



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

ENQUIRY	Phone: +91 431 257 7653 Email : karunanidhy@bhel.in spsy@bhel.in kmk@bhel.in Web : www.bhel.com
NOTICE INVITING TENDER	

TWO PART BID	Enquiry Number:	Enquiry Date:	Due date for submission of quotation:
Tender to be submitted in two Parts	2621800002	12.01.2018	06.02.2018

You are requested to quote the Enquiry number date and due date in all your correspondence. This is only a request for quotation and not an order.

Please note that under any circumstances both delayed offer and late offers will not be considered. Hence vendors are requested to ensure that the offer is reaching physically our office before 14.00 hrs on the Date of tender opening.

Item	Description	Quantity	(Indigenous Vendors) Matl. will be Delivered to
10	Twin Electrode GTAW system for Cladding Application with Rotator and Column & Boom as per the technical specification & commercial conditions applicable (to be downloaded from web site (http://www.bhel.com) http://www.bhel.com/tender/tender_home.php or https://eprocure.gov.in/epublish/app)	1.00 No.	FOR, BHEL Stores, High Pressure Boiler Plant, Tiruchirappalli - 620014

Important points to be taken care during submission of offer

1. Material shall be delivered to: Indigenous Vendors: As stated above.
Foreign Vendors: CFR Chennai Seaport / CFR Chennai Airport
2. Delivery required 6 Months including PDI from the date of purchase order.
3. Erection & Commissioning period required 4 Weeks from the date of intimation by BHEL to vendor for deputation of their Engineers for E&C.
4. EMD for this Tender will be (INR) : 2,00,000.00
5. Compliance Form Nos.: TRY/IMP/01 & TRY/IND/01A to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.
6. All updates, amendments, corrigenda, etc., (if any), for each tender will be posted only on the above websites from time to time, as and when required, until each tender is opened. There will be no publication of such updates, amendments, corrigenda, etc., through newspapers or any other media.

BHEL's General guidelines / instructions (refer MM / CE / GENL / 001 - EMD) including bank guarantee formats and list of consortium banks, commercial terms check-list can be downloaded from BHEL web site (<http://www.bhel.com>) http://www.bhel.com/tender/tender_home.php or from the Government tender website <https://eprocure.gov.in/epublish/app> under above Enquiry reference.

(This is not an E-tender, please submit your offer in hard copies)
Tenders should reach us before 14:00 hours on the due date
Tenders will be opened at 14:30 hours on the due date
Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present

Yours faithfully,
For **BHARAT HEAVY ELECTRICALS LIMITED**

DCM / Capital Equipment / MM

PART - A

TENDER REQUIRMENT OF THE SUPPLY OF “TWIN ELECTRODE GTAW CLADDEING APPLICATION WITH ROTATOR AND COLUMN & BOOM”

SECTION – I: Qualifying Criteria

The BIDDER has to compulsorily meet the Qualification Criteria indicated in Section 1 to get qualified. Otherwise the technical offer will not be considered.

S. No.	TENDER PARTICULARS	VENDOR's RESPONSE
1.1	Only those (OEMs), who have supplied and commissioned at least two complete “TWIN ELECTRODE GTA CLADDEING APPLICATION WITH ROTATOR AND COLUMN & BOOM” of the offered model in the past ten years (on the date of opening of Tender). Vendor to specify.	
1.2	Only those vendors (OEMs) should quote, who have supplied and commissioned in the last 10 years (as on the original date of tender opening) at least TWO “TWIN ELECTRODE GTA CLADDEING APPLICATION WITH ROTATOR AND COLUMN & BOOM” of the offered model. EITHER (i) In at least one country other than the country of origin to establish vendor's global business activity. OR (ii) In India; and the referred machines are presently working satisfactorily for more than one year from the date of commissioning (as on the original date of tender opening). The name and contact addresses of the customers to whom the above said machine were supplied to be furnished with details.	
1.3	Vendor has to submit at least ONE PERFORMANCE CERTIFICATE for satisfactory performance of “TWIN ELECTRODE GTA CLADDEING APPLICATION WITH ROTATOR AND	

	COLUMN & BOOM” as referred under clause 1.2 above, for a minimum period of one year from the Date of commissioning (as on the original date of tender opening) from their customers in India or in any other country outside the country of origin, supplied and commissioned in the last 10 years.	
1.4	Performance certificate as Original Certificate of E-mail directly from the customer may be submitted. The original certificate may be returned after verification by BHEL, if required. For furnishing the Performance Certificate, a suggestive format is provided as an enclosure (ANNEXURE-A) .	
1.5	BHEL reserves the right to verify the information provided by the Vendor for the referred machine at their referred customer’s works. It shall be the responsibility of the vendor to facilitate the visit of BHEL’s team at their refereed customer works. The Travel, Board, and Lodging expenses for BHEL Personnel shall be borne by BHEL. In case the information provided by vendor is found to be false / incorrect, the offer shall be rejected. BHEL reserves the right to accept or reject the OEM’S based on the assessment of their technical and financial capability.	

SECTION – II

The BIDDER/VENDOR are requested to provide the following information:-

S. No.	TENDER PARTICULARS	VENDOR's RESPONSE
2.1	The BIDDER / VENDOR to furnish Reference List of Customers, with complete address, details of contact person, where "TWIN ELECTRODE GTA CLADDEING APPLICATION WITH ROTATOR AND COLUMN & BOOM" have been supplied in the past	
2.2	Specify details of "TWIN ELECTRODE GTA CLADDEING APPLICATION WITH ROTATOR AND COLUMN & BOOM" supplied to other unit of BHEL, if any (Year of commissioning with details etc).	
2.3	Details on SERVICE –AFTER-SALES Set-up in India including the Address of Agent/Service Centers In India.	
2.4	Any Additional data to supplement the manufacturing capability of the BIDDER for the subject equipment.	

SECTION – III

The BIDDER to note:

S. No.	TENDER PARTICULARS	VENDOR's RESPONSE
3.1	The BIDDER shall submit the offer in TWO PARTS - Technical [with PART A & PART B] & Commercial and Price Bid.	
3.2	The Offer shall contain a comparative statement of Technical Specifications given by BHEL and the Offer Details submitted by the Bidder, against each clause. A just 'CONFIRMED' or 'COMPLIES' or 'YES' or 'NO-DEVIATION' or similar words in the technical comparative statement may lead to disqualification of the Technical Offer. In case of any deviations in any of the technical specifications, such deviations should be clearly specified in the comparative statement. All systems and sub systems proposed in the solution should be detailed in description with illustrations/photographs, if required	
3.3	The BIDDER shall assure a continuous support for SPARES and SERVICE for five	

	years, from the date of commissioning of the equipment at BHEL Works.	
3.4	The Technical Offer shall be supported by Product Catalogue and Data Sheets in ORIGINAL and complete technical details / literature on the QUOTED MODELS of Hot Wire Narrow Gap TIG welding system (s).	
3.5	The Commercial Offer (given with the Technical Offer) shall contain the Scope of Supply and the Un-Priced Part of the Price-Bid, for confirmation for the scope of supply.	
3.6	Earlier performance & field experience (service support) with BHEL (if any) will be a reckoning factor for the technical qualification of the OFFER. Vendor can quote of supply to BHEL units of systems of similar capability.	

ANNEXURE -A**Suggested Format of Performance Certificate**

The Performance should be certified by the customer on Customer's Letter Head and submitted along with the offer.

PERFORMANCE CERTIFICATE

1.0	Name of the Machine:	
2.0	Suppliers name	
3.0	Make & Model Number of the Welding System, Powersource, Welding Head / Torch and other Major Accessories	
4.0	Month & Year of Commissioning	
5.0	Application for which the Welding System is used	
6.0	MACHINE DETAILS :	
6.1	Size of the jobs performed in the machine	
	a) Plate /Pipe thickness (minimum and maximum) in mm b) Pipe inner diameter (minimum and maximum) in mm c) Materials	
7.0	Performance of the Machine (Please tick the appropriate option)	☐ Satisfactory ☐ Non Satisfactory
8.0	Service after sales (Please tick the appropriate option)	☐ Satisfactory ☐ Non Satisfactory
9.0	Other remarks (if any)	
Date:		Signature & Seal of the Authority Issuing the Performance Certificate

PART B**TECHNICAL SPECIFICATIONS FOR "TWIN ELECTRODE GTAW CLADDEING APPLICATION WITH ROTATOR AND COLUMN & BOOM"**

S. No	PARTICULARS AND BHEL SPECIFICATION	VENDOR'S OFFER
1.0	PURPOSE & APPLICATION	
1.1	a) The system should be suitable to clad Inconel NiCr₃ material to tube sheet end curved surface of primary dished head curved surface, ID of inlet, outlet, manhole nozzle to primary dished head, gasket seating surface of both primary and secondary manhole nozzles and ID of steam outlet nozzle using Twin Electrode GTAW process. b) The technology comprises of Two TIG electrode with hot wire feeding system specially for high speed cladding application of weld deposition min 5 -6 kg/hr. c) The cladding technique intended of higher deposition with lower dilution level. d) The system should be suitable for carrying out the cladding in curved surface of dished end by rotating the job and keeping the Twin torch stationary either in 1G or 2G position. e) The system should be suitable for carrying out the cladding in inner surface of nozzle just by rotating the ETR system (Twin Electrode Torch) only and keeping the job stationary up to inner diameter of 700 mm f) The system should include the all category of cladding torch suitable for inner diameter range from 30 mm to 700 mm.	Vendor to confirm

	g) The machine shall also consist of suitable heavy duty Column & Boom with necessary cross slide arrangement to hold and maneuver the twin TIG torch system & a 30 T capacity tilting type positioner / job rotator synchronized with the welding function / program to hold and maneuver the job to clad the required profile. The system is capable to withstand the preheat temperature of 150-degree C and Post weld heat treatment soaking temperature of 300-degree C h) Presently the preheating is done by burner flame of special design which is inserted from the back side the positioner through center hole. The positioner must have the provision to center opening for fixing the gas burners.		
2.0	JOB DETAILS		
2.1	a) Dished end SA-10 (Refer Annexure 1a)	• Max. diameter 2600 mm • Weight: - 8 Tons • Cladding thickness: 12 mm • Cladding Position: 1G /2G • Cladding will be done on ID of the curved surface by rotating the job and holding the Twin Tungsten Electrode torch stationary.	Vendor to consider while designing the system.
	b) Nozzles (Outer diameter) (Refer Annexure 1b)	• Diameter range from 450 to 600 mm • Depth of nozzle 150 to 250 mm • Cladding thickness: - 12 mm • Cladding Position: - 2-G	

		Cladding will be done on ID of the nozzle by rotating the torch and keeping the job stationary.	
	c) Tube sheet end (Refer Annexure 1c)	- Max. diameter 2600 mm - Height: 690 mm - Weight: - 20.0 Tons - Cladding thickness: - 12 mm - Cladding Position: 1G /2G - Cladding will be done on ID of the curved surface by rotating the job and holding the Twin Tungsten Electrode torch stationary.	
	d) Steam Outlet nozzle (Refer Annexure 1b, similar with different inlet diameter)	- Diameter: - 618 mm - Weight: - 2.5 tons. - Cladding Position: - 2-G - Cladding will be done on ID of the nozzle by rotating the torch and keeping the job stationary.	
2.2	MATERIAL		
	a) Dished end b) Nozzles c) Tube sheet dished end d) Steam Outlet nozzle e) Gasket seating surface	- Low alloy steel 20MnMoNi55 - Low alloy steel 20MnMoNi55 - Low alloy steel 20MnMoNi55 - Low alloy steel 20MnMoNi55 - Low alloy steel 20MnMoNi55	Vendor to consider while designing the system.

2.3	WELDING CONSUMABLE		
	a) Filler wire specification b) Filler wire diameter c) Filler wire spool size	• ER NiCr3 • 1.2 • 15 kg	Vendor to confirm
2.4	PRE-HEATING, INTERPASS TEMPERATURE		
	a) Preheating temperature b) Interpass Temperature	• 150-degree C • 350 degree C	Vendor to ensure the capability of system at this temperature range
3.0	SCOPE OF SUPPLY		
3.1	Digital Inverter based DC TIG welding power source suitable for twin electrode with hot wire feeding, suitable cooling units, operating remote pendent, System controller with industrial PC , licensed Software and all necessary accessories to control all the component	1 set	Vendor to confirm
3.2	Endless rotating welding head with Twin Tungsten electrode (for inner diameter up to 700 mm)	1 set	Vendor to confirm
3.3	WELDING TORCHES a) TWIN ELECTROD CLADDING TORCH Twin tungsten electrode welding torch (single torch with 2 electrode) for surface cladding and ID nozzle cladding of diameter range from 150 mm to 700 mm. b) SINGLE ELECTROD TORCH Conventional cladding torch for nozzle ID cladding from for min diameter of 30 mm and above (For ID tube cladding).	1 set of torches to cover the complete range	Vendor to inform

	c) Torch should be equipped with swiveling head for different angles like, 0, 30, 45, 60 and 90		
3.4	5x4 meter Column & Boom with cross slide for holding the welding head (Column with 360 degree rotating movement)	1 set	
3.5	Custom make tilting rotary positioner with min. 30 Tons capacity	1 set	
3.6	Data logger and data viewer	1 set	
3.7	Interconnection cable for all components	For all connection	
3.8	Machine spares and consumables	For 5 years	
3.9	Equipment Inspection and Acceptance at Vendors Place		
3.10	Documentation	3 set soft and hard copy	
3.11	Equipment Installation, Commissioning, training at BHEL & actual component programming.		
3.12	Guarantee	As per clause no. 15	
3.13	General Points	As per clause no. 16	
Note: - Vendor has to suggest the best programming sequence for actual dished end component to achieve the higher productivity and quality.			
4.0	DIGITAL INVERTER BASED DC TIG WELDING POWER SOURCE, CONTROLLER, COOLING UNIT & REMOTE PENDENT		
4.1	Two numbers of welding power source with digital inverter based technology (Compatible for programming for TIG cold & hot wire feeding)		Vendor to provide the detailed information about the number of welding power source
4.2	Input Voltage supply	3-phase, 415, 50 Hz	Vendor to specify
4.3	Input voltage tolerance Limit		Vendor to specify
4.4	Welding Current Range	5 – 500 Amps	Vendor to confirm
4.5	Duty cycle (min)	350 @ 100 % DC	Vendor to confirm

4.6	Programmable pre and post gas flow rate		Vendor to confirm
4.7	Power source equipped with both with pulsing & without pulsing with synchronized wire feeding.		Vendor to confirm
4.8	Programming adjustment for starting and end current with upslope time and down slope time should be available		Vendor to confirm
4.9	Storage memory for storing.	min 99 welding parameters	Vendor to confirm
4.10	Facility for wire start delay and wire feeding pulsing		Vendor to confirm
4.11	Wire feed speed range		Vendor to specify
4.12	Wire diameter can be used		Vendor to specify
4.13	Control shielding gas flow through power source		Vendor to specify
4.14	External emergency stop synchronization		Vendor to specify
4.15	Degree of protection		Vendor to specify
4.16	Good visibility welding pendent for controlling the welding parameter during welding		Vendor to specify
4.17	An external water cooling unit		Vendor to specify
4.18	Coolant tank capacity		Vendor to specify
4.19	Max. Pump Pressure		Vendor to specify
4.20	DC TIG welding inverter power source for hot wire feeding to improve the productivity		Vendor to specify
4.21	Power source should have CC/CV operation for wire heating during hot wire TIG welding process		Vendor to specify
4.22	Input Power supply for hot wire power source	230 V, single Phase, 50Hz	Vendor to specify
4.23	Max. duty cycle for hot wire power source	min 150 A @ 100% DC	Vendor to confirm
4.24	Industrial PC for data input / data recording / data monitoring, min 12" TFT-touch display with touch pad with additional key board		Vendor to specify

4.25	The power source must be inbuilt with axis cards to control the welding power source, hot wire power source, Rotating positioner axis, Rotary welding head, linear axis (cross slide), motorized slide for AVC & OSC function and column & boom		Vendor to specify
4.26	Software programming language should be in English only		Vendor to specify
4.27	Offline programming should also be available		Vendor to specify
4.28	Equipment must have auto centering facility		Vendor to specify
4.29	The controller should be suitable to be used dual cathode twin tungsten hot wire TIG cladding process		Vendor to specify
4.30	Controller should have provision to display actual values in digits during welding		Vendor to specify
5.0	ENDLESS TORCH ROTATING WELDING HEAD		
5.1	Welding head is compatible with TWIN Tungsten in single torch with hot wire system		
5.2	Welding head should be able to rotate endless times during overlay welding		Vendor to specify
5.3	Working diameter range with • With single electrode (Nozzle Id of min 30 mm to 320 & flat & curved surface in 1G/2G OR 3G position • twin electrode. (Nozzle ID from 150 mm to 700 mm & flat & curved surface in 1G/2G & 3G position)		Vendor to specify
5.4	Welding Process TIG Hot/Colt wire		Vendor to specify
5.5	Welding head is to be compatible with Twin Tungsten electrode with continuous hot wire feeding and also with conventional cladding welding torches.		Vendor to specify

5.6	The welding head should be able to transfer of shielding gas, coolant, power & electrical signals without interruption during rotation of torch.		Vendor to specify
5.7	Welding head rotation speed range		Vendor to specify
5.8	Welding head for integrated slide with AVC		Vendor to specify
5.9	AVC stroke (travel distance)		Vendor to specify
5.10	Machine torch holder for hot wire TIG torch and easy change over should be available.		Vendor to specify
6.0	TWIN TUNGSTEN ELECTRODE TORCH		
6.1	Conventional single electrode water cooled cladding Torch should be available for min. inside diameter ranging from 30 to 150 mm mm suitable for weld overlay.		Vendor to specify
6.2	Twin electrode water cooled cladding torch for surface cladding and inner diameter nozzle cladding from 150 to 700 mm without rotating the job.		Vendor to specify
6.3	Torch should be equipped with swiveling head for different angles like, 0, 30, 45, 60 and 90 degree for different-different application		Vendor to specify
6.4	Cladding torch should be with different current capacity from 200 to 500 A @ 100% DC		Vendor to provide the detail information
6.5	Torch travel depth both for single electrode and double electrode		Vendor to specify
6.6	Dual cathode /Twin tungsten torch should be with 500 Amps current carrying capacity		Vendor to specify
6.7	Twin tungsten torch should have hot wire feeding for higher deposition rate and higher productivity		Vendor to specify
6.8	Hot wire feeding tubes should be water cooled		Vendor to specify
6.9	Twin tungsten torch should have adjustable torch head both in vertical and horizontal position.		Vendor to specify

6.10	Cladding torch should be robust and designed with proper insulation inside to withstand the HF striking voltage & high working temperature		Vendor to specify
7.0	5X4 M COLUMN & BOOM WITH CROSS SLIDE		
7.1	Max. load capacity shall be designed based on the capability of carrying the load of the endless rotary welding head with torch and other accessories	Kindly specify the load carrying capacity	Vendor to specify
7.2	Input voltage supply for Column & Boom		Vendor to specify
7.3	Vertical boom travel speed	100 – 2000 mm/min	Vendor to confirm
7.4	Horizontal boom travel speed	100 – 2000 mm/min	Vendor to confirm
7.5	Min / Max height under boom	1000 mm / 6000 mm	Vendor to confirm
7.6	Vertical boom travel	5000 mm	Vendor to confirm
7.7	Horizontal boom travel	4000 mm	Vendor to confirm
7.8	Deflection of boom		Vendor to specify
7.9	Column & Boom with carriage to be designed for position and guiding of welding heads and accessories		Vendor to specify
7.10	Should be useful for various application in combination with welding turn table, Rotator unit, (circular seam and longitudinal seam and overlay welding)		Vendor to confirm
7.11	Column & boom can be enable to rotate 360 degree and arrangement for locking and unlocking for any position as required		Vendor to confirm
7.12	Mounted on rigid fabricated base complete with machine guideways for elevation of boom carriage		Vendor to confirm
7.13	Robust steel boom carriage counter balanced and fitted with an anti-fall safety device.		Vendor to confirm

7.14	Boom machined accurately through its length and mounted in adjustable guide rollers running in totally enclosed bearing, giving vibration less movement of mounted devices.		Vendor to confirm
7.15	Lifting facility such as hook		Vendor to specify
7.16	Limit switch function should be available for both horizontal and vertical movement		Vendor to confirm
7.17	Accessories: Platform for control unit / power source, mounting plates , torch brackets,		Vendor to specify
7.18	Function: Forward/Reverse, UP/Down, travel speed, Emergency stop- all the function should be available in both manual remote and controller remote.		Vendor to specify
7.19	Must have built in variable frequency motor drives on both vertical and horizontal axis, to enable axes to work as step axis and welding axis respectively.		Vendor to specify
7.20	Cross slide travel distance Vertical / Horizontal		Vendor to specify
7.21	Programmable travel speed of column & boom		Vendor to specify
7.22	Slide should be motorized with control for step axis and manual torch positioning and also for AVC in TIG/Hot wire TIG		Vendor to specify
7.23	Cross slide should have manual swivel / tilting unit	+ / - 45 degree	Vendor to confirm
9.0	TILTING ROTARY POSITIONER MIN 30 TONS CAPACITY		
Note: - Positioner must have the provision for inserting the burger from the back side through center hole. Vendor has to verify the positioner fabrication drawing before fabrication. Refer Annexure 3 a, b & c			
8.1	Max. load capacity in vertical position	30000 kg (30 Tons)	Vendor to confirm
8.2	Degree of table tilting	135 deg Max	Vendor to confirm
8.3	Degree of table rotation	360 deg	Vendor to confirm
8.4	Max. load table horizontal		Vendor to specify

8.5	Table diameter	Min 3000 mm	Vendor to confirm
8.6	Variable speed table rotation		Vendor to specify
8.7	Max. rotation torque		Vendor to specify
8.8	Max. tilting torque		Vendor to specify
8.9	Rated Center of Gravity	500 mm	Vendor to specify
8.10	Rated Eccentricity	150 mm	Vendor to specify
8.11	Motor Rating of Rotation drive		Vendor to confirm
8.12	Motor Rating of Tilting drive		Vendor to confirm
8.13	Control unit built in with variable frequency motor drives		Vendor to specify
8.14	Face plate with concentric circular markings		Vendor to confirm
8.15	Minimum and Maximum diameter of job can be clamped		Vendor to specify
8.16	Tilting with AC motor fitted with fail-safe electromagnetic brake		Vendor to confirm
8.17	Cam operated limit switch to prevent overrun and fixed tilting speed		Vendor to specify
8.18	Face plate thickness		Vendor to specify
8.19	Faceplate should have sandwich design to be able to withstand up to 300 degree C for preheating parts and post heating parts		Vendor to confirm
8.20	Should have function : left/right/stop; tilting Up/Down; rotation speed; Emergency Stop		Vendor to confirm
8.21	Should be controllable from both the main system controller remote and dedicated remote for the turn table,		Vendor to confirm
8.22	Anti-back lash device should be available		Vendor to specify
9.0	DATA LOGGER AND DATA VIEWER		
9.1	Date logger and Date viewer through controller shall be capable of measuring and recording all operating variables including voltage, current, gas flow rate etc. for the entire duration of welding		Vendor to confirm

9.2	Both data logger and data viewer should run on an external PC/main controller without need for any extra device		Vendor to confirm
9.3	Date logger should have the facility to export the data into excel sheet		Vendor to confirm
9.4	System Configuration: - The recorder should have sufficient channels to record the operating variables including, Welding Current – Peak/Background, Welding Voltage, Hot wire Current, Wire Speed, Gas Volume, Welding Position etc.		Vendor to specify
9.5	Scan time of data should be 100 milli seconds or less.		Vendor to specify
9.6	Software: - Any software requirements for addressing the data recording and processing (to analyze the data in a computer in different forms) to be supplied as part of the system.		Vendor to confirm
10.0	INTERCONNECTION CABLE FOR ALL COMPONENTS		
10.1	All necessary interconnection, communication, earth cable etc. of required quantity should be supplied along with system.		Vendor to confirm
10.2	All necessary hoses both for water flow and gas flow, gas regulators etc. to be supplied as part of the system.		Vendor to confirm
11.0	MACHINE SPARES AND CONSUMABLES		
11.1	Itemized break-up of mechanical, electrical and electronic spares used in the machine in sufficient quantity as per recommendation of Vendors for 5 years of trouble free operation on three shift continuous running basis shall be suggested by vendor. The list to include following, in addition to other recommended spares (Unit price for each item of spare shall be offered)		Vendor to confirm

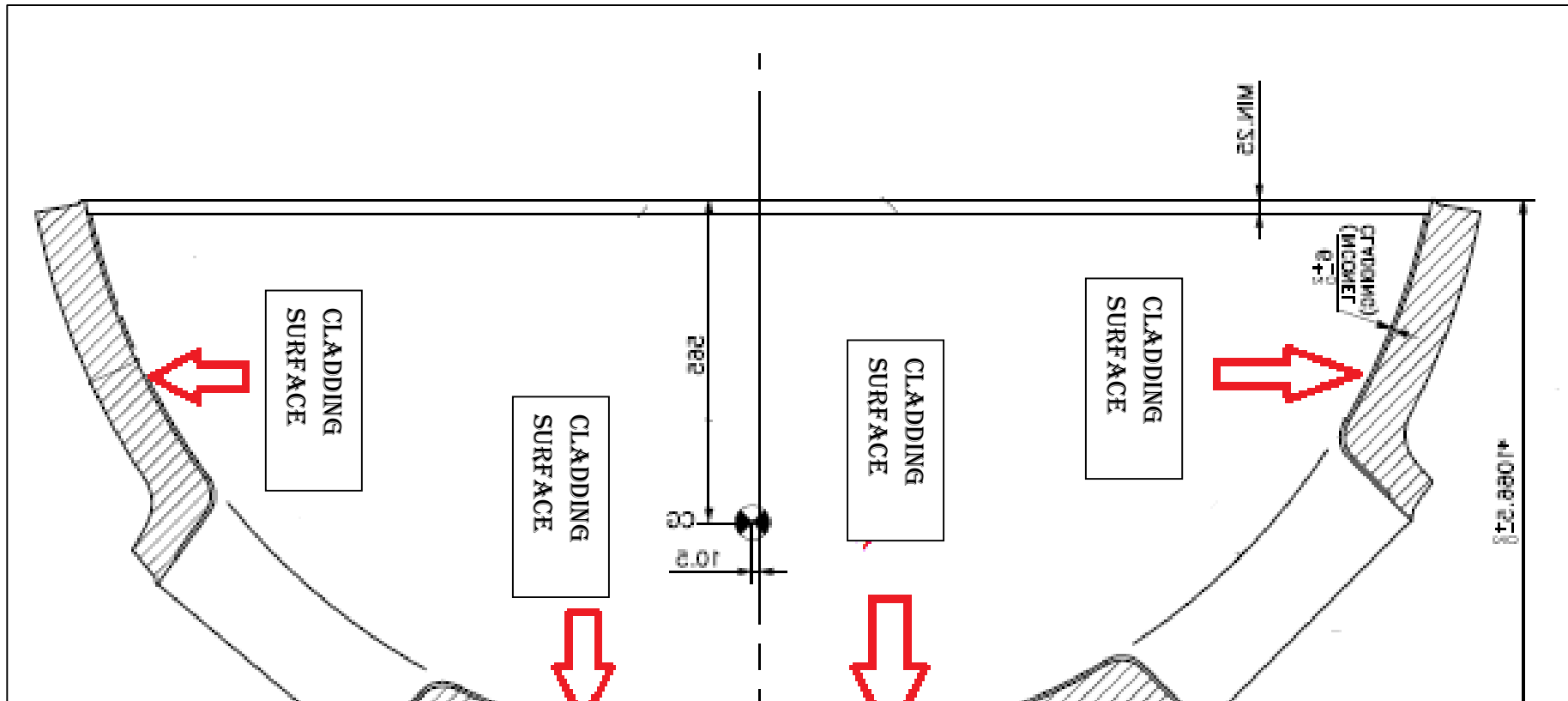
11.2	Mechanical Spares: All types of pumps, valves pressure switches, rollers, transducers, flow switches, filters, seals, O rings, water cooled hose, wire feed rollers and wire pressing rollers, fasteners, sprockets, gears, cams, bearing etc if any to be provided.	Vendor to confirm
11.3	Electrical / Electronic Spares : All types of printed circuit boards, relays, contractors, Proximity switches, push buttons, semiconductors, fuses, special fuses, circuit breakers, main power switch, encoders indication lams, spares for microprocessor based system, servo motors for feed drivers, power module & control cards for drives etc.	
11.4	Welding Consumables : Nozzle, Gas cup, Gas filters, Tungsten Tip, wire liner etc. to be included	Vendor to confirm & enlist
11.5	Recommended set of spares for all attachment are to be suggested with details.	Vendor to confirm
11.6	All types of spares for total machine and accessories shall be available for at least ten years after supply of the machine. If machine or control is likely to become obsolete in this period, the vendor should inform BHEL sufficiently in advance and provide drawing of parts/details of spars & suppliers to enable BHEL to procure these in advance, if required	Vendor to confirm
11.7	Vendor to confirm that complete list of spares for machine and accessories, along with item part no/specification/type model, and name and address of the spare supplier shall be furnished along with documentation to be supplied with the machine.	Vendor to confirm
12.0	EQUIPMENT INSPECTION AND ACCEPTANCE AT VENDORS PLACE	
12.1	1. The welding equipment and Accessories, before dispatch the system, the complete pre-dispatch inspection will be carried out by the team of BHEL executives (it involves from WRI, Production and M&S representative) at the manufacturer's site which included carrying out all the functional test, welding trials & acceptance of the same 2. The welding trials shall be carried out on any standard Carbon Steel (min 25 mm thickness flat or curved plate) using Austenitic stainless steel filler wire as recommended by BHEL. 3. A cladding will be carried out over the circle of minimum 200 mm for a depth of 12 to 15 mm.	Vendor to confirm

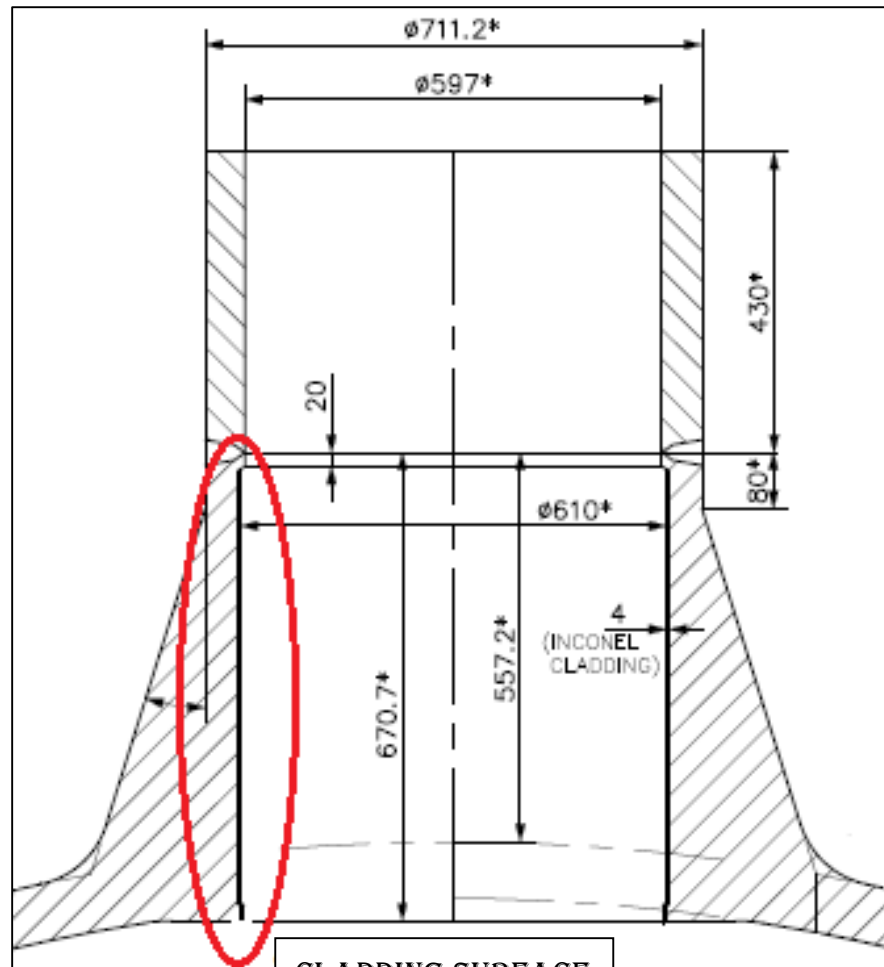
	4. The minimum 2 numbers of continuous weld joint should be cladded and pass the Liquid Penetration examination & bend test as per ASME Sec V. 5. All the materials and consumable needed for the trials shall be arranged by the vendors only A Portion of cladded samples have to be return to BHEL along with the equipment for conducting further tests.	
13.0	DOCUMENTATION	
13.1	The following documents in English language should be supplied along with the machine: - Hard Copies: 3 sets Soft Copies : 3 Set 1. Operating manuals of welding power source, controller, welding head, column and boom, rotator, chilling unit, welding torches, data acquisition system etc. 2. Operation and Maintenance manual of all accessories 3. Programming manual of the machine 4. Maintenance manuals with all assembly drawing of machine assemblies. sub-assemblies with parts list 5. Electrical wiring Drawing – power & control circuits. 6. Maintenance & Interface manuals for machine control system 7. Microprocessor / complete printed circuit board schematic indication check points for electronic controls. 8. Complete list of alarm log, error code, error messages and remedies and on line fault diagnostic to be provided by the vendors, 9. Specification ratings of all bought out items 10. Catalogs', O&M manuals for all bought out items used in the machine 11. Trouble shooting chart for main and all sub-system 12. Parameter selection software, file handling and display recording. Serial and USB ports to be ensured. 13. Preventive maintenance check list for Electrical and mechanical system.	Vendor to confirm

	Complete list of spares for machine, along with item part no/ specification/type /model and make and adders of the sub-vendor.	
14.0	MACHINE ERACTION, COMMISSIONING & TRAINING AT BHEL	
14.1	The manufacturer shall be responsible for the installation of the machine at the site and its subsequent start up at the site.	Vendor to confirm
14.2	All handling tools and mechanical / electrical help required for the installation and commissioning shall be provided by the BHEL.	Vendor to confirm
14.3	Complete application prove out to the satisfactory level of BHEL to be done by the suppliers only.	Vendor to confirm
14.4	The required material and consumable for carry out prove out trials at site will be provided by the BHEL	Vendor to confirm
14.5	After successfully commissioning of the welding system capability and prove out welding trials to be carried out considering actual application. Cladding will be carried on small similar mock up pilot model similar to actual requirements. Minimum 4 -5 joint will be cladded under the guidance of vendors	Vendor to confirm
14.6	After successfully commissioning, training & prove out trials vendors has to assist BHEL in programming the actual dished end component using their expert (for initial one week time)	Vendor to confirm
14.7	The supplier shall impart training to BHEL's machine operator and maintenance crew in operation and maintenance during commissioning of the machine at BHEL works, for 5 working days. It includes Safety, Operational of the machine PC based System & Operation, Trouble – Shooting, software application, all special features of the machine, electrical/mechanical/ electronics system etc.	Vendor to confirm
14.8	The manufacturer shall be responsible for providing the technical assistance for the machine during commissioning & training through its welding expert only.	Vendor to confirm
14.9	Tools, Tackles, Test Mandrels, instruments and other necessary equipment required to carry out all above activities should be brought by the Vendor	Vendor to confirm
15.0	GUARANTEE	

15.1	Performance Guarantee to be given for 12 months from the date of commissioning or 18 months from the date of dispatch whichever is earlier	Vendor to confirm
15.2	The supply shell also quote the extended warranty for two years as optional	Vendor to confirm
16.0	GENERAL POINTS	
16.1	Machine Model Number and other related details	Vendor to confirm
16.2	Total connected Load (in kVA)	Vendor to confirm
16.3	Total weight of the machine & Accessories	Vendor to confirm
16.4	General Arrangement drawings	Vendor to confirm
16.5	Calibration certificates for all machines, meters and equipment	Vendor to confirm
16.6	All electronic controls for integrated controller / drives that need stabilized supply shall be provided with suitable voltage stabilizer	Vendor to confirm
16.7	Civil & foundation details if any, for the equipment shall be provided 3 months before shipment of equipment	Vendor to confirm
16.8	Sea worthy & rigid packing for all items of complete machine, control system, all accessories and other supplied items to avoid any damage / loss in transit. When machined is dispatch in container, all small loose items shall be suitably packed in boxes	Vendor to confirm
16.9	The system shall have equipped with a control panel in his machine though which the power supply will be distribute to various sub-assemblies. (BHEL will provide the single3-phase AC supply (without Neutral) at single point near the machine)	Vendor to confirm
16.10	The equipment must have the feature of Remote diagnosis facility by which the machine can be diagnosed from a remote location through Internet.	Vendor to confirm
17.0	OPTIONAL REQUIREMENT	
17.1	Video function with one video control rack, related bundle and one display.	
17.2	Portable type tungsten grinder :- Qty 4 numbers	Vendor to specify the make and model of the same
17.3	Vendor has to suggest the suitable heating pads for heating from back side up to 150 degree & 350 degree C up to the wall thinness of 75 mm	Vendor to suggest the necessary heating pads

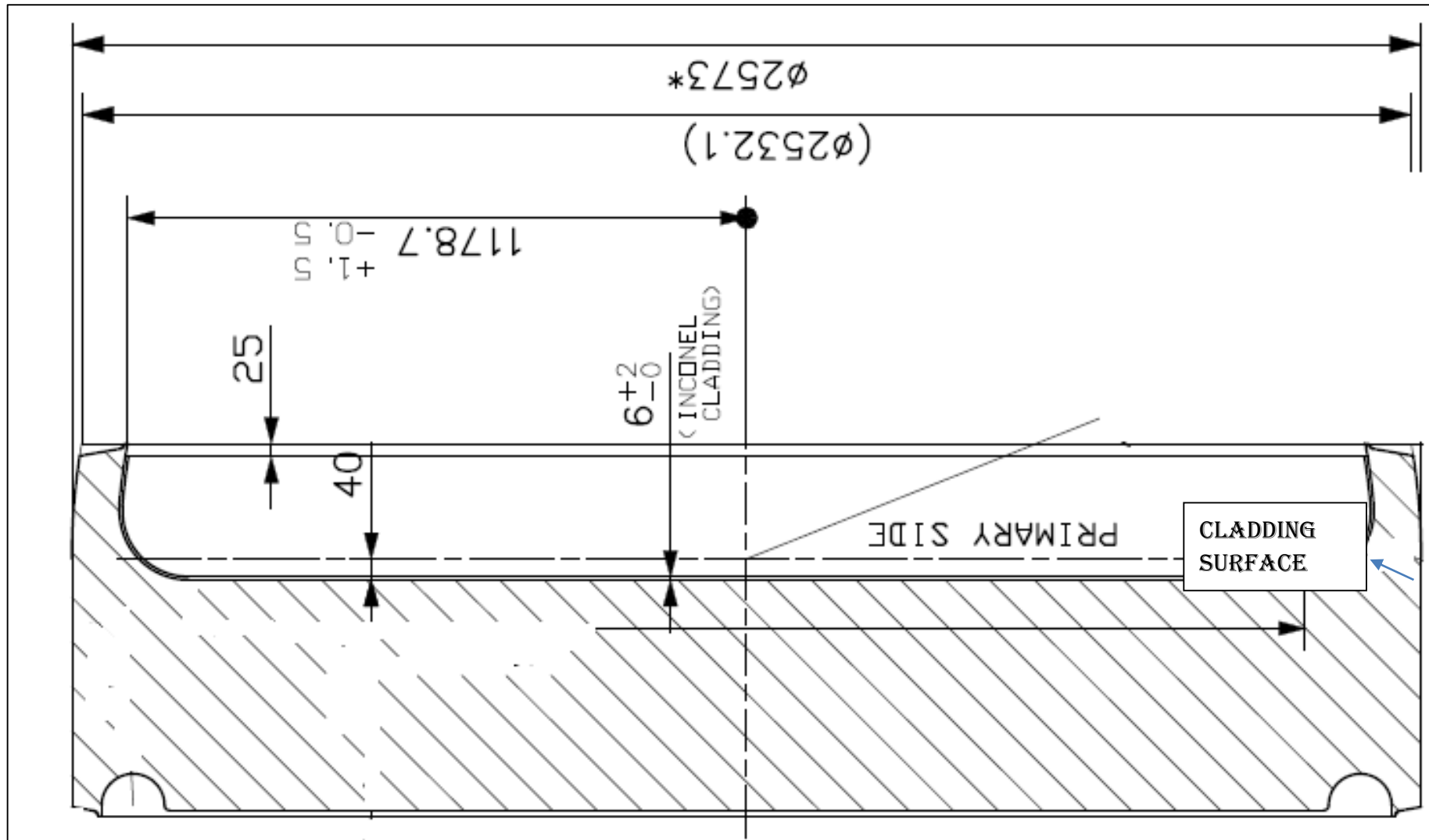
Annexure 1(a)



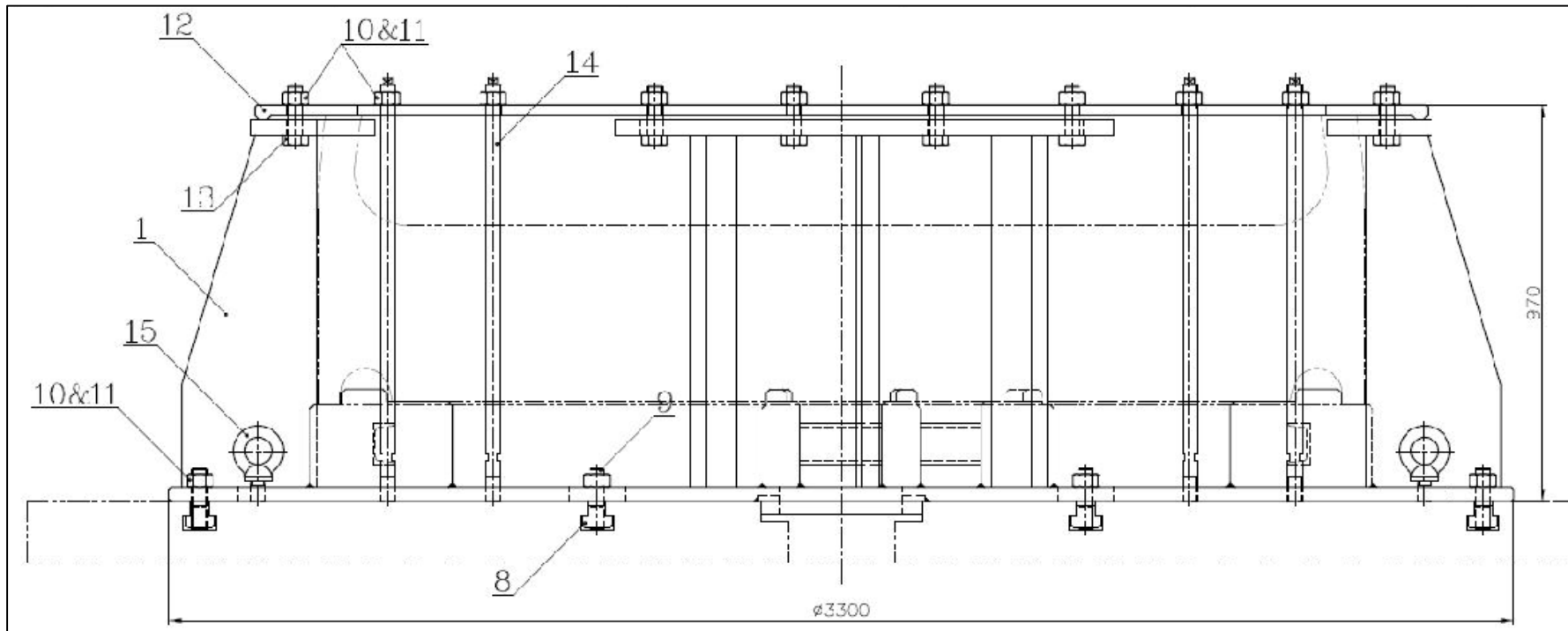


Annexure 1(b)

Annexure 1(c)

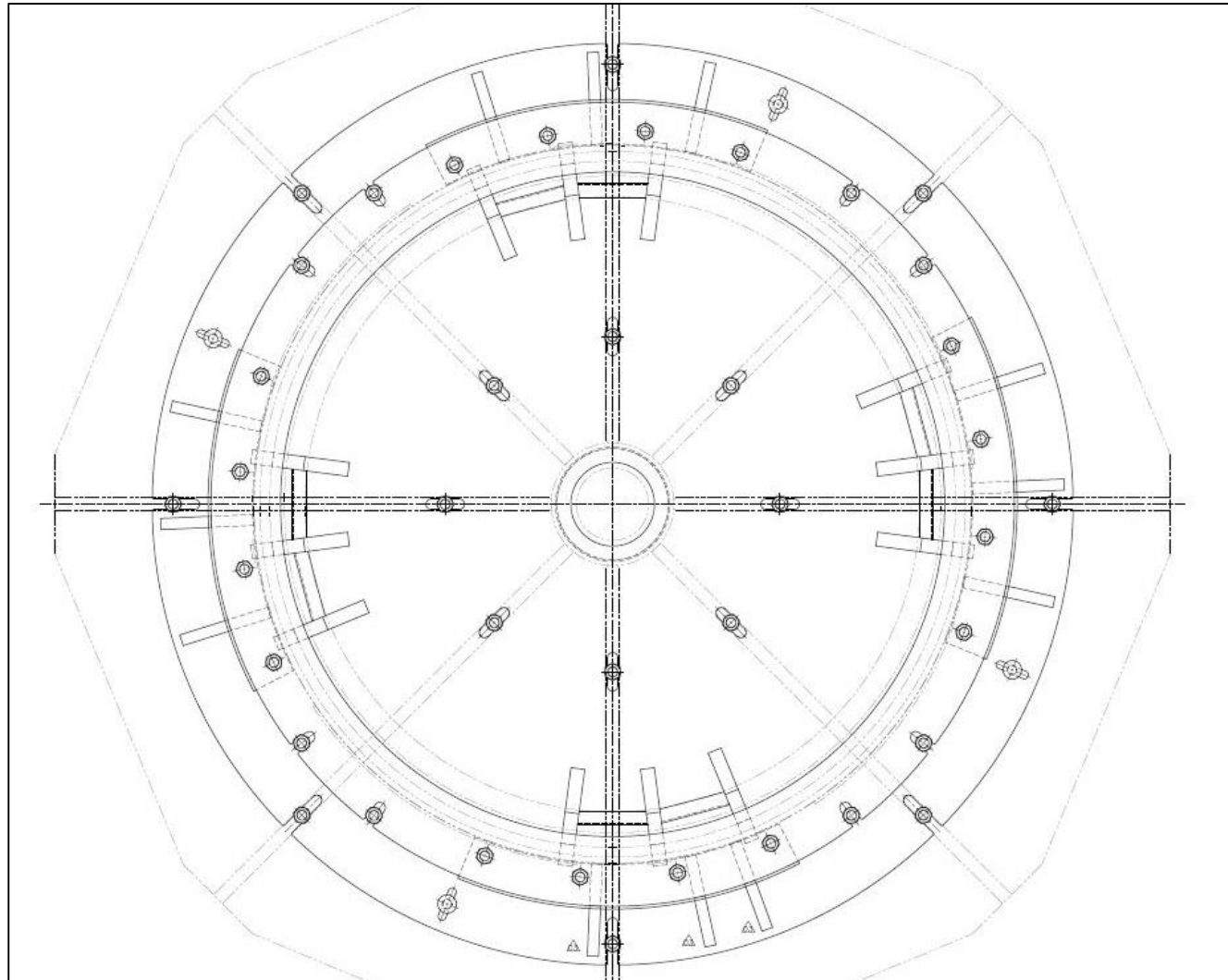


Annexure 3 (a)



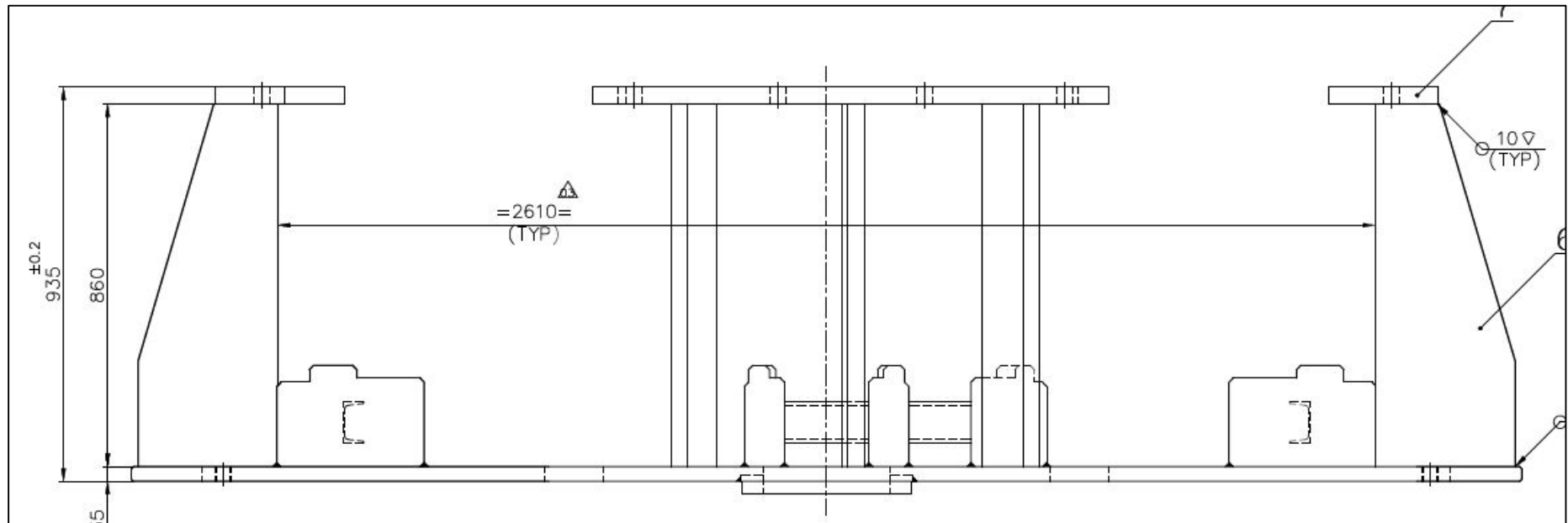
Cladding fixture side view

Annexure 3 (b)



Cladding Fixture top view

Annexure 3 (c)



Cladding Fixture base assembly side view