	Transformer Plant, BHARAT HEAVY ELECTRICAL LIMITED, BHEL, JHANSI.	Machine No	MT-3/2/1533	Enquiry No. :	
		Quantity	1 No	Due Date :	
		Spec. No.	6223	Supplier's Ref.:	
				Date :	

SPECIFICATION CUM COMPLIANCE CERTIFICATION FOR CNC FACING AND CENTERING MACHINE

1	**Vendor(OEM) must submit complete information against clause no. 23.0 The offer meeting this clause would only be processed.**
2	The "Offered" Column and where applicable, the "Deviations" & "Remarks" Column of this format shall be filled in by the Vendor and submitted along with the offer. Inadequate / incomplete, ambiguous, or unsustainable information against any of the clauses
3	The offer and all documents enclosed with offer should be in English language only.

ADDRESS OF THE SUPPLIER :	**ADDRESS OF THE INDIAN AGENTS :**
TELEPHONE NOS.:	**TELEPHONE NOS.:**
FAX NOS.:	**FAX NOS.:**
E-MAIL ADDRESS :	**E-MAIL ADDRESS :**

SPECIFICATION CUM COMPLIANCE CERTIFICATION FOR CNC FACING AND CENTERING MACHINE

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED	OFFERED	DEVIATIONS	REMARKS
1.0	**PURPOSE & WORKPIECE MATERIAL**				
1.1	Purpose: facing,centering,conning,centre drilling , gang drilling , counter boring and tapping on axles as per drawings 06/02/11/3 and 17181101015.	Vendor To Confirm			
1.2	Work Piece Material: Alloy Steel, , Mild steel,steel	Vendor To Confirm			
1.3	Machine should have capacity to finish one job in 45 mins(max) including set up time.(Calculation to be submitted)	Vendor To Confirm and submit			
2.0	**SPECIFICATION:**				
2.1	**CAPACITY & SIZE :**				
2.1.1	Type : Machine may be single ended or double ended type . However if single ended type machine offered then suitable automatic arrangement for rotation of axle for set up change to be provided.	Vendor To confirm and specify			
2.1.2	Max.Job dia : 300 mm(Min) Min Job dia: 100 mm(Max)	Vendor To confirm and specify			
2.1.3	Max.Job Length : 3000 mm(Min) Min Job length: 1500 mm(Max)	Vendor To confirm and specify			
2.1.4	Max. Weight of Work-piece :1500 kg.	Vendor to Confirm			
2.1.5	a) 8 holes , M12x32 gang drilling & tapping	Vendor to Confirm			

SPECIFICATION CUM COMPLIANCE CERTIFICATION FOR CNC FACING AND CENTERING MACHINE					
SNO	**DESCRIPTION FOR BHEL REQUIREMENT**	**SPECIFIED**	**OFFERED**	**DEVIATIONS**	**REMARKS**
	b) 3 holes, 1"-8UNC-2B gang drilling & tapping	Vendor to Confirm			
2.2	**SPINDLE**				
2.2.1	Spindle Diameter	Vendor to specify			
2.2.2	Spindle Motor Power (AC CONTINOUS DUTY SI).- 18.5 kW Min (To be supported by calculation with maximum depth of cut and feed). These datas will be tested during predispatch inspection and during E&C.	Vendor to confirm and submit			
2.2.3	Spindle Motor make- Siemens/ Fanuc. Model has to be specified	Vendor to confirm and specify			
2.2.4	Spindle Bore Dias (Radial & Axial)	Vendor to specify			
2.2.5	Taper in spindle	ISO 50			
2.2.6	Spindle speed (Infinielty variable & selectable through progrem)	1-4000 rpm			
2.2.7	Details of speed ranges (Selected through program)	Vendor to furnish			
2.2.8	Range of spindle speed at constant power	Vendor to specify			
2.2.9	Max. Spindle Torque	Vendor to specify			
2.2.10	RPM at wich max. permisissble torque is available	Vendor to specify			
2.2.11	Torque/power/ speed diagram of spindle motor is to be submitted with the offer	Vendor to furnish			
2.2.12	Spindle orientation -Progarammable	Vendor to confirm			
2.3	**MACHINE BED :**				
2.3.1	No. of Guide ways	Vendor to Specify			
2.3.2	Bed width across ways	Vendor to Specify			
2.3.3	Type of guide ways: (Details should be submitted) Guideways to be hardened & ground. Guideways to be rust- free while in contact with water-mix coolant or with humidity of atmosphere	Vendor to Specify			
2.3.4	Hardness of guideways	Vendor to Specify			
2.3.5	Metallic Telescopic Covers of rust resistant material should be provided with wipers for all axes guide ways. Joints of telescopic covers should be sealed to avoid mixing of coolant & hydrostatic oil.	Vendor to Confirm			
2.3.6	Guideways to be robust to withstand maximum loads to be encountered during operation	Vendor to Confirm			
2.4	**FEEDS AND DRIVE SYSTEM:**				
2.4.1	Feed range in X,Y & Z Axes (Infinitely variable) : **1-5000mm/min or more**	Vendor to Confirm			
2.4.2	Rapid traverse in X,Y,Z Axis (Infinitely variable): **10000mm/min or more**	Vendor to Confirm			
2.4.3	Feed motors & drives: **FANUC ?i or SIEMENS 1FT/1FK** series servo motors with matching servo drives	Vendor to Specify			

SPECIFICATION CUM COMPLIANCE CERTIFICATION FOR CNC FACING AND CENTERING MACHINE					
SNO	**DESCRIPTION FOR BHEL REQUIREMENT**	**SPECIFIED**	**OFFERED**	**DEVIATIONS**	**REMARKS**
2.4.4	Feed back system for X ,Y& Z axes: **Heidenhain linear scales** (Details should be submitted)	Vendor to Confirm			
2.4.5	Details of System to ensure zero backlash for X ,Y& Z axis	Vendor to Confirm			
2.4.6	Mechanism for locking axis	Vendor to Specify			
2.4.7	Maximum feed force inindividual axis	Vendor to Specify			
2.4.8	Maximum Torque in inindividual axis	Vendor to Specify			
2.4.9	Detail of inindividual axis feed mechanism	Vendor to Specify			
2.5	**Fixture**				
2.5.1	Suitable 2 nos hydraulic fixture for job clamping of each job as per drawing 06/02/11/3 and 17181101015 to be offered . Details to be submitted	Vendor to confirm and submit			
2.5.2	Automatic Loading and unloading system must be quoted as an option.	Vendor to confirm and submit			
2.6	**Traverses :**				
2.6.1	Z-axis travel : (To suit clause 2.1.3)	Vendor to Specify			
2.6.2	X-axis travel : (To suit clause 2.1.2)	Vendor to Specify			
2.6.3	Y-axis travel :	Vendor to Specify			
2.6.4	Cutting force available at the carriage	Vendor to Specify			
2.6.5	Layout showing extreme positions of the all axes movements	Vendor to Specify			
2.7	**Automatic Tool Changer : If some other arrangement used supplier has to furnish full details**				
2.7.1	Type: chain type/drum type	Vendor to specify			
2.7.2	Tool selection method	Random & Shortest path			
2.7.3	Tool taper	ISO 50			
2.7.4	Number of tools in the magazine	Minium 16			
2.7.5	Maximum Diameter of tool : (a) With all pockets full: (b) With adjacent pockets empty:	Vendor to specify			
2.7.6	Max length of tool	Vendor to specify			
2.7.7	Max. Weight of Tool	Vendor to specify			
2.7.8	Limitation regarding length & weigth of tool/ tool holder clamped in different tool holder for truble free operation	Vendor to specify			
2.7.9	Tool change time (Tool-to-tool)	Vendor to specify			
2.7.10	Tool change (Chip-to-Chip)	Vendor to specify			
2.7.11	The machine shall have manual tool loading/unloading through push button provided on m/c	Vendor to confirm			
2.7.12	The spindle taper will have the provision of cleaning by compressed air blow during ATC cycle	Vendor to confirm			
2.7.13	Manual insertion/ withdrawl of tool from the spindle	Vendor to confirm			
2.7.14	One push button for retrieval cycle will be provided to extrract a tool trapped anywhere in the ATC cycle.	Vendor to confirm			

SPECIFICATION CUM COMPLIANCE CERTIFICATION FOR CNC FACING AND CENTERING MACHINE					
SNO	**DESCRIPTION FOR BHEL REQUIREMENT**	**SPECIFIED**	**OFFERED**	**DEVIATIONS**	**REMARKS**
2.7.15	The machine operationshould be possible with of without referencing ATC	Vendor to confirm			
2.7.16	One set of tool holder relention stud (20 nos) shall be provided as standard item with the machine	Vendor to confirm			
2.7.17	Working of tool changer arm should be explained in details. Full ATC catalogue should be submitted with the offer.	Vendor to furnish			
2.8	**CONSTRUCTION:**				
2.8.1	Vendor to furnish details of material, hardness & constructional details including explanatory drawings of various components/assemblies like Headstock, guides, carriages , spindle, ATC etc	Vendor to Specify			
2.8.2	Video images on CD including hard copy explaining the technical features / Literature with photographs, drawings explaining the technical features should be enclosed with the offer	Vendor to Confirm			
2.9	**OPERATION AND CONTROL SYSTEM:**				
2.9.1	**OPERATOR'S PANEL:**				
2.9.1.1	Swivelling and sliding type air conditioned operator's pendant of Rittal make(preferable) or equivalent Internationally reputed make, with complete CNC operator panel (OP) and machine control panel (MCP) of required configuration shall be provided .All switches with suitable interlock with table rotation should be within reach of operator of average height (Indian) for easy & safe operation. All displays/indications should also be conveniently placed accordingly. Layout showing complete details should be submitted.	Vendor to Confirm			
2.9.2	**CNC SYSTEM & FEATURES :**				
2.9.2.1	Make: **FANUC / SIEMENS** **Model: Siemens 840 D/ Equivalent fanuc**	Vendor to Confirm			
2.9.2.2	Details of Standard features	Vendor to offer			
2.9.2.3	The system should have full alphanumeric keyboard, TFT colour display (10.4" or larger), Machine Control Panel (MCP), RS232C serial interface, PCMCIA card/USB port for data input/output, network ready, graphic simulation and **on- screen PLC Ladder**	Vendor to Specify			
2.9.2.4	Details of optional features, recommended by vendor.	Vendor to Specify			
2.9.2.5	Details of other optional features	Vendor to Confirm			

SPECIFICATION CUM COMPLIANCE CERTIFICATION FOR CNC FACING AND CENTERING MACHINE					
SNO	**DESCRIPTION FOR BHEL REQUIREMENT**	**SPECIFIED**	**OFFERED**	**DEVIATIONS**	**REMARKS**
	1. Axes Interpolation : Linear, Circular, Cylindrical	Vendor to Confirm			
	2. Part Program Memory :	Vendor to specify			
	3. Technology Cycles :. Face milling , centering ,Centre drilling , peripheral drilling and tapping	Vendor to Confirm			
	4. Pitch error compensation	Vendor to Confirm			
	5. Backlash Error Compensation Facility	Vendor to Confirm			
	6.Graphics simulation of Part Program and Machining process.	Vendor to Confirm			
	7. Software Limits through Machine Parameters	Vendor to Confirm			
	8. Constant cutting speed & constant surface speed.	Vendor to Confirm			
2.9.2.6	The Controller should have feature to accept USB / Pen- Drives for Part Program and Machine data transfer both ways.	Vendor to Confirm			
2.9.3	**MANUAL CONTROL :**				
2.9.3.1	Complete manual operation of machine should be possible through Machine Control Panel (MCP). The MCP should have Spindle & Feed override switches, +/- Jog keys for individual axis, Start/Stop keys for Cycle, Spindle & Feed and additiona	Vendor to Confirm			
2.9.4	**HAND HELD UNIT:**				
2.9.4.1	Hand Held unit, alongwith sufficient length of interfacing cable is to be offered for handwheel (MPG) operation of individual axis in increment mode and provision for spindle inch in c.w & c.c.w directions, speed & feed control and cycle start / stop. The	Vendor to Confirm			
2.9.5	**UPS FOR CNC SYSTEM:**				
2.9.5.1	UPS of 10 minutes for CNC system with inbuilt cooling and charge status display is to be supplied only in case of PC based CNC systems. Preferable Make: APLAB /APC / EMERSON (LIEBERT) or any other make of international repute	Vendor to Confirm			
2.10	**MACHINE LIGHTS:**				
2.10.1	Machine Lights for sufficient illumination of complete working area on both sides of machine should be provided for clear visibility.	Vendor to Confirm			
2.10.2	A magnetic base portable spot light with sufficiently long cable should also be provided.	Vendor to Confirm			
2.10.3	Any lights required in the foundation/pit area shall also be foreseen and supplied by the vendor.	Vendor to Confirm			
2.10.4	All light fittings, consumables, adapters/receptacles should have compatibility with Indian equivalents	Vendor to Confirm			

SPECIFICATION CUM COMPLIANCE CERTIFICATION FOR CNC FACING AND CENTERING MACHINE					
SNO	**DESCRIPTION FOR BHEL REQUIREMENT**	**SPECIFIED**	**OFFERED**	**DEVIATIONS**	**REMARKS**
2.10.5	Flashing / rotary type End of Cutting and Program Stop Light should be provided.	Vendor to Confirm			
2.10.6	All lights should be protected from chips and coolant.	Vendor to Confirm			
2.11	**AIR CONDITIONERS:**				
2.11.1	Air Conditioners with Dehumidifiers of suitable / sufficient capacity should be provided for all Electrical / Electronic Panels / Cabinets including Operator's Panel considering specified ambient conditions. Detailed specifications of the same to be submi	Vendor to Confirm			
2.12	**HYDRAULIC SYSTEM :**				
2.12.1	The System should be centralised. Hydraulic Tank shall preferably be located at floor level	Vendor to Specify			
2.12.2	Make Rexroth / Vickers Sperry or equivalent from a reputed manufacturer. (Details to be submitted)	Vendor to Specify			
2.12.3	Filtration System, Details should be submitted.	Vendor to Specify			
2.12.4	Failure indication	Vendor to Specify			
2.12.5	Hydraulic pump capacity (flow / pressure)	Vendor to Specify			
2.12.6	Each pump should have an independent motor. Tandem pumps should not be used	Vendor to Confirm			
2.12.7	First filling of all_required Oils & Grease etc. to be supplied by vendor. Indigenous (Indian) source or Indian equivalent and specifications of oils/ greases are also to be provided by the vendor.	Vendor to Confirm			
2.12.8	Refrigerated type cooling system of sufficient capacity to maintain complete Hydraulic System, including lubrication oil, hydrostatic oil and gearbox oil, etc. at a temperature not exceeding 40 deg C irrespective of the ambient conditions. Complete details to be furnished	Vendor to Confirm			
2.13	**COOLANT SYSTEM :**				
2.13.1	Coolant System with all accessories shall be provided for Recirculating Type Flood Coolant System	Vendor to Confirm			
2.13.2	It shall have the provision so that coolant is available directly at the tool-cutting tip.	Vendor to Confirm			
2.13.3	Coolant collection and recirculation system should be leakproof & perfect to avoid any spillage on shop floor, trenches for cables & foundation pit of the machine etc.	Vendor to Confirm			
2.13.4	Coolant Flow Diagram showing filters, pumps, valves, tanks etc.to be submitted with the offer.	Vendor to Confirm			
2.13.5	Coolant Tank Capacity	Vendor to Specify			

SPECIFICATION CUM COMPLIANCE CERTIFICATION FOR CNC FACING AND CENTERING MACHINE					
SNO	**DESCRIPTION FOR BHEL REQUIREMENT**	**SPECIFIED**	**OFFERED**	**DEVIATIONS**	**REMARKS**
2.13.6	Pressure & rate of flow of coolant for different variants should be furnished in the offer. The Pressure should be sufficient for the coolant to reach the tool tip at full pressure.	Vendor to Specify			
2.13.7	For finer control of Pressure and Coolant Flow Rate, after its activation through program or switches, Rotary/ potentiometer switches shall be provided on the Operator's Panel	Vendor to Confirm			
2.13.8	The coolant tank should be fitted with skimmer for regular cleaning of coolant from contamination with tramp oil.	Vendor to Confirm			
2.13.9	**Coolant Filteration System: Recirculating type coolant system with centrifugal Hydrocyclone System/ Vaccum Rotary drum type System/ Cartridge Type Filtration System and magnetic separator / paper filteration system**	Vendor to Specify			
2.13.10	Coolant should not get mixed with lubricating oil. Coolant falling on job / table should not get mixed with machine table / bed lubricating oil. Necessary provision to be made.	Vendor to Confirm			
2.14	**ELECTRICAL :**				
2.14.1	415V +/- 10%, 50HZ +/- 3 %, 3 Phase AC (4 wire system with neutral) Power Supply 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 conne	Vendor to Confirm			
2.14.2	**Tropicalisation: All electrical / electronic equipment shall be tropicalized**	Vendor to Confirm			
2.14.3	Electrical cabinets should be of **Rittal make (preferable) or equivalent Internationally reputed make, properly air conditioned and sealed from ingress of liquids and encroachment of rodents**	Vendor to Confirm			
2.14.4	All electrical components in the cabinets shoul be mounted on DIN Rail	Vendor to Confirm			
2.14.5	All electrical and electronic panels including operator's panel should be provided with fluorescent lamps for sufficient illumination and power receptacles of 220Volts, 5 Amp AC. All adapters/receptacles should have compatibility with Indian equivalents	Vendor to Confirm			
2.14.6	Motors shall conform to IEC or Indian Standards	Vendor to Confirm			

SPECIFICATION CUM COMPLIANCE CERTIFICATION FOR CNC FACING AND CENTERING MACHINE					
SNO	**DESCRIPTION FOR BHEL REQUIREMENT**	**SPECIFIED**	**OFFERED**	**DEVIATIONS**	**REMARKS**
2.14.7	All cables outside the electrical cabinets and operator pendant must be routed through flexible conduits capable of withstanding stress, chip hazard and ingress of oil/coolant (in armoured conduits). All cables through trenches to run on cable trays. Addi	Vendor to Confirm			
2.14.8	Vendor should ensure the proper earthing for the machine and its peripherals.	Vendor to Confirm			
2.14.9	In-cycle hour counter with reset facility.	Vendor to Confirm			
2.15	**SAFETY ARRANGEMENTS:**				
	Following safety features in addition to other standard safety features should be provided on the machine:				
	1. Machine should have adequate and reliable safety interlocks / devices to avoid damage to the machine, workpiece and the operator due to the malfunctioning or mistakes. Machine functions should be continuously monitored and alarm / warning indications	Vendor to Confirm			
	2. A detailed list of all alarms / indications provided on machine along with cause and remedy should be submitted by the supplier.	Vendor to Confirm			
	3. All the pipes, cables etc. on the machine should be well supported and protected. These should not create any hinderance to machine operator's movement for effective use of machine.	Vendor to Confirm			
	4. All the rotating parts used on machine should be statically & dynamically balanced to avoid undue vibrations.	Vendor to Confirm			
	5. Emergency Switches at suitable locations as per International Norms should be provided.	Vendor to Confirm			
	6. Oil & water pipe lines should not run with electrical cable in the same tray / trench.	Vendor to Confirm			
2.16	**ENVIRONMENTAL PERFORMANCE OF THE MACHINE :**				
	The Machine should conform to following factors related to environment :				
	(a) Maximum noise level shall be 85 dB(A) at normal load condition, 1meter 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. Suppli	Vendor to Confirm			
	(b) There shall not be any emissions from the machine except fumes of cutting fluid during machining.	Vendor to Confirm			

SPECIFICATION CUM COMPLIANCE CERTIFICATION FOR CNC FACING AND CENTERING MACHINE					
SNO	**DESCRIPTION FOR BHEL REQUIREMENT**	**SPECIFIED**	**OFFERED**	**DEVIATIONS**	**REMARKS**
	(c) No hazardous chemicals shall be required to be used in the machine.	Vendor to Confirm			
	(d) If any safety / environmental protection enclosure is required it should be built in the machine by the vendor.	Vendor to Confirm			
	(e) Paint of the machine should be oil / coolant resistant and should not peel off and mix up with coolant.	Vendor to Confirm			
	(f) There should not be any effluent from the machine. In case there are any effluents from the machine, they should be properly treated	Vendor to Confirm			
3.0	**CHIP CONVEYOR :**				
3.1	A chip conveyor system to carry both short and curly chips efficiently and effectively (at a capacity twice of that specified in clause 1.3) to the chip bin should be provided on the machine. two nos of movable Chip bins of big size to be supplied.	Vendor to Confirm and submit details			
3.2	Type of chip conveyor	Vendor to Specify			
3.3	Width of conveyor	Vendor to Specify			
3.4	Elevation of chip conveyor for chip bin	Vendor to Specify			
3.5	Material of chip conveyor (should be rust resistant)	Vendor to Specify			
3.6	Operation of chip conveyor (forward & reverse) through push buttons on operator's panel and at Chip Conveyor	Vendor to Confirm			
3.7	Layout showing location of chip conveyor should be submitted.	Vendor to Confirm			
4.0	**ULTRA ISOLATION TRANSFORMER**				
4.1	Indian make Ultra Isolation Transformer (TTN configuration) suitable for complete machine shall be supplied	Vendor to Specify			
4.2	Make: Reputed Indian make (NEEL/SAIGON/AEI)	Vendor to Confirm			
4.3	Model and Rating	Vendor to Specify			
4.4	Catalogue of the Ultra Isolation Transformer shall be submitted with the offer.	Vendor to Specify			
5.0	**PNEUMATIC SYSTEM: (if required for the machine)**				
5.1	**AIR COMPRESSOR:**				
5.1.1	Independent Air Compressor Make: ELGI / ATLAS COPCO / INGERSOLL RAND) with refrigerated type Dryer & Filter of suitable capacity for the total compressed air requirements of the machine & accessories and to suit required air quality should be supplied. T	Vendor to specify			
5.1.2	Make & Model of Air Compressor	Vendor to specify			
5.1.3	Make & Model of Refrigerated Air Dryer	Vendor to specify			
5.1.4	Capacity (Flow, Pressure & KW)	Vendor to specify			
5.2	**COMPRESSED AIR POINTS:**				

SPECIFICATION CUM COMPLIANCE CERTIFICATION FOR CNC FACING AND CENTERING MACHINE					
SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED	OFFERED	DEVIATIONS	REMARKS
5.2.1	Compressed Air Point with manually ON/ OFF Valve and flexible pipe of suitable length for work piece cleaning.	Vendor to confirm			
6.0	**TOOLINGS:**				
6.1	2 sets of all types of tool holders, adapters, sleeves, cutting tools etc.required for the machine including those listed below are to be supplied extra than used for job proving	Vendor to Confirm			
6.2	Standard spare for all the above tools & Holders 01 set each	Vendor to Confirm			
6.3	All types of cutting tools, tool holders, adapters, sleeves, grinding wheels, probes/stylii etc. recommended by vendor in sufficient quantity for complete machining of proveout components apart from the above list 6.1.	Vendor to Confirm			
6.4	Job Fastners 02 Set	Vendor to Confirm			
7.0	**MEASURING SYSTEMS:(Optional)**				
7.1	Automatic Job Measuring System comprising of Renishaw make or equivalent Wireless system, with requisit software, measuring cycles, calibration system and all types of probes / styli required for measuring all machined dimensions of the prove-out component	Vendor to Confirm			
8.0	**LEVELING & ANCHORING SYSTEM**				
8.1	Complete anchoring system including foundation bolts, anchoring materials, fixators, leveling shoes etc should be supplied	Vendor to Confirm			
9.0	**TOOLS FOR ERECTION, OPERATION & MAINTENANCE :**				
9.1	Special tools and equipment required for erection of the machine shall be brought by the vendor. Necessary tools like Torque Wrench, Spanners, Keys, grease guns etc.for operation and maintenance of the machine should be	Vendor to Confirm			
9.2	Test mandrel for checking spindle run-out & alignment of headstock/tailstock etc. should be supplied	Vendor to Confirm			
10.0	**ACCESSORIES:**				
10.1	Vendor to furnish list of all standard accessories inclusive of following-	Vendor to furnish			
10.1.1	Tool Cabinet				
10.1.2	Full Enclosure of machine including transparent window to prevent flying of chips				
10.2	Vendor to furnish list of all optional accessories along with cost	Vendor to furnish			
11.0	**SPARES:**				

SPECIFICATION CUM COMPLIANCE CERTIFICATION FOR CNC FACING AND CENTERING MACHINE					
SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED	OFFERED	DEVIATIONS	REMARKS
11.1	Itemised breakup of mechanical, hydraulic, electrical and electronic spares used on the machine in sufficient quantity as per recommendation of Vendor for 2 years of trouble free operation after expiry of guarantee period. The list to include	Vendor to Specify			
	a) Mechanical & Hydraulic Spares: As per enclosed Annexure 1	Vendor to Confirm			
	b) Electrical /Electronic / CNC Spares: As per enclosed Annexure 1	Vendor to Confirm			
11.2	All types of spares for total machine and accessories should be available for atleast 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 & suppliers to enable BHEL to procure them in advance.	Vendor to Confirm			
11.3	Recommended set of spares for all attachments are to be offered with details.	Vendor to Specify			
11.4	Vendor to confirm that complete list of spares for machine and accessories, along with specification / type / model, and name & address of the spare supplier shall be furnished along with documentation to be supplied with the machine	Vendor to Confirm			
12.0	**DOCUMENTATION :** Five sets of following documents (Hard copies) in English language should be supplied along with the machine	Vendor to Confirm			
12.1	Operating manuals of Machine & CNC system	Vendor to Confirm			
12.2	Programming Manuals of Machine & CNC system	Vendor to Confirm			
12.3	Detailed 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	Vendor to Confirm			
12.4	Maintenance, Interface & commissioning manuals for CNC system, spindle & feed drives and position feedback system.	Vendor to Confirm			
12.5	Manufacturing drawings for all supplied tool holders, coolant connections, tailstock center, adapters, sleeves, fixtures etc.	Vendor to Confirm			
12.6	Catalogues, O&M Manuals of all bought out items including drawings,wherever applicable.	Vendor to Confirm			
12.7	Detailed specification of all rubber items and hydraulic/lube fittings	Vendor to Confirm			

SPECIFICATION CUM COMPLIANCE CERTIFICATION FOR CNC FACING AND CENTERING MACHINE					
SNO	**DESCRIPTION FOR BHEL REQUIREMENT**	**SPECIFIED**	**OFFERED**	**DEVIATIONS**	**REMARKS**
12.8	Operating Manuals, Maintenance Manuals & Catalogues for supplied Automatic Tool Offset & Job Measuring Systems, Isolation Transformer, Air-Compressor and all supplied Accessories.	Vendor to Confirm			
12.9	Hard copy (Print-out) as well as soft copy (in PDF format) of Electrical Schematics of the machine with comments in English	Vendor to Confirm			
12.10	Hard copy (Print-out) of PLC program with comments in English.	Vendor to Confirm			
12.11	Soft copy of PLC program and complete machine data.	Vendor to Confirm			
12.12	Complete back-up of hard disk on GHOST CD (only in case of PC based CNC system)	Vendor to Confirm			
12.13	Complete Master List of parts used in the machine shall be submitted by the vendor.	Vendor to Confirm			
12.14	One additional set of all the above documentation on CD ROM, wherever possible.	Vendor to Confirm			
13.0	**TRAINING**				
13.1	BHEL Persons should be trained at supplier's Works for two weeks in the area of (a) CNC Part Programming (preferably using UG NX 6 or latest version) / Technology, Use of all CNC Features, Programming for Measuring Systems & supplied ac	Vendor to Confirm			
13.2	Air-fare, boarding & lodging for the trainees shall be borne by BHEL.				
13.3	Competent, English speaking experts shall be arranged by the vendor during training for satisfactory & effective training of BHEL personnel.	Vendor to Confirm			
13.4	Vendor should commit to organize training of Electronics Engineer and Programmer at the CNC System Manufacturer's works for advanced features and specialised training required by BHEL	Vendor to Confirm			
13.5	Job prove-out and measurement as per Clause 19.2.8	Vendor to Confirm			
14.0	**FOUNDATION :**				
14.1	For facilitating foundation design by BHEL / it's Consultant, the Vendor is required to submit the following within one month from the date of Letter of Intent (LOI): a) Foundation layout plan. b) Monting details. c) Loading detail (static as well as dynamic)	Vendor to Confirm			
15.0	**ERECTION & COMMISSIONING**				

SPECIFICATION CUM COMPLIANCE CERTIFICATION FOR CNC FACING AND CENTERING MACHINE					
SNO	**DESCRIPTION FOR BHEL REQUIREMENT**	**SPECIFIED**	**OFFERED**	**DEVIATIONS**	**REMARKS**
15.1	Supplier to take full responsibility for carrying out the erection, start up, testing of machine, it's control & all types of other supplied equipment , machining of test pieces etc. Service requirement like power, air & water shall be provided by BHEL	Vendor to Confirm			
15.2	Erection & Commissioning of Voltage stabilizer and Isolation Transformer shall be responsibility of the vendor.	Vendor to Confirm			
15.3	Successful proving of BHEL components by the supplier shall be considered as part of commissioning. All tests, as mentioned at **clause 19 (Machine Acceptance) shall form part of the commissioning activity.**	Vendor to Confirm			
15.4	Tools, Tackles, Test Mandrels, instruments and other necessary equipment including Laser equipment required to carry out all above activities should be brought by the supplier.	Vendor to Confirm			
15.5	Commissioning spares, required for commissioning of the machine within stipulated time, shall be brought by the supplier on returnable basis.	Vendor to Confirm			
15.6	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 sup	Vendor to Confirm			
15.7	Schedule of Erection and Commissioning shall be submitted with the offer.	Vendor to Confirm			
15.8	Charges, duration, terms & conditions for E&C should be furnished in detail separately by vendor along with offer.	Vendor to Specify			
16.0	**ACCURACY TESTS:**				
16.1	**GEOMETRICAL ACCURACIES :**				
16.1.1	Geometrical Accuracy Tests shall be in accordance with ISO 3070 (Latest Revision) standard or equivalent applicable standard (whichever is finer). Detailed Test Charts for the same, clearly showing the accuracies to be achieved on the machine, shall be submitted with offer.	Vendor to Specify			
16.1.2	Head Stock Spindle run out: (Radial & Axial)- 0.005(max)	Vendor to Confirm			
16.1.3	All other accuracies to confirm to ISO 1708 (Latest Revision) or Suppliers Test chart whichever is finer.	Vendor to Confirm			
16.1.8	All the above accuracies should be demonstrated to BHEL engineers during pre-acceptance at Suppliers works and during Erection & Commissioning at BHEL Works.	Vendor to Confirm			

SPECIFICATION CUM COMPLIANCE CERTIFICATION FOR CNC FACING AND CENTERING MACHINE					
SNO	**DESCRIPTION FOR BHEL REQUIREMENT**	**SPECIFIED**	**OFFERED**	**DEVIATIONS**	**REMARKS**
16.2	**MACHINE POSITIONING ACCURACIES & REPEATABILITY: Should be measured as per VDI/DGQ 3441 (Latest Revision)**	Vendor to Confirm			
16.2.1	Positioning accuracy in all axis per 100 mm : Vendor to offer values . BHEL will decide about maximum allowed.	Vendor to Confirm and specify			
16.2.2	Repeatability in all axis : Vendor to offer values . BHEL will decide about maximum allowed.	Vendor to Confirm and specify			
16.2.3	Total positioning error along X & Z axes - Vendor to offer values . BHEL will decide about maximum allowed.	Vendor to Confirm and specify			
16.2.4	All the above accuracies should be demonstrated to BHEL engineers during pre-acceptance at Suppliers works and during Erection & Commissioning at BHEL Works	Vendor to Confirm			
	Note 1: Resolution of system should be 1 micron.	Vendor to Confirm			
	Note 2: Accuracy should remain within specified tolerance over a time period of 24 hours (Maximum temperature variation is 25 degree centigrade during peak summer)	Vendor to Confirm			
17.0	**OPERATING CONDITIONS & THERMAL STABILITY:**				
17.1	Total machine including CNC system and all supplied items should work trouble free and efficiently under following operating conditions and should give specified accuracies. Power Supply: Voltage: 415 V - 10%, +10% Frequency: 50 Hz +3%, - 3% No. of phases = 3 Ambient Conditions: Temperature = 2 to 50 degree celsius Relative Humidity = 95% max.(details of provisions on the machine for the same are to be furnished by Vendor)	Vendor to Confirm			
17.2	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 that machine is suitable for above and details of provisions on the machine for the same are to be furnished by Vendor)	Vendor to Confirm			

SPECIFICATION CUM COMPLIANCE CERTIFICATION FOR CNC FACING AND CENTERING MACHINE					
SNO	**DESCRIPTION FOR BHEL REQUIREMENT**	**SPECIFIED**	**OFFERED**	**DEVIATIONS**	**REMARKS**
17.3	Thermal Stability of the complete machine keeping in view specified Ambient Conditions and accuracy requirements of BHEL components and trouble free operation of the machine should be ensured by vendor.(Vendor to confirm that machine is suitable for above and details of provisions on the machine for the same should be furnished by Vendor)	Vendor to Confirm			
17.4	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			
18.0	**PROVEOUT OF BHEL COMPONENTS :**				
18.1	Drawings of proveout components are enclosed drawing no. 06/02/11/3 and 17181101015. Vendor to submit preliminary process, time study & tool list recommended by them along with the offer. Change in process/tools may be mutually discussed and agreed. Complete machining of prove out components shall be done by Vendor at BHEL works to the specified design accuracy and surface finish, using cutting tools and CNC programs to be provided by the vendor to prove the machine after complete erection, tests & test piece machining etc. Material for the proveout components shall be provided by BHEL. Vendor should submit the CNC programs, setting schemes, process sheets, tooling layouts, time studies etc. in advance for the prove out components. Vendor shall be fully responsible for machining of proveout components as per drawing and other requirements specified by BHEL to the full satisfaction of BHEL. Clarifications, if any required by vendor, regarding accuracy requirements of the proveout components, whether specified or not, should be discussed and cleared by vendor during initial technical discussions.	Vendor to Confirm			

SPECIFICATION CUM COMPLIANCE CERTIFICATION FOR CNC FACING AND CENTERING MACHINE					
SNO	**DESCRIPTION FOR BHEL REQUIREMENT**	**SPECIFIED**	**OFFERED**	**DEVIATIONS**	**REMARKS**
18.2	During proveout, all tools shall be set by using supplied Tool measuring System and final job inspection shall be done by supplied Job Measuring System(If ordered) on machine. Tapping accuracy will be checked by go-not go gauge for acceptance. Vendor shall be responsible for any deviation/rejection in proveout component due to wrong machining or malfunctioning of the machine during proveout machining and also for the delay in machining due to improper recommended tooling etc. The cost of such deviation / rejection, if any, shall be refunded by the vendor to BHEL.	Vendor to Confirm			
19.0	**MACHINE ACCEPTANCE: (Tests/Activities to be Performed by Vendor**	Vendor to Confirm			
19.1	**Tests/Activities to be carried out at supplier's works on the machine before dispatch :**				
19.1.1	Geometrical accuracies in accordance with Clause 16.1.1	Vendor to Confirm			
19.1.2	Positioning accuracies in accordance with Clause 16.2	Vendor to Confirm			
19.1.3	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			
19.1.4	Demonstration of all features of the machine, control system & accessories	Vendor to Confirm			
19.1.5	Machining of **test piece as per AFNOR/ISO/NAS . Vendor to supply test piece and tooling for it's machining.**	Vendor to Confirm			
19.1.6	Machining of proveout component as per drawing no. 06/02/11/3 and 17181101015 at vendor's works. The required raw material can be issued from BHEL, Jhansi if required but the transportation of material to Vendor's work shall be arranged by Vendor. Requisite tooling & CAM software to be supplied .	Vendor to confirm			
19.1.7	Full load test to demonstrate the maximum power & cutting capacity of the machine.	Vendor to Confirm			
19.2	**Tests/Activities to be carried out at BHEL works while commissioning the machine :**				
19.2.1	Geometrical accuracies in accordance with Clause 16.1.1	Vendor to Confirm			
19.2.2	Positioning accuracies in accordance with Clause 16.2	Vendor to Confirm			
19.2.3	Full load test to demonstrate the maximum power & cutting capacity of the machine.	Vendor to Confirm			

SPECIFICATION CUM COMPLIANCE CERTIFICATION FOR CNC FACING AND CENTERING MACHINE					
SNO	**DESCRIPTION FOR BHEL REQUIREMENT**	**SPECIFIED**	**OFFERED**	**DEVIATIONS**	**REMARKS**
19.2.4	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			
19.2.5	Demonstration of all features of the machine, control system & accessories to the satisfaction of BHEL for efficient and effective use of the machine	Vendor to Confirm			
19.2.6	Demostration by actual use of all supplied attachments and accessories to their full capacity.	Vendor to Confirm			
19.2.7	Machining test piece as per AFNOR/ISO/NAS. Vendor to arrange Test pieces and tooling for it's machining.	Vendor to Confirm			
19.2.8	Proveout machining as per Clause 18.0	Vendor to Confirm			
19.2.9	Two week supervision of independent operation of machine including measuring system by BHEL after job proveout	Vendor to Confirm			
19.2.10	Training of BHEL machine operators in operation of complete machine including measuring system & accessories etc by the supplier's experts / engineers during their stay at BHEL works	Vendor to Confirm			
20.0	**PACKING:**				
20.1	Sea worthy & rigid packing for all items of complete machine, CNC System, all Accessories and other supplied items to avoid any damage/loss in transit. When machine is despatched in containers, all small loose items shall be suitably packed in boxes	Vendor to Confirm			
21.0	**GUARANTEE :**				
21.1	24 months from the date of acceptance of the machine at BHEL works.	Vendor to Confirm			
22.0	**GENERAL :**				
22.1	Machine Model No.	Vendor to Specify			
22.2	Total connected load (KVA):	Vendor to Specify			
22.3	Floor area required (Length, Width, Height) for complete machine & accessories	Vendor to Specify			
22.4	Painting of Machine / Electrical Panels : RAL 6011 Apple Green (Polyurethane Paint)	Vendor to Specify			
22.5	Total weight of the machine	Vendor to Specify			
22.6	Weight of heaviest part of machine	Vendor to Specify			
22.7	Weight of the heaviest assembly / sub-assembly of the Machine	Vendor to Specify			
22.8	Dimensions of largest part/ sub-assembly/ assembly of the machine	Vendor to Specify			
22.9	Vendor to submit , along with offer, reference list of customers where similar machines have been supplied mentioning broad specifications of the supplied machine.	Vendor to Confirm			

SPECIFICATION CUM COMPLIANCE CERTIFICATION FOR CNC FACING AND CENTERING MACHINE					
SNO	**DESCRIPTION FOR BHEL REQUIREMENT**	**SPECIFIED**	**OFFERED**	**DEVIATIONS**	**REMARKS**
22.10	Detailed catalogues , sketch/ photographs of the m/c and accessories/ attachments should be submitted with the offer.	Vendor to Confirm			
22.11	Hydraulic, Pneumatic & oil pipings should be preferably metallic except places where flexible pipings are essential.All the pipes required for the same shall be included in the standard scope of the machine, including first-fill of Hydraulic oil.	Vendor to Confirm			
23.0	**REFERENCE LIST / QUALIFYING CONDITIONS :**				
23.1	**COMPANY PROFILE**				
	The BIDDER has to provide the details pertaining to each clause in the table given below to understand the profile of the BIDDER's COMPANY.	Vendor to submit			
	Number of years of experience of the BIDDER/ VENDOR in the field of Design, Manufacturing, & supply of Machines for similar Applications	Vendor to submit			
	Details on the Codes/Standards adopted for the machine design and manufacturing	Vendor to submit			
	Details on Manufacturing facilities available with the VENDER for:	Vendor to submit			
	(a) Sourcing/Building large machine casting or fabricated components	Vendor to submit			
	(b) Heat treatment facilities	Vendor to submit			
	(c) Machine assembly & testing Rigs	Vendor to submit			
	Capacity of vendor to supply machine within 9 months	Vendor to confirm			
	Capacity of vendor .	Vendor to submit			
23.2	Only those vendors, who have supplied and commissioned at least one similar machine for job length of 2000 mm or more and job dia of 200 mm or more for similar application in the past ten years(on the date of opening of Tender) and such machine is presently working satisfactorily for more than one year after commissioning (on the date of opening of Tender) . The following information should be submitted by the vendor about the companies where similar machines have been supplied. This is required from all the vendors for qualification of their offer.	Vendor to Confirm			
	1. Name of the customer / company where similar machine is installed.	Vendor to Specify			
	2. Complete postal address of the customer.	Vendor to Specify			
	3. Month & Year of commissioning.	Vendor to Specify			
	4. Application for which the machine is supplied .	Vendor to Specify			

SPECIFICATION CUM COMPLIANCE CERT... ICATION FOR CNC FACING AND CENTERING M...CHINE					
SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED	OFFERED	DEVIATIONS	REMARKS
	5. Name and designation of the contact person of the customer.	Vendor to Specify			
	6. Phone, FAX no. and email address of the contact person of the customer.	Vendor to Specify			
	7. Performance certificate from the customers regarding satisfactory performance of machine supplied to them in original.	Vendor to Submit			
	8. BHEL reserves the right to verify information submitted by vendor. In case the information is found to be false/incorrect at any point of time, the offer shall be rejected.	Vendor to Confirm			
	9. Complete brochure of the product range of smilar machines.	Vendor to Submit			

Arjun Singh 7/6/11 Mgr. (WE&S)	Md. Arshad 09/06/11 Mgr. (LMM)
S.J.Chakraborty 7/6/11 Sr. DGM (WE&S)	K.D.Manjhi DGM (LMM & LMP)