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## INVITATION TO TENDER

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Ref.: OS/22-23/7935/FH/13/014

Date: 18.11.2022

**Sub: Fabrication of Fired Heater against S.O. No. 7935 inside premises of BHEL-HPVP, Visakhapatnam**

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Dear Sir,

Sealed tenders are invited for the subject work in **two part bid** system from vendors who are experienced in fabrication of similar jobs subject to the following eligibility criteria:

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### 1. ELIGIBILITY CRITERIA:

- 1.1 The bidder should have an experience of having successfully completed similar works i.e., Fabrication of Structural items, Piping / Coils during the last 7 years ending 31<sup>st</sup> Oct. 2022.  
**Note:** Work Order and Work Completion Certificate / any other relevant document from the customer shall be enclosed in support of successful and satisfactory completion of the work.
  - 1.2 Bidders shall also have to enclose the documents of Registration of Firm/ Factory License/ Certificate of Incorporation, EPF, ESI, PAN, GSTIN, Udyog Aadhaar Memorandum/ Udyam Registration (if registered with MSME) etc.
  - 1.3 The works executed in the name of individual / firm of the tenderer will only be considered for eligibility criteria.
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### 2. LOCATION OF WORK SPOT:

- 2.1 The fabrication work is to be carried out inside the premises of BHEL – HPVP, Visakhapatnam.

### 3. VENDOR'S SCOPE OF WORK:

Fabrication of various equipments / items of **Fired Heater (Tag no. 412-H-1001)** which consists of Radiant Section, Radiant Arch, Radiant Floor, Convection Section Modules, Header Box Panels, Convection coils, Off-take Ducts, Cold Air Ducts, Hot air Ducts, Bypass Ducts, Flue Gas Ducts, Stack, Supporting structure, Stair Tower with Landings, Platforms, Staircase, Ladders, Handrails etc., as per the drawings, Specifications & standards, Painting Schedule, QAP, WPS etc., which includes the following activities but not limited to the same:

- 3.1 Collection of Raw materials & BOCs from HPVP stores and shifting of the same to site including unloading, handing over of finished structural items and loose items like fasteners, gaskets etc., to logistics dept. inside the plant and finished items / equipments at site including loading onto the trailers.
- 3.2 Fabrication of Radiant Shell including Rolling of Shell Plates, Fabrication of Supporting Columns, Stiffeners etc., and welding with Shell section as per drawings. Radiant shell section shall be dispatched to site in segments without refractory lining as per drawings and Modularization Philosophy.
- 3.3 Fabrication of Radiant Arch and Floor in segments as per drawings and Modularization Philosophy.
- 3.4 Trial Assembly of Radiant Section i.e., Radiant Section segments, Arch & Floor segments and dismantling of the same for dispatch to site.
- 3.5 Fabrication of Tapping Sub-assemblies, Sleeves, Nozzles, Sight doors, Tube pulling door, Pressure Relief Door, Explosion door, breeching access door, Peephole assembly, Instrument nozzles etc., required for Radiant section as per drawings at HPVP and will be dispatched to site in loose condition.
- 3.6 Fabrication of Convection Section in Modules as per drawings and handing over to Refractory Vendor which includes the following:
  - a) Fabrication of Convection casing along with supporting structure
  - b) Fabrication of End Tube Sheets (ETS) and assembly of ETS with Convection modules after refractory lining.
  - c) Installation of Intermediate Tube Sheets

- d) Fabrication, assembly & welding of instrument nozzles, Observation Doors, Breeching Access doors, Steam Lancing Doors etc. as per drawings.
  - e) Fit-up, assembly & welding of Convection coils (**MOC: P9**) Cross-over & Jump-over Coils including NDT like Radiography, PWHT / Local SR of joints wherever applicable as per approved QAP, insertion of coils in convection modules after refractory lining and dry out. Fit up, assembly and welding of In-situ joints, NDT etc., of convection coils as per drawings & QAP.
  - f) Fabrication of Convection Section Header Boxes and Trial assembly with Convection modules before refractory dry out and removal after dry out.
- 3.7 Fabrication of all Ducts of specifications (CS & LAS) as per relevant drawings viz., Off-take Duct, Cold Air Ducts, Hot Air Ducts, Bypass Ducts, Flue Gas Ducts including instrument nozzles, supporting structure etc. Trial Assembly of Ducts (system wise) and dismantling & handing over of the same to Refractory Vendor and loading of same for dispatch to site after refractory work.
  - 3.8 Fabrication of Heater & Stack supporting structure, Stair Tower with Landings, Platforms, Staircase, Ladders, Handrails etc., as per relevant drawings.
  - 3.9 Fabrication of Stack in sections including Base plate ring, Stiffeners, Platform support cleats, Helical Strakes, instrument nozzles etc., as per relevant drawings. Fabrication of Stack involves Rolling of Shell, assembly & welding of Externals, assembly and welding of Instrument nozzles etc. Trial Assembly of Stack sections and dismantling & handing over of the same to Refractory Vendor and loading of same for dispatch to site.
  - 3.10 Fabrication & Assembly of Breeching Door, Observation doors, Access doors, Pressure Relief doors, Tube pulling doors, Peep hole assemblies, SS Retainer plates wherever applicable as per relevant drawings, specifications and standards.
  - 3.11 Surface Preparation and application of total no. of coats of Paints as per Painting Schedule, EIL Specifications and Standards excluding Final Finish coat.  
**Supply of all applicable Paints as per Painting Schedule from approved manufacturers is in vendor's scope.** The Paint Manufacturer's certificates for the supply of paints shall be submitted to BHEL-HPVP before application.
  - 3.12 Compressor and other machinery / equipments required for Blasting and Painting are to be arranged by the vendor at their cost. Blast Cleaning and Painting as per Painting Schedule **is to be carried out in a closed enclosure. Painting is to be carried out by Painters qualified by HPVP.** All the necessary tests like checking of Surface preparation with Profile Gauge, Tape adhesion, Galvanizing DFT for applicable items, Elcho Meter for measuring DFT etc., required during the painting are to be carried out by the Vendor as per approved Painting procedure, QAP, Specifications and standards.
  - 3.13 **Hot Dip Galvanizing of Handrails** to 80 to 85 microns (approx. weight of 5 MT) as per latest revision of ISO 14713-2 / ISO 1461.
  - 3.14 NDT like DPT, MPT, Radiography, UT, PWHT etc., shall be carried out as per approved drawings, QAP, Specifications and standards. NDT agency deployed by Vendor has to be approved by BHEL-HPVP before deployment. Preheating & Post heating of coil joints to be carried out as per WPS.
  - 3.15 **Section bending of structural items wherever required.**
  - 3.16 100% PMI shall be carried out for weldments of Alloy steel and Stainless steel materials. All alloy steel materials shall be stenciled with PMI OK after satisfactory PMI check.
  - 3.17 Assistance for Refractory Lining works like handling / shifting of Modules / sections/ ducts with suitable cranes to specified locations, rotation to facilitate application of refractory and assistance for refractory Dry out like arranging the refractory lined equipments as per the approved Dry out plan & schedule as per requirement of Refractory / Dry out contractor.
  - 3.18 Suitable extra bracings / Stiffening as required shall be provided to prevent distortion / damage during handling, transportation and erection. Prior to Lifting and handling of Modules involving heavy lifts like Radiant section segments, Convection Modules, Stack, Ducts etc., Lifting arrangements and scheme for the same are to be submitted by the vendor for approval.
  - 3.19 Rectification of Raw materials such as straightening etc., if any and trial assembly after fabrication wherever required as per Drawings / QAP and rectification of defects, if any attributable to vendors, found after handing over to Logistics dept.

- 3.20 The fabricated items shall strictly conform to the dimensions and tolerances indicated in the drawings. It must be ensured that correct dimensions and deviations, if any, are recorded properly and is made available to BHEL officials or their authorized agencies.
- 3.21 Free issue materials should be collected within 3 days from the date of intimation by Outsourcing without failure.
- 3.22 In case of requirement of off-cut materials, the vendor shall have to arrange for Gas Cutting & manpower at BHEL Stores.
- 3.23 No extra rates are applicable for the additional joints to be made in Plates / Rolled sections / Pipes.
- 3.24 Submission of economic cutting plans for all plate materials, Pipes, Tubes and sections issued by BHEL and obtaining approval of competent authority is mandatory before taking up fabrication. Wherever fabrication is done without proper approved cutting plans, any loss of materials arising due to the same will be recovered as per BHEL recovery rates.
- 3.25 The work is to be executed as per the latest approved Drawings, Group Manufacturing Specification (GMS), Shipping List released for each PGMA, QAP, WPS, Standards & Specifications etc.
- 3.26 All indirect materials, consumables like electrodes, filler wires, gases, grinding wheels etc., required for fabrication are in the scope of the Vendor. The electrodes / filler wire shall be of BHEL approved makes only and the vendor shall submit the Batch Test Certificates to BHEL for verification before using on the job.
- 3.27 Identification of all items shall be hard stamped by encircling with paint and stenciled in a specific format with details of Project name, Customer No., Work Order No., PGMA No., DU No., Qty., Weight, and match marking etc., for identification and dispatch as per the instructions of the concerned. Completed job without proper identification will not be accepted by HPVP - Stores / Logistics.
- 3.28 Vendors shall have to return the excess / balance materials including off-cuts and total scrap available with them exclusive of process allowance & invisible wastage to HPVP Stores after material reconciliation but before submission of their final bill. In case the same are not returned by the vendors, Recovery shall be made as per BHEL Rates / MSTC rates plus applicable taxes, prevailing at the time of processing of the final bills.
- 3.29 Hydra crane of suitable capacity, Chains / Slings required for shifting, fabrication, loading & unloading etc., is in the scope of vendor. BHEL-HPVP will provide 75 MT crane as per the requirement where Hydra crane will not serve the purpose. One helper is to be deployed by vendor on daily basis for upkeep maintenance of 75 MT crane. **Non-deployment of Helper will attract deduction of Helper charges in RA Bills.**
- 3.30 Shifting of Structural items to HPVP shops for carrying out Section Bending, wherever required and shifting back to site after section bending.
- 3.31 Vendors should deploy Experienced & Qualified QC personnel for carrying out the inspection activities in coordination with BHEL QC inspector / TPIA. **Non-deployment will attract penalty at the rate decided by BHEL and same will be deducted in RA Bills.**
- 3.32 Vendors should deploy Qualified NDT personnel (Level III / Level II) at site for carrying out the NDT inspection activities in coordination with BHEL QC –NDT / TPIA. **Non-deployment will attract penalty at the rate decided by BHEL and same will be deducted in RA Bills.**
- 3.33 Vendors shall engage sufficient man power and resources for fabrication to meet HPVP delivery schedules and augmentation of manpower has to be done by Vendor as and when needed as per instructions of BHEL-HPVP to meet intermediate time lines. If the same is not done by vendor within the dates mutually discussed and agreed, BHEL will exercise the right to engage manpower at the risk and cost of the vendor.
- 3.34 Sufficient No. of Rollers & Idlers required for fabrication of Radiant section, Stack, Ducts etc., are to be arranged by the vendor. **Non-deployment in specified time will attract penalty at the rate decided by BHEL and same will be deducted in RA Bills.**
- 3.35 Welding is to be carried out by qualified welders only. Qualification of welders shall be carried out by the vendor at HPVP under supervision of BHEL / WT dept. at their own cost including all consumables. However, Test Coupons shall be provided by BHEL as free issue.
- 3.36 All the Scaffolding materials like Pipes, Clamps, Jallies etc., for temporary platform works required during the complete course of the fabrication are to be arranged by the Vendor. All the Temporary materials & Bed materials required for fabrication are to be arranged by the vendor at their cost.

- 3.37 Temporary shed for Painting: Temporary shed for Grit Blasting and painting is to be constructed by the Vendor at his own cost. Land required for the same will be provided inside the HPVP premises and development of the same construction of the shed to be done by the vendor. All Scaffolding materials like Pipes, Clamps, GI sheets etc., required for closed enclosure are to be arranged by Vendor. Painting of all the structural items, which are to be sent loose, to be done in this shed only. Transportation of the same from the fabrication yards to shed to be done by vendor.
- If the shed is not constructed by vendor within dates mutually discussed and agreed time, BHEL will exercise the right to execute the same at the risk and cost of the vendor.
- 3.38 Any modification work due to revision of the drawings during fabrication is to be carried out by the vendor without any additional cost.
- 3.39 Adequate facilities like welding equipments, baking ovens, holding ovens, Portable ovens, preheating coils with recording, handling facilities like felt slings, metal slings, D-shackles etc., and measuring instruments duly calibrated must be available with the vendor. All the above equipments must be under working condition and relevant documents for the same are to be made available for verification by BHEL-HPVP / TPI Officials or their authorized agents.
- 3.40 All the measuring instruments used for inspection and testing shall have valid calibration certificates from NABL Laboratory or traceable to national / international standards.
- 3.41 Loading of finished items onto the trailer and Handing over of the same to Logistics dept.
- 3.42 Gate passes for the entry of Manpower, Materials, Cranes, Trailers etc., inside the premises of BHEL-HPVP are to be taken care by the contractor.
- 3.43 Vendors shall abide by all the rules and statutory regulations in force from time to time as per the Factories Act. It is their responsibility to ensure the safety of their workmen and fulfilling the ESI, PF and other relevant statutory regulations.
- 3.44 Power will be provided at one point to the Vendor as Free Issue. Arrangement of Power Distribution Board with suitable capacity Switch Fuse unit as incomer, all outgoing with necessary safe trips like MCB, ELCB etc., as per the industrial safety norms and their installation, all outgoing cables from Distribution Board, termination at the distribution board, cabling for the distribution of Power & Working Area Lighting. Sufficient Area lighting at the work place shall be arranged by the vendor at their cost.
- 3.45 Though not mentioned specifically, any activity which is required for completion of the work is deemed to be included in the scope of work of bidders.

#### 4. **BHEL SCOPE:**

BHEL – HPVP shall provide the following as free issue:

- 4.1 Supply of Drawings, GMS, QAP, NDE Procedures, WPS, Painting Schedule etc.
- 4.2 Raw materials like Plates (full / off-cuts), Pipes / Tubes, Round Bars, Rolled Sections / Structural items etc., and BOCs like Pipe Fittings, Flanges, Elbows, Fasteners, Gaskets etc., as per GMS from HPVP stores.
- 4.3 Application of Refractory / Insulation lining of equipments / items as per requirement.
- 4.4 **Fabrication of Radiant Coils is in the scope of BHEL-HPVP.**
- 4.5 One 75 MT crane along with operator shall be provided by BHEL free of charge for fabrication where Hydra crane will not serve the purpose. **However, Riggers required for handling the job shall be provided by the vendor.** Diesel for operation of 75 MT crane shall be Free Issue by BHEL. One helper is to be deployed by vendor on daily basis for upkeep maintenance of 75 MT crane.
- 4.6 Area required for fabrication will be provided free of charge by BHEL. All other arrangements for site enabling including Jungle Clearance & Surface Levelling etc., if required and security for safe custody of free issue materials shall be done by the vendor only.
- 4.7 Power and Water shall be provided free of charge at one point but further distribution to the work location is to be carried out by the vendor. In case of power failure, the vendor shall have to make alternate arrangement for smooth functioning of the work without any extra cost to BHEL.

**5. INSPECTION:**

- 5.1 Inspection shall be carried out by M/s. BHEL-HPVP, Vizag / BHEL Authorized Inspection Agency / Customer as per approved QAP. Contractor shall have to offer for Stage wise and Final inspection as per approved QAP and obtain necessary stage wise & final clearances before proceeding for further operations.
- 5.2 Fabrication Vendor shall be solely responsible for preparation and submission of all Inspection Reports & documents duly certified by Inspection Authority for the finished items.
- 5.3 All the documentation related to inspection clearance of M/s. BHEL/ TPIA/ Customer, Generation of Inspection Reports, Preparation of Final Documents as per BHEL standard formats etc., are included in the scope of vendor and scanned copy as well as hard copy of the same is to be submitted to BHEL-QA.

**Note:**

QAP enclosed with the tender document is tentative only and may be subject to revision due to incorporation of comments of the approving authority. Hence, the approved QAP issued to the vendor after ordering shall only be followed for execution and inspection of the job.

**6. DELIVERY:**

Finished items along with inspection documents and all other certificates are to be handed over to HPVP-Logistics within **14 weeks from the date of issue of First consignment of free issue materials or 6 weeks from the date of issue of Last consignment of materials, whichever is later**. The delivery period includes the time involved in collection of all raw materials, cutting plan approval, handing over of finished items at HPVP-Logistics.

**Note:**

- a) In case the delivery period offered by the vendor is more than the tender delivery, Price quoted by the bidder shall be loaded for additional period @1/2 % per week or part thereof for the purpose of evaluation of Bidder Status.
- b) Vendor has to submit a detailed micro schedule immediately after the award of the job along with the resource deployment plan of machineries and manpower required for completion of the job to meet the Project delivery schedule. The schedule will be reviewed and approved by our projects and execution team. Periodic Monitoring of progress of fabrication activities will be done based on this mutually agreed and approved schedule and any shortfalls during the execution has to be made up by vendor with a catch up plan failing which penal action as deemed fit will be taken by BHEL.
- c) For intermediate operations of Refractory vendor wherever applicable, the time period from the date of handing over to the date of taking over will be excluded from the delivery period for the purpose of computation of LD.

**7. SITE MOBILISATION:**

Successful bidders shall have to complete site mobilization within 7 days from the date of receipt of order or from the date of intimation for the same by BHEL whichever is later.

**8. PRICE:**

- 8.1 The price shall be quoted **strictly** as per the Schedule of Rates enclosed at Annexure – I for the detailed scope of work and the quoted price shall be inclusive of all applicable taxes & duties **except GST**.
- 8.2 The prices shall be fixed & firm without any escalation during the entire period of contract and till completion of the work.
- 8.3 GST shall be reimbursable to the vendor as detailed in Clause - 9 and as per Annexure – GST.
- 8.4 Income tax will be deducted at applicable rates from RA & Final bills.

**9. GOODS & SERVICES TAX (GST):**

- 9.1 Bidders shall make a note of the following points of GST before submission of their offer:
  - a) Vendors shall have to mention their GSTIN no. (15 Digits) in their Technical Bid. If any specific exemption is available, a declaration with due supporting documents need to be furnished for considering the offer.
  - b) Semi-finished goods are to be delivered by the Vendors in BHEL, HPVP premises within a maximum period of one year from the date of issue of the material, failing which the whole transaction will be considered as Supply & Sale and GST is required to be paid along with interest (calculated @ SBI Base Rate + 6%) along with penalty, if any, from the date of Challan on the whole value of materials. Hence vendors shall have to ensure that materials issued to them are returned within 365 days.

- c) After fabrication, the vendors shall have to deliver the Semi - finished Goods by fulfilling the following formalities:
- i) GST invoice should be raised by the vendors by paying GST on job work charges at applicable rates and by incorporating the HPVP GSTIN no. in the invoice for availing the reimbursement of GST from HPVP.
- ii) The vendor shall also have to enter in their GST Return -1 (GSTR-1) the details of invoice raised for payment of GST so as to enable HPVP to avail input credit.

#### **10. REVERSE AUCTION:**

- 10.1 BHEL shall be resorting to Reverse Auction (RA) for this tender. RA shall be conducted among the techno-commercially qualified bidders. Business Rules for Reverse Auction are given at Annexure – V and Guidelines for Reverse Auction are available on our website, [www.bhel.com](http://www.bhel.com) → supplier registration → Guidelines for Reverse Auction 2021, before submission of their offer.
- 10.2 Sealed envelope / Electronic Price bids of all the techno-commercially qualified bidders shall be opened and the same shall be considered as initial bids of the bidders in RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope / Electronic price bid along with applicable loading, if any, shall be considered for ranking.
- 10.3 BHEL will inform bidders the details of service provider who will provide business rules, all necessary training and assistance before commencement of online bidding. The bidders participating in the Reverse Auction shall have to necessarily submit '**Process Compliance Form**' (PCF) to the designated Service Provider.
- 10.4 Bidders are advised to read the 'Business Rules' (Annexure – V) indicating details of RA event carefully, before reverse auction event.

#### **11. VALIDITY OF OFFER:**

The offer shall be valid for a period of **3 months** from the date of Reverse Auction.

- 12. Other Terms & Conditions, whichever applicable, shall be as per Annexure – III enclosed.

#### **13. RISK PURCHASE:**

In case the contractor fails to execute the work within the scheduled time or due to any other reasons, BHEL - HPVP reserves the right to get the same completed through some other party at the risk & cost of the contractor and any additional expenditure incurred due to the same shall be charged to the contractor.

#### **14. GENERAL:**

- 14.1 The bidders shall study the Tender documents, Drawings, Quality Documents and all other relevant documents in detail for understanding the scope of work and the processes involved before submission of offer. Bidders shall get clarifications, if any, from concerned officials on the scope of work, clarifications related to welding or any other details of the tender document, over phone between 09:00 AM and 04:00 PM on any working day or through e-mail.
- 14.2 **Conditional / Partial Price Bids** and any other deviations to the tender terms & conditions are not acceptable and BHEL reserves the right to reject such offers without further correspondence. Bidders shall confirm their acceptance to all the terms & conditions of the tender enquiry in the Techno-commercial Bids and any deviations mentioned in the Price Bids shall not be considered for evaluation.
- 14.3 BHEL reserves the right to modify or cancel the tender enquiry at any stage without assigning any reasons thereof.
- 14.4 The General Terms & Conditions, if any, contradicting with the specific terms & conditions given in the tender, then specific terms & conditions shall only be considered.

- 15. The following documents shall form part of the tender enquiry:

- i) Schedule of Rates : Annexure – I
- ii) List of Reference Drawings/ Documents : Annexure – II
- iii) General Terms & Conditions : Annexure – III
- iv) Acceptance to tender terms & conditions : Annexure – IV
- v) Business Rules for Reverse Auction : Annexure – V
- vi) GST Compliance for Indigenous Suppliers : Annexure – GST
- vii) QAP, Drawings, Painting Schedule etc.

**16. TENDER SUBMISSION (Through E - Mail):**

- 16.1 Techno-commercial bids along with the tender document duly signed & stamped by the bidder on all pages and a covering letter on Company's Letter Head addressed to DGM (Outsourcing), BHEL-HPVP, Visakhapatnam shall be sent through an e-mail to the e-mail ID [technicalbid-hpvp@bhel.in](mailto:technicalbid-hpvp@bhel.in).
- 16.2 Price bid (i.e., Annexure – I) shall also be sent separately through e-mail to another e-mail ID [pricebid-hpvp@bhel.in](mailto:pricebid-hpvp@bhel.in).
- 16.3 Offers completed in all respects along with all the supporting documents shall be sent to the above e-mails only latest by **14.00 Hrs. on 28.11.2022** duly mentioning the Name of Work, Tender Ref. No. & Date and Technical Bid / Price Bid in the subject of the e-mail.

**Note:** Don't mark CC and BCC while submitting your offer as the system is designed to reject such mails having more than one recipient. Max. file size of the attachment shall be 20 MB only. In case the file size is more, bidder can submit their offer through multiple mails within the due date and time.

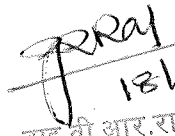
16.4 TENDERS RECEIVED AFTER THE DUE DATE & TIME ARE NOT ACCEPTABLE.

16.5 OFFERS SENT IN ANY OTHER FORM WILL BE TREATED AS INVALID AND WILL BE SUMMARILY REJECTED.

**17. TENDER OPENING:**

- 17.1 Techno-commercial Bids will be opened at **14.00 Hrs on 28.11.2022**. The bidders may depute their representatives at the time of opening of Technical bids.
- 17.2 After evaluation of the Techno-commercial Bids, intimation regarding date & procedure of conducting Reverse Auction shall be given by the service provider to all eligible Techno-commercially qualified bidders through an e-mail in advance at an appropriate time.

For Bharat Heavy Electricals Limited,

  
18/11/22  
वाइ.वी.आर.राव/Y.V.R. RAO  
उप महा प्रबन्धक (ओ एस)/Dy.GM (OS)  
बीएचईएल, एचपीवीपी/BHEL-HPVP,  
विशाखपट्टणम/VISAKHAPATNAM-530 012

**SCHEDULE OF RATES**

Ref : OS/22-23/7935/FH/13/014

Date : 18.11.2022

Sub : Fabrication of Fired Heater against S.O. No. 7935 inside premises of BHEL-HPVP, Visakhapatnam

Sl. No	Item Description	Qty.	Unit	Unit Rate (Rs.)	Total Amount (Rs.)
	Complete Fabrication, Assembly, Welding, NDT, Trial Assembly of various items of Fired Heater against SO no. 7935 inside premises of BHEL-HPVP as per the drawings, QAP, WPS, Specifications and standards as per the detailed scope of work specified in the tender. (All consumables & Paints are in the scope of the vendor)				
<b>1</b>	<b>FABRICATION OF RADIANT SECTION, CONVECTION SECTION WITH COILS &amp; STACK</b>				
1.1	Radiant Shell & Supporting Structure, Radiant Arch and Radiant Floor in segments including sub-assemblies like Sight / Observation doors, Access Doors, Breeching Doors, Pressure Relief Doors / Explosion Door, Tube Pulling Door, Peep Hole Assembly, instrument nozzles etc. (excl. Refractory and coils)	45.5	MT		
1.2	Convection Section in modules form including supporting Structure, Access door, Breeching Door, instrument nozzles, Header Boxes, Steam Lancing Doors, Intermediate Tube Sheets, End Tube Sheets etc. (excl. Refractory and coils)	28.5	MT		
1.3	Stack including stiffeners, Lugs, Access Doors, instrument nozzles, strakes, Rain Hood etc. (excl. Refractory)	45	MT		
1.4	Convection Coils including Cross overs & Jump overs, Loose fabricated spools and Coil insertion in Convection Modules (MOC: LAS P9)	1600	Inch Dia		
<b>2</b>	<b>FABRICATION OF DUCTS AND STRUCTURALS</b>				
2.1	Cold Air Ducts, Bypass Ducts, Flue Gas Ducts, <b>Hot Air Ducts (MOC: LAS - 18 MT)</b> etc., including stiffeners, instrument nozzles etc. (excl. Refractory)	70	MT		
2.2	Structurals like Stair Tower with Landings, Platforms, Staircases, Ladders, Handrails, Supporting structure etc.	92	MT		
2.3	Hot Dip Galvanising of Handrails	5	MT		
	<b>TOTAL</b>				
<b>Total Amount in words:</b>					

**Notes :**

- 1) **L1 status shall be evaluated based on the total quoted value.**
- 2) The quantity and weights indicated above are tentative and may slightly vary on both sides depending upon the requirement at the time of ordering / execution. However, payment shall be made for the actual quantities & weights only.
- 3) The bidders are advised to go through all the drawings & documents before quoting the tender.
- 4) The evaluation currency for this tender shall be **INR**.
- 5) The quoted price shall be inclusive of all applicable taxes & duties **except GST**. GST shall be reimbursable to the vendor as detailed in Clause – 9. Income tax shall be deducted at applicable rates from the vendor's bills.
- 6) The prices shall be fixed & firm without any escalation during the entire period of contract and till completion of the work.
- 7) Tenderer should quote the amount in figures & words. It may be noted that corrections, overwriting etc. are not allowed. If there is a discrepancy between amount in figures & words, the amount in words shall prevail unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail. If there is an error in the total corresponding to the addition or subtraction of sub-totals, the sub-totals shall prevail and total shall be corrected accordingly. In case of mismatch between rate and amount in figures, rate in figures shall be taken into consideration for further evaluation and processing.

**Signature of the Bidder with Stamp**



Ref : OS/22-23/7935/FH/13/014

Date : 18.11.2022

Sub : Fabrication of Fired Heater against S.O. No. 7935 inside premises of BHEL-HPVP, Visakhapatnam

**LIST OF REFERENCE DRAWINGS / DOCUMENTS**

Sl. No.	S.O. No.	Description of Work	Description of Drawings / Documents	Drawing / Document No.	Rev. No.	No. of Sheets
1	7935	Fab. of Fired Heater	General Arrangement Elevation & Plans	AGFIS-116-DW-1001 (Sht. 1 of 4 to 4 of 4)	1	4
2			General Arrangement - APH Ducting Plans	AGFIS-116-DW-1002 (Sht. 1 of 2 to 2 of 2)	1	2
3			Details of Convection Coils	AGFIS-116-DW-1005 (Sht. 1 of 2 to 2 of 2)	1	2
4			Details of Cross-Overs	AGFIS-116-DW-1006 (Sht. 1 of 3 to 3 of 3)	1	3
5			QAP	CQP 2534 Dated 12.11.2022	0	8
6			Painting Schedule	7935-PAINT-SCH-001 (Sht. 1 of 2 & 2 of 2)	0	2

**Note :** Documents indicated above are purely tentative and may be subject to revisions due to incorporation of comments of the approving authority. Hence, the approved drawings and documents issued to the vendor after ordering shall only be followed for execution & inspection of the job.

**GENERAL TERMS & CONDITIONS****1. TECHNICAL DELIVERY CONDITIONS:**

The work should conform to the technical data given in our drawings, GMS, Shipping List Specifications, QAP, WPS etc.

**2. PARTY'S SCOPE:**

The scope of the party shall be as follows: -

- a) All welding equipments, baking oven, tools, jigs and fixtures, measuring instruments duly calibrated, handling facilities, testing facilities etc.
- b) All materials other than those mentioned under "Free Issue Materials", which are required for completion of the work.
- c) All consumables such as electrodes, gases, grinding wheels etc.

**Note: Electrodes of specification mentioned in the drawings / WPS and of BHEL approved brands only shall be used and MTCs of the same shall be submitted to BHEL for verification before use.**

**3. REVISION OF DRAWINGS:**

There may be minor changes in the drawings during execution. In such a case, party should accommodate the same without any extra claim.

**4. WELDING QUALIFICATION:** Qualification of required number of Welders is party's responsibility at their cost.**5. X-RAY:**

All welding shall be of X-ray quality where specified on drawings. Inspection would specify the quantum of X-ray based on drawings / code requirement. Party should strictly follow the WPS and QAP issued by BHEL during welding. Getting the welds radiographed and getting them cleared by inspection is the responsibility of the party.

**6. RECTIFICATIONS / REJECTIONS:**

Any rectification due to defective work, if required, shall be done by the party free of charge with a suitable technology approved before hand by BHEL in writing. The cost of material, if any used for rectification work / rejection work, will be estimated by BHEL and the same shall be debited to party's account. In case any rectification / rework is to be carried out due to defective material supplied by BHEL, the replacement material and consumables will be supplied by BHEL free of Cost.

**7. SECURITY DEPOSIT:**

Vendors shall have to submit a Bank Guarantee for **10%** of the order value in case of **HPVP ADM site** or **25%** of the material cost in case of Vendor works towards Security Deposit and safe custody of free issue materials within 15 days from the date of intimation by Outsourcing dept. The BG shall be valid for the contract period with a claim period of 12 months. This Bank Guarantee shall be released to the contractor after completion of work and on acceptance of the same by BHEL / Owner

Bidder agrees to submit performance security required for execution of the contract within the time period mentioned above. In case of delay in submission of performance security, enhanced performance security which would include interest (SBI rate + 6%) for the delayed period, shall be submitted by the bidder. Further, if performance security is not submitted till such time the first bill becomes due, the amount of performance security due shall be recovered as per terms defined in NIT/contract, from the bills along with due interest.

**8. PERFORMANCE BANK GUARANTEE:**

Vendors shall have to submit Performance Bank Guarantee (claim period of 12 months) for 10% of the order value covering for the defects liability period. If PBG is not submitted, 10% of the order value shall be deducted towards PBG from the final bill and shall be refundable after performance guarantee period, if no defects are found during this period.

**9. RAW MATERIALS ISSUE:**

Raw materials shall be issued with appropriate processing allowance and invisible wastage over the theoretical requirement of raw materials (**Plates, Sheets, Sections and Pipes**).

**10. TRANSFER / RETURN OF LEFT OVER MATERIALS:**

Party should maintain proper records for receipt & use of all free issue materials. The left over materials & scrap as per the material accounting statement shall be returned to HPVP stores along with finished job. Material Transfer Vouchers (MTV) from one order to another or from one vendor to another and Material Return Vouchers should be submitted immediately after transfer / return. The material reconciliation statement shall be submitted by the contractor after verification and certification by BHEL along with the final bill **within 30 days from the date of completion of work**. Otherwise, recovery for the balance materials shall be made from any of their pending bills without further intimation.

**11. MATERIAL RECONCILIATION:**

Orders issued to the vendors have to be completed in all respects including Material Accounting within a maximum of **180 days** from the **date of issue of the first material** from BHEL - HPVP stores.

**Maximum of 0.5 %** on the requirement of materials (**Plates, Sections and Pipes**) is admitted towards **process allowance and invisible wastage**.

Scrap quantity is permissible up to a **maximum of 1% on Structural (Beams, Channels, Angles, Rods, Pipes etc.), 2% on Sheets, 3% for Plates** on the theoretical requirement of materials.

**If wastage and scrap is beyond the above limits**, it should be fully justified with cutting diagrams etc. which are to be approved in advance by BHEL. **Otherwise, the cost of raw materials beyond approved limits will be recovered from the contractor as per BHEL recovery rates including applicable taxes & duties.**

Material reconciliation including return of balance materials, off-cuts is to be completed within 20 days from the date of completion of the order. The material reconciliation statement shall be submitted by the contractor after verification and certification by BHEL-HPVP along with the final bill **within 30 days from the date of completion of work**. Otherwise, recovery for the balance materials shall be made from any of their pending bills without further intimation,

Repeated occurrence of inordinate delays in returning and settling the material accounting will entail BHEL the right to terminate the contract forthwith or impose a temporary suspension on further loading at the discretion of BHEL.

**12. SCRAP & OFF-CUT NORMS:**

Sl. No.	Description	Scrap Size (in mm)	Off-Cut (in MM)
1.	CS/AS Sheets & Plates	Below 500 × 250	500 × 250 & above
2.	Rolled sections Rod, angles etc. (other than -tubes, pipes)	Below 1000	1000 & above
3.	Tubes & Pipes	Below 500	500 & above
4.	Universal column	Below 1000	1000 & Above
5.	SS Sheets & Plates	Below 500 × 250	500 × 250 & above
6.	SS Structural, Rods, Tubes, Pipes	Below 250	250 & above
7.	Non – ferrous: sheets & plates, rods & tubes	Below 500 × 250 (S & PL), Below 250 (Rods & Tubes)	500 × 250 & above, 250 & above
8.	Big size Scrap	(2500 & above) × (150 to 249)	-

**13. INSPECTION:**

Party shall contact our Quality Control Dept. for stages of inspection before commencement of job and should strictly follow the stages of inspection as per QAP.

**14. WORKMANSHIP GUARANTEE:**

The vendors should give workmanship guarantee for fabricated items for a period of 18 months from the date of last delivery of the order. Any defects due to incomplete work, faulty workmanship found in the fabricated items after delivery during the defects liability period shall be rectified / replaced by the vendor free of cost. Otherwise, the expenditure incurred towards the same will be recovered from the pending bills of vendors.

**15. WORK PROGRESS:**

The fabricator shall furnish a weekly report on the progress of work along with the status of availability of free issue materials and requirement of further materials, if any.

Outsourcing dept. personnel will visit vendor's works from time to time to assess and review the work progress. Free access shall be provided to BHEL or its inspection agency at all reasonable times of the day / night.

In case the progress is not satisfactory or supplies are delayed abnormally beyond the contractual delivery date, BHEL-HPVP, Visakhapatnam reserves the right to cancel the order in part or full or get the balance job in as is where is condition completed elsewhere by another agency at the risk and cost of Fabricator. The value of the work carried out by the party will be assessed by BHEL and the same shall be final. No compensation will be given to the fabricator in case of cancellation of order or diversion of balance job even if the jobs have been processed partly.

**16. DELIVERY:**

Finished items should be handed over to BHEL-HPVP on party's delivery challans along with Job completion certificate / Final Inspection Report from inspection agency / HPVP-QC department.

**17. PENALTY:**

If delivery exceeds the stipulated delivery schedule, penalty 1/2 % of the total value of order per week or part there of subject to a maximum of 10% on the total value of the order will be levied. However, time taken for the following will not be considered as delay on the part of the Sub-Contractor.

- 1) Intermediate operations, if any, carried out by BHEL.
- 2) Waiting time for BHEL / Third party Inspection beyond a normal time of 3 days.

**18. PAYMENT TERMS:**

Payment shall be made against RA Bills within 45 days for MSE (Micro & Small Enterprise), 60 days for Medium Enterprise and 90 days for non-MSEs from the date of submission of Bill.

90% payment will be made after handing over of the finished equipments along with all inspection documents to HPVP shops / Logistics dept. / ADM site / Lova Garden site, duly inspected & cleared by Inspection authority. Balance 10% payment shall be made along with the Final Bill against completion of total order in all respects including documentation.

Vendors shall have to submit the bills in the formats specified by HPVP-Outsourcing and the bills submitted in the specified format along with necessary supporting documents are only admitted for processing. The following documents shall be submitted along with the Final Bill: -

1. No Claim Certificate from the contractor
2. No Dues Certificate from BHEL
3. Work Completion Certificate from BHEL
4. Material Reconciliation Statement submitted by the Contractor and certified by concerned authority of BHEL (if applicable)
5. Workmanship Guarantee certificate from the contractor

**19. SECRECY:**

All the documents of BHEL inclusive of Drawings, GMS and Standards made available to the fabricator 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 shall be returned to BHEL on demand after completion of the job. This secrecy clause is binding on the employees of the fabricators also. Violation of the same may lead to suspension of business with the vendor and necessary legal action.

**20. SUB-LETTING:**

In general, sub-letting of jobs will not be permitted. But in special circumstances, this may be allowed. In such case, the party should obtain written approval from BHEL-HPVP, Visakhapatnam before sub-letting.

**21. FACTORY RULES AND REGULATIONS:**

Party shall abide by all the rules and statutory regulations in force from time to time as per factories act. It shall be party's responsibility to ensure the safety of their workmen and fulfilling the ESI, PF and other relevant statutory regulations.

**22. FACTORY RULES AND REGULATIONS:**

Party shall abide by all the rules and statutory regulations in force from time to time as per factories act. It shall be party's responsibility to ensure the safety of their workmen and fulfilling the ESI, PF and other relevant statutory regulations.

**23. SAFETY:**

- a) Contractor shall adhere to safe construction practices, guard against hazardous & unsafe working conditions and shall comply with the safety rules of BHEL and local authorities. He shall maintain First Aid facilities for all his employees and labour. Contractor's responsibility includes supply of welder kit, all safety items such as safety belts, white and colour glasses, goggles, safety helmets, safety shoes etc.
- b) *Contractor and his employees shall follow all fire & safety, security regulations of BHEL.*

**24. HOUSE KEEPING:**

During execution of work, the contractor at all times keep the working place and storage area clean and free from accumulation of waste materials, rubbish etc.,

**25. ACCIDENT / DAMAGE / CONDUCT ETC.:**

Contractor will be held responsible for any disorderly conduct / misconduct, indiscipline, theft, smoking etc., on the part of his men. He will ensure summarily eviction of such men from his premises failing which BHEL would remove them from the factory on his responsibility. Any damage to and or loss of equipment, machinery, building etc., to BHEL or BHEL employees, visitors or other contractors resulting from his own or any of his men's negligence shall be liable to be made good by him. Contractor shall be solely responsible for any accident in which you or your men or your equipment may be involved during the execution of contract on account of any reason what so ever.

**26. TERMINATION OF CONTRACT:**

In the event of any failure on the part of the contractor, BHEL reserves the right to terminate the contract by giving a notice of 2 weeks for any of the following lapses and contractual violations: -

- a) Failure to make labour payments in time as per the rules
- b) Failure to progress the job according to the agreed schedule
- c) Failure to mobilize adequate man power, tools & tackles and consumables in time
- d) Failure to adhere to Quality Standards of BHEL
- e) Refused to co-operate with other agencies working in the same area
- f) Failure to resolve labour disputes like strikes etc., within 7 days of occurrence
- g) Failure to comply with statutory regulations applicable at BHEL

BHEL shall also be free to intervene and take necessary remedial measures. All costs incurred with interest and overheads shall be recovered from contractor by such foreclosing or off-loading any part of the contract work.

**27. DISPUTES:**

Head of BHEL- HPVP Unit will be the final authority for any disputes arising out of this contract. The disputes / arbitration / settlement of contractual or legal issues shall be under the Jurisdiction of Visakhapatnam Court.

**28.** For this procurement, Public Procurement (Preference to Make in India), Order 2017 dated 15.06.2017 & 28.05.2018 and subsequent Orders issued by the respective Nodal Ministry shall be applicable even if issued after issue of this NIT but before finalization of Contract / PO / WO against this NIT.

In the event of any Nodal Ministry prescribing higher or lower percentage of purchase preference and / or local content in respect of this procurement, same shall be applicable.

**29.** The Bidder declares that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s). This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

In case, the Bidder is found having indulged in above activities, suitable action shall be taken by BHEL as per extant policies/ guidelines.

**Acceptance to Tender Terms & Conditions**

I / We hereby confirm that the Tender documents, Drawings, Quality documents etc., have been studied in detail and we have fully understood the scope of work.

I / We accept to all the Terms and Conditions of the Tender Enquiry and the prices quoted are in accordance with the same.

I / We give our acceptance to participate in Reverse Auction for this tender.

Tender documents duly signed on all the pages by the Owner / authorized representative of the bidder are attached herewith.

**Signature of the bidder with stamp**

**BUSINESS RULES FOR REVERSE AUCTION (RA)**

This has reference to tender no. **OS/22-23/7935/FH/13/014, dated 18.11.2022**. BHEL shall finalise the Rates for **Fabrication of Fired Heater against S.O. No. 7935 inside premises of BHEL-HPVP, Visakhapatnam** through Reverse Auction mode. BHEL has made arrangement with an authorized Service provider (details will be shared before reverse auction) for conducting RA. Bidders should go through the instructions given below and submit acceptance of the same.

The technical & commercial terms are as per (a) BHEL Tender Enquiry No. **OS/22-23/7935/FH/13/014, dated 18.11.2022**, (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) Price bids of all techno-commercially qualified bidders shall be opened.
- ii) **Reverse Auction:** The 'bid decrement' will be decided by BHEL.
- iii) The lowest bidder in sealed envelope price 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. However, no bidder shall be allowed to lower its bid below the current L1 by more than 5 decrements at one go.
- v) After the completion of the reverse auction, the Closing Price shall be available for further processing.
- vi) Wherever the evaluation is done on total cost basis, after Reverse Auction, prices of individual line items shall be reduced on pro-rata basis.

**2. Schedule for reverse auction:** The Reverse Auction schedule will be intimated to the techno-commercially qualified bidders at a later stage.**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 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, taxes, duties, freight and insurance as specified in tender document 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 mentioned in the tender.

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 90 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 Reverse Auction will be considered as the bidder's final offer to execute the work.
8. Unique user IDs shall be used by bidders during bidding process. 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 separately intimated to respective 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 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. 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.

In order to ward-off contingent situation of connectivity failure 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 safe guard 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, quoted during the 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](http://www.bhel.com)).
17. Bidders' bid will be taken as an offer to execute the work/ supplies the item as per enquiry no. **OS/22-23/7935/FH/13/014, dated 18.11.2022**. 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](http://www.bhel.com)).
18. Bidders shall be able to view the following on their screen along with the necessary fields during 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](http://www.bhel.com)), shall be initiated by BHEL.

**Signature of the Bidder with Stamp**

**PROCEDURE FOR GST PAYMENT**

1. In Response to Tenders for Indigenous supplier will be entertained only if the vendor has a valid GSTIN which should be clearly mentioned in the offer. If any specific exemption is available, a declaration with due supporting documents need to be furnished for considering the offer.
2. Supplier shall mention their GSTIN 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. All invoices shall bear the HSN Code for each item separately (Harmonized System of Nomenclature)/ SAC code (Services Accounting Code).
4. 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.
5. All documents like Test Certificate, LR copy, Guarantee/Warranty certificate, work completion certificate, any other document mentioned in PO, shall be sent along with the vehicle/consignment where ever applicable. 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.
6. 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.
7. 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 for the delayed period i.e. from the month of receipt till the month tax credit is availed, from the running bills.
8. 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.
9. This is to inform that GST portion of invoice, shall be released only upon Vendor declaring such invoice in his GSTR-1 and receipt of goods and Tax invoice by BHEL and Confirmation of payment of GST thereon by vendor on GSTN portal. Alternatively, BG of appropriate value may be obtained from vendor which shall be valid At least one month after the confirmation of date of payment of GST by vendor on GSTN portal and receipt of Tax invoice and receipt of goods, whichever is later. Above is subject to receipt of goods/service and tax invoice thereof along with vendor declaring invoice in his return and paying GST within timeline prescribed for availing ITC by BHEL.
10. That in case vendor delays Declaring such invoice in his return and GST credit availed by BHEL is denied or reversed subsequently as per GST law, GST amount paid by BHEL towards such ITC reversal as per GST law shall be recoverable from vendor/contractor along with interest levied/ leviable on BHEL.

***Note: The above will be followed strictly for processing vendor payments to ensure GST Compliance.***

**Signature of the bidder with stamp**



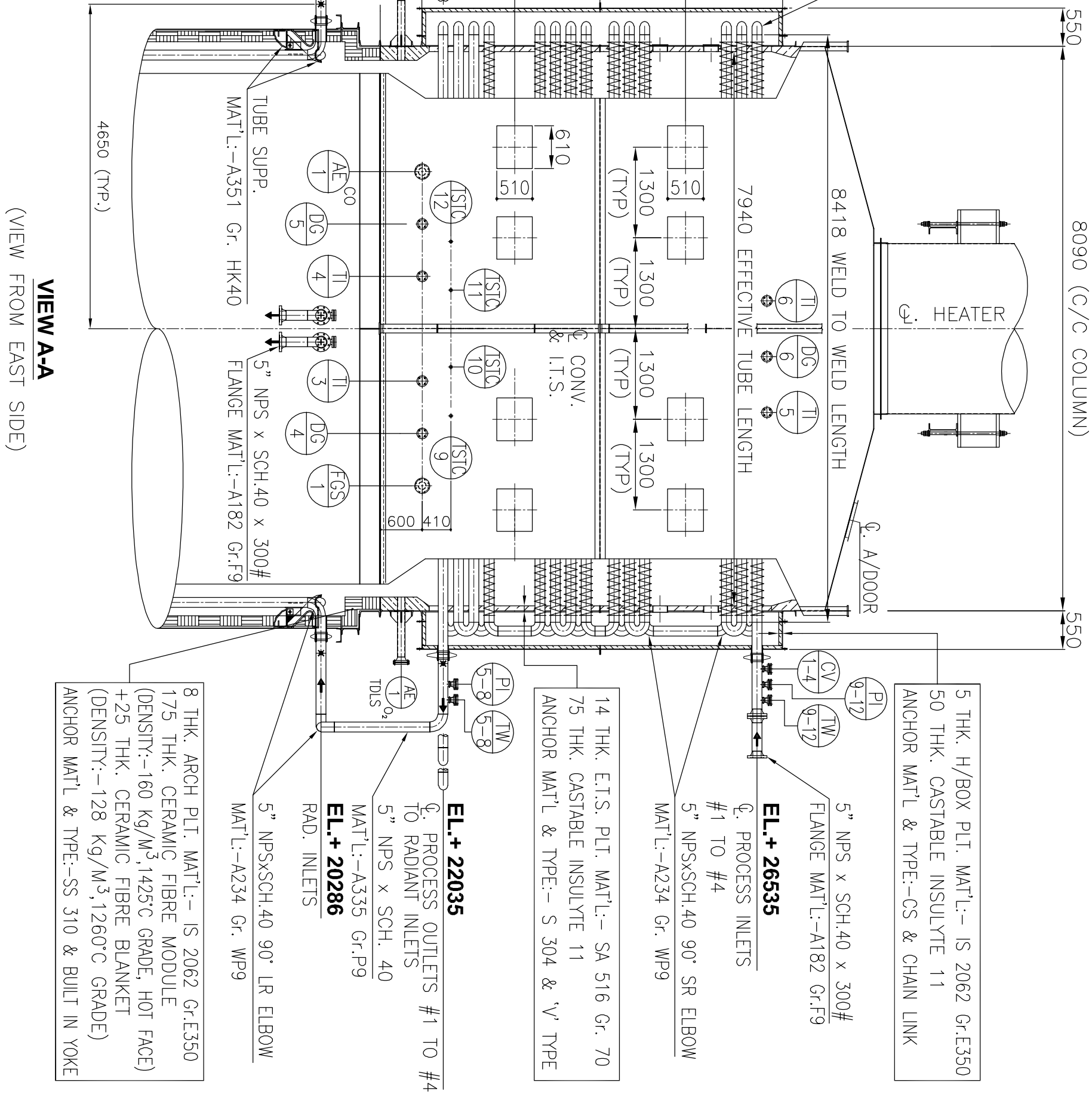
REFERENCE DRAWINGS

DRAWING NO.	TITLE
AGFS-116-DW-1000	FOUNDATION LOADING PLAN
AGFS-116-DW-1002	GA APH LAYOUT
AGFS-116-DW-1003	EQUIPMENT LAYOUT

GENERAL NOTES:-

- ALL DIMENSIONS & ELEVATIONS ARE IN MM UNLESS OTHERWISE NOTED.
- ELEVATIONS GIVEN ARE RELEVANT TO REFERENCE GRADE EL.+0000.
- ALL MATERIALS SHALL BE CARBON STEEL IS-2062 Gr. E350 EXCEPT WHERE NOTED OTHERWISE.
- ALL FLANGE HOLES SHALL STRADDLE VERTICAL & HORIZONTAL CENTER LINES.
- ALL EXPANSION GAPS INCLUDING AROUND BURNERS TO BE "PACKED" WITH CERAMIC FIBRE BLANKET OF DENSITY 128 KG/M<sup>3</sup> 1260°C GRADE.
- ALL CONNECTIONS SHALL BE WELDED TO DEVELOP FULL STRENGTH OF THE MEMBERS CONNECTED EXCEPT CONNECTIONS THAT ARE SPECIFICALLY GIVEN AS BOLTED.
- DETAILS NOT ILLUSTRATED MAY BE SUITABLY DEVELOPED BY CONTRACTOR.
- ALL STRUCTURAL MEMBERS SHALL BE COPED TO SUIT THE CONNECTING MEMBERS PROFILE.
- ALL GAPS IN INSULATION MARKED "PACK" TO BE PACKED WITH CERAMIC FIBRE.
- ALL EXTERNAL SURFACES SHALL BE BLAST CLEANED TO SA 2<sub>1/2</sub>.
- PAINING:-
  - EXTERNAL SURFACES FOR HEATER AND APH UNINSULATED DUCT:
  - a) PRIMER COAT : 65-75 MICRONS DFT INORGANIC ZINC SILICATE PRIMER.
  - b) INTERMEDIATE COAT : 100-150 MICRONS DFT HB EPOXY MIO.
  - c) FINISH COAT : 40-50 MICRONS DFT TWO PACK ACRYLIC POLY-URETHANE (PU)
- EXTERNAL SURFACES FOR HOT AIR DUCT:
- a) FINISH COAT : 2 COAT OF 15-20 MICRONS DFT HR ALUMINIUM/SILOICONE ALUMINIUM.
- b) HEATER STRUCTURE : STEEL GREY
- c) FINISH COLOR: (i) HEATER/DUCT CASING : HEAT RESISTING ALUMINIUM

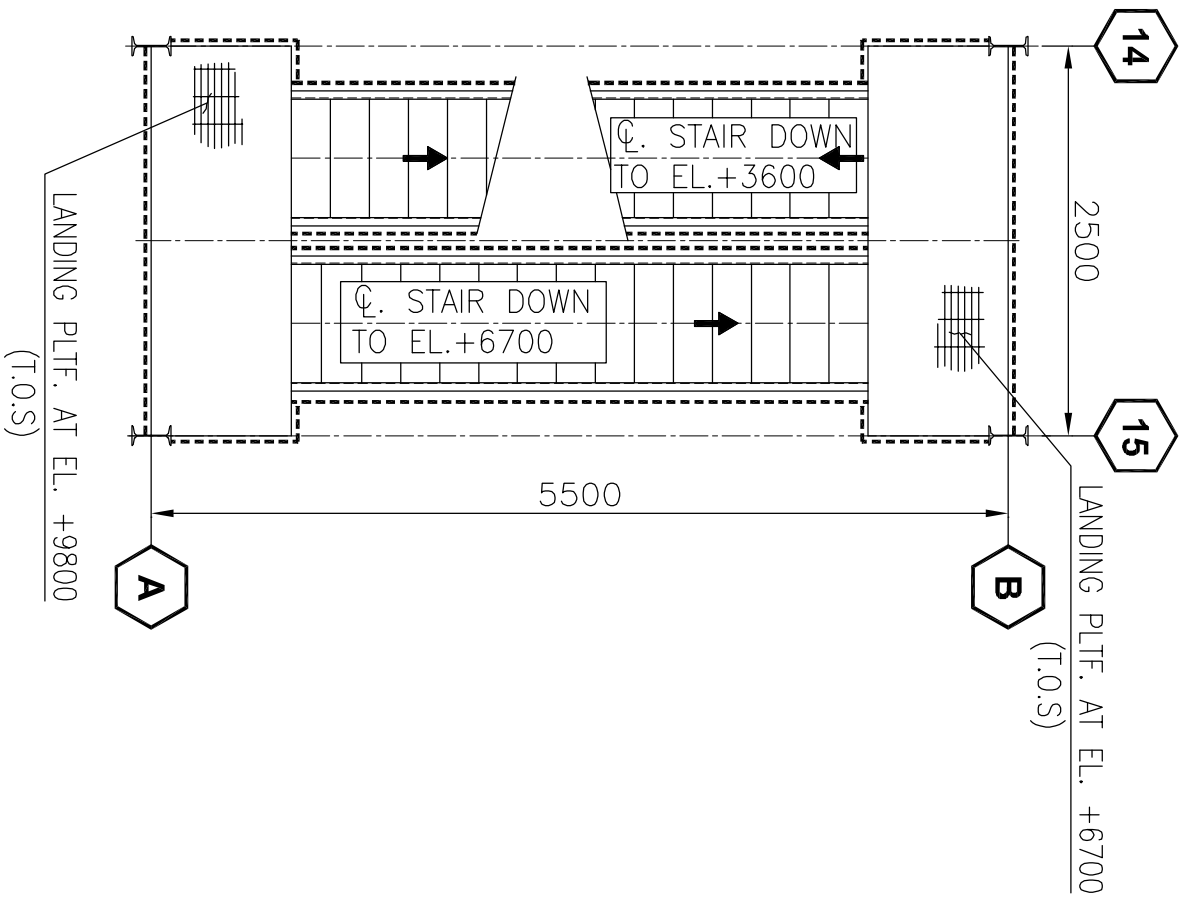
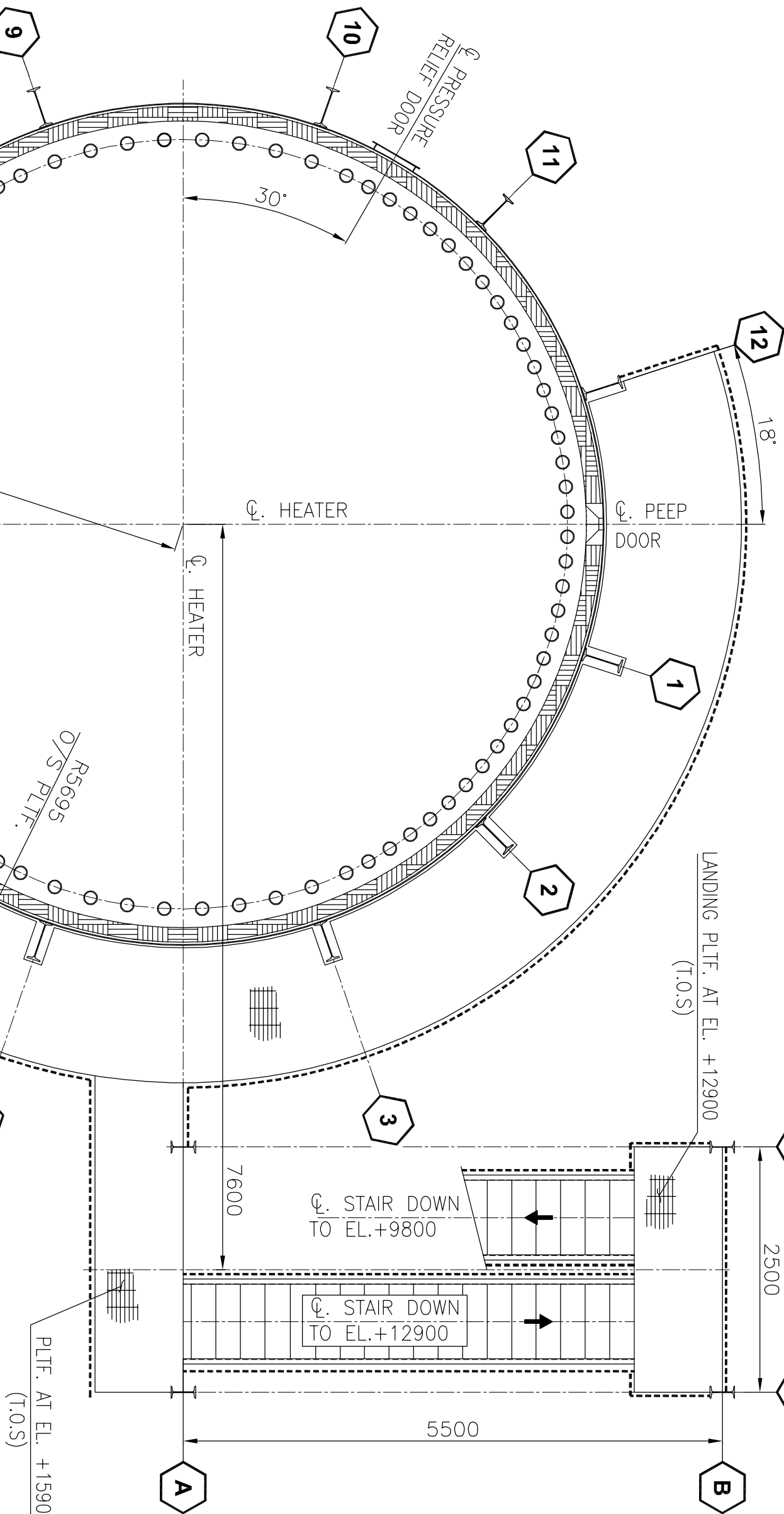
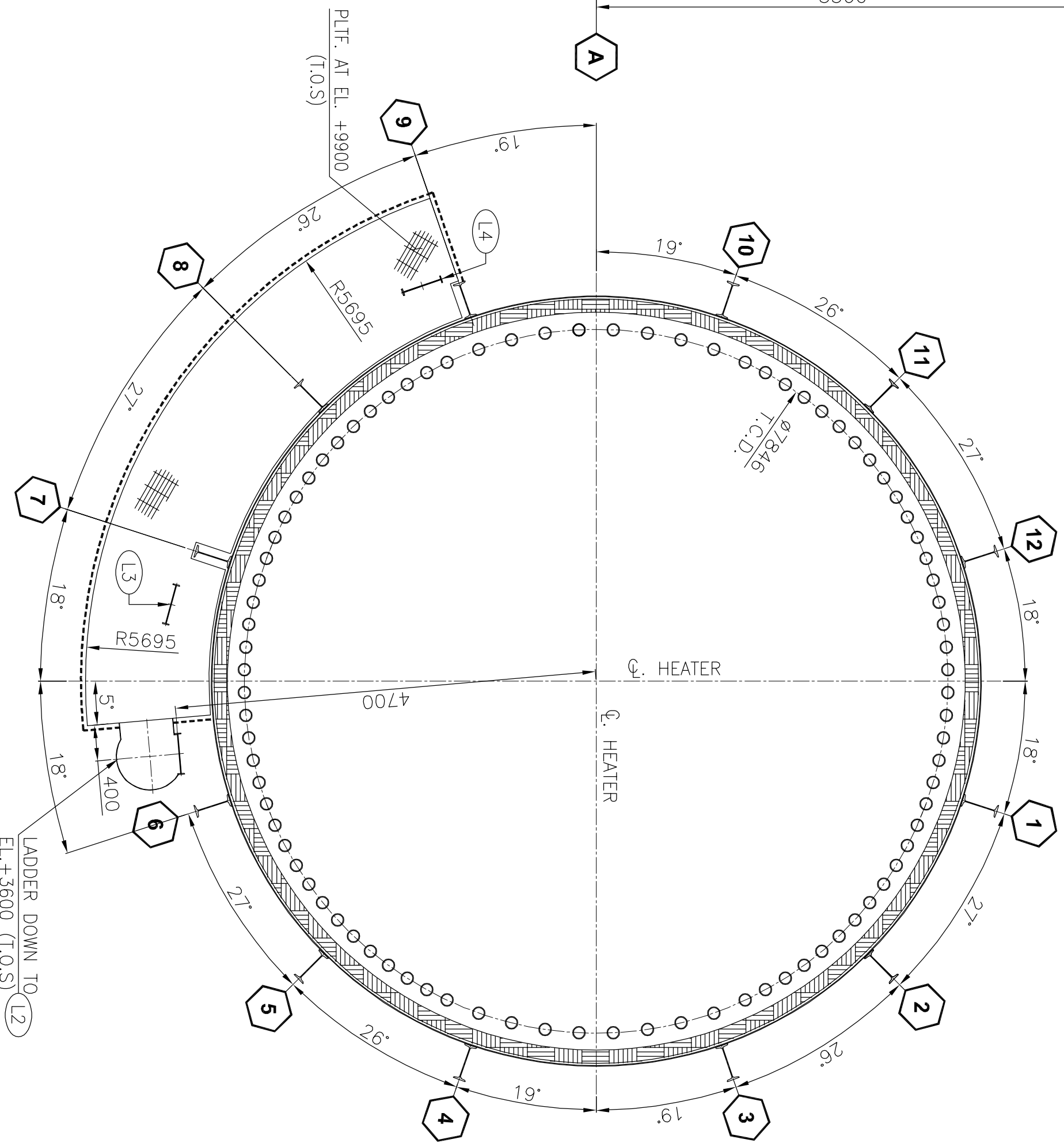
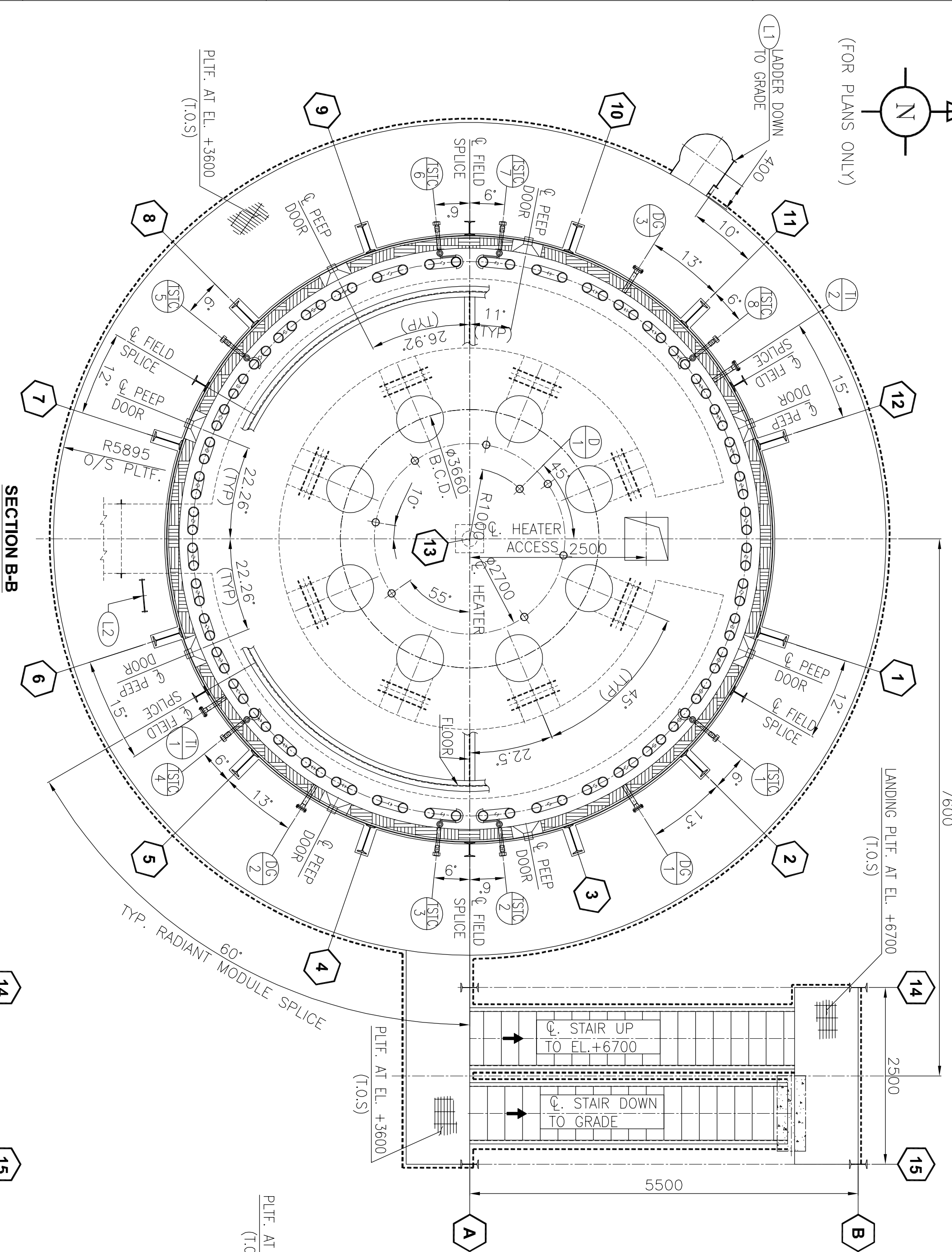
- INTERNAL SURFACE:
  - a) SURFACE PREPARATION:- SSPC SP-6.
  - b) 2x(90-100 MICRONS EACH) EPILUS-56 OF SHALMAR PAINTS OR EQ. SHALL BE APPLIED ON SHELL PLATE IN CONTACT WITH CERAMIC FIBER.
- CASIBABLE LINED SURFACES SHALL BE SEALED WITH CURING COMPOUND TO PROTECT AGAINST ALKALI HYDROLYSIS. COMPOUND SHALL BE A SOLUTION OF RESIN AND HYDROCARBONS IN CONFORMANCE WITH ASTM C309, TYPE 2, CLASS B WITH LOW PERMEABILITY COMPATIBLE WITH ALUMINOUS CEMENTS, EASE OF APPLICATION, SHORT DRYING TIME AND LONG STORAGE LIFE.
- CURING COMPOUND SHOULD CONTAIN FACTORY ADDED CONTRASTING COLOR TO ALLOW IDENTIFICATION OF AREAS TO WHICH COMPOUND HAS BEEN APPLIED.
- CURING COMPOUND SHALL BE IMMEDIATELY APPLIED AFTER CASTING/ REMOVAL OF SHUTTERING.
- 0.5-1 MM THK POTASSIUM SILICATE SOLUTION SHALL BE APPLIED ON INSIDE OF SHELL PLATE OF STACK. ADDITIONALLY 1-2 MM THK. POTASSIUM SILICATE MORTAR SHALL BE APPLIED ON THE HOT FACE OF CASIBABLE OF STACK AFTER AIR DRYING OF CASIBABLE.
- ALL RETAINER PLATES SHALL BE OF SS 310 IN RADIANT AND SS 304 IN CONV. SECTION.
- ALL SKEW AND DIRECT WELDING SHALL BE DONE BY PREPARING THE CONNECTING MEMBER ENDS TO SUITABLE PROFILE (NOT TO SHARP) AND THEN WELDED.
- ALL ELEVATIONS REFERRED TO ARE TOP OF STEEL/INNER SIDE OF GRAFTING.
- SUITABLE EXTRA BRACING SHALL BE PROVIDED (AS REQUIRED) TO PREVENT DISTORTION/DAMAGE TO STRUCTURE DURING HANDLING, TRANSPORTATION AND ERECTION.
- ALL LAPS ON PLATES TO BE 25 MM UNLESS OTHERWISE NOTED.
- BOLT HOLES FOR MATCHING PARTS/MATCHING FLANGES SHALL BE MATCH MARKED AND HOLES DRILLED.
- DRAIN HOLES SHALL BE PROVIDED AT ALL LOCATIONS WHERE IN WATER IS LIKELY TO TRAP.
21. GALVANIZATION REQUIREMENT - SPARKWAY TREADS, PLATFORM GRATING.
- THERE ARE TOTAL OF 88 TUBES IN 4 PASSES IN RADIANT SECTION. LAST 4 TUBES IN EACH PASS ARE SPACED AT 30 PITCH (381 MM) ON EITHER SIDES.
- BLANCE TUBES ARE SPACED AT 20 PITCH (254 MM) WITH 0 BEING NOMINAL DIA. OF TUBE.
- PINGING SPOOL OF 600MM IS CONSIDERED AT CONNECTION INLET AND RADIANT OUTLET EACH PASS. THE SPOOL CAN REMOVE AT THE TIME OF RIGGING.
- 3 MM THK. SS-304 METAL PROTECTION PLATE FOR COVERING ALL REFRACTORY EXPOSED TO STEAM LANING NOZZLE.





LIST OF AUXILIARY CONNECTION

SYMBOLS	QTY.	SERVICE	DESCRIPTION
	7	FLUE GAS TEMPERATURE	1 1/2"NPS x SCH.80 WITH 300# WNRF FLANGE + B.F + GASKETS + NUTS & STUD PIPE MATERIAL:- SS304L FLANGE MATERIAL:- A105
	8	DRAFT GAUGE	1 1/2"NPS x SCH.80 WITH 300# WNRF FLANGE + B.F + GASKETS + NUTS & STUD PIPE MATERIAL:- SS304L FLANGE MATERIAL:- A105
	2	FLUE GAS SAMPLING	4"NPS x SCH.40 WITH 300# WNRF FLANGE + B.F + GASKETS + NUTS & STUD PIPE MATERIAL:- SS304L FLANGE MATERIAL:- A105
	2	O <sub>2</sub> ANALYZER	4"NPS x SCH.40 WITH 300# WNRF FLANGE + B.F + GASKETS + NUTS & STUD PIPE MATERIAL:- SS304L FLANGE MATERIAL:- A105
	1	SO <sub>x</sub> , NO <sub>x</sub> , CO ANALYZER	4"NPS x SCH.40 WITH 300# WNRF FLANGE + B.F + GASKETS + NUTS & STUD PIPE MATERIAL:- SS304L FLANGE MATERIAL:- A105
	2	CO ANALYZER	4"NPS x SCH.40 WITH 300# WNRF FLANGE + B.F + GASKETS + NUTS & STUD PIPE MATERIAL:- SS304L FLANGE MATERIAL:- A105
	1	SPM	4"NPS x SCH.40 WITH 300# WNRF FLANGE + B.F + GASKETS + NUTS & STUD PIPE MATERIAL:- SS304L FLANGE MATERIAL:- A105
	4	MONITORING NOZZLES	6" NPS x SCH.40 WITH 300# WNRF FLANGE + B.F + GASKETS + NUTS & STUD PIPE MATERIAL:- SS 304L FLANGE MATERIAL:- A105
	4	COIL VENT	5" SCH.40 x 1 1/2" SCH.80 3000# WELDOLET +2" NPS x SCH.80 300# WNRTJ FLANGE + B.F + GASKETS + NUTS & STUD MATERIAL:- A182 Gr.F9
	12	PROCESS FLUID TEMPERATURE	5" SCH.40 x 1 1/2" SCH.80 3000# WELDOLET +1 1/2" NPS x SCH.80 300# WNRTJ FLANGE + B.F + GASKETS + NUTS & STUD MATERIAL:- A182 Gr.F9
	12	PROCESS FLUID PRESSURE GAUGE	5" SCH.40 x 1 1/2" SCH.80 3000# WELDOLET +1 1/2" NPS x SCH.80 300# WNRTJ FLANGE + B.F + GASKETS + NUTS & STUD MATERIAL:- A182 Gr.F9
	12	TUBE SKIN THERMOCOUPLE	1 1/2" NPT 3000# THREADED COUPLING WITH PLUG PIPE MATERIAL:- SS304L
	1	DRAIN	4" NPS x SCH.40 WITH 300# WNRF FLANGE + B.F + GASKETS + NUTS & STUD PIPE MATERIAL:- SS304L FLANGE MATERIAL:- A105



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REV.	DATE	DESCRIPTION	DWN.	CHK.	APPD.	ENGR.
1	03.10.22	WHOLE DRAWING REVISED & IFA	AD	NA	AD	HAR.ALI
0	19.08.22	ISSUED FOR APPROVAL	MK	NA	AD	HAR.ALI

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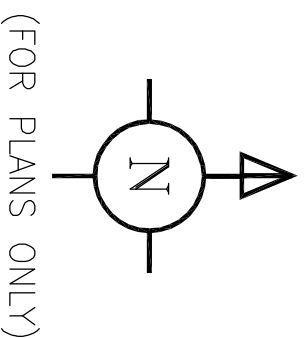
**BHARAT HEAVY ELECTRICALS LTD.**  
HEAVY PLATES & VESSELS PLANT UNIT, VISAKHAPATNAM-530012

**FRESH FEED FURNACE (412-H-1001)**

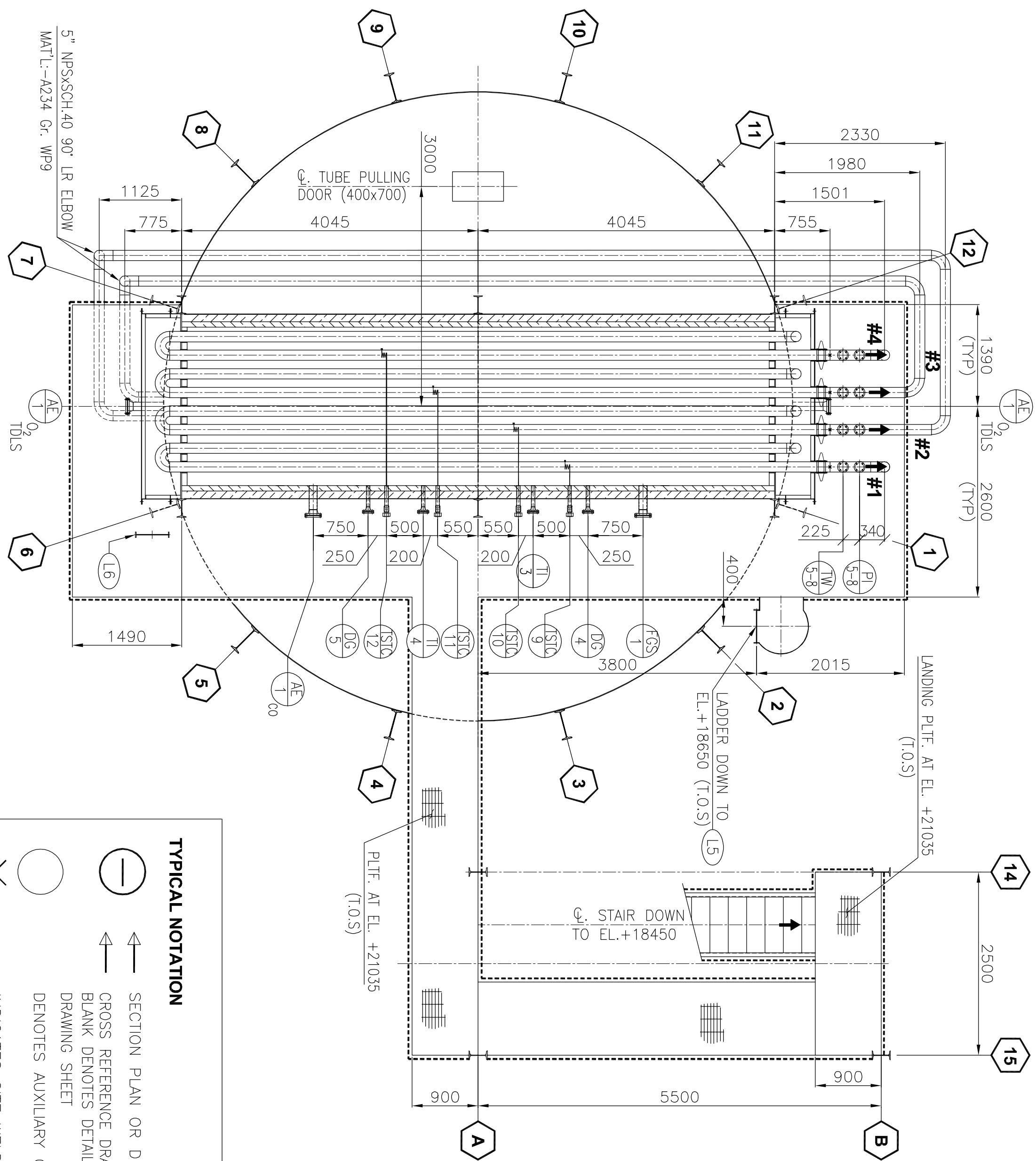
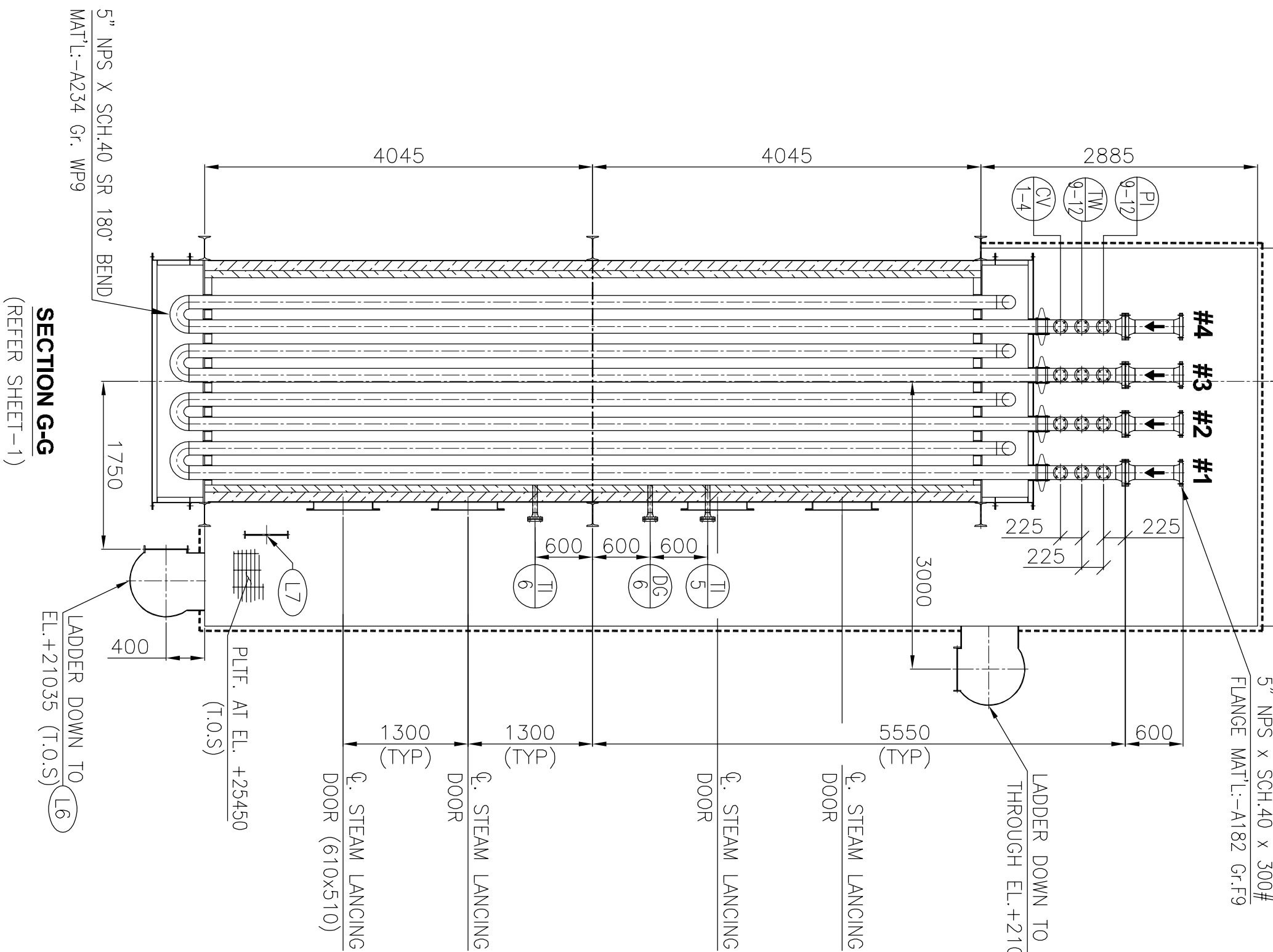
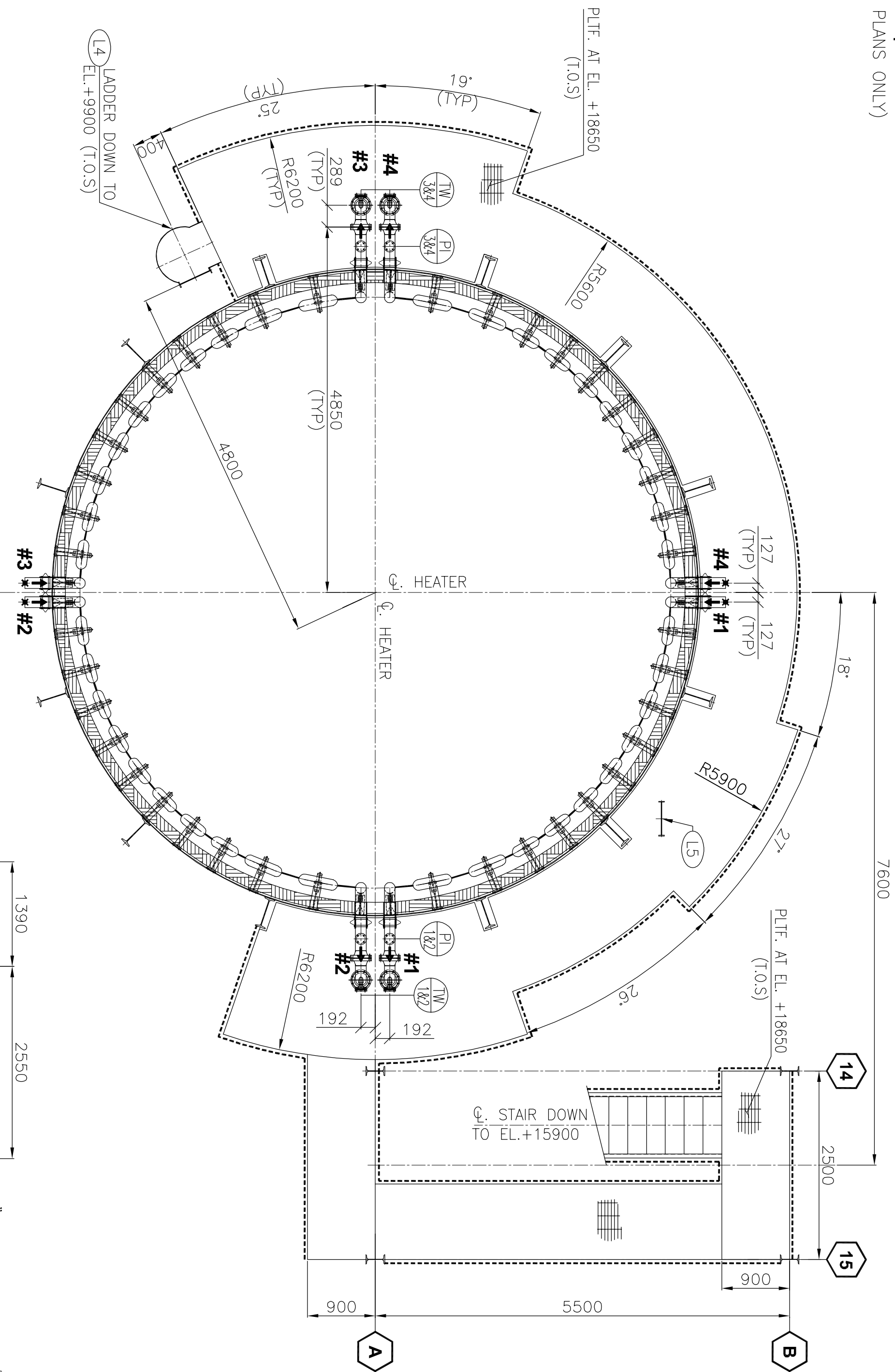
**GENERAL ARRANGEMENT - PLANS**

ALL DIMENSIONS ARE IN MILLIMETERS	THIRD ANGLE PROJECTION	CLIENT:
IN INCHES		BHARAT HEAVY ELECTRICALS LTD.
OTHERWISE		HEAVY PLATES & VESSELS PLANT UNIT, VISAKHAPATNAM-530012
CLIENT :		
LOCATION :		
UNIT :		
SERVICE :		
ITEM NO. :		
AGFS JOB NO.:		
SCALE :	PRG.No.	REV.
1 : 48	AGFS-116-DW-1001	SHT. 2 OF 4





(FOR PLANS ONLY)



#### TYPICAL NOTATION

	SECTION PLAN OR DETAIL
	CROSS REFERENCE DRAWING NO. IF LEFT
	BLANK DENOTES DETAIL APPEARS ON SAME DRAWING SHEET
	DENOTES AUXILIARY CONNECTION
	INDICATES SITE WELD
	INDICATES SHOP WELD
	DENOTES GRID NO.
	O/S : OUTSIDE
	EL+ : ELEVATION
	T.O.S : TOP OF STEEL
	CL : CENTER LINE
	N/S : NEAR SIDE
	F/S : FAR SIDE
	B.C.D : BURNER CIRCLE DIA
	PLTF. : PLATFORM
	REF. : REFRACTORY
	NPS. : NORMAL PIPE SIZE
	T.C.D : TUBE CIRCLE DIA

1	03.10.22	WHOLE DRAWING REVISED & IFA	AJ	NA	AD	HAR	ALI
0	19.08.22	ISSUED FOR APPROVAL	MK	NA	AD	HAR	ALI

REV.	DATE	DESCRIPTION	DWN.	CHK.	APPD.	ENGR.	ENGR.

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HEAVY PLATES & VESSELS PLANT UNIT, VISAKHAPATNAM-530012

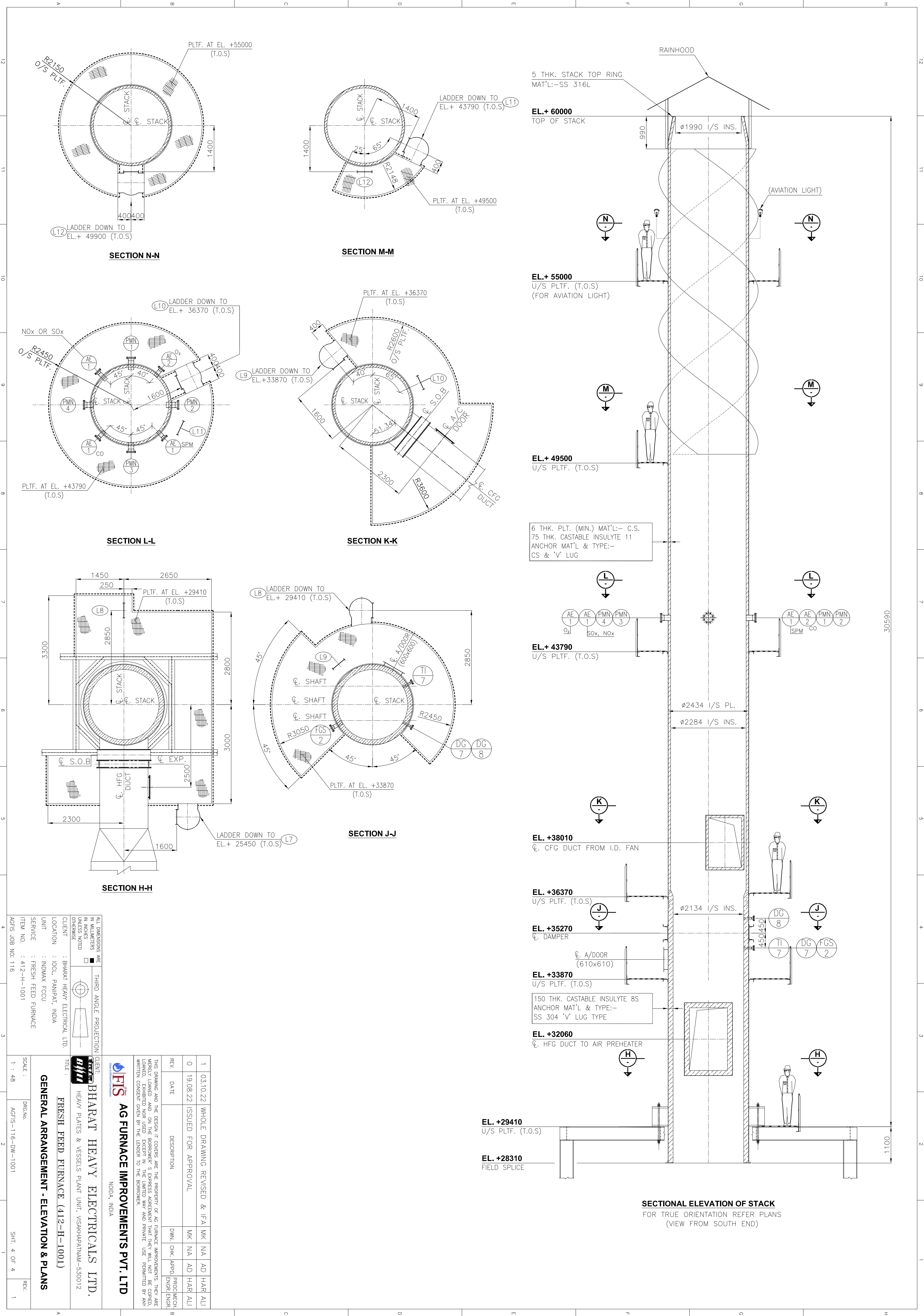
**FRESH FEED FURNACE (412-H-1001)**

**GENERAL ARRANGEMENT - PLANS**

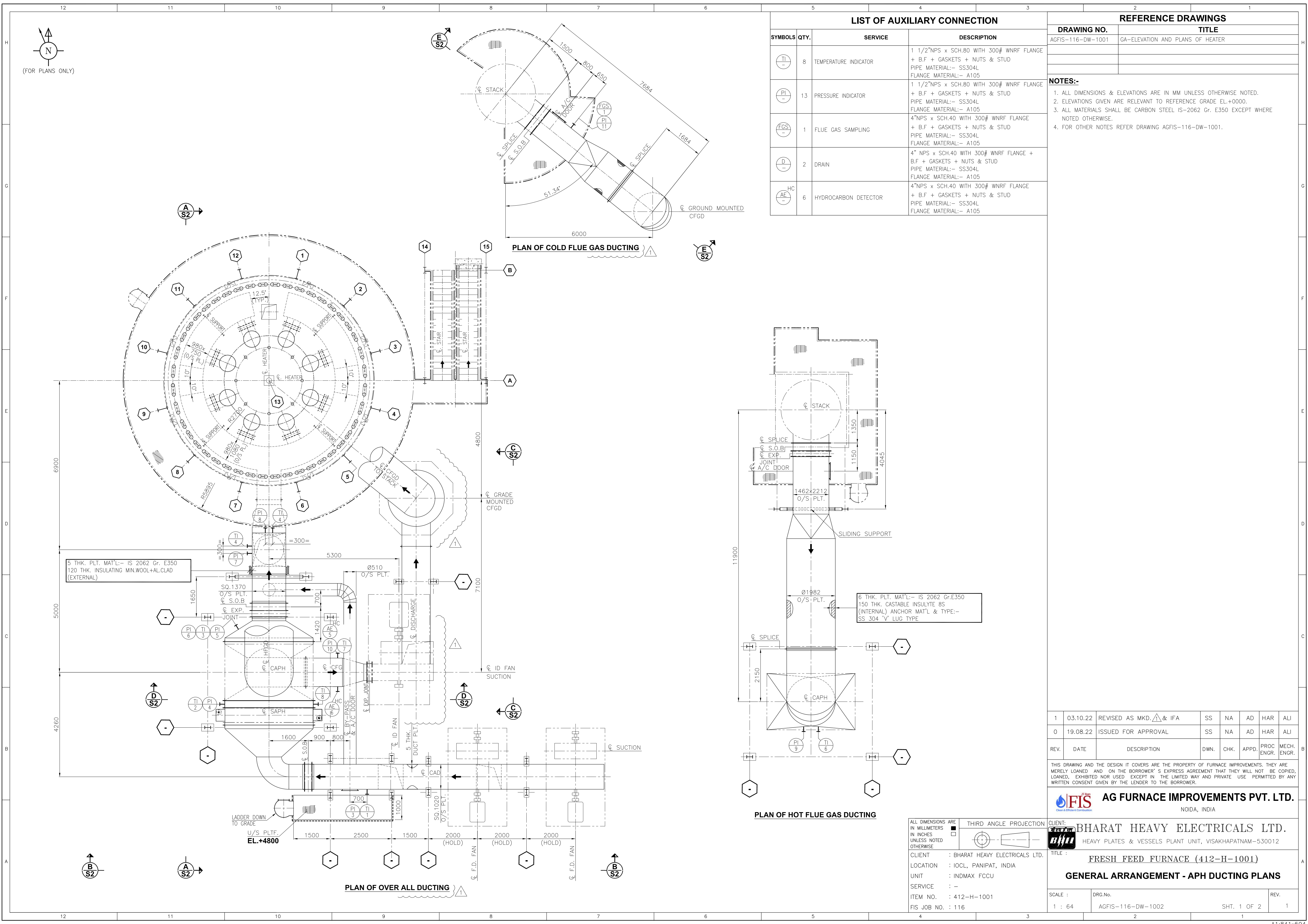
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE	THIRD ANGLE PROJECTION	CLIENT: BHARAT HEAVY ELECTRICALS LTD.
IN INCHES UNLESS NOTED OTHERWISE		HEAVY PLATES & VESSELS PLANT UNIT, VISAKHAPATNAM-530012
CLIENT: BHARAT HEAVY ELECTRICALS LTD.		
LOCATION: IOCL, PANIPAT, INDIA		
UNIT: INDMAX FCCU		
SERVICE: FRESH FEED FURNACE		
ITEM NO.: 412-H-1001		
AGFS JOB NO.: 116		

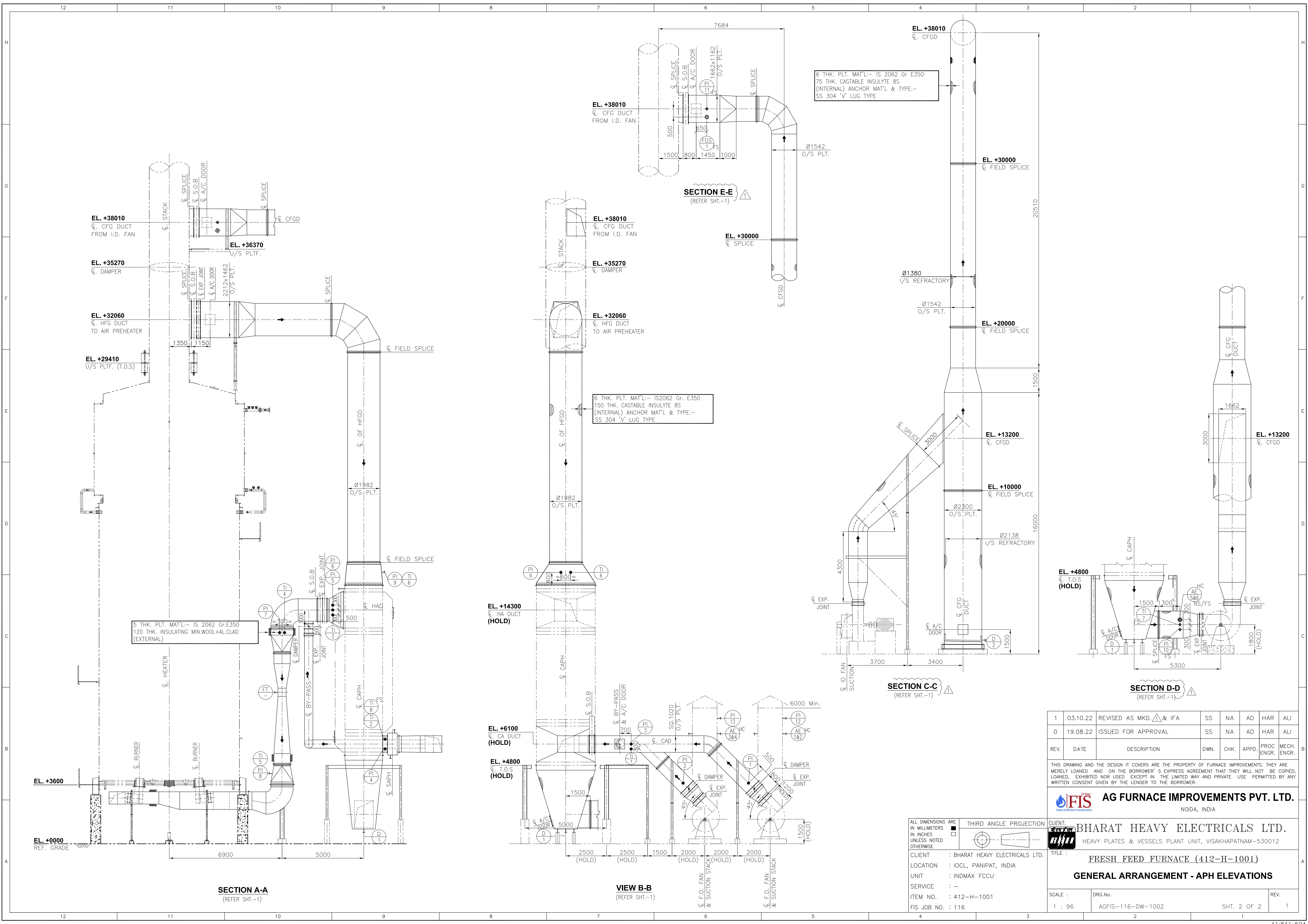
SCALE: 1 : 48	REV. 1
AGFS-116-DW-1001	SHT. 3 OF 4












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0	19.08.22	ISSUED FOR APPROVAL	SS	NA	AD	HAR	ALI
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<div><div> <b>FIS</b> Consulting Engineers</div><div><b>AG FURNACE IMPROVEMENTS PVT. LTD.</b> NOIDA, INDIA</div></div>							
CLIENT: <b>BHARAT HEAVY ELECTRICALS LTD.</b> HEAVY PLATES & VESSELS PLANT UNIT, VISAKHAPATNAM-530012							
TITLE: <b>FRESH FEED FURNACE (412-H-1001)</b> <b>GENERAL ARRANGEMENT - APH ELEVATIONS</b>							
SCALE: 1 : 96		DRG.No. AGFIS-116-DW-1002		SHT. 2 OF 2		REV. 1	

ALL DIMENSIONS ARE IN MILLIMETERS IN INCHES UNLESS NOTED OTHERWISE

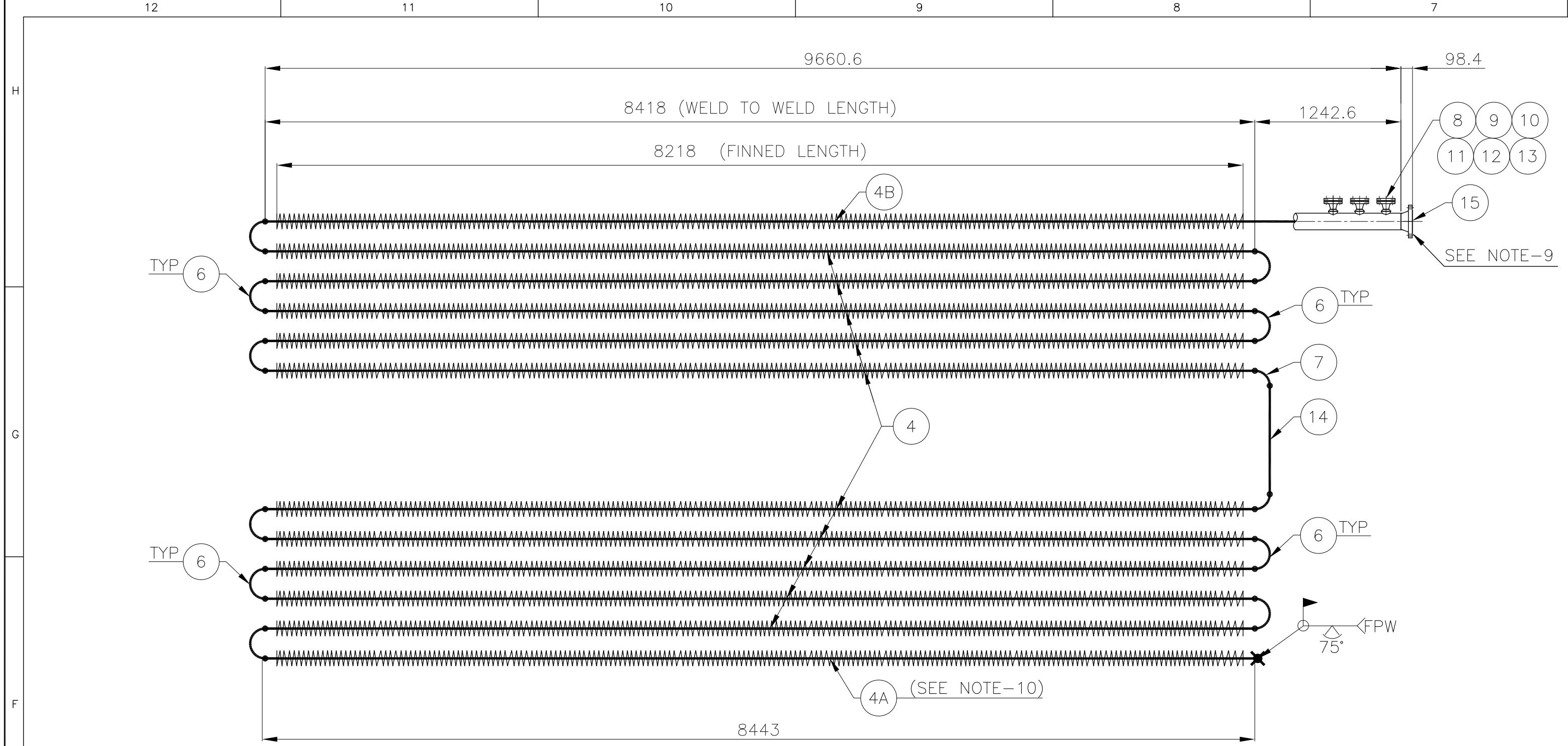
THIRD ANGLE PROJECTION

CLIENT : BHARAT HEAVY ELECTRICALS LTD.  
LOCATION : IOCL, PANIPAT, INDIA  
UNIT : INDMAX FCCU  
SERVICE : -  
ITEM NO. : 412-H-1001  
FIS JOB NO. : 116

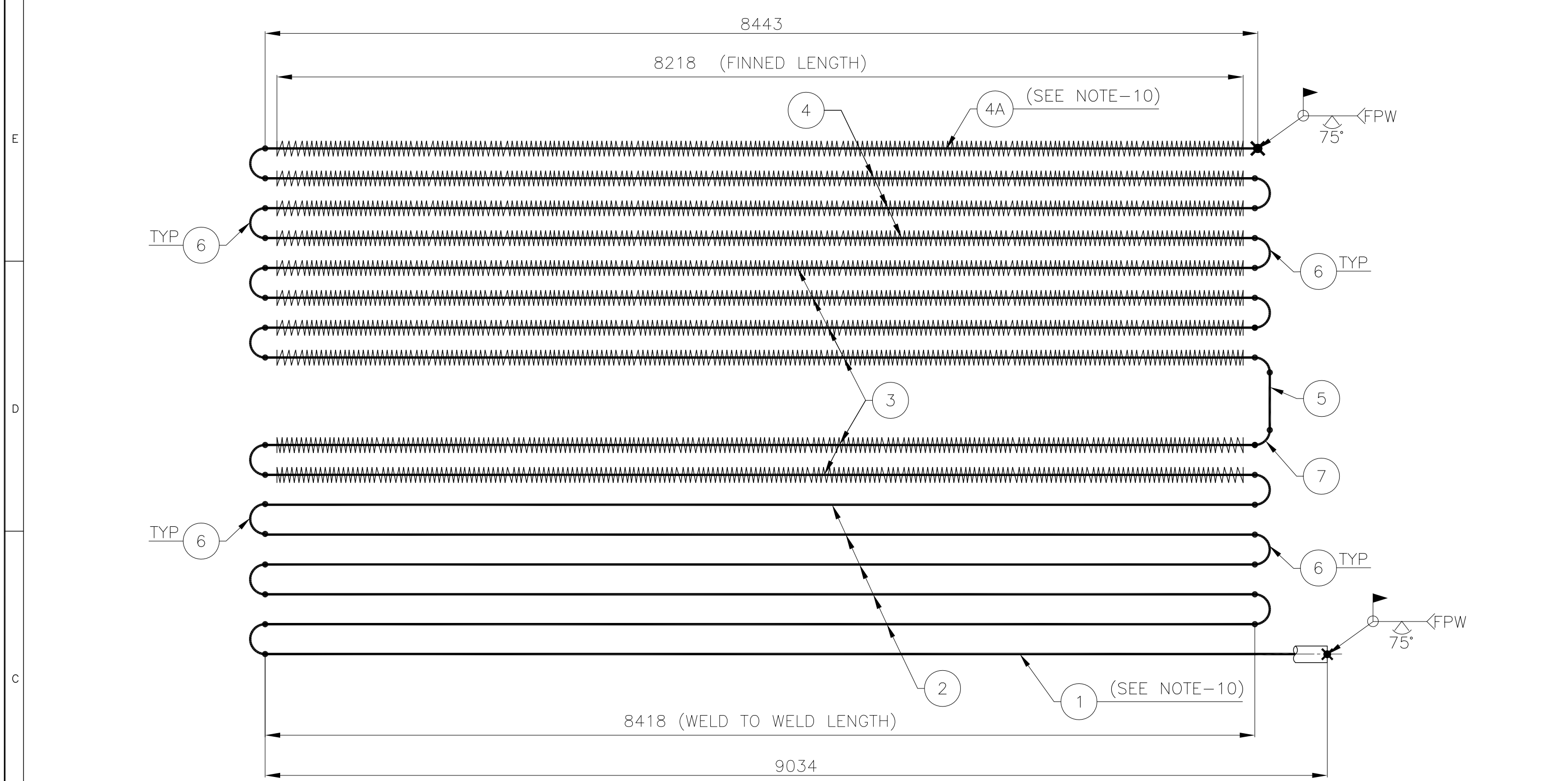




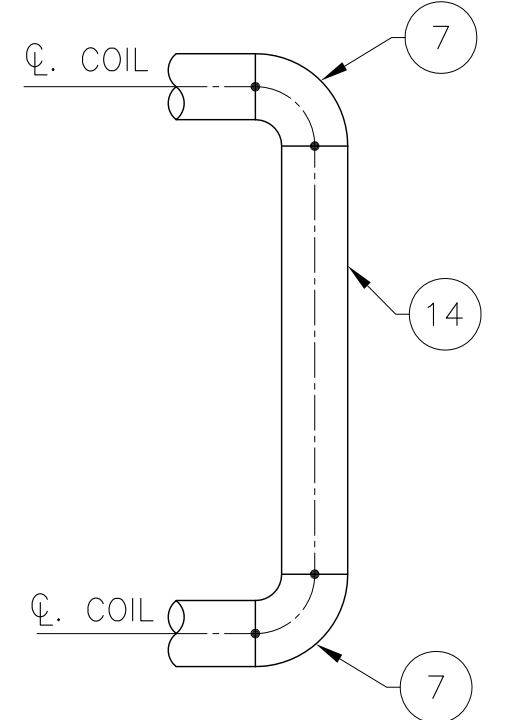
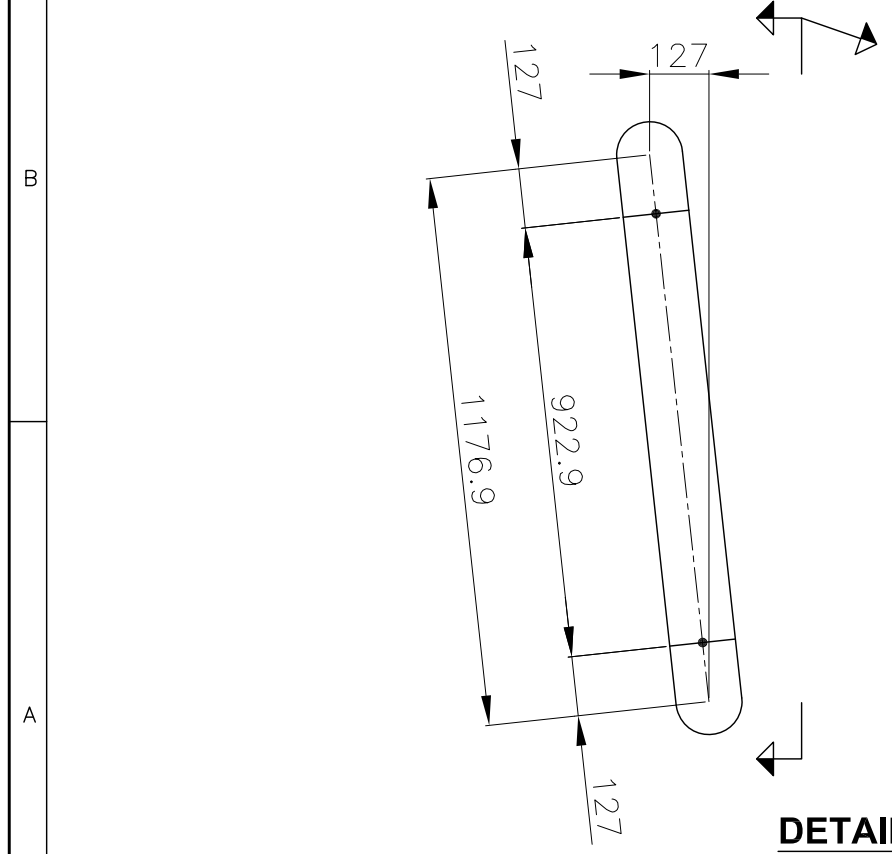




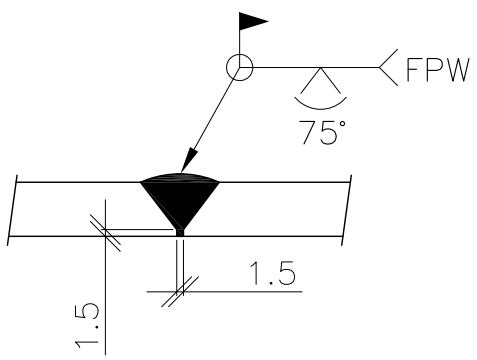
CONVECTION COIL DEVELOPED VIEW FOR PASS #1 TO #4  
MK.-116-CC-2



CONVECTION COIL DEVELOPED VIEW FOR PASS #1 TO #4  
MK.-116-CC-1

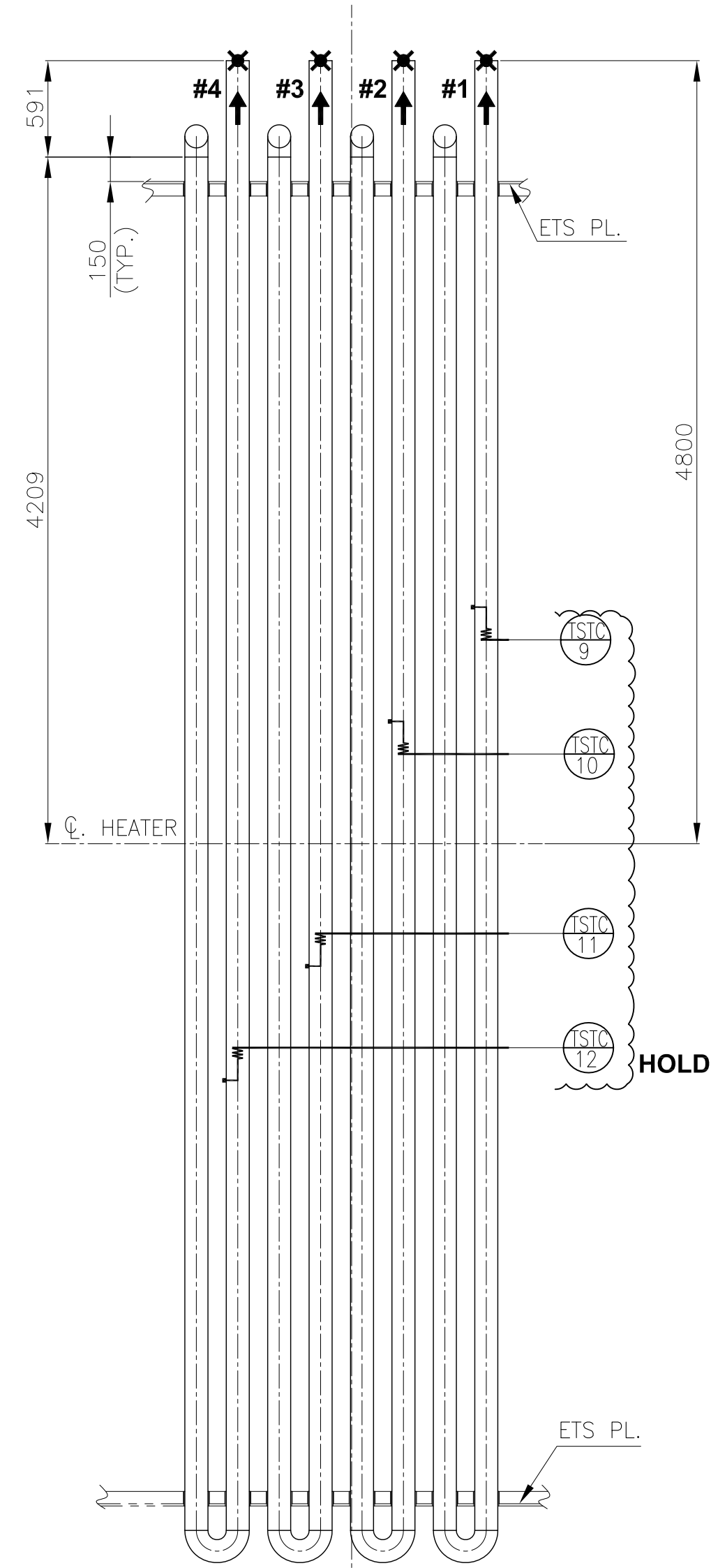
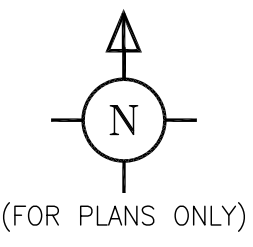


DETAIL-2



TYPICAL FIELD BUTT WELD DETAIL


6			5			4			3		
BILL OF MATERIAL											
MK. NO.	ITEM NO.	QTY	DESCRIPTION	SIZE		LENGTH (MM)	MATERIAL	UNIT WT (KG/M)	WT. (in KG.)		
				WIDTH	THK.						
MK. 116-CC-SP-1											
	15	8	FLANGE	5" NPS x SCH.40 x 300# WNRF		A182 Gr.F9	14.6	116.8			
	16	4	PIPE	5" NPS x SCH.40 BBE		403.2	A335 Gr.P9	21.7	35.		
WEIGHT									152		
MK. 116-CC-JO-1											
	7	8	ELBOW	5" NPS x SCH.40 x 90° SR		A234 Gr. WP9	4.3	34.4			
	17	4	PIPE	5" NPS x SCH.40 BBE		165.7	A335 Gr.P9	21.7	14.4		
WEIGHT									49		
TOTAL WEIGHT									41856		
FIELD MATERIAL											
	18	4	GASKET	5" NPS x 300#			SS 316L FOR INNER, OUTER RING & WINDING STRIP, CGI SPIRAL WOUND WITH FLEXIBLE GRAPHITE FILLER				
	19	32	STUDS	M20 FULL THRD.		125	A 193 Gr.B7	—	—		
	20	64	NUT	M20 HEAVY HEX.		STD	A 194 Gr.2H	—	—		



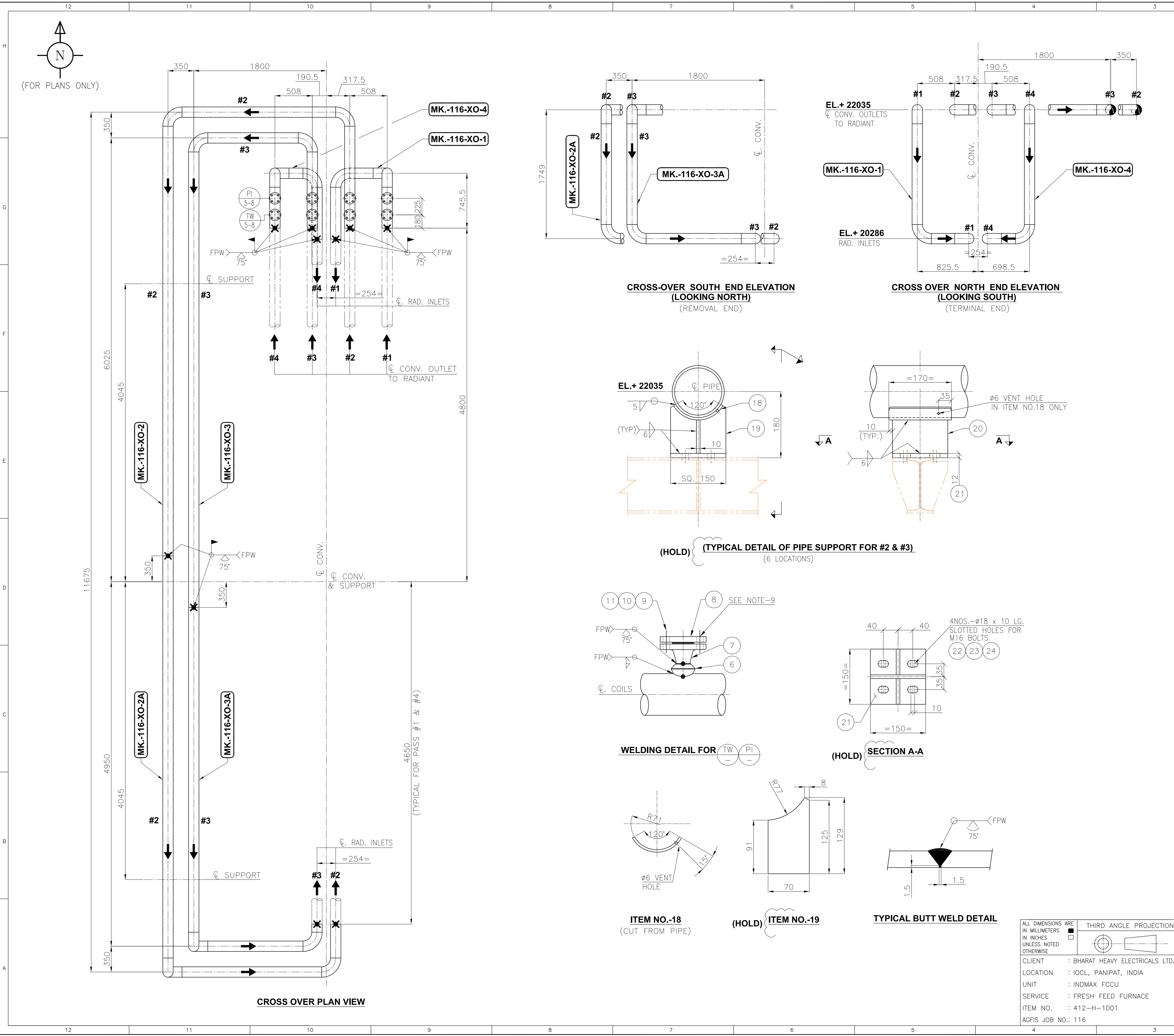
SECTION A-A  
(CONVECTION OUTLET PLAN VIEW)

ALL DIMENSIONS ARE IN MILLIMETERS IN INCHES UNLESS NOTED OTHERWISE		THIRD ANGLE PROJECTION	
CLIENT : BHARAT HEAVY ELECTRICALS LTD.		LOCATION : IOCL, PANIPAT, INDIA	
UNIT : INDMAX FCCU		SERVICE : FRESH FEED FURNACE	
ITEM NO. : 412-H-1001		AGFIS JOB NO.: 116	

BILL OF MATERIAL						
MK. NO.	ITEM NO.	QTY	DESCRIPTION	SIZE		LENGTH (MM)
				WIDTH	THK.	
	1	4	PIPE	5" NPS x SCH.40 BBE	9034	A335 Gr.P9
	2	20	PIPE	5" NPS x SCH.40 BBE	8418	A335 Gr.P9
	3	24	PIPE	5" NPS x SCH.40 BBE	8418	A335 Gr.P9
			SOLID FIN	1.52 THK. x 12.7 HT x 197 FINS/M	8218	11-130r
	4	12	PIPE	5" NPS x SCH.40 BBE	8418	A335 Gr.P9
			SOLID FIN	1.52 THK. x 25.4 HT x 197 FINS/M	8218	CS
	4A	4	PIPE	5" NPS x SCH.40 BBE	8443	A335 Gr.P9
			SOLID FIN	1.52 THK. x 25.4 HT x 197 FINS/M	8218	CS
	5	4	PIPE	5" NPS x SCH.40 BBE	487	A335 Gr.P9
	6	56	RETURN BEND	5" NPS x SCH.40 x 180° SR	A234 Gr.WP9	8.6
	7	8	ELBOW	5" NPS x SCH.40 x 90° SR	A234 Gr.WP9	4.3
WEIGHT						19586
	4	40	PIPE	5" NPS x SCH.40 BBE	8418	A335 Gr.P9
			SOLID FIN	1.52 THK. x 25.4 HT x 197 FINS/M	8218	CS
	4A	4	PIPE	5" NPS x SCH.40 BBE	8443	A335 Gr.P9
			SOLID FIN	1.52 THK. x 25.4 HT x 197 FINS/M	8218	CS
	4B	4	PIPE	5" NPS x SCH.40 BBE	9660.6	A335 Gr.P9
			SOLID FIN	1.52 THK. x 25.4 HT x 197 FINS/M	8218	CS
	6	40	RETURN BEND	5" NPS x SCH.40 x 180° SR	A234 Gr.WP9	8.6
	7	8	ELBOW	5" NPS x SCH.40 x 90° SR	A234 Gr.WP9	4.3
	8	12	WELDOLET	5" NPS x SCH.40 x 1 1/2" NPS x SCH.80	A182 Gr.F9	1.0
	9	12	FLANGE	1 1/2" NPS x SCH.80 x 300# WNRF	A182 Gr.F9	3.2
	10	12	BLIND FLANGE	1 1/2" NPS x 300# RF	A182 Gr.F9	2.7
	11	12	GASKET	1 1/2" NPS x 300#	SS 316L FOR INNER, OUTER RING & WINDING STRIP, CGI SPIRAL WOUND WITH FLEXIBLE GRAPHITE FILLER	
	12	48	STUD	M20 FULL THREADED.	95	A 193 Gr.B7
	13	96	NUT	M20 HEAVY HEX.	STD	A 194 Gr.2H
	14	4	PIPE	5" NPS x SCH.40 BBE	922.9	A335 Gr.P9
	15	4	FLANGE	5" NPS x SCH.40 x 300# WNRF	A182 Gr.F9	14.6
WEIGHT						22069

1	11.10.22	WHOLE DRAWING REVISED & IFA	MS	MK	NA	ALI	AD
0	26.08.22	ISSUED FOR APPROVAL	SS	MK	NA	ALI	AD
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 <b>AG FURNACE IMPROVEMENTS PVT. LTD.</b> NOIDA, INDIA							
CLIENT: <b>BHARAT HEAVY ELECTRICALS LTD.</b> HEAVY PLATES & VESSELS PLANT UNIT, VISAKHAPATNAM-530012							
TITLE : <b>FRESH FEED FURNACE (412-H-1001)</b>							
<b>DETAILS OF CONVECTION COILS</b>							
SCALE : 1 : 32		DRG.No. AGFIS-116-DW-1005		SHT. 2 OF 2		REV. 1	



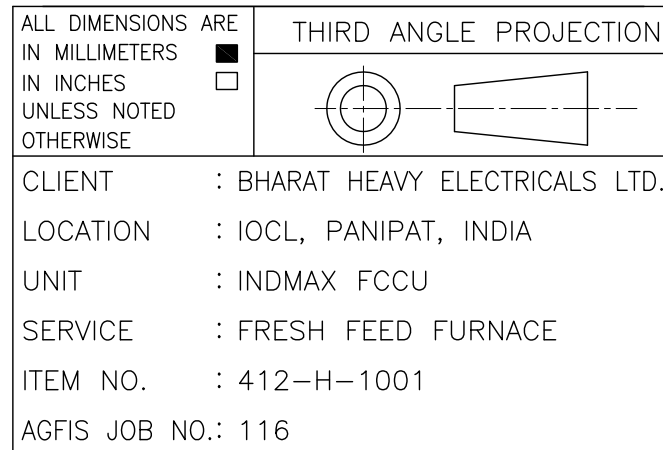



REFERENCE DRAWINGS	
DRAWING NO.	TITLE
AGFIS-116-DW-1001	GA- ELEVATION AND PLANS OF HEATER
AGFIS-116-DW-1004	DETAILS OF RADIANT COILS
AGFIS-116-DW-1005	DETAILS OF CONVECTION COILS
NOTES :-	
<div>1. DO NOT SCALE THE DRAWING, ASK IF IN DOUBT.</div> <div>2. ALL DIMENSIONS AND UNITS ARE IN THE MKS SYSTEM, U.N.O.</div> <div>3. ELEVATIONS GIVEN ARE RELEVANT TO REF. GRADE EL.+0000.</div> <div>4. ALL ITEMS SHALL BE CHECKED BY FULL SCALE LAYOUT BEFORE FABRICATION.</div> <div>5. NO UNDER CUT OF PIPE WALL IS PERMITTED DUE TO WELDING.</div> <div>6. COMPLETED ASSEMBLIES TO BE SHOP HYDRO TESTED AFTER COMPLETION OF WELDING AND ALL STATED INSPECTION REQUIREMENTS.</div> <div>7. COIL SHALL BE DRIED AFTER HYDROTEST.</div> <div>8. ALL WELD PREPARATION SHALL CONFORM TO ANSI B16.25 AND PROJECT SPEC.</div> <div>9. ALL FLANGE BOLT HOLES SHALL STRADDLE NATURAL CENTER LINES.</div> <div>10. PIPES WITH FIELD WELDS SHALL HAVE 25mm EXTRA LENGTH TO PERMIT WELDING OF CAP/BLIND FOR HYDRO TEST. THE EXTRA LENGTH SHALL BE TRIMMED AFTER HYDRO-TEST AND PROVIDED WITH WELD BEVELS.</div> <div>11. ALL COIL WELDS MUST BE FULL PENETRATION TYPE.</div> <div>12. ALL PIPES AND FITTINGS SHALL BE SEAMLESS TYPE.</div> <div>13. FIELD WELDING ENDS OF ALL ELBOWS, WELDOLETS SHALL BE COVERED SUITABLY BY COIL FABRICATOR TO PROTECT ENDS DURING TRANSPORTATION AND HANDLING.</div> <div>14. PWHT SHALL BE CARRIED OUT ON PRESSURE PART WELD AS PER PROJECT SPEC.</div> <div>15. 100% RT REQUIRED FOR ALL WELDS AFTER PWHT.</div> <div>16. 100% PMI TESTING REQUIRED ON ALLOY PRESSURE PART WELDS INCLUDING WELD FILLER MATERIALS.</div> <div>17. GENERAL ENGINEERING SPECIFICATION FOR FIRED HEATER DOC. NO. 6745-PRC-000-EC-003.</div> <div>18. EIL ENGINEERING DESIGN BASIS (PART-B) DOC. NO. B269-999-02-42-ODB-1001.</div> <div>19. ENGINEERING DESIGN BASIS FIRED HEATER EQUIPMENT MECHANICAL DOC. NO. B269-999-80-44-EDB-1001.</div> <div>20. TECHNICAL SPECIFICATION FOR PIPE, FITTING, FLANGES, GASKET &amp; FASTENERS DOC. NO. 6745-PIP-EC-0001.</div> <div>21. EIL STANDARD SPECIFICATION OF COIL WORK FOR FIRED HEATERS. DOC. NO. 6-17-0003.</div> <div>22. SPECIFICATION FOR POSITIVE IDENTIFICATION (PMI) AT SUPPLIER'S WORK DOC. NO. 6745-PIP-EC-0006.</div> <div>23. LEGEND:-</div> <div><div>BBE</div><div>•</div><div>✕</div><div>FPW</div><div>EL.</div><div>CL</div></div> <div><div>:</div><div>:</div><div>:</div><div>:</div><div>:</div><div>:</div></div> <div><div>BEVELED ON BOTH ENDS</div><div>INDICATES SHOP WELD</div><div>INDICATES FIELD WELD</div><div>FULL PENETRATION WELD</div><div>ELEVATION</div><div>CENTER LINE</div></div>	
DESIGN CONDITIONS	
DESIGN CODE (TUBE)	ASME B31.3
DESIGN PRESSURE, ELASTIC/RUPTURE, (KG/CM <sup>2</sup> )(G)	29.6
DESIGN FLUID TEMP. (°C)	324
SHOP HYDROTEST PRESSURE (KG/CM <sup>2</sup> )	55
FIELD HYDROTEST PRESSURE (KG/CM <sup>2</sup> )	55
CORROSION ALLOWANCE-COIL(MM)	3
RADIOGRAPHY: (ALL PRESSURE PART)	100%
POST WELD HEAT TREATMENT	YES
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<div><div></div><div>AG FURNACE IMPROVEMENTS PVT. LTD.</div><div>NOIDA, INDIA</div></div>	
CLIENT: BHARAT HEAVY ELECTRICALS LTD.	
HEAVY PLATES & VESSELS PLANT UNIT, VISAKHAPATNAM-530012	
TITLE : FRESH FEED FURNACE (412-H-1001)	
DETAILS OF CROSS-OVERS	
SCALE :	DRG.No.
1 : 24	AGFIS-116-DW-1006
SHT. 1 OF 3	REV.
	0






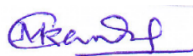



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	MANUFACTURER'S NAME & ADDRESS  <b>BHEL-VISAKHAPATNAM</b> or Approved Sub-Contractor		<b>MANUFACTURING QUALITY PLAN</b>						PROJECT: IOCL, Panipat INDMAX Unit PACKAGE: Fired Heater SO NO: 7935 Customer FOA : RHQPJ/2022-2023/EPDCM2/FOA/04 Dt. 22-07-2022				
			<b>ITEM:</b> Fresh Feed Furnace TAG No : <b>412-H-1001</b>			<b>QP NO:</b> CQP 2534 Rev 0 Date: 12.11.2022 PAGE 1 of 4							

SL No	ITEM & OPEARATION	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY				REMARKS
									M	C	N	PMC	
1	2	3	4	5	6	7	8	D					


1.0	RAW MATERIALS & BOUGHT OUT ITEMS AFTER RECEIPT AT SHOP												
1.1	Plates as applicable	Mechanical Chemical NDT as applicable	Traceability as applicable, TC verification	100%	Material Specification as per Column 2, Internal TDC, tKIS Tender specification.	Mfg TC As applicable	√	-	QC	R	R		
1.2	Pipes & Tubes as applicable	Mechanical Chemical NDT as applicable	Traceability as applicable, TC verification	100%	Material Specification as per Column 2, Internal TDC, tKIS Tender specification.	Mfg TC/ Material Data Report	√	-	QC	H	H		Refer Note 1
1.3	Flanges & Fittings as applicable	Mechanical Chemical NDT as applicable	Traceability as applicable, TC verification	100%	Material Specification as per Column 2, Internal TDC, tKIS Tender specification.	Mfg TC/ Material Data Report	√	-	QC	H	R		Refer Note 1
1.4	Other Materials as per respective material specification and BHEL Drawing as applicable					-			QC	-			Check on sample basis

Prepared by   P. Gopi Kishore Manager/QA	Reviewed & Approved By   A.K. Mandal AGM (Q&BE)	<b>LEGEND:</b>  P: Perform; R: Review; W: Witness; RW: Random Witness; V: Verification QC: Quality Control; NDT: Non-Destructive Testing; TDC: Technical Delivery Condition; TC: Test Certificate; AWS: American Welding Society; WPS: Welding Procedure Specification; PQR: Procedure Qualification Record; WQR: Welder Qualification Record; RT: Radiographic testing; LPI: Liquid Penetrant Inspection; PMI: Positive Material Identification M: BHEL/Approved sub-contractor; C: BHEL QC/ND/Authorized Inspection Agency (AIA); N: TPIA representing Customer; For clauses marked with (TICK) in "D", Certificates shall be included in Documentation. PMC : Project Management Consultant (tKIS-India).	Approved By          Customer Signature & Stamp
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	MANUFACTURER'S NAME & ADDRESS  <b>BHEL-VISAKHAPATNAM</b> <b>or Approved Sub-Contractor</b>		<b>MANUFACTURING QUALITY PLAN</b>						PROJECT: IOCL, Panipat INDMAX Unit PACKAGE: Fired Heater SO NO: 7935 Customer FOA : RHQPJ/2022-2023/EPDCM2/FOA/04 Dt. 22-07-2022				
			<b>ITEM:</b> Fresh Feed Furnace TAG No : <b>412-H-1001</b>			QP NO: CQP 2534 Rev 0 Date: 12.11.2022 PAGE 2 of 4							

SL No	ITEM & OPEARATION	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY				REMARKS
									M	C	N	PMC	
1	2	3	4	5	6	7	8	D					

<b>2.0</b>	<b>IN PROCESS INSPECTION (of activities as per Execution Philosophy)</b>												
2.1	Welding Qualification	Procedure Qualification	WPS Review	100%	ASME Sec IX as applicable	WPS PQR	-	P	QC	V	R		
2.2	Welder Qualification	Personnel Qualification	WQR Review	100%	AWS/IBR/IS (#)	WQR	-	P	QC	V	R		# As applicable, TPI Witness for new PQR.
2.3	NDE Procedure Qualification	Procedure Qualification	Review	100%	ASNT/ISNT	Procedures	-	P	NDT	V	-		
2.4	Edge preparation & Bevel ends for all items	Soundness	Visual & PT	100%	IS 800 & tKIS Specification	PT Report	√	P	QC & NDT	V	R		
2.5	Fit up inspection	Alignment, Weld angle, mismatch, root gap & other parameters	Visual & Dimension	100%	BHEL Drawing, tKIS Specification & approved Drawings as applicable	-	-	P	QC	W	R		
<b>2.6</b>	<b>NDE</b>												
2.6.A	Root and final welds of all butt and fillet joints	Soundness	PT	100%	Customer Specification	PT Report		P	NDT	RW	R		RW-10%
2.6.B	All welds	Soundness	Visual	100%	As per approved drawing & tKIS specification	-		P	QC	R	R		
2.6.C	Butt welds & all T joints	Soundness	RT	100%	Customer Specification	RT Report	√	P	NDT	RW	R		RW-10% ; RT film review.
2.7	PWHT	Temp Vs Time	Review	100 %	Drawing & other documents as applicable	HT Chart		P	QC	V	R		

<div><div>बीएसईएल</div><div></div></div>		MANUFACTURER'S NAME & ADDRESS  <b>BHEL-VISAKHAPATNAM</b> <b>or Approved Sub-Contractor</b>	MANUFACTURING QUALITY PLAN					PROJECT: IOCL, Panipat INDMAX Unit PACKAGE: Fired Heater SO NO: 7935 Customer FOA : RHQPJ/2022-2023/EPDCM2/FOA/04 Dt. 22-07-2022					
			ITEM: Fresh Feed Furnace TAG No : <b>412-H-1001</b>		QP NO: CQP 2534 Rev 0 Date: 12.11.2022 PAGE 3 of 4								
SL No	ITEM & OPEARATION	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY				REMARKS
									M	C	N	PMC	
1	2	3	4	5	6	7	8	D					

<b>3.0</b>	<b>REFRACTORY INSTALLATION WORK</b>												
3.1	Clearance prior to start	Mechanical Completeness	Visual, Measurement	100%	BHEL Drawing, tKIS Specification & approved Drawings as applicable	Inspection Report	√	P	QC	W	R		Refer Execution Philosophy also.
3.2	Refractory application & Dry out	Completeness	Visual, Measurement	100%	Approved Refractory Procedure, Execution Philosophy, tKIS Specification as applicable	Inspection Report	√	P	QC	W	R		
<b>4.0</b>	<b>FINAL INSPECTION &amp; TESTING</b>												
4.1	Visual & Dimensional check	Visual & Dimensions	Visual, Measurement	100%	BHEL Drawing, tKIS Specification & approved Drawings as applicable	Inspection Report	√	P	QC	W	W		Refer Execution Philosophy also.
4.2	Identification, Surface Preparation & Painting	Stencilling, Cleanliness & PMI	Verification, Visual	100%	Customer Specification & BHEL Drawing, Execution Philosophy as applicable	PMI / Painting reports		P	QC	V	RW		PMI for SS & Alloy Steel Items
4.3	Preservation & packing	Packing	Visual & Verification	100%	BHEL Drawing	-		P	QC	V	-		
4.4	Spares as applicable	Completeness	Verification	100%	Approved Drawings / Documents	Reports	√	P	QC	V	R		
4.5	Data Folder	Documents	Verification	100%	IBR as applicable #	Documentation			QC	V	R		# For other than IBR, as per customer specification
4.6	Despatch Clearance	Completeness	Verification	100%	Approved Drawings / Documents		√	-	-	W	R		



		<b>MANUFACTURER'S NAME &amp; ADDRESS</b>  <b>BHEL-VISAKHAPATNAM or Approved Sub-Contractor</b>		<b>MANUFACTURING QUALITY PLAN</b>					<b>PROJECT:</b> IOCL, Panipat INDMAX Unit <b>PACKAGE:</b> Fired Heater <b>SO NO:</b> 7935 <b>Customer FOA :</b> RHQPJ/2022-2023/EPDCM2/FOA/04 <b>Dt.</b> 22-07-2022				
				<b>ITEM:</b> Fresh Feed Furnace <b>TAG No :</b> 412-H-1001									
SL No	ITEM & OPEARATION	CHARACTERISTICS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY				REMARKS
								D	M	C	N	PMC	
1	2	3	4	5	6	7	8						

**NOTES:**

- 1) Pipes and fittings shall be procured in seamless condition.
- 2) Hydro test for Radiant coils and Convection coils will be done at site after completion of site / field welds as well.
- 3) Coil ends shall be capped for safety.
- 4) After completion of painting, stencilling shall be done on all the equipment using normal Arial lettering style. Lettering colour can be black or white depending on the background to have legibility.
- 5) PMI shall be 100%. PMI is only for stainless steel (pipes, flanges, fittings and plates), alloy steel (flanges and fittings) and weldments of alloy steel and stainless steel. All alloy stainless steel. All alloy materials shall be stencilled with PMI OK after satisfactory PMI check.
- 6) Quality Plan for Site Construction activity in line to ICP Notes is being submitted separately.
- 7) Document pertaining to Execution philosophy is enclosed that enumerates scope at site as well at shop including modularisation.

## **EXECUTION METHODOLOGY for FIRED HEATER**

### **RADIANT SECTION:**

- Fabrication of Radiant columns & casing wall panels of Radiant section including Surface preparation and application of Primer paint at HPVP. The Radiant Columns and casing Wall panels will be dispatched to site in loose condition as per Modularization philosophy.
- Erection of columns on Foundations and erection of Casing wall panels to form the Radiant Box. Fit up and welding of Wall panels to form complete Radiant casing at site.
- Fabrication of Radiant Arch and Floor in segments as per Modularization philosophy including Surface preparation and application of Primer paint at HPVP. These Arch and Floor segments will be dispatched to site.
- Fabrication of Radiant platforms, staircase, ladders, Handrails etc. at HPVP and dispatch to site in loose DU's.
- Fabrication of Radiant Outlet Header (24"), cross over & jump over coil spools, Sight doors, Instrument nozzles, Tube pulling door, Explosion door, breeching access door etc. at HPVP and will be dispatched to site.
- Erection and welding of Arch and Floor plates of the Radiant section at site.
- Marking and cutting openings in Radiant section for fixing and welding of Sight doors, Instrument nozzles, Tube pulling door, Explosion door, access door etc. at site. Installation and welding / fixing of these Sight doors, Instrument nozzles, Tube pulling door, Explosion door, access door etc.
- Radiant hanger supports received as BOC 's at HPVP will be dispatched to site. Erection and Alignment of Radiant coil hanger supports will be done prior to the erection of radiant coils.
- After completion of all the welding, Mechanical clearance will be obtained for Installation of Refractory lining in the Radiant section.
- Application of refractory Lining in the Radiant walls as per approved Refractory lining procedure.
- Fabrication of Radiant Coils in Banjos at HPVP including NDT as per QAP in line with Modularization philosophy and dispatched to site. Radiant coils banjos are inserted through the Arch opening and erected inside Radiant section along with coil hangers at site.
- Alignment, fit up and Welding and NDT of site weld joints of Radiant coils including weld joints of the coil joints with radiant manifold.
- Application of balance Refractory in wall and Arch portion after obtaining mechanical completion in Radiant section.

- Marking and cutting openings on Radiant floor for fixing of Burners, peep holes, spigot pipes etc. at site and installation of Peep holes and other auxiliary assemblies in the Floor excluding Burners.
- Trail assembly of Burners in the Floor plate will be done and removed for application of Floor Refractory after the completion of Radiant coil assembly and welding and hydro test.
- Floor Refractory will be carried out as per approved refractory procedure.
- Burners will be installed after the completion of the refractory lining.

#### **CONVECTION SECTION:**

- Fabrication of Convection Sections including Refractory lining and Coils will be done in Two Modules as per Modularization philosophy at HPVP.
- Fabrication of Convection modules consisting of casing, supporting structure, ITS castings, ETS, Header Boxes, Instrument nozzles, OBDs, Breeching Access doors, Retainer plates etc. at HPVP.
- After Hot work is completed in the Convection Modules, Mechanical clearance will be obtained for releasing the Modules for refractory lining.
- Refractory lining in both the Modules will be done at HPVP as per the approved procedure.
- Fabrication of Header boxes and ETS in panels along with Refractory lining and assembly with convection section at HPVP.
- Dry Out of the Refractory lining in Convection Modules, if applicable, will be carried out after completion of refractory lining as per approved procedure.
- Prefabrication of Convection coils (J sticks form) including all NDT as per QAP will be carried out simultaneously so that the same are ready for Insertion in the Convection Modules after the Refractory application and dry out is completed.
- The Prefabricated Convection coils will be inserted in the Convection Modules and Assembly, fit up and welding of site joints including NDT as per QAP will be carried out.
- The convection modules will be dispatched to site in TWO Modules.
- Erection and welding of convection Module-I on the Radiant section at site.
- Erection and welding of convection Module-II on convection Module-I at site.
- Refractory lining at Joint of Module I and Module –II will be carried at site after Welding.
- Erection and welding of convection off-take duct along with Damper on convection section at site.
- Fabrication of Convection & Stack supporting structure, platforms, ladders, Handrails etc. at HPVP and dispatched to site in loose DU's.

- Erection, Fit up and welding of convection and stack supporting structure, Platforms & staircase structures, ladders and handrails at site.
- Erection and welding of cross over coils i.e., convection outlet to Radiant inlet and Jump over coils i.e., in between convection Module-I to Module-II at site.
- Hydro test of Radiant and convection coils at site.
- Erection and fixing of Header boxes with convection section after Hydro test of Coils at site.
- Application of external insulation of Coils, manifold at site.

### **STACK**

- Fabrication of Stack in 3 sections with refractory application and Dry out at HPVP as per Modularization philosophy and sent to site.
- Fabrication of Stack Modules including Rolling, Fit up and assembly of shell sections, Instrument tapping points, Wind Strakes, Supporting structure for Paint trolley and applicable NDT at HPVP in THREE Modules.
- Mechanical clearance to be obtained and release for Refractory in the Stack modules.
- Application of refractory lining and Dry out of the Refractory lining of Three Modules of Stack.
- Fabrication of Stack platforms, ladders, Handrails etc. at HPVP and dispatched to site in loose DU's.
- Erection, alignment and welding of Stack sections on the supporting structure.
- Erection of Stack supporting structure, platforms, ladders, Handrails etc. at site.
- Refractory lining at Joint of Stack Module I, II & III will be carried at site after completion of welding of site joints.

### **FD Fans, ID Fans, CAPH and Steam APH**

FD Fans, ID Fans, CAPH and Steam APH will be recd. at site from Vendors as BOC's as per approved Modularization philosophy.

The fabrication of supporting structure for CAPH and Steam APH will be carried out at HPVP and dispatched to site in loose DU's. The erection, alignment and welding of supporting structures will be carried out at site.

Erection, Alignment and Grouting of CAPH and Steam APH will be carried out on the supporting structure at site as per approved QAP.

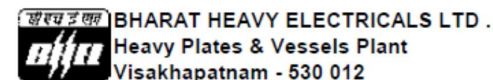
Erection, Alignment and Grouting of FD Fans and ID Fans will be carried out at site as per approved QAP. Further activities like Installation of Motor, Alignment of Motor with Fan, Decoupled/ Idle Run of Motor etc. will be carried and Fans will be made ready for Couple run.

### **Off take Ducts, Cold Air, Hot air, Bypass, Hot Flue Gas Ducts:**

Fabrication of Cold Air, Hot air, Bypass, Hot Flue Gas Ducts in segments as per the Modularization philosophy will be done at HPVP.

- Fabrication of Cold Air, Hot air, Bypass, Hot Flue Gas Ducts in segments as per the Modularization philosophy will be done at HPVP.
- After completion of Fabrication of Hot Flue gas ducts, Refractory lining will be carried out at HPVP and dry out will be carried out as per approved procedure.
- The Ducts after completion of fabrication and refractory lining & dry out, wherever applicable, will be dispatched to site.
- Erection of Interconnecting Ducts between FD Fans, ID Fans, CAPH and Steam APH will be carried out.
- Application of external insulation Hot Air Ducts at site.

### Painting Schedule for Heater Package



Project: Fired Heater of Fresh Feed Furnace (412-H-1001) for M/s. IOCL-PANIPAT

Doc.No.: 7935-PAINT-SCH-001 (SHT-1 of 2) / R-0

EIL Job No.: B378

S.No.	DESCRIPTION	SURFACE PREPARATION & PROFILE	Temp. applicable Deg C	Coating type/system	PRIMER COAT		FINISH COAT		TOTAL DFT μm/min	Color code
					PAINT	NO OF COATS / DFT	PAINT	NO OF COATS / DFT		
1	Heater Casing plate, Columns and structural stiffeners in contact with heater casing & Stack shell with stiffeners, H-Box plate, Duct stiffeners & Supports	SSPC-SP-10	≤250	Spray	F-9 @ 65-75μ DFT/Coat	1 coat of F-9	F-12 @ 20μ DFT/Coat	2 coats of F-12	105-115	Heat resistant aluminum 9006
2	Stair tower & APH support structure and platform support beams, & misc. structures	SSPC-SP-10	≤80	Spray	F-9 @ 65-75μ DFT/Coat + P-6 @ 40 μ DFT/coat (Tie/ Mist Coat)	1 coat of F-9 + 1 coat of P-6	F-6B @ 100 μ DFT/Coat + F-2 @ 40μ DFT/Coat	2 coats of F-6B + 1 coat of F-2	345-355	Steel grey 7011
3	Radiant Shell Inside (*)	SSPC-SP-7 or SSPC-SP-3	175	Spray	F-15 @ 75-100μ DFT/Coat	1 coat of F-15	F-15 @ 75μ DFT/Coat	2 coats of F-15	225	Heat resistant aluminum 9006
4	Stair stringers and Chequered plates	SSPC-SP-10	≤80	Spray	F-9 @ 65-75μ DFT/Coat + P-6 @ 40 μ DFT/coat (Tie/ Mist Coat)	1 coat of F-9 + 1 coat of P-6	F-6B @ 100 μ DFT/Coat + F-2 @ 40μ DFT/Coat	2 coats of F-6B + 1 coat of F-2	345-355	Black 9005
5	Hand railing, Ladder vertical post (Except hand rail post which is covered above)	SSPC-SP-10	≤80	Hot dip galvanizing+ spray paint	Hot Dip Galvanizing to 80-85 microns as per ISO 14713-2/ ISO 1461 + 1 coat of P-6 @ 40μ DFT/coat		F-2 @ 40μ DFT/Coat	1 coat	80 (excluding galvanizing)	Signal red 3001
6	Ladder rungs, Ladder cage, Handrail posts	SSPC-SP-10	≤80	Hot dip galvanizing+ spray paint	Hot Dip Galvanizing to 80-85 microns as per ISO 14713-2/ ISO 1461 + 1 coat of P-6 @ 40μ DFT/coat		F-2 @ 40μ DFT/Coat	1 coat	80 (excluding galvanizing)	Black 9005
7	Gratings	SSPC-SP-10	≤80	Hot dip galvanizing+ spray paint	Hot Dip Galvanizing to 80-85 microns as per ISO 14713-2/ ISO 1461 + 1 coat of P-6 @ 40μ DFT/coat		F-2 @ 40μ DFT/Coat	1 coat	80 (excluding galvanizing)	Black 9005
8	Cold Air Duct Inside Surface	SSPC-SP-10	<80	Spray	F-9 @ 65-75μ DFT/Coat	1 coat of F-9	F-6A @ 100μ DFT/Coat + F-2 @ 50μ DFT/Coat	1 coat of F-6A + 1 coat of F-2	225	Steel grey 7011
9	Cold Air Duct outside Surface	SSPC-SP-10	<80	Spray	F-9 @ 65-75μ DFT/Coat + P-6 @ 40 μ DFT/coat (Tie/ Mist Coat)	1 coat of F-9 + 1 coat of P-6	F-6A @ 100 μ DFT/Coat + F-2 @ 40μ DFT/Coat	2 coats of F-6B + 1 coat of F-2	345-355	Steel grey 7011

### Painting Schedule for Heater Package

Project: Fired Heater of Fresh Feed Furnace (412-H-1001) for M/s. IOCL-PANIPAT

Doc.No.: 7935-PAINT-SCH-001 (SHT-1 of 2) / R-0

EIL Job No.: B378



**BHARAT HEAVY ELECTRICALS LTD .**  
Heavy Plates & Vessels Plant  
Visakhapatnam - 530 012

S.No.	DESCRIPTION	SURFACE PREPARATION & PROFILE	Temp. applicable Deg C	Coating type/system	PRIMER COAT		FINISH COAT		TOTAL DFT $\mu\text{m}/\text{min}$	Color code
					PAINT	NO OF COATS / DFT	PAINT	NO OF COATS / DFT		
10	Hot Air / Bypass Duct Inside & Outside Surface, FLUE GAS DUCT outside Surface	SSPC-SP-10	400	Spray	F-12 @ 20 $\mu$ DFT/Coat	2 coats of F-12	F-12 @ 20 $\mu$ DFT/Coat	2 coats of F-12	80	Steel grey 7011
11	FLUE GAS DUCT Inside Surface (*)	SSPC-SP-10	175	Spray	F-15 @ 75-100 $\mu$ DFT/Coat	1 coat of F-15	F-15 @ 75 $\mu$ DFT/Coat	2 coats of F-15	225	Steel grey 7011

Notes:

- 1) No overcoating to be done on F-9 as it will lead to mud cracking
- 2) All primers and finish coats should be ambient temperature curing and air drying unless otherwise specified.
- 3) For Stack inside shell, 3mm Coating of potassium silicate mortar (as per IS 4832 part-1) before application of castable lining (supply & application by Refractory vendor)
- 4) (\*) -Radiant Shell Inside Surface & Flue Gas Duct Inside Surface – Paint is in scope of Insulation & Refractory Vendor scope.

**DESCRIPTION OF PAINTS:**

- F-12: Heat Resistance Silicone Aluminium Paint (upto 540 deg C)
- F-9: Inorganic Zinc Silicate Coating
- F-6B: Epoxy High Build Coating
- P-6: Epoxy Zinc Phosphate Primer
- F-2: Acrylic Polyurethane finish paint
- F-15: Epoxy Phenolic Coating cured with Polyamine Adduct hardner
- F-6A: Epoxy High Build Coating
- F-2: Acrylic Polyurethane finish paint

Note: Painting Schedule is tentative only and may be subject to revision due to incorporation of comments of the approving authority. Hence, the approved Painting Schedule issued to the vendor after ordering shall only be followed for execution of the job.