



Bharat Heavy Electricals Limited,

Enquiry No. : **BAP/OT-1/A8**

Due Date : **30.04.2008**

Supplier's Ref.:

Date :

Specification cum Compliance Certificate for NC HYDRAULIC SHEARING MACHINE

Note:-

1. 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.

2. The offer and all documents enclosed with offer should be in English language only.

Name & Address of the supplier:

Name & Address of the Indian Agent:

Telephone No.

Telephone No.

Fax No.

Fax No.

e-mail :

e-mail :

Scope: Supply, Erection & Commissioning of HYDRAULIC SHEARING MACHINE complying with the following specification

S No.	Description - BHEL's Requirement	Specified	Offered	Deviations	Remarks
1.0	PURPOSE & WORK PIECE MATERIAL				
1.1	Purpose: Shearing of metals	Full Shearing			
1.2	Work Piece Material:	Mild Steel, Alloy Steel & Stainless Steel			
2.0	SPECIFICATION				
2.1	MACHINE CONFIGURATION: Hydraulically operated, variable rake angle, Motorized blade clearance adjustment, NC controlled swing sway back gauge with precision ball screws and AC Servo Motor & Drive. Pneumatic/Hydraulic plate support system on the rear side of the machine	Vendor to confirm			
2.2	CAPACITY & SIZE				
2.2.1	Maximum Shearing Capacity (Mild Steel - 45 Kg/mm ² of UTS)	16 mm x 3000 mm			
2.2.2	Maximum Shearing width	3100 mm			
2.2.3	Rake angle adjustment	1.0 to 3.0 deg			
2.2.4	Blade gap adjustment	0.1 - 1.8 mm			
2.2.5	No. of Strokes per minute for max. cutting width & min cutting width.	7 - 11			

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2.2.6	No. of hold downs (min)	12 - 16			
2.2.7	Motor Power (Apprx.)	30 KW			
2.2.8	Throat (Apprx.)	100 mm			
2.2.9	Working Height from floor level	900 - 1000 mm			
2.3 TABLE					
2.3.1	Ball transfer table for in feed.	Vendor to Confirm			
2.3.2	Squaring arm of 1 metre long on both ends.	Vendor to Confirm			
2.3.3	Front support arm (2 Nos. of 1 metre long each)	Vendor to Confirm			
2.3.4	Hydraulic hold downs (Independently operatable)	Vendor to Confirm			
2.3.5	Shadow line cutting facility.	Vendor to Confirm			
2.3.6	Finger guard / Laser Beam guard (Interlocked)	Vendor to Confirm			
2.4 CONSTRUCTION:					
2.4.1	Vendor to furnish details of material, hardness & constructional details, including explanatory drawings, of various components like Column, frame, blade clamping & adjusting system, Lubrication system, etc .of the machine.	Vendor to furnish			
2.4.2	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 furnish			
2.4.3	The blade beam guides shall have hardened slide ways and heavy duty pre-loaded guide rollers.	Vendor to Confirm			
2.4.4	The blade shall be of single piece rectangular in construction with four cutting edges.	Vendor to Confirm			
2.4.5	Motorized blade clearance adjustment through push button with reading	Vendor to Confirm			
2.4.6	Rake angle adjustment through push button with direct reading.	Vendor to Confirm			
2.4.7	Direct cutting length / stroke adjustment facility.	Vendor to Confirm			
2.4.8	Sheet support facility for the smooth disposal of sheared materials.	Vendor to Confirm			
2.5 MOTORIZED BACK GAUGE:					
2.5.1	The machine shall be provided with NC Controlled Motorized Back Gauge (1000 mm) with precision ball screws, AC Servo Motor & Drive. Back Gauge accuracy (length of cut) = +/- 0.1 mm / Meter. Back Gauge should have sufficient support to avoid cantilever stress.	Vendor to Confirm			

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2.5.2	The back gauge shall be of swing away type and operated by electrical push button for cutting more length beyond 1000 mm.	Vendor to Confirm			
2.5.2	The working principle of the above mechanism shall be explained clearly.	Vendor to explain			
3.0	OPERATION AND CONTROL SYSTEM:				
3.1	CONTROL PANEL:				
3.1.1	Control panel shall be placed in the left side of the machine. Layout showing complete details shall be submitted.	Vendor to submit			
3.1.2	Machine shall be provided main switch with key and signal light.	Vendor to Confirm			
4.0	MANUAL CONTROL :				
4.1	Movable electrically operated foot switch along with hand switch shall be provided.	Vendor to confirm			
4.2	Inching facility and cycle control facility shall be provided	Vendor to confirm			
5.0	HYDRAULIC SYSTEM : Details should be Submitted by the Vendor				
5.1	The System should have centralized Hydraulic Tank minimum capacity 4 times of the pump flow.	Vendor to confirm			
5.2	Make Rexroth / Vickers/Parker only. (Details to be submitted)	Vendor to confirm			
5.3	Filtration System	Required			
5.4	Failure indication	Required			
5.5	Hydraulic Oil Cooling system of sufficient capacity to maintain the oil temperature not exceeding 40 deg C. Complete details should be submitted	Vendor to confirm			
5.6	Hydraulic pump capacity (flow / pressure)	Vendor to reply			
5.7	Complete hydraulic circuit shall be submitted along with technical bid.	Vendor to reply			
6.0	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 reply			
6.1	Lubrication shall be life time lubricated wherever possible. Other lubrication points shall be of automatic type. Details shall be submitted.	Vendor to reply			
7.0	ELECTRICAL :				

S No.	Description - BHEL's Requirement	Specified	Offered	Deviations	Remarks
7.1	415V + 10% / -10%, 50HZ +/-3 HZ, 3 Phase AC (3 wire system with out neutral) Power Supply Voltage will be provided by BHEL at a single point near the machine, as per layout recommended by Vendor. All types of cables, connections, circuit breakers etc. required for connecting BHEL's power supply point to different parts of the machine/control cabinets, shall be the responsibility of vendor. Requirement of grounding/earthing with required material details is to be informed by vendor well in advance so that same could be incorporated during construction of foundation.	Vendor to confirm			
8.0	Tropicalisation: All electrical / electronic equipment shall be tropicalized	Vendor to confirm			
8.1	All electrical & electronic control cabinets & panels should be dust and vermin proof	Vendor to confirm			
8.2	All electrical components in the cabinets should be mounted on DIN Rail	Vendor to confirm			
8.3	All electrical and electronic panels including operator's panel should be provided with Compact Fluorescent Lamps for sufficient illumination and power receptacles of 220Volts, 5/15 Amp AC. All adapters/receptacles should have compatibility with Indian equivalents.	Vendor to confirm			
8.4	Motors shall conform to IEC or Indian Standards	Vendor to confirm			
8.5	All cables and cable trays required for the machine should be included in the offer.	Vendor to confirm			
8.6	Vendor should ensure the proper earthing for the machine and its peripherals.	Vendor to confirm			
8.7	The electrical components used shall be from reputed international makes such as Siemens / Telemechanique / Merlin Gerin / GE/ ABB and shall be accordance with DIN/IEC Standards.	Vendor to confirm			
	SAFETY ARRANGEMENTS:				
	Following safety features in addition to other standard safety features should be provided on the machine:				

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9.0	1. Machine should have adequate and reliable safety interlocks / devices to avoid damage to the machine, work piece and the operator due to the malfunctioning or mistakes. Details shall be submitted in the technical bid.	Vendor to furnish details			
	2. Electrically interlocked finger guard				
	3. Photo electric / laser finger guard				
	4. Shear operation control through hand and foot combination switch				
	5.In case of overloads due to wrong manoeuvres /malfunctions the machine should stop to avoid damage to machine and man.				
	6.Detailed list of safety alarms / indications provided on the machine shall be submitted along with the offer.				
	7. 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.				
	8. Emergency Switches at suitable locations as per International Norms should be provided.				
	9. Necessary protection shall be provided in the Hydraulic power pack to prevent from over loading.				
10.0	ENVIRONMENTAL PERFORMANCE OF THE MACHINE :				
	The Machine shall conform to following factors related to environment :	Vendor to confirm			
	(a) 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. Supplier to demonstrate compliance to noise level, if so required.				
	(b) If any safety / environmental protection enclosure is required it should be built in the machine by the vendor.				
	(c) Paint of the machine should be oil / coolant resistant and should not peel off and mix up with coolant.				
11.0	SHEAR BLADE DRAWING:				

S No.	Description - BHEL's Requirement	Specified	Offered	Deviations	Remarks
11.1	The Shear blade shall be of single blade construction and detailed manufacturing drawing indicating material specification, tolerance and hardness shall be furnished in case of ordering.	Vendor to confirm			
12.0	LEVELING & ANCHORING SYSTEM				
12.1	Complete anchoring system including foundation bolts, anchoring materials, leveling shoes etc should be supplied	Vendor to confirm			
13.0	TOOLS FOR ERECTION, OPERATION & MAINTENANCE :				
13.1	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 supplied. List of such tools should be submitted with offer	Vendor to note and agree			
14.0	ESSENTIAL ACCESSORIES:				
14.1	Additional Blades: Two set of shear blades required additionally apart from one set fixed on the machine. (Totally 3 Sets required)	Vendor to confirm			
14.2	Rear Sheet Support Mechanism: Necessary sheet support arrangement shall be provided to hold-up the sheet till end of the cut to avoid buckling effect on both small and large sheet. After the sheet has been cut, the arrangement should dispose the sheet to the floor level/trolley.				
15.0	SPARES:				
15.1	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 on three shifts continuous running basis should be offered by vendor. The list to include following, in addition to other recommended spares: (Unit Price of each item of spare should be offered in the price bid)	Vendor to note			
	a) Mechanical & Hydraulic Spares: All types of Pumps, Valves, Pressure Switches, Transducers, Flow Switches, Filters, Seals, O-rings, Hydraulic Hoses etc.	Vendor to note			

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	b) Electrical /Electronics: All types of Relays, Contactors, Proximity Switches, Push Buttons, Indicating Lamps, Semiconductor Fuses, Special Fuses, Circuit Breakers, Main Power Switch, etc.	Vendor to note			
15.2	Vendor to supply 2 Sets of Electronic cards or PCBs or LCD Monitors, Modules or PLCs or Display Boards if used in the machine along with machine as essential spares.	Vendor to note			
15.3	All types of spares for total machine and accessories should be available for at least ten years after supply of the machine. If machine or control is likely to become obsolete in this period, the vendor should inform BHEL sufficiently in advance and provide drawings of parts / details of spares & suppliers to enable BHEL to procure these in advance, if required	Vendor to note			
15.4	Recommended set of spares for all attachments are to be offered with details.	Vendor to note			
15.5	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			
16.0	DOCUMENTATION : Five sets of following documents (Hard copies) in English language should be supplied along with the machine. Only originals shall be supplied. Photocopies will not be accepted.	Vendor to confirm			
16.1	Operating manuals of Machine & NC system				
16.2	Programming Manuals of Machine & NC system				
16.3	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 including ladder drawing shall be supplied with the parts list.				
16.4	Manufacturing drawings for all supplied shear blades, back gauge, fixtures etc.				
16.5	Catalogues, O&M Manuals of all bought out items including drawings, wherever applicable.				

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16.6	Detailed specification of all rubber items and hydraulic/lube fittings.	Vendor to confirm			
16.7	PLC program print-outs with comments in English.				
16.8	PLC program on CD, NC data & PLC data on CD.				
16.9	Complete Master List of parts used in the machine shall be submitted by the vendor.				
16.10	One additional set of all the above documentation on CD ROM, wherever possible.				
17.0 TRAINING					
17.1	BHEL Persons should be trained at supplier's Works for mutually agreed period in the area of (a) Electrical, Electronic maintenance for machine & other supplied equipments (b) Mechanical & Hydraulic maintenance of the machine & other supplied equipments (c) Operation of the machine & other supplied equipments.	Vendor to agree			
17.2	Air-fare, boarding & lodging for the trainees shall be borne by BHEL.	Vendor to note			
17.3	Competent, English speaking experts shall be arranged by the vendor during training for satisfactory & effective training of BHEL personnel.	Vendor to note			
17.4	Vendor to quote for training on <i>per diem</i> basis	Vendor to note			
18.0 FOUNDATION :					
18.1	Vendor shall submit the layout drawing within one month from the date of Letter of Intent (LOI) / P.O. Layout should contain layout of the machine and load points including details viz. static / dynamic load details etc. 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. Foundation of the machine will be designed by BHEL and to be concurred by the vendor. 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 agree			

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19.0	ERECTION & COMMISSIONING				
19.1	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 note			
19.2	Successful working of full capacity of the machine by the supplier shall be considered as part of commissioning. All tests, as mentioned at clause 21 (Machine Acceptance) shall form part of the commissioning activity.	Vendor to note			
19.3	Tools, Tackles, instruments and other necessary equipments required to carry out all above activities should be brought by the supplier.	Vendor to note			
19.4	Commissioning spares, required for commissioning of the machine within stipulated time, shall be brought by the supplier on returnable basis.	Vendor to note			
19.5	All Cover Plates required for the machine and its peripherals including pits, if any, shall be supplied and installed by the vendor.	Vendor to note			
19.6	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 supply sufficient quantity of touch-up paint of various colours of paint used.	Vendor to note			
19.7	Schedule of Erection and Commissioning shall be submitted with the offer.	Vendor to note			
19.8	Charges, duration, terms & conditions for E&C should be furnished in detail separately by vendor along with offer.	Vendor to note			
19.9	Machine to be supplied with first filling of oil and grease. Equivalent Indian standards of all types of oils and grease used in the machine to be furnished by the vendor.	Vendor to confirm			

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20.0	TESTING STANDARD & PROCEDURE				
20.1	Straightness of lower bearing knife surface	Vendor to specify the Standard.			
20.2	Straightness of back gauge angle				
20.3	Parallelism of back gauge angle at various positions with reference to lower knife				
20.4	Deviation of back gauge angle setting from the reading on read out / indicator dial.	Vendor to specify the Standard.			
20.5	Repeatability of setting of the back gauge angle				
21.0	MACHINE ACCEPTANCE: (Tests/Activities should be Performed by Vendor)	Should be accepted & confirmed by Vendor			
21.1	Tests/Activities should be carried out at supplier's works on the machine before dispatch :	Vendor to confirm			
21.1.1	The machine should be tested for full load test at supplier works before despatch.				
21.1.2	Demonstration of all features of the machine, control system & accessories.				
21.2	Tests/Activities should be carried out at BHEL works while commissioning the machine :	Vendor to confirm			
21.2.1	Full load test to demonstrate the maximum power & cutting capacity of the machine at BHEL works.				
21.2.2	Demonstration of all features of the machine, control system & accessories to the satisfaction of BHEL for efficient and effective use of the machine.				
21.2.3	Training of BHEL machine operators in operation of complete machine & accessories etc by the supplier's experts / engineers during their stay at BHEL works.				
21.2.4	Demonstration by actual use of all supplied attachments and accessories to their full capacity for actual jobs.				
22.0	PACKING:				
22.1	Sea worthy & rigid packing for all items of complete machine with 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 note			

S No.	Description - BHEL's Requirement	Specified	Offered	Deviations	Remarks
23.0	GUARANTEE :				
23.1	24 months from the date of acceptance of the machine at BHEL works.	Vendor to agree			
24.0	Cutting Accuracy: As per class I of DIN 55804. Vertical square & clean cut. Minimum bow, twist and camber.	Vendor to agree			
25.0	GENERAL :				
25.1	Machine Model	Vendor to furnish			
25.2	Total connected load (KVA):	Vendor to furnish			
25.3	Floor area required (Length, Width, Height) for complete machine & accessories	Vendor to furnish			
25.4	Painting of Machine / Electrical Panels : RAL 6011 Apple Green (Polyurethane Paint)	Required			
25.5	Total weight of the machine	Vendor to furnish			
25.6	Weight of heaviest part of machine	Vendor to furnish			
25.7	Weight of the heaviest assembly / sub-assembly of the Machine	Vendor to furnish			
25.8	Dimensions of largest part/ sub-assembly/ assembly of the machine	Vendor to furnish			
25.9	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, capacity, CNC System etc	Vendor to furnish			
25.10	Detailed catalogues, sketch/photographs of the m/c and accessories/ attachments should be submitted with the offer.	Vendor to submit			
25.11	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.	Vendor to note			
25.12	Formula for calculating required force to shear MS & SS plates to be furnished by the vendor.	Vendor to confirm.			