Annexure -1

1. MACHINE:

1.1 Model: **1563, RUSSIAN**

1.2 Type: **Double column vertical boring machine.**

1.3 Table diameter: **6300mm.**

1.4 Maximum turning diameter: **6300 mm**

1.5 Height under tool holder / Cross slide: **3200 mm**

1.6 Maximum load capacity: **125 Tons**

HEADS

1.7 No. of Heads: **2 (Vertical LH with milling head & Vertical RH)**

1.8 Distance between center lines:
Minimum: **840 mm**
Maximum: **6850 mm**

1.9 Maximum traverse:
Horizontal (by feed screw): **3575 mm (incl. 150mm over run above table center)**
Vertical (by feed screw): **2000 mm**

1.10 Rapid traverse of Ram Slides & Heads:
Horizontal: **1500 mm/min.**
Vertical: **1500 mm/min.**

Feed Range: 0.035 to 285 mm/min.

1.11 Swiveling of Ram: **-15° to +30°**

1.12 Rapid Drive – AC Motor 7 KW, 1305 RPM

1.13 Feed Drive – AC Induction motor through DTC drive.
Original feed drive was through a DC Motor of 6.6 KW, Rated 2000 RPM, Max. 2800RPM (approx. 31Nm)

CROSS RAIL

1.14 Maximum traverse: **2890 mm**

1.15 Rapid traverse: **0.3 mm/min.**

1.16 **Milling Head with LH**: Max. Torque - 50 Kgmt, 3 Phase induction motor- 4.5 Kw, Speed range 80 to 675 rpm, Number of speed steps-10.

TABLE MOTOR:

1.17 The existing Table Motor is Russian make DC Motor, 112.5 kW, 1000/2200 RPM which is vertically mounted with drive-end bottom.

1.18 Table speed: 0.28 – 25.5 RPM

1.19 4 speed steps

2. REQUIREMENTS:

2.1 Left Hand (LH) Ram of the machine shall be retrofitted with a new CNC system **(along with the option of Manual Operation).**

2.2 New CNC Controller with new PLC should be able to carry out all the primary (axes & table) & auxiliary functions of the machine.

2.3 AC Servo drives and Servo Motors of suitable rating for Cross (X-) and Longitudinal (Z-) feeds along with a reduction gearbox for CNC LH ram shall be provided.

2.4 AC servo motor and drive for Cross (X-) and Longitudinal (Z-) feeds shall be provided.

- ***In existing Feed system the Gear Reduction Ratio of Feed motor to Lead Screw is approx. 100. Thus, torque requirement at Lead Screw is approx. 3100Nm***

2.5 Existing table drive and table motor is to be replaced with an inverter grade AC Asynchronous motor with forced cooling and velocity feedback and AC Drive for 4-Quadrant operation.

- ***The torque of New AC motor should not be less than the torque of existing DC motor. (Existing main motor details at Sl. No. - 1.17)***

2.6 Original capacity of the machine as per OEM specifications shall be maintained.

3.	SCOPE OF SUPPLY	Vendor to Confirm/ Deviation	Remarks
3.1	A new CNC Controller with a new PLC to perform the functions as per detailed specifications shall be provided. CNC controller should be either **Fanuc (0i-TD or advanced)** or **Siemens (Sinumerik 828D or advanced)** with 10.4 inch or more TFT/LCD monitor with full alpha numeric integrated keyboard and standard Machine Control Panel (MCP) for turning operations. With **three** Compact Flash card / Memory Key card 1GB minimum for data backup.		
3.2	AC Servo drives and Servo Motors for LH Ram (of suitable rating) for Cross (X-) and Longitudinal (Z-) feeds should be provided. The AC Servo drives & servo motors should either be **Fanuc αI series servo drives & servo motors** or **Sinamics servo drive and servo motors**. Both the servomotors shall be with in-built electromagnetic brakes. At present a single motor coupled to a gearbox and clutches drives both the X & Z feeds. Vendor can employ suitable **backlash free gearbox of Alpha/ZF/Desch - make** together with a Servo motor to achieve required feeds and torque. Gearbox shall provide suitable reduction to enable appropriate motor selection. **Details shall be provided by the vendor in the offer.**		
3.3	AC servo motor (of suitable rating) with matching drive for the cross & longitudinal feeds of the conventional Right Hand (RH) ram. Servo motor and drive should be of **Fanuc /Siemens** make in line with Sl. No. - 1.13. Details shall be provided in the offer.		
3.4	AC inverter grade motor with forced cooling and speed feedback arrangement and 4-Q AC Digital Drive for table to replace existing Russian make DC Motor, 112.5 kW, 1000/2200 RPM which is vertically mounted with drive-end at bottom.		
3.5	Ultra Isolation transformer of suitable KVA rating for all the feed drives and table drive.		
3.6	All the power cables and signal cables of suitable length for table and feed motors. Control cables of Lapp/Igus make to connect field elements and switchgear wirings.		
3.7	Electrical cabinet(s) incorporating the new table drive & feed drives, CNC & PLC accessories and other switchgear should be provided including 8 channel relay boards for field outputs. At present approx. 128 inputs and 96 outputs are used in ABB-PLC.		

3.8	Standalone Panel/Desk incorporating the CNC Panel, monitor, MCP and selector switches shall be provided.		
3.9	Hanging type operator panel as in existing setup incorporating the existing operating features to run both the heads independently with table rotation shall be provided		
3.10	For CNC LH Ram: Rotary encoder feedback may be used for Position control either directly coupled to the ball screw or through timing belt/ backlash free gears.		
3.11	Conventional RH Ram: Linear magnetic scales of suitable length should be provided for X- & Z- Axes along with a DRO mounted at a suitable location on an adjustable arm. ***The scales & DRO should be of Electronica / Sony make.*** Pre-assembled Position feedback cables from measuring system to CNC system (LH Ram) and for DRO (RH Ram) including transducer adapter cables. Mounting brackets, mounting plates etc. for mounting of scales and transducers and other items required for ensuring accuracy and repeatability of the feed axes for both heads shall be provided.		
3.12	i) Backlash free **ball-screw & ball-nut** of THK/Rexroth-Bosch/HMT make for both axes X -& Z- of LH Ram along with the **bearing housings** which shall be of SKF/FAG/TIMKIN make only. The make of the ball-screws shall be specified in the technical offer. ii) Vendor shall examine the technical feasibility of installing **electromagnetic brakes** directly on the ball lead screws and offer comments. Based on suitability, BHEL would later ask the vendor to submit the Price impact of installation of such EM brakes before opening of price bid.		
3.13	Lead screw and Lead Nut of reputed make for both the axes X and Z of conventional RH Ram along with the bearing housings which shall be of SKF/FAG/TIMKIN make only.		
3.14	**Optional Item:** Vendor shall offer a **Hydraulic counter balancing system** for the Left Head ram. Prices shall be quoted by the vendor for this item in his Price bid which shall also be considered in evaluation of Lowest (L1) bidder. **However, BHEL shall reserve the right whether to include or opt out this item while placing final work order.**		

3.15	**If during technical scrutiny phase, any major works/materials are found essential for successful commissioning and performance of the machine which are otherwise not envisaged in the scope of work, the vendor shall be asked to offer the same and submit their prices in a sealed envelope. Such envelope (s) shall be opened with the original price bid and prices of that work/ material shall also be included while computing L1 (lowest) bidder.**		
3.16	Lubrication system (Cenlub/Vogel Make preferable) to be provided for the Left Head and Right Head separately.		
3.17	New table motor and drive; electrical cabinet; switch gear; control desk etc. shall be supplied as per **Sl. No. - 8**.		
3.18	All the Mechanical & Electrical items and fittings including brackets, couplings, cable glands, ferrules and tags etc. required for the retrofitting work of the machine.		
3.19	Machine work light on both the heads and on cross rail suitably positioned for proper illumination.		
3.20	Following documents: **(3 sets each)** ❖ Electrical circuit diagram (Hard & soft copy). ❖ PLC printout in ladder form with symbols & comments in English (Hard & soft copy). ❖ O&M manuals (hard copy) for CNC, PLC, Drives, Measuring systems & all BOI. ❖ Programming manual (hard copy) for CNC system. ❖ Machine data (NC, PLC, Setting & Alarm text), Drives data & PLC program (soft copy). ❖ O&M manual for ball screws & ball nuts. ❖ Drawing of all fittings including brackets, flanges etc. ❖ List of all mechanical/electrical/electronic items used (Bill of material) on machines in details.		
3.21	Following **Spares** shall be quoted priced itemwise : ❖ Control card and power card one each of the feed drives of CNC Left Head. ❖ Complete 4 Q – Digital drive for table (as per Sl. No. – 8.6) ❖ CNC system complete with CF card, monitor and MCP as used (as per Sl. No. – 3.1) ❖ DRO unit along with 02 nos. scanning heads for magnetic scales (as per Sl. No. – 3.11) ❖ Complete PLC system as used in machine as Sl. No. 3.1		

4.	**SCOPE OF WORK**		
4.1	**Mechanical reconditioning/ modifications:**		
	The machine should be modified to the suit the fitment of CNC system on the Left hand RAM so that LH Ram can traverse in X -and Z - axes in AUTO, JOG, MANUAL modes with CNC in the given feed range without giving any interruptions and withstand cutting forces while taking intermittent cuts. Emphasis is to be given on the following works: ❖ Present lead-screw arrangements for X- and Z- axes are to be replaced with backlash free **ball lead screw** arrangements **for LH RAM.** ❖ Present lead-screw arrangements for X and Z axes are to be replaced with new **lead screw and nut** arrangements **for RH RAM**. ❖ Installation of new AC Servo feed motors for Cross (X) and Longitudinal (Z) feeds of the **CNC LH ram**. ❖ Installation of suitable backlash free gear box to transfer drive to ball lead screw of **CNC LH Ram** traverses. ❖ Installation of new AC Servo feed motor for Cross (X) and Longitudinal (Z) feeds of the **Conventional RH ram**. ❖ Installation of Rotary encoder through backlash free arrangement of timing belt/ Gears to the Ball Lead screw of the LH ram. **OR** Motor encoder itself can also be used for position feedback if it is ensured that there is no backlash between motor drive and driven part. ❖ Installation of the linear scales for Cross and Longitudinal traverse of RH ram. The linear scales for RH Ram must have accuracies not more than 10µm per meter and should be suitable for resolutions of 1µm (0.001mm) for DRO display. ❖ Installation of automatic lubrication system of adequate capacity (CENLUB/Vogel make preferable) for LH and RH Ram.		

	❖ Overhauling of existing moving type operator pendent in up/down/left/right movement control with induction motors through push buttons. ❖ Rewiring of entire machine with Cables of reputed make including Control, signal & Power cabling (including Cabling to Spindle & feed motors). The vendor to note that the entire machine has to be rewired. Input Power Supply to the machine will be provided by BHEL. Terminal boxes, screwed terminal blocks, ferrules, cable glands, control transformers etc. required as per the new electrical scheme should be provided of reputed makes viz. Wago, Phoenix contact etc. ❖ All power cables, signal cables and control cables for RAMs are to be routed through existing cable drag chain on cross rail. ❖ All components, power and signal cables are to be properly labeled with metallic tags in panels as well as on machine.		
4.2	**CNC Retrofit:** ❖ Installation of new electrical cabinet(s). ❖ Installation of new standalone operator Panel. ❖ Interfacing & commissioning of the CNC, PLC, Position feedback, Table & Feed drives systems ❖ All field outputs should be configured through 8-channel Relay Boards. ❖ Prove-out of the main functions (axes & table). ❖ Prove-out of the auxiliary functions. ❖ Incorporation and Demonstration of the alarms and message prompts. ❖ Prove-out of the machining of 2 component as per drawing enclosed with part program in automatic mode.		
4.3	Both X- and Z- axes of retrofitted **LH Ram** shall be **LASER calibrated** and correction/ compensation values shall be entered into CNC System.		

5.	**CNC FEATURES**		
5.1	CNC controller should be offered with following features: ❖ Mode selection through a mode selector switch/keys ❖ 10.4" or more color TFT/LCD monitor for display. ❖ Display of NC & PLC Alarms with remedial descriptions. ❖ Minimum 128 kB memory for program storage. ❖ Facility to store up to 999 subroutine programmes & 9999 part programmes. ❖ Background editing of programs. ❖ Part program renaming & copying facility. ❖ Editing functions: Selecting, copying, deleting of block (within a program and in-between programs). ❖ Block search with calculations in automatic mode. ❖ Facility to store 4 zero offsets. ❖ It should be possible to store 64 tool offsets. ❖ Resolution of 0.001 mm, accuracy should be as per VDI3441. ❖ Backlash & pitch error compensation facility. ❖ Software limits through machine parameters. ❖ Automatic tool offset loading facility. ❖ Offline Graphic simulation (Fast simulation of tool movements without requirement of locking machine axes/ independent of machine movements). ❖ Repositioning on the contour.		
6.	**OPERATIONAL FEATURES**		
6.1	The standalone panel /control desk with the CNC operator panel should have the following operational features or more either on the MCP or provided additionally. ❖ Axes selection keys X & Z. ❖ Directional keys + & - for axis movement in jog. ❖ Rapid traverse key.		

	❖ Rotary table ON / OFF. ❖ Rotary table rotation direction CW/CCW. ❖ Emergency stop. ❖ Reset facility. ❖ Single block switch/key ❖ Dry run switch/key ❖ Oil pump ON push-button/key. ❖ Main motor ON push-button/key. ❖ Cross rail up/down push-button/key. ❖ Indicators for main motor ON, Oil pump ON, cross rail locked/unlocked, Table ON.		
6.2	The Hanging Pendant as in existing setup shall incorporate all the existing and necessary features to operate both heads and table independently **(*CNC LH Ram* and conventional RH Ram):** ❖ Axis selection of both heads. ❖ Table inch CW/CCW. ❖ Table rotation on/off CW/CCW ❖ Emergency Pushbutton ❖ Swiveling motor anticlockwise ❖ Swiveling motor clockwise ❖ Table gear change Pushbuttons ❖ Feed continuous for both heads (one head at a time) along with continuous table rotation ❖ Head selection on/off switch (RH/LH) ❖ Current meter for table, table RPM potentiometer along with a dial to indicate selected/set RPM ❖ All required pushbuttons and **LED** indicating lamps to run both heads RH & CNC LH independently. ❖ **Layout of the Hanging pendant shall be submitted by the vendor after placement of Work Order and will need approval of BHEL.**		

6.3	It should be possible to have Manual control of machine Left Head independent of MDI/CNC part program. Manual control should have following provisions: ❖ START (CW/CCW) and STOP of Table Rotation. ❖ Inching (CW/CCW) of Table Rotation. ❖ Regulation and Indication of Table RPM ❖ Start, Stop, Regulation and Indication of Feed, Fast traverse, Inching in X and Z.		
6.4	Monitoring: ❖ Any abnormality on the machine should be indicated by indicating lamps, PLC alarms & message prompts. ❖ PLC alarms & messages should include the device number and/or the operand.		
6.5	Safety Features should include ❖ Fuses & Overloads of appropriate ratings for all primary & auxiliary circuits. ❖ Limit switches & sensors to avoid over-travel & collision of any part of the machine. ❖ Float & pressure switches to ensure proper functioning of hydraulic & lubrication systems.		
7.	**PROGRAMMING FEATURES**		
	❖ Decimal point programming. ❖ Programmable dwell. ❖ Storage of user defined subroutine independent of the main program. ❖ Variable parametric programming with mathematical functions including trigonometric & logic functions. ❖ Arc-programming with radius & end-point. ❖ Conditional & unconditional jump. ❖ Programmable tool offset. ❖ Programmable zero offset. ❖ Subroutine nesting up to 3 levels. ❖ Programmable skip. ❖ Facility of inclusion of message in the part programme. ❖ Corner rounding & chamfering.		

	❖ Diameter programming. ❖ Face grooving ❖ Tool nose radius compensation. (TNRC) ❖ Programming of primary & auxiliary functions through M, S, T codes.		
8.	**ELECTRICAL SYSTEM**		
8.1	Electrical panel(s) along with switch gear, relay, contactors, overloads, fuses, MCBs and MPCBs should be suitably positioned in the space created after removal of existing cabinets and all compartments should be illuminated for ease of maintenance.		
8.2	The switchgear (MCBs, MPCBs, Overloads, Contactors, and Relays etc.) should be of any one of the following makes: Siemens, Schneider or ABB.		
8.3	All indicating lamps should be LED type.		
8.4	Electrical Cabinet should be of Rittal make with proper air conditioning and should be dust and vermin proof.		
8.5	Standalone Desk/Operator panel should be of Rittal Make with EBM/EBM-nadi exhaust fan having air removal capacity of about **1800m³/hour.**		
8.6	The existing Table Motor (Russian make DC Motor 112.5 kW, 1000/2200RPM) is to be replaced by an AC inverter grade motor (vertical mount drive end bottom)with forced cooling and speed feedback arrangement and 4-Q AC Digital Drive and it should be interfaced with the new CNC system and switchgear. **The torque and rated RPM of new AC motor should not be less than the existing DC motor.**		
8.7	Replacement of all limit switches, proximity switches, pressure switches and flow switches. New pressure switches and flow switch should have digital display and should be of Türck/Parker/Hydac make.		
8.8	Control desk shall be suitably positioned for ease of operation.		
8.9	All the panels, Junction boxes, devices should have nomenclatures/Tags and individual wires ferruled as per the electrical schematics.		
8.10	Existing AC motors for cross rail movement, cross rail locking, head swiveling, table gear change, pendant up/down movement should be retained & rewired.		

8.11	The wiring of the entire machine shall be replaced by new one of adequate capacity with LAPP/IGUS/SAB/FINOLEX make cables. Selection and Operation of RH Ram should be possible from the Main control Desk.		
8.12	Provision should be made to operate the Table from the Control Desk as well as from the Hanging Pendant in inch & continuous mode at different speeds.		
8.13	220VAC, 5A sockets should be provided in the Electrical Cabinet(s) and on the Operator Control desk.		
9.	**GENERAL OPERATING CONDITIONS**		
9.1	Temperature: 5° to 50°C		
9.2	Humidity: 0 - 95% RH		
9.3	Power Supply: 415V +/-10%, 50 Hz +/- 3%, 3 Phase, 3wire without neutral.		
10.	**MISCELLANEOUS**		
10.1	Bill of material for the supplied items shall be provided.		
10.2	The geometrical accuracy of the machine shall be checked by the vendor before taking the machine for retrofitting as per Machine's Geometrical test chart.		
10.3	**All the work is to be done in situ at BHEL, Haridwar.**		
10.4	The Vendor is advised to inspect the machine prior to quoting ascertain all the relevant details required for successful completion of the work.		
10.5	Machining facility will be provided by BHEL if possible.		
10.6	The vendor shall bring all tools, tackles and testing equipment with them for successful commissioning of machine.		

11.	**COMPLETION AND ACCEPTANCE**		
11.1	Final Acceptance shall be at HEEP, BHEL, Haridwar after: 1. Upon completion of the scope of supply and scope of work at BHEL. 2. Machine shall be switched ON and all functional features of the machine shall be demonstrated. 3. Successful machining of **2 nos. BHEL components (as per Annexure -6).** Drawings with highlighted operations shall be furnished by BHEL. 3.1 Operator and tooling shall be provided by BHEL. 3.2 Machining operations which are currently being done under Tracer control shall be demonstrated by the vendor under CNC control. 3.3 If a regular job is not available after machine retrofitting is completed, Step '3.2' shall be demonstrated on a technological /test piece and its successful machining will be deemed to be completion of Job prove out. *The attached drawings (**as per Annexure - 6**) should be treated as BHEL property. Strict confidentiality is to be maintained and under no circumstances these drawings or copy of these must be transferred to third party without permission of BHEL. These drawings must not be used directly or indirectly in any way detrimental to the interest of BHEL.* After settlement of all pending issues related to work and supply, a certificate for Completion of works in all respect shall be released by BHEL which will be the referred document for Final Acceptance and final payment to the vendor.		
12.	**PERIOD OF RETROFIT**		
12.1	**Supply of Material: - Six (6) months maximum** from the date of award of contract. Early delivery shall be acceptable.		
12.2	**Work: - Four (4) months maximum** from the date of release of machine. Work includes installation, commissioning of supplied material and final hand-over after job prove out.		
12.3	Vendor to note that early delivery shall be acceptable with prior approval of BHEL.		
13.	**PAYMENT TERMS**		
13.1	No advance payment shall be made to the vendor.		

13.2	1st payment of 80% of material and spare cost along with 100% taxes & duties (Excise duty, CST / VAT as applicable) may be made after inspection & acceptance of material at BHEL Haridwar.		
13.3	Final payment of balance 20% of material and spare cost +100% of commissioning charges + service taxes as applicable shall be payable after final acceptance of the machine (as per Clause 11). This payment shall be released against the PBG as per Clause 17.		
13.4	All the payments shall be made through e-payment.		
13.5	Timely submission of CENVATABLE invoices along with necessary documents to enable avail of CENVAT (Excise duty, Service tax & VAT) credit by BHEL. Note: Wherever CENVAT credit cannot be availed within given time limit due to delay in submission of invoices or for any other reason attributed to vendor, loss of such CENVAT credit will be recovered from such vendor.		
14.	**RISK PURCHASE CLAUSE**		
14.1	In case of delays in supplies / defective supplies or non-fulfillment of any other terms & conditions given in the work order BHEL may cancel the work order in full or part thereof and may also make the purchase of the material / service from elsewhere / alternative source at the risk and cost of supplier. Vendor does not agree to above clause, their offer is liable to be rejected. In case any vendor accepts risk purchase clause initially and subsequently declines to honor the term in the eventuality of RISK PURCHASE, they may be banned for business with BHEL.		
15.	**EARNEST MONEY DEPOSIT (EMD)**		
15.1	Vendors have to deposit the EMD of **Rs. 2 Lakhs**. EMD may be deposited through pay order or demand draft in favor of Account Officer, BHEL, Haridwar only.		
15.2	EMD shall be converted to security deposit if the work is awarded.		
15.3	EMD of unsuccessful bidders shall be refunded back normally within fifteen days of acceptance of award of work by the successful bidder.		
15.4	EMD shall not carry any interest.		
15.5	EMD by bidder will be forfeited as per tender document, if : • After opening the tender, the tenderer revokes his tender within the validity period or increases his earlier quoted rates • The tenderer does not commence the work within the period as per LOI/contract.		
15.6	Offers without EMD will be rejected and will not be considered for evaluation.		

15.7	The units registered under Single Point Registration Scheme of NSIC are eligible to get the benefits under "Public Procurement Policy for Micro & Small Enterprises (MSEs) Order 2012" as notified by the Government of India, Ministry of Micro, small and Medium Enterprises, New Delhi. • Issue of the Tender Sets free of cost; • Exemption from payment of Earnest Money Deposit (EMD). • MSE suppliers can avail the above benefits only if they submit along with their offer, attested copies of EM-II certificate having deemed validity (five years from date of issue of acknowledgement in EM-II) or valid NSIC certificate or EM-II certificate along with attested copy of a CA certificate (Format enclosed **Annexure -4** attached where deemed validity of EM – II certificate of five years has expired) applicable for the relevant financial year (latest audited). Date to be reckoned for determining deemed validity will be the date of bid opening (Part 1 in case of two part bid). Non submission of such documents will lead to consideration of bid at par with other bidders. No benefit shall be applicable for this enquiry if any deficiencies in above required documents are not submitted before price bid opening. If tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal. **Documents should be notarized or attested by Gazetted officer.**		
16.	**SECURITY DEPOSIT (SD)**		
16.1	Successful vendor shall deposit security. The rate of security deposit will be as below:		
16.2	For work Up to Rs. 10 Lakhs : 10% of work order value Above Rs. 10 Lakhs upto Rs. 50 Lakhs : Rs. 1 Lakh + 7.5% amount exceeding Rs. 10 Lakhs Above Rs. 50 Lakhs: Rs. 4 Lakhs + 5% amount exceeding Rs. 50 Lakhs		
16.3	The security deposit should be submitted before the start of work in the following forms: i) Cash (As permissible under the Income Tax Act) ii) Pay Order, Demand Draft in favour of BHEL, Hardwar iii) Local cheques of Scheduled Banks, subject to realization. iv) Bank Guarantee from Scheduled Banks/Public Financial Institution as defined in the companies Act. The Bank guarantee format should have the approval of BHEL.		
16.4	Security Deposit shall not carry any interest.		
16.5	EMD of successful tenderer can be converted and adjusted against the Security Deposit.		

16.6	100% of the Security Deposit amount shall be refunded to the vendor after post commissioning successful running of the machine for one month. SD shall be released after the submission of Performance Bank Guarantee (PBG) by the vendor.		
17.	**WARRANT Y AND PERFORMANCE BANK GUARANTEE (PBG)**		
17.1	Vendor shall stand warranty for smooth functioning of the machine, including all the mechanical items and parts employed in CNC retrofitting, for a period of **one year** from the date of FINAL HAND-OVER of the machine.		
17.2	Vendor shall be required to submit a performance bank guarantee (PBG) for 10% of the total work order value which shall be valid for a period of 12 months from the date of final acceptance of machine.		
17.3	The PBG shall be submitted on a non-judicial stamp paper of value not less than Rs.100/- issued by any one of the nationalized banks (**as per Annexure-3)**		
18.	**LATE DELIVERY (LD)CLAUSE**		
18.1	LD @ 0.5% per week subject to a maximum of 10% of the Material cost including spare parts shall be applicable for delay in deliveries. The time period from invitation date for Pre dispatch inspection from vendor to the date of arrival of Pre Dispatch Team to vendor's works and any other reasons attributed to BHEL will not be accounted for in delivery period. This period will be excluded for the purpose of calculating LD. Vendor should intimate regarding PDI 15 days in advance.		
18.2	LD @ 0.5 % per week subject to a maximum of 10% of the Commissioning Charges shall be applicable for delay beyond scheduled commissioning date for reasons attributed to the vendor.		
19.	**TRAINING**		
19.1	Vendor shall provide training to BHEL staff for operation & maintenance of the system supplied by them during installation & commissioning.		
19.2	Vendor shall provide training in the programming & maintenance aspects of CNC controller at OEM's works/training center to two BHEL engineers.		
19.3	Vendor shall also provide training of Servo drives supplied and installed by the vendor at OEM's Training Centre for one BHEL engineer.		
20.	**BHEL'S OBLIGATION/ FACILITIES**		
20.1	Existing electrical schematic of the machines shall be provided by BHEL to the vendor.		
20.2	Crane facility along with lifting tackles, trolleys etc. will be made available free of charge while working in BHEL		

	premises only. Any civil work required for the erection of panel shall be done by BHEL.		
20.3	Facilities of minor welding, brazing, minor machining limited to fitting work /rework etc. will be made available free of cost inside BHEL premises.		
20.4	Consumables like lubricants, kerosene oil, cotton waste etc. will be supplied free of cost by BHEL during execution of works inside BHEL premises. Contractor should make his own arrangements for all types of hand tools including pneumatic/electrical drill machines, grinders, scraping tools along with the general purpose measuring instruments, straight edges etc.		
21.	**SUBMISSION OF BILL OF MATERIAL (BOM)**		
21.1	Before inviting BHEL for Pre-dispatch inspection, vendor shall submit to BHEL the Bill of Material (BOM) and proposed electrical drawing/ schematic for scrutiny and approval.		
22.	**OFFER**		
22.1	Total offer should be submitted in two parts in the following manner. ❖ Techno-commercial bid. ❖ Price bid.		
22.2	Techno-commercial & price bids should be submitted in separate envelopes marked accordingly. The price bid will be opened after finalization of Techno-commercial bids.		
22.3	The envelop shall contain the **Techno-commercial Bid (ANNEXURE '1')** with technical details and commercial terms & conditions along with relevant documents like copies of ESI, PF code, PAN No., Service Tax Regn. No., TIN No., CST No., Experience Certificates, Audited Balance Sheet of last 3 years, P.O copies & Commissioning/ Performance certificates (against Pre-qualifying conditions) , Tender fees (Rs. 1000/-), EMD and **Check List as per ANNEXURE '5'**.		
22.4	The envelop shall be super scribed with "Techno-Commercial Bid", Name of work & NIT No.		
22.5	Point-wise compliance of this scope of supply and work is to be given by vendors while submitting their techno-commercial offer in the format provided by BHEL. Each page of the compliance list has to be signed by the vendor.		
22.6	The vendor must note that no prices are to be quoted/ mentioned in the techno-commercial offer.		
22.7	The second envelope shall contain only the price bid with separate price for material, spares, work & applicable taxes & duties on **Price Bid Format only as per ANNEXURE '2'**.		

22.8	Any other information in the price bid shall not be considered and the quotation is likely to be rejected. Price bid document shall be signed by the bidder at the bottom of the page.		
22.9	The envelope shall be sealed and super scribed with “Price Bid”, Name of work & NIT No.		
22.10	Price bids of only techno commercially accepted vendors shall be opened.		
22.11	The award of works will be made on basis of the total of Material cost, Spare Parts cost, Commissioning charges and all taxes, duties as applicable (Cost to BHEL).		
	The Vendor should submit their best price at this stage itself and they will not be allowed to revise the price. Any revision / discount given by the vendor subsequently will be ignored.		
22.12	Both the above two envelopes shall be kept in another sealed cover. The cover shall be super-scribed with “Quotation for (name of work), NIT No. & due date and shall be submitted in **Tender Box** kept in the **Tender room** of Purchase department at the **4th floor, Main Administrative Building of BHEL, HEEP, Haridwar** and it should also contain Bidder address.		
23.	**PRE-DISPATCH INSPECTION**		
23.1	Pre-dispatch inspection of all the items covered under Scope of Supply at **Para Sl. No. -3** shall be carried out by BHEL at vendor’s works.		
23.2	Supplier shall invite BHEL for carrying out pre- inspection. Deputed BHEL persons shall do pre acceptance at vendor works and give dispatch clearance. Expenses of Boarding and lodging of BHEL personnel during PDI shall be borne by BHEL.		
24.	**COMMERCIAL TERMS**		
24.1	Prices shall be quoted on “Firm Price” basis only. The prices should be on F.O.R BHEL, Haridwar basis inclusive of Packing & Forwarding, transit insurance & Transportation charges. Applicable % of ED & Sales Tax, Installation/ Commissioning Charges & Service Tax should be clearly indicated in attached Price bid format as per **“Annexure 2”**		
24.2	Validity of offer shall be for a minimum period of 120 days from the date of Tender Opening.		
24.3	Freight & transit insurance charges from Dispatching station to BHEL, Haridwar shall be borne by the party.		
24.4	The material will be dispatched to Central Plant Stores, HEEP, BHEL, Haridwar with instruction to forward the same to **SDGM (WEX-MCR).**		

25.	**PACKING**		
26.1	Supplier shall arrange for adequate protection and packing of the consignment so as to avoid loss and damage during transit and also take appropriate measures to prevent metal parts from rusting and corrosion during transit. Handling instructions shall be clearly printed /painted on the packages. Each package should carry a detailed packing slip.		
26.	**PRE-QUALIFYING CRITERIA**		
26.1	Offers shall be considered only of those vendors/ manufacturers who meet the below mentioned criteria: **1.** Average annual turnover during the **last 3 financial years** ending 31st March or 31st December or as the case may be, should be at least **Rs. 50 lakhs**. Copies of audited balance sheets shall be submitted. **2.** Experience of having successfully completed "similar works" during last **7 years** ending on 30th May' 2015: **Definition of "Similar Works":** Similar works means either of the following: **A.** Retrofitting of a Lathe with a new CNC System, Servo Drives and Servo Motors along with replacement of Lead Screw and nuts of X- and Z- axes with Ball screws and nuts. Details of class, make, Length, Dia. and pitch of ball screw is to be provided. However, if the lathe had rack and pinion arrangement in Z-axis and the same had been upgraded to double pinion gearbox system / Ball screw and nut during retrofitting, it is also acceptable. **B.** Retrofitting of a Vertical borer with a new CNC System, Servo Drives and Servo Motors along with replacement of Lead Screw and nuts of X- and Z- axes with Ball screw and nuts. Details of class, make, Length, Dia. and pitch of ball screw is to be provided. **C.** Retrofitting of a Horizontal borer with a new CNC System, Servo Drives and Servo Motors along with replacement of Lead Screw and nuts of X-, Y- and Z- axes with Ball screws and nuts. Details of class, make, Length, Dia. and pitch of ball screw is to be provided. However, if the Horizontal borer had rack and pinion arrangement in X- axis and the same had been upgraded to double pinion gearbox system / Ball screw and nut during retrofitting, it is also acceptable.		

26.2	**The machine builders who have designed, manufactured and successfully commissioned any of above mentioned CNC machines during last 7 years ending on 30th May' 2015 may also submit their offers. However, they have to meet PQC requirements of 26.1 - (1.)**		
26.3	Documentary evidence such as P.O. / W.O. Copies giving scope of supply and scope of work, final MOM/ commissioning certificate/ performance certificate shall be submitted as part of Tender technical bid in support of Pre- Qualification Requirements.		
26.4	Customer's details such as Name, Address, Telephone No., FAX No., email ID shall be submitted by the vendor along with documentary evidences as per Para 26.3. BHEL reserves the right to verify the information provided by the vendor with the vendor's customers directly. Vendor shall also agree to facilitate the visit of BHEL engineer(s) to his customer's premises, if considered necessary by BHEL. Travel, boarding and lodging expenditure for such visits shall be borne by BHEL.		

Annexure -2

PRICE BID FORMAT

Name of Work: CNC RETROFITTING OF DOUBLE COLUMN VERTICAL BORING M/C, PLAN NO. - 1-010 OF BL-3

Sl. No.	Description of item	Unit	Qty.	Basic Rate (in Rs.)	Excise Duty (in %)	VAT/CST (in %) (VAT with FORM-17 or CST with C-FORM)	Service Tax (in %)	Total Value (in Rs.)
1.	Material **(Sl. No. - 3.1-3.13 and 3.16-3.20)**	Set	01		%	%		
2.	Spares (**Sl. No. - 3.21)**	Set	01		%	%		
3.	Installation & Commissioning	Set	01				%	
4.	Hydraulic Counter Balancing System **(Sl. No. – 3.14)**	Set	01		%	%	%	
	TOTAL COST (in Figures)							
	TOTAL COST (in Words) :							

ANNEXURE – 3

Performa for Bank Guarantee

In consideration of the Bharat Heavy Electrical Limited Siri fort N. Delhi through

Division HEEP Hardwar (hereinafter called the Company') having agreed to exempt---------- (hereinafter called 'the said Contractor' which term includes 'Suppliers' for the purpose of this Bond) from the demand under the terms and conditions of an Agreement date. ---------- Made between ----------and ---------- for (hereinafter called 'the said Agreement') of Security Deposit for the due fulfillment by the said Contractor of the terms and conditions contained in the said Agreement, on production of a Bank Guarantee for Rs. ---------- (Rupees----------only).

1. We, _____(Indicate the name of the Bank)_____ (hereinafter referred to as 'the Bank') at the request _____ _____(Contractor (s) do hereby undertake to pay to the Company an amount not exceeding Rs._____ _____ against any loss or damage caused to or suffered or would be caused to or suffered by the Company by reason of any breach by the said Contractor (s) of any of the terms and conditions contained in the said Agreement.

2. We, _____(indicate the name of the Bank)_____ do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the Company stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Company by reason of breach by the said Contractor(s), of any of the terms of conditions contained in the said Agreement or by reason of the contractor(s), failure to perform the said Agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs._____.

3. We undertake to pay to the Company any money so demanded notwithstanding any dispute or disputes raised by the Contractor(s) in any suit or proceeding pending before any court or Tribunal relating thereto our liability under this present being absolute and unequivocal.

   The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the Contractor(s) shall have no claim against us for making such payment.

4. We, _____(indicate the name of the Bank)_____ further agree that the Guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Company under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till _____ Office / Department / Division of Bharat Heavy Electrical Limited certifies that the terms and conditions of the said Agreement have been fully and property carried out by the said contractor(s) and accordingly discharged this guarantee. Unless a demand or claim under this guarantee is made on us in writing on or before the _____ _____ we shall be discharged from all the liability under this guarantee thereafter.

5. We, _____(indicate the name of the Bank)_____ further agree with the Company that the Company shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said contractor(s) form time to time or to postpone for any time or from time to time any of the power exercisable by the company against the said contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by any reason of any such variation or extension being granted to the said contractor(s) or for any forbearance, act or omission on the part of the company or any indulgence by the company to the said contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the constitution

   of the Bank or the contractor(s).

7. We, _____(indicate the name of the bank)_____ lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Company in writing.

Dated the _____ day of _____

For _____(indicate the name of the bank)_____

Annexure – 4

Certificate by Charted Accountant on Letter Head

This is to certify that M/s …… (hereinafter referred to as 'company') having its registered office at ……is registered under MSMED Act 2006, Entrepreneur Memorandum No. Part –II ……Dtd: …… Category: …… (Micro/ small). (Copy enclosed).

Further verified from Books of account that the investment of the company as per the latest audited financial year…….. as per MSMED Act 2006 is as follows:

1. **For Manufacturing Enterprises:** Investment in plant and machinery (i.e. original cost excluding land and building and the items specified by Ministry of small scale Industries vide its notification No. S.O. 1722(E) Dtd. October 5 , 2006):
   Rs. …….. Lacs
2. **For Service Enterprises:** Investment in equipments (i.e. original cost excluding land and building and furniture, fittings and other items not directly related to the service rendered or as may be notified under MSMED Act, 2006):
   Rs. …….. Lacs

(Strike off whichever is not applicable)

The above investment of Rs…… Lacs is within permissible limit of Rs……Lacs for…… (Micro/ small) (Strike off whichever is not applicable) category under MSMED Act 2006.

Or

The company has graduated from its original capacity (Micro/ small) (Strike off whichever is not applicable) and date of graduation of such enterprise from its original capacity is……. (dd/mm/yy) which is within the period of 3 years from the date of graduation of such enterprise from its original category as notified vide S. O. No. 3322 (E) dated 01.11.2013 published in the gazette notification dated 04.11.2013 by ministry if MSME.

Date:
(Signature)
Name-
Membership No.-
Seal of Chartered accountant

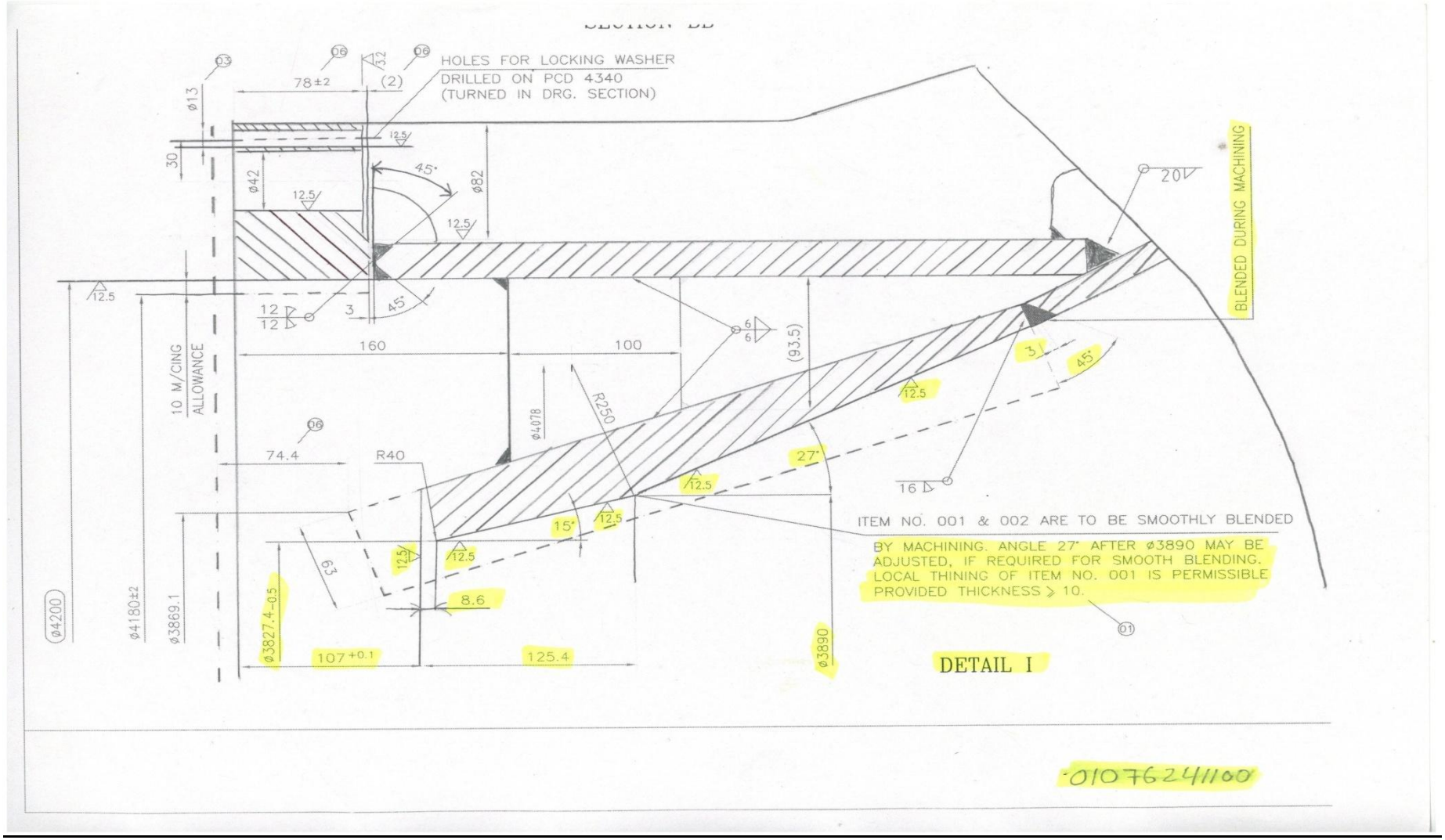
Annexure -5

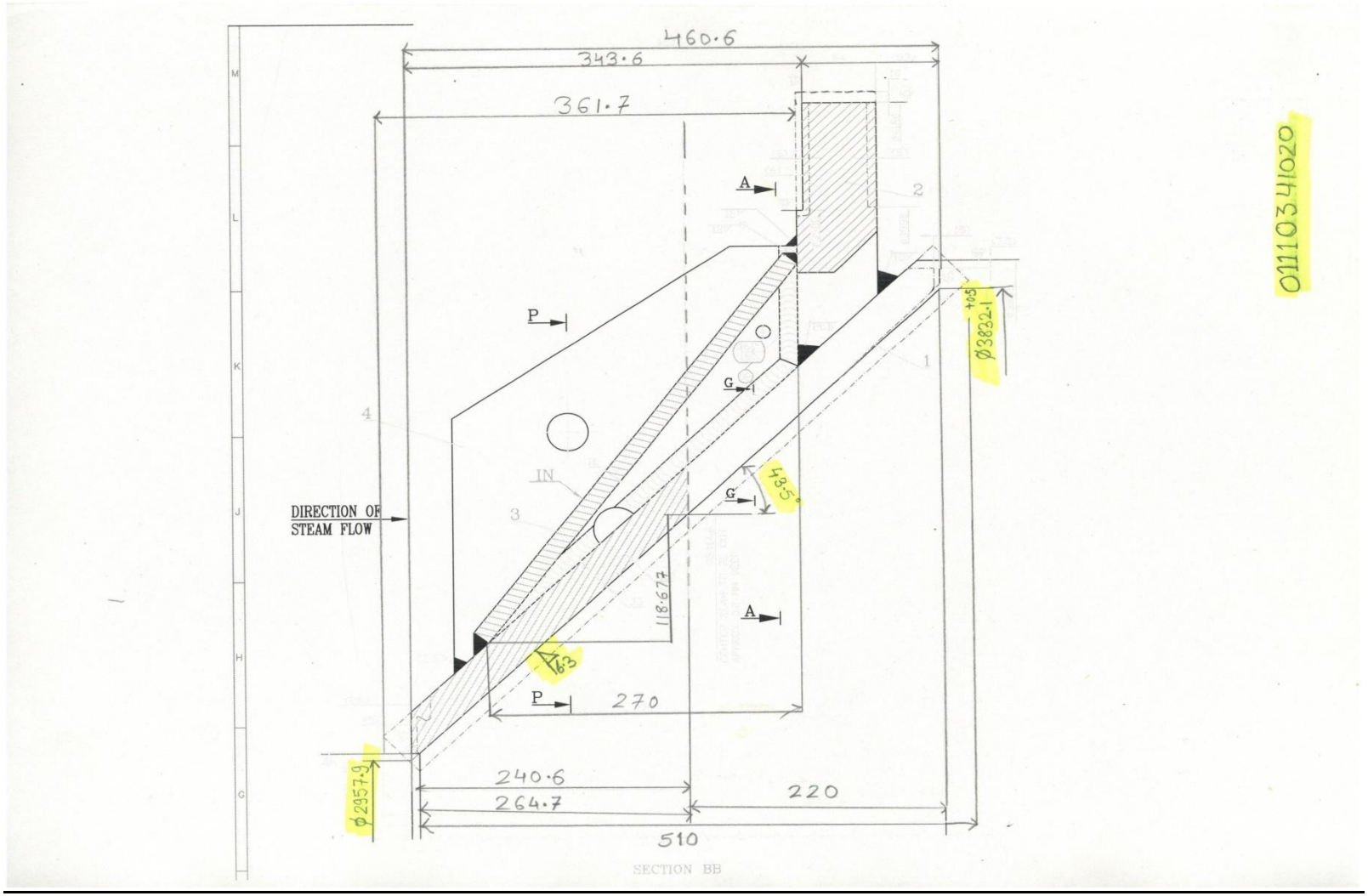
CHECK LIST FOR TENDER

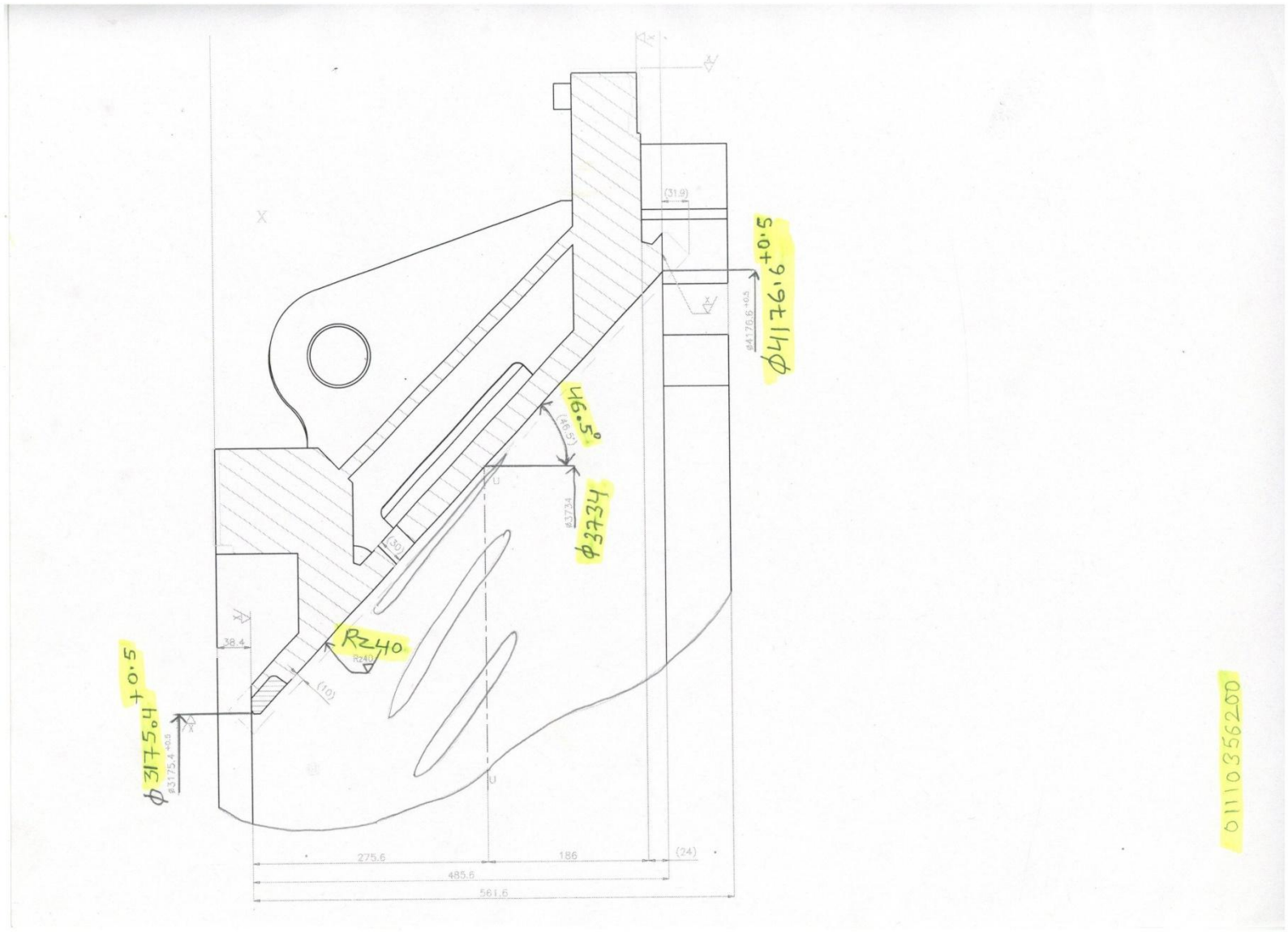
NIT No. :

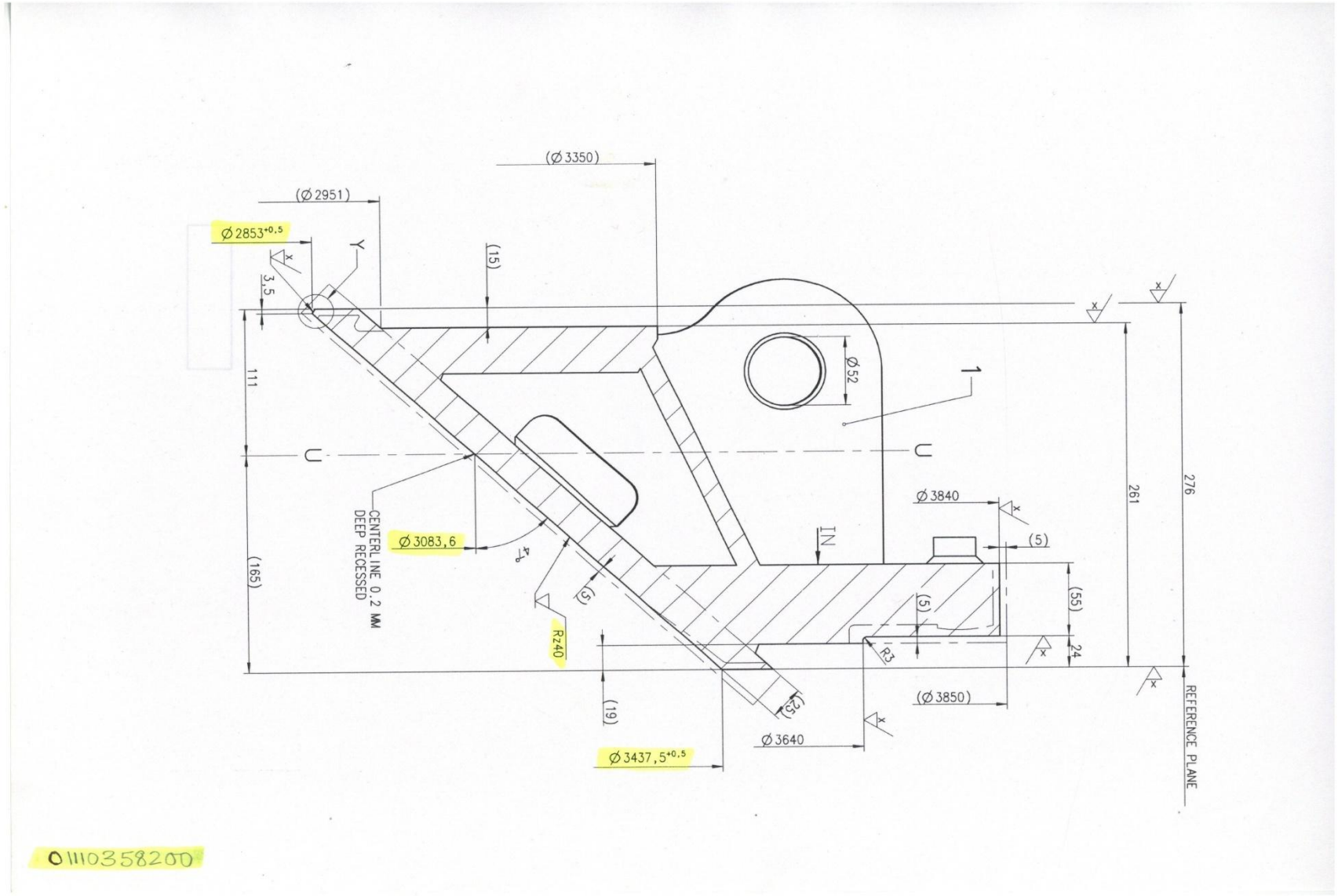
Vendor shall ensure that following documents / particulars have been enclosed with tender. This check list shall be enclosed with Techno-commercial Bid.

S. No.	Particulars	YES/NO	REMARKS
1.	**Sealed Techno-commercial Bid** as per Annexure '1' of NIT		
2.	**Sealed Price Bid** as per Annexure '2' of NIT		
3.	**Compliance** to all the points of the Annexure '1'of NIT		
4.	**Audited balance sheets** for the last three years should be submitted required as per Para 26.1 of Annexure 'A' of NIT		
5.	**P.O. copies and Commissioning/ Performance certificates** required as per 26.3 of Annexure '1' of NIT		
6.	**Name, address & contact details of their customer** required as per 26.4 of Annexure '1' of NIT		
7.	**Tender Fee** enclosed		
8.	**Earnest Money Deposit (EMD)** required as per Para 15.1 of Annexure '1' of NIT		


HOLES FOR LOCKING WASHER
DRILLED ON PCD 4340
(TURNED IN DRG. SECTION)
78±2
(2)
ø13
30
ø42
ø82
45°
12.5
20
BLENDED DURING MACHINING
160
100
(93.5)
10 M/CING ALLOWANCE
ø4078
R250
74.4
R40
27°
16
3
45°
ITEM NO. 001 & 002 ARE TO BE SMOOTHLY BLENDED
BY MACHINING. ANGLE 27° AFTER ø3890 MAY BE ADJUSTED, IF REQUIRED FOR SMOOTH BLENDING.
LOCAL THINING OF ITEM NO. 001 IS PERMISSIBLE
PROVIDED THICKNESS ⩾ 10.
(ø4200)
ø4180±2
ø3869.1
ø3827.4 -0.5
63
8.6
107 +0.1
125.4
ø3890
DETAIL I
01076241100


460.6
343.6
361.7
A
P
G
IN
DIRECTION OF
STEAM FLOW
43.5°
118.677
63
270
240.6
264.7
220
510
Ø2957.9
Ø3832.1 +0.5
011103.41020
SECTION BB


φ3175.4 +0.5
φ4176.6 +0.5
φ3734
46.5°
R240
38.4
(10)
(30)
(31.9)
(46.5)
275.6
186
(24)
485.6
561.6
01110356200


(Ø3350)
(Ø2951)
Ø2853+0.5
Y
3.5
(15)
111
(165)
Ø52
1
U
U
CENTERLINE 0.2 MM
DEEP RECESSED
Ø3083,6
4°
(5)
Rz40
IN
Ø3840
(5)
(55)
(5)
24
R3
261
276
(Ø3850)
(19)
(5)
Ø3640
Ø3437,5+0.5
REFERENCE PLANE
01110358200