



Transformer Plant,
BHARAT HEAVY ELECTRICAL LIMITED,
BHEL, JHANSI.

Machine No	MT-1/1/1541	Enquiry No.	
Quantity	1 No	Due Date :	
Spec. No.	6225	Supplier's Ref.:	
		Date :	

SPECIFICATION CUM COMPLIANCE CERTIFICATION FOR
CNC Laser Cutting Machine

NOTE:-

1. Vendor must submit complete information against clause no. 24.0 . The offer not meeting this clause would not 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 of the specifications/requirements shall be treated as non-compliance.
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 :
SCOPE: SUPPLY, ERECTION & COMMISSIONING OF CNC Laser Machine AS SPECIFIED BELOW	

S.N.	Description For BHEL Requirement	Specified/ Confirm Values	Offered	Deviations (To be indicated in Yes or No)	Remarks
1	Purpose & Work Material				
1.1	Purpose: CNC Laser Cutting Machine is required to accurately and burr free cut and making holes in any profile on metal sheet/plate in small/ large batch quantities	Vendor to confirm			
1.2	Operation / Jobs Involved: • CNC Controlled Laser Cutting Machine is required to cut various items having diverse profiles on a single metal sheet/plate in small /large batches with least possible scrap portion	Vendor to confirm			

S.N.	Description For BHEL Requirement	Specified/ Confirm Values	Offered	Deviations (To be indicated in Yes or No)	Remarks
1.3	Work Piece Material: <ul style="list-style-type: none"> • Carbon Steel Plates • HRCS and CRCS Sheets • High Strength lowr Alloy Steel • Quenched and Tempered Steel • Stainless Steel • Aluminium 	Vendor to confirm			
1.4	Plate Thickness range: <ul style="list-style-type: none"> • Steel : 0.5mm to 16 mm(min) ✓ • Stainless Steel 0.6mm to 15mm(min) • Aluminium 0.6 to 10mm Vendor to specify thickness range for other materials	Vendor to specify			
2	Machine Specifications:				
2.1	Machine configuration Features: The coordinate laser machine should be bridge type construction.	Vendor to confirm			
2.2	Carriage	Vendor to specify			
2.2.1	Bed Area: Two shuttle beds of 2.54 x 8 meter (Min)	Vendor to specify			
2.2.2	Cutting speed for MS full range in m/min and also for SS . AL. with cutting finish and Kerf Size.	Vendor to specify			
2.2.3	Min X Axis positioning speed in m/min = 60m/min	Vendor to specify			
2.2.4	Min Y Axis Positioning Speed in m/min= 60 m/min	Vendor to specify			
2.2.5	Min simultaneous speed in m/min = 85 m/min	Vendor to specify			
2.3	Cutting Head				
2.3.1	Number of Lens	Vendor to specify			
2.3.2	Nozzle used for Various Sheet Thickness with Diameter	Vendor to specify			
2.3.3	Type of Lenses	Vendor to specify			
2.3.4	Plasma Detection and Pierce detection feature must be available	Vendor to confirm			
2.3.5	Beam Head Stroke 100mm (Minimum)	Vendor to specify			
2.3.6	Beam Head lift up speed	Vendor to specify			
2.3.7	Beam Head lift down speed	Vendor to specify			
2.3.8	Height of Working Table	Vendor to specify			
2.3.9	Cutting Head with Non Contact capacitive sensor	Vendor to specify			
2.3.10	Laser guided beam for positioning the cutting head	Vendor to specify			
2.4	Preburn functions to burn film, paint from the plate prior to cutting	Vendor to specify			

S.N.	Description For BHEL Requirement	Specified/ Confirm Values	Offered	Deviations (To be indicated in Yes or No)	Remarks
2.5	Cutting and assist gas requirement				
	a. Quality of laser gases	Vendor to specify			
	b. Quality of different assist gases	Vendor to specify			
	c. Type of gases	Vendor to specify			
2.6	All latest functions like nitroline, piercing line, plasma control, compressed air cutting etc.	Vendor to specify			
2.7	FEED AND DRIVE SYSTEM				
2.7.1	Feed drives motors for X & Y axes (AC servo motors) shall be digital type of either Siemens, Fanuc, Baldor, Baumuller or Selin systems make (Details of model make, type etc. to be submitter)	Vendor to confirm and submit			
2.7.2	Type of power transmission: Pre-loaded backlash free double sided hardened pinion & rack drive. Positive synchronous method be used or the drive for the main axes to be done directly (i.e without intermediate gear) by high torque motors (AC) via an adjusted rack and pinion without clearance.	Vendor to specify the details			
2.7.2.1	The longitudinal travel of bridge on a precision track should be through servo drives on both sides of bridge having electronic synchronization control to avoid skewing of the machine even with extremely large working width. Or frictionless liner drive system.	Vendor to confirm and specify			
2.7.2.2	Positive closed loop system to ensure synchronous operation of both drives. The bridge should not twist in any condition and should trip if there is slightest mismatch.	Vendor to confirm and specify			
2.7.2.3	The transverse motion (Y-axis) of the cutting head is to be obtained through backlash free adjustable transverse drive carriage on the precision rack. Or frictionless linear drive system.	Vendor to confirm and specify			
2.7.3	Mechanism for locking X, Y & Z axis.	Vendor to specify			
2.7.4	Necessary clutch should be incorporated in driving system to permit free moving of cutting heads and machine bridge.	Vendor to specify			
2.8	Laser Oscillator	Vendor to specify			
2.8.1	TYPE: RF/DC CO2 discharge excitation.	Vendor to specify			
2.8.2	Make- Trumf/Bysotronic/FANUC	Vendor to confirm and submit			
2.8.3	Rated output to be provided	Vendor to specify			
2.8.4	Pulse power output to be provided	Vendor to specify			
2.8.5	Wave length	Vendor to specify			

S.N.	Description For BHEL Requirement	Specified/ Confirm Values	Offered	Deviations (To be indicated in Yes or No)	Remarks
2.8.6	Polarisation	Vendor to specify			
2.8.7	Beam modes for highest accuracy cutting.	Vendor to specify			
2.8.8	Operation modes and their frequencies	Vendor to specify			
2.8.9	Discharge voltage	Vendor to specify			
2.8.10	Beam diameter for very accurate sheet processing and plate work	Vendor to specify			
2.8.11	Focus diameter for very accurate sheet processing and plate work	Vendor to specify			
2.8.12	Rayleigh length for very accurate sheet processing and plate work	Vendor to specify			
2.8.13	image distance	Vendor to specify			
2.8.14	Focal length with different lenses or range with auto focus mirror	Vendor to specify			
2.8.15	Output stability:	Vendor to specify			
2.8.16	No. of hours of operation before scheduled maintenance. Min desired 7500 hrs.	Vendor to specify and confirm			
2.9	Power and gases (Laser and cutting aid) consumption information for different materials	Vendor to specify			
2.9.1	Oscillator power selected for above said requirements Min 4 kW	Vendor to confirm and submit			
2.9.2	Materials (MS,SS,AL) cutting with selected gases (O2, N2 any other) at various optics, feed rates and laser power	Vendor to specify in table for every combination for all specified metals			
	Mild steel with Air as cutting gas	Vendor to specify			
	Mild steel with Oxygen as cutting gas	Vendor to specify			
	Mild steel with Nitrogen as cutting gas	Vendor to specify			
	Similarly for all above defined materials with all prescribed cutting gases including air	Vendor to specify			
2.10'	ACCURACY	Vendor to specify			
2.10.1	Deviation of laser cut material from drawing dimensions in 2 MX2M job considering both compressed air and inert gas as cutting gases for cut material of various thicknesse in ± microns	Vendor to specify			
2.10.2	Positioning accuracy: ±.....mm/1M and in 8M	Vendor to specify			
2.10.3	Repeatability: ±.....mm/1M and in 8M	Vendor to specify			
2.10.4	Squareness:.....mm/2000 mm x 2000 mm.	Vendor to specify			
2.10.5	Cut surface roughness on mild steel of maximum thickness specified by vendor against CI 1.14 as per ISO 9013 or DIN 2310-5.	Vendor to specify			

S.N.	Description For BHEL Requirement	Specified/ Confirm Values	Offered	Deviations (To be indicated in Yes or No)	Remarks
2.10.6	Kerf width on mild steel:	Vendor to specify			
2.10.7	Speed accuracy:	Vendor to specify			
2.10.8	All the above accuracies to be demonstrated to BHEL engineers during pre-acceptance at suppliers works and during Erection & commissioning at BHEL works	Vendor to specify			
2.11	Water chiller				
2.11.1	Model	Vendor to specify			
2.11.2	Cooling capacity	Vendor to specify			
2.11.3	Controlled temperature range	Vendor to specify			
2.11.4	Circulating water pressure	Vendor to specify			
2.11.5	Circulating water flow rate	Vendor to specify			
2.11.6	Chiller should have anti corrosion additives	Vendor to specify			
2.11.7	Power consumption	Vendor to specify			
2.12	CONSTRUCTION				
2.12.1	Vendor to furnish details of material, hardness & constructional details, including explanatory drawings, of various components/assemblies like column, end carriage, cross arm, oscillator and cutting head etc. of the machine.	Vendor to confirm			
2.12.2	Vedio 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			
2.13	OPERATION AND CONTROL SYSTEM:				
2.13.1	OPERATORS PANEL:				
	Swiveling type operators panel having complete CNC and machine control system with TFT/LCD of required configuration shall be provided on the operators platform. All switches on the operators panel should be within reach of operator of average height (Indian) for convenient, efficient & safe operation. All displays/indications should also be conveniently placed accordingly. Layout showing complete details of the of the panel should be submitted.	Vendor to confirm			
2.13.2	CNC SYSTEM & FEATURES:				
2.13.2.1	CNC control for continuous monitoring of cutting parameter and positioning. (Vendor to specify the details).	Vendor to confirm			

S.N.	Description For BHEL Requirement	Specified/ Confirm Values	Offered	Deviations (To be indicated in Yes or No)	Remarks
2.13.2.2	Type: PC based latest version, Siemens 840D/Planer/Biostronic latest model in market	Vendor to confirm			
2.13.2.3	Model:	Vendor to specify			
2.13.2.4	Details of standard features. List to be submitted.	Vendor to specify			
2.13.2.5	Details of optional features, recommended by vendor to be submitted	Vendor to specify			
2.13.2.6	Details of other optional features	Vendor to specify			
2.13.2.7	All software changes in Laser cutting software should be supported free of cost for 10 years if there is any operating platform changes.	Vendor to confirm			
2.13.2.8	All required softwares including nesting and CAM to be supplied	Vendor to confirm			
2.13.2.9	MANUAL CONTROL: Complete manual control of machine with required switches/keys should be provided on operators panel for selection of required axis, axis direction, cutting feed, On/off, display of torch position ect. for manual operation without using CNC program of MDI mode. Diagram/ Sketches for switches/ keys provided on operators pendant to be submitted.	Vendor to confirm			
2.14	MACHINE LIGHTS:	Vendor to confirm			
2.14.1	Machine lights for sufficient illumination of complete working area and on operators control panel should be provided for clear visibility	Vendor to confirm			
2.14.2	All light fittings consumable, adapters/ receptacles should have compatibility with Indian equivalents.	Vendor to confirm			
2.15	ELECTRICAL SYSTEM:				
2.15.1	415 ±10%, 50 HZ, ± 3% AC(4 wire system with 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 part of the machine/control cabinets, shall be the responsibility of vendor. Requirement of grounding/earthing with required material details is to be informed by vendor well in advance so that could be incorporated during construction of foundation.	Vendor to confirm			
2.15.2	Tropicalisation: All electrical / electronics equipment shall be tropicalized to suit 50 degrees celsius ambient.	Vendor to confirm			
2.15.3	All electrical & components in the cabinets & panels should be dust and vermin proof	Vendor to confirm			
2.15.4	All electrical components in the cabinets should be mounted on DIN Rail	Vendor to confirm			

S.N.	Description For BHEL Requirement	Specified/ Confirm Values	Offered	Deviations (To be indicated in Yes or No)	Remarks
2.15.5	All electrical and electronic panels including operators panel should be provided with fluorescent lamp for sufficient illumination and power receptacles of 220 V/ 5/15 Amp AC. All adapters/receptacles should have compatibility with Indian equivalents.	Vendor to confirm			
2.15.6	Motors shall conform to IFC or Indian Standard.	Vendor to confirm			
2.15.7	All cable moving with traversing axes should be installed in Caterpillar/ Drag chain. Additionally, all the cable trays required for laying of cable should be included in the offer.	Vendor to confirm			
2.15.8	Vendor should ensure the proper earthing for the machine and its peripherals.	Vendor to confirm			
2.16	Air conditioners with dehumidifiers of sufficient capacity to be provided for all electrical/ electronic panels/ control cabinets and CNC cabinets including operators panel considering specified ambient conditions. Detailed specifications of the same are to be submitted.	Vendor to confirm			
2.17	Compact dust & Fume extractor system of sufficient capacity. (Vendor to specify details.)	Vendor to confirm			
2.18	SAFETY ARRANGEMENTS:				
	Following safety features in addition to other standard safety features should be provided on the machine.	Vendor to confirm			
	1) The area sensor protection to be equipped at both longitudinal ends of the machine to stop machine travelling and laser near irradiation on detecting persons of obstacles.	Vendor to confirm			
	2) Plasma sensor for detecting plasma arising from the stainless steel plate and stopping beam radiation and travelling.	Vendor to confirm			
	3) Machine should have adequate and reliable safety interlocks/ devices to avoid damage to the machine workpiece and the operator due to the malfunctioning of mistakes. Machine functions should be continuously monitored and alarm/warning indications through lights/ alarm number with messages (on CNC display and panels) should be available.	Vendor to confirm			
	4) A detailed list of all alarms/indications provided on the machine should be submitted by the supplier	Vendor to confirm			
	5) All the pipes, cables etc on the machine should be well supported and protected.	Vendor to confirm			

S.N.	Description for BHEL Requirement	Specified/ Confirm Values	Offered	Deviations (To be indicated in Yes or No)	Remarks
	6) All the parts used on machine should be statically & dynamically balanced to avoid undue vibrations	Vendor to confirm			
	7) Emergency switches at suitable locations as per international norms are to be provided	Vendor to confirm			
	8) Laser enclosure to meet International laser safety standard.	Vendor to confirm			
	9) The machine should comply with the essential International safety and health regulations and should be marked with applicable standard.	Vendor to confirm			
2.19	ENVIRONMENTAL PERFORMANCE OF THE MACHINE:	Vendor to confirm			
	The machine shall confirm to following factors related to environment:	Vendor to confirm			
	a) If any safety/ environmental protection enclosed is required it should be built in the machine by the vendor	Vendor to confirm			
3	DIAGNOSTIC SYSTEM:				
3.1	Fault diagnostic system	Vendor to confirm			
3.1.1	Supplier's own diagnostic system with required hardware and software should be supplied and installed on the CNC system. This should include customised auto-diagnostic system with supporting hardware and software which shows detailed cause and remedy for the fault on the display with full video diagnostic help for faults related to mechanical and electrical maintenance.	Vendor to confirm			
3.1.2	Help guide should be provided to use diagnostic system.	Vendor to confirm			
4	LEVELING & ANCHORING SYSTEM: Complete anchoring system including foundation bolts, anchoring materials, fixators, leveling shoes etc shall be supplied for the machine.	Vendor to confirm			
5	TOOLS FOR ERECTION, OPERATION & MAINTENANCE: 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 supplied. List of such tools should be submitted with offer.	Vendor to confirm			
6	ACCESSORIES:(IF ANY)	Vendor to specify			
7	SPARES:	Vendor to specify			

S.N.	Description for BHEL Requirement	Specified/ Confirm Values	Offered	Deviations (To be indicated in Yes or No)	Remarks
7.1	Furnished breakup of mechanical hydraulic, electrical and electronics spares used on the machine in sufficient quantity as per recommendation of vendor for 2 years of trouble free operation on three shifts continuous basis should be offered by vendor. The list to include following, in addition to other recommended spares:(Unit price of each item spares should be offered)	Vendor to specify			
7.2	a) Mechanical spares: All type of valves, All types of pressure switches/ transducers, All type of filters, All type of seals.	vendor to submit			
7.3	b) Electrical / electronic/ CNC spares: Encoder, CPU board, front panel display, feed drives, spare hard disk with complete software etc.	vendor to submit			
7.4	OPTICAL SPARES: Lens spare beam benders, Folding mirrors and optical spares.	vendor to submit			
7.5	All type of spares for total machine and accessories should be available for atleast ten years after supply of the machine. If machine of 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 these in advance, if required.	Vendor to confirm			
7.6	Recommended set of spares for all attachments are to be offered with details	vendor to submit			
7.7	Vendor to confirm that complete list of spares for machine and accessories along with specification/ type/ model name & address of the spare supplier shall be furnished along with documentation to be supplied with the machine.	Vendor to confirm			
8.0 LOADING & UNLOADING SYSTEM:					
8.1	A suitable loading and unloading system considering sizes of 2.5x7 m and 20 mm thick sheets of magnetic/nonmagnetic material to be offered as option alongwith all details.	Vendor to confirm and submit			
9.0 SERVO STABILIZER:					
9.1	Indian make Oil / Air Cooled Servo Controlled Voltage Stabilizer suitable for complete machine, its drives, controls, P.L.C etc. with no undesirable Harmonics in the stabiliser output.	Vendor to confirm and submit			
9.2	Make: NEIL/Blue Line /Servomax make	Vendor to submit			
9.3	Model & Rating	Vendor to specify			

S.N.	Description for BHEL Requirement	Specified/ Confirm Values	Offered	Deviations (To be indicated in Yes or No)	Remarks
9.4	Spares Package for the Voltage Stabiliser for 2 years working should also be offered.	Vendor to confirm and submit			
9.5	Catalogue of the Voltage Stabiliser shall be submitted with the offer.	Vendor to submit			
10.0	ULTRA ISOLATION TRANSFORMER				
10.1	Indian make Ultra Isolation Transformer suitable for complete machine, its drives, controls, PLC etc.	Vendor to confirm and submit			
10.2	Make: NEEL/Blue Line/Servomax make	Vendor to submit			
10.3	Model & Rating	Vendor to specify			
10.4	Spares Package for the Ultra Isolation Transformer for 2 years working should also be offered, if recommended.	Vendor to confirm and submit			
10.5	Catalogue of the Ultra Isolation Transformer shall be submitted with the offer.	Vendor to submit			
11.0	PNEUMATIC SYSTEM:				
11.1	AIR COMPRESSOR:				
11.1.1	Independent Air Compressor (of reputed Indian make) 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. The system should be so designed to have additional provision and required accessories so that BHEL compressed air supply having pressure 5Kg/cm ² could be used as and when required. The compressor unit should be suitable for continuous duty.	Vendor to confirm and submit			
11.1.2	Make & Model of Air Compressor	Vendor to specify			
11.1.3	Make & Model of Refrigerated Air Dryer	Vendor to specify			
11.1.4	Capacity (Flow, Pressure & KW)	Vendor to specify			
11.2	COMPRESSED AIR POINTS:				
11.2.1	Compressed Air Point with manual ON/ OFF Valve and flexible pipe of suitable length for work piece cleaning.	Vendor to confirm and submit			
12.0	DOCUMENTATION :				
	Five sets of following documents (Hard copies) in English language should be supplied along with the machine				

S.N.	Description For BHEL Requirement	Specified/ Confirm Values	Offered	Deviations (To be indicated in Yes or No)	Remarks
12.1	Operating manuals of Machine & CNC system	Vendor to confirm			
12.1	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/ Hydraulic circuit diagrams. All Assembly/ Sub Assembly Drawings shall be supplied with the part list also	Vendor to confirm			
12.4	Maintenance. Interface & commissioning manuals for CNC system. head . oscillator & feed drives.	Vendor to confirm			
12.5	Manufacturing drawings for all supplied 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			
12.8	Operating Manuals. Maintenance Manuals & Catalogues for supplied Job Measuring Systems. Voltage Stabilizer, Isolation Transformer, Air-Compressor and all supplied Accessories.	Vendor to confirm			
12.9	PLC program print-outs with comments in English.	Vendor to confirm			
12.10	PLC program on CD, NC data & PLC data on pen /equivalent drive.	Vendor to confirm			
12.11	Complete back-up of hard disk on GHOST CD and clear written Instructions (3 copies) to take back-up and reloading of a new hard disk.	Vendor to confirm			
12.12	Complete Master List of parts used in the machine shall be submitted by the vendor.	Vendor to confirm			
12.13	One additional set of all the above documentation on CD ROM, wherever possible.	Vendor to confirm			
	13.0 TRAINING				

S.N.	Description for BHEL Requirement	Specified/ Confirm Values	Offered	Deviations (To be indicated in Yes or No)	Remarks
13.1	BHEL Personnel should be trained at supplier's Works for 10 working days each in the area of (a) CNC Part Programming / Technology, Use of all CNC Features, Programming for Measuring Systems & supplied accessories etc. (b) Electrical, Electronic & CNC maintenance for machine & other supplied equipments (c) Mechanical & Hydraulic maintenance of the machine & other supplied equipments (d) Operation of the machine & other supplied equipments.	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 to quote for training on man - day basis	Vendor to confirm			
14.0 FOUNDATION :					
14.1	Vendor shall submit the preliminary layout drawing for getting BHEL's approval within one month from the date of Letter of Intent (L.OI) / P.O. Soil condition data will be furnished by BHEL along with the approval. Complete Foundation Design including details viz. static / dynamic load details etc. and Final layout drawings shall be submitted by the supplier within three months after getting BHEL's approval. The layout should consist of all requirements pertaining to complete machine including space requirement for Voltage Stabilizer, Isolation Transformer, Air compressor, Chip Bin & any other accessories. BHEL shall construct complete foundation for the machine under supervision of supplier and at supplier's responsibility. Vendor should arrange equipments required for the testing of foundation, if required by the vendor. The vendor shall also indicate detailed specifications of grouting compound and Grouting procedure etc. for foundation bolts of the machine.	Vendor to confirm			
15.0 ERECTION & COMMISSIONING					

S.N.	Description For BHEL Requirement	Specified/ Confirm Values	Offered	Deviations (To be indicated in Yes or No)	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. at only one point to be indicated by supplier in their foundation/layout drawings. Other requirements like crane and helping personnel shall also be provided by BHEL. Details of these requirements should be informed by vendor in advance.	Vendor to confirm			
15.2	Erection & Commissioning of Voltage stabilizer, Isolation Transformer & Air Compressor shall also 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	Test mandrel for checking run-out/laper & alignment should be supplied	Vendor to confirm			
15.5	Tools, Tackels, 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			
15.6	Commissioning spares, required for commissioning of the machine within stipulated time, shall be brought by the supplier on returnable basis.	Vendor to confirm			
15.7	All Cover Plates required for the machine and its peripherals including pits, if any, shall be supplied and installed by the vendor. The plates should be sourced from India	Vendor to confirm			
15.8	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 colours of paint used.	Vendor to confirm			
15.9	Schedule of Erection and Commissioning shall be submitted with the offer.	Vendor to confirm and submit			
15.10	Charges, duration, terms & conditions for E&C should be furnished in detail separately by vendor along with offer.	Vendor to confirm and submit			
16 GEOMETRICAL ACCURACIES:					
16.1	Submit test chart for all accuracies as per DIN 8609/ ISO 10791 standard or equivalent applicable standard.	Vendor to confirm			

S.N.	Description for BHEL Requirement	Specified/ Confirm Values	Offered	Deviations (To be indicated in Yes or No)	Remarks
16.2	All the above accuracies should be demonstrated to BHEL engineers during pre-acceptance at supplier's works and during erection & commissioning at BHEL works.	Vendor to confirm			
17 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% Hz: +3%, - 3% No. of phases = 3 Frequency: 50 Ambient Conditions: Temperature = 5 to 45 degree celsius Relative Humidity = 95% max. (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 and submit			
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 and submit			
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. (Confirm that machine is suitable for above and details of provisions on the machine for the same should be furnished)	Vendor to confirm and submit			
18 PROVEOUT OF BHEL COMPONENTS :					
18.1	Drawings bearing no EML-1-6-006,EML/4C/SR-1-5-403 and 06/2/15/68 of prove out component are enclosed. Vendor shall be fully responsible for cutting 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			

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18.2	Vendor to submit preliminary process, time study recommended by them within three months from issue of I.O.I.. Change in process may be mutually discussed and agreed. Complete cutting of prove out components shall be done by Vendor at BHEL works to the specified design accuracy and surface finish, using CNC programs to be provided by the vendor to prove the machine after complete erection, tests & test piece cutting etc. Material for the proveout components shall be provided by BHEL. Vendor should submit the CNC programs, setting schemes, process sheets, time studies etc. in advance for the prove out components.	Vendor to specify			
18.3	Final job inspection shall be done by supplied Job Measuring System. Vendor shall be responsible for any deviation/rejection in proveout component due to wrong cutting or malfunctioning of the machine during proveout cutting. 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 should be carried out at supplier's works on the machine before dispatch :	Vendor to confirm			
19.1.1	Geometrical accuracies as per test chart.	Vendor to confirm			
19.1.2	Positioning accuracies as per cl. No. 2.10	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	Cutting test piece as per relevant international standard. Vendor to arrange Test pieces.	Vendor to specify			
19.2	Tests/Activities should be carried out at BHEL works while commissioning the machine :	Vendor to confirm			
19.2.1	Geometrical accuracies as per test chart.	Vendor to confirm			
19.2.2	Positioning accuracies as per cl. No. 2.10	Vendor to confirm			
19.2.3	Full load test to demonstrate the maximum cutting capacity of the machine for all specified materials.	Vendor to confirm			

S.N.	Description For BHEL Requirement	Specified/ Confirm Values	Offered	Deviations (To be indicated in Yes or No)	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	Proveout cutting of four components each as per dwg no E.MU-1-6-006, E.MU/4C/ASR-1-5-403 and 06/215/68. Raw material will be provided by BHEL.	Vendor to confirm			
19.2.7	Two weeks supervision of independent operation of machine by BHEL after job proveout	Vendor to confirm			
19.2.8	Cutting test profile as per relevant international standard.	Vendor to confirm			
19.2.9	Training of BHEL machine operators in operation of complete machine & accessories etc by the supplier's experts / engineers during their stay at BHEL works	Vendor to confirm			
19.2.10	Demonstration by actual use of all supplied attachments and accessories to their full capacity.	Vendor to confirm			
20	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	CLARANTEE :				
21.1	24 months from the date of acceptance of the machine.	Vendor to confirm			
22.0	GENERAL :				
22.1	Machine Model	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 confirm			
22.5	Total weight of the machine	Vendor to specify			
22.6	Weight of heaviest part of machine	Vendor to specify			

S.N.	Description For BHEL Requirement	Specified/ Confirm Values	Offered	Deviations (To be indicated in Yes or No)	Remarks
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 i.e. Model/bed size, oscillator power, CNC System etc	Vendor to submit			
22.10	Detailed catalogues, sketch/ photographs of the m/c and accessories/ attachments should be submitted with the offer.	Vendor to submit			
22.11	Hydraulic & Pneumatic 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.	Vendor to confirm			
23.	COMPANY PROFILE/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 Laser cutting 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 / partners with the VENDOR for:	Vendor to submit			
	(a) Sourcing/Building large machine casting or fabricated components	Vendor to submit			
	(b) Heat treatment facilities	Vendor to submit			
	(c) Resonator/oscillator sourcing	Vendor to submit			
	(d) Machine assembly & testing Rigs	Vendor to submit			
	(e) Capacity of vendor to supply machine within 9 months	Vendor to confirm			
	(f) Capacity of vendor for manufacturing similar machines.	Vendor to submit			
23.2	QUALIFYING CONDITIONS :				
	Only those vendors(OEM), who have supplied and commissioned at least two similar machines(with bed size of 2.5x6.5 mtrs ² or more and resonator power 3 kw(min) or more) in the past 10 years (on the date of opening of tender) and such machines are presently working satisfactorily for more than one year after commissioning (on the date of opening of tender) should quote.	Vendor to submit details			

S.N.	Description For BHEL Requirement	Specified/ Confirm Values	Offered	Deviations (To be indicated in Yes or No)	Remarks
	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 submit details			
	1. Name of the customer / company where similar machine is installed.	Vendor to submit			
	2. Complete postal address of the customer.	Vendor to submit			
	3. Month & Year of commissioning.	Vendor to submit			
	4. Parameters of machine(s) supplied & application for which the machine is supplied.	Vendor to submit			
	5. Name and designation of the contact person of the customer.	Vendor to submit			
	6. Phone, FAX no. and email address of the contact person of the customer.	Vendor to submit			
	7. Performance certificate from the customers regarding satisfactory performance of machine supplied to them (original certificate or through E-mail directly from the customer). The original may be returned after verification by BHEL, If required.	Vendor to submit			
23.3	BHEL reserves the right to verify the information provided by vendor. In case the information provided by vendor is found to be false/incorrect, the offer shall be rejected.	Vendor to confirm			

V S Chakraborty DGM (Fab) 22.8.2012	Arjun Singh Sr. Mgr. (WEX) 22.8.2012	Y K Dhangra Sr. Engg (WEX) 22.8.2012
R N Jha AGM (Fab)	S. J. Chakraborty AGM (WEX)	A K Shivpuri DGM (WEX)