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## INVITATION TO TENDER

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Ref : OS/2428/19-20/01/004

Date : 09.04.2019

Sub : **Fabrication of 2<sup>nd</sup> Stage HDS Stabiliser Column (H2) and 2<sup>nd</sup> Stage HDS Amine Absorber / 2<sup>nd</sup> Stage Amine Absorber K.O. Drum (H1) against S.O. 2428 inside the premises of BHEL - HPVP, Visakhapatnam.**

Dear Sir,

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

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### **ELIGIBILITY CRITERIA**

- (1) Bidders shall have an experience of executing similar works (i.e. Fabrication of Pressure Vessels etc.) for a minimum of one project as on 31st March'2019. Bidders shall have to enclose Work Orders and Work Completion Certificates in support of the same.
- (2) Average Annual Turnover of the bidders for the last 3 financial years should be Rs.10 Lakhs. Bidders shall enclose IT Returns and other necessary documents in support of the same.
- (3) Bidders shall have to enclose the documents of Registration of Firm, EPF, ESI, PAN & GST.
- (4) The works executed in the name of individual / firm of the tenderer will only be considered for eligibility criteria.

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### **1. LOCATION OF WORK SPOT :**

The fabrication work is to be carried out inside the premises of BHEL. HPVP, Visakhapatnam, Andhra Pradesh.

### **2. VENDOR'S SCOPE OF WORK :**

- The following columns are to be fabricated for **IOCL, Haldia Refinery** .
  - (a) **2<sup>nd</sup> Stage HDS Stabiliser Column (H2) (Tag No. 87-C-102)** : **1 No. – 20.93 MT**
  - (b) **2<sup>nd</sup> Stage HDS Amine Absorber / 2<sup>nd</sup> Stage Amine Absorber K.O. Drum (Tag No. 87-C-101)** : **1 No. – 07.28 MT**
- Complete fabrication of the Columns as per the approved drawings, QAP, WPS, Specifications & Standards, etc. and it also includes the following activities but not limited to the same :
- Fabrication of Skirt including Pressing / Rolling of Skirt Shell sections
- Fabrication of Bolting Bars, Lifting Lugs, Sub-assemblies of Nozzles, Nozzle Internal Connections, Pipe Davit Assembly, Man Hole Davit Assembly, Sleeves, Thermocouple Tappings, Instrument Tappings, Pipe Support Clips, Platform & Ladder Clips, Access Door, Internals, Insulation Cleats & Support Rings, Externals etc. as per drawings
- Assembly & Welding of Tray Supports, Bolting Bars, Lip Nozzles, Flanges, Skirt, Internal and External attachments like Lifting Lugs, Davit Assembly Supports, Pipe Support Clips, Platform & Ladder Clips, Insulation Cleats, Insulation Support Rings, etc.as per drawings
- NDT like DPT, MPI, Radiography & UT shall be carried out as per approved QAP :
  - (a) All Butt Welds : 100% Radiography
  - (b) Nozzle to Shell or Dished end welds : For nozzle OD > 114.3, RT / UT as applicable  
For other Nozzles, 100% MPI
  - (c) All other welds : As per QAP

- Transportation of Columns in two or three sections to HPVP Shops for SR and back to ADM site after SR
- Local SR of the C-Seam Joint of Columns
- Hydrotesting of Complete Columns
- Surface preparation by Blast Cleaning & Painting of Primer and Finish Paints in applicable no. of coats as per approved Painting Schedule
- Hydra Crane up to 14MT capacity required for fabrication, unloading & loading at ADM site
- Collection of free issue raw materials and finished components from HPVP Stores / Shops and shifting of the same to ADM site including unloading
- Handing over of loose items like fasteners, gaskets, spares to Logistics dept. inside the Plant and finished equipments at ADM site including Loading onto the trailers at ADM site.
- Submission of economic Cutting Plans for all the plate materials, pipes, tubes and sections issued by BHEL and approval must be obtained from competent authority 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.

- Free issue items cleared by QC shall be collected within 3 days from the date of intimation without failure. Any delay beyond the 3 days shall be considered for levying of L.D.
- Qualified Engineers & Supervisors shall be deployed for proper co-ordination of the job.
- Welder's qualification is the responsibility of the Vendor. However, Test Pieces shall be provided by BHEL as free issue.
- Welding is to be carried out strictly using NACE electrodes wherever applicable as per relevant drawings & WPS. NACE electrodes shall be procured from HPVP approved agencies. Specifications and Vendors details are mentioned in the annexures.
- Any modification work due to revision of drawings during fabrication is to be carried out by the vendor without any extra cost.
- 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 vendors.

**3. BHEL SCOPE :** BHEL . HPVP shall provide the following as free issue :

- Applicable drawings, GMS, QAP & WPS, Painting Schedule etc.
- The following raw materials and finished components from HPVP stores :
  - BQ & CS Plates (full / off-cuts) ,
  - Pipes / Tubes, Round Bars, Structural items etc. in running meters
  - BOCs like fasteners, gaskets etc. as per GMS
  - Paints as per requirement
  - Shell Plates in Rolled condition except Skirt
  - Forged Items like Lip Nozzles, SR Nozzles etc.
  - Flanges, Fittings in finished condition
  - Tori Cone Petals in pressed condition
  - Tray Support Rings in Section Rolled Condition
  - Dished Ends in formed condition
  - Stress Relieving of Columns in two or three sections

- One 75 MT crane along with operator and fuels will be provided by BHEL free of charge for fabrication, loading & unloading at ADM site. Maintenance of the crane including spares shall also be in the scope of BHEL. However, Riggers required for handling the job shall have to be provided by the vendor.
- Area required for fabrication will be provided free of charge.
- Power, Water shall also be provided free of charge at one point but further distribution to desired location is in bidder's scope. In case of power failure, the vendor shall have to make alternative arrangement for smooth functioning of the work without any extra cost to BHEL.

**4. INSPECTION :**

Inspection shall be carried out by M/s. BHEL . Vizag / BHEL Authorized Inspection Agency / Customer as per approved QAP. Contractor shall have to offer for Stagewise and Final inspection as per approved QAP and obtain necessary clearances before proceeding for further operations.

**5. DELIVERY :**

Finished items along with inspection documents and all other certificates are to be handed over to HPVP Logistics as per the following schedule :

Within **4 weeks** from the date of issue of last consignment of free issue materials / components.

**Note** : For intermediate operations like SR, 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.

**6. PRICE :**

The price shall be quoted as per the Schedule of Rates enclosed at Annexure . I for the detailed scope of work of each item. The prices shall be fixed & firm without any escalation during the entire period of contract and till completion of the work.

The quoted price shall be inclusive of all applicable taxes & duties except GST and Income tax will be deducted at applicable rates from RA & Final bills. GST shall be reimbursable to the vendor as detailed in Clause . 7 and as per Annexure . GST.

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

Bidders shall make a note of the following points of GST before submission of their offer :

- Vendors registered under GST Act shall have to produce their GSTIN no. (15 Digits) in their Technical Bid in case their turnover exceeds 20.00 lakh. In case, any vendor is unregistered, they have to produce a certificate from Chartered Accountant that their turnover does not exceed Rs. 20.00 lakh.
- 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 and Sale and GST is required to be paid along with interest 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.
- After fabrication, the vendors shall have to deliver the Semi - finished Goods by fulfilling the following formalities :

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.

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

**8. REVERSE AUCTION :**

BHEL reserves the right to opt for Reverse Auction at its discretion instead of opening the price bids submitted in sealed envelope and any information regarding the reverse auction shall be decided after technical evaluation and shall be intimated to the bidders at appropriate time. The bidders are requested to give their acceptance for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids in case BHEL decides to go for RA.

In case BHEL decides to go for RA, only those bidders who give their acceptance will be allowed to participate in RA and these bidders shall have to necessarily submit Online Sealed Bid in the RA. Non-submission of Online Sealed Bid by the bidder will be considered as tampering of the tendering process and will invite action by BHEL as per extent guidelines in vogue.

9. Other Terms & Conditions shall be as per Annexure . III enclosed.

**10. 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.

**11. VALIDITY OF OFFER :**

The offer shall be valid for a period of **3 months** from the last date for tender submission.

**12. GENERAL :**

- 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 offers. One complete set of drawings shall be made available in the office of Sr. Manager (Outsourcing) and the same shall be referred during working hours. Drawings, QAP, WPS etc. shall be sent to vendor's e-mail address.

For any clarifications required on this tender document, scope of work etc., the bidders shall depute their authorized representatives to BHEL, Visakhapatnam with prior intimation to get clarifications from concerned authorities between 09:00 AM and 04:30 PM.

- Bidders shall confirm their acceptance to all the terms & conditions of the tender enquiry. Any deviations to the tender terms & conditions are not acceptable and BHEL reserves the right to reject such offers without further correspondence
- BHEL reserves the right to modify or cancel the tender enquiry at any stage without assigning any reasons thereof.

**13. The following documents shall form part of the tender enquiry :**

- i) Schedule of Rates : Annexure . I
- ii) List of Drawings & Documents : Annexure . II  
(Drawings, QAP, WPS etc. shall be sent by e-mail to vendor's registered e-mail address on request)
- iii) General Terms & Conditions : Annexure . III
- iv) Acceptance to tender terms & conditions : Annexure . IV
- v) Reverse Auction Rules & Regulations : Annexure . V
- vi) Procedure for GST Payment : Annexure . GST
- vii) Specifications & Vendor's details for NACE Electrodes

**14. TENDER SUBMISSION :**

Techno-commercial bids shall be submitted along with the **tender document duly signed by the bidder on all pages**. Techno-Commercial Bid and Price bid shall be placed in two separate envelopes and both shall be kept in another big envelope.

Tenders completed in all respects shall be dropped in the **Outsourcing Tender Box** placed at Reception counter, Admn. Building, BHEL - HPVP, Visakhapatnam before **14.00 hrs. on 23.04.2019** duly superscribing the Subject, Tender Ref. No. and Technical / Price Bid on the envelopes.

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


**Note : Offers sent in any other form will be treated as invalid and will be summarily rejected.**

**15. OPENING OF TENDERS :**

Techno-commercial Bids will be opened on **23.04.2019 at 14.00 Hrs.** at Customer Cell, Admn. Building, BHEL - HPVP, Visakhapatnam. The price bid of the techno-commercially qualified bidders will be opened in presence of representatives of the bidders and the date & time of opening of price bids will be intimated later. The bidders may depute their representatives at the time of opening.

In case of opting for Reverse Auction, intimation shall be given to the qualified bidders in advance at appropriate time.

for Bharat Heavy Electricals Limited,



09/4/19

(B.Venugopal)  
Dy.Manager (Outsourcing)

**Schedule of Rates**

Ref : OS/2428/19-20/01/004

Date : 09.04.2019

Sub : Fabrication of 2nd Stage HDS Stabiliser Column (H2) and 2nd Stage HDS Amine Absorber / 2nd Stage Amine Absorber K.O. Drum (H1) against S.O. 2428 inside the premises of BHEL - HPVP, Visakhapatnam.

Sl. No.	S.O. No.	Description of Work	Unit	Qty.	Unit Rate (in ₹)	Total Amount (in ₹)
1		Complete Fabrication of Columns with free issue raw materials / finished components including NDT, Hydrotesting, Blasting & Painting as per the Drawings, Specifications, QAP, WPS & Painting Schedule and including Collection of FIMs from HPVP stores / shops, transportation to ADM site, transportation of shell sections from ADM site to Shops for SR and back to ADM site, Loading of equipments onto the trailers & welding of supports for transportation and Handing over of the finished equipments to HPVP Logistics dept. etc. complete in all respects as per the detailed scope of work mentioned in the tender document.				
1.1	2428	2nd Stage HDS Amine Absorber / 2nd Stage Amine Absorber KO Drum (H1) (Tag No. 87-C-101)	MT	7.28		
1.2	2428	2nd Stage HDS Stabilizer Column (H2) (Tag No. 87-C-102)	MT	20.93		
		<b>Total</b>	<b>MT</b>	<b>28.21</b>		
<b>Total Amount in Words :</b>						

**Notes :**

- 1) L1 Status will be evaluated on total quoted value and there will be no distribution of work.
- 2) The quantity and weights indicated above are approximate and may slightly vary on both sides subject to revision or addition or deletion of drawings. However, payment shall be made for the actual weights as per the applicable drawings / BOM.
- 3) The prices shall be fixed & firm without any escalation during the entire period of contract and till completion of work.
- 4) The quoted price shall be inclusive of all applicable taxes & duties except GST and Income tax will be deducted from Vendor's bills at applicable rates. However, GST shall be reimbursed by BHEL on submission of proof of GST payment.
- 5) The bidders are advised to go through all the drawings & documents before quoting the tender.
- 6) BHEL reserves the right to go for Reverse auction as per the applicable guidelines instead of opening price bids.
- 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 any 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**

**LIST OF REFERENCE DRAWINGS & DOCUMENTS**

Sub : Fabrication of 2nd Stage HDS Stabiliser Column (H2) and 2nd Stage HDS Amine Absorber / 2nd Stage Amine Absorber K.O. Drum (H1) against S.O. 2428 inside the premises of BHEL - HPVP, Visakhapatnam.

Sl. No.	S.O. No.	PGMA	Description of Drg. / Document	Drg. / Doc. No.	No. of Sheets	Rev. No.
01	2428	CL-010	GMS	-	10	2
02			GMS Index Sheet	-	1	2
03			Shipping List	-	1	2
04			Gen. Assy. of 2nd Stage HDS Amine Absorber	1-CL-010-U0014	1	1
05			Assy. Details of 2nd Stage HDS Amine Absorber / 2nd Stage Amine Absorber K.O. Drum	1-CL-010-U0015	1	0
06			Orientation Details of Nozzles, L-Seam etc.	2-CL-010-U0018	1	0
07			Details of Cone Development for 2nd Stage HDS Amine Absorber / 2nd Stage Amine Absorber K.O. Drum	2-CL-010-U0027	1	0
08			Anchor Chair with Tailing Lug	3-CL-010-U0070	1	0
09			Access Opening Details	3-CL-010-U0071	1	0
10			Structural Guide Support	3-CL-010-U0072	1	0
11			Support Ring & Internals	3-CL-010-U0073	1	0
12			Detail of Lifting Trunion	3-CL-010-U0074	1	0
13			Detail of Name Plate Bracket	3-CL-010-U0075	1	0
14			Detail of Nozzle - 02	3-CL-010-U0103	1	0
15			Detail of Demister	3-CL-010-U0170	1	0
16			Detail of Pipe Davit	3-CL-011-U0069	1	0
17			Detail of Rain Shield	3-CL-010-U0102	1	0
18			Details of Bottom D'end for 2nd Stage HDS Amine Absorber / K.O. Drum	4-CL-010-U0008	1	0
19			Details of Fire Proofing Nuts	4-CL-020-U0025	1	0

Sl. No.	S.O. No.	PGMA	Description of Drg. / Document	Drg. / Doc. No.	No. of Sheets	Rev. No.	
20	2428	CL-020	GMS	-	12	1	
21			GMS Index Sheet	-	1	1	
22			Shipping List	-	1	1	
23			Gen. Assy. of 2nd Stage HDS Stabilizer	1-CL-020-U0016	1	0	
24			Assy. Details of 2nd Stage HDS Stabilizer	1-CL-020-U0017	1	0	
25			Detail of Monkey Ladder for 2nd Stage HDS Stabilizer	2-CL-020-U0025	1	0	
26			Access Opening Details	3-CL-020-U0079	1	0	
27			Detail of Toricone for 2nd Stage HDS Stabilizer	3-CL-020-U0005	1	0	
28			Detail of Feed Distribution Nozzle-I1 for 2nd Stage HDS Stabilizer	3-CL-020-U0076	1	0	
29			Tray Support Rings & Bolting Bar Details	3-CL-020-U0081	1	0	
30			Detail of Name Plate Bracket	3-CL-020-U0083	1	0	
31			Detail of Rain Shield for 2nd Stage HDS Stabilizer	3-CL-020-U0099	1	0	
32			Details of Pipe Nozzle-I1	3-CL-020-U0101	1	0	
33			Detail of Cones for 2nd Stage HDS Stabilizer	3-CL-020-U0119	1	0	
34			Details of Bottom D'end for 2nd Stage HDS Stabilizer	4-CL-020-U0011	1	0	
35			Details of Fire Proofing Nuts	4-CL-020-U0025	1	0	
36			Manhole Davit Assy. for MH 24"NB x 150#	3-CL-030-U0043	1	0	
37			CL-010 & CL-020	Standard Quality Plan for General Structurals	SQP:NP:07/03	11	3
38				Quality Assurance Plan	CQP:2468	3	0
39				Welding Procedure Specification	M.1.1.75	1	0
40	Painting Schedule	PS:2427					

Note : The drawings & documents mentioned above are indicative only and scope of work may vary as per actual detailed drawings issued for fabrication.

**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.**

**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 supplied 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 materials within one week from the date of issue of Order. The BG shall be valid for the contract period with a claim period of 3 months. This Bank Guarantee shall be released to the contractor after completion of work and on acceptance of the same by BHEL / Owner and on submission of Performance BG 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 final bill.**8. RAW MATERIAL 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**).**9. TRANSFER / RETURN OF LEFT OVER MATERIAL :** 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.**10. 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. This is a statutory requirement under Central Excise Rules and must be strictly complied with.

**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.

**11. SCRAP & OFFCUT 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)	-

**12. 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.

**13. 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.

**14. 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.

15. **DELIVERY** : Finished items should be handed over to the Logistics dept. on party's delivery challans along with Job completion certificate / Final Inspection Report from inspection agency / HPVP-QC department.

16. **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.

17. **PAYMENT TERMS** :

100% payment will be made against delivery of the finished items duly inspected & cleared by Inspection authority along with all inspection documents to Logistics Dept. Payment shall be made within **45 days** from the date of submission of RA Bill.

Only one bill will be admitted for orders with value less than Rs. 5 lakhs and a maximum of two bills are allowed for orders of value more than Rs. 5 lakhs. In such cases, the first bill value shall be restricted to a maximum of 50 % of the order value and a minimum of 50% of the total DUs of the order.

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

18. **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.

19. **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.

20. **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.

21. **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.

**22. 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.,

**23. 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.

**24. 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.

**25. 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.

**26.** 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.

**Signature of the Bidder with Stamp**

**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 in case BHEL decides to opt for 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**

**GENERAL TERMS AND CONDITIONS OF RA (REVERSE AUCTION)**

BHEL reserves the right to go for Reverse Auction (RA) (Guidelines as available on [www.bhel.com](http://www.bhel.com)) instead of opening the sealed envelope price bid, submitted by the bidder. This will be decided after techno-commercial evaluation. Bidders have to give their acceptance with the offer for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case BHEL decides to go for RA.

Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit ~~Process~~ compliance form (to the designated service provider) as well as ~~Online~~ sealed bid in the Reverse Auction. Non-submission of ~~Process~~ compliance form or ~~Online~~ sealed bid by the agreed bidder(s) will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines for suspension of the business dealings with suppliers/ contractors (as available on [www.bhel.com](http://www.bhel.com)).

The bidders have to necessarily submit online sealed bid less than or equal to their envelope sealed price bid already submitted to BHEL along with the offer. **The envelope sealed price bid of successful L1 bidder in RA, if conducted, shall also be opened after RA and the order will be placed on lower of the two bids (RA closing price & envelope sealed price) thus obtained. The bidder having submitted this offer specifically agrees to this condition and undertakes to execute the contract on thus awarded rates.**

If it is found that L1 bidder has quoted higher in online sealed bid in comparison to envelope sealed bid for any item(s), the bidder will be issued a warning letter to this effect. However, if the same bidder again defaults on this count in any subsequent tender in the unit, it will be considered as fraud and will invite action by BHEL as per extant guidelines for suspension of business dealings with suppliers / contractors (as available on [ww.bhel.com](http://www.bhel.com)).+

As a reminder to the bidders, system will flash following message (in **RED Colour**) during the course of ~~online~~ sealed bid

%Bidders to submit online sealed bid less than or equal to their envelope sealed bid already submitted to BHEL+

**Signature of the Bidder with Stamp**

**GST COMPLIANCE FOR INDIGENOUS SUPPLIERS**

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**

**ANNEXURE-1: PRE QUALIFICATION CRITERIA/ELIGIBILITY CRITERIA FOR ER70S2 (NACE) GTAW FILLER RODS**

- Offered ER70S2 (NACE) Filler rods as per ASME SEC II Part-C 2017 SFA 5.1 and meeting all TDC requirements only will be considered for scrutiny.
- The parties who had supplied the offered brand in past satisfactorily to any PSU (or) any reputed power plant equipment manufacturing units (or) any Refinery units will be considered for scrutiny. Offers enclosed with related P.O copies (or) approvals only will be considered technically acceptable.

Prepared by:

Approved by:



## TECHNICAL DELIVERY CONDITIONS FOR ER70S2 (NACE) GTAW FILLER ROD

### A) SCOPE:

Material is to be supplied along with Batch Test Certificate incorporating with a certificate of compliance as We certify that the supply made against this batch Test certificate conform to all requirements as per ASME SEC II Part C+latest edition and addenda and NACE SP0472 (applicable on the date of issue of purchase order) in all respects and reported for the following properties guaranteed as mentioned respectively.

### B) TEST REQUIREMENTS:

The base metal for weld test assembly and testing procedure to be employed for verifying compliance to section (B) of this TDC document shall be as specified in ASME SEC II Part C+(Latest Edition and Addenda) SFA 5.18, ER70S2 and as per NACE-TM-02-84, NACE TM 0177 & NACE SP0472 standard requirements.

#### B.1 CHEMICAL COMPOSITION:

Chemistry of undiluted weld metal as per ASME SEC II Part C (Latest Edition and Addenda) SFA 5.18 ER70S2 & shall match with the requirements of A. No.1 of QW-442 of ASME SEC IX (Latest Edition & Addenda) and additionally meeting the following stipulations:

Sulphur %	0.01 Max
Phosphorus %	0.015 Max.
Nickel %	0.2 Max.

#### B.2 RADIOGRAPHIC SOUNDNESS:

The rod when used as filler in GTAW with 100% Argon shielding shall deposit weld metal that flows freely, uniformly without spatter or other defects and shall exhibit excellent wetting characteristics. The rods shall be suitable for radiography quality butt joint welding of NACE Vessels of SA516 Gr.60 HIC resistant + NACE MR103 Compliant + NACE SP0472 Plate Material. The radiographic test shall meet the requirements of ASME SECII C (Latest Edition and Addenda) SFA 5.18 ER70S2

#### B.3 MECHANICAL PROPERTIES:

B.3.1 Mechanical properties of undiluted weld metal deposited using this electrode after Post-weld heat treated condition at  $630 \pm 10^{\circ}\text{C}$  for 2 hrs as per ASME SEC II Part C and shall meet the requirements as below.

Yield Strength at 0.2 % Offset	400 MPa Minimum
Tensile Strength	480 MPa Minimum
Elongation	25% Minimum

B.3.2 Hardness of undiluted weld metal in as-welded condition shall not exceed 200BHN

B.3.3 Average CVN impact energy taken on five specimens after PWHT at  $630 \pm 10^{\circ}\text{C}$  for 2 hrs shall be 5.0 Kg-m / 49 Joules minimum when tested at minus  $30^{\circ}\text{C}$ . No single specimen value shall be less than 3.6 Kg-m / 35 Joules minimum

B.3.4 Hydrogen induced cracking (HIC) & Sulphide Stress Corrosion Cracking (SSCC) test on undiluted weld metal in as-welded condition as per NACE-TM-02-84 standard & using the acidified test solution specified in NACE standard TM 0177 and shall meet the following:

Crack length ratio (CLR)  $\leq 5\%$

Crack Sensitivity Ratio (CSR)  $\leq 1\%$

**C) FORM-SIZE, FINISH-UNIFORMITY, IDENTIFICATION, MARKING:**

C.1 The rods shall be supplied in straight lengths of 1000 mm,  $+15$ ,  $-0$ mm and as specified in the purchase order. The tolerance on diameter shall be as per SFA-5.02.

C.2 The rods shall meet the requirements of clause 17.1 and 17.4 of SFA 5.28.

C.3 Each filler rod shall be marked by embossing with classification designation/brand on ends for positive identification.

C.4 The rods shall meet the requirements of clause 4.6 of SFA 5.02.

**D) PACKAGING:**

F.1 Rods of the same size and batch/lot shall be packed in water resistant plastic tube shaped cartons. Each tube carton shall weigh not more than 10kg. The cartons shall be provided with watertight lid to ensure waterproof during transit & storage. Tube cartons shall be packed in waterproof boxes with crates so as to ensure no damage during shipment and normal storage conditions.

F.2 Weight of each crate shall not exceed 1000Kg.

F.3 The cartons shall have product information as per clause 4.6 of SFA-5.02

**E) TESTING & CERTIFICATION:**

G.1 Each consignment of rods supplied shall be from one batch only.

G.2 Lot/Batch classification shall be Class S1 as per SFA-5.01 filler metal procurement guidelines of ASME SEC II Part C (Latest Edition and Addenda)

G.3 The level of testing shall be Schedule-K of section 5.0 & Table 1 of SFA 5.01 Filler metal procurement guidelines of ASME SEC II Part C (Latest Edition and Addenda)

G.4 Batch Test Certificate incorporating with a certificate of compliance as "We certify that the supply made against this batch Test certificate conform to all requirements as per SFA 5.18 ER70S2 of ASME SEC II Part C (Latest Edition and Addenda) and addenda and NACE SP0472 (applicable on the date of issue of purchase order) and meets additional requirements specified in this TDC document" shall be sent.

- G.5** The batch(es) to be supplied shall be tested by NABL approved lab and shall have EIL approved (like CEIL TPI agency) Third party inspection approval for the batch supplied and the same BTC shall be sent prior to despatch of the material.
  
- F)** Any deviation from TDC shall be clearly specified vide offer. Offer shall specify whether the offered brand fully meet the TDC requirements or not. Otherwise, it will be treated that all TDC requirements are met with.

**LIST OF PMD VENDORS – ER70S2 NACE**

<b>AWS</b>	ER70S2 NACE	<b>Group</b>	08-consumables		
<b>SIZE</b>	1.6, 2.4	<b>MATERIAL CODE</b>	182411443315 (KG-1.6DIA);		
<b>MATERIAL GROUP</b>	FILLER ROD		182421443325 (KG - 2.5DIA)		
<b>MATERIAL GROUP DESCRIPTION</b>	ER70S2 NACE GTAW FILLER ROD				
<b>TDC NO. -VIZAG</b>	ER70S2N REV. 0 DT. 09.02.2019	<b>SFA NO.</b>	5.18		

Mat Group	Vendor No	Vendor Name	Size Detail	Brand	country	EMAIL	PHONE1	contact person	Address	
FILLER ROD		D&H secheron Electrodes Pvt. Ltd	1.6, 2.5	D&H F70S2	INDIA	sales@dnhsecheron.net; dnhchn@dnhsecheron.net;	0731-4229222; 0-96850-91106; 0891-2716650	SHIV CHATURVEDI - 9685091121	www.dnhsecheron.com; Vsp office: Flat no. 2, sneha appartment, balaji hills, balayya sastry layout, vizag - 530013, Fax: 0891- 2717169; dnhvsp@dataone.in; GVR Murty-Sr.SalesManager- 9346234385	
FILLER ROD		GEE LIMITED	1.6, 2.5	GETIG70S2	INDIA	mpdhanuka@geelimited.com; srinivas@geelimited.com	02522 281176, 02522 281188	M.P. DHANUKA- 9820504504 Executive Director- Technical & Marketing ; C SRINIVAS/Regional Manager - 9848115444; QC- 02522280358; 281176- dinesh/abjeeth	Regd. Off & Works: Plot No.B -12,MIDC,Kalyan- Bhiwandi Road,Saravli,Kalyan(West)- 421311 Thane,Maharastra,India. Tel : +91-02522- 281176/88/90 Fax :+91- 02522-281199 E-mail : sales@geelimited.com; Website : www.geelimited.com	

FILLER ROD		ANAND ARC LIMITED	1.6, 2.5	ANAND TIG-2	INDIA	sales@anandarc.com	0-22-42688484; 22-42688400	D KRISHNAMURTHY - DIRECTOR -MARKETING	Corp. office: 701, Trade Centre, Bandra-kurla complex (BKC), Bandra (east), Mumbai - 400051, INDIA; New No. 22, Old no. 31, Railway colony, III street, Aminjikarai, Chennai - 600029, Tel-044-23746379, 044-23741841, Fax - 044-23741841	www.anandarc.com
FILLER ROD		ADOR WELDING LIMITED	1.6, 2.5	TIGFIL70S2 (SPL)	INDIA	cmo@adorians.com	022-8623 9300/35, 2596, 2564	C Nagabhushanam/DGM-MARKETING	M.O: 5/A, CORPORA, LBS MARG, Bhandup(W), Mumbai - 400078, INDIA; Phone-022-8623 9300/35, 2596, 2564, Fax: 022-2596 6562, 25966062; www.adorwelding.com	CHANGED FROM "CITOTIG T2 (SPL)" WITH CHANGE IN COMPANY NAME FROM M/S. ADVANI OERLIKON LIMITED.
FILLER ROD		HILARIUS HAARLEM HOLLAND B.V	1.6, 2.5	HILCO SG 1A	NETHERLANDS	jiwanram@jiwan.com	091-33-22298566	n k mody, JJ George (jiwanram sh.):	Jiwanram Sheoduttrai, G.P.O. Box 996, Kolkata 700001, INDIA; OFFICE: Block D, Chowringhee mansion, 30, Jawaharlal nehru road, kolkata 700016, INDIA	JIWANRAM SHEODUTTRAI, KOLKATA manufacturer/Indian agent
FILLER ROD		WELDWELL SPECIALITY PVT. LTD.	1.6, 2.5	NO 65G	INDIA	cgc@weldwell.com	022-2558-2746, 25515523, 25503270,	Suraj Nair	104, Acharya Commercial centre, Dr. C. Gidwani Road, Near Basant Cinema, Chembur, Mumbai - 400074	

FILLER ROD		K M CROWN WELDING CONSUMABLES PVT. LTD.	1.6, 2.5	CROWN TIG-70S2	INDIA	kmcchennai@yahoo.co.in	044-28280718		D.No. B-10, C-10, II Floor, Parsn commercial complex, No.1, Kodambakkam High Road, Chennai - 600006	
FILLER ROD		ESAB INDIA LIMITED	1.6, 2.5	OKTIG RODS2 (SPL)	INDIA		044-42957894; 044-42957895	D S JAGDEESH, Sales Manager/south	Welding consumables Division: Karumuttu centre, VI floor, new no. 634 (old no. 498) Anna salai, Nandanam, Chennai - 600035; Regd. Office: Plot no. 13, 3rd Main road,	
WELD ELEC		ADOR WELDING LIMITED	1.6, 2.5		INDIA	sankararao@adorions.com; ninadthigale@adorions.com	9553553355	P SANKAR-SR. AREA SALES MANAGER-9553553355; NINAD THIGALE - TECH MARKETING & PRODUCT DEVELOPMENT - 9552554150 ; hari ganesh - Vendor development	CORPORATE MARKETING OFFICE, P.B. NO. 2, CHINCHWAD, PUNE, 411019	
WELD ELEC		VOESTALPINE BOHLER WELDING	1.6, 2.5	BOHLER NER 70 S-2 NACE	INDIA	naveenkumar@voestalpine.com; suresh.prakash@voestalpine.com; parwati.shivanagi@voestalpine.com	2381271759; 9818471482; 7290024560	Naveen kumar/National sales manager - 9818471482; Suresh prakash/Regional sales Manager/south - 7290024560	B.201, UNIVERSAL BUSINESS PARK, CHANDIVLI FARM ROAD, OFF SAKI VIHAR ROAD, SAKI NAKA, MUMBAI, 400072	DEALER: M/s. SAANVI ENTERPRISES

**ANNEXURE-1: PRE QUALIFICATION CRITERIA/ELIGIBILITY CRITERIA FOR E7018 (NACE) SMAW ELECTRODES**

- Offered E7018 (NACE) electrodes as per ASME SEC II Part-C 2017 SFA 5.1 and meeting all TDC requirements only will be considered for scrutiny.
- The parties who had supplied the offered brand in past satisfactorily to any PSU (or) any reputed power plant equipment manufacturing units (or) any Refinery units will be considered for scrutiny. Offers enclosed with related P.O copies (or) approvals only will be considered technically acceptable.

Prepared by:

Approved by:



## **TECHNICAL DELIVERY CONDITIONS FOR E7018 (NACE) SMA WELDING ELECTRODES**

### **A) SCOPE:**

Material is to be supplied along with Batch Test Certificate incorporating with a certificate of compliance as ~~±~~We certify that the supply made against this batch Test certificate conform to all requirements as per ASME SEC II Part ~~©~~+latest edition and addenda and NACE SP0472 (applicable on the date of issue of purchase order) in all respectsq and reported for the following properties guaranteed as mentioned respectively.

### **B) TEST REQUIREMENTS:**

The base metal for weld test assembly and testing procedure to be employed for verifying compliance to section (B) of this TDC document shall be as specified in ASME SEC II Part ~~©~~(Latest Edition and Addenda) SFA 5.1, E7018 and as per NACE- TM-02-84, NACE TM 0177 & NACE SP0472 standard requirements.

#### **B.1 CHEMICAL COMPOSITION:**

Chemistry of undiluted weld metal as per ASME SEC II Part C(Latest Edition and Addenda)SFA 5.1 E7018 & shall match with the requirements of A. No.1 of QW-442 of ASME SEC IX (Latest Edition & Addenda) and additionally meeting the following stipulations:

Sulphur %	0.01 Max
Phosphorus %	0.015 Max.
Nickel %	0.2 Max.

#### **B.2 RADIOGRAPHIC SOUNDNESS:**

The electrode shall be suitable for radiography quality butt joint welding of NACE Vessels of SA516 Gr.60 HIC resistant + NACE MR103 Compliant + NACE SP0472 Plate Material. The radiographic test shall meet the requirements of ASME SECII C (Latest Edition and Addenda) SFA 5.1 E7018

#### **B.3 MECHANICAL PROPERTIES:**

B.3.1 Mechanical properties of undiluted weld metal deposited using this electrode after Post-weld heat treated condition at  $630 \pm 10^{\circ}\text{C}$  for 2 hrs as per ASME SEC II Part C and shall meet the requirements as below.

Yield Strength at 0.2 % Offset	400 MPa Minimum
Tensile Strength	490 MPa Minimum
Elongation	25% Minimum

B.3.2 Hardness of undiluted weld metal in as-welded condition shall not exceed 200BHN

- B.3.3 Average CVN impact energy taken on five specimens after PWHT at  $630 \pm 10^{\circ}\text{C}$  for 2 hrs shall be 5.0 Kg-m / 49 Joules minimum when tested at minus  $30^{\circ}\text{C}$ . No single specimen value shall be less than 3.6 Kg-m / 35 Joules minimum .
- B.3.4 Hydrogen induced cracking (HIC) & Sulphide Stress Corrosion Cracking (SSCC) test on undiluted weld metal in as-welded condition as per NACE-TM-02-84 standard & using the acidified test solution specified in NACE standard TM 0177 and shall meet the following:

Crack length ratio (CLR)  $\leq 5\%$   
Crack Sensitivity Ratio (CSR)  $\leq 1\%$

**C) SIZE, CORE WIRE, COVERING, EXPOSED CORE, IDENTIFICATION:**

- C.1 The electrode shall be supplied in diameters and lengths as specified in the purchase order. The tolerance on diameter and length shall be as per SFA-5.02.
- C.2 The electrodes shall meet the requirements of clause 3.2, 3.3, 3.4 of SFA-5.02

**D) FILLET WELD TEST:**

Fillet weld test done using this electrode shall meet the requirements specified in ASME SEC II C SFA 5.1, E7018

**E) MOISTURE CONTENT OF COVERING:**

Moisture content of the electrode covering shall not exceed the limit specified in ASME SEC II C, SFA 5.1 E7018

**F) PACKAGING:**

- F.1 Electrodes in standard quantity shall be wrapped tightly in a corrugated paper with moisture proof packing in polythene bags and sealed. These shall be further packed either in hermetically sealed containers or in cardboard packets and then packed with polythene bags and sealed.
- F.2 The number of electrodes per packet shall be such that the net weight of each packet does not exceed 5Kg. Packets shall be further packed in cardboard cartons each weighing not more than 25Kg. The cartons shall be packed in waterproof boxes with crates so as to ensure no damage during shipment and normal storage conditions.
- F.3 Weight of each crate shall not exceed 1000Kg.
- F.4 Markings of packages shall be as per clause 4.6 of SFA-5.02

**G) TESTING & CERTIFICATION:**

- G.1 Each consignment of electrodes supplied shall be from one batch only.
- G.2 Lot/Batch classification shall be Class C1 as per SFA-5.01 filler metal procurement guidelines of ASME SEC II Part C (Latest Edition and Addenda)
- G.3 The level of testing shall be Schedule-K of section 5.0 & Table 1 of SFA 5.01 Filler metal procurement guidelines of ASME SEC II Part C (Latest Edition and Addenda)

- G.4** Batch Test Certificate (BTC) incorporating with a certificate of compliance as "We certify that the supply made against this batch Test certificate conform to all requirements as per SFA 5.1 E7018 of ASME SEC II Part C (Latest Edition and Addenda) and addenda and NACE SP0472 (applicable on the date of issue of purchase order) and meets additional requirements specified in this TDC document" shall be sent.
  - G.5** The batch(es) to be supplied shall be tested by NABL approved lab and shall have EIL approved (like CEIL TPI agency) Third party inspection approval for the batch supplied and the same BTC shall be sent prior to despatch of the material.
- H)** Any deviation from TDC shall be clearly specified vide offer. Offer shall specify whether the offered brand fully meet the TDC requirements or not. Otherwise, it will be treated that all TDC requirements are met with.

**LIST OF PMD VENDORS – E7018 NACE**

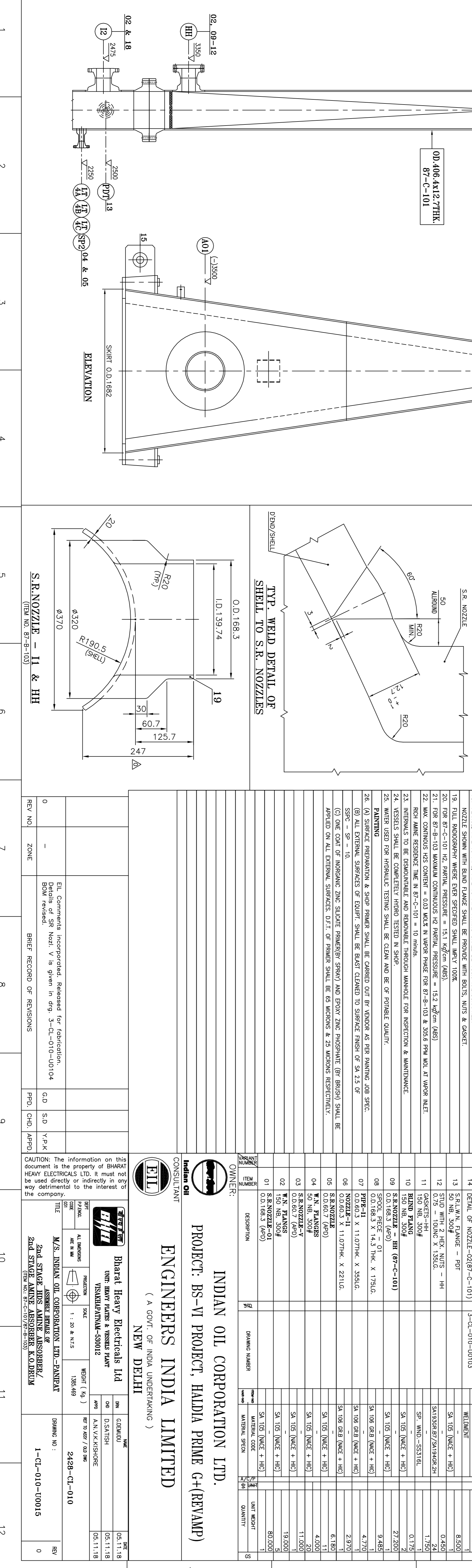
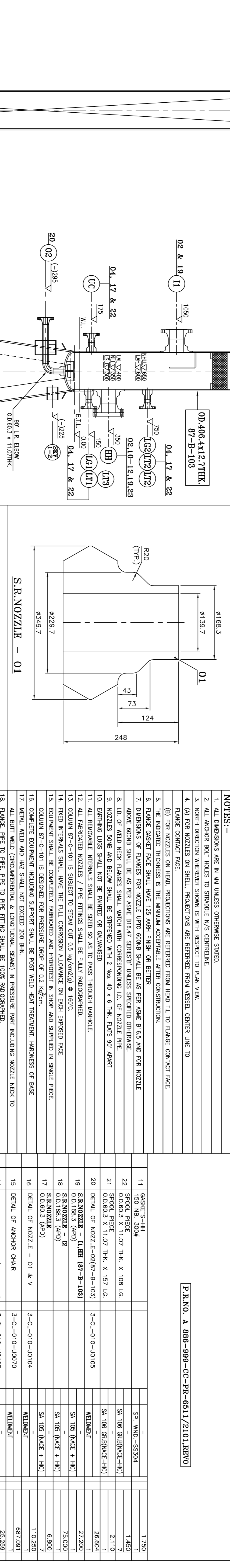
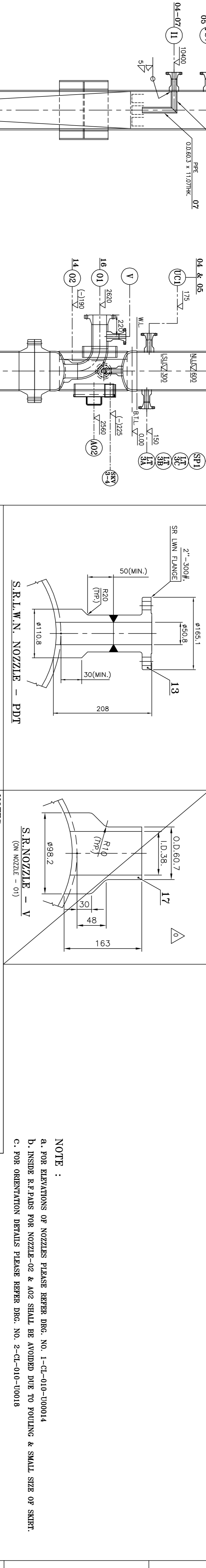
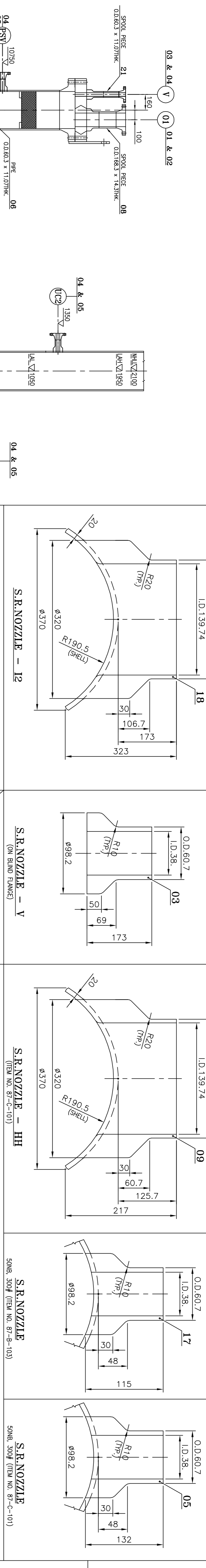
<b>AWS</b>	E7018 NACE	<b>Group</b>	08-consumables		
<b>SIZE</b>	3.15, 4, 5MM	<b>MATERIAL CODE</b>	182411101730 (PCS); 182411101740 (PCS); 182411101750 (PCS);		
<b>MATERIAL GROUP</b>	WELD ELEC				
<b>MATERIAL GROUP DESCRIPTION</b>	E7018 NACE SMAW ELECTRODE				
<b>TDC NO. -VIZAG</b>	E7018N REV. 3 DT. 09.02.2019	<b>SFA NO.</b>	5.1		

Mat Group	Vendor No	Vendor Name	Size Detail	Brand	country	EMAIL	PHONE1	contact person	Address	
WELD ELEC		HONAVAR ELECTRODES PVT. LTD.	3.15, 4, 5	ULTIMATE-18NC	INDIA	honavarelectrodes@gmail.com; honavarmarketing@gmail.com	022-25020317	p venkata rao/Area Manager Mob: 9866224859	H.O: 305-309, 3RD FLOOR, DAMJI SHAMJI INDUSTRIAL COMPLEX, 9 LBS MARG, KURLA (WEST), MUMBAI - 400 070; TEL - 91-22-2502 0317 / 2502 1238 / 65008821; FAX - 91-22-2510 0048; EMAIL: hal@vsnl.com; Website: www.honavarelectrodes.net	
WELD ELEC		D&H secheron Electrodes Pvt. Ltd	3.15, 4, 5	SUPRATHER ME (MOD)	INDIA	sales@dnhsecheron.net; dnhchn@dnhsecheron.net;	0731-4229222; 0-96850-91106	SHIV CHATURVEDI - 9685091121		

WELD ELEC		LINCOLN ELECTRIC	3.15, 4, 5	JETWELD LH70	INDIA	mohamed_aleem@lincolnelectric.in; Klpandey@lincolnelectric.in; sankaranarayanan@lincolnelectric.in; 'info@lincolnelectric.in'		9940537816 – Mohamed aleem		
WELD ELEC		GEE LIMITED	3.15, 4, 5	Gricon Green (SPL) NC	INDIA	mpdhanuka@geelimited.com; srinivas@geelimited.com; hyderabad@geelimited.com	02522 281176, 02522 281188	C SRINIVAS/Regional Manager - 9848115444 M.P. DHANUKA - 9820504504 Executive Director- Technical & Marketing	Regd. Off & Works: Plot No.B -12,MIDC,Kalyan-Bhiwandi Road,Saravli,Kalyan(West)-421311 Thane,Maharastra,India. Tel : +91-02522-281176/88/90 Fax :+91-02522-281199 E-mail : sales@geelimited.com; Website : www.geelimited.com	
WELD ELEC		ANAND ARC LIMITED	3.15, 4, 5	ANANDTHERME (N)	INDIA	mkverma@anandarc.com		D KRISHNAMURTHY - DIRECTOR -MARKETING; mk verma - 7045918330/GM-MARKETING	New No. 22, Old no. 31, Railway colony, III street, Aminjikarai, Chennai - 600029, Tel-044-23746379, 044-23741841, Fax - 044-23741841	

WELD ELEC		ADOR WELDING LIMITED	3.15, 4, 5		INDIA	sankararao@adorians.com; ninadthigale@adorions.com	9553553355	P SANKAR-SR. AREA SALES MANAGER-9553553355; NINAD THIGALE - TECH MARKETING & PRODUCT DEVELOPMENT - 9552554150 ; hari ganesh - Vendor development	CORPORATE MARKETING OFFICE, P.B. NO. 2, CHINCHWAD, PUNE, 411019	
WELD ELEC		VOESTALPINE BOHLER WELDING	3.15, 4, 5	BOHLER FOX N EV50-1 (SPL):	INDIA	naveenkumar@voestalpine.com; suresh.prakash@voestalpine.com; parwati.shivanagi@voestalpine.com	2381271759; 9818471482; 7290024560	Naveen kumar/National sales manager - 9818471482; Suresh prakash/Regional sales Manager/south - 7290024560	B.201,UNIVERSAL BUSINESS PARK, CHANDIVLI FARM ROAD, OFF SAKI VIHAR ROAD, SAKI NAKA, MUMBAI, 400072	DEALER: M/s. SAANVI ENTERPRISES





**NOTES:-**

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
2. ALL ANCHOR BOLT HOLES TO SPINDLE N/S CENTERLINE.
3. NORTH DIRECTION WHEREVER SHOWN IS WITH RESPECT TO PLAIN VIEW.
4. (A) FOR NOZZLES ON SHELL, PROJECTIONS ARE REFERRED FROM VESSEL CENTER LINE TO FLANGE CONTACT FACE.
5. (B) FOR NOZZLES ON HEAD, PROJECTIONS ARE REFERRED FROM HEAD T.I. TO FLANGE CONTACT FACE.
6. THE INDICATED THICKNESS IS THE MINIMUM ACCEPTABLE AFTER CONSTRUCTION.
7. DIMENSIONS OF FLANGES FOR NOZZLE UP TO 600MM SHALL BE AS PER ASME B16.5 AND FOR NOZZLE ABOVE 600MM SHALL BE AS PER ASME B16.47 SERIES UNLESS OTHERWISE SPECIFIED.
8. I.D. OF WELD NECK FLANGES SHALL MATCH WITH CORRESPONDING I.D. OF NOZZLE PIPE.
9. NOZZLES 50MM AND BELOW SHALL BE CENTERED WITH 2 Nos. 40 x 8 THK. ELAS 90° ABERT
10. FINISHING LUGS SHALL NOT BE PAINTED OR GALVANIZED.
11. ALL REMOVABLE INTERNALS SHALL BE SIZED SO AS TO PASS THROUGH MANHOLE.
12. ALL FABRICATED NOZZLES / PIPE FITTINGS SHALL BE FULLY RADIOGRAPHED.
13. COLUMN 87-C-101 IS SUBJECT TO STEAM OUT 0.5 kg/cm<sup>2</sup> @ 180°C.
14. FRIGID INTERNALS SHALL HAVE THE FULL CORROSION ALLOWANCE ON EACH EXPOSED FACE.
15. EQUIPMENT SHALL BE COMPLETELY FABRICATED AND HYDROTEST IN SHOP AND SUPPLIED IN SINGLE PIECE.
16. COLUMN 87-C-101 IS DESIGNED FOR PRESSURE DROP OF 0.2 kg/cm<sup>2</sup>.
17. METAL WELD AND HAZ SHALL NOT EXCEED 200 BHNL.
18. ALL BUTT WELD (CIRCUMFERENTIAL & LONGITUDINAL SEAMS) IN PRESSURE PART INCLUDING NOZZLE NECK TO NOZZLE SHOWN WITH BLIND FLANGE SHALL BE PROVIDED WITH BOLTS, NUTS & GASKET.
19. FULL RADIOGRAPHY WHERE EVER SPECIFIED SHALL IMPLY 100%.
20. FOR 87-C-101 1/2, PARTIAL PRESSURE = 15.1 kg/cm<sup>2</sup> (ABS).
21. FOR 87-B-103 MAXIMUM CONTINUOUS 1/2 PARTIAL PRESSURE = 15.2 kg/cm<sup>2</sup> (ABS).
22. MAX. CONTINUOUS USE CONTAIN = 0.03 MILE IN VAPOR PHASE FOR 87-B-103 & 305.8 PPM MOL. AT VAPOR ALET.
23. MAX. ALLOWED RESIDUE TIME IN 87-C-101 = 10 minutes.
24. INTERNALS TO BE DISMOUNTABLE AND REMOVABLE THROUGH MANHOLE FOR INSPECTION & MAINTENANCE.
25. VESSELS SHALL BE COMPLETELY HYDRO TESTED IN SHOP.
26. WATER USED FOR HYDRAULIC TESTING SHALL BE CLEAN AND BE OF POTABLE QUALITY.

**PAINTING**

26. (A) SURFACE PREPARATION & SHOP PRIMER SHALL BE CARRIED OUT BY VENDOR AS PER PAINTING JOB SPEC.

SPFC - SP - 10.

(B) ALL EXTERNAL SURFACES OF EQUIPT. SHALL BE BLAST CLEANED TO SURFACE FINISH OF SA 2.5 OF

(C) ONE COAT OF ANODIC ZINC SILICATE PRIMER (SPRAY) AND EPOXY ZINC PHOSPHATE (BY BRUSH) SHALL BE APPLIED ON ALL EXTERNAL SURFACES. DFT. OF PRIMER SHALL BE 65 MICRONS & 25 MICRONS RESPECTIVELY.

**NOTE :**

- a. FOR ELEVATIONS OF NOZZLES PLEASE REFER DRG. NO. 1-CL-010-000014
- b. INSIDE R.F.PADS FOR NOZZLE-02 & A02 SHALL BE AVOIDED DUE TO PILING & SMALL SIZE OF SKIRT.
- c. FOR ORIENTATION DETAILS PLEASE REFER DRG. NO. 2-CL-010-000018

P.R.NO. A 886-999-CC-PR-6511/2101.REV00

NO.	DESCRIPTION	QTY	UNIT
11	GASKETS-HH	1	PAIR
12	SPNDL. PRCE	1	PC
22	0.060.3 X 11.07 THK. X 108 LG.	1	PC
21	0.060.3 X 11.07 THK. X 157 LG.	1	PC
20	DETAIL OF NOZZLE-02(87-B-103)	1	PC
19	S.R.NOZZLE - 11(HH (87-B-103)	1	PC
18	S.R.NOZZLE - 12	1	PC
17	S.R.NOZZLE	1	PC
16	DETAIL OF NOZZLE - 01 & V	1	PC
15	DETAIL OF ANCHOR CHAIR	1	PC
14	DETAIL OF NOZZLE-02(87-C-101)	1	PC
13	S.R.L.W.N. FLANGE - PDT	1	PC
12	TOLD WITH HEX. NUTS - HH	1	PC
11	GASKETS-HH	1	PC
10	BLIND FLANG	1	PC
09	S.R.NOZZLE - HH (87-C-101)	1	PC
08	SPNDL. PRCE (87-C-101	1	PC
07	PPR-11	1	PC
06	NOZZLE-11	1	PC
05	S.R.NOZZLE	1	PC
04	W.N. FLANGERS	1	PC
03	S.R.NOZZLE-V	1	PC
02	W.N. FLANGERS	1	PC
01	S.R.NOZZLE	1	PC

**INDIAN OIL CORPORATION LTD.**  
**PROJECT: BS-VI PROJECT, HALDIA PRIME G+ (REVAMP)**  
**ENGINEERS INDIA LIMITED**  
 (A GOVT. OF INDIA UNDERTAKING)  
**NEW DELHI**

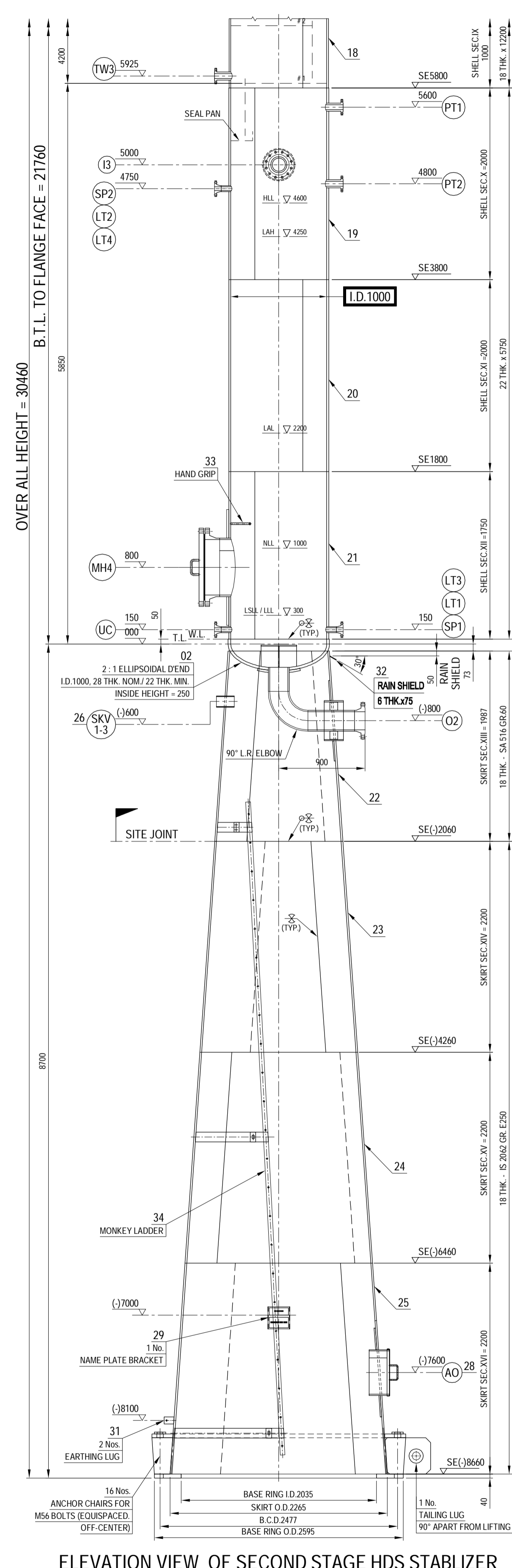
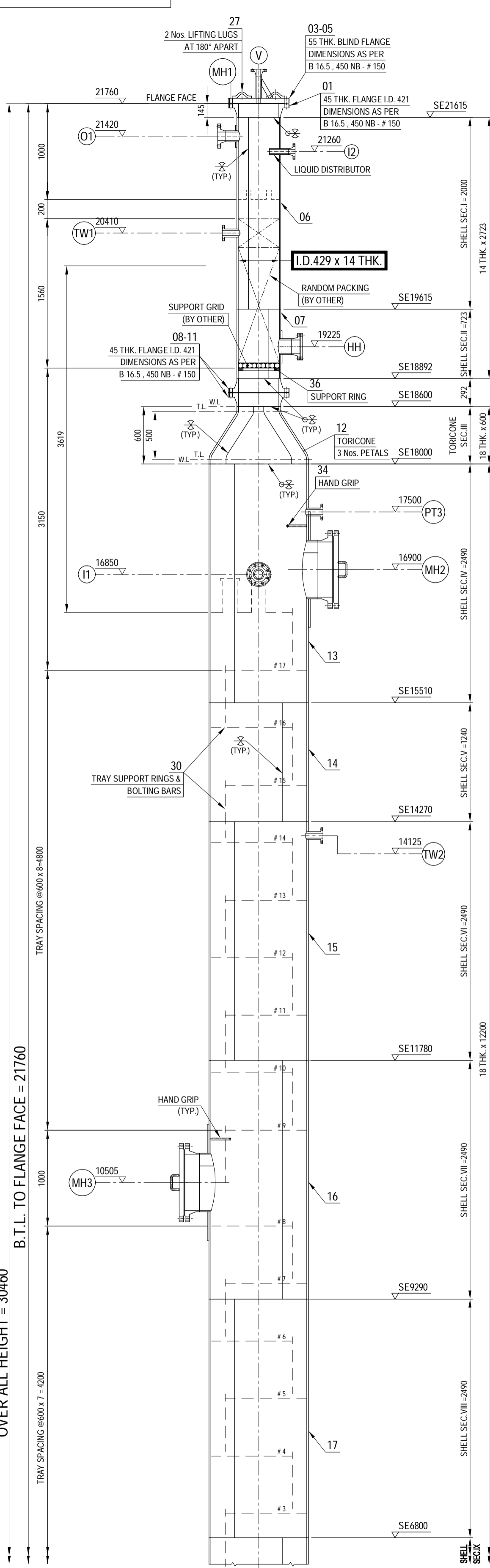
**OWNER:**  
**INDIAN OIL CORPORATION LTD.**

**CONSULTANT:**  
**Engineers India Limited**  
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 2nd Stage, JMS Avenue, JSSRORR/2,  
 HALDIA PRIME G+ (REVAMP)  
 (ITEM NO. 87-C-101-000015)

**DATE:** 05.11.18  
**REV:** 05.11.18  
**BY:** A.N.V.K.SINGH  
**CHECKED:** D.S.MISHRA  
**DATE:** 05.11.18

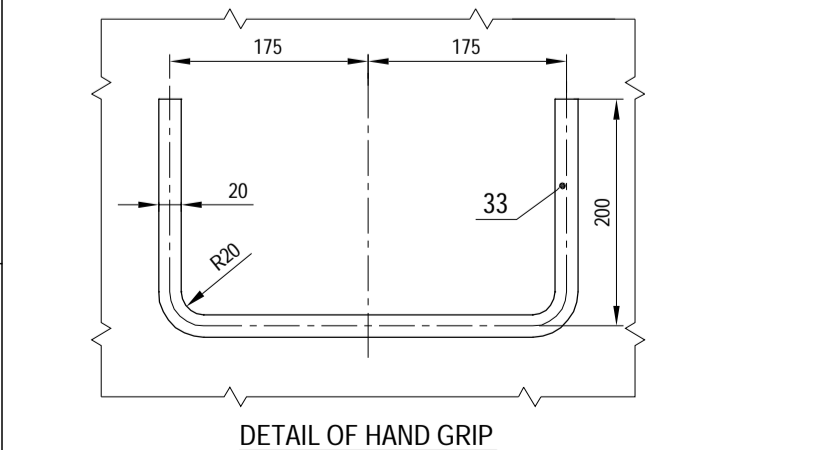
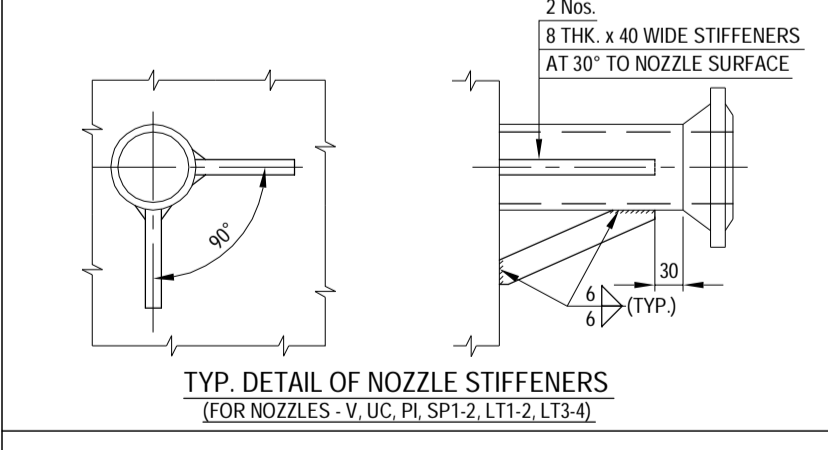
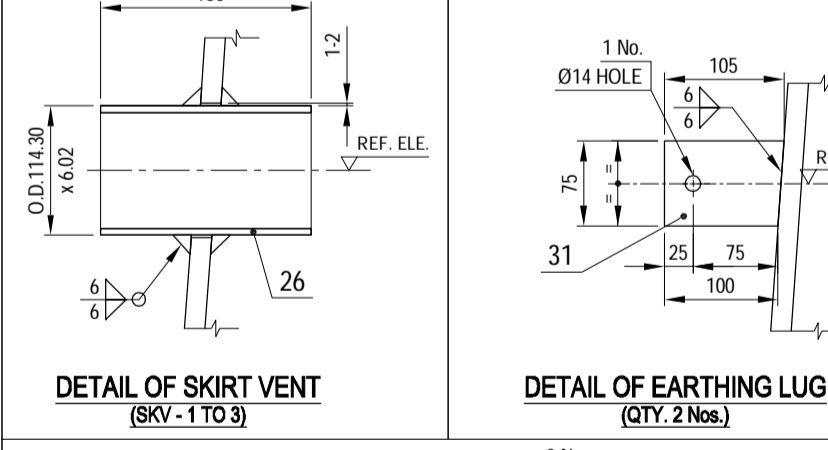
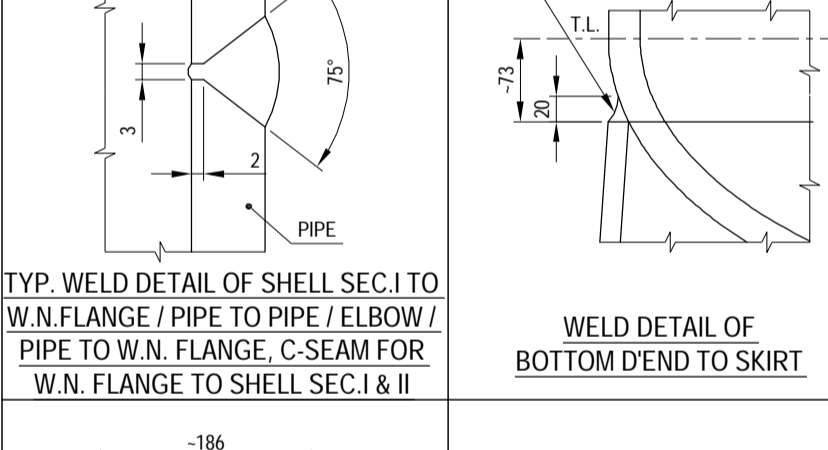
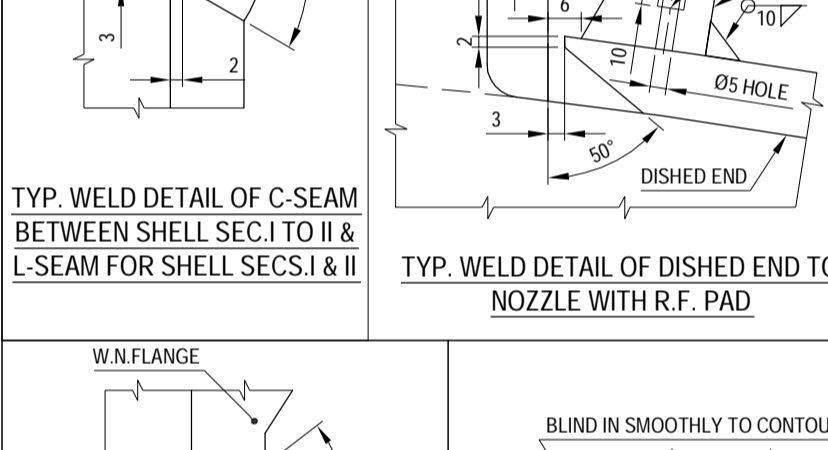
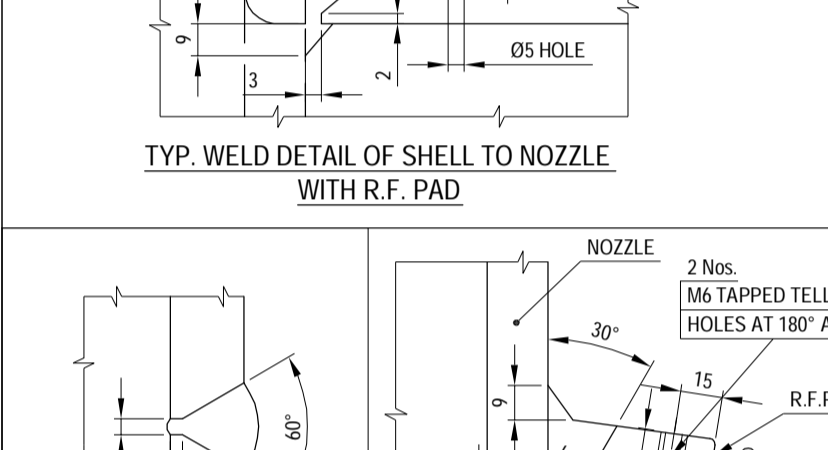
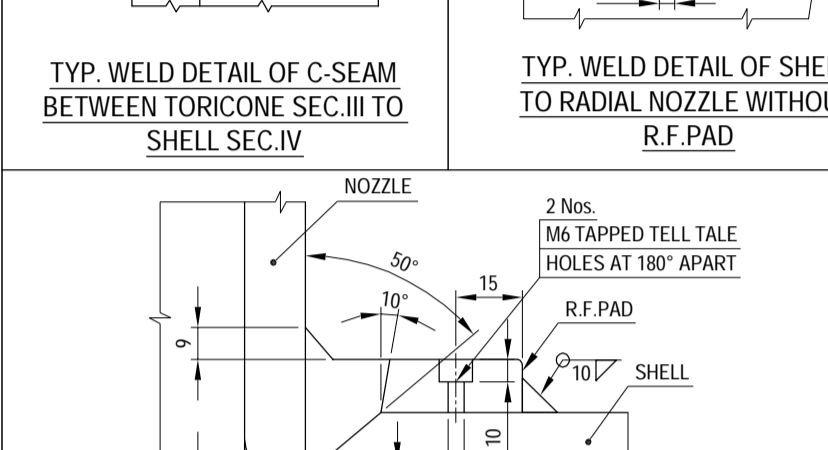
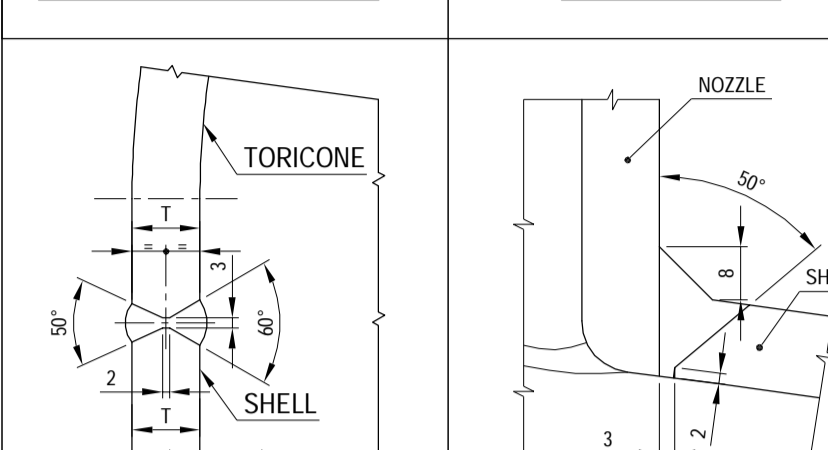
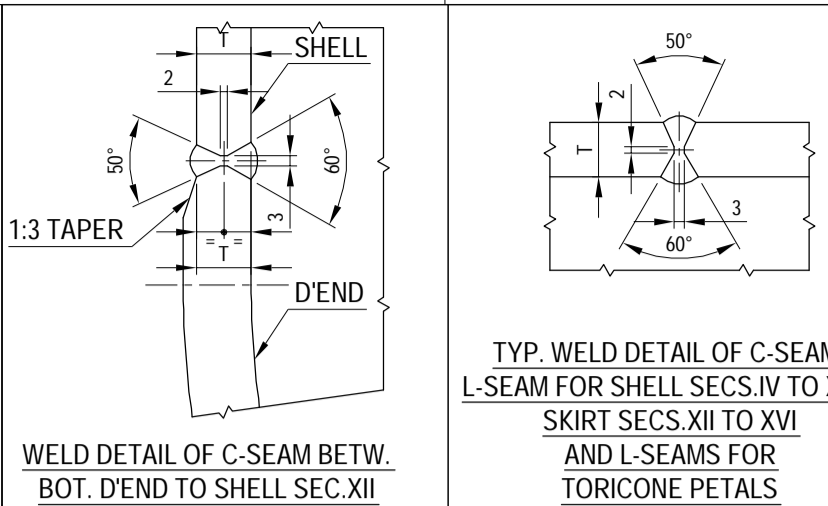
REV. NO.	ZONE	DESCRIPTION	APPD.	CHKD.	APPD.
0	-	ELI Comments incorporated. Released for fabrication. Details of SR Nozz. V is given in dpg. 3-CL-010-00104 BOM revised.	PPD.	CHD.	APPD.

910001-020-70-1 : ON ONLY



ELEVATION VIEW OF SECOND STAGE HDS STABILIZER (ITEM NO.87-C-102)

PR NO. A886-999-CC-PR-6511 / 2101, REV.0



**NOTES:-**

- (A) ALL FLANGE BOLT HOLES TO STRADDLE CENTRE LINE OF VESSEL AS PER EIL STD.NO.7-12-0015 REV.6
- (B) ALL ANCHOR BOLT HOLES TO STRADDLE N/S CENTRELINE.
- (C) NORTH DIRECTION WHEREVER SHOWN IS WITH RESPECT TO PLAN VIEW.
- FLUID CONTAIN H2S AND H2
- FOR NOZZLES ON SHELL, PROJECTIONS ARE REFERRED FROM VESSEL CENTER LINE TO FLANGE CONTACT FACE.
- (B) FOR NOZZLES ON HEAD, PROJECTIONS ARE REFERRED FROM HEAD T.L. TO FLANGE CONTACT FACE.
- FLANGE GASKET FACE SHALL HAVE 125 AARH FINISH OR BETTER
- I.D. OF WELD NECK FLANGES SHALL MATCH WITH CORRESPONDING I.D. OF NOZZLE PIPE.
- ALL REMOVABLE INTERNALS SHALL BE SIZED SO AS TO PASS THROUGH NEAREST MANHOLE.
- (A) R.F.PADS ARE TO BE WELDED TO SHELL SUCH THAT ONE TELL TALE HOLE WILL BE AT (B) R.F.PADS SHALL BE PNEUMATICALLY TESTED FOR LEAK TIGHTNESS TO 1.05 KG/SQ.CM (G) WITH SOAP SOLUTION ON ALL ATTACHMENT WELDS.
- (C) TELL TALE HOLES SHALL NOT BE PLUGGED & SHALL BE FILLED WITH HARD GREASE ONLY.
- WHEREVER R.F.PADS / PADS CROSS OVER WELD SEAMS OF VESSEL THE WELD IS TO BE GROUND FLUSH, P.T.CHECKED & RADIOGRAPHED BEFORE WELDING THE ATTACHMENTS.
- ALL SHARP CORNERS TO BE ROUNDED OFF.
- ALL BUTT WELDS OF PRESSURE PARTS ARE FULL PENETRATION TYPE.
- FILLET WELD SIZES INDICATED SHOWS THE LEG SIZE AND ARE MINIMUM.
- TRAY ELEVATIONS GIVEN ARE TO THE TOP OF SUPPORT RINGS.
- COLUMN IS SUBJECT TO STEAM OUT CONDITION OF 0.5 kg/cm (g) AT 160°C (NOT IN BHEL HVPV SPEC)
- PLATE MATERIAL IS 2062 GR.B (E250 QUALITY B) MAY BE REPLACED BY PLATES TO MATERIAL SPECN. SA 516 GR.60 / 70
- NO ATTACHMENT OTHER THAN SHOWN ON THE DRAWING IS TO BE WELDED WITHOUT PRIOR APPROVAL OF THE EIL / TECHNOLOGY DEPT.
- TAILING LUG SHALL BE PROVIDED AT 90° TO LIFTING LUGS
- PICKLING AND PASSIVATION OF ALL SS SURFACES SHALL BE CARRIED OUT ASTM A380.
- (A) ALL BUTT JOINTS (LONGITUDINAL & CIRCUMFERENTIAL) INCLUDING NOZL. NECK FLANGE , PIPE TO PIPE AND PIPE TO PIPE FITTING SHALL BE 100% RADIOGRAPHED.
- (B) ALL NOZZLES FABRICATED FROM PLATE SHALL BE 100% RADIOGRAPHED.
- THE NOZZLES LT1 & LT2, LT3 & LT4 ARE PAIR OF INSTRUMENT NOZZLES. TOLERANCES SHALL BE STRICTLY FOLLOWED AS PER NOTE-5 OF EIL STD.NO.7-12-0001 REV.5
- GASKETS USED DURING HYDRAULIC TEST SHALL BE OF SAME SPECIFICATION AS SERVICE GASKETS.
- WATER USED FOR HYDRAULIC TESTING SHALL BE CLEAN AND BE OF POTABLE QUALITY.
- VESSEL SHALL BE COMPLETELY HYDROTESTED IN SHOP.
- PAINTING**
- (A) ALL EXTERNAL SURFACES OF EQUIPT. SHALL BE BLAST CLEANED TO SURFACE FINISH OF SA 2.5 OF SSPC - SP - 10.
- (B) ONE COAT OF INORGANIC ZINC SILICATE PRIMER SHALL BE APPLIED ON ALL EXTERNAL SURFACES . D.F.T. OF PRIMER SHALL BE 75 MICRONS.
- (C) NO OVER COATING TO BE DONE ON AS IT WILL LEAD TO MID CRACKING.
- EQUIPMENT SHALL BE TRANSPORTED IN TWO PIECE.
- ALL INSPECTION REQUIREMENTS SHALL BE AS PER APPLICABLE QUALITY PLAN.
- EARTHING LUGS ARE NOT TO BE PAINTED (OR) GALVANISED.
- LENGTH OF SKIRT SECTION SHALL SUITABLY CUT AND PREPARE WELD EDGE FOR SITE JOINT BEFORE TRANSPORTATION.
- COLUMN SHALL BE ASSEMBLED AT SITE IN HORIZONTAL POSITION COMPLETE IN ALL RESPECTS INCLUDES LOCAL NDT.
- COMPLETE EQUIPMENT INCLUDING (TOP COURSE OF SKIRT) SUPPORT SHALL BE POST WELD HEAT TREATED. HARDNESS OF BASE METAL WELD & HAZ SHALL NOT EXCEED 200 BHN.

REV NO.	ZONE	BRIEF RECORD OF REVISIONS	PPD.	CHD.	APPD.
34	MONKEY LADDER	2-CL-020-U0025			
33	HAND GRIP FOR MH NOZZLES 20 x 20 x 735 LG.				
32	RAIN SHIELD	3-CL-020-U0099			
31	EARTHING LUG 10 THK. x 105 X 75 TRAY SUPPORTING RINGS & BOLTING BARS				
30	DETAIL OF NAME PLATE BRACKET	3-CL-020-U0083			
29	DETAIL OF ACCESS OPENING	3-CL-020-U0079			
28	DETAIL OF LIFTING LUG	3-CL-020-U0082			
27	SKIRT VENT PIPE SKV1-3				
26	SKIRRT SECTION-XVI				

MARK NO.	QTY.	SERVICE	N.P.S.	O.D.	SCH. THK.	RATING TYPE / CLASS	FACE	R.F.PAD	PROJE.	REMARKS
AO	1	ACCESS OPENING	18"	450	14 THK.	-	-	18 THK.	A.P.D.	
SKV	3	SKIRT VENTS	4"	114.3	40	6.02	-	-	-	
LT	2	LEVEL TRANSMITTER (DP TYPE)	2"	60.3	XXS	11.07	300	W.N./R.F.	-	670
LT	2	LEVEL TRANSMITTER (DP TYPE)	2"	60.3	XXS	11.07	300	W.N./R.F.	-	670
SP	1-2	STAND PIPE	2"	60.3	XXS	11.07	300	W.N./R.F.	-	670
PT	1-3	PRESSURE TRANSMITTER	-	50.8	I.D.	-	300	L.W.N.	-	670
UC	1	UTILITY CONNECTION	2"	60.3	XXS	11.07	300	W.N./R.F.	-	670
V	1	VENT	2"	60.3	XXS	11.07	300	W.N./R.F.	-	A.P.D.
TW	2-3	THERMOWELL	-	50.8	I.D.	-	300	L.W.N.	-	670
TW-1	1	THERMOWELL	-	50.8	I.D.	-	300	L.W.N.	-	380
MH-4	1	MANHOLE + B.F. + DAVIT	24"	610.0	16 THK.	-	150	W.N./R.F.	300 x 22	770
MH	2	MANHOLE + B.F. + DAVIT	24"	610.0	16 THK.	-	150	W.N./R.F.	300 x 18	770
MH-1	1	MANHOLE + B.F.	18"	457.0	16 THK.	-	150	W.N./R.F.	-	A.P.D.
HH	1	HAND HOLE + B.F.	6"	168.3	120	14.27	150	W.N./R.F.	85 x 14	430
O2	1	LIQUID OUTLET	8"	219.1	100	15.09	300	W.N./R.F.	110 x 25	1430
O1	1	VAPOR OUTLET	4"	114.3	160	13.49	300	W.N./R.F.	60 x 14	430
I3	1	REBOILER RETURN	6"	168.3	120	14.27	300	W.N./R.F.	85 x 22	720
I2	1	REFLUX INLET	2"	60.3	XXS	11.07	300	W.N./R.F.	-	380
II	1	FEED INLET	4"	114.3	160	13.49	300	W.N./R.F.	60 x 18	720

TABLE OF NOZZLES AND FLANGES

DESIGN DATA		ASME SECTION VIII DIV.-1 EDITION 2015	
WORKING PRESSURE	(Kg/Cm <sup>2</sup> g)	INT. TOP 7.8	BOT. 8.1
DESIGN PRESSURE	(Kg/Cm <sup>2</sup> g)	INT. 9.6	EXTR. FV
WORKING TEMPERATURE	(°C)	TOP 152	BOTTOM 198
DESIGN TEMPERATURE	(°C)	INT. 228	EXTR. 198
MDMT	(°C)	5	
CORROSION ALLOWANCE	(mm)	6 (FIXED)   3 (REMOVABLE)	
TYPE OF HEAD		BOTTOM: 2:1 ELLIPSOIDAL	TOP: BLIND FLANGE
JOINT EFFICIENCY		SHELL 1.0	HEAD / TORICONE : 1
RADIOGRAPHY		SHELL FULL	HEAD / TORICONE : FULL
POST WELD HEAT TREATMENT		YES (NOTE-28)	
HEAT TREATMENT		N/A	
OPERATING MEDIUM		HYDROCARBON	
SP. GRAVITY		0.683	
WIND SPECIFICATION		IS:875	
EARTH QUAKE SPECIFICATION		IS:1893 + SITE SPECTRA	
CAPACITY	(M <sup>3</sup> )	14.86	
PAINTING / CLEANING		AS PER SPECN. (NOTE-22)	
INSULATION THICKNESS (mm) (HEAT CONSERVATION)		50 mm HOT	
FIRE PROOFING (BY OTHERS)		YES	
HYDROSTATIC TEST	(Kg/Cm <sup>2</sup> g)	12.48	HORIZONTAL VERTICAL (AT TOP)
PRESSURE (NEW & COLD)	(HOLD) TPIA		
INSPECTION BY			
<b>APPROXIMATE WEIGHT (Kgs.)</b>		SEISMIC (DB)	171000
ERECTOR	: 23000	OPERATING	: 58000
HYDROTEST (SHOP)	: 37800	HYDROTEST (FIELD)	: 687000
WIND		SEISMIC (MC)	186000
			11000
			191000
			12500

**VESEL SL NO. : 26638**

ITEM NO.	DESCRIPTION	QTY.	UNIT	WEIGHT	QTY.	WEIGHT
24	SKIRRT SECTION-XV PLATE 18 THK.	1	N	0.00	1	0.00
23	SKIRRT SECTION-XIV PLATE 18 THK.	1	N	0.00	1	0.00
22	SKIRRT SECTION-XIII PLATE 18 THK.	1	N	0.00	1	0.00
21	SHELL SECTION-XII PLATE-22X3211X1750	1	N	970.36	1	970.36
20	SHELL SECTION-XI PLATE-22X3211X2000	1	N	1108.98	1	1108.98
19	SHELL SECTION-X PLATE-22X3211X2000	1	N	1108.98	1	1108.98
18	SHELL SECTION-IX PLATE-18X3198X1000	1	N	451.90	1	451.90
17	SHELL SECTION-VIII PLATE-18X3198X2490	1	N	1125.22	1	1125.22
16	SHELL SECTION-VII PLATE-18X3198X2490	1	N	1125.22	1	1125.22
15	SHELL SECTION-VI PLATE-18X3198X2490	1	N	1125.22	1	1125.22
14	SHELL SECTION-V PLATE-18X3198X1240	1	N	560.35	1	560.35
13	SHELL SECTION-IV PLATE-18X3198X2490	1	N	1125.22	1	1125.22
12	TORICONE SECTION-III 3 PETALS	1	N	0.00	1	0.00
11	1/8" STUD WITH NUT 150 LG.	16	N	1.180	16	1.180
10	TOP FLANGE 450NB, #150 45 THK.	1	N	0.00	1	0.00
09	GASKET 450NB, #150 3 THK.	1	N	0.00	1	0.00
08	TOP FLANGE 450NB, #150 45 THK.	1	N	0.00	1	0.00
07	SHELL SECTION-II PLATE-18X1379X723	1	N	140.89	1	140.89
06	SHELL SECTION-I PLATE-18X1379X2000	1	N	389.75	1	389.75
05	1/8" STUD WITH NUT 150 LG.	16	N	1.180	16	1.180
04	GASKET 450NB, #150 3 THK.	1	N	0.00	1	0.00
03	BLIND FLANGE 450NB, #150 55 THK.	1	N	0.00	1	0.00
02	BOTTOM DISHED END 28 THK.NOM./22 THK.MIN.	1	N	0.00	1	0.00
01	TOP FLANGE 450NB, #150 45 THK.	1	N	0.00	1	0.00

**INDIAN OIL CORPORATION LTD.**  
PROJECT: BS-IV PROJECT - HALDIA PRIME G+ (REVAMP)

**ENGINEERS INDIA LIMITED**  
(A GOVT. OF INDIA UNDERTAKING)  
NEW DELHI

**Bharat Heavy Electricals Ltd**  
UNIT: HEAVY PLATES & VESSELS PLANT  
VISAKHAPATNAM-530012

DATE: 30.10.2018  
SIGNATURE: D.BATHISH  
DATE: 30.10.2018  
SIGNATURE: A.N.V.KRANTHI KISHORE

SCALE: 1:30 & N.T.S.  
WEIGHT (Kg.): 2428-CL-020

**GENERAL ASSEMBLY OF SECOND STAGE HDS STABILIZER (ITEM NO.87-C-102)**

DRAWING NO.: 1-CL-020-U0016

**DOCUMENT REVIEW DETAILS**

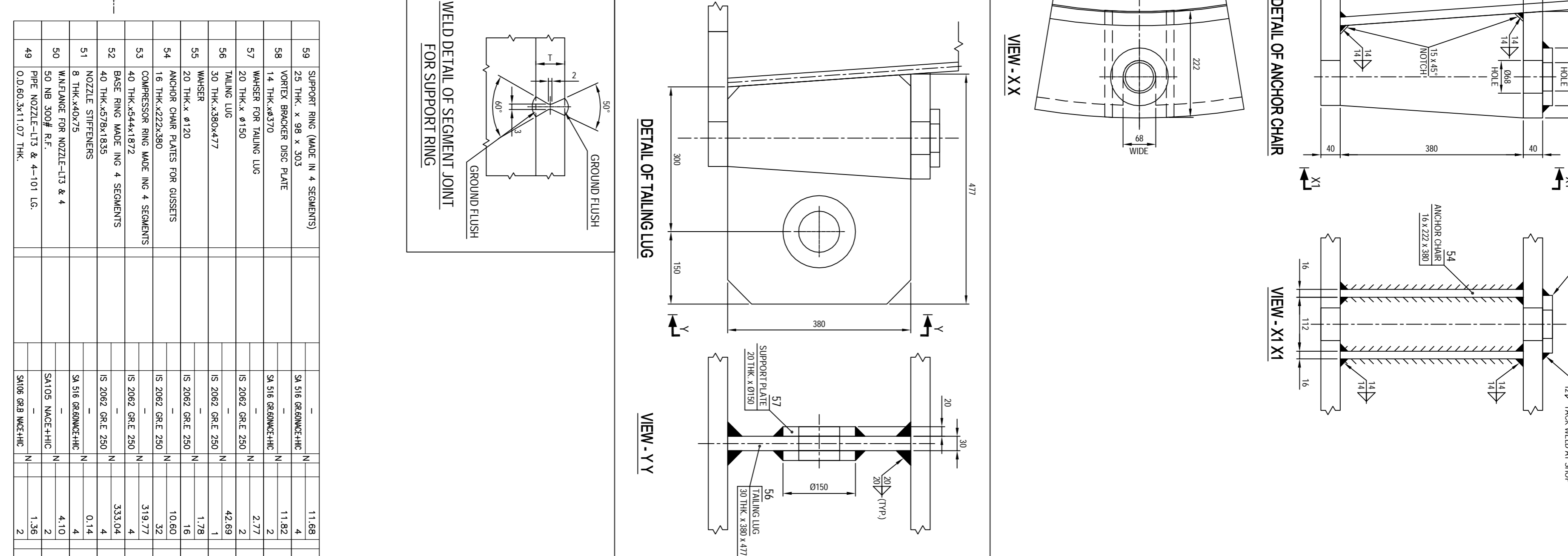
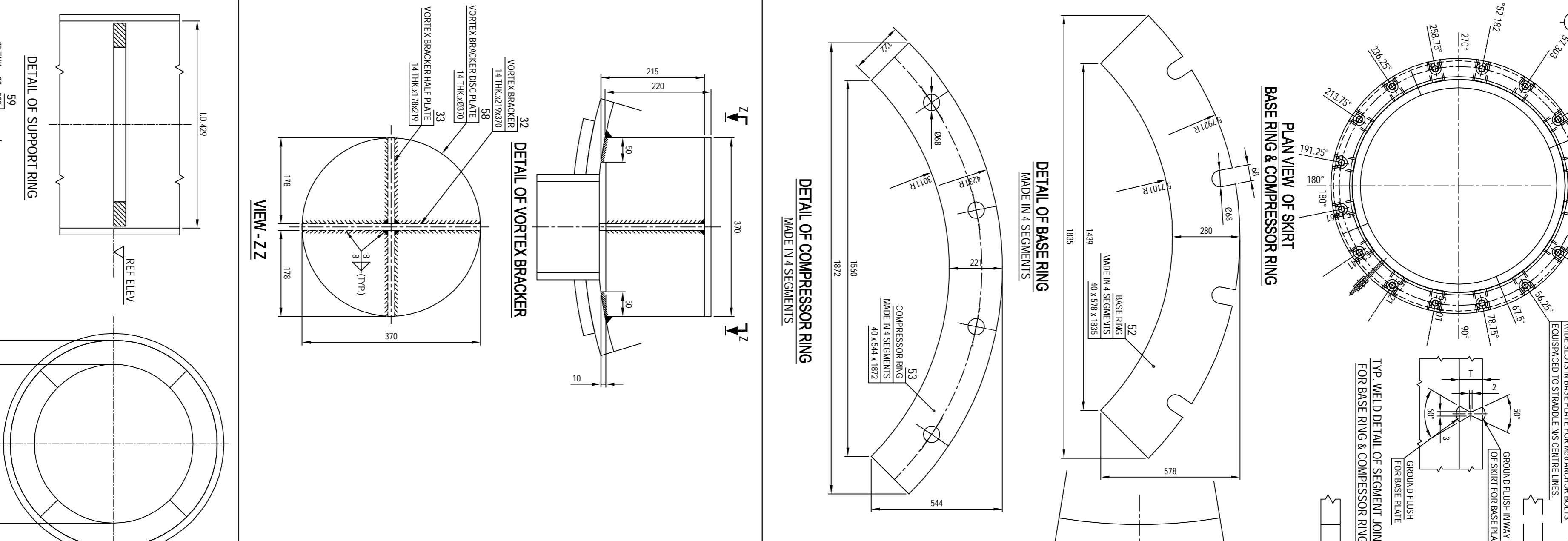
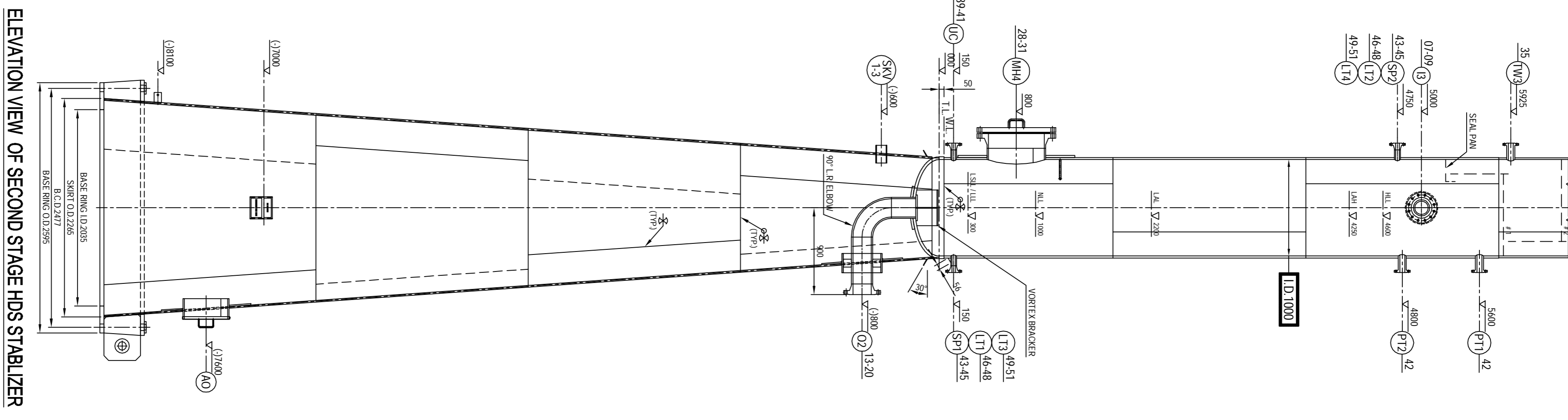
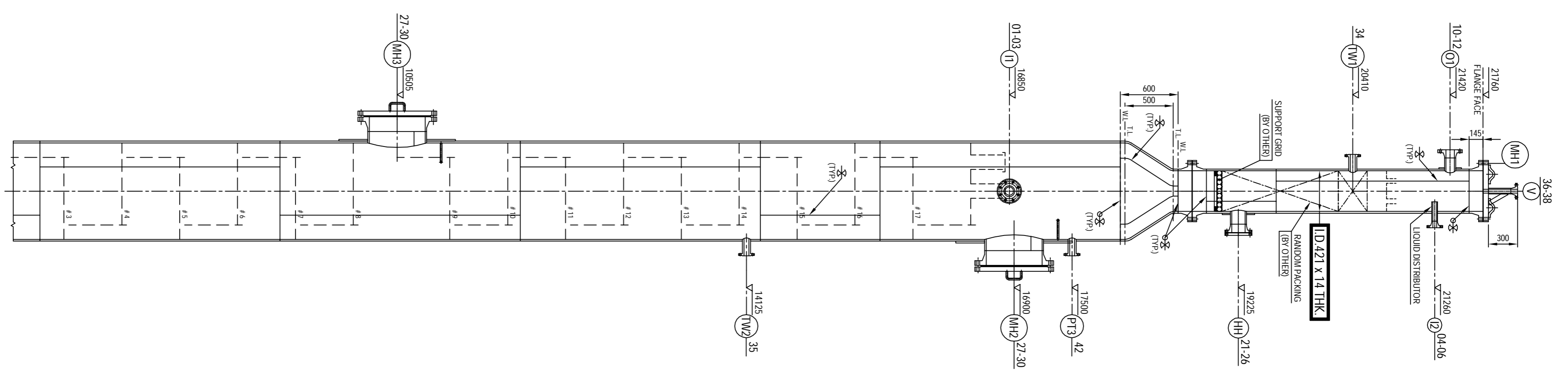
1. No. of comments: 0

2. Proceed with manufacture / fabrication as per the commented document. Revised document required.

3. Document does not conform to basic requirements as marked. Requested for review.

4. Retained for Records.

Signature with Date: 29-NOV-2018  
Name of Reviewer: KUMAR TARUN (A328)



ITEM NO.	DESCRIPTION	QTY	UNIT	REMARKS
48	NOZZLE STIFFENERS	0.14	N	
49	NOZZLE STIFFENERS	4.10	N	
50	NOZZLE STIFFENERS	1.35	N	
51	NOZZLE STIFFENERS	0.14	N	
52	NOZZLE STIFFENERS	4.10	N	
53	NOZZLE STIFFENERS	2.00	N	
54	NOZZLE STIFFENERS	6.58	N	
55	NOZZLE STIFFENERS	0.46	N	
56	NOZZLE STIFFENERS	4.10	N	
57	NOZZLE STIFFENERS	1.35	N	
58	NOZZLE STIFFENERS	0.46	N	
59	NOZZLE STIFFENERS	4.10	N	
60	NOZZLE STIFFENERS	1.35	N	
61	NOZZLE STIFFENERS	0.46	N	
62	NOZZLE STIFFENERS	4.10	N	
63	NOZZLE STIFFENERS	1.35	N	
64	NOZZLE STIFFENERS	0.46	N	
65	NOZZLE STIFFENERS	4.10	N	
66	NOZZLE STIFFENERS	1.35	N	
67	NOZZLE STIFFENERS	0.46	N	
68	NOZZLE STIFFENERS	4.10	N	
69	NOZZLE STIFFENERS	1.35	N	
70	NOZZLE STIFFENERS	0.46	N	
71	NOZZLE STIFFENERS	4.10	N	
72	NOZZLE STIFFENERS	1.35	N	
73	NOZZLE STIFFENERS	0.46	N	
74	NOZZLE STIFFENERS	4.10	N	
75	NOZZLE STIFFENERS	1.35	N	
76	NOZZLE STIFFENERS	0.46	N	
77	NOZZLE STIFFENERS	4.10	N	
78	NOZZLE STIFFENERS	1.35	N	
79	NOZZLE STIFFENERS	0.46	N	
80	NOZZLE STIFFENERS	4.10	N	
81	NOZZLE STIFFENERS	1.35	N	
82	NOZZLE STIFFENERS	0.46	N	
83	NOZZLE STIFFENERS	4.10	N	
84	NOZZLE STIFFENERS	1.35	N	
85	NOZZLE STIFFENERS	0.46	N	
86	NOZZLE STIFFENERS	4.10	N	
87	NOZZLE STIFFENERS	1.35	N	
88	NOZZLE STIFFENERS	0.46	N	
89	NOZZLE STIFFENERS	4.10	N	
90	NOZZLE STIFFENERS	1.35	N	
91	NOZZLE STIFFENERS	0.46	N	
92	NOZZLE STIFFENERS	4.10	N	
93	NOZZLE STIFFENERS	1.35	N	
94	NOZZLE STIFFENERS	0.46	N	
95	NOZZLE STIFFENERS	4.10	N	
96	NOZZLE STIFFENERS	1.35	N	
97	NOZZLE STIFFENERS	0.46	N	
98	NOZZLE STIFFENERS	4.10	N	
99	NOZZLE STIFFENERS	1.35	N	
100	NOZZLE STIFFENERS	0.46	N	

FOR ORIENTATION & ELEVATION OF NOZZLES PLEASE REFER DRG. NO. 1-CL-020-U0016

**PR NO. A886-999-CC-PR-6511 / 2101, REV.0**

**ELEVATION VIEW OF SECOND STAGE HDS STABILIZER**  
(ITEM NO. 87-C-102)

**DETAIL OF SUPPORT RING**

**DETAIL OF SUPPORT RING SEGMENT**

**PLAN VIEW OF SUPPORT RING**  
(MADE IN 4 SEGMENTS)

**DETAIL OF VORTEX BRACKER**

**DETAIL OF COMPRESSOR RING**  
(MADE IN 4 SEGMENTS)

**DETAIL OF TAILING LUG**

**WELD DETAIL OF SEGMENT JOINT FOR SUPPORT RING**

**DETAIL OF ANCHOR CHAIR**

**VIEW - Z-Z**

**VIEW - X-X**

**VIEW - Y-Y**

**VIEW - X1-X1**

REV. NO.	DATE	DESCRIPTION	APPD.	CHKD.	APPRD.
04-01-2019		HEAVY ELECTRICALS INCORPORATED BOM REVISION, RELEASED FOR FABRICATION			

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

**INDIAN OIL CORPORATION LTD.**  
PROJECT: BS-IV PROJECT - HALDIA  
PRIME G+ (REVAMP)

**ENGINEERS INDIA LIMITED**  
(A GOVT. OF INDIA UNDERPRANKING)  
NEW DELHI

**Bharat Heavy Electricals Ltd**  
UNIT: BHARAT HEAVY ELECTRICALS PLANT  
VIKRAMADITYA NAGAR, BHARATPUR, RAJASTHAN-300012  
INDIA

**ASSEMBLY DETAILS OF SECOND STAGE HDS STABILIZER**  
(ITEM NO. 87-C-102)

ISSUED: 1-CL-020-U0017

DATE: 08-FEB-2019

REVIEWER: PANDEY SUNIL KUMAR (6882)

APPROVED: [Signature]