

Welcome To Outsourcing

OPEN Tender No. is 658015E Dated 21.09.2019

NIT- No: 48940 dt 21-09-2019

Invited up to :- 14.10.2019 by 09:45 Hrs , Tender opening 14.10.2019-10.00 Hrs

MANUFACTURE of **TANK SHELLS** WITH VENDOR's
MATERIAL (OVM)



Boiler Auxiliaries Plant (BAP), BHEL, Ranipet is Manufacturing Boiler Auxiliaries such as APH (Air-Pre Heater), ESP (Electrostatic Precipitators), FANs (Industrial Fans), G&D (Gates and Dampers), Steel Chimneys, WEG (Wind Electric Generator), Desalination, Fabric Filters etc.

In addition to above, BAP Ranipet has to also manufacture newly added components such as CHP, AHP, Bunker structures, Switch Yard Structures, BOP structures, FGD Components & structures, etc. along with the boiler auxiliaries components which are also required concurrently at site to meet the project schedule.

This OPEN tender enquiry is issued for complete manufacture of Tank shells and transport stiffeners with vendors own raw material procured from BHEL approved material suppliers, as per BHEL drawings and customer QP, Painting scheme & other quality work instructions.

Quantum of work: 1396 MT +/-10%

No of vendors required: 6 vendors (Six only)

Reverse Auction will be conducted for finalizing the rates among the successful bidders.

Kindly Submit Your Offers as per the tender requirements given vide Sections and Annexures detailed below.

Please visit www.bhel.com to download the tender document under NIT-48940 dt 21.09.2019

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Bharat Heavy Electricals Limited
Boiler Auxiliaries Plant, Ranipet- 632 406
SECTION – I

OVM CONTRACT 2019-20

Enquiry No. 658015E

Date: 21.09.2019

BHEL invites offers for entering into contract from OVM vendors for complete manufacture of Tank shells (Straight /Conical) with /without base supports and transport stiffeners with vendors own raw material procured from BHEL approved Material suppliers as per drawings and customer MQP. Scope includes blast cleaning to Sa 2½ finish and painting as per painting scheme (PS) issued by BHEL. Scope also includes delivery of finished goods to respective customer site (Mouda, North karanpura, Barh).

Instructions for offer submission:

- All documents as listed in the index sheet (**Section I to XIII and Annexures A to L**) shall be downloaded from NIT mentioned above. The bidder is advised to go through all the documents, Terms & Conditions detailed under Sections I to XIII and Annexures A to L carefully before submitting their offer for the tender.
- Below mentioned documents will form part of the **Techno-commercial bid evaluation:**
 - SECTION - II : Salient features and General instructions
 - SECTION - IVA : General Conditions of tender
 - SECTION - IVB : Terms and Conditions of the tender
 - SECTION - V : Rate Schedule wise quantity
 - ANNEXURE - A : PRICE BID FORMAT
 - ANNEXURE - B : Integrity Pact
 - ANNEXURE - C : Certification for MSE**
 - ANNEXURE - D : Declaration by the bidder
 - ANNEXURE - E : Checklist for NIT
 - ANNEXURE - F : Affidavit
 - ANNEXURE - G : not applicable
 - ANNEXURE - H : Non-Disclosure Agreement
 - ANNEXURE - I : Not applicable
 - ANNEXURE - J : Vendor Capacity
 - ANNEXURE - K : GST Details

Annexure L: Frame work Confidentiality Agreement cum undertaking shall submitted by Vendor at the time of contract signing. It is mandatory for Vendors to submit Annexure L before signing of contract.

Enquiry No. & Date	658015E Date 21-09-2019 NIT_48940
Due Date & Time for Submission Of Offer	14.10.2019 Prior to 09.45 Hrs
Date & Time for Tender Opening (Price Bid)	14.10.2019 by 10-00 Hrs
Place for Submission Of Offer	At Tender Box located in Outsourcing department, Third Floor, Administrative Building, BAP/BHEL/Ranipet-632406.
Place Of Tender Opening	Outsourcing office at 3 rd Floor / BAP / BHEL / Ranipet

This tender specifies a set of prequalification criteria defining the eligibility for the vendors to quote against a particular Rate Schedule of this tender. The Bidders are advised to go through all the enclosed Tender documents terms & conditions detailed under [Sections I to XII, Annexures- A to L](#), and Rate Schedule carefully before submitting their Offer.

All the [Annexures A to L](#) should be filled, wherever applicable by the bidders without fail for evaluation of their offer and **all necessary Self attested copies of the supporting documents** as required are to be attached.

The bid shall be submitted in [three parts](#) namely (1) EMD or Valid MSME certificate (2) Techno commercial bid (3) Price Bid.

Kindly refer to the [Section-IV](#) – General Terms and Conditions of the tender for detailed procedure for submission of offers and details of exemption from submission of EMD for vendors registered with MSME

Kindly refer to [Section-II](#) to [Section-IV](#) for detailed scope. Sealed Tenders are hereby invited from experienced Contractors for the above scope.

Note: Vendors banned by any of the BHEL units are not eligible to participate in this tender.

Contact details / address for any clarification and for Offer submission.

DGM-(Planning & Contracts)

Outsourcing Department, Boiler Auxiliaries Plant

Bharat Heavy Electricals Limited, ,Ranipet-632406

Phone : 04172-284030, 284158, 241170

E-Mail : gsugumar@bhel.in, ssvasan@bhel.in, psara@bhel.in

➤ **Integrity Pact:**

- The Integrity Pact-[Annexure ‘B’](#) is an integral part of this Tender. Vendors shall submit the dully filled and signed Annexure-B along with other documents which form part of the techno-commercial offer.
- Any offer received without Annexure-B Integrity pact duly signed and stamped, will be rejected.
- “Integrity Pact” is applicable as per Govt. guidelines & all suppliers shall submit the Integrity Pact duly signed.
- IP is a tool to ensure that activities and transactions between the Company and its Bidders /contractors are handled in a fair, transparent and corruption free manner. A panel of Independent External Monitor (IEMs) have been appointed to oversee implementation of IP in BHEL.
- The IP as enclosed with the tender (Annexure-B) has to be submitted (duly signed by authorized signatory who signs in the offer) along with offer. Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification.

Details of IEM for this tender is furnished below:

Name : Shri D.R.S Chaudhary, IAS (Retd.)

Address: E-1/164 Arera Colony, Bhopal- 462 016 (M.P.)

Phone : +91 755 4050495

Name : Mrs. Pravin Tripathi, IA & AS (Retd.)

Address : D-243, Anupam Gardens, Lane

IB, Neb Sarai, Sainik Farms,

New Delhi – 110 068

Phone : +91 11 29533206 / 29531715.

Email : pravin.tripathi@gmail.com

- Please refer Section-8 of Annexure-B i.e. the IP for Role and responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to the IEM mentioned in the tender.
- As per BHEL's Fraud prevention Policy, Nodal officers were nominated by BHEL Management. The details of such Nodal officers are furnished below:

Name	Designation	E-mail	Phone (Office)
C.P.Chengappa	GM - NP, Services & PC	chengappa@bhe.in	04172-284587
P.Raguraman	GM - Operations	pr@bhel.in	04172-284574
P.Ravikumar	GM - MM	pravi@bhel.in	04172-284450
S. Anilkumar	GM - BE & Civil	sanil@bhel.in	04172-284681
P.Jayakanth	GM - Engineering	pjayakanth@bhel.in	04172-284167
S.Kannan	GM - Finance & Receivable Management	skannan@bhel.in	04172-284518
B. Srinivasa Rao	GM - Outsourcing	bsrao0104@bhel.in	04172-284945
Rupesh Telang	GM - WCM & Shipping	rt1@bhel.in	04172-284300
G A Saravanan	GM - Marketing & New growth areas	saravananga@bhel.in	04172-284446

Any bidder / contractor who come across any fraudulent behaviour of BHEL's employees may communicate the same to any / all of these Nodal officers.

No routine correspondence shall be addressed to the IEM (Phone/post/email) regarding the clarifications, time extensions or any other administrative queries, etc. on the tender issued. All such clarification/ issues shall be addressed directly to the tender issuing (procurement) department.

Corrigendum:

Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Revisions, etc. to Tender Specifications will be hosted in BHEL web site only under the NIT No. mentioned above.

The bidder along with its associate/ collaborators/ sub- contractors/ sub-vendors/ consultants/ service provider shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website <http://www.bhel.com> and shall immediately bring to the notice of BHEL management about any fraud or suspected fraud as soon as it comes to their notice.

For any clarification required in this regard, the Bidders may contact:

DGM / Planning & Contracts

Outsourcing Department, Boiler Auxiliaries Plant

Bharat Heavy Electricals Limited, Ranipet-632406

Phone : 04172-284030, 284158, 241170

E-mail: gsugumar@bhel.in, psara@bhel.in, ssvasan@bhel.in

AGM/ Outsourcing
BHEL-Ranipet

****MSE suppliers can avail the intended benefits only if they submit along with offer, attested photocopies of either (i) EM II certificate having deemed validity (Five years from the date of issue of acknowledgement in EM –II) or valid NSIC certificate or EM II certificate where the deemed validity of EM II is over along with (ii) CA certificate or Udyog Aadhar Memorandum (UAM) along with CA certificate (Format enclosed as per Annexure C applicable for the year, certifying quantum of investment in plant and machinery within the permissible limit as per the act for relevant status (Micro or small) where the deemed validity of EM II is over. Date to be reckoned for determining the deemed validity will be the last date of technical bid submission. Non submission of such documents will lead to consideration of their bids at par with other Non MSME bidders and MSME status of such suppliers shall be shifted to Non MSME supplier till the supplier submits these documents.**

Open tender for Manufacture of Tank shells

SECTION II – SALIENT FEATURES OF NIT

- 1) This is a notice inviting offers in three part bid through OPEN Tender from OVM vendors for complete manufacture of Tank shells (Straight /Conical) with /without base supports and transport stiffeners with vendors own raw material procured from BHEL approved Material suppliers as per drawings and customer MQP. Scope includes blast cleaning to Sa 2½ finish and painting as per painting scheme (PS) issued by BHEL. Scope also includes delivery of finished goods to respective customer site (Mouda, North karanpura & Barh).
- 2) This tender covers the item as listed in [Section III](#).
- 3) [Vacant](#)
- 4) The tentative quantity for this tender will be **1396 MT** +/- 10% as shown in [Section V](#).
- 5) Price Variation Clause (PVC) will not be applicable.
- 6) The vendor shall not sublet or assign this work or any part thereof without the written permission of BHEL.
- 7) The detailed procedure for loading of urgently required items and PO cancellation has been included in this tender.
- 8) Vendor shall quote rates on “**PER MT**” basis, inclusive of cost incurred in procurement of raw material (including direct materials, consumables etc.), fabrication as per BHEL drawings and QP indicated above, handling charges, NDT, RT if required, Trial assembly & Inspection, transportation and dispatch of finished jobs to direct to site .The scope of work is detailed under ‘terms & conditions of [Section IV B](#)’. Drawings indicated against each Rate schedules are only representative, which covers the typical work content for that particular rate schedule. All representative drawings may be studied carefully to assess the work content, before quoting.
- 9) Rates quoted in any other format/ in any other units (other than MT) may not be accepted and may be rejected.
- 10) **PERSON AUTHORIZED FOR SIGNING THE TENDER DOCUMENTS:**
 - a) The tender documents shall be signed by the Authorized Signatory Only. Authorized signatory shall be the person holding “power of attorney” on behalf of the firm/company/Bidder-concerned and authorized/empowered, by MD or Board of Directors or owner of the firm, to act on behalf of the firm for quoting this Tender and all proceedings connected with, till finalization and execution of the Contract.
 - b) In case of Single Ownership / Proprietorship establishment, tender shall be signed by the Owner / Proprietor Only.

Open tender for Manufacture of Tank shells

SECTION II – SALIENT FEATURES OF NIT

- c) In case of partnership Firm under Partnership Act,
- d) the tender shall be signed by all the Partners of the firm or by the Managing Partner who have Signature and Seal of the Firm authorized to do so or by a person holding the Power of Attorney on behalf of the Partnership Firm.
- e) A copy of the Partnership Deed and/or a copy of the Power of Attorney, attested by a Public Notary shall accompany the offer.

11) EVALUATION OF OFFER:

The offer submitted by vendor shall be subjected to evaluation as per the Eligibility of rate schedules and submission of required documents. Clarification required from vendors by BHEL, if any shall be furnished by vendors within the time specified and delayed responses beyond the stipulated time lines are liable to be rejected. Results of the evaluation process shall be intimated to all the vendors who have submitted the required documents as per terms and conditions stipulated in the tender documents.

12) Suspension of Business Dealings

- It may please be noted that guidelines/rules in respect of suspension of business dealings', 'Vendor evaluation format' etc. may undergo change from time to time and the latest one shall be followed.
- Offers of Vendors who have been banned or put under hold for any of the rate schedules mentioned in [Section III](#) will not be considered for evaluation. Offers of Vendors who engage the services of Vendors banned by BHEL shall be rejected. The list of banned firms is available on BHEL web site (www.bhel.com ---> Tender Notification - List of Banned Firms).
- Abridged version of extant 'Guidelines for suspension of business dealings with suppliers/ contractors' is uploaded on www.bhel.com on "supplier registration page" at the following link: http://www.bhel.com/vender_registration/pdf/Suspension-of-Business-Dealings-with-Supplier-issued-Sept13_abridged.pdf. The bidders will be dealt by BHEL as per Suspension of Business Dealings guidelines.

13) OTHER INSTRUCTIONS FOR BIDDERS:

- MSE Vendors, to avail the concessions/ subsidies as per Govt. guidelines, should submit the valid MSE certificates along with the Techno Commercial Bid as specified in the Tender Enquiry.

Open tender for Manufacture of Tank shells

SECTION II – SALIENT FEATURES OF NIT

- It will be the firm's responsibility to ensure that the tender documents, drawings, Quality documents and related technical & commercial conditions are studied and understood fully before submitting the offer.
- Offers with deviations to techno commercial terms and conditions which are incomplete / otherwise considered defective / tender submitted is not in accordance with the tender conditions / deviations to the conditions, shall be rejected.
- If a firm is found to have given false information / documents as a part of their offer such offers shall be rejected and the firm shall be banned from doing business with all BHEL units.
- If a Bidder's /Contractor's or a firm of Contractors/any of its shareholder's or shareholder's RELATIVE is EMPLOYED in BHEL, BHEL shall be informed in writing of this fact at the time of offer submission. Hiding of such fact may lead to cancellation of tender/Contract/PO, besides other actions as per BHEL's procedures.
- If any correction is to be made in the offer by the firm, his//her/their Representative, must be authenticated by the firm who has signed the original tender.
- Vendors are instructed to fill the details ONLY in the space provided in all Annexures. Changing the formats, price bid formats or modifying the contents of formats or any other insertions/ deletions will be construed as tampering of BHEL's process, and the offer of the concerned vendor may be rejected.
- Vendor should note that BHEL has full discretion to decide to order the quantity in OSB route through separate tender instead of OVM process.
- BHEL reserves the right to operate or close the tender partly or fully.
- Rates quoted by vendor shall be valid for **4 months** from the date of tender opening.
- Subsequently, a contract shall be entered with successful bidder and contract shall be valid for **12 months** from the date of finalization of tender.
- No revision of price(s) shall be entertained after opening of tender offers.
- All entries in Tender documents shall be clearly written in one ink or typed.

Open tender for Manufacture of Tank shells

SECTION II – SALIENT FEATURES OF NIT

- BHEL will conclude that the offer has been submitted by the firm fully understanding all the requirements both explicit and implied and other conditions and accepting the same. After tender opening, the bidders are not allowed to change / alter any of the conditions either partly or fully. Offers of any such firms doing so will be rejected.
- The entire terms and Conditions contained in all the [Sections I to XIII & Annexures A to P](#) of this tender shall be deemed to form an integral part of this Contract to be entered between the Vendor & BHEL.
- In case BHEL finds that vendors join together, form cartel, or influence others / new vendors to submit offers in their favor, then BHEL will take severe action against such vendors including permanent blacklisting / banning of such vendors for BHEL's Business.
- Bidders will be disqualified from BHEL vendors list and business with them will be suspended by BHEL, if it is found that they indulge / carry out activities / business which are in direct competition or detrimental to BHEL business and accordingly such vendor shall be banned.
- As a policy, BHEL is not registering any power of attorney issued by contractors/suppliers in favor of their bank for the collection of invoice amounts on behalf of contractors/suppliers. Merely, because BHEL had acted upon any such request by the party or their bankers does not constitute any legal right or binding on BHEL for any acts of omissions and commissions or failure to act upon it or for any payment made directly to the party. If any banker includes BHEL also as a **party** to any such dispute between the banker and the **party**, all legal and incidental expenses thereof will be recovered from the concerned parties only.

15.0 DECLARATION:

All the Annexures also form part of the tender terms and conditions. The Tenderer shall furnish signed and seal [Annexure-D](#) along with the offer stating that the tender Terms and conditions have been fully read and understood and the prices quoted are in accordance with the same.

Section III - List of Rate Schedules and Eligibility criteria

Enquiry No: 658015E dt.21-09-2019 NIT_48940

Eligibility Criteria (for all the below Items):

General fabrication facility required for this requirements :

- Land area minimum 0.99 acres covered with fencing / compound.
- Covered shed : minimum 2400 sq.ft
- Gas cutting , Welding - Straightening - Edge preparation facilities, Shell Rolling upto thickness of plate 16 mm, Drilling , Punching, Shearing - Bending of plates / Structural

All testing facilities for carrying out :

- Weld Checks (MPI/LPI) - Measuring instruments / templates for dimensions check.
- Technically suitable Plain surface for carrying out the trial assembly / inspection.

Blast cleaning & Painting facilities :

- to meet the QP requirements indicated in the Annexures and respective Painting schemes. In case of blasting is done at different sources, the same is to be done with prior approval from BHEL and all test reports, inspection documents for the same is to be submitted to BHEL.

Raw-material:

Reports of Material procurement and the respective test certificates and other documents required by BHEL.

Financial soundness : Proof of document in line with Annexure - K (C)

Sl No	Project ref	RS Ref. No	Scope of work and Product Description	Grand Total	UNIT	Delivery to
1	MOUDA	MA01	Complete manufacture of <u>Tank Shells (Straight) with Base Supports and Transport Stiffners</u> with vendors own raw material procured from BHEL Approved Material Suppliers , as per BHEL drawings and customer MQP. Scope includes blast cleaning to Sa 2½ finish and painting as per painting scheme (PS) issued by BHEL. Scope also includes delivery of finished goods to customer site .	62 (+/-10%)	MT	NTPC MOUDA Dist: NAGPUR MAHARASHTRA
2	MOUDA	MA02	Complete manufacture of <u>Tank Shells (Straight) with Transport Stiffners</u> with vendors own raw material procured from BHEL Approved Material Suppliers , as per BHEL drawings and customer MQP. Scope includes blast cleaning to Sa 2½ finish and painting as per painting scheme (PS) issued by BHEL. Scoper also includes delivery of finished goods to customer site .	168 (+/-10%)	MT	NTPC MOUDA Dist: NAGPUR MAHARASHTRA
3	MOUDA	MA03	Complete manufacture of <u>Conical Shells / Covers / Related Structures</u> with vendors own raw material procured from BHEL Approved Material Suppliers , as per BHEL drawings and customer MQP. Scope includes blast cleaning to Sa 2½ finish and painting as per painting scheme (PS) issued by BHEL. Scoper also includes delivery of finished goods to customer site .	51 (+/-10%)	MT	NTPC MOUDA Dist: NAGPUR MAHARASHTRA
4	NK Pura	KA01	Complete manufacture of <u>Tank Shells (Straight) with Base Supports and Transport Stiffners</u> with vendors own raw material procured from BHEL Approved Material Suppliers , as per BHEL drawings and customer MQP. Scope includes blast cleaning to Sa 2½ finish and painting as per painting scheme (PS) issued by BHEL. Scope also includes delivery of finished goods to customer site .	140 (+/-10%)	MT	NTPC-NORTH KARANPURA DIST- CHATRA JHARKHAND
5	NK Pura	KA02	Complete manufacture of <u>Tank Shells (Straight) with Transport Stiffners</u> with vendors own raw material procured from BHEL Approved Material Suppliers , as per BHEL drawings and customer MQP. Scope includes blast cleaning to Sa 2½ finish and painting as per painting scheme (PS) issued by BHEL. Scoper also includes delivery of finished goods to customer site .	181 (+/-10%)	MT	NTPC-NORTH KARANPURA DIST- CHATRA JHARKHAND

Section III - List of Rate Schedules and Eligibility criteria

Enquiry No: 658015E dt.21-09-2019 NIT_48940

Eligibility Criteria (for all the below Items):

General fabrication facility required for this requirements :

- Land area minimum 0.99 acres covered with fencing / compound.
- Covered shed : minimum 2400 sq.ft
- Gas cutting , Welding - Straightening - Edge preparation facilities, Shell Rolling upto thickness of plate 16 mm, Drilling , Punching, Shearing - Bending of plates / Structural

All testing facilities for carrying out :

- Weld Checks (MPI/LPI) - Measuring instruments / templates for dimensions check.
- Technically suitable Plain surface for carrying out the trial assembly / inspection.

Blast cleaning & Painting facilities :

- to meet the QP requirements indicated in the Annexures and respective Painting schemes. In case of blasting is done at different sources, the same is to be done with prior approval from BHEL and all test reports, inspection documents for the same is to be submitted to BHEL.

Raw-material:

Reports of Material procurement and the respective test certificates and other documents required by BHEL.

Financial soundness : Proof of document in line with Annexure - K (C)

Sl No	Project ref	RS Ref. No	Scope of work and Product Description	Grand Total	UNIT	Delivery to
6	NK Pura	KA03	Complete manufacture of <u>Conical Shells / Covers / Related Structures</u> with vendors own raw material procured from BHEL Approved Material Suppliers , as per BHEL drawings and customer MQP. Scope includes blast cleaning to Sa 2½ finish and painting as per painting scheme (PS) issued by BHEL. Scope also includes delivery of finished goods to customer site .	114 (+/-10%)	MT	NTPC-NORTH KARANPURA DIST- CHATRA JHARKHAND
7	Barh I & II	BA01	Complete manufacture of <u>Tank Shells (Straight) with Base Supports and Transport Stiffners</u> with vendors own raw material procured from BHEL Approved Material Suppliers , as per BHEL drawings and customer MQP. Scope includes blast cleaning to Sa 2½ finish and painting as per painting scheme (PS) issued by BHEL. Scope also includes delivery of finished goods to customer site .	167 (+/-10%)	MT	NTPC LTD., BARH SUPER THERMAL POWER PROJECT,BARH, BIHAR
8	Barh I & II	BA02	Complete manufacture of <u>Tank Shells (Straight) with Transport Stiffners</u> with vendors own raw material procured from BHEL Approved Material Suppliers , as per BHEL drawings and customer MQP. Scope includes blast cleaning to Sa 2½ finish and painting as per painting scheme (PS) issued by BHEL. Scope also includes delivery of finished goods to customer site .	191 (+/-10%)	MT	NTPC LTD., BARH SUPER THERMAL POWER PROJECT,BARH, BIHAR
9	Barh I & II	BA03	Complete manufacture of <u>Conical Shells / Covers / Related Structures</u> with vendors own raw material procured from BHEL Approved Material Suppliers , as per BHEL drawings and customer MQP. Scope includes blast cleaning to Sa 2½ finish and painting as per painting scheme (PS) issued by BHEL. Scope also includes delivery of finished goods to customer site .	323 (+/-10%)	MT	NTPC LTD., BARH SUPER THERMAL POWER PROJECT,BARH, BIHAR

Note:

Raw-Materials are to be PROCURED from BHEL approved sources only (Refer Section:VIII) as per the material specification and approved manufacturing drawings /QP / PS ref numbers given in section V



Bharat Heavy Electricals Limited
Boiler Auxiliaries Plant,
Ranipet – 632 406
Phone : 04172 - 284030

SECTION IV A - GENERAL CONDITIONS OF NIT

I- DEFINITIONS

Throughout these conditions and in the specifications “**THE CONTRACTEE**” means the **Bharat Heavy Electricals Limited**, acting through the General Manager/OUT SOURCING, Ranipet, unless the context otherwise provides “**THE CONTRACTOR/VENDOR** ” means the person, firm, vendor or company with whom the Purchase Order under this contract is placed and shall be deemed to include the Contractor’s successors (approved by the Contractee) representatives, heirs, executors and administrators as the case may be unless excluded by the terms of the Contract. “**DRAWINGS**” means the drawings exhibited or provided for the guidance of the Contractor by the Contractee.

II- EXECUTION

The whole contract is to be executed in the most approved substantial and workman like manner to the entire satisfaction of the Contractee, or the Inspecting Officer who shall have power to reject any of the Structural which he may disapprove; and his decision thereon and any question as to the true intent and meaning of the specifications of drawing or of the work necessary for the proper completion of the contract, shall be final and conclusive. The contractee may require alteration if any to be made during the progress of work and should these alterations be such that either party to the contract considers as an alteration involving change in cost such alteration shall not be carried out until amended cost have been submitted by contractor and accepted by the Contractee. Should the Contractor proceed to work without obtaining the consent of the Contractee in writing to an amended cost of work the Contractor shall be deemed to have agreed to execute the work at such charges as may be considered reasonable by the Contractee.

III- FORCE MAJEURE

If any time during the continuance of this Contract the performance in whole or part by either part of any obligation under this contract shall be prevented or delayed by reasons of war, hostilities, acts of public enemy, civil commotions, sabotage, fires, floods, explosions, epidemic quarantine restrictions or acts of God (herein referred to as events), provided the notice of the happenings of any such events is given by either party to other party within 21 (Twenty one) days from the date of occurrence thereof, either party shall by reason of such event not be entitled to terminate this contract, nor shall either party have any claim for damages against the other in respect of such non-performance and delay in performance and delivery under the contract shall be resumed as soon as possible after such event has come to an end or ceased to exist and the decision of the Contractee as to whether such event has come to an end or has ceased exist shall be final and conclusive. If the performance in whole or part of any obligation under this contract is prevented or delayed by reason of any such event, claims for extension of time shall be granted for periods considered reasonable by the Contractee subject to prompt notification by the Contractor to the Contractee of the

particulars of the events and supply to the Contractee if required of any supporting evidence. Any waiver of time in respect of partial instalment shall not be deemed to be a waiver of time in respect of remaining work schedules.

IV- TERMINATION OF CONTRACT/RISK PURCHASE

If as a result of difficulty in procurement of materials which is justified with proper documentary evidence and BHEL's concurrence or due to force majeure reasons or any other reasons whatsoever the contractor is unable to keep the delivery schedule of the Contractee, the Contractee to the extent considered necessary may grant extension of time. Should there be delay in work, beyond the extended date of delivery, it shall be open to the Contractee to terminate the contract in part or full and make other arrangements for executing work elsewhere at the cost and risk of the Contractor. Any cost implication towards such alternate procurement shall be recovered from the Contractor

V- INTERPRETATION

The Contractee shall decide any dispute or difference of opinion in respect of the interpretation, effect or application of this particular condition of the Contract or the amount recoverable hereunder from the contractor and the decision shall be final and conclusive.

VI- BOOK EXAMINATION CLAUSE:

The Contractor shall whenever required produce or cause to be produced for examination by any Officer of the Contractee authorized in that behalf, any cost or other account book or account voucher, receipt letter, memorandum, paper or writing or any copy extract from any such document and also furnish information and returns verified in such a manner as may be required in any way relating to the execution of this contract or relevant for verifying or ascertaining the cost of execution of this contract (the decision of such officer of the Contractee on this question or relevancy of any documents, information or return being final and binding on the Parties). The obligation imposed by this clause is without prejudice to the any other obligation under the contract / purchase order or under any statutes/ rules or orders binding the contractor. The contractor shall if the authorized officer or the Contractee so required (whether before or after the prices have been finally fixed), afford facilities to the officer of the Contractee concerned to visit the contractors works for the purpose of examining the process of manufacture and estimate or ascertaining the cost for production of the articles, if any portion of the work be carried out by a sub-contractor of any subsidiary of an allied firm or company, the authorized officer of the Contractee shall have power to secure the books of such sub-contractor, or any subsidiary or allied firm or company shall be open to his inspection.

VII - SET OFF CLAUSES

Notwithstanding anything contained herein, the payment shall be subject to the deduction of any amount for which the vendor is liable directly or indirectly under this contract or any other contract of the vendor or any other vendor's contract where the proprietor/any of the partners /directors of the present vendor is/are proprietor/director/s /partner/s, in respect of which BHEL, Ranipet is a Contractee"

VIII - LAWS GOVERNING THE CONTRACT

The Laws of Government of India in force shall govern the Contract. Irrespective of the place of the execution of the Contract/ place of payment under the contract, the contract shall be deemed to have been made at the place at which the acceptance of the offer has been issued.

IX - JURISDICTION OF THE COURT

The Courts at Ranipet, Tamil Nadu alone shall have jurisdiction to decide any dispute arising out of or in respect of the contract.

X - THE GLOBAL COMPACT

Global Compact was a signature initiative of the then United Nations Secretary General Kofi Annan and Four United Nation Agencies:

- ❖ Office of the High Commissioner for Human Rights
- ❖ International Labour Organisation
- ❖ United Nations Environment Programme
- ❖ United Nations Development Programme

This is a broad based initiative and engages:

- ❖ Individual Companies
- ❖ Business Associations
- ❖ International Labour
- ❖ Human Rights, Environment and
- ❖ Development Organisations
- ❖ Academic & Public Policy
- ❖ Institutions and United Nations

The Contractee (BHEL) is a member of this Global Compact. As a participating company, we have the obligation to

- ❖ Support and respect Human Rights within our spheres of influence.
- ❖ Make sure we are not complicit in Human Rights abuses.
- ❖ Make sure we are not employing Forced or compulsory labour.
- ❖ Refrain from employing Child Labour
- ❖ Eliminate discrimination in our hiring and firing policies.
- ❖ Support a precautionary approach to Environmental challenges.
- ❖ Undertake initiatives to promote greater environmental responsibility.
- ❖ Encourage development and diffusion of environmentally friendly Technologies

Contractor shall also ensure to fall in line with the above principles.

SECTION IV-B: TERMS AND CONDITIONS

1.0 QUANTUM OF WORK:

- 1.1** The total tentative quantum envisaged for ordering through this Contract is around **1396 MT +/- 10%** involving following products.

Complete manufacture of Tank shells (Straight /Conical) with /without base supports and transport stiffeners with vendors own raw material procured from BHEL approved Material suppliers as per drawings and customer MQP. Scope includes blast cleaning to Sa 2½ finish and painting as per painting scheme (PS) issued by BHEL. Scope also includes delivery of finished goods to customer site (Mouda , North karanpura , Barh) .

- 1.2** The entire quantum of work is under nine rate Schedule under reference. The rate schedule is given in [Section-III](#). The quantity indicated is tentative and may vary during the execution of the contract, depending on the order inflow to BHEL, customer clearance, project progress etc.

1.3 NO OF SOURCES REQUIRED : 6 (Six only)

2.0 SCOPE OF WORK:

The broad scope of work in respect of all the rate schedules includes:

- 2.1** Procurement of raw materials and consumables like electrodes etc., from BHEL/ NTPC approved raw material sources as per [Section VIII](#), as per the raw material Specifications/ Technical delivery conditions (TDC's) as per [Section IX](#), and quantities as per Drawings/ GMS (Group Manufacture specification) to be issued by BHEL along with purchase orders (PO's) / to be hosted in B2B.
- 2.2** Fabrication of components as per BHEL drawings and QP to be issued along with Purchase order after contract agreement. However, to understand the nature, type & quantum of work content, a set of representative drawings are attached under [Section VI](#). It is to be noted that the actual drawings and work content will be known only after design document release and may contain work content which may vary marginally.
- 2.3** Fabrication of components shall also be according to the drawings/Quality Plan (QP)/ Quality Work Instructions (QWI) / customer approved quality plans as listed under [Section IX](#).
- 2.4** Heat treatment, NDT, other testing works as called for in PO/Drawings/QP/QWIs, wherever necessary shall be carried out through BHEL approved vendors as listed in [Section X](#).
- 2.5** Surface preparation & Painting as per the quality documents as detailed in [Section IX](#).
- 2.6** Procurement of all indirect materials, consumables, packing materials required for the completion and the despatch of the jobs. Refer [Section VIII](#) for list of approved sources.
- 2.7** All handling charges till completion of fabrication & despatch up to destination is in Vendor's scope.
- 2.8** All costs towards testing & inspection including Customer/ BHEL/ BHEL nominated agency as per BHEL's QP/PO /Drawings and customer CHP, till obtaining of MDCC (wherever applicable).
- 2.9** Transportation of finished components to respective site and obtaining of acknowledgement from respective BHEL site incharge.
- 2.10** The typical list of raw materials involved product / rate schedule wise is provided under [Section VII](#) for the information of vendors.
- 2.11** [Not applicable](#)

- 2.12 The Surface preparation and painting as per the project's painting scheme detailed in [Section IX](#).
2.13 Not Applicable
2.14 The scope of work is further detailed in subsequent clauses.

A. DETAILED SCOPE:

- 2.15 Detailed scope includes procurement of Raw materials and consumables required for manufacture, welding and Painting as stipulated in the drawings / QWIs / Welding procedures and stencilling as per clause 'E' referred below.
2.16 Conducting MPI/LPI, other NDT & heat treatment wherever called for in the Drawings/QWIs/ Quality Plans of Projects is in the scope of vendor (cost is in the scope of vendor).
2.17 The Ultrasonic Testing, Radiographic Testing and Stress Relieving if required are to be carried out by BHEL approved agency. List of approved agencies are given in [Section X](#). In case there is no approved agency near vendor's works, vendor has to locate suitable agency for RT, MPI, LPI, SR and UT and get them approved by BHEL before commencing the job. The Vendor shall have in house LPI, MPI facilities (equipment's and qualified personnel).
2.18 Only Class-I measuring tapes shall be used, procured from M/s. Tajima, Hyderabad, which shall be calibrated at BHEL Lab or any NABL, approved Lab before use.
2.19 Handling equipment's for movement of finished goods.
2.20 Not applicable
2.21 Not applicable
2.22 Any other item/s required for safe dispatch is included in the scope of vendors. Assembly Items are to be dispatched with adequate bolt which is in the scope of the vendor.
2.23 Required equipment's for handling of raw materials/WIP & finished goods should be available at Vendor works.
2.24 Providing the necessary facilities, gauges, instruments, etc. for carrying out the testing & inspection by customer/BHEL/BHEL nominated agency as per BHEL's QP/PO/Drawings and customer CQP, till obtaining of MDCC is in Vendor scope.
2.25 GR posting if applicable will be done only on receipt of MDCC. Vendor shall have to co-ordinate with the concerned official for MDCC. For NTPC despatches, GR posting is possible after receipt of MDCC in Outsourcing/BHEL, Ranipet.

B. RAW MATERIAL PROCUREMENT:

- 2.26 Raw materials are to be procured from the CUSTOMER/NTPC/BHEL approved sources as per BHEL TDC (latest revision) or respective material specification as indicated in the [Section-VIII](#). Raw materials can also be procured from other sources as per guidelines as per the applicable procedure given in [Section IX](#).
2.27 Raw materials and paints are to be procured with relevant Test Certificate (TC) and these have to be submitted/ produced in original during inspection. Any test both destructive and non-destructive if required will have to be carried out by the vendors at their own cost. All such reports in original will have to be submitted during inspection. Vendors also shall verify the materials & TC to comply with the QP.
2.28 The system for storing and issuing materials shall be available with vendor for easy traceability.
2.29 Periodic audit of system of purchasing, storing and issue, etc. will have to be carried out by the vendors. BHEL will also audit the same.

2.30 For raw material substitutions requested by vendor if there is increase in weight, no cost escalation will be considered. Drawings/GMS shall not be revised.

C. TRANSPORTATION:

2.31 The quoted rates for the rate schedule shall be on **FOR SITE** on TOTAL COST (raw-material, consumables, manufacture, Trial assembly, blast cleaning, painting, inspection and delivery to respective site) on **per MT basis**.

2.32 The details of various products envisaged for despatch of components & the respective tonnage are indicated under [Section V](#).

2.33 All the consignments are normally envisaged for despatch to DTS as given in the Annexure A directly from vendor's works.

D. DELIVERY PERIOD:

2.34 Timely delivery is the essence of the Contract.

2.35 The finished goods should be delivered **within 4 months** from the date of placement of PO. However, the delivery date will be indicated in the Purchase Order as per project requirement or priority.

2.36 **Staggered delivery** wherever applicable will be clearly mentioned at the time of PO placement.

2.37 Outsourcing Planning will indicate the delivery date against each item of PO during PO placement in case of staggered delivery.

2.38 The finished components have to be despatched as per the despatch priority issued by BHEL at the time of purchase order placement. If staggered delivery is applicable, then delivery should be as per the date mentioned against each line item.

2.39 Vendors have to arrange for despatch of the finished goods either in Trucks or Trailer/ Hydraulic axles for safe delivery through their transport carriers. Safe delivery of the goods to Project authorities is in the scope of the vendor. Any Deviation/ discrepancy of the materials received at site, if any shall have to be rectified or replaced by vendor. If the same is not rectified/replaced by the concerned vendor, the same will be rectified /replaced by BHEL and the cost incurred shall be recovered from the vendor.

2.40 Loading of finished goods on Truck / Trailer including packing, lashing wherever required for safe transportation is in the scope of the vendor.

2.41 Vendors have to communicate in writing to the insurance agency or BHEL as indicated in the Despatch Instruction, the despatch details to enable them to cover the transit insurance. In case of any transit damage to materials, the vendor shall carry out the rectification, and the amount realised from the insurance company shall be paid to vendor. Vendor shall cooperate and provide all documents to claim the damage from the insurance company.

2.42 As soon as the despatches are made, vendors have to submit scanned copy of LR, DC and GST Invoice to BAP/Ranipet. Vendor has to arrange for site Acknowledgment of the finished goods in good condition after due verification.

2.43 Original site acknowledged LR copies along with original (both front and back side of LR with site acknowledgement) along with IR, DC, GST invoice and system generated online invoice along with other annexures also to be furnished to BHEL for processing the invoice.

2.44 It is the responsibility of the vendor to get specific acknowledgement from site authorities for packed items in case the consignment was despatched in packed condition. The original acknowledgment has to be submitted to BHEL along-with the Invoice.

2.45 Vendor should get their clarifications (wrt. Engg drawings, Material substitutions, quality procedural clarifications) resolved **within 15 days** from the receipt of Drawing / PO. Any delays in raising query will have to be accommodated by the vendor within the PO delivery date.

E. PAINING, STENCILING & PACKING:

2.46 The finished product shall be cleaned as per the approved Quality Plan (including blast cleaning as necessitated for the Project) and painted with primer and finish paint as per [Section IX](#) with paints procured from our approved paint manufacturers list vide [Section “VIII”](#). In case of Special Painting Jobs, processing shall be according to the Customer approved Painting Scheme.

2.47 The Project name, Work Order No., Number off, DU Number, Weight, and Vendor Code number shall be legibly stencilled for identification and despatch as may be advised.

2.48 After painting and stencilling, suitable packing should be made, according to the job size. Loose pieces should be sent only by packed of appropriate size which is in the scope of vendor .

2.49 Identification on parts shall be made on the Flanges / Angles. Match marks on parts shall be hand punched and stencilled. Identification of Structures shall be hand punched and stencilled. Vendor Code number shall be punched using letter punch and bordered suitably for identification. Machined / drilled surfaces shall be protected with rust preventive oil. Weldable areas are to be applied with weldable primer.

2.50 In case any complaint is received from site regarding poor quality of product including painting issues, the concerned vendors shall be asked to rectify within a short time or else BHEL may arrange rectification through alternate agencies and recover from the vendor for all the connected expenditure involved in repair / rework. Vendors shall not absolve their responsibility even beyond normal warranty period, irrespective of the fact that the product had been inspected by BHEL/QC/AIA. If a proper blasting and painting process is followed, the painting should withstand for 5 to 8 years even if exposed to severe / corrosive atmosphere and hence vendors cannot absolve their responsibility even beyond normal warranty period, irrespective of the fact that the product had been inspected by BHEL/QC/AIA. In order to avoid such penalties, the vendors are advised to follow the established process of blasting and painting.

3.0 GST Compliance in respect of ensuring Input Tax Credit (ITC):

3.1 Supplier shall mention their GSTN registration number in all their invoices and invoices shall be in the format as specified/prescribed under GST laws. Invoices shall necessarily contain Invoice number (in case of multiple numbering system is being followed for billing like SAP invoice no, commercial invoice no etc., then the Invoice No which is linked/uploaded in GSTN network shall be clearly indicated), item description as per PO, Quantity, Rate, Value, applicable taxes with nomenclature (like IGST, SGST, CGST & UTGST) separately, HSN/ SAC Code, etc.

3.2 All invoices shall bear the HSN Code for each item separately (Harmonized System of Nomenclature)/ SAC code (Services Accounting Code).

3.3 A declaration to the effect that all invoice particulars are/were uploaded in the GSTN network/ portal & all tax liability as per GST rules and regulations have been and will be discharged, shall be mentioned in the invoice. If not mentioned in the invoice, a separate declaration shall be submitted as per the requirement of BHEL.

3.4 All documents like Test Certificate, LR copy, any other document mentioned in PO, shall be sent along with the vehicle/consignment. For all consignments received within the calendar month, input credit will be availed within that month in line with monthly returns filing cycle. In case of any discrepancy

in the document or non-submission of documents mentioned in the PO, then BHEL will not be able to accept or account the material, in such case availing of tax credit will be deferred to next month or so.

- 3.5 In case of discrepancy in the data uploaded by supplier in the GSTN portal or in case of any shortages or rejection in the supply, then BHEL will not be able to avail the tax credit and will notify the supplier of the same. Supplier has to rectify the data discrepancy in the GSTN portal or issue credit note (details to be uploaded in GSTN portal) for the shortages or rejections in the suppliers, within the calendar month notified by BHEL.
- 3.6 For any such delay in availing of tax credit for reasons attributable to supplier (as mentioned above), interest (calculated @ SBI Base Rate + 6%) along with penalty (if any) will be deducted/recovered for the delayed period i.e. from the month of receipt till the month tax credit is availed, from the running bills.
- 3.7 Under GST regime, BHEL has to discharge GST liability on LD recovered from suppliers/contractors. Hence applicable GST shall also be recoverable from suppliers/contractors on LD amount. For this Debit note will be issued by BHEL indicating the respective supply invoice number.
- 3.8 In case any changes in taxes and duties as per Gov. Notification (including GST), the same shall be applicable from time to time.
- 3.9 Duplicate copy of the Invoice meant for the transporter should accompany the material as stipulated under CE Rules 52A and 172C OR 57CE.

4.0 INSPECTION:

- 4.1 Inspection shall be by our Quality Control Department and / or by our customers and / or by an appointed agency or persons authorized by us. Vendor shall provide all facilities and equipment's, calibrated instruments and standard gauges required for inspection free of cost.
- 4.2 The works are deemed to have been completed and accepted, only after the inspector / Agency/Agencies accept/approve the Inspection Report (IR). IR has to be raised as per BHEL B2B format.
- 4.3 Nevertheless, inspection and acceptance of the component does not absolve the responsibility of the vendors against any manufacturing defects noticed later.
- 4.4 BHEL representative from unit or CQ is authorised to carry out audits along with TPIA at Vendor's works before clearing the items for despatch wherever required.

5.0 PRICE VARIATION CLAUSE (PVC):

- 5.1 The rates finalized for this tender is FIRM and NO price variation clause is applicable.

6.0 Evaluation of Price bids:

- 6.1 The Price bid shall be valid for 12 months from the date of tender opening.
- 6.2 L1 ranking will be arrived on 'TOTAL COST' basis. Rate quoted (on per MT basis) shall be evaluated on the basis of Lowest quoted rates.
- 6.3 The tenders will be evaluated on DTS. Additional Taxes/Toll etc., incurred during transit shall NOT be paid extra over the "DTS" rates quoted.
- 6.4 The vendors quoting the lowest rates will be the successful bidder for the respective Rate schedules.
- 6.5 Wherever there is tie in L1 rate, revised offer shall be obtained from tied lowest bidders. In case of further tie in L1 rate, lot shall be made to find L1. L1 rate of respective rate schedule shall be counter offered to eligible Vendors as per below mentioned procedure for counter offering.
- 6.6 If the number of Vendors eligible for counter offering exceeds the limit as prescribed in distribution of load due to tie at particular ranking, then all eligible Vendors at that ranking shall be considered for counter offering.

- 6.7 Ordering on the successful bidder/s is/are proposed depending on the monthly spare capacity, customer approval of the vendor for the specific project & product, pending orders of BHEL with vendor at the time of loading, quality and delivery performance of the vendor for each Schedule.

7.0 Counter offering process:

- 7.1 Post price bid opening, if the rates quoted by the lowest bidder is not acceptable to BHEL, then Lowest Bidder(s) (L1 Vendor in respective rate schedules) will be called for price negotiation process.
- 7.2 Number of vendors required in this tender is only SIX. As the quantum to be completed is high and delivery requirements are concurrent for all items of the tender, BHEL shall counter offer the finalised L1 Rates (on Landed Cost basis) to max. 5 accepting vendors. In any case the H1 vendor will not be considered.
- 7.3 Vendors may kindly note that the Counter-offer rates (finalized L1 Rates) shall be offered only to the vendors eligible for that Rate schedule.
- 7.4 Based on acceptance of counter offered L1 rate in various rate schedules by Vendor for each Rate Schedule, a Contract will be entered between Vendor and BHEL.
- 7.5 A Contract shall be entered into with L1 Vendors and the other eligible Vendors who have accepted the counter offered L1 rate **The contract thus signed shall be valid for ordering up to a period of 12 months from the date of finalisation of tender.** However, validity of the contract is subject to further extension with mutual consent of Vendors.
- 7.6 Delivery dates in the PO to be released will be decided by BHEL based on customer Contract requirement.
- 7.7 BHEL also reserve the right to re-float or cancel the entire enquiry proceedings partly or fully in case the negotiated rates are not within BHEL's estimation.
- 7.8 Performance monitoring of the supplier will be carried out periodically. This will be one of the main criteria for ordering.

8.0 Eligible bidders for Counter offer

Number of Vendors to be considered for Counter offering process shall be max.5 other than the L1. In case of No of vendors responded are less than the required (6 vendors), the order distribution will be made among the available vendors proportionally. H1, the top higher ranked vendors will not be considered for counter offer.

9.0 Load Distribution:

- 9.1 Load distribution shall made at the rate of 25 % to L1, 20% to L2 , 15% to L3 & 13.33% to L4 to L6 vendor APPROXIMATELY (may vary according to the assembly weight / individual part weight)..
- 9.2 L1 Vendor shall be loaded subject to their capacity, meeting BHEL delivery requirement, quality performance and load available with BHEL. Balance load in each rate schedule will be distributed among Vendors accepting the counter offered rate based on their tender ranking subject to their capacity, performance, delivery and quality performance.
- 9.3 The loading will depend on tender ranking, capacity mentioned in [Annexure J](#), and assessment by BHEL Ranipet.
- 9.4 Monthly capacity has to be filled by the vendor as per [Annexure-J](#), to enable BHEL for loading of appropriate quantity.

PURCHASE ORDER CANCELLATION

- 9.5** Vendors will have to acknowledge the PO **within 7 days** from the date of release of PO, otherwise BHEL has the right to cancel the PO.
- 9.6** Cancellation of partial/full PO after PO delivery date - LD/Penalty will be recovered for the delayed period on entire PO value and further, loading will be stopped. Delayed period will be from the PO date to PO cancellation date. BHEL has the right to get the left items ordered elsewhere with notice to the vendor; at the risk and cost of the vendor and the additional expenditure / difference in Cost, if any, including consequential cost shall be recovered from the defaulted vendor.
- 9.7** BHEL has the right to divert/cancel the order if the vendor has not procured at least 50% of the quantity of raw materials within 60 days from PO date. Purchase order placed on steel mills and with proper payment voucher/proof will be considered for not cancelling the PO by BHEL. The submission of data by vendor for DB clearance by BHEL/QC shall be the proof of procurement. This is to avoid delay in project schedule due to delay in raw material procurement by vendors. In case the vendor fails to procure at least 50% of the quantity of raw materials within 60 days from PO date, further loading will be suspended.
- 9.8** If a Vendor rejects a PO/does not respond for PO acceptance (within seven days) consecutively three times or more, **then Vendor will not be eligible loading in all the rate schedules.**

10.0 QUALITY / TECHNICAL REQUIREMENTS:

- 10.1** Supply of the components should strictly conform to dimensions and tolerances indicated in the Drawings, Quality Plan and Duct Manual, if applicable. Vendors must ensure that dimensional deviations, if any, are recorded properly in the Dimension Record books and the same shall be made available to BHEL Officials or their authorized agencies. All the Quality records are to be submitted to BAP/Ranipet portal. Any correction or revisions as advised by BHEL at post PO stages, shall be carried out by the vendor, based on the revised drawings or interim inspection from BHEL extra cost implications if any shall be informed to BHEL before carrying out the job.
- 10.2** Welding to be carried out by Qualified Welder and as per BHEL Approved Welding Procedure Specification. The welder qualification and welding procedure (**as per relevant SIP**) shall have to be done by QC / BHEL or by their authorized appointed agency. The cost of any approval on this account is in the scope of vendor.
- 10.3** Only the right kind of electrodes shall be used as called for in the Drawings.
- 10.4** Any other work to be carried out other than the requirements of Drawings / QWIs shall have the prior approval of BHEL.
- 10.5** Adequate facilities like welding equipment's, baking oven, handling facilities and measuring instruments duly calibrated as called for by us must be available. All the above equipment's must be under working condition and the same is to be made available for verification by BHEL Officials or their authorized agents.
- 10.6** The instruments / gauges are to be calibrated at BHEL Lab (chargeable basis as per applicable rates) or any NABL, approved Lab periodically as follows:
- Sl. No. Type Periodicity
 - Measuring Instruments / Gauges - One Year
 - Limit Gauges (E.g. Plug / Ring) - One Year
 - Temperature, Pressure Gauges - 6 Months
 - Measuring Steel Tapes – One Time

10.7 Calibration status shall be displayed at the Vendor's Works in a conspicuous location.

11.0 PROGRESS REPORT:

11.1 The vendor shall mail their completion plan and progress report from time to time as and when required by BHEL.

11.2 The submission, receipt and acceptance of such reports shall not prejudice the rights of BHEL, under the contract nor shall operate as estoppels against BHEL, merely by reason of the fact that they have not taken notice of or objected to any information contained in such reports. Action as deemed fit would be taken if the progress of work is not satisfactory.

12.0 MSE PREFERENCE & DOCUMENTS:

12.1 MSME suppliers can avail the intended benefits only if they submit along with offer, attested photocopies of either (i) EM II certificate having deemed validity (Five years from the date of issue of acknowledgement in EM –II) OR valid NSIC certificate or EM II certificate where the deemed validity of EM II is over along with (ii) CA certificate or Udyog Aadhar Memorandum (UAM) along with CA certificate (Format enclosed as per [Annexure C](#) applicable for the year, certifying quantum of investment in plant and machinery within the permissible limit as per the act for relevant status (Micro or small) where the deemed validity of EM II is over. Date to be reckoned for determining the deemed validity will be the last date of technical bid submission. Non submission of such documents will lead to consideration of their bids at par with other Non MSME bidders and MSME status of such suppliers shall be shifted to Non MSME supplier till the supplier submits these documents.

13.0 PAYMENT TERMS:

13.1 The weights in Group Manufacturing Specification (GMS) shall be the basis for calculating the total requirement of raw materials for fabrication. However, vendor shall correlate all the drawings & GMS and take into consideration a suitable process allowance over and above this, for procurement of raw materials. For the purpose of billing as well as transport, the weight of GMS shall be the basis. Changes in the weight due to material substitution will be carried out by temporary DCN & GMS / PO will not be revised on account of this. However, weight changes due to design change shall be compensated by PO amendment, based on vendor request.

13.2 100% Payment shall be made through electronic mode by EFT/RTGS within 45 days from the date of site acknowledgment, IR and Invoice to BHEL Ranipet subject to submission of bill along with site acknowledgement / acknowledgement requisite documents in original including Performance Bank Guarantee of 2.5% of the PO value. Vendors have to coordinate with the customer / site authorities for obtaining acknowledgement.

13.3 Billing shall be made for complete PO Sl. No. (i.e. one Complete DU), and Bills for partial despatches of PO Sl. No. (DU) will not be entertained.

13.4 Vendor should ensure that the following documents are submitted for bill processing to avoid any delay in processing of payment.

✓ **OVM – Despatch**

- a. Online Invoice – duly signed by vendor with seal
- b. Online Invoice Annexures - duly signed by vendor with seal
- c. GST Invoice – Original copy for RECEIPT - In vendor letter head (Values to be

checked with B2B tax invoice template) and a copy of the GST invoice should be attached.

- d. Original IRs – with relevant painting/SB remarks and ODC details (if applicable) - duly signed by BHEL QC inspector and vendor with seal
- e. Original DCs – Sign and seal of vendor
- f. Original LR's – Quantity despatched as loose/packed acknowledged by BHEL Sites official along with sign and name seal – LR acknowledged.
- g. Performance Bank Guarantee @ 2.5% of the PO value.

13.5 The concessions/ subsidies as applicable to MSE vendors as per Govt. guidelines subject shall be Extended to eligible MSE vendors subject to submission of valid documents.

14.0 PERFORMANCE BANK GUARANTEE (PBG):

14.1 All successful bidders have to submit the Bank Guarantee before signing of contract. Bank Guarantee has to be stamped in accordance with stamp act.

14.2 Purchase Order will be released only after signing of the contract and receipt of PBG as per annexure S.

14.3 The vendor shall warrant that the supplied products comply fully with the drawings and other technical requirements for a **warranty period of 18 Months**, from the site acknowledgement date of last dispatch. If the supplies are found defective owing to faulty raw material / workmanship / incomplete work, within a period of eighteen months from the date of despatch, the vendor shall make good of it / replace the same free of cost.

14.4 To cover such eventualities, the vendor shall furnish Performance Bank Guarantee (PBG) @ 2.5 % of the PO value.

✓ Validity of PBG: From [the date of submission of PBG] till [date of last dispatch + **18 months** (warranty period)] + 90 days (Claim period)

14.5 If the vendor does not complete the re-work at project site in time, then the re-work shall be completed by BHEL. Cost of the re-work will be deducted/recovered from PBG or any of the amount due to vendors or from both.

15.0 LIQUIDATED DAMAGES / PENALTY & RISK PURCHASE:

15.1 If **staggered delivery** is indicated in the PO, LD will be levied on the undelivered portion. Liquidated damages at the rate of 0.5% of the undelivered portion value of the Purchase order item value for each week or part thereof beyond the specified delivery period will be levied subject to a maximum of 10% of total PO Value (max 11.8% of PO value i.e 10% plus applicable GST of 18%) without prejudice to any other relief or compensation to BHEL, under any other condition of the contract and applicable laws.

15.2 For the PO's indicated No staggered delivery. In case of single delivery indicated in the PO: Where the vendor supplies the finished goods beyond the specified delivery period, liquidated damages at the rate of 0.5% of the total value of the Purchase order for each week or part thereof will be levied subject to a maximum of 10% of the total purchase order value (max 11.8% of PO value i.e 10% plus applicable GST of 18%) without prejudice to any other relief or compensation to BHEL, under any other condition of the contract and applicable laws.

- 15.3** GST at prevailing rate is applicable on LD amount. Credit note will be issued by the vendor indicating the respective supply invoice.
- 15.4** Delivery Extensions shall not be entertained for normal cases unless there are delays which have justifiable reasons not attributable to Vendor. In case of amendment in PO, LD will be calculated as per the amended PO.
- 15.5** Invoices received without any request for delivery extension and or without proper justification, LD will be automatically deducted.
- 15.6** In such cases where the reasons for delay (before PO delivery date) are attributable to BHEL, the vendors are expected to send a request for delivery extension (within PO delivery date) along with supporting documents & justification, indicating the number of days/ date till which extension is required. (Beyond this date, extension shall not be made). Also Vendor has to opt 'YES' for delivery extension required in B2B. In case of no response it will assumed that delivery extension is not required.
- 15.7** Delivery extension if any, should be obtained before Invoice creation. Once bill has been submitted & posted, deferred payment amount (max 11.8 % of PO value) will be withheld until full PO completion & delivery extension completion. Any financial implication on account of delayed delivery shall be borne by the Vendor.
- 15.8** In case of any revision/ amendment of PO, the LD shall be linked to the amended/revised PO value.
- 15.9** The defaulted vendor shall be liable for any loss, which BHEL may sustain by reason of such risk purchases in addition to liquidated damages as mentioned above.
- 15.10** In case of LD recovery, the applicable GST shall also be recovered from the suppliers.

16.0 DETENTION CHARGES – No detention charges applicable

17.0 Action and Compensation in case of Bad Workmanship:

- 17.1** If any work has been executed with unsound, imperfect or bad workmanship or with materials of inferior quality, the fabricator shall on demand in writing from BHEL specifying the work, materials/articles complained of, notwithstanding that the same may have been passed, certified and paid for, forthwith, rectify the work so specified in whole or in part as the case may require, at their own cost and in the event of his failure to do so within reasonable period, BHEL will rectify or remove and re-execute the work at the risk and expense of the vendor.
- 17.2** BHEL will have general supervision and direction over the work. BHEL has the authority to stop the work, whenever such stoppage may be necessary to ensure the proper execution of the contract.
- 17.3** BHEL shall also have the authority to reject all the work, which does not conform to the specification, to direct the application of forces to any portion of the work as, in their judgement is required, and order the force increased or diminished and to decide on matters which arise in the execution of the work.
- 17.4** BHEL reserves the right to suspend the work or part thereof at any time and no claim whatsoever on this account will be entertained. In case of any dispute, the fabricator may appeal to BHEL whose decision shall be final and binding.

18.0 SUBLETTING:

- 18.1** The vendor shall not sublet or assign this work or any part thereof without the prior written permission of BHEL. In the event of the vendor subletting or assigning this work or any part thereof without such permission, BHEL shall be entitled to cancel the Order and execute the same

elsewhere at the risk and cost of the vendor and the vendor shall be liable for any loss or damage which BHEL may sustain in consequence of such event. Further BHEL has the right to cancel the PO's placed on such vendor/s and suspend the business dealings with such vendor/s as per the policy of BHEL. The vendors who are falling under highest bidder category shall not be considered.

19.0 VENDOR PERFORMANCE RATING:

19.1 Quality, right at the first time and delivery in time are the essence of the contract.

19.2 Based on the site feedback on the quality of the finished goods received, delivery performance and service rendered; a General Feedback on the Performance will be sent to vendors or hosted in B2B system. Vendors are required to take note of the deviations enumerated in this and improve their performance in subsequent despatches. Vendors, whose performance is poor continuously, are liable to be delisted and no orders shall be placed on them.

20.0 CONFIDENTIALITY OBLIGATION:

20.1 All the documents of BHEL (inclusive of Drawings, GMS and Standards) made available to the vendor should be kept in strict confidence and under no circumstance be made available to others or allow others to make use of them. Such documents should be returned to BHEL after completion of the work ordered and also as and when BHEL demands.

20.2 The above CONFIDENTIALITY CLAUSE is binding on the employees of the vendors also. Any contravention will be viewed very seriously and may include cancelling the contract or legal action on the vendor.

21.0 RISK PURCHASE /PENALTIES /ABNORMALLY LOW BID:

21.1 In case any Vendor does not execute the orders within the PO delivery or mutually agreed extended delivery date, BHEL may cancel the PO partially or completely. Completely or partial cancelled quantum will be executed through other eligible Vendors at the Risk and cost of the Vendor, who has failed to execute the purchase order. Expenditure involved, if any will be recovered from the bills or from any amount due to the Vendor, who has failed to execute the purchase order/contract.

21.2 Vendors are cautioned that, withdrawal after price bid opening or after contract signing or PO/LOI acceptance will be construed as tampering with BHEL's tender process. Suitable action for suspension of further business with the vendor may be taken as per BHEL corporate procedures.

21.3 Vendors pending payments shall be withheld and/or their BG may be invoked to cover the liabilities of BHEL towards risk purchase, if any.

21.4 The supplier shall be liable for any loss which BHEL may sustain by reason of such risk purchases in addition to liquidated damages as detailed under LD clause.

21.5 It may please be noted that guidelines/rules in respect of suspension of business dealings', 'Vendor evaluation format' etc may undergo change from time to time and the latest one shall be followed.

21.6 Abridged version of extant 'Guidelines for suspension of business dealings with suppliers/ contractors' has now been uploaded on www.bhel.com on "supplier registration page" at the following link: http://www.bhel.com/vender_registration/vender.php (Guidelines for suspension of business dealings with suppliers/ contractors).

22.0 B2B COMMUNICATION:

22.1 BHEL will establish communication with our Vendors through **B2B**. Most of the mass communications are sent through B2B and hence vendors are advised to access our web regularly.

- 22.2 Vendors are required to have Internet connectivity.
- 22.3 Vendors are required to access our web site on a regular basis.
- 22.4 Before commencing the job, latest GMS, Quality Plan applicable to the project or PO is to be ascertained, through the B2B portal. All the Quality records are to be submitted to BAP/Ranipet portal.
- 23.0 **Reverse auction (RA) / on-line bidding on internet:**
- 23.1 "BHEL reserves the right to go for Reverse Auction (RA) (Guidelines as available on www.bhel.com) instead of opening the sealed envelope price bid, submitted by the bidder. This will be decided after techno-commercial evaluation. Bidders shall give their acceptance with their offer for participation in RA. Non-acceptance to participate in RA may result in non-consideration of the bids, in case BHEL decides to go for RA."
- 23.2 Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit 'Process compliance form' (to the designated service provider) as well as 'Online sealed bid' in the Reverse Auction. Non-submission of 'Process compliance form' or 'Online sealed bid' by the agreed bidder(s) will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines for "Suspension of Business Dealings with Suppliers/ Contractors (as available on www.bhel.com)."
- 23.3 The philosophy followed for reverse auction shall be English Reverse (No ties).
- 23.4 For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.
- 23.5 BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on internet.
- 23.6 In case of reverse auction, BHEL will inform the bidders the details of Service Provider to enable them to contact & get trained.
- 23.7 Business rules like event date, time, bid decrement, extension etc. also will be communicated through service provider for compliance.
- 23.8 Bidders have to fax the Compliance form (annexure IV) before start of Reverse auction. Without this, the bidder will not be eligible to participate in the event.
- 23.9 Reverse auction will be conducted on scheduled date & time.

Note: Decision to go for RA or not will be on case to case basis.

- 23.10 At the end of Reverse Auction event, the lowest bidder value will be known on auction portal.
- 23.11 The lowest bidder has to fax/e-mail the duly signed and filled-in prescribed format for price breakup including that of line items, to the Service provider within two working days of Auction without fail.
- 23.12 Bidders are be required to read the "Terms and Conditions" section of the auctions site of Service provider, using the Login IDs and passwords given to them by the service provider before reverse auction event. Bidders should acquaint themselves of the „Business Rules of Reverse Auction“, which will be communicated before the Reverse Auction.
- 23.13 If the Bidder or any of his representatives are found to be involved in Price manipulation/ cartel formation of any kind, directly or indirectly by communicating with other bidders, action as per extant BHEL guidelines, shall be initiated by BHEL and the results of the RA scrapped/ aborted.
- 23.14 The Bidder shall not divulge either his Bids or any other exclusive details of BHEL to any other party.

- 23.15** The bidders have to necessarily submit online sealed bid less than or equal to their envelope sealed price bid already submitted to BHEL along with their offer. The envelope sealed price bid of successful L1 bidder in RA, if conducted, would also be opened after the RA and the order will be placed on lower of the two bids (RA closing price & envelope sealed price) thus obtained. It is considered that the bidder having submitted their offer specifically agrees to this condition and undertakes to execute the contract on thus awarded rate/s.
- 23.16** If it is found that L1 bidder has quoted higher in the online sealed bid in comparison to the envelope sealed bid for any item(s), the bidder will be issued a warning letter to this effect. However, if the same bidder again defaults on this count in any subsequent tender, it will be considered as fraud and will invite action by BHEL as per extant guidelines for suspension of business dealings with suppliers/ contractors (as available on www.bhel.com).”
- 23.17** The calculation sheet e.g. excel sheet (which will help to arrive at ‘Total Cost to BHEL’) will be communicated to respective bidders of RA by BHEL. In line with the NIT terms, BHEL will provide the calculation sheet (e.g., EXCEL sheet) which will help to arrive at “Total Cost to BHEL” like Packing & forwarding charges, Taxes and Duties, Freight charges, Insurance, Service Tax for Services and loading factors (for non-compliance to BHEL standard Commercial terms & conditions) for each of the bidder to enable them to fill-in the price and keep it ready for keying in during the Auction.]
- 23.18** This calculation sheet will be finalized based on the evaluation criteria specified in the NIT.
- 23.19** Suppliers are required to submit their best price bid in a separate sealed cover along with techno-commercial bid. After evaluation of Techno-Commercial Bids:
- a) In case BHEL decides not to conduct RA, the envelope sealed price bids of all techno-commercially qualified bidders, along with price impact, if any, would be opened and processed as per extant the internal Purchase/ Works Policy as applicable to BHEL.
 - b) In case BHEL decides to conduct RA, business rules of RA will be sent to service provider.(See Annexure for Model General Business Rules of RA.)
- 23.20** Generally the start price for the RA would be the lowest of
- a)Lowest online sealed bid and
 - b) Internal Estimate of BHEL
- Note: Wherever more than one lowest online sealed bids are identical and lower than the estimate, the start price, would be that price arrived by reducing the lowest online sealed bid by maximum of one decrement.
- 23.21** Reverse auction process would deemed to have started upon receipt of ‘Online Sealed Bids’ from the bidders within the prescribed time frame as per Business Rules.
- 23.22** After receipt of ‘online sealed bids’, the start price & bid decrement will be decided by BHEL and the same would be communicated to the service provider, to start the bidding process.
- 23.23** Only those bidders who have submitted the ‘online sealed bid’ within the scheduled time would be eligible to participate further in RA process. However, the H1 bidder (whose quote is highest in online sealed bid) will not be allowed to participate in further RA process provided minimum three bidders are left after removal of H1 bidder. In case of tie for H1 bid (identical online sealed bids), 15 minutes additional time would be provided and all the participating bidders would be informed by mail/ message on bidding screen to enable bidders submit revised online sealed bids so as to break the tie.

- 23.24** If the lowest online sealed bid is the starting price, then the lowest bidder in online sealed bid shall be shown as current L1 automatically by the system. System would have the provision to indicate this bid as current L1 for further bidding.
- 23.25** If the start price is lower than the lowest online sealed bid, on acceptance of such start price by any bidder, this bid would be indicated as current L1 for further bidding.
- 23.26** In case of no further bidding, RA will be deemed to have been successful with current L1 bidder.
- 23.27** All bidders who had given online sealed bid would be able to see their rank and L1 price and their ranking L1, L2 etc. would be based on their last quoted price irrespective of quote received in RA or online sealed bid.
- 23.28** RA shall be treated as failed in the following scenarios:
- a) In cases where the start price is (a) estimate or (b) one decrement (maximum) lower than the lowest of the online sealed bids and no bidder accepts the start price.
 - b) In cases where the number of online sealed bids are less than four before removal of highest bidder.
 - c) In cases of tie among H1 bidders, even after extension of submission of online sealed bids once by 15 minutes.
 - d) Wherever, the evaluation is done for individual line items, RA shall be treated as failed only for those line item(s) for which any of the above a), b) or c) satisfies.
- 23.29** In cases of failure of RA, sealed envelope price bids (of item(s) for which RA has failed) of all the techno-commercially qualified bidders would be opened and the tender would be processed accordingly. However, the envelope sealed bid(s) of techno-commercially acceptable bidder(s) who had agreed to participate in the RA and had failed to submit the online sealed bid would not be opened.
- 23.30** After declaring L1 upon completion of RA, the envelope sealed price bid of L1 bidder would also be opened for placement of order on lower of the two bids (RA closing price & envelope sealed price) and the offers would be processed as per extant their internal Purchase/ Works policy provisions of BHEL. Action as per NIT terms would be taken if online sealed bid is higher than the envelope sealed bid.
- Relative position of bidders (for usage in cases of predefined splitting the quantities) would also include bidders who have given 'online sealed bids' but have not given further bids in auction. In case of splitting requirement, H1 bidder may be considered for counter offer if the pre-stated (NIT) numbers of suppliers do not accept the counter offer. However, principle of splitting to N-1 bidder would be maintained.
- 23.31** In case H1 bidder happen to be MSE and was removed from further bidding but is within L1 + 15% band, then this bid would be considered and to be processed in line with 'Public Procurement Policy for Micro & Small Enterprises (MSEs) order, 2012'.
- 23.32** For providing preference to domestically manufactured Electronic Products, in accordance with Department of Electronics and Information Technology (DeitY) Gazette Notification No. 33(3)/2013-IPHW dated 23.12.2013 and its related notifications issued from time to time, H1 bidder removed from further bidding would be considered for counter-offer to meet domestic bidder requirement for the item(s) under procurement.
- 23.33** In case BHEL decides not to go for Reverse Auction for the tender enquiry, the Price bids and price impacts, if any, already submitted and available with BHEL would be opened as per BHEL's standard practice.

23.34 In case of enquiry through e-Procurement, the sealed electronic price bid (e-bid) would be treated as sealed envelope price bid.

Note: In order to bring more transparency and to address any queries of Bidders on Reverse Auction, an abridged version of BHEL's "Common Guidelines for conducting Reverse Auction (RA)" has been hosted in BHEL's web site www.bhel.com under the links "Supplier Registration Page" and "Tender Notification". All Bidders are requested to visit the link and familiarize themselves with BHEL's RA procedures and guidelines before submission of their bid/s. Submission of Bid shall mean that the Bidder has read and understood BHEL's RA procedures and the bid is in agreement with the same.

24.0 OTHER CONDITIONS:

- 24.1** Partnership firms should have the latest Form-A (Rule 5) Declaration issued by Registrar of Firms and the copy of the same should be produced at the time of signing of the Contract.
- 24.2** **BHEL Ranipet** never enters in to any agreement or never gives any undertaking or Power of Attorney to any Bank/s in relation to the Bill discounting facilities availed/ to be availed by its various vendors. BHEL Ranipet has no obligation what so ever, directly or indirectly, to any Bank/s in relation to the Bills received by BHEL Ranipet excepting payment of the same as authorised by the vendors at the time of entering into the contract, subject to the conditions for honouring the Bills provided in the contract and BHEL does not recognise any charge on the proceeds of the Bill. If any Bank initiates any legal action against fabricator/s in relation such facilities and includes BHEL a party in the said dispute, all legal expenses, cost and any other losses thereof shall be recovered from the concerned vendors.
- 24.3** All the Statutory Obligations such as ESI, PF, Labour Acts, Factories Act, GST, etc. will have to be taken care of by the vendor. BHEL will have no liability on them. Notwithstanding the above, if any demand notice is served by the concerned Statutory Authorities for recovery of any of their dues on BHEL, the same would be paid with notice to the vendor and recovered from any pending / future bills.
- 24.4** All Safety Precautions and use of Safety Equipment's are to be followed while carrying out the fabrication and Despatch of the same. The vendor must have proper tools and handling equipment's. There should always be a responsible person available to oversee the operation and compliance of safety regulation etc. If any non-compliance with respect to proper safety conditions/requirements, BHEL may withhold visit/inspection, instruct stoppage of work till such time the desired safety requirements/conditions are met with.
- 24.5** Vendors are required to equip themselves with communication facilities like Telephone, internet and e-mail, etc. BHEL will have the right not to consider those vendors who do not equip themselves with these facilities.
- 24.6** The vendor shall be responsible for mismatch of components if any noticed at site during erection. Any rework shall be carried out by vendor at their cost and risk including transport, if necessary.
- 24.7** All clarifications pertaining to techno-commercial conditions of the tender shall be sought before submitting the price bid. After issuance of LOI, no claim for increase in rates will be entertained by BHEL.

For and on behalf of
DGM / Outsourcing
Boiler Auxiliaries Plant, Bharat Heavy Electricals Limited, Ranipet

ANNEXURE FOR REVERSE AUCTION

Model General Business Rules for Reverse Auction

This has reference to tender no {tender number....date...}. BHEL shall finalise the Rates for the supply of {item name} through Reverse Auction mode. BHEL has made arrangement with M/s. {Service provider}, who shall be BHEL's authorized service provider for the same. Bidders should go through the instructions given below and submit acceptance of the same.

The technical & commercial terms are as per (a) BHEL Tender Enq. No. {...} dated {...}, (b) Bidders' technical & commercial bid (in case of two part bid) and (c) subsequent correspondences between BHEL and the bidders, if any.

1. Procedure of Reverse Auctioning

- i. Online Sealed Bid: This duration of online sealed bid will be {...} minutes. All bidders to submit their online sealed bids during this period.
- ii. Online Reverse Auction: The 'opening price' i.e. start price for RA and 'bid decrement' will be decided by BHEL.
- iii. If BHEL decides the lowest online sealed bid as the starting price, then the lowest bidder in online sealed bid shall be shown as current L1 automatically by the system and no acceptance of that price is required. System shall have the provision to indicate this bid as current L1.
- iv. Bidders by offering a minimum bid decrement or the multiples thereof can displace a standing lowest bid and become "L1" and this continues as an iterative process.
- v. After the completion of the online reverse auction, the Closing Price (CP) shall be available for further processing.

2. Schedule for Reverse Auction: The Reverse Auction is tentatively scheduled on {date}; and the duration of online sealed bid will be {...} minutes. All bidders to submit their online sealed bids during this period.

- Online Sealed Bid:-

- {Start Time:
- Close Time: }

- Online Reverse Auction:-

- {Start Time:
- Close Time: }

3. Auction extension time:

If a bidder places a bid in the last {...} minutes of closing of the Reverse Auction and if that bid gets accepted, then the auction's duration shall get extended automatically for another {...} minutes, for the entire auction (i.e. for all the items in the auction), from the time that bid comes in. Please note that the auto-extension will take place only if a bid comes in those last {...} minutes and if that bid gets accepted as the lowest bid. If the bid does not get accepted as the lowest bid, the auto-extension will not take place even if that bid might have come in the last {...} minutes. In case, there is no bid in the last {...} minutes of closing of Reverse Auction, the auction shall get closed automatically without any extension. However, bidders are advised not to wait till the last

minute or last few seconds to enter their bid during the auto-extension period to avoid complications related with internet connectivity, network problems, system crash down, power failure, etc.

The above process will continue till completion of Reverse Auction.

Complaints/ Grievances, if any, regarding denial of service or any related issue should be given in writing thru e-mail/ fax to M/s. {Service provider} with a copy to BHEL within 15 minutes prior to initial closing time of Online Reverse Auction.

4. Bid price: The Bidder has to quote the {.....} Price inclusive of Packing & Forwarding charges, all the routine & type tests as per tender scope, ED + cess, CST against C-form, Freight (bidder to provide original Freight paid receipt), insurance charges, etc. including loading (if indicated by BHEL due to deviations in technical/ commercial terms) for the Items specified. Details are as shown in Excel Sheet for calculation of total cost to BHEL(To be specified by Unit as per NIT conditions).

5. Bidding currency and unit of measurement:

Bidding will be conducted in Indian Rupees per Unit of the material as per the specifications {...}

In case of foreign currency bids, exchange rate (TT selling rate of State Bank of India) as on scheduled date of tender opening (Part-I bid) shall be considered for conversion in Indian Rupees. If the relevant day happens to be a Bank holiday, then the forex rate as on the previous bank (SBI) working day shall be taken.

6. Validity of bids: Price shall be valid for {... days} from the date of reverse auction. These shall not be subjected to any change whatsoever.

7. Lowest bid of a bidder: In case the bidder submits more than one bid, the lowest bid at the end of Online Reverse Auction will be considered as the bidder's final offer to execute the work.

8. Bidders shall be assigned a Unique User Name & Password by M/s. {Service provider}. Bidders are advised to change the Password and edit the information in the Registration Page after the receipt of initial Password from M/s. {Service provider} to ensure confidentiality. All bids made from the Login ID given to the bidders will be deemed to have been made by the bidders/ bidders 'company.

9. Post auction procedure: BHEL will proceed with the Lowest Bid in the Reverse Auction for further processing.

10. Any commercial/ technical loading shall be intimated to bidders prior to RA. The excel sheet provided in this regard shall cover all these aspects. Commercial/ technical loading if any, shall be added by the respective bidder in its price during online sealed bid & Online Reverse Auction. Modalities of loading & de-loading shall be separately intimated to the bidders. The responsibility for correctness of total cost to BHEL shall lie with the bidders.

11. Computerized reverse auction shall be conducted by BHEL (through M/s. {Service Provider}), on pre-specified date, while the bidders shall be quoting from their own offices/ place of their choice. Internet connectivity shall have to be ensured by bidders themselves.

During the RA process if a bidder is not able to bid and requests for extension of time by FAX/ email/ phone then time extension of additional 15 minutes will be given by the service provider provided such requests come before 5 minutes of auction closing time. However, only one such request per bidder can be entertained. Despite this extension if bidder fails to upload his prices due to extreme case of failure of Internet connectivity, (due to any reason whatsoever may be) it is the bidders'

responsibility/ decision to send fax communication immediately to M/s. {Service provider}, furnishing the price the bidder wants to bid online with a request to the service provider to upload the faxed price online so that the service provider will up load that price online on behalf of the Bidder. It shall be noted clearly that the concerned bidder communicating this price to service provider has to solely ensure that the fax message is received by the service provider in a readable/ legible form and also the Bidder should simultaneously check up with service provider about the clear receipt of the price faxed. It shall also be clearly understood that the bidder shall be at liberty to send such fax communications of prices to be

uploaded by the service provider only within the closure of Bid time and under no circumstance it shall be allowed beyond the closure of Bid time /reverse auction. It shall also be noted that the service provider should be given a reasonable required time by the bidders, to upload such prices online and if such required time is not available at the disposal of the Service provider at the time of receipt of the fax message from the bidders,

the service provider will not be uploading the prices and either BHEL or the service provider are not responsible for this unforeseen circumstances. In order to ward-off such contingent situation bidders are requested to make all the necessary arrangements/ alternatives whatever required so that they are able to circumvent such situation and still be able to participate in the reverse auction successfully. Failure of power or loss of connectivity at the premises of bidders during the Reverse auction cannot be the cause for not participating in the reverse auction. On account of this, the time for the auction cannot be extended and neither BHEL nor M/s. {Service provider} is responsible for such eventualities.

12. Proxy bids: Proxy bidding feature is a pro-bidder feature to safeguard the bidder's interest of any internet failure or to avoid last minute rush. The proxy feature allows bidders to place an automated bid in the system directly in an auction and bid without having to enter a new amount each time a competing bidder submits a new offer. The bid amount that a bidder enters is the minimum that the bidder is willing to offer. Here the software bids on behalf of the bidder. This obviates the need for the bidder participating in the bidding process until the proxy bid amount is decrementally reached by other bidders. When proxy bid amount is reached, the bidder (who has submitted the proxy bid) has an option to start participating in the bidding process.

The proxy amount is the minimum amount that the bidder is willing to offer. During the course of bidding, the bidder cannot delete or change the amount of a proxy bid. Bids are submitted in decrements (decreasing bid amounts). The application automates proxy bidding by processing proxy bids automatically, according to the decrement that the auction originator originally established when creating the auction, submitting offers to the next bid decrement each time a competing bidder bids, regardless of the fact whether the competing bids are submitted as proxy or standard bids. However, it may please be noted that if a manual bid and proxy bid are submitted at the same instant manual bid will be recognized as the L1 at that instant. In case of more than one proxy bid, the system shall bid till it crosses the threshold value of 'each lowest proxy bid' and thereafter allow the competition to decide the final L1 price. Proxy bids are fed into the system directly by the respective bidders. As such this information is privy only to the respective bidder(s).

13. Bidders are advised to get fully trained and clear all their doubts such as refreshing of screen, quantity being auctioned, tender value being auctioned etc. from M/s. {Service provider}.

14. M/s. {Service provider}, shall arrange to demonstrate/ train the bidder or bidder's nominated person(s), without any cost to bidders. M/s. {Service provider}, shall also explain the bidders, all the business rules related to the Reverse Auction. Bidders are required to submit their acceptance to the terms/ conditions/modalities before participating in the Reverse Auction in the process compliance form as enclosed. Without this, the bidder will not be eligible to participate in the event.

15. Successful bidder shall be required to submit the final prices (L1) in prescribed format (Annexure-VI) for price breakup including that of line items, if required, quoted during the Online Reverse Auction, duly signed and stamped as token of acceptance without any new condition (other than those already agreed to before start of auction), after the completion of auction to M/s. {Service provider} besides BHEL within two working days of Auction without fail.

16. Any variation between the final bid value and that in the confirmatory signed price breakup Document will be considered as tampering the tender process and will invite action by BHEL as per extant guidelines for suspension of business dealings (as available on www.bhel.com).

17. Bidders' bid will be taken as an offer to execute the work/ supplies of the item as per enquiry

No. {...} dt. {...}. Bids once made by the bidder, cannot be cancelled/ withdrawn and bidder shall be bound to execute the work as mentioned above at bidder's final bid price. Should bidder back out and not execute the contract as per the rates quoted, BHEL shall take action as per extant guidelines for suspension of business dealings (as available on www.bhel.com).

18. Bidders shall be able to view the following on their screen along with the necessary fields during Online Reverse Auction:

- a. Leading (Running Lowest) Bid in the Auction (only total price of package).
- b. Bid Placed by the bidder.
- c. Start Price.
- d. Decrement value.
- e. Rank of their own bid during bidding as well as at the close of auction

19. BHEL's decision on award of contract shall be final and binding on all the Bidders.

20. BHEL reserves the right to extend, reschedule or cancel the Reverse Auction process at any time, before ordering, without assigning any reason, with intimation to bidders.

21. BHEL shall not have any liability to bidders for any interruption or delay in access to the site irrespective of the cause. In such cases, the decision of BHEL shall be binding on the bidders.

22. Other terms and conditions shall be as per bidder's techno-commercial offers and other correspondences, if any, till date.

23. If there is any clash between this business document and the FAQ available, if any, in the website of M/s. {Service provider}, the terms & conditions given in this business document will supersede the information contained in the FAQs. Any changes made by BHEL/ service provider (due to unforeseen contingencies) after the first posting shall be deemed to have been accepted if the bidder continues to access the portal after that time..

24. Bidder shall not divulge either his Bids or any other exclusive details of BHEL to any other party. If the Bidder or any of his representatives are found to be involved in Price manipulation/ cartel formation of any kind, directly or indirectly by communicating with other bidders, action as per extant BHEL guidelines for suspension of business dealings (as available on www.bhel.com), shall be initiated by BHEL.

RA price confirmation and breakup

(To be submitted by L1 bidder after completion of RA)

To

- M/s. Service provider
- Postal address

CC: M/s BHEL

BOILER AUXILIARIES PLANT
INDIRA GANDHI INDUSTRIAL COMPLEX
RANIPET – 632406
TAMILNADU
INDIA.

Sub: Final price quoted during Reverse Auction and price breakup

Dear Sir,

We confirm that we have quoted.

Rs. { _____ } in value & in words _____ } for item(s) covered under tender enquiry
No. { ... } dt. { ... }

Total price of the items covered under above cited enquiries is inclusive of {Packing & forwarding, E.D. , C.S.T. , freight and insurance charges up to {.....}
District, {.....} State and Type Test Charges etc., (exclusive of service tax), other as per NIT}

as our final landed prices as quoted during the Reverse Auction conducted today {date} which will be valid for a period of { ____ in nos. & in words ____ } days.

The price break-up including that of line items is as given below.

Total	=====
	- Rs.in value & in words
	=====

Thanking you and looking forward to the valuable order from BHEL.

Yours sincerely,

For _____

Name:

Company:

Date:

Seal:

SECTION - V - PROJECT WISE PLANNED Quantity - FOR Enq: 658015E / 21-09-2019 NIT 48940

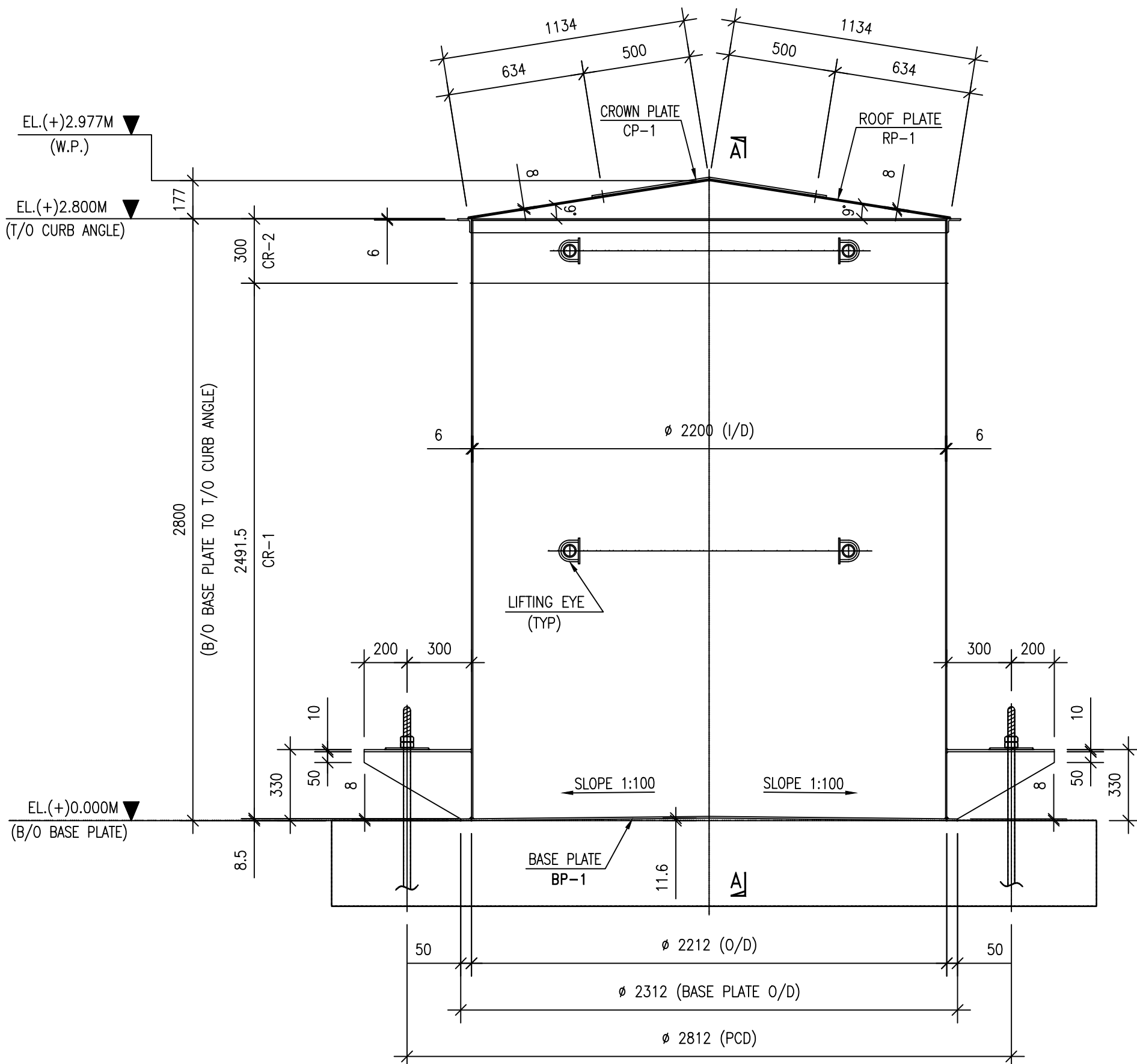
PGMA	PGMA DESCRIPTION	Mouda	N K Pura	Barh-St-1	Barh-St-2	Total	Reference Drawing
FW226	EMERGENCY QUENCH WATER TANK	26.0	39.4	39.4	26.0	130.8	0-FW-226-00251
FW742	LIMESTONE SLURRY STORAGE TANK	108.7	223.1	180.0	130.0	641.8	0-FW-742-00683-00687
FW743	AUXILIARY ABSORBER TANK	61.6	77.6	72.6	72.6	284.3	0-FW-743-00804-00807
FW744	FILTRATE TANK	8.8	14.3	12.5	9.7	45.3	0-FW-744-00681-00682;1-FW-744-00792
FW745	WASTE WATER TANK	15.0	22.4	19.4	16.6	73.4	0-FW-745-00692-00694
FW747	HYDROCLONE WASTE WATER TANK	22.0	16.5	13.4	10.4	62.2	0-FW-747-00690-00691;1-FW-747-00793
FW748	PROCESS WATER TANK	20.3	26.9	27.8	20.9	95.9	0-FW-748-00688-00689
FW800	CLARIFIED WATER TANK	14.0	10.3	10.3	9.4	44.0	0-FW-800-00680;1-FW-800-00791
FW802	NEUTRALISATION TANK & ACCESSOR	4.5	4.5	4.5	4.5	18.0	0-FW-802-00176;1-FW-802-00369
Grand Total		280.9	435.0	379.7	300.2	1395.8	All wt in MT
Note :	Drawings provided are only indicative and vary for each WO at the time of order issue						
Project	Manufacture QP	PS ref		QP catagorisation		Reference Trial assy Procedure	
Mouda	QP NO.: FGS: 737	PS: Mouda FGD: G503		BAP:QA:MECH:PGMA CAT:G503		PRQA:700	
N K Pura	QP NO.: FGS: 737	PS: NK FGD: : G601		BAP:QA:MECH:PGMA CAT:G601		PRQA:700	
Barh-St-1	QP NO.: FGS: 737	PS : Barh I FGD : : G604		BAP:QA:MECH:PGMA CAT:G604		PRQA:700	
Barh-St-2	QP NO.: FGS: 737	PS : Barh II FGD : : G607		BAP:QA:MECH:PGMA CAT:G607		PRQA:700	
Rate Schedule Nos	<u>Rate schedule - Scope of Work :</u>		<u>RS Description</u>	<u>Customer wise</u>			<u>Total (MT)</u>
				<u>Mouda (2)</u>	<u>N K Pura (3)</u>	<u>Barh St.I&II (5)</u>	
MA01 KA01 BA01	Complete manufacture of <u>Tank Shells (Straight) with Base Supports and Transport Stiffners</u> with vendors own raw material procurred from BHEL Approved Material Suppliers , as per BHEL drawings and customer MQP. Scope includes blast cleaning to Sa 2½ finish and painitng as per painting scheme (PS) issued by BHEL. Scope also includes delivery of finished goods to customer site .		Tank Shells with Base Supports	62 (MA01)	140 (KA01)	166 (BA01)	368

MA02 KA02 BA02	Complete manufacture of <u>Tank Shells (Straight) with Transport Stiffners</u> with vendors own raw material procurred from BHEL Approved Material Suppliers , as per BHEL drawings and customer MQP. Scope includes blast cleaning to Sa 2½ finish and painitng as per painting scheme (PS) issued by BHEL. Scoper also includes delivery of finished goods to customer site .	Tank Shells	168 (MA02)	181 (KA02)	191 (BA02)	540
MA03 KA03 BA03	Complete manufacture of <u>Conical Shells/Covers/Related Structures</u> with vendors own raw material procurred from BHEL Approved Material Suppliers , as per BHEL drawings and customer MQP. Scope includes blast cleaning to Sa 2½ finish and painitng as per painting scheme (PS) issued by BHEL. Scoper also includes delivery of finished goods to customer site .	Conical Shells/Covers	51 (MA03)	114 (KA03)	323 (BA03)	488
TOTAL Wt in MT			281	435	680	1396

SECTION –VI

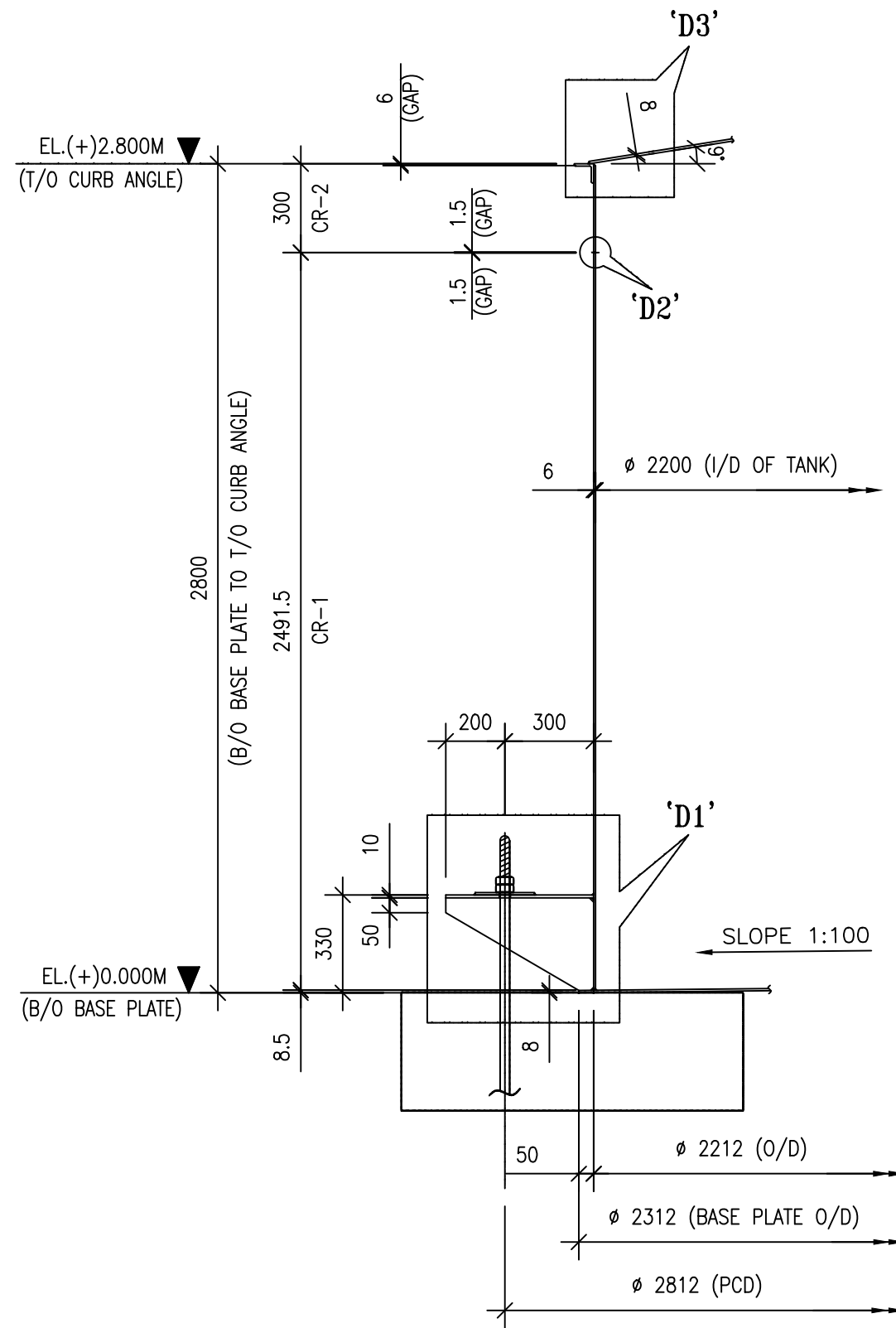
ENQ:658015E 21-09-2019

NIT_48940



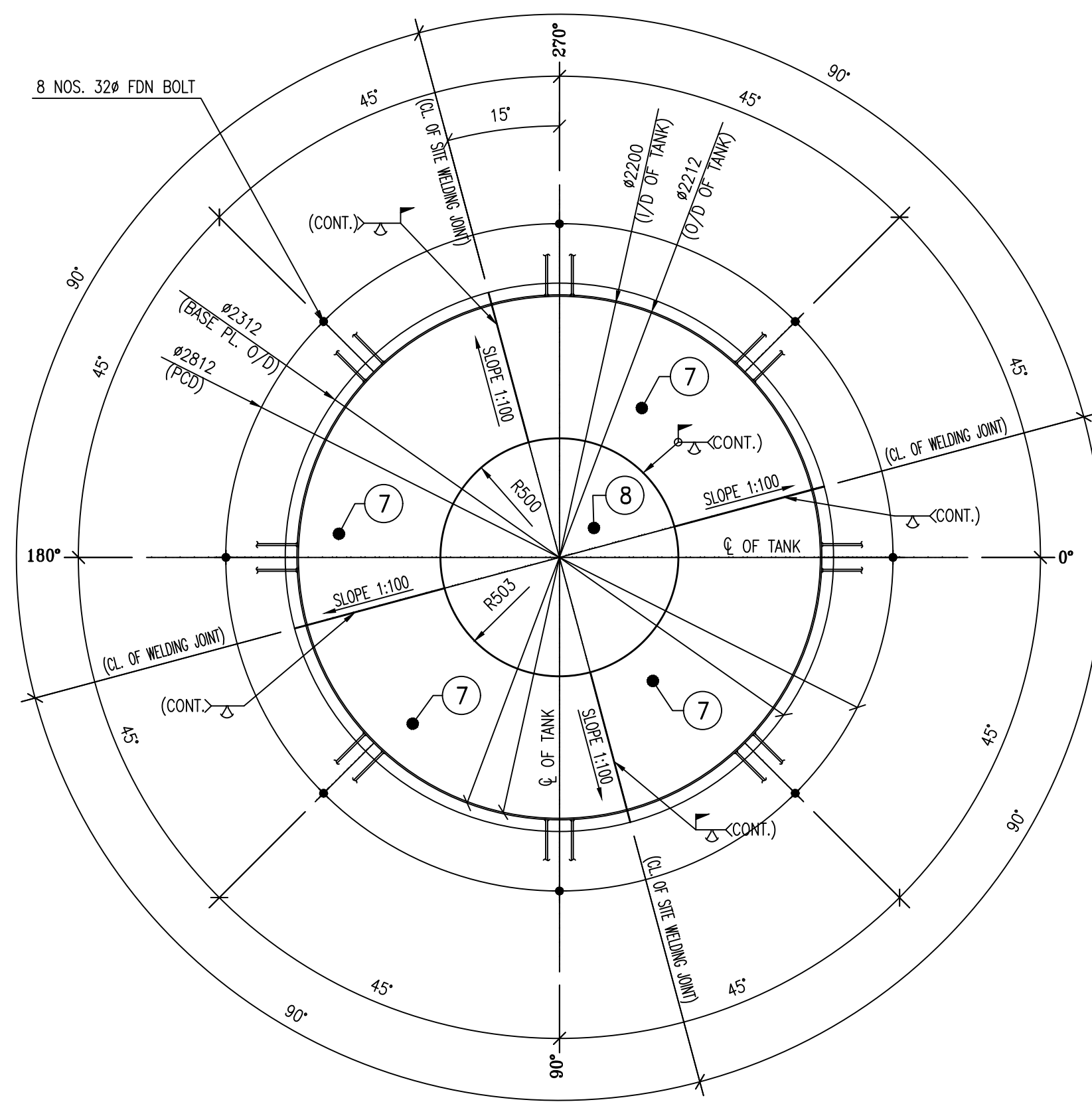
MARKING ELEVATION OF NEUTRALISATION TANK

(REQD. 2 NOS.)
(SCALE-1:20)



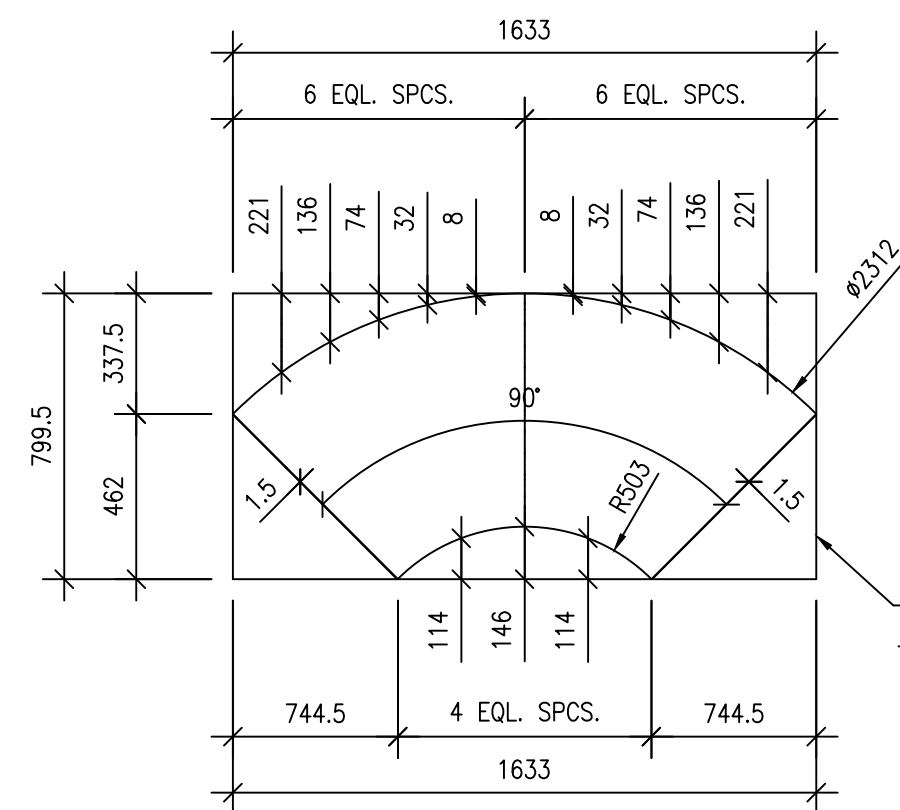
SECTION A-A

(SCALE-1:20)



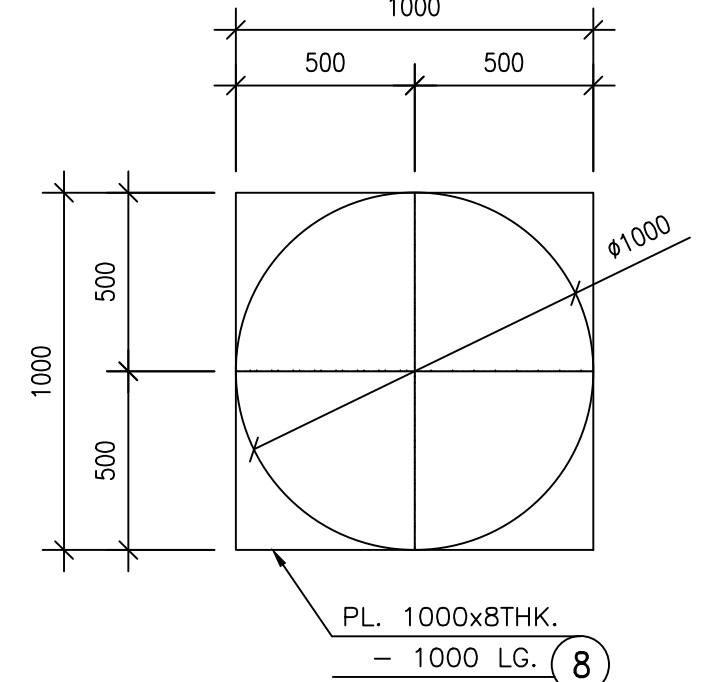
DEVELOPMENT OF BASE PLATE MKD. BP-1

(REQD. 1 NO. PER TANK)
(SCALE-1:20)



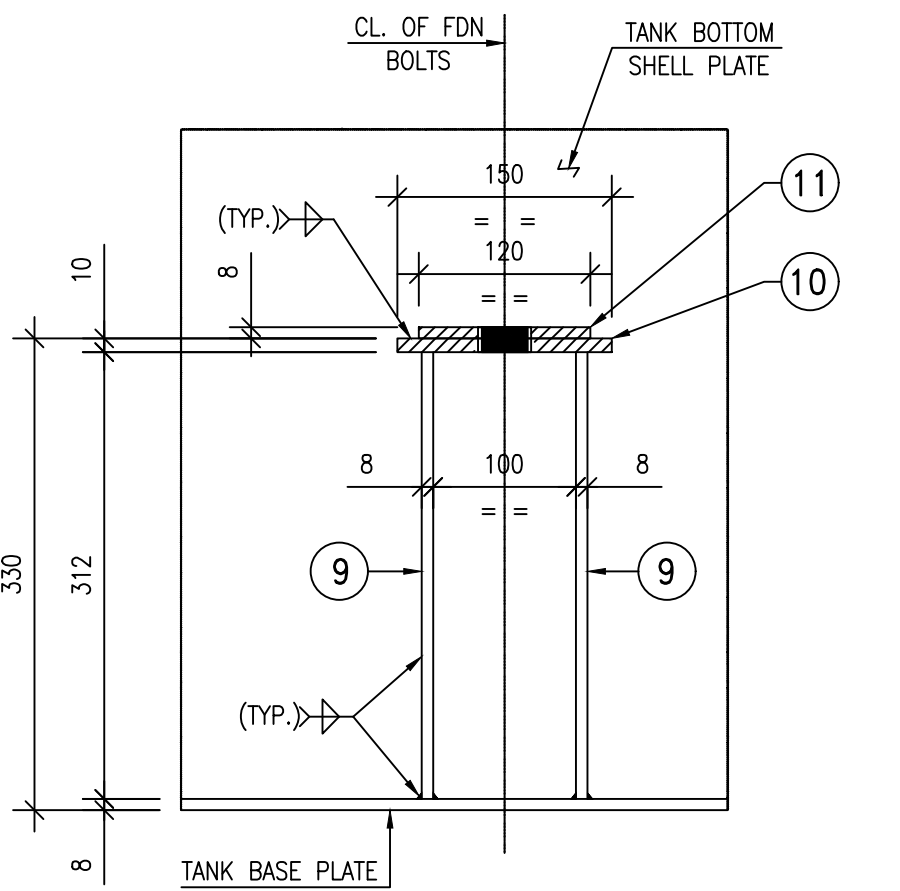
DETAIL OF ITEM NO. 7

(SCALE 1:20)



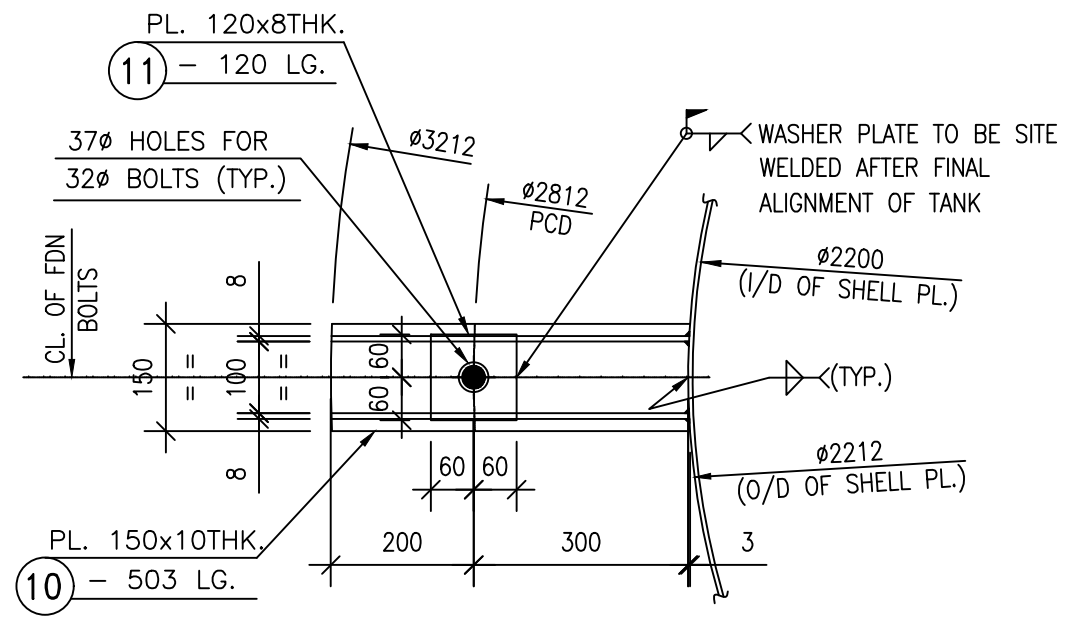
DETAIL OF ITEM NO. 8

(SCALE 1:20)



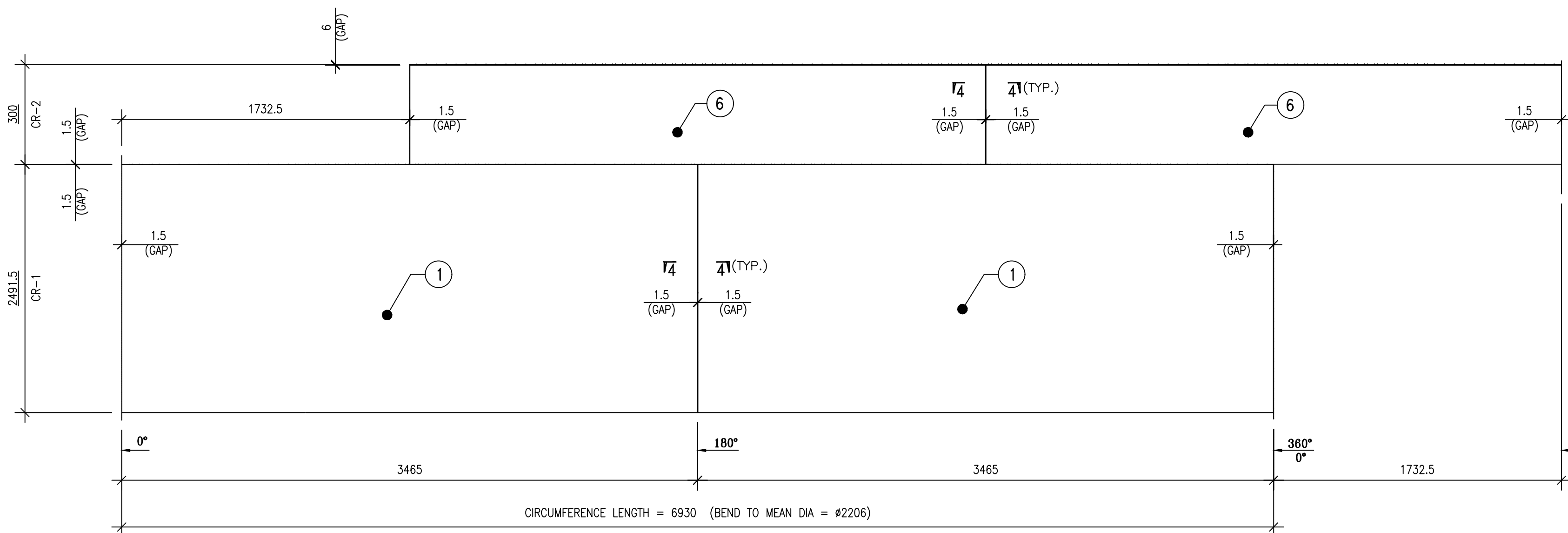
SECTION 1-1

(SCALE-1:5)



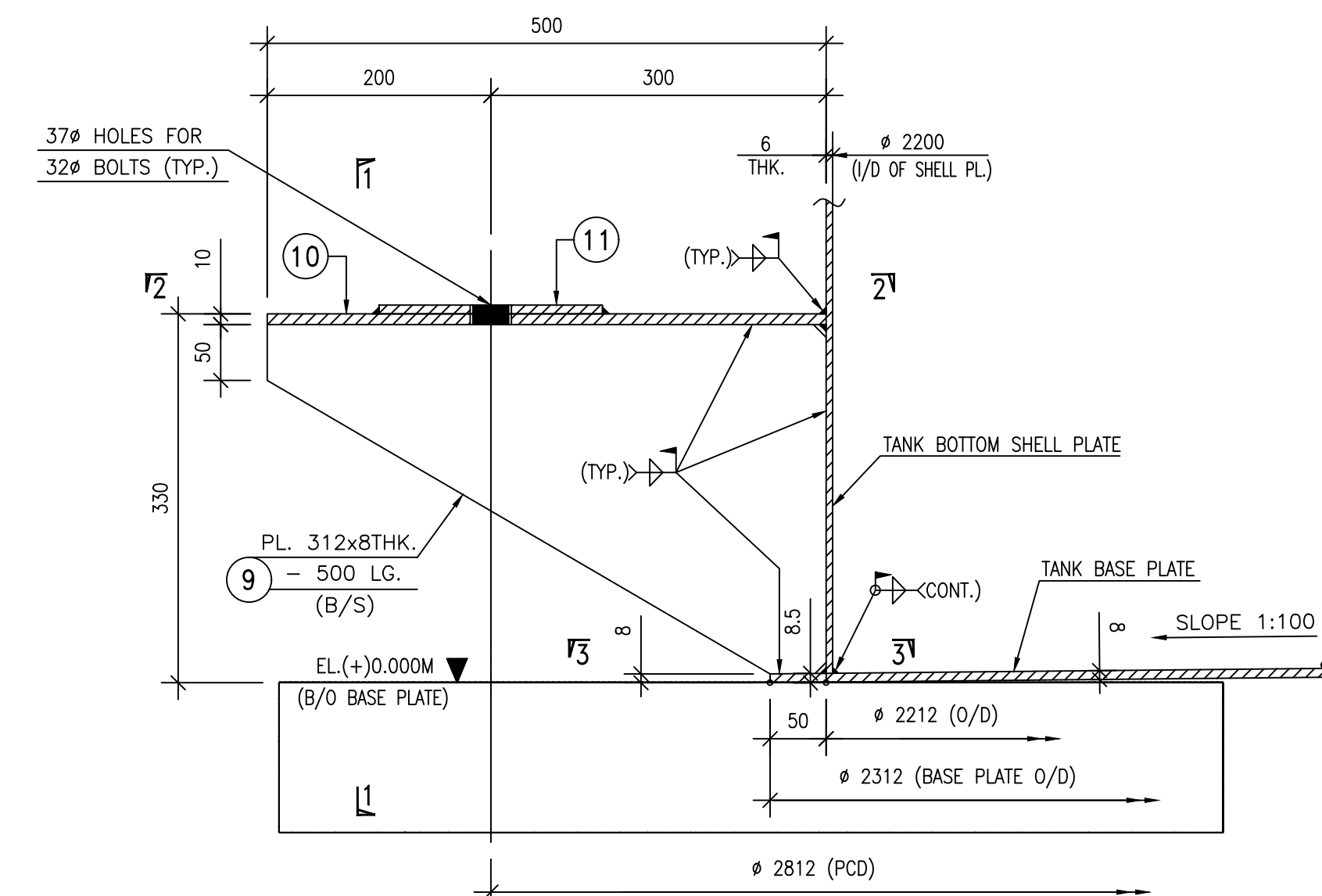
PLAN 2-2

(SCALE-1:10)



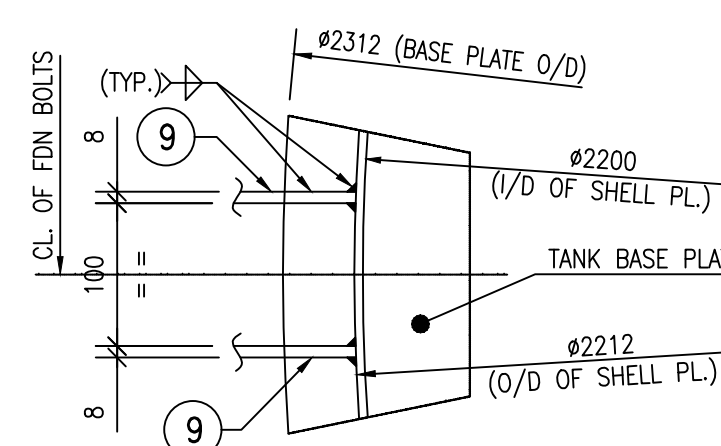
DEVELOPMENT OF COURSE MKD. CR-1 & CR-2

(REQD. 1 NO. PER TANK)
(SCALE-1:20)



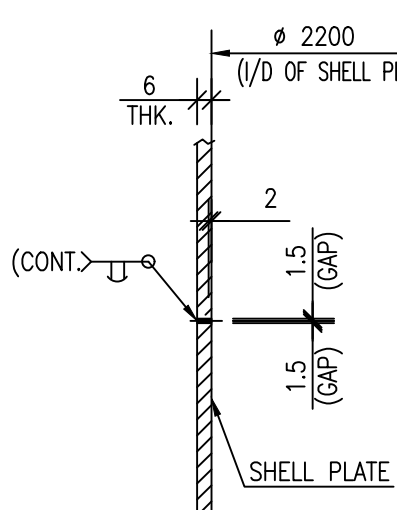
DETAIL - 'D1'

(REQD. 8 NOS. PER TANK)
(SCALE-1:5)



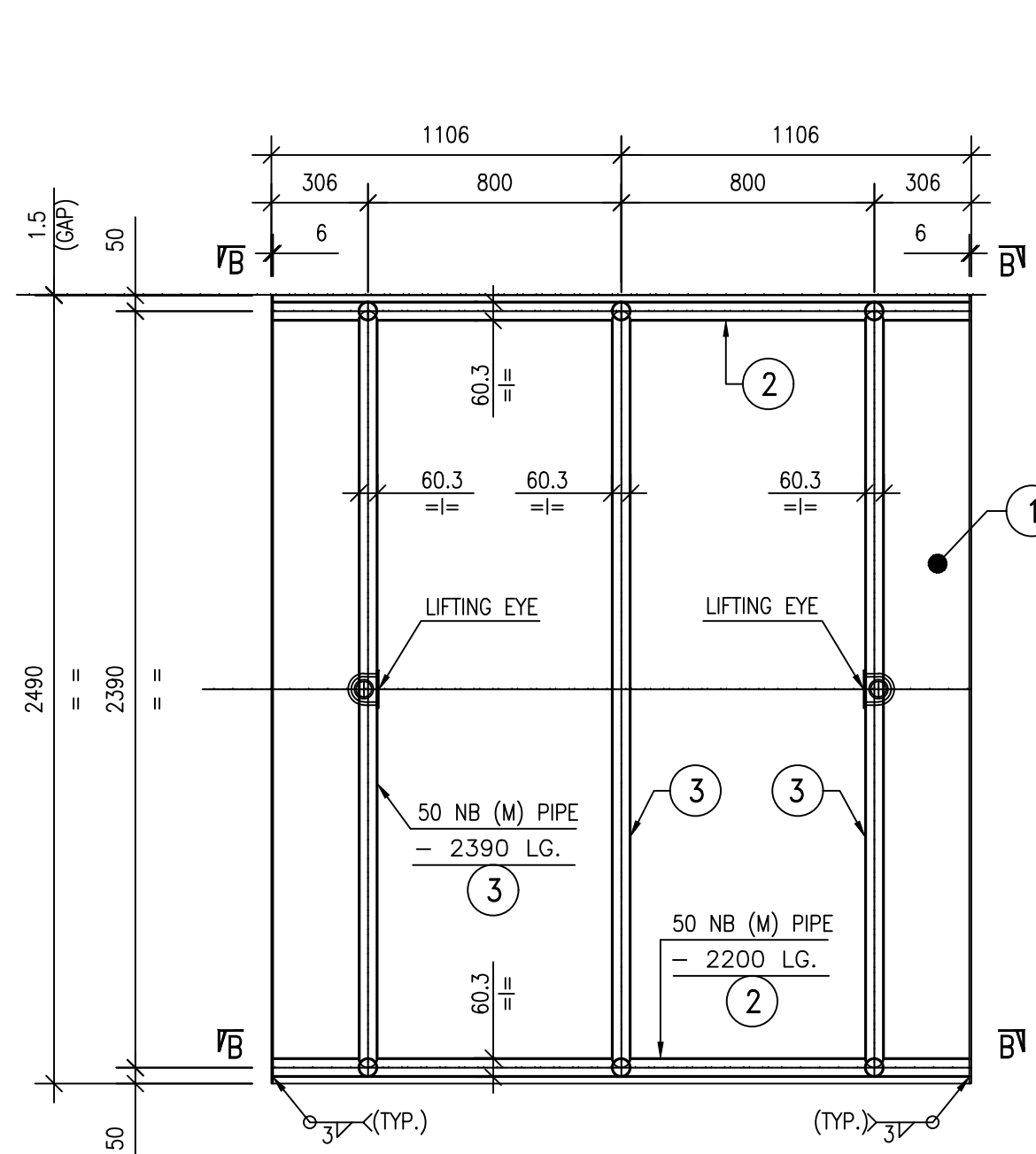
PLAN 3-3

(SCALE-1:5)



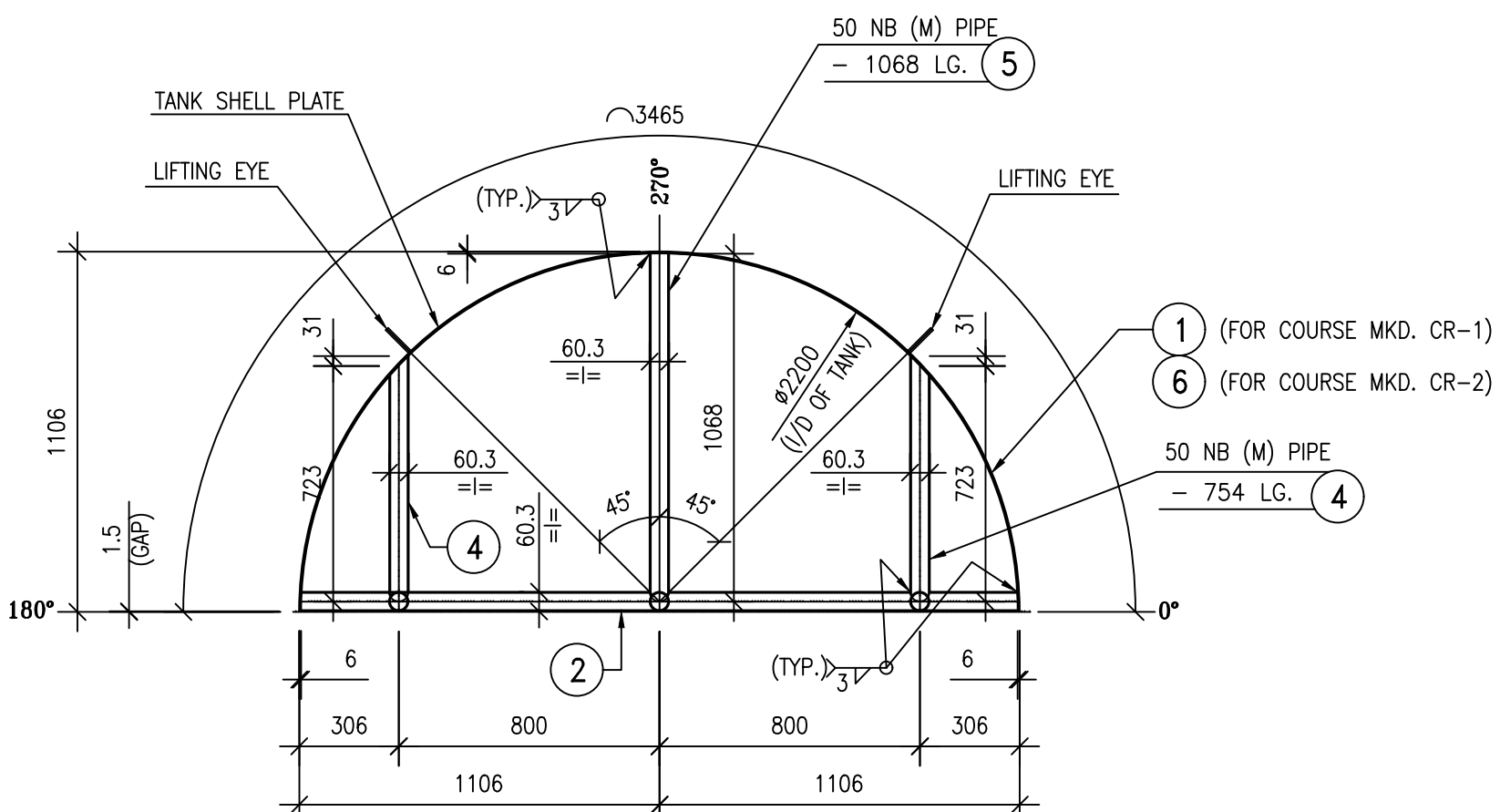
DETAIL - 'D2'

(SCALE-1:5)



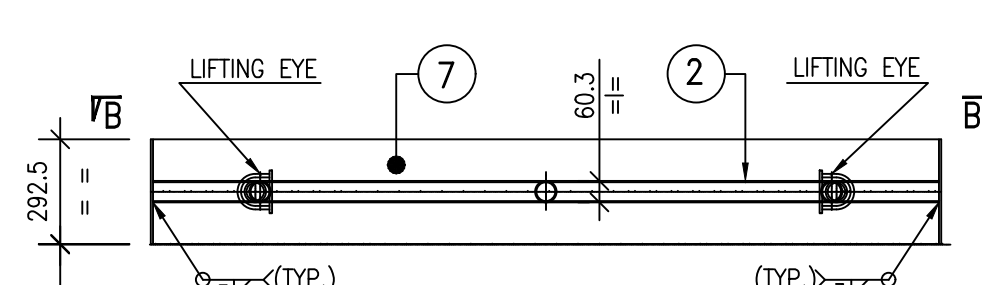
TRANSPORT STIFFENER ARRANGEMENT FOR COURSE MKD. CR-1

(REQD. 2 NOS. PER TANK)



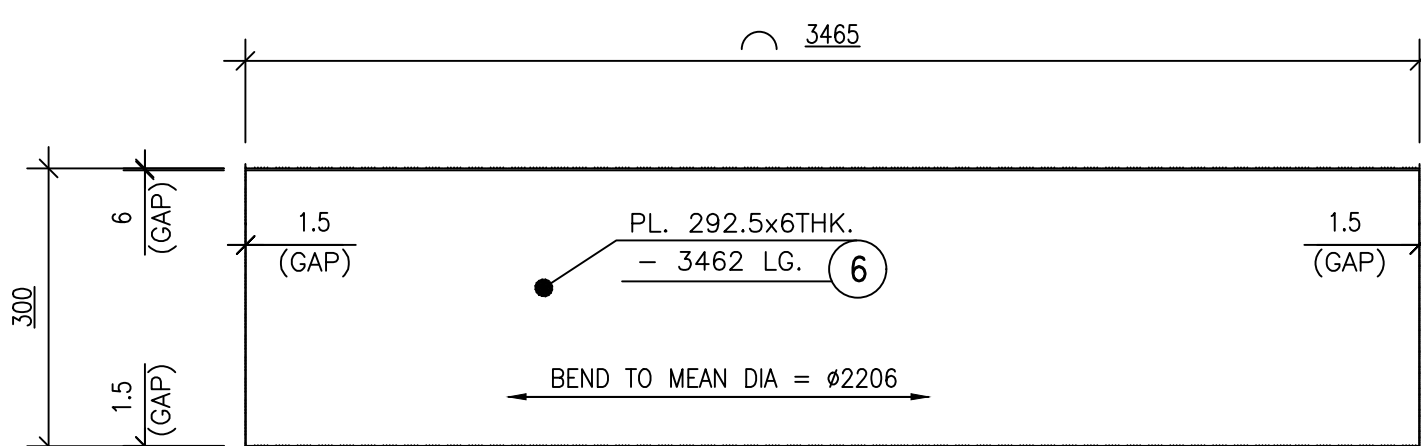
PLAN B-B

(SCALE-1:20)



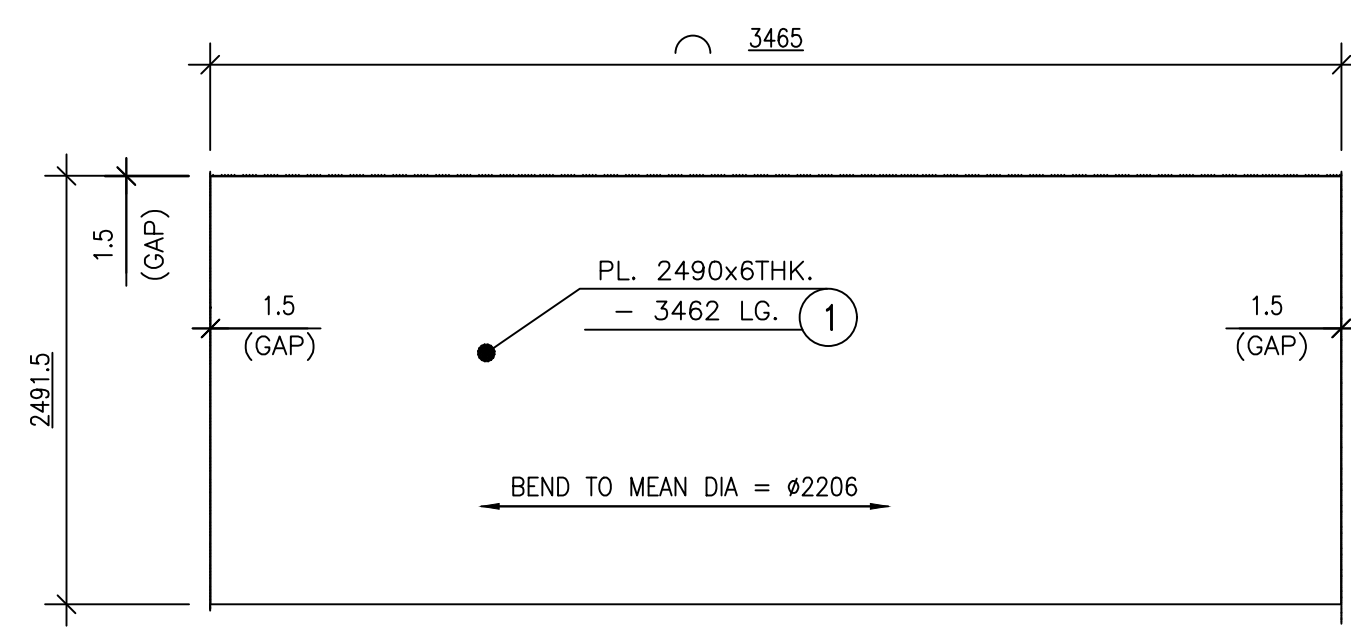
TRANSPORT STIFFENER ARRANGEMENT FOR COURSE MKD. CR-2

(REQD. 2 NOS. PER TANK)



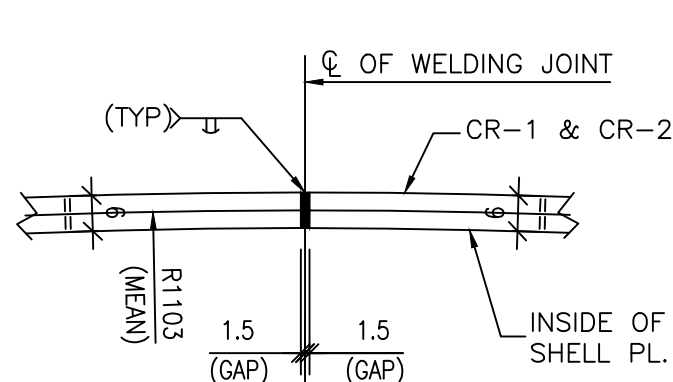
DETAIL OF ITEM NO. 6

(SCALE 1:20)



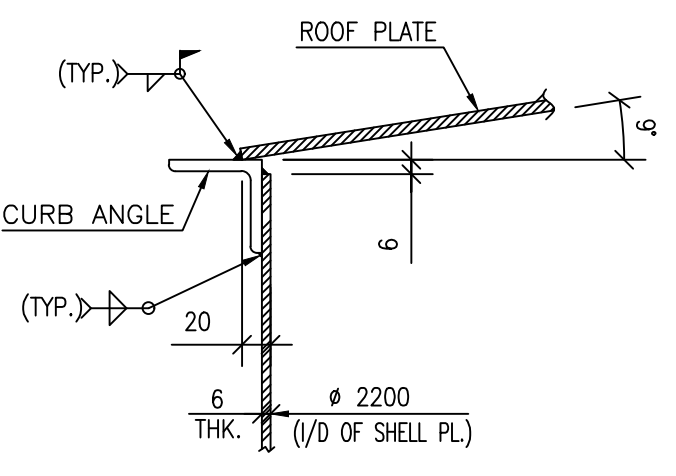
DETAIL OF ITEM NO. 1

(SCALE 1:20)



SECTION 4-4

(SCALE-1:5)



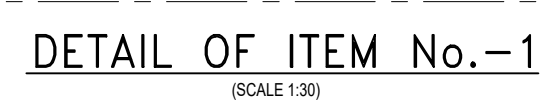
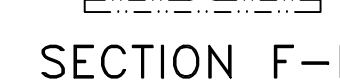
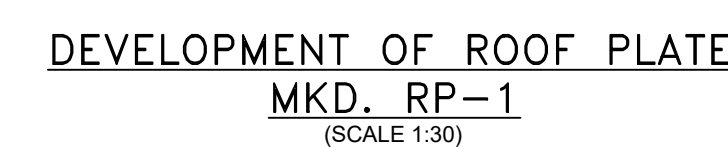
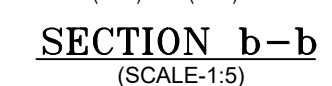
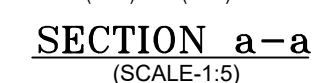
DETAIL - 'D3'

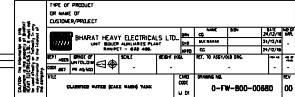
(SCALE-1:5)

NOTES:-

1. ALL DIMENSIONS ARE IN MM. & LEVELS ARE IN M.
2. ALL ERECTION HOLES ARE 17.5# FOR M-16 BOLTS U.N.O.
3. ALL PERMANENT HOLES ARE 17.5# FOR M-16 BOLTS U.N.O.
4. ALL MEMBERS AND GUSSETS PLATES TO BE CUT AFTER FULL SCALE SHOP LAYOUT BEFORE FABRICATION
5. ALL SHOP WELD ARE 6mm. THICK AND SITE WELD ARE 6mm. THICK. U.N.O.
6. ERECTION HOLES SHOWN THUS
7. PERMANENT HOLES SHOWN THUS
8. ALL ERECTION BOLTS SHALL BE RETAINED IN POSITION
9. THIS DRG. SHALL BE READ IN CONJUNCTION WITH DRG. NO. 1-FW-802-00369

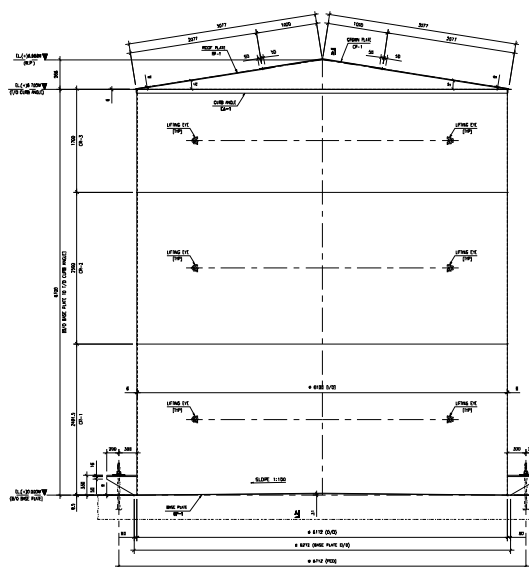
TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		Bharat Heavy Electricals Ltd.		UNIT: BOLTER AUXILIARIES PLANT.	
DEPT	AGCS	GRADE OF UNTO DIM	SCALE	WEIGHT (KG)	REF TO ASSY/OLD DRG.
CODE	862	PR-AG-590			
DRAWING NO.		0-FW-802-00176		REV	
U 01				01	



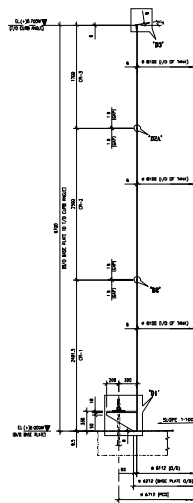


IN 2000

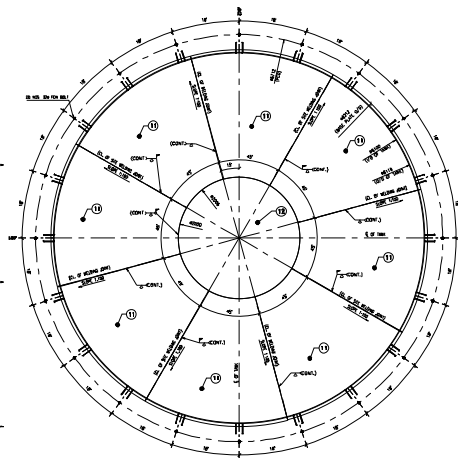
For production
REF.-PR.OL.560 For printing
REF.-PR.OL.560 For total drive



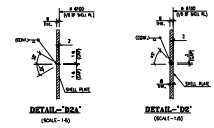
MARKING ELEVATION OF FILTRATE WATER TANK
(H/O : NO)



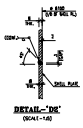
SECTION A-A



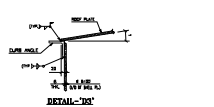
DEVELOPMENT OF BASE PLATE MKD. BP-
(REQD. 1 IN. PER TANK)
(SCALE - 1/20)



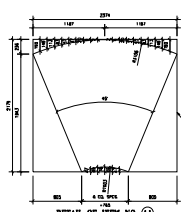
DETAIL-D2A
(SCALE-1/4)



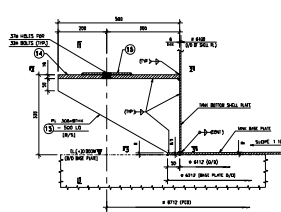
DETAIL-1
(SCALE - 1/8")



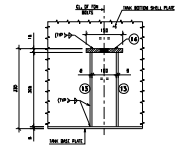
DETAILS:



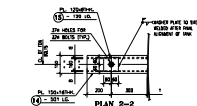
803



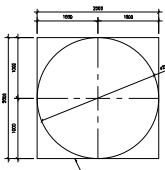
DETAIL-"D1"
(PROD. 20 NOV.)
(CROSS-1.1.1)



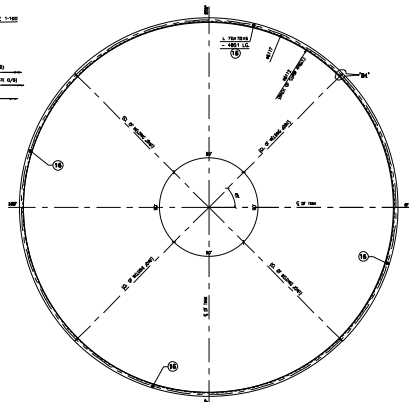
SECTION 1-1



Eq. 13.16.4C
= 50.1 LC



DETAIL OF ITEM NO. 12
(PAGE 122)



DETAIL OF CURB ANGLE MKD. CA-
(REC'D 1 NO PER TANK)

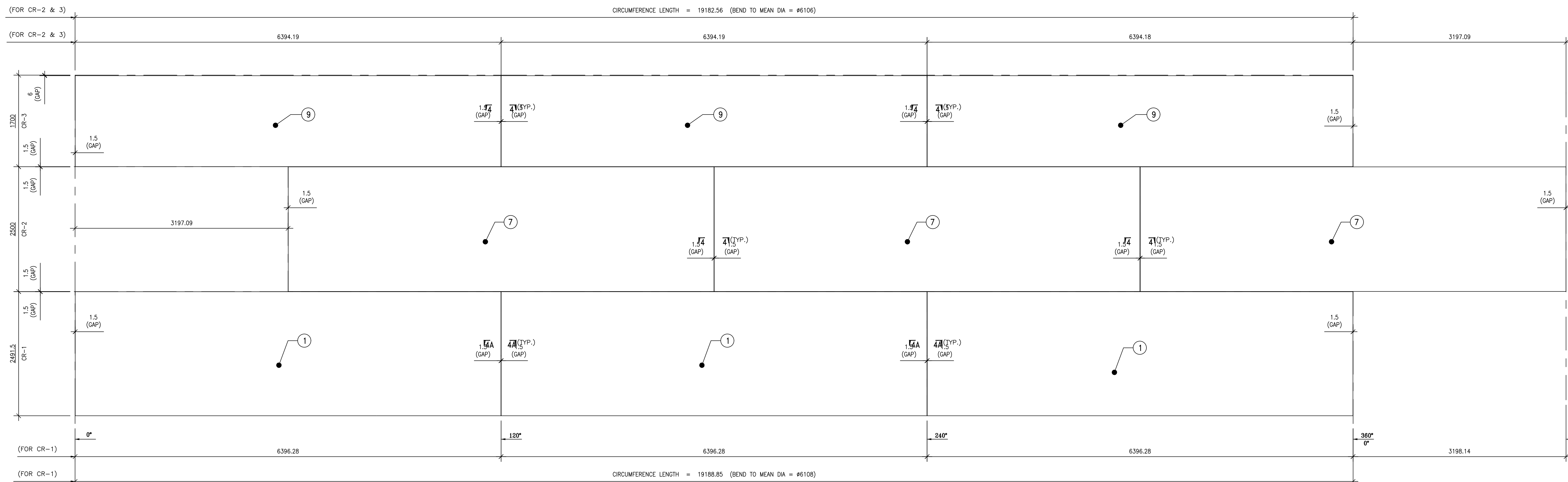


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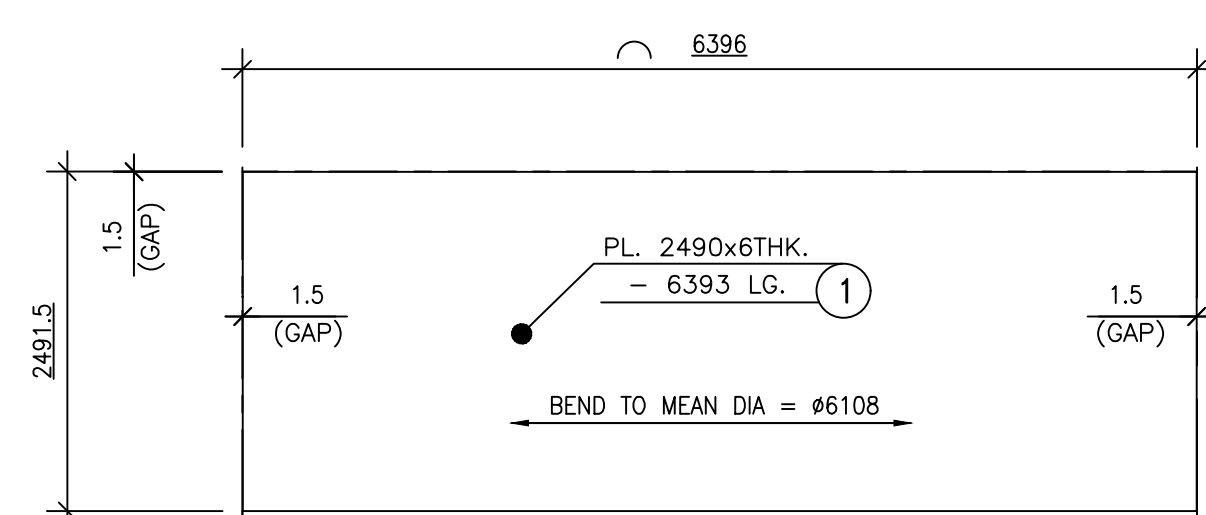
THIS DRAWING SHALL BE READ ALONG WITH
0-FW-744-00682
1-FW-744-00792

SHEET 1 OF 3

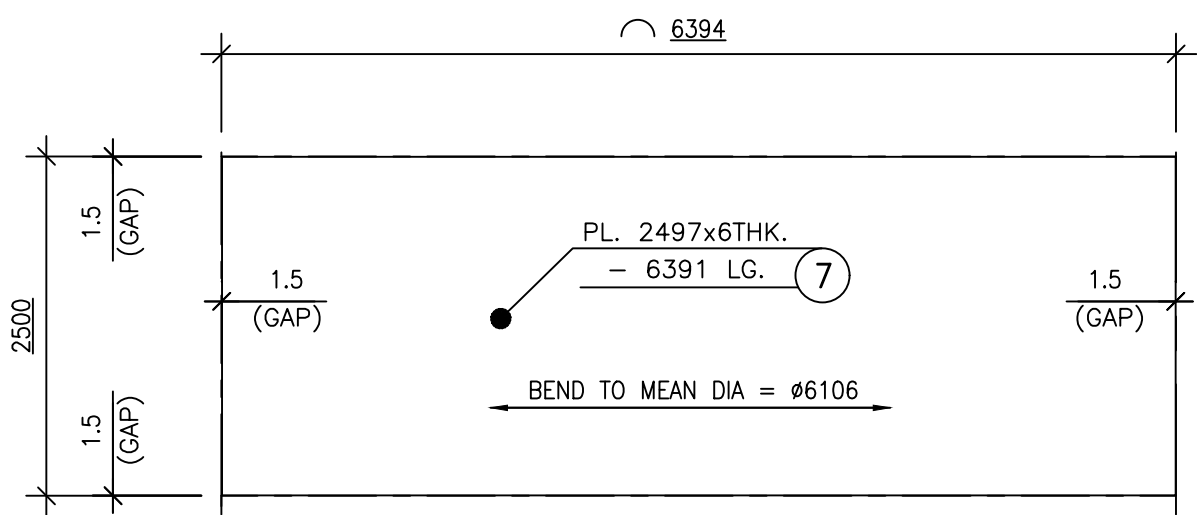
[illegible]



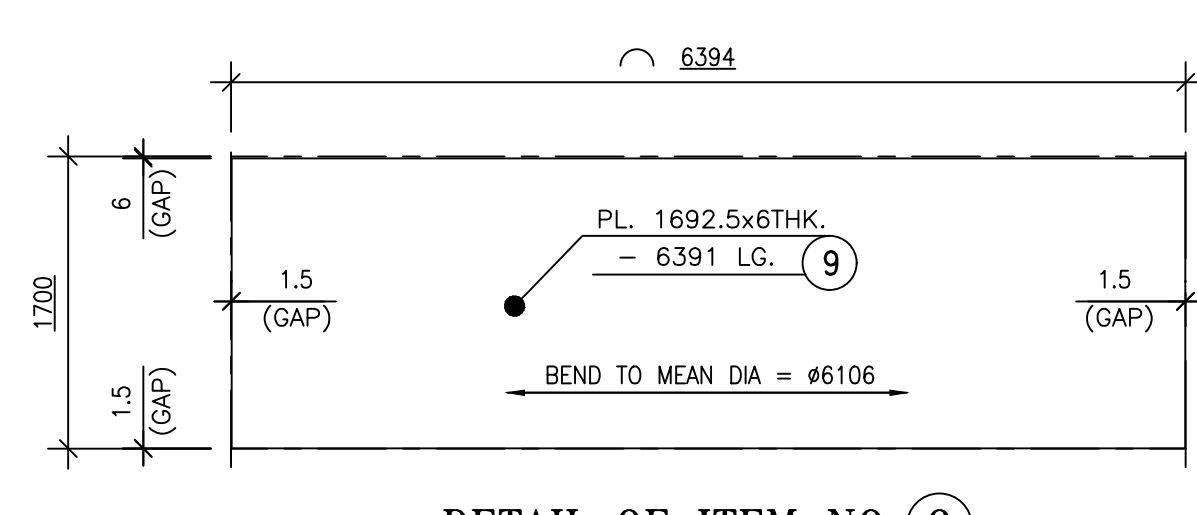
DEVELOPMENT OF COURSE MKD. CR-1, CR-2 & CR-3
(REQD. 1 NO. PER TANK)
(SCALE-1:20)



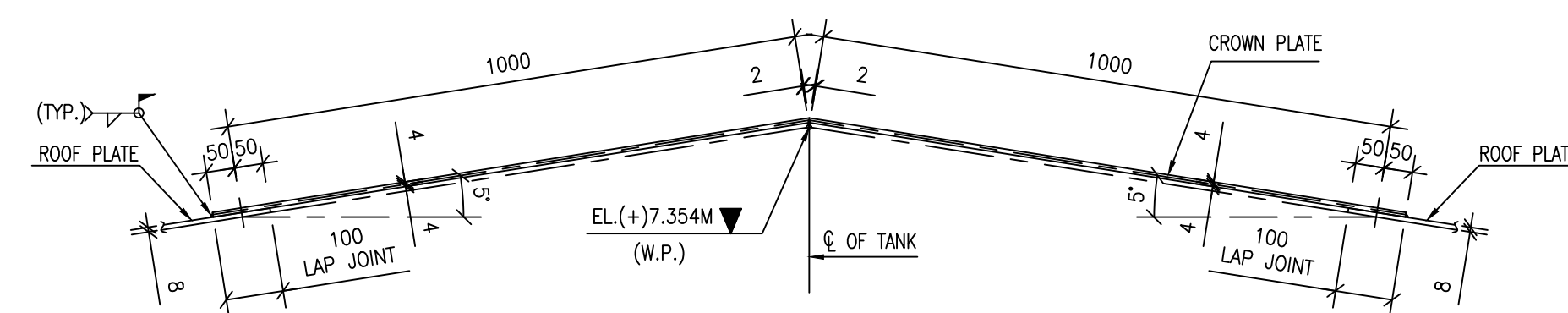
DETAIL OF ITEM NO. 1
(SCALE 1:20)



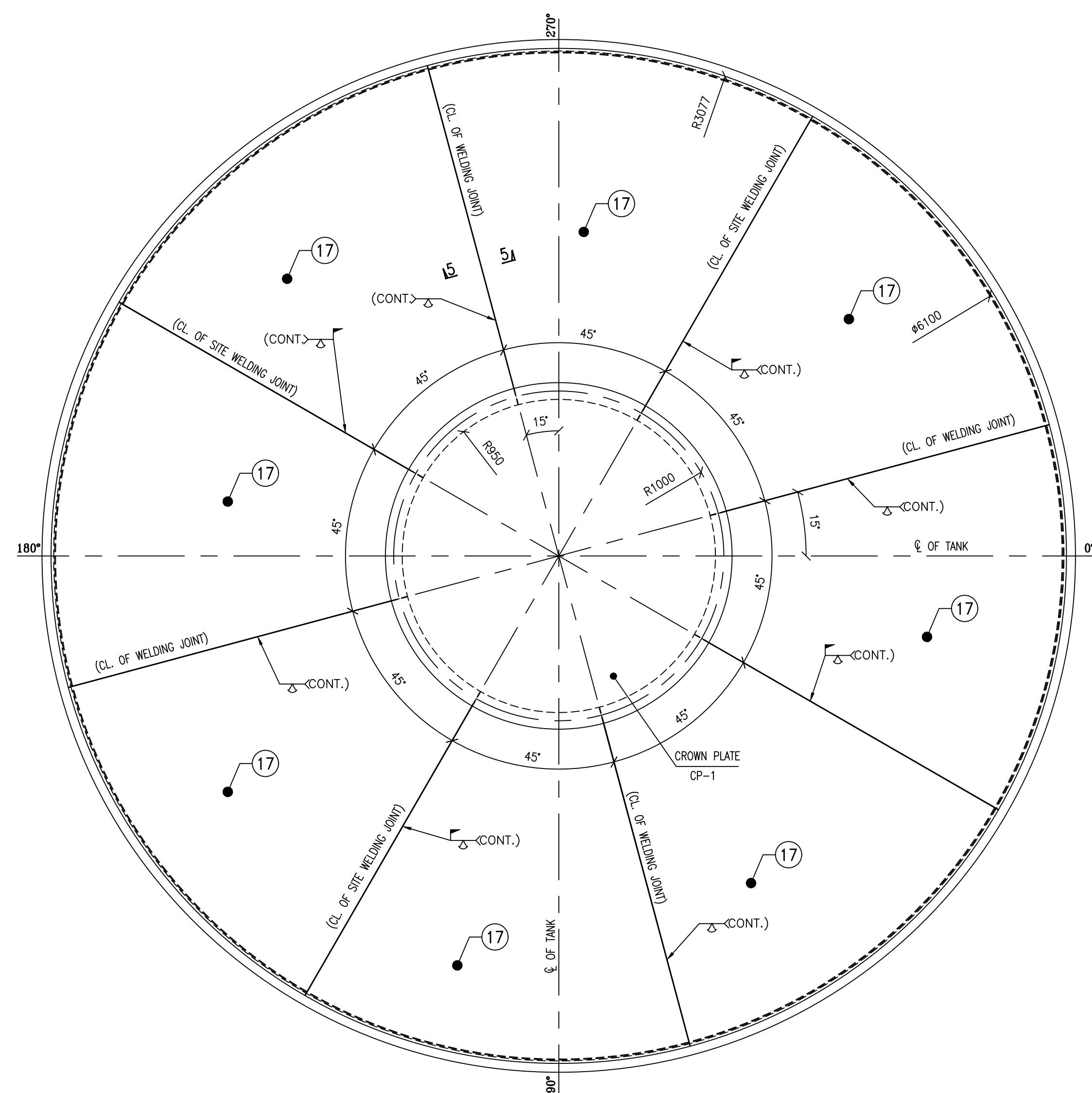
DETAIL OF ITEM NO. 7
(SCALE 1:20)



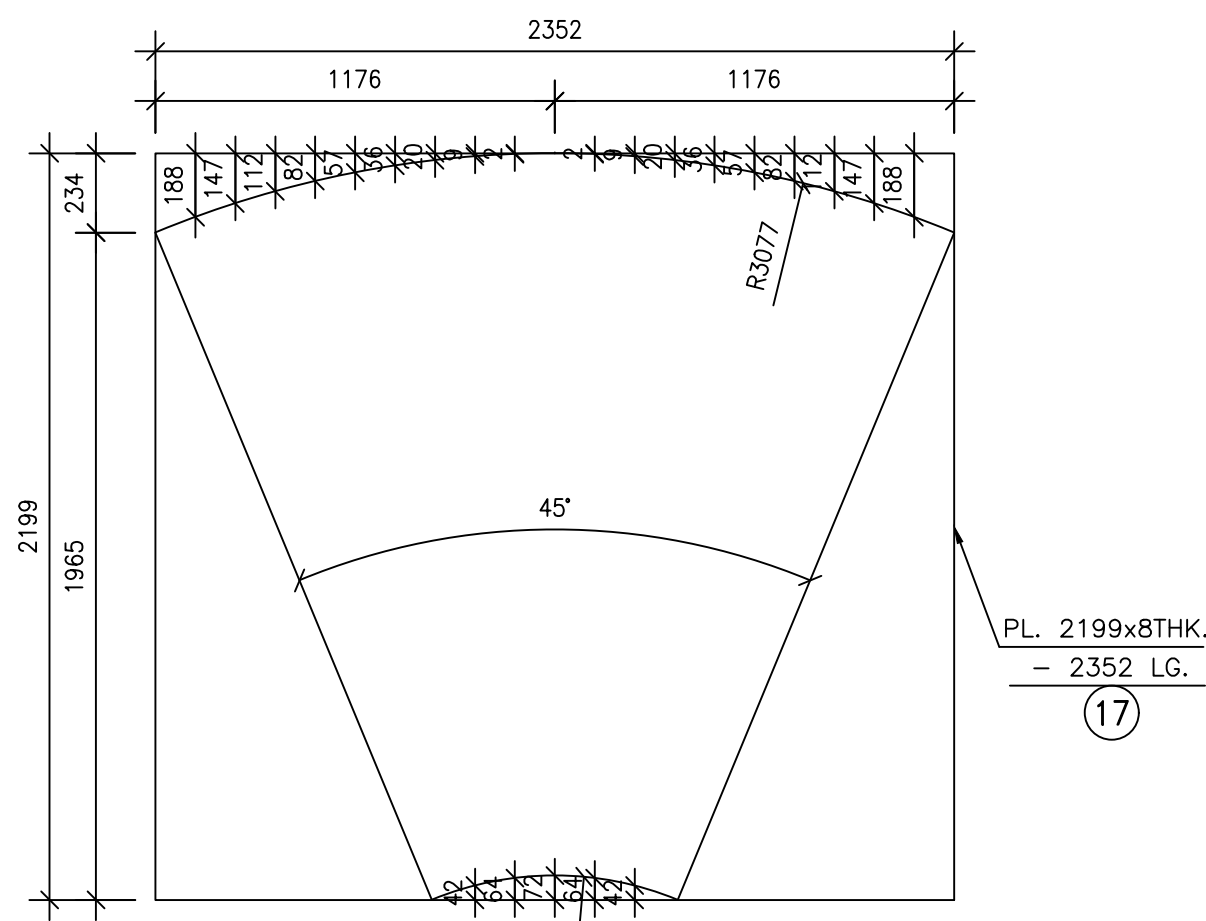
DETAIL OF ITEM NO. 9
(SCALE 1:20)



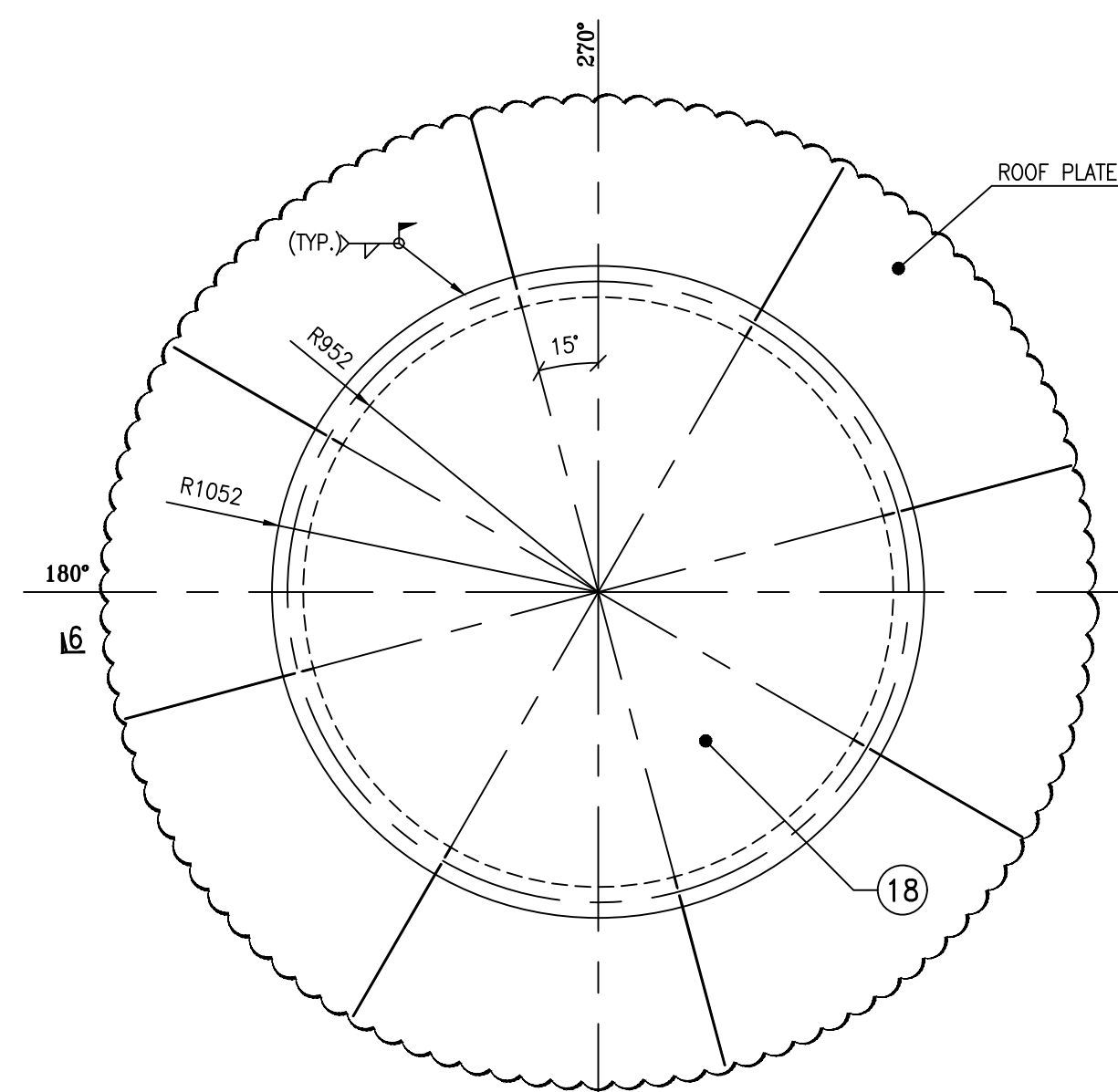
SECTION 6-6
(SCALE-1:5)



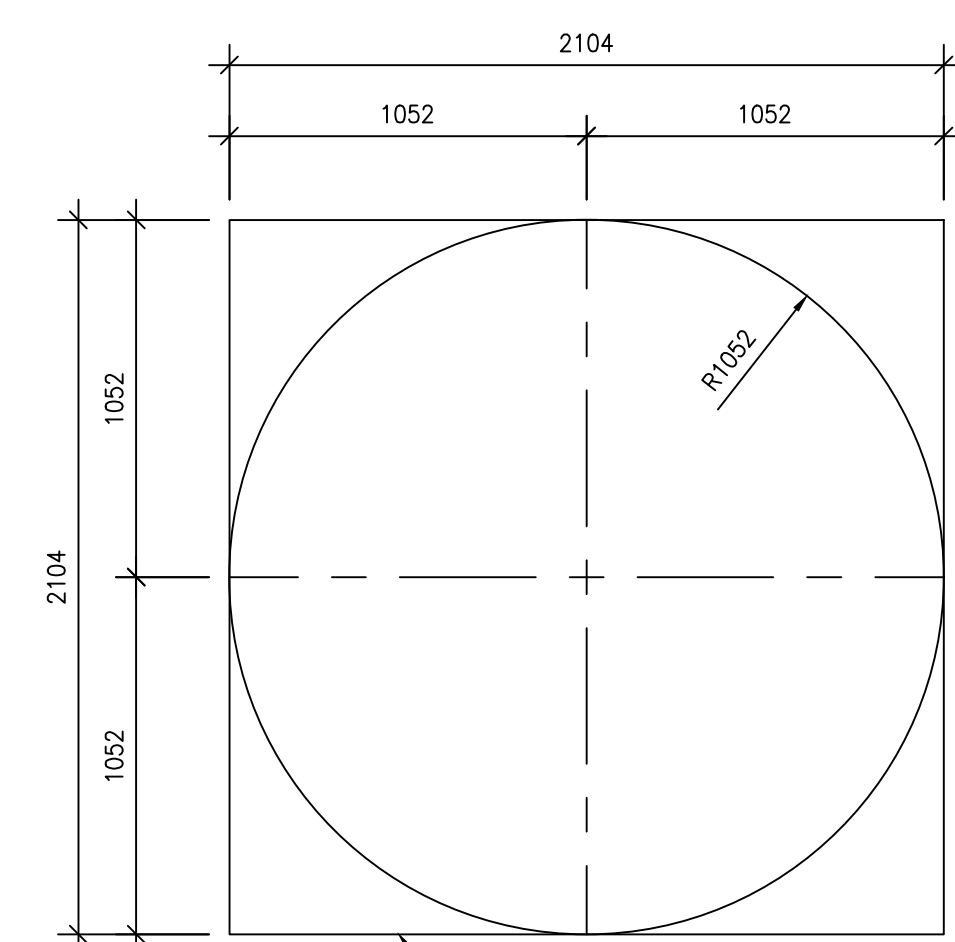
DETAIL OF ROOF PLATE MKD. RP-1
(REQD. 1 NO. PER TANK)
(SCALE 1:20)



DETAIL OF ITEM NO. 17
(SCALE 1:20)



DEVELOPMENT OF CROWN PLATE MKD. CP-1
(REQD. 1 NO. PER TANK)
(SCALE 1:20)



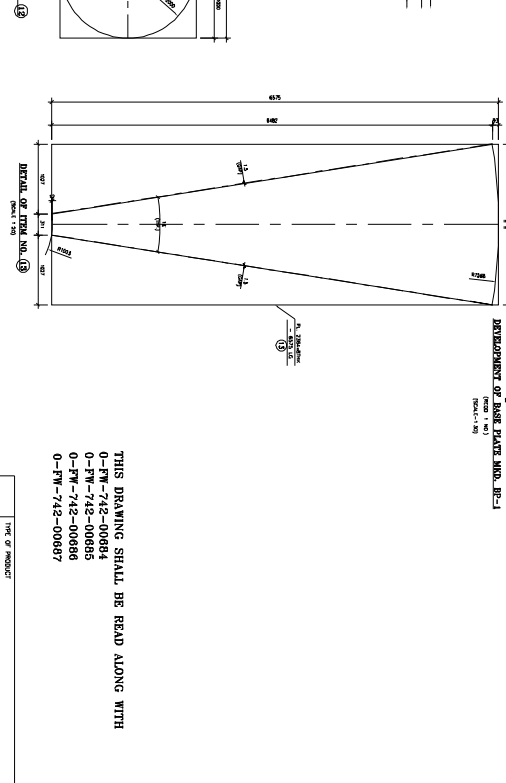
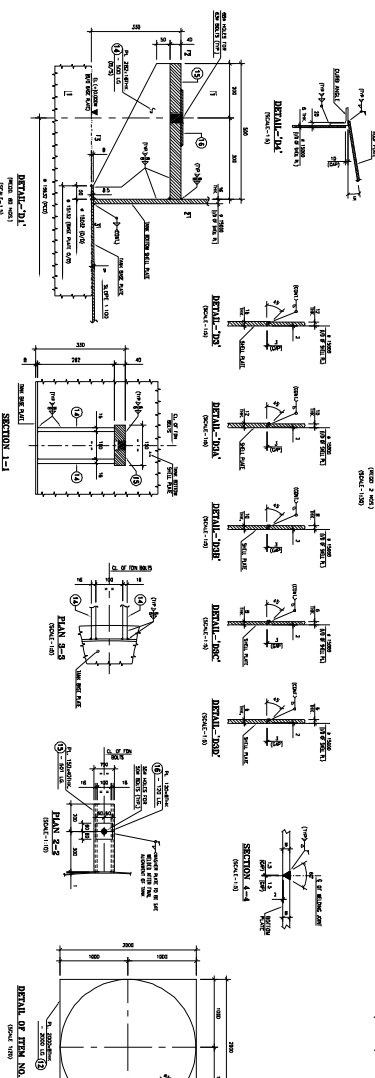
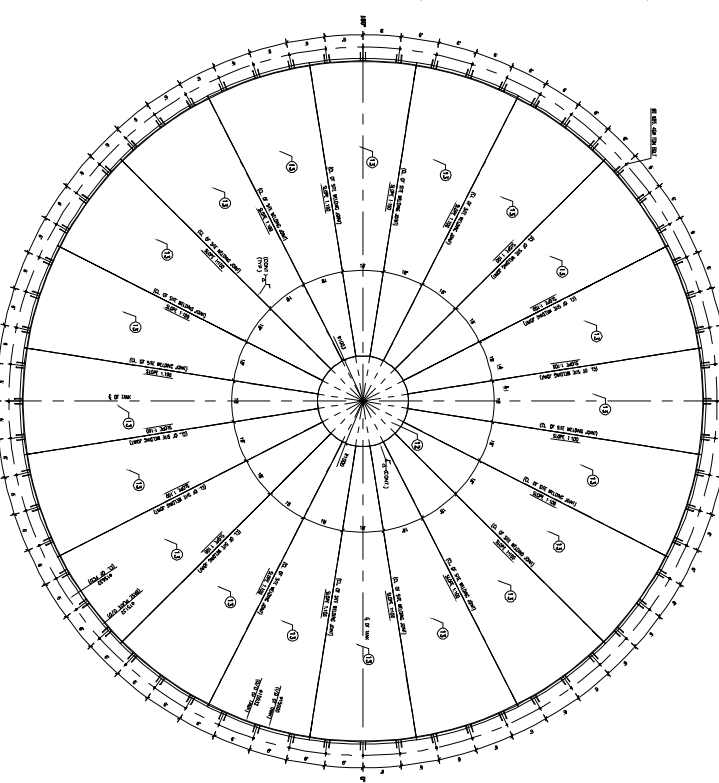
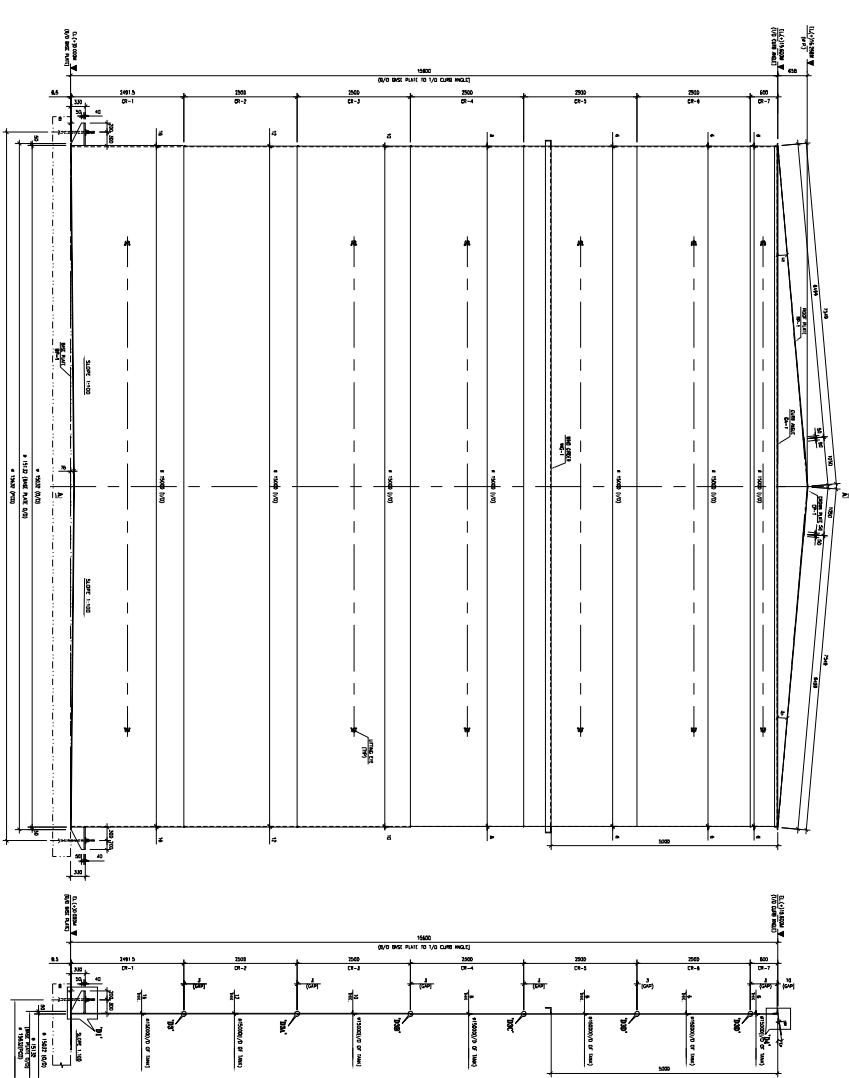
DETAIL OF ITEM NO. 18
(SCALE 1:20)

THIS DRAWING SHALL BE READ ALONG WITH
0-FW-744-00681
1-FW-744-00792

SHEET 2 OF 3

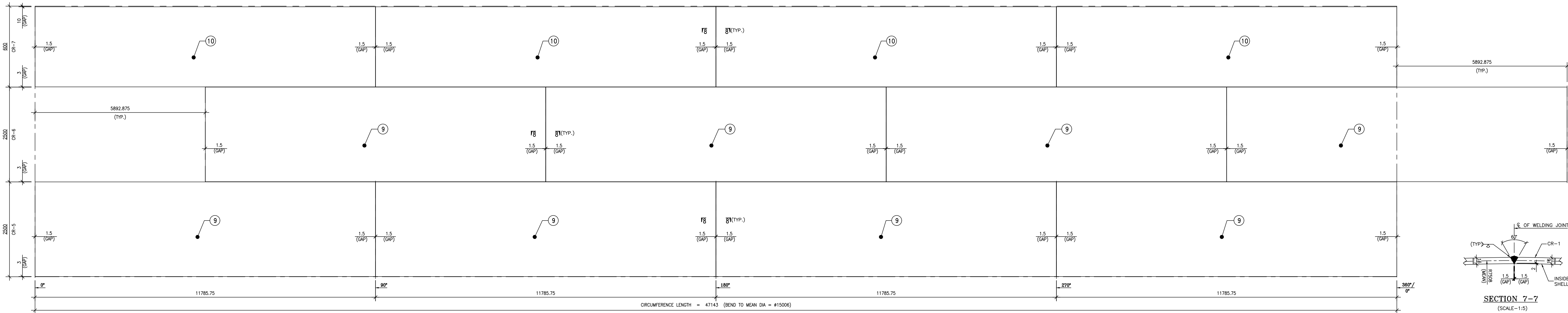
REV	DATE	ALTERED
ZONE		CHECKED

CAUTION: The information on this drawing is the property of Bharat Heavy Electricals Ltd. and shall not be disclosed to the public or any third party without the written consent of the company.		TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		Bharat Heavy Electricals Ltd.		UNIT: BOILER AUXILIARIES PLANT.		PROJECT - 652-4000		DATE: 24/12/18		NO. OF SHEETS	
		DEPT	ACCS	GRADE OF UNTOLODIM	SCALE	WEIGHT (KG)	REF TO ASSY/OLD DRG.	REV NO.	NO. OF SHEETS	REV	NO. OF SHEETS	REV	NO. OF SHEETS
CODE	862	PR:QA:500											
TITLE		CARD CODE		DRAWING NO.		REV		REV		REV		REV	
FILTRATE WATER TANK		U 01		0-FW-744-00682		00							

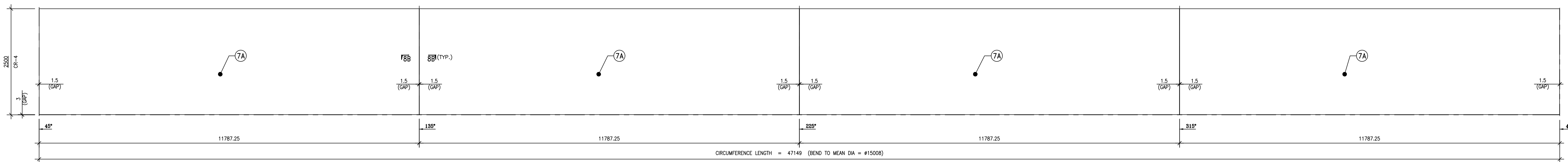


THIS DRAWING SHALL BE READ ALONG WITH
0-FW-742-0064
0-FW-742-0065
0-FW-742-0066
0-FW-742-0067

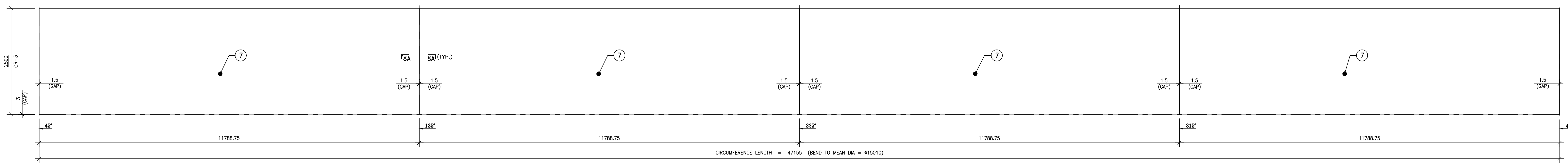
TYPE OF PRODUCT		DRAWING PROJECT		DATE		SCALE		SHEET NO.		TOTAL SHEETS	
0-FW-742-0064		0-FW-742-0065		0-FW-742-0066		0-FW-742-0067		0-FW-742-0068		0-FW-742-0069	
0-FW-742-0070		0-FW-742-0071		0-FW-742-0072		0-FW-742-0073		0-FW-742-0074		0-FW-742-0075	
0-FW-742-0076		0-FW-742-0077		0-FW-742-0078		0-FW-742-0079		0-FW-742-0080		0-FW-742-0081	
0-FW-742-0082		0-FW-742-0083		0-FW-742-0084		0-FW-742-0085		0-FW-742-0086		0-FW-742-0087	
0-FW-742-0088		0-FW-742-0089		0-FW-742-0090		0-FW-742-0091		0-FW-742-0092		0-FW-742-0093	
0-FW-742-0094		0-FW-742-0095		0-FW-742-0096		0-FW-742-0097		0-FW-742-0098		0-FW-742-0099	
0-FW-742-0100		0-FW-742-0101		0-FW-742-0102		0-FW-742-0103		0-FW-742-0104		0-FW-742-0105	
0-FW-742-0106		0-FW-742-0107		0-FW-742-0108		0-FW-742-0109		0-FW-742-0110		0-FW-742-0111	
0-FW-742-0112		0-FW-742-0113		0-FW-742-0114		0-FW-742-0115		0-FW-742-0116		0-FW-742-0117	
0-FW-742-0118		0-FW-742-0119		0-FW-742-0120		0-FW-742-0121		0-FW-742-0122		0-FW-742-0123	
0-FW-742-0124		0-FW-742-0125		0-FW-742-0126		0-FW-742-0127		0-FW-742-0128		0-FW-742-0129	
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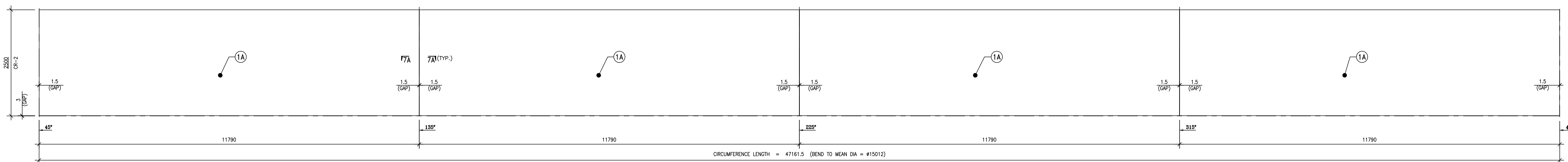
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(REQD. 1 NO.)
(SCALE-1:20)



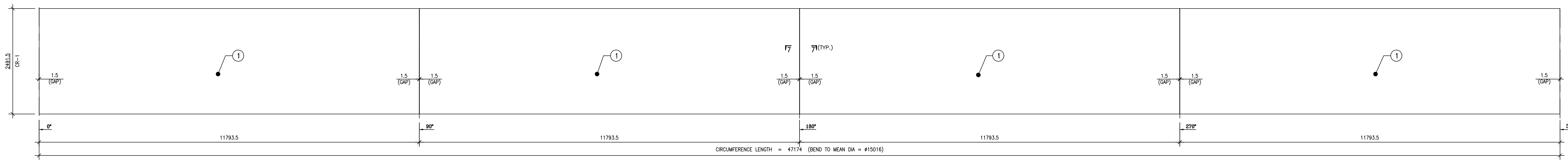
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(SCALE-1:20)



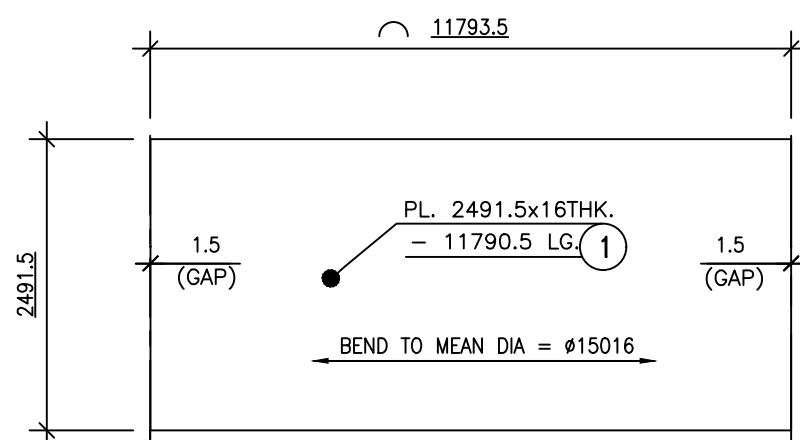
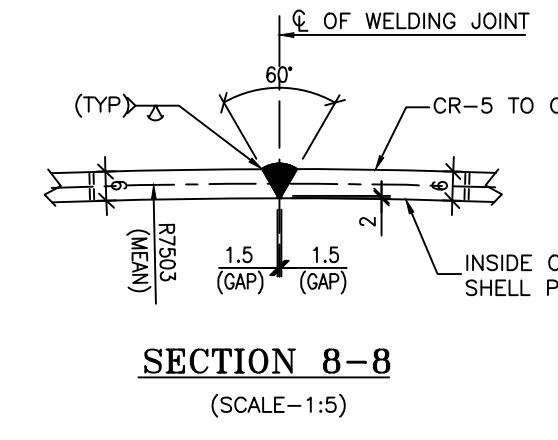
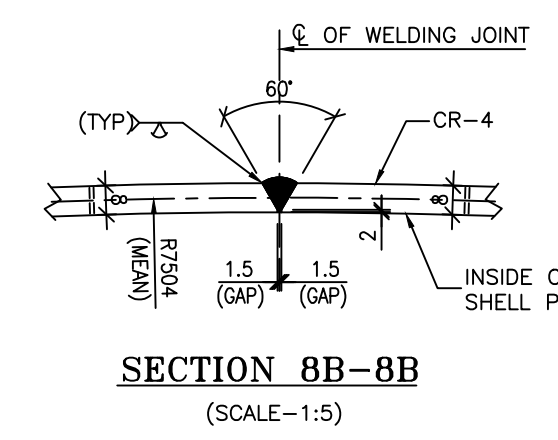
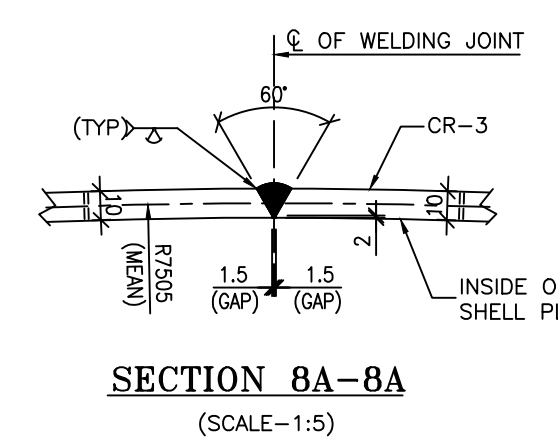
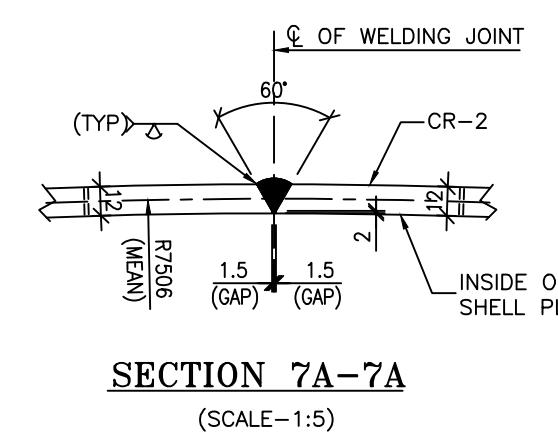
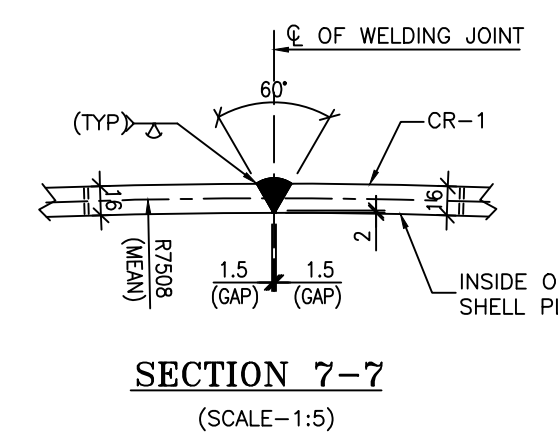
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(REQD. 1 NO.)
(SCALE-1:20)



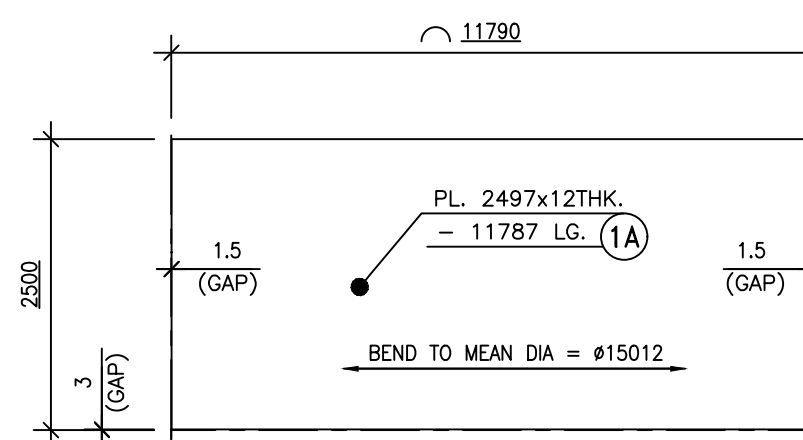
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(REQD. 1 NO.)
(SCALE-1:20)



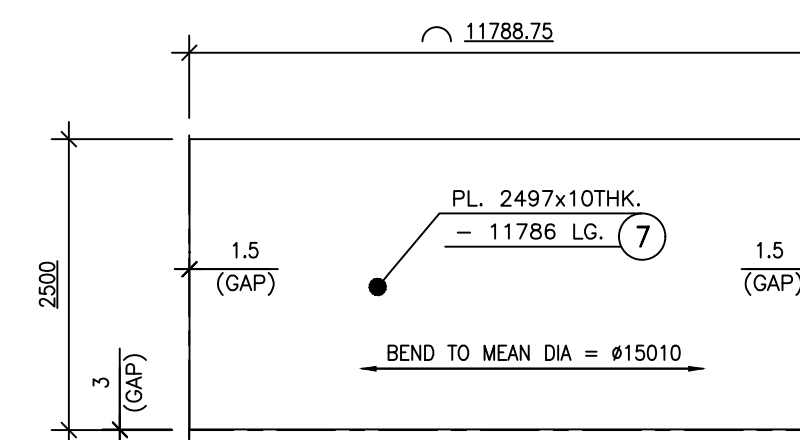
DEVELOPMENT OF COURSE MKD. CR-1
(REQD. 1 NO.)
(SCALE-1:20)



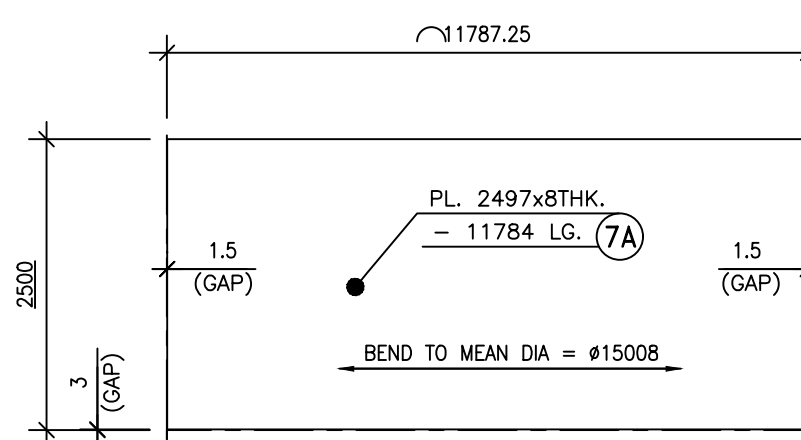
DETAIL OF ITEM NO. 1
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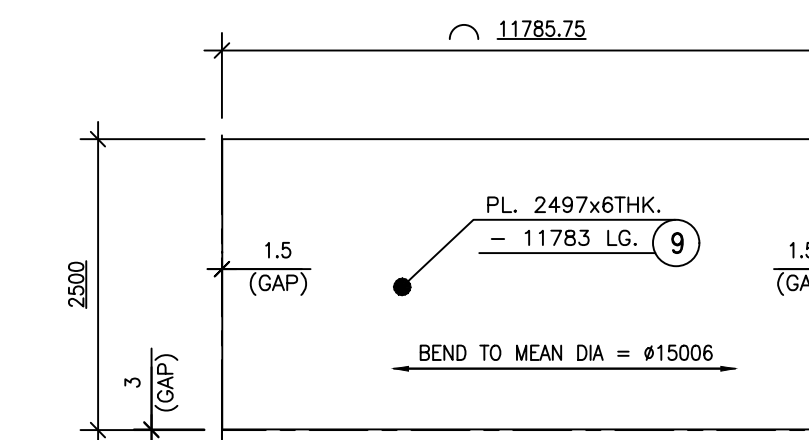
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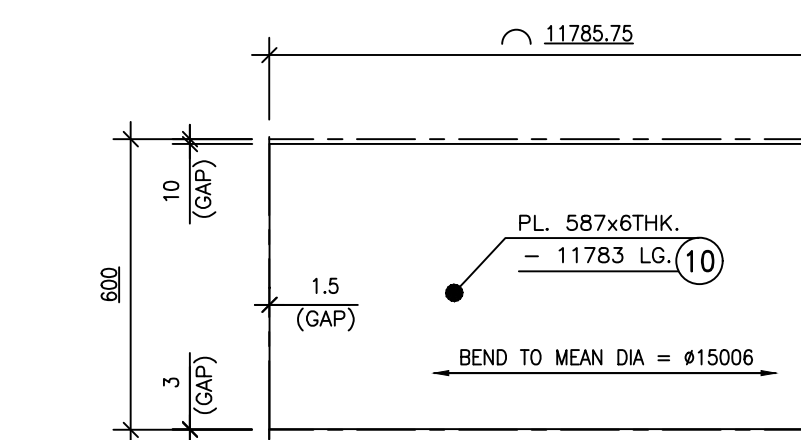
DETAIL OF ITEM NO. 7
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DETAIL OF ITEM NO. 7A
(SCALE 1:20)



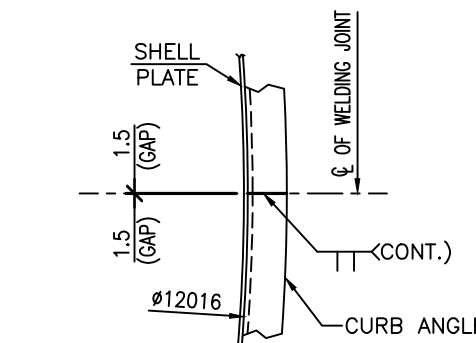
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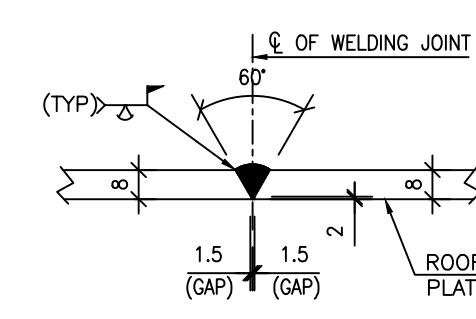
DETAIL OF ITEM NO. 10
(SCALE 1:20)

THIS DRAWING SHALL BE READ ALONG WITH
0-FW-742-00683
0-FW-742-00685
0-FW-742-00686
0-FW-742-00687

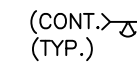
CAUTION: The information on this drawing is the property of Bharat Heavy Electricals Ltd. and shall not be used for any other purpose without the written consent of the company.		TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		NAME		SIGN	DATE	NO. OF
		Bharat Heavy Electricals Ltd. UNIT: BOILER AUXILIARIES PLANT. PLANT: 652-400.		C.G.	C.G.		24/12/18	VAR.
DEPT: AQCS		GRADE OF UNTOLODIM		SCALE		WEIGHT (KG.)		REV. NO. OF
CODE: 862		PR: A2-500		-		-		-
TITLE		DRAWING NO.		REF. TO ASSY/OLD DRG.		REV.		NO. OF
LIMESTONE SLURRY STORAGE TANK		U 01		-		-		-
DETAIL OF BASE PLATE MKD. BP-1 FOR LIMESTONE SLURRY STORAGE TANK		0-FW-742-00684		-		-		-



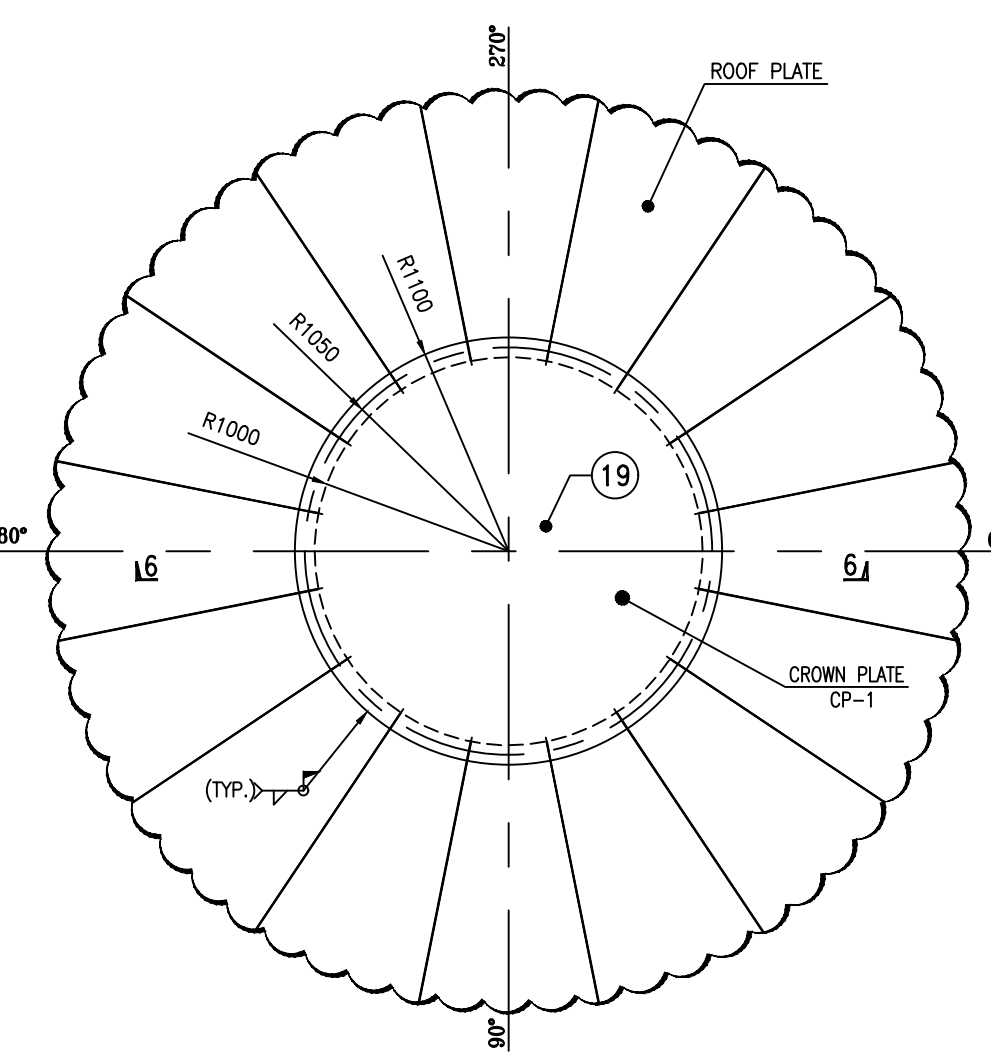
DETAIL OF CURB ANGLE MKD. CA-1
(REQD. 1 NO.)
(SCALE-1:30)



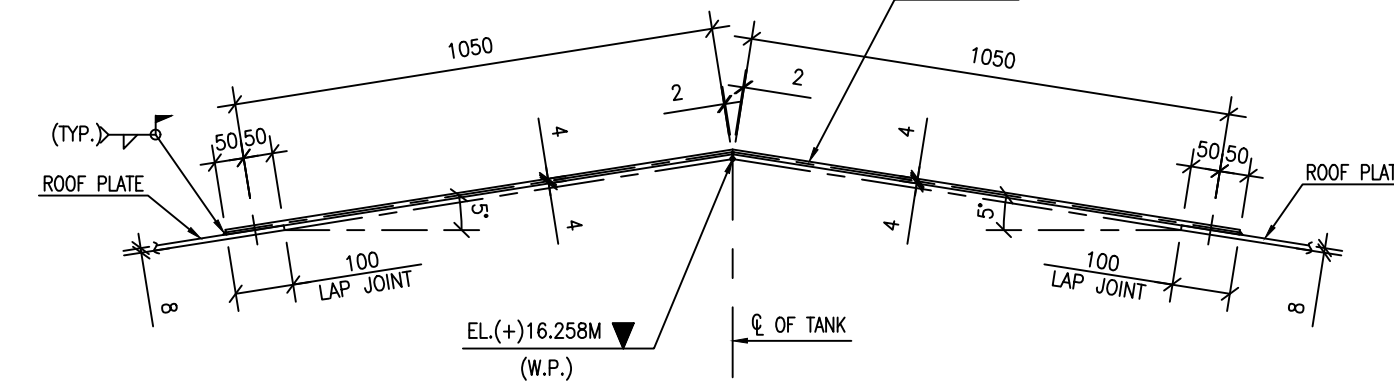
SECTION 5-5
(SCALE-1:5)



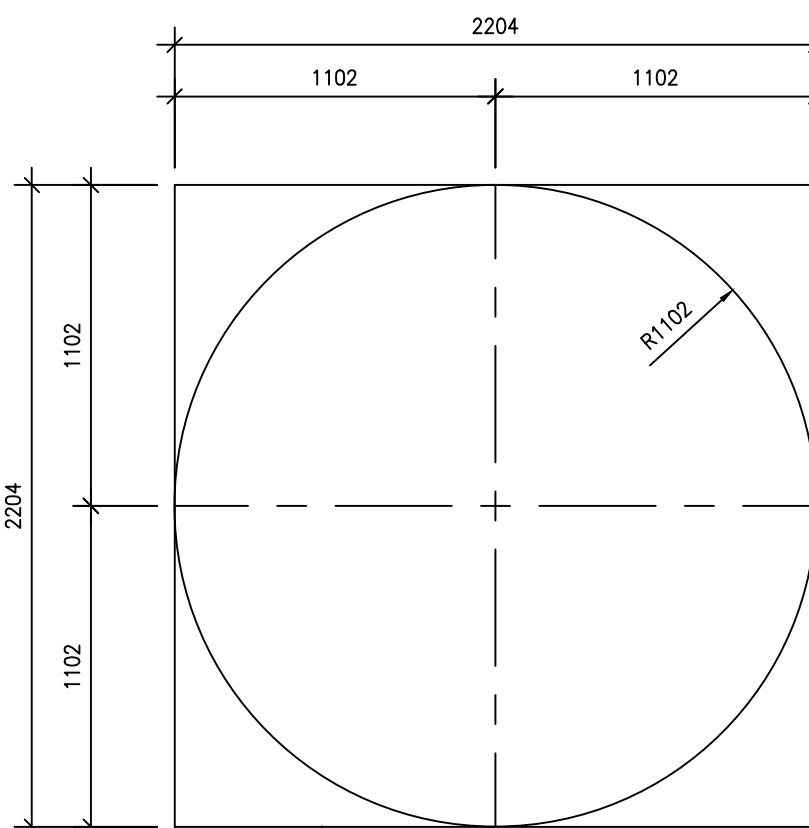
DETAIL OF ROOF PLATE MKD. RP-1
(REQD. 1 NO.)
(SCALE 1:30)



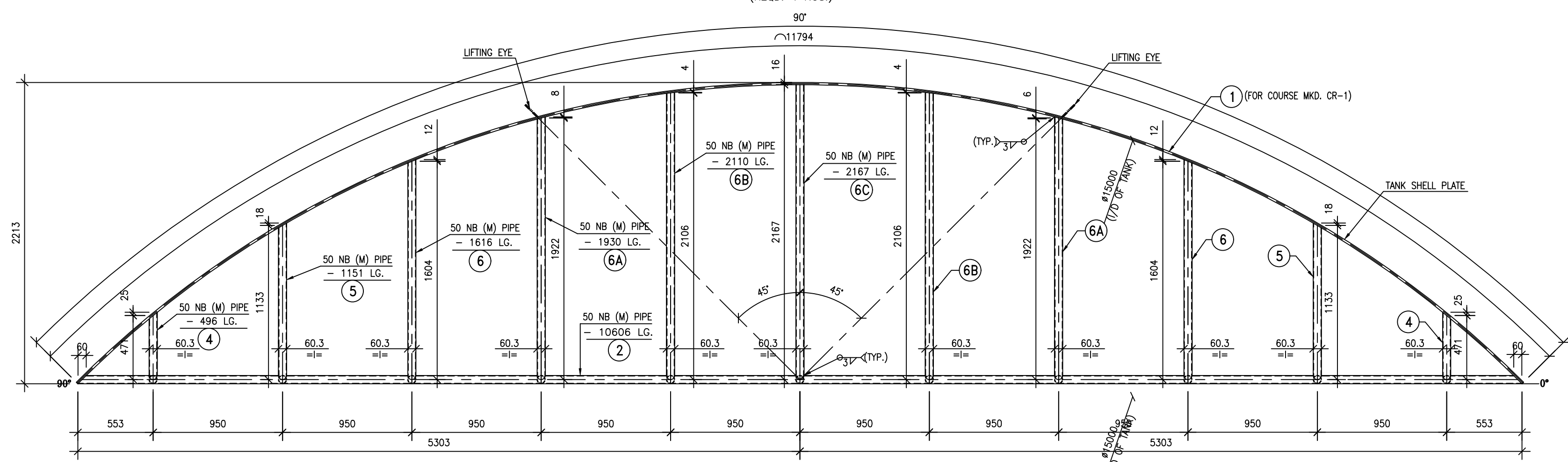
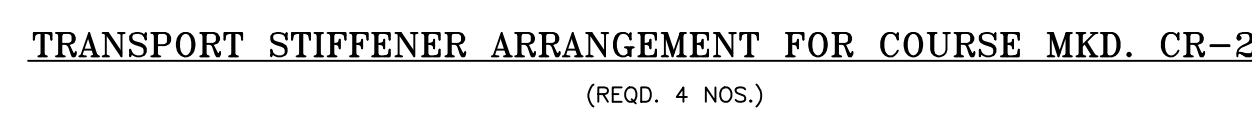
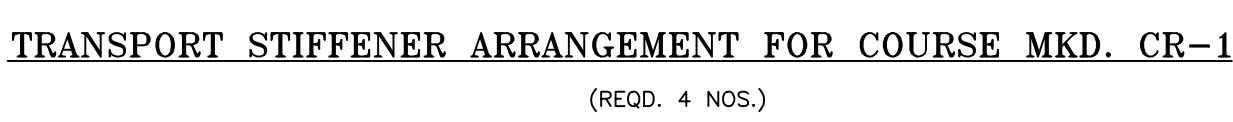
DEVELOPMENT OF CROWN PLATE MKD. CP-1
(REQD. 1 NO.)
(SCALE 1:30)



SECTION 6-6
(SCALE-1:5)



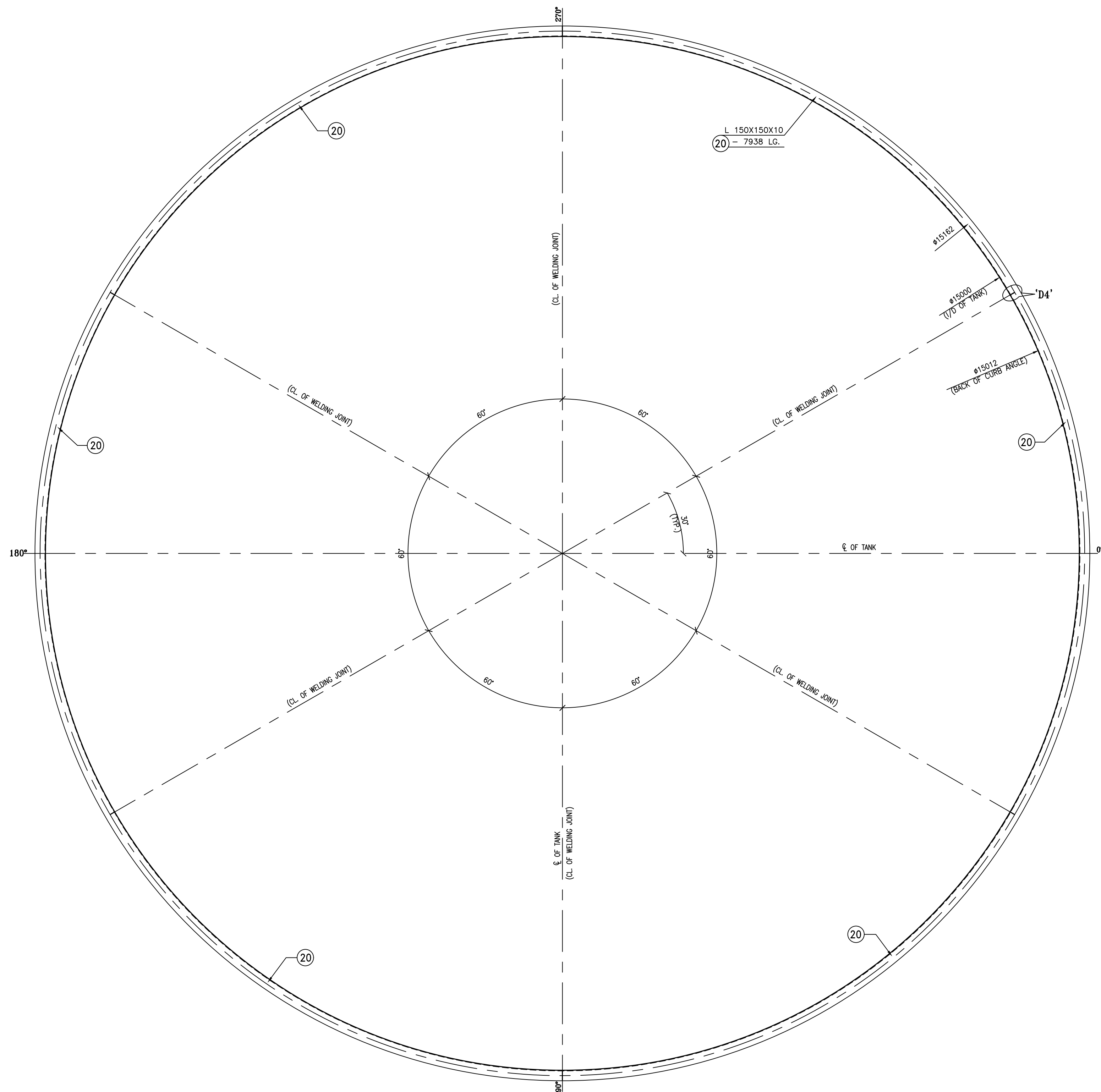
DETAIL OF ITEM NO. 19
(SCALE 1:20)



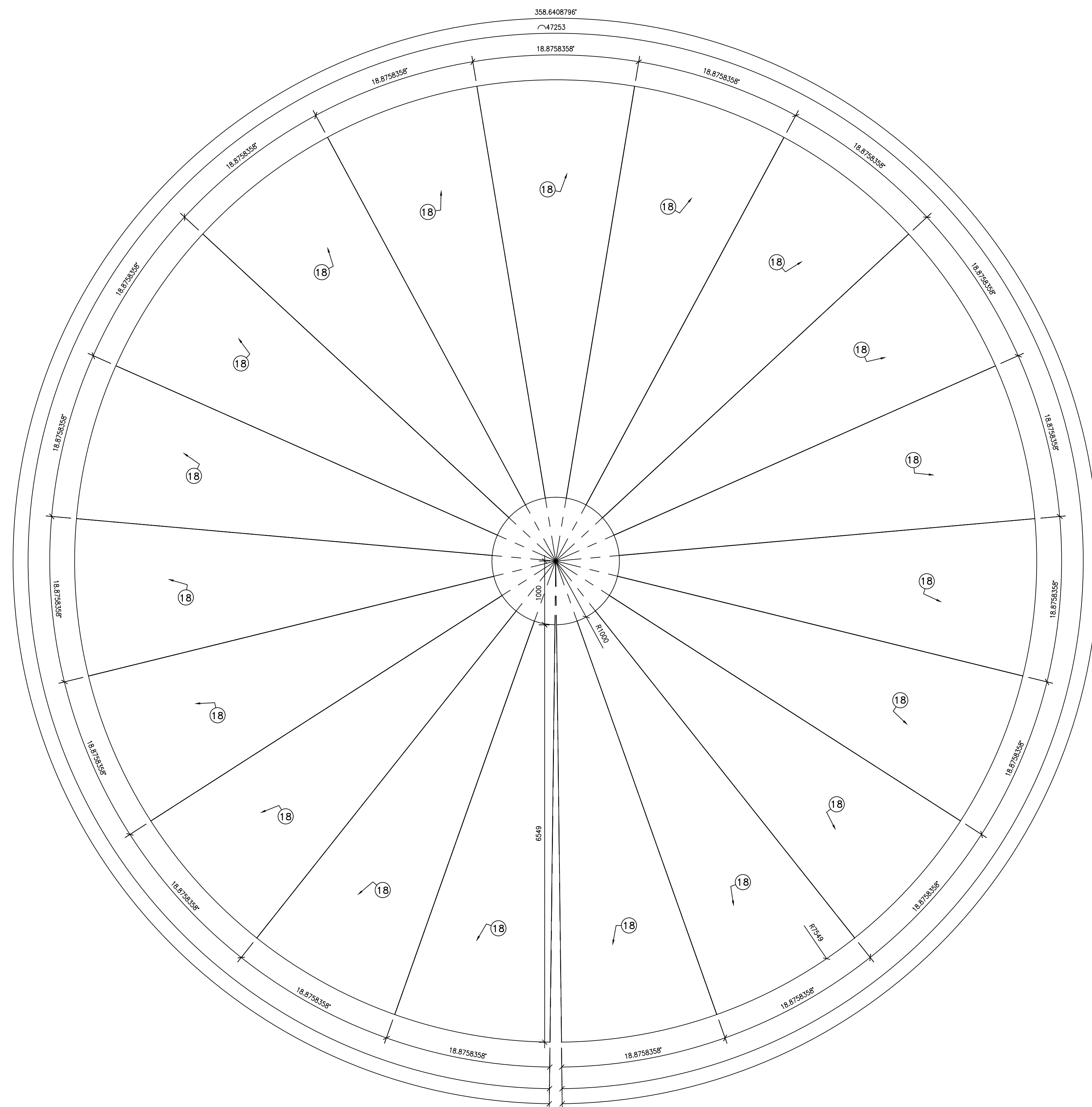
PLAN B-E
(SCALE-1:20)

THIS DRAWING SHALL BE READ ALONG WITH
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0-FW-742-00684
0-FW-742-00686
0-FW-742-00687

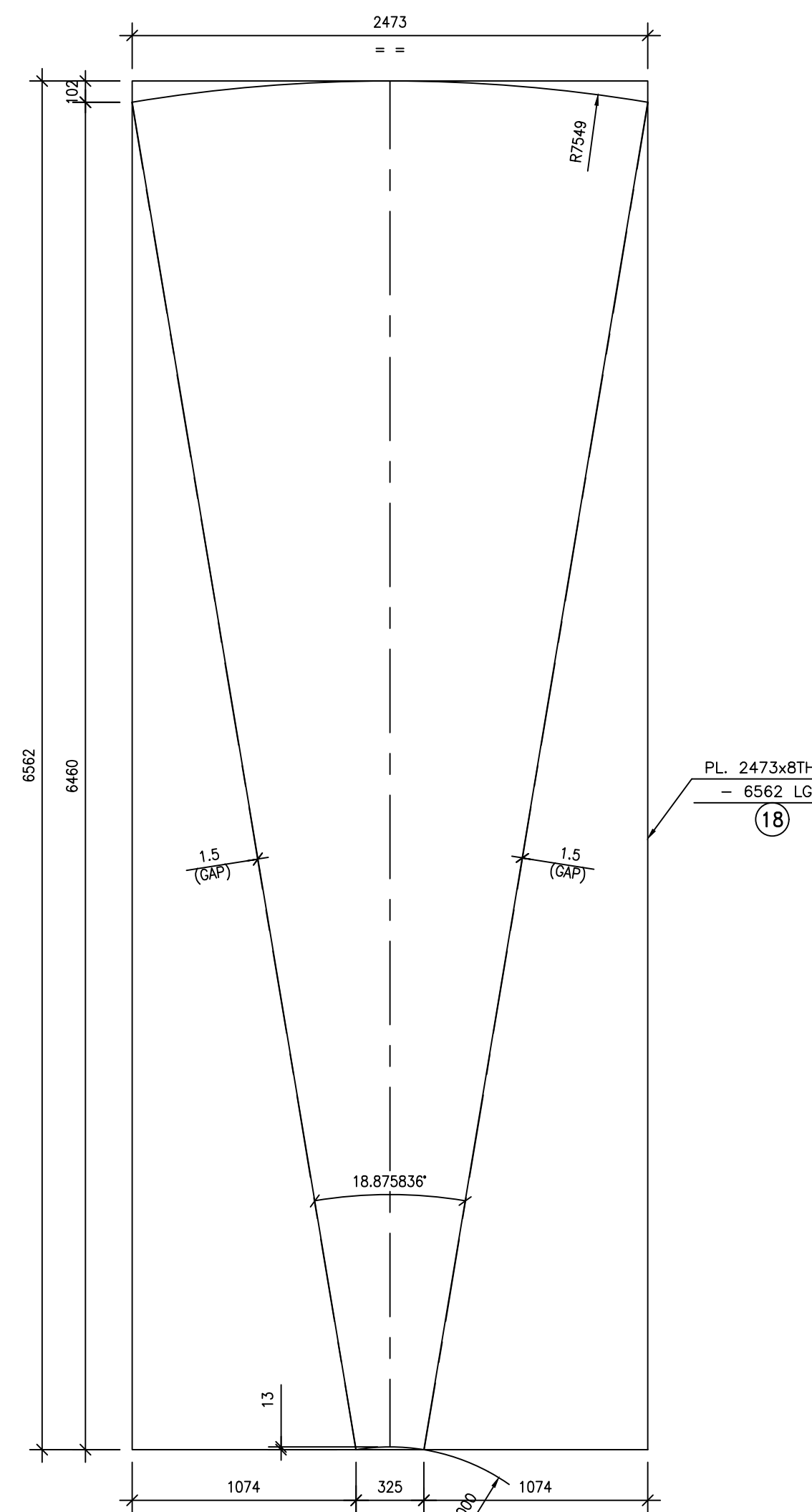
REV	DATE	ALTERED CHECKED	DEPT	AGCS	GRADE OF UNTOLD		SCALE	WEIGHT (KG)	REF. TO ASSY/OLD DRG.	REV NO.	NO. OF PIECES
ZONE			CODE	862	PR: AQ-500		-				
QUANTITY Drawn in the proper quantity and in the correct detail. It is the user's duty to verify the quantity and the company.			TITLE DETAIL OF BASE PLATE MOD. BP-1 FOR LIMESTONE SLURRY STORAGE TANK					CARD CODE U 01	DRAWING NO. 0-FW-742-00685	REV	00



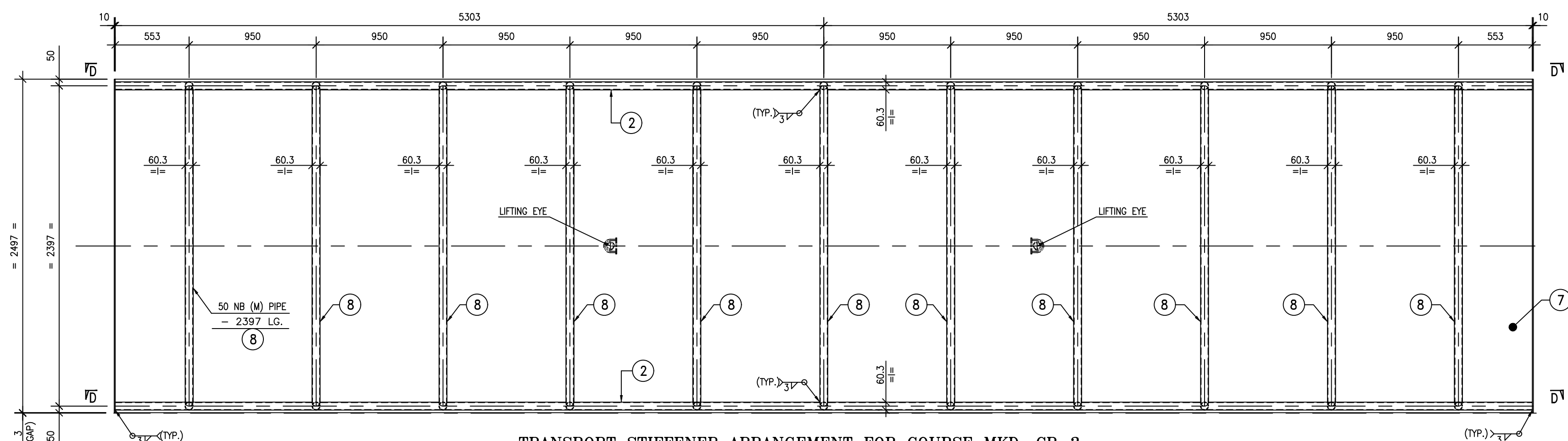
DETAIL OF WIND GIRDER MKD. WG-1
(REQD. 1 NOS.)
(SCALE=1:30)



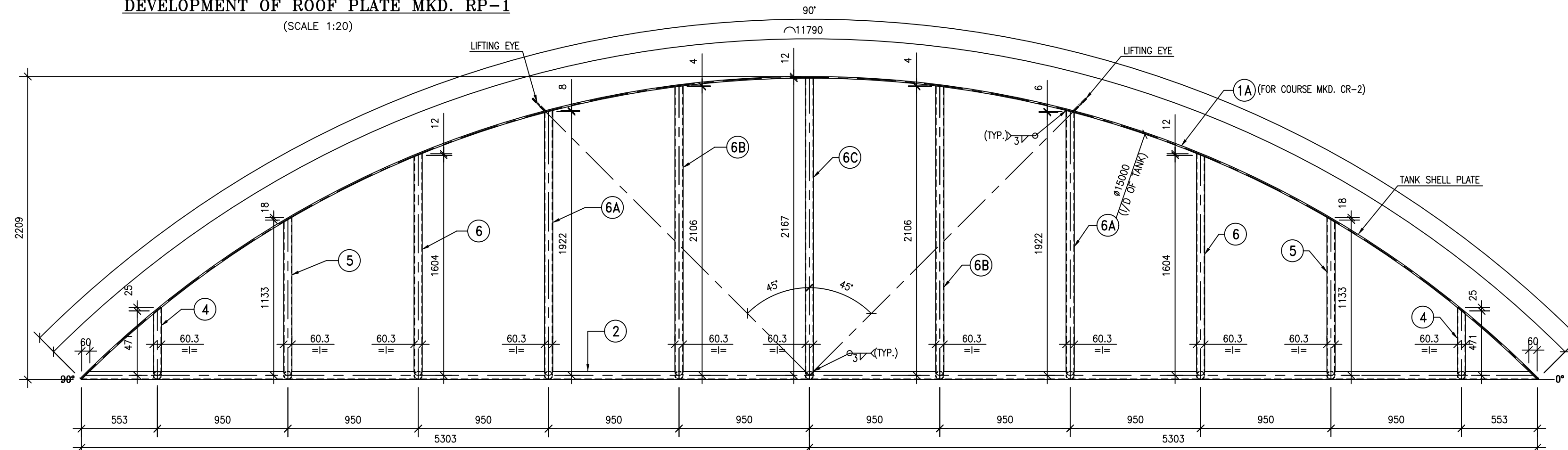
DEVELOPMENT OF ROOF PLATE MKD. RP-1
(SCALE 1:20)



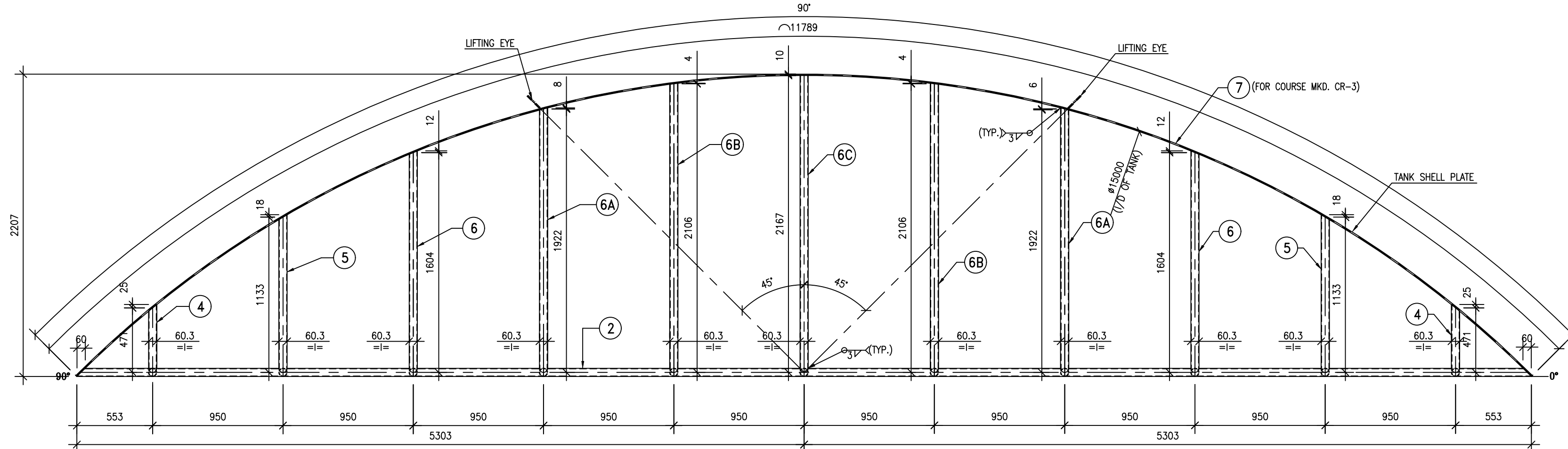
DETAIL OF ITEM NO. (18)
(SCALE 1:20)



TRANSPORT STIFFENER ARRANGEMENT FOR COURSE MKD. CR-3
(REQD. 4 NOS.)



PLAN C-C
(SCALE=1:20)

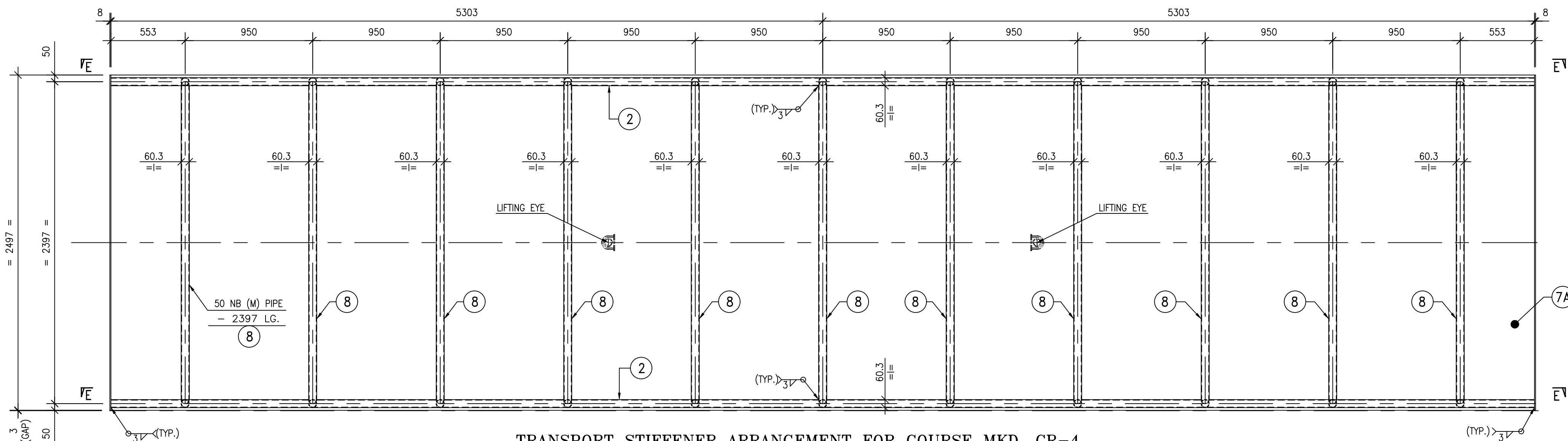


PLAN D-D
(SCALE=1:20)

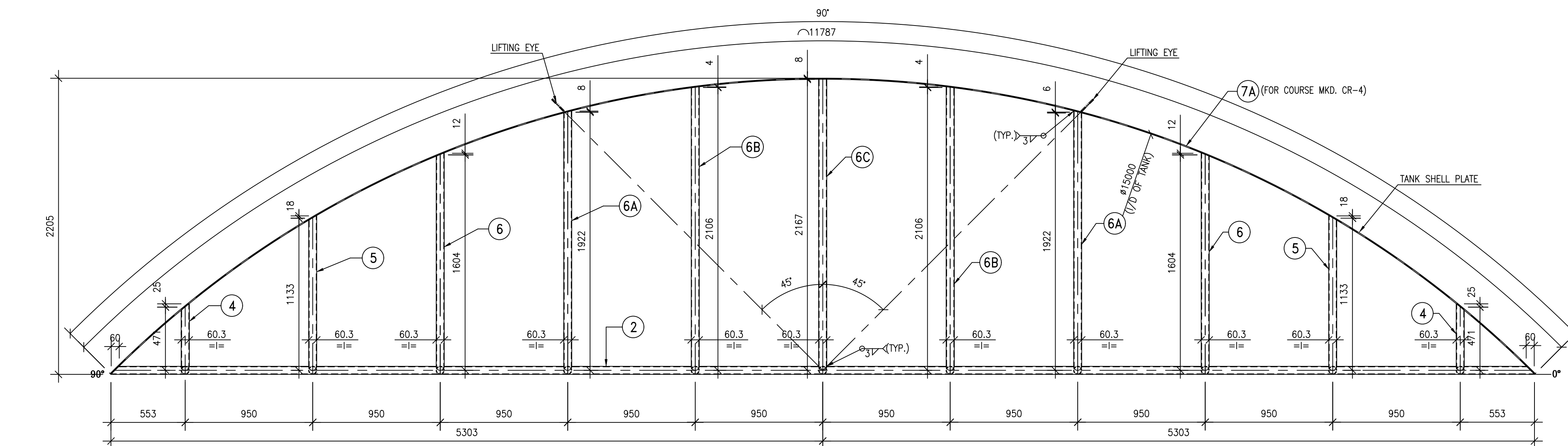
THIS DRAWING SHALL BE READ ALONG WITH
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0-FW-742-00684
0-FW-742-00685
0-FW-742-00687

SHEET 4 OF 5

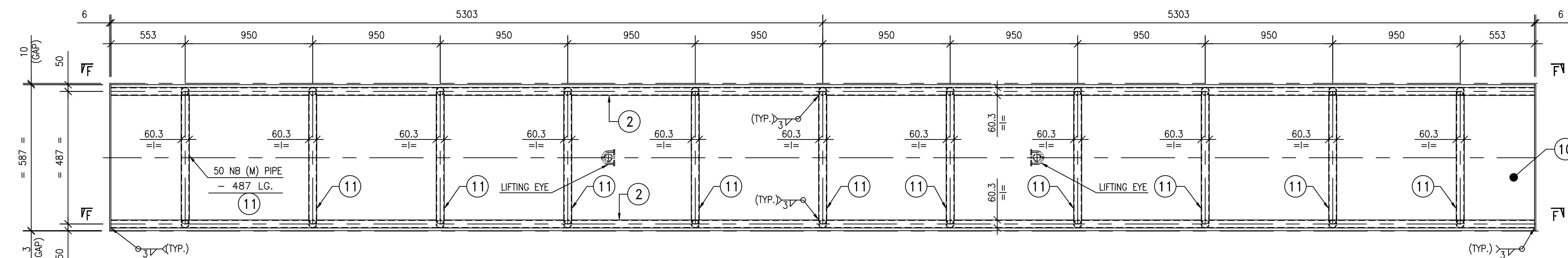
TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		NAME		SIGN		DATE		NO. OF VAR.	
BHARAT HEAVY ELECTRICALS LTD.		C.G.		M.K. NAHAK		24/12/18		24/12/18	
UNIT: BOILER AUXILIARIES PLANT.		C.G.		M.K. NAHAK		24/12/18		24/12/18	
DEPT		GRADE OF		SCALE		WEIGHT (KG.)		REF. TO ASSY/OLD DRG.	
CODE 862		UNTOLDIM		PR.A2.500		-		-	
TITLE		LIMESTONE SLURRY STORAGE TANK		DETAIL OF BASE PLATE MKD. RP-1 FOR LIMESTONE SLURRY STORAGE TANK		CARD CODE		DRAWING NO.	
U 01		0-FW-742-00686		00		REV		-	



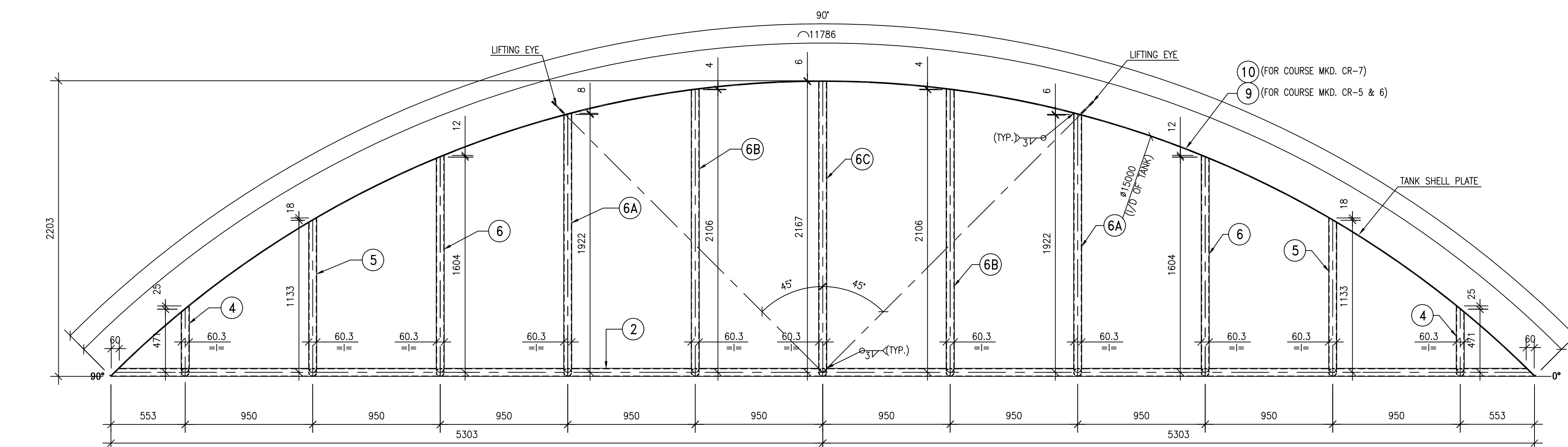
TRANSPORT STIFFENER ARRANGEMENT FOR COURSE MKD. CR-4
(REQD. 4 NOS.)



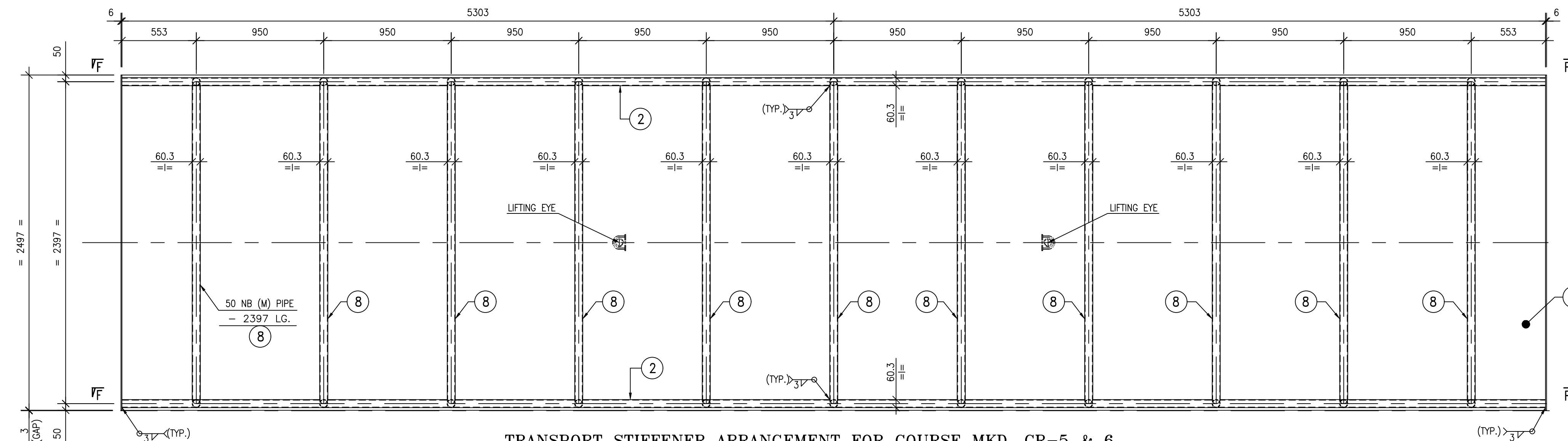
PLAN E-E
(SCALE-1:20)



TRANSPORT STIFFENER ARRANGEMENT FOR COURSE MKD. CR-7
(REQD. 4 NOS.)



PLAN F-F
(SCALE-1:20)



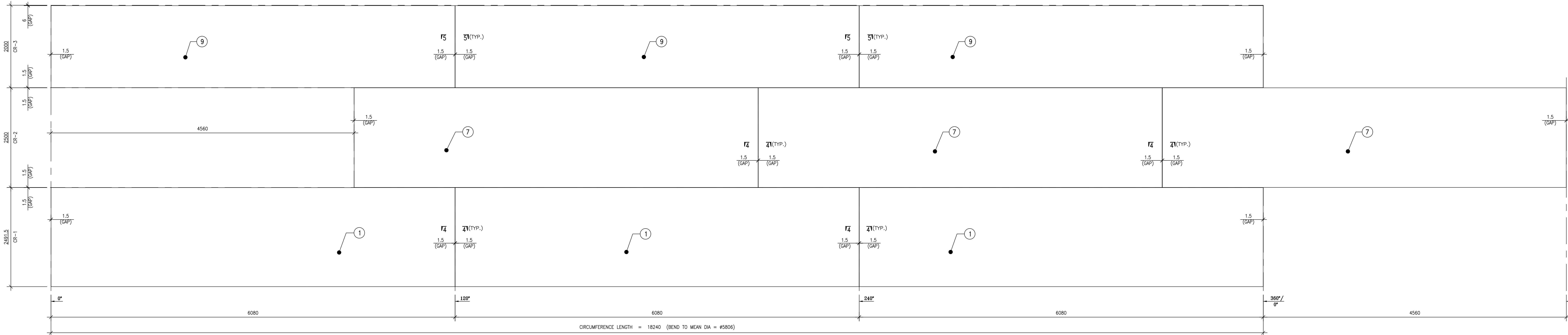
TRANSPORT STIFFENER ARRANGEMENT FOR COURSE MKD. CR-5 & 6
(REQD. 4 NOS.)

BILL OF MATERIALS									
ERECTION MKD.	ITEM NO.	SECTION	LENGTH IN mm.	NOS. REQD.	UNIT WT. (Kg.)	TOTAL WT. (Kg.)	QTY. REQD.	ERE. MKD. WT. (Kg.)	REMARKS
CR-1	1	PL 2491.5x16	11790.5	4	125.60	14758.52			
	2	50 NB (M) PIPE	10606	8	5.03	426.79			
	3	50 NB (M) PIPE	2391.5	44	5.03	529.29			
	4	50 NB (M) PIPE	496	16	5.03	39.92			
	5	50 NB (M) PIPE	1151	16	5.03	92.63			
	6	50 NB (M) PIPE	1616	16	5.03	130.06			
	6A	50 NB (M) PIPE	1930	16	5.03	155.33			
	6B	50 NB (M) PIPE	2110	16	5.03	169.81			
	6C	50 NB (M) PIPE	2167	8	5.03	87.20			
	12	PL 2000x8	2000	1	62.80	251.20			
	13	PL 2364x8	6575	20	62.80	19022.38			
	14	PL 282x16	500	120	125.60	2125.15			
	15	PL 150x40	501	60	314.00	1415.83			
	16	PL 120x8	120	60	62.80	54.26			
						39756.36	2	79516.72	
CR-2	1A	PL 2497x12	11787	4	94.20	11090.03			
	2	50 NB (M) PIPE	10606	8	5.03	426.79			
	3	50 NB (M) PIPE	2397	44	5.03	530.50			
	4	50 NB (M) PIPE	496	16	5.03	39.92			
	5	50 NB (M) PIPE	1151	16	5.03	92.63			
	6	50 NB (M) PIPE	1616	16	5.03	130.06			
	6A	50 NB (M) PIPE	1930	16	5.03	155.33			
	6B	50 NB (M) PIPE	2110	16	5.03	169.81			
	6C	50 NB (M) PIPE	2167	8	5.03	87.20			
CR-3	7	PL 2497x10	11786	4	78.50	9240.91			
	2	50 NB (M) PIPE	10606	8	5.03	426.79			
	3	50 NB (M) PIPE	2397	44	5.03	530.50			
	4	50 NB (M) PIPE	496	16	5.03	39.92			
	5	50 NB (M) PIPE	1151	16	5.03	92.63			
	6	50 NB (M) PIPE	1616	16	5.03	130.06			
	6A	50 NB (M) PIPE	1930	16	5.03	155.33			
	6B	50 NB (M) PIPE	2110	16	5.03	169.81			
	6C	50 NB (M) PIPE	2167	8	5.03	87.20			
CR-4	7A	PL 2497x8	11784	4	62.80	7391.47			
	2	50 NB (M) PIPE	10606	8	5.03	426.79			
	3	50 NB (M) PIPE	2397	44	5.03	530.50			
	4	50 NB (M) PIPE	496	16	5.03	39.92			
	5	50 NB (M) PIPE	1151	16	5.03	92.63			
	6	50 NB (M) PIPE	1616	16	5.03	130.06			
	6A	50 NB (M) PIPE	1930	16	5.03	155.33			
	6B	50 NB (M) PIPE	2110	16	5.03	169.81			
	6C	50 NB (M) PIPE	2167	8	5.03	87.20			
CR-5	9	PL 2497x6	11783	4	47.10	5543.13			
	2	50 NB (M) PIPE	10606	8	5.03	426.79			
	3	50 NB (M) PIPE	2397	44	5.03	530.50			
	4	50 NB (M) PIPE	496	16	5.03	39.92			
	5	50 NB (M) PIPE	1151	16	5.03	92.63			
	6	50 NB (M) PIPE	1616	16	5.03	130.06			
	6A	50 NB (M) PIPE	1930	16	5.03	155.33			
	6B	50 NB (M) PIPE	2110	16	5.03	169.81			
	6C	50 NB (M) PIPE	2167	8	5.03	87.20			
CR-6	9	PL 2497x6	11783	4	47.10	5543.13			
	2	50 NB (M) PIPE	10606	8	5.03	426.79			
	3	50 NB (M) PIPE	2397	44	5.03	530.50			
	4	50 NB (M) PIPE	496	16	5.03	39.92			
	5	50 NB (M) PIPE	1151	16	5.03	92.63			
	6	50 NB (M) PIPE	1616	16	5.03	130.06			
	6A	50 NB (M) PIPE	1930	16	5.03	155.33			
	6B	50 NB (M) PIPE	2110	16	5.03	169.81			
	6C	50 NB (M) PIPE	2167	8	5.03	87.20			
CR-7	10	PL 587x6	11783	4	47.10	1303.09			
	2	50 NB (M) PIPE	10606	8	5.03	426.79			
	11	50 NB (M) PIPE	487	44	5.03	107.78			
	4	50 NB (M) PIPE	496	16	5.03	39.92			
	5	50 NB (M) PIPE	1151	16	5.03	92.63			
	6	50 NB (M) PIPE	1616	16	5.03	130.06			
	6A	50 NB (M) PIPE	1930	16	5.03	155.33			
	6B	50 NB (M) PIPE	2110	16	5.03	169.81			
	6C	50 NB (M) PIPE	2167	8	5.03	87.20			
CA-1	17	L 75X75XB	7900	6	6.80	322.32			
						2512.61	2	5025.21	
WG-1 CP-1 RP-1	18	PL 2473x8	6562	20	62.80	20382.15			
						322.32	2	644.64	
	19	PL 2204x8	2204	1	62.80	305.06			
						20382.15	2	40784.30	
	20	L 150X150X12	7938	6	27.30	1300.24			
						305.06	2	610.12	
						1300.24	2	2600.49	
GRAND TOTAL WEIGHT = 223101.17 KG. = 223.101 T									

ABSTRACT			
SL. NO.	SECTION	TOTAL WT. (Kg.)	SPECIFICATION
1	L 150X150X12	2600.49	IS:2062,GR.E250
2	L 75X75XB	644.64	IS:2062,GR.E250
3	50 NB (M) PIPE	22003.41	IS:1161
4	PL 40 THK	2831.65	IS:2062,GR.E250
5	PL 16 THK	33767.34	IS:2062,GR.E250
6	PL 12 THK	22180.06	IS:2062,GR.E250
7	PL 10 THK	18481.82	IS:2062,GR.E250
8	PL 8 THK	95813.05	IS:2062,GR.E250
9	PL 6 THK	24778.72	IS:2062,GR.E250
GRAND TOTAL WEIGHT = 223101.17 KG. = 223.101 T			

THIS DRAWING SHALL BE READ ALONG WITH
0-FW-742-00683
0-FW-742-00684
0-FW-742-00685
0-FW-742-00686

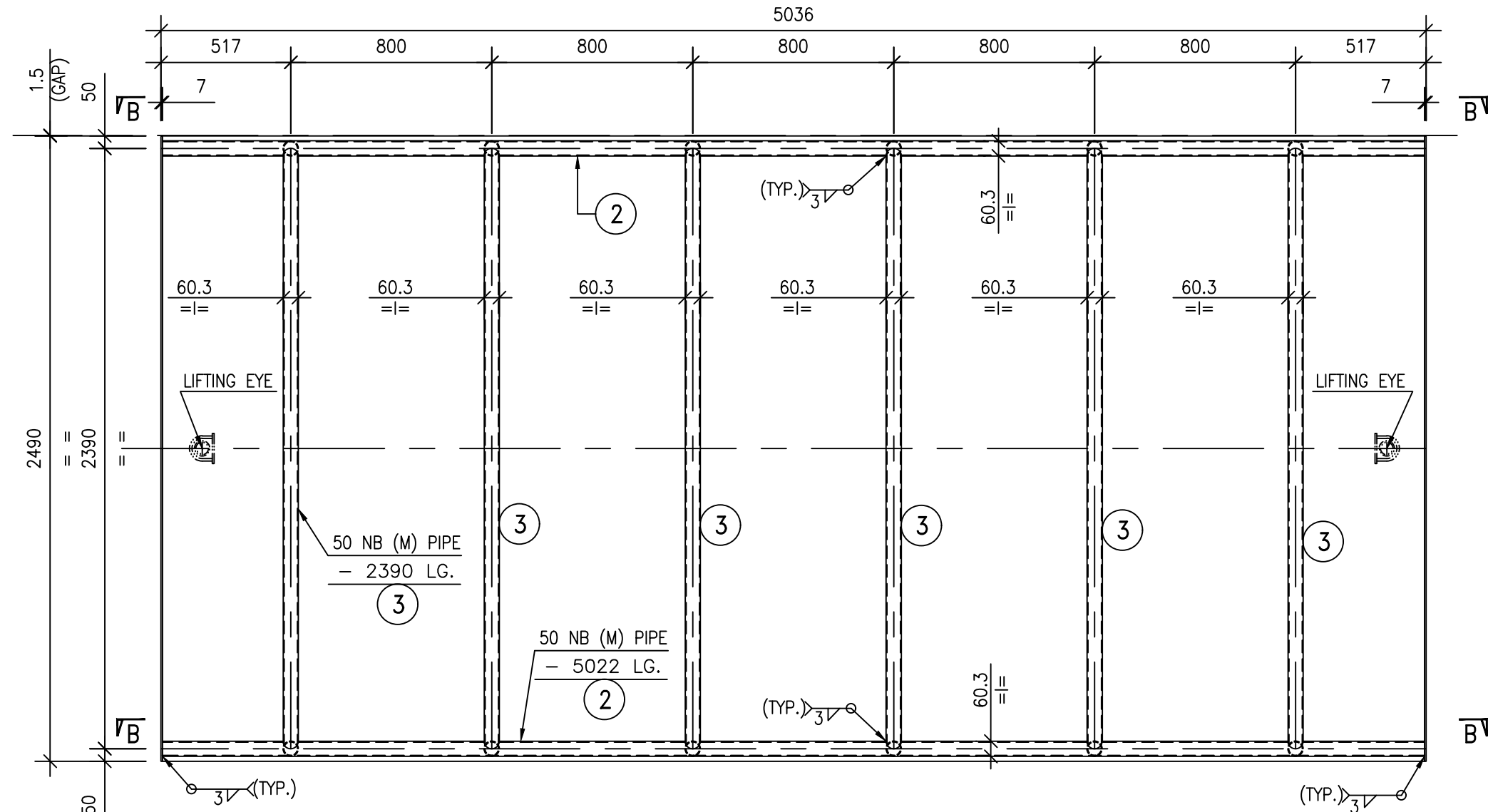
TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		DEPT. ACDS		GRADE OF UNITS/DIM		SCALE		WEIGHT (KG.)		REF. TO ASSY/OLD DRG.		REV. NO.		NO. OF PAGES	
Bharat Heavy Electricals Ltd.		862		PR. AG. 500		1:1		-		-		-		-	
LIMESTONE SLURRY STORAGE TANK		U 01		U 01		U 01		U 01		U 01		U 01		U 01	
DRAWING NO.		0-FW-742-00687		00		00		00		00		00		00	



DEVELOPMENT OF COURSE MKD. CR-1, CR-2 & CR-3

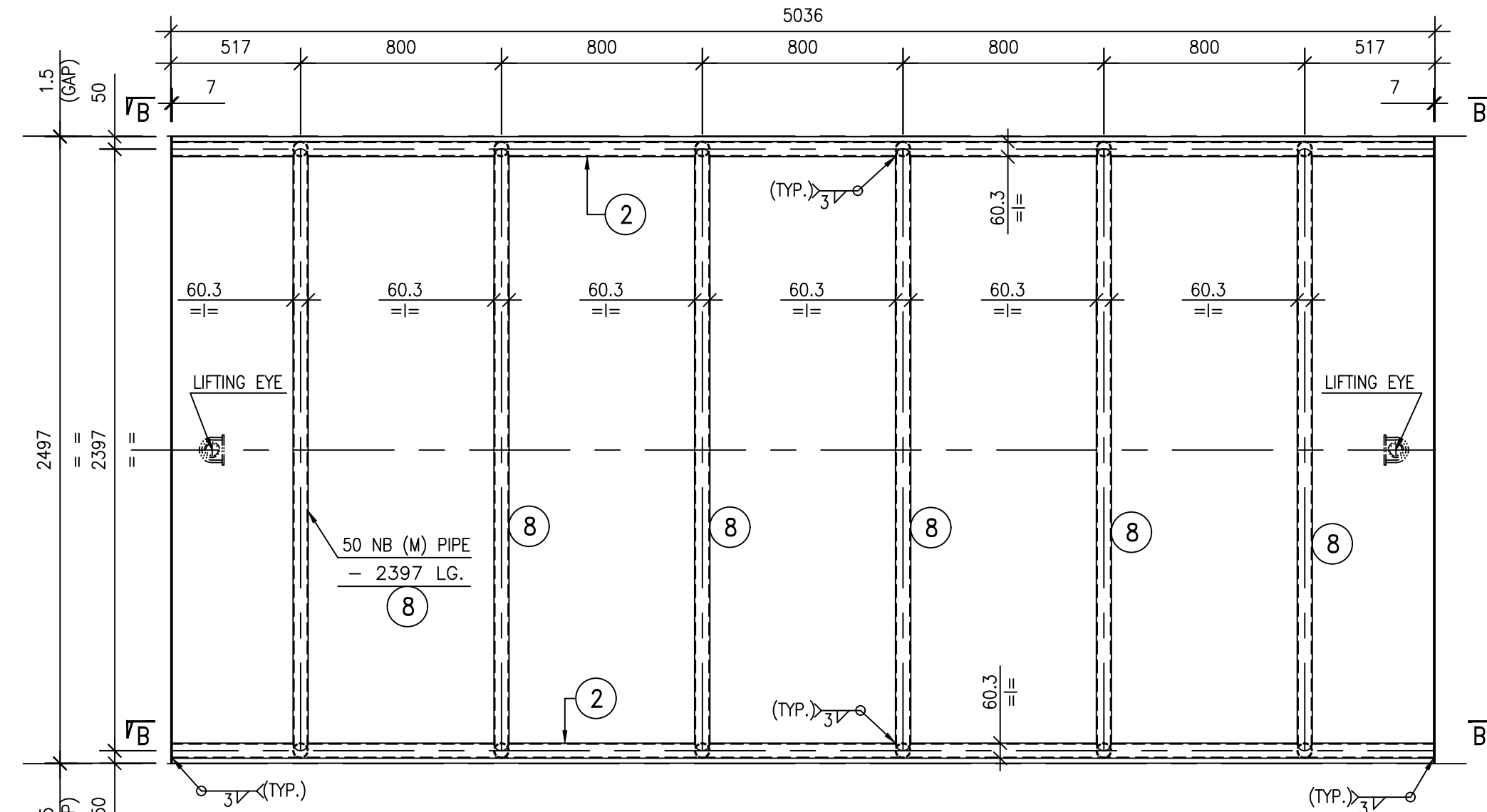
(REQD. 1 NO.)

(SCALE-1:20)



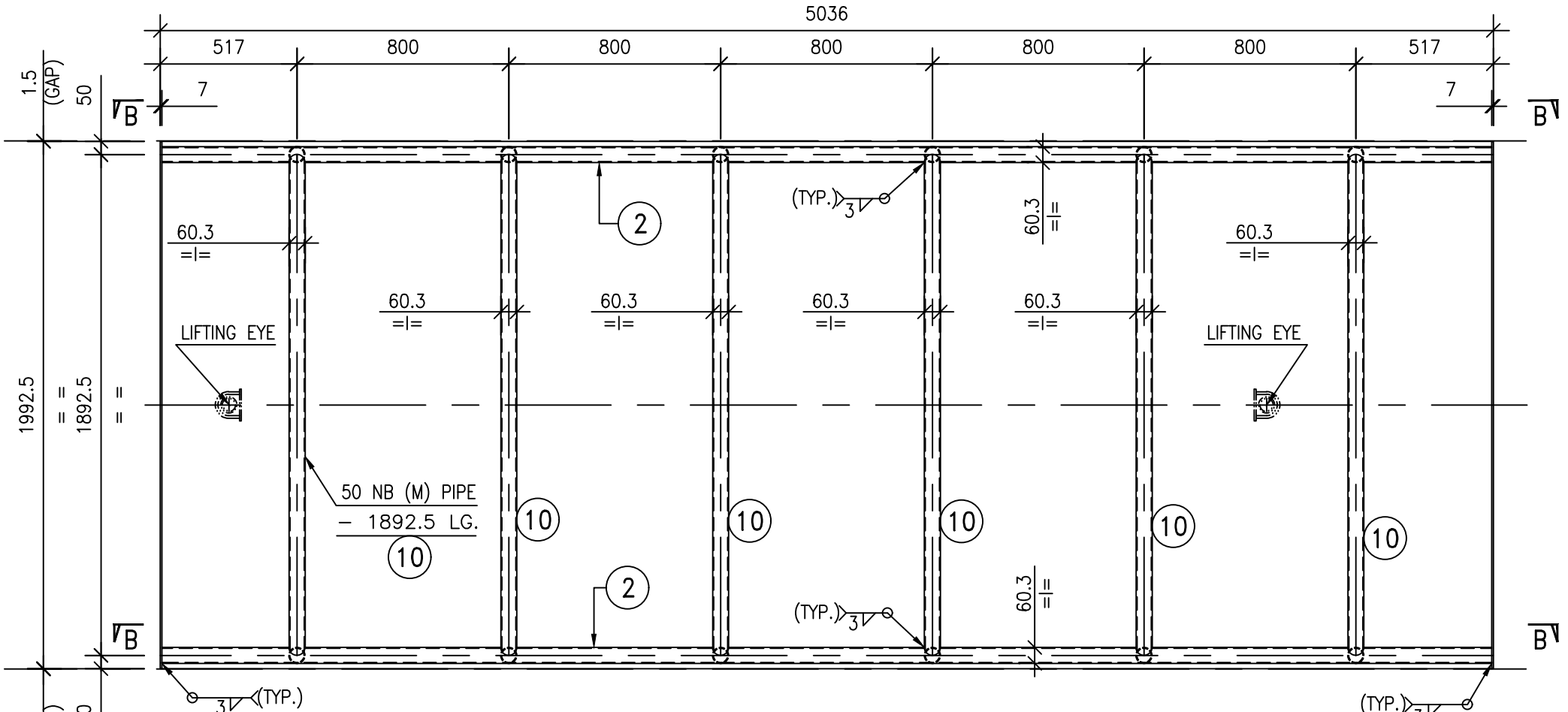
TRANSPORT STIFFENER ARRANGEMENT FOR COURSE MKD. CR-1

(REQD. 2 NOS.)



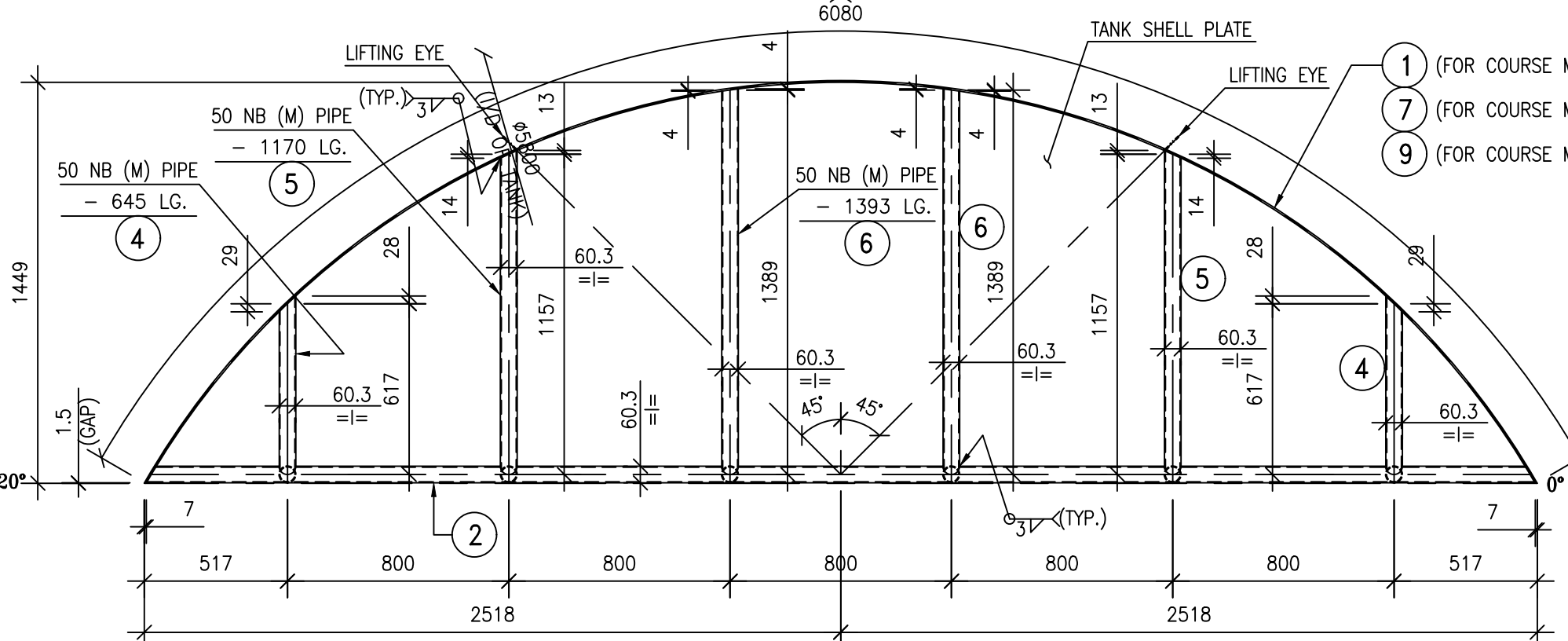
TRANSPORT STIFFENER ARRANGEMENT FOR COURSE MKD. CR-2

(REQD. 2 NOS.)



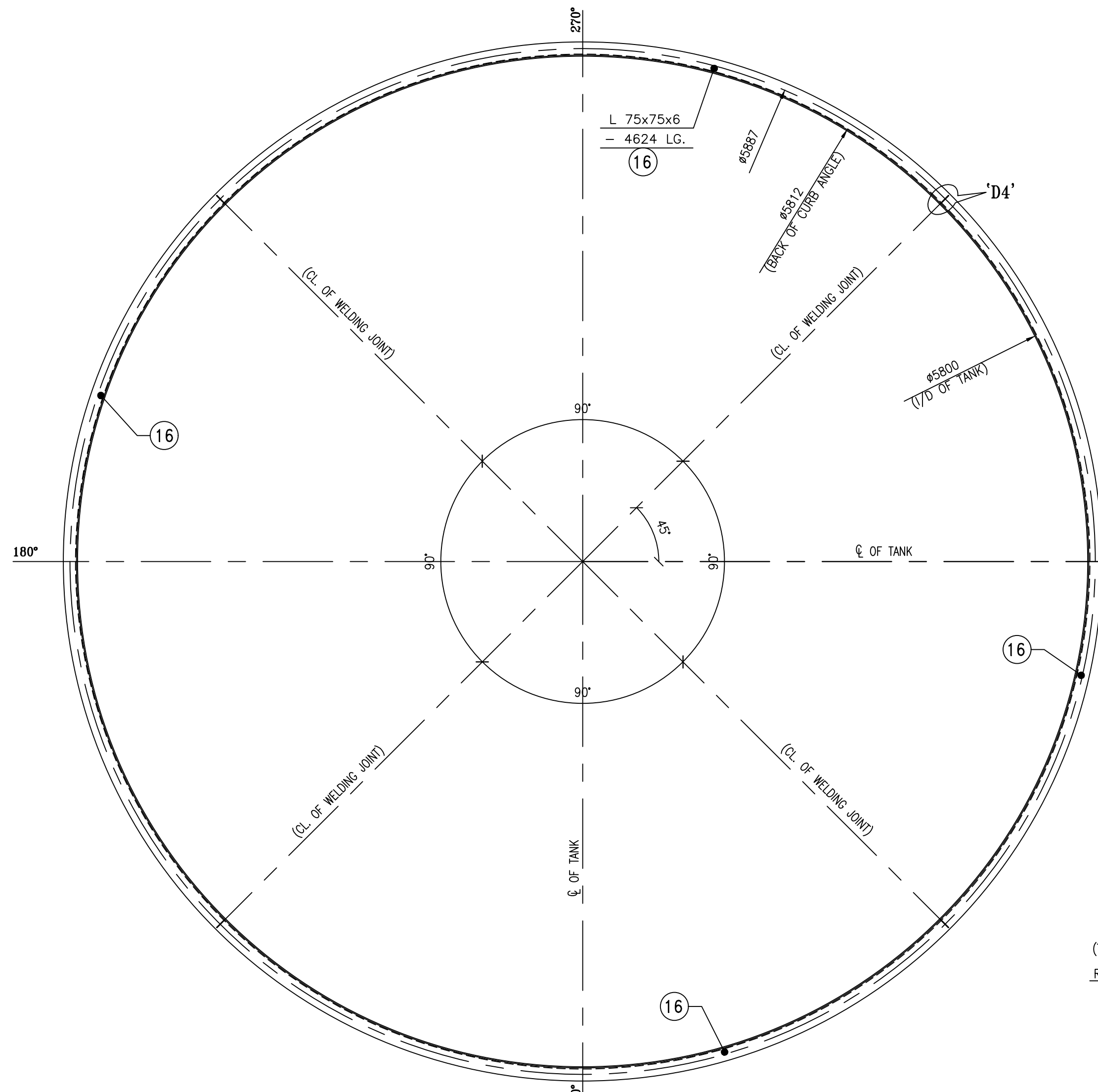
TRANSPORT STIFFENER ARRANGEMENT FOR COURSE MKD. CR-3

(REQD. 2 NOS.)



PLAN B-B

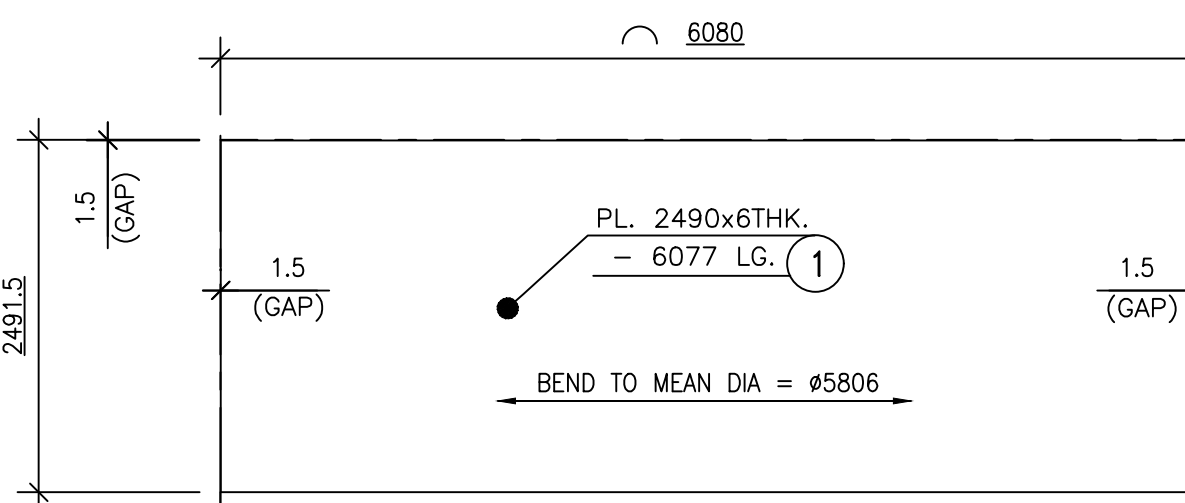
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DETAIL OF CURB ANGLE MKD. CA-1

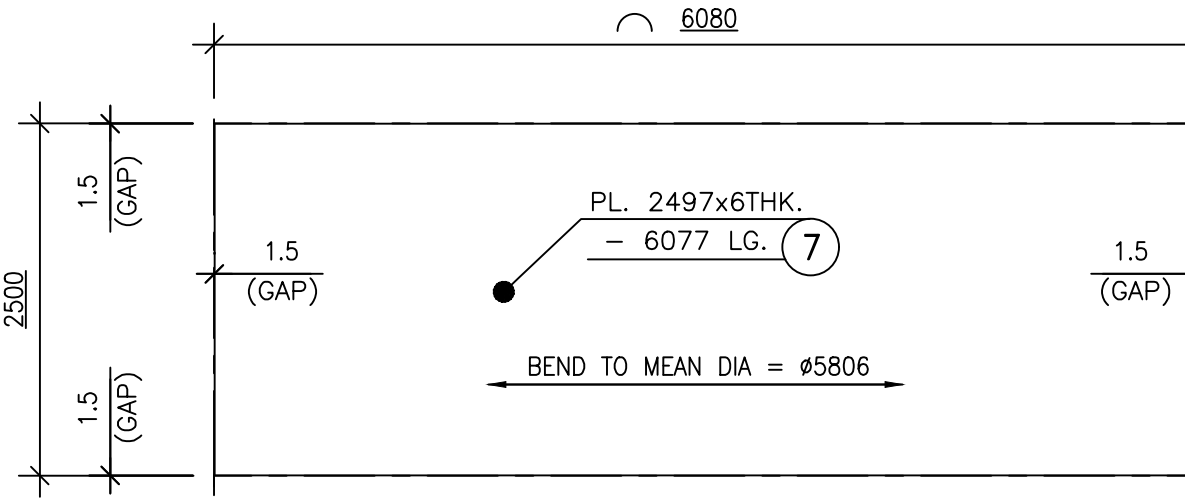
(REQD. 1 NO.)

(SCALE-1:20)



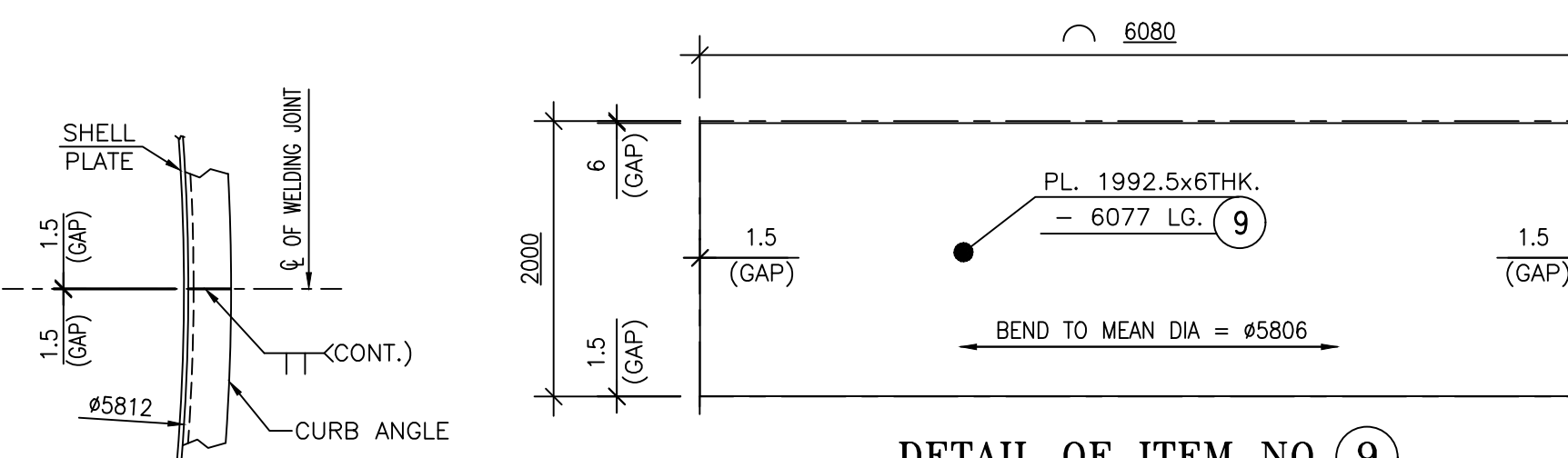
DETAIL OF ITEM NO. 1

(SCALE 1:20)



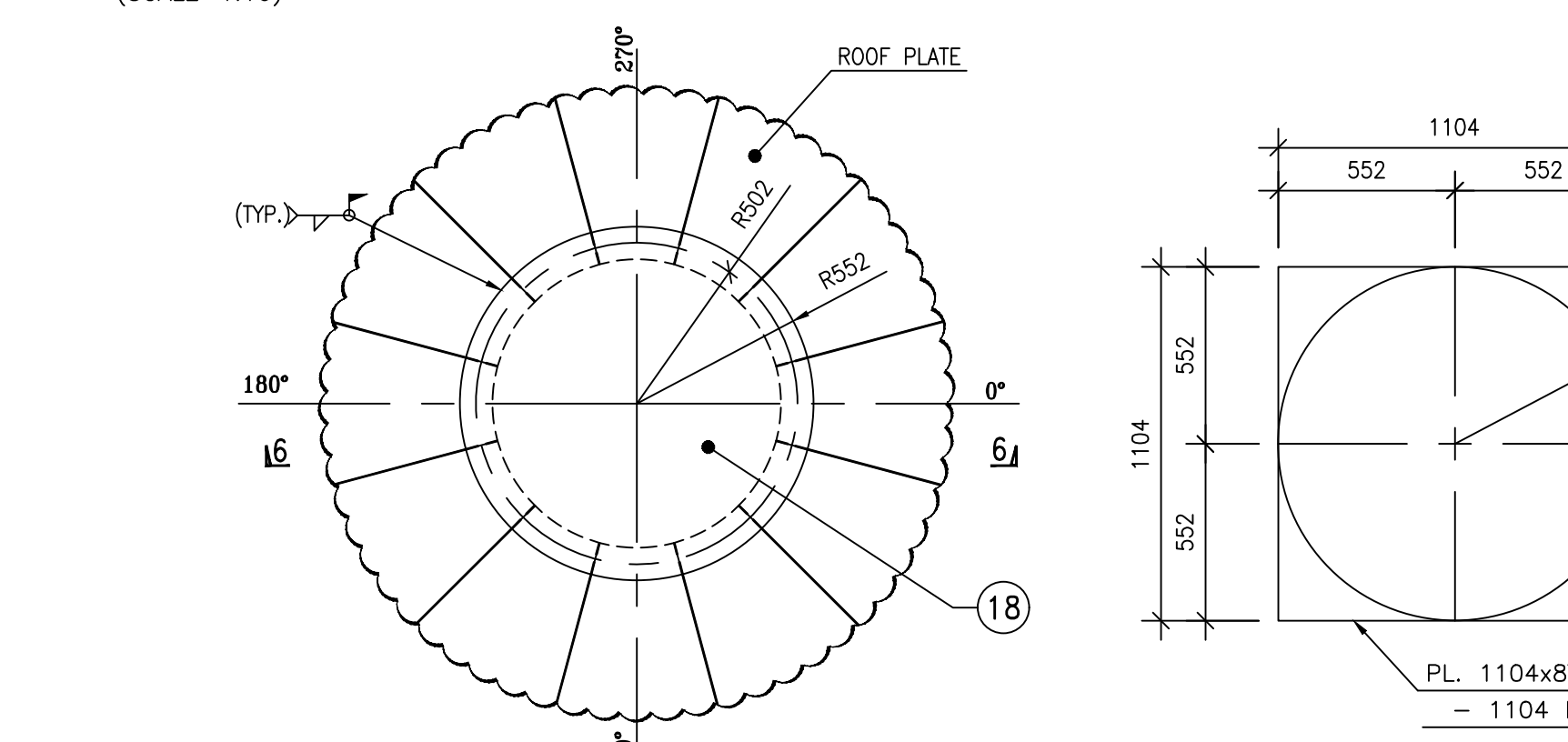
DETAIL OF ITEM NO. 7

(SCALE 1:20)



DETAIL OF ITEM NO. 9

(SCALE 1:20)



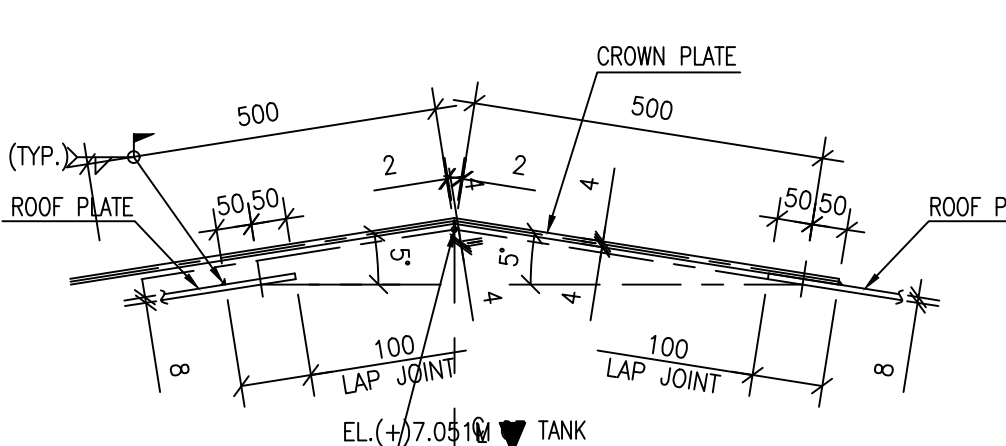
DEVELOPMENT OF CROWN PLATE MKD. CP-1

(REQD. 1 NO.)

(SCALE 1:20)

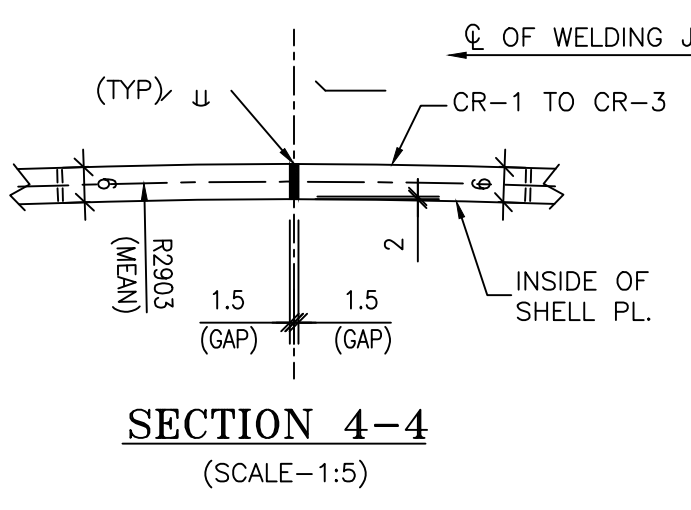
DETAIL OF ITEM NO. 18

(SCALE 1:20)



SECTION 6-6

(SCALE-1:5)



SECTION 4-4

(SCALE-1:5)

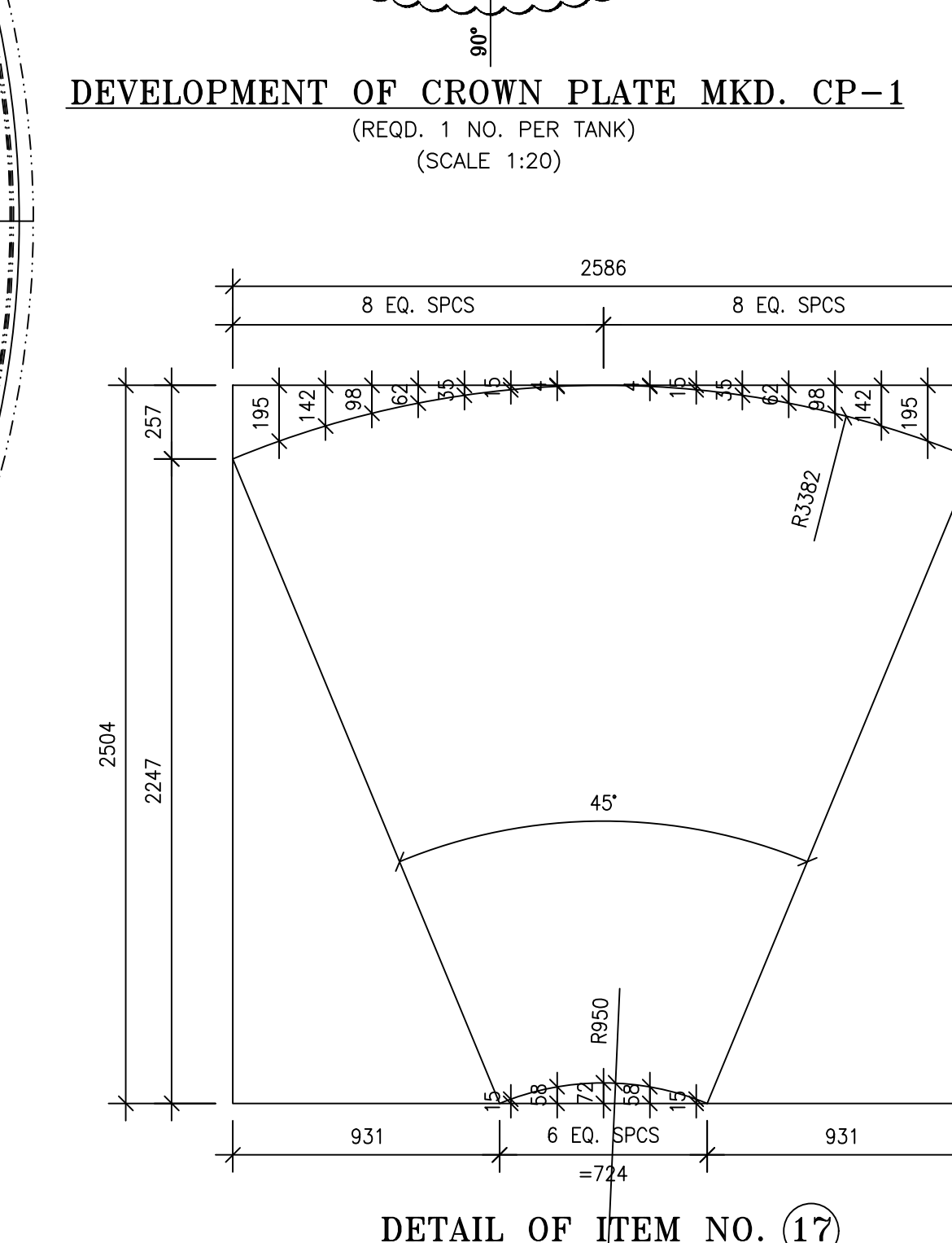
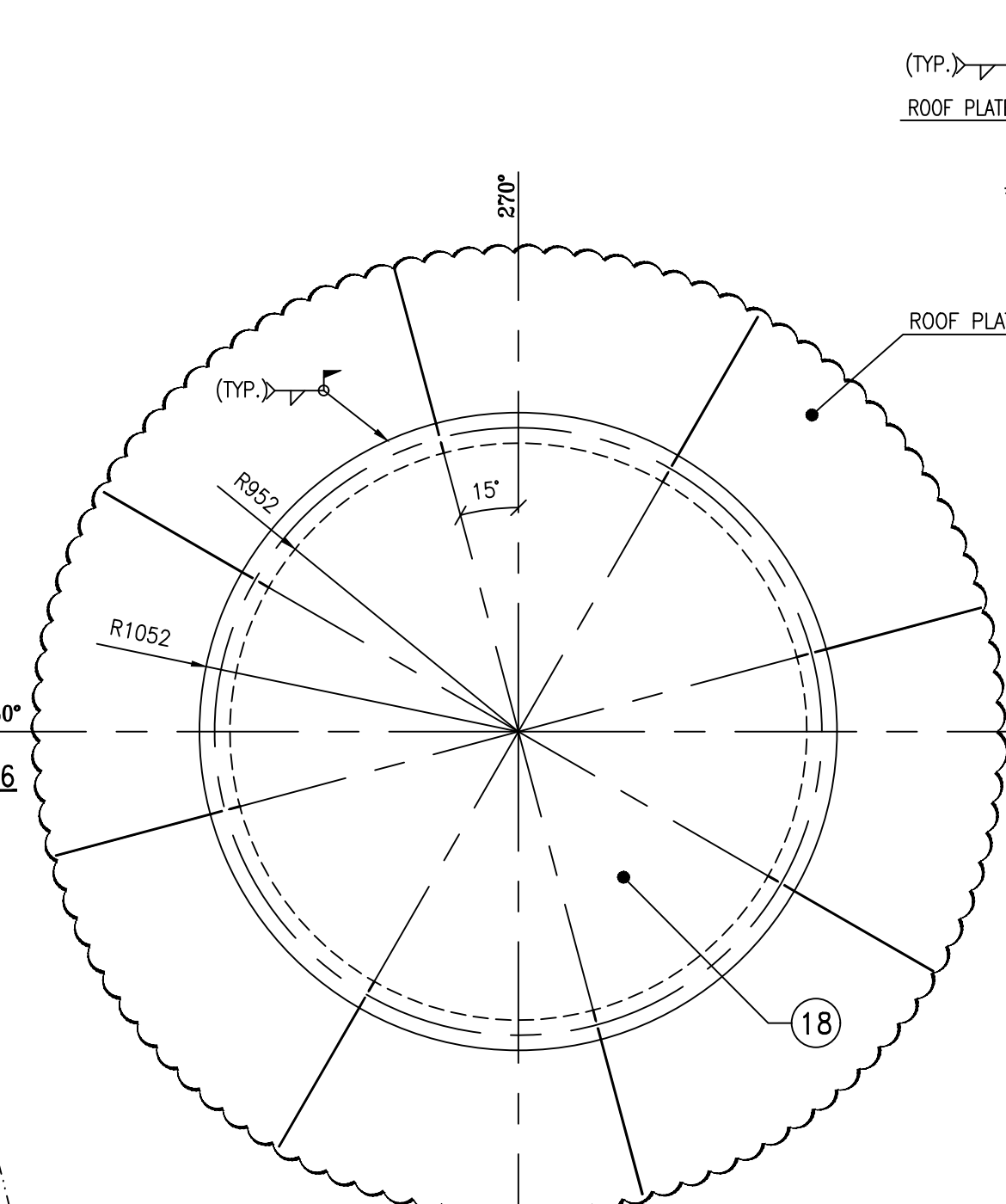
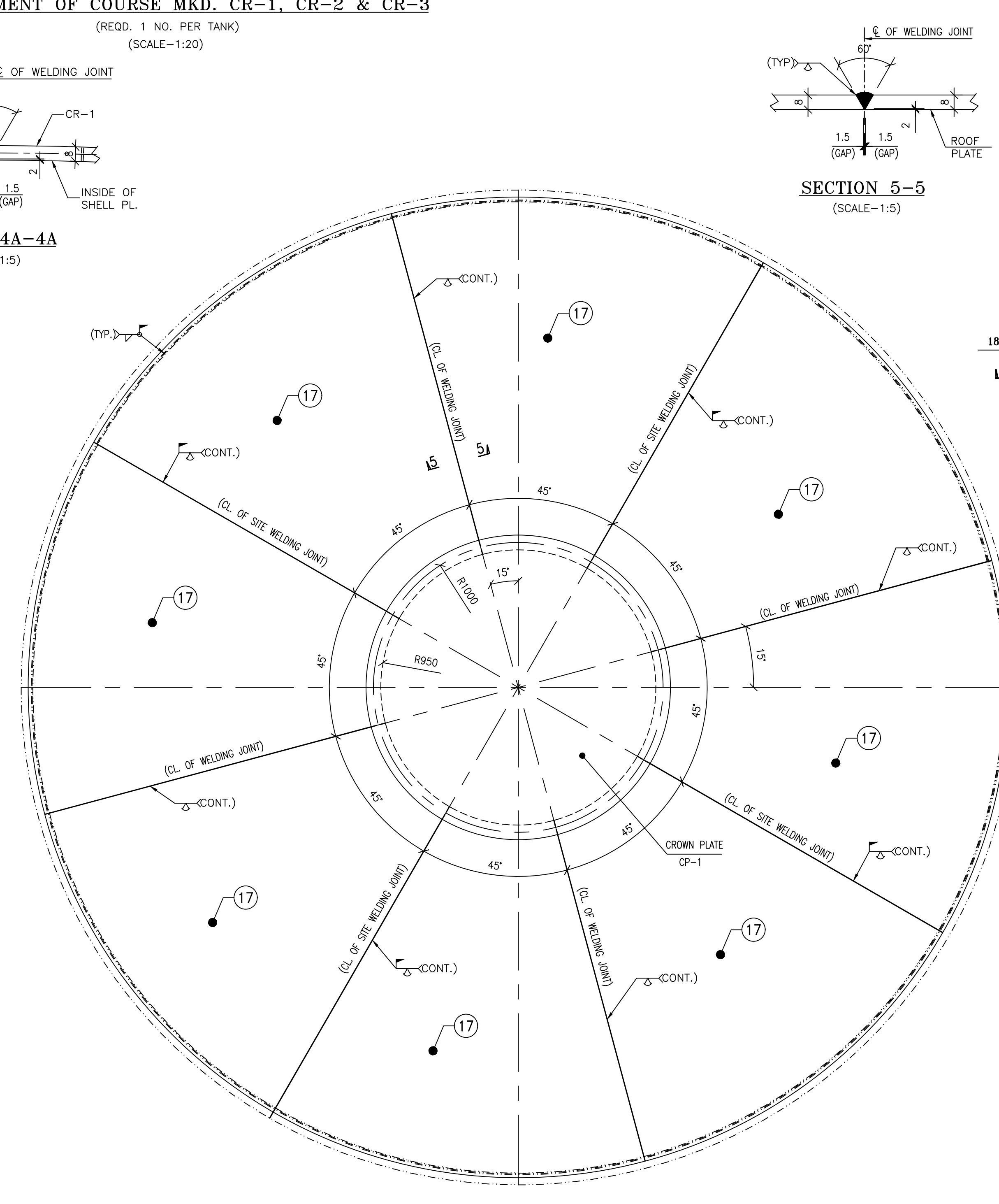
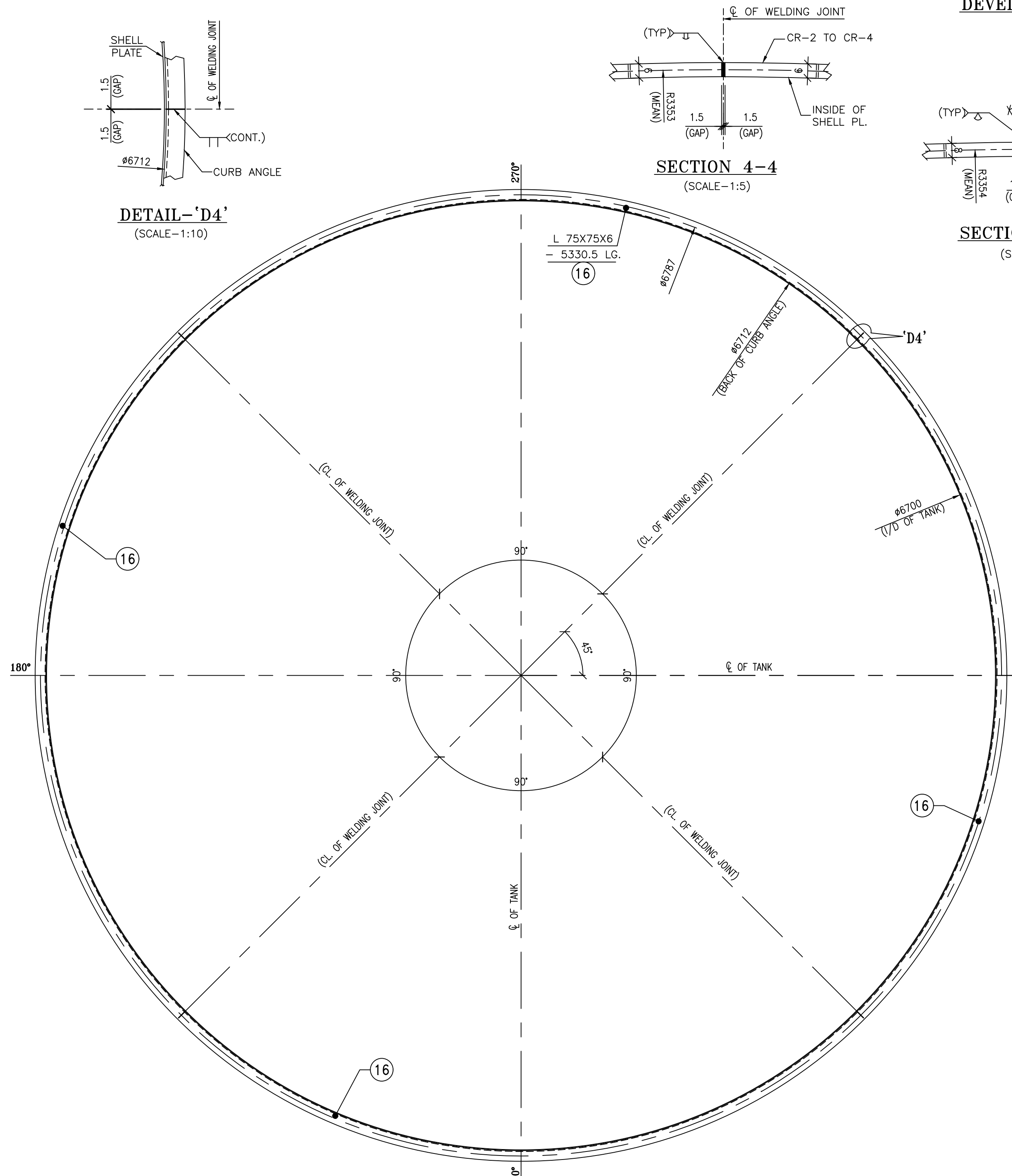
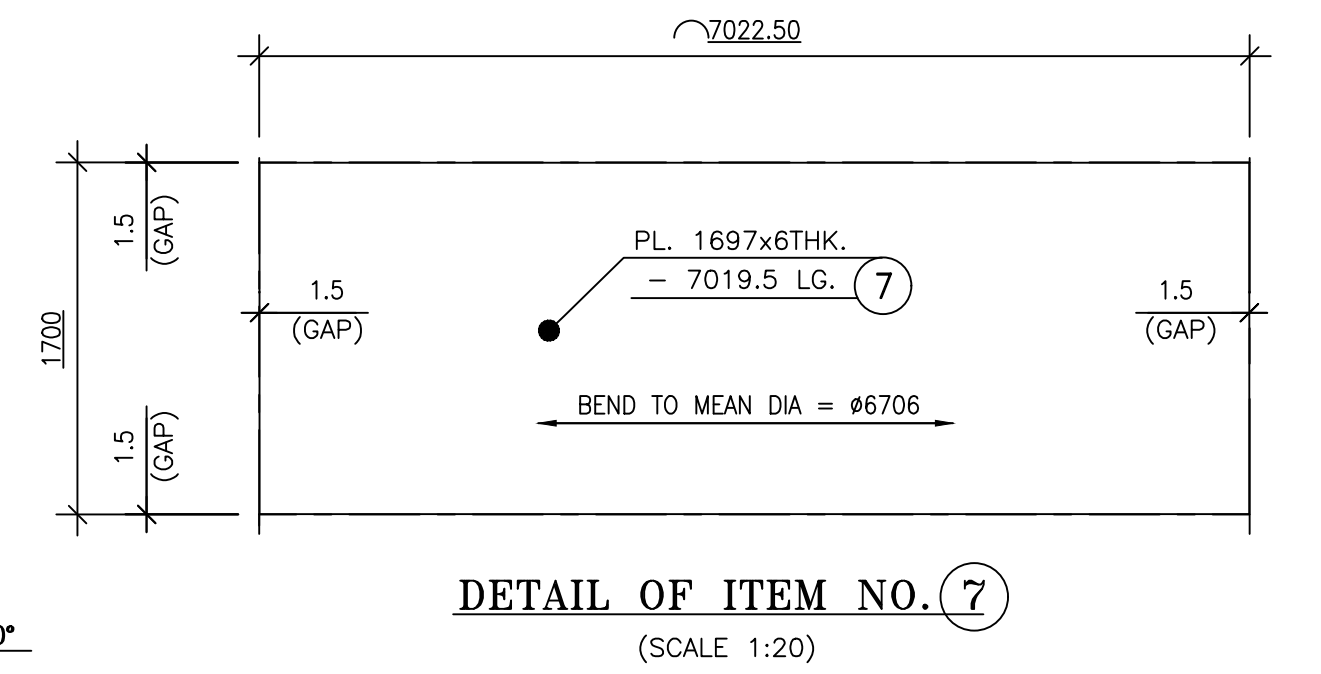
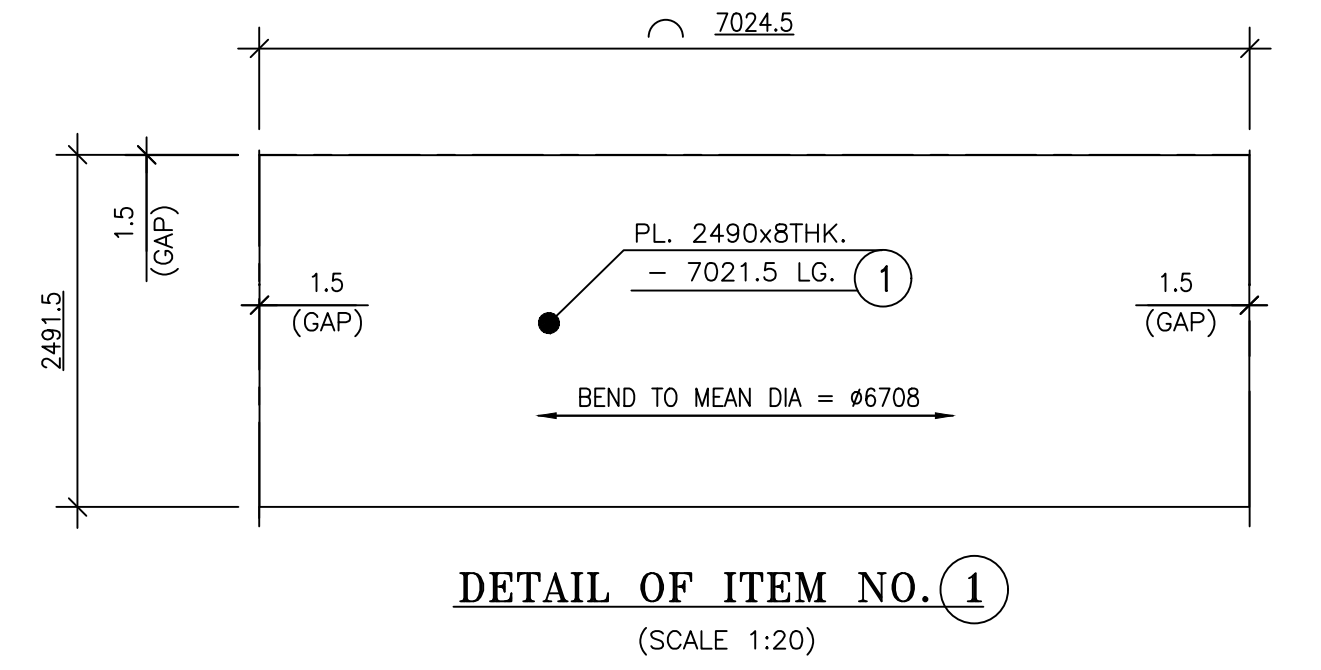
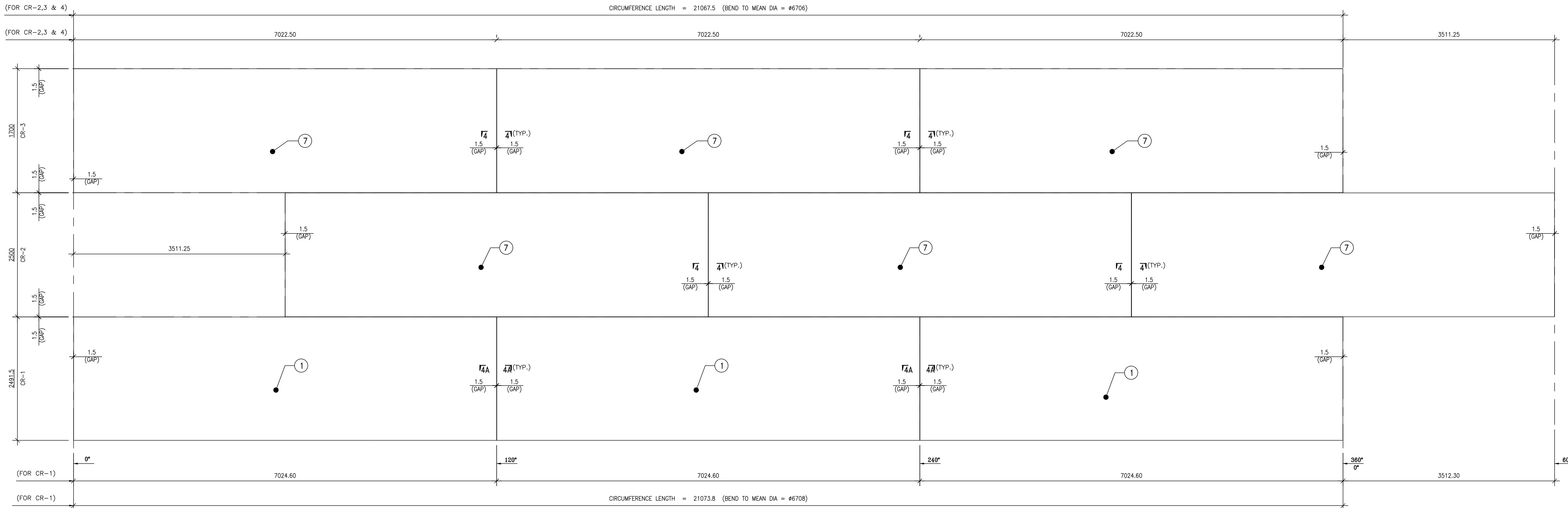
BILL OF MATERIALS							TOTAL WT. :		26764.72
ERECTION MKD.	ITEM NO.	SECTION	LENGTH IN mm.	NOS. REQD.	UNIT WT. (Kg.)	TOTAL WT. (Kg.)	QTY. REQD.	ERE. MKD. WT. (Kg.)	REMARKS
CR-1	1	PL 2490x6	9117	2	47.10	2138.47			
	2	50 NB (M) PIPE	5022	4	5.03	101.04			
	3	50 NB (M) PIPE	2390	14	5.03	168.30			
	4	50 NB (M) PIPE	645	8	5.03	25.95			
	5	50 NB (M) PIPE	1170	8	5.03	47.08			
	6	50 NB (M) PIPE	1393	8	5.03	56.05			
	13	PL 306x8	500	24	62.80	230.60			
	14	PL 150x16	502	12	125.60	113.49			
	15	PL 120x8	120	12	62.80	10.85			
						2891.85	2	5783.69	
CR-2	7	PL 2497x6	9117	2	47.10	2144.48			
	2	50 NB (M) PIPE	5022	4	5.03	101.04			
	8	50 NB (M) PIPE	2397	14	5.03	168.80			
	4	50 NB (M) PIPE	645	8	5.03	25.95			
	5	50 NB (M) PIPE	1170	8	5.03	47.08			
	6	50 NB (M) PIPE	1393	8	5.03	56.05			
CR-3	9	PL 1992.5x6	9117	2	47.10	1711.20			
	2	50 NB (M) PIPE	5022	4	5.03	101.04			
	10	50 NB (M) PIPE	1892.5	14	5.03	133.27			
	4	50 NB (M) PIPE	645	8	5.03	25.95			
	5	50 NB (M) PIPE	1170	8	5.03	47.08			
	6	50 NB (M) PIPE	1393	8	5.03	56.05			
BP-1						2074.60	2	4149.21	
	11	PL 2520x8	2953	6	62.80	2803.98			
CP-1 RP-1 CA-1	12	PL 1000x8	1000	1	62.80	62.80			
						2866.78	2	5733.56	
	16	L 75x75x6	4624	4	6.80	125.77			
						125.77	2	251.55	
	17	PL 2541x8	2928	6	62.80	2803.41			
						2803.41	2	5606.82	
	18	PL 1104x8	1104	1	62.80	76.54			
						76.54	2	153.08	
GRAND TOTAL WEIGHT = 26764.72 KG. = 26.765 T									

ABSTRACT			
SL. NO	SECTION	TOTAL WT. (Kg.)	SPECIFICATION
1	L 75x75x6	251.55	IS:2062.GR.E250
2	50 NB (M) PIPE	1511.61	IS:1161
3	PL 16 THK	226.98	IS:2062.GR.E250
4	PL 8 THK	11976.37	IS:2062.GR.E250
5	PL 6 THK	11988.29	IS:2062.GR.E250
TOTAL WEIGHT = 26764.72 KG.			

THIS DRAWING SHALL BE READ ALONG WITH
0-FW-748-00688

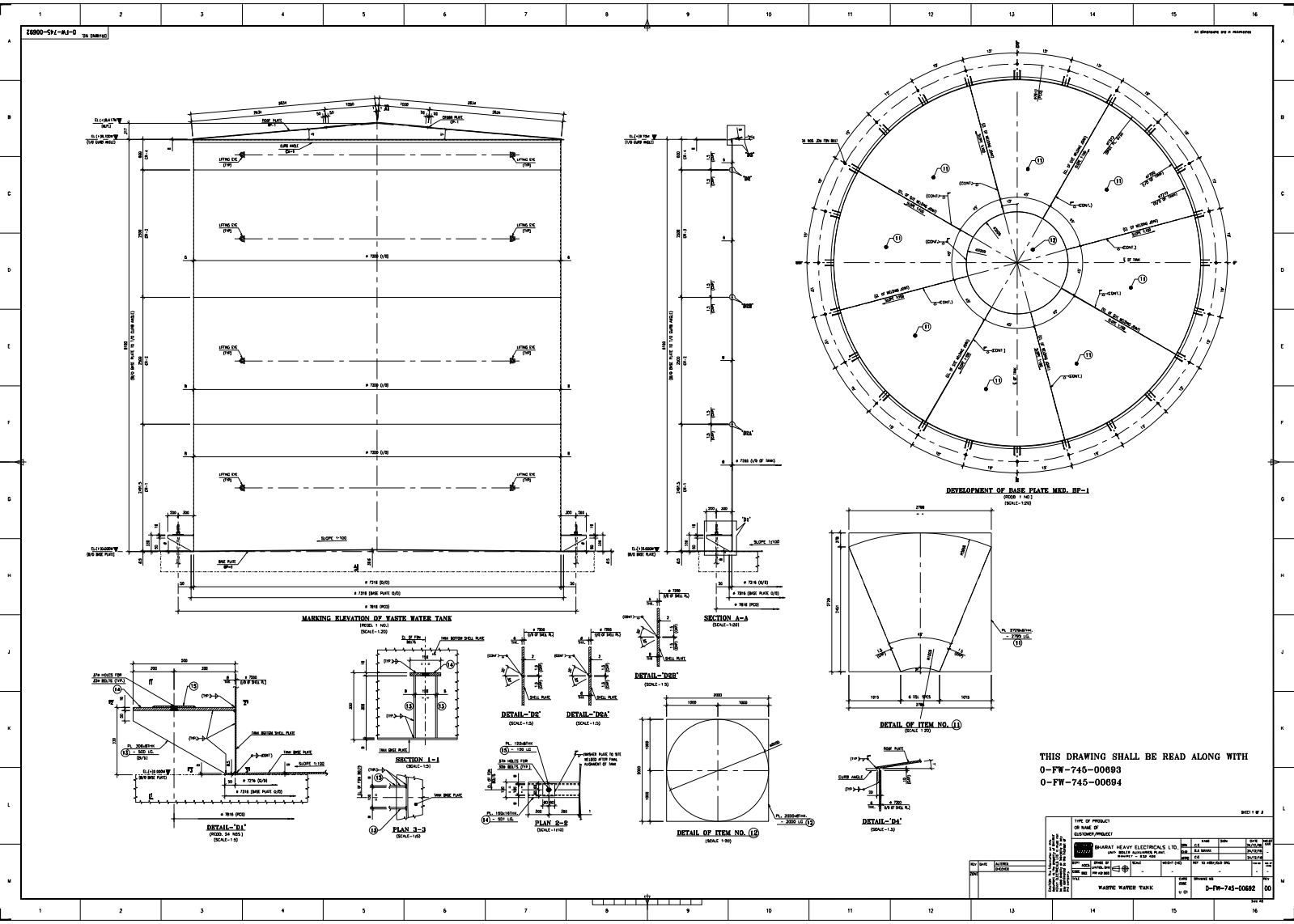
TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		Bharat Heavy Electricals Ltd.		UNIT: BOILER AUXILIARIES PLANT.		PROJECT: 68900-84Z-MJ-0		SIGN		DATE		NO. OF	
DEPT: ACQS		GRADE OF UNTOLOM		SCALE		WEIGHT (KG.)		REF. TO ASSY/OLD DRG.		REV. NO.		NO. OF	
CODE: 862		PRI. AG. 500		1:1		-		-		-		-	
TITLE		PROCESS WATER TANK		CARD CODE		DRAWING NO.		REV.		REV.		REV.	
				U 01		0-FW-748-00689							

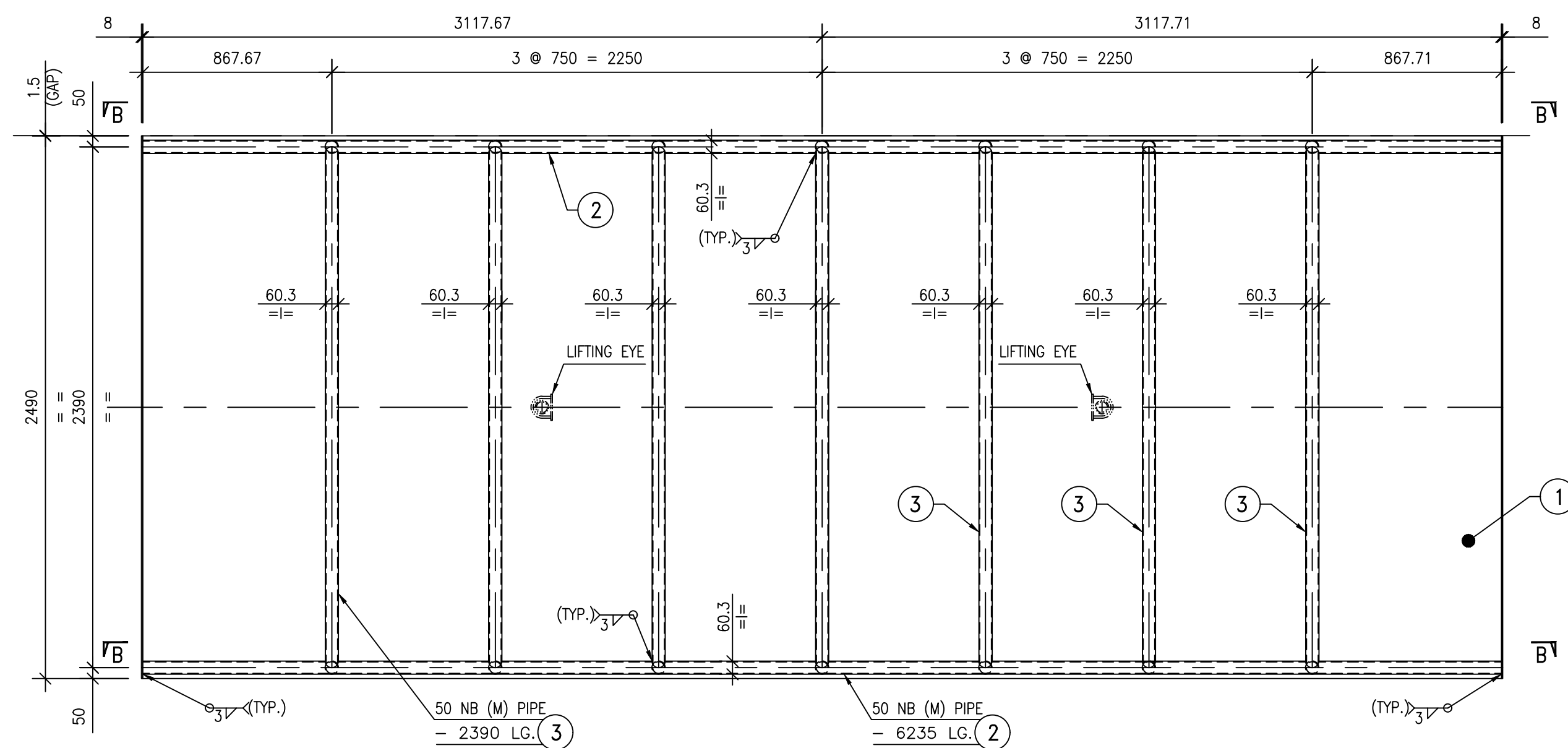
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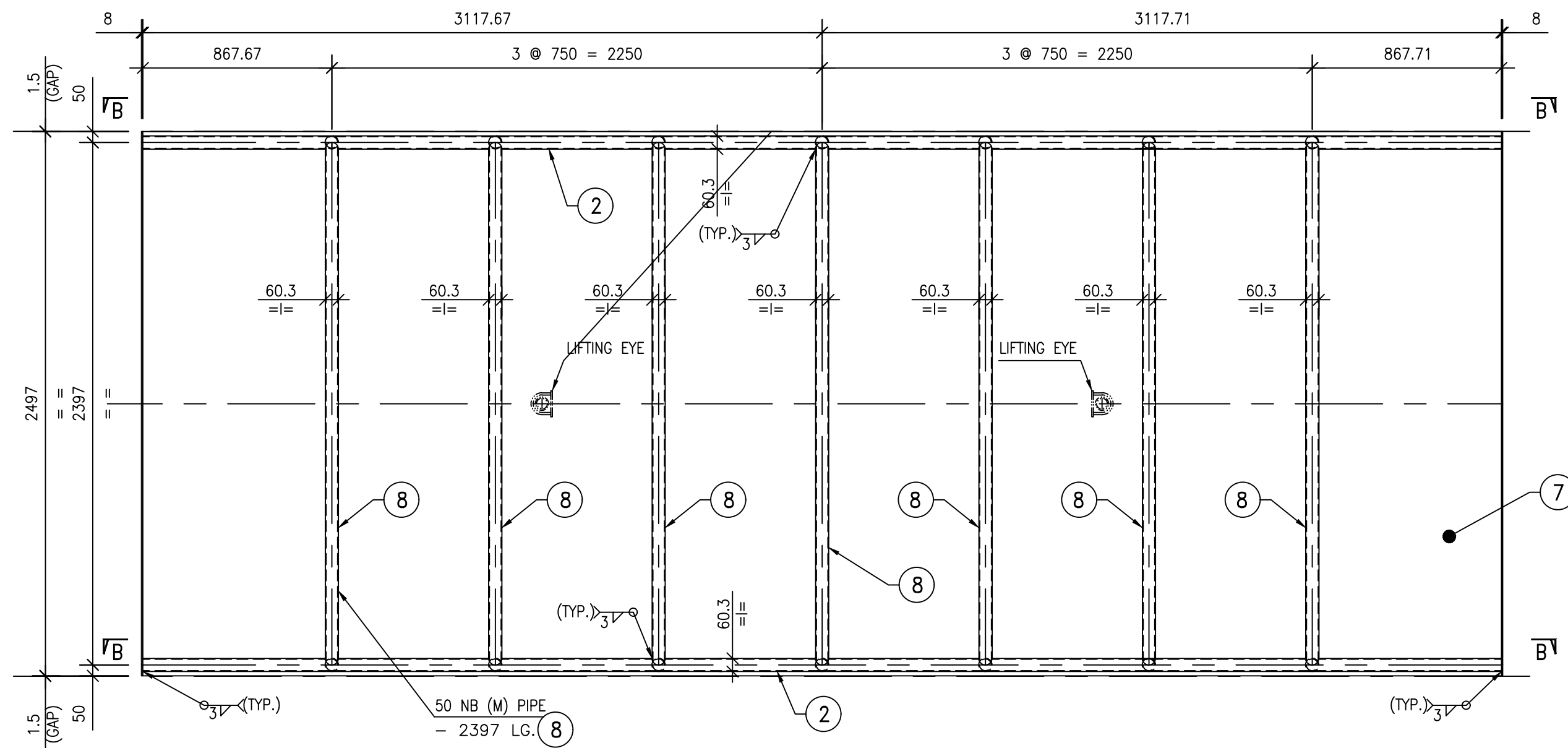
THIS DRAWING SHALL BE READ ALONG WITH
0-FW-747-00690
1-FW-747-00793

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		NAME		SIGN		DATE		NO. OF VAR.	
BHARAT HEAVY ELECTRICALS LTD.		C.G.		M.K. NAHAK		24/12/18		24/12/18	
UNIT: BOILER AUXILIARIES PLANT.		C.G.		M.K. NAHAK		24/12/18		24/12/18	
DEPT. ACQS		GRADE OF		SCALE		WEIGHT (KG.)		REF. TO ASSY/OLD DRG.	
CODE 862		UNTOLDIM		PR.A2.500		-		-	
TITLE		CARD		DRAWING NO.		REV		NO. OF REV.	
SECONDARY HYDROCYCLONE FEED TANK		U 01		0-FW-747-00691		00		00	

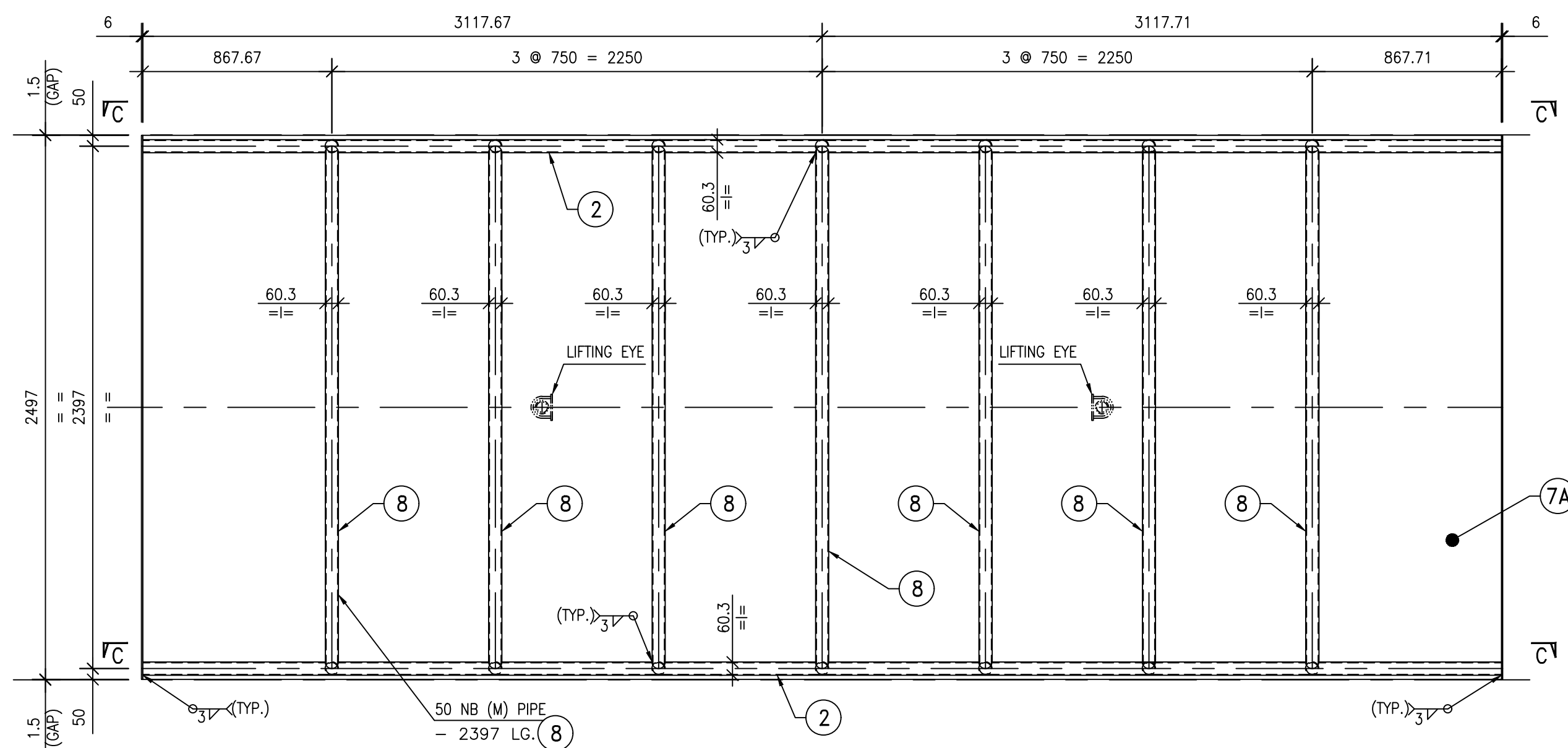




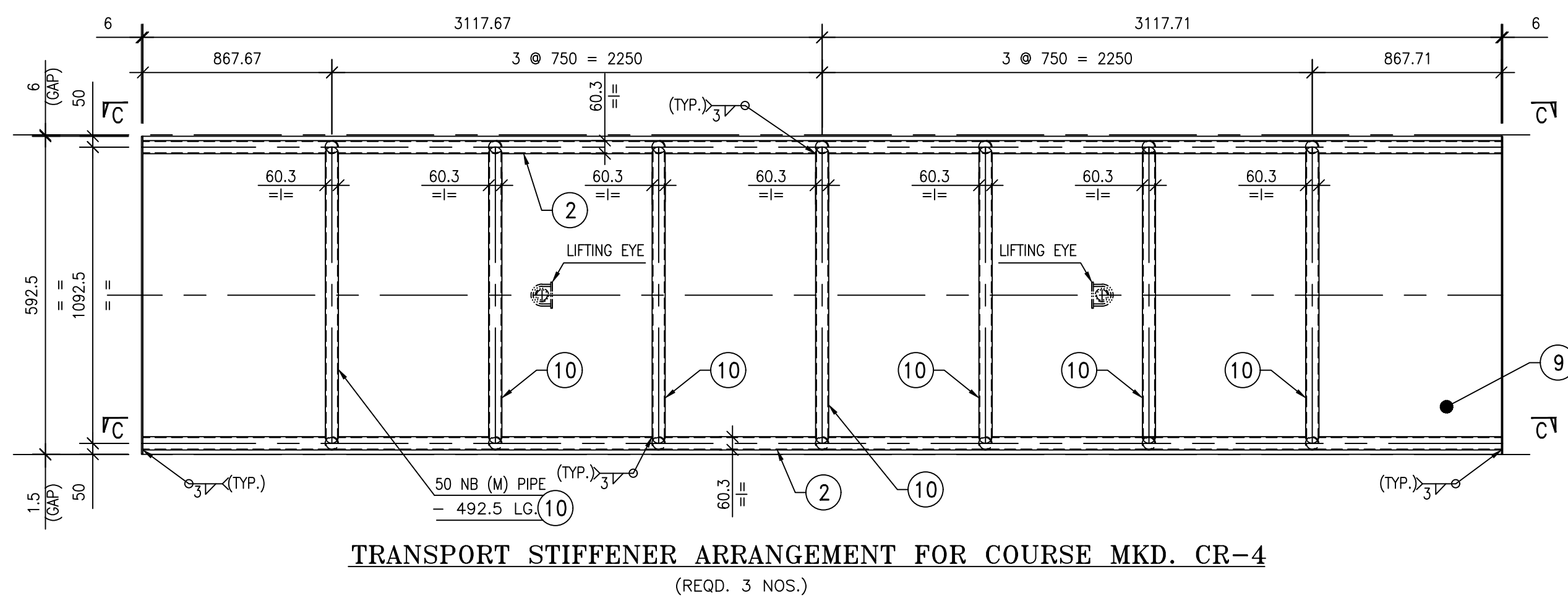
TRANSPORT STIFFENER ARRANGEMENT FOR COURSE MKD. CR-1
(REQD. 3 NOS.)



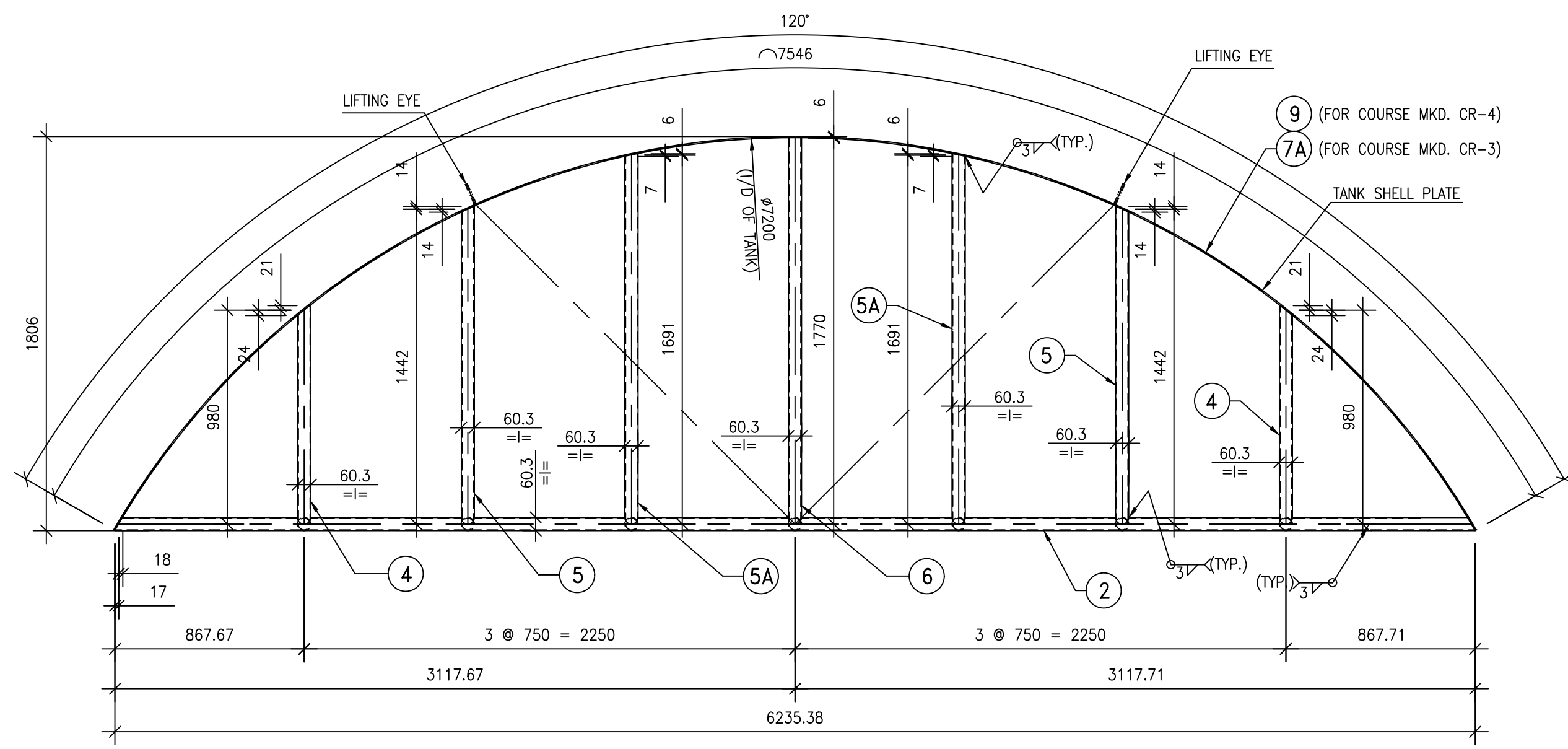
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(REQD. 3 NOS.)



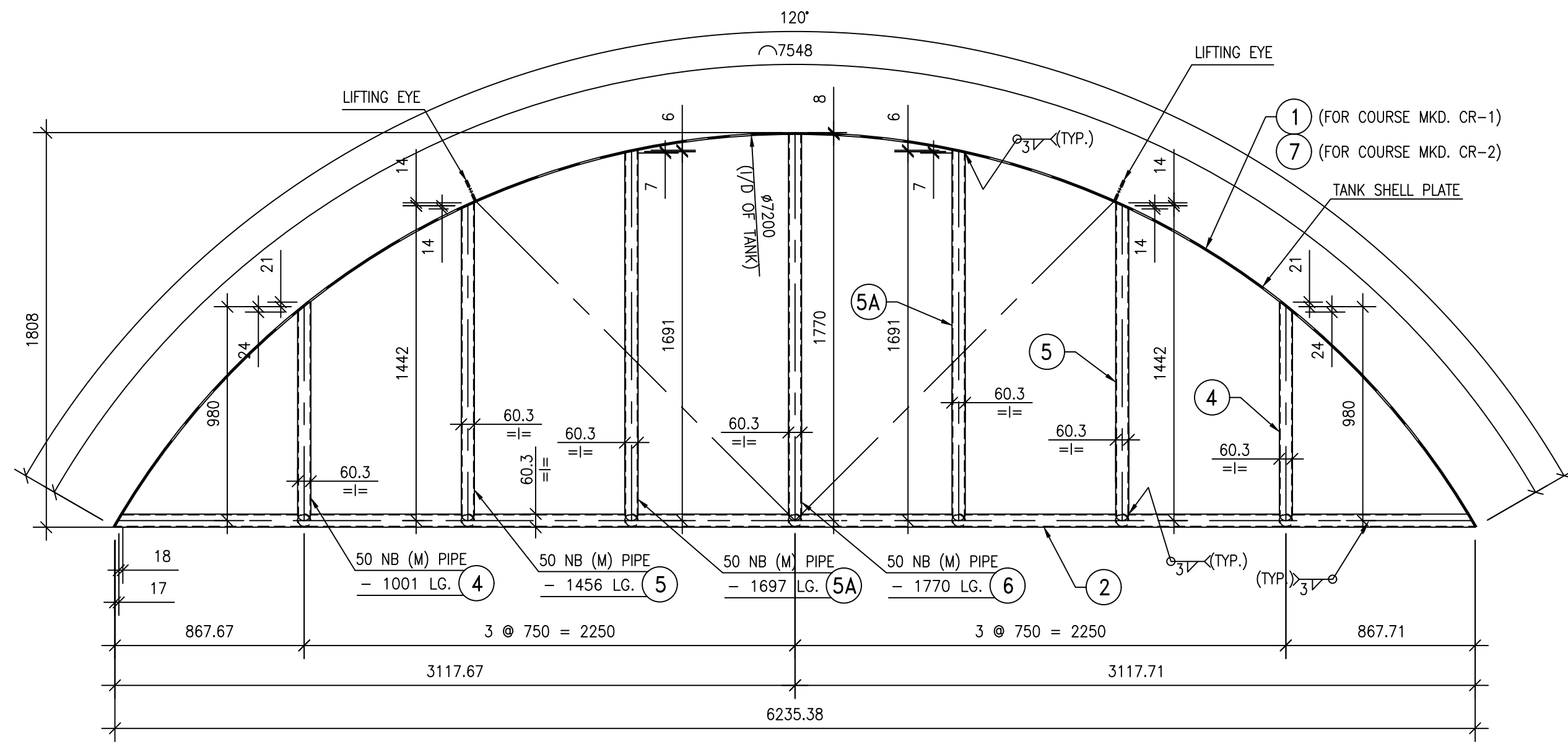
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(REQD. 3 NOS.)



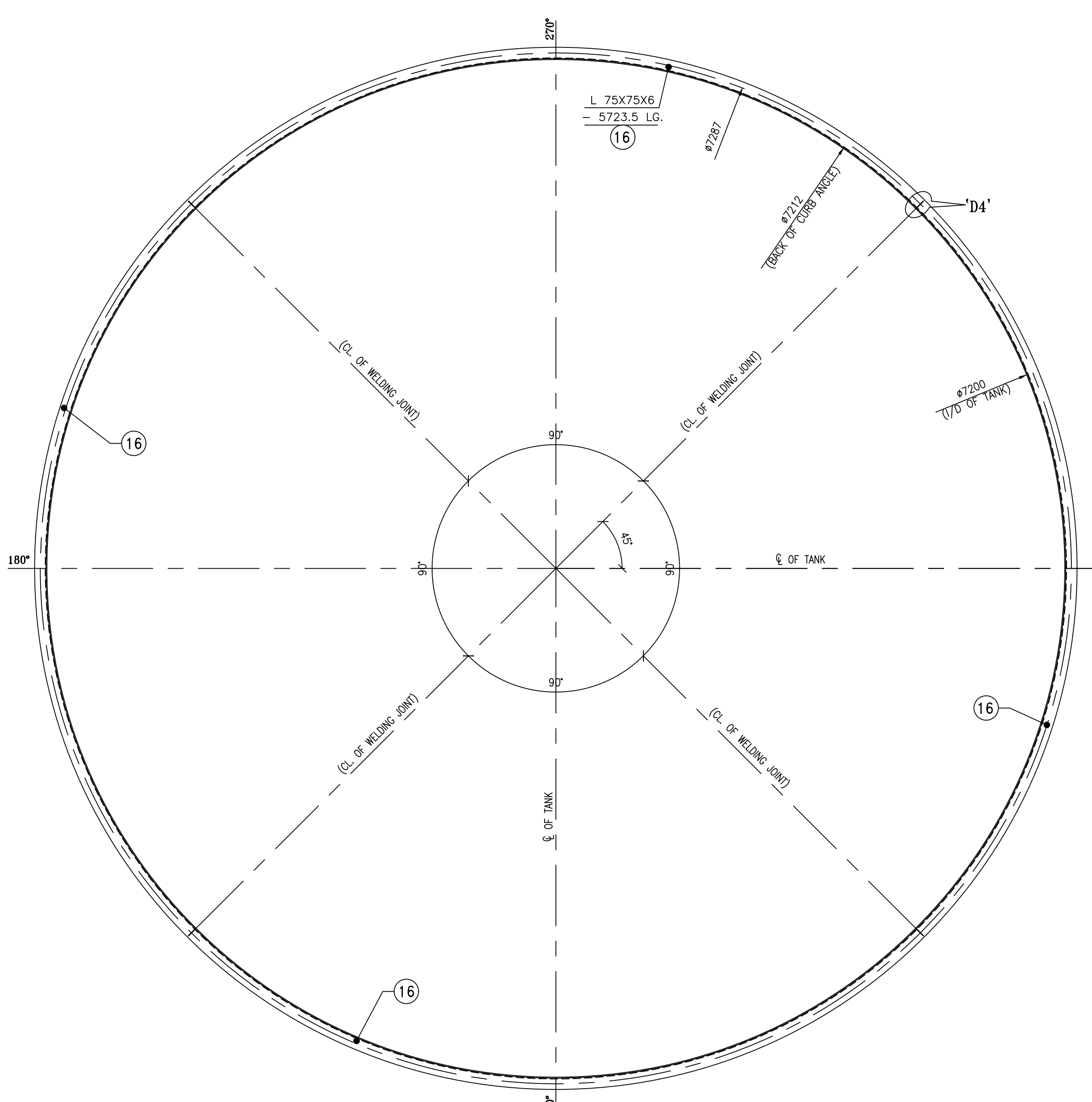
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(REQD. 3 NOS.)



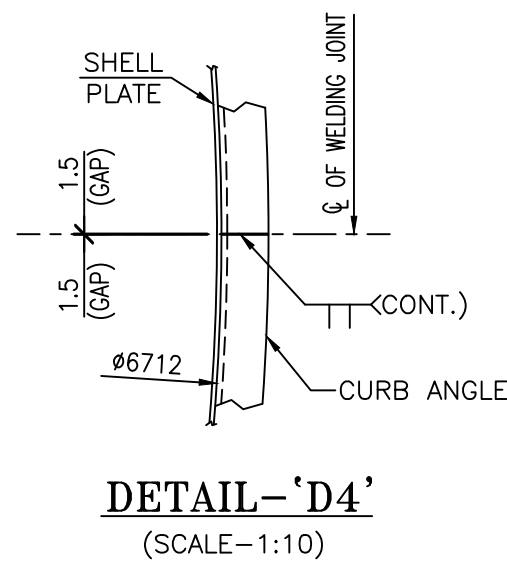
PLAN C-C
(SCALE-1:20)



PLAN B-B
(SCALE-1:20)



DETAIL OF CURB ANGLE MKD. CA-1
(REQD. 1 NOS.)
(SCALE-1:20)



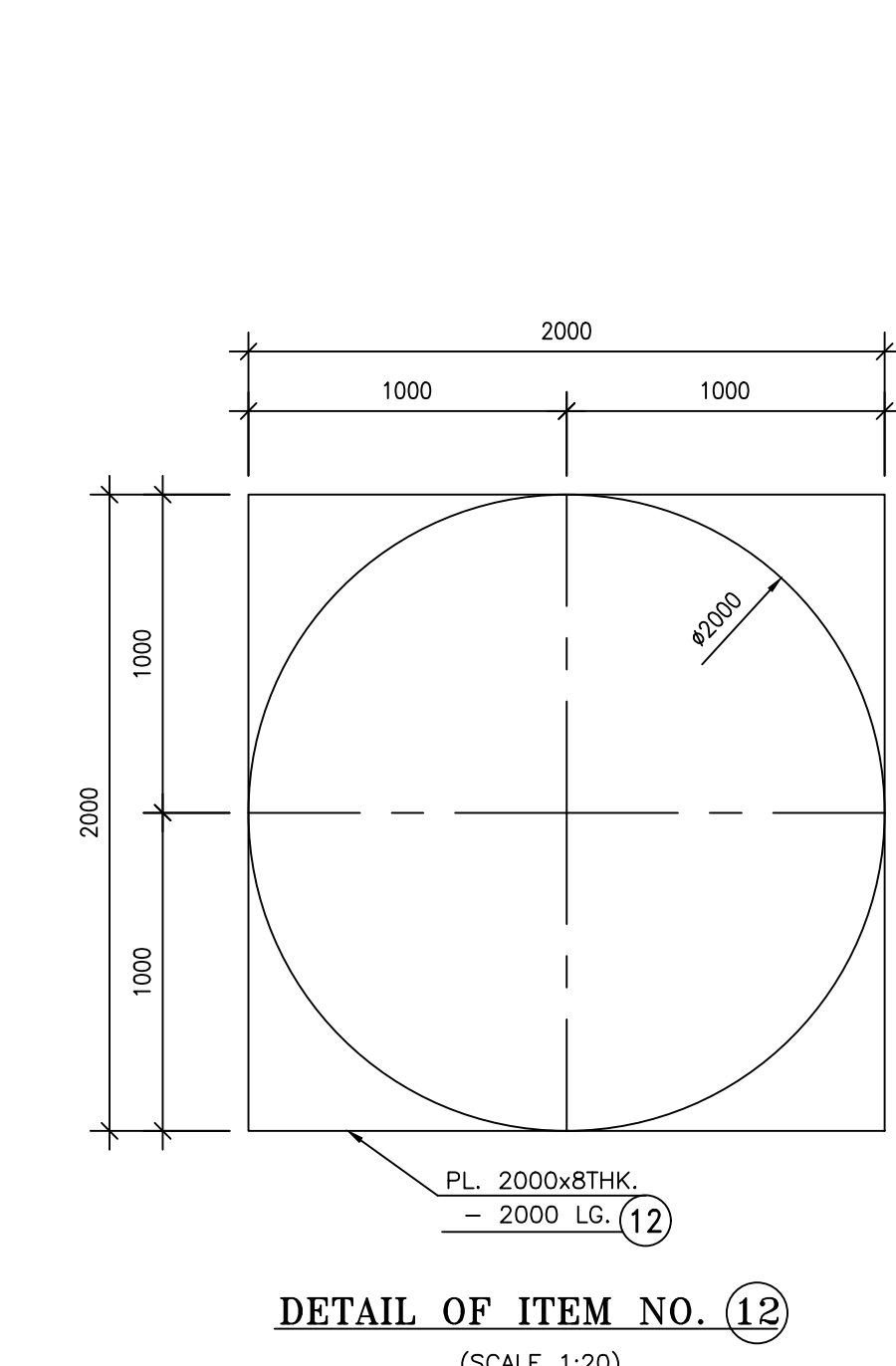
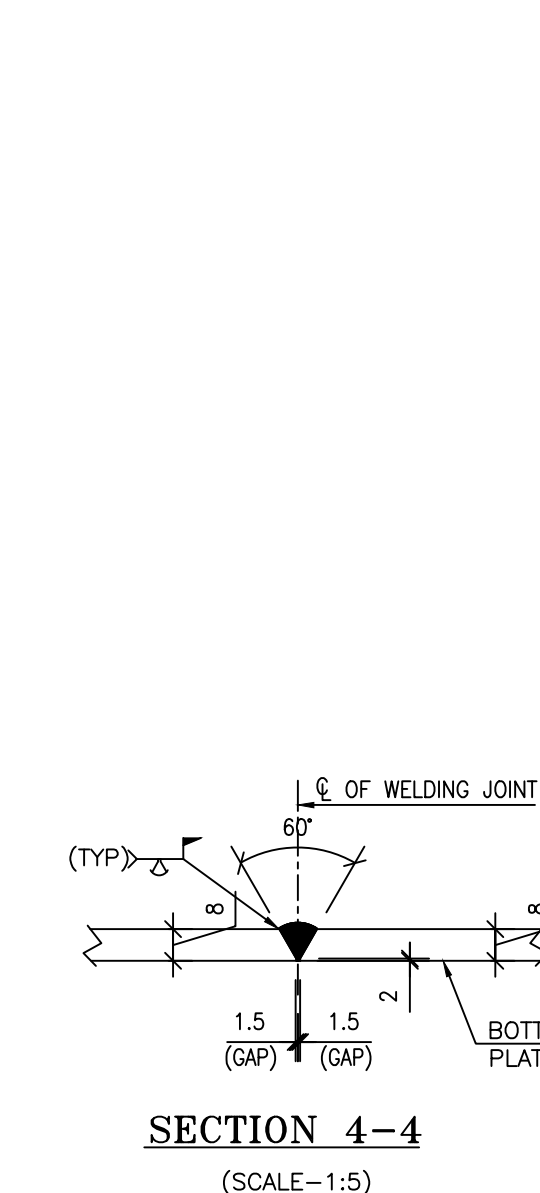
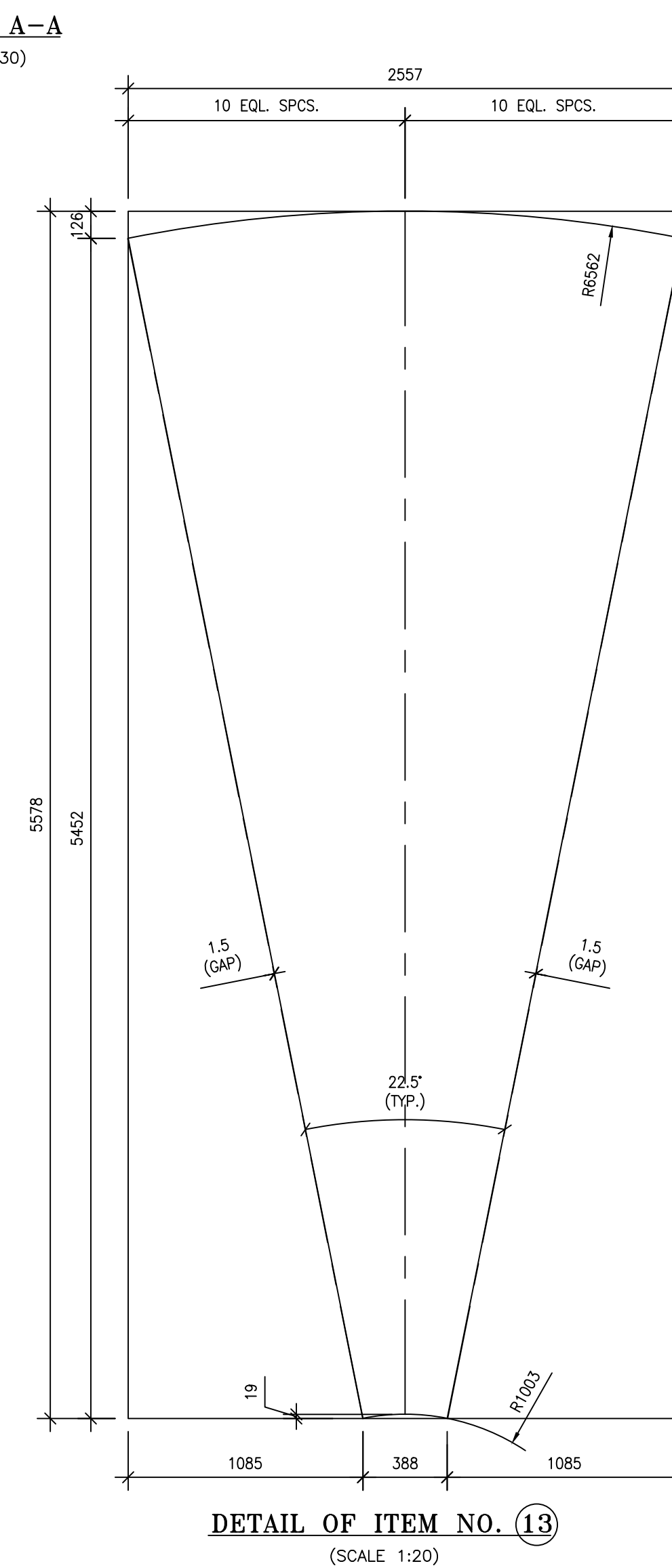
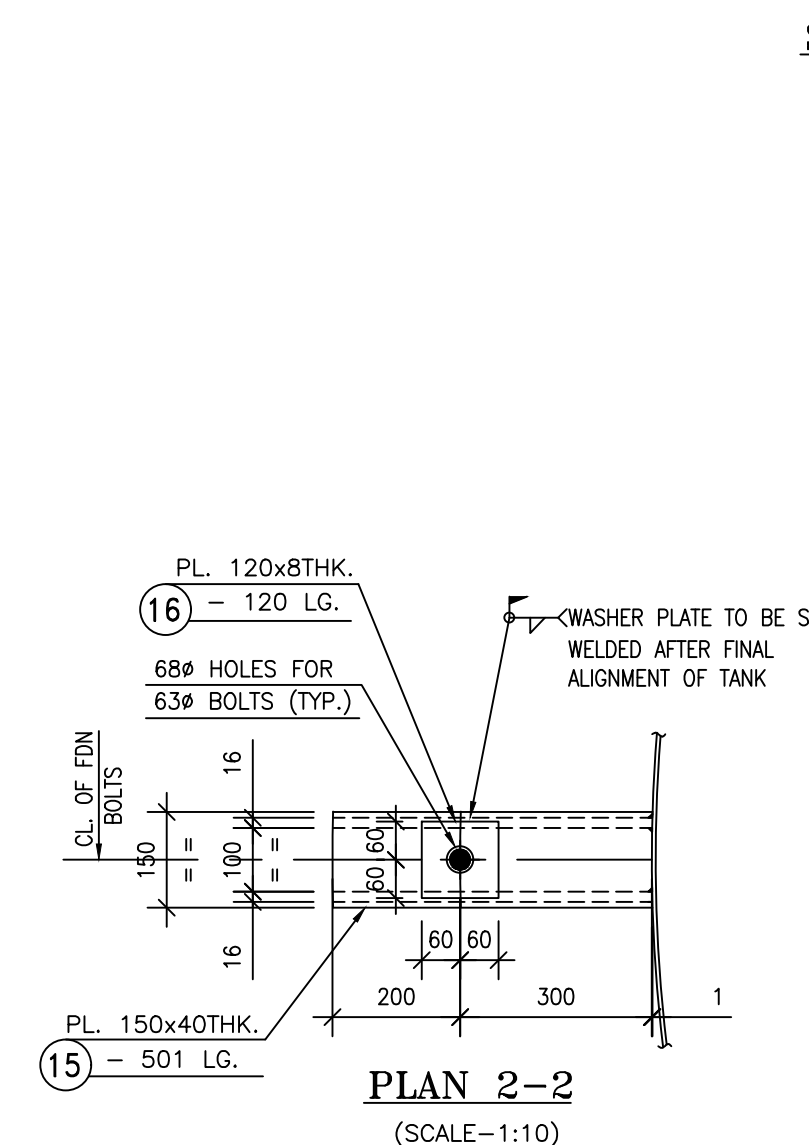
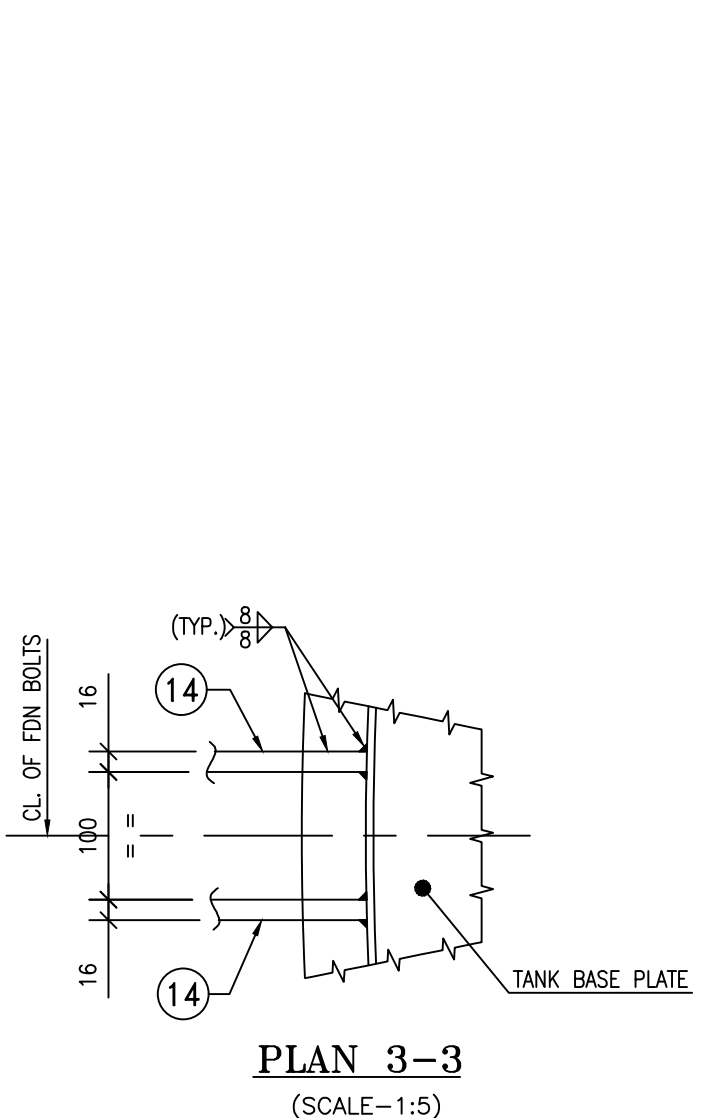
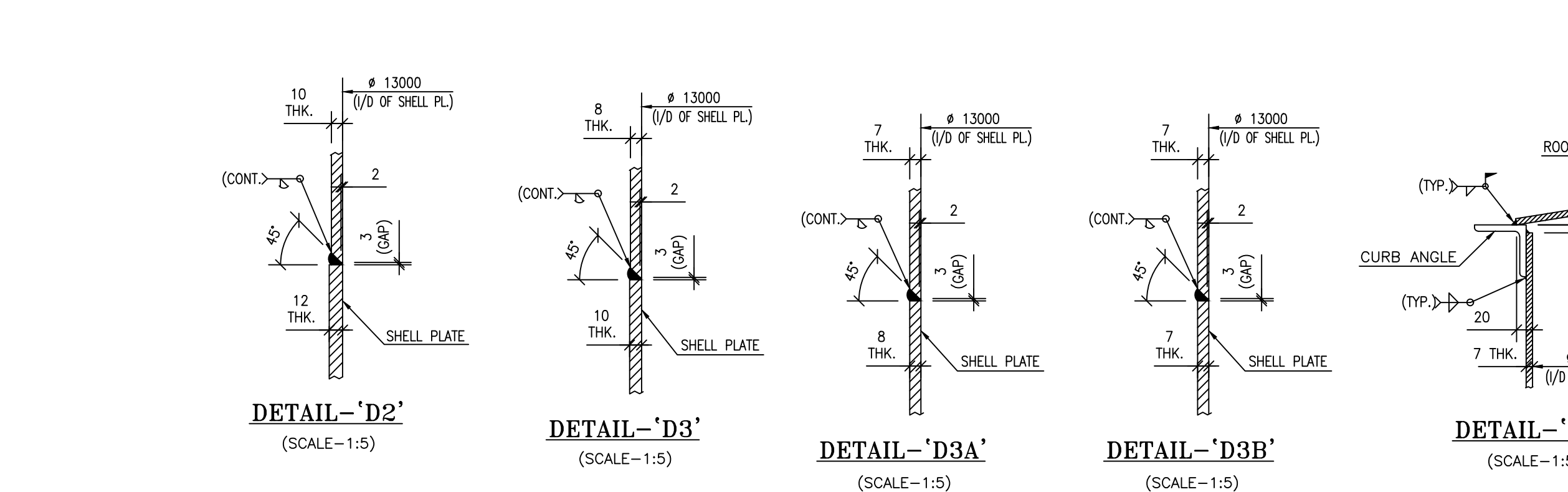
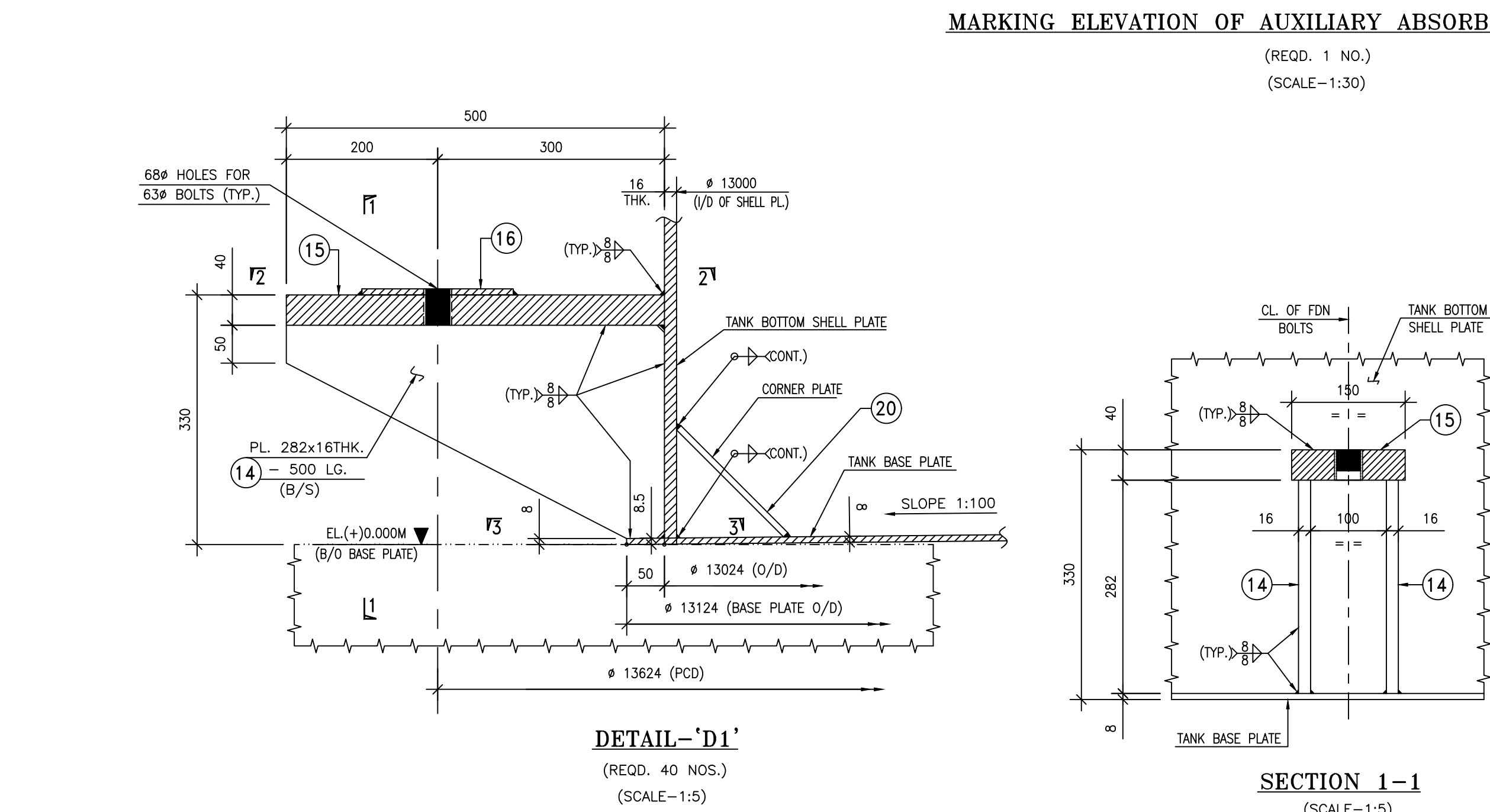
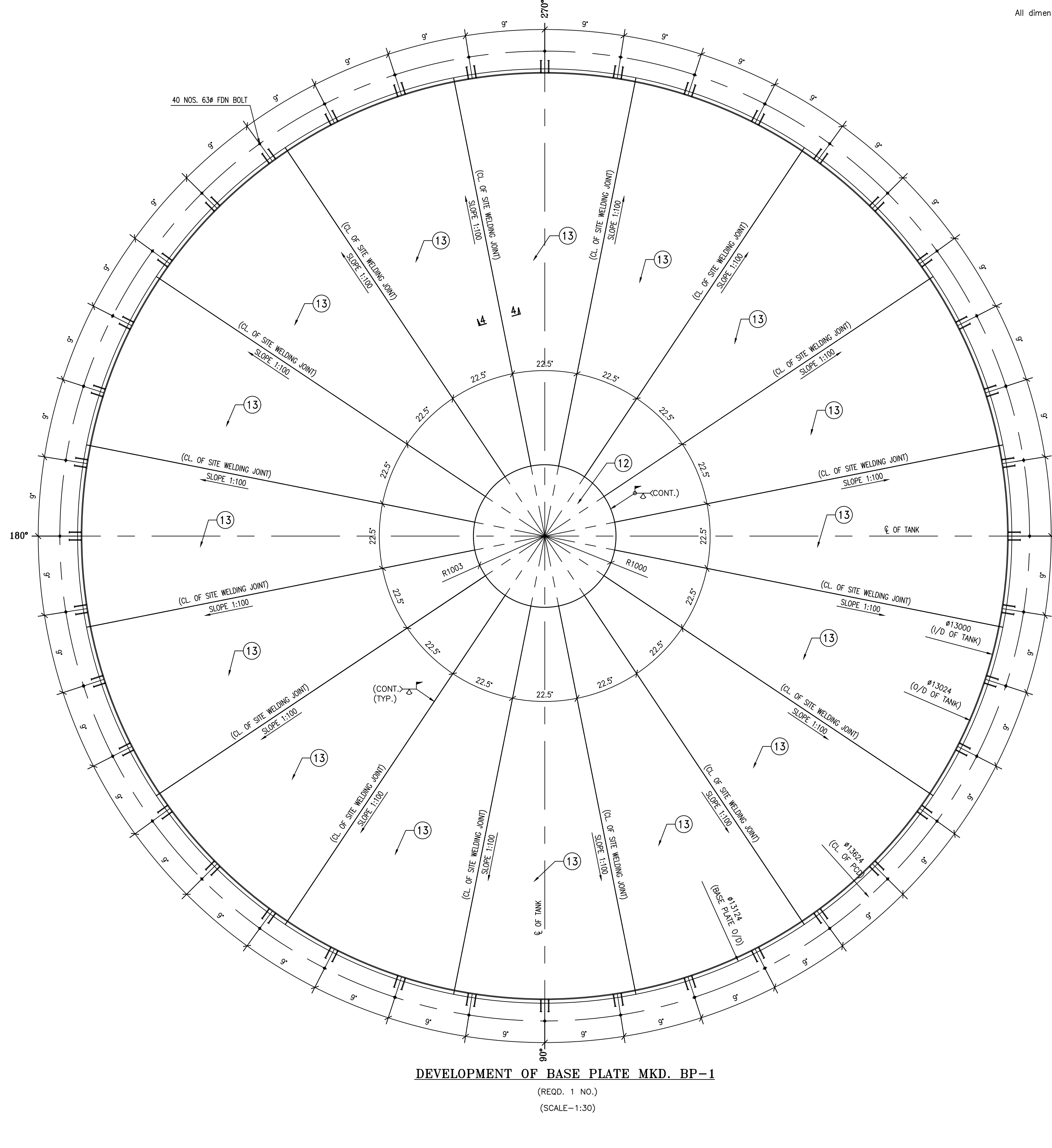
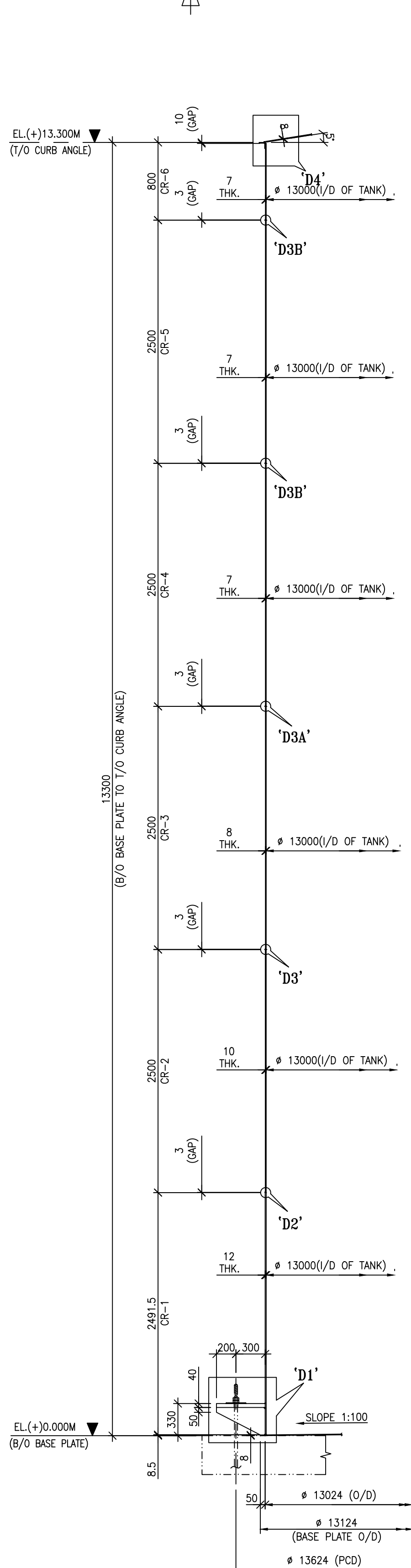
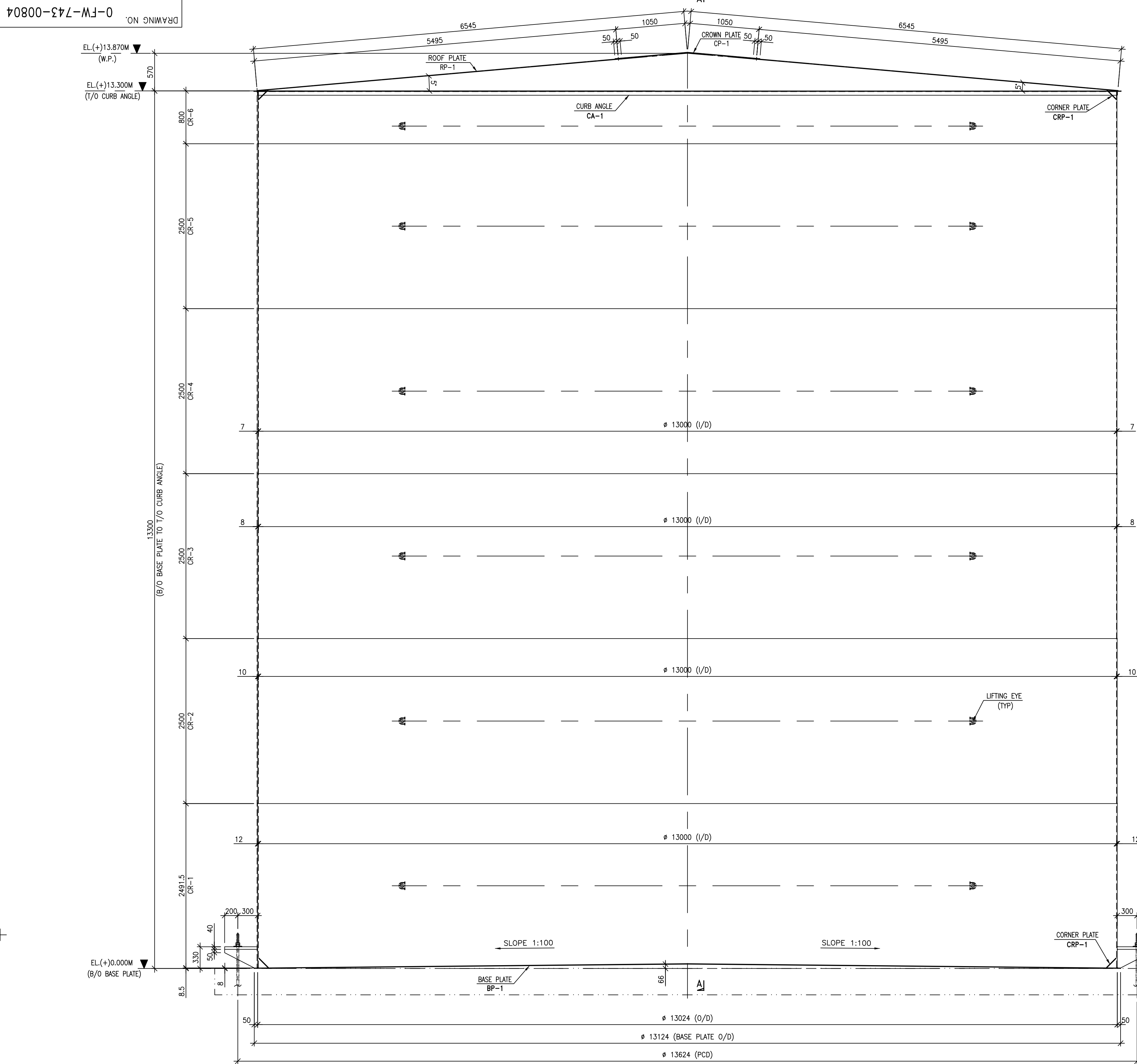
DETAIL-D4'
(SCALE-1:10)

BILL OF MATERIALS							TOTAL WT. :		22236.20
ERECTION MKD.	ITEM NO.	SECTION	LENGTH IN mm.	NOS. REQD.	UNIT WT. (Kg.)	TOTAL WT. (Kg.)	QTY. REQD.	ERE. MKD. WT. (Kg.)	REMARKS
CR-1	1	PL 2490x8	7545	3	62.80	3539.48			
	2	50 NB (M) PIPE	6235	6	5.03	188.17			
	3	50 NB (M) PIPE	2390	21	5.03	252.46			
	4	50 NB (M) PIPE	1001	12	5.03	60.42			
	5	50 NB (M) PIPE	1456	12	5.03	87.88			
	5A	50 NB (M) PIPE	1697	12	5.03	102.43			
	6	50 NB (M) PIPE	1770	6	5.03	53.42			
	11	PL 2729x8	2795	8	62.80	3832.08			
	12	PL 2000x8	2000	1	62.80	251.20			
	13	PL 306x8	500	48	62.80	461.20			
	14	PL 150x16	501	24	125.60	226.53			
	15	PL 120x8	120	24	62.80	21.70			
						9076.98	1	9076.98	
CR-2	7	PL 2497x8	7545	3	62.80	3549.43			
	2	50 NB (M) PIPE	6235	6	5.03	188.17			
	8	50 NB (M) PIPE	2397	21	5.03	253.20			
	4	50 NB (M) PIPE	1001	12	5.03	60.42			
	5	50 NB (M) PIPE	1456	12	5.03	87.88			
	5A	50 NB (M) PIPE	1697	12	5.03	102.43			
CR-3	7A	PL 2497x8	7543	3	47.10	2661.37			
	2	50 NB (M) PIPE	6235	6	5.03	188.17			
	8	50 NB (M) PIPE	2397	21	5.03	253.20			
	4	50 NB (M) PIPE	1001	12	5.03	60.42			
	5	50 NB (M) PIPE	1456	12	5.03	87.88			
	5A	50 NB (M) PIPE	1697	12	5.03	102.43			
CR-4	9	PL 592 5x6	7543	3	47.10	631.50			
	2	50 NB (M) PIPE	6235	6	5.03	188.17			
	10	50 NB (M) PIPE	492 5	21	5.03	52.02			
	4	50 NB (M) PIPE	1001	12	5.03	60.42			
	5	50 NB (M) PIPE	1456	12	5.03	87.88			
	5A	50 NB (M) PIPE	1697	12	5.03	102.43			
CA-1	16	L 75X75X6	5723.5	4	6.80	1175.85			
						155.68	1	155.68	
RP-1	17	PL 2756x8	2779	8	62.80	3847.84			
						3847.84	1	3847.84	
	18	PL 2104x8	2104	1	62.80	278.00			
CP-1						278.00	1	278.00	
GRAND TOTAL WEIGHT =22236.20 KG. = 22.236 T									

ABSTRACT			
SL. NO.	SECTION	TOTAL WT. (Kg.)	SPECIFICATION
1	L 75X75X6	155.68	IS:2062,GR.E250
2	50 NB (M) PIPE	2780.17	IS:1161
3	PL 16 THK	226.53	IS:2062,GR.E250
4	PL 8 THK	15780.95	IS:2062,GR.E250
5	PL 6 THK	3292.87	IS:2062,GR.E250
TOTAL WEIGHT =22236.20 KG.			

THIS DRAWING SHALL BE READ ALONG WITH
0-FW-745-00692
0-FW-745-00693

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		NAME		SIGN		DATE		NO. OF	
Bharat Heavy Electricals Ltd.		M.K. NAHAK				24/12/18		VAR.	
UNIT: BOILER AUXILIARIES PLANT.		C.S.		C.S.		24/12/18			
DEPT. ACQS. GRADE OF UNTOLO DIV. PR. A2.500		SCALE		WEIGHT (KG.)		REF. TO ASSY/OLD DRG.		REV. NO. NO. OF	
CODE 862		U 01		-		-		-	
TITLE		WASTE WATER TANK		DRAWING NO.		0-FW-745-00694		REV.	
								00	

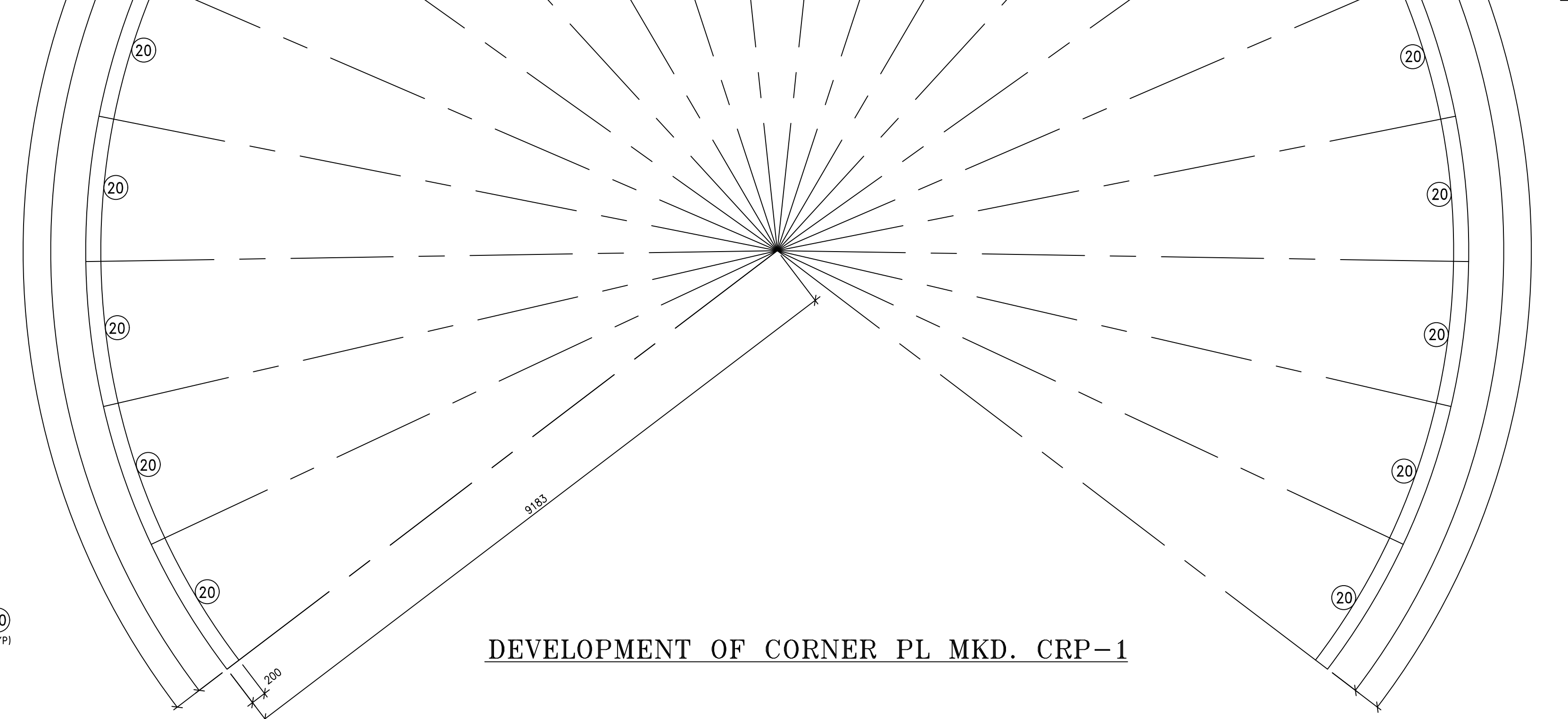
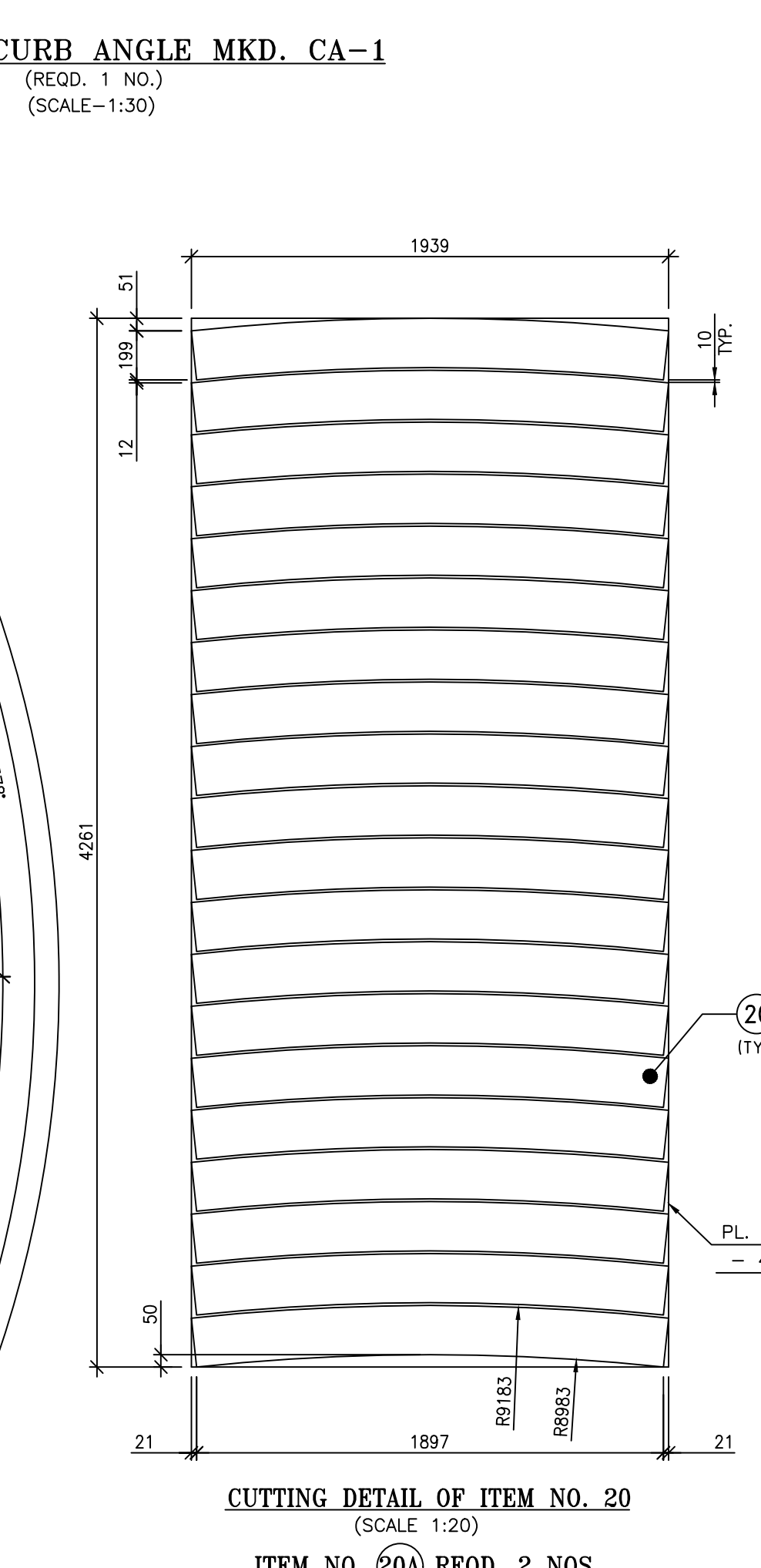
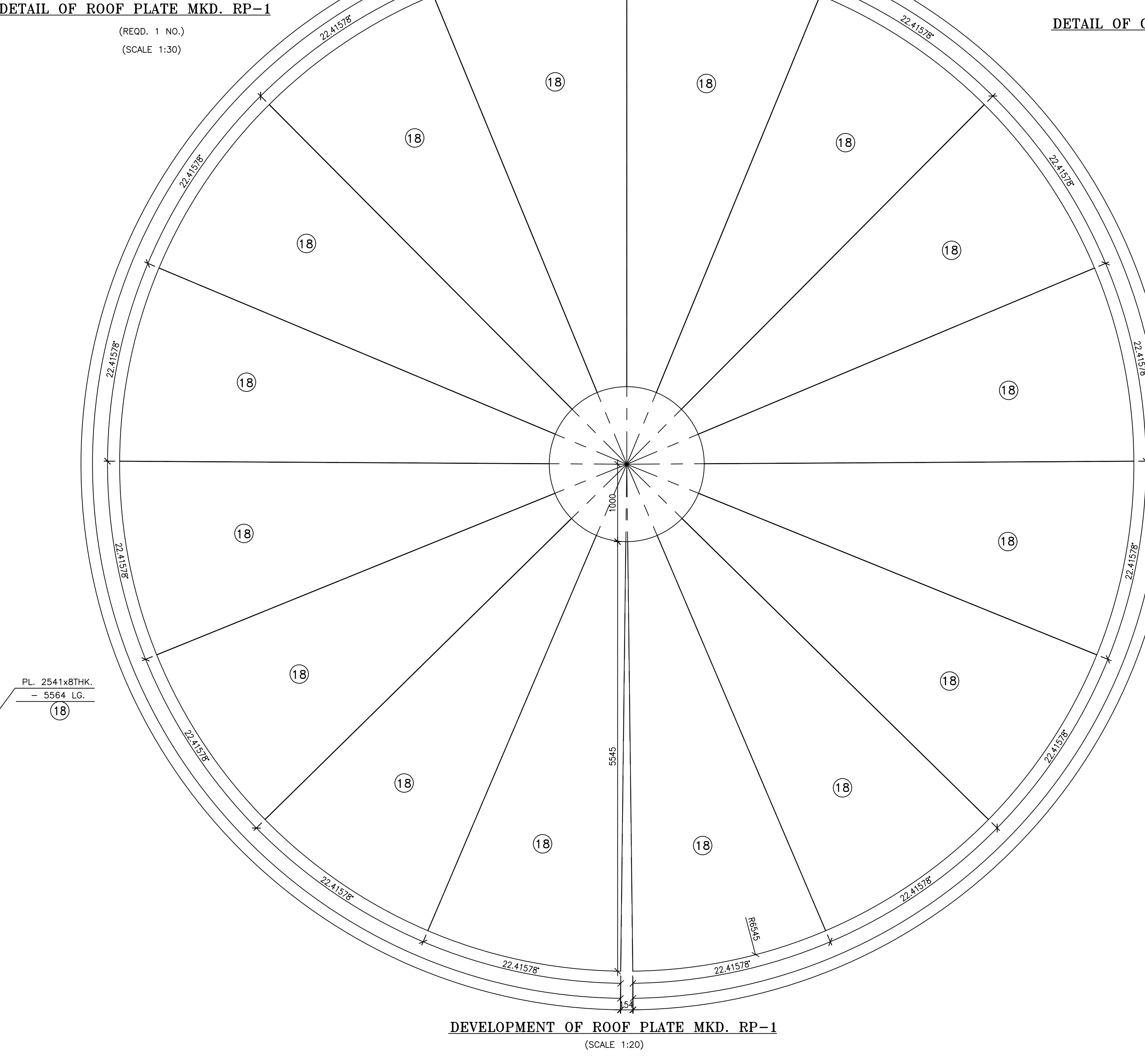
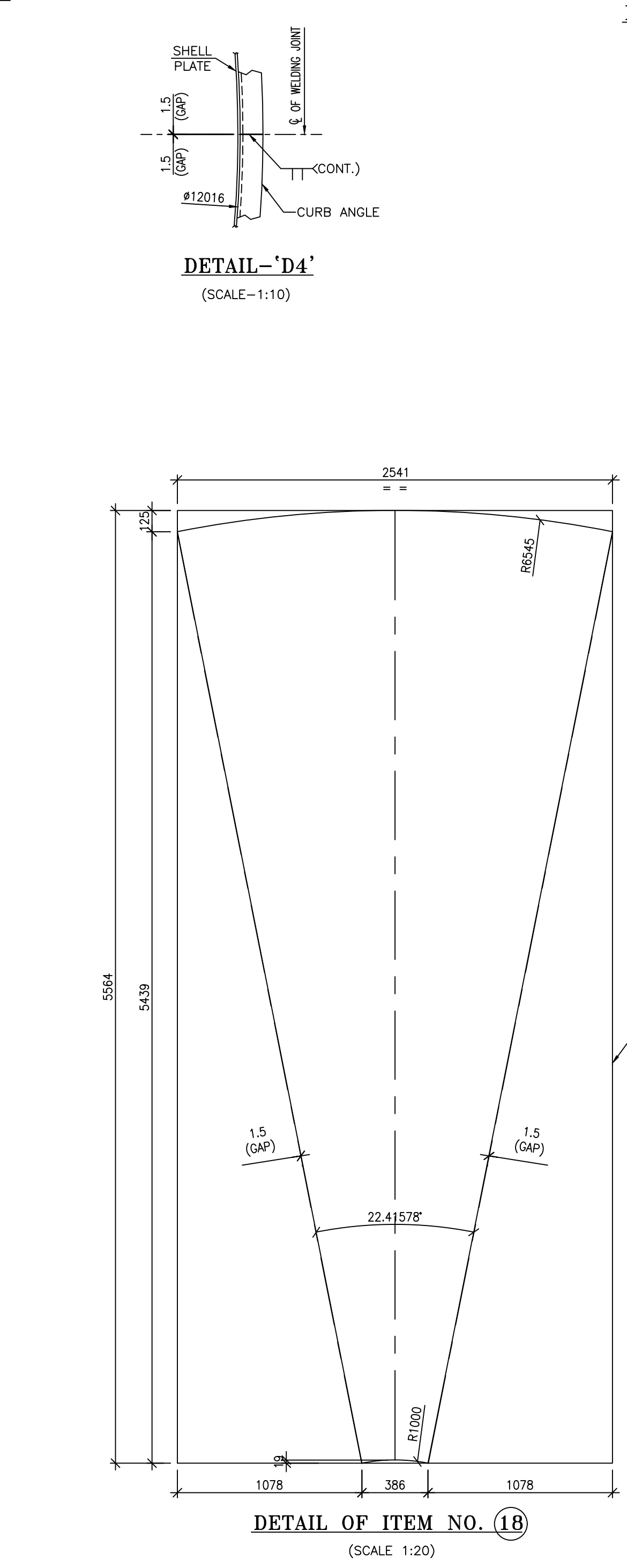
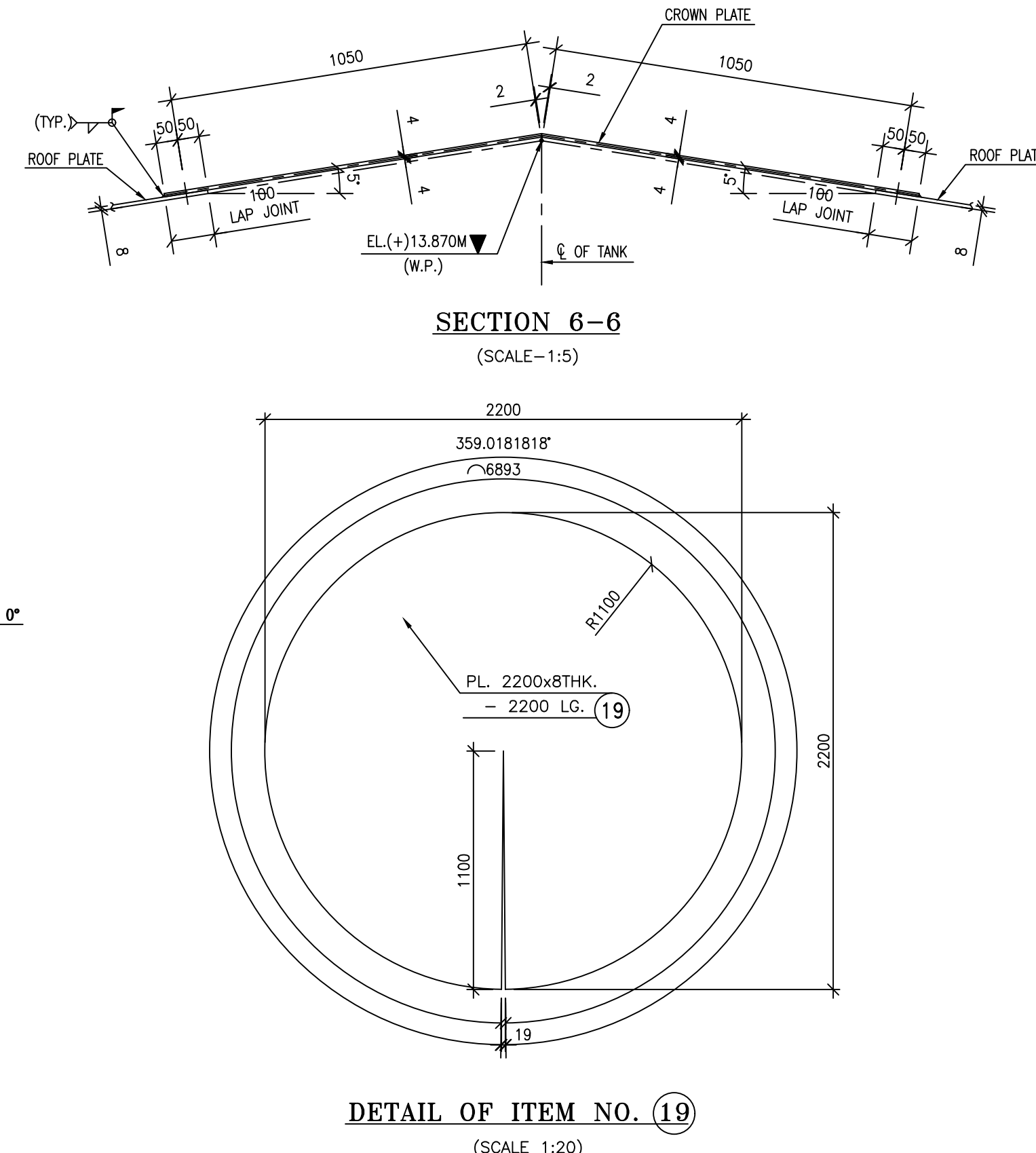
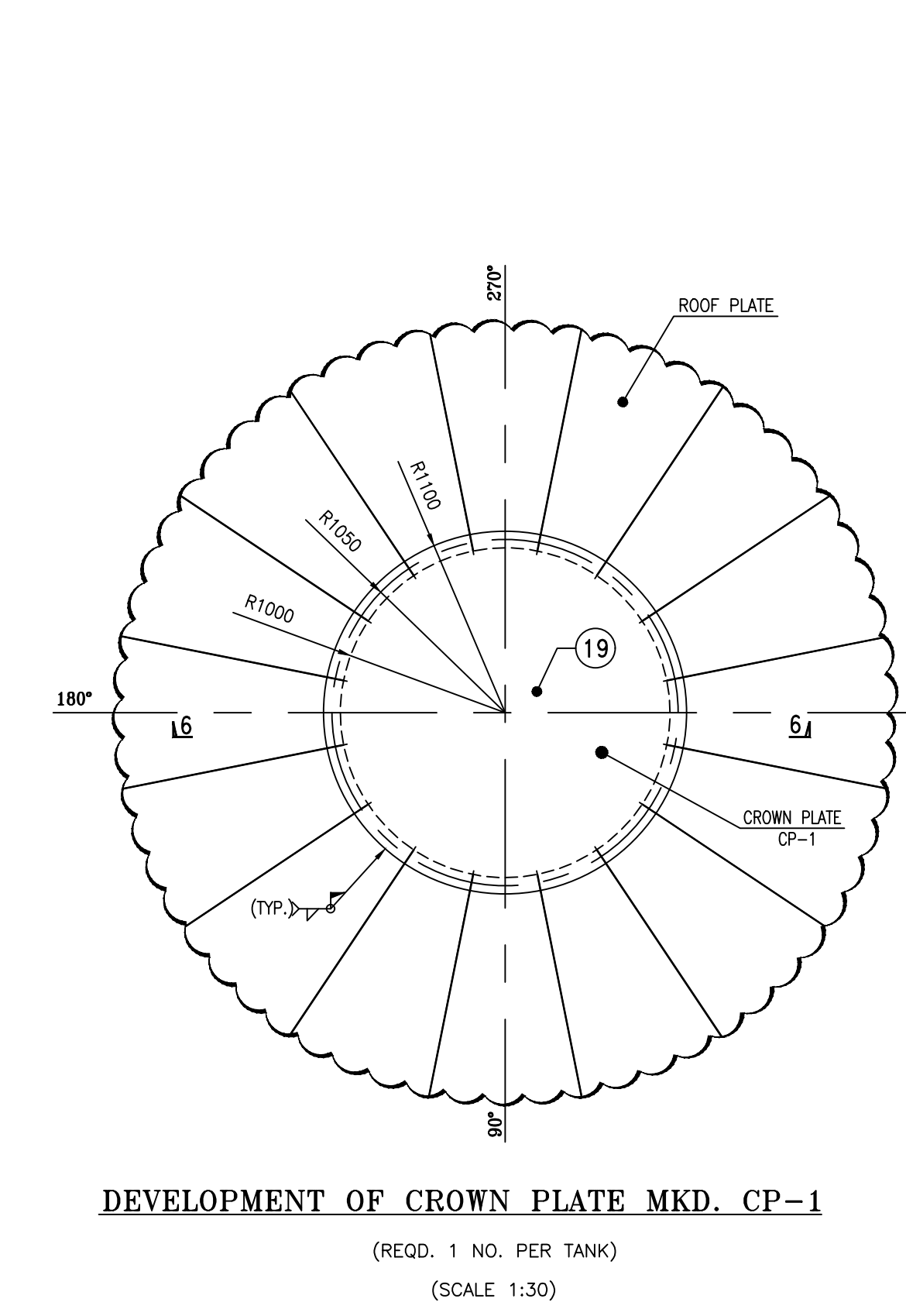
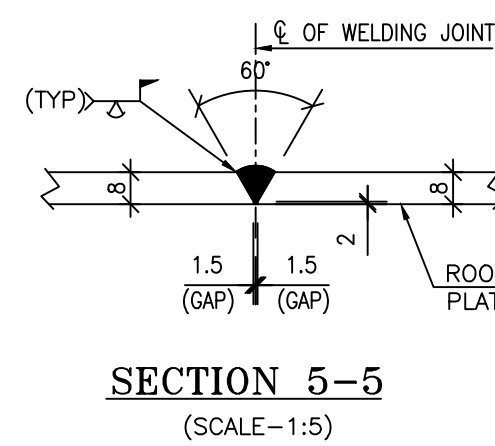
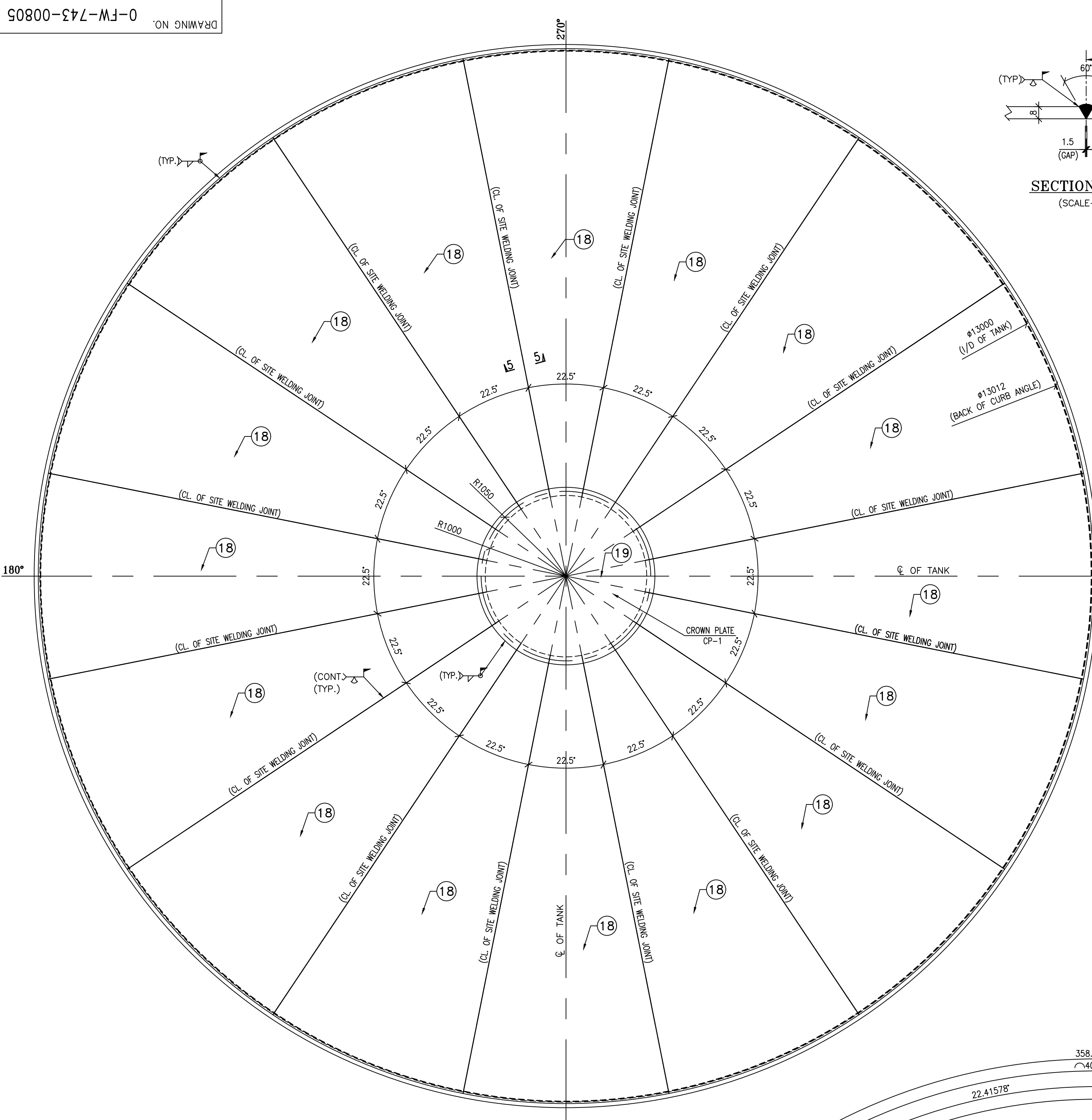


- NOTES:-
1. ALL DIMENSIONS ARE IN MM. & LEVELS ARE IN M.
 2. ALL ERECTION HOLES ARE 17.5# FOR M-16 BOLTS U.N.O.
 3. ALL PERMANENT HOLES ARE 17.5# FOR M-16 BOLTS U.N.O.
 4. ALL MEMBERS AND GUSSETS PLATES TO BE CUT AFTER FULL SCALE SHOP LAYOUT BEFORE FABRICATION
 5. ALL SHOP WELD ARE 6mm. THICK AND SITE WELD ARE 6mm. THICK U.N.O.
 6. ERECTION HOLES SHOWN THUS
 7. PERMANENT HOLES SHOWN THUS
 8. ALL ERECTION BOLTS SHALL BE RETAINED IN POSITION
 9. THIS DRG. SHALL BE READ IN CONJUNCTION WITH DRG. NO.

THIS DRAWING SHALL BE READ ALONG WITH
0-FW-743-00805
0-FW-743-00806
0-FW-743-00807

SHEET 1 OF 4

DEPT	ACQS	GRADE OF	SCALE	WEIGHT (KG)	REF. TO ASSY/OLD DRG.	REV	NO. OF
CODE	862	UNTOLDIM	PR:AG:500	-	-	-	PRG
TITLE				DRAWING NO.		REV	
AUXILIARY ABSORBENT TANK				0-FW-743-00804		00	



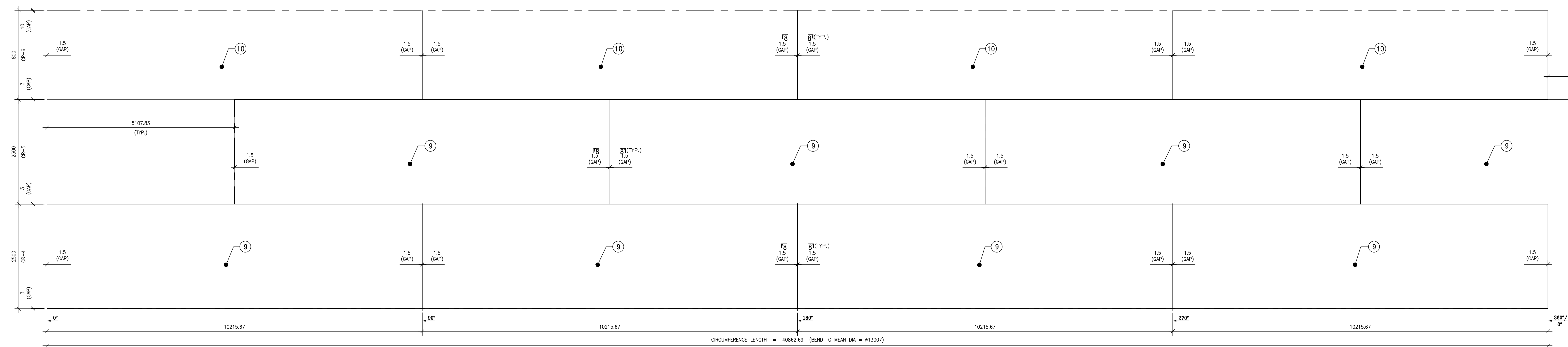
- NOTES:-
1. ALL DIMENSIONS ARE IN MM. & LEVELS ARE IN M.
 2. ALL ERECTION HOLES ARE 17.5# FOR M-16 BOLTS U.N.O.
 3. ALL PERMANENT HOLES ARE 17.5# FOR M-16 BOLTS U.N.O.
 4. ALL MEMBERS AND GUSSETS PLATES TO BE CUT AFTER FULL SCALE SHOP LAYOUT BEFORE FABRICATION
 5. ALL SHOP WELD ARE 6mm. THICK AND SITE WELD ARE 6mm. THICK. U.N.O.
 6. ERECTION HOLES SHOWN THUS 
 7. PERMANENT HOLES SHOWN THUS 
 8. ALL ERECTION BOLTS SHALL BE RETAINED IN POSITION
 9. THIS DRG. SHALL BE READ IN CONJUNCTION WITH DRG. NO.

THIS DRAWING SHALL BE READ ALONG WITH
0-FW-743-00804
0-FW-743-00806
0-FW-743-00807

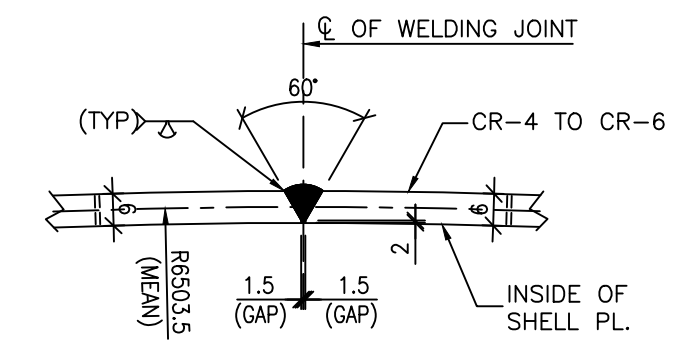
TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		NAME		SIGN		DATE		NO. OF	
BHARAT HEAVY ELECTRICALS LTD.		BHARAT HEAVY ELECTRICALS LTD.		BHARAT HEAVY ELECTRICALS LTD.		BHARAT HEAVY ELECTRICALS LTD.		BHARAT HEAVY ELECTRICALS LTD.	
UNIT: BOILER AUXILIARIES PLANT.		UNIT: BOILER AUXILIARIES PLANT.		UNIT: BOILER AUXILIARIES PLANT.		UNIT: BOILER AUXILIARIES PLANT.		UNIT: BOILER AUXILIARIES PLANT.	
PROJECT - 652		PROJECT - 652		PROJECT - 652		PROJECT - 652		PROJECT - 652	
DEPT. AQCS		GRADE OF UNTOLOM		SCALE		WEIGHT (KG.)		REF. TO ASSY/OLD DRG.	
CODE 862		PR.A2.500		-		-		-	
TITLE		AUXILIARY ABSORBENT TANK		DRAWING NO.		REV.		NO. OF	
DETAIL OF ROOF PLATE MKD. RP-1 & CURB ANGLE MKD. CA-1 FOR AUXILIARY ABSORBENT TANK		U 01		0-FW-743-00805		00		00	

0-FW-743-00806

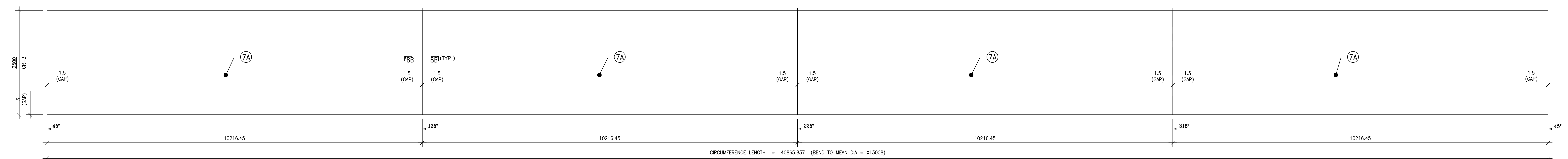
All dimensions are in millimetres



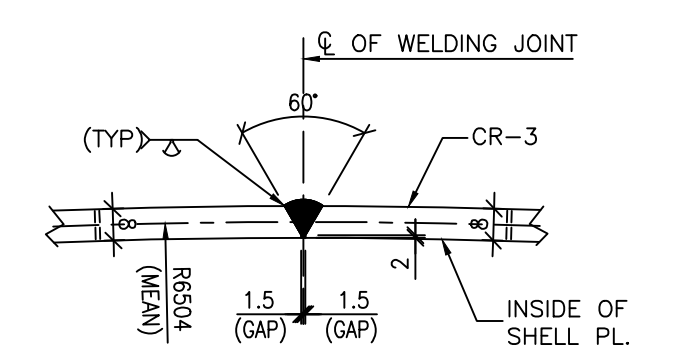
DEVELOPMENT OF COURSE MKD. CR-4, CR-5 & CR-6
(REQD. 1 NO.)
(SCALE-1:20)



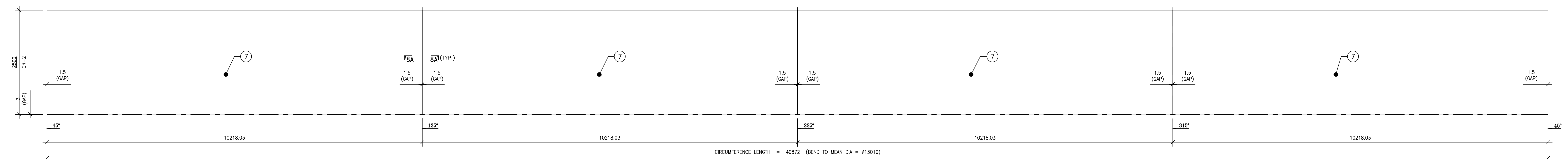
SECTION 8-8
(SCALE-1:5)



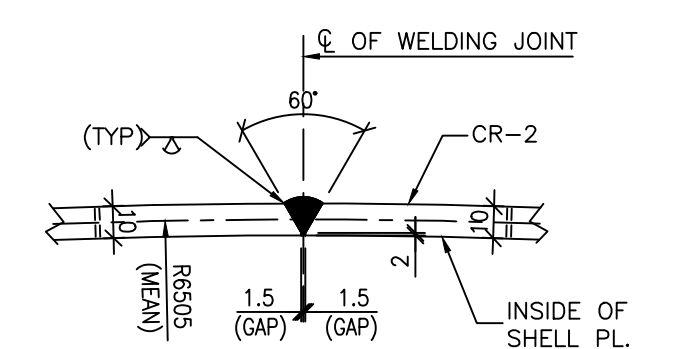
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(REQD. 1 NO.)
(SCALE-1:20)



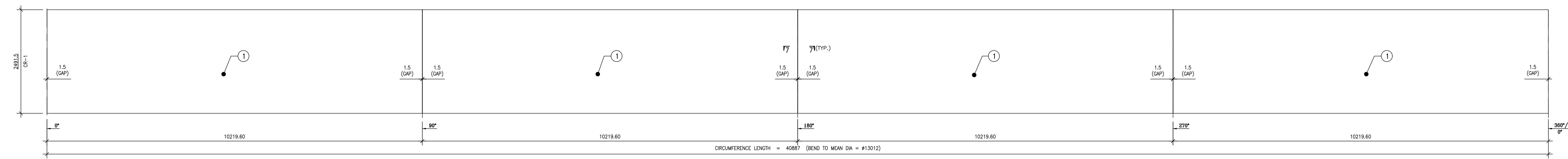
SECTION 8B-8B
(SCALE-1:5)



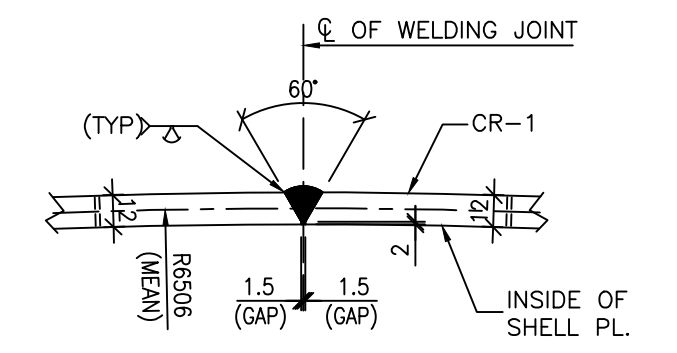
DEVELOPMENT OF COURSE MKD. CR-2
(REQD. 1 NO.)
(SCALE-1:20)



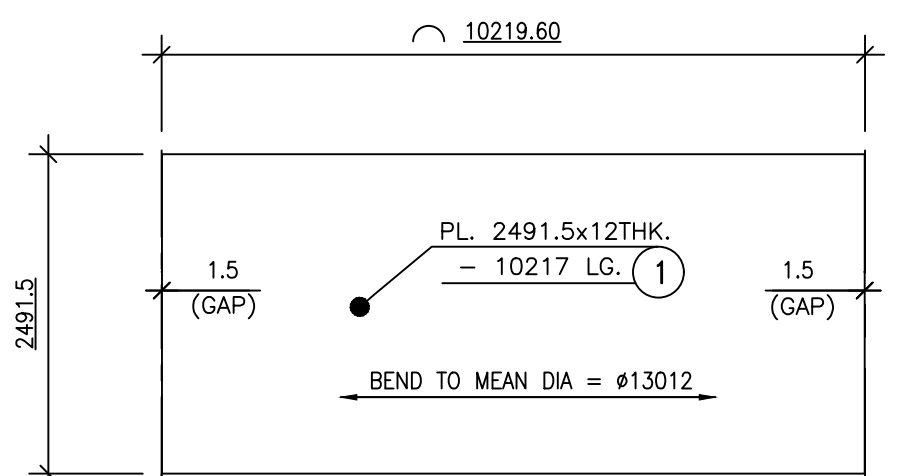
SECTION 8A-8A
(SCALE-1:5)



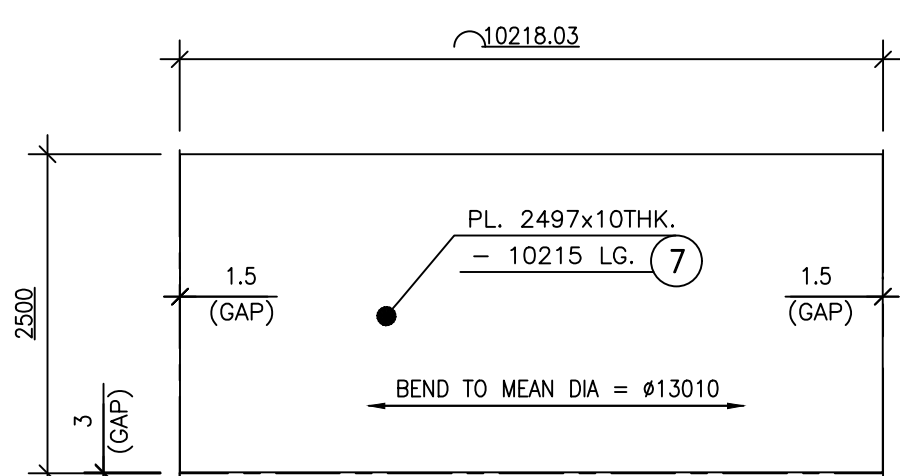
DEVELOPMENT OF COURSE MKD. CR-1
(REQD. 1 NO.)
(SCALE-1:20)



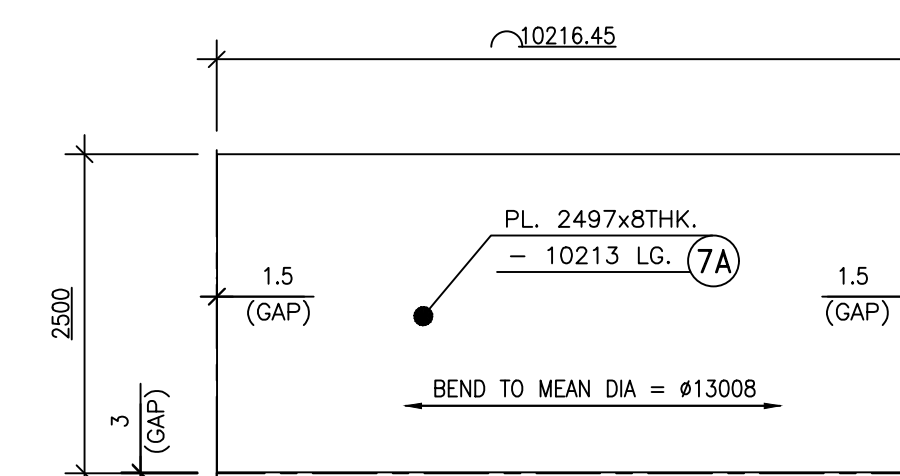
SECTION 7-7
(SCALE-1:5)



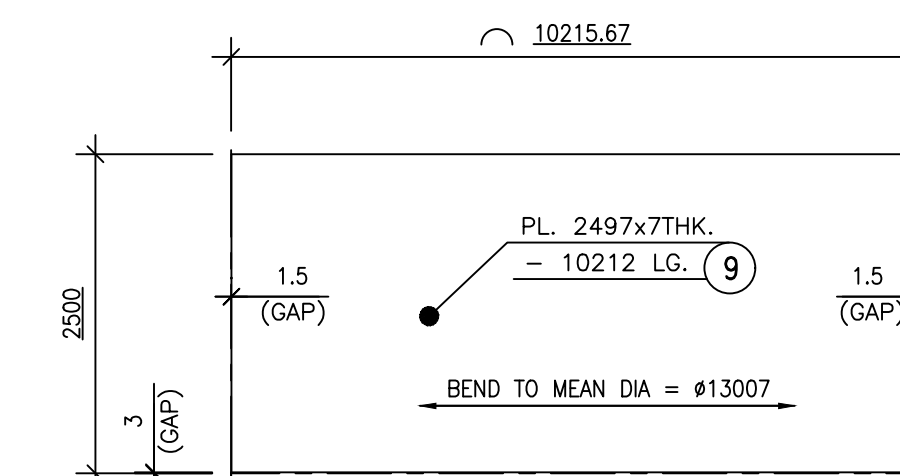
DETAIL OF ITEM NO. 1
(SCALE 1:20)



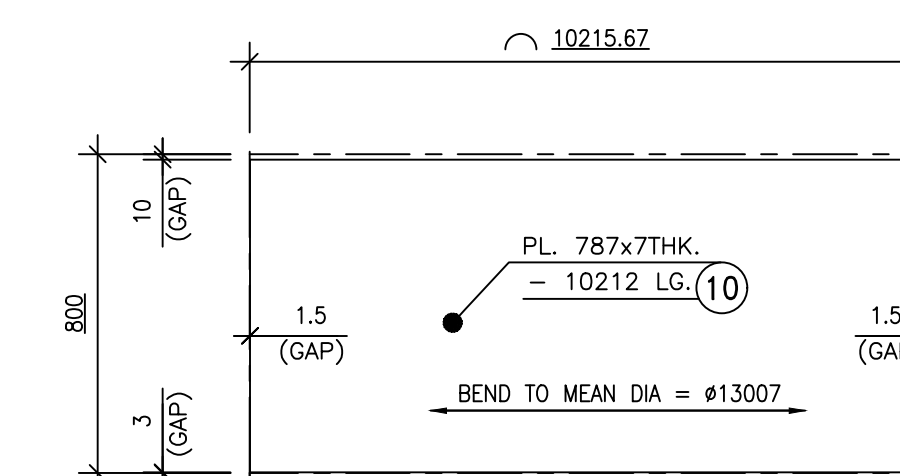
DETAIL OF ITEM NO. 7
(SCALE 1:20)



DETAIL OF ITEM NO. 7A
(SCALE 1:20)



DETAIL OF ITEM NO. 9
(SCALE 1:20)



DETAIL OF ITEM NO. 10
(SCALE 1:20)

- NOTES:-**
1. ALL DIMENSIONS ARE IN MM. & LEVELS ARE IN M.
 2. ALL ERECTION HOLES ARE 17.5# FOR M-16 BOLTS U.N.O.
 3. ALL PERMANENT HOLES ARE 17.5# FOR M-16 BOLTS U.N.O.
 4. ALL MEMBERS AND GUSSETS PLATES TO BE CUT AFTER FULL SCALE SHOP LAYOUT BEFORE FABRICATION
 5. ALL SHOP WELD ARE 6mm. THICK AND SITE WELD ARE 6mm. THICK. U.N.O.
 6. ERECTION HOLES SHOWN THUS
 7. PERMANENT HOLES SHOWN THUS
 8. ALL ERECTION BOLTS SHALL BE RETAINED IN POSITION
 9. THIS DRG. SHALL BE READ IN CONJUNCTION WITH DRG. NO.

THIS DRAWING SHALL BE READ ALONG WITH
0-FW-743-00804
0-FW-743-00805
0-FW-743-00807

SHEET 3 OF 4

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		NAME		SIGN		DATE		NO. OF VARS.	
BHARAT HEAVY ELECTRICALS LTD.		EQU/STRM		31.01.19		31.01.19		-	
UNIT: BOILER AUXILIARIES PLANT.		ADDRESS		31.01.19		31.01.19		-	
DEPT. APCS		GRADE OF UNTOLODIM		SCALE		WEIGHT (KG.)		REF. TO ASSY/OLD DRG.	
CODE 862		PR.AQ.500		-		-		-	
TITLE		CARD CODE		DRAWING NO.		REV		NO. OF TIMES	
AUXILIARY ABSORBENT TANK		U 01		0-FW-743-00806		00		-	

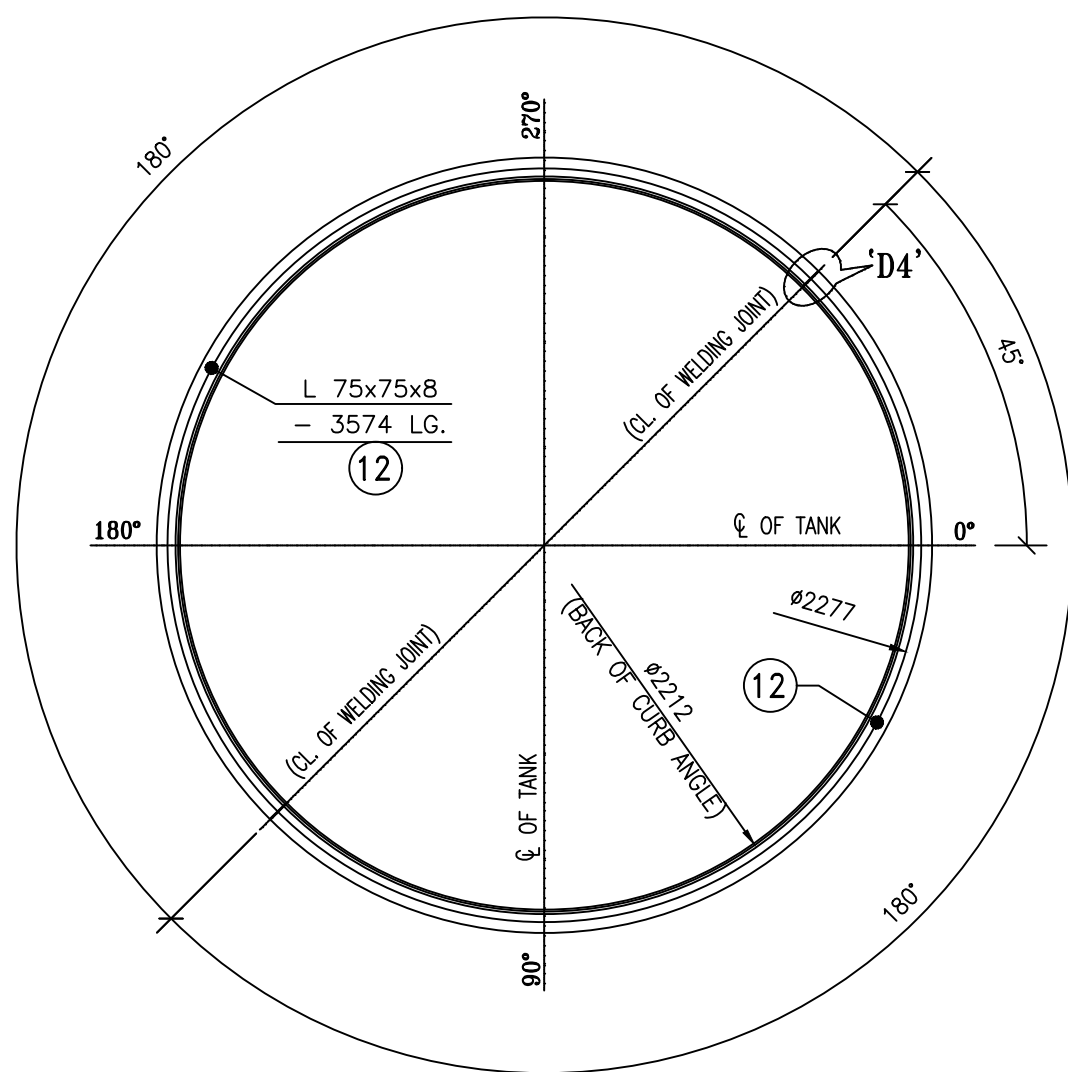
CAUTION: The information on this drawing is the property of Bharat Heavy Electricals Ltd. and shall not be disclosed to any third party without the written consent of the company.

Size A0

1-FW-802-00369
DRAWING NO.

All dimensions are in millimetres

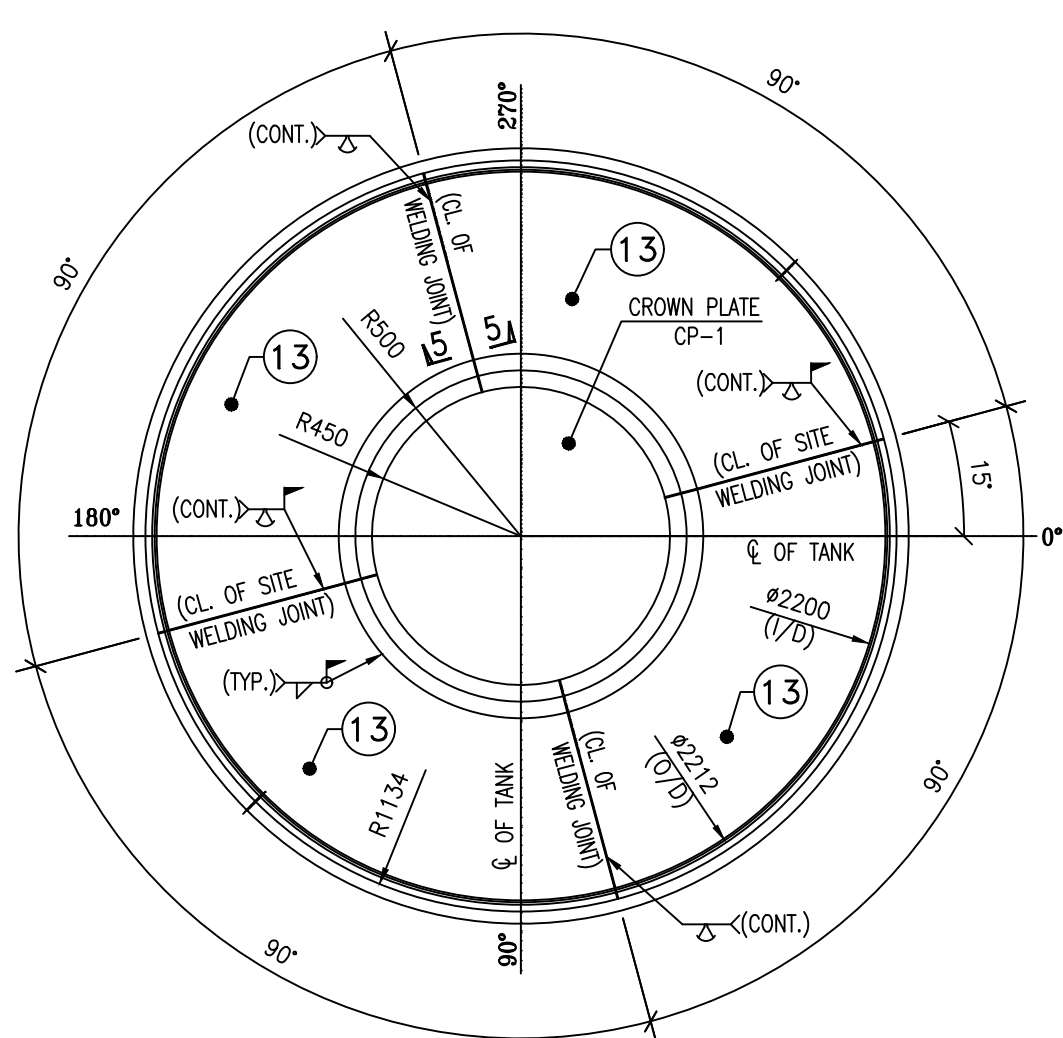
For production
REF.-PR: QA:590 For painting
REF.-PR: QA:500 For untol. dims.



DETAIL OF CURB ANGLE MKD. CA-1

(REQD. 1 NO. PER TANK)

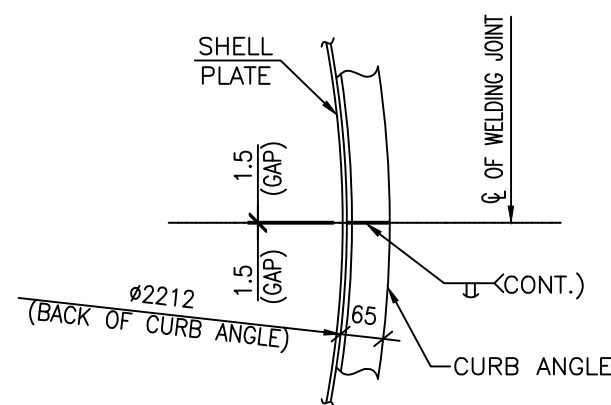
(SCALE-1:20)



DEVELOPMENT OF ROOF PLATE MKD. RP-1

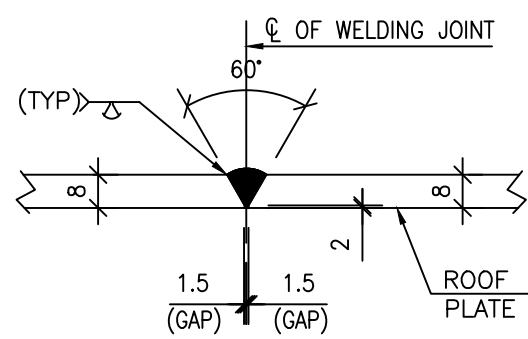
(REQD. 1 NO. PER TANK)

(SCALE 1:20)



DETAIL-'D4'

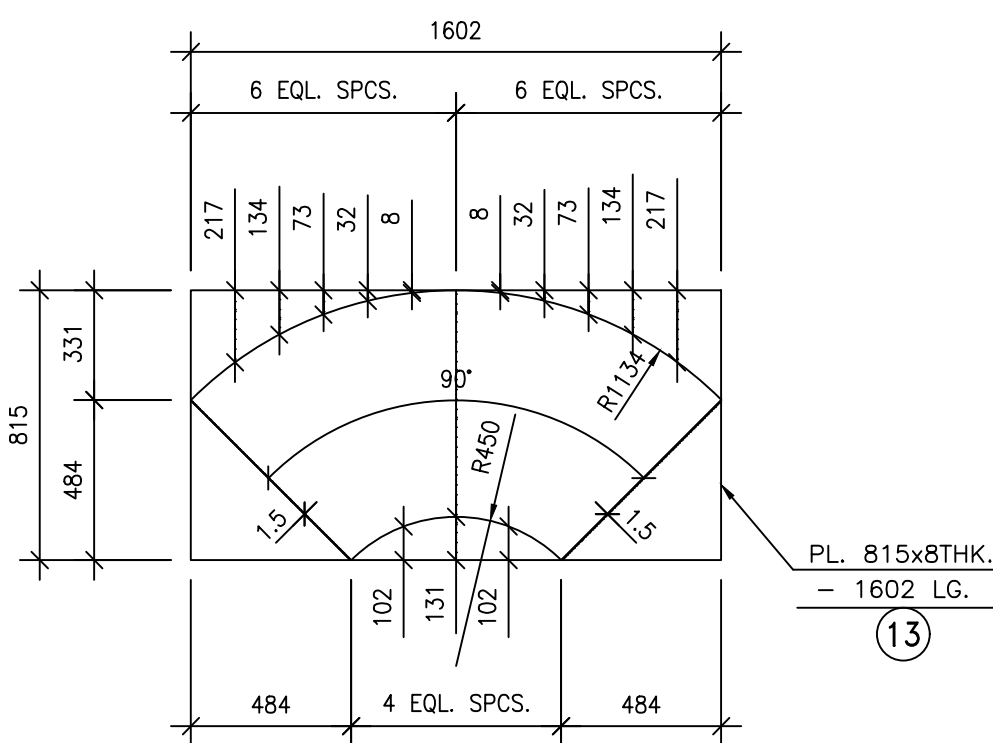
(SCALE-1:10)



SECTION 5-5

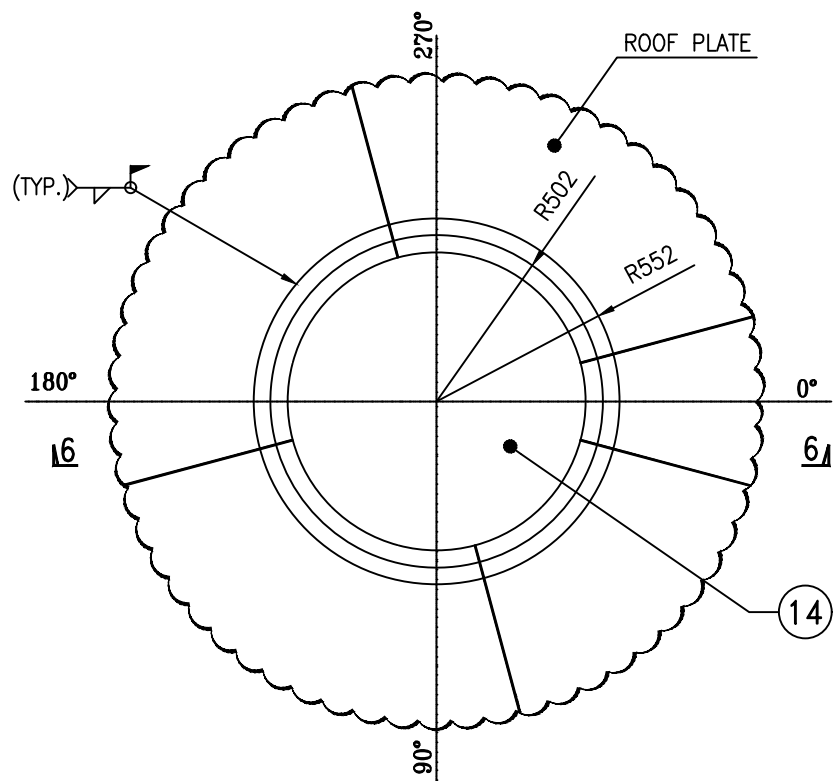
(SCALE-1:5)

BILL OF MATERIALS								
ERECTION MKD.	ITEM NO.	SECTION	LENGTH IN mm.	NOS. REQD.	UNIT WT. (Kgs./m/m2)	TOTAL WT. (Kgs.)	QTY. REQD.	ERECTION MKD. WT. (Kgs.)
CR-1	1	PL.2490x6	3462	2	47.10	812.04		
	2	50 NB (M) PIPE	2200	4	5.03	44.26		
	3	50 NB (M) PIPE	2390	6	5.03	72.13		
	4	50 NB (M) PIPE	754	8	5.03	30.34		
	5	50 NB (M) PIPE	1068	4	5.03	21.49		
CR-2	6	PL.292.5x6	3462	2	47.10	95.39		
	2	50 NB (M) PIPE	2200	4	5.03	44.26		
	3	50 NB (M) PIPE	2390	6	5.03	72.13		
	4	50 NB (M) PIPE	754	8	5.03	30.34		
	5	50 NB (M) PIPE	1068	4	5.03	21.49		
BP-1	7	PL.799.5x8	1633	4	62.80	327.96		
	8	PL.1000x8	1000	1	62.80	62.80		
	9	PL.312x8	500	16	62.80	156.75		
	10	PL.150x10	503	8	78.50	47.38		
	11	PL.120x8	120	8	62.80	7.23		
CA-1	12	L.75x75x8	3574	2	8.90	63.62	1x2	1204.26
						63.62	1x2	127.23
RP-1	13	PL.815x8	1602	4	62.80	327.97		
						327.97	1x2	655.95
CP-1	14	PL.1104x8	1104	1	62.80	76.54		
						76.54	1x2	153.08
GRAND TOTAL WEIGHT =						4,628.28 Kgs	=	4.628 T



DETAIL OF ITEM NO. 13

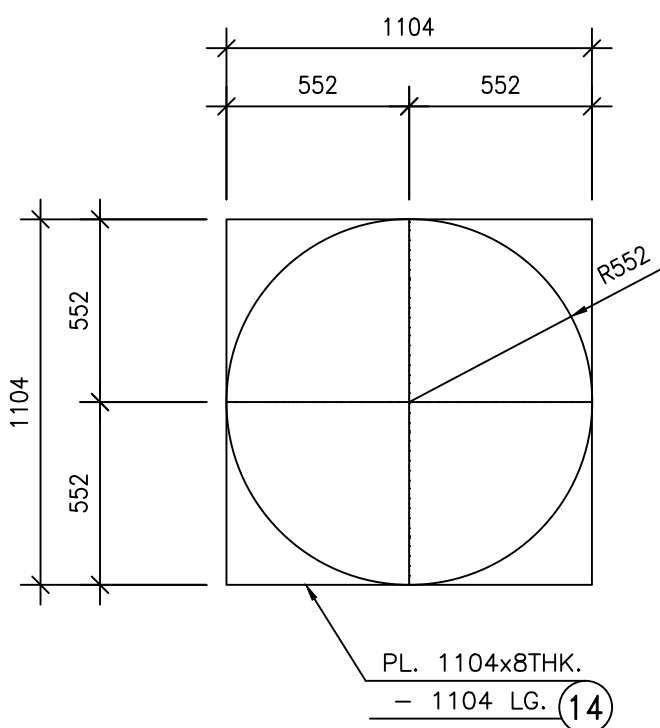
(SCALE 1:20)



DEVELOPMENT OF CROWN PLATE MKD. CP-1

(REQD. 1 NO.)

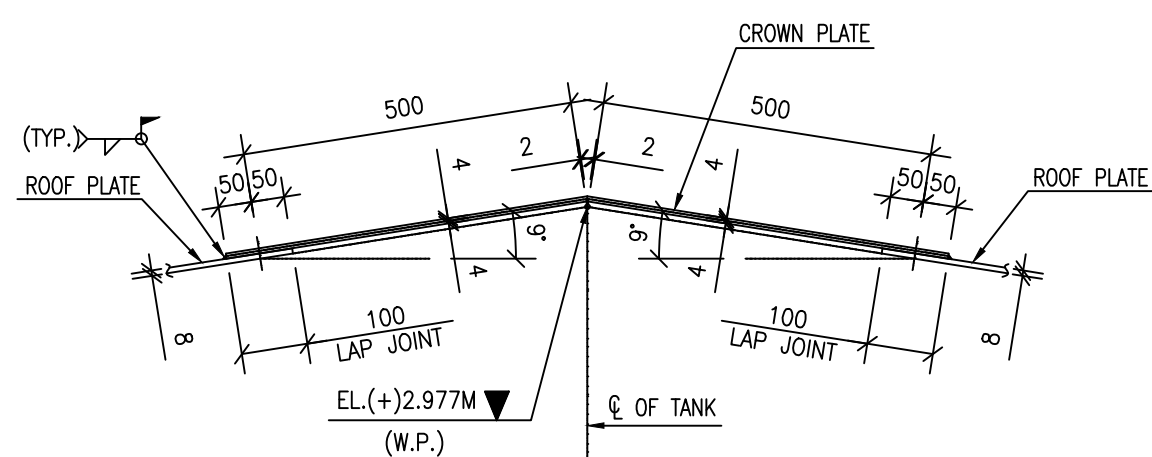
(SCALE 1:20)



DETAIL OF ITEM NO. 14

(SCALE 1:20)

ABSTRACT			
SL. NO.	SECTION	TOTAL WT. (kgs)	SPECIFICATION
1	PL. 6 THK.	1814.86	IS:2062, GR. E250
2	PL. 8 THK.	1918.52	
3	PL. 10 THK.	94.77	
4	L. 75x75x8	127.23	IS:1161
5	50 NB (M) PIPE	672.89	
TOTAL WEIGHT =		4628.28	



SECTION 6-6

(SCALE-1:5)

NOTES:-

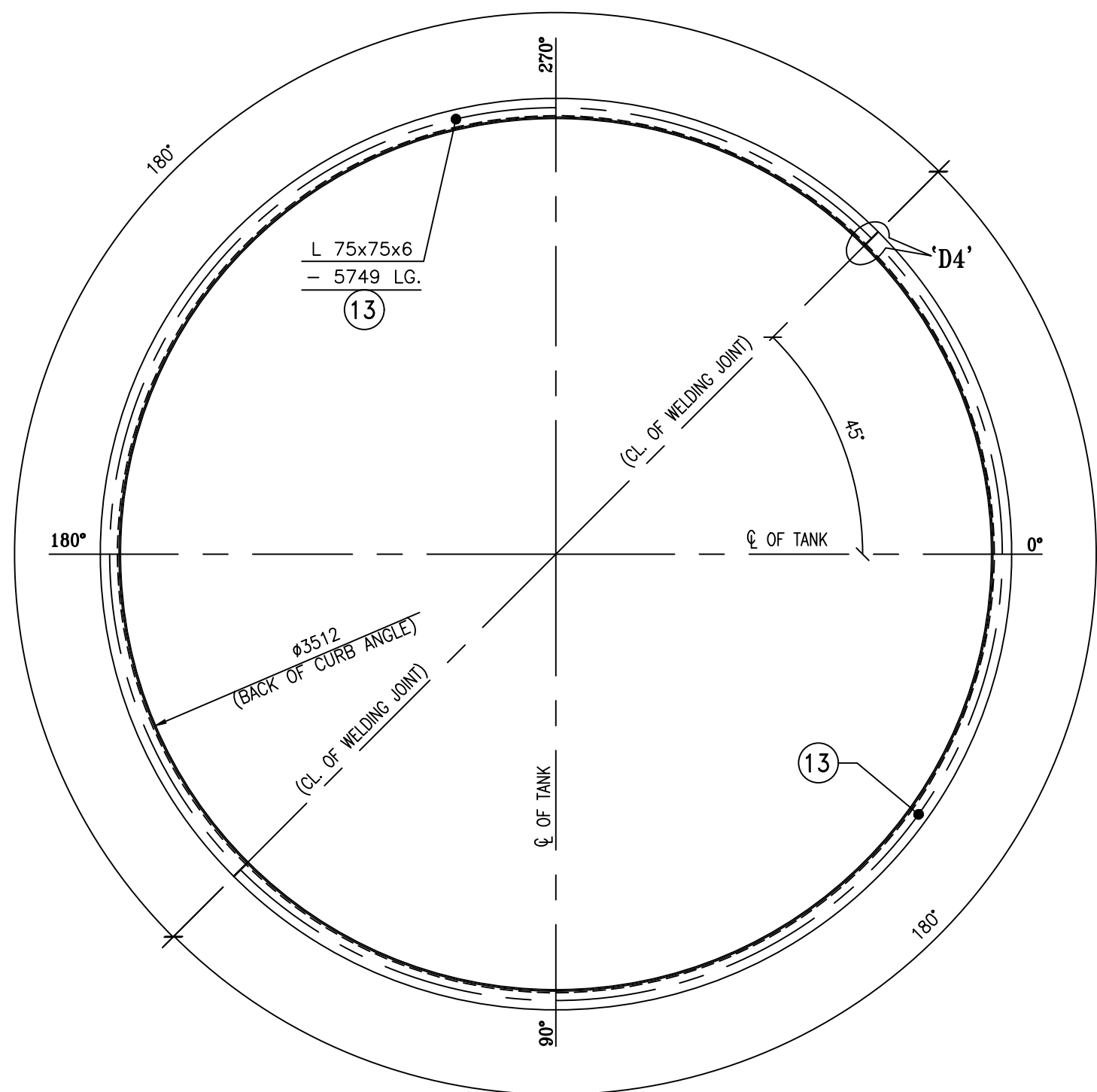
1. ALL DIMENSIONS ARE IN MM. & LEVELS ARE IN M.
2. ALL ERECTION HOLES ARE 17.5Ø FOR M-16 BOLTS U.N.O.
3. ALL PERMANENT HOLES ARE 17.5Ø FOR M-16 BOLTS U.N.O.
4. ALL MEMBERS AND GUSSETS PLATES TO BE CUT AFTER FULL SCALE SHOP LAYOUT BEFORE FABRICATION
5. ALL SHOP WELD ARE 6mm. THICK AND SITE WELD ARE 6mm. THICK. U.N.O.
6. ERECTION HOLES SHOWN THUS
7. PERMANENT HOLES SHOWN THUS
8. ALL ERECTION BOLTS SHALL BE RETAINED IN POSITION
9. THIS DRG. SHALL BE READ IN CONJUNCTION WITH DRG. NO. 0-FW-802-00176

REV	DATE	ALTERED
		CHECKED
ZONE		

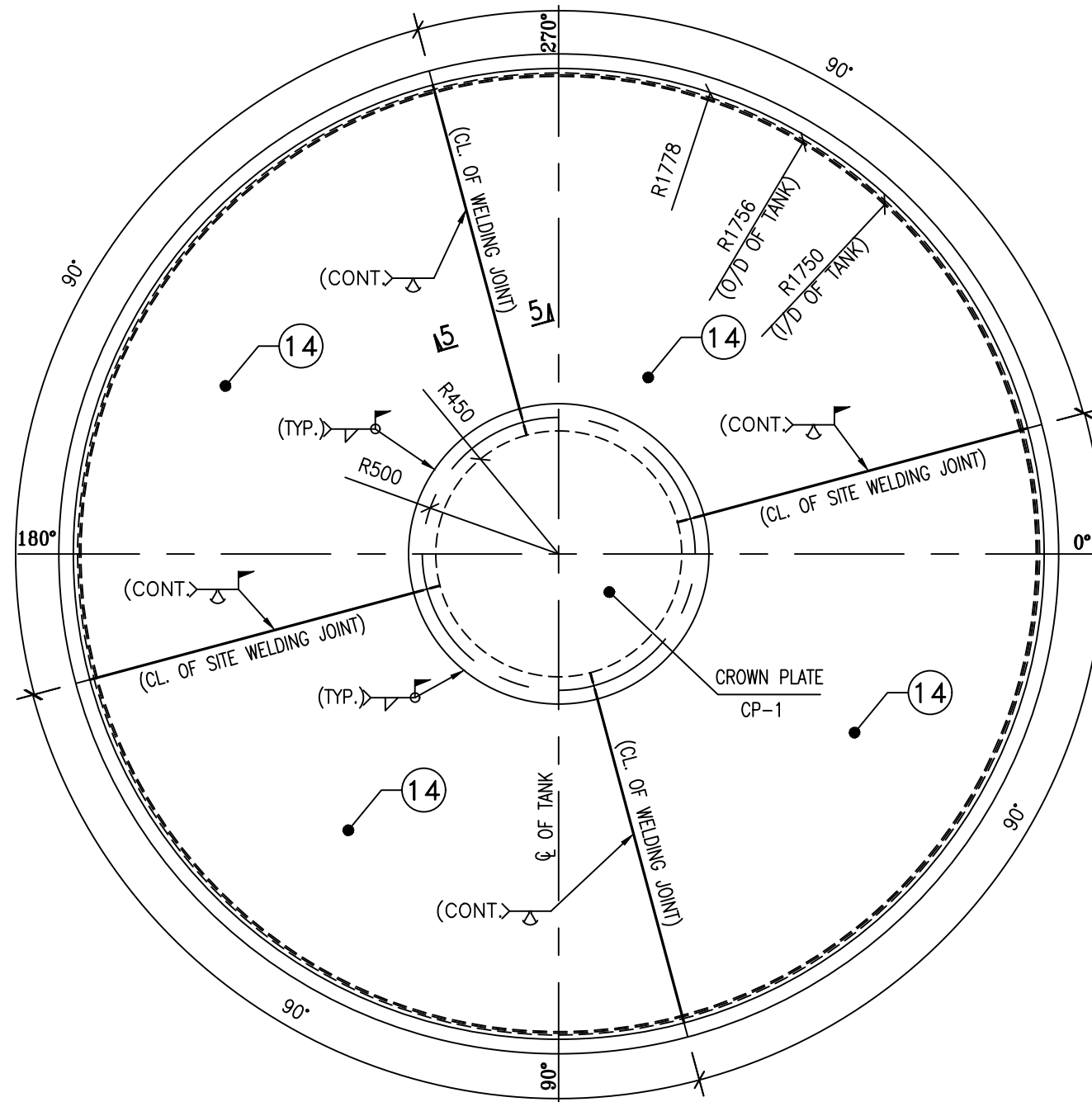
CAUTION: The information on this document is the property of BHARAT HEAVY ELECTRICALS LTD. It must not be used directly or indirectly in any way detrimental to the interest of the company.

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		DRN		NAME	SIGN	DATE	NO.OF VAR.		
 BHARAT HEAVY ELECTRICALS LTD., UNIT: BOILER AUXILIARIES PLANT. RANIPET - 632 406.		CHD		BVREDDY		09.05.18	-		
		APPD		C.GANESH		09.05.18			
DEPT	AQCS	GRADE OF UNTOL.DIM	SCALE	WEIGHT (KG).		REF. TO ASSY/OLD DRG.	ITEM NO.	NO. OF TENS	
CODE	862	PR-QA:500		1:20	-	-	-	-	
TITLE				NEUTRALISATION TANK		CARD CODE		DRAWING NO.	REV
DETAIL OF CURB ANGLE MKD. CA-1, ROOF PLATE MKD. RP-1 & CROWN PLATE MKD. CP-1 WITH B.O.M FOR NEUTRALISATION TANK				U 01		1-FW-802-00369		01	

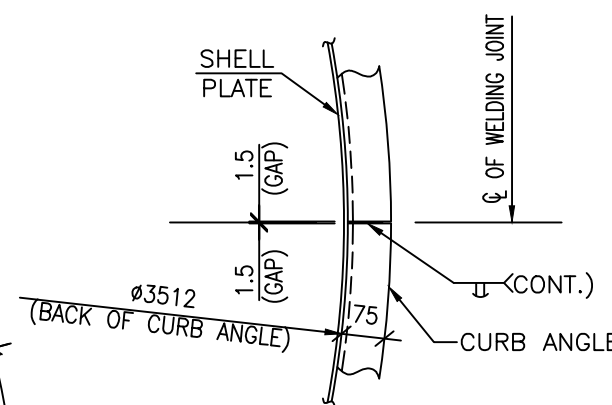
Size A1
12



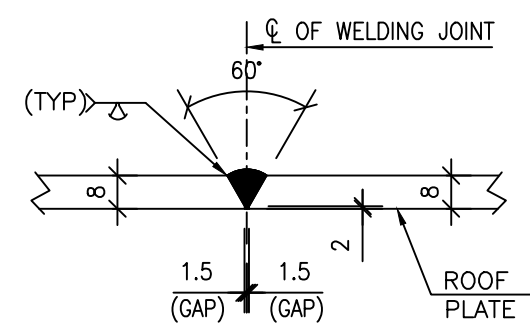
DETAIL OF CURB ANGLE MKD. CA-1
(REQD. 1 NO. PER TANK)
(SCALE-1:20)



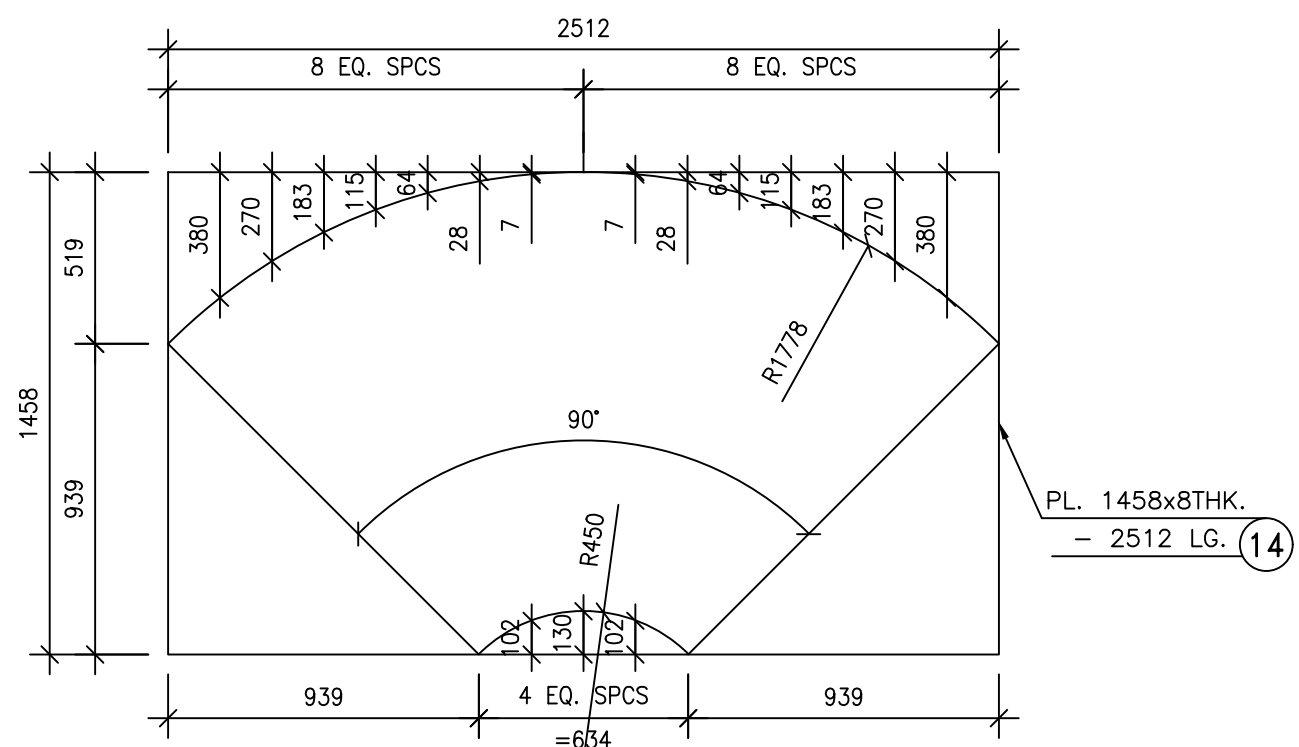
DEVELOPMENT OF ROOF PLATE MKD. RP-1
(REQD. 1 NO. PER TANK)
(SCALE 1:20)



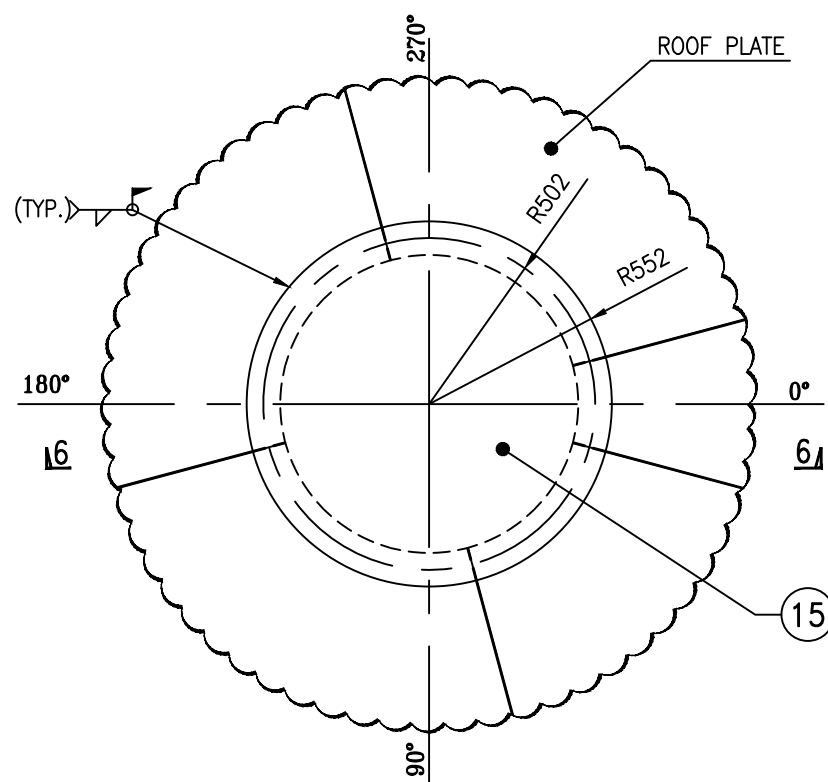
DETAIL - 'D4'
(SCALE-1:10)



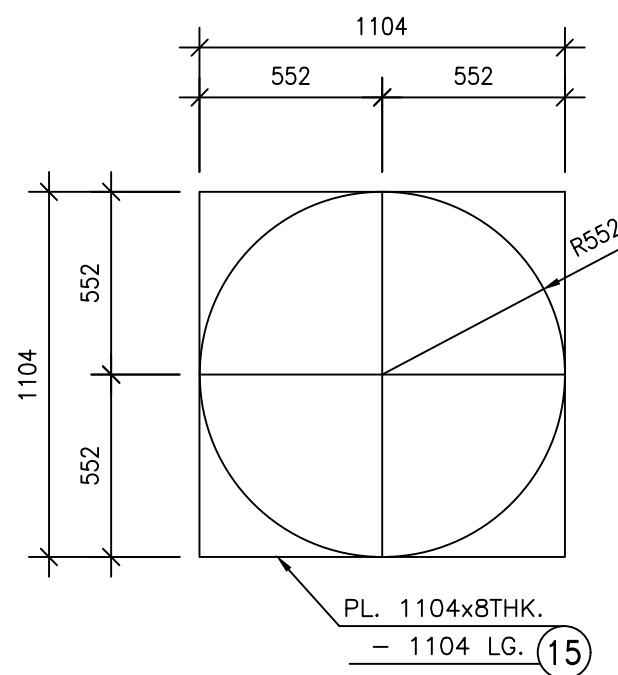
SECTION 5-5
(SCALE-1:5)



DETAIL OF ITEM NO. 14
(SCALE 1:20)



DEVELOPMENT OF CROWN PLATE MKD. CP-1
(REQD. 1 NO.)
(SCALE 1:20)



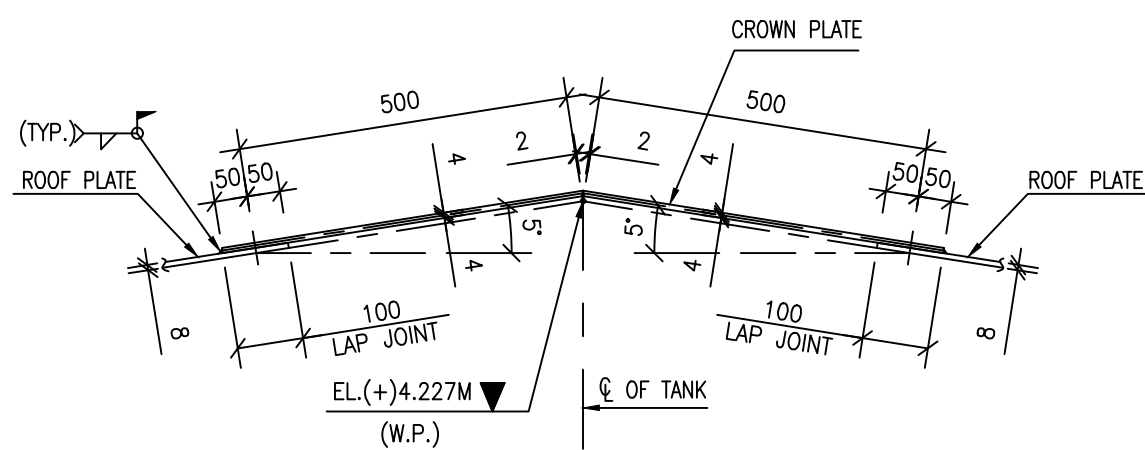
DETAIL OF ITEM NO. 15
(SCALE 1:20)

BILL OF MATERIALS							TOTAL WT. :		9768.25
ERECTION MKD.	ITEM NO.	SECTION	LENGTH IN mm.	NOS. REQD.	UNIT WT. (Kg.)	TOTAL WT. (Kg.)	QTY. REQD.	ERE. MKD. WT. (Kg.)	REMARKS
CR-1	1	PL 2490x6	5507	2	47.10	1291.71			
	2	50 NB (M) PIPE	3500	4	5.03	70.42			
	3	50 NB (M) PIPE	2390	6	5.03	72.13			
	4	50 NB (M) PIPE	1425	8	5.03	57.34			
	5	50 NB (M) PIPE	1718	4	5.03	34.57			
	8	PL 1449.5x8	2552	4	62.80	929.22			
	9	PL 1000x8	1000	1	62.80	62.80			
	10	PL 306x8	500	24	62.80	230.60			
	11	PL 150x12	502	24	94.20	170.07			
	12	PL 120x8	120	24	62.80	21.70			
						2940.56	2	5881.13	
	6	PL 1292.5x6	5507	2	47.10	670.50			
CR-2	2	50 NB (M) PIPE	3500	4	5.03	70.42			
	7	50 NB (M) PIPE	1192.5	6	5.03	35.99			
	4	50 NB (M) PIPE	1425	8	5.03	57.34			
	5	50 NB (M) PIPE	1718	4	5.03	34.57			
						868.81	2	1737.63	
CP-1 RP-1 CA-1	13	L 75X75X6	5749	2	6.80	78.19			
						78.19	2	156.37	
	14	PL 1458x8	2512	4	62.80	920.02			
CP-1						920.02	2	1840.04	
	15	PL 1104x8	1104	1	62.80	76.54			
						76.54	2	153.08	
GRAND TOTAL WEIGHT = 9768.25 KG. = 9.768 T									

ABSTRACT			
SL. NO.	SECTION	TOTAL WT. (Kg.)	SPECIFICATION
1	L 75X75X6	156.37	IS:2062,GR.E250
2	50 NB (M) PIPE	865.65	IS:1181
3	PL 12 THK	340.14	IS:2062,GR.E250
4	PL 8 THK	4481.77	IS:2062,GR.E250
5	PL 6 THK	3924.41	IS:2062,GR.E250
TOTAL WEIGHT = 9.768 T			

THIS DRAWING SHALL BE READ ALONG WITH
0-FW-800-00680

SHEET 2 OF 2



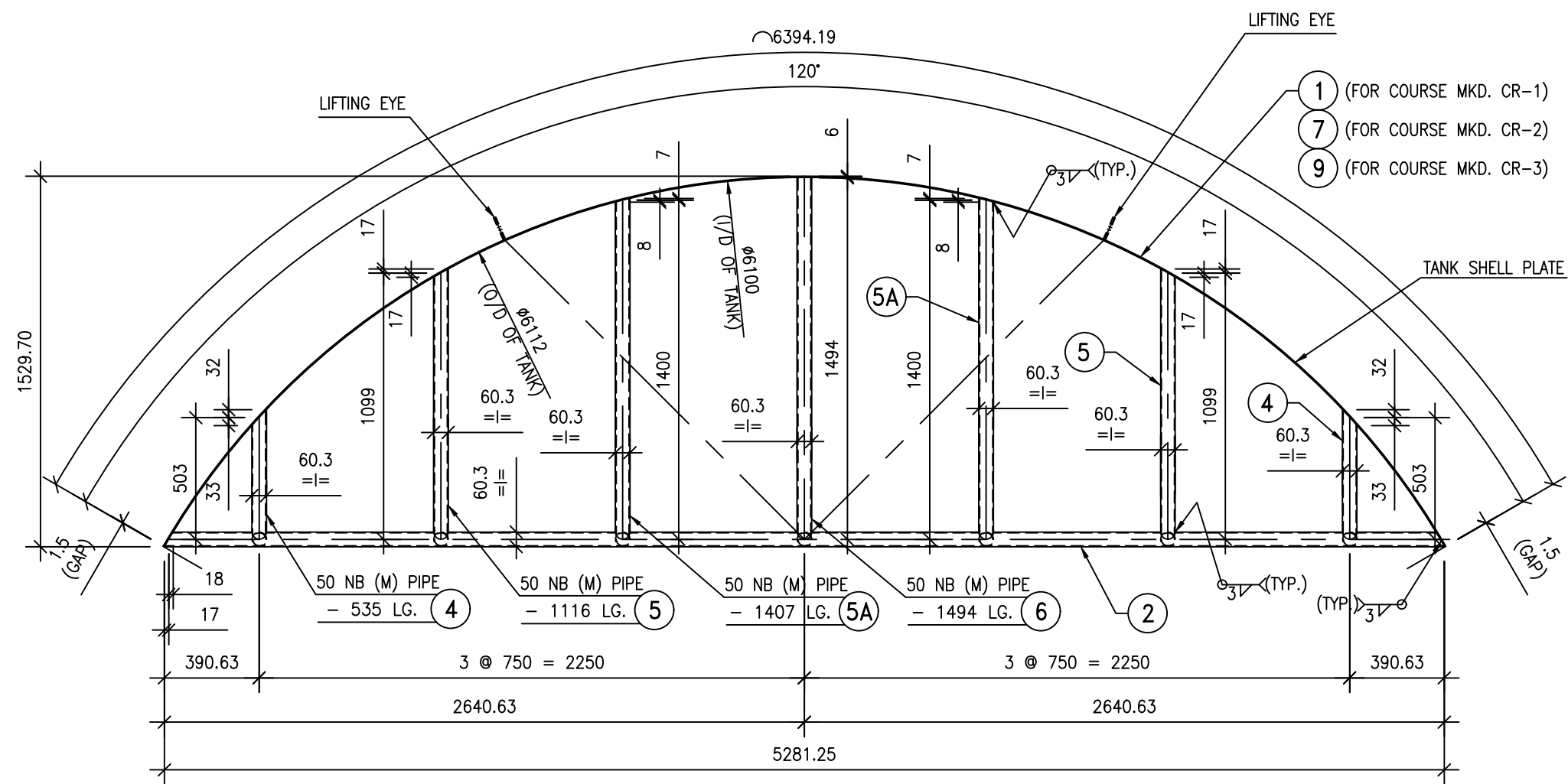
SECTION 6-6
(SCALE-1:5)

REV	DATE	ALTERED
ZONE		CHECKED

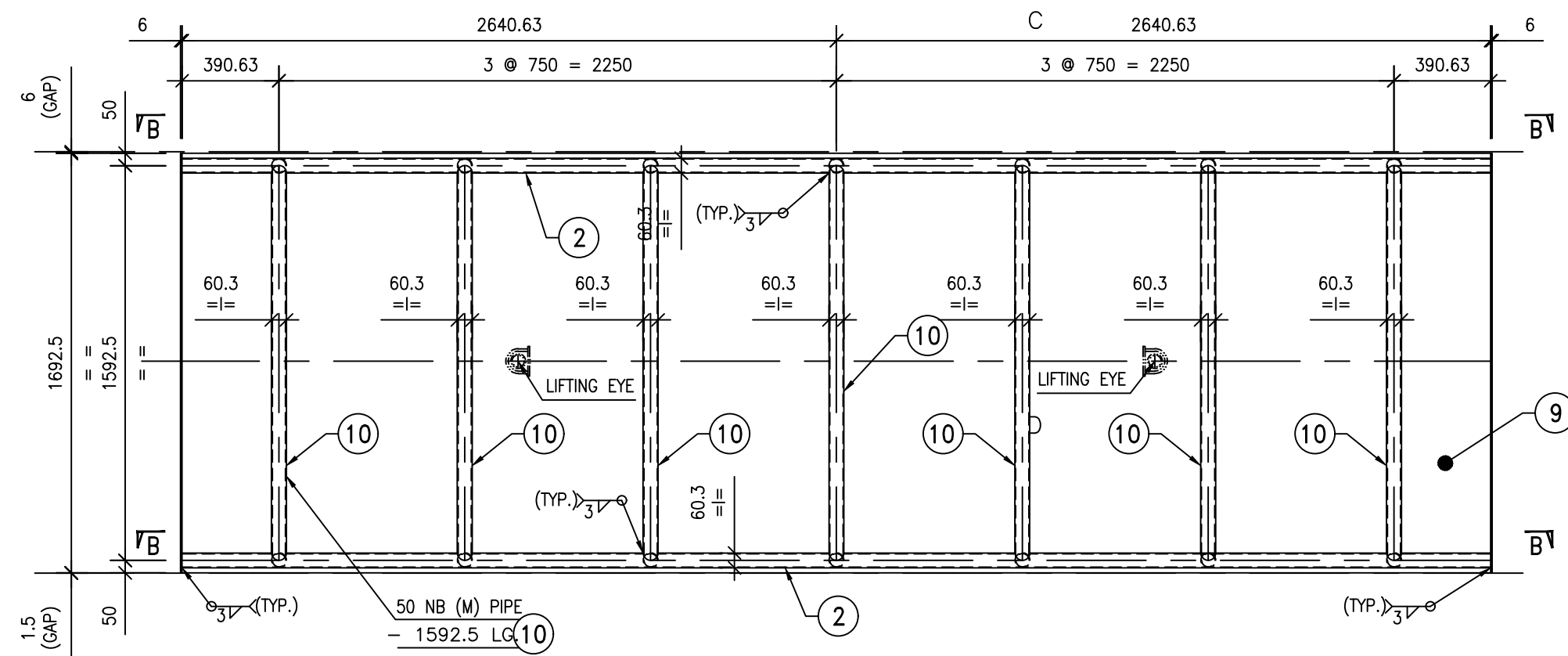
CAUTION: The information on this document is the property of BHARAT HEAVY ELECTRICALS LTD. and must not be divulged to the public in any way detrimental to the interest of the company.		TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT				DRN	NAME	SIGN	DATE	NO. OF VAR.
		BHARAT HEAVY ELECTRICALS LTD., UNIT: BOILER AUXILIARIES PLANT, RANIPET - 632 406.				CGD	M.K.NAHAK		24/12/18	-
		DEPT. AQCS GRADE OF UNTOL.DIM SCALE WEIGHT (KG). REF. TO ASSY/OLD DRG. ITEM NO. NO. OF PAGES				APPD	CG		24/12/18	-
		CODE 862 PR-QA:500								
TITLE		CARD CODE		DRAWING NO.		REV				
CLARIFIED WATER (CAKE WASH) TANK		U 01		1-FW-800-00791				00		

1-FW-744-00792
DRAWING NO.

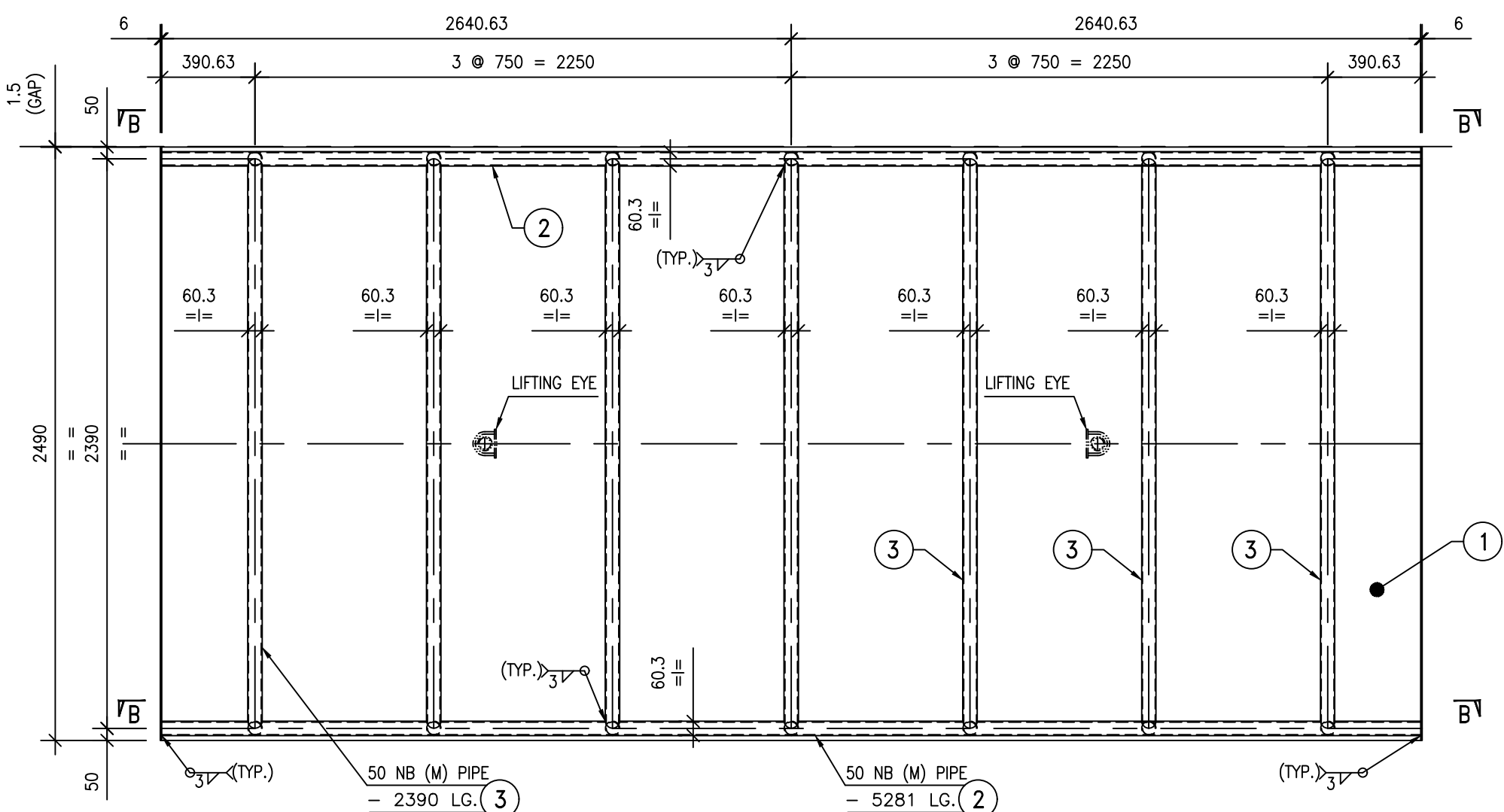
All dimensions are in millimetres
For production
REF.-PR:QA:590 For painting
REF.-PR:QA:500 For untol. dimns.



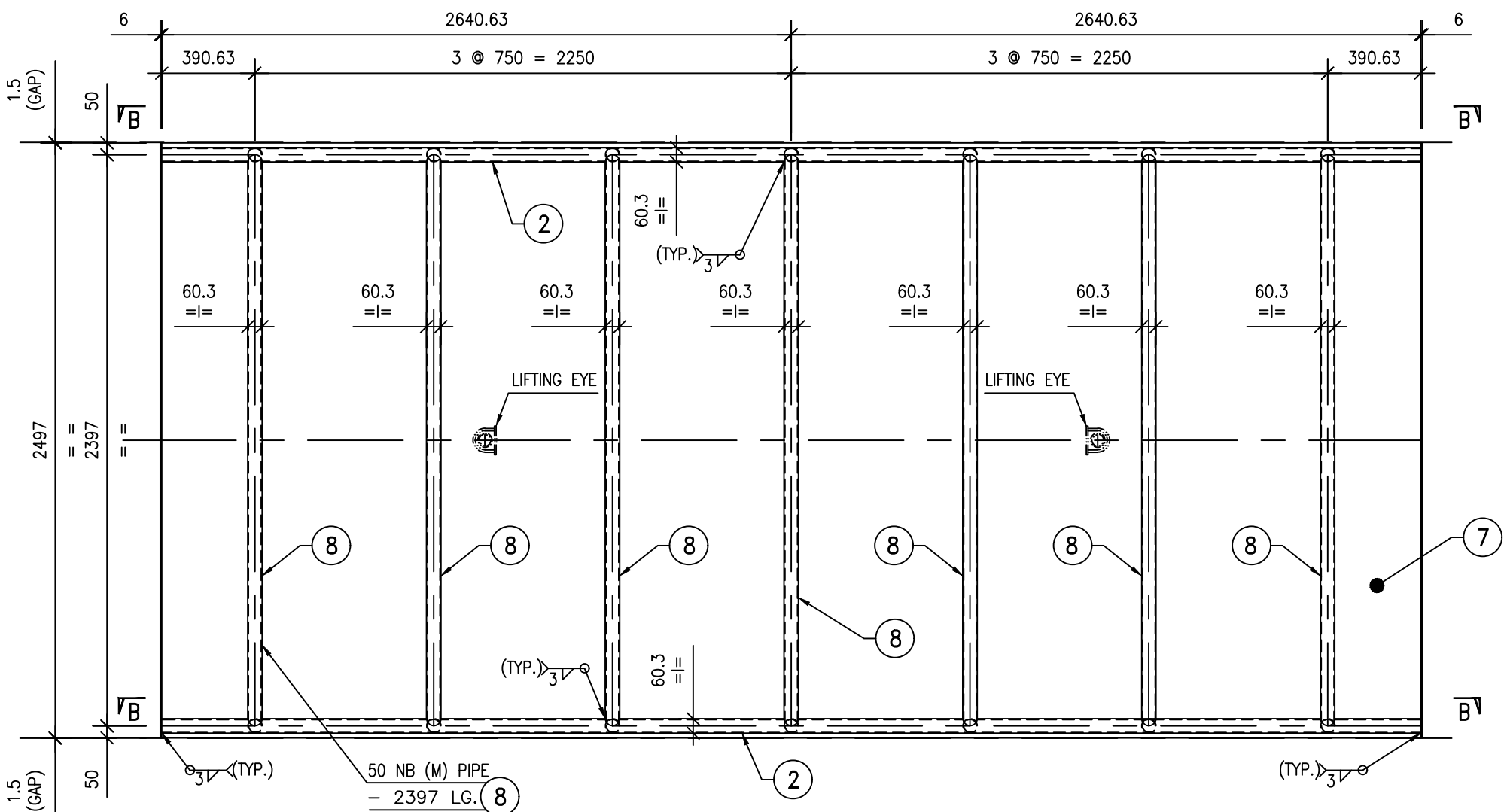
PLAN B-B
(SCALE-1:20)



TRANSPORT STIFFENER ARRANGEMENT FOR COURSE MKD. CR-3
(REQD. 3 NOS. PER TANK)



TRANSPORT STIFFENER ARRANGEMENT FOR COURSE MKD. CR-1
(REQD. 3 NOS. PER TANK)



TRANSPORT STIFFENER ARRANGEMENT FOR COURSE MKD. CR-2
(REQD. 3 NOS. PER TANK)

BILL OF MATERIALS							TOTAL WT. :		14323.31
ERECTION MKD.	ITEM NO.	SECTION	LENGTH IN mm.	NOS. REQD.	UNIT WT. (Kg.)	TOTAL WT. (Kg.)	QTY. REQD.	ERE. MKD. WT. (Kg.)	REMARKS
CR-1	1	PL.2490x6	6393	3	47.10	2249.29			
	2	50 NB (M) PIPE	5281	6	5.03	159.38			
	3	50 NB (M) PIPE	2390	21	5.03	252.46			
	4	50 NB (M) PIPE	535	12	5.03	32.29			
	5	50 NB (M) PIPE	1116	12	5.03	67.36			
	5A	50 NB (M) PIPE	1407	12	5.03	84.93			
CR-2	6	50 NB (M) PIPE	1494	6	5.03	45.09			
						2890.80	1	2890.80	
	7	PL.2497x6	6391	3	47.10	2254.91			
	2	50 NB (M) PIPE	5281	6	5.03	159.38			
	8	50 NB (M) PIPE	2397	21	5.03	253.20			
	4	50 NB (M) PIPE	535	12	5.03	32.29			
CR-3	5	50 NB (M) PIPE	1116	12	5.03	67.36			
	5A	50 NB (M) PIPE	1407	12	5.03	84.93			
	6	50 NB (M) PIPE	1494	6	5.03	45.09			
						2897.16	1	2897.16	
	9	PL.1692.5x6	6391	3	47.10	1528.41			
	2	50 NB (M) PIPE	5281	6	5.03	159.38			
BP-1	10	50 NB (M) PIPE	1592.5	21	5.03	168.22			
	4	50 NB (M) PIPE	535	12	5.03	32.29			
	5	50 NB (M) PIPE	1116	12	5.03	67.36			
	5A	50 NB (M) PIPE	1407	12	5.03	84.93			
	6	50 NB (M) PIPE	1494	6	5.03	45.09			
						2085.68	1	2085.68	
CA-1	11	PL.2179x8	2374	8	62.80	2598.89			
	12	PL.2000x8	2000	1	62.80	251.20			
	13	PL.306x8	500	40	62.80	384.34			
	14	PL.150x16	501	20	125.60	188.78			
	15	PL.120x8	120	20	62.80	18.09			
						3441.29	1	3441.29	
RP-1	16	L 75X75X6	4851	4	6.80	131.95			
						131.95	1	131.95	
	17	PL.2199x8	2352	8	62.80	2598.44			
						2598.44	1	2598.44	
	18	PL.2104x8	2104	1	62.80	278.00			
						278.00	1	278.00	
GRAND TOTAL WEIGHT =14323.31 KG. = 14.323 T									

ABSTRACT			
SL. NO.	SECTION	TOTAL WT. (Kg.)	SPECIFICATION
1	L 75X75X6	131.95	IS:2062,GR.E250
2	50 NB (M) PIPE	1841.02	IS:1161
3	PL 16 THK	188.78	IS:2062,GR.E250
4	PL 8 THK	6128.95	IS:2062,GR.E250
5	PL 6 THK	8032.61	IS:2062,GR.E250
TOTAL WEIGHT =14323.31 KG.			

THIS DRAWING SHALL BE READ ALONG WITH
0-FW-744-00681
0-FW-744-00682

SHEET 3 OF 3

REV	DATE	ALTERED
		CHECKED

CAUTION: The information on this document is the property of BHARAT HEAVY ELECTRICALS LTD. and must not be used directly or indirectly in any way detrimental to the interest of the company.		TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT	
		BHARAT HEAVY ELECTRICALS LTD., UNIT: BOILER AUXILIARIES PLANT, RANIPET - 632 406.	
DEPT	AQCS	GRADE OF UNTOL.DIM	SCALE
CODE	862	PR:QA:500	
TITLE		WEIGHT (KG.)	REF. TO ASSY/OLD DRG.
FILTRATE WATER TANK		-	
CARD CODE	U 01	DRAWING NO.	REV
		1-FW-744-00792	00

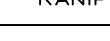
Size A1
12



ABSTRACT			
SL. NO.	SECTION	TOTAL WT. (Kg.)	SPECIFICATION
1	L 75X75X6	144.99	IS:2062,GR.E250
2	50 NB (M) PIPE	1929.74	IS:1161
3	PL 16 THK	226.53	IS:2062,GR.E250
4	PL 8 THK	18082.37	IS:2062,GR.E250
5	PL 6 THK	3366.36	IS:2062,GR.E250
TOTAL WEIGHT = 16469.99 KG.			

THIS DRAWING SHALL BE READ ALONG WITH
0-FW-747-00690
0-FW-747-00691

SHEET 3 OF 3

CAUTION: The information on this drawing is preliminary and may be subject to change without notice. It must not be used directly or indirectly in any way detrimental to the interest of the company.	TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT									
	 BHARAT HEAVY ELECTRICALS LTD., UNIT: BOILER AUXILIARIES PLANT. RANIPET — 632 406.					DRN CHD	NAME M.K. NAHAK	SIGN	DATE 24/12/18	NO. OF VAR.
						APPD	C.G.		24/12/18	—
									24/12/18	
DEPT CODE		AQCS 862	GRADE OF UNTOL.DIM PR: AQ: 500	 SCALE	WEIGHT (KG). —	REF. TO ASSY/OLD DRG. —			ITEM NO. —	NO. OF ITEMS
TITLE SECONDARY HYDROCYCLONE FEED TANK						CARD CODE U 01	DRAWING NO. 1-FW-747-00793			REV 00

SECTION VII - PROJECT WISE MATERIAL Quantity - FOR Enq: 658015E / 21-09-2019 NIT 48940

RM DESCRIPTION	MATL. SPEC	EMERGENCY QUENCH WATER TANK	LIMESTONE SLURRY STORAGE TANK	AUXILIARY ABSORBER TANK	FILTRATE TANK	WASTE WATER TANK	HYDROCLON E WASTE WATER TANK	PROCESS WATER TANK	CLARIFIED WATER TANK	NEUTRALISA TION TANK & ACCESSOR	GRAND TOTAL
		FW226	FW742	FW743	FW744	FW745	FW747	FW748	FW800	FW802	
ERW60.3X3.6	IS1161	10.8	65.9	28.1	5.3	8.6	7.3	10.1	3.7	2.7	142.5
ISA 65X65X6	IS2062GRA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1
ISA 75X75X6	IS2062GRA	1.0	1.7	0.8	0.4	0.4	0.4	0.7	0.5	0.0	6.0
ISA 75X75X8	IS2062GRA	0.0	0.6	0.3	0.1	0.2	0.3	0.3	0.2	0.5	2.5
ISA 150X150X12	IS2062GRA	0.0	7.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	9.2
Plate 6 mm	IS2062GRA	0.0	66.1	0.0	18.6	25.4	22.3	41.5	18.0	7.3	199.3
Plate 7 mm	IS2062GRA	0.0	28.7	54.6	0.0	0.0	0.0	0.0	0.0	0.0	83.3
Plate 8 mm	IS2062GRA	60.3	267.8	127.2	19.8	36.3	30.5	40.8	20.4	7.7	610.8
Plate 10 mm	IS2062GRA	0.0	66.0	32.2	0.5	1.5	0.5	1.5	0.1	0.4	102.7
Plate 12 mm	IS2062GRA	2.3	59.9	28.0	0.0	0.0	0.0	0.0	0.6	0.0	90.8
Plate 16 mm	IS2062GRA	0.0	68.4	5.7	0.3	0.2	0.3	0.2	0.2	0.0	75.2
Plate 20 mm	IS2062GRA	2.6	0.0	0.0	0.2	0.8	0.5	0.8	0.0	0.0	4.8
Plate 25 mm	IS2062GRB	46.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.6
Plate 28 mm	IS2062GRB	0.0	2.1	1.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1
Plate 32 mm	IS2062GRB	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0
Plate 40 mm	IS2062GRB	0.0	5.7	3.8	0.0	0.0	0.0	0.0	0.0	0.0	9.4
ISMC150	IS2062GRA	6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.5
ISMC200	IS2062GRA	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2
Grand Total		131.2	641.8	283.8	45.3	73.4	62.1	95.9	43.6	18.5	1395.8

Project wise material Summary												
RM DESCRIPTION	MATL. SPEC	Mouda(G503-4)		N K Pura (G601-3)			Barh St-I (G604 - 6)			Barh st-II (G607 -8)		Grand Total
ERW60.3X3.6	IS1161	29	1	41	1	1	36	1	1	30	1	143
ISA 150X150X12	IS2062GRA			3			3			3		9
ISA 65X65X6	IS2062GRA	0										0
ISA 75X75X6	IS2062GRA	0	0	2	0	0	2	0	0	2	0	6
ISA 75X75X8	IS2062GRA	2										2
ISA75X75X8	IS2062GRA	0		0			0			0		1
ISMC150	IS2062GRA	1	1	1	1	1	1	1	1	1	1	6
ISMC200	IS2062GRA	0	0	0	0	0	0	0	0	0	0	1
Plate 10 mm	IS2062GRA	25		28			26			24		103
Plate 12 mm	IS2062GRA	0	0	32	0	0	29	0	0	27	0	91
Plate 16 mm	IS2062GRA	1		36			33			6		75
Plate 20 mm	IS2062GRA	0	0	1	0	0	1	0	0	1	0	5
Plate 25 mm	IS2062GRB	5	5	5	5	5	5	5	5	5	5	47
Plate 28 mm	IS2062GRB	3										3
Plate 32 mm	IS2062GRB									2		2
Plate 40 mm	IS2062GRB			4			4			1		9
Plate 6 mm	IS2062GRA	36	0	55	0	0	58	0	0	50	0	199
Plate 7 mm	IS2062GRA	43		13			14			14		83
Plate 8 mm	IS2062GRA	122	6	189	6	6	141	6	6	123	6	611
Grand Total		268	13	408	13	13	354	13	13	287	13	1396

GROUP DESCRIPTION	Vendor Name	TRANSPZONE	COUNTRY	Nature	Vendor Type
Fasteners	NIRMAL ENGINEERING WORKS	TRICHY	India	PERMANENT	Manufacturer
Fasteners	INDAID ENGINEERS PVT LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	STUD CRAFT (INDIA) PVT. LTD.,	PUNE	India	PERMANENT	Manufacturer
Fasteners	ANTONY INDUSTRIES,		India	PERMANENT	Manufacturer
Fasteners	BHARAT ENGINEERING	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	BALSARA ENGINEERING PRODUCTS LTD	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	ORBIT	TRICHY	India	PERMANENT	Manufacturer
Fasteners	J.C INDUSTRIES	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	SARASWATHI METAL FAB	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	GANGAI INDUSTRIES,	PUDUKKOTTA	India	PERMANENT	Manufacturer
Fasteners	SHRI SARAVANA ENGG WORKS		India	PERMANENT	Manufacturer
Fasteners	POWER PIPING CO.	TRICHY	India	PERMANENT	Manufacturer
Fasteners	LOKHANDWALA ENGG CO	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	BHARAT ENGINEERING,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	VEL INDIA STRUCTRUALS	RANIPET	India	PERMANENT	Manufacturer
Fasteners	KANNAPIRAN ENGINEERING INDUSTRIES	TRICHY	India	PERMANENT	Manufacturer
Fasteners	BALAMURUGAN ENGG. WORKS,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	JMS ENGINEERING	COIMBATORE	India	PERMANENT	Manufacturer
Fasteners	VINAYAK BUSINESS PVT LTD.	CALCUTTA	India	PERMANENT	Manufacturer
Fasteners	BASIL FASTENER INDUSTRIES	BARODA	India	PERMANENT	Manufacturer
Fasteners	M A TRADE SYNDICATE	CHENNAI	India	PERMANENT	Trader
Fasteners	BALAMURUGAN ENGG. WORKS,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	FAST TECH ENGINEERS PVT LTD.	THANE	India	PERMANENT	Manufacturer
Fasteners	J.C INDUSTRIES	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	JK FITWELL PVT LTD.	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	MEHTA TRADING COMPANY,	MUMBAI	India	PERMANENT	Manufacturer
Fasteners	SAHAS HARDWARE STORES,	CHENNAI	India	PERMANENT	Trader
Fasteners	BHARAT ENGINEERING,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	SREE PAVITHRA INDUSTRIES,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	SREE PAVITHRA INDUSTRIES,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	SRI VENGATACHALAM ENGG WORKS(P)LTD		India	PERMANENT	Manufacturer
Fasteners	SAHAS HARDWARE STORES,	CHENNAI	India	PERMANENT	Trader
Fasteners	BHARAT ENGINEERING,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	MEHTA TRADING COMPANY,	MUMBAI	India	PERMANENT	Manufacturer

Fasteners	FAST TECH ENGINEERS PVT LTD.	THANE	India	PERMANENT	Manufacturer
Fasteners	VARDHMAN INDUTRIAL FASTENERS	DELHI	India	PERMANENT	Manufacturer
Fasteners	BALAMURUGAN ENGG. WORKS,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	JK FITWELL PVT LTD.	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	M A TRADE SYNDICATE	CHENNAI	India	PERMANENT	Trader
Fasteners	J.C INDUSTRIES	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	TRIPLEFAST MIDDLE EAST LTD		Utd.Arab Emir.	PERMANENT	Manufacturer
Fasteners	VINAYAK BUSINESS PVT LTD.	CALCUTTA	India	PERMANENT	Manufacturer
Fasteners	MOD FORGE PVT.LIMITED	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	GANGAI INDUSTRIES,	PUDUKKOTTA	India	PERMANENT	Manufacturer
Fasteners	B.N.INDUSTRIES,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	KANNAPIRAN ENGINEERING INDUSTRIES	TRICHY	India	PERMANENT	Manufacturer
Fasteners	PERFECT TOOL & DIE MAKERS PVT LTD.	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	SREENIVASA ENGINEERING WORKS,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	CAUVERY ENGINEERING WORKS	PUDUKKOTTA	India	PERMANENT	Manufacturer
Fasteners	LOKHANDWALA ENGG CO	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	BHARAT ENGINEERING,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	POWER PIPING CO.	TRICHY	India	PERMANENT	Manufacturer
Fasteners	J.C INDUSTRIES	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	BALAMURUGAN ENGG. WORKS,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	JAYASREE INDUSTRIES		India	PERMANENT	Manufacturer
Fasteners	REGIONAL ENGG. WORKS		India	PERMANENT	Manufacturer
Fasteners	FRONTIER TOOLINGS	KANPUR	India	PERMANENT	Manufacturer
Fasteners	PERFECT TOOL & DIE MAKERS PVT LTD.	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	MOD FORGE PVT.LIMITED	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	BALAMURUGAN ENGG. WORKS,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	J.C INDUSTRIES	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	SREENIVASA ENGINEERING WORKS,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	BHARAT ENGINEERING,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	LOKHANDWALA ENGG CO	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	SRI VENGATACHALAM ENGG WORKS(P)LTD		India	PERMANENT	Manufacturer
Fasteners	J.C INDUSTRIES	CHENNAI	India	PERMANENT	Manufacturer

Fasteners	SREENIVASA ENGINEERING WORKS,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	THOMSON ENGG WORKS	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	SRI VENGATACHALAM ENGG WORKS(P)LTD		India	PERMANENT	Manufacturer
Fasteners	JK FITWELL PVT LTD.	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	BHARAT ENGINEERING,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	BALAMURUGAN ENGG. WORKS,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	ORBIT	TRICHY	India	PERMANENT	Manufacturer
Fasteners	JAYASREE INDUSTRIES		India	PERMANENT	Manufacturer
Fasteners	TECHNO INDUSTRY	CALCUTTA	India	PERMANENT	Manufacturer
Fasteners	SPRING SUPPORTS MANUFACTURING	CALCUTTA	India	PERMANENT	Manufacturer
Fasteners	SHRI SARAVANA ENGG WORKS		India	PERMANENT	Manufacturer
Fasteners	AAA SUPPORTS PVT LTD.,	MUMBAI	India	PERMANENT	Manufacturer
Fasteners	JMS ENGINEERING	COIMBATORE	India	PERMANENT	Manufacturer
Fasteners	KANNAPIRAN ENGINEERING INDUSTRIES	TRICHY	India	PERMANENT	Manufacturer
Fasteners	JMS ENGINEERING	COIMBATORE	India	PERMANENT	Manufacturer
Fasteners	SHRI SARAVANA ENGG WORKS		India	PERMANENT	Manufacturer
Fasteners	PERFECT TOOL & DIE MAKERS PVT LTD.	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	BALAMURUGAN ENGG. WORKS,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	BHARAT ENGINEERING,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	KEMS FORGINGS LIMITED	BANGALORE	India	PERMANENT	Manufacturer
Fasteners	LOKHANDWALA ENGG CO	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	J.C INDUSTRIES	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	SREENIVASA ENGINEERING WORKS,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	TECHNO INDUSTRY	CALCUTTA	India	PERMANENT	Manufacturer

Fasteners	KANNAPIRAN ENGINEERING INDUSTRIES	TRICHY	India	PERMANENT	Manufacturer
Fasteners	THILLAI ENGINEERING WORKS,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	BUMPER INDIA PVT LTD	MUMBAI	India	PERMANENT	Manufacturer
Fasteners	VETRIVEL FORGINGS,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	SKF INDIA LTD.	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	MOD FORGE PVT.LIMITED	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	TECHNO INDUSTRY	CALCUTTA	India	PERMANENT	Manufacturer
Fasteners	PERFECT TOOL & DIE MAKERS PVT LTD.	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	J.C INDUSTRIES	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	BALAMURUGAN ENGG. WORKS,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	SREENIVASA ENGINEERING WORKS,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	BHARAT ENGINEERING,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	LOKHANDWALA ENGG CO	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	J.C INDUSTRIES	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	TECHNO INDUSTRY	CALCUTTA	India	PERMANENT	Manufacturer
Fasteners	JAYASREE INDUSTRIES		India	PERMANENT	Manufacturer
Fasteners	KANNAPIRAN ENGINEERING INDUSTRIES	TRICHY	India	PERMANENT	Manufacturer
Fasteners	BALAMURUGAN ENGG. WORKS,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	ORBIT	TRICHY	India	PERMANENT	Manufacturer
Fasteners	SREENIVASA ENGINEERING WORKS,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	LOKHANDWALA ENGG CO	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	BHARAT ENGINEERING,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	GANGAI INDUSTRIES,	PUDUKKOTTA	India	PERMANENT	Manufacturer
Fasteners	PERFECT TOOL & DIE MAKERS PVT LTD.	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	SHRI SARAVANA ENGG WORKS		India	PERMANENT	Manufacturer
Fasteners	BALAMURUGAN ENGG. WORKS,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	BHARAT ENGINEERING,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	LOKHANDWALA ENGG CO	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	SRI VENGATACHALAM ENGG WORKS(P)LTD		India	PERMANENT	Manufacturer
Fasteners	SHRI SARAVANA ENGG WORKS		India	PERMANENT	Manufacturer
Fasteners	SREE PAVITHRA INDUSTRIES,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	J.C INDUSTRIES	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	THOMSON ENGG WORKS	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	SREENIVASA ENGINEERING WORKS,	CHENNAI	India	PERMANENT	Manufacturer

Fasteners	BUSTLE ENGINEERING INDUSTRIES,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	HAJI IRON &STEEL WORKS		India	PERMANENT	Manufacturer
Fasteners	VINAYAK BUSINESS PVT LTD.	CALCUTTA	India	PERMANENT	Manufacturer
Fasteners	SREE PAVITHRA INDUSTRIES,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	LOKHANDWALA ENGG CO	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	THOMSON ENGG WORKS	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	FAST TECH ENGINEERS PVT LTD.	THANE	India	PERMANENT	Manufacturer
Fasteners	J.C INDUSTRIES	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	BALAMURUGAN ENGG. WORKS,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	BHARAT ENGINEERING,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	VINAYAK BUSINESS PVT LTD.	CALCUTTA	India	PERMANENT	Manufacturer
Fasteners	JK FITWELL PVT LTD.	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	SRI VENGATACHALAM ENGG WORKS(P)LTD		India	PERMANENT	Manufacturer
Fasteners	VARDHMAN INDUTRIAL FASTENERS	DELHI	India	PERMANENT	Manufacturer
Fasteners	UDEHRA FASTENERS LIMITED,	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	INDUSTRIAL ENGINEERING CORPORATION	THANE	India	PERMANENT	Manufacturer
Fasteners	JK FITWELL PVT LTD.	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	MEHTA TRADING COMPANY,	MUMBAI	India	PERMANENT	Manufacturer
Fasteners	PRESIDENT ENGG.WORKS,	MUMBAI	India	PERMANENT	Manufacturer
Fasteners	MEGA ENGINEERING PVT LTD.,	MUMBAI	India	PERMANENT	Manufacturer
Fasteners	J.J.INDUSTRIES,	MUMBAI	India	PERMANENT	Manufacturer
Fasteners	BHARAT ENGINEERING,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	VINAYAK BUSINESS PVT LTD.	CALCUTTA	India	PERMANENT	Manufacturer
Fasteners	SREE PAVITHRA INDUSTRIES,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	UDEHRA FASTENERS LIMITED,	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	FAST TECH ENGINEERS PVT LTD.	THANE	India	PERMANENT	Manufacturer

Fasteners	SRI VENGATACHALAM ENGG WORKS(P)LTD		India	PERMANENT	Manufacturer
Fasteners	Udehra Fasteners Limited	AMRITSAR	India	PERMANENT	Manufacturer
Fasteners	Kay Hi-Tech Engineers Pvt. Ltd.	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	DEEPAK FASTENERS LIMITED,	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	PRECISION AUTO ENGINEERS	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	New Star Industries	AMRITSAR	India	PERMANENT	Manufacturer
Fasteners	NEXO INDUSTRIES (PVT.) LTD.	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	NEXO INDUSTRIES (PVT.) LTD.	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	SANVIR INDUSTRIES	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	Udehra Mechanical Works	AMRITSAR	India	PERMANENT	Manufacturer
Fasteners	PRECISION AUTO ENGINEERS	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	HARYANA FASTENERS	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	Kay Hi-Tech Engineers Pvt. Ltd.	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	Udehra Fasteners Limited	AMRITSAR	India	PERMANENT	Manufacturer
Fasteners	New Star Industries	AMRITSAR	India	PERMANENT	Manufacturer
Fasteners	HARYANA FASTENERS	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	Kay Hi-Tech Engineers Pvt. Ltd.	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	PRESIDENT ENGG.WORKS,	MUMBAI	India	PERMANENT	Manufacturer
Fasteners	PRECISION AUTO ENGINEERS	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	Udehra Mechanical Works	AMRITSAR	India	PERMANENT	Manufacturer
Fasteners	NEXO INDUSTRIES (PVT.) LTD.	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	KAPURTHALA INDUSTRIAL CORPORATION	AMRITSAR	India	PERMANENT	Manufacturer
Fasteners	New Star Industries	AMRITSAR	India	PERMANENT	Manufacturer
Fasteners	PRECISION AUTO ENGINEERS	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	Udehra Mechanical Works	AMRITSAR	India	PERMANENT	Manufacturer
Fasteners	Udehra Fasteners Limited	AMRITSAR	India	PERMANENT	Manufacturer
Fasteners	HARYANA FASTENERS	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	Pankaj International	AMRITSAR	India	PERMANENT	Manufacturer
Fasteners	VARDHMAN INDUTRIAL FASTENERS	DELHI	India	TRIAL	Manufacturer

Fasteners	RBM INDUSTRIES	AMRITSAR	India	TRIAL	Manufacturer
Fasteners	Kay Hi-Tech Engineers Pvt. Ltd.	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	S R Forgings	AMRITSAR	India	Development	Manufacturer
Fasteners	MORNING STAR INDUSTRIES.,	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	PRESIDENT ENGG.WORKS,	MUMBAI	India	PERMANENT	Manufacturer
Fasteners	SANVIR INDUSTRIES	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	New Star Industries	AMRITSAR	India	PERMANENT	Manufacturer
Fasteners	Souvenir International	AMRITSAR	India	PERMANENT	Manufacturer
Fasteners	NEXO INDUSTRIES (PVT.) LTD.	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	BALAMURUGAN ENGG. WORKS,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	PRECISION AUTO ENGINEERS	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	Kay Hi-Tech Engineers Pvt. Ltd.	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	M/s Hazur Singh & Sons	AMRITSAR	India	PERMANENT	Trader
Fasteners	SAHAS HARDWARE STORES,	CHENNAI	India	PERMANENT	Trader
Fasteners	SAHAS HARDWARE STORES,	CHENNAI	India	PERMANENT	Trader
Fasteners	BALAMURUGAN ENGG. WORKS,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	PRESIDENT ENGG.WORKS,	MUMBAI	India	PERMANENT	Manufacturer
Fasteners	PYONIER POLY CRAFTS	MADURAI	India	PERMANENT	Manufacturer
Fasteners	PRECISION AUTO ENGINEERS	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	Kay Hi-Tech Engineers Pvt. Ltd.	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	New Star Industries	AMRITSAR	India	PERMANENT	Manufacturer
Fasteners	THILLAI ENGINEERING WORKS,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	UNITY FORGE PRIVATE LIMITED	MARAIMLNGR	India	PERMANENT	Manufacturer
Fasteners	VETRIVEL FORGINGS,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	SREE PAVITHRA INDUSTRIES,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	MOD FORGE PVT.LIMITED	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	HARIHAR ALLOYS (P) LTD.	TRICHY	India	PERMANENT	Manufacturer
Fasteners	CHENNAI FORGE PRODUCTS PVT.LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	VARSHA TECHNOLOGY	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	KEMS FORGINGS LIMITED	BANGALORE	India	PERMANENT	Manufacturer
Fasteners	K.C.S ENGINEERING WORKS	BHOPAL	India	PERMANENT	Manufacturer
Fasteners	LAKSHMI PRECISION SCREWS LTD.,	ROHTAK	India	PERMANENT	Manufacturer
Fasteners	PIONEER NUTS AND BOLTS PVT LTD	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	SUNDRAM FASTENERS LIMITED,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	FORTUNE FASTENERS	ROHTAK	India	PERMANENT	Manufacturer
Fasteners	SAVETA ENGINEERING CO PVT LTD	SANGLI	India	PERMANENT	Manufacturer

Fasteners	Udehra Mechanical Works	AMRITSAR	India	PERMANENT	Manufacturer
Fasteners	K.C.S ENGINEERING WORKS	BHOPAL	India	PERMANENT	Manufacturer
Fasteners	INDUSTRIAL ENGINEERING CORPORATION	THANE	India	PERMANENT	Manufacturer
Fasteners	ASP PRIVATE LIMITED	CALCUTTA	India	PERMANENT	Manufacturer
Fasteners	DEEPAK FASTENERS LIMITED,	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	SANGAM FASTENERS PVT. LTD.,	HUBLI	India	PERMANENT	Manufacturer
Fasteners	SANGAM FASTENERS PVT. LTD.,	HUBLI	India	PERMANENT	Manufacturer
Fasteners	MEGA ENGINEERING PVT LTD.,	MUMBAI	India	PERMANENT	Manufacturer
Fasteners	Udehra Mechanical Works	AMRITSAR	India	PERMANENT	Manufacturer
Fasteners	PIONEER NUTS AND BOLTS PVT LTD	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	MEENA FASTENERS (P) LTD.,	TRICHY	India	PERMANENT	Manufacturer
Fasteners	K.C.S ENGINEERING WORKS	BHOPAL	India	PERMANENT	Manufacturer
Fasteners	LAKSHMI PRECISION SCREWS LTD.,	ROHTAK	India	PERMANENT	Manufacturer
Fasteners	PRESIDENT ENGG.WORKS,	MUMBAI	India	PERMANENT	Manufacturer
Fasteners	J.J.INDUSTRIES,	MUMBAI	India	PERMANENT	Manufacturer
Fasteners	INDUSTRIAL ENGINEERING CORPORATION	THANE	India	PERMANENT	Manufacturer
Fasteners	MEHTA TRADING COMPANY,	MUMBAI	India	PERMANENT	Trader
Fasteners	PANKAJ INTERNATIONAL,	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	ASP PRIVATE LIMITED	CALCUTTA	India	PERMANENT	Manufacturer
Fasteners	DEEPAK FASTENERS LIMITED,	LUDHIANA	India	PERMANENT	Manufacturer
Fasteners	K.C.S ENGINEERING WORKS	BHOPAL	India	PERMANENT	Manufacturer
Fasteners	KANNAPIRAN ENGINEERING INDUSTRIES	TRICHY	India	PERMANENT	Manufacturer
Fasteners	PIPE HANGERS AND SUPPORTS PVT. LTD,	PUDUKKOTTA	India	PERMANENT	Manufacturer
Fasteners	S&G ENGINEERS (P) LTD	FARIDABAD	India	PERMANENT	Manufacturer
Fasteners	PRIYAA BOILERS (P) LIMITED		India	PERMANENT	Manufacturer
Fasteners	VETRIVEL FORGINGS,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	SEAM INDUSTRIES LIMITED,	NAGPUR	India	PERMANENT	Manufacturer

Fasteners	JMS ENGINEERING	COIMBATORE	India	PERMANENT	Manufacturer
Fasteners	SPRING SUPPORTS MANUFACTURING	CALCUTTA	India	PERMANENT	Manufacturer
Fasteners	AAA SUPPORTS PVT LTD.,	MUMBAI	India	PERMANENT	Manufacturer
Fasteners	TECHNO INDUSTRY	CALCUTTA	India	PERMANENT	Manufacturer
Fasteners	SHRI SARAVANA ENGG WORKS		India	PERMANENT	Manufacturer
Fasteners	UNITECH MACHINES LTD.,	SHAHARNPUR	India	PERMANENT	Manufacturer
Fasteners	PIONEER ENGG INDS		India	PERMANENT	Manufacturer
Fasteners	K. S. PIPE FITTINGS PVT.LTD	FARIDABAD	India	PERMANENT	Manufacturer
Fasteners	ASIAN INDUSTRIAL VALVES AND INSTRUM	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	PERFECT TOOL & DIE MAKERS PVT LTD.	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	TECHNO INDUSTRY	CALCUTTA	India	PERMANENT	Manufacturer
Fasteners	S.A.I.LUBE OIL SOLUTIONS,	CHENNAI	India	PERMANENT	Manufacturer
Fasteners	JMS ENGINEERING	COIMBATORE	India	PERMANENT	Manufacturer
Fasteners	SHRI SARAVANA ENGG WORKS		India	PERMANENT	Manufacturer
Packing Materials	WOODSPOT	JULLUNDAR	India	PERMANENT	Manufacturer
Packing Materials	M.R.ENGINEERING WORKS	SAHARANPUR	India	PERMANENT	Manufacturer
Packing Materials	Onkar Saw Mills	AMRITSAR	India	PERMANENT	Manufacturer
Packing Materials	Sewak Saw Mills	AMRITSAR	India	PERMANENT	Manufacturer
Packing Materials	Ravi Timber Traders	AMRITSAR	India	PERMANENT	Manufacturer
Packing Materials	Vision Trade solutionsPvt. Ltd.	AMRITSAR	India	PERMANENT	Manufacturer
Packing Materials	NEFAB INDIA PRIVATE LIMITED	GURGAON	India	PERMANENT	Manufacturer

Paints & Thinners	Rely Paints Pvt. Ltd.	AMRITSAR	India	PERMANENT	Manufacturer
Paints & Thinners	ARCOY INDUSTRIES (INDIA) PRIVATE LI	AMRITSAR	India	PERMANENT	Manufacturer
Paints & Thinners	AKZO NOBEL INDIA LTD.	BANGALORE	India	PERMANENT	Manufacturer
Paints & Thinners	Shalimar Paints Ltd.	AMRITSAR	India	PERMANENT	Manufacturer
Paints & Thinners	Kansai Nerolac Paints Ltd	CHANDIGARH	India	PERMANENT	Manufacturer
Paints & Thinners	Marigold Paints Private Limited	AHMEDABAD	India	PERMANENT	Manufacturer
Paints & Thinners	STAR PAINT & OIL INDUSTRIES	MUMBAI	India	PERMANENT	Manufacturer
Paints & Thinners	TITAN PAINTS & CHEMICALS LTD	COIMBATORE	India	PERMANENT	Manufacturer
Paints & Thinners	PASU MEENA PAINTS INDUSTRIES	TIRUPUVNAM	India	PERMANENT	Manufacturer
Paints & Thinners	WESTERN INDIA PAINT& COLOUR CO. (P)	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	CHEMECOAT PAINTS,	TRICHY	India	PERMANENT	Manufacturer
Paints & Thinners	SRI MEENAAKSHI PAINT INDUSTRIES	PUDUKKOTTA	India	PERMANENT	Manufacturer
Paints & Thinners	GRAUER & WEIL (INDIA) LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	SUNDARAM PAINTS PVT LTD	THANJAVUR	India	PERMANENT	Manufacturer
Paints & Thinners	SHALIMAR PAINTS LTD.	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	NOVAA PAINTS	TRICHY	India	PERMANENT	Manufacturer
Paints & Thinners	KORROCOAT POLYMERS PVT LTD	PUNE	India	PERMANENT	Manufacturer
Paints & Thinners	HARLEQUIN PAINTS PVT LTD	KHOPOLI	India	PERMANENT	Manufacturer
Paints & Thinners	SHALIMAR PAINTS LTD.	CHENNAI	India	PERMANENT	Manufacturer

Paints & Thinners	HARLEQUIN PAINTS PVT LTD	KHOPOLI	India	PERMANENT	Manufacturer
Paints & Thinners	JOTUN INDIA PVT LTD	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	TITAN PAINTS & CHEMICALS LTD	COIMBATORE	India	PERMANENT	Manufacturer
Paints & Thinners	KORROCOAT POLYMERS PVT LTD	PUNE	India	PERMANENT	Manufacturer
Paints & Thinners	CARBOLINE INDIA PRIVATE LTD	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	POWER LIGHT PAINTS	TRICHY	India	PERMANENT	Manufacturer
Paints & Thinners	WESTERN INDIA PAINT& COLOUR CO. (P)	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	STAR PAINT & OIL INDUSTRIES	MUMBAI	India	PERMANENT	Manufacturer
Paints & Thinners	BERGER PAINTS INDIA LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	ADVANCE PAINTS PVT LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	RAMDEV RESINS PVT LTD	GANDHINAGR	India	PERMANENT	Manufacturer
Paints & Thinners	KANSAI NEROLAC PAINTS LIMITED,	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	SHALIMAR PAINTS LTD.	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	HARLEQUIN PAINTS PVT LTD	KHOPOLI	India	PERMANENT	Manufacturer
Paints & Thinners	CARBOLINE INDIA PRIVATE LTD	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	TITAN PAINTS & CHEMICALS LTD	COIMBATORE	India	PERMANENT	Manufacturer
Paints & Thinners	RAMDEV RESINS PVT LTD	GANDHINAGR	India	PERMANENT	Manufacturer
Paints & Thinners	BERGER PAINTS INDIA LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	POWER LIGHT PAINTS	TRICHY	India	PERMANENT	Manufacturer

Paints & Thinners	STAR PAINT & OIL INDUSTRIES	MUMBAI	India	PERMANENT	Manufacturer
Paints & Thinners	ADVANCE PAINTS PVT LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	ASIAN PAINTS PPG PRIVATE LTD.	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	JOTUN INDIA PVT LTD	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	KORROCOAT POLYMERS PVT LTD	PUNE	India	PERMANENT	Manufacturer
Paints & Thinners	KANSAI NEROLAC PAINTS LIMITED,	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	WESTERN INDIA PAINT& COLOUR CO. (P)	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	CARBOLINE INDIA PRIVATE LTD	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	SEVEN SEAS PAINTS PVT. LIMITED	NOIDA	India	PERMANENT	Manufacturer
Paints & Thinners	SHALIMAR PAINTS LTD.	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	BERGER PAINTS INDIA LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	KORROCOAT POLYMERS PVT LTD	PUNE	India	PERMANENT	Manufacturer
Paints & Thinners	KANSAI NEROLAC PAINTS LIMITED,	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	GRAUER & WEIL (INDIA) LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	RAMDEV RESINS PVT LTD	GANDHINAGR	India	PERMANENT	Manufacturer
Paints & Thinners	HARLEQUIN PAINTS PVT LTD	KHOPOLI	India	PERMANENT	Manufacturer
Paints & Thinners	ASIAN PAINTS PPG PRIVATE LTD.	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	STAR PAINT & OIL INDUSTRIES	MUMBAI	India	PERMANENT	Manufacturer
Paints & Thinners	POWER LIGHT PAINTS	TRICHY	India	PERMANENT	Manufacturer

Paints & Thinners	WESTERN INDIA PAINT& COLOUR CO. (P)	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	TITAN PAINTS & CHEMICALS LTD	COIMBATORE	India	PERMANENT	Manufacturer
Paints & Thinners	JOTUN INDIA PVT LTD	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	BERGER PAINTS INDIA LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	HARLEQUIN PAINTS PVT LTD	KHOPOLI	India	PERMANENT	Manufacturer
Paints & Thinners	KORROCOAT POLYMERS PVT LTD	PUNE	India	PERMANENT	Manufacturer
Paints & Thinners	SHALIMAR PAINTS LTD.	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	RAMDEV RESINS PVT LTD	GANDHINAGR	India	PERMANENT	Manufacturer
Paints & Thinners	ASIAN PAINTS PPG PRIVATE LTD.	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	MEGA SHIELD COATING (P) LTD.,	MADURAI	India	PERMANENT	Manufacturer
Paints & Thinners	ADVANCE PAINTS PVT LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	SEVEN SEAS PAINTS PVT. LIMITED	NOIDA	India	PERMANENT	Manufacturer
Paints & Thinners	CARBOLINE INDIA PRIVATE LTD	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	NOVAA PAINTS	TRICHY	India	PERMANENT	Manufacturer
Paints & Thinners	WESTERN INDIA PAINT& COLOUR CO. (P)	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	SRI MEENAAKSHI PAINT INDUSTRIES	PUDUKKOTTA	India	PERMANENT	Manufacturer
Paints & Thinners	POWER LIGHT PAINTS	TRICHY	India	PERMANENT	Manufacturer
Paints & Thinners	CHEMECOAT PAINTS,	TRICHY	India	PERMANENT	Manufacturer
Paints & Thinners	PASU MEENA PAINTS INDUSTRIES	TIRUPUVNAM	India	PERMANENT	Manufacturer

Paints & Thinners	GRAUER & WEIL (INDIA) LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	SUNDARAM PAINTS PVT LTD	THANJAVUR	India	PERMANENT	Manufacturer
Paints & Thinners	KANSAI NEROLAC PAINTS LIMITED,	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	SHALIMAR PAINTS LTD.	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	KANSAI NEROLAC PAINTS LIMITED,	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	JOTUN INDIA PVT LTD	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	HARLEQUIN PAINTS PVT LTD	KHOPOLI	India	PERMANENT	Manufacturer
Paints & Thinners	POWER LIGHT PAINTS	TRICHY	India	PERMANENT	Manufacturer
Paints & Thinners	KORROCOAT POLYMERS PVT LTD	PUNE	India	PERMANENT	Manufacturer
Paints & Thinners	CHEMECOAT PAINTS,	TRICHY	India	PERMANENT	Manufacturer
Paints & Thinners	ADVANCE PAINTS PVT LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	RAMDEV RESINS PVT LTD	GANDHINAGR	India	PERMANENT	Manufacturer
Paints & Thinners	WESTERN INDIA PAINT& COLOUR CO. (P)	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	TITAN PAINTS & CHEMICALS LTD	COIMBATORE	India	PERMANENT	Manufacturer
Paints & Thinners	GRAUER & WEIL (INDIA) LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	ASIAN PAINTS PPG PRIVATE LTD.	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	GRAND POLYCOATS CO. PVT. LTD,	BARODA	India	PERMANENT	Manufacturer
Paints & Thinners	CARBOLINE INDIA PRIVATE LTD	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	BERGER PAINTS INDIA LTD.,	CHENNAI	India	PERMANENT	Manufacturer

Paints & Thinners	AKZO NOBEL INDIA LTD.	BANGALORE	India	PERMANENT	Manufacturer
Paints & Thinners	CHEMECOAT PAINTS,	TRICHY	India	PERMANENT	Manufacturer
Paints & Thinners	KORROCOAT POLYMERS PVT LTD	PUNE	India	PERMANENT	Manufacturer
Paints & Thinners	BERGER PAINTS INDIA LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	POWER LIGHT PAINTS	TRICHY	India	PERMANENT	Manufacturer
Paints & Thinners	ASIAN PAINTS PPG PRIVATE LTD.	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	AKZO NOBEL INDIA LTD.	BANGALORE	India	PERMANENT	Manufacturer
Paints & Thinners	RAMDEV RESINS PVT LTD	GANDHINAGR	India	PERMANENT	Manufacturer
Paints & Thinners	GRAUER & WEIL (INDIA) LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	KANSAI NEROLAC PAINTS LIMITED,	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	GRAND POLYCOATS CO. PVT. LTD,	BARODA	India	PERMANENT	Manufacturer
Paints & Thinners	TITAN PAINTS & CHEMICALS LTD	COIMBATORE	India	PERMANENT	Manufacturer
Paints & Thinners	SEVEN SEAS PAINTS PVT. LIMITED	NOIDA	India	PERMANENT	Manufacturer
Paints & Thinners	SHALIMAR PAINTS LTD.	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	JOTUN INDIA PVT LTD	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	WESTERN INDIA PAINT& COLOUR CO. (P)	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	ADVANCE PAINTS PVT LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	CARBOLINE INDIA PRIVATE LTD	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	HARLEQUIN PAINTS PVT LTD	KHOPOLI	India	PERMANENT	Manufacturer

Paints & Thinners	HARLEQUIN PAINTS PVT LTD	KHOPOLI	India	PERMANENT	Manufacturer
Paints & Thinners	POWER LIGHT PAINTS	TRICHY	India	PERMANENT	Manufacturer
Paints & Thinners	RAMDEV RESINS PVT LTD	GANDHINAGR	India	PERMANENT	Manufacturer
Paints & Thinners	ASIAN PAINTS PPG PRIVATE LTD.	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	WESTERN INDIA PAINT& COLOUR CO. (P)	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	GRAND POLYCOATS CO. PVT. LTD,	BARODA	India	PERMANENT	Manufacturer
Paints & Thinners	SHALIMAR PAINTS LTD.	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	TITAN PAINTS & CHEMICALS LTD	COIMBATORE	India	PERMANENT	Manufacturer
Paints & Thinners	AKZO NOBEL INDIA LTD.	BANGALORE	India	PERMANENT	Manufacturer
Paints & Thinners	GRAUER & WEIL (INDIA) LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	SEVEN SEAS PAINTS PVT. LIMITED	NOIDA	India	PERMANENT	Manufacturer
Paints & Thinners	BERGER PAINTS INDIA LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	ADVANCE PAINTS PVT LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	JOTUN INDIA PVT LTD	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	KANSAI NEROLAC PAINTS LIMITED,	CHENNAI	India	PERMANENT	Manufacturer
Paints & Thinners	CARBOLINE INDIA PRIVATE LTD	CHENNAI	India	PERMANENT	Manufacturer
Pipes	NAVRATNA METAL CORPN.,	MUMBAI	India	PERMANENT	Trader
Pipes	STEELMET INDUSTRIES,	MUMBAI	India	PERMANENT	Trader
Pipes	NAVNEET METAL CORPN.	MUMBAI	India	PERMANENT	Trader
Pipes	STERLING METAL DISTRIBUTORS,	MUMBAI	India	PERMANENT	Trader
Pipes	METAL TUBE INDUSTRIES	MUMBAI	India	PERMANENT	Trader
Pipes	KALPANA STEEL CENTRE	MUMBAI	India	PERMANENT	Trader
Pipes	SAKTHI HI-TECH CONTSTRN. (P) LTD		India	PERMANENT	Manufacturer

Pipes	SHRI SARAVANA ENGG WORKS		India	PERMANENT	Manufacturer
Pipes	BHARAT ENGG ENTERPRISES		India	PERMANENT	Manufacturer
Pipes	BALAMURUGAN ENGG. WORKS,	CHENNAI	India	PERMANENT	Manufacturer
Pipes	J.C INDUSTRIES	CHENNAI	India	PERMANENT	Manufacturer
Pipes	SREENIVASA ENGINEERING WORKS,	CHENNAI	India	PERMANENT	Manufacturer
Pipes	MUTHUKUMAR ENGG WORKS		India	PERMANENT	Manufacturer
Pipes	GOOD LUCK STEEL TUBES LTD	GAZIABAD	India	PERMANENT	Manufacturer
Pipes	JINDAL (INDIA) LIMITED,	CALCUTTA	India	PERMANENT	Manufacturer
Pipes	BHUSHAN STEEL LIMITED,	MUMBAI	India	PERMANENT	Manufacturer
Pipes	RATNAMANI METALS & TUBES LTD.,	AHMEDABAD	India	PERMANENT	Manufacturer
Pipes	MKK METAL SECTIONS PVT LTD	RANIPET	India	PERMANENT	Manufacturer
Pipes	SWASTIK PIPES LIMITED,	DELHI	India	PERMANENT	Manufacturer
Pipes	INDUS TUBES LTD	DELHI	India	PERMANENT	Manufacturer
Pipes	ADVANCE STEEL TUBES LTD	GAZIABAD	India	PERMANENT	Manufacturer
Pipes	HI-TECH PIPES LIMITED,	DELHI	India	PERMANENT	Manufacturer
Pipes	WELSPUN CORP LIMITED,	MUMBAI	India	PERMANENT	Manufacturer
Pipes	STEEL AUTHORITY OF INDIA LTD	CHENNAI	India	PERMANENT	Manufacturer
Pipes	GAURANG PRODUCTS PVT LTD	DELHI	India	PERMANENT	Manufacturer
Pipes	JCO GAS PIPE LTD.	DELHI	India	PERMANENT	Manufacturer
Pipes	MEGHA ENGINEERING	HYDERABAD	India	PERMANENT	Manufacturer
Pipes	WELSPUN CORP LIMITED,	MUMBAI	India	PERMANENT	Manufacturer
Pipes	RATNAMANI METALS & TUBES LTD.,	AHMEDABAD	India	PERMANENT	Manufacturer

Pipes	LALIT PIPES AND PIPES LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Pipes	MAN INDUSTRIES (INDIA) LTD.	MUMBAI	India	PERMANENT	Manufacturer
Pipes	JINDAL (INDIA) LIMITED,	CALCUTTA	India	PERMANENT	Manufacturer
Pipes	STEEL AUTHORITY OF INDIA LTD	CHENNAI	India	PERMANENT	Manufacturer
Pipes	TOPWORTH PIPES & TUBES PVT.LTD.,	MUMBAI	India	PERMANENT	Manufacturer
Pipes	ESSAR STEEL INDIA LTD	HAZIRA	India	PERMANENT	Manufacturer
Pipes	CAPACITE STRUCTURES LTD.	MUMBAI	India	PERMANENT	Manufacturer
Pipes	SURYA GLOBAL STEEL TUBES LTD,	DELHI	India	PERMANENT	Manufacturer
Pipes	JINDAL SAW LTD.,	DELHI	India	PERMANENT	Manufacturer
Pipes	BHUSHAN STEEL LIMITED,	MUMBAI	India	PERMANENT	Manufacturer
Pipes	LALIT PIPES AND PIPES LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Pipes	MAN INDUSTRIES (INDIA) LTD.	MUMBAI	India	PERMANENT	Manufacturer
Pipes	RATNAMANI METALS & TUBES LTD.,	AHMEDABAD	India	PERMANENT	Manufacturer
Pipes	JINDAL SAW LTD.,	DELHI	India	PERMANENT	Manufacturer
Pipes	ESSAR STEEL INDIA LTD	HAZIRA	India	PERMANENT	Manufacturer
Pipes	SWASTIK PIPES LIMITED,	DELHI	India	PERMANENT	Manufacturer
Pipes	GAURANG PRODUCTS PVT LTD	DELHI	India	PERMANENT	Manufacturer
Pipes	BHUSHAN STEEL LIMITED,	MUMBAI	India	PERMANENT	Manufacturer
Pipes	MKK METAL SECTIONS PVT LTD	RANIPET	India	PERMANENT	Manufacturer
Pipes	HI-TECH PIPES LIMITED,	DELHI	India	PERMANENT	Manufacturer
Pipes	JCO GAS PIPE LTD.	DELHI	India	PERMANENT	Manufacturer

Pipes	STEEL AUTHORITY OF INDIA LTD	CHENNAI	India	PERMANENT	Manufacturer
Pipes	RATNAMANI METALS & TUBES LTD.,	AHMEDABAD	India	PERMANENT	Manufacturer
Pipes	WELSPUN CORP LIMITED,	MUMBAI	India	PERMANENT	Manufacturer
Pipes	JINDAL (INDIA) LIMITED,	CALCUTTA	India	PERMANENT	Manufacturer
Pipes	RATNAMANI METALS & TUBES LTD.,	AHMEDABAD	India	PERMANENT	Manufacturer
Pipes	LALIT PIPES AND PIPES LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Pipes	VALLOUREC TUBES FRANCE		France	PERMANENT	Manufacturer
Pipes	PRODUCTOS TUBULARES S.A.U		Spain	PERMANENT	Manufacturer
Pipes	METAL ONE CORPORATION,		Japan	PERMANENT	Foreign Agent
Pipes	TUBOS REUNIDOS INDUSTRIAL S.L.U.		Spain	PERMANENT	Manufacturer
Pipes	JIANGSU CHENGDE STEEL TUBE SHARE CO		China	PERMANENT	Manufacturer
Pipes	S.K.T.INTERNATIONAL TRADING (SHANG		China	PERMANENT	Foreign Agent
Pipes	RINGMILL SPA,		Italy	PERMANENT	Manufacturer
Pipes	YANGZHOU CHENGDE STEEL PIPE CO. LT		China	PERMANENT	Manufacturer
Pipes	YANGZHOU LONTRIN STEEL		China	PERMANENT	Manufacturer
Pipes	WYMAN-GORDON FORGINGS INC.		USA	PERMANENT	Manufacturer
Pipes	ZHEJIANG GROSS SEAMLESS STEEL		China	PERMANENT	Manufacturer
Pipes	HENGYANG STEEL TUBE GROUP INT'L		China	PERMANENT	Manufacturer
Pipes	TENARIS GLOBAL SERVICES,S.A.,		Uruguay	PERMANENT	Foreign Agent

Pipes	SUMITOMO CORPORATION ASIA & OCEANIA		Singapore	PERMANENT	Foreign Agent
Pipes	IBF S.P.A.		Italy	PERMANENT	Manufacturer
Pipes	SICHUAN SANZHOU SPECIAL STEEL		China	PERMANENT	Manufacturer
Pipes	BENTELER STEEL / TUBE GmBH		Germany	PERMANENT	Manufacturer
Pipes	JINDAL SAW LTD.,	NASIK	India	PERMANENT	Sales Office
Pipes	SICHUAN SANZHOU SPECIAL STEEL		China	PERMANENT	Manufacturer
Pipes	YANGZHOU LONTRIN STEEL		China	PERMANENT	Manufacturer
Pipes	BENTELER STEEL / TUBE GmBH		Germany	PERMANENT	Manufacturer
Pipes	JIANGXI HONGDU STEEL WORKS CO LTD		China	PERMANENT	Manufacturer
Pipes	HUBEI XINYEGANG STEEL CO LTD		China	PERMANENT	Manufacturer
Pipes	YANGZHOU CHENGDE STEEL PIPE CO. LT		China	PERMANENT	Manufacturer
Pipes	VALLOUREC TUBES FRANCE		France	PERMANENT	Manufacturer
Pipes	WYMAN-GORDON FORGINGS INC.		USA	PERMANENT	Manufacturer
Pipes	TENARIS GLOBAL SERVICES,S.A.,		Uruguay	PERMANENT	Foreign Agent
Pipes	ZHEJIANG GROSS SEAMLESS STEEL		China	PERMANENT	Manufacturer
Pipes	ISMT LIMITED,	PUNE	India	PERMANENT	Manufacturer
Pipes	TRANSWORLD FZE,		Utd.Arab Emir.	PERMANENT	Foreign Agent
Pipes	S.K.T.INTERNATIONAL TRADING (SHANG		China	PERMANENT	Foreign Agent
Pipes	RINGMILL SPA,		Italy	PERMANENT	Manufacturer
Pipes	HENGYANG STEEL TUBE GROUP INT'L		China	PERMANENT	Manufacturer

Pipes	PRODUCTOS TUBULARES S.A.U		Spain	PERMANENT	Manufacturer
Pipes	SUMITOMO CORPORATION ASIA & OCEANIA		Singapore	PERMANENT	Foreign Agent
Pipes	JIANGSU CHENGDE STEEL TUBE SHARE CO		China	PERMANENT	Manufacturer
Pipes	TUBOS REUNIDOS INDUSTRIAL S.L.U.		Spain	PERMANENT	Manufacturer
Pipes	METAL ONE CORPORATION,		Japan	PERMANENT	Foreign Agent
Pipes	IBF S.P.A.		Italy	PERMANENT	Manufacturer
Pipes	ZHEJIANG GROSS SEAMLESS STEEL		China	PERMANENT	Manufacturer
Pipes	SICHUAN SANZHOU SPECIAL STEEL		China	PERMANENT	Manufacturer
Pipes	YANGZHOU LONTRIN STEEL		China	PERMANENT	Manufacturer
Pipes	MAHARASHTRA SEAMLESS LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Pipes	JIANGSU CHENGDE STEEL TUBE SHARE CO		China	PERMANENT	Manufacturer
Pipes	RINGMILL SPA,		Italy	PERMANENT	Manufacturer
Pipes	TUBOS REUNIDOS INDUSTRIAL S.L.U.		Spain	PERMANENT	Manufacturer
Pipes	ARCELORMITTAL TUBULAR PRODUCT ROMAN		Romania	PERMANENT	Manufacturer
Pipes	WYMAN-GORDON FORGINGS INC.		USA	PERMANENT	Manufacturer
Pipes	METAL ONE CORPORATION,		Japan	PERMANENT	Foreign Agent
Pipes	YANGZHOU CHENGDE STEEL PIPE CO. LT		China	PERMANENT	Manufacturer
Pipes	IBF S.P.A.		Italy	PERMANENT	Manufacturer
Pipes	VALLOUREC TUBES FRANCE		France	PERMANENT	Manufacturer

Pipes	ISMT LIMITED,	PUNE	India	PERMANENT	Manufacturer
Pipes	TRANSWORLD FZE,		Utd.Arab Emir.	PERMANENT	Foreign Agent
Pipes	S.K.T.INTERNATIONAL TRADING (SHANG		China	PERMANENT	Foreign Agent
Pipes	SUMITOMO CORPORATION ASIA & OCEANIA		Singapore	PERMANENT	Foreign Agent
Pipes	HEAVY METALS & TUBES LTD UNIT-III,	MEHASANA	India	PERMANENT	Manufacturer
Pipes	PRODUCTOS TUBULARES S.A.U		Spain	PERMANENT	Manufacturer
Pipes	HENGYANG STEEL TUBE GROUP INT'L		China	PERMANENT	Manufacturer
Pipes	HUBEI XINYEGANG STEEL CO LTD		China	PERMANENT	Manufacturer
Pipes	JIANGXI HONGDU STEEL WORKS CO LTD		China	PERMANENT	Manufacturer
Pipes	TENARIS GLOBAL SERVICES,S.A.,		Uruguay	PERMANENT	Foreign Agent
Pipes	BENTELER STEEL / TUBE GmbH		Germany	PERMANENT	Manufacturer
Pipes	JINDAL SAW LTD.,	NASIK	India	PERMANENT	Sales Office
Pipes	JINDAL SAW LTD.,	DELHI	India	PERMANENT	Manufacturer
Pipes	MEGHA ENGINEERING	HYDERABAD	India	PERMANENT	Manufacturer
Pipes	RATNAMANI METALS & TUBES LTD.,	AHMEDABAD	India	PERMANENT	Manufacturer
Pipes	CAPACITE STRUCTURES LTD.	MUMBAI	India	PERMANENT	Manufacturer
Pipes	ESSAR STEEL INDIA LTD	HAZIRA	India	PERMANENT	Manufacturer
Pipes	WELSPUN CORP LIMITED,	MUMBAI	India	PERMANENT	Manufacturer
Pipes	WELSPUN CORP LIMITED,	MUMBAI	India	PERMANENT	Manufacturer
Pipes	GAURANG PRODUCTS PVT LTD	DELHI	India	PERMANENT	Manufacturer
Pipes	MKK METAL SECTIONS PVT LTD	RANIPET	India	PERMANENT	Manufacturer
Pipes	VENKATESWARA CONDUITS PVT.LTD	CHENNAI	India	PERMANENT	Manufacturer
Pipes	TATA STEEL LIMITED.	CHENNAI	India	PERMANENT	Manufacturer
Pipes	SWASTIK PIPES LIMITED,	DELHI	India	PERMANENT	Manufacturer
Pipes	TOPWORTH PIPES & TUBES PVT.LTD.,	MUMBAI	India	PERMANENT	Manufacturer
Pipes	TAMILNADU STEEL TUBES LTD.	CHENNAI	India	PERMANENT	Manufacturer

Pipes	GOOD LUCK STEEL TUBES LTD	GAZIABAD	India	PERMANENT	Manufacturer
Pipes	RAVINDRA TUBES LIMITED,	DELHI	India	PERMANENT	Manufacturer
Pipes	APL APOLLO TUBES LIMITED,	DELHI	India	PERMANENT	Manufacturer
Pipes	ZENITH BIRLA (INDIA) LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Pipes	INDUS TUBES LTD	DELHI	India	PERMANENT	Manufacturer
Pipes	SURYA ROSHNI LTD	DELHI	India	PERMANENT	Manufacturer
Pipes	HI-TECH PIPES LIMITED,	DELHI	India	PERMANENT	Manufacturer
Pipes	ADVANCE STEEL TUBES LTD	GAZIABAD	India	PERMANENT	Manufacturer
Pipes	HUADI STEEL GROUP CO. LTD.		China	PERMANENT	Manufacturer
Pipes	ROMAN CORPORATION		Japan	PERMANENT	Manufacturer
Pipes	REMI EDELSTAHL TUBULARS LIMITED,	MUMBAI	India	PERMANENT	Manufacturer
Pipes	SUMITOMO CORPORATION ASIA & OCEANIA		Singapore	PERMANENT	Foreign Agent
Pipes	PRAKASH STEELAGE LTD	MUMBAI	India	PERMANENT	Manufacturer
Pipes	TUBACEX TUBOS INOXIDABLES, S.A		Spain	PERMANENT	Manufacturer
Pipes	REMI EDELSTAHL TUBULARS LIMITED,	MUMBAI	India	PERMANENT	Manufacturer
Pipes	PRAKASH STEELAGE LTD	MUMBAI	India	PERMANENT	Manufacturer
Pipes	APEX TUBES PVT. LTD,	GURGAON	India	PERMANENT	Manufacturer
Pipes	RATNAMANI METALS & TUBES LTD.,	AHMEDABAD	India	PERMANENT	Manufacturer
Pipes	CHOKSI TUBE CO.LTD.	MUMBAI	India	PERMANENT	Manufacturer
Pipes	FLASH FORGE PVT LTD.,	VIZAG	India	PERMANENT	Manufacturer
Pipes	S&G ENGINEERS (P) LTD	FARIDABAD	India	PERMANENT	Manufacturer
Pipes	DEE DEVELOPMENT ENGINEERS LTD.,	FARIDABAD	India	PERMANENT	Manufacturer

Pipes	UNITECH MACHINES LTD.,	SHAHARNPUR	India	PERMANENT	Manufacturer
Pipes	S&G ENGINEERS (P) LTD	FARIDABAD	India	PERMANENT	Manufacturer
Pipes	DEE DEVELOPMENT ENGINEERS LTD.,	FARIDABAD	India	PERMANENT	Manufacturer
Pipes	UNITECH MACHINES LTD.,	SHAHARNPUR	India	PERMANENT	Manufacturer
Pipes	FLASH FORGE PVT LTD.,	VIZAG	India	PERMANENT	Manufacturer
Pipes	WELSPUN CORP LIMITED,	MUMBAI	India	PERMANENT	Manufacturer
Pipes	RATNAMANI METALS & TUBES LTD.,	AHMEDABAD	India	PERMANENT	Manufacturer
Pipes	LIAONING LARGE SCALE STEEL PIPE CO.		China	PERMANENT	Manufacturer
Pipes	JINDAL SAW LTD.,	DELHI	India	PERMANENT	Manufacturer
Pipes	JINDAL INDUSTRIES LTD.,	ROHTAK	India	PERMANENT	Manufacturer
Pipes	ESSAR STEEL INDIA LTD	HAZIRA	India	PERMANENT	Manufacturer
Pipes	JINDAL (INDIA) LIMITED,	CALCUTTA	India	PERMANENT	Manufacturer
Pipes	MAHARASHTRA SEAMLESS LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Pipes	SURYA ROSHNI LTD	DELHI	India	PERMANENT	Manufacturer
Pipes	SEAH STEEL CORPORTAION		South Korea	PERMANENT	Manufacturer
Pipes	TOPWORTH PIPES & TUBES PVT.LTD.,	MUMBAI	India	PERMANENT	Manufacturer
Pipes	GAURANG PRODUCTS PVT LTD	DELHI	India	PERMANENT	Manufacturer
Pipes	BHUSHAN STEEL LIMITED,	MUMBAI	India	PERMANENT	Manufacturer
Pipes	SURYA GLOBAL STEEL TUBES LTD,	DELHI	India	PERMANENT	Manufacturer

Pipes	LALIT PIPES AND PIPES LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Pipes	PSL LIMITED,	CHENNAI	India	PERMANENT	Manufacturer
Pipes	JINDAL PIPES LTD.	GURGAON	India	PERMANENT	Manufacturer
Pipes	MAN INDUSTRIES (INDIA) LTD.	MUMBAI	India	PERMANENT	Manufacturer
Pipes	TAMIL NADU STEEL TUBES LTD.	CHENNAI	India	PERMANENT	Sales Office
Pipes	TATA STEEL LIMITED.	CHENNAI	India	PERMANENT	Manufacturer
Pipes	SURYA ROSHNI LTD	DELHI	India	PERMANENT	Manufacturer
Pipes	GOOD LUCK STEEL TUBES LTD	GAZIABAD	India	PERMANENT	Manufacturer
Pipes	JINDAL INDUSTRIES LTD.,	ROHTAK	India	PERMANENT	Manufacturer
Pipes	NAVRATAN PIPE AND PROFILE LTD.,	JAIPUR	India	PERMANENT	Manufacturer
Pipes	GAURANG PRODUCTS PVT LTD	DELHI	India	PERMANENT	Manufacturer
Pipes	MKK METAL SECTIONS PVT LTD	RANIPET	India	PERMANENT	Manufacturer
Pipes	SWASTIK PIPES LIMITED,	DELHI	India	PERMANENT	Manufacturer
Pipes	JINDAL PIPES LTD.	GURGAON	India	PERMANENT	Manufacturer
Pipes	P.S.STEEL TUBES LTD, UNIT II	BHILAI	India	PERMANENT	Manufacturer

Pipes	RIDDHI STEEL & TUBES (P) LTD	AHMEDABAD	India	PERMANENT	Manufacturer
Pipes	NEZONE TUBES LIMITED,	CALCUTTA	India	PERMANENT	Manufacturer
Pipes	ZENITH BIRLA (INDIA) LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Pipes	APL APOLLO TUBES LIMITED,	DELHI	India	PERMANENT	Manufacturer
Pipes	SAWARIA PIPES PRIVATE LIMITED,	SECNDRABAD	India	PERMANENT	Manufacturer
Pipes	CRIMSON METAL ENGINEERING CO.LTD.	CHENNAI	India	PERMANENT	Manufacturer
Pipes	WYMAN-GORDON FORGINGS INC.		USA	PERMANENT	Manufacturer
Pipes	METAL ONE CORPORATION,		Japan	PERMANENT	Foreign Agent
Pipes	SICHUAN SANZHOU SPECIAL STEEL		China	PERMANENT	Manufacturer
Pipes	S.K.T.INTERNATIONAL TRADING (SHANG		China	PERMANENT	Foreign Agent
Pipes	ZHEJIANG GROSS SEAMLESS STEEL		China	PERMANENT	Manufacturer
Pipes	YANGZHOU LONTRIN STEEL		China	PERMANENT	Manufacturer
Pipes	HENGYANG STEEL TUBE GROUP INT'L		China	PERMANENT	Manufacturer
Pipes	VALLOUREC TUBES FRANCE		France	PERMANENT	Manufacturer
Pipes	YANGZHOU CHENGDE STEEL PIPE CO. LT		China	PERMANENT	Manufacturer
Pipes	TUBOS REUNIDOS INDUSTRIAL S.L.U.		Spain	PERMANENT	Manufacturer
Pipes	PRODUCTOS TUBULARES S.A.U		Spain	PERMANENT	Manufacturer

Pipes	BENTELER STEEL / TUBE GmBH		Germany	PERMANENT	Manufacturer
Pipes	RINGMILL SPA,		Italy	PERMANENT	Manufacturer
Pipes	JIANGSU CHENGDE STEEL TUBE SHARE CO		China	PERMANENT	Manufacturer
Pipes	IBF S.P.A.		Italy	PERMANENT	Manufacturer
Pipes	SUMITOMO CORPORATION ASIA & OCEANIA		Singapore	PERMANENT	Foreign Agent
Pipes	TENARIS GLOBAL SERVICES,S.A.,		Uruguay	PERMANENT	Foreign Agent
Pipes	TRANSWORLD FZE,		Utd.Arab Emir.	PERMANENT	Foreign Agent
Pipes	HUBEI XINYEGANG STEEL CO LTD		China	PERMANENT	Manufacturer
Pipes	BENTELER STEEL / TUBE GmBH		Germany	PERMANENT	Manufacturer
Pipes	METAL ONE CORPORATION,		Japan	PERMANENT	Foreign Agent
Pipes	YANGZHOU CHENGDE STEEL PIPE CO. LT		China	PERMANENT	Manufacturer
Pipes	ISMT LIMITED,	PUNE	India	PERMANENT	Manufacturer
Pipes	HENGYANG STEEL TUBE GROUP INT'L		China	PERMANENT	Manufacturer
Pipes	IBF S.P.A.		Italy	PERMANENT	Manufacturer
Pipes	S.K.T.INTERNATIONAL TRADING (SHANG		China	PERMANENT	Foreign Agent
Pipes	VALLOUREC TUBES FRANCE		France	PERMANENT	Manufacturer
Pipes	SUMITOMO CORPORATION ASIA & OCEANIA		Singapore	PERMANENT	Foreign Agent
Pipes	TUBOS REUNIDOS INDUSTRIAL S.L.U.		Spain	PERMANENT	Manufacturer
Pipes	RINGMILL SPA,		Italy	PERMANENT	Manufacturer

Pipes	SICHUAN SANZHOU SPECIAL STEEL		China	PERMANENT	Manufacturer
Pipes	JINDAL SAW LTD.,	NASIK	India	PERMANENT	Sales Office
Pipes	JIANGSU CHENGDE STEEL TUBE SHARE CO		China	PERMANENT	Manufacturer
Pipes	TENARIS GLOBAL SERVICES,S.A.,		Uruguay	PERMANENT	Foreign Agent
Pipes	PRODUCTOS TUBULARES S.A.U		Spain	PERMANENT	Manufacturer
Pipes	YANGZHOU LONTRIN STEEL		China	PERMANENT	Manufacturer
Pipes	JIANGXI HONGDU STEEL WORKS CO LTD		China	PERMANENT	Manufacturer
Pipes	WYMAN-GORDON FORGINGS INC.		USA	PERMANENT	Manufacturer
Pipes	ZHEJIANG GROSS SEAMLESS STEEL		China	PERMANENT	Manufacturer
Pipes	BENTELER STEEL / TUBE GmBH		Germany	PERMANENT	Manufacturer
Pipes	METAL ONE CORPORATION,		Japan	PERMANENT	Foreign Agent
Pipes	YANGZHOU CHENGDE STEEL PIPE CO. LT		China	PERMANENT	Manufacturer
Pipes	VALLOUREC TUBES FRANCE		France	PERMANENT	Manufacturer
Pipes	TENARIS GLOBAL SERVICES,S.A.,		Uruguay	PERMANENT	Foreign Agent
Pipes	RINGMILL SPA,		Italy	PERMANENT	Manufacturer
Pipes	ARCELORMITTAL TUBULAR PRODUCT ROMAN		Romania	PERMANENT	Manufacturer
Pipes	JIANGXI HONGDU STEEL WORKS CO LTD		China	PERMANENT	Manufacturer
Pipes	ZHEJIANG GROSS SEAMLESS STEEL		China	PERMANENT	Manufacturer
Pipes	MAHARASHTRA SEAMLESS LTD.,	CHENNAI	India	PERMANENT	Manufacturer

Pipes	HENGYANG STEEL TUBE GROUP INT'L		China	PERMANENT	Manufacturer
Pipes	JIANGSU CHENGDE STEEL TUBE SHARE CO		China	PERMANENT	Manufacturer
Pipes	YANGZHOU LONTRIN STEEL		China	PERMANENT	Manufacturer
Pipes	TUBOS REUNIDOS INDUSTRIAL S.L.U.		Spain	PERMANENT	Manufacturer
Pipes	JINDAL SAW LTD.,	NASIK	India	PERMANENT	Sales Office
Pipes	SICHUAN SANZHOU SPECIAL STEEL		China	PERMANENT	Manufacturer
Pipes	HUBEI XINYEGANG STEEL CO LTD		China	PERMANENT	Manufacturer
Pipes	S.K.T.INTERNATIONAL TRADING (SHANG		China	PERMANENT	Foreign Agent
Pipes	HEAVY METALS & TUBES LTD UNIT-III,	MEHASANA	India	PERMANENT	Manufacturer
Pipes	ISMT LIMITED,	PUNE	India	PERMANENT	Manufacturer
Pipes	PRODUCTOS TUBULARES S.A.U		Spain	PERMANENT	Manufacturer
Pipes	WYMAN-GORDON FORGINGS INC.		USA	PERMANENT	Manufacturer
Pipes	SUMITOMO CORPORATION ASIA & OCEANIA		Singapore	PERMANENT	Foreign Agent
Pipes	IBF S.P.A.		Italy	PERMANENT	Manufacturer
Pipes	TRANSWORLD FZE,		Utd.Arab Emir.	PERMANENT	Foreign Agent
Pipes	TUBACEX TUBOS INOXIDABLES, S.A		Spain	PERMANENT	Manufacturer
Pipes	HUADI STEEL GROUP CO. LTD.		China	PERMANENT	Manufacturer
Pipes	PRODUCTOS TUBULARES S.A.U		Spain	PERMANENT	Manufacturer
Pipes	SALZGITTER MANESSMANN STAINLESS		Italy	PERMANENT	Manufacturer
Pipes	ZHEJIANG JIULI HI-TECH METALS Co. L		China	PERMANENT	Manufacturer

Pipes	JIANGSU WUJIN STAINLESS STEEL PIPE		China	PERMANENT	Manufacturer
Steel	JEETMULL JAICHANDLALL PVT LTD	CALCUTTA	India	PERMANENT	Manufacturer
Steel	TRUST IMPEXS	CHENNAI	India	PERMANENT	Indian Agent
Steel	CHANDAN STEEL LIMITED,	VALSAD	India	PERMANENT	Manufacturer
Steel	BHANSALI BRIGHT BARS PVT. LTD,	MUMBAI	India	PERMANENT	Manufacturer
Steel	NATIONAL WIRENETTING INDUSTRIES,	CALCUTTA	India	PERMANENT	Manufacturer
Steel	KIRAN WIRE NETTING CO.,	CHENNAI	India	PERMANENT	Sales Office
Steel	JEETMULL JAICHANDLALL (MADRAS)	CHENNAI	India	PERMANENT	Manufacturer
Steel	JEETMULL JAICHANDLALL (MADRAS)	CHENNAI	India	PERMANENT	Manufacturer
Steel	JEETMULL JAICHANDLALL PVT LTD	CALCUTTA	India	PERMANENT	Manufacturer
Steel	NATIONAL WIRENETTING INDUSTRIES,	CALCUTTA	India	PERMANENT	Manufacturer
Steel	KIRAN WIRE NETTING CO.,	CHENNAI	India	PERMANENT	Sales Office
Steel	VIKRANT FORGE LIMITED,	CALCUTTA	India	PERMANENT	Manufacturer
Steel	WESTERN INDIA FORGINGS LTD	PUNE	India	PERMANENT	Manufacturer
Steel	ISMT LIMITED,	PUNE	India	PERMANENT	Manufacturer
Steel	STAR WIRE(INDIA) LTD	FARIDABAD	India	PERMANENT	Manufacturer
Steel	STEEL AUTHORITY OF INDIA	CHENNAI	India	PERMANENT	Sales Office
Steel	ARCVAC FORGECAST PRIVATE LIMITED,	CALCUTTA	India	PERMANENT	Manufacturer
Steel	SUNFLAG IRON & STEEL CO.LTD.,	BHANDARARD	India	PERMANENT	Manufacturer
Steel	WESTERN INDIA FORGINGS LTD	PUNE	India	PERMANENT	Manufacturer
Steel	ISMT LIMITED,	PUNE	India	PERMANENT	Manufacturer
Steel	STAR WIRE(INDIA) LTD	FARIDABAD	India	PERMANENT	Manufacturer
Steel	SUNFLAG IRON & STEEL CO.LTD.,	BHANDARARD	India	PERMANENT	Manufacturer
Steel	ARCVAC FORGECAST PRIVATE LIMITED,	CALCUTTA	India	PERMANENT	Manufacturer
Steel	STEEL AUTHORITY OF INDIA	CHENNAI	India	PERMANENT	Sales Office
Steel	VIKRANT FORGE LIMITED,	CALCUTTA	India	PERMANENT	Manufacturer
Steel	Bharat Heavy Electricals Limited ,T	AMRITSAR	India	PERMANENT	Manufacturer
Steel	SAIL-VISL	DELHI	India	PERMANENT	Manufacturer
Steel	ISMT LIMITED,	PUNE	India	PERMANENT	Manufacturer
Steel	GRAPHITE INDIA LTD.,	BHVANESHWAR	India	PERMANENT	Manufacturer
Steel	Kumar Engineering Corporation	AMRITSAR	India	TRIAL	Manufacturer
Steel	MOD FORGE PVT.LIMITED	CHENNAI	India	PERMANENT	Manufacturer

Steel	KALYANI CARPENTER SPECIAL STEELS	PUNE	India	PERMANENT	Manufacturer
Steel	SUNFLAG IRON & STEEL CO.LTD.,	BHANDARARD	India	PERMANENT	Manufacturer
Steel	STAR WIRE(INDIA) LTD	FARIDABAD	India	PERMANENT	Manufacturer
Steel	ARCVAC FORGECAST PRIVATE LIMITED,	CALCUTTA	India	PERMANENT	Manufacturer
Steel	R.L.STEELS & ENERGY LTD.,	AURANGABAD	India	PERMANENT	Manufacturer
Steel	KALYANI CARPENTER SPECIAL STEELS	PUNE	India	PERMANENT	Manufacturer
Steel	ARCVAC FORGECAST PRIVATE LIMITED,	CALCUTTA	India	PERMANENT	Manufacturer
Steel	Vikrant Forge Limited	CALCUTTA	India	PERMANENT	Manufacturer
Steel	SUNFLAG IRON & STEEL CO.LTD.,	BHANDARARD	India	PERMANENT	Manufacturer
Steel	STAR WIRE(INDIA) LTD	FARIDABAD	India	PERMANENT	Manufacturer
Steel	ISMT LIMITED,	PUNE	India	PERMANENT	Manufacturer
Steel	Bharat Heavy Electricals Limited ,T	AMRITSAR	India	PERMANENT	Manufacturer
Steel	SAIL-VISL	DELHI	India	PERMANENT	Manufacturer
Steel	MOD FORGE PVT.LIMITED	CHENNAI	India	PERMANENT	Manufacturer
Steel	Kumar Engineering Corporation	AMRITSAR	India	TRIAL	Manufacturer
Steel	KALYANI CARPENTER SPECIAL STEELS	PUNE	India	PERMANENT	Manufacturer
Steel	STAR WIRE(INDIA) LTD	FARIDABAD	India	PERMANENT	Manufacturer
Steel	Bharat Heavy Electricals Limited ,T	AMRITSAR	India	PERMANENT	Manufacturer
Steel	Kumar Engineering Corporation	AMRITSAR	India	TRIAL	Manufacturer
Steel	MAHINDRA SANYO SPECIAL STEEL	RAIGARH	India	PERMANENT	Sales Office
Steel	LAXCON STEELS LTD	AHMEDABAD	India	PERMANENT	Manufacturer
Steel	VIKRANT FORGE LIMITED,	CALCUTTA	India	PERMANENT	Manufacturer
Steel	ARCVAC FORGECAST PRIVATE LIMITED,	CALCUTTA	India	PERMANENT	Manufacturer
Steel	Steel Authority of India Limited	AMRITSAR	India	PERMANENT	Sales Office
Steel	Steel Authority of India Limited	AMRITSAR	India	PERMANENT	Sales Office
Steel	STEEL AUTHORITY OF INDIA LTD	LUDHIANA	India	PERMANENT	Sales Office
Steel	Bharat Heavy Electricals Limited ,T	AMRITSAR	India	PERMANENT	Manufacturer
Steel	ARCVAC FORGECAST PRIVATE LIMITED,	CALCUTTA	India	Development	Manufacturer
Steel	KALYANI CARPENTER SPECIAL STEELS	PUNE	India	Development	Manufacturer
Steel	STAR WIRE(INDIA) LTD	FARIDABAD	India	PERMANENT	Manufacturer
Steel	BGH EDELSTAHL FREITAL GMBH		Germany	Development	Manufacturer
Steel	LAXCON STEELS LTD	AHMEDABAD	India	Development	Manufacturer
Steel	VIKRANT FORGE LIMITED,	CALCUTTA	India	PERMANENT	Manufacturer
Steel	BGH EDELSTAHL FREITAL GMBH		Germany	PERMANENT	Manufacturer

Steel	MAHER LIMITED		United Kingdom	PERMANENT	Trader
Steel	SPECIAL METALS WIGGIN LIMITED		United Kingdom	PERMANENT	Manufacturer
Steel	SALZGITTER MANNESMANN,		Germany	PERMANENT	Manufacturer
Steel	INDUSTEEL LOIRE		France	PERMANENT	Manufacturer
Steel	ACRONI.D.O.O,		Slovenia	PERMANENT	Manufacturer
Steel	INDUSTEEL BELGIUM		Belgium	PERMANENT	Manufacturer
Steel	KALYANI CARPENTER SPECIAL STEELS	PUNE	India	PERMANENT	Manufacturer
Steel	DEUTSCHE EDELSTAHLWERKE GMBH,		Germany	PERMANENT	Manufacturer
Steel	GLORIA MATERIAL TECHNOLOGY CORP,		Taiwan	PERMANENT	Manufacturer
Steel	ASCO INDUSTRIES SAS		France	PERMANENT	Manufacturer
Steel	TRUST IMPEXS	CHENNAI	India	PERMANENT	Indian Agent
Steel	VIKRANT FORGE LIMITED,	CALCUTTA	India	PERMANENT	Manufacturer
Steel	STAR WIRE(INDIA) LTD	FARIDABAD	India	PERMANENT	Manufacturer
Steel	DEUTSCHE EDELSTAHLWERKE GMBH,		Germany	PERMANENT	Manufacturer
Steel	CHANDAN STEEL LIMITED,	VALSAD	India	PERMANENT	Manufacturer
Steel	SUNFLAG IRON & STEEL CO.LTD.,	BHANDARARD	India	PERMANENT	Manufacturer
Steel	KALYANI CARPENTER SPECIAL STEELS	PUNE	India	PERMANENT	Manufacturer
Steel	LAXCON STEELS LTD	AHMEDABAD	India	PERMANENT	Manufacturer
Steel	MISHRA DHATU NIGAM LTD.,	HYDERABAD	India	PERMANENT	Manufacturer
Steel	BGH EDELSTAHL FREITAL GMBH		Germany	PERMANENT	Manufacturer
Steel	STAR WIRE(INDIA) LTD	FARIDABAD	India	Development	Manufacturer
Steel	BGH EDELSTAHL SIEGEN GMBH		Germany	PERMANENT	Manufacturer
Steel	BHARAT FORGE LIMITED	PUNE	India	Development	Manufacturer
Steel	BGH EDELSTAHL FREITAL GMBH		Germany	PERMANENT	Manufacturer
Steel	KUNJ FORGINGS P LTD	GAZIABAD	India	TRIAL	Manufacturer
Steel	KALYANI STEELS LTD	PUNE	India	PERMANENT	Manufacturer

Steel	STEEL AUTHORITY OF INDIA	CHENNAI	India	PERMANENT	Sales Office
Steel	ISMT LIMITED,	PUNE	India	PERMANENT	Manufacturer
Steel	DAYE SPECIAL STEEL CO.,LTD		China	PERMANENT	Manufacturer
Steel	RMG ALLOY STEEL LIMITED	AHMEDABAD	India	PERMANENT	Manufacturer
Steel	DAEWOO INTERNATIONAL CORPORATION		South Korea	PERMANENT	Foreign Agent
Steel	UNION STAHL GMBH,		Germany	PERMANENT	Foreign Agent
Steel	ESSAR STEEL INDIA LIMITED,	CHENNAI	India	PERMANENT	Manufacturer
Steel	UTTAM VALUE STEELS LTD	NASIK	India	PERMANENT	Manufacturer
Steel	JIANGYIN XINGCHENG SPECIAL STEEL		China	PERMANENT	Manufacturer
Steel	DILLINGER INTERNATIONAL		France	PERMANENT	Manufacturer
Steel	NLMK PLATE SALES SA		Belgium	PERMANENT	Manufacturer
Steel	INDUSTEEL BELGIUM		Belgium	PERMANENT	Manufacturer
Steel	INDUSTEEL LOIRE		France	PERMANENT	Manufacturer
Steel	JINDAL STEEL AND POWER LTD.,	ANGUL	India	TRIAL	Manufacturer
Steel	ACRONI.D.O.O,		Slovenia	PERMANENT	Manufacturer
Steel	SALZGITTER MANNESMANN,		Germany	PERMANENT	Manufacturer
Steel	HANWA CO.LTD.,		Japan	PERMANENT	Foreign Agent
Steel	STEEL AUTHORITY OF INDIA LTD	TRICHY	India	PERMANENT	Manufacturer
Steel	STEEL FORCE N.V		Belgium	PERMANENT	Foreign Agent

Steel	KUNJ FORGINGS P LTD	GAZIABAD	India	PERMANENT	Manufacturer
Steel	SUNFLAG IRON & STEEL CO.LTD.,	BHANDARARD	India	PERMANENT	Manufacturer
Steel	KALYANI CARPENTER SPECIAL STEELS	PUNE	India	PERMANENT	Manufacturer
Steel	ISMT LIMITED,	PUNE	India	PERMANENT	Manufacturer
Steel	ASCO INDUSTRIES SAS		France	PERMANENT	Manufacturer
Steel	ARCVAC FORGECAST PRIVATE LIMITED,	CALCUTTA	India	PERMANENT	Manufacturer
Steel	MAHINDRA SANYO SPECIAL STEEL	RAIGARH	India	PERMANENT	Manufacturer
Steel	VIKRANT FORGE LIMITED,	CALCUTTA	India	PERMANENT	Manufacturer
Steel	GRAPHITE INDIA LTD.,	BHVNESHWR	India	PERMANENT	Manufacturer
Steel	GLORIA MATERIAL TECHNOLOGY CORP,		Taiwan	PERMANENT	Manufacturer
Steel	STAR WIRE(INDIA) LTD	FARIDABAD	India	PERMANENT	Manufacturer
Steel	STEEL AUTHORITY OF INDIA	CHENNAI	India	PERMANENT	Sales Office
Steel	DEUTSCHE EDELSTAHLWERKE GMBH,		Germany	PERMANENT	Manufacturer
Steel	DILLINGER INTERNATIONAL		France	PERMANENT	Manufacturer
Steel	INDUSTEEL LOIRE		France	PERMANENT	Manufacturer
Steel	INDUSTEEL BELGIUM		Belgium	PERMANENT	Manufacturer
Steel	REINER BRACH GMBH & CO.KG		Germany	PERMANENT	Manufacturer
Steel	HANWA CO.LTD.,		Japan	PERMANENT	Foreign Agent
Steel	JINDAL STEEL AND POWER LTD.,	ANGUL	India	PERMANENT	Manufacturer
Steel	ESSAR STEEL INDIA LIMITED,	CHENNAI	India	PERMANENT	Manufacturer
Steel	STEEL AUTHORITY OF INDIA LTD	BHILAI	India	PERMANENT	Manufacturer
Steel	SALZGITTER MANNESMANN,		Germany	PERMANENT	Manufacturer
Steel	STEEL AUTHORITY OF INDIA LTD	BHILAI	India	PERMANENT	Manufacturer
Steel	INDUSTEEL LOIRE		France	PERMANENT	Manufacturer

Steel	INDUSTEEL BELGIUM		Belgium	PERMANENT	Manufacturer
Steel	SALZGITTER MANNESMANN,		Germany	PERMANENT	Manufacturer
Steel	JINDAL STEEL AND POWER LTD.,	ANGUL	India	PERMANENT	Manufacturer
Steel	DILLINGER INTERNATIONAL		France	PERMANENT	Manufacturer
Steel	JINDAL STEEL & POWER LIMITED,	CHENNAI	India	PERMANENT	Manufacturer
Steel	ESSAR STEEL INDIA LIMITED,	CHENNAI	India	PERMANENT	Manufacturer
Steel	JIANGYIN XINGCHENG SPECIAL STEEL		China	PERMANENT	Manufacturer
Steel	REINER BRACH GMBH & CO.KG		Germany	PERMANENT	Manufacturer
Steel	JSW STEEL LIMITED	CHENNAI	India	PERMANENT	Manufacturer
Steel	DAYE SPECIAL STEEL CO.,LTD		China	PERMANENT	Manufacturer
Steel	RMG ALLOY STEEL LIMITED	AHMEDABAD	India	PERMANENT	Manufacturer
Steel	ISMT LIMITED,	PUNE	India	PERMANENT	Manufacturer
Steel	KALYANI STEELS LTD	PUNE	India	PERMANENT	Manufacturer
Steel	STEEL AUTHORITY OF INDIA	CHENNAI	India	PERMANENT	Sales Office
Steel	JINDAL STEEL & POWER LIMITED,	CHENNAI	India	PERMANENT	Manufacturer
Steel	ADHUNIK METALIKS LTD.,	SURNDRNAGR	India	PERMANENT	Manufacturer
Steel	KANISHK STEEL INDUSTRIES Ltd.,	CHENNAI	India	PERMANENT	Manufacturer
Steel	CHENNAI UNITED METAL INDUSTRIES	CHENNAI	India	PERMANENT	Manufacturer
Steel	BEEKAY STEEL INDUSTRIES LTD.	KANCHIPURM	India	PERMANENT	Manufacturer
Steel	FERROMET STEELS PVT. LTD.	CHENNAI	India	PERMANENT	Manufacturer

Steel	HANWA CO.LTD.,		Japan	PERMANENT	Foreign Agent
Steel	STEEL AUTHORITY OF INDIA LTD	BHILAI	India	PERMANENT	Manufacturer
Steel	DILLINGER INTERNATIONAL		France	PERMANENT	Manufacturer
Steel	REINER BRACH GMBH & CO.KG		Germany	PERMANENT	Manufacturer
Steel	JIANGYIN XINGCHENG SPECIAL STEEL		China	TRIAL	Manufacturer
Steel	SALZGITTER MANNESMANN,		Germany	PERMANENT	Manufacturer
Steel	ESSAR STEEL INDIA LIMITED,	CHENNAI	India	PERMANENT	Manufacturer
Steel	QINGDAO INTERCONTINENTAL STEEL LTD.		Hong Kong	PERMANENT	Foreign Agent
Steel	DAEWOO INTERNATIONAL CORPORATION		South Korea	PERMANENT	Foreign Agent
Steel	TATA STEEL LIMITED	CHENNAI	India	PERMANENT	Manufacturer
Steel	JSW STEEL LTD.,	MUMBAI	India	PERMANENT	Manufacturer
Steel	JINDAL STEEL AND POWER LTD.,	ANGUL	India	PERMANENT	Manufacturer
Steel	ESSAR STEEL INDIA LIMITED,	CHENNAI	India	PERMANENT	Manufacturer
Steel	UTTAM VALUE STEELS LTD	NASIK	India	PERMANENT	Manufacturer
Steel	JSW STEEL LTD.	BELLARY	India	PERMANENT	Manufacturer
Steel	STEEL AUTHORITY OF INDIA LTD	BHILAI	India	PERMANENT	Manufacturer
Steel	JINDAL STEEL & POWER LIMITED,	CHENNAI	India	PERMANENT	Manufacturer
Steel	STEEL AUTHORITY OF INDIA LTD	ROURKELA	India	PERMANENT	Manufacturer

Steel	STEEL AUTHORITY OF INDIA LTD	BOKARO	India	PERMANENT	Manufacturer
Steel	JSW STEEL LTD.	BELLARY	India	PERMANENT	Manufacturer
Steel	STEEL AUTHORITY OF INDIA LTD	TRICHY	India	PERMANENT	Manufacturer
Steel	UTTAM VALUE STEELS LTD	NASIK	India	PERMANENT	Manufacturer
Steel	BHUSHAN STEEL LTD	CHENNAI	India	PERMANENT	Manufacturer
Steel	ESSAR STEEL INDIA LIMITED,	CHENNAI	India	PERMANENT	Manufacturer
Steel	MTC BUSINESS PVT LTD	CHENNAI	India	PERMANENT	Manufacturer
Steel	MAHAMAYA STEEL INDUSTRIES,	RAIPUR	India	PERMANENT	Manufacturer
Steel	SUJANA METAL PRODUCTS LTD,	VIZAG	India	PERMANENT	Manufacturer
Steel	RELIABLE SPONGE PVT.LTD.,	ROURKELA	India	PERMANENT	Manufacturer
Steel	JEEVAKA INDUSTRIES PVT LTD	HYDERABAD	India	PERMANENT	Manufacturer
Steel	TOPWORTH STEEL AND POWER PVT.LTD.,	DURG	India	PERMANENT	Manufacturer
Steel	NOBLE TECH INDUSTRIES PVT. LIMITED,	KANCHIPURM	India	PERMANENT	Manufacturer
Steel	MONNET ISPAT &ENERGY LIMITED	DELHI	India	PERMANENT	Manufacturer
Steel	PRIME ISPAT LIMITED,	RAIPUR	India	PERMANENT	Manufacturer
Steel	SKS ISPAT & POWER LTD,	DELHI	India	PERMANENT	Manufacturer
Steel	STEEL AUTHORITY OF INDIA LTD	BHILAI	India	PERMANENT	Manufacturer
Steel	BEEKAY STRUCTURAL STEELS.,	VIZAG	India	PERMANENT	Manufacturer
Steel	KHYATI ISPAT LTD	RAIPUR	India	PERMANENT	Manufacturer
Steel	NANDAN STEELS & POWER LTD.,	RAIPUR	India	PERMANENT	Manufacturer

Steel	FORTUNE METALIKS LIMITED	RAIPUR	India	PERMANENT	Manufacturer
Steel	SHRI BAJRANG ALLOYS LTD.	RAIPUR	India	PERMANENT	Manufacturer
Steel	K L STEELS (P) LTD,	GAZIABAD	India	PERMANENT	Manufacturer
Steel	JINDAL STEEL & POWER LIMITED,	CHENNAI	India	PERMANENT	Manufacturer
Steel	KARAMTARA ENGINEERING PVT LTD	MUMBAI	India	PERMANENT	Manufacturer
Steel	STEEL AUTHORITY OF INDIA LTD	DURGAPUR	India	PERMANENT	Manufacturer
Steel	STEELAUTHORITY OF INDIA LTD.,	CALCUTTA	India	PERMANENT	Manufacturer
Steel	VANDANA ISPAT LIMITED	RAIPUR	India	PERMANENT	Manufacturer
Steel	KANISHK STEEL INDUSTRIES Ltd.,	CHENNAI	India	PERMANENT	Manufacturer
Steel	MAHAMAYA STEEL INDUSTRIES,	RAIPUR	India	PERMANENT	Manufacturer
Steel	SHRI BAJRANG ALLOYS LTD.	RAIPUR	India	PERMANENT	Manufacturer
Steel	FORTUNE METALIKS LIMITED	RAIPUR	India	PERMANENT	Manufacturer
Steel	VANDANA ISPAT LIMITED	RAIPUR	India	PERMANENT	Manufacturer
Steel	NOBLE TECH INDUSTRIES PVT. LIMITED,	KANCHIPURM	India	PERMANENT	Manufacturer
Steel	GOYAL ENERGY & STEEL PVT LTD	RAIPUR	India	PERMANENT	Manufacturer
Steel	KARAMTARA ENGINEERING PVT LTD	MUMBAI	India	PERMANENT	Manufacturer
Steel	BEEKAY STRUCTURAL STEELS.,	VIZAG	India	PERMANENT	Manufacturer
Steel	SUJANA METAL PRODUCTS LTD,	VIZAG	India	PERMANENT	Manufacturer

Steel	VANDANA ROLLING MILLS LIMITED	RAIPUR	India	PERMANENT	Manufacturer
Steel	MTC BUSINESS PVT LTD	CHENNAI	India	PERMANENT	Manufacturer
Steel	SKS ISPAT & POWER LTD,	DELHI	India	PERMANENT	Manufacturer
Steel	FERROMET STEELS PVT. LTD.	CHENNAI	India	PERMANENT	Manufacturer
Steel	MONNET ISPAT &ENERGY LIMITED	DELHI	India	PERMANENT	Manufacturer
Steel	PRIME ISPAT LIMITED,	RAIPUR	India	PERMANENT	Manufacturer
Steel	TOPWORTH STEEL AND POWER PVT.LTD.,	DURG	India	PERMANENT	Manufacturer
Steel	STEEL AUTHORITY OF INDIA LTD	DURGAPUR	India	PERMANENT	Manufacturer
Steel	RELIABLE SPONGE PVT.LTD.,	ROURKELA	India	PERMANENT	Manufacturer
Steel	JEEVAKA INDUSTRIES PVT LTD	HYDERABAD	India	PERMANENT	Manufacturer
Steel	RASHTRIYA ISPAT NIGAM LIMITED	CHENNAI	India	PERMANENT	Sales Office
Steel	STEELAUTHORITY OF INDIA LTD.,	CALCUTTA	India	PERMANENT	Manufacturer
Steel	NANDAN STEELS & POWER LTD.,	RAIPUR	India	PERMANENT	Manufacturer
Steel	CHENNAI UNITED METAL INDUSTRIES	CHENNAI	India	PERMANENT	Manufacturer
Steel	MAHAVIR STEEL INDUSTRIES LTD.	MUMBAI	India	PERMANENT	Manufacturer
Steel	KHYATI ISPAT LTD	RAIPUR	India	PERMANENT	Manufacturer
Steel	JINDAL STEEL & POWER LIMITED,	CHENNAI	India	PERMANENT	Manufacturer
Steel	K L STEELS (P) LTD,	GAZIABAD	India	PERMANENT	Manufacturer
Steel	PUSHPAK STEEL INDUSTRIES PVT LTD.	PUNE	India	PERMANENT	Manufacturer

Steel	STEEL AUTHORITY OF INDIA LTD	BHILAI	India	PERMANENT	Manufacturer
Steel	CHENNAI UNITED METAL INDUSTRIES	CHENNAI	India	PERMANENT	Manufacturer
Steel	STEEL AUTHORITY OF INDIA LTD	BHILAI	India	PERMANENT	Manufacturer
Steel	KHYATI ISPAT LTD	RAIPUR	India	PERMANENT	Manufacturer
Steel	VANDANA ROLLING MILLS LIMITED	RAIPUR	India	PERMANENT	Manufacturer
Steel	K L STEELS (P) LTD,	GAZIABAD	India	PERMANENT	Manufacturer
Steel	GOYAL ENERGY & STEEL PVT LTD	RAIPUR	India	PERMANENT	Manufacturer
Steel	FORTUNE METALIKS LIMITED	RAIPUR	India	PERMANENT	Manufacturer
Steel	PRIME ISPAT LIMITED,	RAIPUR	India	PERMANENT	Manufacturer
Steel	PUSHPAK STEEL INDUSTRIES PVT LTD.	PUNE	India	PERMANENT	Manufacturer
Steel	NANDAN STEELS & POWER LTD.,	RAIPUR	India	PERMANENT	Manufacturer
Steel	VANDANA ISPAT LIMITED	RAIPUR	India	PERMANENT	Manufacturer
Steel	RASHTRIYA ISPAT NIGAM LIMITED	CHENNAI	India	PERMANENT	Sales Office
Steel	SKS ISPAT & POWER LTD,	DELHI	India	PERMANENT	Manufacturer
Steel	STEEL AUTHORITY OF INDIA LTD	DURGAPUR	India	PERMANENT	Manufacturer
Steel	MONNET ISPAT &ENERGY LIMITED	DELHI	India	PERMANENT	Manufacturer
Steel	JEEVAKA INDUSTRIES PVT LTD	HYDERABAD	India	PERMANENT	Manufacturer
Steel	TOPWORTH STEEL AND POWER PVT.LTD.,	DURG	India	PERMANENT	Manufacturer
Steel	RELIABLE SPONGE PVT.LTD.,	ROURKELA	India	PERMANENT	Manufacturer

Steel	SHRI BAJRANG ALLOYS LTD.	RAIPUR	India	PERMANENT	Manufacturer
Steel	STEELAUTHORITY OF INDIA LTD.,	CALCUTTA	India	PERMANENT	Manufacturer
Steel	KARAMTARA ENGINEERING PVT LTD	MUMBAI	India	PERMANENT	Manufacturer
Steel	BEEKAY STRUCTURAL STEELS.,	VIZAG	India	PERMANENT	Manufacturer
Steel	MAHAVIR STEEL INDUSTRIES LTD.	MUMBAI	India	PERMANENT	Manufacturer
Steel	JINDAL STEEL & POWER LIMITED,	CHENNAI	India	PERMANENT	Manufacturer
Steel	NOBLE TECH INDUSTRIES PVT. LIMITED,	KANCHIPURM	India	PERMANENT	Manufacturer
Steel	KANISHK STEEL INDUSTRIES Ltd.,	CHENNAI	India	PERMANENT	Manufacturer
Steel	MAHAMAYA STEEL INDUSTRIES,	RAIPUR	India	PERMANENT	Manufacturer
Steel	SUJANA METAL PRODUCTS LTD,	VIZAG	India	PERMANENT	Manufacturer
Steel	MTC BUSINESS PVT LTD	CHENNAI	India	PERMANENT	Manufacturer
Steel	KHYATI ISPAT LTD	RAIPUR	India	PERMANENT	Manufacturer
Steel	STEELAUTHORITY OF INDIA LTD.,	CALCUTTA	India	PERMANENT	Manufacturer
Steel	SIAM YAMATO STEEL CO. LTD.		Thailand	PERMANENT	Manufacturer
Steel	JINDAL STEEL & POWER LIMITED,	CHENNAI	India	PERMANENT	Manufacturer
Steel	ARCELOR MITTAL INTERNATIONAL LUXEMB		Germany	PERMANENT	Manufacturer
Steel	MAITHAN ISPAT LTD.	JAIPUR	India	PERMANENT	Manufacturer
Steel	SANGHVI FORGINGS & ENGINEERING LTD	BARODA	India	PERMANENT	Manufacturer
Steel	STAR WIRE(INDIA) LTD	FARIDABAD	India	PERMANENT	Manufacturer

Steel	KUNJ FORGINGS P LTD	GAZIABAD	India	PERMANENT	Manufacturer
Steel	VIKRANT FORGE LIMITED,	CALCUTTA	India	PERMANENT	Manufacturer
Steel	MAHINDRA SANYO SPECIAL STEEL	RAIGARH	India	PERMANENT	Manufacturer
Steel	BHUSHAN POWER & STEEL LIMITED	CHENNAI	India	PERMANENT	Manufacturer
Steel	ASCO INDUSTRIES SAS		France	PERMANENT	Manufacturer
Steel	SUNFLAG IRON & STEEL CO.LTD.,	BHANDARARD	India	PERMANENT	Manufacturer
Steel	STEEL AUTHORITY OF INDIA	CHENNAI	India	PERMANENT	Sales Office
Steel	GORADIA SPECIAL STEELS LTD	KHOPOLI	India	PERMANENT	Manufacturer
Steel	ARCVAC FORGECAST PRIVATE LIMITED,	CALCUTTA	India	PERMANENT	Manufacturer
Steel	ISMT LIMITED,	PUNE	India	PERMANENT	Manufacturer
Steel	STEEL AUTHORITY OF INDIA LTD	TRICHY	India	PERMANENT	Manufacturer
Steel	STAR WIRE(INDIA) LTD	FARIDABAD	India	PERMANENT	Manufacturer
Steel	MAHINDRA SANYO SPECIAL STEEL	RAIGARH	India	PERMANENT	Manufacturer
Steel	ISMT LIMITED,	PUNE	India	PERMANENT	Manufacturer
Steel	ADHUNIK METALIKS LTD.,	SURNDRNAGR	India	PERMANENT	Manufacturer
Steel	RASHTRIYA ISPAT NIGAM LIMITED	CHENNAI	India	PERMANENT	Sales Office
Steel	ARCVAC FORGECAST PRIVATE LIMITED,	CALCUTTA	India	PERMANENT	Manufacturer
Steel	GORADIA SPECIAL STEELS LTD	KHOPOLI	India	PERMANENT	Manufacturer
Steel	SUNFLAG IRON & STEEL CO.LTD.,	BHANDARARD	India	PERMANENT	Manufacturer
Steel	STEEL AUTHORITY OF INDIA	CHENNAI	India	PERMANENT	Sales Office
Steel	BHUSHAN POWER & STEEL LIMITED	CHENNAI	India	PERMANENT	Manufacturer
Steel	R.L.STEELS & ENERGY LTD.,	AURANGABAD	India	PERMANENT	Manufacturer
Steel	KHYATI ISPAT LTD	RAIPUR	India	PERMANENT	Manufacturer
Steel	STEEL AUTHORITY OF INDIA LTD	CHENNAI	India	PERMANENT	Manufacturer
Steel	BRG IRON & STEEL CO. PVT LTD	CALCUTTA	India	PERMANENT	Manufacturer
Steel	JINDAL STAINLESS (HISAR) LIMITED	CHENNAI	India	PERMANENT	Manufacturer
Steel	OUTOKUMPU STAINLESS AB		Sweden	PERMANENT	Manufacturer
Steel	ACRONI.D.O.O,		Slovenia	PERMANENT	Manufacturer

Steel	EVERSHINING INTERNATIONAL LIMITED		China	PERMANENT	Foreign Agent
Steel	JINDAL STAINLESS LIMITED.	JAIPUR	India	PERMANENT	Manufacturer
Steel	LAXCON STEELS LTD	AHMEDABAD	India	PERMANENT	Manufacturer
Steel	CHANDAN STEEL LIMITED,	VALSAD	India	PERMANENT	Manufacturer
Steel	DEUTSCHE EDELSTAHLWERKE GMBH,		Germany	PERMANENT	Manufacturer
Steel	MISHRA DHATU NIGAM LTD.,	HYDERABAD	India	PERMANENT	Manufacturer
Steel	KALYANI CARPENTER SPECIAL STEELS	PUNE	India	PERMANENT	Manufacturer
Steel	TRUST IMPEXS	CHENNAI	India	PERMANENT	Indian Agent
Steel	STAR WIRE(INDIA) LTD	FARIDABAD	India	PERMANENT	Manufacturer
Steel	JSW STEEL LTD.	BELLARY	India	PERMANENT	Manufacturer
Steel	SHYAM STEEL INDUSTRIES LTD	CALCUTTA	India	PERMANENT	Manufacturer
Steel	FORTUNE METALIKS LIMITED	RAIPUR	India	PERMANENT	Manufacturer
Steel	ELECTROSTEEL STEELS LTD.	CALCUTTA	India	PERMANENT	Manufacturer
Steel	SHRI BAJRANG POWER & ISPAT LTD.	RAIPUR	India	PERMANENT	Manufacturer
Steel	ANKIT METAL & POWER LTD.	CALCUTTA	India	PERMANENT	Manufacturer
Steel	TOPWORTH URJA & METALS LTD	NAGPUR	India	PERMANENT	Manufacturer
Steel	STEEL EXCHANGE INDIA LIMITED	VIZAG	India	PERMANENT	Manufacturer
Steel	SHYAM METALICS AND ENERGY LIMITED	CALCUTTA	India	PERMANENT	Manufacturer
Steel	SRMB SRIJAN LIMITED	CALCUTTA	India	PERMANENT	Manufacturer
Steel	KAMACHI SPONGE & POWER	CHENNAI	India	PERMANENT	Manufacturer
Steel	MONNET ISPAT &ENERGY LIMITED	DELHI	India	PERMANENT	Manufacturer

Steel	REAL ISPAT & POWER LTD.	RAIPUR	India	PERMANENT	Manufacturer
Steel	SHIVALI UDYOG (I) LIMITED	RAIPUR	India	PERMANENT	Manufacturer
Steel	MS AGARWAL FOUNDRIES PVT LTD.	HYDERABAD	India	PERMANENT	Manufacturer
Steel	SUJANA METAL PRODUCTS LTD,	VIZAG	India	PERMANENT	Manufacturer
Steel	VANDANA GLOBAL LTD	RAIPUR	India	PERMANENT	Manufacturer
Steel	JINDAL STEEL & POWER LIMITED,	CHENNAI	India	PERMANENT	Manufacturer
Steel	RELIABLE SPONGE PVT.LTD.,	ROURKELA	India	PERMANENT	Manufacturer
Steel	STEEL AUTHORITY OF INDIA LTD	BHILAI	India	PERMANENT	Manufacturer
Steel	STEEL AUTHORITY OF INDIA LTD	DURGAPUR	India	PERMANENT	Manufacturer
Steel	RASHTRIYA ISPAT NIGAM LIMITED	CHENNAI	India	PERMANENT	Sales Office
Steel	KANISHK STEEL INDUSTRIES Ltd.,	CHENNAI	India	PERMANENT	Manufacturer
Steel	RAMA POWER & STEEL PVT LTD	SATNA	India	PERMANENT	Manufacturer
Steel	ANJANI STEELS LIMITED	DELHI	India	PERMANENT	Manufacturer
Steel	BMM ISPAT LTD	CHENNAI	India	PERMANENT	Manufacturer
Tubes	AKSHAR PRECISION TUBES PVT. LTD.,	BARODA	India	PERMANENT	Manufacturer
Tubes	WUXI SHIJIA HEAT ENERGY EQUIPMENT C		China	PERMANENT	Manufacturer
Tubes	SSTP		India	PERMANENT	Manufacturer
Tubes	Bhandari Foils and Tubes Ltd.	AMRITSAR	India	PERMANENT	Manufacturer
Tubes	GAURANG PRODUCTS PVT LTD	DELHI	India	PERMANENT	Manufacturer
Tubes	Bharat Heavy Electricals Limited ,T	AMRITSAR	India	PERMANENT	Manufacturer
Tubes	Tube India	AMRITSAR	India	PERMANENT	Trader
Tubes	Scorodite Stainless India (Pvt.) L	AMRITSAR	India	PERMANENT	Manufacturer

Tubes	INDUSTRIAL METAL CORPORATION.	MUMBAI	India	PERMANENT	Manufacturer
Tubes	JIANGYIN JIEDE METAL MATERIAL		China	PERMANENT	Manufacturer
Tubes	AHMEDABAD STRIPS P. LTD.,	AHMEDABAD	India	PERMANENT	Manufacturer
Tubes	GULDE KALTWALZWERK GMBH & CO.KG		Germany	PERMANENT	Manufacturer
Tubes	SHANGHAI CHANGQIANG POWER CO LTD.		China	TRIAL	Manufacturer
Tubes	TUBE PRODUCTS OF INDIA,	CHENNAI	India	PERMANENT	Manufacturer
Tubes	AHMEDABAD STRIPS P. LTD.,	AHMEDABAD	India	PERMANENT	Manufacturer
Tubes	INNOVENTIVE INDUSTRIES LIMITED,	PUNE	India	PERMANENT	Manufacturer
Tubes	GULDE KALTWALZWERK GMBH & CO.KG		Germany	PERMANENT	Manufacturer
Tubes	OTTO WOLFF HANDELSGESELLSCHAFT MBH		Germany	PERMANENT	Manufacturer
Tubes	APL APOLLO TUBES LIMITED,	DELHI	India	PERMANENT	Manufacturer
Tubes	BHUSHAN POWER & STEEL LIMITED,	CHANDIGARH	India	PERMANENT	Manufacturer
Tubes	TATA STEEL LIMITED.	CHENNAI	India	PERMANENT	Manufacturer
Tubes	ZENITH BIRLA (INDIA) LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Tubes	MKK METAL SECTIONS PVT LTD	RANIPET	India	PERMANENT	Manufacturer
Tubes	NEZONE TUBES LIMITED,	CALCUTTA	India	PERMANENT	Manufacturer
Tubes	CAPARO ENGINEERING INDIA PVT. LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Tubes	P.S.STEEL TUBES LTD, UNIT II	BHILAI	India	PERMANENT	Manufacturer
Tubes	TUBE PRODUCTS OF INDIA,	CHENNAI	India	PERMANENT	Manufacturer
Tubes	SAWARIA PIPES PRIVATE LIMITED,	SECNDRABAD	India	PERMANENT	Manufacturer
Tubes	NAVRATAN PIPE AND PROFILE LTD.,	JAIPUR	India	PERMANENT	Manufacturer
Tubes	RIDDHI STEEL & TUBES (P) LTD	AHMEDABAD	India	PERMANENT	Manufacturer
Tubes	JINDAL PIPES LTD.	GURGAON	India	PERMANENT	Manufacturer
Tubes	CRIMSON METAL ENGINEERING CO.LTD.	CHENNAI	India	PERMANENT	Manufacturer
Tubes	JOTINDRA STEEL & TUBES LTD.	FARIDABAD	India	PERMANENT	Manufacturer
Tubes	SWASTIK PIPES LIMITED,	DELHI	India	PERMANENT	Manufacturer
Tubes	TUBOS REUNIDOS INDUSTRIAL S.L.U.		Spain	PERMANENT	Manufacturer
Tubes	SUMITOMO CORPORATION ASIA & OCEANIA		Singapore	PERMANENT	Foreign Agent
Tubes	BENTELER STEEL / TUBE GmbH		Germany	PERMANENT	Manufacturer

Tubes	SSTP		India	PERMANENT	Manufacturer
Tubes	TENARIS GLOBAL SERVICES,S.A.,		Uruguay	PERMANENT	Foreign Agent
Tubes	SALZGITTER MANESSMANN PRECISION		France	PERMANENT	Manufacturer
Tubes	TENARIS GLOBAL SERVICES,S.A.,		Uruguay	PERMANENT	Foreign Agent
Tubes	JINDAL SAW LTD.,	NASIK	India	PERMANENT	Sales Office
Tubes	HEAVY METALS & TUBES LTD UNIT-III,	MEHASANA	India	TRIAL	Manufacturer
Tubes	METAL ONE CORPORATION,		Japan	PERMANENT	Foreign Agent
Tubes	YANGZHOU LONTRIN STEEL		China	PERMANENT	Manufacturer
Tubes	TUBOS REUNIDOS INDUSTRIAL S.L.U.		Spain	PERMANENT	Manufacturer
Tubes	JIANGXI HONGDU STEEL WORKS CO LTD		China	PERMANENT	Manufacturer
Tubes	CHANGZHOU CHANGBAO PRECISION &		China	PERMANENT	Manufacturer
Tubes	JIANGSU CHENGDE STEEL TUBE SHARE CO		China	PERMANENT	Manufacturer
Tubes	SUMITOMO CORPORATION ASIA & OCEANIA		Singapore	PERMANENT	Foreign Agent
Tubes	VALLOUREC TUBES FRANCE		France	PERMANENT	Manufacturer
Tubes	BENTELER STEEL / TUBE GmBH		Germany	PERMANENT	Manufacturer
Tubes	ISMT LIMITED,	PUNE	India	PERMANENT	Manufacturer
Tubes	BAOSHAN IRON & STEEL CO LTD.		China	PERMANENT	Manufacturer
Tubes	HANGZHOU COGENERATION (HONG KONG)		Hong Kong	TRIAL	Foreign Agent
Tubes	HENGYANG STEEL TUBE GROUP INT'L		China	PERMANENT	Manufacturer
Tubes	BAOSHAN IRON & STEEL CO LTD.		China	PERMANENT	Manufacturer
Tubes	HEAVY METALS & TUBES LTD UNIT-III,	MEHASANA	India	PERMANENT	Manufacturer
Tubes	HANGZHOU COGENERATION (HONG KONG)		Hong Kong	TRIAL	Foreign Agent
Tubes	SSTP		India	PERMANENT	Manufacturer
Tubes	HENGYANG STEEL TUBE GROUP INT'L		China	PERMANENT	Manufacturer
Tubes	MAHARASHTRA SEAMLESS LTD.,	CHENNAI	India	PERMANENT	Manufacturer

Tubes	ROHWERK MAXUTTE GmbH		Germany	TRIAL	Manufacturer
Tubes	SUMITOMO CORPORATION ASIA & OCEANIA		Singapore	PERMANENT	Foreign Agent
Tubes	BENTELER STEEL / TUBE GmbH		Germany	PERMANENT	Manufacturer
Tubes	YANGZHOU LONTRIN STEEL		China	PERMANENT	Manufacturer
Tubes	JIANGSU CHENGDE STEEL TUBE SHARE CO		China	PERMANENT	Manufacturer
Tubes	TENARIS GLOBAL SERVICES,S.A.,		Uruguay	PERMANENT	Foreign Agent
Tubes	CHANGZHOU CHANGBAO PRECISION &		China	PERMANENT	Manufacturer
Tubes	ISMT LIMITED,	PUNE	India	PERMANENT	Manufacturer
Tubes	JINDAL SAW LTD.,	NASIK	India	PERMANENT	Sales Office
Tubes	JIANGXI HONGDU STEEL WORKS CO LTD		China	PERMANENT	Manufacturer
Tubes	TUBOS REUNIDOS INDUSTRIAL S.L.U.		Spain	PERMANENT	Manufacturer
Tubes	VALLOUREC TUBES FRANCE		France	PERMANENT	Manufacturer
Tubes	IL SHIN STEEL INTERNATIONAL CO.,		South Korea	PERMANENT	Foreign Agent
Tubes	HUADI STEEL GROUP CO. LTD.		China	PERMANENT	Manufacturer
Tubes	CHANDAN STEEL LIMITED,	VALSAD	India	PERMANENT	Manufacturer
Tubes	TUBACEX TUBOS INOXIDABLES, S.A		Spain	PERMANENT	Manufacturer
Tubes	METAL ONE CORPORATION,		Japan	PERMANENT	Foreign Agent
Tubes	JIANGSU WUJIN STAINLESS STEEL PIPE		China	PERMANENT	Manufacturer
Tubes	ZHEJIANG JIULI HI-TECH METALS Co. L		China	PERMANENT	Manufacturer
Tubes	SALZGITTER MANESSMANN STAINLESS		Italy	PERMANENT	Manufacturer
Tubes	SUMITOMO CORPORATION ASIA & OCEANIA		Singapore	PERMANENT	Foreign Agent
Tubes	BENTELER STEEL / TUBE GmbH		Germany	PERMANENT	Manufacturer
Tubes	TENARIS GLOBAL SERVICES,S.A.,		Uruguay	PERMANENT	Foreign Agent
Tubes	METAL ONE CORPORATION,		Japan	PERMANENT	Foreign Agent
Tubes	JIANGSU CHENGDE STEEL TUBE SHARE CO		China	PERMANENT	Manufacturer

Tubes	SUMITOMO CORPORATION ASIA & OCEANIA		Singapore	PERMANENT	Foreign Agent
Tubes	YANGZHOU LONTRIN STEEL		China	PERMANENT	Manufacturer
Tubes	VALLOUREC TUBES FRANCE		France	PERMANENT	Manufacturer
Tubes	CHANGZHOU CHANGBAO PRECISION &		China	PERMANENT	Manufacturer
Tubes	TUBOS REUNIDOS INDUSTRIAL S.L.U.		Spain	PERMANENT	Manufacturer
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	ESAB INDIA LTD	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	TAPADIA ENGINEERS & TRADERS P.LTD.	RAIPUR	India	PERMANENT	Manufacturer
Welding Consumables	NDT FLUXES.	KUMKARI	India	PERMANENT	Manufacturer
Welding Consumables	TAPADIA ENGINEERS & TRADERS P.LTD.	RAIPUR	India	PERMANENT	Manufacturer
Welding Consumables	LINCOLN ELECTRIC FRANCE S.A.		France	PERMANENT	Manufacturer
Welding Consumables	Ador Welding Limited	DELHI	India	PERMANENT	Manufacturer
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	D & H INDIA LIMITED	AMRITSAR	India	PERMANENT	Manufacturer
Welding Consumables	ESAB INDIA LTD.	AMRITSAR	India	PERMANENT	Manufacturer
Welding Consumables	HONAVAR ELECTRODES PVT LTD	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	MAILAM INDIA LIMITED	PONDICHERY	India	PERMANENT	Manufacturer
Welding Consumables	M/s Modi Arc Electrodes Co.	AMRITSAR	India	PERMANENT	Manufacturer
Welding Consumables	Bharat Heavy Electricals Limited ,T	AMRITSAR	India	PERMANENT	Manufacturer
Welding Consumables	Bharat Heavy Electricals Limited ,T	AMRITSAR	India	PERMANENT	Manufacturer

Welding Consumables	Bharat Heavy Electricals Limited ,T	AMRITSAR	India	PERMANENT	Manufacturer
Welding Consumables	Bharat Heavy Electricals Limited ,T	AMRITSAR	India	PERMANENT	Manufacturer
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	NOUVEAUX INDUSTRIES (P) LTD.,	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	ADOR WELDING LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	ANITA FLUXES ALLOY SPECIALITY	BANGALORE	India	PERMANENT	Manufacturer
Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer
Welding Consumables	METRODE PRODUCTS LIMITED,		United Kingdom	PERMANENT	Manufacturer
Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	METRODE PRODUCTS LIMITED,		United Kingdom	PERMANENT	Manufacturer
Welding Consumables	ESAB INDIA LTD	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	SPECIAL METALS WELDING PRODUCTS		USA	PERMANENT	Manufacturer
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	SATKUL ENTERPRISES LTD.		India	PERMANENT	Indian Agent
Welding Consumables	METRODE PRODUCTS LIMITED,		United Kingdom	PERMANENT	Manufacturer
Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer

Welding Consumables	GEE LIMITED,	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	Arya Engineering		India	PERMANENT	Indian Agent
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	METRODE PRODUCTS LIMITED,		United Kingdom	PERMANENT	Manufacturer
Welding Consumables	METRODE PRODUCTS LIMITED,		United Kingdom	PERMANENT	Manufacturer
Welding Consumables	VENUS WIRE INDUSTRIES PVT LTD	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	AIR LIQUIDE WELDING FRANCE,		France	PERMANENT	Manufacturer
Welding Consumables	ADOR FONTECH LIMITED,	BANGALORE	India	Development	Manufacturer
Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer
Welding Consumables	METRODE PRODUCTS LIMITED,		United Kingdom	PERMANENT	Manufacturer
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	AIR LIQUIDE WELDING FRANCE,		France	PERMANENT	Manufacturer
Welding Consumables	AIR LIQUIDE WELDING FRANCE,		France	PERMANENT	Manufacturer
Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer
Welding Consumables	METRODE PRODUCTS LIMITED,		United Kingdom	PERMANENT	Manufacturer
Welding Consumables	D&H INDIA LIMITED	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	MANTEK WIRES	COIMBATORE	India	PERMANENT	Manufacturer

Welding Consumables	WELD EXCEL INDIA LTD.,	LUDHIANA	India	PERMANENT	Manufacturer
Welding Consumables	ALPHA ARC PVT LTD	GAZIABAD	India	PERMANENT	Manufacturer
Welding Consumables	K.M.CROWN WELDING CONSUMABLES PVT.,	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	SRI DHARAANI STEEL,	SIVAKASI	India	PERMANENT	Manufacturer
Welding Consumables	MODI ARC ELECTRODES CO.	GAZIABAD	India	PERMANENT	Manufacturer
Welding Consumables	ROYAL WELDING WIRES PVT. LTD.,	KANCHIPURM	India	PERMANENT	Manufacturer
Welding Consumables	MURLI ELECTRODE PVT. LTD,	NAGPUR	India	PERMANENT	Manufacturer
Welding Consumables	CALCUTTA ELECTRODES PVT. LTD.,	RAIPUR	India	PERMANENT	Manufacturer
Welding Consumables	JAGSHAAN INDUSTRIES	NAGPUR	India	PERMANENT	Manufacturer
Welding Consumables	RAAJRATNA ELECTRODES LTD	AHMEDABAD	India	PERMANENT	Manufacturer
Welding Consumables	ADOR WELDING LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	ANAND ARC LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	ESAB INDIA LTD	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	EVERSHINE WIRES	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	MARUTI WELD PRIVATE LIMITED,	DELHI	India	PERMANENT	Manufacturer
Welding Consumables	NALLI ARC INDUSTRIE,	ERODE	India	PERMANENT	Manufacturer
Welding Consumables	NOUVEAUX INDUSTRIES (P) LTD.,	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	RASI ELECTRODES LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	STANDARD WIRE PRODUCTS	CHENNAI	India	PERMANENT	Manufacturer

Welding Consumables	VOLTARC ELECTRODES (P) LTD,	TIRUPATHI	India	PERMANENT	Manufacturer
Welding Consumables	WIRE AND WIRE PRODUCTS	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	WELDFAST ELECTRODES PVT LTD,	NAGPUR	India	PERMANENT	Manufacturer
Welding Consumables	KLINWELD WIRES PVT. LTD.,	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	NATIONAL ENGINEERING ENTERPRISES,	JAMSHEDPUR	India	PERMANENT	Manufacturer
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	PRASHANTH CYLINDERS PVT. LTD.,	BANGALORE	India	PERMANENT	Manufacturer
Welding Consumables	PRECISION DRAWEL PVT., LTD.,	NAGPUR	India	PERMANENT	Manufacturer
Welding Consumables	GEE LIMITED,	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	CLASSIC ELECTRODES (INDIA) LTD.,	CALCUTTA	India	PERMANENT	Manufacturer
Welding Consumables	MODI HITECH INDIA LTD.,	DELHI	India	PERMANENT	Manufacturer
Welding Consumables	PRECISION WELDARC LTD,	CALCUTTA	India	PERMANENT	Manufacturer
Welding Consumables	ROYAL ARC ELECTRODES LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	UNIQUE WELDING PRODUCTS PVT.LTD.,	V.VIDNAGAR	India	PERMANENT	Manufacturer
Welding Consumables	M W WIRETECK PVT. LTD.	DELHI	India	PERMANENT	Manufacturer
Welding Consumables	MAILAM INDIA LIMITED	PONDICHERY	India	PERMANENT	Manufacturer
Welding Consumables	WELD ALLOY PRODUCTS,	NOIDA	India	PERMANENT	Manufacturer
Welding Consumables	B&H ELECTRODES PVT. LTD,	CHANDIGARH	India	PERMANENT	Manufacturer
Welding Consumables	ATHARVE WELDING TECHNOLOGIES (INDIA	SHOLAPUR	India	PERMANENT	Manufacturer

Welding Consumables	MAGNARC ELECTRODES PVT.LTD.,	VIZAG	India	PERMANENT	Manufacturer
Welding Consumables	SHAKUNT ENTERPRISES PRIVATE LIMITED	LUDHIANA	India	PERMANENT	Manufacturer
Welding Consumables	VARUN ELECTRODES PVT. LTD.,	PANIPAT	India	PERMANENT	Manufacturer
Welding Consumables	DAYACHAND ENGINEERING INDUSTRIES	MEERUT	India	PERMANENT	Manufacturer
Welding Consumables	VEEPEES INDIA,		India	PERMANENT	Indian Agent
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	VEEPEES INDIA,		India	PERMANENT	Indian Agent
Welding Consumables	SATKUL ENTERPRISES LTD.		India	PERMANENT	Indian Agent
Welding Consumables	METRODE PRODUCTS LIMITED,		United Kingdom	PERMANENT	Manufacturer
Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer
Welding Consumables	METRODE PRODUCTS LIMITED,		United Kingdom	PERMANENT	Manufacturer
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer
Welding Consumables	AIR LIQUIDE WELDING FRANCE,		France	PERMANENT	Manufacturer
Welding Consumables	METRODE PRODUCTS LIMITED,		United Kingdom	PERMANENT	Manufacturer
Welding Consumables	ESAB INDIA LTD	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer
Welding Consumables	METRODE PRODUCTS LIMITED,		United Kingdom	PERMANENT	Manufacturer

Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	ANITA FLUXES ALLOY SPECIALITY	BANGALORE	India	PERMANENT	Manufacturer
Welding Consumables	ADOR WELDING LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	NOUVEAUX INDUSTRIES (P) LTD.,	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	D&H INDIA LIMITED	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	RAAJRATNA ELECTRODES LTD	AHMEDABAD	India	PERMANENT	Manufacturer
Welding Consumables	PRECISION WELDARC LTD,	CALCUTTA	India	PERMANENT	Manufacturer
Welding Consumables	K.M.CROWN WELDING CONSUMABLES PVT.,	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	SUN ENTERPRISES	THANJAVUR	India	PERMANENT	Manufacturer
Welding Consumables	ROYAL WELDING WIRES PVT. LTD.,	KANCHIPURM	India	PERMANENT	Manufacturer
Welding Consumables	RUPA INDUSTRIES,	SECNDRABAD	India	PERMANENT	Manufacturer
Welding Consumables	OSCAR AUTO FLUX,	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	A V WELDTECH PVT.LTD.,	NAGPUR	India	PERMANENT	Manufacturer
Welding Consumables	JAGSHAAN INDUSTRIES	NAGPUR	India	PERMANENT	Manufacturer
Welding Consumables	SUN AUTO WELD INDUSTRIES,	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	ESAB INDIA LTD	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	ANAND ARC LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	RENUKA FLUXES COMPANY,	SALEM	India	PERMANENT	Manufacturer

Welding Consumables	SUBMER FLUX TECHNOLOGIES,	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	VOLTARC ELECTRODES (P) LTD,	TIRUPATHI	India	PERMANENT	Manufacturer
Welding Consumables	TAPADIA ENGINEERS & TRADERS P.LTD.	RAIPUR	India	PERMANENT	Manufacturer
Welding Consumables	NOUVEOFLUX CHEMICAL COMPANY	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	THERMIT ALLOYS (P) LTD,	SHIMOGA	India	PERMANENT	Manufacturer
Welding Consumables	WELMET TECHNOLOGIES PVT. LTD.,	NAGPUR	India	PERMANENT	Manufacturer
Welding Consumables	SUPER WELD PRODUCTS	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	S.CHEMS & ALLIED PRODUCERS PVT LIMI	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	R.M.H.CHEMICAL INDUSTRIES	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	MANTEK WELDAIDFLUX CO.	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	LAKSHMI CHEMICAL INDUSTRIES	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	ADOR WELDING LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	METRODE PRODUCTS LIMITED,		United Kingdom	PERMANENT	Manufacturer
Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	AIR LIQUIDE WELDING FRANCE,		France	PERMANENT	Manufacturer
Welding Consumables	NIPPON STEEL & SUMIKIN BUSSAN		Japan	PERMANENT	Channel Partner
Welding Consumables	I.A.BARNES & CO. LTD,		United Kingdom	PERMANENT	Foreign Agent
Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer

Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	METRODE PRODUCTS LIMITED,		United Kingdom	PERMANENT	Manufacturer
Welding Consumables	MARUTHI ELECTRODES (P) LTD.,	BANGALORE	India	PERMANENT	Manufacturer
Welding Consumables	ADOR WELDING LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	HONAVAR ELECTRODES PVT. LTD.,	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	INDUSTRIA NAZIONALE ELETTRODI S.p.A		Italy	PERMANENT	Manufacturer
Welding Consumables	HONAVAR ELECTRODES PVT. LTD.,	MUMBAI	India	Development	Manufacturer
Welding Consumables	GEE LIMITED,	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	ADOR WELDING LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	METRODE PRODUCTS LIMITED,		United Kingdom	PERMANENT	Manufacturer
Welding Consumables	ESAB INDIA LTD	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	I.A.BARNES & CO. LTD,		United Kingdom	PERMANENT	Foreign Agent
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	MARUTHI ELECTRODES (P) LTD.,	BANGALORE	India	PERMANENT	Manufacturer
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	MARUTHI ELECTRODES (P) LTD.,	BANGALORE	India	PERMANENT	Manufacturer
Welding Consumables	HONAVAR ELECTRODES PVT. LTD.,	MUMBAI	India	Development	Manufacturer
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent

Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer
Welding Consumables	ADOR WELDING LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	METRODE PRODUCTS LIMITED,		United Kingdom	PERMANENT	Manufacturer
Welding Consumables	INDUSTRIA NAZIONALE ELETTRODI S.p.A		Italy	PERMANENT	Manufacturer
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	I.A.BARNES & CO. LTD,		United Kingdom	PERMANENT	Foreign Agent
Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	METRODE PRODUCTS LIMITED,		United Kingdom	PERMANENT	Manufacturer
Welding Consumables	GEE LIMITED,	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	ADOR FONTECH LIMITED,	BANGALORE	India	Development	Manufacturer
Welding Consumables	MARUTHI ELECTRODES (P) LTD.,	BANGALORE	India	PERMANENT	Manufacturer
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	METRODE PRODUCTS LIMITED,		United Kingdom	PERMANENT	Manufacturer
Welding Consumables	ADOR FONTECH LIMITED,	BANGALORE	India	Development	Manufacturer
Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	METRODE PRODUCTS LIMITED,		United Kingdom	PERMANENT	Manufacturer
Welding Consumables	AIR LIQUIDE WELDING FRANCE,		France	PERMANENT	Manufacturer

Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer
Welding Consumables	NIPPON STEEL & SUMIKIN BUSSAN		Japan	PERMANENT	Channel Partner
Welding Consumables	METRODE PRODUCTS LIMITED,		United Kingdom	PERMANENT	Manufacturer
Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer
Welding Consumables	NIPPON STEEL & SUMIKIN BUSSAN		Japan	PERMANENT	Channel Partner
Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	Development	Foreign Agent
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	WELDFAST ELECTRODES PVT LTD,	NAGPUR	India	PERMANENT	Manufacturer
Welding Consumables	MODI ARC ELECTRODES CO.	GAZIABAD	India	PERMANENT	Manufacturer
Welding Consumables	VIJEY ELECTRODES AND WIRES PVT.	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	HONAVAR ELECTRODES PVT. LTD.,	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	ROYAL ARC ELECTRODES LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	RAJ KESARI ELECTRODES,	UDAIPUR	India	PERMANENT	Manufacturer
Welding Consumables	MANTEK ELECTRODS PRIVATE LTD,	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	RAJ KESARI ELECTRODES,	UDAIPUR	India	PERMANENT	Manufacturer
Welding Consumables	MARUTI WELD PRIVATE LIMITED,	DELHI	India	PERMANENT	Manufacturer
Welding Consumables	VIJEY ELECTRODES AND WIRES PVT.	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	WELDFAST ELECTRODES PVT LTD,	NAGPUR	India	PERMANENT	Manufacturer

Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	MAILAM INDIA LIMITED	PONDICHERY	India	PERMANENT	Manufacturer
Welding Consumables	HONAVAR ELECTRODES PVT. LTD.,	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	MODI HITECH INDIA LTD.,	DELHI	India	PERMANENT	Manufacturer
Welding Consumables	GEE LIMITED,	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	ROYAL ARC ELECTRODES LIMITED	MUMBAI	India	Development	Manufacturer
Welding Consumables	MODI ARC ELECTRODES CO.	GAZIABAD	India	PERMANENT	Manufacturer
Welding Consumables	MARUTI WELD PRIVATE LIMITED,	DELHI	India	PERMANENT	Manufacturer
Welding Consumables	MANTEK ELECTRODS PRIVATE LTD,	TRICHY	India	Development	Manufacturer
Welding Consumables	MODI HITECH INDIA LTD.,	DELHI	India	PERMANENT	Manufacturer
Welding Consumables	ROYAL ARC ELECTRODES LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	WELDFAST ELECTRODES PVT LTD,	NAGPUR	India	PERMANENT	Manufacturer
Welding Consumables	HONAVAR ELECTRODES PVT. LTD.,	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	MAILAM INDIA LIMITED	PONDICHERY	India	PERMANENT	Manufacturer
Welding Consumables	VIJEY ELECTRODES AND WIRES PVT.	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	MODI ARC ELECTRODES CO.	GAZIABAD	India	PERMANENT	Manufacturer
Welding Consumables	D&H INDIA LIMITED	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	GEE LIMITED,	MUMBAI	India	PERMANENT	Manufacturer

Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer
Welding Consumables	AIR LIQUIDE WELDING FRANCE,		France	PERMANENT	Manufacturer
Welding Consumables	METRODE PRODUCTS LIMITED,		United Kingdom	PERMANENT	Manufacturer
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	MAILAM INDIA LIMITED	PONDICHERY	India	Development	Manufacturer
Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer
Welding Consumables	METRODE PRODUCTS LIMITED,		United Kingdom	PERMANENT	Manufacturer
Welding Consumables	B&H ELECTRODES PVT. LTD,	CHANDIGARH	India	PERMANENT	Manufacturer
Welding Consumables	BALAJI ELECTRODES	COIMBATORE	India	PERMANENT	Manufacturer
Welding Consumables	IDEAL ELECTRODES	COIMBATORE	India	PERMANENT	Manufacturer
Welding Consumables	RUKHMANI ELECTRODES PVT.LTD.,	CALCUTTA	India	PERMANENT	Manufacturer
Welding Consumables	BRIGHT WELD TECHNOLOGIES	COIMBATORE	India	PERMANENT	Manufacturer
Welding Consumables	RAAJRATNA ELECTRODES LTD	AHMEDABAD	India	PERMANENT	Manufacturer
Welding Consumables	SPECTRA SUPER ALLOYS LTD,	JAMSHEDPUR	India	PERMANENT	Manufacturer
Welding Consumables	WELDCOM ELECTRODES PVT.LTD.,	SURAT	India	PERMANENT	Manufacturer
Welding Consumables	MICRO WELD (INDIA)	LUDHIANA	India	PERMANENT	Manufacturer
Welding Consumables	SOLARC WELD RODS,	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	RASI ELECTRODES LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	ATHARVE WELDING TECHNOLOGIES (INDIA	SHOLAPUR	India	PERMANENT	Manufacturer

Welding Consumables	GEE LIMITED,	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	MAGNARC ELECTRODES PVT.LTD.,	VIZAG	India	PERMANENT	Manufacturer
Welding Consumables	COSMOS ELECTRODES PVT., LTD,	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	MODI HITECH INDIA LTD.,	DELHI	India	PERMANENT	Manufacturer
Welding Consumables	SUPERON SCHWEISSTECHNIK INDIA LTD.,	GURGAON	India	PERMANENT	Manufacturer
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	WELDALL ELECTRODES (INDIA)	NAGPUR	India	PERMANENT	Manufacturer
Welding Consumables	WELD ALLOY PRODUCTS,	NOIDA	India	PERMANENT	Manufacturer
Welding Consumables	ALPHA FLUX & ELETRODES,	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	D&H INDIA LIMITED	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	ORION WIRE MANUFACTURING CO.,	BARAUCH	India	PERMANENT	Manufacturer
Welding Consumables	EUREKA SYSTEMS AND ELECTRODES P.LTD	COIMBATORE	India	PERMANENT	Manufacturer
Welding Consumables	ESAB INDIA LTD	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	ORANGE ELECTRODES INDUSTRIES,	THANE	India	PERMANENT	Manufacturer
Welding Consumables	WELDCRAFT PRIVATE LIMITED,	BANGALORE	India	PERMANENT	Manufacturer
Welding Consumables	MIGLANI ENGINEERS	HARDWAR	India	PERMANENT	Manufacturer
Welding Consumables	SHIELDARC EQUIPMENTS PVT. LTD,	CALCUTTA	India	PERMANENT	Manufacturer
Welding Consumables	SUN ENTERPRISES	THANJAVUR	India	PERMANENT	Manufacturer
Welding Consumables	AARYA ELECTRODES PVT.LTD.	AGRA	India	PERMANENT	Manufacturer

Welding Consumables	MAILAM INDIA LIMITED	PONDICHERY	India	PERMANENT	Manufacturer
Welding Consumables	ALPHA ARC PVT LTD	GAZIABAD	India	PERMANENT	Manufacturer
Welding Consumables	KOLLIPARA ELECTRODES PVT.LTD.,	KRISHNA	India	PERMANENT	Manufacturer
Welding Consumables	VALENCY COMPOUNDS SERVICES PVT LTD	AHAMDNAGAR	India	PERMANENT	Manufacturer
Welding Consumables	NUCOR WELD(INDIA)PVT.LTD.,	BANGALORE	India	PERMANENT	Manufacturer
Welding Consumables	MARUTHI ELECTRODES (P) LTD.,	BANGALORE	India	PERMANENT	Manufacturer
Welding Consumables	RAJ KESARI ELECTRODES,	UDAIPUR	India	PERMANENT	Manufacturer
Welding Consumables	MEGA WELD TECHNOLOGIES,	COIMBATORE	India	PERMANENT	Manufacturer
Welding Consumables	ABIRAMI ELECTRODES,	COIMBATORE	India	PERMANENT	Manufacturer
Welding Consumables	BAGHERWAL ELECTRODES PVT.LTD.,	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	CALCUTTA ELECTRODES PVT. LTD.,	RAIPUR	India	PERMANENT	Manufacturer
Welding Consumables	VARUN ELECTRODES PVT. LTD.,	PANIPAT	India	PERMANENT	Manufacturer
Welding Consumables	ROYAL ARC ELECTRODES LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	SRI RENGHA ELECTRODES (P) LTD,	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	ADOR WELDING LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	MANTEK ELECTRODS PRIVATE LTD,	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	MARUTI WELD PRIVATE LIMITED,	DELHI	India	PERMANENT	Manufacturer
Welding Consumables	ELMARC ELECTRODES PVT. LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	CLASSIC ELECTRODES (INDIA) LTD.,	CALCUTTA	India	PERMANENT	Manufacturer

Welding Consumables	SUNDEEP ELECTRODES PVT. LTD.,	GAZIABAD	India	PERMANENT	Manufacturer
Welding Consumables	HONAVAR ELECTRODES PVT. LTD.,	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	MODI ARC ELECTRODES CO.	GAZIABAD	India	PERMANENT	Manufacturer
Welding Consumables	SETH ELECTRODES PVT. LTD.,	DELHI	India	PERMANENT	Manufacturer
Welding Consumables	MALU ELECTRODES PVT.LIMITED	NAGPUR	India	PERMANENT	Manufacturer
Welding Consumables	SRI VARSHA ELECTRODES,	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	V.N.C.ELECTRODEES,	KARUR	India	PERMANENT	Manufacturer
Welding Consumables	K.M.CROWN WELDING CONSUMABLES PVT.,	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	NIVETHA ELECTRODES,	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	P.R.Industries	KOTA	India	PERMANENT	Manufacturer
Welding Consumables	ROYAL WELDING WIRES PVT. LTD.,	KANCHIPURM	India	PERMANENT	Manufacturer
Welding Consumables	FUSION ENGG. PRODUCTS LTD.,	JAMSHEDPUR	India	PERMANENT	Manufacturer
Welding Consumables	ASOKAA ALLOYS	COIMBATORE	India	PERMANENT	Manufacturer
Welding Consumables	WELDFAST ELECTRODES PVT LTD,	NAGPUR	India	PERMANENT	Manufacturer
Welding Consumables	VOLTARC ELECTRODES (P) LTD,	TIRUPATHI	India	PERMANENT	Manufacturer
Welding Consumables	ACCURATE WELDARC PVT LTD	RAIPUR	India	PERMANENT	Manufacturer
Welding Consumables	ANAND ARC LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	K.M.CROWN WELDING CONSUMABLES PVT.,	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	D&H INDIA LIMITED	INDORE	India	PERMANENT	Manufacturer

Welding Consumables	ADOR WELDING LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	HONAVAR ELECTRODES PVT. LTD.,	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	WELD EXCEL INDIA LTD.,	LUDHIANA	India	PERMANENT	Manufacturer
Welding Consumables	SRI RENGHA ELECTRODES (P) LTD,	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	MANTEK ELECTRODS PRIVATE LTD,	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	MODI ARC ELECTRODES CO.	GAZIABAD	India	PERMANENT	Manufacturer
Welding Consumables	VIJEY ELECTRODES AND WIRES PVT.	CHENNAI	India	Development	Manufacturer
Welding Consumables	ESAB INDIA LTD	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	VARUN ELECTRODES PVT. LTD.,	PANIPAT	India	PERMANENT	Manufacturer
Welding Consumables	ROYAL WELDING WIRES PVT. LTD.,	KANCHIPURM	India	PERMANENT	Manufacturer
Welding Consumables	SUNDEEP ELECTRODES PVT. LTD.,	GAZIABAD	India	PERMANENT	Manufacturer
Welding Consumables	AARYA ELECTRODES PVT.LTD.	AGRA	India	PERMANENT	Manufacturer
Welding Consumables	MAILAM INDIA LIMITED	PONDICHERY	India	PERMANENT	Manufacturer
Welding Consumables	MODI HITECH INDIA LTD.,	DELHI	India	PERMANENT	Manufacturer
Welding Consumables	WELDALL ELECTRODES (INDIA)	NAGPUR	India	Development	Manufacturer
Welding Consumables	RAJ KESARI ELECTRODES,	UDAIPUR	India	PERMANENT	Manufacturer
Welding Consumables	RASI ELECTRODES LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	ROYAL ARC ELECTRODES LIMITED	MUMBAI	India	PERMANENT	Manufacturer

Welding Consumables	WELDFAST ELECTRODES PVT LTD,	NAGPUR	India	PERMANENT	Manufacturer
Welding Consumables	VOLTARC ELECTRODES (P) LTD,	TIRUPATHI	India	PERMANENT	Manufacturer
Welding Consumables	WELD ALLOY PRODUCTS,	NOIDA	India	PERMANENT	Manufacturer
Welding Consumables	THIRUMALA ELECTRODES CO.,	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	KOLLIPARA ELECTRODES PVT.LTD.,	KRISHNA	India	PERMANENT	Manufacturer
Welding Consumables	MARUTHI ELECTRODES (P) LTD.,	BANGALORE	India	PERMANENT	Manufacturer
Welding Consumables	MALU ELECTRODES PVT.LIMITED	NAGPUR	India	Development	Manufacturer
Welding Consumables	SAITRON ENGINEERS PVT. LTD,	NAGPUR	India	PERMANENT	Manufacturer
Welding Consumables	GEE LIMITED,	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	MARUTI WELD PRIVATE LIMITED,	DELHI	India	PERMANENT	Manufacturer
Welding Consumables	B&H ELECTRODES PVT. LTD,	CHANDIGARH	India	PERMANENT	Manufacturer
Welding Consumables	SUPERON SCHWEISSTECHNIK INDIA LTD.,	GURGAON	India	PERMANENT	Manufacturer
Welding Consumables	FUSION ENGG. PRODUCTS LTD.,	JAMSHEDPUR	India	PERMANENT	Manufacturer
Welding Consumables	NUCOR WELD(INDIA)PVT.LTD.,	BANGALORE	India	PERMANENT	Manufacturer
Welding Consumables	COSMOS ELECTRODES PVT., LTD,	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	MAILAM INDIA LIMITED	PONDICHERY	India	PERMANENT	Manufacturer
Welding Consumables	D&H INDIA LIMITED	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	GEE LIMITED,	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	ADOR WELDING LIMITED	MUMBAI	India	Development	Manufacturer

Welding Consumables	VIJEY ELECTRODES AND WIRES PVT.	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	HONAVAR ELECTRODES PVT. LTD.,	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	MODI ARC ELECTRODES CO.	GAZIABAD	India	PERMANENT	Manufacturer
Welding Consumables	ROYAL ARC ELECTRODES LIMITED	MUMBAI	India	Development	Manufacturer
Welding Consumables	WELDCRAFT PRIVATE LIMITED,	BANGALORE	India	PERMANENT	Manufacturer
Welding Consumables	V.N.C.ELECTRODEES,	KARUR	India	PERMANENT	Manufacturer
Welding Consumables	ROYAL WELDING WIRES PVT. LTD.,	KANCHIPURM	India	PERMANENT	Manufacturer
Welding Consumables	ANAND ARC LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	WELD ALLOY PRODUCTS,	NOIDA	India	PERMANENT	Manufacturer
Welding Consumables	MANTEK ELECTRODS PRIVATE LTD,	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	ROYAL ARC ELECTRODES LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	MARUTI WELD PRIVATE LIMITED,	DELHI	India	PERMANENT	Manufacturer
Welding Consumables	RASI ELECTRODES LTD.,	CHENNAI	India	PERMANENT	Manufacturer

Welding Consumables	GEE LIMITED,	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	D&H INDIA LIMITED	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	FUSION ENGG. PRODUCTS LTD.,	JAMSHEDPUR	India	PERMANENT	Manufacturer
Welding Consumables	MODI ARC ELECTRODES CO.	GAZIABAD	India	PERMANENT	Manufacturer
Welding Consumables	MAILAM INDIA LIMITED	PONDICHERY	India	PERMANENT	Manufacturer
Welding Consumables	HONAVAR ELECTRODES PVT. LTD.,	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	ESAB INDIA LTD	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	COSMOS ELECTRODES PVT., LTD,	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	MODI HITECH INDIA LTD.,	DELHI	India	PERMANENT	Manufacturer
Welding Consumables	KOLLIPARA ELECTRODES PVT.LTD.,	KRISHNA	India	PERMANENT	Manufacturer
Welding Consumables	NUCOR WELD(INDIA)PVT.LTD.,	BANGALORE	India	PERMANENT	Manufacturer
Welding Consumables	SUPERON SCHWEISSTECHNIK INDIA LTD.,	GURGAON	India	PERMANENT	Manufacturer

Welding Consumables	K.M.CROWN WELDING CONSUMABLES PVT.,	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	VARUN ELECTRODES PVT. LTD.,	PANIPAT	India	PERMANENT	Manufacturer
Welding Consumables	SUNDEEP ELECTRODES PVT. LTD.,	GAZIABAD	India	PERMANENT	Manufacturer
Welding Consumables	WELDFAST ELECTRODES PVT LTD,	NAGPUR	India	PERMANENT	Manufacturer
Welding Consumables	WELD EXCEL INDIA LTD.,	LUDHIANA	India	PERMANENT	Manufacturer
Welding Consumables	THIRUMALA ELECTRODES CO.,	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	RAJ KESARI ELECTRODES,	UDAIPUR	India	PERMANENT	Manufacturer
Welding Consumables	SRI RENGAL ELECTRODES (P) LTD,	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	VOLTARC ELECTRODES (P) LTD,	TIRUPATHI	India	PERMANENT	Manufacturer
Welding Consumables	MARUTHI ELECTRODES (P) LTD.,	BANGALORE	India	PERMANENT	Manufacturer
Welding Consumables	MAGNA ENGINEERING	VIJAYAWADA	India	PERMANENT	Manufacturer
Welding Consumables	SAITRON ENGINEERS PVT. LTD,	NAGPUR	India	PERMANENT	Manufacturer
Welding Consumables	ALPHA FLUX & ELETRODES,	TRICHY	India	PERMANENT	Manufacturer

Welding Consumables	CLASSIC ELECTRODES (INDIA) LTD.,	CALCUTTA	India	PERMANENT	Manufacturer
Welding Consumables	MAGNARC ELECTRODES PVT.LTD.,	VIZAG	India	PERMANENT	Manufacturer
Welding Consumables	THE INDIAN SEEL & WIRE PRODUCTS LTD	JAMSHEDPUR	India	PERMANENT	Manufacturer
Welding Consumables	RUKHMANI ELECTRODES PVT.LTD.,	CALCUTTA	India	PERMANENT	Manufacturer
Welding Consumables	RAAJRATNA ELECTRODES LTD	AHMEDABAD	India	PERMANENT	Manufacturer
Welding Consumables	MALU ELECTRODES PVT.LIMITED	NAGPUR	India	PERMANENT	Manufacturer
Welding Consumables	ADOR WELDING LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	ALPHA ARC PVT LTD	GAZIABAD	India	PERMANENT	Manufacturer
Welding Consumables	EUREKA SYSTEMS AND ELECTRODES P.LTD	COIMBATORE	India	PERMANENT	Manufacturer
Welding Consumables	BAGHERWAL ELECTRODES PVT.LTD.,	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	MURLI ELECTRODE PVT. LTD,	NAGPUR	India	PERMANENT	Manufacturer
Welding Consumables	SPECTRA SUPER ALLOYS LTD,	JAMSHEDPUR	India	PERMANENT	Manufacturer
Welding Consumables	SOLARC WELD RODS,	TRICHY	India	PERMANENT	Manufacturer

Welding Consumables	CALCUTTA ELECTRODES PVT. LTD.,	RAIPUR	India	PERMANENT	Manufacturer
Welding Consumables	VIJEY ELECTRODES AND WIRES PVT.	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	TIEN TAI ELECTRODE CO., LTD,		Taiwan	PERMANENT	Manufacturer
Welding Consumables	VEEPEES INDIA,		India	PERMANENT	Indian Agent
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	SATKUL ENTERPRISES LTD.		India	PERMANENT	Indian Agent
Welding Consumables	ROYAL ARC ELECTRODES LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	HYUNDAI WELDING CO. LTD.,		South Korea	PERMANENT	Manufacturer
Welding Consumables	THE SHANGHAI LINCOLN ELECTRIC		China	PERMANENT	Manufacturer
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	SATKUL ENTERPRISES LTD.		India	PERMANENT	Indian Agent
Welding Consumables	Arya Engineering		India	Development	Indian Agent
Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	KISWEL LTD.,		South Korea	PERMANENT	Manufacturer
Welding Consumables	SATKUL ENTERPRISES LTD.		India	Development	Indian Agent
Welding Consumables	TIEN TAI ELECTRODE CO., LTD,		Taiwan	PERMANENT	Manufacturer
Welding Consumables	ESAB INDIA LTD	CHENNAI	India	PERMANENT	Manufacturer

Welding Consumables	VEEPEES INDIA,		India	PERMANENT	Indian Agent
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	HYUNDAI WELDING CO. LTD.,		South Korea	PERMANENT	Manufacturer
Welding Consumables	METRODE PRODUCTS LIMITED,		United Kingdom	PERMANENT	Manufacturer
Welding Consumables	SATKUL ENTERPRISES LTD.		India	PERMANENT	Indian Agent
Welding Consumables	TIEN TAI ELECTRODE CO., LTD,		Taiwan	PERMANENT	Manufacturer
Welding Consumables	SATKUL ENTERPRISES LTD.		India	PERMANENT	Indian Agent
Welding Consumables	ESAB INDIA LTD	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	TIEN TAI ELECTRODE CO., LTD,		Taiwan	PERMANENT	Manufacturer
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	VEEPEES INDIA,		India	PERMANENT	Indian Agent
Welding Consumables	THE SHANGHAI LINCOLN ELECTRIC		China	PERMANENT	Manufacturer
Welding Consumables	HYUNDAI WELDING CO. LTD.,		South Korea	PERMANENT	Manufacturer
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	VEEPEES INDIA,		India	PERMANENT	Indian Agent
Welding Consumables	TIEN TAI ELECTRODE CO., LTD,		Taiwan	PERMANENT	Manufacturer
Welding Consumables	WEARTECH INTL INC		USA	PERMANENT	Manufacturer
Welding Consumables	GEE LIMITED,	MUMBAI	India	PERMANENT	Manufacturer

Welding Consumables	KENNAMETAL STELLITE		USA	PERMANENT	Manufacturer
Welding Consumables	Arya Engineering		India	Development	Indian Agent
Welding Consumables	MAILAM INDIA LIMITED	PONDICHERY	India	Development	Manufacturer
Welding Consumables	HONAVAR ELECTRODES PVT. LTD.,	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer
Welding Consumables	SPECIAL METALS WELDING PRODUCTS		USA	PERMANENT	Manufacturer
Welding Consumables	GEE LIMITED,	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	SPECIAL METALS WELDING PRODUCTS		USA	PERMANENT	Manufacturer
Welding Consumables	METRODE PRODUCTS LIMITED,		United Kingdom	PERMANENT	Manufacturer
Welding Consumables	AIR LIQUIDE WELDING FRANCE,		France	PERMANENT	Manufacturer
Welding Consumables	MAILAM INDIA LIMITED	PONDICHERY	India	PERMANENT	Manufacturer
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	ESAB INDIA LTD	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	MODI ARC ELECTRODES CO.	GAZIABAD	India	PERMANENT	Manufacturer
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	ESAB INDIA LTD	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	ROYAL ARC ELECTRODES LIMITED	MUMBAI	India	Development	Manufacturer

Welding Consumables	ESAB INDIA LTD	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	MAILAM INDIA LIMITED	PONDICHERY	India	PERMANENT	Manufacturer
Welding Consumables	HONAVAR ELECTRODES PVT. LTD.,	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	MODI ARC ELECTRODES CO.	GAZIABAD	India	PERMANENT	Manufacturer
Welding Consumables	ESAB INDIA LTD	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	ESAB INDIA LTD	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	ROYAL ARC ELECTRODES LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	ESAB INDIA LTD	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	MODI HITECH INDIA LTD.,	DELHI	India	PERMANENT	Manufacturer
Welding Consumables	GEE LIMITED,	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	MARUTI WELD PRIVATE LIMITED,	DELHI	India	PERMANENT	Manufacturer
Welding Consumables	MODI ARC ELECTRODES CO.	GAZIABAD	India	PERMANENT	Manufacturer
Welding Consumables	HONAVAR ELECTRODES PVT. LTD.,	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	ROYAL ARC ELECTRODES LIMITED	MUMBAI	India	Development	Manufacturer
Welding Consumables	ESAB INDIA LTD	CHENNAI	India	PERMANENT	Manufacturer

Welding Consumables	MAILAM INDIA LIMITED	PONDICHERY	India	PERMANENT	Manufacturer
Welding Consumables	VOESTALPINE BOHLER WELDING NORDIC		Sweden	PERMANENT	Manufacturer
Welding Consumables	AB SANDVIK PROCESS SYSTEM,		Sweden	PERMANENT	Manufacturer
Welding Consumables	GEE LIMITED,	MUMBAI	India	PERMANENT	Indian Agent
Welding Consumables	ZIRCAST LTD	BANGALORE	India	PERMANENT	Manufacturer
Welding Consumables	GEE LIMITED,	MUMBAI	India	PERMANENT	Indian Agent
Welding Consumables	WEARTECH INTL INC		USA	PERMANENT	Manufacturer
Welding Consumables	GEE LIMITED,	MUMBAI	India	PERMANENT	Indian Agent
Welding Consumables	WEARTECH INTL INC		USA	PERMANENT	Manufacturer
Welding Consumables	KENNAMETAL STELLITE		USA	PERMANENT	Manufacturer
Welding Consumables	ZIRCAST LTD	BANGALORE	India	PERMANENT	Manufacturer
Welding Consumables	HOGANAS BELGIUM SA		Belgium	PERMANENT	Manufacturer
Welding Consumables	WEARTECH INTL INC		USA	PERMANENT	Manufacturer
Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer
Welding Consumables	SANWA DIAMOND TOOLS PVT LTD,	MANDIYA	India	PERMANENT	Manufacturer
Welding Consumables	ALCONIX CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	KENNAMETAL STELLITE		USA	PERMANENT	Manufacturer
Welding Consumables	KENNAMETAL STELLITE		USA	PERMANENT	Manufacturer
Welding Consumables	WEARTECH INTL INC		USA	PERMANENT	Manufacturer

Welding Consumables	HOGANAS BELGIUM SA		Belgium	PERMANENT	Manufacturer
Welding Consumables	K.M.CROWN WELDING CONSUMABLES PVT.,	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	SUN ENTERPRISES	THANJAVUR	India	PERMANENT	Manufacturer
Welding Consumables	RAAJRATNA ELECTRODES LTD	AHMEDABAD	India	PERMANENT	Manufacturer
Welding Consumables	RUPA INDUSTRIES,	SECNDRABAD	India	PERMANENT	Manufacturer
Welding Consumables	D&H INDIA LIMITED	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	MAILAM INDIA LIMITED	PONDICHERY	India	PERMANENT	Manufacturer
Welding Consumables	WELMET TECHNOLOGIES PVT. LTD.,	NAGPUR	India	PERMANENT	Manufacturer
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	T.M.INDUSTRIES,	RAIPUR	India	PERMANENT	Manufacturer
Welding Consumables	ANAND ARC LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	VOLTARC ELECTRODES (P) LTD,	TIRUPATHI	India	PERMANENT	Manufacturer
Welding Consumables	RASI ELECTRODES LTD.,	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	NOUVEAUX INDUSTRIES (P) LTD.,	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	WIRE AND WIRE PRODUCTS	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	PRECISION WELDARC LTD,	CALCUTTA	India	PERMANENT	Manufacturer
Welding Consumables	NALLI ARC INDUSTRIE,	ERODE	India	PERMANENT	Manufacturer
Welding Consumables	MANTEK WIRES	COIMBATORE	India	PERMANENT	Manufacturer
Welding Consumables	JAGSHAAN INDUSTRIES	NAGPUR	India	PERMANENT	Manufacturer

Welding Consumables	ESAB INDIA LTD	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	ADOR WELDING LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	EVERSHINE WIRES	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	A V WELDTECH PVT.LTD.,	NAGPUR	India	PERMANENT	Manufacturer
Welding Consumables	SUN WIRES.	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	VEEPEES INDIA,		India	PERMANENT	Indian Agent
Welding Consumables	ESAB INDIA LTD	CHENNAI	India	PERMANENT	Trader
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	ADOR FONTECH LIMITED,	BANGALORE	India	PERMANENT	Manufacturer
Welding Consumables	KISWEL LTD.,		South Korea	PERMANENT	Manufacturer
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	ADOR FONTECH LIMITED,	BANGALORE	India	PERMANENT	Manufacturer
Welding Consumables	KISWEL LTD.,		South Korea	PERMANENT	Manufacturer
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer
Welding Consumables	I.A.BARNES & CO. LTD,		United Kingdom	PERMANENT	Foreign Agent
Welding Consumables	VEEPEES INDIA,		India	PERMANENT	Indian Agent

Welding Consumables	LINCOLN ELECTRIC FRANCE S.A.		France	PERMANENT	Manufacturer
Welding Consumables	INDUSTRIA NAZIONALE ELETTRODI S.p.A		Italy	PERMANENT	Manufacturer
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer
Welding Consumables	ESAB INDIA LTD	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	NOUVEAUX INDUSTRIES (P) LTD.,	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	WIRE AND WIRE PRODUCTS	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	MAILAM INDIA LIMITED	PONDICHERY	India	PERMANENT	Manufacturer
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	ADOR WELDING LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	ESAB INDIA LTD	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	AIR LIQUIDE WELDING FRANCE,		France	PERMANENT	Manufacturer
Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer
Welding Consumables	METRODE PRODUCTS LIMITED,		United Kingdom	PERMANENT	Manufacturer
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	GEE LIMITED,	MUMBAI	India	PERMANENT	Manufacturer

Welding Consumables	GEE LIMITED,	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	D&H SECHERON ELECTRODES PVT LTD.	INDORE	India	PERMANENT	Manufacturer
Welding Consumables	ESAB INDIA LTD	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	MANTEK ELECTRODS PRIVATE LTD,	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	ADOR WELDING LIMITED	MUMBAI	India	PERMANENT	Manufacturer
Welding Consumables	MAILAM INDIA LIMITED	PONDICHERY	India	PERMANENT	Manufacturer
Welding Consumables	NOUVEAUX INDUSTRIES (P) LTD.,	TRICHY	India	PERMANENT	Manufacturer
Welding Consumables	WELMET TECHNOLOGIES PVT. LTD.,	NAGPUR	India	PERMANENT	Manufacturer
Welding Consumables	KANEMATSU TRADING CORPORATION		Japan	PERMANENT	Foreign Agent
Welding Consumables	JAGSHAAN INDUSTRIES	NAGPUR	India	PERMANENT	Manufacturer
Welding Consumables	NALLI ARC INDUSTRIE,	ERODE	India	PERMANENT	Manufacturer
Welding Consumables	WIRE AND WIRE PRODUCTS	CHENNAI	India	PERMANENT	Manufacturer
Welding Consumables	VOESTALPINE BOHLER WELDING		Germany	PERMANENT	Manufacturer
Welding Consumables	K.M.CROWN WELDING CONSUMABLES PVT.,	INDORE	India	PERMANENT	Manufacturer



Reference: CC:PEB:9558:109:35117

Date:24-04-19

From:	Rajeev Maheshwari CTF (BARH TF)	To:	BHEL PMG PPEI building, plot no-25,Film city,sec-16A,Noida,UP- 201301
		CC:	- - -
SUBJECT : BARH, FLUE GAS DESULPHURISATION SYSTEM PACKAGE Please find enclosed following drawings/documents for necessary action at your end as indicated in purpose code.			
VENDOR DRG NO:	null		
NTPC DRG NO:	9558-109-PVM-H-001		
REVISION NO:	03		
DRG TITLE:	Painting schedule of FGD System		
APP CATEGORY:	I		
RELEASE DATE:	24-04-19		
COMMENTS:	Approved with minor comments		



Engineering Division
ISO 9001:2008 Certified

अभियांत्रिकी कार्यालय परिसर, प्लॉट नं.- ए 8ए, सेक्टर-24, पोस्ट बॉक्स नं.- 13, नोएडा (उ प्र) पिन-201 307

टेलिफोन नं.- 0120-2410333, 2410116 फैक्स-0120-2410136, 2410137

पंजीकृत कार्यालय: एनटीपीसी भवन, स्कोप कॉम्प्लेक्स, 7 इंस्टीट्यूशनल एरिया, लोधी रोड, नई दिल्ली-110 003

टेलिफोन नं.- 011-24361018 फैक्स-011-24361018, वेबसाइट: www.ntpc.co.in

ENGINEERING OFFICE COMPLEX, Plot No: A-8A, Sector-24, Post Box No: 13, Noida (UP), Pin-201 307

Telephone No: 0120-2410333, 2410116 Fax-0120-2410136, 2410137

Registered Office: NTPC Bhawan, Scope Complex, 7 Institutional Area, Lodhi Road, New Delhi-110 003

Telephone No: 011-24360100 Fax-011-24361018, Website: www.ntpc.co.in

 RANIPET	Bharat Heavy Electricals Limited Boiler Auxiliaries Plant Ranipet – 632 406	BHEL DOC NO.	PS : Barh I FGD : : G604
		REVISION NO.	03
		DATE	11.04.2019

BARH-STAGE 1 FGD PACKAGE

PAINTING SCHEME for FGD SYSTEM, BOOSTER FAN& GATES& DAMPERS

NTPC CONTRACT NO: CS-9558-109 (1A)-2-FC-NOA-6724 dtd 18.09.2018

NTPC DRG NO: 9558-109-PVM-H-001

BHEL RANIPET Customer No(s).: G604-G606

Prepared By	Reviewed & Approved By
	
Rajamanickam M Dy.Manager/QA	K.C. Gandhi Parimalam DGM/QA

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

RECORD OF REVISION

REV NO	DATE	DETAILS OF REVISION
00	05.01.2019	Original Issue - First Submission
01	08.02.2019	NTPC comments: Change project name BHEL reply: Project name has been changed. Mistake has crept in inadvertently.
		NTPC comments: Ref. clause 1 of Fans, Refer clause 1.04.00 of Sec VI of Part- A, Sub-section III BHEL reply: We have reviewed and wish to state that Axial fan tool & fixtures comprise of very small items like Spanners, Hydraulic jack, Nuts, Studs, Hallenkeys, small plates etc and this will be used only during erection. Since they are very small items blasting cannot be carried out. Hence we request you to retain the painting as given in our painting scheme.
		NTPC comments: SI no: 03 of Fans, SI no: 32,42 of FGD& sl no: 04 of GAD Gratings, add Acid pickling BHEL reply: Incorporated in the document
		NTPC comments: SI no: 05,06,08 to 11, Refer comments in SI no:01 of Page 3 BHEL reply: Incorporated for SI nos: 05,06,9 to 11 except sl no: 08. SI no: 08, Axial booster fan stator is not included because they are insulated and operating temperature closer to 95°C. Hence we request you to accept and retain the same painting as per scheme.
		NTPC comments: SI no: 01, 17, 31 of FGD, please clarify the equipment covered BHEL reply: We wish to state that the PGMA wise details are available in the end of the document. We request you to kindly refer to that details.
		NTPC comments: SI no: 02,03, 17, 44,45, 46,47,48, pl refer sn 1 of page 3 comments BHEL reply: Incorporated in the document as per clause 1.04.00 of Part-A Section VI.
		NTPC comments: DFT corrections in SI no: 13, 28, 30, 36, 45, 55 of FGD BHEL reply: Incorporated in the document.
		NTPC comments: BHEL/MHPS - Japan to clarify what is the experience of QFGDM on painting of absorber (with Ti/C276 clad plate) internal surfaces. What kind of primer/paint is applicable for absorber system? QFGDM Clarification should be furnished BHEL reply: We have referred to our Engg and the reply given by Engg is attached at the end of the document. We would like to submit that as per tender specification, absorber plates are clad. Clad metal is inside the absorber and hence there is no requirement of painting. Accordingly, the document is corrected. We request your approval.
		NTPC comments: SS Lining is only in hopper (conical portion) of Lime stone silo. Furnish, inside painting of cylindrical portion of silo in line with structural painting. BHEL reply: We wish to state that SS lining is only in the conical portion of the lime stone silo. The inside painting of cylindrical portion of silo is given in line with the structural painting specification. It is incorporated in the document.
		NTPC comments: SI no: 51 and 52 of FGD, this clause not valid for slurry and process water pipes, Refer Clause 1.04.00 of Sub sec III of part A BHEL reply: We would like to submit that the referred clause is not valid for slurry and process water pipes. The clause has been corrected and painting as per tender spec clause 7.05.00 of Section-VI, Part-B, Sub Section-I-M5 has been given. We request your acceptance to retain the same painting as per the specification.

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

01	08.02.2019	NTPC comments: As per IS 9404, ground Color of Instrument and service air is skyblue. Birst color band of instrument air is french blue and for service air is silver grey. BHEL reply: We would like to submit that we have referred to the Doc no: QS-01-DIV-W-4, Rev.0, dtd 20.09.2002 page 21& 23 of 27. The colour codes given has been incorporated in this document. Same colour code was suggested for Dadri project also and was approved by NTPC. We request your concurrence and approval for the colour codes adopted.						
		NTPC comments: Mention painting details of HVAC system and FDPS system. BHEL reply: We wish to state that Fire Detection and protection system(FDPS) and Air condition and ventilation system is not under BHEL Ranipet scope of supply. Also we would like to submit that painting for all mechanical items pertaining to Ranipet scope of supply is included.						
		NTPC comments: SI no: 57 of FGD, Refer Clause 1.04.00 of Sub sec III of part A BHEL reply: We would like to submit that since they are structures inside the Gypsum dewatering building and Wet ball mill building, we have referred to clause cl. 7.05.00 of Section-VI, Part-B, Sub section-I-M5 an painting has been given as per that clause. We request your acceptance for the same.						
		NTPC comments: SI no: 02 of GAD, Mention right clause of specification BHEL reply: Right clause has been mentioned.						
		NTPC comments: All structural steel shall be painted as per clause no. 31.03.00, Part-B, Sub-section IVD, Section-VI of technical specification. BHEL reply: Noted and incorporated in the document.						
		NTPC comments: Note 11 to be added BHEL reply: Note added.						
		NTPC comments: Comments in table BHEL reply: Noted and incorporated in the document.						
		NTPC comments: Include Painting details of equipments &structures of Limestone & Gypsum Handling plant BHEL reply: We wish to state that the equipments and structures of Lime stone & Gypsum handling plant is not under BHEL Ranipet scope of supply. Hence it is not included in our painting scheme. It is under BHEL-ISG scope of supply. Also we would like to submit that painting for all mechanical items pertaining to Ranipet scope of supply is included.						
		NTPC comments: Painting schedule for chimney is not included. please include the same or indicate drawing no. where the same is furnished. BHEL reply: We wish to state that the chimney is not under BHEL Ranipet scope of supply. Hence it is not included in our painting scheme. It is under BHEL-PEM scope of supply. Also we would like to submit that painting for all mechanical items pertaining to Ranipet scope of supply is included.						
		NTPC comments: All Steel structures shall be provided with painting as given in the specification. Further, painting system shall also meet the requirements of Corrosivity category C3 (durability High) as per ISO 12944. Painting system for steel surfaces embedded in Concrete shall be given separately. All steel structures shall be designed by following basic design criteria in ISO 12944 Part 3. However, where it is not feasible to follow the design criteria given in ISO 12944 Part 3 where the steel surface are inaccessible for application of protective coating, corrosion allowance of 1.5 mm shall be kept in thickness(over the design thickness) of structural steel members						

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

		for Barh Super Thermal Power Project. All Steel Sections and fabricated Structures, which are required to be transported on sea, shall be provided with anti-corrosive Paint before shipment to take care of sea worthiness. Grating hand rail and ladder shall be galvanized as per specification. BHEL reply: We wish to state that M/s NTPC has already given painting specification in compliance to the ISO 12944. Painting specification is more than the ISO 12944 requirement. We have already incorporated this requirement vide Note 9 under General Notes. Painting for steel surfaces embedded in concrete is given vide Note 12 under General notes. Our Engg group has confirmed that all surfaces are accessible to protective coating and hence it is taken care. Steel sections and fabricated structures are being done in our works only and hence is taken care. Grating, Handrails and Ladder is galvanized only and is indicated in our painting scheme itself.
02	05.03.2019	NTPC comments: Mention title of the referred document and for what it belongs to. BHEL reply: Title of the referred document is Colour and coding scheme of NTPC. It refers to provide the uniform colour and coding scheme for the painting of equipment and piping installed in NTPC power plant by various vendors.
		NTPC comments: Furnish drawing no. where details of HVAC and FDPS systems is available BHEL reply: We wish to submit that FGD is a system similar to SG and TG and handled by different units of BHEL. BAP, Ranipet handles a part of FGD system for which we have furnished the painting scheme. Similarly, other units of BHEL like PEM, ISG, Bangalore, EDN, PESD, Hyderabad, Bhopal& Rudrapur units will submit separately their drawings and documents pertaining to their scope of supply. Hence we have difficulty in furnishing your requirement but we have found that BHEL-PESD, Hyderabad will submit the drawing for your requirement of FDPS and HVAC by PEM as per the MDL list. In this regard, we request NTPC to kindly consider and accord approval for our painting scheme pertaining to BAP scope of supply.
		NTPC comments: SI no: 06,07 of FGD absorber system casing bottom inside surface left & inside surface left BHEL reply: As per the NTPC specification, entire absorber vessel shall be made of clad sheet of C276/ Alloy 59 (minimum 2mm thickness having minimum 7mm thick carbon steel). Since the insides will be of C276 material, painting is not necessary.
		NTPC comments: Painting scheme of inside surface of Lime stone silo (Cylindrical portion) shall be same as painting scheme of Limestone silo-outside surface BHEL reply: We wish to state that the painting envisaged is until erection only. Once the system is commissioned, paint will peel off completely and application of intermediate and finish paints will become redundant, therefore we have proposed only primer. Also primer given is of Inorganic Zinc silicate which offers superior protection against corrosion, abrasion and chemical resistance. Hence we request you to kindly consider and approve the painting envisaged.
		NTPC comments: ECW system painting scheme not found. Please include or clarify if it is covered elsewhere BHEL reply: We wish to submit that ECW system is not under the scope of BAP, Ranipet. ECW system is under BHEL PEM scope. Hence the painting is not covered under this painting schedule.

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

03	11.04.2019	NTPC comments: BHEL to relook the painting scheme for Barh-I and Barh-II, reason due to using existing chimney in Barh-I, which may lead to spillage of acid/liquid carry over in flue gas, since the the flue gas velocity is higher than other NTPC projects. To protect from the corrosion of all equipment of FGD system BHEL to relook the painting scheme. As discussed, Technical reason for considering the different clause of specification shall be mentioned. BHEL reply: As discussed, we wish to submit that Painting scheme envisaged is as per NTPC specification only. Also the NTPC specification conforms to the requirements of ISO 12944 Corrosivity category C3. We have also relooked the painting scheme and BHEL confirms that the painting scheme envisaged offers greater protection against corrosion as Primer is of Inorganic Zinc silicate for surfaces exposed to atmosphere and epoxy primers for indoor surfaces in FGD system. The reasons for considering the different clauses of specification is depending upon the location of the surfaces, some are exposed to atmosphere, some are indoor installation, some surfaces are subjected to temperatures and insulated and some are in flue gas path. Accordingly, paints are selected as per the NTPC specification mentioned in the various clauses. In all the cases NTPC specification is strictly followed in the surfaces as applicable. NTPC comments: As discussed over phone pls revise the total DFT of Slurry pump BHEL reply: Incorporated in the document.						

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

1. FANS

1	Axial Fan tool & fixtures (Clause 20.03.00 of Part- C Section VI)	55 000	Power Tool Cleaning to st3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100
2	Booster Fan foundation material	55 081	Temporary rust preventive fluid application as per PRQA 523 DFT- 20µ All Threaded and other surfaces of foundation bolt and its materials shall be coated with temporary rust preventive fluid. During execution of civil works the dried film of coating will be removed using Organic Solvents.					
3	Booster Fan Handrails & Insert (Clause 31.06.00 of Sec.VI, Part-B, Subsection- IV-D)	55 082	Blast cleaning to Sa 2½/ Acid pickling	Hand rails, Gratings, Ladders- Hot dip galvanizing to 610gms/sq.m (minimum) and to a coating thickness of 87µm (min).				
4	Booster Fan Handrails & Insert- Structural items other than the above (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	55 082	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
5	Axial booster cooling/ seal fan (Clause 1.04.00 of Part- A Section VI)	55 084	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat	100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ	75	300

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
				Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100	Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	25	
6	Booster fan canopy for motor (Clause 1.04.00 of Part- A Section VI)	55 089	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat	100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ	75	300
				Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100	Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	25	
7	Axial booster fan rotor (Clause 20.03.00 of Part- C Section VI)	55 287	Power Tool Cleaning to St3 (SSPC-SP3)	Two coats of Epoxy based Zinc phosphate primer (Two pack system) to IS 13238; DFT- 30µ/coat	60	NIL	--	60
8	Axial booster fan stator (Clause 20.03.00 of Part- C Section VI)	55 587	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100
9	Axial booster fan coupling (Clause 1.04.00 of Part- A Section VI)	55 880	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat	100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ	75	300
				Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100	Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	25	

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
10	Booster fan LOS with lubricant (Clause 1.04.00 of Part- A Section VI)	55 980	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat	100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ	75	300
				Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100	Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	25	
11	Booster fan actuator (Clause 1.04.00 of Part- A Section VI)	55 983	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat	100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ	75	300
				Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100	Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	25	

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

2. FGD SYSTEM

1	Slurry recirculation pump System (Clause 1.04.00 of Part- A Section VI)	FW 212	Power Tool Cleaning to St3 (SSPC-SP3)	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat	100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ	75	300
				Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100	Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	25	
2	Absorber System Internals – Structural items (Clause 1.04.00 of Part- A Section VI)	FW 213	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat	100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ	75	300
				Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100	Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	25	
3	Mist eliminator and accessories- Structural items (Clause 1.04.00 of Part- A Section VI)	FW 215	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat	100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ	75	300
				Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100	Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	25	

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
			profile 40-60µm conforming to ISO 8501-1	film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	100	paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)		
7	Absorber system casing top (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 222	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
8	Absorber system accessories (Clause 20.03.00 of Part- C Section VI)	FW 223	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
9	Emergency Quench water tank- Outside surfaces (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 226	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
10	Emergency Quench water tank- Inside surfaces	FW 226	Blast cleaning to Sa 2½ (Near white metal) with surface profile 35-50µm	Primer: Two coats of Red Oxide Zinc phosphate primer, DFT-30µ/coat; Total-60µ (Primer is only envisaged as lining is given in inside surfaces of the tank)				
11	Emergency quench system (Clause 20.03.00 of Part- C Section VI)	FW 227	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	60	120
12	Air oxidation system (Clause 20.03.00 of Part- C Section VI)	FW 230	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100
13	Duct supports Bypass duct, Booster fan, Scrubber, Stack (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 232 FW 233 FW 234	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00	70	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002	70	240

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
				DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	100	With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)		
14	Structures for RC pump house (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D	FW 236	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
15	Oxidation Air distribution system (Clause 1.04.00 of Part- A Section VI)	FW 244	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	75 25	300

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
16	Expansion joint between bypass (Clause 20.03.00 of Part- C Section VI)	Flue gas swept surface	FW 251	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (two coats)	60	--	60
		Insulated surfaces		Power Tool Cleaning to St3 (SSPC-SP3)	HR Aluminium paint to IS 13183 Gr.II (upto 400 deg C)	40	NIL	40
17	Expansion joint between scrubbers (Clause 20.03.00 of Part- C Section VI)	Flue gas swept surface	FW 253	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	60
		Insulated surfaces		Power Tool Cleaning to St3 (SSPC-SP3)	HR Aluminium paint to IS 13183 Gr.II (upto 400 deg C)	40	NIL	40
18	Ducts between bypass duct inlet& booster fan (Clause 20.03.00 of Part- C Section VI)	Flue gas swept surface	FW 255	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	60
		Insulated surfaces		Power Tool Cleaning to St3 (SSPC-SP3)	HR Aluminium paint to IS 13183 Gr.II (upto 400 deg C)	40	NIL	40
19	Ducts between Booster fan& Scrubber (Clause 20.03.00 of Part- C Section VI)	Flue gas swept surface	FW 256	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	60
		Insulated surfaces		Power Tool Cleaning to St3 (SSPC-SP3)	HR Aluminium paint to IS 13183 Gr.II (upto 400 deg C)	40	NIL	40

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)	
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)		
20	Ducts between Scrubber& Stack (Clause 20.03.00 of Part- C Section VI)	Flue gas swept surface	FW 257	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60
		Insulated surfaces		Power Tool Cleaning to St3 (SSPC-SP3)	HR Aluminium paint to IS 13183 Gr.II (upto 400 deg C)	40	NIL	--	40
21	Duct structure between ducts (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)		FW 260	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 <			

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

				with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ		exposure, gloss less than 30 and colour change less than 2.0Δ E)		
23	Duct structure between scrubber (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 262	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
24	Foundation material for duct structures, scrubbers, Elevators, tanks, pipe racks	FW 280 FW 281 FW 282 FW 740 FW 763	Temporary rust preventive fluid application as per PRQA 523 DFT- 20µ All Threaded and other surfaces of foundation bolt and its materials shall be coated with temporary rust preventive fluid. During execution of civil works the dried film of coating will be removed using Organic Solvents.					
25	Structures for Elevator (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 292	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
26	Elevator and accessories (Clause 20.03.00 of Part- C Section VI)	FW 293 FW 716	Power Tool Cleaning to st3 (SSPC-SP3	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	60	120

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

27	Structures for booster fan handling (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 310	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
28	Handling Equipment- Booster Fan (Clause 20.03.00 of Part-C Section VI)	FW 311	Power Tool Cleaning to st3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	60	120
29	Miscellaneous – FGD system (Clause 20.03.00 of Part-C Section VI)	FW 314	Power Tool Cleaning to st3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100
30	Galleries and railings for Scrubbers, Tanks, Stair (Clause 31.06.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 237 FW 610 FW 722	Blast cleaning to Sa 2½/ Acid pickling	Hand rails, Gratings- Hot dip galvanizing to 610gms/sq.m (minimum) and to a coating thickness of 87µm (minimum)				

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
31	Galleries and railings for Scrubbers, Tanks, Stair – Structures other than the above (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 237 FW 610 FW 722	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
32	Slurry pumps & accessories. (Clause 1.04.00 of Part- A Section VI)	FW 701	Power Tool Cleaning to St3 (SSPC-SP3)	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	75 25	300
33	Monorail for hoist & cranes (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 710	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ	70	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM	70	240

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
				Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	100	D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)		
34	Handling Equipment in FGD (Clause 20.03.00 of Part-C Section VI)	FW 715	Power Tool Cleaning to st3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats) Idler roller shall be applied with two coats of 70 microns at shop	70	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	60	130
35	Agitator support Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 721	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
36	Limestone silo structures Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 730	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy	70	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of	70	240

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
				with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	100	level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)		
37	Limestone Silo- Outside surfaces Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 731	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
38	Lime stone Silo- Inside surfaces (Conical portion)	FW 731	Blast cleaning to Sa 2½ (Near white metal) with surface profile 35-50µm conforming to ISO 8501-1	Primer: Two coats of Red Oxide Zinc phosphate primer to IS: 12744 (SS lining is inside the Limestone silo conical portion, hence primer is only envisaged; SS lining will be done at shops itself)	60	NIL	--	60
39	Lime stone Silo- Inside surfaces (Cylindrical portion)	FW 731	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer Coat: One coat of two component moisture curing Inorganic Ethyl Zinc Silicate Primer to IS 14946, (Solid by volume- 60% (min)), (Metallic zinc content 80% (min)) DFT = 70 µm per coat (min.) Zinc dust composition shall be Type-II as per ASTM D520-00	70	--	--	70

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
40	Limestone silo & Tank accessories (Clause 20.03.00 of Part-C Section VI)	FW 732 FW 750	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100
41	Limestone silo approach platform, Platform for Pipe racks (Clause 31.06.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 733 FW 766	Blast cleaning to Sa 2½/ Acid pickling	Hand rails, Ladders, Gratings- Hot dip galvanizing to 610gms/sq. m (minimum) and to a coating thickness of 87µm (minimum)				
42	Limestone silo approach platform, Pipe racks platform- Structures other than the above (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 733 FW 766	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
43	Limestone Mill – Outside surfaces (Clause 1.04.00 of Part- B Section VI)	FW 734	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	75 25	300

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
44	Lime stone mill- Inside surfaces	FW 734	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer Coat: One coat of two component moisture curing Inorganic Ethyl Zinc Silicate Primer to IS 14946, (Solid by volume- 60% (min)), (Metallic zinc content 80% (min)) DFT = 70 µm per coat (min.) Zinc dust composition shall be Type-II as per ASTM D520-00	70	--	--	70
45	Primary Hydro cyclone and accessories Structural items (Clause 20.03.00 of Part-C Section VI)	FW 736	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	75 25	300
46	Secondary Hydro cyclone and accessories Structural items (Clause 20.03.00 of Part-C Section VI)	FW 737	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	75 25	300

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN ($\mu\text{m min.}$)
				PAINT	DFT ($\mu\text{m min.}$)	PAINT	DFT ($\mu\text{m min.}$)	
47	Gypsum belt filter and accessories Structural items (Clause 20.03.00 of Part-C Section VI)	FW 738	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50 μ /coat Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100 μ	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75 μ Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25 μ Shade: Grey White, RAL9002	75 25	300
48	Lime stone slurry storage tank, Auxiliary absorber tank, Filtrate tank, Wastage water tank, Hydro cyclone waste water tank, Neutralization tank, Process Water tank, Clarified water tank, Belt filter washing tank, Primary Hydro cyclone feed tank Outside surfaces (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 742 FW 743 FW 744 FW 745 FW 747 FW 748 FW 785 FW 786 FW 800 FW 802	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60 μm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70 μ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100 μ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35 μ / coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
49	Lime stone slurry storage tank, Auxiliary absorber tank, Filtrate tank, Wastage water tank, Hydrocyclone waste water tank, Neutralization tank,	FW 742 FW 743 FW 744 FW 745 FW 747 FW 748 FW 785	Blast cleaning to Sa 2½ (Near white metal) with surface profile 35-50 μm	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats) (Liner is inside the tank, hence primer is only envisaged; Protection till erection only)	60	NIL	--	60

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

	Process Water tank, Clarified water tank, Belt filter washing tank, Primary Hydro cyclone feed tank Inside surfaces	FW 786 FW 800 FW 802						

50	Process water pipe accessories (Referred from cl. 7.05.00 of Section-VI, Part-B, Sub section-I-M5)	FW 751	Power Tool Cleaning to St3 (SSPC-SP3)	Primer: Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats) Intermediate: One coat of Synthetic Enamel intermediate coat to IS 2932; DFT- 50µ	60 50	Two coats of Synthetic Enamel to IS 2932, DFT- 50µ/ coat Shade: Grey white RAL 9002 Identification Tag: Sea Green Shade no: 217 as per IS 5	100	210
51	Slurry pipe accessories (Referred from cl. 7.05.00 of Section-VI, Part-B, Sub section-I-M5)	FW 753	Power Tool Cleaning to St3 (SSPC-SP3)	Primer: Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats) Intermediate: One coat of Synthetic Enamel intermediate coat to IS 2932; DFT- 50µ	60 50	Two coats of Synthetic Enamel to IS 2932, DFT- 50µ/ coat Shade: Grey white RAL 9002 Identification Tag: Sea Green Shade no: 217 as per IS 5	100	210
52	Service Air pipe accessories (Referred from cl. 10.00.00 of Section-VI, Part-B, Sub section-I-M3)	FW 754	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coat)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)- 30µ/ coat Identification Tag: Sky Blue Shade no: 101 as per IS 5	60	120
Service Air and instrument air Piping - painting shall be provided as								
53	Instrument air pipe accessories (Referred from cl. 10.00.00 of Section-VI, Part-B,	FW 755	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coat)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)- 30µ/ coat	60	120

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
	Sub section-I-M3)					Identification Tag: Sky Blue Shade no: 101 as per IS 5		
54	Valves and fittings (Temp <95 deg C)	FW 758	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)- 30µ/ coat	60	120
55	Structure for Pipe racks Trestle for pipe racks (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 761 FW 769	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
56	Structures inside Gypsum dewatering building & Ball Mill Building (Referred from cl. 7.05.00 of Section-VI, Part-B, Sub section-I-M5)	FW 787	Power Tool Cleaning to St3 (SSPC-SP3)	Primer: Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats) Intermediate: One coat of Synthetic Enamel intermediate coat to IS 2932; DFT- 50µ	60 50	Two coats of Synthetic Enamel to IS 2932, DFT- 50µ/ coat Shade: Grey White RAL 9002	100	210
57	Supports for Cable trays, tools, Air receivers, commissioning spares	FW 779 FW 790 FW 798 FW 988	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

	(Clause 20.03.00 of Part-C Section VI)							

3. GATES & DAMPERS

01	Gates & Dampers > 95° C Insulated Surfaces& Uninsulated surfaces	57 540 57 550 57 583	Power Tool Cleaning to St3 (SSPC-SP3)	HR Aluminium paint to IS 13183 Gr.II (upto 400 deg C)	40	--	--	40
02	Seal air piping (Referred from cl. 10.00 .00 of Section-VI, Part-B, Sub Section-I-M3)	57 141	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coat)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)- 30µ/ coat Identification Tag: Sky Blue Shade no: 101 as per IS 5	60	120
03	Blower with Motor Knife Gate valve Mounting bracket	57 491 57 497 57 209	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100
04	Ladder, Cage for Ladder Toe Guard Plate Floor Grill, Hand Rails, Hand Rail Post Clause 31.06.00 of Sec.VI, Part-B, Subsection- IV-D	57 466 57 566	Blast cleaning to Sa 2½/ Acid Pickling	Hot Dip Galvanizing to 610 gm per sq. Meter (minimum) and to a coating thickness of 87 µm (minimum)				
05	Other Structural Items- Other than sl.no. 3 of above	57 466 57 566	Blast cleaning to Sa 2½ (Near white metal) with	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min	70	Finish: Two coats of two pack aliphatic isocyanate cured acrylic		240

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (μ m min.)
				PAINT	DFT (μ m min.)	PAINT	DFT (μ m min.)	
	(Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)		surface profile 40- 60 μ m conforming to ISO 8501-1	80% metallic zinc content in dry film, solid by volume minimum 60% $\pm$ 2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70 μ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80% $\pm$ 2) DFT- 100 μ	100	polyurethane paint to IS 13213 solid by volume min.55% $\pm$ 2) DFT- 35 μ / coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0 Δ E)	70	

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (μ m min.)
				PAINT	DFT (μ m min.)	PAINT	DFT (μ m min.)	

4. PAINTING OF DAMAGED AREAS

Areas where paint has deteriorated badly by erosion and areas where the paint film has lost its adhesion property and where the steel has got rusted appreciably - these areas are to be repainted as per the following procedure:

SL NO	SURFACE LOCATION	SURFACE PREPARATION	PRIMER, INTERMEDIATE & FINISH
1	Paint damaged Components falling under Sl.no. 04,05,06,09,10,11 of Fans, Sl no.02,03,04, 05,06,07, 09, 13,14,15, 21,22, 23,25, 27, 31, 33,35,36,37, 42, 43,45,46,47,48,55 of FGD and Sl no. 5 of GAD.	Hand/ Power Tool cleaning to Bare metal to minimum 6 inches peripheral area adjoining to damaged area	Primer: Epoxy Zinc rich primer to IS 14589, DFT-70 μ (If Metal surface exposed) followed by intermediate & finish coat as per respective scheme If primer is intact- Intermediate & finish as per respective scheme
2	Paint damaged components failing under other Sl.nos of Fans, FGD& GAD	Power Tool Cleaning to Bare metal	Primer and Finish : As given in respective scheme

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

GENERAL NOTES

1. No painting is required for Galvanized, non-ferrous & stainless steel items, except as indicated above.
2. Machined items are to be applied with coat of temporary rust preventive oil
3. PGMA's covered in sub-supplier (ie., Purchased) items viz., Agitator/ slide bearing and other sub-delivery components etc., are not indicated in the above list. However, the Painting Schedule for all items supplied by all sub-suppliers and BOI under the scope of BHEL shall be same as for main equipment covered in this document.
4. In sub-assy, wherever plates / sheets of thickness less than or equal to 5mm and rods are used, very minor items like clamps, small items etc - Power Tool or Hand Tool Cleaning to SSPC - SP 3 / SP 2 shall be followed and painting under SI no:01 of Fans shall be followed.
5. Ground shade/colour of finish paints and identification tag/band for equipments, fans, piping, pipe services, supporting structures and other components is followed as per NTPC doc no: QS-01-DIV-W-4 at site.
6. All components covered under different PGMA's are to be painted. In case any component is left out, the same shall be deemed to be included under the relevant section.
7. All threaded and other surfaces of foundation bolts and its materials, insulation pins, Anchor channels, Sleeves shall be coated with temporary rust preventive fluid and during execution of civil works; the dried film of coating shall be removed using organic solvents.
8. Painting requirement for all electrical equipment shall be as per the details identified in specification for the respective equipment.
9. All steel structures shall be provided with painting as given in the specification. Further, painting system shall also meet the requirements of corrosivity category C3 (durability high) as per ISO 12944.
10. Finish coat to be applied after an interval of min 10 hrs and within 6 months (after completion of intermediate coat).
11. Primer coat on steel shall be applied in shop immediately after blast cleaning by airless spray technique.
12. For the portion of steel surfaces embedded in concrete, the surface shall be prepared by Manual cleaning and provided with Primer coat of Chlorinated Rubber based Zinc Phosphate Primer of Minimum 50 Micron DFT

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

PAINTING SCHEME- DETAILS OF PROCUREMENT & APPLICATION PROCESSES

SL NO	TYPE OF PAINT	SPECIFICATION OF PAINT	NO OF PACK	VOLUME OF SOLIDS (% Min)	MODE OF APPLICATION	MIN. OVER COATING INTERVAL (hours)	SHADE
01	Epoxy Zinc phosphate primer	IS 13238	2	40	Spray	24	Grey
02	Zinc Ethyl silicate primer (% Zn on dry film= 80 (min))	IS 14946	2	60	Airless Spray only At Shop	24	Grey
03	Epoxy High solid- Polyamide cured Epoxy based MIO pigmented intermediate coat	--	2	80	Airless Spray only At Shop	16	Brown
04	Aliphatic isocyanate acrylic polyurethane paint	IS 13213	2	55	Spray At Shop	16	Grey white RAL 9002
05	Heat resistant aluminium paint	IS 13183 Grade II	1	--	Brush/ Spray	24	--
06	Long oil alkyd Synthetic enamel finish paint	IS 2932	1	35	Brush/ Spray	12	Corresponding shade no
07	Synthetic Enamel Intermediate coat	IS 2932	1	40	Brush/ Spray	12	--
08	Red oxide Zinc phosphate primer	IS 12744	1	--	Brush/ spray	12	--

PGMA DETAILS

SNO	PGMA	PGMA DESCRIPTION	PGMA DETAILS

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
01	FW 212		Slurry recirculation pump system	RC Pumps incl Shaft seal Common Base Plate Coupling and Guard Gear Box Expansion Bellow Anchor Bolts & Fasteners Special Tools				
02	FW 219		Absorber system base	Absorber tank bottom plate				
03	FW 220		Absorber system structures	Absorber tank structure Absorber tower structure Spray headers structure				
04	FW 221		Absorber system casing bottom	Absorber tank wall casing- bottom				
05	FW 222		Absorber system casing top	Absorber Tank wall casing –Top Mist Eliminator supports Spray pipe supports Internal Beam Shim plates in Absorber area Internal Struts				
06	FW 223		Absorber system accessories	Nozzles and flanges Inspection doors & Man holes Viewing ports Antifoam dosing equipment Suction strainers- FRP				
07	FW 226		Emergency Quench water tank	Base Plate & its supports Roof, Shell				
08	FW 227		Emergency Quench System	Emergency Quenching Spray Pipe Nozzle for Emergency Pipe Fasteners Gaskets				
09	FW 230		Air oxidation System	Oxidation Blowers Common Base Plate Coupling and Guard Anchor Bolts & Fasteners Expansion Bellow Suction & Discharge Silencers Acoustic Enclosure Water Injection cooling system Pipe, Valves & Instruments Special Tools				

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

SNO	PGMA	PGMA DESCRIPTION	PGMA DETAILS
10	FW 244	Oxidation air distribution System	Pipe & Fittings Flanges Pipe Hanger, Bottom Elbow, Bottom sliding supports
11	FW 251	Expansion joint between bypass	Expansion joints Seal Plates & Fasteners
12	FW 253	Expansion joint between scrubbers	Fabric & its fixing fasteners Sleeves & Flanges Gaskets
13	FW 255	Ducts between bypass duct inlet & booster fan	Plates & Stiffeners Guide Vanes
14	FW 256	Ducts between Booster fan & Scrubber	Plates & Stiffeners Guide Vanes
15	FW 257	Ducts between scrubber & stack	Plates & Stiffeners Guide Vanes
16	FW 260	Duct structure between ducts	Duct Supports Gusset Plate Divider plate Internal Struts Support bearings
17	FW 261 FW 262	Duct structure between scrubber	Duct Supports Gusset Plate Divider plate Internal Struts Support bearings
18	FW 292	Structures for Elevator	Columns Seal Plate Bracings Enclosure (Purlin& sheeting)
19	FW 293	Elevator and accessories	Base Frame Buffer Spring Mast Section Cage Control Panel & AC Mandatory Spares
SNO	PGMA	PGMA DESCRIPTION	PGMA DETAILS
20	FW 310	Structures for booster fan handling	Columns Beams Bracings

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

				Seal plate				
21	FW 311		Handling Equipment- Booster fan	Electric hoist				
22	FW 314		Miscellaneous- FGD system	Services & other small items like vents, over flow nozzles, orifices if any				
23	FW 610 FW 722		Galleries & railings for Scrubbers, Tank	Stairs Handrail Step treads Floor grills Ladders Foundation bolts Fasteners				
24	FW 701		Slurry pumps & accessories	Slurry Pumps incl Shaft seal Common Base Plate Coupling and Guard Belt & Pulley Expansion Bellow Anchor Bolts & Fasteners Motor & accessories Sump Pumps incl Shaft seal Common Base Plate Coupling and Guard Belt & Pulley Anchor Bolts & Fasteners Motor & accessories				
25	FW 710		Monorail for hoist& cranes	Insert Plate Stiffener plate Monorail beam				
26	FW 715		Handling Equipment in FGD	Electrically operated Hoists Underslung Cranes Chain Pulleys				
27	FW 721		Agitator support	Channels & Beams				
28	FW 730		Limestone silo structures	Columns Beams Bracings Seal plate Angles, channels				
SNO	PGMA		PGMA DESCRIPTION	PGMA DETAILS				
29	FW 731		Limestone silo	Base plate & its supports Shell, Roof				

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

30	FW 732	Limestone silo accessories	Bag filter Air cannon bin activator Slide gate & bar gate for day silo
31	FW 733	Limestone silo approach platforms	Stairs Handrail Step treads Floor grills Ladders Foundation bolts Fasteners
32	FW 734	Limestone mill	Wet ball mill Hydro cyclone- Mill area Mill circuit pump Mill separator tank with Agitator
33	FW 742	Lime stone slurry storage tank	Base plate & its supports Shell, Roof
34	FW 743	Auxiliary Absorber tank	Base plate & its supports Shell, Roof
35	FW 744	Filtrate tank	Base plate & its supports Shell, Roof
36	FW 745	Wastage water tank	Base plate & its supports Shell, Roof
37	FW 747	Hydro cyclone waste water tank	Base plate & its supports Shell, Roof
38	FW 748	Process Water tank	Base plate & its supports Shell, Roof
39	FW 751	Process water pipe accessories	CS/FRP Pipes & Fittings Sight Glass R Orifice Gaskets & Fasteners
40	FW 753	Slurry pipe accessories	CSRL/FRP Pipes & Fittings Strainer (Cone) Expansion Joint-Rubber R Orifice Gaskets & Fasteners
SNO	PGMA	PGMA DESCRIPTION	PGMA DETAILS
41	FW 754	Service air pipe accessories	GI Pipes & Fittings Flexible Hose

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

			Expansion Joint (Metallic) Hose connector R Orifice Gaskets & Fasteners
42	FW 755	Instrument air pipe accessories	SS Pipes & Fittings Strainer(Y Type) Gaskets & Fasteners
43	FW 758	Valves and fittings	Globe valves Ball Valves Butterfly Valves Diaphragm Valves Gate Valves CheckValves Pinch Valves Knife Gate Valves Control Valves Relief Valves
44	FW 761	Structures for Pipe racks	Bracings Columns
45	FW 280 FW 281 FW 740 FW 763	Foundation material for duct structure Foundation material for scrubber Foundation material for Tanks Foundation material for Pipe racks	Foundation bolts Template
46	FW 766	Platforms for Pipe rack	Stairs Handrail Step treads Floor grills Ladders Foundation bolts Fasteners
47	FW 769	Trestle for Pipe racks	Truss Beams, Supports for all Pipes
48	FW 779	Supports for cable tray	Double Sup Channel & Base plates Single Sup Channel & Base plates Cantilever Arm Fasteners & clamps Brackets
49	FW 790	Tools	Erection , commissioning, special tools
SNO	PGMA	PGMA DESCRIPTION	PGMA DETAILS
50	FW 798	Air receivers	Instrument Air receivers Any Instruments/Valves

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

51	FW 800	Clarified water tank	Base plate & its supports Shell, Roof
52	FW 802	Neutralization tank & accessories	Base plate & its supports Shell, Roof
53	FW 988	Commissioning spares	Startup & commissioning spares

 RANIPET	Bharat Heavy Electricals Limited Boiler Auxiliaries Plant Ranipet – 632 406	BHEL DOC NO.	PS : Barh II FGD : : G607
		REVISION NO.	03
		DATE	11.04.2019

BARH-STAGE 2 FGD PACKAGE

PAINTING SCHEME for FGD SYSTEM, BOOSTER FAN& GATES& DAMPERS

NTPC CONTRACT NO: CS-9560-109(1B)-9-FC-N0A-6720 dated 18.09.2018

NTPC DRG NO: 9560-109-PVM-H-002

BHEL RANIPET Customer No(s).: G607-G608

Prepared By	Reviewed & Approved By
	
Rajamanickam M Dy.Manager/QA	K.C. Gandhi Parimalam DGM/QA

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

RECORD OF REVISION

REV NO	DATE	DETAILS OF REVISION
00	06.02.2019	Original Issue - First Submission
01	26.02.2019	Revised Issue as per Customer comments NTPC comments: SI no: 06& 07 of FGD, Absorber system casing bottom inside surface left, inside surface painting left BHEL reply: As per the NTPC specification, entire absorber vessel shall be made of clad sheet of C276/ Alloy 59 (minimum 2mm thickness having minimum 7mm thick carbon steel). Since the insides will be of C276 material, painting is not necessary.
		NTPC comments: Painting scheme of inside surface of Lime stone silo (Cylindrical portion) shall be same as painting scheme of Limestone silo-outside surface BHEL reply: We wish to state that the painting envisaged is until erection only. Once the system is commissioned, paint will peel off completely and application of intermediate and finish paints will become redundant, therefore we have proposed only primer. Also primer given is of Inorganic Zinc silicate which offers superior protection against corrosion, abrasion and chemical resistance. Hence we request you to kindly consider and approve the painting envisaged.
		NTPC comments: Painting scheme of ECW system not found. Please include it or clarify if it is covered elsewhere BHEL reply: We wish to submit that ECW system is not under the scope of BAP, Ranipet. ECW system is under BHEL PEM scope. Hence the painting is not covered under this painting schedule.
		NTPC comments: 12. For the portion of steel surfaces embedded in concrete, the surface shall be prepared by Manual cleaning and provided with Primer coat of Chlorinated Rubber based Zinc Phosphate Primer of Minimum 50 Micron DFT. BHEL reply: Incorporated in the document.
02	14.03.2019	NTPC comments: Ref. sl no: 06 to 09 of Fans, Include the all the PGMA list covered here BHEL reply: We confirm that all the PGMA's are covered. There is no other PGMA for that referred items.
		NTPC comments: Ref. Sl. No 01 of FGD, as per clause no 1.04.00 Paints/Painting, Sub-section -III, Part-A, Vendor to provide 300 microns DFT. BHEL reply: We wish to submit that, since slurry recirculation pumps are inside the building (indoor installation), we have referred to the clause 7.05.00 of Sub section: I-M5 since the requirements were stipulated in that clause. We have used the same scheme for slurry recirculation pumps in Dadri FGD project and was approved by M/s NTPC. In this regard, we request M/s NTPC to consider and kindly approve the same painting which is envisaged.
		NTPC comments: Ref. sl no: 04, 05,06,07,09,13 of FGD, why different clause is being referred for absorber internal structure and absorber base BHEL reply: We wish to submit that above referred sl nos are all steel structures exposed to atmosphere/need superior protection and hence painting as per cl 31.03.00 is given. Also the painting system for steel structures meets the requirements of Corrosivity category C3 as per ISO 12944. Structural of Absorber internals are not exposed to atmosphere and inside the absorber and since the painting requirements are not stipulated for this item, we have referred to clause 1.04.00 of Sub-section- III. Hence we request M/s NTPC to kindly approve the painting envisaged and approve the document.

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

03	11.04.2019	NTPC comments: SL no: 01 of FGD, As discussed revise the total DFT BHEL reply: Incorporated in the document.						
		NTPC comments: Water tank, revise as per the either civil clause or FGD system Clause BHEL reply: As discussed, we wish to submit that the Water tank outside surfaces is as per the civil clause only. However, for internal surfaces, since the tank is to be filled with water, red oxide zinc phosphate primer will be adequate to provide protection which is required till the erection only. After erection, lining is given in the inside surfaces of tank as per specification. Therefore, we request you to kindly consider and approve the painting envisaged.						
		NTPC comments: BHEL to relook the painting scheme for Barh-I and Barh-II, reason due to using existing chimney in Bahr-I, which may lead to spillage of acid/liquid carry over in flue gas, since the the flue gas velocity is higher than other NTPC projects. To protect from the corrosion of all equipment of FGD system BHEL to relook the painting scheme BHEL reply: As discussed, we wish to submit that Painting scheme envisaged is as per NTPC specification only. Also, the NTPC specification conforms to the requirements of ISO 12944 Corrosivity category C3. We have also relooked the painting scheme and BHEL confirms that the painting scheme envisaged offers greater protection against corrosion as Primer is of Inorganic Zinc silicate for surfaces exposed to atmosphere and epoxy primers for indoor surfaces in FGD system.						

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

1. FANS

1	Axial Fan tool & fixtures (Clause 20.03.00 of Part- C Section VI)	55 000	Power Tool Cleaning to st3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100
2	Booster Fan foundation material	55 081	Temporary rust preventive fluid application as per PRQA 523 DFT- 20µ All Threaded and other surfaces of foundation bolt and its materials shall be coated with temporary rust preventive fluid. During execution of civil works the dried film of coating will be removed using Organic Solvents.					
3	Booster Fan Handrails & Insert (Clause 31.06.00 of Sec.VI, Part-B, Subsection- IV-D)	55 082	Blast cleaning to Sa 2½/ Acid pickling	Hand rails, Gratings, Ladders- Hot dip galvanizing to 610gms/sq.m (minimum) and to a coating thickness of 87µm (min).				
4	Booster Fan Handrails & Insert- Structural items other than the above (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	55 082	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
5	Axial booster cooling/ seal fan (Clause 1.04.00 of Part- A Section VI)	55 084	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat	100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ	75	300

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
				Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100	Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	25	
6	Booster fan canopy for motor (Clause 1.04.00 of Part- A Section VI)	55 089	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	75 25	300
7	Axial booster fan rotor (Clause 20.03.00 of Part- C Section VI)	55 287	Power Tool Cleaning to St3 (SSPC-SP3)	Two coats of Epoxy based Zinc phosphate primer (Two pack system) to IS 13238; DFT- 30µ/coat	60	NIL	--	60
8	Axial booster fan stator (Clause 20.03.00 of Part- C Section VI)	55 587	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100
9	Axial booster fan coupling (Clause 1.04.00 of Part- A Section VI)	55 880	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	75 25	300

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
10	Booster fan LOS with lubricant (Clause 1.04.00 of Part- A Section VI)	55 980	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat	100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ	75	300
				Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100	Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	25	
11	Booster fan actuator (Clause 1.04.00 of Part- A Section VI)	55 983	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat	100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ	75	300
				Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100	Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	25	

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
9	Emergency Quench water tank- Outside surfaces (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 226	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
10	Emergency Quench water tank- Inside surfaces	FW 226	Blast cleaning to Sa 2½ (Near white metal) with surface profile 35-50µm	Primer: Two coats of Red Oxide Zinc phosphate primer, DFT-30µ/coat; Total-60µ (Primer is only envisaged as lining is given in inside surfaces of the tank)				
11	Emergency quench system (Clause 20.03.00 of Part- C Section VI)	FW 227	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	60	120
12	Air oxidation system (Clause 20.03.00 of Part- C Section VI)	FW 230	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100
13	Duct supports Bypass duct, Booster fan, Scrubber, Stack (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 232 FW 233 FW 234	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition	70	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat	70	240

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
			conforming to ISO 8501-1	and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	100	Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)		
14	Structures for RC pump house (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D	FW 236	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
15	Oxidation Air distribution system (Clause 1.04.00 of Part- A Section VI)	FW 244	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	75 25	300

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
16	Expansion joint between bypass (Clause 20.03.00 of Part- C Section VI)	Flue gas swept surface	FW 251	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (two coats)	60	--	60
		Insulated surfaces		Power Tool Cleaning to St3 (SSPC-SP3)	HR Aluminium paint to IS 13183 Gr.II (upto 400 deg C)	40	NIL	40
17	Expansion joint between scrubbers (Clause 20.03.00 of Part- C Section VI)	Flue gas swept surface	FW 253	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	60
		Insulated surfaces		Power Tool Cleaning to St3 (SSPC-SP3)	HR Aluminium paint to IS 13183 Gr.II (upto 400 deg C)	40	NIL	40
18	Ducts between bypass duct inlet& booster fan (Clause 20.03.00 of Part- C Section VI)	Flue gas swept surface	FW 255	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	60
		Insulated surfaces		Power Tool Cleaning to St3 (SSPC-SP3)	HR Aluminium paint to IS 13183 Gr.II (upto 400 deg C)	40	NIL	40
19	Ducts between Booster fan& Scrubber (Clause 20.03.00 of Part- C Section VI)	Flue gas swept surface	FW 256	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	60
		Insulated surfaces		Power Tool Cleaning to St3 (SSPC-SP3)	HR Aluminium paint to IS 13183 Gr.II (upto 400 deg C)	40	NIL	40

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)	
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)		
20	Ducts between Scrubber& Stack (Clause 20.03.00 of Part- C Section VI)	Flue gas swept surface	FW 257	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60
		Insulated surfaces		Power Tool Cleaning to St3 (SSPC-SP3)	HR Aluminium paint to IS 13183 Gr.II (upto 400 deg C)	40	NIL	--	40
21	Duct structure between ducts (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)		FW 260	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
22	Duct structure between scrubber (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)		FW 261	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs	70	240

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

				with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ		exposure, gloss less than 30 and colour change less than 2.0Δ E)		
23	Duct structure between scrubber (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 262	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
24	Foundation material for duct structures, scrubbers, Elevators, tanks, pipe racks	FW 280 FW 281 FW 282 FW 740 FW 763	Temporary rust preventive fluid application as per PRQA 523 DFT- 20µ All Threaded and other surfaces of foundation bolt and its materials shall be coated with temporary rust preventive fluid. During execution of civil works the dried film of coating will be removed using Organic Solvents.					
25	Structures for Elevator (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 292	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
26	Elevator and accessories (Clause 20.03.00 of Part- C Section VI)	FW 293 FW 716	Power Tool Cleaning to st3 (SSPC-SP3	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	60	120

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

27	Structures for booster fan handling (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 310	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
28	Handling Equipment- Booster Fan (Clause 20.03.00 of Part-C Section VI)	FW 311	Power Tool Cleaning to st3 (SSPC-SP3	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	60	120
29	Miscellaneous – FGD system (Clause 20.03.00 of Part-C Section VI)	FW 314	Power Tool Cleaning to st3 (SSPC-SP3	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	60	120
30	Galleries and railings for Scrubbers, Tanks, Stair (Clause 31.06.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 237 FW 610 FW 722	Blast cleaning to Sa 2½/ Acid pickling	Hand rails, Gratings- Hot dip galvanizing to 610gms/sq.m (minimum) and to a coating thickness of 87µm (minimum)				

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
31	Galleries and railings for Scrubbers, Tanks, Stair – Structures other than the above (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 237 FW 610 FW 722	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
32	Slurry pumps & accessories. (Referred from cl. 7.05.00 of Section-VI, Part-B, Sub section-I-M5)	FW 701	Power Tool Cleaning to St3 (SSPC-SP3)	Primer: Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats) Intermediate: One coat of Synthetic Enamel intermediate coat to IS 2932; DFT- 50µ	60 50	Two coats of Synthetic Enamel to IS 2932, DFT- 50µ/ coat Shade: Light blue RAL 5012	100	210
33	Monorail for hoist & cranes (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 710	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
34	Handling Equipment in FGD (Clause 20.03.00 of Part-C Section VI)	FW 715	Power Tool Cleaning to st3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats) Idle roller shall be applied with two coats of 70 microns at shop	70	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	60	130
35	Agitator support Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 721	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
36	Limestone silo structures Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 730	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
37	Limestone Silo- Outside surfaces Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 731	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
38	Lime stone Silo- Inside surfaces (Conical portion)	FW 731	Blast cleaning to Sa 2½ (Near white metal) with surface profile 35-50µm conforming to ISO 8501-1	Primer: Two coats of Red Oxide Zinc phosphate primer to IS: 12744 (SS lining is inside the Limestone silo conical portion, hence primer is only envisaged; SS lining will be done at shops itself)	60	NIL	--	60
39	Lime stone Silo- Inside surfaces (Cylindrical portion)	FW 731	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer Coat: One coat of two component moisture curing Inorganic Ethyl Zinc Silicate Primer to IS 14946, (Solid by volume- 60% (min)), (Metallic zinc content 80% (min)) DFT = 70 µm per coat (min.) Zinc dust composition shall be Type-II as per ASTM D520-00	70	--	--	70
40	Limestone silo & Tank accessories (Clause 20.03.00 of Part-C Section VI)	FW 732 FW 750	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	60	120

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
41	Limestone silo approach platform, Platform for Pipe racks (Clause 31.06.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 733 FW 766	Blast cleaning to Sa 2½/ Acid pickling	Hand rails, Ladders, Gratings- Hot dip galvanizing to 610gms/sq. m (minimum) and to a coating thickness of 87µm (minimum)				
42	Limestone silo approach platform, Pipe racks platform- Structures other than the above (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 733 FW 766	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
43	Limestone Mill – Outside surfaces (Clause 1.04.00 of Part- B Section VI)	FW 734	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	75 25	300
44	Lime stone mill- Inside surfaces	FW 734	Blast cleaning to Sa 2½ (Near white metal)	Primer Coat: One coat of two component moisture curing Inorganic Ethyl Zinc Silicate Primer to IS 14946,	70	--	--	70

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
			with surface profile 40-60µm conforming to ISO 8501-1	(Solid by volume- 60% (min)), (Metallic zinc content 80% (min)) DFT = 70 µm per coat (min.) Zinc dust composition shall be Type-II as per ASTM D520-00				
45	Primary Hydro cyclone and accessories Structural items (Clause 20.03.00 of Part-C Section VI)	FW 736	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	75 25	300
46	Secondary Hydro cyclone and accessories Structural items (Clause 20.03.00 of Part-C Section VI)	FW 737	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	75 25	300
47	Gypsum belt filter and accessories Structural items (Clause 20.03.00 of Part-C Section VI)	FW 738	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat Intermediate: One coat of Two component epoxy based	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ	75 25	300

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
				intermediate paint pigmented with MIO/Tio2 DFT- 100µ		Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002		
48	Lime stone slurry storage tank, Auxiliary absorber tank, Filtrate tank, Wastage water tank, Hydro cyclone waste water tank, Neutralization tank, Process Water tank, Clarified water tank, Belt filter washing tank, Primary Hydro cyclone feed tank Outside surfaces (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 742 FW 743 FW 744 FW 745 FW 747 FW 748 FW 785 FW 786 FW 800 FW 802	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
49	Lime stone slurry storage tank, Auxiliary absorber tank, Filtrate tank, Wastage water tank, Hydrocyclone waste water tank, Neutralization tank, Process Water tank, Clarified water tank, Belt filter washing tank, Primary Hydro cyclone feed tank Inside surfaces	FW 742 FW 743 FW 744 FW 745 FW 747 FW 748 FW 785 FW 786 FW 800 FW 802	Blast cleaning to Sa 2½ (Near white metal) with surface profile 35-50µm	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats) (Liner is inside the tank, hence primer is only envisaged; Protection till erection only)	60	NIL	--	60

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

50	Process water pipe accessories (Referred from cl. 7.05.00 of Section-VI, Part-B, Sub section-I-M5)	FW 751	Power Tool Cleaning to St3 (SSPC-SP3)	Primer: Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats) Intermediate: One coat of Synthetic Enamel intermediate coat to IS 2932; DFT- 50µ	60 50	Two coats of Synthetic Enamel to IS 2932, DFT- 50µ/ coat Shade: Grey white RAL 9002 Identification Tag: Sea Green Shade no: 217 as per IS 5	100	210
51	Slurry pipe accessories (Referred from cl. 7.05.00 of Section-VI, Part-B, Sub section-I-M5)	FW 753	Power Tool Cleaning to St3 (SSPC-SP3)	Primer: Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats) Intermediate: One coat of Synthetic Enamel intermediate coat to IS 2932; DFT- 50µ	60 50	Two coats of Synthetic Enamel to IS 2932, DFT- 50µ/ coat Shade: Grey white RAL 9002 Identification Tag: Sea Green Shade no: 217 as per IS 5	100	210
52	Service Air pipe accessories (Referred from cl. 10.00.00 of Section-VI, Part-B, Sub section-I-M3)	FW 754	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coat)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)- 30µ/ coat Identification Tag: Sky Blue Shade no: 101 as per IS 5	60	120
53	Instrument air pipe accessories (Referred from cl. 10.00.00 of Section-VI, Part-B, Sub section-I-M3)	FW 755	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coat)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)- 30µ/ coat Identification Tag: Sky Blue Shade no: 101 as per IS 5	60	120

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
54	Valves and fittings (Temp <95 deg C)	FW 758	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)- 30µ/ coat	60	120
55	Structure for Pipe racks Trestle for pipe racks (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 761 FW 769	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
56	Structures inside Gypsum dewatering building & Ball Mill Building (Referred from cl. 7.05.00 of Section-VI, Part-B, Sub section-I-M5)	FW 787	Power Tool Cleaning to St3 (SSPC-SP3)	Primer: Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats) Intermediate: One coat of Synthetic Enamel intermediate coat to IS 2932; DFT- 50µ	60 50	Two coats of Synthetic Enamel to IS 2932, DFT- 50µ/ coat Shade: Grey White RAL 9002	100	210
57	Supports for Cable trays, tools, Air receivers, commissioning spares (Clause 20.03.00 of Part-C Section VI)	FW 779 FW 790 FW 798 FW 988	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	60	120

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

3. GATES & DAMPERS

01	Gates & Dampers > 95° C Insulated Surfaces& Uninsulated surfaces	57 540 57 550 57 583	Power Tool Cleaning to St3 (SSPC-SP3)	HR Aluminium paint to IS 13183 Gr.II (upto 400 deg C)	40	--	--	40
02	Seal air piping (Referred from cl. 10.00 .00 of Section-VI, Part-B, Sub Section-I-M3)	57 141	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coat)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)- 30µ/ coat Identification Tag: Sky Blue Shade no: 101 as per IS 5	60	120
03	Blower with Motor Knife Gate valve Mounting bracket	57 491 57 497 57 209	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	60	120
04	Ladder, Cage for Ladder Toe Guard Plate Floor Grill, Hand Rails, Hand Rail Post Clause 31.06.00 of Sec.VI, Part-B, Subsection- IV-D	57 466 57 566	Blast cleaning to Sa 2½/ Acid Pickling	Hot Dip Galvanizing to 610 gm per sq. Meter (minimum) and to a coating thickness of 87 µm (minimum)				
05	Other Structural Items- Other than sl.no. 3 of above (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	57 466 57 566	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ	70	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002	70	240

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
				Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	100	With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)		

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

4. PAINTING OF DAMAGED AREAS

Areas where paint has deteriorated badly by erosion and areas where the paint film has lost its adhesion property and where the steel has got rusted appreciably - these areas are to be repainted as per the following procedure:

SL NO	SURFACE LOCATION	SURFACE PREPARATION	PRIMER, INTERMEDIATE & FINISH
1	Paint damaged Components falling under Sl.no. 04,05,06,09,10,11 of Fans, Sl no.02,03,04, 05,06,07, 09, 13,14,15,21,22,23,25,27,31, 33,35,36,37,42,43,45,46,47,48, 55 of FGD and Sl no. 5 of GAD.	Hand/ Power Tool cleaning to Bare metal to minimum 6 inches peripheral area adjoining to damaged area	Primer: Epoxy Zinc rich primer to IS 14589, DFT-70µ (If Metal surface exposed) followed by intermediate & finish coat as per respective scheme If primer is intact- Intermediate & finish as per respective scheme
2	Paint damaged components failing under other Sl.nos of Fans, FGD& GAD	Power Tool Cleaning to Bare metal	Primer and Finish : As given in respective scheme

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

GENERAL NOTES

1. No painting is required for Galvanized, non-ferrous & stainless steel items, except as indicated above.
2. Machined items are to be applied with coat of temporary rust preventive oil
3. PGMA's covered in sub-supplier (ie., Purchased) items viz., Agitator/ slide bearing and other sub-delivery components etc., are not indicated in the above list. However, the Painting Schedule for all items supplied by all sub-suppliers and BOI under the scope of BHEL shall be same as for main equipment covered in this document.
4. In sub-assy, wherever plates / sheets of thickness less than or equal to 5mm and rods are used, very minor items like clamps, small items etc - Power Tool or Hand Tool Cleaning to SSPC - SP 3 / SP 2 shall be followed and painting under SI no:01 of Fans shall be followed.
5. Ground shade/colour of finish paints and identification tag/band for equipments, fans, piping, pipe services, supporting structures and other components is followed as per NTPC doc no: QS-01-DIV-W-4 at site.
6. All components covered under different PGMA's are to be painted. In case any component is left out, the same shall deemed to be included under the relevant section.
7. All threaded and other surfaces of foundation bolts and its materials, insulation pins, Anchor channels, Sleeves shall be coated with temporary rust preventive fluid and during execution of civil works; the dried film of coating shall be removed using organic solvents.
8. Painting requirement for all electrical equipment shall be as per the details identified in specification for the respective equipment.
9. All steel structures shall be provided with painting as given in the specification. Further, painting system shall also meet the requirements of corrosivity category C3 (durability high) as per ISO 12944.
10. Finish coat to be applied after an interval of min 10 hrs and within 6 months (after completion of intermediate coat).
11. Primer coat on steel shall be applied in shop immediately after blast cleaning by airless spray technique.
12. For the portion of steel surfaces embedded in concrete, the surface shall be prepared by Manual cleaning and provided with Primer coat of Chlorinated Rubber based Zinc Phosphate Primer of Minimum 50 Micron DFT.

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

PAINTING SCHEME- DETAILS OF PROCUREMENT & APPLICATION PROCESSES

SL NO	TYPE OF PAINT	SPECIFICATION OF PAINT	NO OF PACK	VOLUME OF SOLIDS (% Min)	MODE OF APPLICATION	MIN. OVER COATING INTERVAL (hours)	SHADE
01	Epoxy Zinc phosphate primer	IS 13238	2	40	Spray	24	Grey
02	Zinc Ethyl silicate primer (% Zn on dry film= 80 (min))	IS 14946	2	60	Airless Spray only At Shop	24	Grey
03	Epoxy High solid- Polyamide cured Epoxy based MIO pigmented intermediate coat	--	2	80	Airless Spray only At Shop	16	Brown
04	Epoxy based finish paint	IS 14209	2	62	Airless Spray only	16	Corresponding shade no
05	Aliphatic isocyanate acrylic polyurethane paint	IS 13213	2	55	Spray At Shop	16	Grey white RAL 9002
06	Heat resistant aluminium paint	IS 13183 Grade II	1	--	Brush/ Spray	24	--
07	Synthetic Enamel undercoat	IS 2932	1	40	Brush/ Spray	12	--
08	Long oil alkyd Synthetic enamel finish paint	IS 2932	1	35	Brush/ Spray	12	Corresponding shade no
09	Red oxide Zinc phosphate primer	IS 12744	1	--	Brush/ spray	12	--

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

PGMA DETAILS

SNO	PGMA	PGMA DESCRIPTION	PGMA DETAILS
01	FW 212	Slurry recirculation pump system	RC Pumps incl Shaft seal Common Base Plate Coupling and Guard Gear Box Expansion Bellow Anchor Bolts & Fasteners Special Tools
02	FW 219	Absorber system base	Absorber tank bottom plate
03	FW 220	Absorber system structures	Absorber tank structure Absorber tower structure Spray headers structure
04	FW 221	Absorber system casing bottom	Absorber tank wall casing- bottom
05	FW 222	Absorber system casing top	Absorber Tank wall casing –Top Mist Eliminator supports Spray pipe supports Internal Beam Shim plates in Absorber area Internal Struts
06	FW 223	Absorber system accessories	Nozzles and flanges Inspection doors & Man holes Viewing ports Antifoam dosing equipment Suction strainers- FRP
07	FW 226	Emergency Quench water tank	Base Plate & its supports Roof, Shell
08	FW 227	Emergency Quench System	Emergency Quenching Spray Pipe Nozzle for Emergency Pipe Fasteners Gaskets
09	FW 230	Air oxidation System	Oxidation Blowers Common Base Plate Coupling and Guard Anchor Bolts & Fasteners Expansion Bellow Suction & Discharge Silencers Acoustic Enclosure Water Injection cooling system

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

			Pipe, Valves & Instruments Special Tools

SNO	PGMA	PGMA DESCRIPTION	PGMA DETAILS
10	FW 244	Oxidation air distribution System	Pipe & Fittings Flanges Pipe Hanger, Bottom Elbow, Bottom sliding supports
11	FW 251	Expansion joint between bypass	Expansion joints Seal Plates & Fasteners
12	FW 253	Expansion joint between scrubbers	Fabric & its fixing fasteners Sleeves & Flanges Gaskets
13	FW 255	Ducts between bypass duct inlet & booster fan	Plates & Stiffeners Guide Vanes
14	FW 256	Ducts between Booster fan & Scrubber	Plates & Stiffeners Guide Vanes
15	FW 257	Ducts between scrubber & stack	Plates & Stiffeners Guide Vanes
16	FW 260	Duct structure between ducts	Duct Supports Gusset Plate Divider plate Internal Struts Support bearings
17	FW 261 FW 262	Duct structure between scrubber	Duct Supports Gusset Plate Divider plate Internal Struts Support bearings
18	FW 292	Structures for Elevator	Columns Seal Plate Bracings Enclosure (Purlin& sheeting)
19	FW 293	Elevator and accessories	Base Frame Buffer Spring Mast Section Cage Control Panel & AC Mandatory Spares

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

SNO	PGMA	PGMA DESCRIPTION	PGMA DETAILS
20	FW 310	Structures for booster fan handling	Columns Beams Bracings Seal plate
21	FW 311	Handling Equipment- Booster fan	Electric hoist
22	FW 314	Miscellaneous- FGD system	Services & other small items like vents, over flow nozzles, orifices if any
23	FW 610 FW 722	Galleries & railings for Scrubbers, Tank	Stairs Handrail Step treads Floor grills Ladders Foundation bolts Fasteners
24	FW 701	Slurry pumps & accessories	Slurry Pumps incl Shaft seal Common Base Plate Coupling and Guard Belt & Pulley Expansion Bellow Anchor Bolts & Fasteners Motor & accessories Sump Pumps incl Shaft seal Common Base Plate Coupling and Guard Belt & Pulley Anchor Bolts & Fasteners Motor & accessories
25	FW 710	Monorail for hoist& cranes	Insert Plate Stiffener plate Monorail beam
26	FW 715	Handling Equipment in FGD	Electrically operated Hoists Underslung Cranes Chain Pulleys
27	FW 721	Agitator support	Channels & Beams
28	FW 730	Limestone silo structures	Columns Beams Bracings Seal plate Angles, channels

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

SNO	PGMA	PGMA DESCRIPTION	PGMA DETAILS
29	FW 731	Limestone silo	Base plate & its supports Shell, Roof
30	FW 732	Limestone silo accessories	Bag filter Air cannon bin activator Slide gate & bar gate for day silo
31	FW 733	Limestone silo approach platforms	Stairs Handrail Step treads Floor grills Ladders Foundation bolts Fasteners
32	FW 734	Limestone mill	Wet ball mill Hydro cyclone- Mill area Mill circuit pump Mill separator tank with Agitator
33	FW 742	Lime stone slurry storage tank	Base plate & its supports Shell, Roof
34	FW 743	Auxiliary Absorber tank	Base plate & its supports Shell, Roof
35	FW 744	Filtrate tank	Base plate & its supports Shell, Roof
36	FW 745	Wastage water tank	Base plate & its supports Shell, Roof
37	FW 747	Hydro cyclone waste water tank	Base plate & its supports Shell, Roof
38	FW 748	Process Water tank	Base plate & its supports Shell, Roof
39	FW 751	Process water pipe accessories	CS/FRP Pipes & Fittings Sight Glass R Orifice Gaskets & Fasteners
40	FW 753	Slurry pipe accessories	CSRL/FRP Pipes & Fittings Strainer (Cone) Expansion Joint-Rubber R Orifice Gaskets & Fasteners

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

SNO	PGMA	PGMA DESCRIPTION	PGMA DETAILS
41	FW 754	Service air pipe accessories	GI Pipes & Fittings Flexible Hose Expansion Joint (Metallic) Hose connector R Orifice Gaskets & Fasteners
42	FW 755	Instrument air pipe accessories	SS Pipes & Fittings Strainer(Y Type) Gaskets & Fasteners
43	FW 758	Valves and fittings	Globe valves Ball Valves Butterfly Valves Diaphragm Valves Gate Valves CheckValves Pinch Valves Knife Gate Valves Control Valves Relief Valves
44	FW 761	Structures for Pipe racks	Bracings Columns
45	FW 280 FW 281 FW 740 FW 763	Foundation material for duct structure Foundation material for scrubber Foundation material for Tanks Foundation material for Pipe racks	Foundation bolts Template
46	FW 766	Platforms for Pipe rack	Stairs Handrail Step treads Floor grills Ladders Foundation bolts Fasteners
47	FW 769	Trestle for Pipe racks	Truss Beams, Supports for all Pipes
48	FW 779	Supports for cable tray	Double Sup Channel & Base plates Single Sup Channel & Base plates Cantilever Arm Fasteners & clamps Brackets
49	FW 790	Tools	Erection , commissioning, special tools

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

SNO	PGMA	PGMA DESCRIPTION	PGMA DETAILS
50	FW 798	Air receivers	Instrument Air receivers Any Instruments/Valves
51	FW 800	Clarified water tank	Base plate & its supports Shell, Roof
52	FW 802	Neutralization tank & accessories	Base plate & its supports Shell, Roof
53	FW 988	Commissioning spares	Startup & commissioning spares

 RANIPET	Bharat Heavy Electricals Limited Boiler Auxiliaries Plant Ranipet – 632 406	BHEL DOC NO.	PS: Mouda FGD: G503
		REVISION NO.	02
		DATE	14.05.2019

MOUDA FGD PACKAGE

PAINTING SCHEME for FGD SYSTEM, BOOSTER FAN& GATES& DAMPERS

NTPC CONTRACT NO: CS-9561-109(113)-9-FC-N0A-6722 Dt.18.09.2018

NTPC DRG NO: 9561-109-RP-PVM-H-396

BHEL RANIPET Customer No(s).: G503-G504

Prepared By	Reviewed & Approved By
	
Rajamanickam M Dy.Manager/QA	K.C. Gandhi Parimalam DGM/QA

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

RECORD OF REVISION

REV NO	DATE	DETAILS OF REVISION
00	06.02.2019	Original Issue - First Submission
01	27.04.2019	Revised Issue NTPC comments: ACW/ECW system shall be included BHEL reply: We would like to submit that ACW/ECW system comes under BHEL-PEM and they will be submitting their painting scheme for their scope of supply. Also, we would like to stress that FGD is a system comparable to SG& TG and supplied by seven units namely Ranipet, PEM, ISG& EDN, Bangalore, Bhopal, Hyderabad and Trichy. Hence, we have made this painting scheme for Ranipet scope of supply for which PGMAs are released by Ranipet Engg.
		NTPC comments: Furnish painting scheme for chimney and its associated components BHEL reply: We would like to submit that as stated above, chimney and its associated components doesn't fall under Ranipet scope of supply and it comes under BHEL-PEM. Hence this painting scheme does not cover painting for chimney and its associated components. We request M/s NTPC to consider and approve the painting scheme envisaged.
		NTPC comments: Color shade shall be as per NTPC standard document doc no: QS-01-DIV-W-4 with latest revision. BHEL reply: We would like to submit that all the color shades mentioned in this document are as per the NTPC standard document doc no: QS-01-DIV-W-4 (Latest).
		NTPC comments: SI no: 6 of Fans, how is this line with spec? BHEL reply: We wish to submit that Booster fan canopy for motor has been given painting as per the clause 1.04.00 of Part-A, section-VI as its part of FGD system. Also, the painting envisaged as per the spec provides superior resistance to corrosion and polyurethane finish paint provides glossy surface finish. Hence this painting is in line with the specification only and we request M/s NTPC to approve the painting envisaged as the same painting is approved for Barh-I and II projects.
		NTPC comments: SI no: 7 of Fans, what is the basis? BHEL reply: Axial booster fan rotor is housed inside the housing and is flue gas path. The rotor needs protection till erection only. Therefore, the painting envisaged is only the primer as once the fan is commissioned, paint will be completely peeled off as it is in flue gas path. Hence, we request M/s NTPC to approve the painting envisaged. Also, we would like to submit that this was approved for Barh-I & II painting schemes as same reason was explained.
		NTPC comments: SI no: 10& 11 of Fans, what is the basis of selecting shade? BHEL reply: We would like to submit that we have devised color shades as per NTPC standard document: QS-01-DIV-W-4 (latest). In the document, for fans it was grey white, hence we have given the same color shade for booster fan and its associated equipment also. We request you to kindly approve the same shade envisaged similar to approved Barh-I& II painting schemes.
		NTPC comments: SI no: 01 of FGD, why is this selected? BHEL reply: We submit that the paint given was as per clause no 7.05.00 as the surfaces was similar. Slurry recirculation pumps were indoor and kept in a building. This surface was only available under clause 7.5.00. This same comment was raised for Barh-I and II as well. When we explained the reason, NTPC Engg wanted to follow clause 1.04.00 itself for slurry recirculation pumps, hence we changed

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
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		for Barh-I and Barh-II. Similarly, we have changed for Mouda also as per clause 1.04.00. We request NTPC to approve the painting envisaged.
		NTPC comments: SI no: 02 of FGD, basis of selecting shades? BHEL reply: We would like to submit that basis of selecting shades is as per NTPC standard document for color coding. These internals along with their supports will be placed inside the absorber.
		NTPC comments: SI no: 10,11,12& 13 of FGD, why is this selected? BHEL reply: We wish to submit that, sl no: 10, Emergency Quench water tank inside surfaces, Primer is only envisaged as liner is given in the inside surfaces of the tank. SI no: 11 and 12 are given painting as per clause 20.03.00 as temperature is less than 95 deg C. The clause 20.03.00 is used as painting surface under this PGMA's are not covered under any other clause. For sl no: 13, since it is of duct supports, painting is given as per the civil specification. The same was approved in Barh-I & II also. We have given the same painting specification for Mouda, North Karanpura and Barh-I & II as painting specification is same for all projects. Hence, we request M/s NTPC to kindly approve the same.
		NTPC comments: SI no: 17,18, 19& 20 of FGD, shall be in line with specification BHEL reply: We wish to submit that painting is as per clause 20.03.00 and is line with the specification only. The reason for giving this specification is the temperatures are of flue gas temperature before absorber and 60 deg C after absorber of FGD system. Hence this surface will be insulated outside and flue gas swept surface inside. Hence Heat resistant paints is given in the insulated side. Since insides are of flue gas swept surface, primers are only given as paint will be peeled off during commissioning. This same painting was approved for Barh-I & II as well. Hence, we request NTPC to kindly consider and approve the painting envisaged.
		NTPC comments: SI no: 31, 32 & 33 of FGD, Provide basis BHEL reply: We wish to submit that SI no: 31 & 33 of FGD are given painting as per the civil specification as surfaces are exposed to atmosphere. For sl no: 32, slurry pumps are of indoor surfaces and housed in a building. Hence, we have proposed this painting as per clause 7.05.00 as that clause only contains the painting for that type of surface. Hence we request M/s NTPC to approve the painting envisaged as approved for Barh painting schemes.
		NTPC comments: SL no: 39 of FGD, Painting surface of inside surface of Limestone Silo (cylindrical portion) shall be same as painting scheme of Limestone silo- outside surface BHEL reply: We wish to state that the painting envisaged is until erection only. Once the system is commissioned, paint will peel off completely and application of intermediate and finish paints will become redundant, therefore we have proposed only primer. Also, primer given is of Inorganic Zinc silicate which offers superior protection against corrosion, abrasion and chemical resistance. Hence, we request you to kindly consider and approve the painting envisaged.
01	27.04.2019	NTPC comments: Note 12 to be incorporated BHEL reply: Incorporated in the document.
02	14.05.2019	NTPC comments: As per that document not all structures are in RAL 9002, there is distinction between primary and secondary member color shade, same shall be incorporated BHEL reply: We wish to submit that we have selected colour shades as per the NTPC colour coding scheme only. Since all these structures are supporting structures, we have taken reference as SI no: 10. The distinction between primary and secondary member colour shade is indicated in SI no: 13, which are not applicable for our type of structures. Hence we request you to kindly consider and

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

02	14.05.2019	approve our painting schedule. Also we would like to submit that same shade only has been envisaged and approved by M/s NTPC for Barh-I, Barh II, North Karanpura, Patratu and Dadri projects also.						
		NTPC comments: Liner can be provided over paint also. BHEL to follow specification. BHEL reply: We would like to submit that Emergency quenching tank will be provided with rubber lining at site. For rubber lining at site, paint has to be peeled off to make rubber with metal contact. Therefore, we had envisaged red oxide zinc phosphate primer which can provide protection till erection and can be easily removed for making rubber lining at site. In this regard, we request you to kindly consider and approve the painting envisaged. Also we would like to submit that we had envisaged the same reason for Barh-I, Barh-II, North karanpura and Patratu projects and same was approved by M/s NTPC.						
		NTPC comments: It should be as per spec. BHEL reply: We would like to submit that we had given the same reason for Barh-I, Barh-II, North Karnapura, Dadri painting schemes in which the inside surfaces of lime stone silo will be given primer only and same was approved by M/s NTPC. We would like to stress the point that paint will be peeled off completely in the inside surfaces. Once the system is commissioned, application of intermediate and finish paints is redundant. For outside surfaces, we have given all the coats as surfaces will be exposed to atmosphere. At this context, we would like to request again to consider and approve the painting envisaged for inside surfaces of lime stone silo (cylindrical portion).						
		NTPC comments: SI no: 12 of FGD, why isn't clause 1.04.01 of Part A, Sub section -III page 2 of 5 is used? BHEL reply: SI no: 12 is of Air oxidation system which comprises of Oxidation blowers and its small auxiliaries. This will be kept inside the acoustic hood which is again housed in a building. It is exposed to operating temperature below 95 deg C and hence clause no: 20.03.00 is used. The clause 1.04.00 is for components where no specific requirement is stipulated. Since the requirements of painting of this PGMA is clearly stipulated in Clause 20.03.00, we have used that clause. Also we would like to submit that we have envisaged the same painting for Barh-I, Barh-II, North Karnapura and Dadri projects also which is approved by M/s NTPC.						
		NTPC comments: SI no: 19 of FGD, Is it same as Ethyl silicate zinc primer? BHEL reply: We wish to submit that given paint is Red Oxide Zinc phosphate primer as it is exposed to flue gas in the inside. Red Oxide Zinc phosphate primer will provide protection till erection only, once the system is commissioned, paint will get peeled off due to the flue gases. This is not same as Ethyl silicate zinc primer. This Ethyl silicate zinc primer is given only to the civil structures as it is exposed to atmosphere.						
		NTPC comments: SI no: 20 of FGD, this should be in line with specification. This temp is less than 90. BHEL reply: Incorporated in the document.						
		NTPC comments: SI no: 29 of FGD, why isn't clause 1.04.01 of Part A, Sub section -III page 2 of 5 is used? BHEL reply: We wish to submit that Miscellaneous FGD system consists of only small orifices, overflow nozzles, vents etc which are very small items and exposed to operating temperature below 95 deg C. Hence primer with finish as per clause 20.03.00 is followed since the painting requirement is stipulated in that clause. Clause 1.04.00 of Part-A, Subsection III is for components where no requirement is stipulated.						

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

1. FANS

1	Axial Fan tool & fixtures (Clause 20.03.00 of Part- C Section VI)	55 000	Power Tool Cleaning to st3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100
2	Booster Fan foundation material	55 081	Temporary rust preventive fluid application as per PRQA 523 DFT- 20µ All Threaded and other surfaces of foundation bolt and its materials shall be coated with temporary rust preventive fluid. During execution of civil works the dried film of coating will be removed using Organic Solvents.					
3	Booster Fan Handrails & Insert (Clause 31.06.00 of Sec.VI, Part-B, Subsection- IV-D)	55 082	Blast cleaning to Sa 2½/ Acid pickling	Hand rails, Gratings, Ladders- Hot dip galvanizing to 610gms/sq.m (minimum) and to a coating thickness of 87µm (min).				
4	Booster Fan Handrails & Insert- Structural items other than the above (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	55 082	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
5	Axial booster cooling/ seal fan (Clause 1.04.00 of Part- A Section VI)	55 084	Blast cleaning to Sa 2½ (SSPC-SP 10)	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat	100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ	75	300

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
				Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100	Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	25	
6	Booster fan canopy for motor (Clause 1.04.00 of Part- A Section VI)	55 089	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin-based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	75 25	300
7	Axial booster fan rotor (Clause 20.03.00 of Part- C Section VI)	55 287	Power Tool Cleaning to St3 (SSPC-SP3)	Two coats of Epoxy based Zinc phosphate primer (Two pack system) to IS 13238; DFT- 30µ/coat	60	NIL	--	60
8	Axial booster fan stator (Clause 20.03.00 of Part- C Section VI)	55 587	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100
9	Axial booster fan coupling (Clause 1.04.00 of Part- A Section VI)	55 880	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	75 25	300

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
10	Booster fan LOS with lubricant (Clause 1.04.00 of Part- A Section VI)	55 980	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat	100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ	75	300
				Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100	Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	25	
11	Booster fan actuator (Clause 1.04.00 of Part- A Section VI)	55 983	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat	100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ	75	300
				Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100	Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	25	

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN ($\mu\text{m min.}$)
				PAINT	DFT ($\mu\text{m min.}$)	PAINT	DFT ($\mu\text{m min.}$)	
4	Absorber System- Base (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 219	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60 μm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ± 2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70 μ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80% ± 2) DFT- 100 μ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55% ± 2) DFT- 35 μ / coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0 Δ E)	70	240
5	Absorber system structures (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 220	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60 μm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ± 2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70 μ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80% ± 2) DFT- 100 μ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55% ± 2) DFT- 35 μ / coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0 Δ E)	70	240

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN ($\mu\text{m min.}$)
				PAINT	DFT ($\mu\text{m min.}$)	PAINT	DFT ($\mu\text{m min.}$)	
6	Absorber system casing bottom (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 221	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60 μm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70 μ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100 μ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35 μ / coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
7	Absorber system casing top (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 222	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60 μm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70 μ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100 μ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35 μ / coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
8	Absorber system accessories (Clause 20.03.00 of Part- C Section VI)	FW 223	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
9	Emergency Quench water tank- Outside surfaces (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 226	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
10	Emergency Quench water tank- Inside surfaces	FW 226	Blast cleaning to Sa 2½ (Near white metal) with surface profile 35-50µm	Primer: Two coats of Red Oxide Zinc phosphate primer, DFT-30µ/coat; Total-60µ (Primer is only envisaged as lining is given in inside surfaces of the tank)				
11	Emergency quench system (Clause 20.03.00 of Part- C Section VI)	FW 227	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	60	120
12	Air oxidation system (Clause 20.03.00 of Part- C Section VI)	FW 230	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100
13	Duct supports Bypass duct, Booster fan, Scrubber, Stack (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 232 FW 233 FW 234	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00	70	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002	70	240

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
				DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	100	With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)		
14	Structures for RC pump house (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D	FW 236	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
15	Oxidation Air distribution system (Clause 1.04.00 of Part- A Section VI)	FW 244	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/TiO2 DFT- 100µ	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	75 25	300

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
16	Expansion joint between bypass (Clause 20.03.00 of Part- C Section VI)	Flue gas swept surface	FW 251	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (two coats)	60	--	60
		Insulated surfaces		Power Tool Cleaning to St3 (SSPC-SP3)	HR Aluminium paint to IS 13183 Gr.II (upto 400 deg C)	40	NIL	40
17	Expansion joint between scrubbers (Clause 20.03.00 of Part- C Section VI)	Flue gas swept surface	FW 253	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	60
		Insulated surfaces		Power Tool Cleaning to St3 (SSPC-SP3)	HR Aluminium paint to IS 13183 Gr.II (upto 400 deg C)	40	NIL	40
18	Ducts between bypass duct inlet& booster fan (Clause 20.03.00 of Part- C Section VI)	Flue gas swept surface	FW 255	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	60
		Insulated surfaces		Power Tool Cleaning to St3 (SSPC-SP3)	HR Aluminium paint to IS 13183 Gr.II (upto 400 deg C)	40	NIL	40
19	Ducts between Booster fan& Scrubber (Clause 20.03.00 of Part- C Section VI)	Flue gas swept surface	FW 256	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	60
		Insulated surfaces		Power Tool Cleaning to St3 (SSPC-SP3)	HR Aluminium paint to IS 13183 Gr.II (upto 400 deg C)	40	NIL	40

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)	
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)		
20	Ducts between Scrubber& Stack (Clause 20.03.00 of Part- C Section VI)	Flue gas swept surface	FW 257	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60
		Insulated surfaces		Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100
21	Duct structure between ducts (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)		FW 260	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
22	Duct structure between scrubber (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)		FW 261	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs	70	240

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

				with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ		exposure, gloss less than 30 and colour change less than 2.0Δ E)		
23	Duct structure between scrubber (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 262	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
24	Foundation material for duct structures, scrubbers, Elevators, tanks, pipe racks	FW 280 FW 281 FW 282 FW 740 FW 763	Temporary rust preventive fluid application as per PRQA 523 DFT- 20µ All Threaded and other surfaces of foundation bolt and its materials shall be coated with temporary rust preventive fluid. During execution of civil works the dried film of coating will be removed using Organic Solvents.					
25	Structures for Elevator (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 292	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
26	Elevator and accessories (Clause 20.03.00 of Part- C Section VI)	FW 293 FW 716	Power Tool Cleaning to st3 (SSPC-SP3	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	60	120

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

27	Structures for booster fan handling (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 310	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
28	Handling Equipment- Booster Fan (Clause 20.03.00 of Part-C Section VI)	FW 311	Power Tool Cleaning to st3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	60	120
29	Miscellaneous – FGD system (Clause 20.03.00 of Part-C Section VI)	FW 314	Power Tool Cleaning to st3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100
30	Galleries and railings for Scrubbers, Tanks, Stair (Clause 31.06.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 237 FW 610 FW 722	Blast cleaning to Sa 2½/ Acid pickling	Hand rails, Gratings- Hot dip galvanizing to 610gms/sq.m (minimum) and to a coating thickness of 87µm (minimum)				

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
31	Galleries and railings for Scrubbers, Tanks, Stair – Structures other than the above (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 237 FW 610 FW 722	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
32	Slurry pumps & accessories. (Referred from cl. 7.05.00 of Section-VI, Part-B, Sub section-I-M5)	FW 701	Power Tool Cleaning to St3 (SSPC-SP3)	Primer: Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats) Intermediate: One coat of Synthetic Enamel intermediate coat to IS 2932; DFT- 50µ	60 50	Two coats of Synthetic Enamel to IS 2932, DFT- 50µ/ coat Shade: Light blue RAL 5012	100	210
33	Monorail for hoist & cranes (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 710	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
34	Handling Equipment in FGD (Clause 20.03.00 of Part-C Section VI)	FW 715	Power Tool Cleaning to st3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats) Idle roller shall be applied with two coats of 70 microns at shop	70	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	60	130
35	Agitator support Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 721	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
36	Limestone silo structures Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 730	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
37	Limestone Silo- Outside surfaces Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 731	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
38	Lime stone Silo- Inside surfaces (Conical portion)	FW 731	Blast cleaning to Sa 2½ (Near white metal) with surface profile 35-50µm conforming to ISO 8501-1	Primer: Two coats of Red Oxide Zinc phosphate primer to IS: 12744 (SS lining is inside the Limestone silo conical portion, hence primer is only envisaged; SS lining will be done at shops itself)	60	NIL	--	60
39	Lime stone Silo- Inside surfaces (Cylindrical portion)	FW 731	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer Coat: One coat of two component moisture curing Inorganic Ethyl Zinc Silicate Primer to IS 14946, (Solid by volume- 60% (min)), (Metallic zinc content 80% (min)) DFT = 70 µm per coat (min.) Zinc dust composition shall be Type-II as per ASTM D520-00	70	--	--	70
40	Limestone silo & Tank accessories (Clause 20.03.00 of Part-C Section VI)	FW 732 FW 750	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
41	Limestone silo approach platform, Platform for Pipe racks (Clause 31.06.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 733 FW 766	Blast cleaning to Sa 2½/ Acid pickling	Hand rails, Ladders, Gratings- Hot dip galvanizing to 610gms/sq. m (minimum) and to a coating thickness of 87µm (minimum)				
42	Limestone silo approach platform, Pipe racks platform- Structures other than the above (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 733 FW 766	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
43	Limestone Mill – Outside surfaces (Clause 1.04.00 of Part- B Section VI)	FW 734	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	75 25	300
44	Lime stone mill- Inside surfaces	FW 734	Blast cleaning to Sa 2½ (Near white metal)	Primer Coat: One coat of two component moisture curing Inorganic Ethyl Zinc Silicate Primer to IS 14946,	70	--	--	70

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
			with surface profile 40-60µm conforming to ISO 8501-1	(Solid by volume- 60% (min)), (Metallic zinc content 80% (min)) DFT = 70 µm per coat (min.) Zinc dust composition shall be Type-II as per ASTM D520-00				
45	Primary Hydro cyclone and accessories Structural items (Clause 1.04.00 of Part- B Section VI)	FW 736	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	75 25	300
46	Secondary Hydro cyclone and accessories Structural items (Clause 1.04.00 of Part- B Section VI)	FW 737	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	75 25	300
47	Gypsum belt filter and accessories Structural items (Clause 1.04.00 of Part- B Section VI)	FW 738	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat Intermediate: One coat of Two component epoxy based	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ	75 25	300

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
				intermediate paint pigmented with MIO/Tio2 DFT- 100µ		Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002		
48	Lime stone slurry storage tank, Auxiliary absorber tank, Filtrate tank, Wastage water tank, Hydro cyclone waste water tank, Process Water tank, Belt filter washing tank, Primary Hydro cyclone feed tank Outside surfaces (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 742 FW 743 FW 744 FW 745 FW 747 FW 748 FW 785 FW 786	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
49	Lime stone slurry storage tank, Auxiliary absorber tank, Filtrate tank, Wastage water tank, Hydrocyclone waste water tank, Process Water tank, Belt filter washing tank, Primary Hydro cyclone feed tank Inside surfaces	FW 742 FW 743 FW 744 FW 745 FW 747 FW 748 FW 785 FW 786	Blast cleaning to Sa 2½ (Near white metal) with surface profile 35-50µm	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats) (Liner is inside the tank, hence primer is only envisaged; Protection till erection only)	60	NIL	--	60

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

50	Process water pipe accessories (Referred from cl. 7.05.00 of Section-VI, Part-B, Sub section-I-M5)	FW 751	Power Tool Cleaning to St3 (SSPC-SP3)	Primer: Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats) Intermediate: One coat of Synthetic Enamel intermediate coat to IS 2932; DFT- 50µ	60 50	Two coats of Synthetic Enamel to IS 2932, DFT- 50µ/ coat Shade: Grey white RAL 9002 Identification Tag: Sea Green Shade no: 217 as per IS 5	100	210
51	Slurry pipe accessories (Referred from cl. 7.05.00 of Section-VI, Part-B, Sub section-I-M5)	FW 753	Power Tool Cleaning to St3 (SSPC-SP3)	Primer: Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats) Intermediate: One coat of Synthetic Enamel intermediate coat to IS 2932; DFT- 50µ	60 50	Two coats of Synthetic Enamel to IS 2932, DFT- 50µ/ coat Shade: Grey white RAL 9002 Identification Tag: Sea Green Shade no: 217 as per IS 5	100	210
52	Service Air pipe accessories (Referred from cl. 10.00.00 of Section-VI, Part-B, Sub section-I-M3)	FW 754	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coat)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)- 30µ/ coat Identification Tag: Sky Blue Shade no: 101 as per IS 5	60	120
53	Instrument air pipe accessories (Referred from cl. 10.00.00 of Section-VI, Part-B, Sub section-I-M3)	FW 755	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coat)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)- 30µ/ coat Identification Tag: Sky Blue Shade no: 101 as per IS 5	60	120
54	Valves and fittings (Temp <95 deg C)	FW 758	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)- 30µ/ coat	60	120

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
55	Structure for Pipe racks Trestle for pipe racks (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 761 FW 769	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
56	Structures inside Gypsum dewatering building & Ball Mill Building (Referred from cl. 7.05.00 of Section-VI, Part-B, Sub section-I-M5)	FW 787	Power Tool Cleaning to St3 (SSPC-SP3)	Primer: Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats) Intermediate: One coat of Synthetic Enamel intermediate coat to IS 2932; DFT- 50µ	60 50	Two coats of Synthetic Enamel to IS 2932, DFT- 50µ/ coat Shade: Grey White RAL 9002	100	210
57	Supports for Cable trays, Tools, Air receivers, (Clause 20.03.00 of Part-C Section VI)	FW 779 FW 790 FW 798	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

3. GATES & DAMPERS

01	Gates & Dampers > 95° C Insulated Surfaces& Uninsulated surfaces	57 540 57 550 57 583	Power Tool Cleaning to St3 (SSPC-SP3)	HR Aluminium paint to IS 13183 Gr.II (upto 400 deg C)	40	--	--	40
02	Seal air piping (Referred from cl. 10.00 .00 of Section-VI, Part-B, Sub Section-I-M3)	57 141	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coat)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)- 30µ/ coat Identification Tag: Sky Blue Shade no: 101 as per IS 5	60	120
03	Blower with Motor Knife Gate valve Mounting bracket	57 491 57 497 57 209	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100
04	Ladder, Cage for Ladder Toe Guard Plate Floor Grill, Hand Rails, Hand Rail Post Clause 31.06.00 of Sec.VI, Part-B, Subsection- IV-D	57 566	Blast cleaning to Sa 2½/ Acid Pickling	Hot Dip Galvanizing to 610 gm per sq. Meter (minimum) and to a coating thickness of 87 µm (minimum)				
05	Other Structural Items- Other than sl.no. 3 of above (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	57 566	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ	70	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002	70	240

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
				Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	100	With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)		

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

4. PAINTING OF DAMAGED AREAS

Areas where paint has deteriorated badly by erosion and areas where the paint film has lost its adhesion property and where the steel has got rusted appreciably - these areas are to be repainted as per the following procedure:

SL NO	SURFACE LOCATION	SURFACE PREPARATION	PRIMER, INTERMEDIATE & FINISH
1	Paint damaged Components falling under Sl.no. 04,05,06,09,10,11 of Fans, Sl no. 01,02,03,04, 05,06,07, 09, 13, 14, 15, 21, 22, 23,25, 27, 31, 33,35, 36, 37, 42,43, 45,46, 47, 48, 55 of FGD and Sl no. 5 of GAD.	Hand/ Power Tool cleaning to Bare metal to minimum 6 inches peripheral area adjoining to damaged area	Primer: Epoxy Zinc rich primer to IS 14589, DFT-70µ (If Metal surface exposed) followed by intermediate & finish coat as per respective scheme If primer is intact- Intermediate & finish as per respective scheme
2	Paint damaged components failing under other Sl.nos of Fans, FGD& GAD	Power Tool Cleaning to Bare metal	Primer and Finish : As given in respective scheme

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

GENERAL NOTES

1. No painting is required for Galvanized, non-ferrous & stainless steel items, except as indicated above.
2. Machined items are to be applied with coat of temporary rust preventive oil
3. PGMA's covered in sub-supplier (ie., Purchased) items viz., Agitator/ slide bearing and other sub-delivery components etc., are not indicated in the above list. However, the Painting Schedule for all items supplied by all sub-suppliers and BOI under the scope of BHEL shall be same as for main equipment covered in this document.
4. In sub-assy, wherever plates / sheets of thickness less than or equal to 5mm and rods are used - Power Tool or Hand Tool Cleaning to SSPC - SP 3 / SP 2 shall be followed and painting under SI no:01 of Fans shall be followed.
5. Ground shade/colour of finish paints and identification tag/band for equipments, fans, piping, pipe services, supporting structures and other components is followed as per NTPC doc no: QS-01-DIV-W-4 at site.
6. All components covered under different PGMA's are to be painted. In case any component is left out, the same shall be deemed to be included under the relevant section.
7. All threaded and other surfaces of foundation bolts and its materials, insulation pins, Anchor channels, Sleeves shall be coated with temporary rust preventive fluid and during execution of civil works; the dried film of coating shall be removed using organic solvents.
8. Painting requirement for all electrical equipment shall be as per the details identified in specification for the respective equipment.
9. All steel structures shall be provided with painting as given in the specification. Further, painting system shall also meet the requirements of corrosivity category C3 (durability high) as per ISO 12944.
10. Finish coat to be applied after an interval of min 10 hrs and within 6 months (after completion of intermediate coat).
11. Primer coat on steel shall be applied in shop immediately after blast cleaning by airless spray technique.
12. For the portion of steel surfaces embedded in concrete, the surface shall be prepared by Manual cleaning and provided with Primer coat of Chlorinated Rubber based Zinc Phosphate Primer of Minimum 50 Micron DFT.

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

PAINTING SCHEME- DETAILS OF PROCUREMENT & APPLICATION PROCESSES

SL NO	TYPE OF PAINT	SPECIFICATION OF PAINT	NO OF PACK	VOLUME OF SOLIDS (% Min)	MODE OF APPLICATION	MIN. OVER COATING INTERVAL (hours)	SHADE
01	Epoxy Zinc phosphate primer	IS 13238	2	40	Spray	24	Grey
02	Zinc Ethyl silicate primer (% Zn on dry film= 80 (min))	IS 14946	2	60	Airless Spray only At Shop	24	Grey
03	Epoxy High solid- Polyamide cured Epoxy based MIO pigmented intermediate coat	--	2	80	Airless Spray only At Shop	16	Brown
04	Epoxy based finish paint	IS 14209	2	62	Spray	16	Corresponding shade no
05	Aliphatic isocyanate acrylic polyurethane paint	IS 13213	2	55	Spray At Shop	16	Corresponding shade no
06	Heat resistant aluminium paint	IS 13183 Grade II	1	--	Brush/ Spray	24	--
07	Long oil alkyd Synthetic enamel finish paint	IS 2932	1	35	Brush/ Spray	12	Corresponding shade no
08	Synthetic Enamel undercoat	IS 2932	1	40	Brush/Spray	12	
09	Red oxide Zinc phosphate primer	IS 12744	1	--	Brush/ spray	12	--

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

PGMA DETAILS

SNO	PGMA	PGMA DESCRIPTION	PGMA DETAILS
01	FW 212	Slurry recirculation pump system	RC Pumps incl Shaft seal Common Base Plate Coupling and Guard Gear Box Expansion Bellow Anchor Bolts & Fasteners Special Tools
02	FW 219	Absorber system base	Absorber tank bottom plate
03	FW 220	Absorber system structures	Absorber tank structure Absorber tower structure Spray headers structure
04	FW 221	Absorber system casing bottom	Absorber tank wall casing- bottom
05	FW 222	Absorber system casing top	Absorber Tank wall casing –Top Mist Eliminator supports Spray pipe supports Internal Beam Shim plates in Absorber area Internal Struts
06	FW 223	Absorber system accessories	Nozzles and flanges Inspection doors & Man holes Viewing ports Antifoam dosing equipment Suction strainers- FRP
07	FW 226	Emergency Quench water tank	Base Plate & its supports Roof, Shell
08	FW 227	Emergency Quench System	Emergency Quenching Spray Pipe Nozzle for Emergency Pipe Fasteners Gaskets
09	FW 230	Air oxidation System	Oxidation Blowers Common Base Plate Coupling and Guard Anchor Bolts & Fasteners Expansion Bellow Suction & Discharge Silencers Acoustic Enclosure Water Injection cooling system

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

			Pipe, Valves & Instruments Special Tools

SNO	PGMA	PGMA DESCRIPTION	PGMA DETAILS
10	FW 244	Oxidation air distribution System	Pipe & Fittings Flanges Pipe Hanger, Bottom Elbow, Bottom sliding supports
11	FW 251	Expansion joint between bypass	Expansion joints Seal Plates & Fasteners
12	FW 253	Expansion joint between scrubbers	Fabric & its fixing fasteners Sleeves & Flanges Gaskets
13	FW 255	Ducts between bypass duct inlet & booster fan	Plates & Stiffeners Guide Vanes
14	FW 256	Ducts between Booster fan & Scrubber	Plates & Stiffeners Guide Vanes
15	FW 257	Ducts between scrubber & stack	Plates & Stiffeners Guide Vanes
16	FW 260	Duct structure between ducts	Duct Supports Gusset Plate Divider plate Internal Struts Support bearings
17	FW 261 FW 262	Duct structure between scrubber	Duct Supports Gusset Plate Divider plate Internal Struts Support bearings
18	FW 292	Structures for Elevator	Columns Seal Plate Bracings Enclosure (Purlin& sheeting)
19	FW 293	Elevator and accessories	Base Frame Buffer Spring Mast Section Cage Control Panel & AC Mandatory Spares

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

SNO	PGMA	PGMA DESCRIPTION	PGMA DETAILS
20	FW 310	Structures for booster fan handling	Columns Beams Bracings Seal plate
21	FW 311	Handling Equipment- Booster fan	Electric hoist
22	FW 314	Miscellaneous- FGD system	Services & other small items like vents, over flow nozzles, orifices if any
23	FW 610 FW 722	Galleries & railings for Scrubbers, Tank	Stairs Handrail Step treads Floor grills Ladders Foundation bolts Fasteners
24	FW 701	Slurry pumps & accessories	Slurry Pumps incl Shaft seal Common Base Plate Coupling and Guard Belt & Pulley Expansion Bellow Anchor Bolts & Fasteners Motor & accessories Sump Pumps incl Shaft seal Common Base Plate Coupling and Guard Belt & Pulley Anchor Bolts & Fasteners Motor & accessories
25	FW 710	Monorail for hoist& cranes	Insert Plate Stiffener plate Monorail beam
26	FW 715	Handling Equipment in FGD	Electrically operated Hoists Underslung Cranes Chain Pulleys
27	FW 721	Agitator support	Channels & Beams
28	FW 730	Limestone silo structures	Columns Beams Bracings Seal plate Angles, channels

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

SNO	PGMA	PGMA DESCRIPTION	PGMA DETAILS
29	FW 731	Limestone silo	Base plate & its supports Shell, Roof
30	FW 732	Limestone silo accessories	Bag filter Air cannon bin activator Slide gate & bar gate for day silo
31	FW 733	Limestone silo approach platforms	Stairs Handrail Step treads Floor grills Ladders Foundation bolts Fasteners
32	FW 734	Limestone mill	Wet ball mill Hydro cyclone- Mill area Mill circuit pump Mill separator tank with Agitator
33	FW 742	Lime stone slurry storage tank	Base plate & its supports Shell, Roof
34	FW 743	Auxiliary Absorber tank	Base plate & its supports Shell, Roof
35	FW 744	Filtrate tank	Base plate & its supports Shell, Roof
36	FW 745	Wastage water tank	Base plate & its supports Shell, Roof
37	FW 747	Hydro cyclone waste water tank	Base plate & its supports Shell, Roof
38	FW 748	Process Water tank	Base plate & its supports Shell, Roof
39	FW 751	Process water pipe accessories	CS/FRP Pipes & Fittings Sight Glass R Orifice Gaskets & Fasteners
40	FW 753	Slurry pipe accessories	CSRL/FRP Pipes & Fittings Strainer (Cone) Expansion Joint-Rubber R Orifice Gaskets & Fasteners

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

SNO	PGMA	PGMA DESCRIPTION	PGMA DETAILS
41	FW 754	Service air pipe accessories	GI Pipes & Fittings Flexible Hose Expansion Joint (Metallic) Hose connector R Orifice Gaskets & Fasteners
42	FW 755	Instrument air pipe accessories	SS Pipes & Fittings Strainer(Y Type) Gaskets & Fasteners
43	FW 758	Valves and fittings	Globe valves Ball Valves Butterfly Valves Diaphragm Valves Gate Valves CheckValves Pinch Valves Knife Gate Valves Control Valves Relief Valves
44	FW 761	Structures for Pipe racks	Bracings Columns
45	FW 280 FW 281 FW 740 FW 763	Foundation material for duct structure Foundation material for scrubber Foundation material for Tanks Foundation material for Pipe racks	Foundation bolts Template
46	FW 766	Platforms for Pipe rack	Stairs Handrail Step treads Floor grills Ladders Foundation bolts Fasteners
47	FW 769	Trestle for Pipe racks	Truss Beams, Supports for all Pipes
48	FW 779	Supports for cable tray	Double Sup Channel & Base plates Single Sup Channel & Base plates Cantilever Arm Fasteners & clamps Brackets
49	FW 790	Tools	Erection , commissioning, special tools

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (μ m min.)
				PAINT	DFT (μ m min.)	PAINT	DFT (μ m min.)	

SNO	PGMA	PGMA DESCRIPTION	PGMA DETAILS
50	FW 798	Air receivers	Instrument Air receivers Any Instruments/Valves
51	FW 800	Clarified water tank	Base plate & its supports Shell, Roof
52	FW 802	Neutralization tank & accessories	Base plate & its supports Shell, Roof
53	FW 988	Commissioning spares	Startup & commissioning spares

	Bharat Heavy Electricals Limited Boiler Auxiliaries Plant Ranipet – 632 406	BHEL DOC NO.	PS: NK FGD: : G601
		REVISION NO.	02
		DATE	11.04.2019

NORTH KARANPURA FGD PACKAGE

PAINTING SCHEME for FGD SYSTEM, BOOSTER FAN& GATES& DAMPERS

NTPC CONTRACT NO: CS-4410-109-2-FC/SC-NOA-6695/6696 dtd 31.07.2018

NTPC DRG NO: 4410-109-RP-PVM-H-001

BHEL RANIPET Customer No(s).: G601-G603

Prepared By	Reviewed & Approved By
	
Rajamanickam M Dy.Manager/QA	K.C. Gandhi Parimalam DGM/QA

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

RECORD OF REVISION

REV NO	DATE	DETAILS OF REVISION
00	05.01.2019	Original Issue - First Submission
01	06.02.2019	NTPC comments: BHEL to ensure the documents shall be updated wrt to comments given in Barh FGD. BHEL reply: We have ensured that comments given in Barh- FGD is taken into account and updated.
		NTPC comments: Gratings, or Acid Pickled in SI no: 03 of Fans, SL no: 30, 40 of FGD& SI no: 04 of GAD BHEL reply: Incorporated in the document.
		NTPC comments: SS Lining is only in hopper (conical portion) of Lime stone silo. Furnish, inside painting of cylindrical portion of silo in line with structural painting. BHEL reply: SS lining is only for the conical portion of the silo, so we have split into conical and cylindrical portion for painting. Painting for cylindrical portion is given as per the Structural specification.
		NTPC comments: All structural steel shall be painted as per clause no. 31.03.00, Part-B, Sub-section IVD, Section-VI of technical specification. BHEL reply: Noted and incorporated in the document.
		NTPC comments: Note 11 added and "At Shop to be added in document". BHEL reply: Incorporated in the document.
		NTPC comments: Include the painting details for the Fire Detection and protection system(FDPS) and Air condition and ventilation system also as per technical specification. BHEL reply: We wish to state that Fire Detection and protection system(FDPS) and Air condition and ventilation system is not under BHEL Ranipet scope of supply. Also we would like to submit that painting for all mechanical items pertaining to Ranipet scope of supply is included.
02	11.04.2019	NTPC comments: Please include Painting schedule for Belt Conveyor System & Technological Structure in line with Technical Specification BHEL reply: We wish to state that Belt conveyor system & Technological structure is not under BHEL Ranipet scope of supply. Also we would like to submit that there is no PGMA released for the above item by Ranipet Engg.
		NTPC comments: BHEL to include all the details in the submitted document in totality irrespective of their individual units/head. Further BHEL to confirm the submission of Painting schedule for same and accordingly mention the doc no. also for clarity. BHEL reply: We wish to submit that FGD is a system comparable to SG and TG. Nearly six units of BHEL make and give supplies for this FGD system as per their scope. Individual BHEL units specialize in their scope and it is not possible to submit the document in totality. Individual BHEL units make painting scheme based on their scope and submit to customer for approval. This is the practice we adopt for SG and TG packages as well. Also, only the concerned BHEL units know the complexity of the painting involved in the surfaces envisaged. Hence, we have submitted this painting scheme for BHEL, Ranipet scope of supply considering the surfaces and as per NTPC specification. Similarly, other BHEL units will be submitting their painting scheme pertaining to their scope. We request M/s NTPC to consider this above explanation and accord approval to our painting scheme.

As confirmed by BHEL, Painting schedule for HVAC and FDPS shall be submitted by other units of BHEL and not by BHEL-Ranipet.BHEL to en

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

		NTPC comments: Belt Conveyor System & associated Technological Structure are part of FGD Package Scope BHEL-Ranipet may pl. refer BHEL-ISG & incorporate details in document BHEL reply: We wish to submit that we have submitted painting scheme for our scope of supply. ISG will be submitting their painting scheme for their scope of supply. This Painting scheme has been made for PGMA's released by our Ranipet Engg. Hence we request NTPC to kindly consider our reply and accord acceptance.
		NTPC comments: BHEL to share the QFGDM MHPS-Japan experience of painting of absorber systems BHEL reply: MHPS- Japan reply and the annexure sheet of the painting system submitted to BHEL for Maitree project by MHPS is attached for your kind reference. Also, we would like to submit that painting envisaged is equivalent to the NTPC specification. MHPS also does not have a standard painting scheme for absorber as evident from their reply.
		NTPC comments: Painting scheme of inside surface of Lime stone silo (Cylindrical portion) shall be same as painting scheme of Limestone silo-outside surface BHEL reply: We wish to state that the painting envisaged is until erection only. Once the system is commissioned, paint will peel off completely and application of intermediate and finish paints will become redundant, therefore we have proposed only primer. Also, primer given is of Inorganic Zinc silicate which offers superior protection against corrosion, abrasion and chemical resistance. Hence, we request you to kindly consider and approve the painting envisaged
02	11.04.2019	NTPC comments: Note 12 to be incorporated. BHEL reply: Incorporated in the document.

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

1. FANS

1	Axial Fan tool & fixtures (Clause 20.03.00 of Part- C Section VI)	55 000	Power Tool Cleaning to st3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100
2	Booster Fan foundation material	55 081	Temporary rust preventive fluid application as per PRQA 523 DFT- 20µ All Threaded and other surfaces of foundation bolt and its materials shall be coated with temporary rust preventive fluid. During execution of civil works the dried film of coating will be removed using Organic Solvents.					
3	Booster Fan Handrails & Insert (Clause 31.06.00 of Sec.VI, Part-B, Subsection- IV-D)	55 082	Blast cleaning to Sa 2½/ Acid pickling	Hand rails, Gratings- Hot dip galvanizing to 610gms/sq.m (minimum) and to a coating thickness of 87µm (min).				
4	Booster Fan Handrails & Insert- Structural items other than the above (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	55 082	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
5	Axial booster cooling/ seal fan (Clause 1.04.00 of Part- A Section VI)	55 084	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat	100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ	75	300

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
				Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100	Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	25	
6	Booster fan canopy for motor (Clause 1.04.00 of Part- A Section VI)	55 089	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat	100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ	75	300
				Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100	Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	25	
7	Axial booster fan rotor (Clause 20.03.00 of Part- C Section VI)	55 287	Power Tool Cleaning to St3 (SSPC-SP3)	Two coats of Epoxy based Zinc phosphate primer (Two pack system) to IS 13238; DFT- 30µ/coat	60	NIL	--	60
8	Axial booster fan stator (Clause 20.03.00 of Part- C Section VI)	55 587	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100
9	Axial booster fan coupling (Clause 1.04.00 of Part- A Section VI)	55 880	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat	100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ	75	300
				Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100	Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	25	

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
10	Booster fan LOS with lubricant (Clause 1.04.00 of Part- A Section VI)	55 980	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat	100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ	75	300
				Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100	Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	25	
11	Booster fan actuator (Clause 1.04.00 of Part- A Section VI)	55 983	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat	100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ	75	300
				Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100	Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	25	

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

2. FGD SYSTEM

1	Slurry recirculation pump System (Referred from cl. 7.05.00 of Section-VI, Part-B, Sub section-I-M5)	FW 212	Power Tool Cleaning to St3 (SSPC-SP3)	Primer: Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats) Intermediate: One coat of Synthetic Enamel intermediate coat to IS 2932; DFT- 50µ	60 50	Two coats of Synthetic Enamel to IS 2932, DFT- 50µ/ coat Shade: Light blue RAL 5012	100	210
2	Absorber System Internals – Structural items (Clause 1.04.00 of Part- A Section VI)	FW 213	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	75 25	300
3	Mist eliminator and accessories- Structural items (Clause 1.04.00 of Part- A Section VI)	FW 215	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	75 25	300
4	Absorber System- Base (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 219	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition	70	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat	70	240

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
			conforming to ISO 8501-1	and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	100	Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)		
5	Absorber system structures (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 220	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
6	Absorber system casing bottom (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 221	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ	70	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM	70	240

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
				Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	100	D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)		
7	Absorber system casing top (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 222	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
8	Absorber system accessories (Clause 20.03.00 of Part- C Section VI)	FW 223	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100
9	Emergency Quench water tank- Outside surfaces (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 226	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ	70	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002	70	240

SI No	SURFACE LOCATION		PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
					PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
					Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	100	With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)		
10	Emergency Quench water tank- Inside surfaces		FW 226	Blast cleaning to Sa 2½ (Near white metal) with surface profile 35-50µm	Primer: Two coats of Red Oxide Zinc phosphate primer, DFT-30µ/coat; Total-60µ (Primer is only envisaged as lining is given in inside surfaces of the tank)				
11	Emergency quench system (Clause 20.03.00 of Part- C Section VI)		FW 227	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	60	120
12	Air oxidation system (Clause 20.03.00 of Part- C Section VI)		FW 230	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100
13	Oxidation Air distribution system (Clause 1.04.00 of Part- A Section VI)		FW 244	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	75 25	300
14	Expansion joint between bypass (Clause 20.03.00 of	Flue gas swept surface	FW 251	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (two coats)	60	--	--	60
		Insulated surfaces		Power Tool Cleaning to St3 (SSPC-SP3)	HR Aluminium paint to IS 13183 Gr.II (upto 400 deg C)	40	NIL	--	40

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

	Part- C Section VI)								
15	Expansion joint between scrubbers (Clause 20.03.00 of Part- C Section VI)	Flue gas swept surface	FW 253	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60
		Insulated surfaces		Power Tool Cleaning to St3 (SSPC-SP3)	HR Aluminium paint to IS 13183 Gr.II (upto 400 deg C)	40	NIL	--	40
16	Ducts between bypass duct inlet& booster fan (Clause 20.03.00 of Part- C Section VI)	Flue gas swept surface	FW 255	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60
		Insulated surfaces		Power Tool Cleaning to St3 (SSPC-SP3)	HR Aluminium paint to IS 13183 Gr.II (upto 400 deg C)	40	NIL	--	40
17	Ducts between Booster fan& Scrubber (Clause 20.03.00 of Part- C Section VI)	Flue gas swept surface	FW 256	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60
		Insulated surfaces		Power Tool Cleaning to St3 (SSPC-SP3)	HR Aluminium paint to IS 13183 Gr.II (upto 400 deg C)	40	NIL	--	40
18	Ducts between Scrubber& Stack	Flue gas swept surface	FW 257	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	NIL	--	60

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)	
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)		
	(Clause 20.03.00 of Part- C Section VI)	Insulated surfaces		Power Tool Cleaning to St3 (SSPC-SP3)	HR Aluminium paint to IS 13183 Gr.II (upto 400 deg C)	40	NIL	--	40
19	Duct structure between ducts (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 260	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240	
20	Duct structure between scrubber (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 261	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240	

[illegible]

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
22	Foundation material for duct structures, scrubbers, tanks, pipe racks	FW 280 FW 281 FW 740 FW 763	Temporary rust preventive fluid application as per PRQA 523 DFT- 20µ All Threaded and other surfaces of foundation bolt and its materials shall be coated with temporary rust preventive fluid. During execution of civil works the dried film of coating will be removed using Organic Solvents.					
23	Structures for Elevator (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 292	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
24	Elevator and accessories (Clause 20.03.00 of Part- C Section VI)	FW 293	Power Tool Cleaning to st3 (SSPC-SP3	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	60	120

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

25	Structures for booster fan handling (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 310	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
26	Handling Equipment- Booster Fan (Clause 20.03.00 of Part-C Section VI)	FW 311	Power Tool Cleaning to st3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	60	120
27	Miscellaneous – FGD system (Clause 20.03.00 of Part-C Section VI)	FW 314	Power Tool Cleaning to st3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100
28	Galleries and railings for Scrubbers, Tanks (Clause 31.06.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 610 FW 722	Blast cleaning to Sa 2½/ Acid pickling	Hand rails, Gratings- Hot dip galvanizing to 610gms/sq.m (minimum) and to a coating thickness of 87µm (minimum)				

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
29	Galleries and railings for Scrubbers, Tanks – Structures other than the above (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 610 FW 722	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
30	Slurry pumps & accessories. (Referred from cl. 7.05.00 of Section-VI, Part-B, Sub section-I-M5)	FW 701	Power Tool Cleaning to St3 (SSPC-SP3)	Primer: Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats) Intermediate: One coat of Synthetic Enamel intermediate coat to IS 2932; DFT- 50µ	60 50	Two coats of Synthetic Enamel to IS 2932, DFT- 50µ/ coat Shade: Light blue RAL 5012	100	210
31	Monorail for hoist & cranes (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 710	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
32	Handling Equipment in FGD (Clause 20.03.00 of Part-C Section VI)	FW 715	Power Tool Cleaning to st3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats) Idle roller shall be applied with two coats of 70 microns at shop	70	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	60	130
33	Agitator support Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 721	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
34	Limestone silo structures Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 730	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
35	Limestone Silo- Outside surfaces Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 731	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
36	Lime stone Silo- Inside surfaces (Conical portion)	FW 731	Blast cleaning to Sa 2½ (Near white metal) with surface profile 35-50µm conforming to ISO 8501-1	Primer: Two coats of Red Oxide Zinc phosphate primer to IS: 12744 (SS lining is inside the Limestone silo conical portion, hence primer is only envisaged; SS lining will be done at shops itself)	60	NIL	--	60
37	Lime stone Silo- Inside surfaces (Cylindrical portion)	FW 731	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer Coat: One coat of two component moisture curing Inorganic Ethyl Zinc Silicate Primer to IS 14946, (Solid by volume- 60% (min)), (Metallic zinc content 80% (min)) DFT = 70 µm per coat (min.) Zinc dust composition shall be Type-II as per ASTM D520-00	70	--	--	70
38	Limestone silo accessories (Clause 20.03.00 of Part-C Section VI)	FW 732	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
39	Limestone silo approach platform, Platform for Pipe racks (Clause 31.06.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 733 FW 766	Blast cleaning to Sa 2½/ Acid pickling	Hand rails, Ladders, Gratings- Hot dip galvanizing to 610gms/sq. m (minimum) and to a coating thickness of 87µm (minimum)				
40	Limestone silo approach platform, Pipe racks platform- Structures other than the above (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 733 FW 766	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
41	Limestone Mill – Outside surfaces (Clause 1.04.00 of Part- B Section VI)	FW 734	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	75 25	300
42	Lime stone mill- Inside surfaces	FW 734	Blast cleaning to Sa 2½ (Near white metal)	Primer Coat: One coat of two component moisture curing Inorganic Ethyl Zinc Silicate Primer to IS 14946,	70	--	--	70

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
			with surface profile 40-60µm conforming to ISO 8501-1	(Solid by volume- 60% (min)), (Metallic zinc content 80% (min)) DFT = 70 µm per coat (min.) Zinc dust composition shall be Type-II as per ASTM D520-00				
43	Primary Hydro cyclone and accessories Structural items (Clause 1.04.00 of Part- B Section VI)	FW 736	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	75 25	300
44	Secondary Hydro cyclone and accessories Structural items (Clause 1.04.00 of Part- B Section VI)	FW 737	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat Intermediate: One coat of Two component epoxy based intermediate paint pigmented with MIO/Tio2 DFT- 100µ	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002	75 25	300
45	Gypsum belt filter and accessories Structural items (Clause 1.04.00 of Part- B Section VI)	FW 738	Blast cleaning to Sa 2½	Primer: Two coats of Epoxy resin based Epoxy Zinc phosphate primer to IS 13238 DFT- 50µ/coat Intermediate: One coat of Two component epoxy based	100 100	Finish: One coat of Epoxy based finish paint to IS 14209; DFT- 75µ	75 25	300

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
				intermediate paint pigmented with MIO/Tio2 DFT- 100µ		Finish: One coat of acrylic aliphatic polyurethane paint to IS 13213 DFT-25µ Shade: Grey White, RAL9002		
46	Lime stone slurry storage tank, Auxiliary absorber tank, Filtrate tank, Wastage water tank, Hydro cyclone waste water tank, Neutralization tank, Process Water tank, Clarified water tank Outside surfaces (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 742 FW 743 FW 744 FW 745 FW 747 FW 748 FW 800 FW 802	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
47	Lime stone slurry storage tank, Auxiliary absorber tank, Filtrate tank, Wastage water tank, Hydrocyclone waste water tank, Neutralization tank, Process Water tank, Clarified water tank Inside surfaces	FW 742 FW 743 FW 744 FW 745 FW 747 FW 748 FW 800 FW 802	Blast cleaning to Sa 2½ (Near white metal) with surface profile 35-50µm	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats) (Liner is inside the tank, hence primer is only envisaged; Protection till erection only)	60	NIL	--	60

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

48	Process water pipe accessories (Referred from cl. 7.05.00 of Section-VI, Part-B, Sub section-I-M5)	FW 751	Power Tool Cleaning to St3 (SSPC-SP3)	Primer: Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats) Intermediate: One coat of Synthetic Enamel intermediate coat to IS 2932; DFT- 50µ	60 50	Two coats of Synthetic Enamel to IS 2932, DFT- 50µ/ coat Shade: Grey white RAL 9002 Identification Tag: Sea Green Shade no: 217 as per IS 5	100	210
49	Slurry pipe accessories (Referred from cl. 7.05.00 of Section-VI, Part-B, Sub section-I-M5)	FW 753	Power Tool Cleaning to St3 (SSPC-SP3)	Primer: Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats) Intermediate: One coat of Synthetic Enamel intermediate coat to IS 2932; DFT- 50µ	60 50	Two coats of Synthetic Enamel to IS 2932, DFT- 50µ/ coat Shade: Grey white RAL 9002 Identification Tag: Sea Green Shade no: 217 as per IS 5	100	210
50	Service Air pipe accessories (Referred from cl. 10.00.00 of Section-VI, Part-B, Sub section-I-M3)	FW 754	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coat)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)- 30µ/ coat Identification Tag: Sky Blue Shade no: 101 as per IS 5	60	120
51	Instrument air pipe accessories (Referred from cl. 10.00.00 of Section-VI, Part-B, Sub section-I-M3)	FW 755	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coat)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)- 30µ/ coat Identification Tag: Sky Blue Shade no: 101 as per IS 5	60	120
52	Valves and fittings (Temp <95 deg C)	FW 758	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)- 30µ/ coat	60	120

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
53	Structure for Pipe racks Trestle for pipe racks (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	FW 761 FW 769	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	70 100	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002 With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)	70	240
54	Supports for Cable trays, tools, Air receivers, commissioning spares (Clause 20.03.00 of Part-C Section VI)	FW 779 FW 790 FW 798 FW 988	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

3. GATES & DAMPERS

01	Gates & Dampers > 95° C Insulated Surfaces& Uninsulated surfaces	57 540 57 550 57 583	Power Tool Cleaning to St3 (SSPC-SP3)	HR Aluminium paint to IS 13183 Gr.II (upto 400 deg C)	40	--	--	40
02	Seal air piping	57 141	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coat)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)- 30µ/ coat Identification Tag: Sky Blue Shade no: 101 as per IS 5	60	120
03	Blower with Motor Knife Gate valve Mounting bracket	57 491 57 497 57 209	Power Tool Cleaning to St3 (SSPC-SP3)	Red Oxide Zinc Phosphate Primer to IS: 12744 (Two coats)	60	Synthetic Enamel to IS 2932 Shade: Grey white RAL 9002 (Two coats)	40	100
04	Ladder, Cage for Ladder Toe Guard Plate Floor Grill, Hand Rails, Hand Rail Post Clause 31.06.00 of Sec.VI, Part-B, Subsection- IV-D	57 466 57 566	Blast cleaning to Sa 2½/ Acid Pickling	Hot Dip Galvanizing to 610 gm per sq. Meter (minimum) and to a coating thickness of 87 µm (minimum)				
05	Other Structural Items- Other than sl.no. 3 of above (Clause 31.03.00 of Sec.VI, Part-B, Subsection- IV-D)	57 466 57 566	Blast cleaning to Sa 2½ (Near white metal) with surface profile 40-60µm conforming to ISO 8501-1	Primer: One coat of Two component moisture curing zinc (ethyl) silicate primer coat (Min 80% metallic zinc content in dry film, solid by volume minimum 60% ±2). Zinc dust composition and properties shall be as per Type II as per ASTM D520-00 DFT- 70µ	70	Finish: Two coats of two pack aliphatic isocyanate cured acrylic polyurethane paint to IS 13213 solid by volume min.55%±2) DFT- 35µ/ coat Shade: Grey white, RAL 9002	70	240

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
				Intermediate: One coat of Two component polyamide cured epoxy with MIO content (containing lamellar MIO Min 30% on pigment, solid by volume min. 80%±2) DFT- 100µ	100	With gloss retention (SSPC paint spec no.36, ASTM D4587, D2244, D523 of level 2 after min. 1000 hrs exposure, gloss less than 30 and colour change less than 2.0Δ E)		

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

4. PAINTING OF DAMAGED AREAS

Areas where paint has deteriorated badly by erosion and areas where the paint film has lost its adhesion property and where the steel has got rusted appreciably - these areas are to be repainted as per the following procedure:

SL NO	SURFACE LOCATION	SURFACE PREPARATION	PRIMER, INTERMEDIATE & FINISH
1	Paint damaged Components falling under Sl.no. 04,05,06,09,10,11 of Fans, Sl no.02,03,04, 05,06,07, 09, 13,19,20,21,23,25, 29, 31, 33,34,35,40,41,43,44,45,46, 53 of FGD and Sl no. 5 of GAD.	Hand/ Power Tool cleaning to Bare metal to minimum 6 inches peripheral area adjoining to damaged area	Primer: Epoxy Zinc rich primer to IS 14589, DFT-70µ (If Metal surface exposed) followed by intermediate & finish coat as per respective scheme If primer is intact- Intermediate & finish as per respective scheme
2	Paint damaged components failing under other Sl.nos of Fans, FGD& GAD	Power Tool Cleaning to Bare metal	Primer and Finish : As given in respective scheme

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

GENERAL NOTES

1. No painting is required for Galvanized, non-ferrous & stainless steel items, except as indicated above.
2. Machined items are to be applied with coat of temporary rust preventive oil
3. PGMA's covered in sub-supplier (ie., Purchased) items viz., Agitator/ slide bearing and other sub-delivery components etc., are not indicated in the above list. However, the Painting Schedule for all items supplied by all sub-suppliers and BOI under the scope of BHEL shall be same as for main equipment covered in this document.
4. In sub-assy, wherever plates / sheets of thickness less than or equal to 5mm and rods are used, very minor items like clamps, small items etc - Power Tool or Hand Tool Cleaning to SSPC - SP 3 / SP 2 shall be followed and painting under SI no:01 of Fans shall be followed.
5. Ground shade/colour of finish paints and identification tag/band for equipments, fans, piping, pipe services, supporting structures and other components is followed as per NTPC doc no: QS-01-DIV-W-4 at site.
6. All components covered under different PGMA's are to be painted. Incase any component is left out, the same shall deemed to be included under the relevant section.
7. All threaded and other surfaces of foundation bolts and its materials, insulation pins, Anchor channels, Sleeves shall be coated with temporary rust preventive fluid and during execution of civil works; the dried film of coating shall be removed using organic solvents.
8. Painting requirement for all electrical equipment shall be as per the details identified in specification for the respective equipment.
9. All steel structures shall be provided with painting as given in the specification. Further, painting system shall also meet the requirements of corrosivity category C3 (durability high) as per ISO 12944.
10. Finish coat to be applied after an interval of min 10 hrs and within 6 months (after completion of intermediate coat).
11. Primer coat on steel shall be applied in shop immediately after blast cleaning by airless spray technique.
12. For the portion of steel surfaces embedded in concrete, the surface shall be prepared by Manual cleaning and provided with Primer coat of Chlorinated Rubber based Zinc Phosphate Primer of Minimum 50 Micron DFT.

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

PAINTING SCHEME- DETAILS OF PROCUREMENT & APPLICATION PROCESSES

SL NO	TYPE OF PAINT	SPECIFICATION OF PAINT	NO OF PACK	VOLUME OF SOLIDS (% Min)	MODE OF APPLICATION	MIN. OVER COATING INTERVAL (hours)	SHADE
01	Epoxy Zinc phosphate primer	IS 13238	2	40	Spray	24	Grey
02	Zinc Ethyl silicate primer (% Zn on dry film= 80 (min))	IS 14946	2	60	Airless Spray only At Shop	24	Grey
03	Epoxy High solid- Polyamide cured Epoxy based MIO pigmented intermediate coat	--	2	80	Airless Spray only At Shop	16	Brown
04	Aliphatic isocyanate acrylic polyurethane paint	IS 13213	2	55	Spray At Shop	16	Corresponding shade no
05	Heat resistant aluminium paint	IS 13183 Grade II	1	--	Brush/ Spray	24	--
06	Long oil alkyd Synthetic enamel finish paint	IS 2932	1	35	Brush/ Spray	12	Corresponding shade no
07	Synthetic Enamel Intermediate coat	IS 2932	1	40	Brush/ Spray	12	--
08	Red oxide Zinc phosphate primer	IS 12744	1	--	Brush/ spray	12	--

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

PGMA DETAILS

SNO	PGMA	PGMA DESCRIPTION	PGMA DETAILS
01	FW 212	Slurry recirculation pump system	RC Pumps incl Shaft seal Common Base Plate Coupling and Guard Gear Box Expansion Bellow Anchor Bolts & Fasteners Special Tools
02	FW 219	Absorber system base	Absorber tank bottom plate
03	FW 220	Absorber system structures	Absorber tank structure Absorber tower structure Spray headers structure
04	FW 221	Absorber system casing bottom	Absorber tank wall casing- bottom
05	FW 222	Absorber system casing top	Absorber Tank wall casing –Top Mist Eliminator supports Spray pipe supports Internal Beam Shim plates in Absorber area Internal Struts
06	FW 223	Absorber system accessories	Nozzles and flanges Inspection doors & Man holes Viewing ports Antifoam dosing equipment Suction strainers- FRP
07	FW 226	Emergency Quench water tank	Base Plate & its supports Roof, Shell
08	FW 227	Emergency Quench System	Emergency Quenching Spray Pipe Nozzle for Emergency Pipe Fasteners Gaskets
09	FW 230	Air oxidation System	Oxidation Blowers Common Base Plate Coupling and Guard Anchor Bolts & Fasteners Expansion Bellow Suction & Discharge Silencers Acoustic Enclosure Water Injection cooling system

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

			Pipe, Valves & Instruments Special Tools

SNO	PGMA	PGMA DESCRIPTION	PGMA DETAILS
10	FW 244	Oxidation air distribution System	Pipe & Fittings Flanges Pipe Hanger, Bottom Elbow, Bottom sliding supports
11	FW 251	Expansion joint between bypass	Expansion joints Seal Plates & Fasteners
12	FW 253	Expansion joint between scrubbers	Fabric & its fixing fasteners Sleeves & Flanges Gaskets
13	FW 255	Ducts between bypass duct inlet & booster fan	Plates & Stiffeners Guide Vanes
14	FW 256	Ducts between Booster fan & Scrubber	Plates & Stiffeners Guide Vanes
15	FW 257	Ducts between scrubber & stack	Plates & Stiffeners Guide Vanes
16	FW 260	Duct structure between ducts	Duct Supports Gusset Plate Divider plate Internal Struts Support bearings
17	FW 261 FW 262	Duct structure between scrubber	Duct Supports Gusset Plate Divider plate Internal Struts Support bearings
18	FW 292	Structures for Elevator	Columns Seal Plate Bracings Enclosure (Purlin& sheeting)
19	FW 293	Elevator and accessories	Base Frame Buffer Spring Mast Section Cage Control Panel & AC Mandatory Spares

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

SNO	PGMA	PGMA DESCRIPTION	PGMA DETAILS
20	FW 310	Structures for booster fan handling	Columns Beams Bracings Seal plate
21	FW 311	Handling Equipment- Booster fan	Electric hoist
22	FW 314	Miscellaneous- FGD system	Services & other small items like vents, over flow nozzles, orifices if any
23	FW 610 FW 722	Galleries & railings for Scrubbers, Tank	Stairs Handrail Step treads Floor grills Ladders Foundation bolts Fasteners
24	FW 701	Slurry pumps & accessories	Slurry Pumps incl Shaft seal Common Base Plate Coupling and Guard Belt & Pulley Expansion Bellow Anchor Bolts & Fasteners Motor & accessories Sump Pumps incl Shaft seal Common Base Plate Coupling and Guard Belt & Pulley Anchor Bolts & Fasteners Motor & accessories
25	FW 710	Monorail for hoist& cranes	Insert Plate Stiffener plate Monorail beam
26	FW 715	Handling Equipment in FGD	Electrically operated Hoists Underslung Cranes Chain Pulleys
27	FW 721	Agitator support	Channels & Beams
28	FW 730	Limestone silo structures	Columns Beams Bracings Seal plate Angles, channels

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

SNO	PGMA	PGMA DESCRIPTION	PGMA DETAILS
29	FW 731	Limestone silo	Base plate & its supports Shell, Roof
30	FW 732	Limestone silo accessories	Bag filter Air cannon bin activator Slide gate & bar gate for day silo
31	FW 733	Limestone silo approach platforms	Stairs Handrail Step treads Floor grills Ladders Foundation bolts Fasteners
32	FW 734	Limestone mill	Wet ball mill Hydro cyclone- Mill area Mill circuit pump Mill separator tank with Agitator
33	FW 742	Lime stone slurry storage tank	Base plate & its supports Shell, Roof
34	FW 743	Auxiliary Absorber tank	Base plate & its supports Shell, Roof
35	FW 744	Filtrate tank	Base plate & its supports Shell, Roof
36	FW 745	Wastage water tank	Base plate & its supports Shell, Roof
37	FW 747	Hydro cyclone waste water tank	Base plate & its supports Shell, Roof
38	FW 748	Process Water tank	Base plate & its supports Shell, Roof
39	FW 751	Process water pipe accessories	CS/FRP Pipes & Fittings Sight Glass R Orifice Gaskets & Fasteners
40	FW 753	Slurry pipe accessories	CSRL/FRP Pipes & Fittings Strainer (Cone) Expansion Joint-Rubber R Orifice Gaskets & Fasteners

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
				PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

SNO	PGMA	PGMA DESCRIPTION	PGMA DETAILS
41	FW 754	Service air pipe accessories	GI Pipes & Fittings Flexible Hose Expansion Joint (Metallic) Hose connector R Orifice Gaskets & Fasteners
42	FW 755	Instrument air pipe accessories	SS Pipes & Fittings Strainer(Y Type) Gaskets & Fasteners
43	FW 758	Valves and fittings	Globe valves Ball Valves Butterfly Valves Diaphragm Valves Gate Valves CheckValves Pinch Valves Knife Gate Valves Control Valves Relief Valves
44	FW 761	Structures for Pipe racks	Bracings Columns
45	FW 280 FW 281 FW 740 FW 763	Foundation material for duct structure Foundation material for scrubber Foundation material for Tanks Foundation material for Pipe racks	Foundation bolts Template
46	FW 766	Platforms for Pipe rack	Stairs Handrail Step treads Floor grills Ladders Foundation bolts Fasteners
47	FW 769	Trestle for Pipe racks	Truss Beams, Supports for all Pipes
48	FW 779	Supports for cable tray	Double Sup Channel & Base plates Single Sup Channel & Base plates Cantilever Arm Fasteners & clamps Brackets
49	FW 790	Tools	Erection , commissioning, special tools

SI No	SURFACE LOCATION	PGMA	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (μ m min.)
				PAINT	DFT (μ m min.)	PAINT	DFT (μ m min.)	

SNO	PGMA	PGMA DESCRIPTION	PGMA DETAILS
50	FW 798	Air receivers	Instrument Air receivers Any Instruments/Valves
51	FW 800	Clarified water tank	Base plate & its supports Shell, Roof
52	FW 802	Neutralization tank & accessories	Base plate & its supports Shell, Roof
53	FW 988	Commissioning spares	Startup & commissioning spares

-----Original Message-----

From: yoshito_tanaka@mhps.com [mailto:yoshito_tanaka@mhps.com]
Sent: Thursday, March 28, 2019 7:21 AM
To: kabilash@bhel.in
Cc: balajirs@bhel.in; jun01_hashimoto@mhps.com; kohei2_yamaguchi@mhps.com; masaya_sakaida@mhps.com; pnaveenr83@bhel.in; rlaks@bhel.in; yuvarajr@bhel.in; hideo_miyanishi@mhps.com
Subject: Re: Painting of Absorber system-reg

Dear **Kabilash** san,

Actually, there is no standard for absorber painting system.
Different customers require different painting system.

Please find the attachment submitted to BHEL for Maitree project.

It is a typical painting system for Absorber.

Kind regards,

Y.Tanaka of MHPS

送信元: "Kabilash KM" <kabilash@bhel.in>
宛先: '田中 義人' <yoshito_tanaka@mhps.com>
Cc: <balajirs@bhel.in>, <jun01_hashimoto@mhps.com>, <kohei2_yamaguchi@mhps.com>, <masaya_sakaida@mhps.com>, <pnaveenr83@bhel.in>, <rlaks@bhel.in>, <yuvarajr@bhel.in>
日付: 2019/02/22 14:04
件名: Painting of Absorber system-reg

Friday, February 22, 2019

Dear Tanaka San,

Greetings!!!

We had submitted painting scheme for North Karanpura FGD project,
Please refer to the attachment of painting scheme submitted to M/s NTPC
(Page 6).

We have given painting for the absorber systems as per NTPC
specification for outside surfaces since inner surfaces are C276
cladded.

NTPC has commented that "BHEL to share the QFGDM MHPS-Japan experience
of painting of absorber systems".

Hence we kindly request you to share the general practice of painting
of absorber systems for both inner & outer surfaces in any of the MHPS
Reference plant wherein the absorber is made of C276 Cladding.

Kindly help us so that we can get approval from M/s NTPC.

Thanks & Regards

KABILASH KM

SENIOR ENGINEER/FGD

BHEL BAP RANIPET

Landline No:04172284832

Mob:No:09488387067

FOR REFERENCE

BHEL will decide the Painting Systems.

Application of Painting Systems

Abb : P : Prime Coat
F : Finish coat
D.F.T : Dry film thickness

I : Intermediate coat
T/U : Touch up

SYSTEM No.		APPLICATION	TEMP °C	SURFACE PREP'N	SHOP PAINT		D.F.T. (μ)	SURFACE PREP'N	SITE PAINT		D.F.T. (μ)	REMARKS
					PAINT NAME				PAINT NAME			
SYSTEM - 1	NON-INSULATED ITEMS	1. Steel Structure Steel Structure Duct Support Pipe Rack Pipe Support Hoist Rail Hand Rail, Ladder, Platform, Stair, etc.	AMB.	SSPC-SP-6 OR ISO8501Sa2	P I	Epoxy Zinc Rich Epoxy M.I.O.	72 x 2 125x 1	SP-3	P (T/U) I F	Epoxy Zinc Rich Epoxy M.I.O. Polyurethane Gloss	(72 x 2) 125 x 1 50 x 2	
SYSTEM - 2		1. Site Assembly Equipment Knock Down Tank	Up to 80°C	SSPC-SP-6 OR ISO8501Sa2	P I	Epoxy Zinc Rich Epoxy M.I.O.	72 x 2 125x 1	SP-3	P (T/U) I F	Epoxy Zinc Rich Epoxy M.I.O. Polyurethane Gloss	(72 x 2) 125 x 1 50 x 2	
SYSTEM - 3		1. Stationary Equipment Tower (Non-Insulated Parts) Tank Heat Exchanger (Non-Insulated Parts) Others 2. Rotating Machinery Pump & Motor Flue Gas Blower Accessory Compressor (Non-Insulated Parts) Compressor Accessory Steam Turbine (Non-Insulated Parts) Dehydration Unit Maintenance Hoist & Crane	Up to 80°C	SSPC-SP-6 OR ISO8501Sa2	P I F	Epoxy Zinc Rich Epoxy M.I.O. Polyurethane Gloss	72 x 2 125x 1 50 x 2	SP-3	P (T/U) I F	Epoxy Zinc Rich Epoxy M.I.O. Polyurethane Gloss	(72 x 2) 125 x 1 50 x 2	
SYSTEM - 4		1. Stationary Equipment	80°C to 300°C	SSPC-SP-6 OR ISO8501Sa2	P F	Zinc or Silicone Zinc Silicon Acrylic system with Inorganic Pigment	50- 63x 1 50- 63x 1	SP-3	P (T/U) F (T/U)	Zinc or Silicone Zinc Silicon Acrylic system with Inorganic Pigment	50- 63x 1 50- 63x 1	
SYSTEM - 5		1. Solvent Storage Tank (Inner)			P	Rust Preventive Coating		SP-10	-	Sand Blasting (Just Before Pre-commissioning)	-	
SYSTEM - 6		1. Shop Fab. Piping (Include fitting & valves,etc.) (Except Stainless Piping)	Up to 80°C	SSPC-SP-6 OR ISO8501Sa2	P I	Epoxy Zinc Rich Epoxy M.I.O.	72 x 2 125x 1	SP-3	P (T/U) I F	Epoxy Zinc Rich Epoxy M.I.O. Polyurethane Gloss	(72 x 2) 125 x 1 50 x 2	

NON-INSULATED ITEMS



Bharat Heavy Electricals Limited

Boiler Auxiliaries Plant

Ranipet – 632 406

Vellore Dist., (TN)

PGMA Categorization for QP and Vendor Category

Customer: N T P C Limited

Project: BARH STAGE-I FGD PROJECT (3X660MW)

Package: FGD Package

NTPC Contract No.: CS-9558-109(1A)-2-FC-NOA-6724 DTD 18/09/2018

NTPC DRG NO: 9558-109-QVM-W-001

DOC.NO.:BAP:QA:MECH:PGMA CAT:G604

REV.03

Dtd. 12-06-2019

SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
PRODUCT : Fans (Mechanical)-Manufacturing Items					
1	55 000	AXIAL FAN TOOL & FIXTURES	DRG	III	III
2	55 081	BOOSTER FAN FOUNDATION MATERIAL	DRG	III	III
3	55 082	BOOSTER FAN HAND RAILS & INSERT PLATE	DRG	III	III
4	55 089	BOOSTER FAN CANOPY FOR MOTOR	DRG	III	III
5	55 287	AXIAL BOOSTER FAN ROTOR	DRG	I	I
6	55 587	AXIAL BOOSTER FAN STATOR	DRG	I	I
PRODUCT : Fans (Mechanical)-BOI Items					
1	55 084	AXIAL BOOSTER COOLING/ SEAL FAN	P.S	III	III
2	55 091	FIRST FILL LUBRICANTS	P.S	III	III
3	55 880	AXIAL BOOSTER FAN COUPLING	P.S	III	III
4	55 287	O- RING, SIMMER RINGS	P.S	III	III
		OTHER SEALS	P.S	III	III
		FASTENERS	IS	III	III
		NAME PLATES	--	III	III
		ANTI-FRICTION BEARINGS	CATALOGUE	III	III
		MALE STUD UNION	CATALOGUE	III	III
		CUP SPRINGS	P.S	III	III
		ELA PIPE CONNECTION	P.S	III	III
		PILLOW BLOCK BEARINGS	CATALOGUE	III	III
		RECTANGULAR RING	CATALOGUE	III	III
5	55 980	RUBBER HOSE& RUBBER BELT/FABRIC FOR EXPANSION JOINT	P.S	III	III
		BOOSTER FAN LOS	SQP	III	III
		LUB OIL COOLERS	CATALOGUE	III	III
		LUB OIL REGULATORS	CATALOGUE	III	III
		PRESSURE CONTROL VALVE	P.S	III	III
		LUB OIL FILTERS	P.S	III	III
		LUB OIL PUMPS	P.S	III	III
		VALVE FOR LUB OIL SYSTEM		III	III
		NAME PLATES		III	III
				III	III
6	55 989	AXIAL BOOSTER FAN INSULATION WOOL	SQP	III	III

NTPC DRG NO: 9558-109-QVM-W-001					
DOC.NO.:BAP:QA:MECH:PGMA CAT:G604			REV.03	Dtd. 12-06-2019	
SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
PRODUCT : FGD (Mechanical)-Manufacturing Items					
1	FW 219	ABSORBER SYSTEM BASE	SQP	III	III
2	FW 220	ABSORBER SYSTEM STRUCTURES- BUILT-UP MEMBERS ABOVE 10MT (SINGLE PIECE)	Endorsement Sheet & MQP	I	III
3	FW 220	ABSORBER SYSTEM STRUCTURES- BUILT-UP MEMBERS LESS THAN 10MT (SINGLE PIECE)	Endorsement Sheet & MQP	II	III
4	FW 220	OTHER ITEMS OF ABSORBER SYSTEM STRUCTURES LIKE BRACINGS AND ITEMS MADE OF ROLLED SECTIONS	SQP	III	III
5	FW 221	ABSORBER SYSTEM CASING BOTTOM	SQP	III	III
6	FW 222	ABSORBER SYSTEM CASING TOP	SQP	III	III
7	FW 226	EMERGENCY QUENCH WATER TANK	SQP	III	III
8	FW 232	DUCT SUPPORT BYPASS DUCT& BOOSTER FAN	DRG/SQP	III	III
9	FW 233	DUCT SUPPORT BOOSTER FAN & SCRUBBER	DRG/SQP	III	III
10	FW 234	DUCT SUPPORT SCRUBBER & STACK	DRG/SQP	III	III
11	FW 236	STRUCTURES FOR RC PUMPHOUSE	DRG/SQP	III	III
12	FW 237	GALLERIES AND RAILINGS FOR STAIRS	DRG	III	III
13	FW 251	EXPANSION JOINT BETWEEN BYPASS	Endorsement Sheet & MQP	I	III
14	FW 255	DUCT BETWEEN BYPASS DUCT INLET (STRAIGHT DUCTS)	SQP	III	III
15	FW 255	DUCT BETWEEN BYPASS DUCT INLET (TRANSITION DUCTS)	SQP	II	III
16	FW 256	DUCT BETWEEN BOOSTER FAN AND SCRUBBER (STRAIGHT DUCTS)	SQP	III	III
17	FW 256	DUCT BETWEEN BOOSTER FAN AND SCRUBBER (TRANSITION DUCTS)	SQP	II	III
18	FW 257	DUCT BETWEEN SCRUBBER AND STACK (STRAIGHT DUCTS)	SQP	III	III
19	FW 257	DUCT BETWEEN SCRUBBER AND STACK (TRANSITION DUCTS)	SQP	II	III
20	FW 260	DUCT STRUCTURE BETWEEN DUCT	SQP	III	III
21	FW 261	DUCT STRUCTURE BETWEEN SCRUBBER	SQP	III	III
22	FW 262	DUCT STRUCTURE BETWEEN SCRUBBER	SQP	III	III
23	FW 280	FOUNDATION MATERIAL FOR DUCT STRUCTURES	DRG	III	III
24	FW 281	FOUNDATION MATERIAL FOR SCRUBBER	DRG	III	III
25	FW 282	FOUNDATION MATERIAL FOR ELEVATOR	DRG	III	III
26	FW 292	STRUCTURES FOR ELEVATOR- BUILT-UP MEMBERS ABOVE 10MT (SINGLE PIECE)	Endorsement Sheet & MQP	I	III
27	FW 292	STRUCTURES FOR ELEVATOR- BUILT-UP MEMBERS LESS THAN 10MT (SINGLE PIECE)	Endorsement Sheet & MQP	II	III
28	FW 292	OTHER ITEMS OF STRUCTURES FOR ELEVATOR LIKE BRACINGS AND ITEMS MADE OF ROLLED SECTIONS	SQP	III	III
29	FW 310	STRUCTURES FOR BOOSTER FAN HANDLING	SQP	III	III
30	FW 610	GALLERIES & RAILINGS FOR SCRUBBER	SQP	III	III
31	FW 710	MONORAIL FOR HOIST& CRANES	SQP	III	III
32	FW 721	AGITATOR SUPPORT	DRG	III	III
33	FW 722	GALLERIES & RAILINGS FOR TANK	DRG	III	III
34	FW 730	LIMESTONE SILO STRUCTURE- BUILT-UP MEMBERS ABOVE 10MT (SINGLE PIECE)	Endorsement Sheet & MQP	I	III
35	FW 730	LIMESTONE SILO STRUCTURE- BUILT-UP MEMBERS LESS THAN 10MT (SINGLE PIECE)	Endorsement Sheet & MQP	II	III

NTPC DRG NO: 9558-109-QVM-W-001					
DOC.NO.:BAP:QA:MECH:PGMA CAT:G604			REV.03	Dtd. 12-06-2019	
SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
36	FW 730	OTHER ITEMS OF LIMESTONE SILO STRUCTURE LIKE BRACINGS AND ITEMS MADE OF ROLLED SECTIONS	SQP	III	III
37	FW 731	LIME STONE SILO	SQP	III	III
38	FW 733	LIMESTONE SILO APPROACH PLATFORM	DRG	III	III
39	FW 740	FOUNDATION MATERIAL FOR TANKS	DRG	III	III
40	FW 742	LIMESTONE SLURRY STORAGE TANK	SQP	III	III
41	FW 743	AUXILIARY ABSORBER TANK	SQP	III	III
42	FW 744	FILTRATE TANK	SQP	III	III
43	FW 745	WASTAGE WATER TANK	SQP	III	III
44	FW 747	HYDROCYCLONE WASTE WATER TANK	SQP	III	III
45	FW 748	PROCESS WATER TANK	SQP	III	III
46	FW 761	STRUCTURE FOR PIPE RACKS	SQP	III	III
47	FW 763	FOUNDATION MATERIAL FOR PIPE RACKS	DRG	III	III
48	FW 766	PLATFORMS FOR PIPE RACKS	DRG	III	III
49	FW 769	TRESTLE FOR PIPE RACKS	DRG	III	III
50	FW 785	BELT FILTER WASHING TANK	SQP	III	III
51	FW 786	PRIMARY HYDROCYCLONE FEED TANK	SQP	III	III
52	FW 787	STRUCTURES INSIDE GYPSUM DEWATERING BUILDING& BALL MILL BUILDING	SQP	III	III
53	FW 800	CLARIFIED WATER TANK	SQP	III	III
54	FW 802	NEUTRALIZATION TANK & ACCESSORIES	SQP	III	III

NTPC DRG NO: 9558-109-QVM-W-001					
DOC.NO.:BAP:QA:MECH:PGMA CAT:G604			REV.03	Dtd. 12-06-2019	
SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
PRODUCT : FGD (Mechanical)- BOI Items					
1	FW 212	SLURRY RECIRCULATION PUMP SYSTEM	MQP	I	I
2	FW 212	OTHER ITEMS OF SLURRY RECIRCULATION PUMP SYSTEM LIKE ACCESSORIES ETC	P.S	III	III
3	FW 213	ABSORBER SYSTEM INTERNALS	SQP	III	III
4	FW 215	MIST ELIMINATOR& ACCESSORIES	SQP	III	III
5	FW 223	ABSORBER SYSTEM ACCESSORIES	P.S	III	III
6	FW 227	EMERGENCY QUENCH SYSTEM	P.S	III	III
7	FW 228	ABSORBER- W/D INTERFACE	P.S	III	III
8	FW 230	AIR OXIDATION SYSTEM- OXIDATION BLOWER	MQP	I	I
9	FW 230	OTHER ITEMS OF AIR OXIDATION SYSTEM	P.S	III	III
10	FW 244	OXIDATION AR DISTRIBUTION SYSTEM	P.S	III	III
11	FW 253	EXPANSION JOINT BETWEEN SCRUBBER	MQP	III	III
12	FW 267	INSULATION MATERIALS FOR DUCTS	SQP	III	III
13	FW 268	FIXING COMPONENTS AND CLADDING	SQP	III	III
14	FW 293 FW 716	ELEVATOR AND ACCESSORIES	P.S	III	III
15	FW 311	HANDLING EQUIPMENT- BOOSTER FAN	DRG	III	III
16	FW 314	MISCELLANEOUS FGD SYSTEM	DRG	III	III
17	FW 701	SLURRY PUMPS	MQP	I	I
18	FW 701	OTHER ACCESSORIES OF SLURRY PUMPS	P.S	III	III
19	FW 715	HANDLING EQUIPMENT- FGD	DRG	III	III
20	FW 720	AGITATORS	MQP	I	I
21	FW 729	LIME STONE SILO LINING	P.S	III	III
22	FW 732	LIMESTONE SILO ACCESSORIES	P.S	III	III
23	FW 734	LIMESTONE GRINDING WET BALL MILL	MQP	I	I
24	FW 734	OTHER ACCESSORIES OF LIME STONE GRINDING WET BALL MILL	P.S	III	III
25	FW 736	PRIMARY HYDROCYCLONE	MQP	I	III
26	FW 737	SECONDARY HYDROCYCLONE	MQP	I	III
27	FW 736 FW 737	OTHER ACCESSORIES OF PRIMARY AND SECONDARY HYDROCYCLONES	P.S	III	III
28	FW 738	GYP SUM VACUUM BELT FILTER	MQP	I	I
29	FW 738	OTHER ACCESSORIES OF GYP SUM BELT FILTER	P.S	III	III
30	FW 741	LINING FOR TANKS & SUMPS (FROM DOMESTIC SOURCE)	MQP	I	III
31	FW 741	LINING FOR TANKS & SUMPS (FROM FOREIGN SOURCE)	MQP	II	III
32	FW 750	TANK ACCESSORIES	P.S	III	III
33	FW 751	PROCESS WATER PIPE ACCESSORIES	SQP	III	III
34	FW 753	SLURRY PIPE ACCESSORIES	SQP	III	III
35	FW 753	RUBBER LINED PIPING OF SLURRY PIPES	MQP	I	III
36	FW 754	SERVICE AIR PIPE ACCESSORIES	SQP	III	III
37	FW 755	INSTRUMENT AIR PIPE ACCESSORIES	SQP	III	III
38	FW 758	CONVENTIONAL VALVES LIKE GATE, GLOBE& BUTTERFLY VALVES OF SIZES 600NB & ABOVE	MQP	II	III
39	FW 758	ALL OTHER VALVES OF SIZE LESS THAN 600NB	P.S	III	III

NTPC DRG NO: 9558-109-QVM-W-001					
DOC.NO.:BAP:QA:MECH:PGMA CAT:G604			REV.03	Dtd. 12-06-2019	
SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
40	FW 790	TOOLS	DRG/T.S/D.S/ CATALOGUE	III	III
41	FW 798	AIR RECEIVERS	SQP	III	III
42	FW 988	COMMISSIONING SPARES	DRG/T.S/D.S/ CATALOGUE	III	III

NTPC DRG NO: 9558-109-QVM-W-001					
DOC.NO.:BAP:QA:MECH:PGMA CAT:G604			REV.03	Dtd. 12-06-2019	
SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
PRODUCT : Gates & Dampers (Mechanical) - Manufacturing Items					
1	57-XXX	Guillotine Gate	Endorsement Sheet & RQP	I	III
2	57-XXX	Damper	Endorsement Sheet & RQP	I	III
3	57-XXX	Other Misc. Item of Guillotine Gates like Transition duct Assy, Mating flange & Air tank.	DRG/PS	III	III
4	57-XXX	Other Misc. Item of Biplane Damper	DRG/PS	III	III
5	57-XXX	Commissioning spares For Gates & Dampers	CQP/DRG/PS	III	III
PRODUCT : Gates & Dampers (Mechanical) - Bought Out Items					
1	57-XXX	Chain	DRG	III	III
2	57-XXX	Bearings	DRG / CATALOGUE	III	III
3	57-XXX	Sprocket	DRG	III	III
4	57-XXX	Adjusting Bolt	DRG	III	III
5	57-XXX	Manual Operators	DRG/PS	III	III
6	57-XXX	Nylon Bush	DRG	III	III
7	57-XXX	Shaft Collar	DRG	III	III
8	57-XXX	Graphite Filament Packing	DRG	III	III
9	57-XXX	Graph oil Bearing	DRG	III	III
10	57-XXX	Fasteners And Raw Matls. Etc.,	IS	III	III
11	57-XXX	Air Cylinder	PS/DRG	III	III
12	57-XXX	Filter Cum Lubricator	DRG/PS	III	III
13	57-XXX	Check Valve	DRG	III	III
14	57-XXX	Isolation Valve	DRG	III	III
15	57-XXX	Other Items Like Fasteners, Hose, Adaptors, Flexible Conduit, Crimping Lug, Electric Cable, Tube Clips, Raw Matls., Etc.,	IS/DRG/PS	III	III
16	57-XXX	Tee Union	DRG	III	III
17	57-XXX	Male Connector	DRG	III	III
18	57-XXX	Expansion Piece	DRG	III	III
19	57-XXX	Blower With Motor	DRG/PS	III	III
20	57-XXX	Solenoid Valve	DRG/PS	III	III
21	57-XXX	Limit Switch & Lever	DRG/PS	III	III

NTPC DRG NO: 9558-109-QVM-W-001					
DOC.NO.:BAP:QA:MECH:PGMA CAT:G604			REV.03	Dtd. 12-06-2019	
SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY

NOTES :-

- 1) All other minor items which are not mentioned in the list can be considered as Cat-III items
- 2) All items shall meet project Tech specification requirement.
- 3) This Catg. List to be read along with QP.

QP Category :

Category - I Quality Plan Approval by NTPC, where physical inspection by **NTPC** is envisaged.

Category - II Quality Plan / Inspection Check List Approval by **NTPC**, but no physical inspection by **NTPC** is envisaged. Certification by Main supplier will be submitted as per NTPC format. (For items under Inspection category-II) If required surveillance may be carried out by NTPC.

Category - III Only Manufacturer's **Certificate of Compliance (COC)** shall be submitted for the issue of dispatch clearance by NTPC wherever applicable.

Vendor Category:

Category - I Acceptable to / Approved by NTPC

Category - III No Specific Vendor Approval by NTPC is required

RECORD OF REVISIONS		
00	Original Issue	Dtd 08/02/2019
	Revised Issue- NTPC comments: Fan Blades, Hum, Impeller etc are CAT-I item, May please be included. BHEL reply: Above items are part of Fan rotor which is already Cat-I. NTPC comments: Stator vendor category from Cat-III to Cat-I BHEL reply: Stator items are only suction chamber, housing which are fabricated item. Hence we request M/s NTPC to consider vendor category as Cat-III in line with Dadri FGD project. NTPC comments: Pressure control valve QP Catg.- II BHEL reply: We would like to submit that the said valve is a part of Lub oil system and it is a very small valve and is manually operated. Hence we request you to retain the categorization as Cat-III. NTPC comments: Absorber tank is Cat-I item. BHEL reply: We wish to submit that absorber tank is made in many segments and sent to site for assembly. At site these segments will be welded together and forms the complete structure. Hence it will be redundant to treat Absorber tank as Cat-I item as manufacturing will be done over a longer period of time and cannot be offered for inspection in single stroke, however we will be offering absorber structures to NTPC for inspection if it is of built-up structure of more than 10MT. Hence we request M/s NTPC to consider the casing as Cat-III. NTPC comments: Metallic Expansion Joints is Cat-I item BHEL reply: Incorporated in the document	

NTPC DRG NO: 9558-109-QVM-W-001					
DOC.NO.:BAP:QA:MECH:PGMA CAT:G604			REV.03	Dtd. 12-06-2019	
SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
01		NTPC comments: Ducts is Cat-II item BHEL reply: We wish to submit that the ducts in FGD system are of straight ducts in majority and some are transistion ducts. In Main plant itself, ducts are Cat-III item whereas in FGD system, the ducts are very limited and even then majority are Straight ducts which are of simple fabrication structures. Also we wish to reiterate that we have got categorization for ducts as Cat-III for Patratu FGD project. Based on teh above we request M/s NTPC to consider it as Cat-III item which will help in expediting project delivery schedules.			
		NTPC comments: Hydrocyclone is Cat-I item. BHEL reply: We agree for Cat-I categorization for Hydrocyclone but the referred item is Hydrocyclone waste water tank which is a simple fabrication made of lesser thk plates. Hence it is considered as Cat-III and we request M/s NTPC also to retain the same categorization.			
		NTPC comments: Absorber tank is Cat-I item BHEL reply: As mentioned earlier, absorber structures is Cat-I item which is incorporated in the document in line with Patratu FGD project. We wish to submit that referred items are Absorber internals like spray nozzles, spray pipes which are proprietary items of MHPS. Hence we request M/s NTPC to consider it as Cat-III item in line with Patratu FGD project.			
		NTPC comments: Hydrocyclone is Cat-I item. BHEL reply: Incorporated in the document.			
		NTPC comments: Mention type of lining Rubber lining is CAT-I For Tanks & Absorber BHEL reply: For tanks, it is rubber lined and for Absorber it is cladded material. We wish to submit that rubber lining will be done at site only as the tanks are made in segments and assembled at site and rubber lining checks will be incorporated in FQP similair to Dadri project. Since we at BAP, Ranipet will be procuring as raw material only and sending to site, we request M/s NTPC to consider as Cat-III item. Also M/s NTPC will be witnessing rubber lining checks at site. For rubber lined piping, we have already incorporated Cat-I in the Catg. plan in line with Patratu FGD project.			
		NTPC comments: Mention type of valves Conventional valves, Butterfly valve & knife gate valves are CAT-II Item BHEL reply: We wish to submit that valves in FGD are simple valves like gate, globe valves etc. Hence we request M/s NTPC to consider as Cat-III in line with Patratu FGD project.			
		NTPC comments: Guillotine Gate and Damper- QP Catg-I BHEL reply: Incorporated in the document			

NTPC DRG NO: 9558-109-QVM-W-001					
DOC.NO.:BAP:QA:MECH:PGMA CAT:G604			REV.03	Dtd. 12-06-2019	
SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
02		NTPC comments: Axial booster fan Stator, Vendor category- I BHEL reply: Incorporated in the document			
		NTPC comments: Lining like rubber, Flake, FRP lining- Cat-I BHEL reply: Incorporated in the document			
		NTPC comments: Conventional valves, Knife gate valves, safety valve Butter fly valve is CAT-II item BHEL reply: Incorporated in the document			
		NTPC comments: As per revised categorization plan for FGD Duct are CAT-II item BHEL reply: 1) We wish to submit that the ducts in FGD system are of straight ducts in majority and some are only transition ducts. 2) Ducts are Cat-III item even in Boiler areas where they are big structures, whereas in FGD system, the ducts are very limited and even then majority are Straight ducts which are of simple fabrication structures. 3) Also we wish to reiterate that ducts are made in segments/individual plates and sent to site. 4) At site, these segments/ individual plates are preassembled and welded together to form ducts, hence we request M/s NTPC to kindly consider ducts as Cat-III item which will help in expediting project delivery schedules.			
03		Based on the discussions held at NTPC EOC office, document has been updated and submitted for your kind approval			Dtd 12/06/2019

Prepared by	Rajamanickam M DM/QA	
Approved By	K C Gandhi Parimalam DGM/QA	



Bharat Heavy Electricals Limited

Boiler Auxiliaries Plant

Ranipet – 632 406

Vellore Dist., (TN)

PGMA Categorization for QP and Vendor Category

Customer: N T P C Limited

Project: BARH STAGE-II FGD PROJECT (2X660MW)

Package: FGD Package

NTPC Contract No.: CS-9560-109(1B)-9-FC-NOA-6720 DTD 18/09/2018

NTPC DRG NO: 9560-109-QVM-W-001

DOC.NO.:BAP:QA:MECH:PGMA CAT:G607

REV.01

Dtd. 12-06-2019

SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
PRODUCT : Fans (Mechanical)-Manufacturing Items					
1	55 000	AXIAL FAN TOOL & FIXTURES	DRG	III	III
2	55 081	BOOSTER FAN FOUNDATION MATERIAL	DRG	III	III
3	55 082	BOOSTER FAN HAND RAILS & INSERT PLATE	DRG	III	III
4	55 089	BOOSTER FAN CANOPY FOR MOTOR	DRG	III	III
5	55 287	AXIAL BOOSTER FAN ROTOR	DRG	I	I
6	55 587	AXIAL BOOSTER FAN STATOR	DRG	I	I
PRODUCT : Fans (Mechanical)-BOI Items					
1	55 084	AXIAL BOOSTER COOLING/ SEAL FAN	P.S	III	III
2	55 091	FIRST FILL LUBRICANTS	P.S	III	III
3	55 880	AXIAL BOOSTER FAN COUPLING	P.S	III	III
4	55 287	O- RING, SIMMER RINGS	P.S	III	III
		OTHER SEALS	P.S	III	III
		FASTENERS	IS	III	III
		NAME PLATES	--	III	III
		ANTI-FRICTION BEARINGS	CATALOGUE	III	III
		MALE STUD UNION	CATALOGUE	III	III
		CUP SPRINGS	P.S	III	III
		ELA PIPE CONNECTION	P.S	III	III
		PILLOW BLOCK BEARINGS	CATALOGUE	III	III
		RECTANGULAR RING	CATALOGUE	III	III
		RUBBER HOSE& RUBBER BELT/FABRIC FOR EXPANSION JOINT	P.S	III	III
		BOOSTER FAN LOS	SQP	III	III
5	55 980	LUB OIL COOLERS	CATALOGUE	III	III
		LUB OIL REGULATORS	CATALOGUE	III	III
		PRESSURE CONTROL VALVE	P.S	III	III
		LUB OIL FILTERS	P.S	III	III
		LUB OIL PUMPS	P.S	III	III
		VALVE FOR LUB OIL SYSTEM		III	III
		NAME PLATES		III	III
		AXIAL BOOSTER FAN INSULATION WOOL	SQP	III	III

NTPC DRG NO: 9560-109-QVM-W-001					
DOC.NO.:BAP:QA:MECH:PGMA CAT:G607			REV.01	Dtd. 12-06-2019	
SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
PRODUCT : FGD (Mechanical)-Manufacturing Items					
1	FW 219	ABSORBER SYSTEM BASE	SQP	III	III
2	FW 220	ABSORBER SYSTEM STRUCTURES- BUILT-UP MEMBERS ABOVE 10MT (SINGLE PIECE)	Endorsement Sheet & MQP	I	III
3	FW 220	ABSORBER SYSTEM STRUCTURES- BUILT-UP MEMBERS LESS THAN 10MT (SINGLE PIECE)	Endorsement Sheet & MQP	II	III
4	FW 220	OTHER ITEMS OF ABSORBER SYSTEM STRUCTURES LIKE BRACINGS AND ITEMS MADE OF ROLLED SECTIONS	SQP	III	III
5	FW 221	ABSORBER SYSTEM CASING BOTTOM	SQP	III	III
6	FW 222	ABSORBER SYSTEM CASING TOP	SQP	III	III
7	FW 226	EMERGENCY QUENCH WATER TANK	SQP	III	III
8	FW 232	DUCT SUPPORT BYPASS DUCT& BOOSTER FAN	DRG/SQP	III	III
9	FW 233	DUCT SUPPORT BOOSTER FAN & SCRUBBER	DRG/SQP	III	III
10	FW 234	DUCT SUPPORT SCRUBBER & STACK	DRG/SQP	III	III
11	FW 236	STRUCTURES FOR RC PUMPHOUSE	DRG/SQP	III	III
12	FW 237	GALLERIES AND RAILINGS FOR STAIRS	DRG	III	III
13	FW 251	EXPANSION JOINT BETWEEN BYPASS	Endorsement Sheet & MQP	I	III
14	FW 255	DUCT BETWEEN BYPASS DUCT INLET (STRAIGHT DUCTS)	SQP	III	III
15	FW 255	DUCT BETWEEN BYPASS DUCT INLET (TRANSITION DUCTS)	MQP	II	III
16	FW 256	DUCT BETWEEN BOOSTER FAN AND SCRUBBER (STRAIGHT DUCTS)	SQP	III	III
17	FW 256	DUCT BETWEEN BOOSTER FAN AND SCRUBBER (TRANSITION DUCTS)	MQP	II	III
18	FW 257	DUCT BETWEEN SCRUBBER AND STACK (STRAIGHT DUCTS)	SQP	III	III
19	FW 257	DUCT BETWEEN SCRUBBER AND STACK (TRANSITION DUCTS)	MQP	II	III
20	FW 260	DUCT STRUCTURE BETWEEN DUCT	SQP	III	III
21	FW 261	DUCT STRUCTURE BETWEEN SCRUBBER	SQP	III	III
22	FW 262	DUCT STRUCTURE BETWEEN SCRUBBER	SQP	III	III
23	FW 280	FOUNDATION MATERIAL FOR DUCT STRUCTURES	DRG	III	III
24	FW 281	FOUNDATION MATERIAL FOR SCRUBBER	DRG	III	III
25	FW 282	FOUNDATION MATERIAL FOR ELEVATOR	DRG	III	III
26	FW 292	STRUCTURES FOR ELEVATOR- BUILT-UP MEMBERS ABOVE 10MT (SINGLE PIECE)	Endorsement Sheet & MQP	I	III
27	FW 292	STRUCTURES FOR ELEVATOR- BUILT-UP MEMBERS LESS THAN 10MT (SINGLE PIECE)	Endorsement Sheet & MQP	II	III
28	FW 292	OTHER ITEMS OF STRUCTURES FOR ELEVATOR LIKE BRACINGS AND ITEMS MSDE OF ROLLED SECTIONS	SQP	III	III
29	FW 310	STRUCTURES FOR BOOSTER FAN HANDLING	SQP	III	III
30	FW 610	GALLERIES & RAILINGS FOR SCRUBBER	SQP	III	III
31	FW 710	MONORAIL FOR HOIST& CRANES	SQP	III	III
32	FW 721	AGITATOR SUPPORT	DRG	III	III

NTPC DRG NO: 9560-109-QVM-W-001					
DOC.NO.:BAP:QA:MECH:PGMA CAT:G607			REV.01	Dtd. 12-06-2019	
SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
33	FW 722	GALLERIES & RAILINGS FOR TANK	DRG	III	III
34	FW 730	LIMESTONE SILO STRUCTURE- BUILT-UP MEMBERS ABOVE 10MT	Endorsement Sheet & MQP	I	III
35	FW 730	LIMESTONE SILO STRUCTURE- BUILT-UP MEMBERS LESS THAN 10MT	Endorsement Sheet & MQP	II	III
36	FW 730	OTHER ITEMS OF LIMESTONE SILO STRUCTURE LIKE BRACINGS AND ITEMS MADE OF ROLLED SECTIONS	SQP	III	III
37	FW 731	LIME STONE SILO	SQP	III	III
38	FW 733	LIMESTONE SILO APPROACH PLATFORM	DRG	III	III
39	FW 740	FOUNDATION MATERIAL FOR TANKS	DRG	III	III
40	FW 742	LIMESTONE SLURRY STORAGE TANK	SQP	III	III
41	FW 743	AUXILIARY ABSORBER TANK	SQP	III	III
42	FW 744	FILTRATE TANK	SQP	III	III
43	FW 745	WASTAGE WATER TANK	SQP	III	III
44	FW 747	HYDROCYCLONE WASTE WATER TANK	SQP	III	III
45	FW 748	PROCESS WATER TANK	SQP	III	III
46	FW 761	STRUCTURE FOR PIPE RACKS	SQP	III	III
47	FW 763	FOUNDATION MATERIAL FOR PIPE RACKS	DRG	III	III
48	FW 766	PLATFORMS FOR PIPE RACKS	DRG	III	III
49	FW 769	TRESTLE FOR PIPE RACKS	DRG	III	III
50	FW 785	BELT FILTER WASHING TANK	SQP	III	III
51	FW 786	PRIMARY HYDROCYCLONE FEED TANK	SQP	III	III
52	FW 787	STRUCTURES INSIDE GYPSUM DEWATERING BUILDING& BALL MILL BUILDING	SQP	III	III
53	FW 800	CLARIFIED WATER TANK	SQP	III	III
54	FW 802	NEUTRALIZATION TANK & ACCESSORIES	SQP	III	III

NTPC DRG NO: 9560-109-QVM-W-001					
DOC.NO.:BAP:QA:MECH:PGMA CAT:G607			REV.01	Dtd. 12-06-2019	
SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
PRODUCT : FGD (Mechanical)- BOI Items					
1	FW 212	SLURRY RECIRCULATION PUMP SYSTEM	MQP	I	I
2	FW 212	OTHER ITEMS OF SLURRY RECIRCULATION SYSTEM LIKE ACCESSORIES	SQP	III	III
3	FW 213	ABSORBER SYSTEM INTERNALS	SQP	III	III
4	FW 215	MIST ELIMINATOR& ACCESSORIES	SQP	III	III
5	FW 223	ABSORBER SYSTEM ACCESSORIES	P.S	III	III
6	FW 227	EMERGENCY QUENCH SYSTEM	P.S	III	III
7	FW 228	ABSORBER- W/D INTERFACE	P.S	III	III
8	FW 230	AIR OXIDATION SYSTEM- OXIDATION BLOWER	MQP	I	I
9	FW 230	OTHER ITEMS OF AIR OXIDATION SYSTEM	P.S	III	III
10	FW 244	OXIDATION AR DISTRIBUTION SYSTEM	P.S	III	III
11	FW 253	EXPANSION JOINT BETWEEN SCRUBBER	MQP	III	III
12	FW 267	INSULATION MATERIALS FOR DUCTS	SQP	III	III
13	FW 268	FIXING COMPONENTS AND CLADDING	SQP	III	III
14	FW 293 FW 716	ELEVATOR AND ACCESSORIES	P.S	III	III
15	FW 311	HANDLING EQUIPMENT- BOOSTER FAN	DRG	III	III
16	FW 314	MISCELLANEOUS FGD SYSTEM	DRG	III	III
17	FW 701	SLURRY PUMPS	MQP	I	I
18	FW 701	OTHER ACCESSORIES OF SLURRY PUMPS	P.S	III	III
19	FW 715	HANDLING EQUIPMENT- FGD	DRG	III	III
20	FW 720	AGITATORS	MQP	I	I
21	FW 729	LIME STONE SILO LINING	P.S	III	III
22	FW 732	LIMESTONE SILO ACCESSORIES	P.S	III	III
23	FW 734	LIMESTONE GRINDING WET BALL MILL	MQP	I	I
24	FW 734	OTHER ACCESSORIES OF LIME STONE GRINDING WET BALL MILL	P.S	III	III
25	FW 736	PRIMARY HYDROCYCLONE	MQP	I	III
26	FW 737	SECONDARY HYDROCYCLONE	MQP	I	III
27	FW 736 FW 737	OTHER ACCESSORIES OF PRIMARY AND SECONDARY HYDROCYCLONE	P.S	III	III
28	FW 738	GYPHUM VACUUM BELT FILTER AND ACCESSORIES	MQP	I	I
29	FW 738	OTHER ACCESSORIES OF GYPHUM BELT FILTER	P.S	III	III
30	FW 741	LINING FOR TANKS & SUMPS (DOMESTIC SOURCE)	MQP	I	III
31	FW 741	LINING FOR TANKS & SUMPS (FOREIGN SOURCE)	MQP	II	III
31	FW 750	TANK ACCESSORIES	P.S	III	III
32	FW 751	PROCESS WATER PIPE ACCESSORIES	SQP	III	III
33	FW 753	RUBBER LINED PIPING OF SLURRY PIPES	MQP	I	III
34	FW 753	SLURRY PIPE ACCESSORIES	SQP	III	III
35	FW 754	SERVICE AIR PIPE ACCESSORIES	SQP	III	III
36	FW 755	INSTRUMENT AIR PIPE ACCESSORIES	SQP	III	III

NTPC DRG NO: 9560-109-QVM-W-001					
DOC.NO.:BAP:QA:MECH:PGMA CAT:G607		REV.01	Dtd. 12-06-2019		
SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
37	FW 758	CONVENTIONAL VALVES LIKE GATE, GLOBE& BUTTERFLY VALVES OF SIZES 600NB & ABOVE	MQP	II	III
38	FW 758	ALL OTHER VALVES OF SIZES LESS THAN 600NB	P.S	III	III
39	FW 790	TOOLS	DRG/T.S/D.S/ CATALOGUE	III	III
40	FW 798	AIR RECEIVERS	SQP	III	III
41	FW 988	COMMISSIONING SPARES	DRG/T.S/D.S/ CATALOGUE	III	III

NTPC DRG NO: 9560-109-QVM-W-001					
DOC.NO.:BAP:QA:MECH:PGMA CAT:G607			REV.01	Dtd. 12-06-2019	
SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
PRODUCT : Gates & Dampers (Mechanical) - Manufacturing Items					
1	57-XXX	Other Misc. Item of Guillotine Gates like Transition duct Assv, Mating flange & Air tank.	DRG/PS	III	III
2	57-XXX	Other Items like Pneumatic Fittings, Tube Clip, Copper Tube Etc., of Cold Air/Hot Air Gate.	DRG/PS	III	III
3	57-XXX	Other Misc. Item of Biplane Damper Louve Damper & Control Damper.	DRG/PS	III	III
4	57-XXX	Commissioning spares For Gates & Dampers	CQP/DRG/PS	III	III
5	57-XXX	Guillotine Gate	Endorsement Sheet & RQP	I	III
6	57-XXX	Damper	Endorsement Sheet & RQP	I	III
PRODUCT : Gates & Dampers (Mechanical) - Bought Out Items					
1	57-XXX	Chain	DRG	III	III
2	57-XXX	Bearings	DRG / CATALOGUE	III	III
3	57-XXX	Sprocket	DRG	III	III
4	57-XXX	Adjusting Bolt	DRG	III	III
5	57-XXX	Manual Operators	DRG/PS	III	III
6	57-XXX	Nylon Bush	DRG	III	III
7	57-XXX	Shaft Collar	DRG	III	III
8	57-XXX	Graphite Filament Packing	DRG	III	III
9	57-XXX	Graph oil Bearing	DRG	III	III
10	57-XXX	Fasteners And Raw Matls. Etc.,	IS	III	III
11	57-XXX	Air Cylinder	PS/DRG	III	III
12	57-XXX	Filter Cum Lubricator	DRG/PS	III	III
13	57-XXX	Check Valve	DRG	III	III
14	57-XXX	Isolation Valve	DRG	III	III
15	57-XXX	Other Items Like Fasteners, Hose, Adaptors, Flexible Conduit, Crimping Lug, Electric Cable, Tube Clips, Raw Matls., Etc.,	IS/DRG/PS	III	III
16	57-XXX	Tee Union	DRG	III	III
17	57-XXX	Male Connector	DRG	III	III
18	57-XXX	Expansion Piece	DRG	III	III
19	57-XXX	Blower With Motor	DRG/PS	III	III
20	57-XXX	Solenoid Valve	DRG/PS	III	III
21	57-XXX	Limit Switch & Lever	DRG/PS	III	III

NTPC DRG NO: 9560-109-QVM-W-001					
DOC.NO.:BAP:QA:MECH:PGMA CAT:G607			REV.01	Dtd. 12-06-2019	
SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY

NOTES:-

- 1) All other items which are not mentioned in the list can be considered as Cat-III items
- 2) All items shall meet project Tech specification requirement.
- 3) This Catg. List to be read along with QP.

QP Category :

Category - I Quality Plan Approval by NTPC, where physical inspection by **NTPC** is envisaged.

Category - II Quality Plan / Inspection Check List Approval by **NTPC**, but no physical inspection by **NTPC** is envisaged. Certification by Main supplier will be submitted as per NTPC format. (For items under Inspection category-II) If required surveillance may be carried out by NTPC.

Category - III Only Manufacturer's **Certificate of Compliance (COC)** shall be submitted for the issue of dispatch clearance by NTPC wherever applicable.

Vendor Category:

Category - I Acceptable to / Approved by NTPC

Category - III No Specific Vendor Approval by NTPC is required

RECORD OF REVISIONS		
00	Original Issue	Dtd 12/04/2019
01	Based on the discussions at NTPC EOC office, this document has been updated and submitted for your kind approval	Dtd 12/06/2019

Prepared by	Rajamanickam M DM/QA	
Approved By	K C Gandhi Parimalam DGM/QA	



Bharat Heavy Electricals Limited

Boiler Auxiliaries Plant

Ranipet – 632 406

Vellore Dist., (TN)

PGMA Categorization for QP and Vendor Category

Customer: N T P C Limited

Project: MOUDA FGD PROJECT (2X500MW)

Package: FGD Package

NTPC Contract No.: CS-9561-109(1B)-9-FC-NOA-6722 DTD 18/09/2018

NTPC DRG NO: 9561-109-RP-QVM-Q-053

DOC.NO.:BAP:QA:MECH:PGMA CAT:G503

REV.01

Dtd. 12-06-2019

SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
PRODUCT : Fans (Mechanical)-Manufacturing Items					
1	55 000	AXIAL FAN TOOL & FIXTURES	DRG	III	III
2	55 081	BOOSTER FAN FOUNDATION MATERIAL	DRG	III	III
3	55 082	BOOSTER FAN HAND RAILS & INSERT PLATE	DRG	III	III
4	55 089	BOOSTER FAN CANOPY FOR MOTOR	DRG	III	III
5	55 287	AXIAL BOOSTER FAN ROTOR	DRG	I	I
6	55 587	AXIAL BOOSTER FAN STATOR	DRG	I	I
PRODUCT : Fans (Mechanical)-BOI Items					
1	55 084	AXIAL BOOSTER COOLING/ SEAL FAN	P.S	III	III
2	55 091	FIRST FILL LUBRICANTS	P.S	III	III
3	55 880	AXIAL BOOSTER FAN COUPLING	P.S	III	III
4	55 287	O- RING, SIMMER RINGS	P.S	III	III
		OTHER SEALS	P.S	III	III
		FASTENERS	IS	III	III
		NAME PLATES	--	III	III
		ANTI-FRICTION BEARINGS	CATALOGUE	III	III
		MALE STUD UNION	CATALOGUE	III	III
		CUP SPRINGS	P.S	III	III
		ELA PIPE CONNECTION	P.S	III	III
		PILLOW BLOCK BEARINGS	CATALOGUE	III	III
		RECTANGULAR RING	CATALOGUE	III	III
		RUBBER HOSE& RUBBER BELT/FABRIC FOR EXPANSION JOINT	P.S	III	III
5	55 980	BOOSTER FAN LOS	SQP	III	III
		LUB OIL COOLERS	CATALOGUE	III	III
		LUB OIL REGULATORS	CATALOGUE	III	III
		PRESSURE CONTROL VALVE	P.S	III	III
		LUB OIL FILTERS	P.S	III	III
		LUB OIL PUMPS	P.S	III	III
		VALVE FOR LUB OIL SYSTEM		III	III
		NAME PLATES		III	III
6	55 989	AXIAL BOOSTER FAN INSULATION WOOL	SQP	III	III

NTPC DRG NO: 9561-109-RP-QVM-Q-053					
DOC.NO.:BAP:QA:MECH:PGMA CAT:G503		REV.01	Dtd. 12-06-2019		
SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
PRODUCT : FGD (Mechanical)-Manufacturing Items					
1	FW 219	ABSORBER SYSTEM BASE	SQP	III	III
2	FW 220	ABSORBER SYSTEM STRUCTURES- BUILT-UP MEMBERS ABOVE 10MT (SINGLE PIECE)	Endorsement Sheet & MQP	I	III
3	FW 220	ABSORBER SYSTEM STRUCTURES- BUILT-UP MEMBERS LESS THAN 10MT (SINGLE PIECE)	Endorsement Sheet & MQP	II	III
4	FW 220	OTHER ITEMS OF ABSORBER SYSTEM STRUCTURES LIKE BRACINGS AND ITEMS MADE OF ROLLED SECTIONS	SQP	III	III
5	FW 221	ABSORBER SYSTEM CASING BOTTOM	SQP	III	III
6	FW 222	ABSORBER SYSTEM CASING TOP	SQP	III	III
7	FW 226	EMERGENCY QUENCH WATER TANK	SQP	III	III
8	FW 232	DUCT SUPPORT BYPASS DUCT& BOOSTER FAN	DRG/SQP	III	III
9	FW 233	DUCT SUPPORT BOOSTER FAN & SCRUBBER	DRG/SQP	III	III
10	FW 234	DUCT SUPPORT SCRUBBER & STACK	DRG/SQP	III	III
11	FW 236	STRUCTURES FOR RC PUMPHOUSE	DRG/SQP	III	III
12	FW 237	GALLERIES AND RAILINGS FOR STAIRS	DRG	III	III
13	FW 251	EXPANSION JOINT BETWEEN BYPASS	Endorsement Sheet & MQP	I	III
14	FW 255	DUCT BETWEEN BYPASS DUCT INLET (STRAIGHT DUCTS)	SQP	III	III
15	FW 255	DUCT BETWEEN BYPASS DUCT INLET (TRANSITION DUCTS)	MQP	II	III
16	FW 256	DUCT BETWEEN BOOSTER FAN AND SCRUBBER (STRAIGHT DUCTS)	SQP	III	III
17	FW 256	DUCT BETWEEN BOOSTER FAN AND SCRUBBER (TRANSITION DUCTS)	MQP	II	III
18	FW 257	DUCT BETWEEN SCRUBBER AND STACK (STRAIGHT DUCTS)	SQP	III	III
19	FW 257	DUCT BETWEEN SCRUBBER AND STACK (STRAIGHT DUCTS)	MQP	II	II
20	FW 260	DUCT STRUCTURE BETWEEN DUCT	SQP	III	III
21	FW 261	DUCT STRUCTURE BETWEEN SCRUBBER	SQP	III	III
22	FW 262	DUCT STRUCTURE BETWEEN SCRUBBER	SQP	III	III
23	FW 280	FOUNDATION MATERIAL FOR DUCT STRUCTURES	DRG	III	III
24	FW 281	FOUNDATION MATERIAL FOR SCRUBBER	DRG	III	III
25	FW 282	FOUNDATION MATERIAL FOR ELEVATOR	DRG	III	III
26	FW 292	STRUCTURES FOR ELEVATOR- BUILT-UP MEMBERS ABOVE 10MT (SINGLE PIECE)	Endorsement Sheet & MQP	I	III
27	FW 292	STRUCTURES FOR ELEVATOR- BUILT-UP MEMBERS LESS THAN 10MT (SINGLE PIECE)	Endorsement Sheet & MQP	II	III
28	FW 292	OTHER ITEMS OF STRUCTURES FOR ELEVATOR LIKE BRACINGS AND ITEMS MADE OF ROLLED SECTIONS	SQP	III	III
29	FW 310	STRUCTURES FOR BOOSTER FAN HANDLING	SQP	III	III
30	FW 610	GALLERIES & RAILINGS FOR SCRUBBER	SQP	III	III
31	FW 710	MONORAIL FOR HOIST& CRANES	SQP	III	III
32	FW 721	AGITATOR SUPPORT	DRG	III	III
33	FW 722	GALLERIES & RAILINGS FOR TANK	DRG	III	III
34	FW 730	LIMESTONE SILO STRUCTURE- BUILT-UP MEMBERS ABOVE 10MT (SINGLE PIECE)	Endorsement Sheet & MQP	I	III
35	FW 730	LIMESTONE SILO STRUCTURE- BUILT-UP MEMBERS LESS THAN 10MT (SINGLE PIECE)	Endorsement Sheet & MQP	II	III
36	FW 730	OTHER ITEMS OF LIMESTONE SILO STRUCTURE LIKE BRACINGS AND ITEMS MADE OF ROLLED SECTIONS	SQP	III	III

NTPC DRG NO: 9561-109-RP-QVM-Q-053					
DOC.NO.:BAP:QA:MECH:PGMA CAT:G503		REV.01	Dtd. 12-06-2019		
SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
37	FW 731	LIME STONE SILO	SQP	III	III
38	FW 733	LIMESTONE SILO APPROACH PLATFORM	DRG	III	III
39	FW 740	FOUNDATION MATERIAL FOR TANKS	DRG	III	III
40	FW 742	LIMESTONE SLURRY STORAGE TANK	SQP	III	III
41	FW 743	AUXILIARY ABSORBER TANK	SQP	III	III
42	FW 744	FILTRATE TANK	SQP	III	III
43	FW 745	WASTAGE WATER TANK	SQP	III	III
44	FW 747	HYDROCYCLONE WASTE WATER TANK	SQP	III	III
45	FW 748	PROCESS WATER TANK	SQP	III	III
46	FW 761	STRUCTURE FOR PIPE RACKS	SQP	III	III
47	FW 763	FOUNDATION MATERIAL FOR PIPE RACKS	DRG	III	III
48	FW 766	PLATFORMS FOR PIPE RACKS	DRG	III	III
49	FW 769	TRESTLE FOR PIPE RACKS	DRG	III	III
50	FW 785	BELT FILTER WASHING TANK	SQP	III	III
51	FW 786	PRIMARY HYDROCYCLONE FEED TANK	SQP	III	III
52	FW 787	STRUCTURES INSIDE GYPSUM DEWATERING BUILDING& BALL MILL BUILDING	SQP	III	III

NTPC DRG NO: 9561-109-RP-QVM-Q-053					
DOC.NO.:BAP:QA:MECH:PGMA CAT:G503		REV.01	Dtd. 12-06-2019		
SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
PRODUCT : FGD (Mechanical)- BOI Items					
1	FW 212	SLURRY RECIRCULATION PUMP SYSTEM	MQP	I	I
2	FW 212	OTHER ITEMS OF RE-CIRCUALTION PUMP SYSTEM LIKE ACCESSORIES	P.S	III	III
3	FW 213	ABSORBER SYSTEM INTERNALS	SQP	III	III
4	FW 215	MIST ELIMINATOR& ACCESSORIES	SQP	III	III
5	FW 223	ABSORBER SYSTEM ACCESSORIES	P.S	III	III
6	FW 227	EMERGENCY QUENCH SYSTEM	P.S	III	III
7	FW 228	ABSORBER- W/D INTERFACE	P.S	III	III
8	FW 230	AIR OXIDATION SYSTEM- OXIDATION BLOWER	MQP	I	I
9	FW 230	OTHER ITEMS OF AIR OXIDATION SYSTEM	P.S	III	III
10	FW 244	OXIDATION AR DISTRIBUTION SYSTEM	P.S	III	III
11	FW 253	EXPANSION JOINT BETWEEN SCRUBBER	MQP	III	III
12	FW 267	INSULATION MATERIALS FOR DUCTS	SQP	III	III
13	FW 268	FIXING COMPONENTS AND CLADDING	SQP	III	III
14	FW 293 FW 716	ELEVATOR AND ACCESSORIES	P.S	III	III
15	FW 311	HANDLING EQUIPMENT- BOOSTER FAN	DRG	III	III
16	FW 314	MISCELLANEOUS FGD SYSTEM	DRG	III	III
17	FW 701	SLURRY PUMPS	MQP	I	I
18	FW 701	OTHER ACCESSORIES OF SLURRY PUMPS	SQP	III	III
19	FW 715	HANDLING EQUIPMENT- FGD	DRG	III	III
20	FW 720	AGITATORS	MQP	I	I
21	FW 729	LIME STONE SILO LINING	P.S	III	III
22	FW 732	LIMESTONE SILO ACCESSORIES	P.S	III	III
23	FW 734	LIMESTONE GRINDING WET BALL MILL	MQP	I	I
24	FW 734	OTHER ACCESSORIES OF LIMESTONE GRINDING WET BALL MILL	P.S	III	III
25	FW 736	PRIMARY HYDROCYCLONE	MQP	I	III
26	FW 737	SECONDARY HYDROCYCLONE	MQP	I	III
27	FW 736 FW737	OTHER ACCESSORIES OF PRIMARY AND SECONDARY HYDROCYCLONE	P.S	III	III
28	FW 738	GYPNUM VACUUM BELT FILTER	MQP	I	I
29	FW 738	OTHER ACCESSORIES OF GYPSUM BELT FILTER	P.S	III	III
30	FW 741	LINING FOR TANKS & SUMPS (DOMESTIC SOURCE)	MQP	I	III
31	FW 741	LINING FOR TANKS & SUMPS (FOREIGN SOURCE)	MQP	II	III
32	FW 750	TANK ACCESSORIES	P.S	III	III
33	FW 751	PROCESS WATER PIPE ACCESSORIES	SQP	III	III
34	FW 753	SLURRY PIPE ACCESSORIES	SQP	III	III
35	FW 753	RUBBER LINED PIPING OF SLURRY PIPES	MQP	I	III
36	FW 754	SERVICE AIR PIPE ACCESSORIES	SQP	III	III
37	FW 755	INSTRUMENT AIR PIPE ACCESSORIES	SQP	III	III
38	FW 758	CONVENTIONAL VALVES LIKE GATE, GLOBE& BUTTERFLY VALVES OF SIZES 600NB & ABOVE	MQP	II	III
39	FW 758	ALL OTHER VALVES OF SIZE LESS THAN 600NB	P.S	III	III

NTPC DRG NO: 9561-109-RP-QVM-Q-053					
DOC.NO.:BAP:QA:MECH:PGMA CAT:G503			REV.01	Dtd. 12-06-2019	
SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
40	FW 790	TOOLS	DRG/T.S/D.S/ CATALOGUE	III	III
41	FW 798	AIR RECEIVERS	SQP	III	III
42	FW 988	COMMISSIONING SPARES	DRG/T.S/D.S/ CATALOGUE	III	III

NTPC DRG NO: 9561-109-RP-QVM-Q-053					
DOC.NO.:BAP:QA:MECH:PGMA CAT:G503		REV.01	Dtd. 12-06-2019		
SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
PRODUCT : Gates & Dampers (Mechanical) - Manufacturing Items					
1	57-XXX	Other Misc. Item of Guillotine Gates like Transition duct Assy, Mating flange & Air tank.	DRG/PS	III	III
2	57-XXX	Other Items like Pneumatic Fittings, Tube Clip, Copper Tube Etc., of Cold Air/Hot Air Gate.	DRG/PS	III	III
3	57-XXX	Other Misc. Item of Biplane Damper Louve Damper & Control Damper.	DRG/PS	III	III
4	57-XXX	Commissioning spares For Gates & Dampers	CQP/DRG/PS	III	III
5	57-XXX	Guillotine Gate	Endorsement Sheet & RQP	I	III
6	57-XXX	Damper	Endorsement Sheet & RQP	I	III
PRODUCT : Gates & Dampers (Mechanical) - Bought Out Items					
1	57-XXX	Chain	DRG	III	III
2	57-XXX	Bearings	DRG / CATALOGUE	III	III
3	57-XXX	Sprocket	DRG	III	III
4	57-XXX	Adjusting Bolt	DRG	III	III
5	57-XXX	Manual Operators	DRG/PS	III	III
6	57-XXX	Nylon Bush	DRG	III	III
7	57-XXX	Shaft Collar	DRG	III	III
8	57-XXX	Graphite Filament Packing	DRG	III	III
9	57-XXX	Graph oil Bearing	DRG	III	III
10	57-XXX	Fasteners And Raw Matls. Etc.,	IS	III	III
11	57-XXX	Air Cylinder	PS/DRG	III	III
12	57-XXX	Filter Cum Lubricator	DRG/PS	III	III
13	57-XXX	Check Valve	DRG	III	III
14	57-XXX	Isolation Valve	DRG	III	III
15	57-XXX	Other Items Like Fasteners, Hose, Adaptors, Flexible Conduit, Crimping Lug, Electric Cable, Tube Clips, Raw Matls., Etc.,	IS/DRG/PS	III	III
16	57-XXX	Tee Union	DRG	III	III
17	57-XXX	Male Connector	DRG	III	III
18	57-XXX	Expansion Piece	DRG	III	III
19	57-XXX	Blower With Motor	DRG/PS	III	III
20	57-XXX	Solenoid Valve	DRG/PS	III	III
21	57-XXX	Limit Switch & Lever	DRG/PS	III	III

NTPC DRG NO: 9561-109-RP-QVM-Q-053					
DOC.NO.:BAP:QA:MECH:PGMA CAT:G503			REV.01	Dtd. 12-06-2019	
SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY

NOTES:-

- 1) All other items which are not mentioned in the list can be considered as Cat-III items
- 2) All items shall meet project Tech specification requirement.
- 3) This Catg. List to be read along with QP.

QP Category :

Category - I Quality Plan Approval by NTPC, where physical inspection by **NTPC** is envisaged.

Category - II Quality Plan / Inspection Check List Approval by **NTPC**, but no physical inspection by **NTPC** is envisaged. Certification by Main supplier will be submitted as per NTPC format. (For items under Inspection category-II) If required surveillance may be carried out by NTPC.

Category - III Only Manufacturer's **Certificate of Compliance (COC)** shall be submitted for the issue of dispatch clearance by NTPC wherever applicable.

Vendor Category:

Category - I Acceptable to / Approved by NTPC

Category - III No Specific Vendor Approval by NTPC is required

RECORD OF REVISIONS		
00	Original Issue	Dtd 08/02/2019
01	Based on the discussions at NTPC EOC office, document has been updated and submitted for your kind approval.	Dtd 12.06.2019

Prepared by	Rajamanickam M DM/QA	
Approved By	K C Gandhi Parimalam DGM/QA	



Bharat Heavy Electricals Limited

Boiler Auxiliaries Plant

Ranipet – 632 406

Vellore Dist., (TN)

PGMA Categorization for QP and Vendor Category

Customer: N T P C Limited

Project: NORTH KARANPURA FGD PROJECT (3X660MW)

Package: FGD Package

NTPC Contract No.: CS-4410-109-2-FC/SC-NOA-6695/6696 DTD 31/07/2018

NTPC DRG NO: 4410-109-RP-QVM-Q-017

DOC.NO.:BAP:QA:MECH:PGMA CAT:G601

REV.02

Dtd. 12-06-2019

SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
PRODUCT : Fans (Mechanical)-Manufacturing Items					
1	55 000	AXIAL FAN TOOL & FIXTURES	DRG	III	III
2	55 081	BOOSTER FAN FOUNDATION MATERIAL	DRG	III	III
3	55 082	BOOSTER FAN HAND RAILS & INSERT PLATE	DRG	III	III
4	55 089	BOOSTER FAN CANOPY FOR MOTOR	DRG	III	III
5	55 287	AXIAL BOOSTER FAN ROTOR	DRG	I	I
6	55 587	AXIAL BOOSTER FAN STATOR	DRG	I	I
PRODUCT : Fans (Mechanical)-BOI Items					
1	55 084	AXIAL BOOSTER COOLING/ SEAL FAN	P.S	III	III
2	55 091	FIRST FILL LUBRICANTS	P.S	III	III
3	55 880	AXIAL BOOSTER FAN COUPLING	P.S	III	III
4	55 287	O- RING, SIMMER RINGS	P.S	III	III
		OTHER SEALS	P.S	III	III
		FASTENERS	IS	III	III
		NAME PLATES	--	III	III
		ANTI-FRICTION BEARINGS	CATALOGUE	III	III
		MALE STUD UNION	CATALOGUE	III	III
		CUP SPRINGS	P.S	III	III
		ELA PIPE CONNECTION	P.S	III	III
		PILLOW BLOCK BEARINGS	CATALOGUE	III	III
		RECTANGULAR RING	CATALOGUE	III	III
		RUBBER HOSE& RUBBER BELT/FABRIC FOR EXPANSION JOINT	P.S	III	III
5	55 980	BOOSTER FAN LOS	SQP	III	III
		LUB OIL COOLERS	CATALOGUE	III	III
		LUB OIL REGULATORS	CATALOGUE	III	III
		PRESSURE CONTROL VALVE	P.S	III	III
		LUB OIL FILTERS	P.S	III	III
		LUB OIL PUMPS	P.S	III	III
		VALVE FOR LUB OIL SYSTEM		III	III
		NAME PLATES		III	III
6	55 989	AXIAL BOOSTER FAN INSULATION WOOL	SQP	III	III

NTPC DRG NO: 4410-109-RP-QVM-Q-017					
DOC.NO.:BAP:QA:MECH:PGMA CAT:G601		REV.02	Dtd. 12-06-2019		
SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
PRODUCT : FGD (Mechanical)-Manufacturing Items					
1	FW 219	ABSORBER SYSTEM BASE	SQP	III	III
2	FW 220	ABSORBER SYSTEM STRUCTURES-BUILT UP MEMBERS ABOVE 10MT (SINGLE PIECE)	Endorsement Sheet & MQP	I	III
3	FW 220	ABSORBER SYSTEM STRUCTURES-BUILT UP MEMBERS LESS THAN 10MT (SINGLE PIECE)	Endorsement Sheet & MQP	II	III
4	FW 220	OTHER ITEMS OF ABSORBER SYSTEM STRUCTURES LIKE BRACINGS AND ITEMS MADE OF ROLLED SECTIONS	SQP	III	III
5	FW 221	ABSORBER SYSTEM CASING BOTTOM	SQP	III	III
6	FW 222	ABSORBER SYSTEM CASING TOP	SQP	III	III
7	FW 226	EMERGENCY QUENCH WATER TANK	SQP	III	III
8	FW 251	EXPANSION JOINT BETWEEN BYPASS	Endorsement Sheet & MQP	I	III
9	FW 255	DUCT BETWEEN BYPASS DUCT INLET (STRAIGHT DUCTS)	SQP	III	III
10	FW 255	DUCT BETWEEN BYPASS DUCT INLET (TRANSITION DUCTS)	MQP	II	III
11	FW 256	DUCT BETWEEN BOOSTER FAN AND SCRUBBER (STRAIGHT DUCTS)	SQP	III	III
12	FW 256	DUCT BETWEEN BOOSTER FAN AND SCRUBBER (TRANSITION DUCTS)	MQP	II	III
13	FW 257	DUCT BETWEEN SCRUBBER AND STACK (STRAIGHT DUCTS)	SQP	III	III
14	FW 257	DUCT BETWEEN SCRUBBER AND STACK (TRANSITION DUCTS)	MQP	II	III
15	FW 260	DUCT STRUCTURE BETWEEN DUCT	SQP	III	III
16	FW 261	DUCT STRUCTURE BETWEEN SCRUBBER	SQP	III	III
17	FW 262	DUCT STRUCTURE BETWEEN SCRUBBER	SQP	III	III
18	FW 280	FOUNDATION MATERIAL FOR DUCT STRUCTURES	SQP	III	III
19	FW 281	FOUNDATION MATERIAL FOR SCRUBBER	SQP	III	III
20	FW 292	STRUCTURES FOR ELEVATOR- BUILT UP MEMBERS ABOVE 10MT (SINGLE PIECE)	Endorsement Sheet & MQP	I	III
21	FW 292	STRUCTURES FOR ELEVATOR- BUILT UP MEMBERS LESS THAN 10MT (SINGLE PIECE)	Endorsement Sheet & MQP	II	III
22	FW 292	OTHER ITEMS OF STRUCTURES FOR ELEVATOR LIKE BRACINGS AND ITEMS MADE OF ROLLED SECTIONS	SQP	III	III
23	FW 310	STRUCTURES FOR BOOSTER FAN HANDLING	SQP	III	III
24	FW 610	GALLERIES & RAILINGS FOR SCRUBBER	SQP	III	III
25	FW 710	MONORAIL FOR HOIST& CRANES	SQP	III	III
26	FW 721	AGITATOR SUPPORT	DRG	III	III
27	FW 722	GALLERIES & RAILINGS FOR TANK	DRG	III	III
28	FW 730	LIMESTONE SILO STRUCTURE- BUILT UP MEMBERS ABOVE 10MT (SINGLE PIECE)	Endorsement Sheet & MQP	I	III
29	FW 730	LIMESTONE SILO STRUCTURE- BUILT UP MEMBERS LESS THAN 10MT (SINGLE PIECE)	Endorsement Sheet & MQP	II	III
30	FW 730	OTHER ITEMS OF LIMESTONE SILO STRUCTURE LIKE BRACINGS AND ITEMS MADE OF ROLLED SECTIONS	SQP	III	III
31	FW 731	LIME STONE SILO	SQP	III	III
32	FW 733	LIMESTONE SILO APPROACH PLATFORM	DRG	III	III
33	FW 740	FOUNDATION MATERIAL FOR TANKS	SQP	III	III
34	FW 742	LIMESTONE SLURRY STORAGE TANK	SQP	III	III

NTPC DRG NO: 4410-109-RP-QVM-Q-017					
DOC.NO.:BAP:QA:MECH:PGMA CAT:G601		REV.02	Dtd. 12-06-2019		
SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
35	FW 743	AUXILIARY ABSORBER TANK	SQP	III	III
36	FW 744	FILTRATE TANK	SQP	III	III
37	FW 745	WASTAGE WATER TANK	SQP	III	III
38	FW 747	HYDROCYCLONE WASTE WATER TANK	SQP	III	III
39	FW 748	PROCESS WATER TANK	SQP	III	III
40	FW 761	STRUCTURE FOR PIPE RACKS	SQP	III	III
41	FW 763	FOUNDATION MATERIAL FOR PIPE RACKS	DRG	III	III
42	FW 766	PLATFORMS FOR PIPE RACKS	DRG	III	III
43	FW 769	TRESTLE FOR PIPE RACKS	DRG	III	III
44	FW 800	CLARIFIED WATER TANK	SQP	III	III
45	FW 802	NEUTRALIZATION TANK & ACCESSORIES	SQP	III	III

NTPC DRG NO: 4410-109-RP-QVM-Q-017					
DOC.NO.:BAP:QA:MECH:PGMA CAT:G601 REV.02 Dtd. 12-06-2019					
SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
PRODUCT : FGD (Mechanical)- BOI Items					
1	FW 212	SLURRY RECIRCULATION PUMP SYSTEM	MQP	I	I
2	FW 212	OTHER ITEMS OF SLURRY RECIRCULATION PUMP SYSTEMS LIKE ACCESSORIES ETC.	P.S	III	III
3	FW 213	ABSORBER SYSTEM INTERNALS	MQP	III	III
4	FW 215	MIST ELIMINATOR& ACCESSORIES	MQP	III	III
5	FW 223	ABSORBER SYSTEM ACCESSORIES	P.S	III	III
6	FW 227	EMERGENCY QUENCH SYSTEM	P.S	III	III
7	FW 228	ABSORBER- W/D INTERFACE	P.S	III	III
8	FW 230	AIR OXIDATION SYSTEM- OXIDATION BLOWER	MQP	I	I
9	FW 230	OTHER ITEMS OF AIR OXIDATION SYSTEM	P.S	III	III
10	FW 244	OXIDATION AR DISTRIBUTION SYSTEM	P.S	III	III
11	FW 253	EXPANSION JOINT BETWEEN SCRUBBER	MQP	III	III
12	FW 267	INSULATION MATERIALS FOR DUCTS	SQP	III	III
13	FW 268	FIXING COMPONENTS AND CLADDING	MQP	III	III
14	FW 293	ELEVATOR AND ACCESSORIES	P.S	III	III
15	FW 311	HANDLING EQUIPMENT- BOOSTER FAN	DRG	III	III
16	FW 314	MISCELLANEOUS FGD SYSTEM	DRG	III	III
17	FW 701	SLURRY PUMPS	MQP	I	I
18	FW 701	OTHER ACCESSORIES OF SLURRY PUMPS	P.S	III	III
19	FW 715	HANDLING EQUIPMENT- FGD	DRG	III	III
20	FW 720	AGITATORS	MQP	I	I
21	FW 729	LIME STONE SILO LINING	P.S	III	III
22	FW 732	LIMESTONE SILO ACCESSORIES	P.S	III	III
23	FW 734	LIMESTONE GRINDING WET BALL MILL	MQP	I	I
24	FW 734	OTHER ACCESSORIES OF LIME STONE GRINDING WET BALL MILL	P.S	III	III
25	FW 736	PRIMARY HYDROCYCLONE	MQP	I	III
26	FW 737	SECONDARY HYDROCYCLONE	MQP	I	III
27	FW 736 FW 737	OTHER ACCESSORIES OF PRIMARY AND SECONDARY HYDRO CYCLONES	P.S	III	III
28	FW 738	GYPHUM VACUUM BELT FILTER	MQP	I	I
29	FW 738	OTHER ACCESSORIES OF GYPHUM BELT FILTER	P.S	III	III
30	FW 741	LINING FOR TANKS & SUMPS (DOMESTIC SOURCE)	MQP	I	III
31	FW 741	LINING FOR TANKS & SUMPS (FOREIGN SOURCE)	MQP	II	III
31	FW 751	PROCESS WATER PIPE ACCESSORIES	MQP	III	III
32	FW 753	RUBBER LINED PIPING FOR SLURRY PIPES	MQP	I	III
33	FW 753	SLURRY PIPE ACCESSORIES	MQP	III	III
34	FW 754	SERVICE AIR PIPE ACCESSORIES	MQP	III	III
35	FW 755	INSTRUMENT AIR PIPE ACCESSORIES	MQP	III	III
36	FW 758	CONVENTIONAL VALVES LIKE GATE, GLOBE& BUTTERFLY VALVES OF SIZES 600NB & ABOVE	MQP	II	III
37	FW 759	ALL OTHER VALVES OF SIZE LESS THAN 600NB	P.S	III	III
38	FW 790	TOOLS	DRG/T.S/D.S/ CATALOGUE	III	III

NTPC DRG NO: 4410-109-RP-QVM-Q-017					
DOC.NO.:BAP:QA:MECH:PGMA CAT:G601			REV.02	Dtd. 12-06-2019	
SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
39	FW 798	AIR RECEIVERS	SQP	III	III
40	FW 988	COMMISSIONING SPARES	DRG/T.S/D.S/ CATALOGUE	III	III

NTPC DRG NO: 4410-109-RP-QVM-Q-017					
DOC.NO.:BAP:QA:MECH:PGMA CAT:G601			REV.02	Dtd. 12-06-2019	
SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY
PRODUCT : Gates & Dampers (Mechanical) - Manufacturing Items					
1	57-XXX	Guillotine Gate	Endorsement Sheet & RQP	I	III
2	57-XXX	Damper	Endorsement Sheet & RQP	I	III
3	57-XXX	Other Misc. Item of Guillotine Gates like Transition duct Assy, Mating flange & Air tank.	DRG/PS	III	III
4	57-XXX	Other Items like Pneumatic Fittings, Tube Clip, Copper Tube Etc., of Cold Air/Hot Air Gate.	DRG/PS	III	III
5	57-XXX	Other Misc. Item of Biplane Damper Louve Damper & Control Damper.	DRG/PS	III	III
6	57-XXX	Commissioning spares For Gates & Dampers	CQP/DRG/PS	III	III
PRODUCT : Gates & Dampers (Mechanical) - Bought Out Items					
1	57-XXX	Chain	DRG	III	III
2	57-XXX	Bearings	DRG / CATALOGUE	III	III
3	57-XXX	Sprocket	DRG	III	III
4	57-XXX	Adjusting Bolt	DRG	III	III
5	57-XXX	Manual Operators	DRG/PS	III	III
6	57-XXX	Nylon Bush	DRG	III	III
7	57-XXX	Shaft Collar	DRG	III	III
8	57-XXX	Graphite Filament Packing	DRG	III	III
9	57-XXX	Graph oil Bearing	DRG	III	III
10	57-XXX	Fasteners And Raw Matls. Etc.,	IS	III	III
11	57-XXX	Air Cylinder	PS/DRG	III	III
12	57-XXX	Filter Cum Lubricator	DRG/PS	III	III
13	57-XXX	Check Valve	DRG	III	III
14	57-XXX	Isolation Valve	DRG	III	III
15	57-XXX	Other Items Like Fasteners, Hose, Adaptors, Flexible Conduit, Crimping Lug, Electric Cable, Tube Clips, Raw Matls., Etc.,	IS/DRG/PS	III	III
16	57-XXX	Tee Union	DRG	III	III
17	57-XXX	Male Connector	DRG	III	III
18	57-XXX	Expansion Piece	DRG	III	III
19	57-XXX	Blower With Motor	DRG/PS	III	III
20	57-XXX	Solenoid Valve	DRG/PS	III	III
21	57-XXX	Limit Switch & Lever	DRG/PS	III	III

NTPC DRG NO: 4410-109-RP-QVM-Q-017					
DOC.NO.:BAP:QA:MECH:PGMA CAT:G601			REV.02	Dtd. 12-06-2019	
SL NO	PGMA	ITEM DESCRIPTION	REF DOCUMENT	QP CATEGORY	VENDOR CATEGORY

NOTES :-

- 1) All other minor items which are not indicated in the above list can be considered as Cat-III items
- 2) All items shall meet project Tech specification requirement.
- 3) This Catg. List to be read along with approved QP.

QP Category :

Category - I Quality Plan Approval by NTPC, where physical inspection by **NTPC** is envisaged.

Category - II Quality Plan / Inspection Check List Approval by **NTPC**, but no physical inspection by **NTPC** is envisaged. Certification by Main supplier will be submitted as per NTPC format. (For items under Inspection category-II) If required surveillance may be carried out by NTPC.

Category - III Only Manufacturer's **Certificate of Compliance (COC)** shall be submitted for the issue of dispatch clearance by NTPC wherever applicable.

Vendor Category:

Category - I Acceptable to / Approved by NTPC

Category - III No Specific Vendor Approval by NTPC is required

RECORD OF REVISIONS		
00	Original Issue	Dtd 08/02/2019
1	Revised Issue- NTPC comments: SQP numbers to be indicated BHEL reply: SQPs are available for Manufacturing items For Structures: FGS:710 For Ducts: SQP NP:01 For Silos and Tanks: We will make separate procedures which are project specific once the release of drawings are completed. NTPC comments: Categorisation of FGD items is being separately signed, after the award. This document need to be aligned with the same. BHEL reply: We wish to submit that this document is aligned with the Post bid discussions regarding QA&I issues for FGD package. Also it is aligned with Patratu project for which categorization is already approved.	Dtd 12.03.2019
2	Revised Issue- As per the discussions held at EOC office, this document has been updated and submitted for your kind approval.	Dtd 12.06.2019

Prepared by	Rajamanickam M DM/QA	
Approved By	K C Gandhi Parimalam DGM/QA	

		MANUFACTURER'S NAME AND ADDRESS M/S BHEL: BAP: RANIPET 632 406 TAMIL NADU & BHEL APPROVED SUBCONTRACTORS		STANDARD QUALITY PLAN									
				SYSTEM: FGD SUB SYSTEM: TANKS		QP NO.: FGS: 737 REV. NO.: 00 DATE: 12.08.2018 PAGE: 01 OF 03			PROJECT: STANDARD		PACKAGE: FGD		
									PACKAGE SUPPLIER: M/S BHEL RANIPET		BHEL CUST NO: STANDARD		
SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY		REMARKS
					M	B				D *	M	B	
1.	2.	3.	4.	5.	6.		7.	8.	9.		** 10.	11.	
1.0	RAW MATERIALS												
1.1	PLATES, ROLLED SECTIONS	CHEM & MECH PROPERTIES	MAJOR	VERIFICATION OF TC	100%	100%	RESPECTIVE MATEIAL SPECIFICATION AS PER DRAWING & NOTE-1	TC	√	P	V		
		SOUNDNESS OF PLATES > 40MM	MAJOR	UT	100%	@@	ASTM A 435	TC	√	P	V		
2.0	INPROCESS CONTROL												
2.1	FLAME CUTTING	LAMINATIONS AND CRACKS	MAJOR	VISUAL	100%	100%	AWS D1.1	R		P	V		
2.2	WELDING	WELDERS ARE QUALIFIED AS PER AWS D1.1 & WELD PROCEDURES ARE PREQUALIFIED TO AWS D1.1											
2.3	EDGE PREPARATION OF SHELL PLATES (SHOP& SITE WELDS)	NDE	MINOR	LPI/ MPI	100%	-	BHE: NDT:RP:PT 01 LATEST BHE:NDT:RP:MT 01 LATEST	R	√	P	V		

@@) PLATES ABOVE 40MM THICKNESS SHALL BE UT TESTED.

PREPARED BY  RAJAMANICKAM.M DY.MGR/ QA	REVIEWED&APPROVED BY  K.C GANDHI PARIMALAM DGM/QA	LEGEND: * RECORDS, INDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: MANUFACTURER/SUB-SUPPLIER B: BHEL/ BHEL'S AIA, P: PERFORM W: WITNESS AND V: VERIFICATION. AS APPROPRIATE, TC – TEST CERTIFICATE, R - REPORT

		MANUFACTURER'S NAME AND ADDRESS M/S BHEL: BAP: RANIPET 632 406 TAMIL NADU & BHEL APPROVED SUBCONTRACTORS		STANDARD QUALITY PLAN									
				SYSTEM: FGD SUB SYSTEM: TANKS		QP NO.: FGS: 737 REV. NO.: 00 DATE: 12.08.2018 PAGE: 02 OF 03			PROJECT: STANDARD		PACKAGE: FGD		
									PACKAGE SUPPLIER: M/S BHEL RANIPET		BHEL CUST NO: STANDARD		
SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY		REMARKS
					M	B				D *	M	B	
1.	2.	3.	4.	5.	6.		7.	8.	9.	D *	** 10.	11.	
2.4	BACK GOUGING WELD GROOVES	SURFACE CHECK	MAJOR	LPI	100%	100%	BHE: NDT:RP:PT01 LATEST	R	✓	P	V		
2.5	BUTT WELDS OF SHELL PLATES- WELD QUALITY & WELD SOUNDNESS	SURFACE CHECK	MAJOR	MPI*	100%	100%	BHE: NDT:RP: PT01 LATEST BHE: NDT:RP:MT01 LATEST	R	✓	P	V	*- MPI TESTING FOR BUTT WELDS ON BOTH SIDES	
2.6	FILLET WELDS	SURFACE CHECK	MAJOR	LPI/MPI	100%	10%	BHE: NDT:RP:PT01 LATEST	R	✓	P	V		
2.7	SHELL PLATES	DIMENSIONS*	MAJOR	MEASUREMENT	100%	100%	DRAWING	R	✓	P	V	*Note-2	
2.8	SHELL PLATES AFTER ROLLING	SHELL RADIUS*	MAJOR	MEASUREMENT	100%	100%	DRAWNIG	R	✓	P	V/ W#	*- TO BE CHECKED WITH TEMPLATE AND CHORD LENGTH OF TEMPLATE SHALL BE 1/3rd TO 1/5th OF DIAMETER	
3.0	FINAL INSPECTION												
3.1	SEGMENTS OF CYLINDRICAL SHELL	DIMENSION CHECK& MATCH MARKING	MAJOR	MEASUREMENT& VISUAL	100%	100%	DRAWING	R	✓	P	V		
PREPARED BY  RAJAMANICKAM.M DY.MGR/ QA				REVIEWED&APPROVED BY  K.C GANDHI PARIMALAM DGM/QA				LEGEND: * RECORDS , IDENTIFIED WITH "TICK" (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: MANUFACTURER/SUB-SUPPLIER B: BHEL/ BHEL'S AIA, P: PERFORM W: WITNESS AND V: VERIFICATION. AS APPROPRIATE, TC – TEST CERTIFICATE, R - REPORT					

 Ranipet		MANUFACTURER'S NAME AND ADDRESS M/S BHEL: BAP: RANIPET 632 406 TAMIL NADU & BHEL APPROVED SUBCONTRACTORS		STANDARD QUALITY PLAN									
				SYSTEM: FGD SUB SYSTEM: TANKS		QP NO.: FGS: 737 REV. NO.: 00 DATE: 12.08.2018 PAGE: 03 OF 03			PROJECT: STANDARD		PACKAGE: FGD		
SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY		REMARKS
					M	B				D *	M	B	
1.	2.	3.	4.	5.	6.		7.	8.	9.	D *	** 10.	11.	
3.2	TRIAL ASSEMBLY OF SHELLS	TRIAL ASSY*, VERTICALITY	MAJOR	MEASUREMENT & VISUAL	100%	100%	DRAWING	R	✓	P	W	*Note-3	
3.3	PROVISION OF TRANSPORT STIFFENERS	CHECK OF PROVISION OF STIFFENERS	MAJOR	VISUAL	100%	100%	DRAWING	R	✓	P	V		
3.4	PAINTING	PAINT FINISH, DFT & SHADE	MAJOR	VISUAL	100%	100%	AS PER APPROVED PAINTING SCHEME	R	✓	P	V		

NOTES:

- #- SHELL PROFILE CAN BE RANDOMLY CHECKED DURING FINAL INSPECTION BY BHEL/ BHEL'S AIA
1. RAW MATERIALS ARE TAKEN TO STOCK ON VERIFICATION OF TC / RANDOM TESTING.
 2. Dimensions of shell plates like length, width and diagonal to be checked before rolling and requirement to be as per drawing.
 3. Trial assembly of shell plates shall be carried out for all segments in a single tier individually (complete ring) on the layout and necessary unique match marking to be ensured with hard punch for each tier of shells in such a way that it cannot be replaced with another shell segment at site. Match marks to be bordered with white paint.

PREPARED BY  RAJAMANICKAM.M DY.MGR/ QA	REVIEWED&APPROVED BY  K.C GANDHI PARIMALAM DGM/QA	LEGEND: * RECORDS, INDENTIFIED WITH "TICK" (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. ** M: MANUFACTURER/SUB-SUPPLIER B: BHEL/ BHEL'S AIA, P: PERFORM W: WITNESS AND V: VERIFICATION. AS APPROPRIATE, TC – TEST CERTIFICATE, R - REPORT



**GUIDELINES FOR TRIAL ASSEMBLY &
NDT REQUIREMENTS OF FGD TANKS
FOR DADRI PROJECT**

DOC No: **PRQA: 700**
Rev: **00**
Effective Date: 28/07/2018
Page: **1 of 4**

1.0 Scope:

This document describes the trial assembly of FGD tanks for Dadri project at BHEL shops & vendor works to ensure correct matching of individual items during assembly and welding at site. Further it describes necessary precautions w.r.t forming of shells, fabrication and specific weld sequence to be followed during execution and non-destructive test requirements.

2.0 Reference document:

- a. Drawing
- b. AWS D1.1 (Latest)
- c. BHE:NDT:RP:PT:01 (Latest)
- d. BHE:NDT:RP:MT:01 (Latest)
- e. BHE:NDT:RP:RT:01 (Latest)
- f. BHE:NDT:RP:UT:04 (Latest)
- g. IS: 7215

3.0 Plate Thickness Details:

- a. Tank shell plate: 6mm, 7mm, 8mm, 10mm thk plates (IS 2062 E250)
- b. Tank base plate: 8mm (IS 2062 E250)
- c. Tank crown plate: 8 mm (IS 2062 E250)
- d. Tank roof plate: 8mm (IS 2062 E250)
- e. Stiffener plate: 28mm (IS 2062 E 250)

4.0 Forming of tank shell:

- a. Tank shell is formed as per the drawing for specific type of tank.
- b. For making shell, required rolling machine of suitable capacity and guide roll of required diameter shall be ensured.
- c. All the plates used for shell shall be joined by butt welding (If required length of plate not avl) and rolled to required shape and radius as per drawing.
- d. Ensure the edge preparation of each shell plate before pre bend operation. (EP shall be on ID side for shop joints)
- e. Ensure the Length, Width and diagonal of each shell plate as per drawing.
- f. Shell radius shall be checked with template and the chord length of the template shall be 1/3 to 1/5 of the diameter.
- g. Rolled plates shall be provided with temporary transport stiffeners to avoid bucking/ opening up due to springing action.
- h. Welding shall be done as per approved WPS with proper welding sequence.
- i. Welding consumables shall be as per approved WPS/ drawing.

el
ref

5.0 Welding and Non-destructive test requirements:

- a. All butt welds shall be as per drawing with back gouging / grinding and root LPI and final MPI.
- b. All butt joints of shell welds shall be MPI tested for plate thickness up to 12mm on both sides.
- c. Fillet welds shall be checked with LPI/ MPI for 10% of welds.

6.0 Trial Assembly

6.1 Individual wall segments of tank shell of individual tier

- a. Fit-up of shell segments shall be done by making a profile template on the fabrication bed. The segmented plates thus fixed on the marking shall be checked for verticality by suitable method.
- b. Fit-up of shell segments shall be done by positioning the segments on the fabrication bed with suitable cross bars to restrain movement during fit-up.
- c. Ensure segments which are sent as loose DU's (assembled at site) to be positioned with the profile template on fabrication bed at shops with unique match mark numbers/ drawing details (as applicable) and clearly marked on all the individual items / wall segments. The match marks are to be verified and ensured before dismantling.
- d. Match marks shall be hard punched before dismantling and bordered with white paint.
- e. Ensure suitable stiffeners to be provided on individual wall segments for handling and transportation purpose.
- f. Above procedure from "a" to "e" in clause 6.1 has to be repeated for other individual tier shell segments.

7.0 Tolerances:

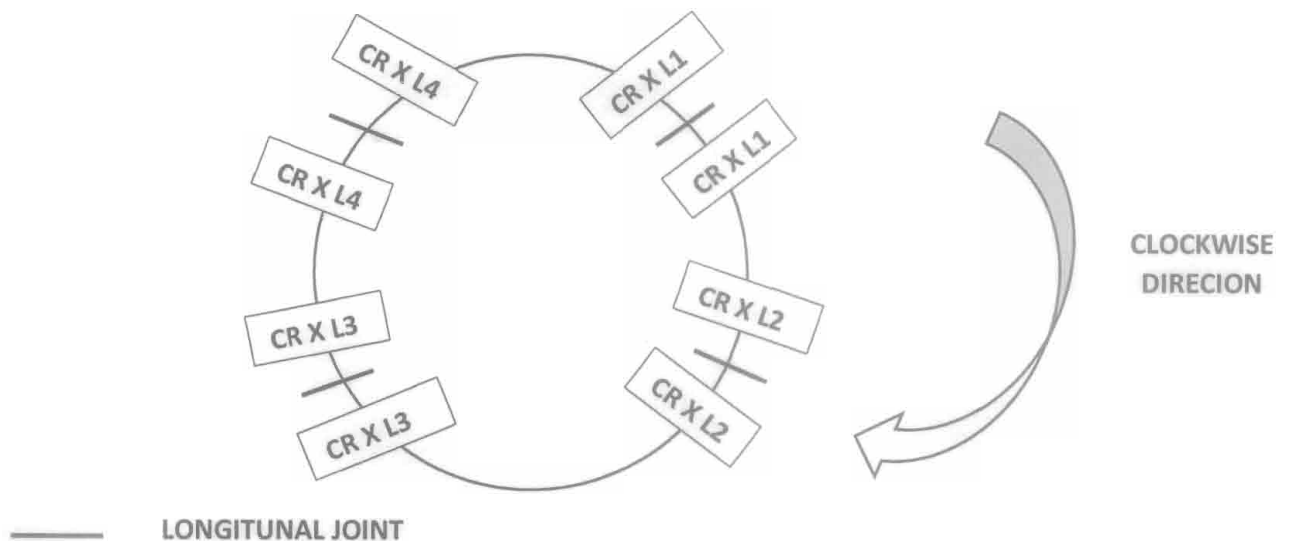
1. Tolerance on radius of shell segment: ± 5 mm
2. Tolerance of verticality of shell segment: Within 7mm
3. Local bulging and / or depressions at any location of shell segment shall not be permitted.

Handwritten signature

7.0 Match marking of shell plates

- For all circumferential joint, match marking shall start with C1, C2..... CZZ.
- For all Longitudinal joints in an individual segment, match marking shall start with CR. X, L1, L2...LYY.
 Where X is the number of the Tier.
 For example: If CR X L1 is punched at one end of segment, same CR X L1 shall be punched at the matching end of another segment. Each segment will have two longitudinal site joints. One segment will have match mark of preceding segment and match mark of adjacent segment. The numbering shall be followed in clockwise direction only. (Refer Sketch)
- The match marking shall be hard punched and bordered with white paint before sending to painting. These match marks are to be traced back after painting and bordered with black paint.
- All site weld joints shall be applied with weld able primer to a distance of 25 mm from the weld joint.

Match marking of Longitudinal Joints:







**GUIDELINES FOR TRIAL ASSEMBLY &
NDT REQUIREMENTS OF FGD TANKS
FOR DADRI PROJECT**

DOC No: **PRQA: 700**
Rev: **00**
Effective Date: 28/07/2018
Page: 4 of 4

Record of revisions

Rev. no	Clause revised	Revision Made	Date
00	---	Original Issue	28.07.2018

Prepared by	Reviewed by			Approved by
	Department	Name	Signature	
 Rajamanickam.M Dy. Mgr/ QA	Engg/ AQCS	C.Ganesh SDGM/ EDC- AQCS		 K.C Gandhi Parimalam DGM/ QA
	OP&C	C. Tamilselvan SM/ OP&C		
	Prodn/Shops	M. Valavan DGM/ A2,A3, H1 bays & COC		
	QC- Shops	N.S. Ravichandran Exe. Addl Engr/ QC- Shops		
	QC-OLI	P.Kannayiram Sr.Engr/ QC- OLI		
	QA	Rakesh Kumar Madhu Sr. Engr/QA		

SECTION XIII

SPECIAL PROVISIONS FOR MICRO AND SMALL ENTERPRISES (MSE BIDDERS)

In line with Gazette notification issued by Ministry of Micro small and medium enterprises on MSE suppliers, the following special provisions shall be applicable.

- i. 20% of the tendered value is earmarked for MSE suppliers in this tender.
- ii. If L1 vendor (or) Counter offer accepted vendor/s is from a Micro / Small enterprise which put together covers 20% of the total tendered value, the 20% earmarking provision is not applicable.
- iii. Out of the 20% tendered value reserved for MSE suppliers, 4% shall be earmarked for procurement from MSE owned by SC / ST entrepreneurs. In the event of failure of such Micro and Small enterprises to participate in the tender process or meet the tender requirements and the L1 price, the 4% sub-target for procurement ear-marked MSE owned by SC / ST entrepreneurs shall be met with other MSE enterprise/s.
- iv. In case MSE vendor participating in the tender quotes within the price band of L1 + 15%, they will be allowed to supply the portion of the requirement subject to acceptance of L1 price by MSE vendor. In case of more than one such MSE, the supply shall be shared proportionately, provided the available quantum is splittable.
- v. In case the available quantum is non-splittable/ not envisaged for splitting as per tender, and if a non-MSME vendor becomes L1, and MSME vendor also participates in the tender, the MSME vendor will be given preference for ordering the available quantum provided the MSME vendor quoted price is within L1 + 15%, and if the MSME vendor accepts the L1 rate.
- vi. MSE suppliers can avail the intended benefits only if they submit along with the offer, attested copies of either EM II certificate having deemed validity (five years from the date of issue of acknowledgement in EM II) or valid NSIC certificate or EM II certificate along with CA certificate or Udyog Aadhar Memorandum (UAM) along with CA certificate (Format enclosed as Annexure C) applicable for the year, certifying quantum of investment in plant and machinery within the permissible limits as per the act for relevant status (MICRO or SMALL) where the deemed validity of EM II is over. Date to be reckoned for determining the deemed validity will be the last date of technical bid submission (Part 1 in case of two part bid). Non submission of such documents will lead to consideration of their bid at par with other bidders. No benefits shall be applicable for the enquiry if any deficiency in the above required documents is not submitted before the price bid opening. If the tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal. Documents should be notarized or attested by a Gazette officer. This provision for MSE will apply subject to the condition that the participating MSE meets the tender requirements.

- vii. In case of any change in the MSE status of the bidder, it shall be the responsibility of the bidder to notify the change as a part of the bid document. If at a later date it comes to the knowledge of BHEL, that the change in the status has not been intimated by the bidder and the order is obtained under the premise of an MSE then BHEL would cancel the pending order against this tender and take necessary steps for suspension of the business dealing with the bidder as per the procurement policy of BHEL.
- viii. In case after the bid opening it is seen that no MSE has become L1, then depending on the nature of the item, if it is not possible to split the tendered items / quantities on account of reasons like customer contract requirements of supplying one make for a given project or technical reasons like tendered items being a system, tendered quantity being low etc., then BHEL would not counter offer the L1 prices even though there may be MSE bidders within the +15% band of L1.

Definitions of MSEs owned by SC/ST is under:

In case of proprietorship firm, proprietor must be SC/ST.

In case of partnership firm, the SC/ST partners must be holding at least 51% shares in the unit.

In case of private limited companies, at least 51% share must be held by SC/ST promoters.

The caste/Tribe/Community certificate issued by the following authorities in the prescribed form for SCs/STs can be considered.

Authorized to Issue SC/ST certificate:

- District Magistrate/Additional District Magistrate/Collector/Deputy commissioner/Additional Deputy Commissioner/Deputy collector/1st class stipendiary magistrate/Sub divisional Magistrate/Taluka Magistrate/Executive magistrate/Extra Assistant commissioner.
- Chief Presidency magistrate/Additional chief presidency magistrate/Presidency magistrate.
- Revenue Officer not below the rank of Thasildar.
- Sub-Divisional officer of the area where the individual and / or his family normally resides.

To avail the benefits of MSE under SC/ST category, the related documents as stated above should be submitted along with tender documents.