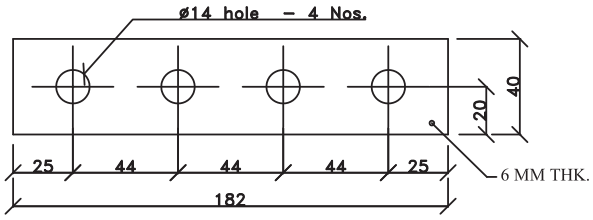
TRAY FIXING CLAMP - TC1/ FRP TRAY- FIXING CLAMP

SPRING NUT & WASHER–1NO.
** :–2MM FOR TRAY FIXING CLAMP TC1*
4MM FOR FRP TRAY– FIXING CLAMP

NOTES

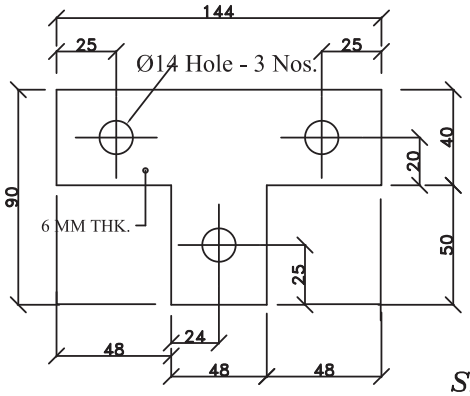
1. ALL DIMENSIONS ARE IN mm.
2. MATERIAL :MILD STEEL AS PER IS-2062
3. FINISH : HOT DIP GALVANISED AS PER IS:2629
4. TOLERANCE ON THICKNESS AS PER IS:1852
5. ALL FABRICATION TOLERANCE AS PER RELEVANT IS.
6. ZINC COATING SHALL BE MIN. 75 MICRONS/ 610 G/SQ. M.

TITLE:	TYPICAL DETAILS OF BOLTABLE TYPE CABLE TRAY SUPPORT MATERIAL & ACCESSORIES	BHEL DRAWING NO. PE–DG–999–507–E013
		SH 9 OF 12



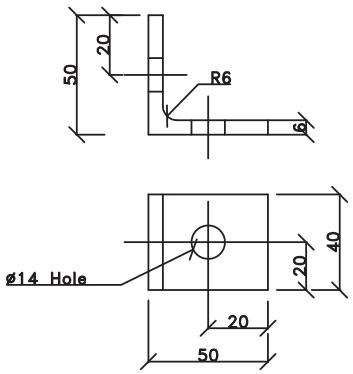
SPRING NUT & WASHER–4NOs.

FLAT PLATE STRAIGHT FITTING PF2



SPRING NUT & WASHER–3NOs.

FLAT PLATE TEE FITTING PF1



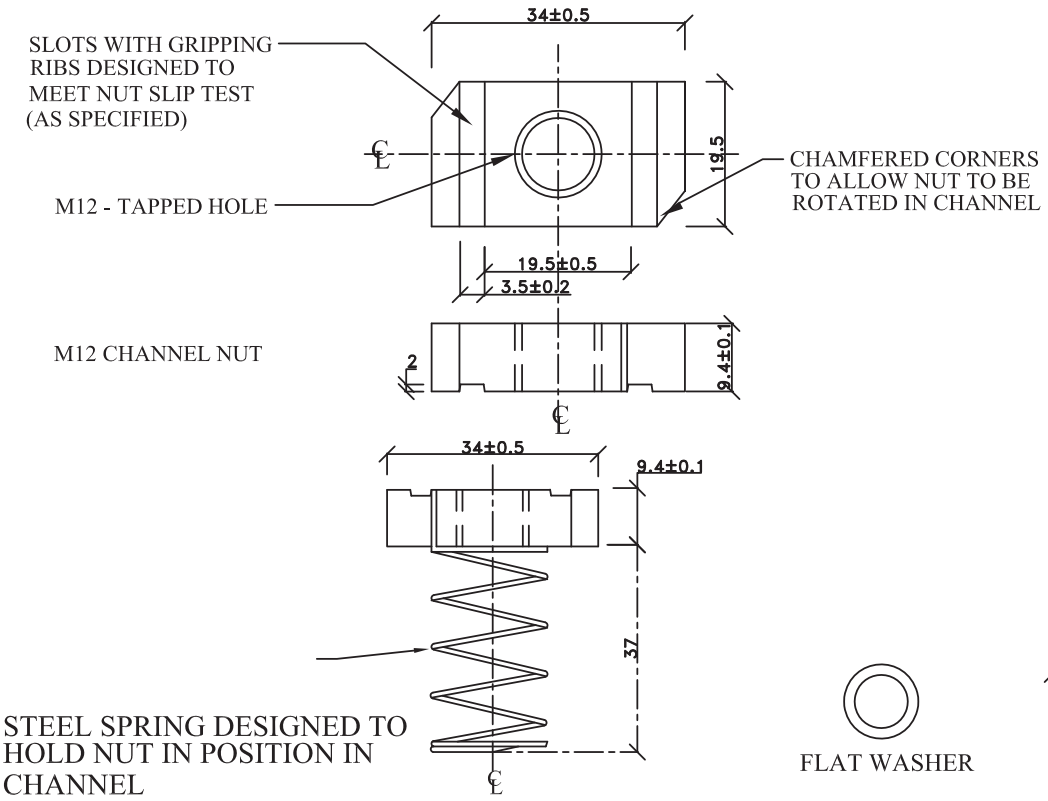
SPRING NUT & WASHER–2NOs.

90^0 ANGLE FITTING LA1

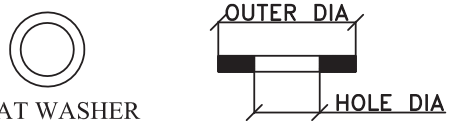
NOTES

1. ALL DIMENSIONS ARE IN mm.
2. MATERIAL :MILD STEEL AS PER IS-2062
3. FINISH : HOT DIP GALVANISED AS PER IS:2629
4. TOLERANCE ON THICKNESS AS PER IS:1852
5. ALL FABRICATION TOLERANCE AS PER RELEVANT IS.
6. ZINC COATING SHALL BE MIN. 75 MICRONS/ 610 G/SQ. M.

TITLE:	TYPICAL DETAILS OF BOLTABLE TYPE CABLE TRAY SUPPORT MATERIAL & ACCESSORIES	BHEL DRAWING NO. PE–DG–999–507–E013
		SH 10 OF 12



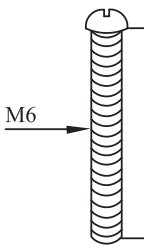
SPRING NUT ASSEMBLY



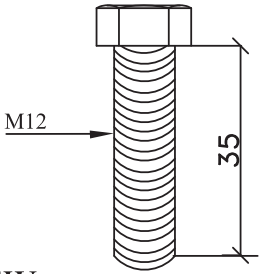
TYPICAL DETAILS OF WASHER

WASHER SIZE DETAILS

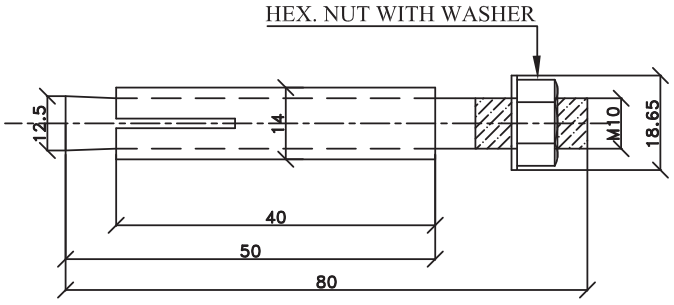
Sl.No.	BOLT/SCREW SIZE	HOLE DIA (IN MM)	OUTER DIA (IN MM)	WAHER THICKNESS (IN MM)
1	M6 PAN HEAD SCREW	6.4	12	1.6
2	M12 HEXA BOLT	13	24	2.5



PAN HEAD SCREW



HEX BOLT

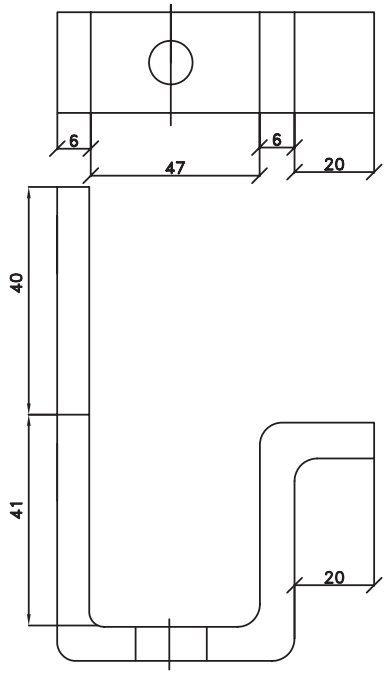


ANCHOR BOLT M10

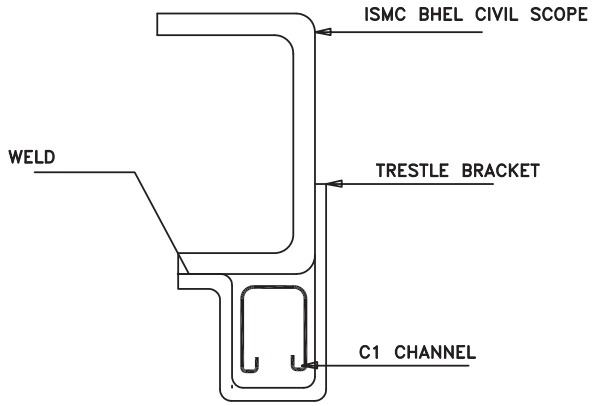
NOTES:

1. MATERIAL - MS AS PER IS - 2062.
2. M6 CHANNEL NUT DIMENSIONAL SIMILAR TO M12.
   EXCEPT HOLE DRILLED AND TAPPED TO M6 PAN HEAD SCREWS.
3. TAPPED HOLE THREADING TO MATCH WITH THREADING OF BOLTS.
4. SURFACE PROTECTION ELECTROGALVANISED / CADMIUM PLATED.
5. ALL DIMENSIONS ARE IN MM.
6. ZINC COATING SHALL BE MIN. 75 MICRONS/ 610 G/SQ. M.

भेल BHEL	TITLE: TYPICAL DETAILS OF BOLTABLE TYPE CABLE TRAY SUPPORT MATERIAL & ACCESSORIES	BHEL DRAWING NO. PE-DG-999-507-E013
		SH 11 OF 12



TRESTLE BRAKET



FIXING ARRANGMENT OF TRESTLE BRACKET

NOTES

1. ALL DIMENSIONS ARE IN mm.
2. MATERIAL :MILD STEEL AS PER IS-2062
3. FINISH : HOT DIP GALVANISED AS PER IS:2629
4. TOLERANCE ON THICKNESS AS PER IS:1852
5. ALL FABRICATION TOLERANCE AS PER RELEVANT IS.
6. ZINC COATING SHALL BE MIN. 75 MICRONS/ 610 G/SQ. M.

TITLE: TYPICAL DETAILS FOR CABLE TRAY SUPPORT SYSTEM	BHEL DRAWING NO. PE-DG-999-507-E007	
	REV. 0	SH 12 OF 12

ANNEXURE-4

TYPICAL DETAILS OF TYPE TEST PROCEDURE/ TEST ARRANGEMENT

REVISIONS				
		NAME	DATE	

TITLE:	TYPICAL DETAILS OF TYPE TEST ARRANGEMENT	DRAWN	NAME	DATE
		DSGN		
DRG. NO.	PE-DG-999-507-E114	CHKD		
		APPD		

BHARAT HEAVY ELECTRICALS LTD.
PROJECT ENGINEERING MANAGEMENT
NOIDA

SH 1 OF 10

TYPE TEST PROCEDURE FOR CABLE TRAY SUPPORT SYSTEM [BOLTABLE TYPE]

1.0 Type tests on Support System for Cable Trays

1.1 **TEST 1 A**

On main support channel type-DC1 for cantilever arms fixed on one side only. A 3.5 metre length of main support channel shall be fixed vertically at each end to a rigid structure as per the fixing arrangement as shown in the enclosed drawing PE-DG-999-507-E114 (Sheet 05 of 10). Eight (8) nos. 750/650 mm cantilever arms shall be fixed to the main channel and arm 1 & 2 of shall be uniformly loaded to a working load of 100 kg over the outboard 600mm. Subsequently a point load of 100 kg shall be applied on arm 2. A uniform proof load on all the arms equal to twice the working load shall be then be applied. Deflections shall be measured at the points shown in the enclosed drawings and at the following load intervals:

i) Working load
ii) Working load + point load
iii) Off load
iv) Proof load + point load
v) Off load

The deflection measured at working loads shall not exceed 16mm. The permanent deflection after removing the combination of working load and point load shall not exceed 10 mm at the arm tips and 6 mm on the channel. No collapse of the structure shall occur with a combination of proof load and point load applied.

1.2 **TEST 1 B**

Test 1 A shall be repeated with Eight Cantilever arms uniformly loaded and with the same point load on arm 2.

2.0 TEST 2

On Main support channel type – DC1 for cantilever arms fixed on both sides

2.1 **TEST 2 A**

A 3.5 m length of main support channel DC1 for cantilever arms fixing on both sides shall be fixed at each end to rigid structure as per the fixing arrangement as shown in the enclosed drawing PE-DG-999-507-E114(Sheet 06 of 10). Six (6) nos. 750/650 mm cantilever arms shall be attached to each sides and each arm uniformly loaded to a working load of 100 kg over the outboard 600 mm. A point load of 100 kg shall then be applied to arm 2, followed by a uniform proof load of twice the working load on all the arms, deflection shall be measured at points shown in the enclosed drawings at the following load intervals.

i) Working load

ii) Working load + point load

iii) Offload

iv) Proof load + point load

v) Offload

The deflection measured at working loads shall not exceed 16mm. The permanent deflection after removing the combination of working load and point load shall not exceed 10 mm at the arm tips and 6 mm on the channel. No collapse of the structure shall occur with a combination of proof load and point load applied.

2.2 **TEST 2 B**

Test 2 A shall be repeated with the assembly but with an asymmetrical load on the DC1 column and point load applied to arm 8 as shown in the enclosed drawing PE-DG-999-507-E114 (Sheet 07 of 10). The 100 kg and 200 kg uniformly distributed loads shall be applied to the upper three arms on one side and the lower three arms on the opposite side.

3.0 TEST 3

Tests on Channel Fixed on Beam/Floor
A length of main support channel section shall be fixed to steel structure/ floor and have loads applied as shown in the drawing no. PE-DG-999-507-E114 (sheet 08 of 10) enclosed and as detailed below:

3.1 **TEST 3 A**

A length of steel structure shall be rigidly supported. It should be fitted on a metre length of channel section using beam clamps welded/bolted. A point load of 1200 kg shall be applied to the centre point via two brackets. No distortion or pulling of the components shall take place.

3.2 **TEST 3 B**

With the components assembled in Test 3A, two perpendicular point loads of 600 kg shall be simultaneously applied at positions 150 mm either side of the centre line, no distortion or pulling of the components shall take place.

3.3 **TEST 3 C**

With the components assembled as in Test 3 A, a perpendicular point load of shall be applied at a point 150 mm on one side of the centre line.

The load shall be gradually increased to the maximum value that can be applied without causing distortion or pulling of the components. This value shall be recorded.

4.0 TEST 4: CHANNEL INSERT (If applicable)

2.5 metre of SC1 Channel fixed to the concrete wall / steel structure as per actual site installation conditions. 6 nos. of 750/650 mm cantilever arms shall be fixed to the SC1 Channel as shown in enclosed drawing PE-DG-999-507-E114 (sheet 09 of 10). Each arm uniformly loaded to a working load of 100 kg over the out board 600 mm. A point load of 100 kg shall then be applied to arm 2, followed by a uniform proof load of twice the working load on all the arms; deflection shall be measured at points shown in the enclosed drawing at the following load intervals:

i) Working load
ii) Working load + point load
iii) Offload
iv) Proof load + point load
v) Offload

The deflection measured at working loads shall not exceed 16mm. The permanent deflection after removing the combination of working load and point load shall not exceed 10 mm at the arm tips and 6 mm on the channel. No collapse of the structure shall occur with a combination of proof load and point load applied.

5.0 TEST 5:

Channel nut slip characteristics (If applicable)

TEST 5 A1, 5 A2, and 5 A3:
A length of channel SC1 section 200 mm long shall have fitted brackets with the two bolts fixing as shown in enclosed drawing PE-DG-999-507-E114 (sheet 10 of 10).
With loads applied at the position shown in drawing enclosed nut slip shall be determined with bolt torque of 30 NM, 50 NM and 65 NM. No fewer than three measurements shall be made for each torque setting.

A minimum loading of 720 kg shall be obtained before nut slip with bolt torque of 65 NM.

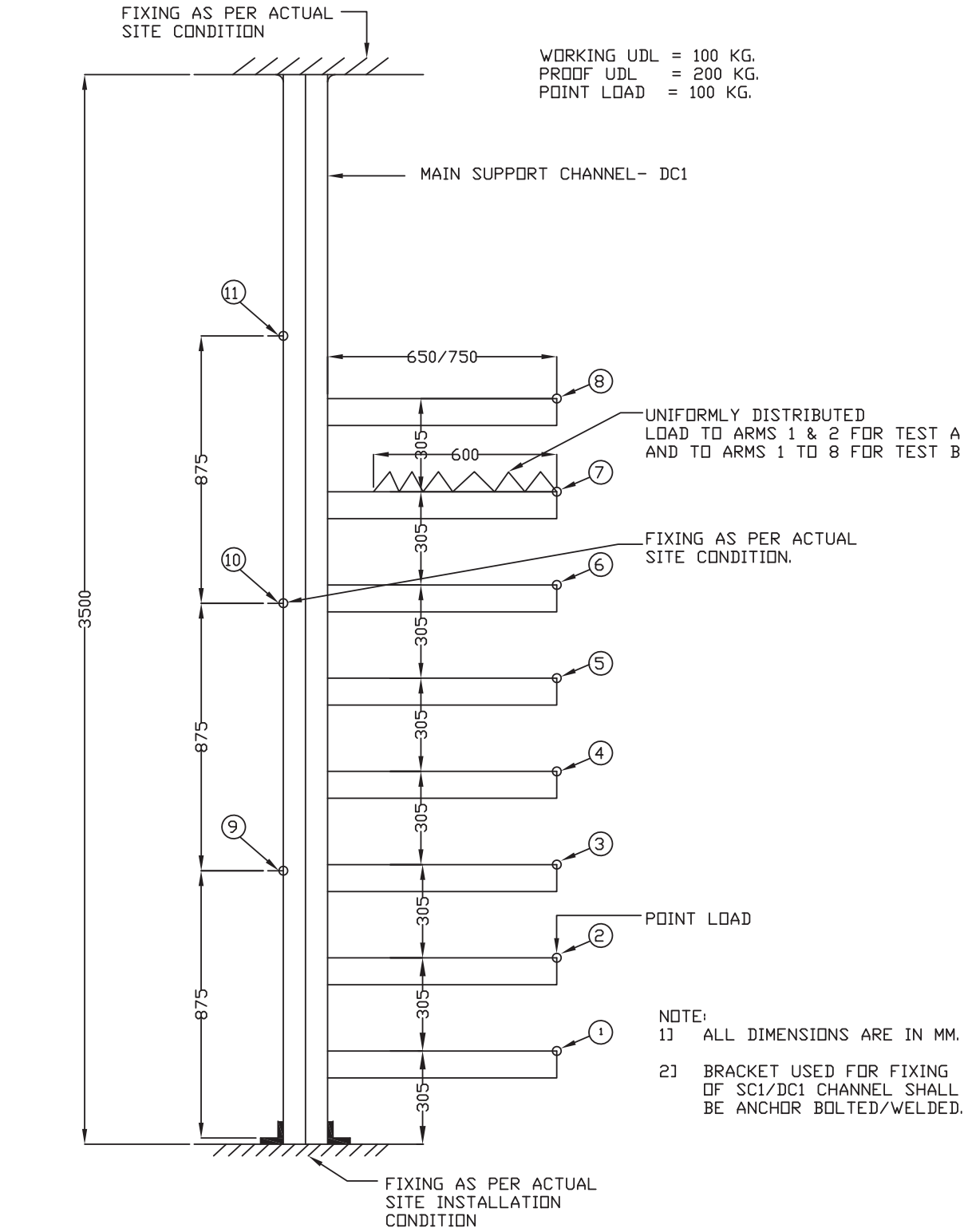
TEST 5 B1, 5 B2, and 5 B3:
The length of channel SC1 section 200 mm long shall have fitted bracket with the one bolt fixing as shown in enclosed drawing PE-DG-999-507-E114 (sheet 10 of 10).
With loads applied at the position shown in drawing enclosed nut slip shall be determined with bolt torque of 30 NM, 50 NM and 65 NM. No fewer than three measurements shall be made for each torque setting.

A minimum loading of 350 kg shall be obtained before nut slip with a bolt torque of 65 NM.

6.0 TEST 6:

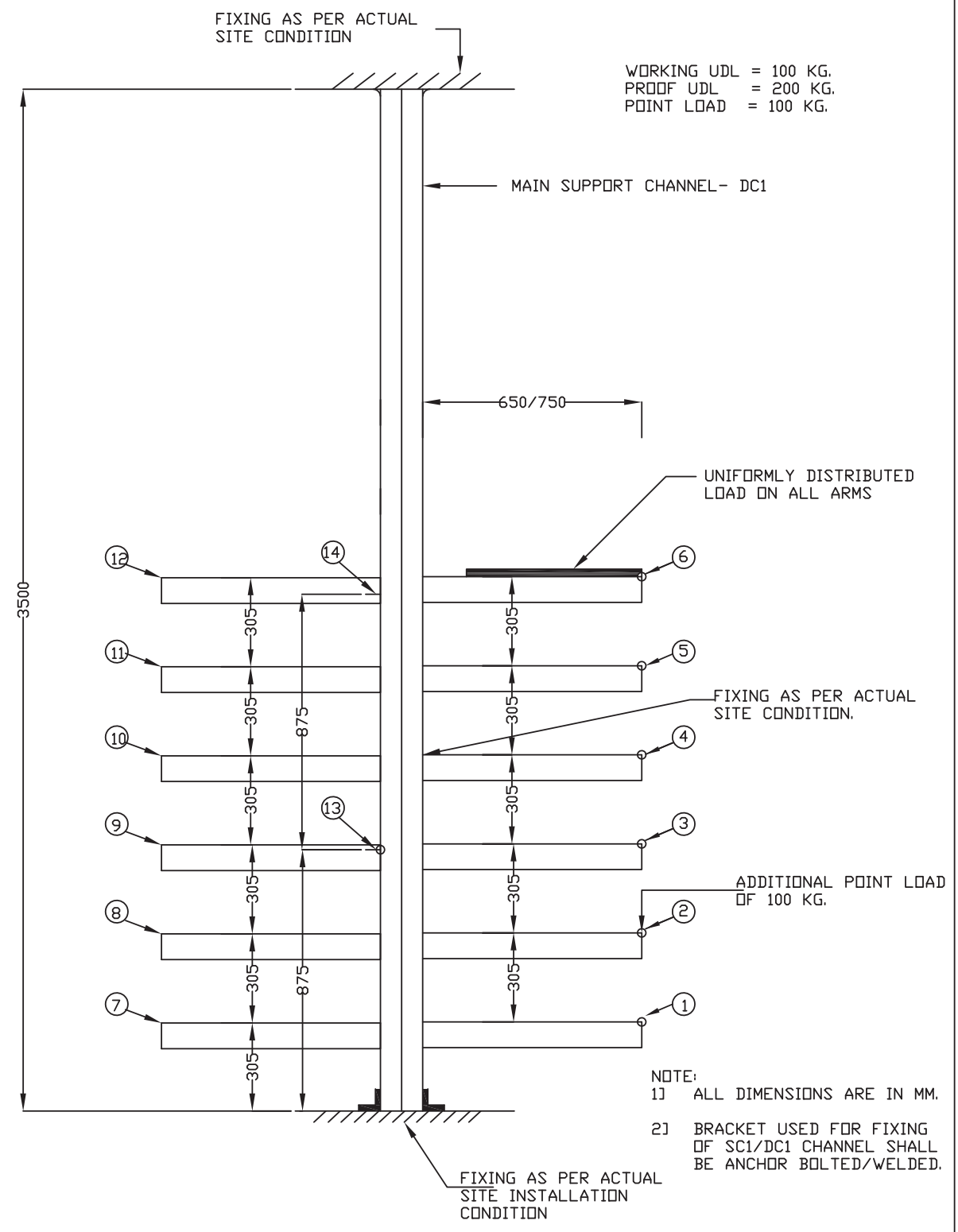
Weld Integrity Test

After the deflection test as per test 1A, 1B, 2A, 2B and 4 above weld integrity shall be checked by magnetic particle inspection to detect sub- surface cracks developed, if any.



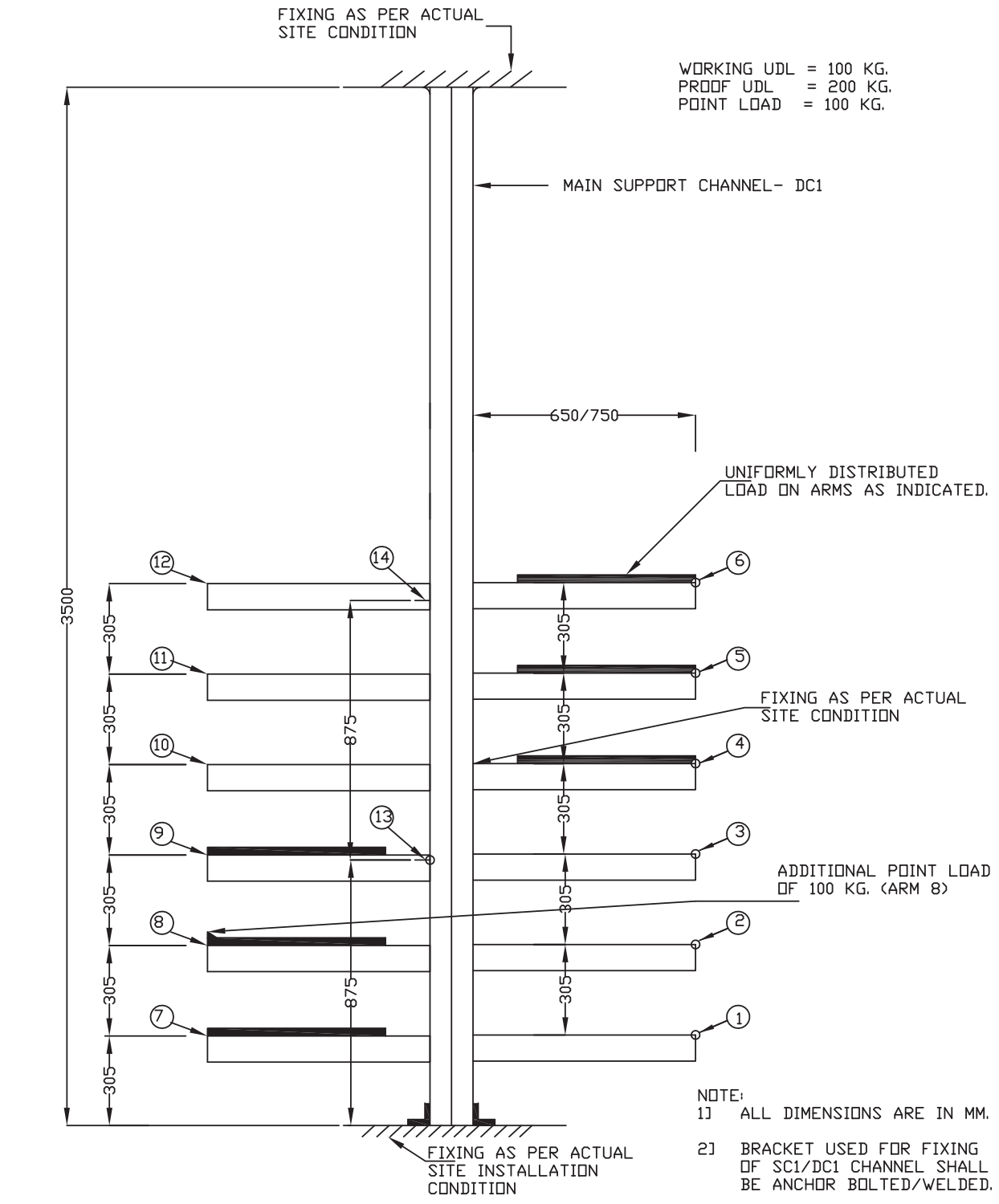
TEST : 1A & 1B: MAIN SUPPORT CHANNEL (CANTILEVER ARM ON ONE SIDE)

भेल BHEL	TITLE: TYPICAL DETAILS OF TYPE TEST ARRANGEMENT	DRG. NO. PE-DG-999-507-E114
		SH 5 OF 10



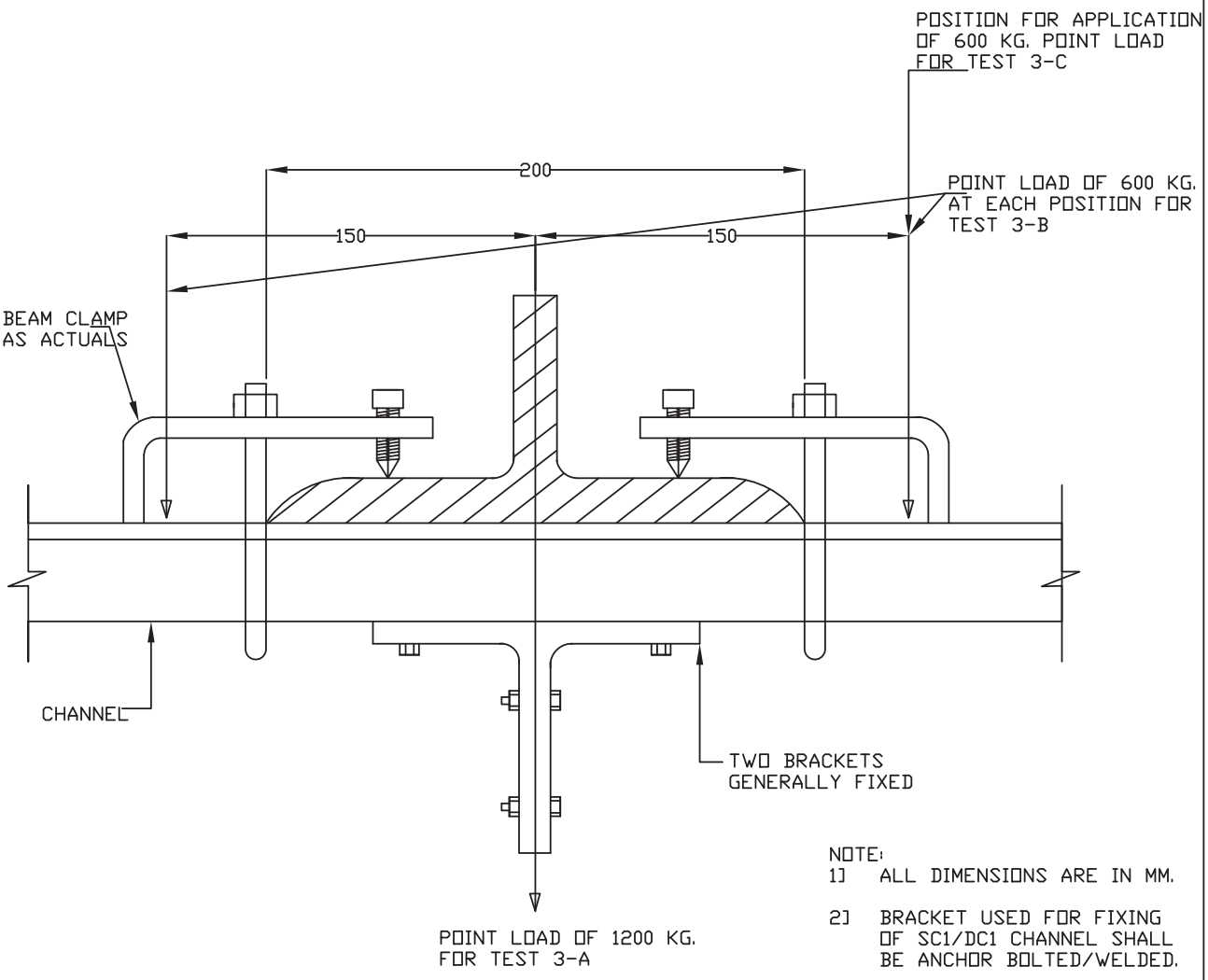
TEST : 2A: MAIN SUPPORT CHANNEL (CANTILEVER ARM ON BOTH SIDES)

BHEL	TITLE: TYPICAL DETAILS OF TYPE TEST ARRANGEMENT	DRG. NO. PE-DG-999-507-E114
		SH 6 OF 10



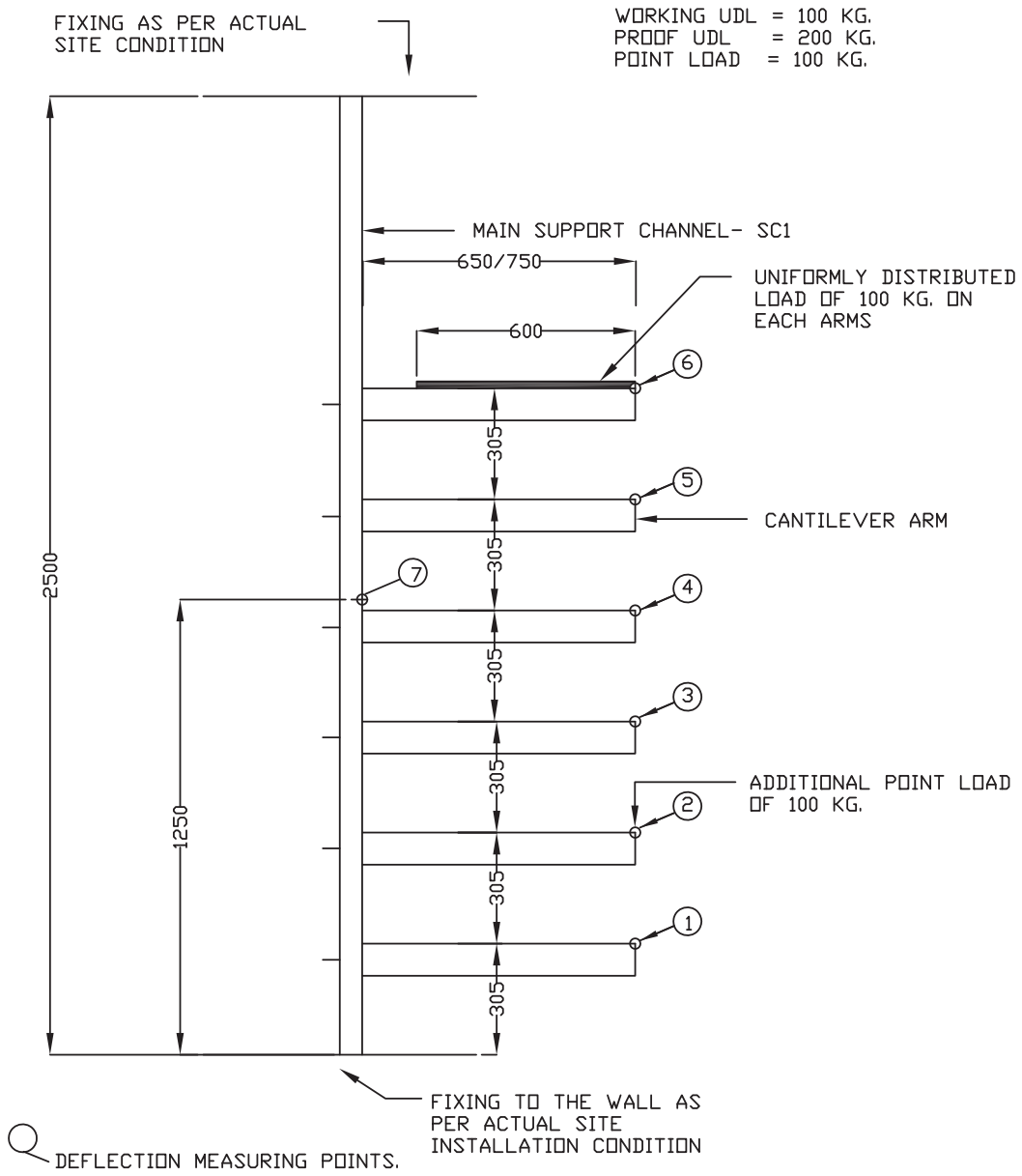
TEST : 2B: MAIN SUPPORT CHANNEL (ASYMMETRIC LOADING)

BHEL	TITLE: TYPICAL DETAILS OF TYPE TEST ARRANGEMENT	DRG. NO. PE-DG-999-507-E114
		SH 7 OF 10



TEST : 3A, 3B, 3C: CHANNEL FIXED ON BEAM/FLOOR.

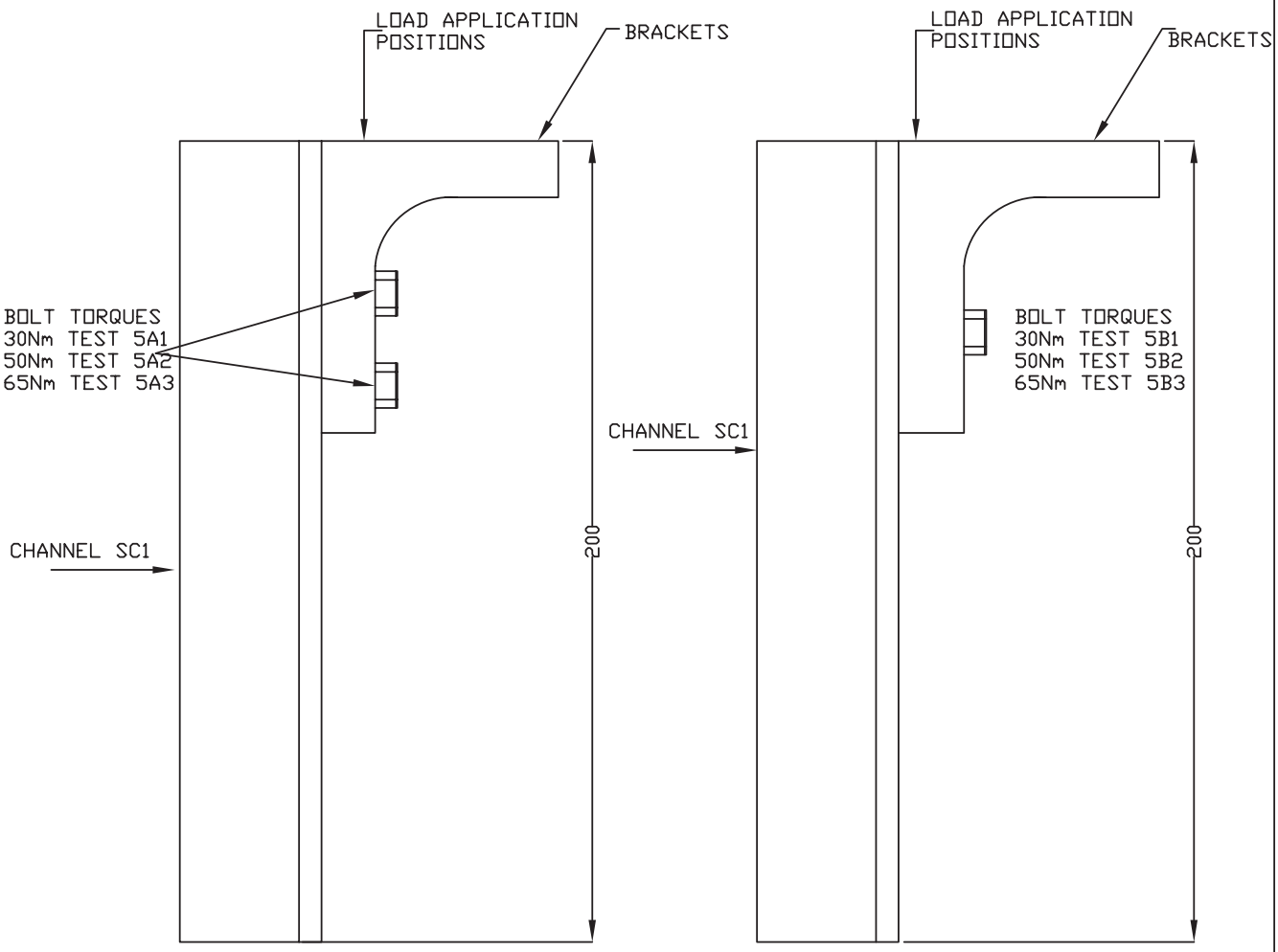
BHEL	TITLE: TYPICAL DETAILS OF TYPE TEST ARRANGEMENT	DRG. NO. PE-DG-999-507-E114
		SH 8 OF 10



NOTE:
1] ALL DIMENSIONS ARE IN MM.

TEST : 4: CHANNEL INSERT

BHEL	TITLE: TYPICAL DETAILS OF TYPE TEST ARRANGEMENT	DRG. NO. PE-DG-999-507-E114
		SH 9 OF 10



ASSEMBLY USING M12 X 25MM LONG HEX. HD. SCREWS LOCK WASHER AND M12 CHANNEL NUT WITH SPRING

TEST : 5A1, 5A2, 5A3:
CHANNEL NUT SLIP CHARACTERISTIC

ASSEMBLY USING M12 X 25MM LONG HEX. HD. SCREWS LOCK WASHER AND M12 CHANNEL NUT WITH SPRING

TEST : 5B1, 5B2, 5B3:
CHANNEL NUT SLIP CHARACTERISTIC

NOTE:
1) ALL DIMENSIONS ARE IN MM.

भेल BHEL	TITLE: TYPICAL DETAILS OF TYPE TEST ARRANGEMENT	DRG. NO. PE-DG-999-507-E114
		SH 10 OF 10

BHEL	**Price Variation Formulae**	**ANNEXURE-C**

Prices shall be variable as per following PVC formulae: -

Cable tray Support System-Boltable	
P = Po/100 (20 + 58 (SBIR/SBIRo) + 7 (Zn/Zno) +15 (W/ Wo))	Indices to be taken from IEEMA Circular (IEEMA(PVC)/TLA&H(R-3)/_/_) for the applicable month.

Wherein,

P = Price payable as adjusted in accordance with the above formula.

Po = Price quoted/confirmed.

SBIRo = Price of Steel Billets- Retail (refer notes)
This price is as applicable on the 1st working day of the month, one month prior to the date of tendering.

Zno = Price of Electrolytic high grade zinc (refer notes)
This price is as applicable on the 1st working day of the month, one month prior to the date of tendering.

Wo = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2016 = 100) (Refer notes)
This index number is as applicable on the first working day of the month, **three months** prior to the date of tendering.

SBIR = Price of Steel Billets-Retail (refer notes)
This price is as applicable on the 1st working day of the month, two 'months prior to the date of delivery.

Zn = Price of Electrolytic high grade zinc (refer notes)
This price is as applicable on the 1st working day of the month, two months prior to the date of delivery.

W = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2016 = 100) (refer notes)
This index number is as applicable on the first working day of the month, **four months** prior to the date of delivery.

The date of delivery is the date on which materials are notified as being ready for inspection/dispatch (in the absence of such notification, the date of manufacturer's dispatch note is to be considered as the date of delivery) or the contracted delivery date (including any agreed extension thereto), whichever is earlier.

	Price Variation Formulae	**ANNEXURE-C**

Notes:

(a) All prices of raw materials are exclusive of modvatable excise/CV duty amount and exclusive of any other central, state or local taxes; octroi etc.

(b) All prices are as on first working day of the month.

(c) PVC ceiling limit shall be positive (+ve) 20% and negative (-ve) unlimited.

CORPORATE QUALITY ASSURANCE/ कॉरपोरेट गुणवत्ता आश्वासन

SUB-VENDOR QUESTIONNAIRE/ सब-वेंडर प्रश्नावली

i.	***Item/Scope of Sub-contracting*** **उप-संविदा(अनुबंध) का मद/ दायरा**			
ii.	***Address of the registered office*** पंजीकृत कार्यालय का पता		***Details of Contact Person*** संपर्क व्यक्ति का विवरण ***(Name, Designation, Mobile, Email)*** (नाम, पदनाम, मोबाइल, ईमेल)	
iii.	***Name and Address of the proposed Sub-vendor's works where item is being manufactured*** प्रस्तावित उप-विक्रेता के कार्यों का नाम और पता, जहां मद का निर्माण किया जा रहा है		***Details of Contact Person:*** संपर्क व्यक्ति का विवरण ***(Name, Designation, Mobile, Email)*** (नाम, पदनाम, मोबाइल, ईमेल)	
iv.	***Annual Production Capacity for proposed item/scope of sub-contracting*** **उप-संविदा(अनुबंध)** के प्रस्तावित मद / दायरे के लिए वार्षिक उत्पादन क्षमता			
v.	***Annual production for last 3 years for proposed item/scope of sub-contracting*** **उप-संविदा(अनुबंध)** के प्रस्तावित मद / दायरे के लिए पिछले 3 वर्षों का वार्षिक उत्पादन			
vi.	***Details of proposed works*** **प्रस्तावित कार्यों का विवरण**			
1.	***Year of establishment of present works*** वर्तमान फैक्टरी की स्थापना का वर्ष			
2.	***Year of commencement of manufacturing at above works*** उपरोक्त फैक्टरी में निर्माण कार्य शुरू होने का वर्ष			
3.	***Details of change in Works address in past (if any*** पूर्व में फैक्टरी स्थल में परिवर्तन का विवरण (यदि कोई हो)***)***			
4.	***Total Area*** कुल क्षेत्र			
	Covered Area शामिल क्षेत्र			
5.	***Factory Registration Certificate*** फैक्टरी पंजीकरण प्रमाण पत्र		***Details attached at Annexure – F2.1*** विवरण अनुलग्नक- एफ 2.1 पर संलग्न है	
6.	***Design/ Research & development set-up*** डिजाइन / अनुसंधान और विकास सेटअप ***(No. of manpower, their qualification, machines & tools employed etc.)*** (श्रमिकों की		***Applicable / Not applicable if manufacturing is as per Main Contractor/purchaser design)*** ***Details attached at Annexure – F2.2***	

	संख्या, उनकी योग्यता, मशीन और उपलब्ध उपकरण आदि)	***(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.	***Overall organization Chart with Manpower Details (Design/Manufacturing/Quality etc)*** मैनपावर विवरण के साथ समग्र संगठन का चार्ट(डिजाइन / विनिर्माण / गुणवत्ता आदि)	***Details attached at Annexure – F2.3*** विवरण अनुलग्नक – F2.3 में संलग्न है।
8.	***After sales service set up in India, in case of foreign sub-vendor(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)	***Applicable / Not applicable*** लागू / लागू नहीं ***Details attached at Annexure – F2.4*** विवरण अनुलग्नक -2.4 पर संलग्न है।
9.	***Manufacturing process execution plan with flow chart 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,	***Details attached at Annexure – F2.5*** विवरण अनुलग्नक - F2.5में संलग्न है।
10.	***Sources of Raw Material/Major Bought Out Item*** कच्चे माल के स्रोत / खरीदे हुए मुख्य मद	***Details attached at Annexure – F2.6*** विवरण अनुलग्नक - F2.6में संलग्न है।
11.	***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	***Details attached at Annexure – F2.7*** विवरण अनुलग्नक - F2.7 पर संलग्न है
12.	***Manufacturing facilities (List of machines, special process facilities, material handling etc.)*** विनिर्माण सुविधा(मशीनों की सूची , विशेष प्रक्रिया सुविधाएं, सामग्री रख-रखाव आदि)	***Details attached at Annexure – F2.8*** विवरण अनुलग्नक - F2.8में संलग्न है।
13.	***Testing facilities (List of testing equipment)*** परीक्षण सुविधाएं(परीक्षण उपकरण की सूची)	***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-	***Applicable / Not applicable*** लागू / लागू नहीं ***Details attached at Annexure – F2.10*** विवरण अनुलग्नक - F2.10में संलग्न है।
	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	***(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 करवाएं 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 फ़ीडबैक	***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 - F2.14में 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

एनटीपीसी NTPC	**CORPORATE QUALITY ASSURANCE/ कॉरपोरेट गुणवत्ता आश्वासन** **SUB-VENDOR QUESTIONNAIRE/ सब-वेंडर प्रश्नावली**

Name: ***नाम:***		***Desig:*** ***पदः***		***Sign:*** ***हस्ताक्षर:***		***Date:*** ***तिथि :***	

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