



**BHARAT HEAVY ELECTRICAL LIMITED**  
Fabrication Plant  
Bharat Heavy Electricals Limited  
Industrial Area Jagdishpur, District: Sultanpur  
Uttar Pradesh-227817 (India)  
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Enquiry No. :  
Due Date :  
Vendor Quotation No.:  
Date :

CONTACT PERSON'S NAME/DESIGN./PHONE NO./E-MAIL (FROM PURCHASE DEPTT

**SECTION IV**

**SPECIFICATION CUM COMPLIANCE CERTIFICATE FOR CNC GAS & PLASMA CUTTING MACHINE**

**NOTE:-**

1. Vendor must submit complete information against Qualification Criteria mentioned against clause no 23 of this technical specification. 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 of the specifications/requirements shall be treated as
3. The offer and all documents enclosed with offer should be in English language only.

NAME & ADDRESS OF THE VENDOR :

TELEPHONE NOS.:  
FAX NOS.:  
E-MAIL ADDRESS :  
DUNS NO.(Of Duns & Bradstreet of USA)

NAME & ADDRESS OF THE  
INDIAN AGENTS (If Any) :  
TELEPHONE NOS.:  
FAX NOS.:  
E-MAIL ADDRESS :

SCOPE:	DESIGN, MANUFACTURE, INSPECTION & TESTING AT VENDOR'S WORKS, PACKING & FORWARDING, SUPPLY, ERECTION & COMMISSIONING AND PROVING AT BHEL WORKS OF CNC GAS & PLASMA CUTTING MACHINE COMPLYING TO SPECIFICATION AS BELOW:				
SL. NO.	DESCRIPTION OF BHEL REQUIREMENT	TO BE SPECIFIED BY/OFFERED BY/CONFIRMED BY	OFFERED	DEVIATION	REMARKS
1.0	<b>PURPOSE</b>				
1.1	<b>Purpose:</b> Oxy-acetylene cutting of carbon steels, low alloy steels and gas plasma cutting of stainless steels ,Inconel materials.	Vendor			
2.0	<b>JOB REQUIREMENT :</b>				
2.1	<b>Oxy-Acetylene cutting :</b> The machine should be capable of cutting carbon steel and low alloy steel plates of following specification: (i) Maximum plate thickness - upto 300 mm. (ii) 4 Nos of plates of size 2500 mm (Width) x 10,000 mm (Length) placed side by side & also along length. (iii) Any contour cutting as per CNC programme.	Vendor Vendor Vendor Vendor			
2.2	<b>DRY GAS PLASMA CUTTING:</b> The machine should be capable of cutting stainless steels , Inconel materials. i) Maximum plate thickness - upto 100 mm (for stainless steels). ii) Straight , circular , contour cutting as per CNC programmes. iii) Hole Piercing capacity (maximum diameter of hole can be pierced ). iv) Plasma gas -Argon/Hydrogen / Nitrogen	Vendor Vendor Vendor Vendor Vendor			
2.3	<b>SOFTWARE PACKAGE:</b> Required for generation of nesting plans for oxy-acetylene and dry gas plasma cutting on CNC gas/plasma cutting machine facilitating following interface functions:- i) Powerful CAD system for design of parts for thermal cutting . ii) Auto CAD system for importation of components from Engineering /design departments. iii) Auto nesting of components w.r.t thickness & materials grades of components with best utilization of plate . iv) Importation of parts which have already been created with the help of another CAD system v) Programme for the manual on screen nesting of parts on to a plate. vi) Acceptance of ESSi format to read the CNC programme. vii) Software package to take care for remnant ( Off cut /scrap pieces)	Vendor Vendor Vendor Vendor Vendor Vendor Vendor			
3	<b>TECHNICAL SPECIFICATION:</b>				

SL. NO.	DESCRIPTION OF BHEL REQUIREMENT	TO BE SPECIFIED BY/OFFERED BY/CONFIRMED BY	OFFERED	DEVIATION	REMARKS
3.1	Basic Equipment:- Should be capable to cut 4 nos plates of size 2500 mm x 10000 mm. Placed side by side & along length.	Vendor			
3.1.1	Heavy duty gantry construction .	Vendor			
3.1.2	Powerful double sides synchronized longitudinal rack & pinion drive.	Vendor			
3.1.3	Track width - 6000 mm.	Vendor			
3.1.4	Overall width - 7500 mm (track to track) .	Vendor			
3.1.5	Track length - 24000mm.	Vendor			
3.1.6	Thickness cutting capacity -Upto 300 mm (maximum) quality of cut as per DIN2310 part -2 for oxy-acetylene cutting .	Vendor			
3.1.7	Thickness cutting capacity -upto 100 mm (maximum) quality of cut as per DIN2310 part -4 for dry gas plasma cutting.	Vendor			
3.2	<b>CUTTING TORCH:</b>				
	The equipment should be capable for mounting of 3 nos cutting torches to cover the whole range of cutting upto 300 mm (maximum) for oxy-acetylene cutting & upto 100 mm (maximum) for dry gas plasma cutting .	Vendor			
3.2.1	Oxy-acetylene contour cutting Torch - 2 nos. (cutting capacity upto 300 mm)	Vendor			
3.2.2	Dry gas plasma cutting Torch- 1 no. (cutting capacity upto 100 mm).	Vendor			
3.2.3	Gas Cutting torches should be capable of cutting 2 nos. plates simultaneously in identical or mirror image with the same programme.	Vendor			
3.2.4	Plasma cutting Torch will be placed after 2 nos gas cutting torches.	Vendor			
3.3.	<b>CONTROL SYSTEM:</b>				
	Two axes CNC control system with programming facility having following features mentioning model ,make ,complete details:-	Vendor			
3.3.1.	Control unit , operating system & user interface with necessary features including.	Vendor			
a	Simple and clearly arranged menu guide for programming	Vendor			
b	Control panel with large switches for all machine functions.	Vendor			
c	CPU -(Model/capacity to be specified) .	Vendor			
d	TFT-colour monitor (Size/details to be specified).	Vendor			
e	Floppy disc drive and CD drive system. (MB to be mentioned)	Vendor			
f	Digital I/O -Broad (details to be mentioned)	Vendor			
g	Data transfer Facility with additional USB port & by remote.	Vendor			
h	Inbuilt standard shapes with variable lead in / lead out.	Vendor			
i	Programmable kerf & kerf compensation between pierce points .	Vendor			
j	Automatic plate alignments.	Vendor			
k	Reversing /repositioning .	Vendor			
l	Angle dependent corner slow down.	Vendor			
m	Edit /MOI/ Text programme function.	Vendor			
n	Programme mirror imaging .	Vendor			
o	Programme rotation in 1 deg.-steps.	Vendor			
p	Powder marking ( speed 20 m/min with slow down at corner ) .	Vendor			
q	Zoom function.	Vendor			
r	Copy function.	Vendor			
s	Back up function	Vendor			
t	Look ahead function	Vendor			
u	Cut observation	Vendor			
v	Extended diagonistic system with error log function.	Vendor			
w	Indication of remaining cutting time .	Vendor			
x	Any other necessary functions needed for meeting job requirements mentioned at clause 2.0 of specification.	Vendor			
3.3.2	CAD/CAM programming software package to meet job requirements as mentioned at clause 2.0 of specification .Vendor to provide details of CAD/CAM programming software including :-	Vendor			
	i) CAD-Module giving details of geometry function ,Auxiliary function, Manipulations , Dimensions, Macros,Text input etc.	Vendor			
	ii) Special functions giving details of marking functions, print output , Data converter, NC link, Simulation,Post processor etc.	Vendor			
	iii) Path automatic nesting module giving details of lead in/ lead out , nesting etc.	Vendor			
	iv) Parts library with graphic representation.	Vendor			
	v) Work order management.	Vendor			
3.3.3	<b>OPERATOR PANEL:</b>				

SL. NO.	DESCRIPTION OF BHEL REQUIREMENT	TO BE SPECIFIED BY/OFFERED BY/CONFIRMED BY	OFFERED	DEVIATION	REMARKS
	i) Operator control panel should display all control features ( Refer clause 3.3 of specification) & other features & should have all push buttons ,signal lamps, gauges,Knobs etc. for easy & comfortable operation.	Vendor			
	ii) All details of operator Panel to be provided.	Vendor			
3.4.	<b>DRIVE SYSTEM:</b>				
3.4.1	AC servo motor &drive system including:-	Vendor			
	i)Longitudinal double side drive ii)Transverse drive & control iii)Rapid drive (speed 6000 mm/min)	Vendor			
3.5.	<b>DRY GAS PLASMA CUTTING SYSTEM:-</b>				
3.5.1	Power source with high plasma cutting performance for CNC controlled cutting to meet job requirements as per clause 2.0 of specification .	Vendor			
3.5.2	Interfacing of plasma power source with CNC control system (Refer clause no. 3.3. of specification ) so that operator can switch over easily from oxy-acetylene cutting mode to plasma cutting mode.	Vendor			
3.5.3	Carriages with transverse energy system.	Vendor			
3.5.4	Dry gas plasma torch suspension system for cutting upto 100 mm (maximum) thickness.	Vendor			
3.5.5	Arc height sensing & control system.	Vendor			
3.5.6	Plasma anti - collision device.	Vendor			
3.5.7	Plasma gas supply system including manifold, chiller etc .	Vendor			
3.6.	<b>TRACK /ENERGY FEEDING SYSTEM:</b>				
3.6.1	Drag chain for longitudinal energy feeding system should be strong & flexible and properly supported along total length with sufficient no. of supports so that it can carry total weight of cables & hoses for long time at continuous duty without any breakage or damage on . -Track should be accurately machined & aligned.	Vendor			
3.6.2	Drag chain type energy feeding system to cover entire range of track length to meet job requirements as per clause no. 2.0 of specification.	Vendor			
3.6.3	Drag chain for longitudinal energy feeding system should be strong & flexible and properly supported along total length with sufficient no. of supports so that it can carry total weight of cables & hoses for long time at continuous duty without any breakage or damage of drag chain. Capacity of chain to be mentioned.	Vendor			
3.6.4	Crriage for transverse energy system for both oxy-acetylene & plasma cutting to cover full track width to meet job requirements as per clause 2.0 of specification.	Vendor			
3.7.	<b>TORCH SUSPENSION SYSTEM:</b>				
3.7.1	Torch suspension system for oxy-acetylene cutting including auto ignition device , height sensing device to meet cutting of thickness upto 300 mm (maximum).	Vendor			
3.7.2	Torch suspension system for dry gas plasma cutting including arc height sensing control device to meet cutting at thickness upto 100 mm(maximm)	Vendor			
4.0.	<b>SCOPE OF SUPPLY FOR CUTTING SYSTEM:</b>				
4.1	Gantry system.(Refer clause 3.0 of specification)	Vendor			
4.2.	Heavy duty machined tracks .(Refer clause 3.6 of specification)	Vendor			
4.3.	Energy feeding drag chain for longitudinal and transverse movements for both oxy-acetylene & gas plasma cutting . (Refer clause 3.6.2 & 3.6.3 of specification)	Vendor			
4.4.	Power source & control system for dry gas plasma cutting (Model- KJELLBERG FF1600). -Refer job requirements vide clause no. 2.2 of specification) no. 3.5 of specification	Vendor			Refer clause
4.5.	Two axis CNC-control system for both oxy-acetylene & dry plasma cutting .(Refer clause 3.3 of specification)	Vendor			
4.6.	Software package for Auto CAD/Auto nesting & Corresponding hardware requirements. (Refer clause 2.3 & 3.3.2 of specification)	Vendor			
4.7.	Gas manifold system for both oxy-acetylene &plasma cutting .	Vendor			
4.8.	i) Gas cutting torches - 2 nos ii) Plasma cutting torch - 1 no	Vendor			
4.9.1	Torch suspension system for both oxy -acetylene & plasma cutting torches.(Refer clause 3.7 of specification)	Vendor			
4.9.2	Powder marking device fitted with Torch for plasma cutting.	Vendor			
4.10.	Auto ignition device & flashback arrestors fitted with torches .	Vendor			
4.11.	Sitting arrangement for operator infront of operator panel.	Vendor			
4.12.	Oxy-acetylene - Gas plasma interfacing arrangements.	Vendor			
4.13.1	All hoses & cable assemblies required for oxy-acetylene & plasma cutting system . All power cables & hoses should be of high quality , robust & resistant to heat ,oil and suitable for tropical environment.	Vendor			
4.13.2	Sets of tools required for operation & maintenance of both oxy-acetylene & gas plasma cutting system.	Vendor			

SL. NO.	DESCRIPTION OF BHEL REQUIREMENT	TO BE SPECIFIED BY/OFFERED BY/CONFIRMED BY	OFFERED	DEVIATION	REMARKS
4.14	Cooling System, Chiller unit etc. for Gas Plasma Cutting.	Vendor			
4.15	Cutting tables for oxy-acetylene.	Vendor			
4.16	Removable trays for disposal of slags for entire cutting table of the machine.	Vendor			
4.17	Water table for CNC plasma cutting with up-down water level controller to absorb fumes effectively.	Vendor			
4.18	Industrial PC mounted on the gantry.	Vendor			
4.19	<b>UPS &amp; STABILISER FOR CNC SYSTEM:</b>				
4.19.1	UPS unit including Siemens UPS module SITOP with rechargeable battery of sufficient time and having provision for unattended automatic shutdown feature for Windows operating system.	Vendor			
4.19.2	Stabiliser of suitable rating	Vendor			
4.20	<b>MACHINE LIGHTS:</b>	Vendor			
4.20.1	Machine Lights for sufficient illumination of complete working area including operator's panel should be provided for clear visibility.	Vendor			
4.20.2	All light fittings, consumables, adapters/receptacles should have compatibility with Indian equivalents.	Vendor			
4.21.	<b>AIR CONDITIONERS:</b>				
4.21.1	Independent air conditioners with Dehumidifiers of suitable & sufficient capacity to be provided for each Electrical / Electronic Panels / Cabinets including Operator's Panel considering specified ambient conditions. Detailed specifications of the same to be provided.	Vendor			
4.21.2	Air conditioner must be of refrigerant type.(Refer ambient conditions as per clause no. 18.3 of specification)	Vendor			
4.22.	Items required for civil foundation /erection & Earthing of the machine.(Foundation details & Earthing details to be provided)	Vendor			
5.0.	<b>ELECTRIC SYSTEM:</b>	Vendor			
	Power supply- 415V±10%,50Hz±3% 3 phase AC supply.	Vendor			
5.1	<b>REQUIREMENTS FOR ELECTRICAL EQUIPMENT</b>				
5.2	Power Supply will be provided by BHEL at a single point near the machine, as per layout recommended by Vendor. All types of switches, cables, connections, circuit breakers etc. required for connecting BHEL's power supply point to different parts of the machine should be provided by the vendor.	Vendor			
5.3	Tropicalisation: All electrical / electronic equipment shall be tropicalized.	Vendor			
5.4	All electrical & electronic control cabinets & panels should be dust and vermin proof.	Vendor			
5.5	All electrical components in the cabinets should be mounted on DIN Rail.	Vendor			
5.6.	All electrical / electronic panels to be provided with adequate door locks. All electrical & electronic panels including operator's panel should have sufficient illumination and power receptacles/plug points of 220Volts, 5/15 Amp AC with on/off switch.	Vendor			
5.7	All motors shall conform to IEC or Indian Standards	Vendor			
5.8	All the cable trays required for laying of cables should be included in the offer.	Vendor			
5.9	Vendor should ensure the proper earthing for the machine and its peripherals/accessories. Any material requirement for the same should be informed with foundation design/drawings. The vendor can take earthing connection from the nearest column of the production shop.	Vendor			
6.0.	<b>SAFETY ARRANGEMENTS</b> Following safety features in addition to other standard safety features should be provided on the machine:				
6.1	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 should be generated.	Vendor			
6.2.	A detailed list of all alarms / indications provided on machine should be submitted by the supplier.	Vendor			
6.3	Flash back arrestors should be fitted in the Oxygen / Acetylene pipe lines.	Vendor			
6.4	Non return valves (NRV) should be fitted for Acetylene/oxygen heating as well as cutting lines.	Vendor			
6.5	All the pipes, cables etc. on the machine should be well supported and protected. These should not create any hindrance to machine operator's movement for effective use of machine and for maintenance personnels .	Vendor			
6.6	Emergency Switches at suitable locations as per International Norms should be provided.	Vendor			
6.7	Oil pipe lines should not run with electrical cable in the same trench.	Vendor			
7.0.	<b>ENVIRONMENTAL PERFORMANCE</b> The machine should conform to following factors related to environment :				
7.1.	Maximum noise level shall be 85 dB(A) at normal load condition, 1 meter 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, if required.	Vendor			
7.2.	No hazardous chemicals shall be required to be used in the machine.	Vendor			
7.3.	If any safety / environmental protection enclosure is required it should be built in by the vendor.	Vendor			
7.4.	Paint of the machine should be oil resistant & should not get peeled off.	Vendor			

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8.0.	<b>ULTRA ISOLATION TRANSFORMER</b>				
8.1	Ultra Isolation Transformer (of reputed Indian make) suitable for CNC machine , its drives, controls, PLC etc. for unbalanced load & supply conditions considering specified power supply & ambient conditions.	Vendor			
8.2.	Monitoring device with cutoff facility for under/over output voltage, Devices for load current measurement, MCCB at input for overload/short circuit protection. (Details to be submitted)	Vendor			
9.0.	<b>FAULT DIAGNOSTIC SYSTEM :</b>				
9.1.	Supplier's own diagnostic system with required Software and Hardware installed on the CNC system, which shows detailed cause and remedy for the fault on the CNC system display with full diagnostics indicating the element /device causing the fault.	Vendor			
10.0.	<b>LEVELING &amp; ANCHORING SYSTEM</b>				
	Complete set of anchoring materials including foundation bolts, nuts, washers, fixators, leveling shoes etc for alignment of tracks, levelling of tracks & transverse carriage, torch suspension system & fix the machine to the foundation . Details to be submitted.	Vendor			
11.0.	<b>TOOLS FOR ERECTION, OPERATION &amp; MAINTENANCE</b>				
11.1.	Tools and Equipments 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 by the vendor. List of such tools and machine equipments to be submitted.	Vendor			
11.2.	Set of Test instruments for alignment of track, carriage , checking levelling of cutting table to be brought by vendor . List of instruments to be submitted.	Vendor			
12.0.	<b>SPARES</b>	Vendor			
12.1.	Itemwise breakup of mechanical, electrical and electronic & CNC spares are as follows:-	Vendor			
12.2.	<b>Mechanical Spares</b> : Following Spares are to be offered.	Vendor			
12.2.1	Gears & Pinions. (2 set each type)	Vendor			
12.2.2	Solenoid valves (2 set each type)	Vendor			
12.2.3	Flashback arrestors. (2 set each type)	Vendor			
12.2.4	Bearings used. (2 set each type)	Vendor			
12.2.5	Gas regulators. (2 set each type)	Vendor			
12.3.	Electrical /Electronic / CNC Spares : Following Spares are to be offered.	Vendor			
12.3.1	Relays ( 5 Nos each type )	Vendor			
12.3.2	Proximity Switches ( 5 Nos each type ).	Vendor			
12.3.3	Semiconductor Fuses ( 5 Nos each type )	Vendor			
12.3.4	Circuit Breakers ( 1 No each type )	Vendor			
12.3.5	Software 's back up on CD/hard disc.	Vendor			
12.3.6	Main CPU Board -1 no	Vendor			
12.3.7	Complete drive unit -1 no	Vendor			
12.3.8	Complete plasma arc height sensing system -1 no.	Vendor			
12.3.9	Anti collision device -1 no.	Vendor			
12.3.10	All PCB's of Plasma Power source unit -1 no each.	Vendor			
12.3.11	Power elements of plasma power source -5 nos	Vendor			
12.3.12	Power lead of plasma torch -1 no	Vendor			
12.3.13	Operator's panel with Display Unit -1 no	Vendor			
12.3.14	I/O Cards for PLC ( 1 No each type )	Vendor			
12.3.15	Axis Servo motor-1 no. of each type.	Vendor			
12.3.16	Spare hard disc of same capacity as used in the machine , loaded with system and OEM software .	Vendor			
12.3.17	i) 2 nos spare Gas cutting Torch & Nozzles -50 nos of each size.	Vendor			
	ii) 4 nos spare Plasma cutting Torch with Electrode nozzle ,swirl, front cap etc.- 50 nos each.	Vendor			
12.4.	All types of spares for total machine and accessories should be available for at least ten years after supply of the machine. If machine or control is likely to become obsolete in this period, the vendor should inform BHEL sufficiently in advance and provide spares.	Vendor			
12.5.	Complete list of spares for machine and accessories, with proper identification No./Code. Complete list of all Bought out items along with specification /Type , rating ,model, make & address of supplier. Details technical leaflets , literature for all bought out item, accssories etc. of the supplier. All the details given on the drawing and manual should be in English .Address of the spare supplier shall be furnished along with documentation to be supplied with the machine. The complete list as above will be provided along with documentation, clause no. 13.0.	Vendor			
13.0.	<b>DOCUMENTATION :</b> Three sets of following documents (Hard copies) in English language should be supplied along with the machine:-				

SL. NO.	DESCRIPTION OF BHEL REQUIREMENT	TO BE SPECIFIED BY/OFFERED BY/CONFIRMED BY	OFFERED	DEVIATION	REMARKS
13.1	O & M manuals of Machine & CNC system	Vendor			
13.2	Programming Manuals of Machine & CNC system	Vendor			
13.3	Detailed Maintenance manual of machine with all drawings of machine assemblies/sub-assemblies/parts including Electrical / circuit diagrams. All mechanical Assembly/ Sub Assembly Drawings shall be supplied with the part list also in English.	Vendor			
13.4	Hardware manual of CNC system.	Vendor			
13.5	Interface & commissioning manuals for CNC system.	Vendor			
13.6	Electrical schematic wiring diagram junction Box details , connector pin details cable layout.	Vendor			
13.7	O & M manual of plasma power source .	Vendor			
13.8	Wiring diagram, Circuit diagram , Component layout of plasma Source.	Vendor			
13.9	Interface description of Plasma Source with main machine.	Vendor			
13.10.	Alarm list & diagnostic manual of plasma unit .	Vendor			
13.11	Manual of all bought-out items , Spare parts list and complete addresses of bought- out items supplier.	Vendor			
13.12.	Catalogues, Operation & Maintenance Manuals of all bought out items including drawings, wherever applicable.	Vendor			
13.13.	Details of operator's Panels.	Vendor			
13.14.	Operating Manuals, Maintenance Manuals & Catalogues for supplied accessories.	Vendor			
13.15.	PLC program print-outs ( hard copy ) with comments in English including PLC program for any other auxiliary system if used.	Vendor			
13.16.	PLC program, NC data & PLC data on CD.	Vendor			
13.17.	Operating system & PLC back up on CD.	Vendor			
13.18.	Details of drives controlling the valves.	Vendor			
13.19.	Complete list of parts/items( Bill of materials) used in the machine in English language.	Vendor			
13.20.	One additional set of all the above documentation on CD ROM, wherever possible.	Vendor			
14.0.	<b>FOUNDATION</b>				
14.1.	Vendor shall submit the foundations layout drawings for getting BHEL's approval within one month from the date of Letter of Intent (LOI) or Purchase Order, whichever is earlier. Complete Foundation details viz. static / dynamic load details. Foundation bolts ,clamps, washers etc. to be supplied by vendor.	Vendor			
14.2	Foundation of the machine will be designed by BHEL and will be concurred by the supplier.Construction of foundation will be carried out by BHEL under the supervision of supplier/ supplier representative if he requires so.	Vendor			
15.0.	<b>ERECTION &amp; COMMISSIONING</b>				
15.1	Erection & Commissioning of track ,Gantry, Drag chain , carriage , Power source, cable /hose assemblies, gas manifolds, UPS / Voltage stabilizer, Isolation Transformer with all mechanical /electrical connections shall be responsibility of vendor.	Vendor			
15.2	Successful proving of BHEL components by the supplier shall be considered as part of commissioning for the machine . All tests, as mentioned at Sl. No. 19.0 (Machine Acceptance) and testing/demonstration of tele-diagnostic service etc. shall also be part of erection /commissioning.	Vendor			
15.3	O & M manuals of Machine & CNC system	Vendor			
15.4.	Programming Manuals of Machine & CNC system	Vendor			
15.5	Detailed Maintenance manual of machine with all drawings of machine assemblies/sub-assemblies/parts including Electrical / circuit diagrams. All mechanical Assembly/ Sub Assembly Drawings shall be supplied with the part list also in English.	Vendor			
15.6.	Hardware manual of CNC system.	Vendor			
15.7.	Portion, if any, of the machine, accessories/attachments and other supplied items where paint got rubbed or peeled off during transit or erection should be repainted and matched with the original adjoining paint by the vendor.	Vendor			
16.0.	<b>PROVEOUT</b>				
16.1	Successful cutting of components by vendor as per BHEL requirements through AUTO CAD/ AUTO NESTING /Programming to the specified cutting capability & quality of cut (as per job requirement vide clause no. 2.0 of specification) at BHEL works, using software package / tools etc. supplied by vendor.	Vendor			
17.0.	<b>TRAINING</b>				
17.1.	Four BHEL Persons in a group should be trained at vendor's works in the following area for 2 weeks:- (a) Operation of the machine. (b) CNC Programming for the machine. (c) Mechanical maintenance of the machine. (d) Electrical /Electronic maintenance of the machine.	Vendor			
17.2	Air-fare, boarding & lodging for the trainees shall be borne by BHEL.	Vendor			

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17.3	Competent, English speaking experts shall be arranged by the vendor for satisfactory & effective training of BHEL personnel.	Vendor			
18.0	<b>AMBIENT CONDITIONS &amp; THERMAL STABILITY</b>				
18.1	Total machine including all supplied items should work trouble free and should give specified accuracies under existing power supply and ambient operating conditions, as mentioned below.	Vendor			
18.2	<b>Power Supply (AC):</b> Voltage = 415V +10% / -10% of fluctuations , Frequency= 50Hz +3 / -3 , No. of phases = 3 phase with neutral.	Vendor			
18.3	<b>Ambient Operating Conditions:</b> Temperature = 5 to 50 degree Celsius , Relative Humidity = 95% max.	Vendor			
18.4	The machine should be suitable for continuous operation to its full capacity for 24 hours a day and 7 days a week throughout year. Vendor to ensure and confirm the same.	Vendor			
19.0	<b>MACHINE ACCEPTANCE</b> (Tests/Activities to be performed & demonstrated by Vendor)				
19.1	Tests/Activities to be carried out at vendor's works on the machine before dispatch during Pre-Dispatch Inspection (PDI) by BHEL :	Vendor			
19.1.1	Demonstration of specified/offered Geometrical accuracies as per test chart/standard and specified values.	Vendor			
19.1.2	Demonstration of all features of the machine, control system & accessories	Vendor			
19.2	Tests/Activities to be carried out at BHEL works while commissioning the machine.	Vendor			
19.2.1	Demonstration of specified/offered Geometrical accuracies as per test chart/standard and specified values.	Vendor			
19.2.2	Full load test to demonstrate the maximum power & cutting capacity of the machine.	Vendor			
19.2.3	The machine should be tested for continuous running of 48 hrs. If any break down occurs during this test, the test should be repeated for 48 hrs from that time.	Vendor			
19.2.4	Demonstration of all features of the machine, control system & accessories to the satisfaction of BHEL for efficient and effective use of the machine.	Vendor			
19.2.5	Demonstration by actual use of all supplied accessories to their full capacity for required applications.	Vendor			
19.2.6	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			
20.0	<b>PACKING</b>				
	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 dispatched in containers, all small loose items shall be suitably packed in boxes.	Vendor			
21.0	<b>GUARANTEE</b>				
	Guarantee for complete machine and all supplied accessories/attachments/equipments/items for 24 months from the date of acceptance of the machine.	Vendor			
22	<b>GENERAL</b>				
22.1	Machine Model No.	Vendor to inform			
22.2	Total connected load (KVA)	Vendor to inform			
22.3	Total Space required (Length, Width, Height) for complete machine, accessories/attachments and other supplied items like Voltage Stabilizer, Isolation Transformer.	Vendor to inform			
22.4	<b>Painting of Machine / Electrical Panels :</b> RAL 6011 Apple Green ( Polyurethane Paint )	Vendor to offer			
22.5	Total weight of the machine	Vendor to inform			
22.6	Weight of heaviest part of machine	Vendor to inform			
22.7	Weight of the heaviest assembly of the Machine	Vendor to inform			
22.8	Dimensions of largest part of the machine	Vendor to inform			
22.9	Vendor to submit reference list of customers where similar machines have been supplied mentioning broad specifications of the supplied machine i.e. Model, CNC System, capacity etc.	Vendor to submit			
22.10	Detailed catalogues, sketches/drawings/photographs pertaining to the offered machines and accessories/attachments/items should be submitted with the offer.	Vendor to submit			
22.11	All Cables and Hoses etc. should be well supported & protected in trays/brackets/drag chains etc. All designed & operating parameters for plasma power source, compressor ,chiller unit etc. should be provided.	Vendor to submit			
23	<b>QUALIFYING CONDITIONS</b>				
23.1	Only those vendors, who have supplied and commissioned at least one CNC Gas & Plasma Cutting machine of same or higher capacity for similar applications in past 10 years and such machine is presently working satisfactorily (As on date of opening of tender) should quote. Vendor to submit performance certificates from the customers whom said machine is supplied for the satisfactory performance of the machine after one year of commissioning of the machine and the machine is presently working satisfactorily.	Vendor to comply & submit with the offer			
23.2	Name of the customer / company where similar machine is installed.	Vendor to inform			
23.3	Complete postal address of the customer.	Vendor to inform			

SL. NO.	DESCRIPTION OF BHEL REQUIREMENT	TO BE SPECIFIED BY/OFFERED BY/CONFIRMED BY	OFFERED	DEVIATION	REMARKS
23.4	Month & Year of commissioning.	Vendor to inform			
23.5	Name and designation of the contact person of the customer.	Vendor to inform			
23.6	Phone, FAX no. and e-mail address of the contact person of the customer.	Vendor to inform			
23.8	BHEL reserves the right to verify information submitted by vendor. In case the information is found to be false/incorrect, the offer shall be rejected.	Vendor to accept & confirm			