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 70 49 Fax : +91 431 252 07 19 Email : csguna@bheltry.co.in Web : www.bhel.com

	Enquiry Number:	**Enquiry Date:**	**Due date for submission of quotation:**
	2620800010	**10.03.2008**	**15.04.2008**
You are requested to quote the Enquiry number date and due date in all your correspondences. This is only a request for quotation and not an order			

Item	**Description**	**Quantity**	**Delivery Schedule**
10	Travelling Column Header Pipe Drilling and Stub EP Station – Heavy Duty Travelling Column Radial Arm Drilling Machine (commercial conditions applicable to be downloaded from web site www.bhel.com or http://tenders.gov.in)	2 Nos.	31.01.2009
20	Drum Shell Drilling Station – Heavy Duty Travelling Column Radial Arm Drilling Machine (commercial conditions applicable to be downloaded from web site www.bhel.com or http://tenders.gov.in)	1 No	31.01.2009

Confirmation of acceptance for BHEL commercial terms & conditions and Price Bid formats have been posted in BHEL Corporate web site www.bhel.com or from the Government tender website http://tenders.gov.in (public sector units > Bharat Heavy Electricals Limited page) under Enquiry reference "2620800010".

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 Manager / Capital Equipment / MM

PART A.

QUALIFYING CRITERIA FOR THE SUPPLY OF TRAVELING COLUMN HEAVY DUTY RADIAL ARM DRILLING MACHINES

SECTION – I : COMPANY PROFILE

The BIDDER has to provide the details pertaining to each clause in the table given below and wherever necessary additional sheets may be attached (giving clear reference number) to understand the profile of the BIDDER's COMPANY.

S.No.	PARTICULARS	VENDOR's RESPONSE
1.0	Number of Years of Experience of the BIDDER / VENDOR in the field of Design, Manufacture & Supply of Heavy Duty Traveling Column type Radial Drilling Machines	
2.0	Details on the Codes/Standards of Machine Design and Manufacture	
3.0	Details on Manufacturing Facilities available with the VENDOR for : a) Building Large Machine Castings b) Heat Treatment Facilities c) Heavy Machining & Grinding d) Machine Assembly & Testing	
4.0	Details of Quality System (with Stages of Internal Inspection) followed for the Machine Building and Testing of Capacity	
5.0	Details of Electrical/Electronic Control Panel Design, Manufacturing and Testing Facilities	

SECTION – II : QUALIFYING CRITERIA

The BIDDER / VENDOR has to compulsorily meet the following requirements to get qualified for submitting an offer for the Heavy Duty Radial Drilling Machines:
[Additional Sheets shall be attached with the OFFER, to provide requisite details]

S.No.	REQUIREMENTS	VENDOR's RESPONSE
6.0	The BIDDER / VENDOR shall have a minimum of TEN Years of Continuous Experience in the Field of Design, Manufacture & Supply of Heavy Duty Radial Arm Drilling Machines	
7.0	The BIDDER / VENDOR might have supplied atleast two numbers of Heavy Duty Radial Arm Drilling Machines with Spindle Power more than 12 kW, Drilling Capacity – 100 mm in Mild Steel, and Drilling Head Traverse over 1500 mm on the Machine Radial Arm.	

S.No.	REQUIREMENTS	VENDOR's RESPONSE
8.0	Performance Certificate in the enclosed FORMAT for a period, not less than one year, from CUSTOMERS and Reference List of Customers with full contact details of CONTACT PERSON, who are the End Users of Heavy Duty Radial Arm Drilling Machines supplied as per **Clause No.7.0**	
9.0	BHEL reserves the right to verify the information provided by vendor. In case, it is found to be false/ incorrect, the offer shall get rejected.	
10.0	Details on SERVICE-AFTER-SALES Set-Up in India including the Addresses of Agents / Service Centres in India, to be furnished .	

SECTION – III : BID / OFFER FORMATS

The BIDDER / VENDOR has to comply with the following, for accepting the Technical Offer for scrutiny by the Purchaser :

S.No.	REQUIREMENTS	VENDOR's COMPLIANCE
11.0	The BIDDER shall submit the offer in TWO PARTS - Technical **[**with **PART A & PART B]** & Commercial and Price Bid.	
12.0	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 'YES' or 'CONFIRMED' or 'NO-DEVIATION' or 'COMPLIES' or 'ACCEPTED' or similar words in the technical comparative statement may lead to disqualification of the Technical Offer.	
13.0	The Technical Offer shall be supported by Product Catalogue and Data Sheets in ORIGINAL and complete technical details of 'Bought-Out-Items' with copies of Product Catalogue (if applicable)	
14.0	The Commercial Offer shall contain the Scope of Supply and the Un-Priced Part of the Price-Bid, for confirmation of the inclusion of all the accessories, tooling, auxiliary parts, spares, consumables, etc. with the main and basic equipment, to meet the technical specification requirements.	
15.0	Earlier performance/field experience (including service support) if any, with BHEL for the VENDOR's Equipment, will be a reckoning factor for the technical qualification of the OFFER.	

PERFORMANCE CERTIFICATE – [SAMPLE FORMAT]

(On Customer's Letter Head)

1. Supplier of the Equipment/Machine :

2. Make & Model of the Equipment :

3. Month & Year of Commissioning :

4. Application for which Machine is used :

5. a. Equipment Serial Number :
   b. Spindle Motor Power in Horse Power/kW :
   c. Drilling Capacity in Steel in millimeters :
   d. Drilling Head Traverse in millimeters :
   e. Vertical Stroke of Radial Arm in millimeters :
   f. Machine Column Traverse in X-axis in meters :

6. Performance of the Machine (with reasons for recommendation) : Best in the market / Satisfactory / Good / Average / Not Satisfactory

7. Any other Remarks :

Date:

Signature & Seal of the Authority
Issuing the Performance Certificate

PART B

TECHNICAL SPECIFICATIONS FOR HEAVY DUTY TRAVELLING COLUMN RADIAL ARM DRILLING MACHINE

AA. PURPOSE:

These heavy-duty radial drilling machines are meant for drilling and boring of holes in pipes and cylindrical shells (viz., Boiler Drum and Header Pipes) coming in Utility and Industrial Boilers. And also for hill side drilling of holes on hemi-spherical or semi-ellipsoidal dished end covers. These machines shall be capable of drilling in curved shells of solid steel with thickness up to 200 mm. For Industrial Boiler Drum, nearly 1000 holes of diameter 51.8 mm (per work-piece) are to be drilled on a portion of circumference only, in multiple rows with reaming finish as per standards. The drilling machines will also be used for machining of free ends (oxy-acetylene flame cut ends) of nozzles/stubs welded to shells or pipes to form weld edge after the hydraulic testing. In all the above cases, the work-pieces with job rotators or 'V' Blocks or Jigs or Platform will be placed on Fitter's Bar (with slots for clamping) running throughout the length of the work-centre (21000 mm). These machines will be operated on three-shift basis.

BB. QUANTITY :

The tender is for six machines in total (in two configurations – Type 1 and Type 2), required for three work-centres and in each work-centre two machines will have to be mounted on the same slide-way built-up by adding suitable number of machine beds, to form a machine traverse of 21000 mm.

a. **Machine Configuration – Type 1 :**
One Work-Station with Two Machines (having longer arm length and higher vertical arm travel as per Specification Clause **No. 1.3.5 and 1.3.6**) moving on same machine slide – ways.

b. **Machine Configuration – Type 2 :**
Two Work-Stations each with Two Machines (having normal radial arm length and normal vertical arm travel as per Specification Clause **No. 1.3.5 and 1.3.6**) moving on same machine slide – ways.

CC. JOB DETAILS :

A. **Material :**

a. Steel with tensile strength of 60 kg / mm^2
(SA106Gr.B/C, SA299, SA515/516Gr.60/70asper ASTM Standards)

b. Cast- Iron with tensile strength of 25 kg / mm^2.

c. Alloy Steel and Stainless Steel (martensitic) for Header pipes only
(SA 335 Gr.P11/P12/P22/P91 as per ASTM Standards and
X-20 CrMoV 121 as per DIN Standards)

B. JOB DIMENSIONS :

No.	PART DESCRIPTION	LENGTH in mtrs.	JOB DIAMETER in mm	WALL THICKNESS in mm	WEIGHT in TONS
1	Drum Shells	6.0 to 12.30	914 to 2200	40 to 300	20 to 100
2	Drum End-Cover	-	914 to 2200	60 to 300	1.5 to 10
3	Header Pipes	1.0 to 24 .0	219 to 914	20 to 140	1.0 to 10

C. TYPE OF DRILLS USED :
Standard 118 ° lip angle HSS drills without web thinning. Drills with replaceable carbide / HSS inserts.

D. EDGE PREPARATION :
Edge Preparation of drilled holes (asymmetrical cutting by two cutting tool bits mounted in the same tool holder, taking cut simultaneously.

60

DD. DESCRIPTION OF JOBS :

Annexure – 1 to 5, enclosed with this specification, give the cross-sectional view of typical drum shell with stub holes (five rows on the top side) and typical drilling of holes in hemispherical end-covers.

EE. MACHINE SPECIFICATIONS :

S.No.	PARTICULARS	SPECIFICATIONS	VENDOR's OFFER
1.1.0	**MACHINE CONFIGURATION**: The machine shall consist of a vertical column mounted on the base plate. The horizontal arm moves up and down the column and can be locked at any position. Also the arm shall be manually swiveled about the column center and lock at any position. The drilling Head moves horizontally on the horizontal arm and can be locked at any position. The spindle is housed in the drilling head and can be moved up and down. In each work center two machines will be mounted on the same slide-way built-up by adding suitable number of machine beds to form a machine traverse of 21,000 mm for drilling as per requirement of the job	Vendor to confirm	

S.No.	PARTICULARS	SPECIFICATIONS	VENDOR's OFFER
1.2.0	**DRILLING HEAD**		
1.2.1	Drilling capacity in steel (TS 60 kg/sqmm).	100 mm	
1.2.2	Threading capacity in steel(TS 60 kg/sqmm)	M 76 **x** 6	
1.2.3	Boring capacity in solid steel (in steps)	170 mm	
1.2.4	Drilling capacity in solid cast iron	120 mm	
1.2.5	Taping capacity in solid cast iron	125 mm	
1.2.6	Power of spindle motor	Not less than 15.0 kW	
1.2.7	Taper in spindle	MT 6	
1.2.8	Spindle stroke	**Minimum 360 mm**	**OPTION - 1**
		Mimimum 475 mm	**OPTION - 2**
1.2.9	Spindle diameter in front bearing	Vendor to specify	
1.2.10	Number of spindle speeds	Not less than 15	
1.2.11	Spindle speed range	10-1000 rpm	
1.2.12	No of feeds	Not less than 12	
1.2.13	Spindle feed range in mm/rev. and mm/min.	Vendor to specify	
1.2.14	Auto depth control mechanism for spindle stroke.	Vendor to specify	
1.2.15	Quill diameter	Vendor to specify	
1.2.16	Maximum drilling thrust	Vendor to specify	
1.2.17	Maximum torque on spindle	Vendor to specify	
1.2.18	Mode of pre selection of feed and speed	Vendor to specify	
1.2.19	Drill head traverse speed.	Vendor to specify	
1.3.0	**RADIAL ARM**		
1.3.1	Maximum vertical distance between spindle nose to base of the machine	Vendor to specify	
1.3.2	Minimum vertical distance between Spindle nose to base of the machine, when the Radial Arm is at the lowest level on the Machine Column	Not more than 1000 mm	
1.3.3	Maximum distance from the axis of the spindle to the guide ways on the Machine Column	Vendor to specify	
1.3.4	Minimum distance from the axis of the spindle to the guide ways of column	Vendor to specify	
1.3.5	Drilling Head Traverse Stroke available along the Radial Arm	**Minimum 3200 mm**	**For TYPE - 1**
		Minimum 2000 mm	**For TYPE - 2**
1.3.6	Vertical Travel Stroke of the Radial Arm on the Machine Column	**Minimum 1500 mm**	**For TYPE - 1**
		Minimum 1100 mm	**For TYPE - 2**
1.3.7	Arm up / down speed	Vendor to specify	
1.3.8	Swing of the arm around the column	0 To 180 deg	
1.3.9	Arm dimensions	Vendor to specify	
1.3.10	Powered clamping mechanism of arm on the machine column. (With indicator)	Vendor to submit details	

S.No.	PARTICULARS	SPECIFICATIONS	VENDOR's OFFER
1.4.0	**MACHINE COLUMN & BASE**		
1.4.1	Minimum distance between the centerline of two machine columns when the two machines are taken to the extreme end of the slide ways.	21000 mm	
1.4.2	Overall length of machine base for the above traverse in Point **1.4.1**	Supplier to specify	
1.4.3	Minimum distance between the centerline of two columns of two machines, when they are brought together (with telescopic cover).	Supplier to specify	
1.4.4	Column traverse speeds	Vendor to specify with range	
1.4.5	Column dimensions	Vendor to specify	
1.4.7	Powered locking of Saddle (Machine Base) with Bed to be provided.	Vendor to provide details.	
1.5.0	**MACHINE GUIDE WAYS**		
1.5.1	Width of Arm guide ways	Vendor to specify	
1.5.2	Width of column guide ways	Vendor to specify	
1.5.3	Hardness of guide ways	Vendor to specify	
1.5.4	Sliding Surfaces on guide ways	Vendor to give type & technical details	
1.6.0	**CONSTRUCTION:**		
1.6.1	Vendor to furnish details of material, hardness & constructional details, including explanatory drawings, of various components/assemblies like Column, Bed, Arm, Drilling Head, Spindle, etc. of the machine.	Vendor to furnish	
1.6.2	Video images on CD including hard copy explaining the technical features / Literature with photographs, drawings explaining the technical features shall be enclosed with the offer	Vendor to furnish	
1.6.3	Machine configuration shall be such that drilling head; arm, column and base shall be sturdy enough to withstand all types of reactionary forces developed during drilling with drilling head at farther most point on the radial arm.	Vendor to specify	
1.6.4	Both longitudinal and cross alignments of machine bed guide ways shall be accurate enough to ensure smooth travel of machine on either side from the mid point of the bases.	Vendor to specify	

S.No.	PARTICULARS	SPECIFICATIONS	VENDOR's OFFER
1.6.5	Selecting guide way profile and spacing of guide ways shall ensure jerk free travel and provide sufficient seating area for column base for vibration-free drilling.	Vendor to specify	
1.6.6	Column travel – if it is rack and pinion type, to provide inverted racks in order to protect racks from drill chips.	Vendor to specify	
1.6.7	Column drive gear shall be sturdy with proper mounting with the base without over-hanging. Standard gearboxes of make like Radicon / Elecon / Allryod / SEW / Bonfiglioli preferred.	Vendor to specify	
1.6.8	For arm up and down travel, bellows and bottom support to be provided if it is screw rod / nut arrangement.	Vendor to specify	
1.6.9	Provision of Stainless Steel walk on type telescopic cover for guide-ways on the bed, considering that two machines will be located on a common bed for the entire length of machine bed and to operate both the machines to min and max distance from each other.	Vendor to specify	
1.6.10	For the entire length of each work-centre, metallic cable drag chain arrangement for input power cables, coolant & lubrication hoses shall be provided for easy drag and to avoid entangling with any other part of the system.	Vendor to specify	
1.6.11	Locking mechanism for provisions referred in S.Nos. **1.2.21, 1.3.10** and **1.4.7** are to be spelt out with details	Vendor to specify	
1.6.12	Graduated Dials on headstock shall be of Stainless Steel / Chromium plated.	Vendor to confirm	
1.6.13	Up & down and Travel movement two parallel control required. One at headstock and other at control panel, operable at ground level, mounted on the machine column.	Vendor to confirm	
1.6.14	Flexible metal hose for coolant is preferable at headstock.	Vendor to specify	
1.6.15	Centralised Lubrication System and all lubrication lines to be protected with metallic covers to protect from drilling chips.	Vendor to provide details	

S.No.	PARTICULARS		VENDOR's OFFER
1.6.16	Details of flood coolant system (around 75 lpm @ 3 bar pressure at discharge end of the coolant pump) with valve arrangements to be provided. Independent coolant pump units to be provided for each drilling machine.	Vendor to provide details	
1.6.17	Details of pressure coolant system (around 30 lpm @ 15 bar pressure at discharge end of the pump) with valve arrangements to be provided. Independent coolant pump units to be provided for each drilling machine.	Vendor to provide details	**OPTIONAL**
1.6.18	Power & Speed rating of Electric Motors for a) Spindle b) Arm Elevation c) Drill Head Traverse on Arm, d) Column Travel and e) Coolant Pumps .	Vendor to furnish	
1.7.0	**ACCESSORIES**		
1.7.1	Cast-Iron Box Table with T-Slots (table dimensions / size in mm)	1000L **x** 700 B **x** 800H	**OPTIONAL**
1.7.2	Tilting Table - Range up to 70 deg. (table dimensions / size in mm)	750L **x** 600B **x** 550H	**OPTIONAL**
1.8.0	**MACHINE LIGHTS:**		
1.8.1	Machine Lights (24 Volt AC) to be provided as built in with Headstock for sufficient illumination of complete working area for clear visibility.		Vendor to confirm
1.8.2	A magnetic base 24-volt portable spotlight with sufficiently long cable should also be provided.		Vendor to confirm
1.8.3	All light fittings, consumables, adapters/receptacles should have compatibility with Indian equivalents		Vendor to confirm
1.9.0	**ELECTRICAL SYSTEM:**		
1.9.1	415V + 10% / -10%, 50HZ +/-1.5 HZ, 3 Phase AC (3 wire system with out neutral) Power Supply Source will be provided by BHEL at a single point near the machine, as per layout recommended by Vendor. All types of cables, connections, circuit breakers etc. required for connecting BHEL's power supply point to different parts of the machine/control cabinets, shall be the responsibility of vendor.		Vendor to confirm
1.9.2	All electrical equipment shall be Tropicalized		Vendor to confirm
1.9.3	All electrical control cabinets & panels should be dust and vermin proof		Vendor to confirm
1.9.4	All electrical components in the cabinets should be mounted on DIN Rail		Vendor to confirm

80

S.No.	PARTICULARS	VENDOR's OFFER
1.9.5	All electrical panels should be provided with CFL lamps for sufficient illumination and power receptacles of 220Volts, 5/15 Amp AC. All adapters/receptacles should have compatibility with Indian equivalents.	Vendor to confirm
1.9.6	Motors shall be from M/s Siemens / ABB or other reputed make conforming to IEC and acceptable to BHEL	Vendor to confirm
1.9.7	All cables moving with traversing axes should be installed in metallic cable drag chain. Additionally, all the cable trays required for laying of cables should be included in the offer.	Vendor to provide details.
1.9.8	Vendor should ensure the proper earthing for the machine and its accessories.	Vendor to confirm
1.10.0	**OPERATION AND CONTROL SYSTEM:**	**VENDOR's RESPONSE**
1.10.1	**OPERATOR'S PANEL**: Operator's panel in-built on the drill head is preferred. All switches on the Operator's panel should be within reach of operator for convenient, efficient & safe operation. All indications should also be conveniently placed accordingly.	Vendor to provide details
1.10.2	Inching operation facility to be provided on all movements of the machine.	Vendor to confirm

S.No.	PARTICULARS	VENDOR's OFFER
1.11.0	**SAFETY ARRANGEMENTS:**	
1.11.1	Machine should have adequate and reliable safety interlocks / devices to avoid damage to the machine, work piece and the operator due to the malfunctioning or mistakes.	Vendor to specify the interlocks provided.
1.11.2	A detailed list of all alarms / indications provided on machine should be submitted by the Vendor.	Vendor to confirm
1.11.3	All the pipes, cables etc. on the machine should be well supported and protected.	Vendor to confirm
1.11.4	All the rotating parts used on machine should be statically & dynamically balanced to avoid undue vibrations and suitable covers to be provided.	Vendor to confirm
1.11.5	Limits shall be provided at extreme end of the base and in between two machines to prevent over travel of the machine and collision of the machine respectively.	Vendor to provide details
1.11.6	Emergency Switches at suitable locations as per International norms are to be provided.	Vendor to confirm
1.11.7	Oil & water pipe lines should not run with electrical cable in the same tray / trench.	Vendor to confirm
1.11.8	Projection of operating levers / Hand wheel on the drill head if any shall not be hindrance to operator safety.	Vendor to confirm

S.No.	PARTICULARS	VENDOR's OFFER
1.12.0	**ENVIRONMENTAL PERFORMANCE OF THE MACHINE:** **[The Machine shall conform to following factors related to environment]**	
1.12.1	Maximum noise level shall be 85 dB (A) at normal load condition, 1 M away from the machine with correction factor for back ground noise, if necessary. This will be measured as per international standards like DIN 45635-16. Vendor to demonstrate compliance to noise level, if so required.	Vendor to confirm
1.12.2	If any safety / environmental protection enclosure is required it should be built in the machine by the vendor.	Vendor to confirm
1.12.3	Paint of the machine should be oil / coolant resistant and should not peel off and mix up with coolant.	Vendor to confirm
2.0.0	**TOOLINGS**	
2.1.0	Reduction sleeves MT6-5, 6-4, 4-3 & 4-2, both long & short series.	Vendor to confirm
2.2.0	Tapping attachments of capacity M48x5 to M100x4 with full set of collets. (Vendor should furnish list and details)	Vendor to confirm
2.3.0	Utility tools like drifts and cotter pins of all sizes (2 sets)	Vendor to confirm
3.0.0	**LEVELING & ANCHORING SYSTEM**	
3.1.0	Complete anchoring system including foundation bolts, anchoring materials, fixtures, leveling shoes etc shall be supplied for the Machine etc.	Vendor to confirm
4.0.0	**TOOLS FOR ERECTION, OPERATION & MAINTENANCE**	
4.1.0	The vendor shall bring special tools and equipment required for erection of the machine. Necessary tools like Torque Wrench, Spanners, Keys, grease guns etc.for operation & maintenance of the machine should be supplied. List of such tools shall be submitted with offer	Vendor to confirm
4.2.0	Test mandrel for checking spindle run-out & alignment should be supplied	Vendor to confirm
5.0.0	**SPARES:**	
5.1.0	Itemised breakup of mechanical, hydraulic, electrical spares used on the machine in sufficient quantity as per recommendation of Vendor for 2 years of trouble free operation on three shifts continuous running basis should be offered by vendor. The list to include following, in addition to other recommended spares: **(Unit Price of each item of spare should be offered)**	Vendor to furnish
5.2.0	Mechanical & Hydraulic Spares: Bearings, clutches, gears and all types of pumps, Valves, pressure switches / transducers, filters, seals, O rings, Hydraulic Hoses, etc.	Vendor to furnish

S.No.	PARTICULARS	VENDOR's OFFER
5.3.0	Electrical: All types of Relays, Contactors, Proximity Switches, Push Buttons, Indicating Lamps, Semiconductor Fuses, Special Fuses, Circuit Breakers, Main Power Switch.	Vendor to furnish
5.4.0	All types of spares for total machine and accessories should 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 drawings of parts / details of spares & Vendors to enable BHEL to procure these in advance, if required.	Vendor to furnish
5.5.0	Vendor to confirm that complete list of spares for machine and accessories, along with specification / type / model, and name & address of the spare Vendor shall be furnished along with documentation to be supplied with the machine.	Vendor to furnish
6.0.0	**GENERAL POINTS**	
6.1.0	The offer shall clearly indicate the list of standard accessories that will be supplied along with the machine	Vendor to confirm and enlist
6.2.0	All hydraulic elements shall be of Vickers/Rexroth make	Vendor to confirm and enlist
6.3.0	All electrical devices like contactors, relays and limit switches, push buttons etc. shall be from Siemens / L&T / Alstom / Cuttler Hammer / Telemechanique.	Vendor to confirm and enlist
6.4.0	All components/devices/terminals are to be incorporated with ferrules. (Numbered)	Vendor to confirm
7.0.0	**DOCUMENTATION**	
7.1.0	THREE sets of following documents (Hard copies) in English language should be supplied along with the machine	Vendor to confirm
7.2.0	Detailed Operation and Maintenance manual of machine with all drawings of machine assemblies/sub-assemblies/parts including Electrical / Pneumatic/ Coolant / Hydraulic circuit diagrams. All Assembly/ Sub Assembly Drawings shall be supplied with the part list / Bill Of Materials also	Vendor to confirm
7.3.0	Catalogues, O&M Manuals and drawings of all bought out items, bearings wherever applicable.	Vendor to confirm
7.4.0	Electronic and electrical interconnecting drawings (i.e. between machine, control panel and drives). **Hard Copy in Original: 3 Nos.**	Vendor to confirm
7.5.0	Specification with drawings of clutch plates & brake plates.	Vendor to confirm
7.6.0	Hydraulic, coolant, lubrication and Electrical circuits with BOM	Vendor to confirm
7.7.0	Detailed specification of all rubber items and hydraulic/lube fittings	Vendor to confirm

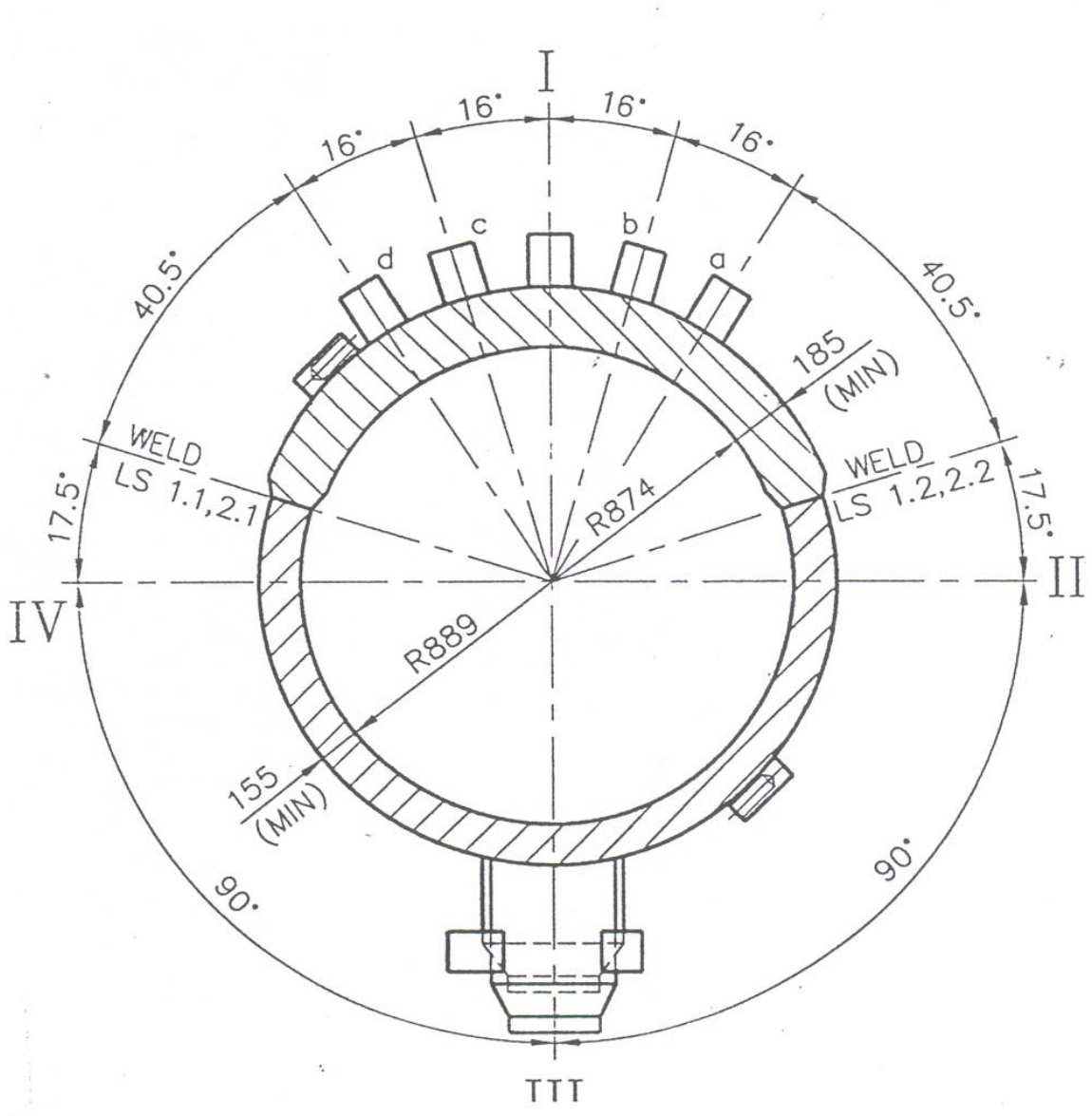
S.No.	PARTICULARS	VENDOR's OFFER
7.8.0	The vendor shall submit complete Master List of parts used in the machine.	Vendor to confirm
7.9.0	One additional set of all the above documentation on CD ROM, wherever possible.	Vendor to confirm
8.0.0	**FOUNDATION:**	
8.1.0	BHEL shall construct complete foundation for the machine. Vendor shall furnish the foundation details.	Vendor to confirm
9.0.0	**ERECTION & COMMISSIONING**	
9.1.0	Vendor to provide supervision for carrying out the erection, start up, testing of machine, it's control system & all types of other supplied equipment, drilling / tapping of test pieces etc. Service requirement like power, air & water shall be provided by BHEL at only one point to be indicated by Vendor in their foundation/layout drawings.	Vendor to confirm
9.2.0	Successful proving of BHEL components by the Vendor shall be considered as part of commissioning. All tests, as mentioned at **Specification Clause No. 15.0.0** shall form part of the commissioning activity.	Vendor to confirm
9.3.0	Portion, if any, of the machine, accessories and other supplied items where paint has rubbed off or peeled during transit or erection should be repainted and merged with the original surrounding paint by the vendor. For this purpose, the vendor should supply sufficient quantity of touch-up paint of various colors of paint used.	Vendor to confirm
10.0.0	**ACCURACY TESTS**	
10.1.0	**GEOMETRICAL ACCURACIES**	
10.2.1	Geometrical Accuracy Tests shall be as per international standards. Detailed Test Charts for the same, clearly showing the accuracies to be achieved on the machine, shall also be submitted with the offer.	Vendor to confirm
10.3.1	All the above accuracies to be demonstrated to BHEL engineers during pre-acceptance tests at Vendors works and during Erection & Commissioning at BHEL Works.	Vendor to confirm
11.0.0	**FINISH REQUIREMENTS**	
11.1.0	Reamed holes with H7 tolerance and 1.6 microns surface finish with reaming shall be demonstrated at the maximum drilling radius	Vendor to confirm
12.0.0	**AMBIENT CONDITIONS & THERMAL STABILITY**	
12.1.0	Total machine and all supplied items should work trouble free and efficiently under following operating conditions and should give specified accuracies. **Ambient Conditions:** Temperature = 25 to 50 Degree Celsius Relative Humidity = 95% maximum.	Vendor to confirm

S.No.	PARTICULARS	VENDOR's OFFER
12.2.0	Weather conditions are tropical, Atmosphere may be dust laden during some part of the year. Machine shall be kept in the normal shop floor condition. Max. Temperature variation is up to 25 deg Celsius in 24 hours.	Vendor to confirm
12.3.0	The machine, including attachments and accessories, should be suitable for 24 hrs. Continuous operation to its full capacity for 24 hour a day and 7 days a week throughout. Vendor to ensure and confirm the same.	Vendor to confirm
13.0.0	**PROVE-OUT OF MACHINE CAPACITY**	
13.1.0	The capacity and capability of the machine is to be demonstrated on a test piece on which drilling and tapping shall be done. Tooling shall be supplied by BHEL.	Vendor to confirm
14.0.0	**MACHINE INSPECTION and ACCEPTANCE: (Tests/Activities to be Performed by Vendor)**	Should be accepted & confirmed by Vendor
14.1.0	**Tests/Activities should be carried out at Vendor's Works**	Vendor to confirm
14.1.1	Geometrical Accuracy Tests as per test chart.	Vendor to confirm
14.1.2	The machine should be tested for continuous running of 48 hrs. If any break down occurs during this test, the test should be repeated for 48 hrs from that time.	Vendor to confirm
14.1.3	Full load test to demonstrate the maximum power & drilling capacity of the machine.	Vendor to confirm
14.2.0	**Tests to be carried out at BHEL Works**	Vendor to confirm
14.2.1	Geometrical Accuracy Tests as per test chart.	Vendor to confirm
14.2.2	Full load test to demonstrate the maximum power & drilling capacity of the machine.	Vendor to confirm
14.2.3	The machine should be tested for continuous running of 48 hrs. If any break down occurs during this test, the test should be repeated for 48 hrs from that time.	Vendor to confirm
14.2.4	Training of BHEL machine operators in operation and maintenance of complete machine & accessories etc. by the Vendor's experts/engineers during their stay at BHEL works	Vendor to confirm
150.0	**PACKING**	
15.1.0	Sea worthy & rigid packing for all items of complete machine, all Accessories & other supplied items to avoid any damage in transit. When machine is dispatched in containers, all small loose items shall be suitably packed in boxes	Vendor to confirm
16.0.0	**GUARANTEE**	
16.1.0	24 months from the date of acceptance of the machine at BHEL Works	Vendor to confirm
17.0.0	**SPECIAL NOTES :** The vendor should submit the following information:	
17.1.0	Machine Model	Vendor to specify
17.2.0	Total connected load in **kVA**	Vendor to specify
17.3.0	Floor area required (Length, Width, Height) for complete machine & accessories	Vendor to specify
17.4.0	Painting of Machine/ Electrical Panels: RAL 6011 Apple Green (Polyurethane Paint)	Vendor to specify

ANNEXURE - I

CROSS SECTIONAL OF DRUM SHELL

DRILLLING POSITIONS

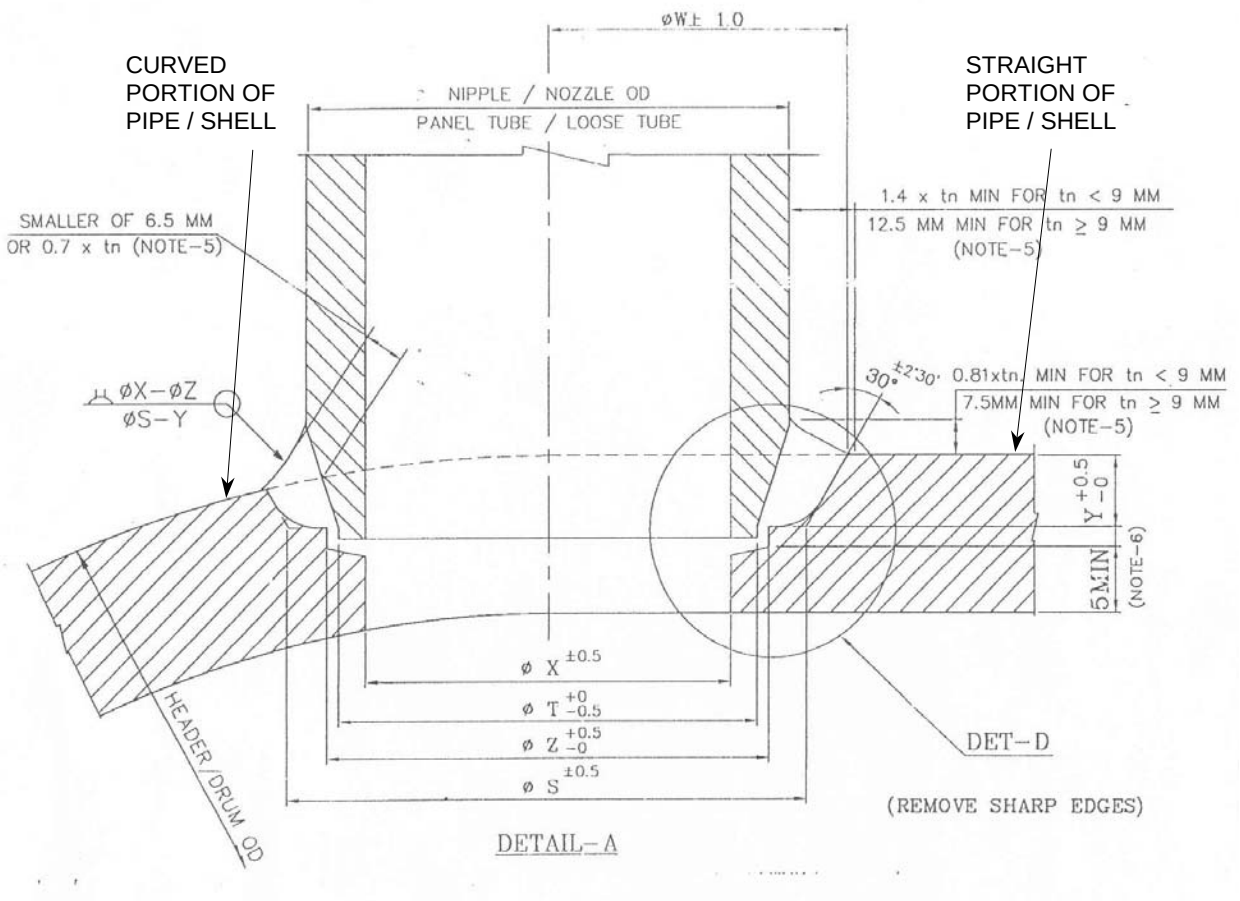


All dimensions are in 'mm'

CABS - 2 - 28 / 36 - 01
BHEL, Tiruchirappalli

ANNEXURE - 2

TYPICAL DRILLING & EDGE PREPARATION STYLE

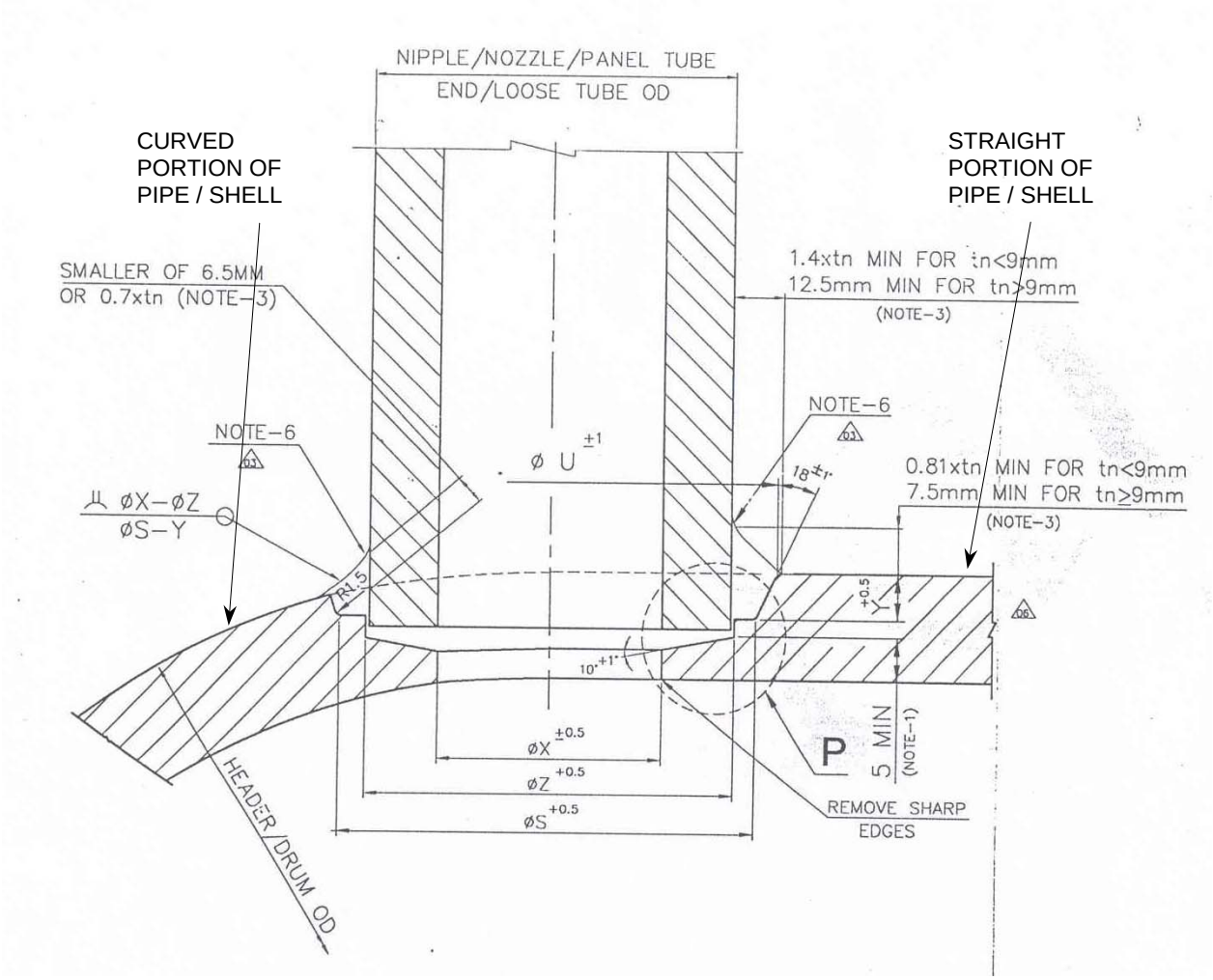


All dimensions are in 'mm'

CABS - 2 - 28 / 36 - 02
BHEL, Tiruchirappalli

ANNEXURE - 3

TYPICAL DRILLING & EDGE PREPARATION STYLE

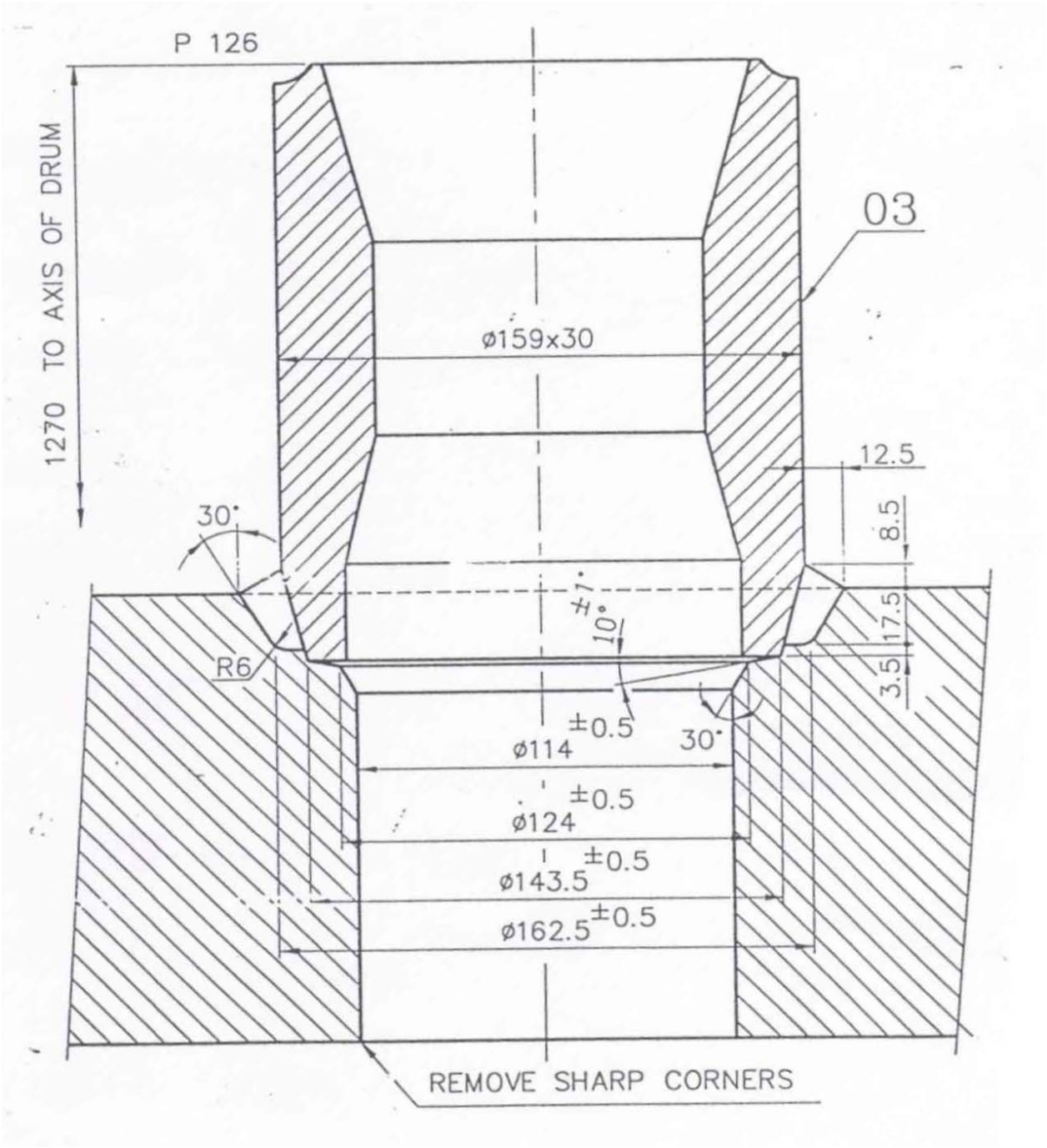


All dimensions are in 'mm'

CABS - 2 - 28 / 36 - 03
BHEL, Tiruchirappalli

ANNEXURE - 4

TYPICAL DRILLING & EDGE PREPARATION STYLE



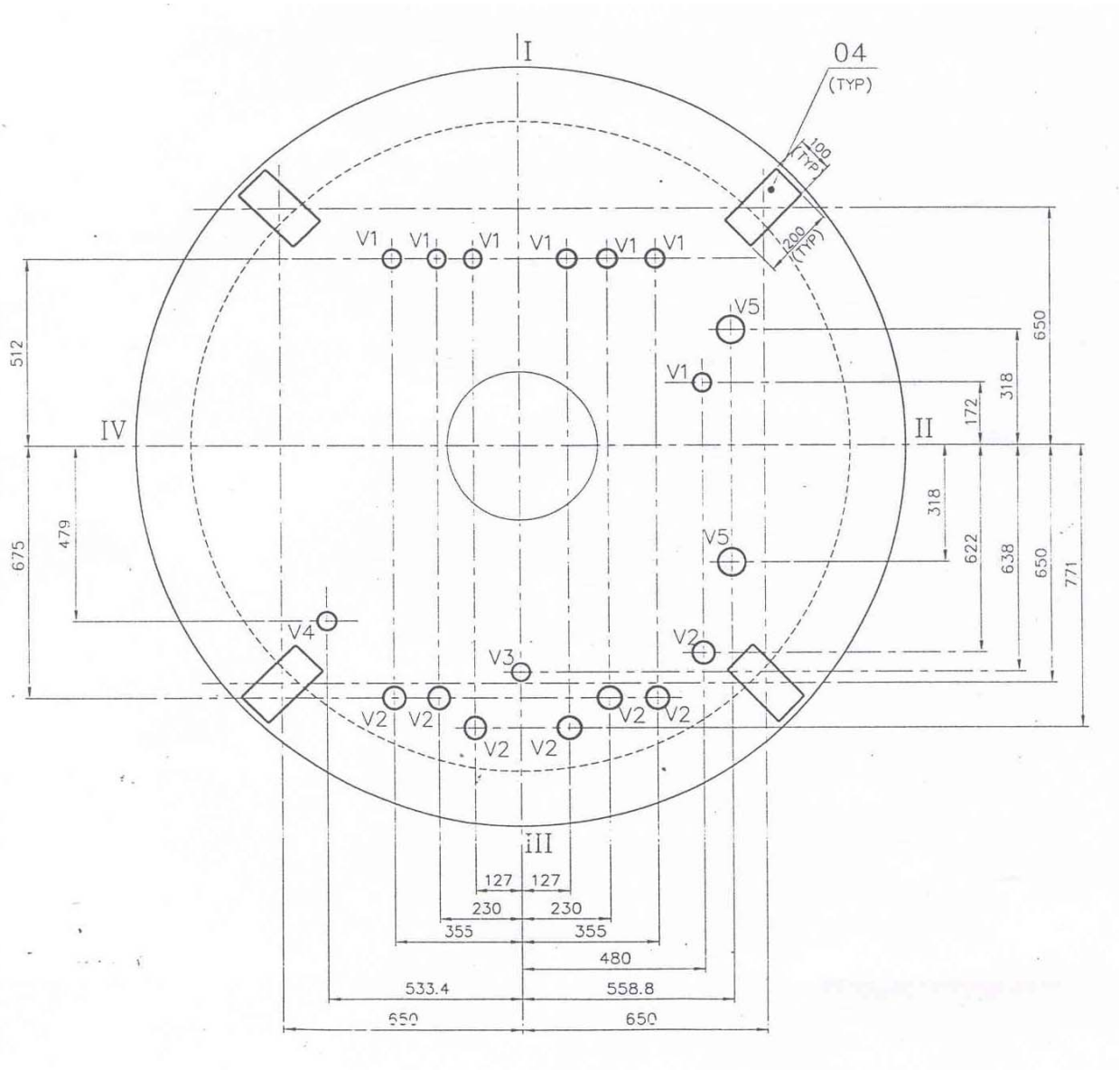
All dimensions are in 'mm'

CABS - 2 - 28 / 36 - 04
BHEL, Tiruchirappalli

ANNEXURE - 5

POSITION OF DRILL HOLES ON HEMISHPERICAL DISHED-END

(PLAN VIEW)



All dimensions are in 'mm'

CABS - 2 - 28 / 36 - 05
BHEL, Tiruchirappalli