Corrigendum - 1 dated 02/09/2024 to CPC Tender No. BHEL/CPC/LRA/ESP-FGD/25/030

Corrigendum - 1 dated 02/09/2024 to CPC Tender No. BHEL/CPC/LRA/ESP-FGD/25/030 for the work of "Erection, commissioning & Trial Operation including application of lining, Insulation, supply & touch-up painting as and where required including Handling of materials at BHEL / Client's Stores / Storage Yard and transportation to site, and handing over of Electrostatic Precipitator (ESP) and its auxiliaries along with Ducting complete with all accessories, lining and insulation from ESP outlet to Chimney Inlet including supply & installation of items as per BOQ and FGD system and related auxiliaries along with the common system of Gypsum Dewatering System. E & C of Ducts of absorber, Absorber tower along with oxidation blowers, Lime Stone Handling System, including supply & installation of items as per BOQ of Unit#3 and Unit#4 of Stage#2 of 2X800 MW NTPC LARA Stage II Project, Dist. Raigarh, CG".

A) Time Extension: Clause No. 1.0 Salient Features of NIT in NOTICE INVITING TENDER is revised as below**:**

Sl. No.	Clause No.	Existing in Tender	Revised As
1	Sl. No. v) DUE DATE & TIME OF OFFER SUBMISSION.	Date: 02/09/2024, Time: 10:00 Hrs	**Date: 09/09/2024,** **Time: 10:00 Hrs**
2	Sl. No. vi) OPENING OF TENDER	Date: 02/09/2024, Time: 16:30 Hrs	**Date: 09/09/2024,** **Time: 16:30 Hrs**

B) Some of the Bidders sought clarifications in regard to the published tender specification. The clarifications/modifications issued by BHEL are as below;

Sl. No	Reference clause of Tender Document	Clause No.	Existing provision	Bidder's query	BHEL's clarification
1	TCC	3.11.7	Contractor to arrange DG Set till construction power is made available by BHEL (approx first 3 months)	We will deploy DG Set of appropriate capacity to provide back-up power essential to continue essential activities from technical and HSE viewpoints. Please	Tender Conditions shall prevail.

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Sl. No	Reference clause of Tender Document	Clause No.	Existing provision	Bidder's query	BHEL's clarification
				provide Construction Power from the beginning.	
2	TCC	4.1	Major T&P (150 MT Crawler Crane) - included in Contractor's scope	Please include in BHEL scope	Tender Conditions shall prevail.
3	TCC	4.1 (Note - 2)	Contractor to remobilize major T&P as per BHEL instruction without any extra cost to BHEL	We will mobilise/demobilize the T&P once as per jointly agreed schedule. However, cost of remobilization may please be reimbursed because it involves substantial additional expenses.	Tender Conditions shall prevail.
4	TCC	4.2 (SN-4)	Trailer with prime mover (20 MT) - 2 nos in Contractor's scope	In our estimation 1 such trailer is necessary for the scope of work, please amend the condition.	**TCC Clause no. 4.2 (SN-4) Modified as: -** Sl No 4 Trailer with Prime Mover (20 MT)- 1 no. in Contractor Scope
5	TCC	4.2 (SN-6)	Low Bed Trailer 70-100 ft span (60 MT) APR is in Contractor's scope	In our estimation that trailer is not required for the current job, request to exclude from the list.	Tender Condition shall prevail. Further refer Clause no. 4.3.1 for clarity.
6	TCC	4.2 (SN-8)	Man-Lifter (minimum 40 m height capacity) APR is in Contractor's scope	Man-lifter of required capacity will be deployed as per site requirement, please exclude the capacity.	Tender Condition shall prevail. Further refer Clause no. 4.3.1 for clarity.
7	TCC	5.1 (SN - 4)	Consumables for Huck Bolting machine are in Contractor's scope	Request for clarity about the scope of routine spare parts of	Refer Clause no 5.1 Table Serial No 4 Remarks "Only machine will

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Sl. No	Reference clause of Tender Document	Clause No.	Existing provision	Bidder's query	BHEL's clarification
	TCC	5.7	BHEL shall supply spare parts free of charges for normal wear & tear	Huck Bolting machine that need periodical replacement (like Jaws, Ejector, Follower, Release kit etc), in earlier projects they are provided by BHEL free of cost.	be provided by BHEL, the consumables required for the machine shall be arranged by bidder".
8	TCC	7 (Non-pressure Parts - 1C)	Payment Terms: some of the assigned percentages are: 7.1.1 Preassembly - 20%, 7.1.4 Welding, Bolting - 20%, 7.1.9 Attachment/Fin welding & Supports - 5%, 7.1.13 Hangers & Supports - 5%	Pre-assembly of NPP involves substantial expenses, assigned percentage (20%) is not commensurate. Same percentage is assigned for in-situ welding where the expenses would be lesser than Pre-assembly. SN. 7.1.9 and 7.1.13 - both are for the same activity namely Supports. We request for the following percentages: 7.1.1 - 30% 7.1.4 - 15% 7.1.9 - 0% 7.1.13 - 5%	Tender Conditions shall prevail.
9	TCC	9	Note to Weight Schedule SN-8: Providing Blanks/Dummies ..... is in scope of the Contractor	Please exclude supply of Blanks/Dummies from Contractor's scope	BHEL will provide materials for the dummies free of cost for conducting the Gas Tightness Test. Fabrication & Erection of

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Sl. No	Reference clause of Tender Document	Clause No.	Existing provision	Bidder's query	BHEL's clarification
					the dummies in the scope of vendor.
10	TCC	12.13	Supply of Special cement for grouting	Request to provide the estimated quantity	Shall be assessed from the Number of Rotating Components in the BOQ of Chapter-IX and drawings.
11	TCC	14.3.5	Supply of Self drilling cum tapping screws and Fixing Clamps for Floor Grills is in Contractor's scope	Please exclude from Contractor's scope.	Tender Conditions shall prevail.
12	TCC	19.5 & 19.6	Supply of Aluminium Paint for Retainer and Bitumen Sealing Compound for sheet joints is Contractor's scope	Please exclude from Contractor's scope.	Tender Conditions shall prevail.
13	TCC	19.4	Supply of Black Bitumen Paint for internal surface of Aluminium Cladding and Bitumen Sealing Compound for joint sealing is in Contractor's scope	Please exclude from Contractor's scope.	Tender Conditions shall prevail.
14	TCC		Welding Process for C-276 and Ti	1) Please specify the processes (e.g. GTAW, SMAW, SAW etc). 2) Whether all the required Filler Wire & Welding Electrodes are supplied by BHEL free of cost.	1) C276 Welding involves SMAW (99%) and GTAW (1%) Titanium Welding Involves GTAW (100%) 2) Refer Chapter-IX of TCC for Special Electrodes. Those covered under the BOQ shall be provided by BHEL Free of Cost. Any Electrode not covered under the

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Sl. No	Reference clause of Tender Document	Clause No.	Existing provision	Bidder's query	BHEL's clarification
					BOQ shall be arranged by bidder at its own cost.
15	TCC		Cutting & Edge Preparation of C-276 & Ti	Please confirm if any cutting/trimming/edge preparation of C-276 and Ti material is required at the site. If yes, please specify the approximate quantum of work and if any special equipment/tools are required and scope thereof.	No cutting/trimming/edge preparation at site, But in any cases of rework minor cuttings to be done, Cutting to be done either by Hand Plasma Cutting machine or grinding cutting wheels, Hand tools like Grinding wheels, Brushes, holding tools and other tools required for Site Welding of C276 equipment & Titanium Equipment should be restricted to use on the one material only. Wire brushes should be stainless steel or C276 composition similar to the steel being cleaned, and should not have been previously used on other materials. Abrasive disks or wheels that have never been used on iron or steel shall only be used for C-276 material.
16	TCC	2.9.12	Sealing compounds and GI wires for insulation mattress binding and Self drilling screws / Self taping screws for sheeting works shall be provided by the agency within the quoted price/rates.	Kindly provide as free of cost	Tender Conditions shall prevail.

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Sl. No	Reference clause of Tender Document	Clause No.	Existing provision	Bidder's query	BHEL's clarification
17	TCC	3.9.3	Land for labour colony shall be arranged by Contractor at their own cost as per availability outside project area preferably within 5Km, Necessary levelling/dressing of land shall be done by the contractor. All arrangement for electricity and drinking/service water to be arranged by the contractor within his quoted price. All expenses towards installation of transformer, depositing requisite fees etc if required shall be borne by vendor.	Land for labour colony- kindly provide by BHEL as free of Cost.	Tender Conditions shall prevail.
18	TCC	2.5.14	Medical/First aid centre/medicine purchased for emergency/Doctor purpose along with ambulance services with fuel and operator (round the clock) shall be arranged by BHEL for handling medical emergencies. Cost against these facilities shall be distributed / shared among the vendors working in Lara Project site proportionately based on contract value.	Please specify the proportion of the contract value that should be recovered	Tender Conditions shall prevail. Further for clarity, refer Clause no 2.5.14.

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<table>
<tr><th>Sl. No</th><th>Reference clause of Tender Document</th><th>Clause No.</th><th>Existing provision</th><th>Bidder's query</th><th>BHEL's clarification</th></tr>
<tr><td>19</td><td>TCC</td><td>2.8.12</td><td>Painting: Touch-up Painting: All structures/ components shall be supplied from BHEL units/ workshops with finish coats of paint. Therefore, final painting is not applicable in the scope of contractor for Unit supplied items (until specifically mentioned in the tender). However, touch up painting (wherever required), incidental to the work, shall be in the scope of the contactor, including supply of the required paints and primers and associated consumables. Special Requirement of Lifeline/scaffolding/ special safety requirement shall be paid on manhour rate as per GCC.</td><td>As stated in "7. Terms of Payment" of the TCC, 1% of the CV is allocated to the ESP, Structure, and Piping head. However, final painting is excluded from the vendor's scope of work, with only touch-up painting included. Could you please define the payment modality? We understand that payment will be made on a prorated basis corresponding to the tonnage erected. Kindly clarify it?</td><td>Tender condition shall prevail. Further, Touch Up Painting on all erected structure shall be in agency scope invariably.</td></tr>
<tr><td>20</td><td>TCC</td><td>2.8.15</td><td>2.8.15 Manpower required exclusively for BHEL Menial and Secretarial Services:-
<table>
<tr><th>SN</th><th>Description of Work/Item</th><th>BOQ (Man Months) Pkg-A</th><th>BOQ (Man Months) Pkg-B</th></tr>
<tr><td>1</td><td>Engineer/Supervisor (Minimum Qualification Engineering/Diploma)</td><td>1+1</td><td>1+1</td></tr>
<tr><td>2</td><td>Computer operator (Skilled)</td><td>1</td><td>1</td></tr>
<tr><td>3</td><td>Service Staff (Semi Skilled)</td><td>1</td><td>1</td></tr>
</table>
Payment from providing the above service shall be made on monthly basis as per as per BOQ item no "Section C: Special Resources".</td><td>We understand that BHEL will utilize this manpower for the work related to the ESP and FGD packages awarded to the vendor</td><td>The manpower required shall be used for the BHEL Menial and Secretarial Services and the payment shall be regulated as per the terms of payment mentioned under Chapter-VII.</td></tr>
</table>

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Sl. No	Reference clause of Tender Document	Clause No.	Existing provision	Bidder's query	BHEL's clarification
21	TCC	2.8.28	Adequate lighting facilities such as hand lamps and area lighting shall be arranged by the contractor at the site of construction, pre-assembly yard and contractor's material storage area etc. at his cost.	We understand that the vendor is responsible only for job site illumination, while the rest of the area lighting is under the scope of M/s BHEL.	Tender Conditions shall Prevail.
22	TCC	3.11.10	The bidder will have to Procure & install General mobile illumination system during construction right from start of his work. This system will include temporary pole lighting, within the quoted price. The illumination should be such that minimum illumination requirement as specified by Indian standards for general illumination is maintained.		
23	TCC	2.9.12	Sealing compounds and GI wires for insulation mattress binding and Self drilling screws / Self taping screws for sheeting works shall be provided by the agency within the quoted price/rates.	According to BHEL's standard practice, sealing compounds, GI wires for insulation mattress binding, and self-drilling/self-tapping screws for sheeting work are to be provided by BHEL. We request that BHEL continue to supply these items as per previous practices.	Tender Conditions shall Prevail.
24	TCC	2.10	BHEL is entitled to engage a separate Contractor for NDT & PWHT / SR for the welding works executed in this contract, without assigning any reason to the	Please confirm if BHEL will arrange for its own agency to conduct NDT services. If so, will the charges for these	Tender condition shall prevail. Further refer Clause no 2.10 where it is mentioned that in case BHEL engages a separate

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Sl. No	Reference clause of Tender Document	Clause No.	Existing provision	Bidder's query	BHEL's clarification
			contractor. In this regard, Contractor shall not be entitled for corresponding payment against as mentioned in Terms of payment Chapter VII of TCC. However, Contractor has to provide all possible support to NDT & PWHT / SR agency such as Scaffolding, area illumination, approach, wrench/sky climber with operator etc. Item no. 7.1.5.2 of Terms of payment Chapter VII of TCC shall be payable for such support. In case, any defect is identified, repair work shall be done by contractor at no extra cost to BHEL. Extra NDT & PWHT / SR arise due to defect, shall be debited to contractor at prevailing rate with 5% overhead. Engagement of NDT & PWHT / SR agency by BHEL, shall not vacate contractor from their responsibility of workmanship till trial run/PG Test/warrantee period. Repair in weld joints, as and when required, shall be attended by the contractor."	services be deducted from the vendor's bill? Alternatively, does this imply that the percentage specified under '7.1.5.1 Completion of non-destructive examination – as per approved FQP/EWS (if not applicable, then this portion to be paid along with Sl.No. 7.1.4)' will not be payable to the vendor?	contractor for NDT & PWHT / SR for the welding works executed in this contract "Contractor shall not be entitled for corresponding payment against as mentioned in Terms of payment Chapter VII of TCC". Relevant Clauses in Chapter-VII shall be referred in this regard.
25		2.8.11	The storage yard is located within the plant boundary in multiple locations. All other materials have to be transported from storage yard to construction area by the contractor at his own cost, using own Pick & Carry Crane (Farrana), crane and trailer.	If the material yard is located more than 3 km from the site, M/s BHEL will be required to pay additional transportation charges per kilometer per metric ton for the extra	Tender Conditions shall Prevail.

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Sl. No	Reference clause of Tender Document	Clause No.	Existing provision	Bidder's query	BHEL's clarification
			13.2 The storage yard is located within the Main Plant Boundary.	distance beyond 3 km from the BHEL storage yard to the project premises.	
26	TCC	3.2.2 Electricity for office, stores, canteen etc. of the bidder (Chargeable) within project premises	Chargeable at a Single point source (Chargeable) prevailing tariff on project site at one or two points near the site at a distance of approx.500 meter.	Pl provided the Unit Charge and demand charges for the office, stores, canteen etc.	Refer the latest DISCOM rates of the state for reference purpose only.
27	TCC	3.9.2	In case labour hutment is not completed as per the drawings and specification and any penalty is imposed by Customer, same shall be recovered from contract's RA Bill. Rectification and Corrections in labour hutment as pointed out by BHEL/Customer shall be bidder's responsibility and any cost incurred by BHEL to complete the works, in case of noncompliance of the instructions, same shall be recovered from his RA Bills along with 5% overheads	What happens if the vendor arranges rented accommodation for their workers in a nearby area close to the site? Is this permitted by BHEL?	Tender Conditions shall Prevail.

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Sl. No	Reference clause of Tender Document	Clause No.	Existing provision	Bidder's query	BHEL's clarification
28	TCC	3.11.7	Contractor to note that till construction power is made available by BHEL (approx. within 3 months from start of work); contractor shall make his own arrangement like DG set etc. The contractor shall also take the approval/ permission of statutory authorities for his DG set installation. The Contractor has to make his own arrangement for the same as required to carry out the job under the scope of work within the quoted rate. Nothing extra shall be paid on this account of DG set up and running for construction and office maintenance etc. *Fuel (HSD) shall be paid at actuals till construction power is made available by BHEL during initial days. For outages of more than 2 hours (15 minutes tolerance) fuel shall be reimbursed by BHEL at actuals for running of DG set exclusively for construction purpose only.*	We understand that until construction power is provided by BHEL (approximately within 3 months from the start of work), BHEL will reimburse the actual fuel costs for running the DG set, which is used exclusively for construction purposes. Pl Clarify ?	Tender Conditions shall Prevail.
29	TCC	4.1 Major T&P:	1.Crawler Crane 150 MT -01 No. 2.Crawler Crane 75 MT -01 No.	*Pl provided the deployment period of each crane. 1.Crawler Crane 150 MT -01 No. : We request that M/s BHEL take responsibility for managing this crane. Is this	1. Tender Conditions shall Prevail

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<tr>
<td></td><td></td><td></td>
<td>4.2 Other T&Ps: The following Other Tools & Plants (T&P) shall be arranged by the Contractor for execution of work as per Technical Conditions of Contract of this tender in each package within the quoted rate.
<table>
<tr><th>SN</th><th>DESCRIPTION OF OTHER T&Ps</th><th>CAPACITY (MINIMUM)</th><th>MINIMUM QUANTITY</th><th>REMARKS</th></tr>
<tr><td>1</td><td>Tyre mounted mobile crane</td><td>35 MT</td><td>As per requirement</td><td>As per requirement</td></tr>
<tr><td>2</td><td>Tyre mounted mobile crane</td><td>18 MT</td><td>As per requirement</td><td>As per requirement</td></tr>
<tr><td>3</td><td>Tyre mounted mobile crane</td><td>10 MT</td><td>As per requirement</td><td>As per requirement</td></tr>
<tr><td>4</td><td>Trailer with prime mover</td><td>20 MT</td><td>2 Nos</td><td>As per requirement</td></tr>
<tr><td>5</td><td>Trailer with prime mover</td><td>40 MT</td><td>1 Nos</td><td>As per requirement</td></tr>
<tr><td>6</td><td>Low bed trailer Low bed trailer with min 70-100 feet span</td><td>60 MT</td><td>As per requirement</td><td>As per requirement</td></tr>
<tr><td>7</td><td>Backhoe Loader/JCB</td><td>NA</td><td>NA</td><td></td></tr>
<tr><td>8</td><td>Man lifter</td><td>min. 40mtr height capacity</td><td>As per requirement</td><td>As per requirement</td></tr>
<tr><td>9</td><td>Calibrated Power driven HSFG bolt tightening machines</td><td>As per Requirment</td><td>As per requirement</td><td>As per requirement</td></tr>
</table>
</td>
<td>crane meant for ESP Package?
2. Crawler Crane 75 MT -01 No.: This will be deployed till completion of Preassembly of outlets Ducts.
3.A 35 MT Tyre Mounted Mobile Crane will be deployed for the pre-assembly of the inlet and outlet funnels and will be released shortly after the pre-assembly is completed.
4. We request that M/s BHEL consider using a 15 MT Farana pick-and-carry crane instead of the 18 MT and 10 MT cranes. And also quantify the qty of its deployment and duration.
5.Based on our past experience, a single 20 MT & 40 MT trailer is sufficient for single ESP & FGD.
6.Since the man lifter is not heavily utilized in the ESP</td>
<td>2. Tender Conditions shall Prevail
3. Tender Conditions shall Prevail
4. Tender Conditions shall Prevail
5. TCC Clause no. 4.2 (SN-4) Modified as:-
Sl No 4 Trailer with Prime Mover (20 MT)- 1 nos in Contractor Scope.
6. Refer Clause 4.14 Penalty due to non-availability of T&Ps.</td>
</tr>
</table>

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Sl. No	Reference clause of Tender Document	Clause No.	Existing provision	Bidder's query	BHEL's clarification
				and FGD areas, does its non-deployment attract a penalty? *.In the event of an overstay of these Cranes & Trailers beyond the original contract period , the monthly hiring charges shall be paid by M/s BHEL at the prevailing market rate on a monthly basis until the equipment is demobilized from the site.	Refer GCC Clause no 2.12 OVERRUN COMPENSATION for the package,
30	TCC	4.1 Major T&P:	21. Air compressor/blower (electric/diesel operated) 210 CFM, 7KG/CM2 -01 no.	As per BHEL's standard practice Air Blower with damper for flow control/ valve for ATT along its all electrical accessories including Power Cable shall be supplied by M/s BHEL.	Tender Conditions shall Prevail.
31	TCC	4.3.2	Heavy Equipment (cranes, winch etc.) manufactured less than 15 Yrs. from the current Year shall be only allowed to be used at project Site.	Instead of stating that the crane's lifespan is less than 15 years, it would be more effective to mention that the crane is in good working condition and suitable for use on site.	Tender Conditions shall Prevail.

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<tr><td>32</td><td>TCC</td><td>5.1 LIST OF T&P TO BE PROVIDED BY BHEL FREE OF HIRE CHARGES ON SHARING BASIS:</td><td>5.1 LIST OF T&P TO BE PROVIDED BY BHEL FREE OF HIRE CHARGES ON SHARING BASIS:
<table><tr><th>SL NO</th><th>DESCRIPTION & CAPACITY OF T&P</th><th>QUANTITY Pkg-A</th><th>QUANTITY Pkg-B</th><th>REMARKS</th></tr><tr><td>1</td><td>Tower Cranes</td><td>1 Nos</td><td>1 Nos</td><td>For ESP and FGD erection. Assistance to be provided by Bidder for Erection, dismantling of the Tower Crane.</td></tr><tr><td>2</td><td>Crane</td><td>As required</td><td>As required</td><td>Any other crane required from the Cranes Mentioned in clause 4.1 of Chapter-IV and Tower Crane, if required to complete the package shall be provided by BHEL. The Capacity of Crane, Quantity and duration of deployment shall be drawn mutually during the review meeting held at site. BHEL decision on deployment of crane other than mentioned in Chapter-IV and Tower Crane shall be final.</td></tr><tr><td>3</td><td>Venturimeter</td><td>As required</td><td>As required</td><td></td></tr><tr><td>4</td><td>Huck Bolting Machine</td><td>As required</td><td>As required</td><td>Only machine will be provided by BHEL, the consumables required for the machine shall be arranged by bidder.</td></tr></table></td><td>1. In which area and for what purpose does M/s BHEL intend to install the tower crane?
Pl specify specification and configuration of Tower Crane.

2.Min one 250 MT crane is required in FGD & ESP area.</td><td>1) Tower Crane Shall be Used in ESP and FGD Area.
Specifications shall be decided in consultation with Project Director depending upon site conditions. However, the crane shall be adequate to cater to the erection needs of ESP and FGD.

2) Refer 5.1 list of T&P to be provided by BHEL free of hire charges on SHARING BASIS table Serial no 2 REMARKS.</td></tr>
<tr><td>33</td><td>TCC</td><td>4.2 Other T&Ps:</td><td>46.Scaffolding materials with forged clamps for insulation, painting etc works (As per Requirement) Min 10,000 pipes and matching clamps</td><td>This quantity is excessive; approximately 5,000 pipes with matching clamps should be sufficient to complete the work.</td><td>Modified as 46. Scaffolding materials with forged clamps for insulation, painting etc works (As per Requirement) Min 5,000 pipes and matching clamps</td></tr>
<tr><td>34</td><td>TCC</td><td></td><td>Air compressor/blower (electric/diesel operated) 210 CFM, 7 KG/CM2-01 no.</td><td>As per BHEL's standard practice Air Blower with damper for flow control/ valve for ATT along its all electrical accessories</td><td>Tender Conditions shall prevail.</td></tr>
</table>

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<tr><th>Sl. No</th><th>Reference clause of Tender Document</th><th>Clause No.</th><th>Existing provision</th><th>Bidder's query</th><th>BHEL's clarification</th></tr>
<tr><td></td><td></td><td></td><td></td><td>including Power Cable shall be supplied by M/s BHEL.</td><td></td></tr>
<tr><td>35</td><td>TCC</td><td></td><td>Sufficient quantity of steel ladders for approach up to the top of each erected column to be required during erection of columns.</td><td>Based on our previous experience using the ladder supplied by BHEL for column erection, we request that M/s BHEL permit the use of the ladder provided in PGMA-79-921,922 & 932</td><td>Tender Conditions shall prevail.</td></tr>
<tr><td>36</td><td>TCC</td><td></td><td>Suspended working platform Size :7mX1mX0.5m, Rated load 800 kg to 1000 Kg, -01 Nos. (Prior to start of Cladding works.)</td><td>For Insulation and cladding we used to erect scaffolding for application of fixing component, insulation and cladding. Could you please clarify the purpose of deploying the suspended working platform in what context?</td><td>Modified as<table><tr><th>SN</th><th>DESCRIPTION OF OTHER T&PS</th><th>CAPACITY (MINIMUM)</th><th>MINIMUM QUANTITY</th><th>REMAKRS</th></tr><tr><td>73</td><td>Suspended working platform Size :7mX1mX0.5m,Rated load 800 kg to 1000 Kg,</td><td>As per Requirment</td><td>As per Requirment</td><td>Prior to start of Cladding works.</td></tr></table></td></tr>
<tr><td>37</td><td></td><td></td><td>MIG welding Machine (For welding of ESP Inner Roof and Outer Roof alone for Sheet Thickness of upto 5 mm.)</td><td>If M/s BHEL permits we may use in Preassembly of Funnels Plates as well as in Casing wall.</td><td>MIG welding can be used for pre-assembly of funnel walls only and not for casing walls.
However, MIG welding should not be used for in-situ for erection welding of ESP funnels.</td></tr>
</table>

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Sl. No	Reference clause of Tender Document	Clause No.	Existing provision	Bidder's query	BHEL's clarification
38	TCC	5.1 list of T&P to be provided by BHEL free of hire charges on sharing basis:	For ESP and FGD erection. Assistance to be provided by Bidder for Erection, dismantling of the Tower Crane.	Is M/s BHEL will provide the required capacity of crane for Erection, dismantling of the Tower Crane.	The required assistance for the Erection and Dismantling of Tower Cranes shall be in the scope of bidder.
39	TCC		Venturi meter	This also falls under the category of "T&P deployed by the vendor". Please clarify whether M/s BHEL will provide it or not.	Tender Conditions shall prevail.
40	TCC		Huck Bolting (As required Machine) Only machine will be provided by BHEL, the consumables required for the machine shall be arranged by bidder.	We request M/s BHEL to provide a new Huck Bolting Machine. If an older, functioning machine is supplied, M/s BHEL must also provide consumables for six months from the date of issue.	Tender Conditions shall prevail.
41	TCC	SECURED RECOVER-ABLE ADVANCES	a) For Package – A 1.For Mobilization of 01 no. of Crane of 150 MT capacity, 1 no. of 75 MT Mobile crane - 2.0% of Contract value of Package-A. 2. For Posting of Site Manager and team consisting of Construction/Erection	We request M/s BHEL to assign a weightage percentage for crane deployment, which should be paid on a monthly basis.	**SECURED RECOVERABLE ADVANCES Modified as:** Interest Free Secured Mobilization Advance as per GCC Clause No. 2.13.1 will be payable under exceptional circumstances on certification of

Corrigendum - 1 dated 02/09/2024 to CPC Tender No. BHEL/CPC/LRA/ESP-FGD/25/030

Sl. No	Reference clause of Tender Document	Clause No.	Existing provision	Bidder's query	BHEL's clarification
			Engineers, Quality Engineer, Safety Engineer etc. in Site Office - 1.5% of Contract value of Package-A. 3.For Mobilization of required T & Ps to start the work, skilled manpower like fitters, Riggers, Gas-cutter, Grinders & other skilled manpower - 1.5% of Contract value of Package-A.		BHEL Construction Manager at Site. Interest Free Mobilization Advance shall be disbursed in specifically mentioned stages of major respective resource mobilization for both packages as specified hereunder: **a) For Package – A** 1) For Posting of Site Manager and team consisting of Construction/Erection Engineers, Quality Engineer, Safety Engineer etc. in Site Office and 1 nos of 75 MT Crane - 2% of Contract value of Package-A. 2) For Mobilization of required T & Ps to start the work, skilled manpower like fitters, Riggers, Gas-cutter, Grinders & other skilled manpower - 1.5% of Contract value of Package-A. 3) For Mobilization of 01 no. of Crane of 150 MT capacity

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Sl. No	Reference clause of Tender Document	Clause No.	Existing provision	Bidder's query	BHEL's clarification
					crane – 1.5% of Contract value of Package-A. **b) For Package – B** 1) For Posting of Site Manager and team consisting of Construction/Erection Engineers, Quality Engineer, Safety Engineer etc. in Site Office and 1 nos of 75 MT Crane - 2% of Contract value of Package-B. 2) For Mobilization of required T & Ps to start the work, skilled manpower like fitters, Riggers, Gas-cutter, Grinders & other skilled manpower - 1.5% of Contract value of Package-B. 3) For Mobilization of 01 no. of Crane of 150 MT capacity crane – 1.5% of Contract value of Package-B. Note:

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Sl. No	Reference clause of Tender Document	Clause No.	Existing provision	Bidder's query	BHEL's clarification
					1. BHEL Site-CM shall be the deciding authority for assessing the admissibility of advance payment to contractor. 2. In case contractor do not fulfil the agreed conditions of payment of earlier mobilization advance, BHEL Construction Manager will have the authority to not allow the subsequent mobilization advance to contractor.
42	TCC	10.1 Brief feature of Electrostatic Precipitator (ESP) & Auxiliaries for each Unit	6) Ash hoppers complete with curved panel heating elements, matching with curved surfaces of conical hopper, level monitors and indicators, outlet flanges, jointing material, poke holes, access doors and walkways beneath the hoppers.	Provide the percentage of DP Test in Hopper.	Refer attached Field Quality Plan.
43	TCC	10.2 Brief feature of Flue Gas Desulfurization (FGD) and	VIII. One number of Passengers cum Goods Elevator of adequate capacity shall be provided with adequate landings for absorber. The erection and commissioning of the Elevator is in Elevator Vendor Scope.	We presume that Passengers cum Goods Elevator shall be provided by M/s BHEL. However, its erection and commissioning of the Elevator is in Elevator Vendor	Refer Point no VIII. Under Serial No 1 of ABSORBER SYSTEM- It is mentioned that Only the structure is in the vendor scope for the Passengers cum Goods Elevator by BHEL. Payment of

Corrigendum - 1 dated 02/09/2024 to CPC Tender No. BHEL/CPC/LRA/ESP-FGD/25/030

Sl. No	Reference clause of Tender Document	Clause No.	Existing provision	Bidder's query	BHEL's clarification
		Auxiliaries for each Unit	Lift Structure and other supporting structure is included in the scope of this contract.	Scope. Pl specify under which head of the Terms of Payment, it will be claimed by the Vendor.	structure shall be made under relevant clauses as mentioned in Chapter-VII.
44	TCC	LIMESTONE GRINDING SYSTEM	Limestone Storage Silos- Fabrication and erection of Limestone Storage Silos complete with Supporting Steel structure, platforms, Staircase, air canons, power operated gates, gravimeter feeders etc.	Will these silos be supplied in preassembled condition? If yes, please also provide the number of segments for each shell	The Silos are supplied in Segments Namely: - 1) Cylinder of Silo- Maximum 3 rings of average 5 nos. of segments in each ring. 2) Ring Beam- Maximum 6 segments. 3) Hopper- Average 26 segments. Including Cone. The above requirements are provided to bidder to have a rough idea of the package; however, the actual segments may vary on approval of the design drawings. Reference drawing is attached, however the same shall not be taken as reference for the LARA Project. Drawings for LARA project shall be issued subsequently.

Corrigendum - 1 dated 02/09/2024 to CPC Tender No. BHEL/CPC/LRA/ESP-FGD/25/030

Sl. No	Reference clause of Tender Document	Clause No.	Existing provision	Bidder's query	BHEL's clarification
45	TCC	FGD	FRP Piping- The Erection Testing and Commissioning of FRP piping in the FGD area is also included in the scope of the contractor, all necessary arrangements required for the completion of the piping including consumables, special tools and tackles are to be arranged by vendor within the quoted rates.	Based on our previous experience M/s BHEL will arrange a separate agency for FRP piping. We request M/s BHEL to exclude it from vendor scope of work.	Tender Conditions shall prevail.
46	TCC	14.2.6	14.2.6 Erection & dismantling of air blowers and connecting pipes & ducts, providing blanks/ dummies at the required locations and conducting gas-tightness test is in the scope of contract and shall be carried out within the quoted rate.	M/s GEEPL presume that Blanks/ Dummies Plates (Materials required) shall be provided by M/s BHEL Free of Cost. Pl clarify ?	BHEL will provide materials for the dummies free of cost for conducting the Gas Tightness Test. Fabrication & Erection of the dummies in the scope of vendor.
47	TCC	14.3.5	14.3.5 Fixing of floor grills shall be done by self-tapping screws and not by weldable studs. Special purpose electrically operated hand tools are available in the market for this, which drills, taps and fixes the screws in a single operation. Supply of necessary self-drilling-cum-tapping screws and fixing clips are in contractor scope. Contractor shall deploy the drilling cum fixing machine required for this purpose as a regular scope of work. i) Agency shall supply self tapping screw for entire scope of work of different sizes as required at site.	Supply of necessary self-drilling-cum-tapping screws and fixing clips shall be supply M/s BHEL.	Tender Conditions shall prevail.

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<table>
<tr><th>Sl. No</th><th>Reference clause of Tender Document</th><th>Clause No.</th><th>Existing provision</th><th>Bidder's query</th><th>BHEL's clarification</th></tr>
<tr><td>48</td><td>GCC</td><td>2.12 OVERRUN COMPENSATION</td><td>2.12.3.1 For initial period of twelve months of extended period, ORC rate applicable over executed value shall be 5%. For every subsequent period of twelve months, ORC rate shall be further increased by 5% over the previous rate. For example, ORC rates applicable for initial period of 12 months and subsequent period of 12 months are given below. This process of increasing ORC rate for each subsequent period of 12 months shall continue till applicability of ORC.
<table>
<tr><th>Sl. No.</th><th>Extended Period for the reasons attributable to BHEL</th><th>ORC rate applicable over executed value</th></tr>
<tr><td>1</td><td>First 12 months</td><td>5%</td></tr>
<tr><td>2</td><td>13th-24th month and so on</td><td>10.25%
{[(1.05 x 1.05)-1] x 100}</td></tr>
</table></td><td>The ORC percentage allocated in this tender document is set at 5%, which is insufficient to cover both the monthly rental charges and the site setup costs. For Heavy T&P items, the fixed monthly rental charges should be paid as per current market rental rates. Additionally, the ORC allocation should be increased from 5% to 10% to adequately cover site setup expenses.</td><td>Tender Conditions shall prevail.</td></tr>
</table>

Corrigendum - 1 dated 02/09/2024 to CPC Tender No. BHEL/CPC/LRA/ESP-FGD/25/030

Sl. No	Reference clause of Tender Document	Clause No.	Existing provision	Bidder's query	BHEL's clarification
49	GCC	2.12.3.5	2.12.3.5 The maximum amount of ORC payable for the month shall be limited to Rs. 10,00,000/- (Rupees Ten Lakhs). 2.12.3.6 In case, there is no shortfall attributable to contractor for the month and also contractor has deployed the resources as agreed in Form-14 but ORC amount payable for the month worked out as per procedure mentioned in clause 2.12.3.3, 2.12.3.4 and 2.12.3.5, is less than Rs.1,00,000/-, then ORC amount payable for the month shall be Rs.1,00,000/- otherwise ORC amount payable for the month shall remain same	We request M/s BHEL to increase the minimum and maximum values of the payable ORC amount, as the current amount is insufficient to cover the monthly site expenses and the vendor's fixed costs.	Tender Conditions shall prevail.
50	GCC	2.12.4	2.12.4 Applicability of ORC: ORC shall not be applicable for following activities.*i). Area cleaning, removal of temporary structures and return of scrap.ii). Punch list points / pending points liquidation pending due to reasons attributable to contractoriii). Submission of "As built Drawing"iv). Material Reconciliationv). Completion of Contract Closure formalities like HR Clearance/ No dues from various dept./ Statutory Authorities etc.*	ORC should be paid for all activities, as delays are generally not caused by the vendor.	Tender Conditions shall prevail.

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<tr><th>Sl. No</th><th>Reference clause of Tender Document</th><th>Clause No.</th><th>Existing provision</th><th>Bidder's query</th><th>BHEL's clarification</th></tr>
<tr><td>51</td><td>General</td><td></td><td>ESIC</td><td>Is ESIC applicable to this project? Please confirm.</td><td>Refer GCC clause no. 2.8.3.</td></tr>
<tr><td>52</td><td>TCC</td><td>3.2.2</td><td>Electricity for office, stores, canteen etc. of the bidder (Chargeable) with in project premises</td><td>Kindly Provide the electricity free of cost for office store and canteen and rest room</td><td>Tender Conditions Shall Prevail</td></tr>
<tr><td>53</td><td>TCC</td><td>3.9.1</td><td>Labour Colony is to be developed by bidder for all the labours required to be deployed for the works. All labour colony set-up is to be developed as per attached drawing and in compliance of statutory requirements.</td><td>We may provide the labour accommodation on rental basis.</td><td>Tender Conditions Shall Prevail</td></tr>
<tr><td>54</td><td>TCC</td><td>3.9.3</td><td>Land for labour colony shall be arranged by contractor at their own cost as per availability outside project area preferably within 5 kms. Necessary levelling/dressing of land shall be done by the contractor.</td><td>Kindly provide the land for labour colony free of cost within 2 kms.</td><td>Tender Conditions Shall Prevail</td></tr>
<tr><td>55</td><td>TCC</td><td>3.9.3</td><td>For Non-Pressure Part Payment terms-
<table>
<tr><th>Sub Packages</th><th>Non-Pressure Parts</th></tr>
<tr><td>On pre-assembly wherever applicable (if not applicable, this portion shall be clubbed with placement in position)</td><td>20%</td></tr>
<tr><td>Placement in position</td><td>20%</td></tr>
<tr><td>Alignment</td><td>10%</td></tr>
<tr><td>Welding/bolting/fixing/Torque check/tightness check of bolts</td><td>20%</td></tr>
</table></td><td>We are request that kindly change the payment terms for Non-Pressure parts as following: -
<table>
<tr><th>Sub-Packages</th><th>Non-Pressure Parts</th></tr>
<tr><td>On pre-assembly wherever applicable (if not applicable, this portion shall be clubbed with placement in position)</td><td>40%</td></tr>
<tr><td>Placement in position</td><td>15%</td></tr>
<tr><td>Alignment</td><td>5%</td></tr>
</table></td><td>Tender Conditions Shall Prevail</td></tr>
</table>

Corrigendum - 1 dated 02/09/2024 to CPC Tender No. BHEL/CPC/LRA/ESP-FGD/25/030

<table>
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<tr><td></td><td></td><td></td><td>
<table>
<tr><td>Completion of non-destructive examination –as per approved FQP/EWS (if not applicable, then this portion to be paid along with S.No. 7.1.4)</td><td>5%</td></tr>
<tr><td>Completion of attachment welding, fin welding, supports in individual area of work</td><td>5%</td></tr>
<tr><td>Hangers & supports etc wherever necessary as per drg</td><td>5%</td></tr>
</table>
</td><td>
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<tr><td>Welding/bolting /fixing/Torque check/tightness check of bolts</td><td>10%</td></tr>
<tr><td>Completion of non-destructive examination –as per approved FQP/EWS (if not applicable, then this portion to be paid along with S.No. 7.1.4)</td><td>5%</td></tr>
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<tr><td>Hangers & supports etc wherever necessary as per drg</td><td>5%</td></tr>
</table>
</td><td></td></tr>
</table>

Note:

1) **All other terms and conditions against this NIT shall remain unchanged.**
2) **This corrigendum is to be submitted duly signed and stamped along with the Techno-commercial bid (Part- I).**

for BHARAT HEAVY ELECTRICALS LTD
Sr. Manager/ SCT

एन टी पी सी लिमिटेड
(भारत सरकार का उद्यम)
NTPC Limited
(A Govt. of India Enterprise)
(Formerly National Thermal Power Corporation Ltd.)
(केंद्रीय कार्यालय नोएडा)
Corporate Center NOIDA

Reference : CC-ENGG-9587-001-104-QVM-Q-091 **Date :** 19/08/2024

From : RAMESH CHANDRA SHIAL ENGINEER	**To :** BHARAT HEAVY ELECTRICALS LTD NEW DELHI 110049 IN **Cc :** sudipt@bhel.in dipakbag@bhel.in

Subject : EPC Package

Please find enclosed following drawings/ documents for necessary action at your end.

Vendor Drg. No.	:	PP-QBE-2401-HD-QA-204
Orgn. Drg. No.	:	9587-001-104-QVM-Q-091
Revision No.	:	00
Drg. Title	:	Filed Quality Plan FOR ESP MECHANICAL ERECTION
App. Category	:	CAT-III
Release Date	:	19/08/2024

Scan to verfiy

Comments : Cat III. Please submit the copy of ESP erection manual for review of this doc.

Cat III. Please submit the copy of ESP erection manual for review of this doc.

Ramesh

इलेक्ट्रो स्टेटिक प्रीसिपिटेटर (यांत्रिक) निर्माण के लिए गुणवत्ता योजना

FIELD QUALITY PLAN FOR ELECTRO STATIC PRECIPITATOR (MECH)

Scan the QR code for checking the latest revision

A Maharatna Company

एनटीपीसी - लारा सुपर थर्मल पावर प्रोजेक्ट चरण-II (2x800 MW)

NTPC- LARA SUPER THERMAL POWER PROJECT STAGE-II (2x800 MW)

एनटीपीसी दस्तावेज़ संख्या / NTPC DOC. NO. : **9587-001-104-QVM-Q-091**
संशोधन संख्या / REV. №: **00**

भारत हेवी इलेक्ट्रिकल्स लिमिटेड
पावर सेक्टर - पूर्वी क्षेत्र, कोलकाता – 700091

BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR - EASTERN REGION, KOLKATA – 700091

दस्तावेज़ संख्या / BHEL DOC. NO. : PP-QBE-2401-HD-QA-204
संशोधन संख्या / REV. №: 00

Ramesh

इलेक्ट्रो स्टेटिक प्रीसिपिटेटर (यांत्रिक) निर्माण के लिए गुणवत्ता योजना

Scan the QR code for checking the latest revision

FIELD QUALITY PLAN FOR ELECTRO STATIC PRECIPITATOR (MECH)

एनटीपीसी दस्तावेज़ संख्या / NTPC DOC. NO. : **9587-001-104-QVM-Q-091**

संशोधन संख्या / REVISION NO.: **00**

द्वारा तैयार PREPARED BY	अरुप रतन पाल / ARUP RATAN PAUL Digitally signed by ARUP RATAN PAUL DN: c=IN, o=BHARAT HEAVY ELECTRICALS LIMITED, ou=GOVERNMENT, 2.5.4.20=b6355c0e40c2ad6bdcd8bf4ead57fc91a7d353fa88668896bf74b6a564865593, postalCode=700091, st=WEST BENGAL, serialNumber=12BC8B448BF8F320E7DE8C1F8B72DAD924764DAA0E46680985AE7403E3A8F0AE, cn=ARUP RATAN PAUL Date: 2024.08.09 17:54:54 +05'30'	द्वारा अनुमोदित APPROVED BY	SNEHASIS MANDOL Digitally signed by SNEHASIS MANDOL DN: c=IN, o=Bharat Heavy Electricals Limited, ou=BHEL PSER KOLKATA purchase, 2.5.4.20=5fed275ac32798aa71a2e99401001e4804c9fb353e7e79b7ec014f370ea3693d, postalCode=700091, st=WEST BENGAL, serialNumber=13adb81bc7329e6de608e52f38c3d75f3d835012f6a443458349c9e1c335bb87, cn=SNEHASIS MANDOL Date: 2024.08.09 17:58:50 +05'30'

एफक्यूपी संख्या / FQP NO.	**PP-QBE-2401-HD-QA-204**
जारी करने की मूल तिथि / DATE OF FIRST ISSUE	06/08/2024
संशोधन संख्या और तारीख / REV. Nº & DATE	Rev. Nº : **00**, Date : **06/08/2024**
कॉपी नंबर / COPY NO.	01
को जारी / ISSUED TO	
जारी करने की तिथि / DATE OF ISSUE	
उद्देश्य / PURPOSE	
द्वारा जारी (हस्ताक्षर और पदनाम) ISSUED BY (SIGNATURE & DESIGNATION)	

बी एच ई एल
BHEL

भारत हेवी इलेक्ट्रिकल्स लिमिटेड
पावर सेक्टर - पूर्वी क्षेत्र, कोलकाता – 700091

BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR - EASTERN REGION, KOLKATA – 700091

पा:से:पू:क्षे: PSER	इलेक्ट्रो स्टेटिक प्रीसिपिटेटर (यांत्रिक) निर्माण के लिए गुणवत्ता योजना FIELD QUALITY PLAN FOR ELECTRO STATIC PRECIPITATOR (MECH)	एफक्यूपी संख्या / FQP NO: **PP-QBE-2401-HD-QA-204** संशोधन संख्या / REV. №: 00 शीट / SHEET : 01 / 01	Scan QR code for checking the latest revision

विषय-सूची / CONTENTS

पा:से:पू:क्षे: PSER	इलेक्ट्रो स्टेटिक प्रीसिपिटेटर (यांत्रिक) निर्माण के लिए गुणवत्ता योजना FIELD QUALITY PLAN FOR ELECTRO STATIC PRECIPITATOR (MECH)	एफक्यूपी संख्या / FQP NO: **PP-QBE-2401-HD-QA-204** संशोधन संख्या / REV. №: 00 शीट / SHEET : 01 / 01	Scan QR code for checking the latest revision

संशोधन स्थिति / STATUS OF REVISIONS

क्रम संख्या SL. NO.	संशोधित शीट का संदर्भ REFERENCE OF SHEETS REVISED	संशोधन संख्या और तारीख REVISION NO. & DATE	टिप्पणियाँ REMARKS
01	All	00, 06/08/2024	Document prepared in line with NTPC Technical Specifications.

पा:से:पू:क्षे: PSER	इलेक्ट्रो स्टेटिक प्रीसिपिटेटर (यांत्रिक) निर्माण के लिए गुणवत्ता योजना FIELD QUALITY PLAN FOR ELECTRO STATIC PRECIPITATOR (MECH)	एफक्यूपी संख्या / FQP NO: **PP-QBE-2401-HD-QA-204** संशोधन संख्या / REV. №: 00 शीट / SHEET : 01 / 01	Scan QR code for checking the latest revision

जाँच और नॉनकन्फ़र्मिटि समाधान के लिए प्राधिकार
AUTHORISATION FOR DIFFERENT CATEGORIES OF CHECKS & NONCONFORMITY DISPOSITION

जाँच की श्रेणी Category of Check	निरीक्षण प्राधिकारी Inspection Authority	साक्षी तथा स्वीकृति प्राधिकारी Witness & Accepting Authority	एनटीपीसी द्वारा निगरानी Surveillance by NTPC
'A' (CHP)	BHEL FQA Engineer in association with Executing Engineer.	NTPC FQA Engineer in association with Executing Engineer.	Head FQA/ NTPC
'B' (CHP)	BHEL Executing Engineer.	NTPC Executing Engineer.	FQA Engineer
'C'	BHEL Executing Engineer.	NTPC Executing Engineer.	Another Engineer authorised by Head (Executing Department)

लेख / Legend:

Class A : Critical, Class B : Major, Class C : Minor.

SR - Site Register, TR- Test Report, LB-Log Book, IR - Inspection Report, MTC - Manufacturer's Test Certificate.

टिप्पणियाँ / Notes :

1. गुणवत्ता योजना में किसी भी गैर-अनुरूपता/विचलन को एनटीपीसी के ध्यान में लाया जाना चाहिए। एनटीपीसी एफएक्यू सिस्टम मैनुअल के अनुसार निपटान प्राधिकारी एनटीपीसी का अधिकृत प्रतिनिधि होगा।

   Any non-conformity/ deviation to the Quality plan must be brought to notice of NTPC/Owner. Dispositioning authority shall be the authorised representative of NTPC/Owner as per NTPC FQA system manual.

2. सभी विशेषताओं के लिए जाँच की मात्रा 100% होगी जब तक कि निर्माण क्षेत्र गुणवत्ता योजना/ संदर्भ दस्तावेजों में अन्यथा उल्लेख न किया गया हो।

   Quantum of check shall be 100% for all characteristics unless otherwise mentioned in Field Quality Plan/ reference documents.

3. ग्राहक अपने निर्णय से किसी भी 'सी' श्रेणी की जाँच में निगरानी करने के लिए भी अधिकृत है।

   Customer is also authorized to carry out surveillance in any of 'C' category of checks at his discretion.

4. सुरक्षित पहुंच सुनिश्चित की जाएगी और केवल उचित सुरक्षा गियर वाले अधिकृत व्यक्ति को ही निर्माण क्षेत्र में प्रवेश करने की अनुमति दी जाएगी।

   Safe access shall be ensured and only the authorized persons with proper safety gears to be allowed in construction area.

पा:से:पू:क्षे: PSER	इलेक्ट्रो स्टेटिक प्रीसिपिटेटर (यांत्रिक) निर्माण के लिए गुणवत्ता योजना FIELD QUALITY PLAN FOR ELECTRO STATIC PRECIPITATOR (MECH)	एफक्यूपी संख्या / FQP NO: **PP-QBE-2401-HD-QA-204** संशोधन संख्या / REV. №: 00 शीट / SHEET : 01 / 06	Scan QR code for checking the latest revision

जाँच का विवरण / STATEMENT OF CHECKS

क्षमता / प्रकार Capacity / Type	: 800MW
सिस्टम System	: Steam Generator & Auxiliaries
सब-सिस्टम Sub-system	: Electro Static Precipitator
क्षेत्र Area	: Mechanical Erection

इस्तेमाल किए गए संक्षिप्ताक्षर / ABBREVIATIONS USED:

R – रिकॉर्ड सत्यापन / Record Verification, V – विसूअल जांच / Visual Check, P – फ़िसीकाल जांच / Physical Check, M – माप / Measurement, T – परीक्षण / Test, MTC – निर्माता परीक्षण प्रमाणपत्र / Manufacturers Test Certificate, SR – साइट रजिस्टर / Site Register, MDR – सामग्री असंगति रिपोर्ट / Material Discrepancy Report

टिप्पणियाँ / NOTES :

1. कार्य को संतोषजनक ढंग से करने के प्रमाण के रूप में, सभी जांचों के लिए एक सामान्य प्रयोजन लॉग शीट, L-00 बनाए रखा जाएगा।

   As an evidence of having carried out the work satisfactorily, a general-purpose log sheet, L-00 shall be maintained for all the checks.

2. गैर-अनुरूपता के मामले में, स्वीकार करने वाला प्राधिकारी स्वीकृति से पहले गैर-अनुरूपता का निपटान सुनिश्चित करेगा, और निपटान लॉग-शीट/प्रोटोकॉल में प्रतिबिंबित किया जाएगा।

   In case of nonconformity, accepting authority shall ensure the disposition of the nonconformity before acceptance and disposition shall be reflected in the log-sheets/ protocols.

3. मानकों, विशिष्टता और ड्राइंग का नवीनतम संशोधन लागू होगा।

   Latest revision of Standards, Specification & Drawings shall apply.

4. माप के लिए केवल एनटीपीसी-स्वीकृत और एनएबीएल मान्यता प्राप्त प्रयोगशाला से वैध अंशांकन प्रमाणपत्र वाले गेज और माप उपकरणों का उपयोग किया जाएगा।

   Only the Gauges and Measuring Instruments having valid calibration from a NTPC-accepted and NABL accredited laboratory shall be used.

5. कॉलम संख्या 'D*' में "टिक" (√) चिह्न के साथ पहचाने गए रिकॉर्ड का प्रारूप अनिवार्य रूप से क्यूए दस्तावेज़ीकरण में शामिल किया जाएगा।

   Format of record identified with "tick" (√) mark in column no. 'D*' shall be essentially included in QA documentation.

FIELD QUALITY PLAN

SUPPLIERS NAME AND ADDRESS	SYSTEM : Steam Generator & Auxiliaries	QP NO. : PP-QBE-2401-UHN-QA-104	PROJECT:	NTPC -LARA stage-II 2x800 MW
भारत हेवी इलेक्ट्रिकल्स लिमिटेड पावर सेक्टर - पूर्वी क्षेत्र, कोलकाता BHARAT HEAVY ELECTRICALS LIMITED PS:ER, KOLKATA	SUB-SYSTEM : Electro Static Precipitator	REV. №: 00	PACKAGE:	EPC
		DATE : 06/08/2024	CONTRACT NO.	CS-9587-001R-2-SC-NOA-7333, DATE-29.08.2023
	AREA : Mechanical Erection	PAGE :2 of 13	MAIN CONTRACTOR	BHEL, PS:ER, KOLKATA

Sl. No	Activity and operation	Type of Check	Characteristics / instruments	Class of check	Quantum of check	Reference Document	Acceptance Norms	Format of Record	D*	Remarks
1	2	3	4	5	6	7	8	9		
1	**GENERAL REQUIREMENTS**									
1.01	Ensure availability of requisite equipment in good working condition well before commencement of concerned activity. NOTE: Functioning of MMEs in proper working condition to be verified on monthly basis.	P & R	Wherever practical, a label shall be affixed on the Instrument, indicating the validity of Calibration	A	All MMEs in the field shall be calibrated before start of work and thereof yearly OR immediately after repair	Technical Specifications & Drawing	The calibration certificate shall specify the fitness of the MMEs within the limit of tolerance for use.	List of equipment / Calibration certificate	√	Calibration shall be done by NABL accredited & NTPC-approved lab and the report shall be submitted to NTPC
1.02	Ensure availability of approved drawings & procedures, as applicable	R	-	B	100% for each structure before start of activity	List of Latest Revision of Approved Drawings and Owner's Technical Specifications		-		
2	**FOUNDATION CHECKS**									
2.01	Location of foundation pedestals of ESP with reference axes to boiler.	M	Measuring Tape	B	100%	Drawing / Erection Manual		L-01	√	
2.02	Top elevation of foundation pedestals to be ensured as per drawing.	M	Water Level / Dumpy Level / Scale	B	100%	Drawing / Erection Manual		L-01	√	
2.03	Spacing between foundation pedestals and its diagonals.	M	Measuring Tape	B	100%	Drawing / Erection Manual		L-01	√	
2.04	Bolt pitches and its diagonals of individual pedestals. (7X-X80 Foundation Bolt)	M	Measuring Tape	B	100%	Drawing / Erection Manual		L-01	√	
3	**STRUCTURE**									
3.01	Check Camber and sweep in column pieces before erection.	M	Piano wire / Tape	B	100%	Drawing & Erection Manual		SR	√	
3.02	Check BOB level, orientation, spacing between columns and its diagonals.	M	Measuring Tape / Water Level	B	100%	Drawing & Erection Manual		L-01	√	BOB shall be ensured using shim plates as per drawing.
3.03	Verticality of X81 columns both in X & Y directions.	M V	Electronic theodolite / Measuring Tape	B	100%	Drawing & Erection Manual		L-02	√	
3.04	Ensure completion of bolt tightening of horizontal and diagonal bracings & supporting structures before erecting casing columns.	M	Bolt tension calibrator, Torque wrench	B	Random 10% or 2 no, bolt assy., which ever is larger, in each joint	Drawing, IS 4000		Joint Protocol	√	
3.05	Verification of test certificates of grout material and grouting of column bases.	V		B	100%	Drawing & Grouting Procedure		SR		Cube test of Grout by FQA
3.06	Ensure proper sequence of welding, as applicable	V	-	C	100%	Drawings & WPS	Drawings & WPS	SR		

FIELD QUALITY PLAN

SUPPLIERS NAME AND ADDRESS	SYSTEM : Steam Generator & Auxiliaries	QP NO. : PP-QBE-2401-UHN-QA-104	PROJECT:	NTPC -LARA stage-II 2x800 MW
भारत हेवी इलेक्ट्रिकल्स लिमिटेड पावर सेक्टर - पूर्वी क्षेत्र, कोलकाता BHARAT HEAVY ELECTRICALS LIMITED PS:ER, KOLKATA	SUB-SYSTEM : Electro Static Precipitator	REV. №: 00	PACKAGE:	EPC
		DATE : 06/08/2024	CONTRACT NO.	CS-9587-001R-2-SC-NOA-7333, DATE-29.08.2023
	AREA : Mechanical Erection	PAGE :3 of 13	MAIN CONTRACTOR	BHEL, PS:ER, KOLKATA

Sl. No	Activity and operation	Type of Check	Characteristics / instruments	Class of check	Quantum of check	Reference Document	Acceptance Norms	Format of Record		Remarks
1	2	3	4	5	6	7	8	9	D*	
4	7X-X01 SLIDE SUPPORT BEARINGS									
4.01	Ensure location and orientation of sliding supports w.r.t. fixed foot. NOTE: Ensure that support bearings are erected in locked condition and to be released before admitting flue gas into ESP.	M	Tape	A	100%	Drawing & Erection Manual	L-03	√		
4.02	Ensure type (biaxial / mono axial) and capacity (vertical load / horizontal load) of bearing as per drawing.	V		B	100%	Drawing & Erection Manual	Log Book			
4.03	Check Top level of support (slide supports and fixed foot).	M	Water Level /Scale	A	100%	Drawing & Erection Manual	L-03	√		
4.04	Check Horizontality of slide supports.	M	Water Level / Scale	A	100%	Drawing & Erection Manual				
4.05	Ensure welding of top and bottom plates at all locations.	V		A	100%	Drawing, Technical Directive: 016 & Erection Manual	SR			
5	7X-X48 CASING STRUCTURE									
5.01	Check Column overall height as per drawing before erection	M	Tape	B	100%	Drawing & Erection Manual	SR			
5.02	Check Diagonals of inlet, outlet and intermediate frames (pre-assembly).	M	Tape	B	100%	Drawing & Erection Manual	L-04	√		
5.03	Check Verticality of all columns of inlet, outlet and intermediate frames in both X & Y directions.	M	Plumb bob / Tape	B	100%	Drawing & Erection Manual	L-02	√		
5.04	Check Verticality of inlet, outlet and intermediate frames after erection.	M	- do -	B	100%	Drawing & Erection Manual	L-02	√		
5.05	Ensure the center line matching of X81 columns, X01 bearings and X48 columns before erection of casing assembly (maximum permissible deviation: 5 mm) · Transfer the foundation center line to base plate center line. · From the base plate, transfer the center line to bearing bottom plate. · From the bearing bottom plate, transfer the center line to X48 column center.	M V	Tape	B	100%	Drawing & Erection Manual	SR			
5.06	Ensure welding of horizontal and diagonal bracings to the gusset provided in the column as per assembly drawing.	V		B	100%	Drawing, Technical Directive: 017 & Erection Manual	SR			
5.07	Ensure completion of welding of casing structure with horizontal and diagonal bracings before erecting further and load the same.	V		B	100%	Drawing, Technical Directive: 017 & Erection Manual	SR			
5.08	Close the welding openings outside of gas path.	V		C	100%	Drawing & Erection Manual	SR			

FIELD QUALITY PLAN

SUPPLIERS NAME AND ADDRESS	SYSTEM : Steam Generator & Auxiliaries	QP NO. : PP-QBE-2401-UHN-QA-104	PROJECT:	NTPC -LARA stage-II 2x800 MW
भारत हेवी इलेक्ट्रिकल्स लिमिटेड पावर सेक्टर - पूर्वी क्षेत्र, कोलकाता BHARAT HEAVY ELECTRICALS LIMITED PS:ER, KOLKATA	SUB-SYSTEM : Electro Static Precipitator	REV. №: 00	PACKAGE:	EPC
		DATE : 06/08/2024	CONTRACT NO.	CS-9587-001R-2-SC-NOA-7333, DATE-29.08.2023
	AREA : Mechanical Erection	PAGE :4 of 13	MAIN CONTRACTOR	BHEL, PS:ER, KOLKATA

Sl. No	Activity and operation	Type of Check	Characteristics / instruments	Class of check	Quantum of check	Reference Document	Acceptance Norms	Format of Record		Remarks
1	2	3	4	5	6	7	8	9	D*	
6	**CASING SHELL**									
6.01	Straightness and diagonals of wall panel assembly before erection.	M	Tape / Piano wire	C	100%	Drawing & Erection Manual	Log Book			
6.02	Ensure that Panels are temporarily stiffened during lifting. NOTE: Wall panels should be welded with respective columns before erecting next panel.	V	-	C	100%	Drawing & Erection Manual	SR			
6.03	Check Verticality of walls.	M	Plumb bob / Tape	B	100%	Drawing & Erection Manual	Joint Protocol		√	
6.04	Check Distance between the walls.	M	Tape	C	100%	Drawing & Erection Manual	SR			
6.05	Check Straightness of wall along the gas flow.	M	Piano wire / Tape	C	100%	Drawing & Erection Manual	SR			
6.06	Check Diagonals of wall panel assembly after erection.	M	Tape	A	100%	Drawing & Erection Manual	L-05		√	
6.07	Ensure welding between primary stiffeners in casing wall with horizontal bracings in X48 PGMA.	V		B	100%	Drawing, Technical Directive: 034 & Erection Manual	SR			Welding & NDT check as per Sl. No. 20
6.08	Ensure completeness of welding at all locations. (Fasteners are provided for locating purpose only).	V		B	100%	Drawing & Erection Manual	SR			Welding & NDT check as per Sl. No. 20
6.09	Weld continuous fillet in the inner side (gas path) of the walls.	V		B	100%	Drawing & Erection Manual	SR			Welding & NDT check as per Sl. No. 20
6.10	Weld fillet size and length of weld to be ensured at all locations.	V		C	100%	Drawing & Erection Manual	SR			Welding & NDT check as per Sl. No. 20
6.11	Ensure proper erection of deflection plates to avoid sneakage.	V		A	100%	Drawing, Technical Directive: 026 & Erection Manual	SR			
7	**ROOF BEAMS**									
7.01	Camber and sweep of roof beams in pre-assembly condition before erection.	M	Piano wire/ Tape/ Water Level	B	100%	Drawing & Erection Manual	Log Book			
7.02	Length, out of squareness of roof beams before erection.	M	Tape / Plumb bob	B	100%	Drawing & Erection Manual	Log Book			
7.03	Centre line to be marked on both side of the flanges.	V		C	100%	Drawing & Erection Manual	Log Book			
7.04	Welding of Roof Beams NOTE: 1. Before placing the splice plate each layer of weld shall undergo LPI 2. LR beam butt welding to be inspected with RT/ PAUT after completion of all welding.	V		B	100%	Drawing & Erection Manual	Log Book			Welding & NDT check as per Sl. No. 20

FIELD QUALITY PLAN

SUPPLIERS NAME AND ADDRESS	SYSTEM : Steam Generator & Auxiliaries	QP NO. : PP-QBE-2401-UHN-QA-104	PROJECT:	NTPC -LARA stage-II 2x800 MW
भारत हेवी इलेक्ट्रिकल्स लिमिटेड पावर सेक्टर - पूर्वी क्षेत्र, कोलकाता BHARAT HEAVY ELECTRICALS LIMITED PS:ER, KOLKATA	SUB-SYSTEM : Electro Static Precipitator	REV. №: 00	PACKAGE:	EPC
		DATE : 06/08/2024	CONTRACT NO.	CS-9587-001R-2-SC-NOA-7333, DATE-29.08.2023
	AREA : Mechanical Erection	PAGE :5 of 13	MAIN CONTRACTOR	BHEL, PS:ER, KOLKATA

Sl. No	Activity and operation	Type of Check	Characteristics / instruments	Class of check	Quantum of check	Reference Document	Acceptance Norms	Format of Record		Remarks
1	2	3	4	5	6	7	8	9	D*	
7.05	Level of bottom flange of roof beams.	M	Water Level / Scale	A	100%	Drawing & Erection Manual		L-05	√	
7.06	Spacing of roof beams.	M	Tape	B	100%	Drawing & Erection Manual		L-05	√	
7.07	Marking of gas path center line (GPCL) on roof beams on top and bottom flange.	M	Plumb bob / Tape	A	100%	Drawing & Erection Manual		L-05	√	
7.08	Alignment of insulator support panel w.r.t. GPCL - spacing and diagonals.	M	Piano wire / Tape	A	100%	Drawing & Erection Manual		L-06	√	
7.09	Ensure TR beam CL coincide with top panel vertical stiffener web bottom line.	M & V	Tape	C	100%	Drawing & Erection Manual				
7.10	Ensure welding of stiffeners in LR beams at casing column locations.	V		C	100%	Drawing & Erection Manual				Welding & NDT check as per Sl. No. 20
7.11	Ensure welding of stiffeners in TR beams at primary channel locations in side wall top panel.	V		C	100%	Drawing & Erection Manual				Welding & NDT check as per Sl. No. 20
7.12	Ensure completeness of welding at all locations. (Fasteners are provided for locating purpose only).	V		B	100%	Drawing & Erection Manual				Welding & NDT check as per Sl. No. 20
8	**COLLECTING ELECTRODE SUSPENSION**									
8.01	Check for straightness and dimensional tolerance (at ground before erection).	M	Tape	C	100%	Drawing & Erection Manual				
8.02	Diagonal variation of individual frame between corner hooks.	M	Tape	B	100%	Drawing & Erection Manual		L-07	√	
8.03	Individual and cumulative pitch of support angles.	M	Tape	C	100%	Drawing & Erection Manual		L-07	√	
8.04	Check Straightness of frame.	M	Piano wire / Tape	B	100%	Drawing & Erection Manual		Log Book		
8.05	Ensure Alignment of frame w.r.t. GPCL.	M	Tape	A	100%	Drawing & Erection Manual		L-08	√	
8.06	Disposition of adjacent suspension frame, cumulative measurement from GPCL to the middle angle of individual suspension frames.	M	Tape	A	100%	Drawing & Erection Manual		L-08	√	
8.07	Hooks in angles at rapping side are in one-line perpendicular to GPCL.	M	Piano wire / Tape	B	100%	Drawing & Erection Manual				
8.08	Distance between center of emitting system suspension point to first hook with collecting electrodes frames.	M	Tape	A C	100%	Drawing & Erection Manual		L-08	√	
8.09	Gap between guide ends and casing walls.	M	Tape	C	100%	Drawing & Erection Manual		L-08	√	
8.10	Level of suspension frames at bottom of end hooks in each field.	M	Water Level / Scale	B	100%	Drawing & Erection Manual		SR		

FIELD QUALITY PLAN

SUPPLIERS NAME AND ADDRESS	SYSTEM : Steam Generator & Auxiliaries	QP NO. : PP-QBE-2401-UHN-QA-104	PROJECT:	NTPC -LARA stage-II 2x800 MW
भारत हेवी इलेक्ट्रिकल्स लिमिटेड पावर सेक्टर - पूर्वी क्षेत्र, कोलकाता BHARAT HEAVY ELECTRICALS LIMITED PS:ER, KOLKATA	SUB-SYSTEM : Electro Static Precipitator	REV. №: 00	PACKAGE:	EPC
		DATE : 06/08/2024	CONTRACT NO.	CS-9587-001R-2-SC-NOA-7333, DATE-29.08.2023
	AREA : Mechanical Erection	PAGE :6 of 13	MAIN CONTRACTOR	BHEL, PS:ER, KOLKATA

Sl. No	Activity and operation	Type of Check	Characteristics / instruments	Class of check	Quantum of check	Reference Document	Acceptance Norms	Format of Record		Remarks
1	2	3	4	5	6	7	8	9	D*	
8.11	Completion of welding. NOTE: 1.Welding of locking plate shall be on one side of roof beam only. 2. Do not weld suspension arrangement and attachment to roof beams. 3. Ensure welding of support angle with support beam.	V	-	B	100%	Drawing & Erection Manual		L-11	√	Welding & NDT check as per Sl. No. 20
9	**EMITTING ELECTRODE SUSPENSION:**									
9.01	Diagonal variation of individual frames between corner holders.	M	Tape	B	100%	Drawing & Erection Manual		L-09	√	
9.02	Individual and cumulative pitch between rows.	M	Tape	B	100%	Drawing & Erection Manual		L-09	√	
9.03	Straightness of support beams, vertical beams and shock beams.	M	Piano wire / Tape	B	100%	Drawing & Erection Manual		Joint Protocol	√	
9.04	Straightness of vertical stays. (if applicable)	V	-	C	100%	Drawing & Erection Manual				
9.05	Alignment of support beam with frame part top.	M	Water level / Tape	A	100%	Drawing & Erection Manual		L-10	√	
9.06	Alignment of frame part top w.r.t. GPCL.	M	Tape	A	100%	Drawing & Erection Manual		Log Book		
9.07	Cumulative pitches and diagonals of the holders of frame part top.	M	Tape	C	100%	Drawing & Erection Manual		Log Book		
9.08	End side emitting frame middle to be positioned before erecting the frame bottom.	V		C	100%	Drawing & Erection Manual				
9.09	During alignment of middle and bottom frames, the water level of shock angle of the middle frame shall be maintained uniform throughout the width of ESP.	V		B	100%	Drawing & Erection Manual				
9.10	Holders are in one line for top, middle and bottom frame part.	M	Plumb bob / Tape	B	100%	Drawing & Erection Manual		Log Book		
9.11	Verticality and diagonals of emitting frame work assembly for frame part middle and bottom.	M	Plumb bob / Tape	A	100%	Drawing & Erection Manual		L-10	√	
9.12	Alignment of holders top to bottom in both directions – measure at four extreme corner holders.	M	Plumb bob / Tape	C	100%	Drawing & Erection Manual		Log Book		
9.13	The gap between emitting frame of two bus sections shall be maintained at prescribed levels at all places. Excess projection of EE frame towards casing wall shall be cut & maintained to 50mm at all levels after completion of alignment.	V		A	100%	Drawing, Technical Directive: 027 & Erection Manual				
9.14	Ensure welding of supporting beam with frame part top and welding of supporting beam with vertical beam.	V		C	100%	Drawing & Erection Manual				

FIELD QUALITY PLAN

SUPPLIERS NAME AND ADDRESS	SYSTEM : Steam Generator & Auxiliaries	QP NO. : PP-QBE-2401-UHN-QA-104	PROJECT:	NTPC -LARA stage-II 2x800 MW
भारत हेवी इलेक्ट्रिकल्स लिमिटेड पावर सेक्टर - पूर्वी क्षेत्र, कोलकाता BHARAT HEAVY ELECTRICALS LIMITED PS:ER, KOLKATA	SUB-SYSTEM : Electro Static Precipitator	REV. №: 00	PACKAGE:	EPC
		DATE : 06/08/2024	CONTRACT NO.	CS-9587-001R-2-SC-NOA-7333, DATE-29.08.2023
	AREA : Mechanical Erection	PAGE :7 of 13	MAIN CONTRACTOR	BHEL, PS:ER, KOLKATA

Sl. No	Activity and operation	Type of Check	Characteristics / instruments	Class of check	Quantum of check	Reference Document	Acceptance Norms	Format of Record		Remarks
1	2	3	4	5	6	7	8	9	D*	
9.15	Ensure welding of stair beam with vertical beam and vertical beam with middle & bottom frames.	V		C	100%	Drawing & Erection Manual				
9.16	Ensure welding of vertical stay with emitting frames and diagonal stay with vertical beam.	V		C	100%	Drawing & Erection Manual				
9.17	Avoid falling of weld splatter on support insulator i.e. complete all the welding in support insulator area before placement of support insulator	V		C	100%	Drawing & Erection Manual				
9.18	Ensure critical dimensions in insulator housing (HT connection clearance with support insulator heater/thermostat)	V		B	100%	Drawing & Erection Manual		Log Book		(dimension is to be indicated)
10	COLLECTING SYSTEM:									
10.01	Straightness of collecting electrodes before erection.	V	Fixture	B	100%	Drawing & Erection Manual				
10.02	Welding of "U" guides in collecting electrodes. Use low current only to avoid damage to CE. (Refer to BAP-Ranipet for WPS no.)	V		B	100%	Drawing & Erection Manual				
10.03	Ensure correct orientation of collecting electrodes (orientation in 1st field is different from other fields).	V		A	100%	Drawing, Technical Directive: 033 & Erection Manual				
10.04	Ensure that each collecting electrode rests on both hooks.	V		A	100%	Drawing & Erection Manual				
10.05	Distance between collecting electrodes to vertical beam (on front & rear).	M	Tape	A	100%	Drawing & Erection Manual		L-11	√	
10.06	Gap at bottom of gas distributor screen assembly (Minimum 100 mm to be maintained).	M	Tape	B	100%	Drawing & Erection Manual		L-11	√	
10.07	Clearance between shock bar edge to ridge cap.	M	Tape	A	100%	Drawing & Erection Manual		L-11	√	
10.08	Clearance between shock bar edge to shock bar guide (40 mm).	M	Tape	A	100%	Drawing, Technical Directive: 007 & Erection Manual		L-11	√	
10.09	Shock pads of all shock bars are in one line.	M	Piano wire /Tape	B	100%	Drawing & Erection Manual		L-11	√	
10.10	Clearance between collecting electrodes and hopper (vertical) deflection plate in the vertical plane.	M	Tape	B	100%	Drawing & Erection Manual		L-11	√	
10.11	Clearance between shock bar to hopper ridge plate (40 mm min).	M	Tape	A	100%	Drawing & Erection Manual		L-11	√	
10.12	Straightness of shock bars and guides.	M	Piano wire	B	100%	Drawing & Erection Manual				
10.13	Lock bolting of electrodes to be done after ensuring straightness of the collecting electrodes.	V		C	100%	Drawing & Erection Manual				
10.14	Ensuring removal of temp locking (if any) between shock bar & guide during alignment. Ensure free movement of shock bars. Refer TD No-46.	V		B	100%	Drawing, Technical Directive: 046 & Erection Manual		Log Book		

FIELD QUALITY PLAN

SUPPLIERS NAME AND ADDRESS	SYSTEM : Steam Generator & Auxiliaries	QP NO. : PP-QBE-2401-UHN-QA-104	PROJECT:	NTPC -LARA stage-II 2x800 MW
भारत हेवी इलेक्ट्रिकल्स लिमिटेड पावर सेक्टर - पूर्वी क्षेत्र, कोलकाता BHARAT HEAVY ELECTRICALS LIMITED PS:ER, KOLKATA	SUB-SYSTEM : Electro Static Precipitator	REV. №: 00	PACKAGE:	EPC
		DATE : 06/08/2024	CONTRACT NO.	CS-9587-001R-2-SC-NOA-7333, DATE-29.08.2023
	AREA : Mechanical Erection	PAGE :8 of 13	MAIN CONTRACTOR	BHEL, PS:ER, KOLKATA

Sl. No	Activity and operation	Type of Check	Characteristics / instruments	Class of check	Quantum of check	Reference Document	Acceptance Norms	Format of Record		Remarks
1	2	3	4	5	6	7	8	9	D*	
11	EMITTING SYSTEM:									
11.01	Record sweep / camber for vertical beam, vertical stay and supporting beam.	M	Tape	C	100%	Drawing & Erection Manual	Log Book			
11.02	Distance between transverse roof beam bottom to emitting frame supporting beam top.	M	Tape	A	100%	Drawing & Erection Manual	L-11		√	
11.03	Concentricity of suspension rod to screen tube.	M	Tape	B	100%	Drawing & Erection Manual	L-11		√	
11.04	Distance between emitting suspension screen tube edge and deflection plate (shield).	M	Tape	B	100%	Drawing & Erection Manual	L-11		√	
11.05	Distance between emitting rapping shaft screen tube edge and deflection plate.	M	Tape	B	100%	Drawing & Erection Manual	L-11		√	
11.06	Pin wheel clearance.	M	Tape	B	100%	Drawing & Erection Manual	L-11		√	
11.07	Spring back of emitting electrode.	M	Tape	A	Random	Drawing & Erection Manual	L-11		√	
11.08	Stretching of emitting electrodes (by stretching tool only).	V		C	100%	Drawing & Erection Manual				
11.09	The emitting electrode shall be stretched only up to hook level to avoid overstretching.	V		C	100%	Drawing & Erection Manual				
11.10	Earthing device shall be located on the frame near the inspection door.	V		B	100%	Drawing & Erection Manual				
11.11	Insulators – cleanliness, glossiness and no cracks.	V		B	100%	Drawing & Erection Manual				
11.12	Supporting flange below the support insulators shall be fully welded as per drawing.	V		A	100%	Drawing, Technical Directive: 005 & Erection Manual				
11.13	Clearance between the emitting frame and collecting electrode.	M	Tape /Go-gauge	A	100%	Drawing & Erection Manual	L-11		√	
12	COLLECTING RAPPING SYSTEM:									
12.01	Clearance between shaft axis to gable wall - front / rear	M	Tape	B	100%	Drawing & Erection Manual	L-11		√	
12.02	Distance between the roof beams and Centre line of 1st and last collecting electrodes in all the fields located in each row adjacent to ESP walls to be marked and plumbed on ESP wall.	M	Tape	B	100%	Drawing & Erection Manual				
12.03	Ensure lube oil as per the grade specified in drawing/datasheet.De-coupling and direction of rotation check	V		B	100%	Drawing & Erection Manual				
12.04	Distance between Centre line of rapping shaft to Centre of shock bar (310 mm).	M	Tape	B	100%	Drawing & Erection Manual	L-11		√	

FIELD QUALITY PLAN

SUPPLIERS NAME AND ADDRESS	SYSTEM : Steam Generator & Auxiliaries	QP NO. : PP-QBE-2401-UHN-QA-104	PROJECT:	NTPC -LARA stage-II 2x800 MW
भारत हेवी इलेक्ट्रिकल्स लिमिटेड पावर सेक्टर - पूर्वी क्षेत्र, कोलकाता BHARAT HEAVY ELECTRICALS LIMITED PS:ER, KOLKATA	SUB-SYSTEM : Electro Static Precipitator	REV. №: 00	PACKAGE:	EPC
		DATE : 06/08/2024	CONTRACT NO.	CS-9587-001R-2-SC-NOA-7333, DATE-29.08.2023
	AREA : Mechanical Erection	PAGE :9 of 13	MAIN CONTRACTOR	BHEL, PS:ER, KOLKATA

Sl. No	Activity and operation	Type of Check	Characteristics / instruments	Class of check	Quantum of check	Reference Document	Acceptance Norms	Format of Record		Remarks
1	2	3	4	5	6	7	8	9	D*	
12.05	Distance between support insulator center and roof beams. (Clarity required)	M	Tape	B	100%	Drawing & Erection Manual		Log Book		
12.06	Ensure motor base plate center line is in same vertical plane with center line of rapping shaft.	V	Water Level/Tape	B	100%	Drawing & Erection Manual				
12.07	Ensure indicator correctness as per direction of rotation marked in drawing.	V		B	100%	Drawing & Erection Manual				
12.08	Shock pad face and shaft axis to be in the same vertical plane to be in the same line for effective rapping.	M	Plumb bob	B	100%	Drawing & Erection Manual				
12.09	Lateral shift of hammers w.r.t. shock pad centers.	M	Tape	B	100%	Drawing & Erection Manual		Log Book		
12.10	Ensure phase angle of hammers and direction of rotation before welding of sleeves.	V		B	100%	Drawing & Erection Manual				
12.11	Locking of plain bearings and set rings.	V		C	100%	Drawing & Erection Manual				
12.12	Alignment of plain bearing and proper seating of rapping shaft in the bearing.	V		C	100%	Drawing & Erection Manual				
12.13	Ensure water level throughout the length of each shaft assembly (use shims if required).	M	Water level / Tape	C	100%	Drawing & Erection Manual		Log Book		
12.14	Set ring position and completion of welding.	V		B	100%	Drawing & Erection Manual		L-11	√	
12.15	Ensure circumferential groove on coupling matches with the edge of clutch.	V		B	100%	Drawing & Erection Manual				
12.16	Radial and axial alignment of clutch and coupling.	V		A	100%	Drawing & Erection Manual				
12.17	Sealing of the opening for CE rapping shaft in the casing.	V		B	100%	Drawing & Erection Manual				
13	**K. EMITTING RAPPING SYSTEM:**									
13.01	Check for the straightness of the shaft.	M	Piano wire	B	100%	Drawing & Erection Manual				
13.02	Ensure that shaft is free from undercuts and burrs.	V		C	100%	Drawing & Erection Manual				
13.03	Distance between shaft Centre to vertical beam.	M	Tape	B	100%	Drawing & Erection Manual		L-11	√	
13.04	Distance between Centre line of rapping shaft to hitting point on shock beam.	M	Tape	B	100%	Drawing & Erection Manual		L-11	√	
13.05	Phase angle of hammers and direction of rotation.	V		B	100%	Drawing & Erection Manual				
13.06	Alignment of bearing & proper seating of rapping shaft in the bearing.	V		B	100%	Drawing & Erection Manual				

FIELD QUALITY PLAN

SUPPLIERS NAME AND ADDRESS	SYSTEM : Steam Generator & Auxiliaries	QP NO. : PP-QBE-2401-UHN-QA-104	PROJECT:	NTPC -LARA stage-II 2x800 MW
भारत हेवी इलेक्ट्रिकल्स लिमिटेड पावर सेक्टर - पूर्वी क्षेत्र, कोलकाता BHARAT HEAVY ELECTRICALS LIMITED PS:ER, KOLKATA	SUB-SYSTEM : Electro Static Precipitator	REV. №: 00	PACKAGE:	EPC
		DATE : 06/08/2024	CONTRACT NO.	CS-9587-001R-2-SC-NOA-7333, DATE-29.08.2023
	AREA : Mechanical Erection	PAGE :10 of 13	MAIN CONTRACTOR	BHEL, PS:ER, KOLKATA

Sl. No	Activity and operation	Type of Check	Characteristics / instruments	Class of check	Quantum of check	Reference Document	Acceptance Norms	Format of Record		Remarks
1	2	3	4	5	6	7	8	9	D*	
13.07	Ensure water level throughout the length of each shaft assembly (use shims if required).	V		C	100%	Drawing & Erection Manual				
13.08	Level of plain bearing to be ensured by water level.	M	Water level / Tape	B	100%	Drawing & Erection Manual		Log Book		
13.09	Set ring position and completion of welding.	V		B	100%	Drawing & Erection Manual		L-11	√	
14	**GD Test related activity:**									
14.01	Ensure the erection of guide vanes in the ducting system as per the flow model report for uniform distribution. Refer TD NO-031.	V		B	100%	Drawing, Erection Manual/ Flow Model Test Report				
14.02	Ensure GD screen orientation as per drawing	V		C	100%	Drawing				
14.03	Deflection plates in the GD screens shall be placed as per flow model report (if applicable) and to be tack welded only after GD test.	V		C	100%	Flow Model Test Report/ GD Test Report				
15	**G D SCREEN RAPPING SYSTEM:**									
15.01	Clearance between shaft axis to primary screen edge.	M	Tape	B	100%	Drawing & Erection Manual		Log Book		
15.02	Distance between Centre line of rapping shaft to hitting point at rapping bracket.	M	Tape	B	100%	Drawing & Erection Manual		L-11	√	
15.03	Lateral shift of hammers w.r.t. hitting point at rapping bracket.	M	Tape	B	100%	Drawing & Erection Manual		Log Book		
15.04	Ensure motor base plate center line is in same vertical plane with center line of rapping shaft.	V	Water Level/Tape	B	100%	Drawing & Erection Manual		Log Book		
15.05	Ensure indicator correctness as per direction of rotation marked in drawing.	V		B	100%	Drawing & Erection Manual				
15.06	Phase angle of hammers and direction of rotation.	V		B	100%	Drawing & Erection Manual				
15.07	Alignment of bearing and proper seating of rapping shaft in the bearing.	V		C	100%	Drawing & Erection Manual				
15.08	Ensure circumferential groove on the coupling matches with the edge of clutch.	V		B	100%	Drawing & Erection Manual				
15.09	Radial and axial alignment of clutch and coupling.	V		B	100%	Drawing & Erection Manual		Log Book		
15.10	Set ring position and completion of welding.	V		A	100%	Drawing & Erection Manual				

FIELD QUALITY PLAN

SUPPLIERS NAME AND ADDRESS	SYSTEM : Steam Generator & Auxiliaries	QP NO. : PP-QBE-2401-UHN-QA-104	PROJECT:	NTPC -LARA stage-II 2x800 MW
भारत हेवी इलेक्ट्रिकल्स लिमिटेड पावर सेक्टर - पूर्वी क्षेत्र, कोलकाता BHARAT HEAVY ELECTRICALS LIMITED PS:ER, KOLKATA	SUB-SYSTEM : Electro Static Precipitator	REV. №: 00	PACKAGE:	EPC
		DATE : 06/08/2024	CONTRACT NO.	CS-9587-001R-2-SC-NOA-7333, DATE-29.08.2023
	AREA : Mechanical Erection	PAGE :11 of 13	MAIN CONTRACTOR	BHEL, PS:ER, KOLKATA

Sl. No	Activity and operation	Type of Check	Characteristics / instruments	Class of check	Quantum of check	Reference Document	Acceptance Norms	Format of Record		Remarks
1	2	3	4	5	6	7	8	9	D*	
16	INLET & OUTLET FUNNELS									
16.01	Check Elevation	M	Tape/Water level	B	100%	Drawing & Erection Manual	L-12	√		
16.02	Check Length and opening dimensions.	M	Tape	C	100%	Drawing & Erection Manual	L-12	√		
16.03	Ensure erection of Tertiary screen.			C	100%	Drawing & Erection Manual				
16.04	Ensure no gap is left after trial assembly and erection.	V		C	100%	Drawing & Erection Manual				
16.05	Kerosene test to be performed for funnel pre-assembly joints	V		B	100%	Drawing & Erection Manual				
17	HOPPERS									
17.01	Ensure welding of hopper plate with ridges as per drawing.	V		B	100%	Drawing, Technical Directive: 018 & Erection Manual				Use E7018 welding electrode and 100% LPI is to be ensured for these joints.
17.02	Elevation (bottom flange).	M	Tape/Water level	B	100%	Drawing & Erection Manual	L-12	√		
17.03	Spacing w.r.t. reference axes.	M	Tape	B	100%	Drawing & Erection Manual	L-12	√		
17.04	Weld continuous fillet in the inner side (gas path) of the walls.	V		B	100%	Drawing & Erection Manual				
17.05	Ensure correct orientation of hopper manhole door location w.r.t. gas flow direction for each row of hoppers.	V		C	100%	Drawing & Erection Manual				
17.06	Ensure surface contact of hopper heater with hopper wall.	V		B	100%	Drawing, Technical Directive: 022 & Erection Manual	SR			
17.07	Ensure welding of poke hole tube as per drawing to avoid dust entry into the heating chamber.	V		A	100%	Drawing, Technical Directive: 012 & Erection Manual	SR			
17.08	Ensure welding of fluidizing pad (customer scope) to avoid damage to heating elements during operation.	V		A	100%	Drawing & Erection Manual	SR			
17.09	Support for ash handling pipes shall be taken from hopper stiffeners only.	V		B	100%	Drawing & Erection Manual				
17.10	Ensure expansion joints are envisaged by ash handling vendor wherever supports are taken from hoppers.	V		B	100%	Drawing & Erection Manual				

FIELD QUALITY PLAN

SUPPLIERS NAME AND ADDRESS	SYSTEM : Steam Generator & Auxiliaries	QP NO. : PP-QBE-2401-UHN-QA-104	PROJECT:	NTPC -LARA stage-II 2x800 MW
भारत हेवी इलेक्ट्रिकल्स लिमिटेड पावर सेक्टर - पूर्वी क्षेत्र, कोलकाता BHARAT HEAVY ELECTRICALS LIMITED PS:ER, KOLKATA	SUB-SYSTEM : Electro Static Precipitator	REV. №: 00	PACKAGE:	EPC
		DATE : 06/08/2024	CONTRACT NO.	CS-9587-001R-2-SC-NOA-7333, DATE-29.08.2023
	AREA : Mechanical Erection	PAGE :12 of 13	MAIN CONTRACTOR	BHEL, PS:ER, KOLKATA

Sl. No	Activity and operation	Type of Check	Characteristics / instruments	Class of check	Quantum of check	Reference Document	Acceptance Norms	Format of Record	D*	Remarks
1	2	3	4	5	6	7	8	9		
18	INSULATOR HOUSING									
18.01	Ensure firm connection without any looseness in the copper tubing on both ends of the bushing insulator.	V		A	100%	Drawing, Technical Directive: 037 & Erection Manual				
18.02	Thermostat for insulator housing heaters shall be fixed at first/second field.	V		B	100%	Drawing & Erection Manual				
19	INSULATION & CLADDING									
19.01	Laying of insulation as per applicable erection drawings.	V		B	100%	Drawing, Technical Directive: 012, 045 & Erection Manual				
20	WELDING & NDT									
20.01	Availability of applicable WPS, Field Welding Schedule / Drawing (as applicable)	R		A	100%	Drawings/ Welding Schedule & WPS	Drawings/ Welding Schedule & WPS	WPS		
20.02	Qualification of welders.	V / R		A	100%	WPS/ ASME Section IX	WPS/ ASME Section IX	WQR	√	
20.03	Edge preparation and fit up of joints. Ensure proper root gap.	V		C	100%	Drawing	Drawing			
20.04	NDT for new edges prepared at site where t > 32 mm	V		C	100% MPI / LPI	ASTM E165	AWS D1.1	NDT Report	√	
20.05	Pre heating, Post heating and Post Weld Heat Treatment of weld joints, as applicable.	V / M	Time Temperature Recorder	A	As per WPS	WPS / Drawing	WPS / Drawing	HT Chart	√	
20.06	Adoption of correct procedure, use of approved Electrodes and methods.	V / R		A	100%	Drawing & WPS	Drawing & WPS			
20.07	Ensure proper sequence of welding.	V		B	Random in each shift	Drawing	Drawing			
20.08	Visual Inspection of field weldments	V / M	Weld gauge	B	100%	Drawing	AWS D1.1	SR	√	Surveillance by FQA
20.09	NDT on back gouged/ ground grooves prior to welding from second side.	V / P	LPI Kit	C	100% LPI	ASTM E165	AWS D1.1	NDT Report	√	Surveillance by FQA
20.10	NDT on field groove welds for t ≥ 32 mm.	V		A	100% RT / UT	AWS D1.1	AWS D1.1	NDT Report	√	Wherever RT is not possible UT to be done
20.11	NDT on field groove welds for t ≥ 25 mm < 32 mm.	V		A	10% RT/ UT and 100% MPI/ LPI	AWS D1.1	AWS D1.1	NDT Report	√	Wherever RT is not possible UT to be done
20.12	NDT on field groove welds for t < 25 mm.	V / P	MPI Kit / LPI Kit	A	10% MPI/ LPI	ASTM E709 / ASTM E165	AWS D1.1	NDT Report	√	

FIELD QUALITY PLAN

SUPPLIERS NAME AND ADDRESS	SYSTEM : Steam Generator & Auxiliaries	QP NO. : PP-QBE-2401-UHN-QA-104	PROJECT:	NTPC -LARA stage-II 2x800 MW
भारत हेवी इलेक्ट्रिकल्स लिमिटेड पावर सेक्टर - पूर्वी क्षेत्र, कोलकाता BHARAT HEAVY ELECTRICALS LIMITED PS:ER, KOLKATA	SUB-SYSTEM : Electro Static Precipitator	REV. №: 00	PACKAGE:	EPC
		DATE : 06/08/2024	CONTRACT NO.	CS-9587-001R-2-SC-NOA-7333, DATE-29.08.2023
	AREA : Mechanical Erection	PAGE :13 of 13	MAIN CONTRACTOR	BHEL, PS:ER, KOLKATA

Sl. No	Activity and operation	Type of Check	Characteristics / instruments	Class of check	Quantum of check	Reference Document	Acceptance Norms	Format of Record	D*	Remarks
1	2	3	4	5	6	7	8	9		
20.13	NDT on field fillet welds	V		A	-100% MPI/ LPI on all fillet welds of built up plate girders - MPI / LPI on other fillet weld : 5% of weld length	ASTM E709 / ASTM E165	AWS D1.1	NDT Report	√	
21	**GENERAL**									
21.01	Completion of air in leakage test before application of insulation. Soap water solution during air tightness test also to be done for casing walls, hoppers joints, funnels and inner roof.	V	Venturi meter	A	100%	Drawing, Technical Directive: 036 & Approved Procedure				
21.02	Completion of welding of insulation hooks and insulation.	V		B	100%	Drawing & Erection Manual				
21.03	Completion of galleries around ESP. Ensure approach and access for PG test of the ESP.	V		B	100%	Drawing, Technical Directive: 025 & Erection Manual				
21.04	Ensure proper insulation of all support insulator housing chambers, inner roof and emitting rapping drive.	V		C	100%	Drawing & Erection Manual				

अरुप रतन पाल / ARUP RATAN PAUL

Digitally signed by ARUP RATAN PAUL
DN: c=IN, o=BHARAT HEAVY ELECTRICALS LIMITED, ou=GOVERNMENT, 2.5.4.20=b6355c0e40c2ad6bdcd8bf4ead57fc91a7d353fa88668896bf74b6a56486559 3, postalCode=700091, st=WEST BENGAL, serialNumber=12BC8B448BF8F320E7DE8C1F8B72DAD924764DAA0E46680985AE7403E3A8F0AE, cn=ARUP RATAN PAUL
Date: 2024.08.09 17:55:19 +05'30'

LEGENDS :

* Records identified with tick (√) shall be essentially included by supplier in QA documentation.
# Class A : Critical, Class B : Major, Class C : Minor.
Class 'A' checks shall be witnessed by Owner FQA and Execution Engineer, Class 'B' checks shall be witnessed by Owner Execution Engineer, Class 'C' checks shall be witnessed by Main contractor engineer. CLASS 'A' &' B' CHECKS SHALL BE NTPC CHP STAGE.
SR - Site Register, TR- Test Report, LB-Log Book, IR - Inspection Report, MTC - Manufacturer's Test Certificate.
Surveillance of Class 'A' checks shall be perform By Owner Head (FQA), Class 'B' by Owner FQA Engineer and for class 'C' Another Executing Engineer authorised by Head (Executing Deptt).
Note: Any non confirmity/ deviation to the Quality plan must be brought to notice of NTPC. Dispositioning authority shall be the authorised representative of NTPC as per NTPC FQA system manual

For Owner Use	NTPC Doc. No. : 9587-001-104-QVM-Q-091 / Rev. - 00		
एनटीपीसी NTPC A Maharatna Company			
Main Contractor	REVIEWED BY	APPROVED BY	APPROVAL SEAL

RECORD OF QUALITY CHECKS

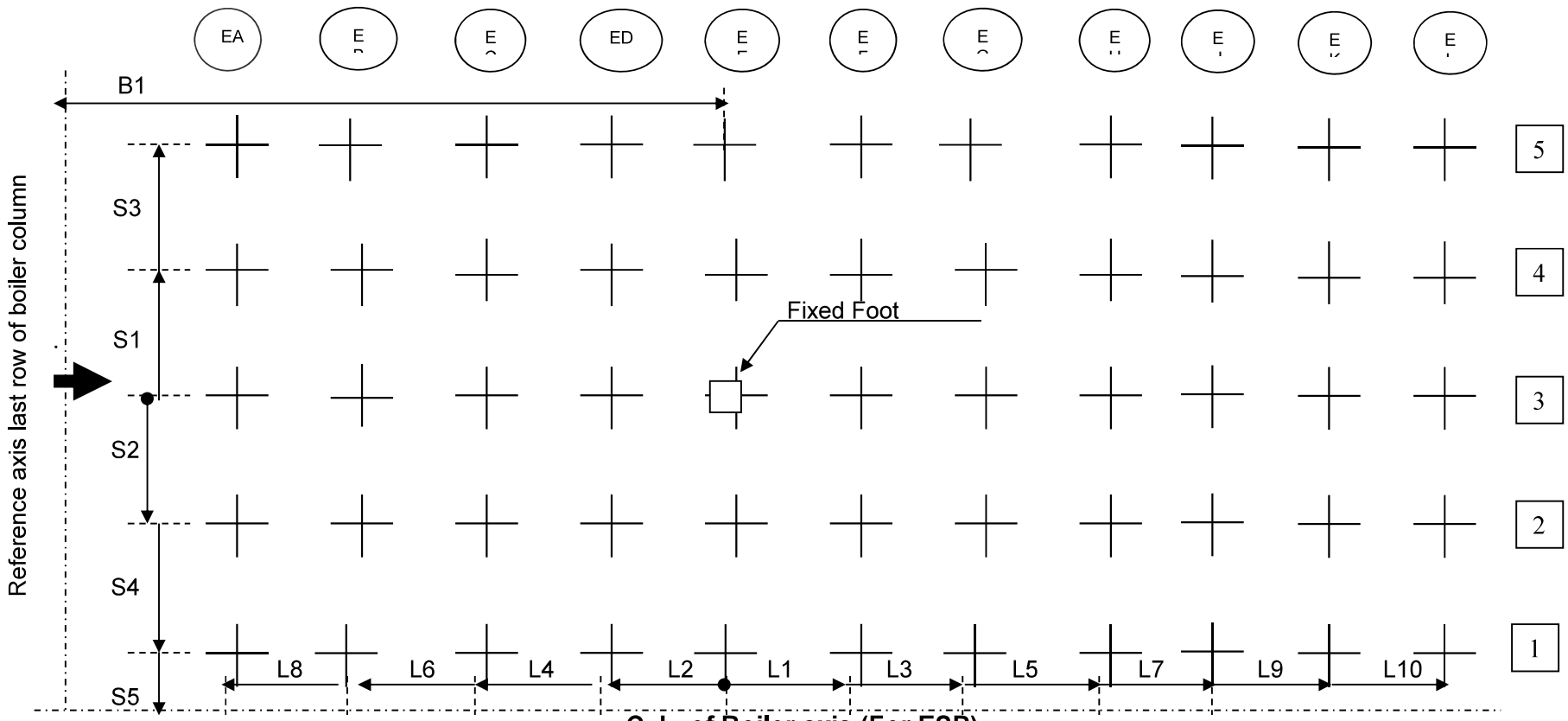
SHEET NO. OF QPI	CHECK NO.	RESULTS ACHIEVED OK / NOT OK	DRAWING / DOCUMENT REFERENCE	FORMAT OF RECORD	INSPECTED BY SIGN. & DATE	CLEARED BY SIGN. & DATE	REMARKS

Note: Any protocol made is to be numbered & mentioned in “Format of Record” column.

		SYSTEM	SUB-SYSTEM	AREA	DOC. NO. : **PP-QBE-2401-HD-QA-204**
PROJECT					REV. NO. : **00**
UNIT NO.		BOILER AUXILIARY	ESP	ERECTION	LOG SHEET NO. : **L-00**
RATING					SHEET **1** / **1** SHEETS

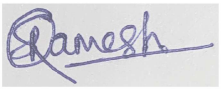
BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT NO.		

Location of ESP with Reference Axes & SPACING OF FOUNDATION PEDESTALS



C. L. of Boiler axis (For ESP)

			NAME	SIGNATURE & DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV. NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L- 01**
RATING		CUSTOMER			PAGE **1 / 7**



BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT REF.		

SPACING OF FOUNDATION PEDESTALS

Tolerance on spacing: ± **10 mm** (including over all)

ESP No : 1 / 2 Pass :

For Column Rows: 1			For Column Rows: 2		
Dimension	As per Drawing	Actual	Dimension	As per Drawing	Actual
L1			L1		
L2			L2		
L3			L3		
L4			L4		
L5			L5		
L6			L6		
L7			L7		
L8			L8		
L9			L9		
L10			L10		
For Column Row: 3			For Column Row: 4		
Dimension	As per Drawing	Actual	Dimension	As per Drawing	Actual
L1			L1		
L2			L2		
L3			L3		
L4			L4		
L5			L5		
L6			L6		
L7			L7		
L8			L8		
L9			L9		
L10			L10		
For Column Row: 5			Dimension	As per Drawing	Actual
Dimension	As per Drawing	Actual			
L1			B1		
L2					
L3					
L4					
L5					
L6					
L7					
L8					
L9					
L10					

Note:

1. Measurements from axis passing through fixed support as reference.
2. The axes passing through the fixed support are perpendicular to each other.

All dimensions are in mm.

			NAME	SIGNATURE & DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV.NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-01**
RATING		CUSTOMER			PAGE **2 / 7**

BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT REF.		

SPACING OF FOUNDATION PEDESTALS

Tolerance on spacing: ± **10 mm** (including over all)

ESP No : 1 / 2 Pass :

For Column Rows: EA			For Column Rows: EB		
Dimension	As per Drawing	Actual	Dimension	As per Drawing	Actual
S1			S1		
S2			S2		
S3			S3		
S4			S4		
S5			S5		
For Column Row: EC			For Column Row: ED		
Dimension	As per Drawing	Actual	Dimension	As per Drawing	Actual
S1			S1		
S2			S2		
S3			S3		
S4			S4		
S5			S5		
For Column Row: EE			For Column Row: EF		
Dimension	As per Drawing	Actual	Dimension	As per Drawing	Actual
S1			S1		
S2			S2		
S3			S3		
S4			S4		
S5			S5		
For Column Row: EG			For Column Row: EH		
Dimension	As per Drawing	Actual	Dimension	As per Drawing	Actual
S1			S1		
S2			S2		
S3			S3		
S4			S4		
S5			S5		

Note:

1. Measurements from axis passing through fixed support as reference.
2. The axes passing through the fixed support are perpendicular to each other.

All dimensions are in mm.

Ramesh

	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT REF.		

SPACING OF FOUNDATION PEDESTALS AND DIAGONALS

Tolerance on spacing: ± **10 mm** (including over all)

ESP No : 1 / 2 Pass :

For Column Rows: EJ			For Column Rows: EK		
Dimension	As per Drawing	Actual	Dimension	As per Drawing	Actual
S1			S1		
S2			S2		
S3			S3		
S4			S4		
S5			S5		
For Column Rows: EL					
Dimension	As per Drawing	Actual	Dimension	As per Drawing	Actual
S1					
S2					
S3					
S4					
S5					

DIAGONAL MEASUREMENTS- TOL.: 1mm/M, Max:10mm

Between Column Rows: 1&2			Between Column Rows: 2&3		
Diagonal Between	Measure ment	Difference	Diagonal Between	Measure ment	Difference
EA1&EB2			EA2&EB3		
EA2&EB1			EA3&EB2		
EB1&EC2			EB2&EC3		
EB2&EC1			EB3&EC2		
EC1&ED2			EC2&ED3		
EC2&ED1			EC3&ED2		
ED1&EE2			ED2&EE3		
ED2&EE1			ED3&EE2		
EE1&EF2			EE2&EF3		
EE2&EF1			EE3&EF2		
EF1&EG2			EF2&EG3		
EF2&EG1			EF3&EG2		
EG1&EH2			EG2&EH3		
EG2&EH1			EG3&EH2		
EH1&EJ2			EH2&EJ3		
EH2&EJ1			EH3&EJ2		
EJ1&EK2			EJ2&EK3		
EJ2&EK1			EJ3&EK2		
EK1&EL2			EK2&EL3		
EK2&EL1			EK3&EL2		

Note:

1. Measurements from axis passing through fixed support as reference.
2. The axes passing through the fixed support are perpendicular to each other.

All dimensions are in mm.

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PROJECT		INSPECTED BY			REV.NO.: **00**
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	DATE OF INSPECTION		
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DIAGONAL MEASUREMENTS

Tolerance : **1mm/M;10mm Max**

ESP No : 1 / 2 Pass :

DIAGONAL MEASUREMENTS- TOL.: 1mm/M, Max:10mm					
Between Column Rows: 3&4			Between Column Rows: 4&5		
Diagonal Between	Measurement	Difference	Diagonal Between	Measurement	Difference
EA3&EB4			EA4&EB2		
EA4&EB3			EA5&EB1		
EB3&EC4			EB4&EC2		
EB4&EC3			EB5&EC4		
EC3&ED4			EC4&ED5		
EC4&ED3			EC5&ED4		
ED3&EE4			ED4&EE5		
ED4&EE3			ED5&EE4		
EE3&EF4			EE4&EF5		
EE4&EF3			EE5&EF4		
EF3&EG4			EF4&EG5		
EF4&EG3			EF5&EG4		
EG3&EH4			EG4&EH5		
EG4&EH3			EG5&EH4		
EH3&EJ4			EH4&EJ5		
EH4&EJ3			EH5&EJ4		
EJ3&EK4			EJ4&EK5		
EJ4&EK3			EJ5&EK4		
EK3&EL4			EK4&EL5		
EK4&EL3			EK5&EL4		

Note:

All dimensions are in mm.

			NAME	SIGNATURE & DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV.NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-01**
RATING		CUSTOMER			PAGE **5 / 7**

BHEL	INSTRUMENT REGN.NO.		
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ELEVATION OF FOUNDATION PEDESTALS

Elevation of foundation pedestal as per drawing: ____ mm

Tolerance on measurements: **± 10 mm.**

ESP No : 1 / 2 Pass :

Location	EA1	EB1	EC1	ED1	EE1	EF1	EG1	EH1	EJ1	EK1	EL1
Actual											
Location	EA2	EB2	EC2	ED2	EE2	EF2	EG2	EH2	EJ2	EK2	EL2
Actual											
Location	EA3	EB3	EC3	ED3	EE3	EF3	EG3	EH3	EJ3	EK3	EL3
Actual											
Location	EA4	EB4	EC4	ED4	EE4	EF4	EG4	EH4	EJ4	EK4	EL4
Actual											
Location	EA5	EB5	EC5	ED5	EE5	EF5	EG5	EH5	EJ5	EK5	EL5
Actual											

All dimensions are in mm.

			NAME	SIGNATURE & DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV.NO.: **00**
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RATING		CUSTOMER			PAGE **6 / 7**

बी एच ई एल BHEL	INSTRUMENT REGN.NO.		
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ELEVATION OF BOTTOM OF BASE PLATE

Elevation of bottom of base plate as per drawing : ____ mm

Tolerance on measurements : **± 10 mm.**

ESP No : 1 / 2 Pass :

Location	EA1	EB1	EC1	ED1	EE1	EF1	EG1	EH1	EJ1	EK1	EL1
Actual											
Location	EA2	EB2	EC2	ED2	EE2	EF2	EG2	EH2	EJ2	EK2	EL2
Actual											
Location	EA3	EB3	EC3	ED3	EE3	EF3	EG3	EH3	EJ3	EK3	EL3
Actual											
Location	EA4	EB4	EC4	ED4	EE4	EF4	EG4	EH4	EJ4	EK4	EL4
Actual											
Location	EA5	EB5	EC5	ED5	EE5	EF5	EG5	EH5	EJ5	EK5	EL5
Actual											

All dimensions are in mm.

बी एच ई एल BHEL	INSTRUMENT REGN.NO.		
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COLUMN VERTICALITY MEASUREMENTS

Tolerance: **1 mm / M ; 10 mm Max.**

ESP No : 1 / 2 Pass :

Column No.	Inclined towards					Column No.	Inclined towards			
	Left	Right	Front	Rear			Left	Right	Front	Rear

All dimensions are in mm.

For each ESP, separate log sheet to be made.

			NAME	SIGNATURE & DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV.NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-02**
RATING		CUSTOMER			PAGE **1 / 1**

BHEL	INSTRUMENT REGN.NO.		
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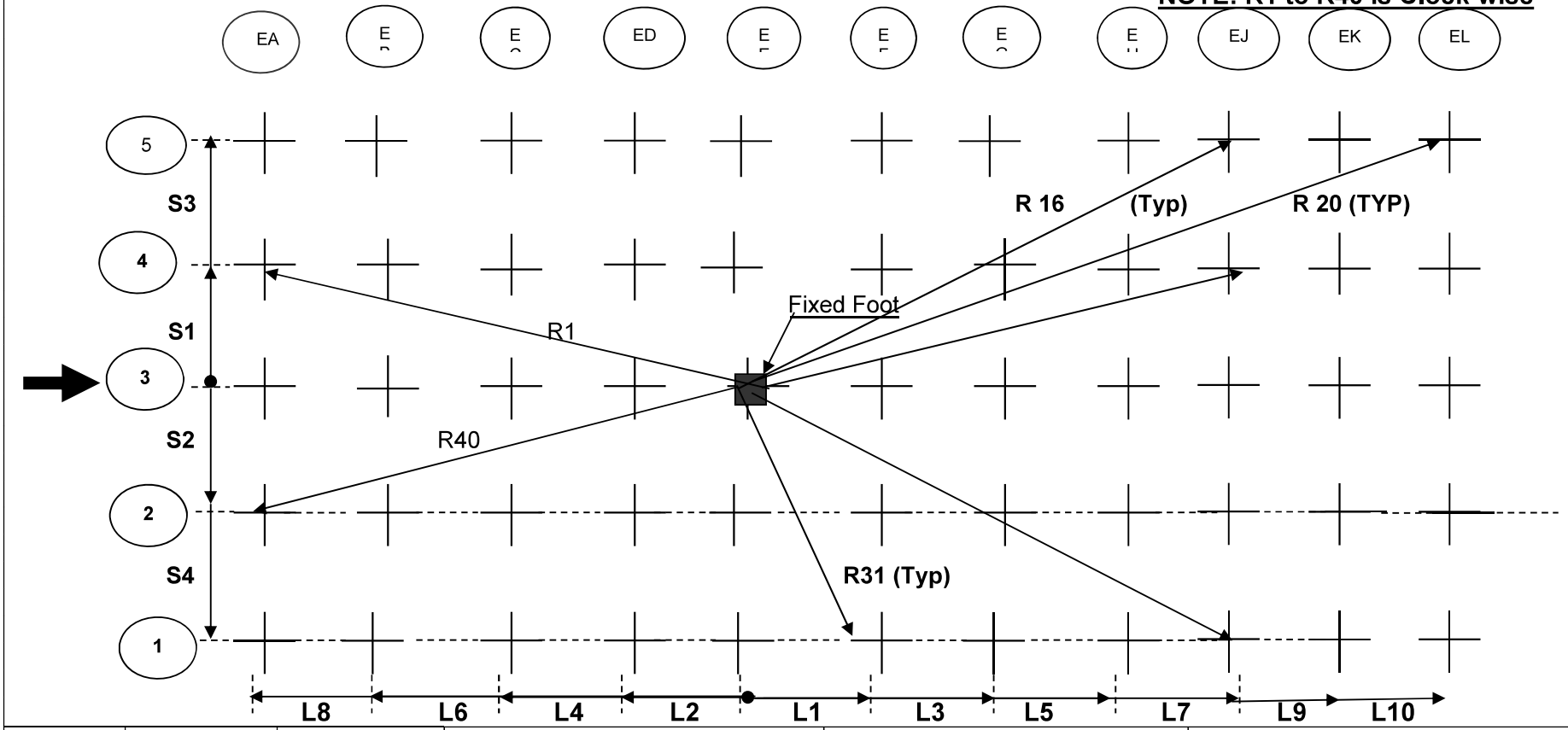
Disposition of Slide supports & Radial Measurements

NOTE: R1 to R40 is Clock-wise



			NAME	SIGNATURE / DATE	QP.NO.: PP-QBE-2401-HD-QA-204
PROJECT		INSPECTED BY			REV. NO.: 00
UNIT NO.		CLEARED BY			LOG SHEET NO.: L-03
RATING		CUSTOMER			PAGE 1 / 3

BHEL	INSTRUMENT REGN.NO.		
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Disposition of Slide Supports

Tolerance on spacing: ± **5 mm Max.**

ESP No : 1 / 2 Pass :

As per Drg. :

SPACING/ ROW	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10
1										
2										
3										
4										
5										

AS PER DRG.											
ROW / SPACING	EA	EB	EC	ED	EE	EF	EG	EH	EJ	EK	EL
S1											
S2											
S3											
S4											

NOTE :

1. Maintain the absolute level of top plate of support within ± **5 mm.**
2. The verticality of supporting column shall be within **10 mm Max.**
3. Align the centre line of column w.r.t. bench mark.
4. Check the orientation of free guided slide supports.
5. Locate slide supports on centre line of column top plate.
6. Ensure the correct orientation of all bearings and log in the plan bottom and plan top dimensions of each bearing as per drawing.
7. All dimensions are in mm.
8. For each ESP, separate log sheet to be made.

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BHEL	INSTRUMENT REGN.NO.		
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LEVEL OF TOP PLATE OF SUPPORTS & RADIAL MEASUREMENTS

Tolerance on level: **± 5 mm Max.**

ESP No : 1 / 2 Pass :

Location	EA1	EB1	EC1	ED1	EE1	EF1	EG1	EH1	EJ1	EK1	EL1
Actual											
Location	EA2	EB2	EC2	ED2	EE2	EF2	EG2	EH2	EJ2	EK2	EL2
Actual											
Location	EA3	EB3	EC3	ED3	EE3	EF3	EG3	EH3	EJ3	EK3	EL3
Actual											
Location	EA4	EB4	EC4	ED4	EE4	EF4	EG4	EH4	EJ4	EK4	EL4
Actual											
Location	EA5	EB5	EC5	ED5	EE5	EF5	EG5	EH5	EJ5	EK5	EL5
Actual											

Radial measurements (between fixed & individual supports)

Tolerance: **± 5 mm Max.**

	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
Actual										
	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20
Actual										
	R21	R22	R23	R24	R25	R26	R27	R28	R29	R30
Actual										
	R31	R32	R33	R34	R35	R36	R37	R38	R39	R40
Actual										

All dimensions are in mm.

			NAME	SIGNATURE & DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
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RATING		CUSTOMER			PAGE **3 / 3**

BHEL	INSTRUMENT REGN.NO.		
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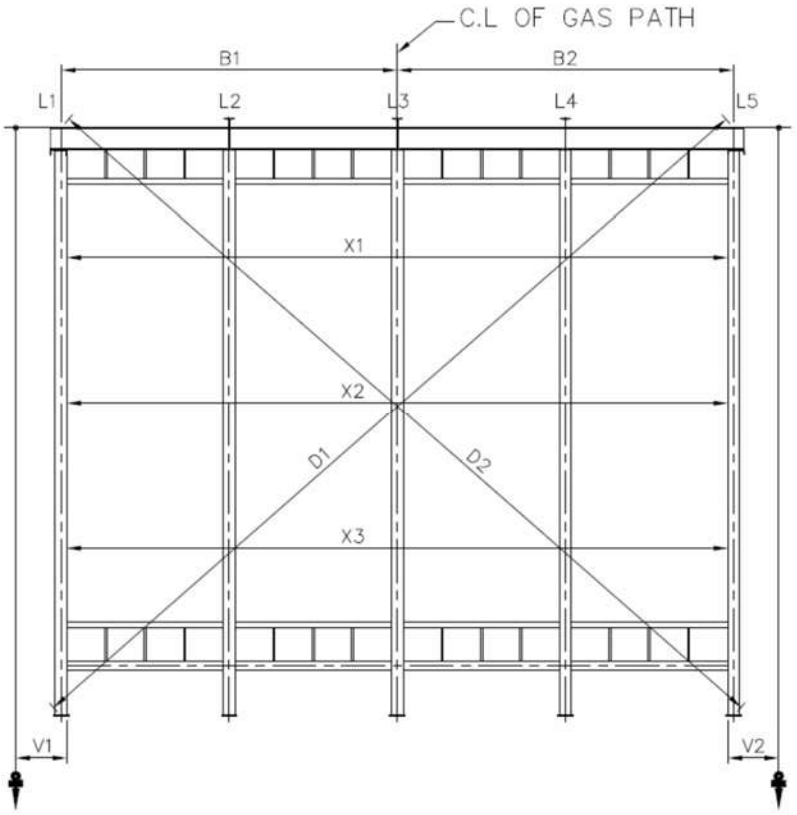
Inlet / Outlet & Intermediate frames of 5 column arrangement

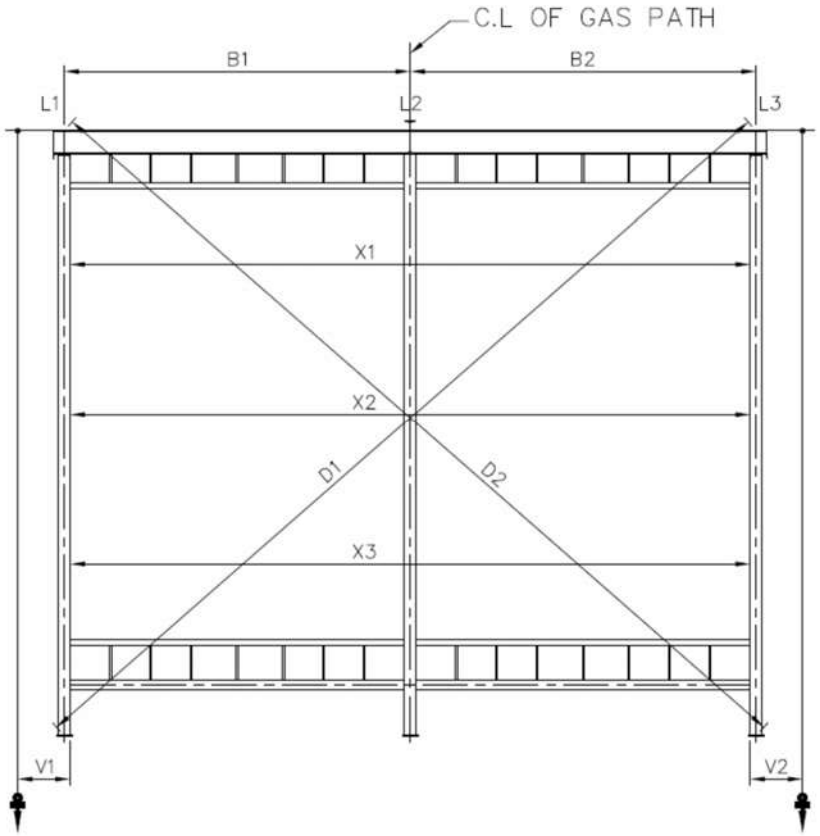


Sl. No.	Check and log	Permissible Deviation	Dimension
1	The level of bottom flange of longitudinal roof beam.	**3 mm**	L1 to L5
2	Verticality of panels.	**10 mm**	V1 & V2
3	The opening along the gas flow.	**± 10 mm**	X1, X2 & X3
4	The centre line of gas path chamber.	**± 2 mm**	B1 & B2
5	Diagonal Difference	**15 mm**	D1~D2

			NAME	SIGNATURE / DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV. NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-04**
RATING		CUSTOMER			PAGE **1 / 5**

BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT NO.		

Inlet / Outlet & Intermediate frames of 3 column arrangement

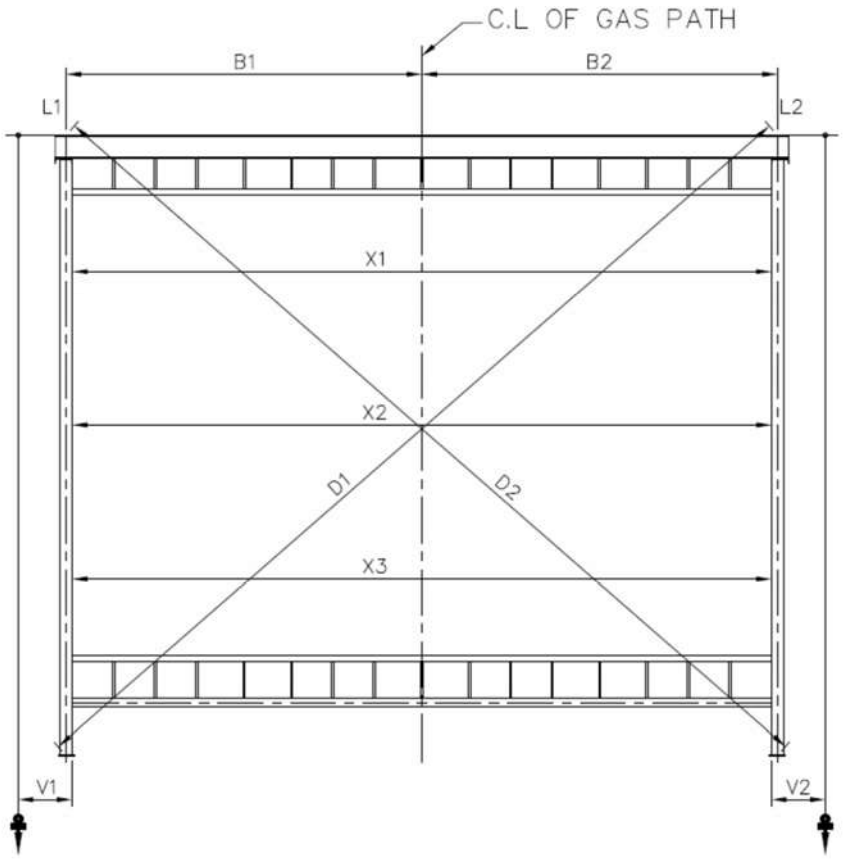


Sl. No.	Check and log	Permissible Deviation	Dimension
1	The level of bottom flange of longitudinal roof beam.	**3 mm**	L1 to L3
2	Verticality of panels.	**10 mm**	V1 & V2
3	The opening along the gas flow.	**± 10 mm**	X1, X2 & X3
4	The centre line of gas path chamber.	**± 2 mm**	B1 & B2
5	Diagonal Difference	**15 mm**	D1~D2

			NAME	SIGNATURE / DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV. NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-04**
RATING		CUSTOMER			PAGE **2 / 5**

BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT NO.		

Inlet / Outlet & Intermediate frames of 2 column arrangement



Sl. No.	Check and log	Permissible Deviation	Dimension
1	The level of bottom flange of longitudinal roof beam.	**3 mm**	L1 & L2
2	Verticality of panels.	**10 mm**	V1 & V2
3	The opening along the gas flow.	**± 10 mm**	X1, X2 & X3
4	The centre line of gas path chamber.	**± 2 mm**	B1 & B2
5	Diagonal Difference	**15 mm**	D1~D2

INSTRUMENT REGN.NO.		
DATE OF INSPECTION		
DRAWING / DOCUMENT NO.		

	Sl.No.	L1	L2	L3	L4	L5	V1	V2	B1	B2	X1	X2	X3	D1 ~ D2
ESP – I	1													
	2													
	3													
	4													
	5													
	6													
	7													
	8													
	9													
	10													
	11													
ESP – II	1													
	2													
	3													
	4													
	5													
	6													
	7													
	8													
	9													
	10													
	11													

			NAME	SIGNATURE / DATE	
PROJECT		INSPECTED BY			QP.NO.: **PP-QBE-2401-HD-QA-204**
UNIT NO.		CLEARED BY			REV. NO.: **00**
RATING		CUSTOMER			LOG SHEET NO.: **L-04**
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BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT NO.		

	Sl.No.	L1	L2	L3	L4	L5	V1	V2	B1	B2	X1	X2	X3	D1 ~ D2
ESP - III	1													
	2													
	3													
	4													
	5													
	6													
	7													
	8													
	9													
	10													
	11													
ESP - IV	1													
	2													
	3													
	4													
	5													
	6													
	7													
	8													
	9													
	10													
	11													

			NAME	SIGNATURE / DATE	
PROJECT		INSPECTED BY			QP.NO.: **PP-QBE-2401-HD-QA-204**
UNIT NO.		CLEARED BY			REV. NO.: **00**
RATING		CUSTOMER			LOG SHEET NO.: **L-04**
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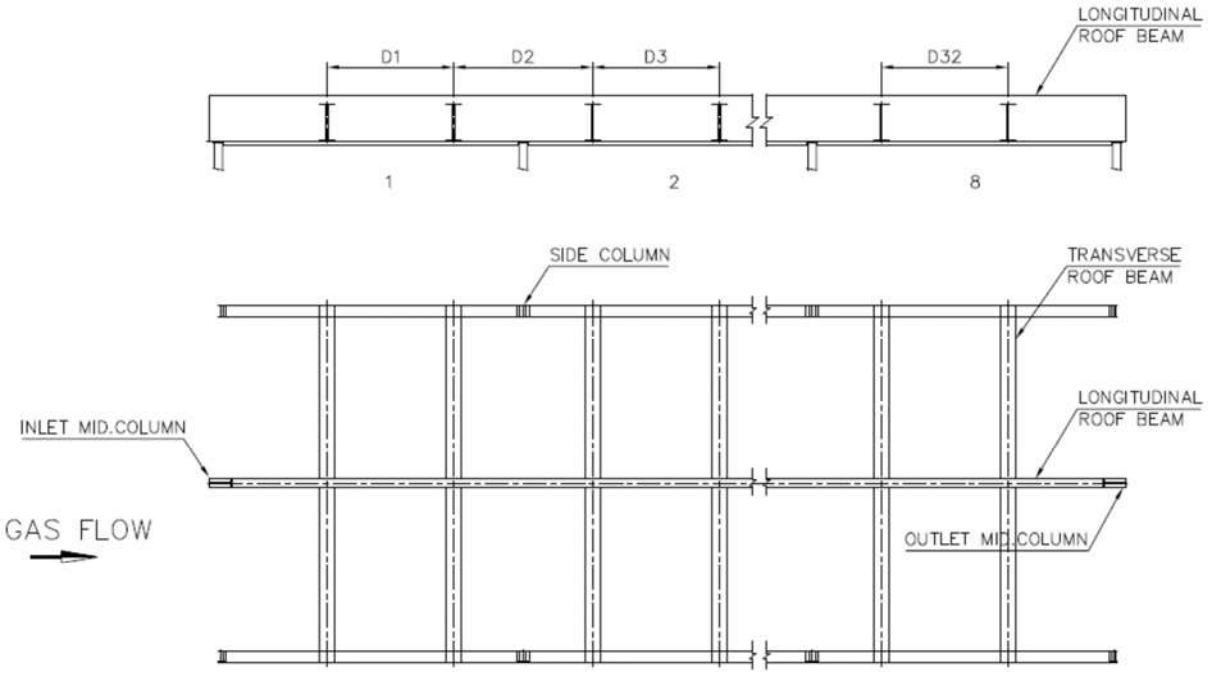
Location of Transverse Roof Beams



NOTE :

1. Take measurements of transverse roof beams location at three places as shown within **5 mm Max.**
2. Ensure the level of the bottom flange of the transverse roof beam within **5 mm Max.**
3. All dimensions are in mm.
4. Separate log sheet to be made for each pass of ESP.

			NAME	SIGNATURE & DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
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UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-05**
RATING		CUSTOMER			PAGE **1 / 3**

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	DRAWING / DOCUMENT REF.		

SPACING OF TRANSVERSE ROOF BEAMS

ESP No.: Pass :

Location	As per Drawing	Measurements		
		1	2	3
D1				
D2				
D3				
D4				
D5				
D6				
D7				
D8				
D9				
D10				
D11				
D12				
D13				
D14				
D15				
D16				
D17				
D18				
D19				
D20				
D21				
D22				
D23				
D24				
D25				
D26				
D27				
D28				
D29				
D30				
D31				
D32				

All dimensions are in mm.
Separate log sheet to be made for each ESP.

			NAME	SIGNATURE & DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV.NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-05**
RATING		CUSTOMER			PAGE **2 / 3**

बी एच ई एल BHEL	INSTRUMENT REGN.NO.		
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LEVEL OF TRANSVERSE ROOF BEAMS

ESP No.: 1 / 2 Pass :

Roof Beam No.	Location			Roof Beam No.	Location		
	1	2	3		1	2	3
1				17			
2				18			
3				19			
4				20			
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							

For each ESP separate log sheet to be made.

All dimensions are in mm.

			NAME	SIGNATURE & DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV.NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-05**
RATING		CUSTOMER			PAGE **3 / 3**

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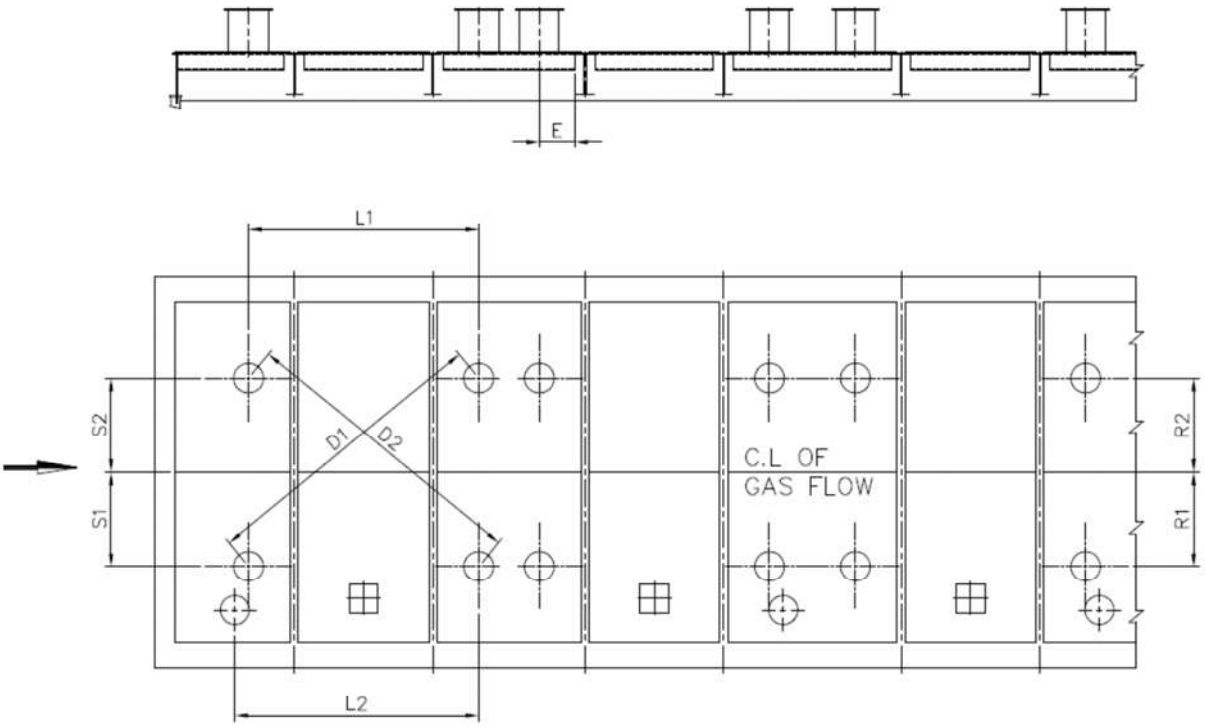
INSULATOR SUPPORT PANEL MEASUREMENTS

ESP No.: 1 / 2 Pass :



Permissible variation:

1. The positioning of the opening for support insulators w.r.t. GPCL = ± **2 mm.** (S1, S2, R1 & R2)
2. The diagonal deviation of the opening for the support of emitting system = **5 mm Max.** (D1& D2)
3. Distance between the end hook to centre line of suspension tube = ± **5 mm**. (E)
4. Spacing = ± **2 mm**. (L1 & L2)

NOTE:

1. Refer Roof panel drawing.
2. S1, S2, R1 & R2 indicates front & rear readings of a field.
3. All dimensions are in mm.
4. Separate log sheet to be made for each pass of ESP.

			NAME	SIGNATURE & DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV.NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-06**
RATING		CUSTOMER			PAGE **1 / 2**

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	DATE OF INSPECTION		
	DRAWING / DOCUMENT REF.		

INSULATOR SUPPORT PANEL MEASUREMENT

ESP No. : 1 / 2 Pass :

Location	ESP FIELD NUMBER									
	1	2	3	4	5	6	7	8	9	10
S1										
S2										
R1										
R2										
L1										
L2										
E										
E										
E										
E										
D1 ~ D2										

All dimensions are in mm.

Separate log sheet to be made for each ESP.

			NAME	SIGNATURE & DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV.NO.: **00**
UNIT NO.		CLCEARED BY			LOG SHEET NO.: **L-06**
RATING		CUSTOMER			PAGE **2 / 2**

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BHEL	INSTRUMENT REGN.NO.		
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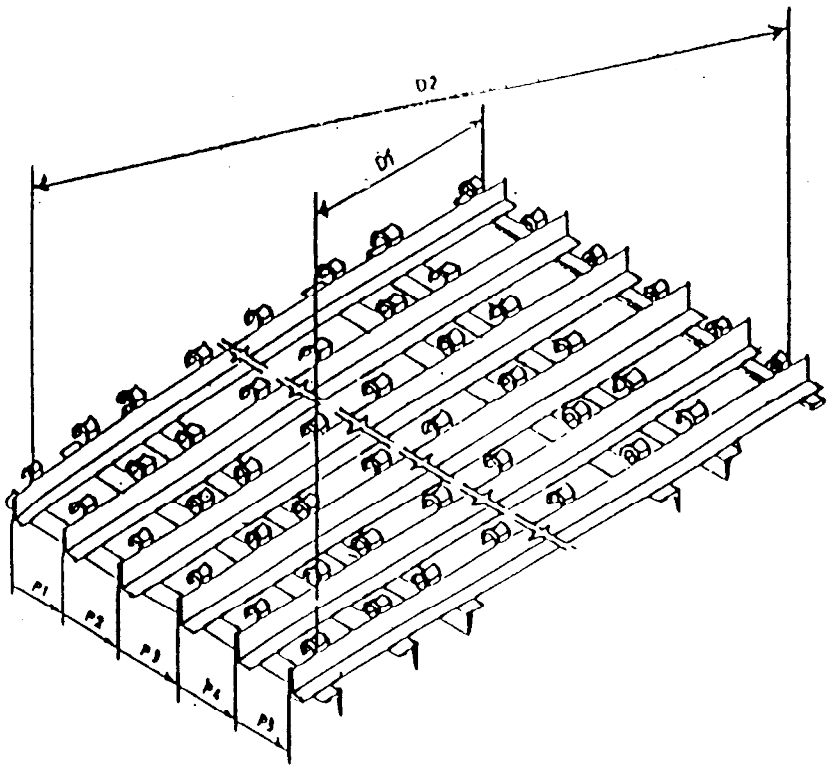
	DRAWING / DOCUMENT REF.		

SUSPENSION FRAME OF COLLECTING ELECTRODES

ESP No.: 1 / 2 Pass :



NOTE :

1. Diagonal difference between corner hooks = **7 mm Max.**
2. Tolerance on cumulative pitch between angles = ± **3 mm Max.**
3. Log the measurements in sheet 2 / 2.

			NAME	SIGNATURE & DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV.NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-07**
RATING		CUSTOMER			PAGE **1 / 2**

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	DATE OF INSPECTION		
	DRAWING / DOCUMENT REF.		

SUSPENSION FRAME OF COLLECTING ELECTRODES - MEASUREMENTS

ESP No.: 1 / 2 Pass :

DU NO.	FRAME NO.	P1	P2	P3	P4	P5	P6	P7	D1	D2	LOCATION
											FRONT
											MIDDLE
											REAR
											FRONT
											MIDDLE
											REAR
											FRONT
											MIDDLE
											REAR
											FRONT
											MIDDLE
											REAR
											FRONT
											MIDDLE
											REAR
											FRONT
											MIDDLE
											REAR
											FRONT
											MIDDLE
											REAR

All dimensions are in mm.

			NAME	SIGNATURE & DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV.NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-07**
RATING		CUSTOMER			PAGE **2 / 2**

BHEL	INSTRUMENT REGN.NO.		
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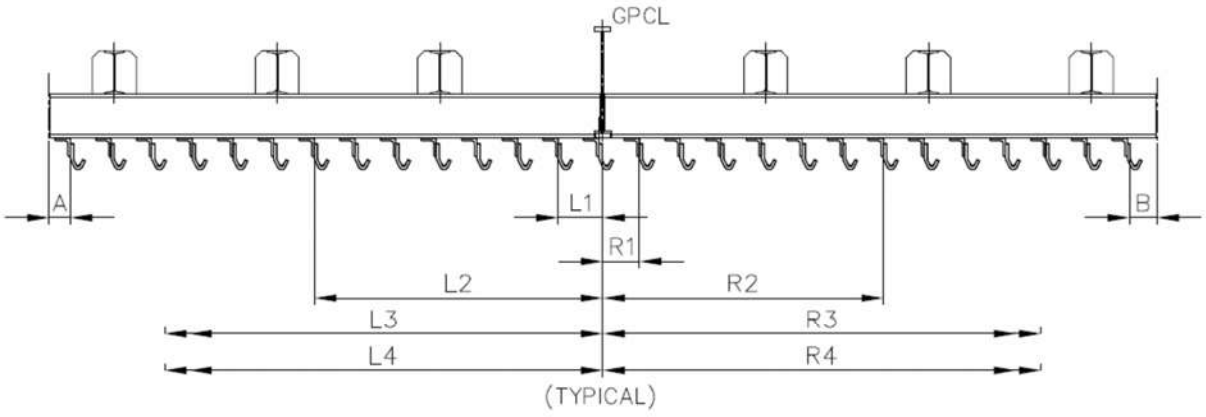
	DRAWING / DOCUMENT REF.		

COLLECTING ELECTRODE SUSPENSION ARRANGEMENT



DIMENSION	1st FIELD	OTHER FIELDS
A	74	126
B	126	74

NOTE :

Take all measurements from GPCL.

The cumulative measurements between GPCL and collecting electrode suspension frame shall be within ± **3 mm.**

Maintain the end hook of support angle in one line and perpendicular to GPCL within ± **3 mm.**

Refer suspension frame of collecting electrode detail drawing.

All dimensions are in mm.

Separate log sheet to be made for each pass of ESP.

			NAME	SIGNATURE & DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV.NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-08**
RATING		CUSTOMER			PAGE **1 / 2**

BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT REF.		

COLLECTING ELECTRODE SUSPENSION ARRANGEMENT

ESP No.: 1 / 2 Pass :

Dimension	ESP FIELD NUMBERS																			
	1		2		3		4		5		6		7		8		9		10	
	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R	F	R
L1																				
R1																				
L2																				
R2																				
L3																				
R3																				
L4																				
R4																				
L5																				
R5																				
L6																				
R6																				
L7																				
R7																				
A																				
B																				

All dimensions are in mm.

Separate log sheet to be made for each ESP.

F - refers to Front side of ESP

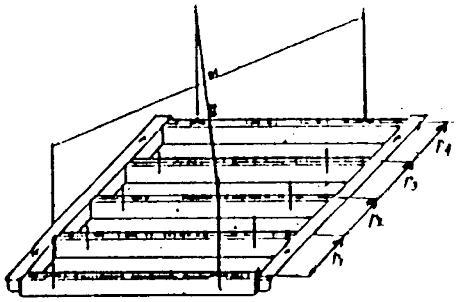
R - Refers to Rear side of the suspension arrangement of the respective field.

			NAME	SIGNATURE & DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV.NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-08**
RATING		CUSTOMER			PAGE **2 / 2**

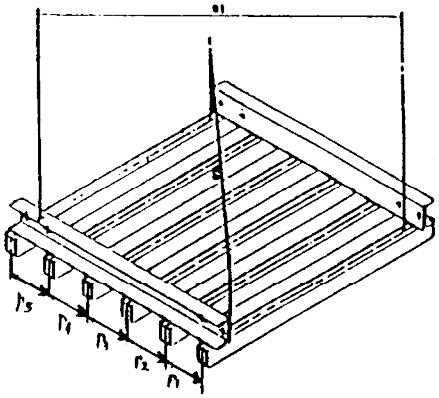
BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT REF.		

SUSPENSION FRAMES OF EMITTING SYSTEM

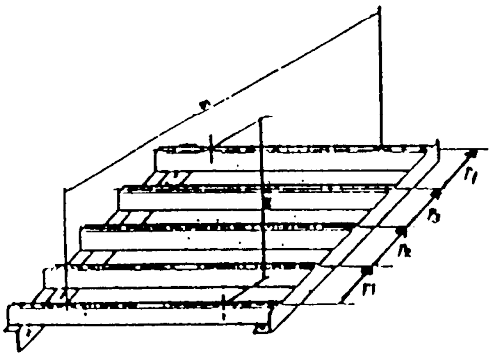
EMITTING FRAME - TOP



EMITTING FRAME - BOTTOM



EMITTING FRAME - MIDDLE



NOTE :

1. Diagonal difference between corner hooks = **7 mm Max.**
2. Tolerance on cumulative pitch between angles = ± **3 mm Max.**
3. Log the measurements in sheet 2 / 2.

			NAME	SIGNATURE & DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV.NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-09**
RATING		CUSTOMER			PAGE **1 / 2**

BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT REF.		

SUSPENSION FRAME OF EMITTING ELECTRODES - MEASUREMENTS

ESP No.: 1 / 2 Pass :

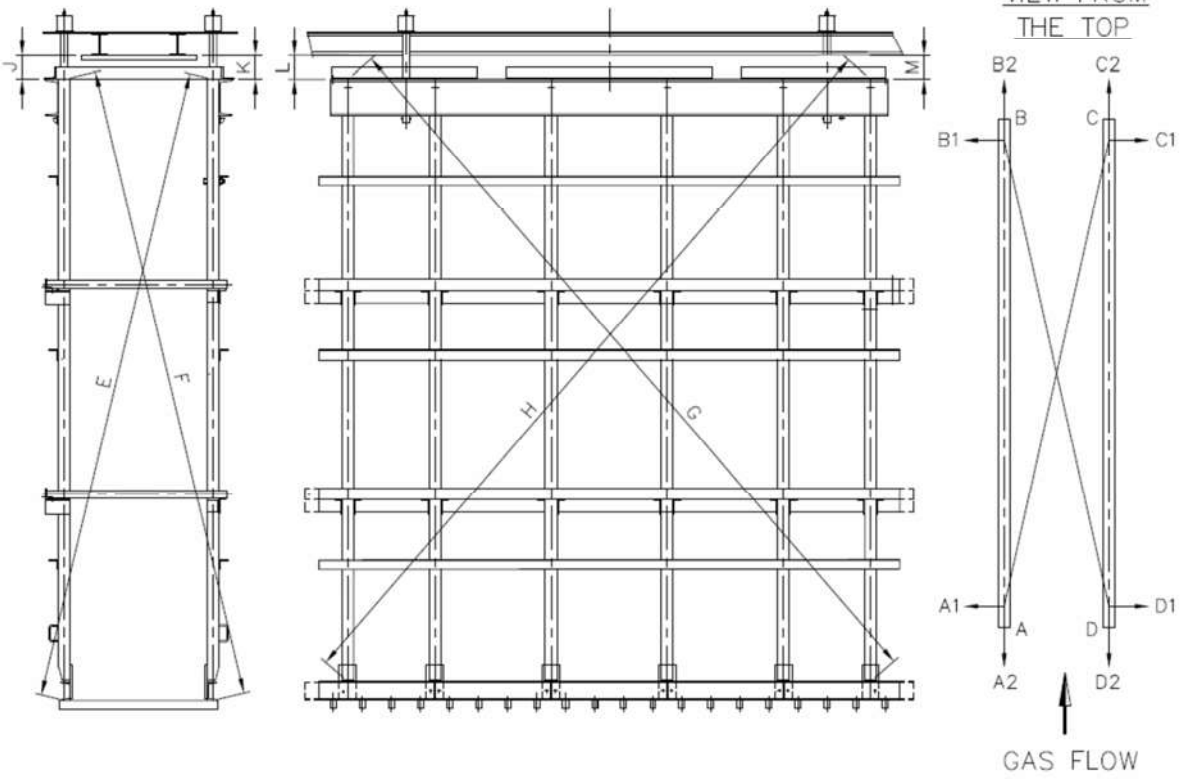
DU NO.	FRAME NO.	P1	P2	P3	P4	P5	P6	P7	D1	D2	LOCATION
											FRONT
											MIDDLE
											REAR
											FRONT
											MIDDLE
											REAR
											FRONT
											MIDDLE
											REAR
											FRONT
											MIDDLE
											REAR
											FRONT
											MIDDLE
											REAR
											FRONT
											MIDDLE
											REAR
											FRONT
											MIDDLE
											REAR

All dimensions are in mm.

			NAME	SIGNATURE & DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV.NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-09**
RATING		CUSTOMER			PAGE **2 / 2**

BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT REF.		

EMITTING SYSTEM FRAME WORK ASSEMBLY



Permissible variation :

The distance between bottom of roof beam and top of supporting beam (J,K,L,M) ... **± 5 mm.**

The verticality of frame work in both the axes by plumbing on four outer most corner holders. (A1, A2, B1, B2, C1, C2, D1, D2) .... **5 mm Max.**

The diagonals of the emitting system after assembly on extreme corner. (E, F,G,H) ..... **10 mm Max.**

LEGEND: A1, A2 ...D2 refers plumb line.

NOTE :

Separate log sheet to be made for each pass of ESP.

All dimensions are in mm.

BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT REF.		

EMITTING SYSTEM FRAME WORK ASSEMBLY

ESP No.: 1 / 2 Pass :

Dimension	ESP FIELD NUMBERS									
	1	2	3	4	5	6	7	8	9	10
A1										
A2										
B1										
B2										
C1										
C2										
D1										
D2										
E ~ F (LS)										
E ~ F (RS)										
G ~ H (FS)										
G ~ H (RRS)										
J										
K										
L										
M										

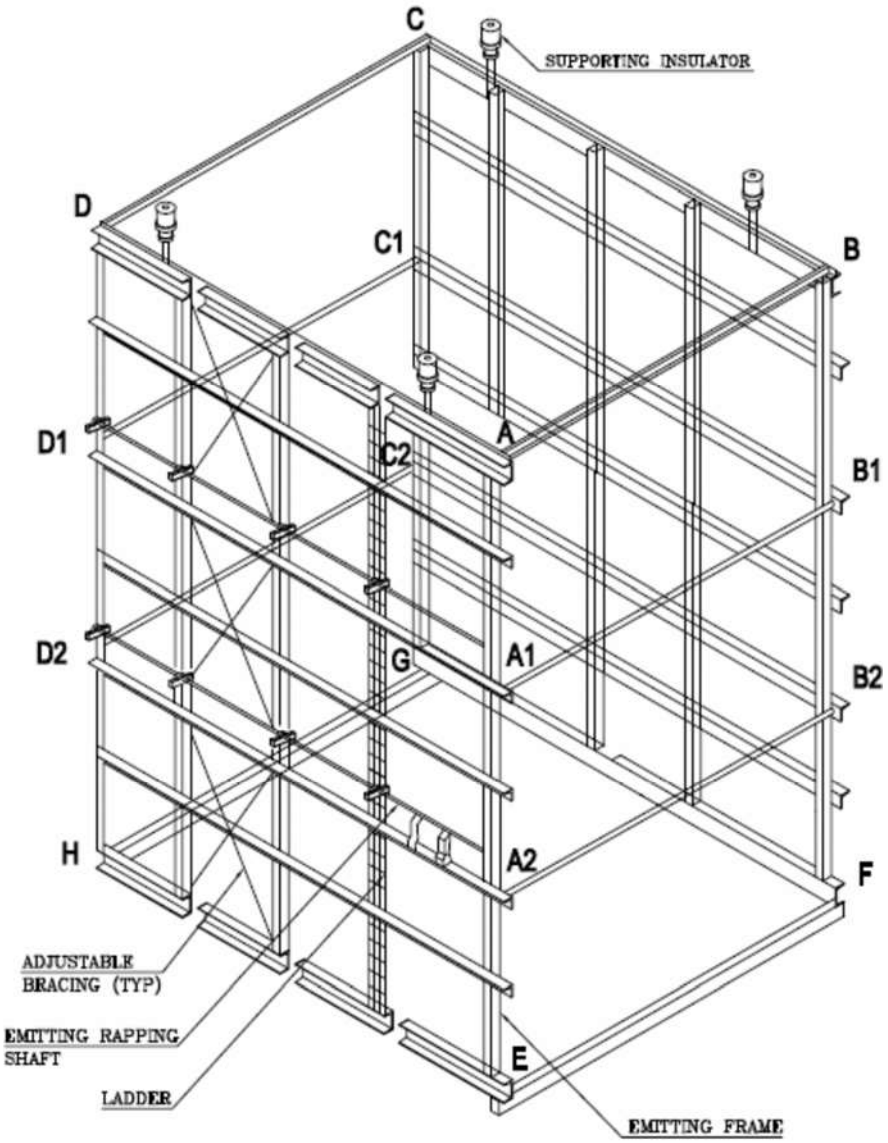
All dimensions are in mm.

Separate log sheet to be made for each pass of ESP.

LEGEND : RS : Right side LS : Left side FS : Front side RRS : Rear side.

BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT REF.		

EMITTING SYSTEM FRAME WORK ASSEMBLY



			NAME	SIGNATURE & DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV.NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-10**
RATING		CUSTOMER			PAGE **3 / 4**

Ramesh

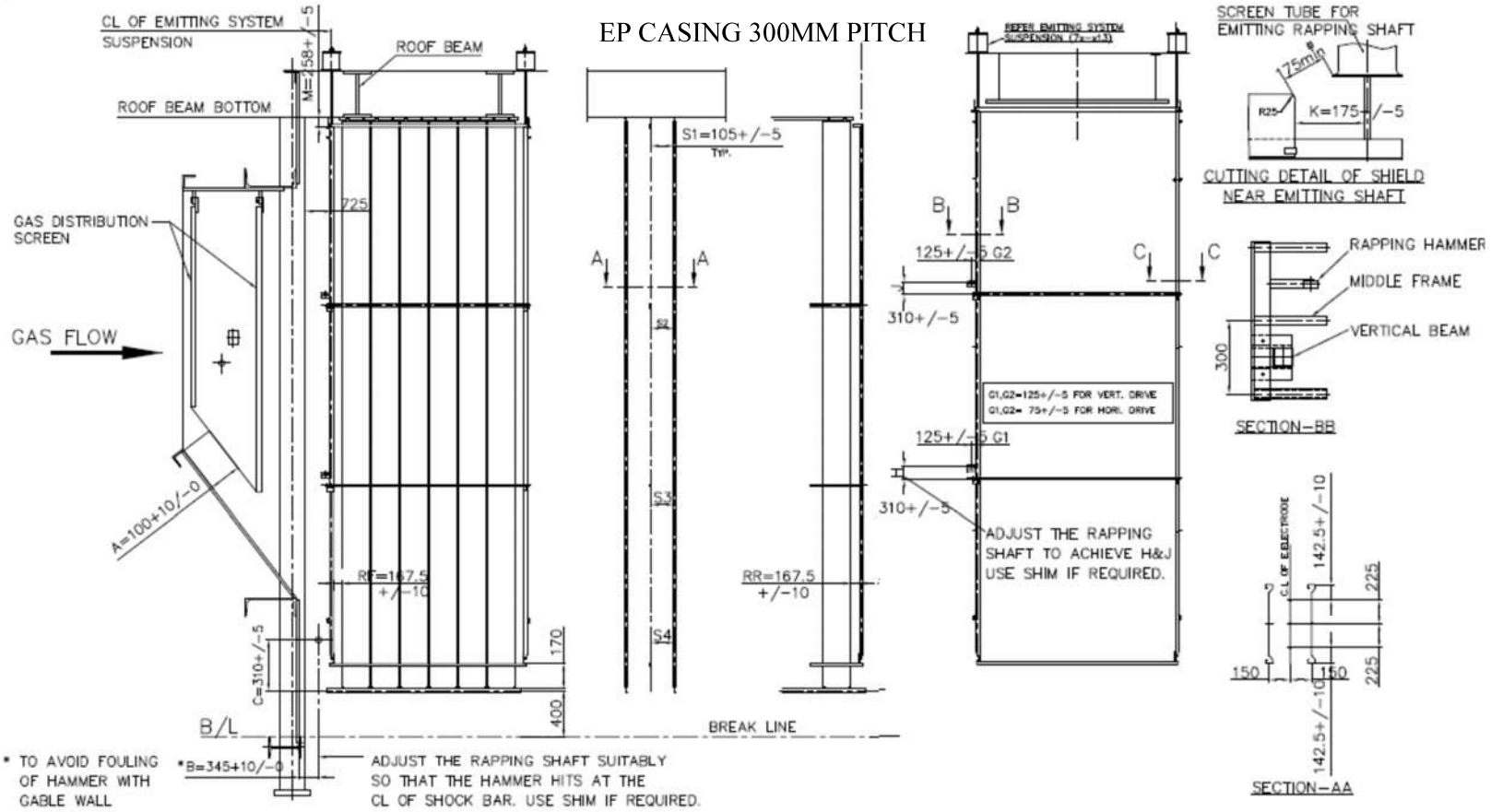
बी एच ई एल BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT REF.		

EMITTING SYSTEM FRAME WORK ASSEMBLY

Measure-ment	FIELD NUMBERS									
	1	2	3	4	5	6	7	8	9	10
AB										
A1B1										
A2B2										
EF										
CD										
C1D1										
C2D2										
GH										
AC										
A1C1										
A2C2										
EG										
BD										
B1D1										
B2D2										
FH										
AD1										
DA1										
BC1										
CB1										
A1D2										
D1A2										
B1C2										
C1B2										
HA2										
ED2										
FC2										
GB2										
AD										
A1D1										
A2D2										
EH										
BC										
B1C1										
B2C2										
FG										

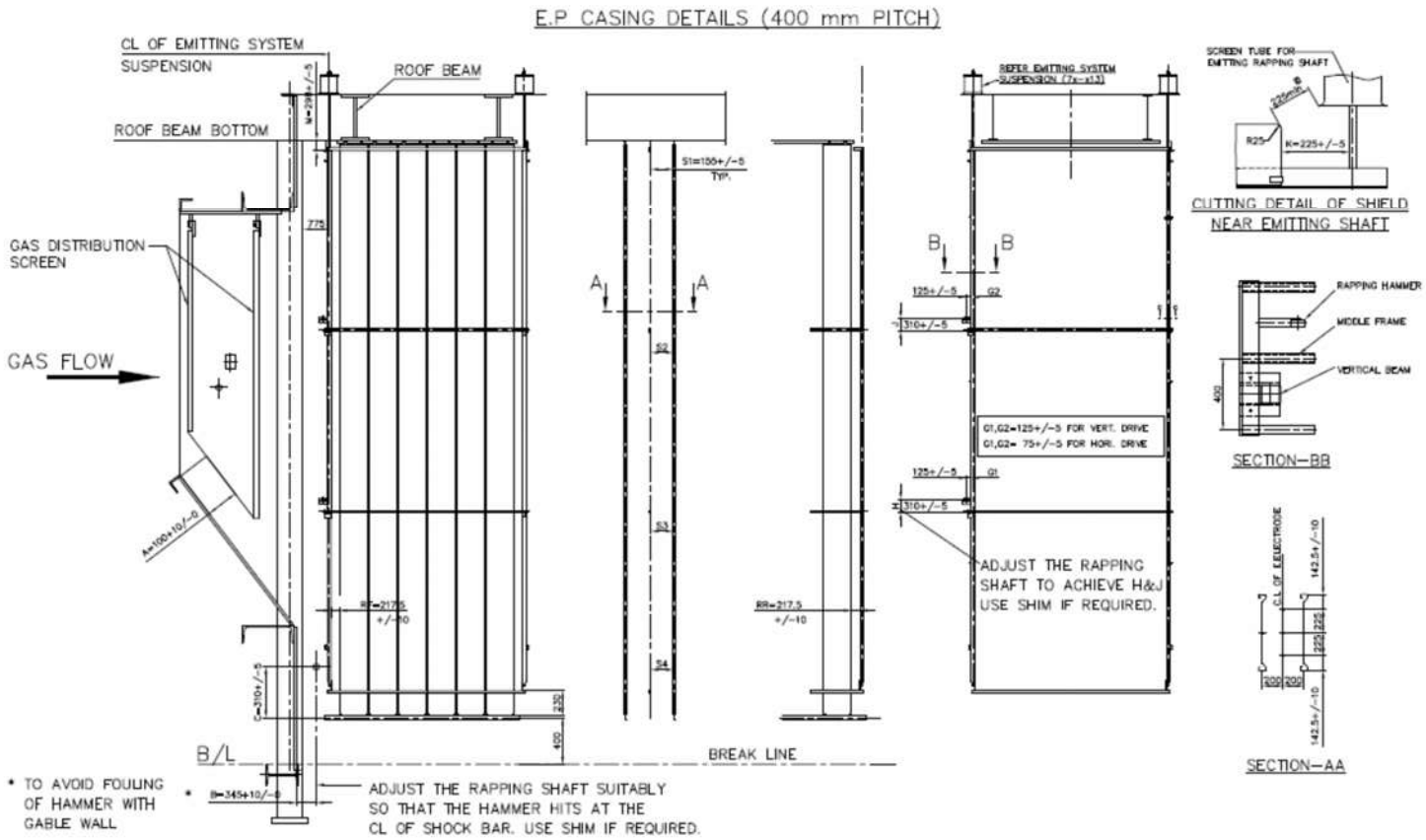
			NAME	SIGNATURE & DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV.NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-10**
RATING		CUSTOMER			PAGE **4 / 4**

BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT NO.		



			NAME	SIGNATURE / DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV. NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-11**
RATING		CUSTOMER			PAGE **1 / 20**

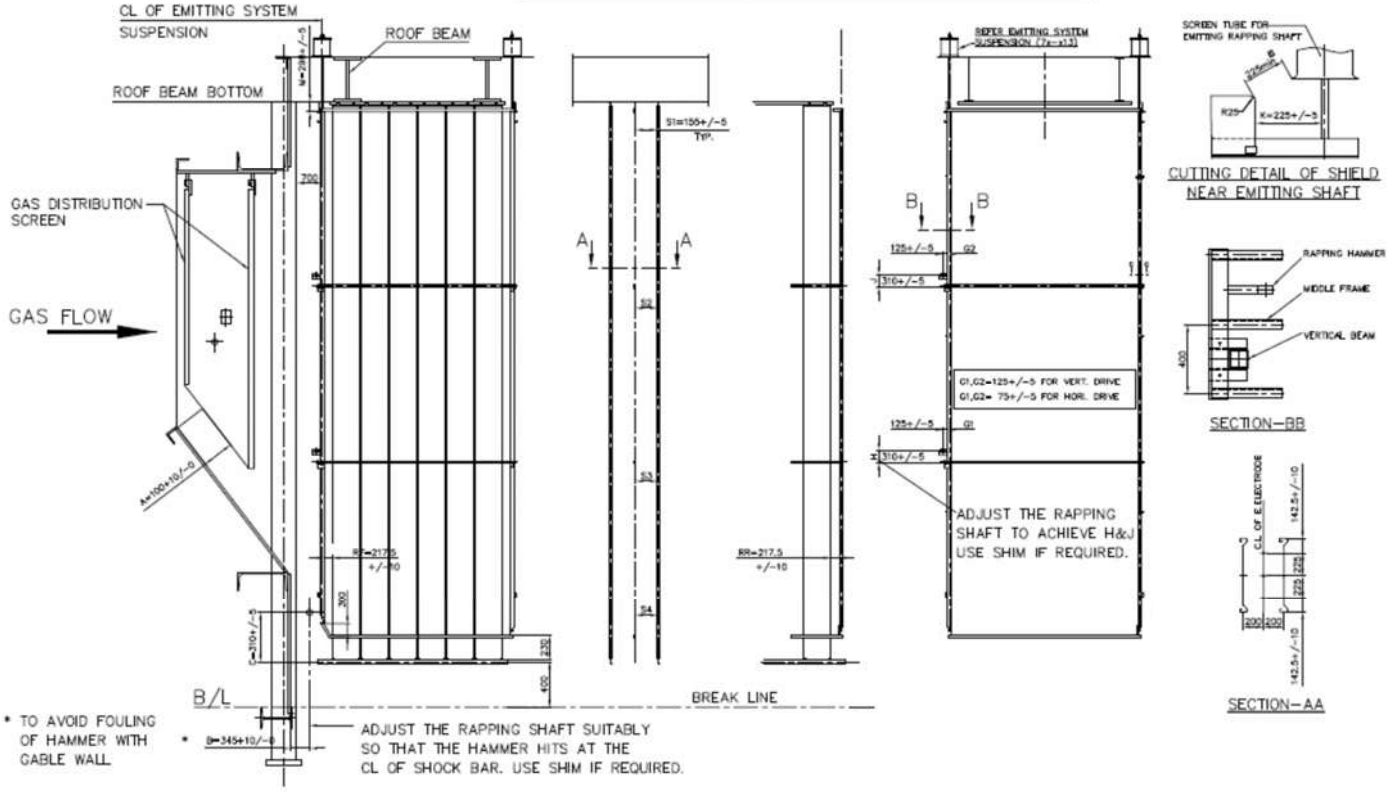
BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT NO.		



			NAME	SIGNATURE / DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV. NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-11**
RATING		CUSTOMER			PAGE **2 / 20**

BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT NO.		

E.P CASING DETAILS (400 mm PITCH–INTERFIELD GAP)



			NAME	SIGNATURE / DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV. NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-11**
RATING		CUSTOMER			PAGE **3 / 20**

बी एच ई एल BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT NO.		

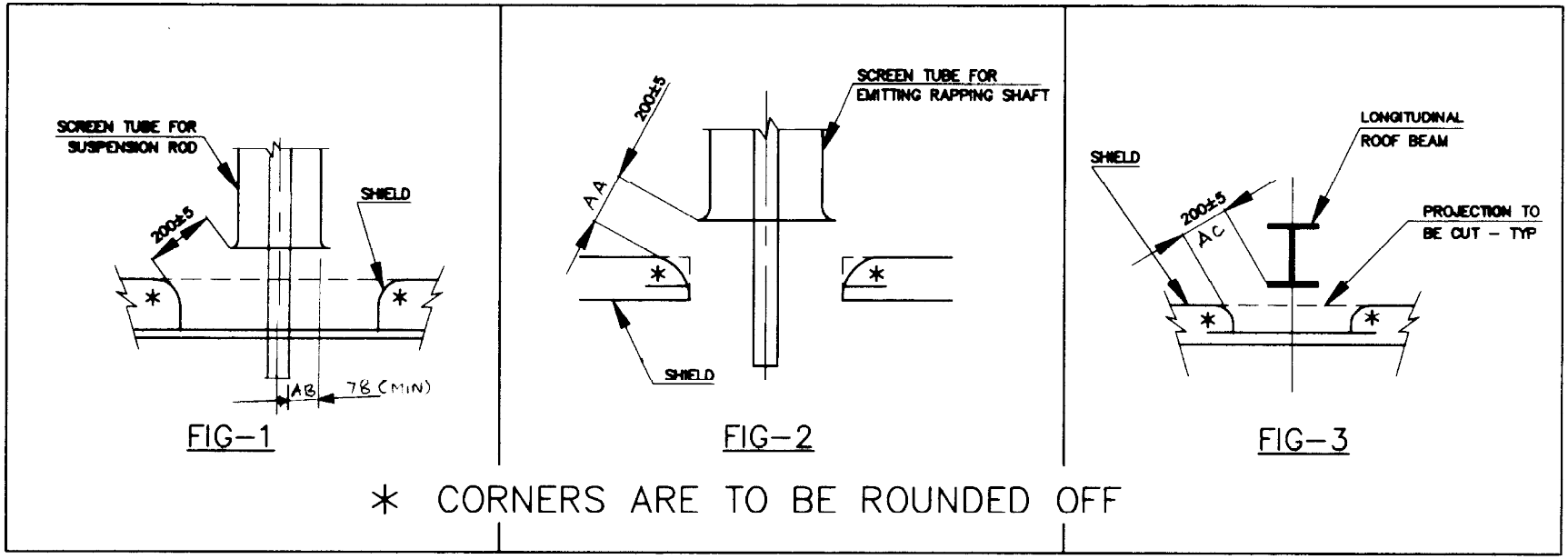
DISPOSITION OF ESP INTERNALS

Field No.	A	B	C	RF	RR	S1	S2	S3	S4	G1	G2	H	J	K	M
	100 + 10 - 00	350 Min.	310 ± 5	217.5± 7	217.5± 7	155± 5	155± 5	155± 5	155± 5	125 ± 5	125 ± 5	310 ± 5	310 ± 5	225 ± 5	298 ± 5

			NAME	SIGNATURE / DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV. NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-11**
RATING		CUSTOMER			PAGE **4 / 20**

BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT NO.		

DISPOSITION OF ESP INTERNALS



			NAME	SIGNATURE / DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV. NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-11**
RATING		CUSTOMER			PAGE **5 / 20**

BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT NO.		

DISPOSITION OF ESP INTERNALS

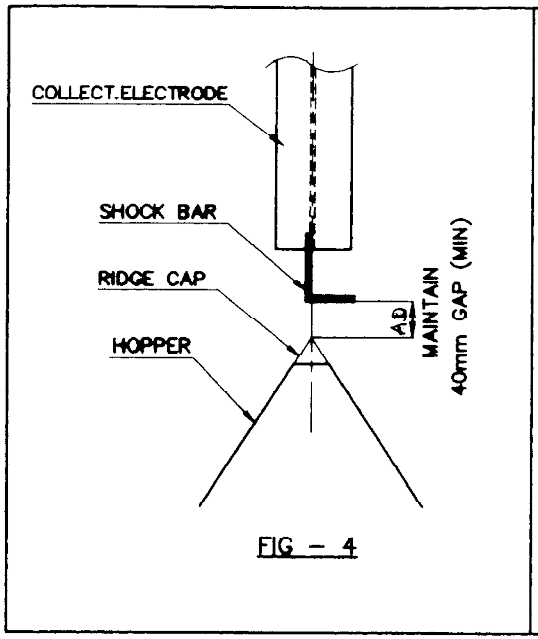


FIG – 4

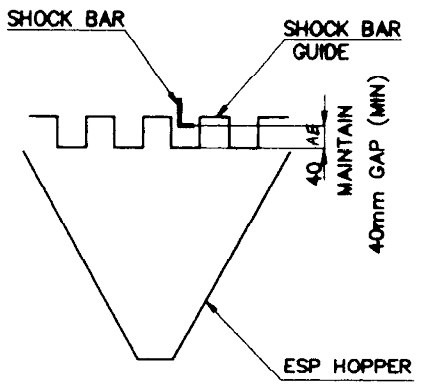


FIG – 5

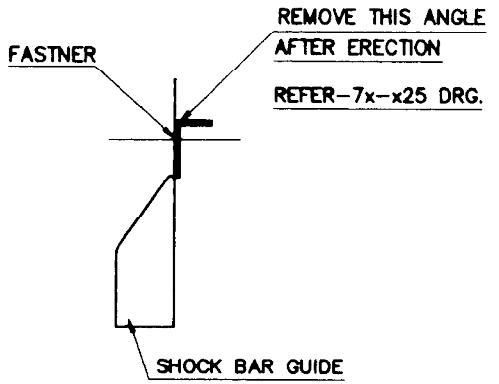


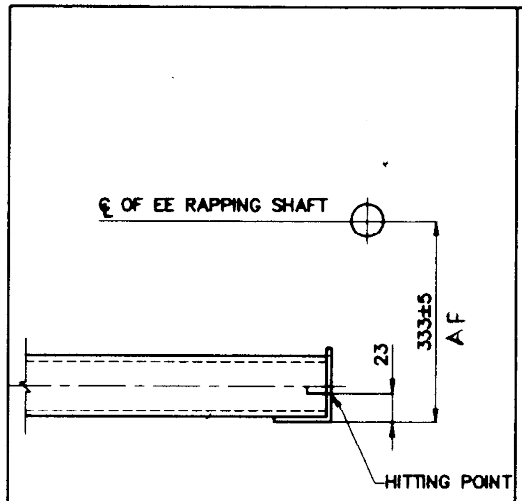
FIG –6

			NAME	SIGNATURE / DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV. NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-11**
RATING		CUSTOMER			PAGE **6 / 20**

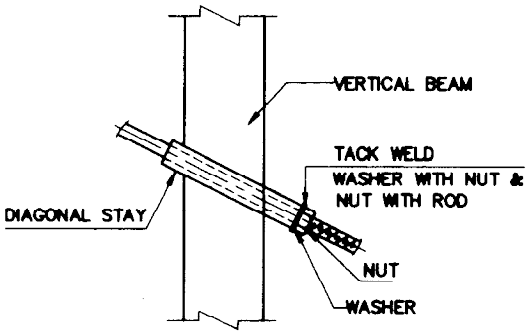
Ramesh

BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT NO.		

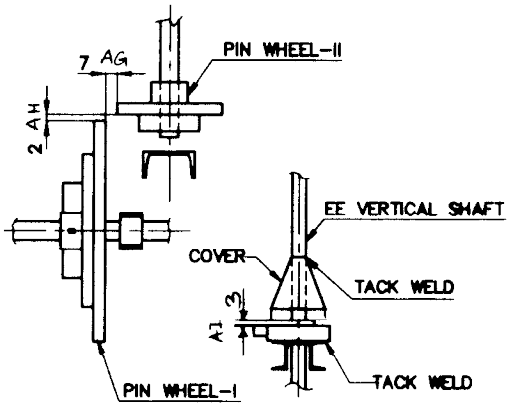
DISPOSITION OF ESP INTERNALS



FIG–7



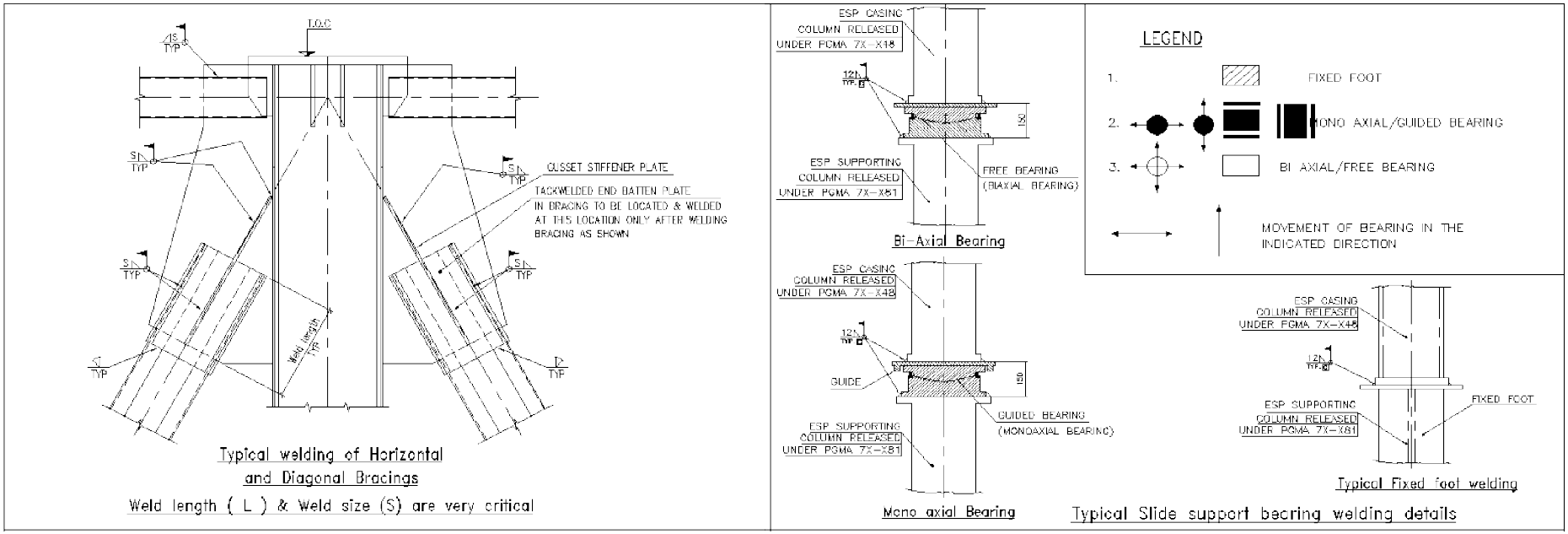
FIG–8



FIG–9

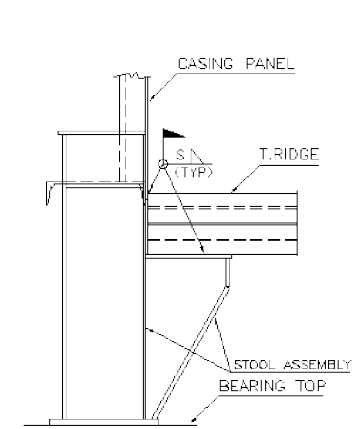
			NAME	SIGNATURE / DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV. NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-11**
RATING		CUSTOMER			PAGE **7 / 20**

BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT NO.		

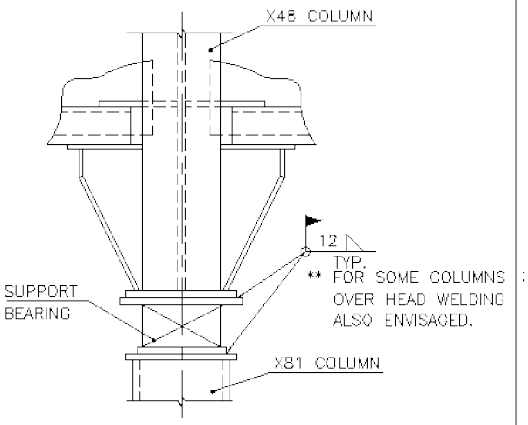


			NAME	SIGNATURE / DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV. NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-11**
RATING		CUSTOMER			PAGE **8 / 20**

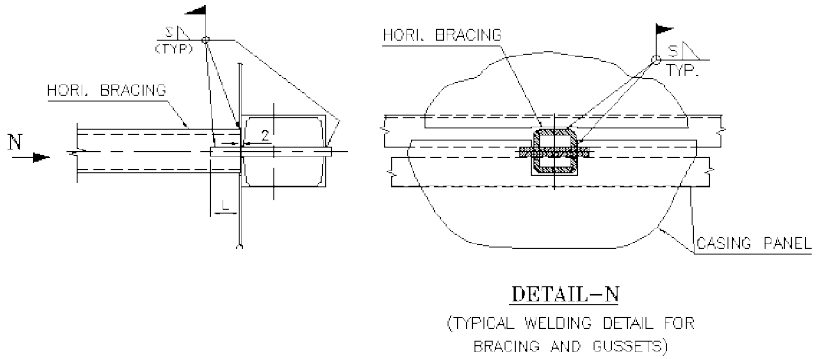
	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT NO.		



TYPICAL RIDGE WELDING DETAIL AT STOOL ASSEMBLY



TYPICAL BEARING WELDING DETAIL

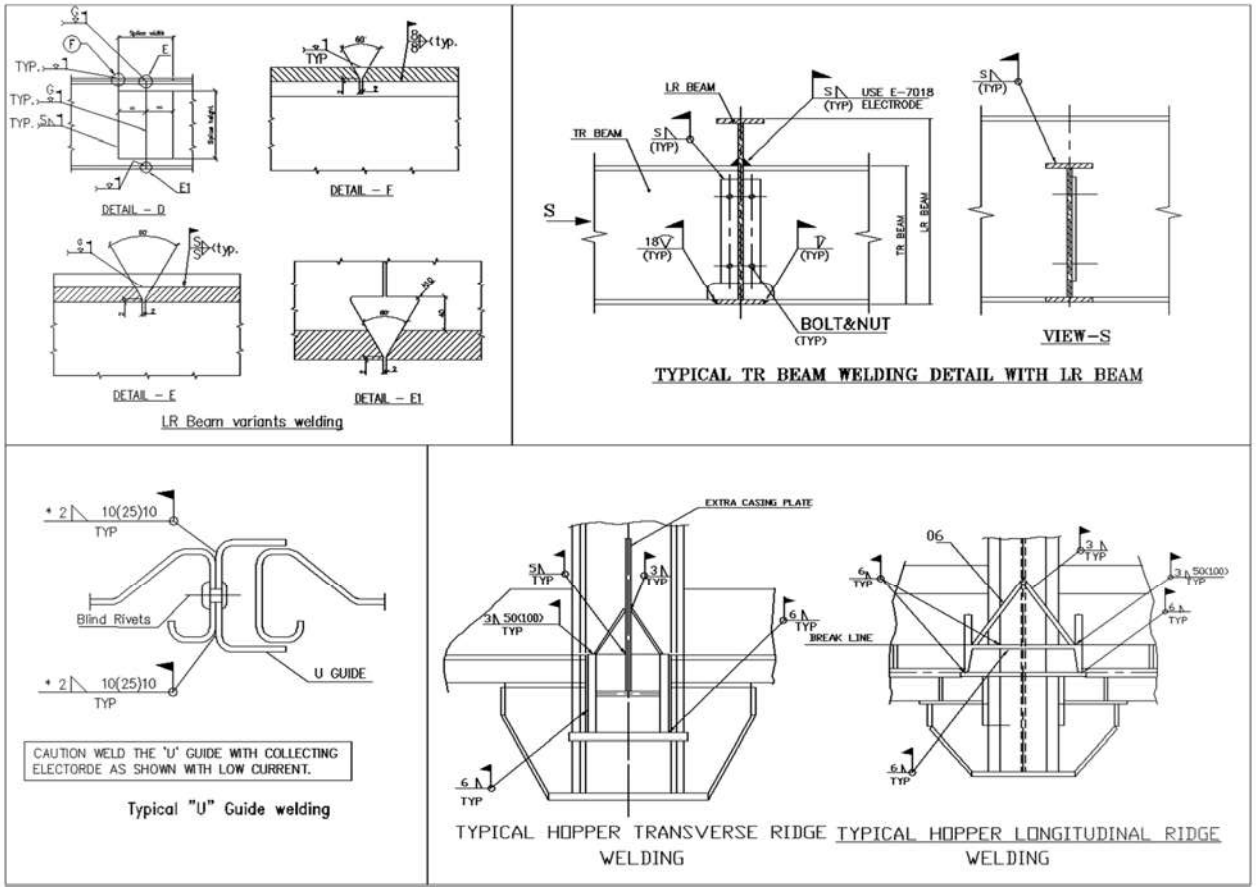


DETAIL–N
(TYPICAL WELDING DETAIL FOR BRACING AND GUSSETS)

HORIZONTAL BRACING WELDING WITH CASING PANEL (WITHOUT SIDE COLUMN AREA)

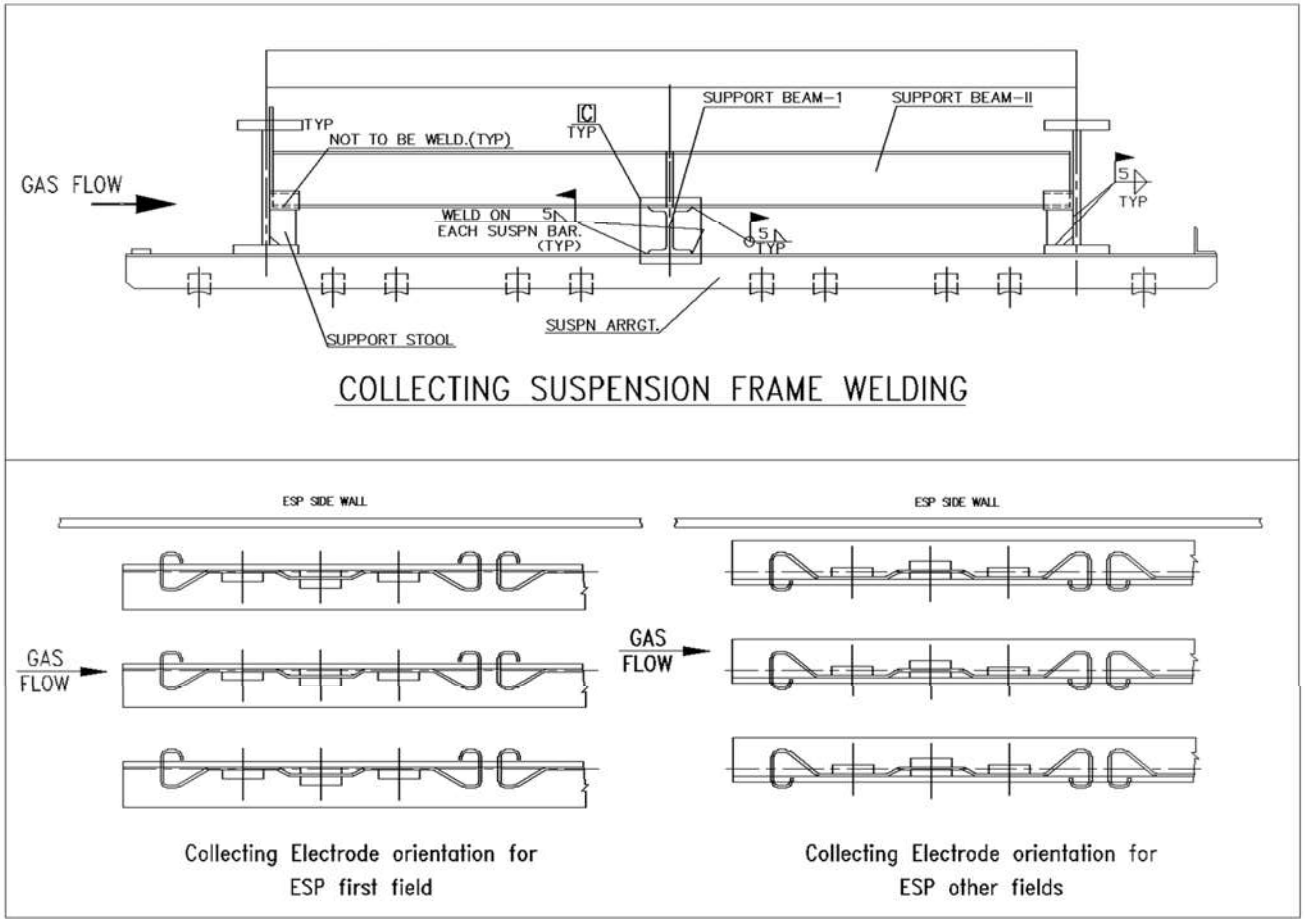
			NAME	SIGNATURE / DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV. NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-11**
RATING		CUSTOMER			PAGE **9 / 20**

BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT NO.		



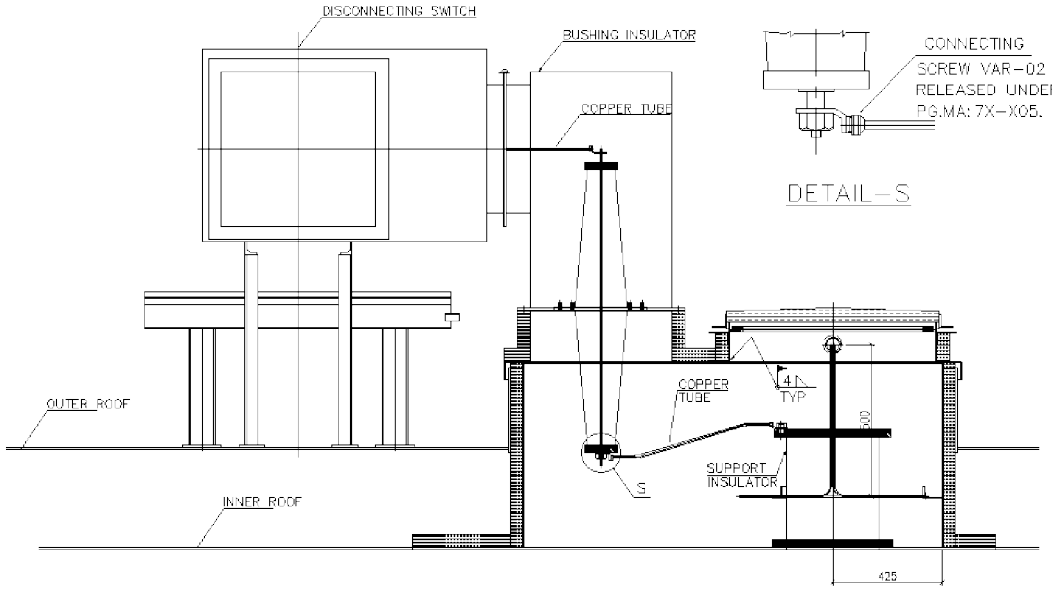
			NAME	SIGNATURE / DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV. NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-11**
RATING		CUSTOMER			PAGE **10 / 20**

BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT NO.		

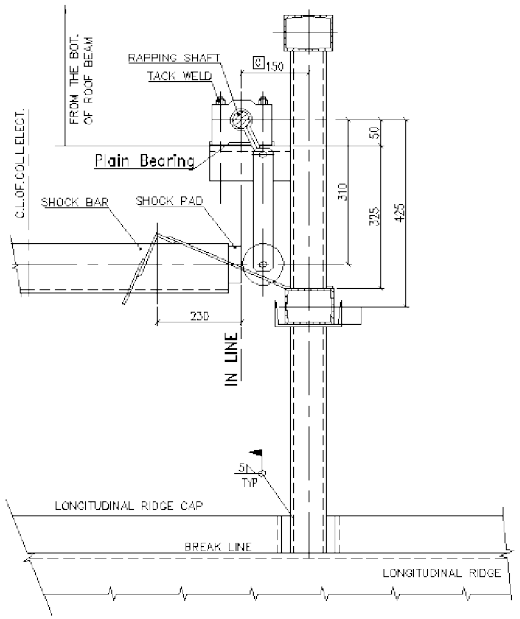


			NAME	SIGNATURE / DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV. NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-11**
RATING		CUSTOMER			PAGE **11 / 20**

BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT NO.		



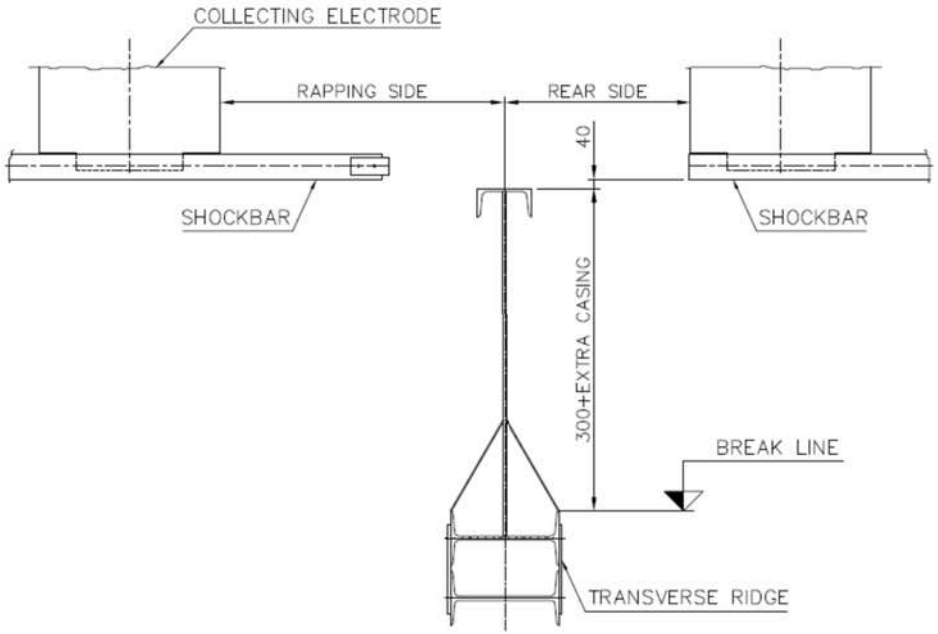
Copper Tubes are to be fixed with insulators ensuring firm connection without any looseness

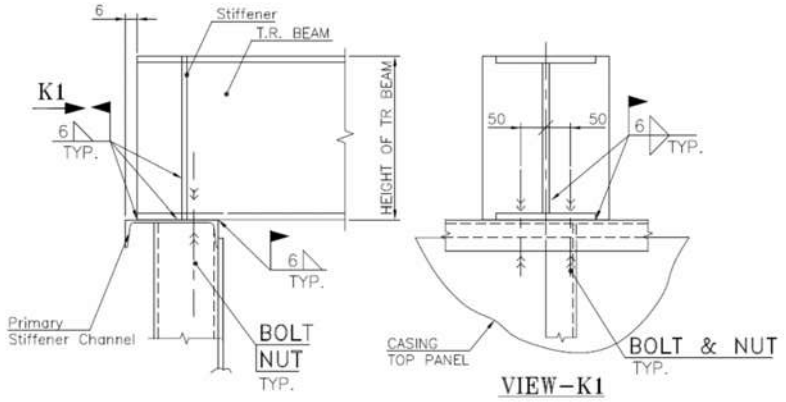


SHOCK BAR & COLLECTING RAPPING SHAFT DIMENSION

			NAME	SIGNATURE / DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV. NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-11**
RATING		CUSTOMER			PAGE **12 / 20**

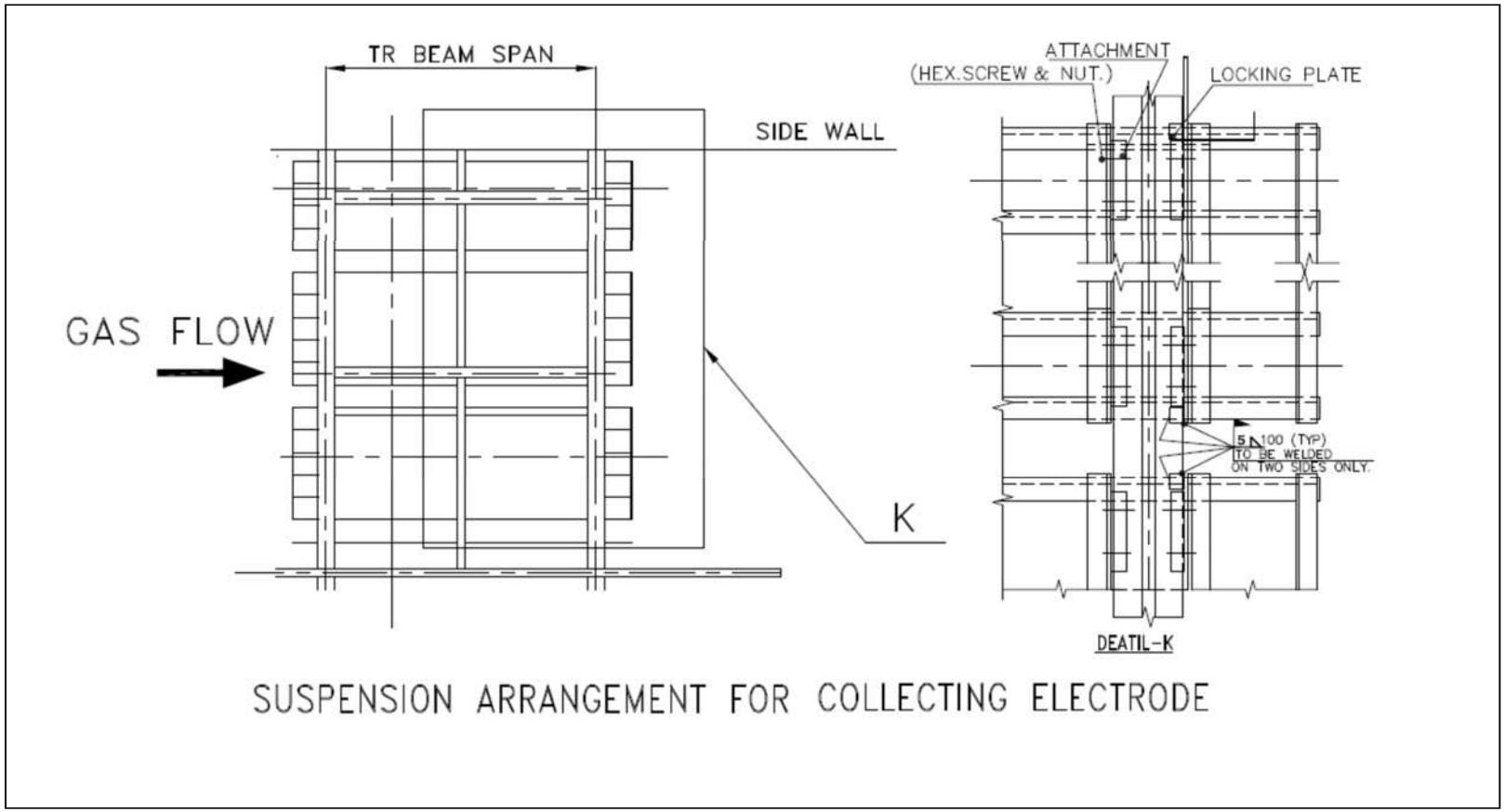
BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT NO.		





			NAME	SIGNATURE / DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV. NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-11**
RATING		CUSTOMER			PAGE **13 / 20**

BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT NO.		

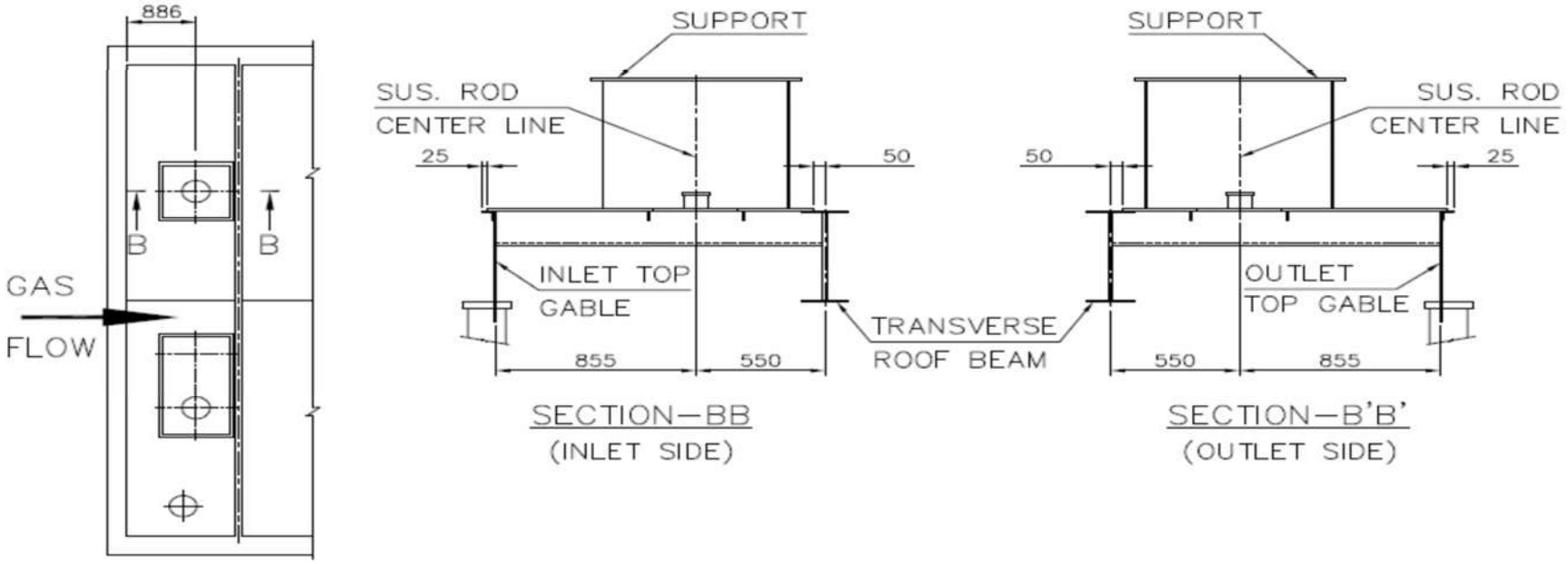


SUSPENSION ARRANGEMENT FOR COLLECTING ELECTRODE

			NAME	SIGNATURE / DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV. NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-11**
RATING		CUSTOMER			PAGE **14 / 20**

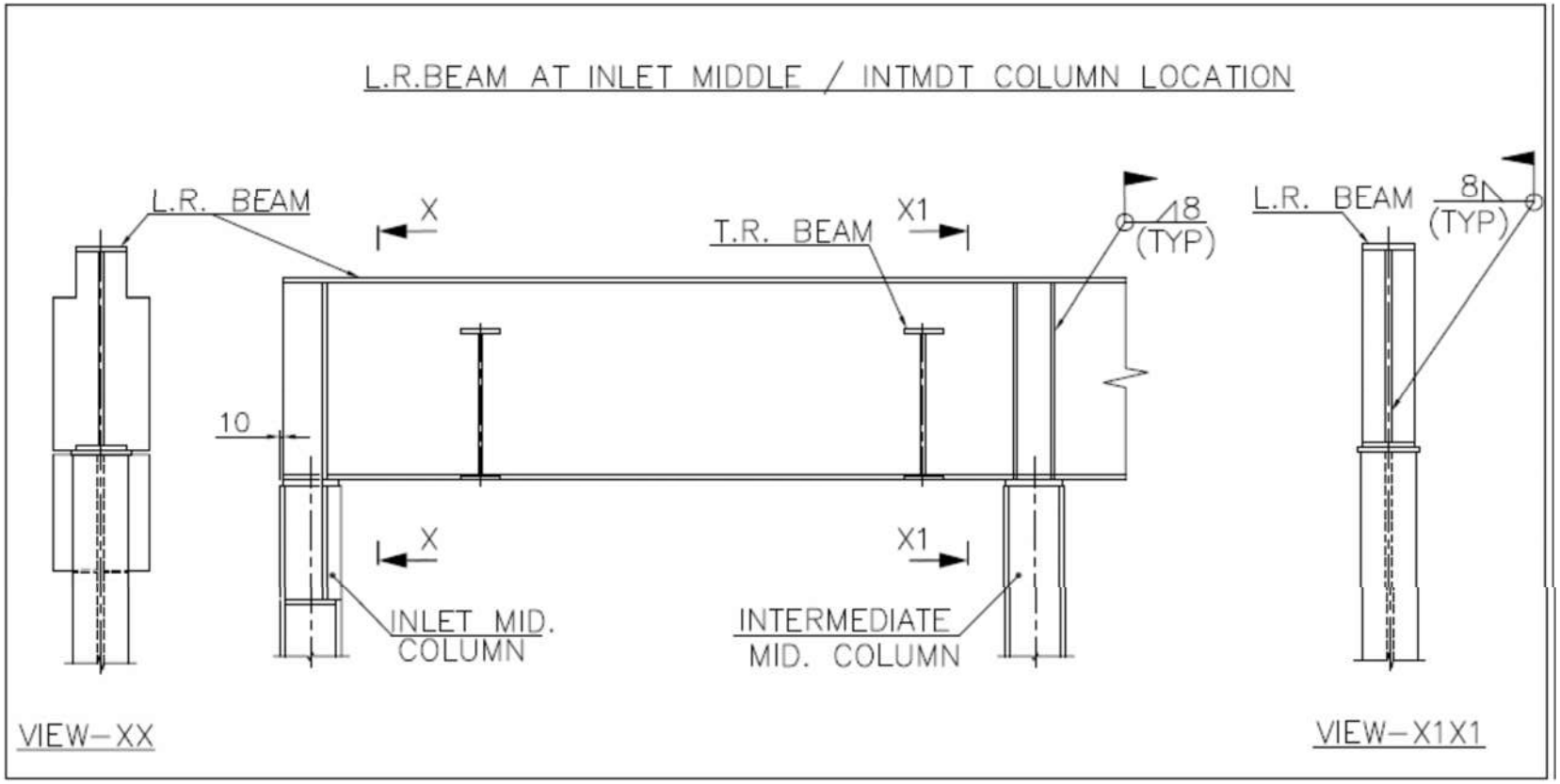
	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT NO.		

LOCATION OF FIRST & LAST ROW SUSPENSION ROD



			NAME	SIGNATURE / DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV. NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-11**
RATING		CUSTOMER			PAGE **15 / 20**

BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT NO.		



			NAME	SIGNATURE / DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV. NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-11**
RATING		CUSTOMER			PAGE **16 / 20**

	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT REF.		

DISPOSITION OF ESP INTERNALS

LOCATION	ESP FIELD NUMBERS									
	1	2	3	4	5	6	7	8	9	10
AA = 200± 5										
AB = 78 Min.										
AC = 200± 5										
AD = 40 Min.										
AE = 40 Min.										
AF = 333± 5										
AG = 7 Min.										
AH = 2 Min.										
AI = 3 Min.										

NOTE :

All dimensions are in mm.

Separate log sheet to be made for each ESP.

BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT REF.		

WELDING COMPLETION

ESP No.: 1/ 2 Pass :

Description	ESP FIELD NUMBERS									
	1	2	3	4	5	6	7	8	9	10
Welding of X81 diagonal & horizontal bracing.										
Welding of X48 diagonal & horizontal bracing.										
Welding of top & bottom plates of support bearing.										
Welding of hopper ridge.										
Welding of hopper wall.										
TR beam to LR beam welding.										
LR Beam to LR Beam welding, and splice plate welding.										
Tack welding of all fasteners of inner arms are completed.										
Tack welding of all fasteners of collecting electrodes / shock bar fixing are completed.										
Tack welding of plain bearing fasteners are done in both rapping mechanism.										
Diagonal stays are properly positioned and tack welded.										
All fasteners in emitting frames are tack welded.										
Set rings are positioned & tack welded with a gap of 2 mm in all rapping shafts.										
Shock bar angle of Fig.06 has been removed.										

NOTE :

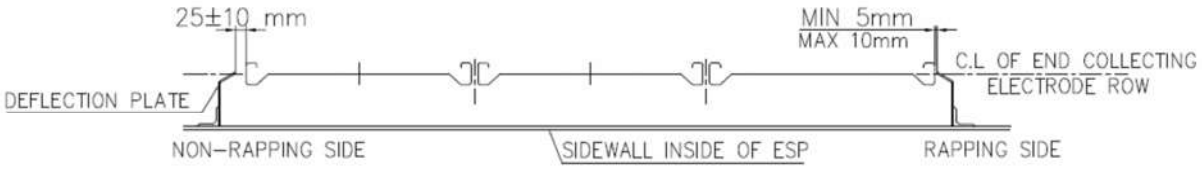
All the above welding are critical.

For activity completion indicate by tick (√) mark in the appropriate boxes against each field numbers.

Separate log sheet to be made for each ESP.

BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT REF.		

MOUNTING ARRANGEMENT OF DEFLECTION PLATE



ESP NO.: 1 / 2 Pass :

Corner	ESP FIELD NUMBERS									
	1	2	3	4	5	6	7	8	9	10
A										
B										
C										
D										

NOTE :

Check the four corners of each field and log the measurements A, B, C & D.

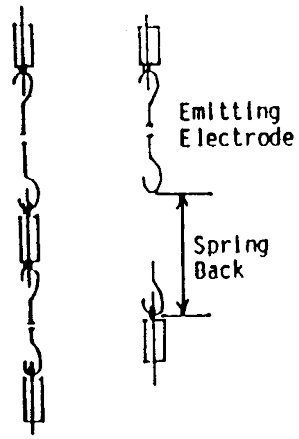
Separate log sheet to be made for each pass of ESP.

All dimensions are in mm.

			NAME	SIGNATURE & DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV.NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-11**
RATING		CUSTOMER			PAGE **19 / 20**

BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT REF.		

SPRING BACK CHECK ON EMITTING ELECTRODES



Select the emitting electrodes at random for the spring back check.

Enter field number, row number and number of emitting electrode etc. along with spring back values.

Choose minimum 5 numbers / field / tier of emitting electrodes for checking.

Minimum spring back value is **350 mm.**

Erection by stretching device & avoid over stretching of electrodes.

ESP No.: 1/ 2

Sl. No.	Field No.	Row No. of EE frame from nearest side wall	No. of EE in the concerned row	Level Top / Bottom	Spring back value (mm)

NOTE : EE – Indicates Emitting Electrode

All dimensions are in mm.

			NAME	SIGNATURE & DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV.NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-11**
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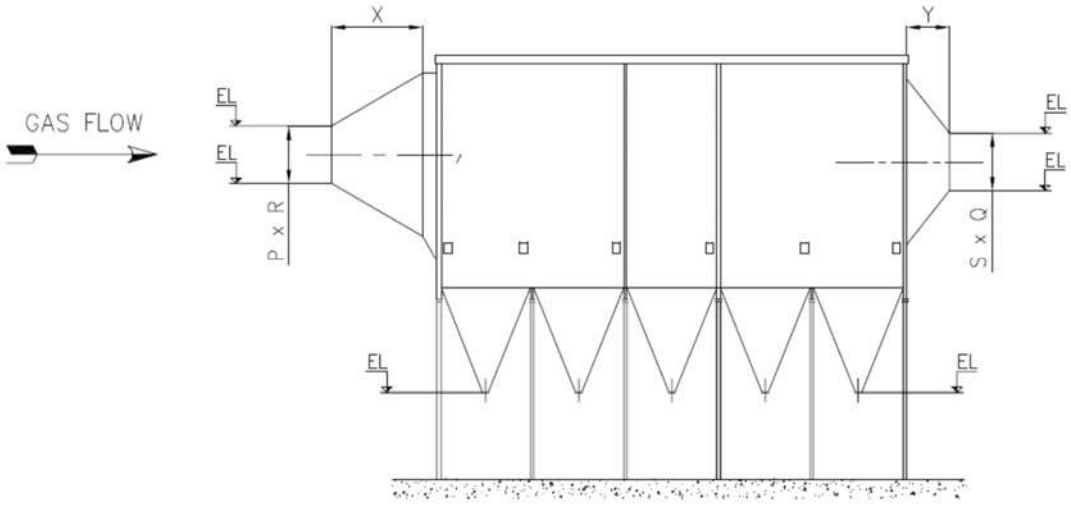
BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT REF.		

INTERFACE MEASUREMENTS ON FUNNELS



ESP No. : Pass :

Measurement of Funnels : Funnel Elevation Tolerance : ± **5 mm.**

Location	As per drawing	Actual
Inlet funnel elevation		
Outlet funnel elevation		

Funnel disposition tolerance : ± **5 mm.**

As per drawing						
Location	X	P	R	S	Q	Y
Pass – A						
Pass - B						
Pass - C						
Pass – D						
Pass – E						
Pass – F						

All dimensions are in mm.
Separate log sheet to be made for each ESP.

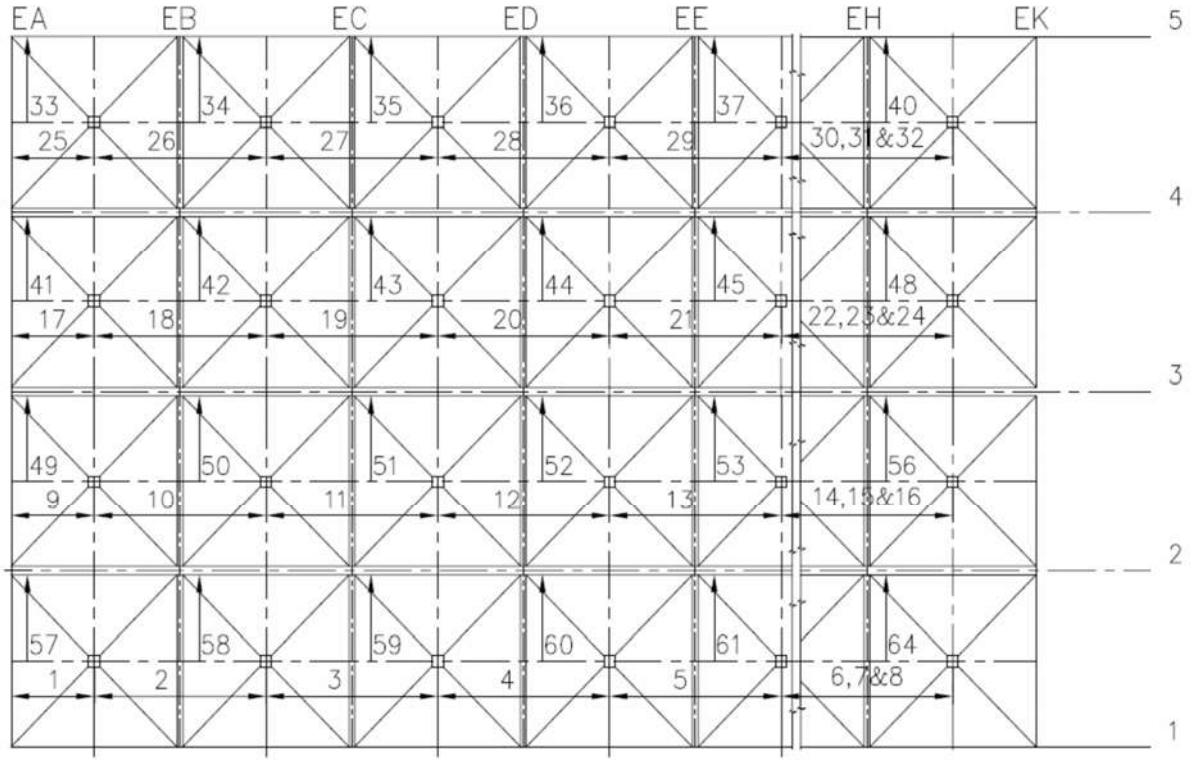
			NAME	SIGNATURE & DATE	QP.NO.: **PP-QBE-2401-HD-QA-204**
PROJECT		INSPECTED BY			REV.NO.: **00**
UNIT NO.		CLEARED BY			LOG SHEET NO.: **L-12**
RATING		CUSTOMER			PAGE **1 / 3**

Ramesh

BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT REF.		

INTERFACE MEASUREMENTS ON HOPPER

ESP No.: 1 / 2 Elevation as per drawing :_____ mm Tolerance : **± 2 mm.**



HOPPER NUMBER	ESP FIELD NUMBERS									
	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4										

NOTE :

All dimensions are in mm.

Separate log sheet to be made for each ESP.

BHEL	INSTRUMENT REGN.NO.		
	DATE OF INSPECTION		
	DRAWING DOCUMENT		

INTER FACE MEASUREMENTS ON HOPPER

ESP No.: 1 / 2 Hopper spacing - Tolerance: **10 mm Max.**

Dimension	1	2	3	4	5	6	7	8	9	10
Actual										
Dimension	11	12	13	14	15	16	17	18	19	20
Actual										
Dimension	21	22	23	24	25	26	27	28	29	30
Actual										
Dimension	31	32	33	34	35	36	37	38	39	40
Actual										
Dimension	41	42	43	44	45	46	47	48	49	50
Actual										
Dimension	51	52	53	54	55	56	57	58	59	60
Actual										
Dimension	61	62	63	64	65	66	67	68	69	70
Actual										
Dimension	71	72	73	74	75	76	77	78	79	80
Actual										

Minimum General Storage and Preservation Requirement

01. Emitting electrode boxes shall be kept in a closed storage and shall be opened only when erection is taken up.

02. Collecting electrodes are to be kept in a semi closed storage to protect against rust and damage. Not more than 3 packages are to be stacked one over the other.

Both collecting and emitting electrodes are critical components of ESP. Any damage will affect the performance of ESP.

03. Keep the insulators over soft material to avoid any damage. Do not stack any other material over the insulator.

04. Electrical components are to be kept in a closed storage to avoid rusting due to moisture and to protect against pilferage.

05. Protect the machined components like support bearings against rusting and damage during storage.

For detailed storage instructions for ESP components refer Erection Manual Chapter 4.0.

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	INSTRUMENT REG. NO./TAG		
	DATE OF INSPECTION		
	DRAWING / DOCUMENT REF.		

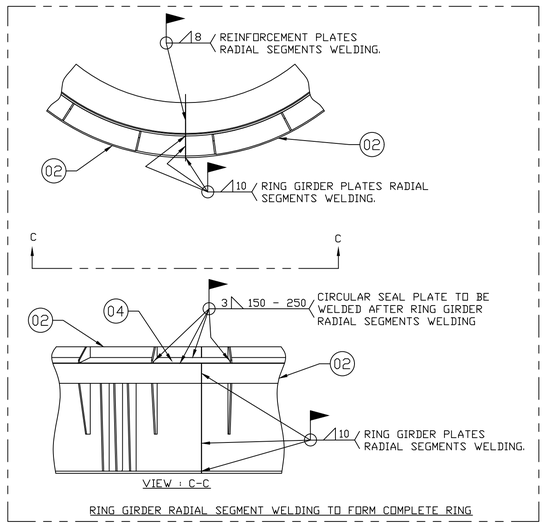
PROTOCOL

			NAME	SIGNATURE & DATE	FQP NO.: PP-QBE-2401-HD-QA-204
PROJECT		INSPECTED BY			REV.NO.: 00
UNIT NO.		CLEARED BY			PROTOCOL NO.
RATING		CUSTOMER			PAGE:

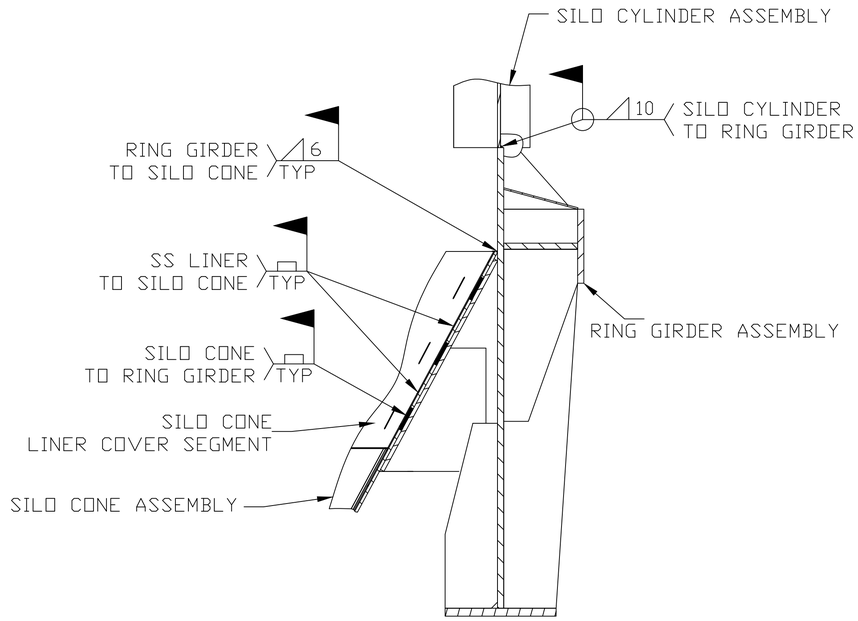
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

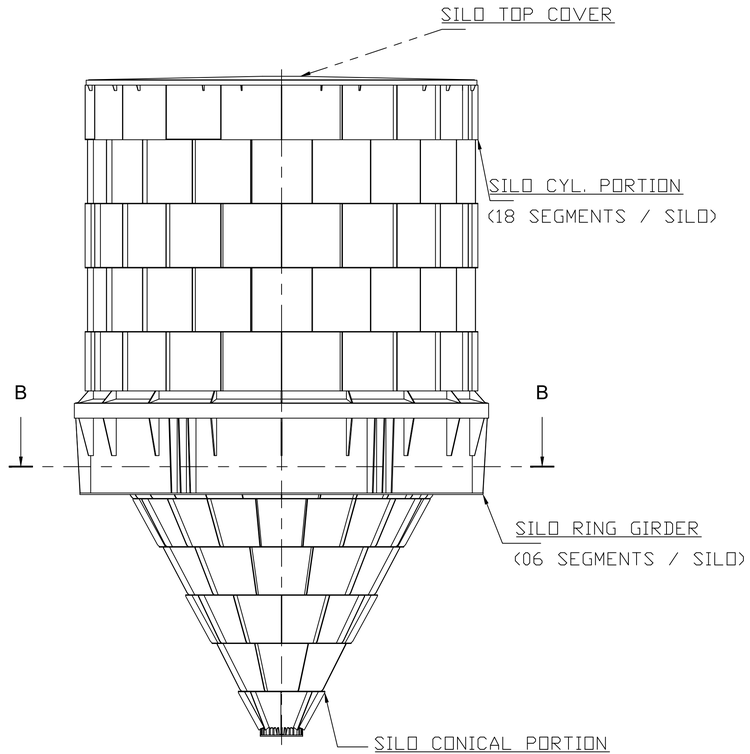
DRG. NO. 1-62-311-00001

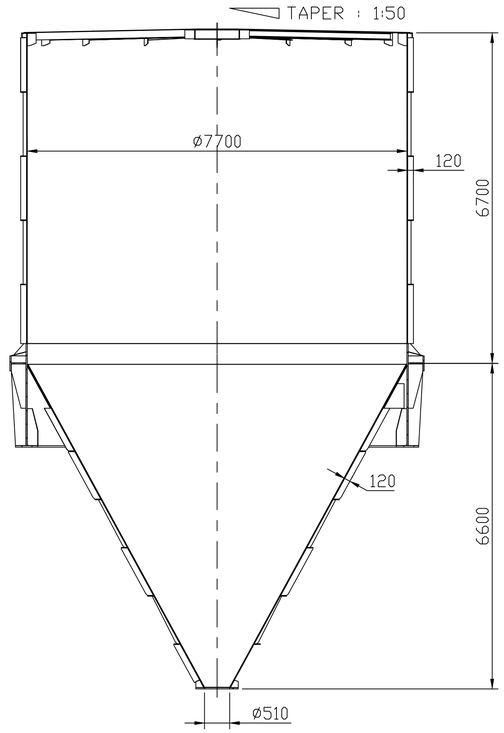


RING GIRDER RADIAL SEGMENT WELDING TO FORM COMPLETE RING



DETAIL - B





SECTION A-A

NO OF SILO PER PROJECT- 02

ITEM NO.	DESCRIPTION	DRAWING NO.	VAR NO.	RAW MATL. SIZE OR CASTING DRG. NO. OR FORGING DRG. NO.	MATERIAL CODE / MATERIAL SPECN.	NET WT. / QUANTITY	GROSS WT.

NON-CAST PARTS:
(FABRICATED AND /OR MACHINED)

ALL DIMENSIONS ARE IN MILLIMETERS
TOLERANCES UNLESS OTHERWISE NOTED
X.XX ±0.40
X. & X.X ±1.5 FOR DIM. 0-610 MM
X. & X.X ±3.8 FOR DIM. 610-2440 MM
X. & X.X ±6.3 FOR DIM. OVER 2440 MM

ANGULAR: ±0°30'

DRILLED HOLES: ø 0-25MM +0.25/-0.00
OVER 25 MM +0.50/-0.00

SURFACE TEXTURE: 25 MICRO METERS
ROUGHNESS AVERAGE-Ra

THIS DRAWING IS IN ACCORDANCE WITH ISO 1101
UNLESS OTHERWISE SPECIFIED, THE THREAD
PITCH IS STANDARD COARSE.

TYPE OF PRODUCT
NAME OF CUSTOMER/PROJECT

LIMESTONE DAY SILO

BHARAT HEAVY ELECTRICALS LIMITED
HYDERABAD

	NAME	SIGN.	DATE	NO.OF VAR.
DRN.	SHARIFF		28.04.21	
CHD.	ABUL		28.04.21	
APPD.	AMAN		28.04.21	

DEPT.	UNTOL. DIMS. GR.		SCALE	WEIGHT (KG)	REF. TO ASSY DRG.	ITEM NO.	NO.OF ITEMS
446	ø/M/F		NTS	---			
CODE PULV.							

CARD CODE

TITLE: SILO GA FOR BRBCL, NABINAGAR

DRAWING NO. 1-62-311-00001 REV. 00

SHEET NO. 01 NO OF SHEETS 01

REV.	DATE	ALTERED / CHD./APPD.	ZONE

INVENTORY NO | SIGN. AND DATE | REF. DRG. NO. | COMPUTER FILE NAME