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ORISSA POWER GENERATION COMPANY LIMITED
2x660 MW IB TPP BANHARPALLI UNITS 3 & 4

VOLUME – IIB

TECHNICAL SPECIFICATION
FOR

CABLE TRAY SUPPORT SYSTEM
(BOLTABLE TYPE)

SPECIFICATION NO : *PE-TS-391-507-E013*
REVISION : *0*

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

	DOCUMENT TITLE	SPECIFICATION NO. PE-TS- 391-507-E013	
BHEL	**TECHNICAL SPECIFICATION FOR CABLE TRAY SUPPORT SYSTEM (BOLTABLE TYPE)**	VOLUME II B	
		SECTION ---	
		REVISION 0	DATE: 24.09.2014
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IT IS CONFIRMED THAT OUR TECHNICAL OFFER COMPLIES WITH THE SPECIFICATION IN TOTO & THAT THERE ARE NO TECHNICAL DEVIATIONS.

BIDDER'S STAMP & SIGNATURE

	DOCUMENT TITLE	SPECIFICATION NO. PE-TS- 391-507-E013	
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INSTRUCTIONS TO BIDDERS FOR PREPARING TECHNICAL OFFERS

1. Two signed and stamped copies of the following shall be furnished by all bidders as technical offer :

    a. Unpriced Price Schedule (Annexure-I: BOQ, as enclosed with the specification).
    b. A copy of this sheet ("Instructions to Bidders for Preparing Technical Offer").
    c. A copy of previous sheet ("Contents").

2. No other technical submittal such as copies of type test certificates, data Sheets, write-up, drawing, technical literature, etc. is required during tender stage. Any such submission, even if made, shall not be considered as part of offer.

3. No comments/ additions/ deletions shall be made by the bidder on the signed & stamped copy of the specification. Any such changes made by the bidder shall not be considered.

4. Confirmations/ comments (if any) regarding delivery schedules shall be furnished as part of the commercial offer. Any reference elsewhere/ covering letter of technical offer shall not be considered by BHEL.

5. 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.

6. Any changes made by the bidder in the price schedule with respect to the item description/ quantities, notes etc. from those given in Annexure-I of specification [Bill Of Quantities] shall not be considered (i.e., technical description, quantities, notes etc. as per specification shall prevail).

BIDDER'S STAMP & SIGNATURE

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PREAMBLE

1.0 The tender document contains two (2) volumes. The bidder shall meet the requirements of all the two volumes.

1.1 **Volume-I (CONDITIONS OF CONTRACT)**

This consists of four parts as below:-

Volume-IA	:	This part contains instructions to bidders for making bids to BHEL.
Volume-IB	:	This part contains general commercial conditions of the tender & includes provision that vendor is responsible for the quality of item supplied by their sub-vendors.
Volume-IC	:	This part contains special conditions of contract.
Volume-ID	:	This part contains commercial conditions for erection & commissioning site work, as applicable.

1.2 **Volume-II TECHNICAL SPECIFICATIONS**

Technical requirements are stipulated in Volume-II which comprises of :-

Volume-IIA	:	General Technical Conditions
Volume-IIB	:	Technical Specification including Drawings, if any.

1.2.1 **Volume-IIB**

This volume is sub-divided into following sections:-

Section-A	:	This section outlines the scope of enquiry.
Section-B	:	This section provides "Project Information".
Section-C	:	This section indicates technical requirements specific to the contract, not covered in Section-D.
Section-D	:	This section comprises of technical specifications of equipments complete with data sheet A.

Data Sheet - A specifies data and other requirements pertaining to the Equipment.

2.0 The requirements mentioned in Section-C / Data Sheets-A of section-D shall prevail and govern in case of conflict between the same and the corresponding requirements mentioned in the descriptive portion in Section-D.

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SECTION – 'A'
SCOPE OF ENQUIRY

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SCOPE OF ENQUIRY

1.0 This specification covers the Design, Manufacture, Inspection and Testing at Manufacturer's works, proper packing and delivery to site of **CABLE TRAY SUPPORT SYSTEM** (BOLTABLE TYPE) as mentioned in different sections of this specification for 2X660MW IB TPP of OPGCL at Banharpalli in Orissa.

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

3.0 The general terms and conditions, instructions to bidders and other attachment referred to elsewhere are hereby made part of the tender specification.

4.0 The bidder shall be responsible for and governed by all requirements stipulated hereinafter.

5.0 Deviations if any should be brought out very clearly on deviation sheet. Otherwise it will be presumed that the bidder's offer is in line with what has been stated/ asked for in this specification.

6.0 The documents shall be in English Language and MKS system of units.

बीएचईएल BHEL	TITLE : **TECHNICAL SPECIFICATION FOR CABLE TRAY SUPPORT SYSTEM (BOLTABLE TYPE)**	SPECIFICATION NO. PE-TS-XXX-509-E013 VOLUME NO. : II-B SECTION : B REV NO. : 0 DATE : SHEET : OF

SECTION – 'B'
PROJECT INFORMATION

TITLE

PROJECT INFORMATION - ELECTRICAL DATA

2 X660MW IB THERMAL POWER STATION, BANHARPALLI

Ambient temperature for Design of electrical equipment in non-air conditioned area	:	50°C
Ambient temperature for Design of electrical equipment in air-conditioned area	:	PEM(MAUX) /EDN, B'lore to furnish.
Relative humidity for design of electrical equipment	:	87%
AC Voltage Level For Aux Power Distribution	:	11 KV, 3 phase, 3 wire 3.3 KV, 3 phase, 3 wire 415 V, 3 phase, 4 wire
Rated frequency	:	50 Hz.
Voltage & Frequency variation	:	All equipment shall be suitable for Voltage variation of ± 10 %, frequency variation of (+) 3% to (-) 5% and 10% combined variation (sum of absolute values) of voltage and frequency.

The voltage level for motor shall be as follows:

• Above 1500 KW	:	11 KV
• Above 200 KW & upto 1500 KW	:	3.3 KV
• Upto 200 KW	:	415 V

AC control voltage	:	240 V, 1ph, 50 HZ
UPS Voltage	:	240 V, 1ph, 50 Hz
DC Voltage for motor, protection, control and emergency lighting	:	220 V
DC Voltage for control & instrumentation	:	24 V
AC Voltage for lighting, Space heating	:	240 V, 1ph, 50 Hz
AC emergency supply	:	415V; 3 Ph; 3 wire
DC Voltage variation	:	187 V - 242 V for 220 V DC

	TITLE	
	PROJECT INFORMATION - ELECTRICAL DATA	
	2 X660MW IB THERMAL POWER STATION, BANHARPALLI	

Fault levels:

400KV System	:	50 kA
11KV System	:	40 kA
3.3KV System	:	40 kA
415V System	:	50 kA
220V DC System	:	25 kA

Grounding:

a).	400KV System	:	Solidly grounded
b).	Generator	:	High resistance grounded through distribution Transformer, transformer secondary loaded with resistor.
c).	11KV System	:	Low Resistance Grounded with Earth-Fault Current limited to 300A
d).	3.3KV System	:	Low Resistance Grounded with Earth-Fault Current limited to 300A
e).	415V System	:	Solidly grounded
f).	220V DC System	:	Ungrounded
g).	Diesel Generator	:	Ungrounded

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SECTION – 'C'
SPECIFIC TECHNICAL REQUIREMENTS

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1.0 SCOPE OF ENQUIRY:

1.1 This enquiry covers the supply of Galvanised sheet steel structural members for BOLTABLE type cable tray support system as per requirement of this specification.

1.2 General technical requirements of Cable tray support system (Boltable type) Materials are indicated in Section-D. Project specific technical/ quality requirements / changes are listed in Section-C & Data Sheet-A.

1.3 The stipulations of Section-C, followed by those of Data Sheet – A shall prevail in case of any conflict between the stipulations of Section-C, Data sheet – A & Section-D.

2.0 BILL OF QUANTITIES:

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

3.0 SPECIFIC TECHNICAL REQUIREMENTS:

3.1 Technical:

S. No.	*Reference clause No. of Section D (if any)*	*Specific Requirement/ Change*

3.2 Quality/ Inspection:

S. No.	*Reference clause No. of Section D (if any)*	*Specific Requirement/ Change*

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ANNEXURE-I

BOQ CUM PRICE SCHEDULE

Item No.	Item Code	Item Description	Unit	Order Quantity	Lot-I Quantity	Unit Price (Ex-Works) Rs.	Total Price (Ex-Works) Rs.
1.0	**507-34016-A**	**SINGLE CHANNEL SC1** (IN STANDARD LENGTH OF 6M PER PIECE)	Metres	26000	18200		
2.0	**507-34012-A**	**DOUBLE CHANNEL DC1** (IN STANDARD LENGTH OF 6M PER PIECE)	Metres	1000	700		
3.0		**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	**507-34009-A**	Cantilever arm for 600mm wide cable trays	Nos.	42500	29750		
3.2	**507-34008-A**	Cantilever arm for 450mm wide cable trays	Nos.	3400	2380		
3.3	**507-34007-A**	Cantilever arm for 300mm wide cable trays	Nos.	7700	5390		
3.4	**507-34006-A**	Cantilever arm for 150mm wide cable trays	Nos.	12500	8750		
4.0		**CLAMPS AND FITTINGS** COMPLETE WITH REQUIRED HARDWARES (Spring nuts/ washers etc. as required for complete installation)					
4.1	**507-34001-A**	90° ANGLE FITTING HL1	Nos.	7000	4900		
4.2	**507-34010-A**	CLAMP FOR SINGLE CHANNEL CC1	Nos.	15000	10500		
4.3	**507-34011-A**	CLAMP FOR DOUBLE CHANNEL CC2	Nos.	500	350		
4.4	**507-34004-A**	BASE PLATE FOR SINGLE CHANNEL BP1	Nos.	4000	2800		
4.5	**507-34003-A**	BASE PLATE FOR DOUBLE CHANNEL BP2	Nos.	500	350		
4.6	**507-34005-A**	BEAM CLAMP BC1	Nos.	5000	3500		
4.7	**507-34021-A**	TRAY FIXING CLAMP TC1	Nos.	500	350		
4.8	**507-34014-A**	FLAT PLATE STRAIGHT FITTING PF2	Nos.	500	350		
4.9	**507-34015-A**	FLAT PLATE TEE FITTING PF1	Nos.	500	350		
4.10	**507-34002-A**	90° ANGLE FITTING LA1	Nos.	10000	7000		

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Notes:

1. The quantities will be released for manufacture in more than one lot. Lot-I quantities, which are indicated above, shall be released for manufacture along with LOI.

2. Manufacturing of Lot-I quantities shall be done after the approval of technical and quality documentation, and supply of same shall be completed within four months of date of approval of documents.

3. Subsequent lots shall be cleared for manufacture based on progress of engineering and site requirements. A lead-time of three months shall be given for completion of supply of each lot from the date of clearance of the quantities.

4. The total quantity variation shall be limited to -30 to +30 % of the total contract value derived on the basis of the Order Quantity.

5. Raw materials:- Steel shall be procured from SAIL/ TISCO / RINL/ ISPAT IND/ JINDAL/ ESSAR/ BHUSHAN STEEL/ authorized re-rollers of SAIL.

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ANNEXURE – II

LIST OF DRAWINGS / DOCUMENTS

(REQUIRED TO BE FURNISHED BY SUCCESSFUL BIDDER AFTER AWARD OF CONTRACT)

Sl. No.	Drawings/Document Description	Drawings / Document Number	Submission date by vendor
a)	Technical Data Sheet	PE-V0-391-507-E051	Within one week of award of contract
b)	GA Drg of cable tray supports (Boltable type)	PE-V0-391-507-E052	Within one week of award of contract
c)	Type test procedure including Typical details of type test arrangement	PE-V0-391-507-E053	Within one week of award of contract
d)	Type test certificates	PE-V0-391-507-E054	Within one week of award of contract
e)	Quality Plan	PE-V0-391-507-E908	Within one week of award of contract

Note:-

It may please be noted that successful bidder is not to make any fresh submittals at contract stage w.r.t. above mentioned drawings/documents. Data Sheet, Standard Quality Plan & Type test procedure as enclosed in the technical specification is to be appended with cover sheet bearing drawing/document number & description as stated above. The signed & stamped copy for the same shall be submitted by successful bidder to BHEL within one week of award of contract without making any changes in the contents of the drawing/document.

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ANNEXURE – III

DRAWING AND DOCUMENTS FOR SUBMISSION

S.N.	Drawings and documents	Soft and Hard Prints
1.0	***DRAWING FOR APPROVAL***	
1.1	For approval	Soft+2 Hard Print
1.2	For customer approval	Soft+2 Hard Print
1.3	For final distribution	Soft+2 CD +5 Hard Print
2.0	DRAWING FOR REFERENCE	
2.1	For reference	Soft+2 Hard Print
2.2	For final distribution	Soft+2 CD+5 Hard Print
3.0	CERTIFICATE, REPORTS ETC.	Soft+2 Hard Print
4.0	AS BUILT DRAWINGS (IF REQUIRED)	Soft+2 CD+8 Hard Print
5.0	O&M MANUAL	
5.1	Draft for approval	Soft +3 CD+ 5 Hard Print
5.2	For final distribution	Soft +3 CD + 8 Hard Print
6.0	QUALITY PLAN / Field quality plan / PG test	Soft + 2 Hard Print

SECTION – 'D'

STANDARD TECHNICAL SPECIFICATION

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1.0 **GENERAL**

This specification covers the design, manufacture, inspection & testing at vendor's works, packing and delivery to site of galvanized cable tray support system (boltable type).

2.0 **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) shall conform to the latest revision of relevant standards and codes of practices as per Annexure-III.

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

3.0 DESIGN REQUIREMENTS AND CONSTRUCTIONAL FEATURES

3.1 Cable Trays Support (boltable type) shall be manufactured as per Technical Data Sheet and as per applicable drawings as enclosed with the 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.

3.2 Standard lengths of SC1/ DC1 channels shall be fabricated out of single piece & it shall not have welded joints in between.

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/ INSPECTION:**

4.1 BHEL's Standard QP (QP NO. PE-QP-999-507-E007 REV 0) is enclosed as per Annexure-II for reference. However, 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 QP approval.

4.2 All materials shall be procured, manufactured, inspected and tested by vendor/ subvendor 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 equipments & 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: -

a) 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 nut slip characteristics (wherever applicable)
f) Weld integrity test
g) 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 (f)" above in line with Type test procedure and drawings attached in Annexure-IV. The final type test procedure shall be subjected to BHEL/customer approval.

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

b) Routine Tests:
(i) Dimension checks

c) Acceptance Test:
(i) Dimension checks
(ii) Tests for galvanizing

6.0 PACKING

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

7.0 DELIVERY

The delivery shall be as per NIT (Notice Inviting Tender).

8.0 DOCUMENTATION

8.1 Documents to be submitted by the bidder along with the bid.
a) A copy of sheet "Contents" with bidder's signature & company stamp
b) A copy of sheet "Instructions to bidders for preparing Technical offer" with bidder's signature & company stamp.
c) Unpriced copy of "Annexure-I (Bill of Quantities)" with bidder's signature & company stamp.

No other documentation is required to be submitted as technical offer. Any information contained in other parts of the offer (e.g. covering letter, annexures, etc.) which is deviating from specification requirements in any way shall not be considered by BHEL as part of offer.

8.2 Documents to be submitted by successful bidder after award of contract shall be as per Annexure-II.

8.3 Vendor drawing/ document schedule for one project shall be as per Annexure-III.

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DATASHEET A
(SPECIFIC TECHNICAL REQUIREMENTS)

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 of zinc coating.
i) IS: 6745 For determining of mass of zinc coating.
j) IS: 1852 For rolling and cutting tolerances of hot rolled steel 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 drawings [PE-DG- 999-507-E013]

3.0 SURFACE TREATMENT:

Galvanizing:

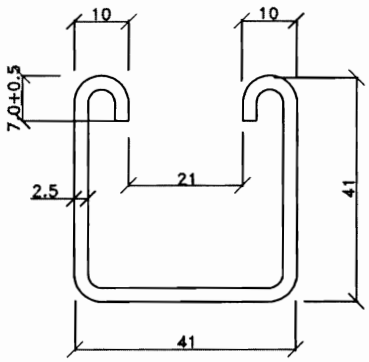
a) Pre-treatment:	As per IS 2629 prior to galvanisation
b) Type	Hot dip galvanization
c) Applicable Standard:	IS 2629
d) Minimum thickness:	75 microns (minimum)
e) Min. weight of Zinc deposit:	610 gms. per square meter
f) Tests for galvanizing:	i) Weight of zinc coating as per IS : 6745 ii) Thickness of zinc coating as per IS : 4759 iii) Uniformity of zinc coating as per IS : 2633 iv) Adhesion as per IS: 2629

TYPICAL DETAILS OF BOLTABLE TYPE CABLE TRAY SUPPORT MATERIAL & ACCESSORIES

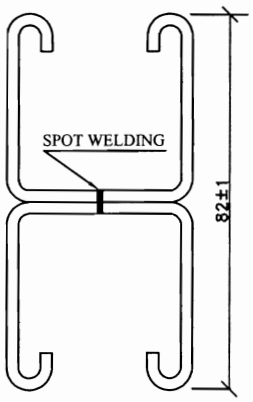
REVISIONS				
		NAME	DATE	

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



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 : HOT/ COLD ROLLED M.S. AS PER RELEVANT IS.
3. FINISH : HOT DIP GALVANISED AS PER IS 2629
4. TOLERANCE ON THICKNESS IS AS PER IS 1852
5. PROFILE TOLERANCE ±0.5 mm

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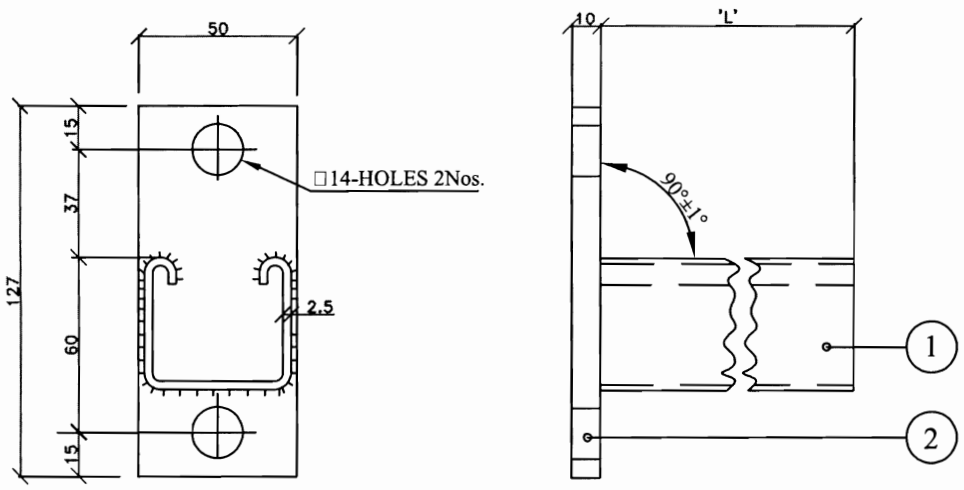
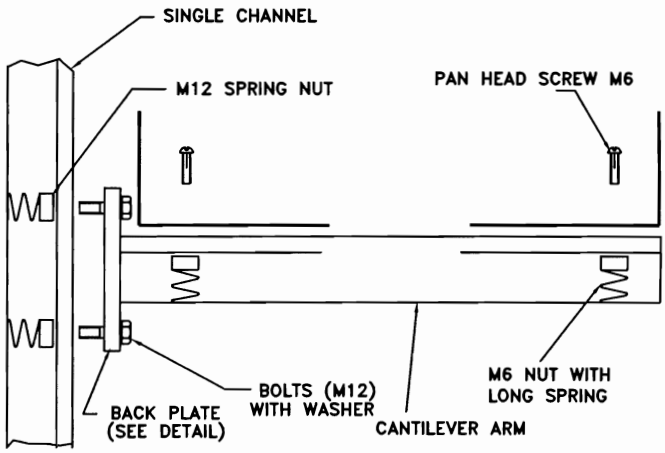


CANTILEVER ARMS

TRAY WIDTH IN MM	CANTILEVER ARM LENGTH (L) IN MM
150	200
300	350
450	500
600	650



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
5. ALL FABRICATION TOLERANCES ARE ± 1.0mm

BOLTEL	**TITLE:** TYPICAL DETAILS OF BOLTABLE TYPE CABLE TRAY SUPPORT MATERIAL & ACCESSORIES	DRG. NO. PE–DG–999–507–E013
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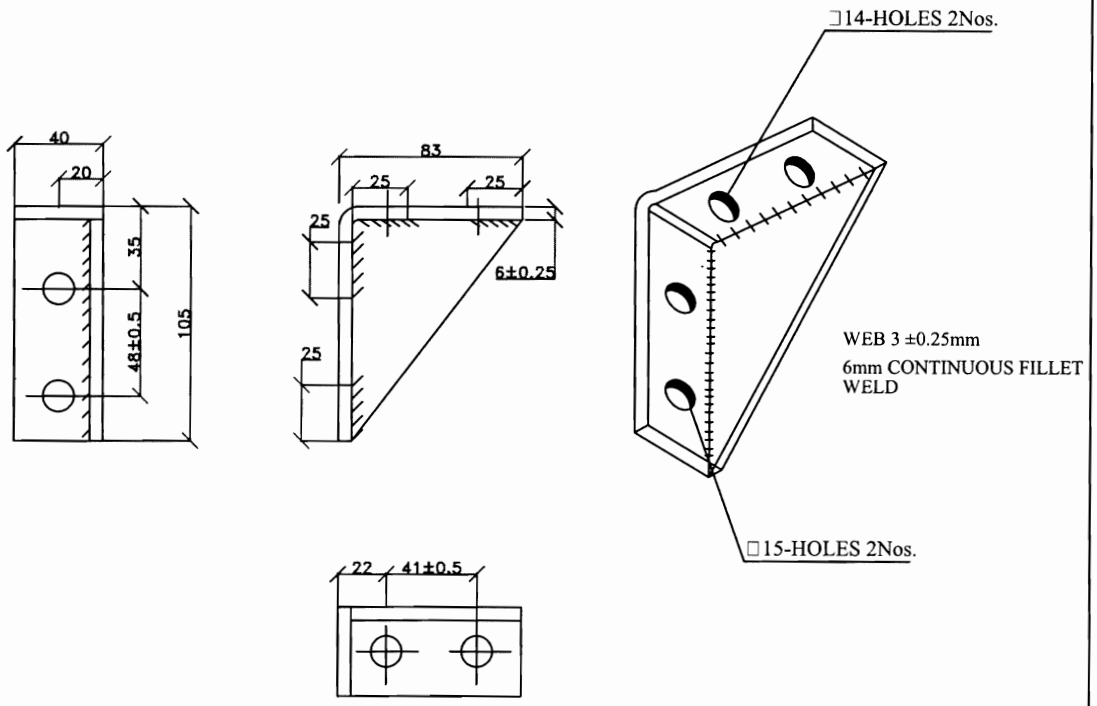


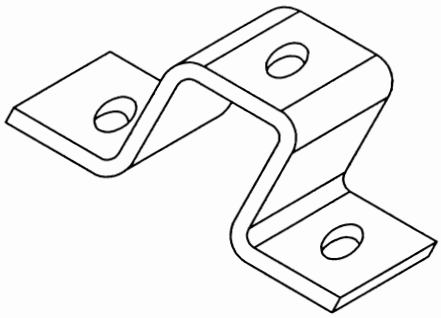
90^0 ANGLE FITTING HL1

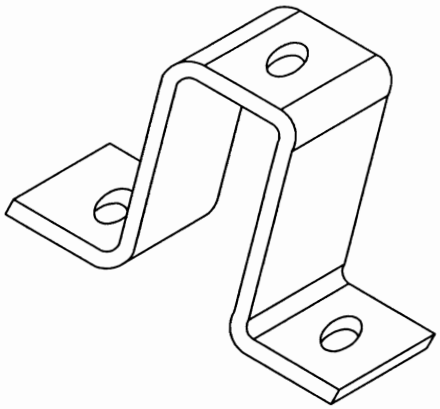
ANCHOR FASTENER–2NOs.
SPRING NUT & WASHER–2NOs.

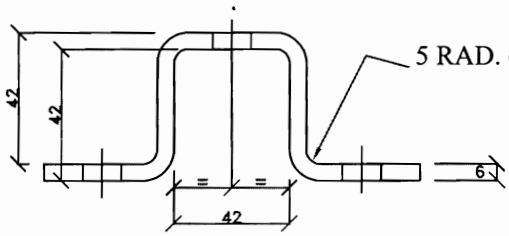
NOTES :

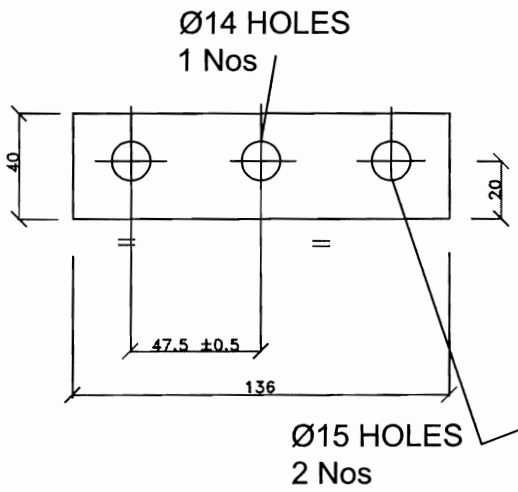
1. ALL DIMENSIONS ARE IN mm.
2. ALL FABRICATION TOLERANCES ±1.0 mm
3. MATERIAL :MILD STEEL AS PER IS-2062
4. FINISH : HOT DIP GALVANISED AS PER IS:2629
5. TOLERANCE ON THICKNESS AS PER IS:1852

BHEL	TITLE: TYPICAL DETAILS OF BOLTABLE TYPE CABLE TRAY SUPPORT MATERIAL & ACCESSORIES	DRG. NO. PE–DG–999–507–E013
		SH 4 OF 11

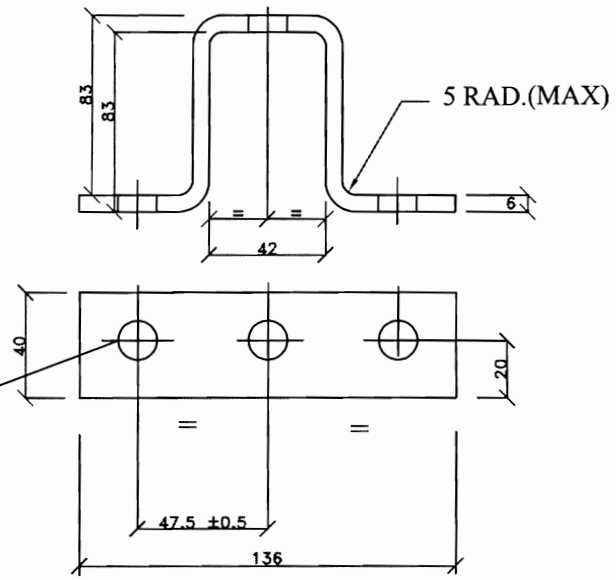








CLAMP FOR SINGLE CHANNEL CC1



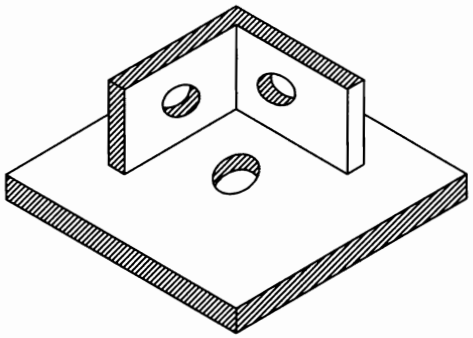
CLAMP FOR DOUBLE CHANNEL CC2

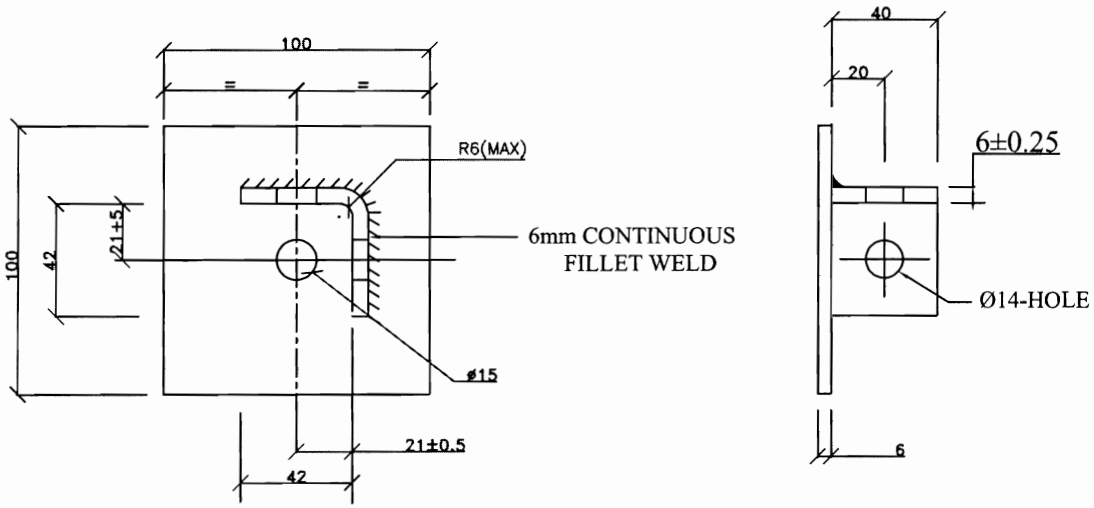
NOTES

1. ALL DIMENSIONS ARE IN mm.
2. ALL FABRICATION TOLERANCES ±1.0 mm
3. MATERIAL :MILD STEEL AS PER IS-2062
4. FINISH : HOT DIP GALVANISED AS PER IS:2629
5. TOLERANCE ON THICKNESS AS PER IS:1852

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 11



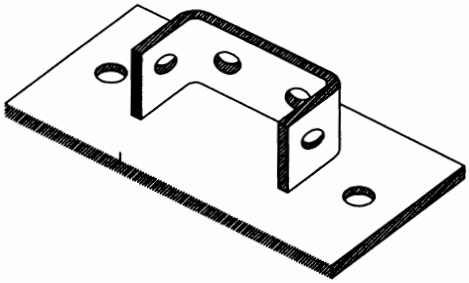


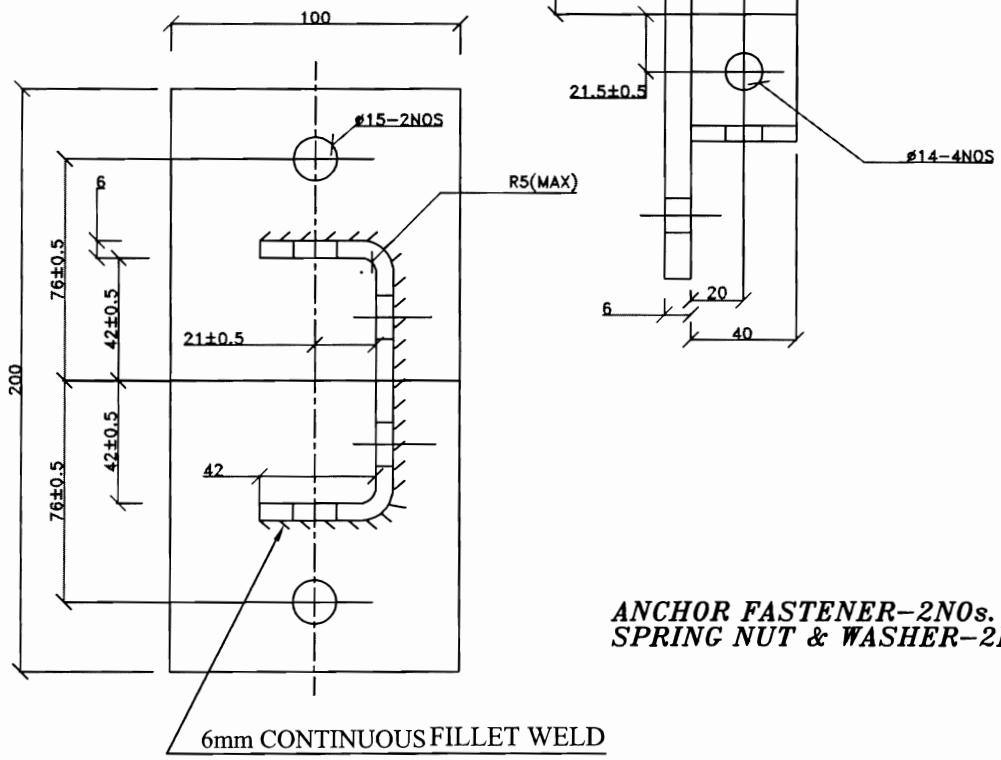
BASE PLATE FOR SINGLE CHANNEL BP1

NOTE

1. ALL DIMENSIONS ARE IN MM.
2. ALL FABRICATION TOLERANCES ±1.0mm.
3. MATERIAL :MILD STEEL AS PER IS-2062
4. FINISH : HOT DIP GALVANISED AS PER IS:2629
5. TOLERANCE ON THICKNESS AS PER IS:1852

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





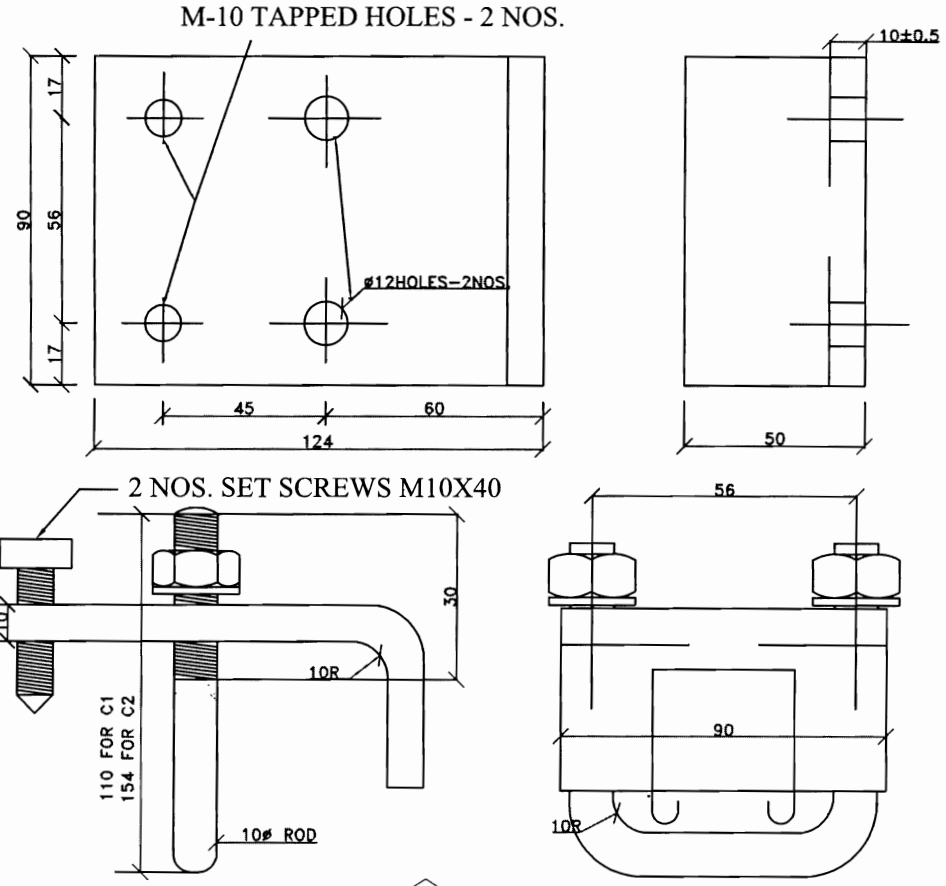
ANCHOR FASTENER–2NOs.
SPRING NUT & WASHER–2NOs.

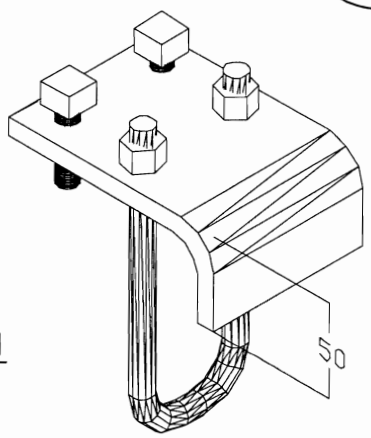
BASE PLATE FOR DOUBLE CHANNEL BP2

NOTES

1. ALL DIMENSIONS ARE IN MM
2. ALL FABRICATION TOLERANCES ±1.0mm
3. MATERIAL :MILD STEEL AS PER IS-2062
4. FINISH : HOT DIP GALVANISED AS PER IS:2629
5. TOLERANCE ON THICKNESS AS PER IS:1852

BHEL	**TITLE: TYPICAL DETAILS OF BOLTABLE TYPE CABLE TRAY SUPPORT MATERIAL & ACCESSORIES**	DRG. NO. PE–DG–999–507–E013
		SH 7 OF 11





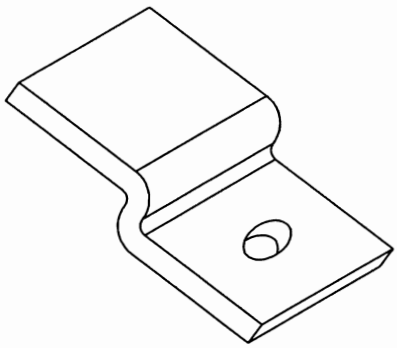
BEAM CLAMP - BC1

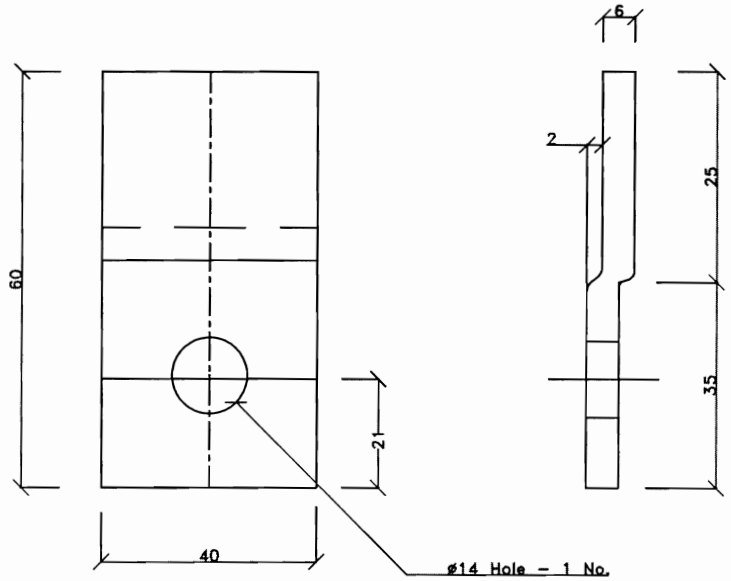
M-10 U-BOLT WITH
2Nos PLAIN WASHERS & NUTS
110 mm FOR SC 1
154 mm FOR DC1
2 NOs. SET SCREWS M10X40

NOTES

1. ALL DIMENSIONS ARE IN mm.
2. ALL FABRICATION TOLERANCES ±1.0mm
3. MATERIAL :MILD STEEL AS PER IS-2062
4. FINISH : HOT DIP GALVANISED AS PER IS:2629
5. TOLERANCE ON THICKNESS AS PER IS:1852

बीएचईएल BHEL	**TITLE:** **TYPICAL DETAILS OF BOLTABLE TYPE CABLE TRAY SUPPORT MATERIAL & ACCESSORIES**	BHEL DRAWING NO. PE-DG-999-507-E013
		SH 8 OF 11





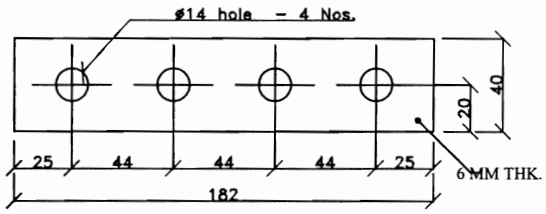
TRAY FIXING CLAMP - TC1

SPRING NUT & WASHER–1NO.

NOTES

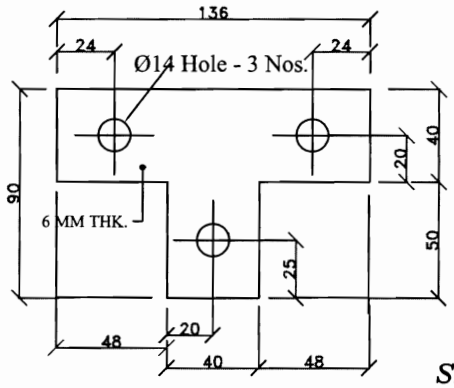
1. ALL DIMENSIONS ARE IN mm.
2. ALL FABRICATION TOLERANCES : ±1.0mm
3. MATERIAL :MILD STEEL AS PER IS-2062
4. FINISH : HOT DIP GALVANISED AS PER IS:2629
5. TOLERANCE ON THICKNESS AS PER IS:1852

BHEL	TITLE: **TYPICAL DETAILS OF BOLTABLE TYPE CABLE TRAY SUPPORT MATERIAL & ACCESSORIES**	BHEL DRAWING NO. PE–DG–999–507–E013
		SH 9 OF 11



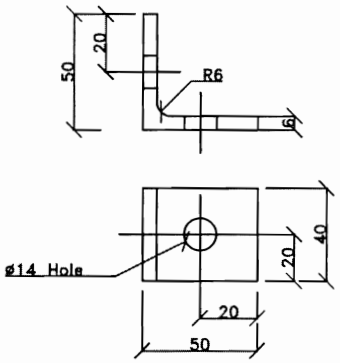
SPRING NUT & WASHER–4NOs.

FLAT PLATE STRAIGHT FITTING PF2



SPRING NUT & WASHER–3NOs.

FLAT PLATE TEE FITTING PF1



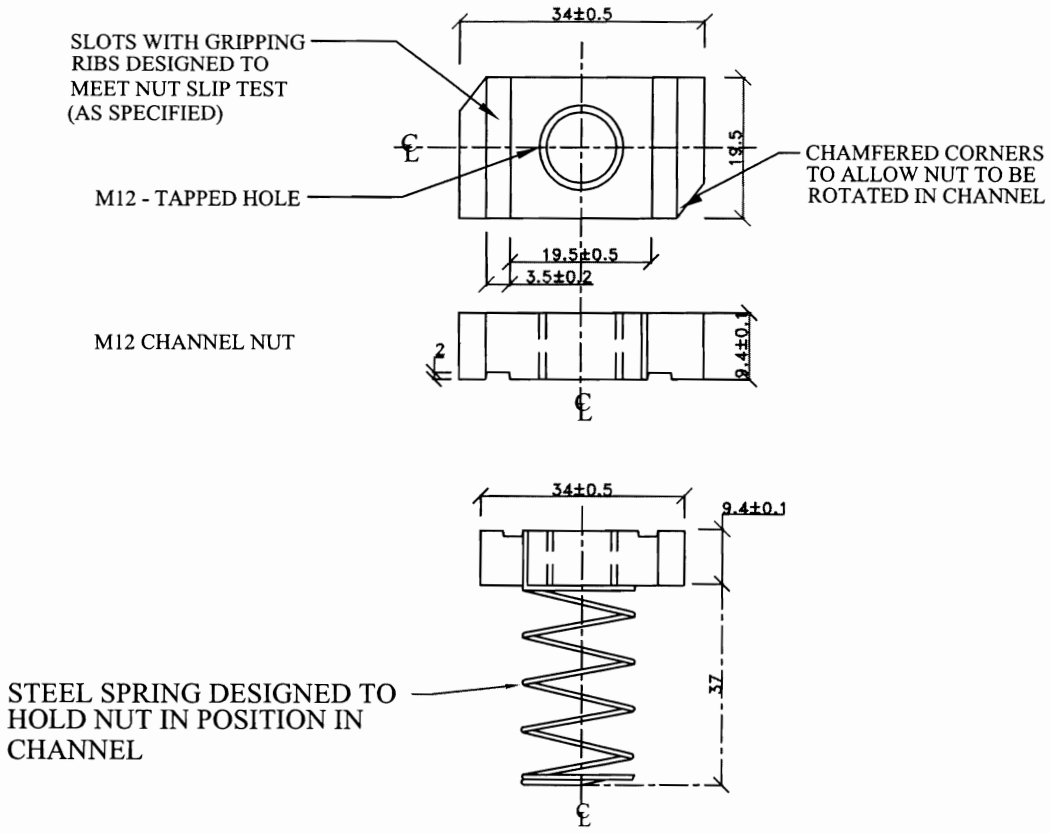
SPRING NUT & WASHER–2NOs.

90^0 ANGLE FITTING LA1

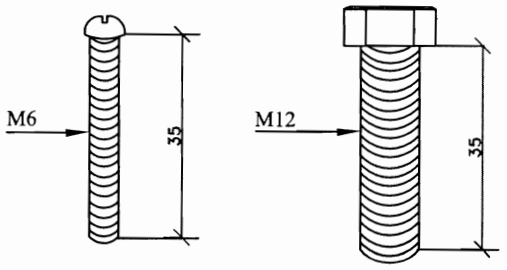
NOTES

1. ALL DIMENSIONS ARE IN mm.
2. ALL FABRICATION TOLERANCES ±1.0 mm
3. MATERIAL :MILD STEEL AS PER IS-2062
4. FINISH : HOT DIP GALVANISED AS PER IS:2629

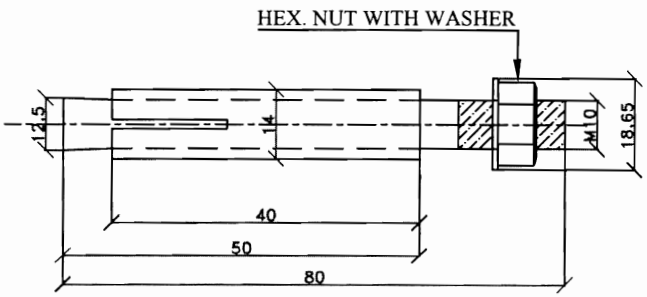
TITLE:	TYPICAL DETAILS OF BOLTABLE TYPE CABLE TRAY SUPPORT MATERIAL & ACCESSORIES	BHEL DRAWING NO. PE–DG–999–507–E013
		SH 10 OF 11



SPRING NUT ASSEMBLY



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.

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

ANNEXURE – IV

TYPE TEST PROCEDURE

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 02 of 07). Arm 1 & 2 of 650 mm cantilever arms shall be uniformly loaded to a working load of 100 kg over the outboard 600 mm. 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) 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.

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 03 of 07). Six (6) nos. 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 04 of 07). 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 05 of 07) 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 650 mm cantilever arms shall be fixed to the SC1 Channel as shown in enclosed drawing PE-DG-999-507-E114 (sheet 06 of 07). 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.

3.0 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 07 of 07).
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 07 of 07).
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.

4.0 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/ DP (Die-Penetration) test to detect sub- surface cracks developed, if any.

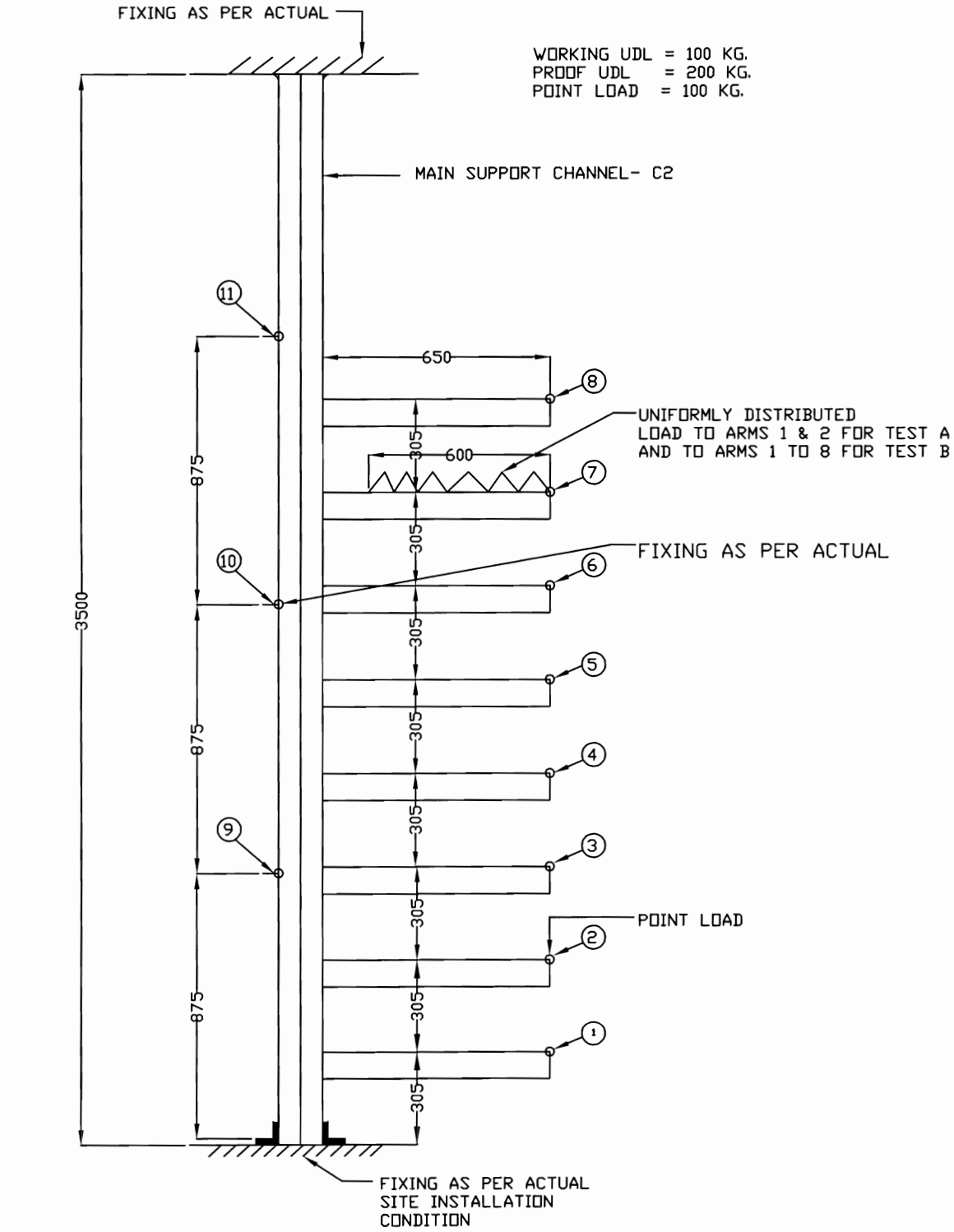
TYPICAL DETAILS OF TYPE TEST ARRANGEMENT

REVISIONS				
		NAME	DATE	

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

BHARAT HEAVY ELECTRICALS LTD.
PROJECT ENGINEERING MANAGEMENT
NOIDA

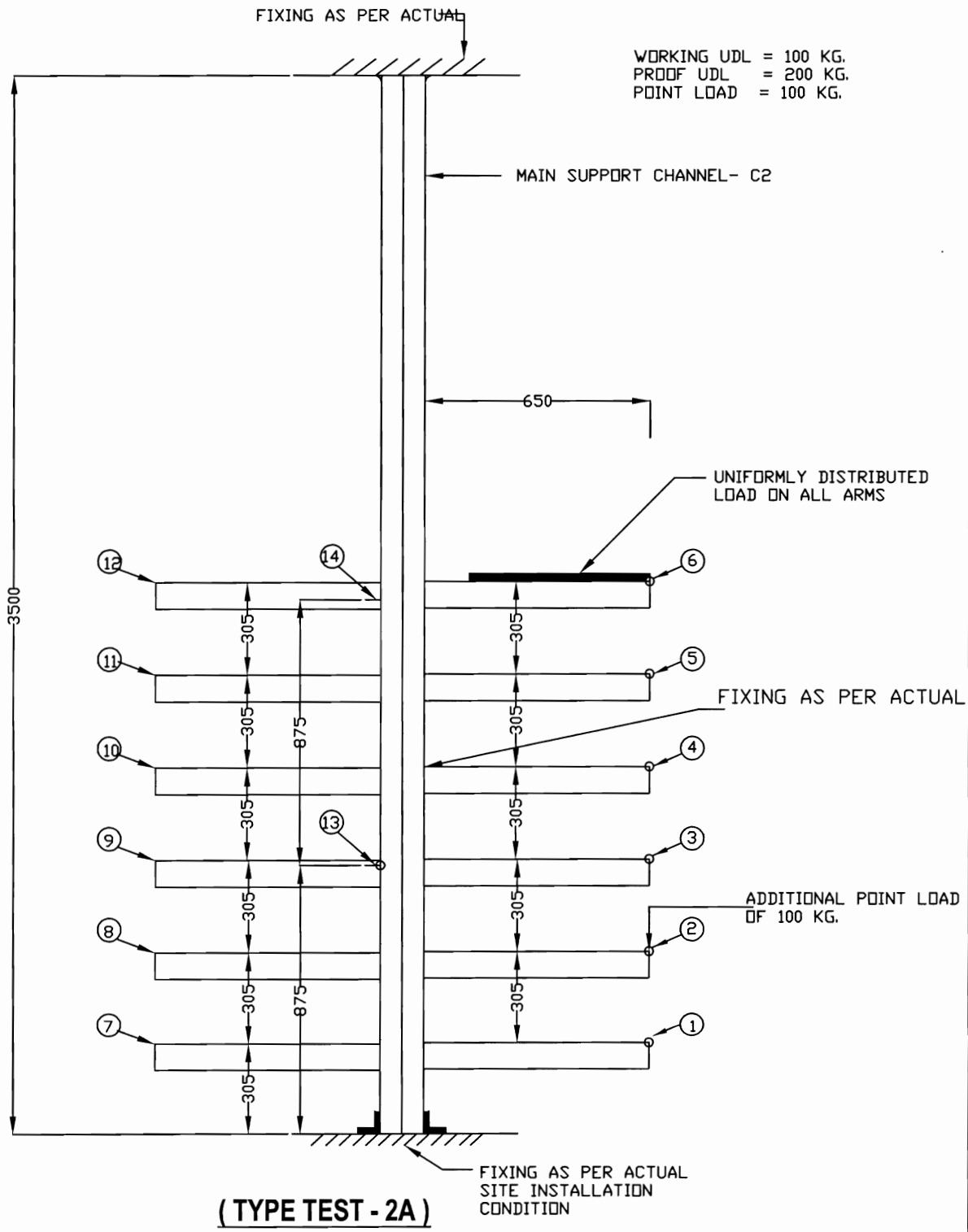
SH 1 OF 7



DEFLECTION MEASURING POINTS.

(TEST : 1A & 1B)

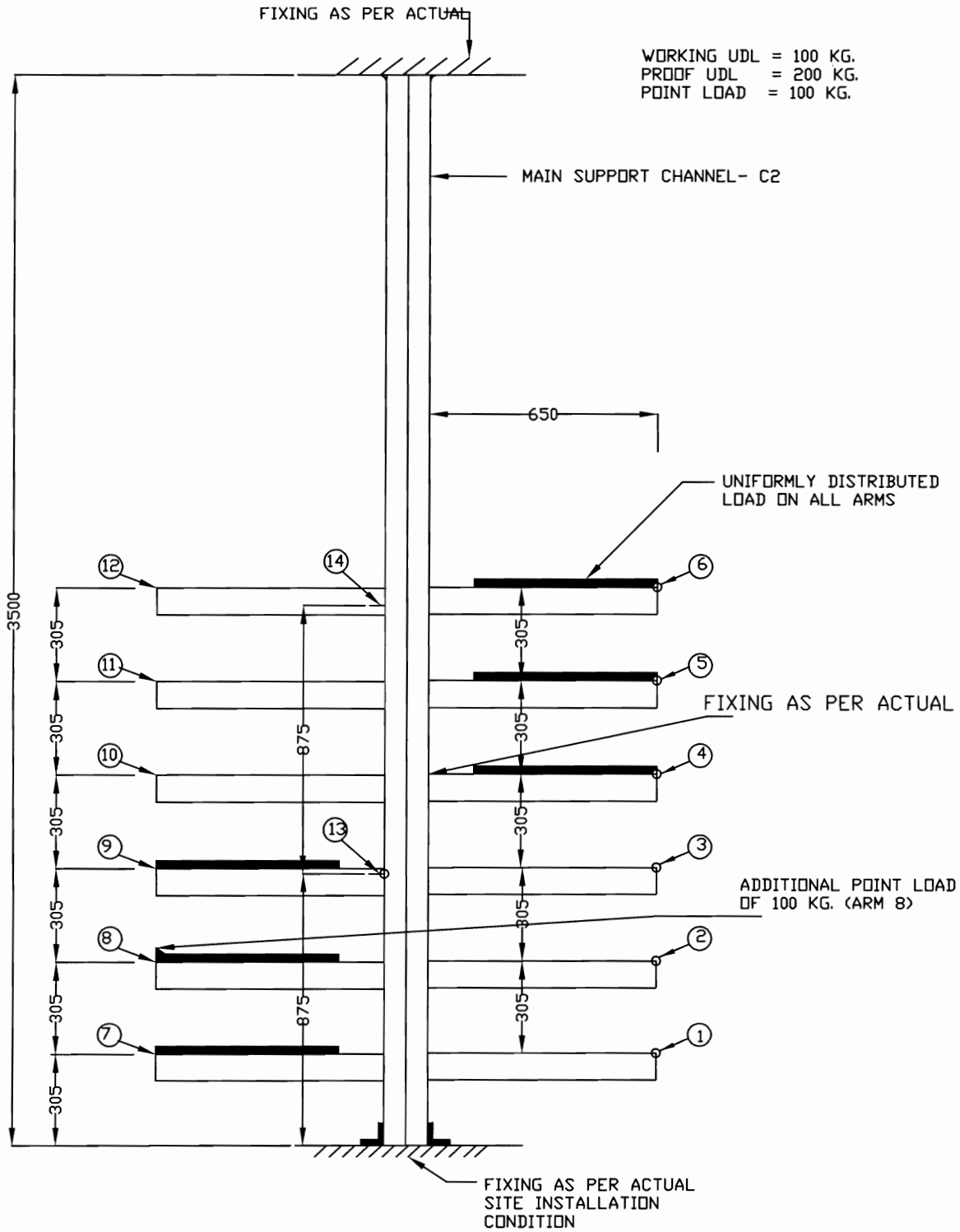
BHEL	TITLE: TYPICAL DETAILS OF TYPE TEST ARRANGEMENT	DRG. NO. PE-DG-999-507-E114
		SH 2 OF 7



(TYPE TEST - 2A)

DEFLECTION MEASURING POINTS.

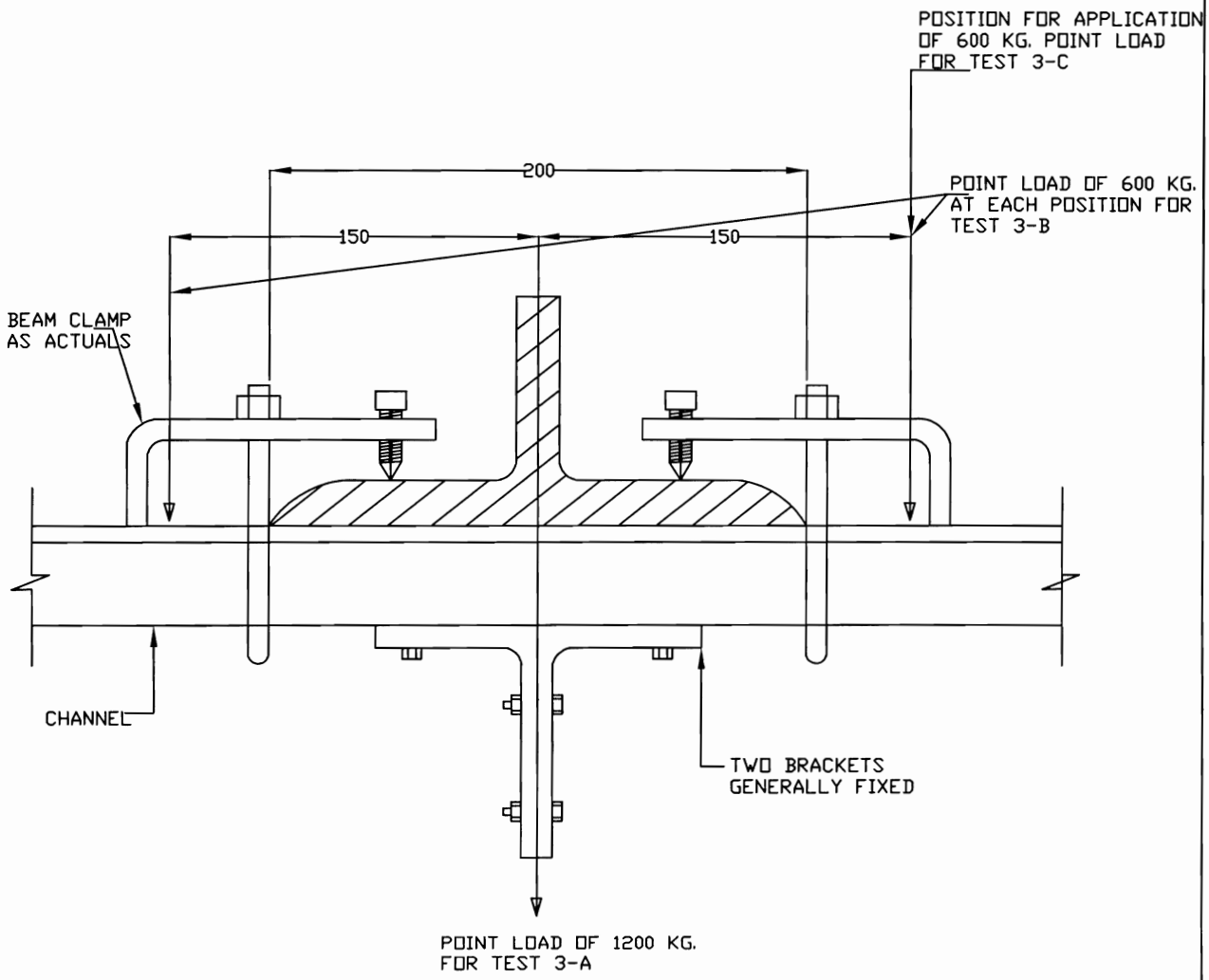
BHEL	**TITLE:** TYPICAL DETAILS OF TYPE TEST ARRANGEMENT	DRG. NO. PE-DG-999-507-E114
		SH 3 OF 7



(TYPE TEST - 2B)

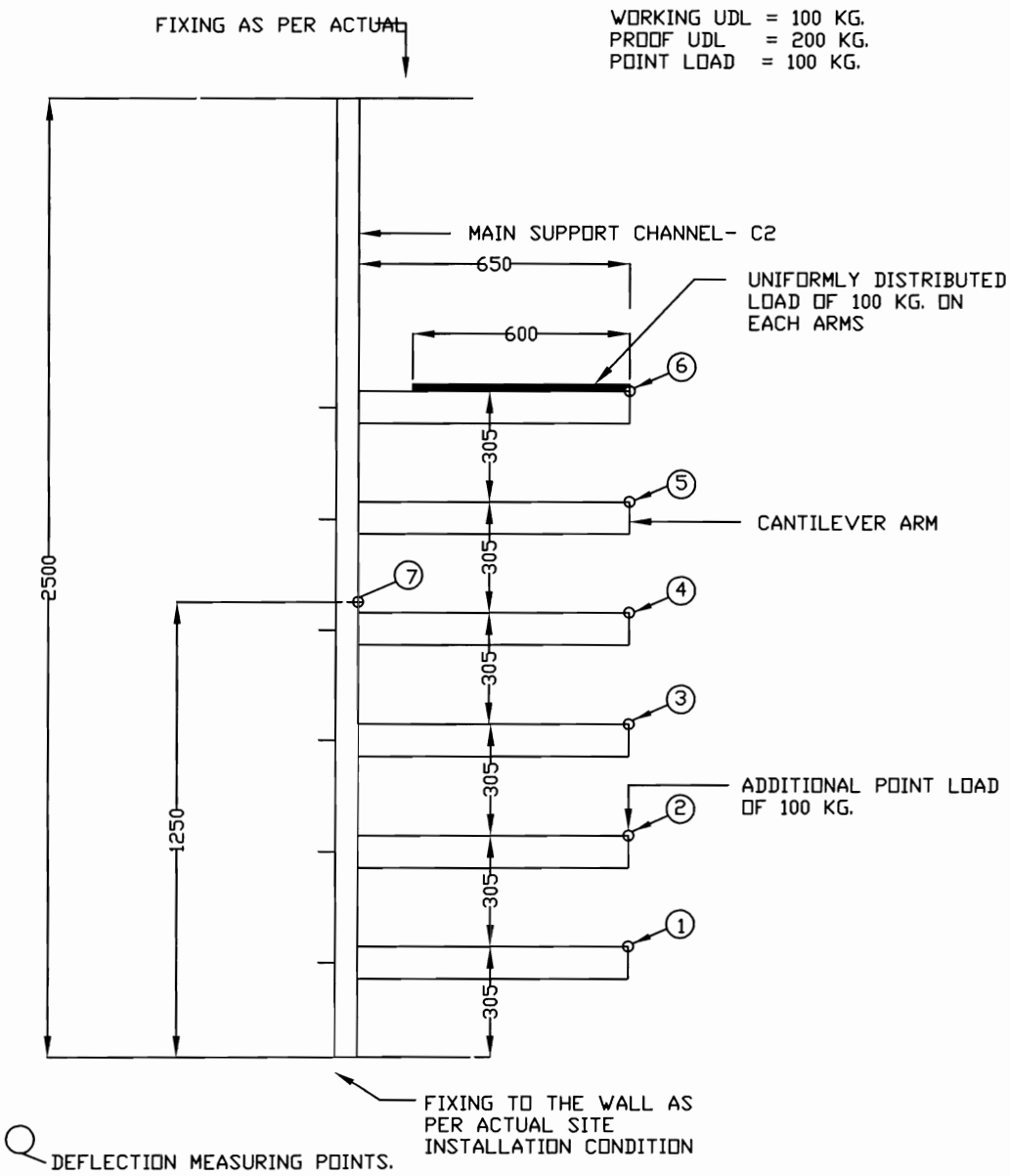
DEFLECTION MEASURING POINTS.

BHEL	TITLE: TYPICAL DETAILS OF TYPE TEST ARRANGEMENT	DRG. NO. PE-DG-999-507-E114
		SH 4 OF 7



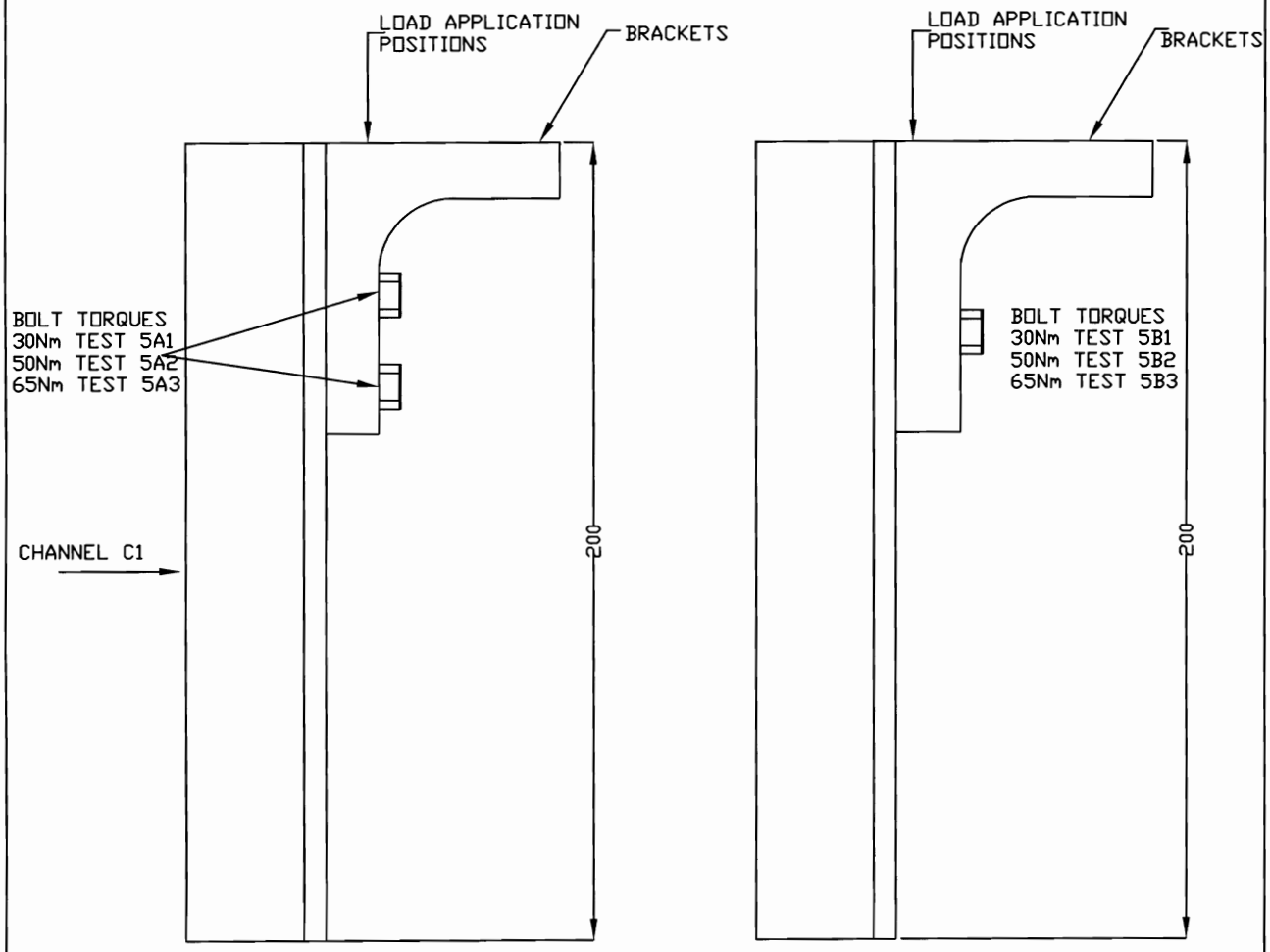
(TEST - 3A, 3B, 3C)

BHEL	TITLE: TYPICAL DETAILS OF TYPE TEST ARRANGEMENT	DRG. NO. PE-DG-999-507-E114
		SH 5 OF 7



(TYPE TEST - 4)

TITLE:	TYPICAL DETAILS OF TYPE TEST ARRANGEMENT	DRG. NO. PE-DG-999-507-E114
		SH 6 OF 7



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

(TEST - 5A1, 5A2, 5A3)

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

(TEST - 5B1, 5B2, 5B3)

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

	DOCUMENT TITLE	SPECIFICATION NO. PE-TS- 391-507-E013	
BHEL	**TECHNICAL SPECIFICATION FOR CABLE TRAY SUPPORT SYSTEM (BOLTED)**	VOLUME II B	
		SECTION -D	
		REVISION 0	DATE: 24.09.2014
		SHEET OF	

STANDARD
QUALITY PLAN

	QUALITY PLAN	CUSTOMER OPGCL	PROJECT TITLE 2x660 MW IB TPP BANHARPALLI UNITS 3 &	SPECIFICATION NO. PE-TS-391-507-E013
		BIDDER/ VENDOR	STANDARD QP NO. : PE-QP-999-507-E007, REV. 0	SPECIFICATION TITLE: TECHNICAL SPEC FOR CABLE TRAY SUPPORT SYSTEM (BOLTABLE)
	SHEET 1 OF2	SYSTEM CABLING	ITEM : CABLE TRAY SUPPORT MATERIAL & ACCESSORIES (BOLTABLE)	DOC. NO.

SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY P	AGENCY W	AGENCY V	REMARKS
1	2	3	4	5	6	7	8	9	10			11
1.0	**RAW MATERIAL**											
1.1	ROLLED SHEET	1.CHEM.& PHY. PROPERTIES	MA	VERIFICATION OF TC'S	100%	IS1079 (for hot rolled) IS-513 (for cold rolled	IS1079 (for hot rolled) IS-513 (for cold rolled)	MILL TC	3/2	-	1/2	Steel shall be procured from SAIL/TISCO/RINL/BHUSAN/JINDAL STEEL/JINDAL ISPAT/ESSAR/LLOYD/ IISCO/ authorised SAIL Re Rollers.
		2.DIMENSIONS	MA	MEASUREMENT	100%	IS-1730/ APP. DATA SHEET	IS-1730/ APP. DATA SHEET	QC RECORD	3/2	-	-	
		3.SURFACE FINISH	MA	VISUAL	100%	IS1079 (for hot rolled) IS-513 (for cold rolled	IS1079 (for hot rolled) IS-513 (for cold rolled)	QC RECORD	3/2	-	-	
1.2	ZINC	CHEM.COMP.	MA	CHEM TEST	EACH HEAT	IS-209	IS-209	QC RECORD	3/2	-	1/2	
2.0	**IN-PROCESS**											
2.1	FABRICATION	1.DIMENSIONS	MA	MEASUREMENT	100%	APPD. DRGS.	APPD. DRGS.	QC RECORD	2	-	1	
		2.WELDING QUALITY	MA	VISUAL	100%	GOOD WELDING PRACTICE	FREE FROM DEFECTS & SLAG	QC RECORD	2	-	1	Welding is to be done by qualified welders in accordance with ASME SEC. IX article III. WPS , PQR & WPQ to be reviewed during inspection.
		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	-	-	
2.3	GALVANISING	1.TEMPERATURE OF BATH	MA	TEMPERATURE INDICATOR	CONTINUOUS	IS-2629	IS-2629	QC RECORD	3/2	-	-	If vendor doesn't have his own galvanizing plant duly approved by BHEL PEM; then galvanizing shall be carried out at BHEL-PEM approved other galvanizing plants as per Annexure-2.

BHEL	PARTICULARS	BIDDER/VENDOR	
	NAME		
	SIGNATURE		
	DATE		BIDDER'S/VENDORS COMPANY SEAL

LEGEND : 1 - BHEL/ CUSTOMER 2 - VENDOR 3 - SUB- VENDOR P - PERFORM W - WITNESS V - VERIFICATION

	QUALITY PLAN		CUSTOMER OPGCL			PROJECT TITLE 2x660 MW IB TPP BANHARPALLI UNITS 3 &			SPECIFICATION NO. PE-TS-391-507-E013			
			BIDDER/ VENDOR			STANDARD QP NO. : PE-QP-999-507-E007, REV. 0			SPECIFICATION TITLE: TECHNICAL SPEC FOR CABLE TRAY SUPPORT SYSTEM (BOLTABLE)			
	SHEET 2 OF 2		SYSTEM CABLING			ITEM : CABLE TRAY SUPPORT MATERIAL & ACCESSORIES (BOLTABLE)			DOC. NO. .			
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY P	AGENCY W	AGENCY V	REMARKS
1	2	3	4	5	6	7	8	9	10			11
		2. DROSS	MA	VISUAL	PERIODIC	IS - 2629	IS - 2629	QC RECORD	3/2	-	-	
		3. RATE OF IMMERSION	MA	VISUAL / MEASUREMENT	100%	IS - 2629 / MFR'S PRACTICE	IS - 2629 / MFR'S PRACTICE	QC RECORD	3/2	-	2	
		4.SURFACE QUALITY	MA	VISUAL	100%	IS - 2629	FREE FROM BURRS, SLAG, ROUGHNESS, FLUX. STAIN. ETC.	QC RECORD	3/2	-	-	
3.0	**FINISHED ITEMS**											
3.1	SINGLE / DOUBLE CHANNELS, CANTILEVER ARMS, CLAMPS	1.DIMENSIONS DISTORTION	MA	MEASUREMENT	IS-2500 (PART 1) LEVEL S-4	APPD. DRG	APPD. DRG	INSP. REPORT	2	1	-	FASTENERS SHALL BE OF REPUTED MAKE
		2.SURFACE FINISH	MA	VISUAL	IS-2500 (PART 1) LEVEL S-4	FREE FROM BURRS, SLAG, ROUGHNESS, FLUX. STAIN. ETC.	FREE FROM BURRS, SLAG, ROUGHNESS, FLUX. STAIN. ETC.	INSP. REPORT	2	1	-	
		3.MASS OF ZINC COATING	MA	CHEM. TEST	IS-4759	IS-6745 / APP. DATA SHEET	APP. DATA SHEET	INSP. REPORT	2	1	-	
		4.UNIFORMITY OF ZINC COATING	MA	CHEM. TEST	IS-4759	IS-2633	IS-2633	INSP. REPORT	2	1	-	
		5.THICKNESS OF ZINC COATING	MA	ELCOMETER	IS-4759	APP. DATA SHEET	APP. DATA SHEET	INSP. REPORT	2	1	-	
		6.ADHESION	MA	MECH.TEST	IS-4759	IS-2629	IS-2629	INSP. REPORT	2	1	-	
3.1.1	TYPE TESTING		CR	TEST	1 SAMPLE	APPD. TYPE TEST PROCEDURE	APPD. TYPE TEST PROCEDURE	INSP. REPORT	2	1	-	
3.1.2	WELD INTEGRITY TEST	SOUNDNESS	CR	MAGNETIC PARTICLE INSPECTION (MPI) DIE-PENETRATION (DP)	SAMPLE TESTED DURING TYPE TESTING	APPD. TYPE TEST PROCEDURE	NO DEFECT	INSP. REPORT	2	1	-	AFTER CARRYING OUT TYPE TEST, WELD INTEGRITY TEST TO CHECK THE WELD SOUNDNESS/ ACCEPTANCE SHALL BE DONE BY MANUFACTURER

BHEL	PARTICULARS	BIDDER/VENDOR	
	NAME		
	SIGNATURE		
	DATE		BIDDER'S/VENDORS COMPANY SEAL

LEGEND : 1 - BHEL/ CUSTOMER 2 - VENDOR 3 - SUB- VENDOR P - PERFORM W - WITNESS V - VERIFICATION

ANNEXURE -2 of 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 GALVANISING 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	M/s Shivam Engineers & Fabricators	A0-282-284, Industrial area, South side of G.T. road, Ghaziabad, U.P.
9	GALVANISING	M/s B.G. Shirke Construction Technology Pvt. Ltd.	Office & factory : 72-76, Mundhawa, Pune - 401 036
10	GALVANISING	M/s Galbro Ispat Galvanizers Pvt. Ltd.	Gut 11 and 12, Opp. Kudus Steel Rolling mill, Wada, Thane , Mumbai

Note:- **The above list doesn't include the list of BHEL - PEM approved galvanizing plants owned by BHEL - PEM registered vendor of cabling packages.**

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

Column11l- 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.