

	<u>BHARAT HEAVY ELECTRICAL LIMITED , BHOPAL</u>				Enquiry No. :
					Due Date :
	<u>CONTACT PERSON'S NAME/DESIGN./PHONE NO./E-MAIL (FROM PURCHASE DEPTT.)</u>				Vendor Quotation No.:
					Date :
<u>SPECIFICATION CUM COMPLIANCE CERTIFICATE FOR 400 TON BLANKING LINE</u>					
NOTE:-					
1. Vendor must submit complete information against all clauses.					
2. The "Offered" Column and where applicable, the "Deviations" & "Remarks" Column of this format should 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 should be treated as non-compliance.					
3. The offer and all documents enclosed with offer should be in English language only.					
NAME & ADDRESS OF THE VENDOR :		NAME & ADDRESS OF THE INDIAN AGENTS (If Any) :			
TELEPHONE NOS.:		TELEPHONE NOS.:			
FAX NOS.:		FAX NOS.:			
E-MAIL ADDRESS :		E-MAIL ADDRESS :			
DUNS NO.(Of Duns & Bradstreet of USA)					
SCOPE: SUPPLY, INSTALLATION & COMMISSIONING OF BLANKING LINE COMPLYING WITH SPECIFICATION AS BELOW					

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATION	REMARKS
1.0	PURPOSE & WORK PIECE MATERIAL			
1.1	The Blanking line should be capable of blanking circular & segmental blanks and finished stampings for stator and rotors of rotating electrical machines. It should have a feeding unit for the precise feeding of the electrical sheet steel in the coil form, a press for punching of laminations, unloading and staking device for punched laminations and suitable provision for removal of scrap. The Blanking Line should be suitable for full automatic operation and with CNC controls.	Vendor to confirm		
1.2	The capacity of Press and the size of table and ram plate has been finalised based on the data of stampings which are proposed to be manufactured on the blanking line. A partial list of stampings is given in drg. No 24026240795 Rev. 00 , Drg. no.34026244003 , 24028141482 Rev. 03, 14026240071 Rev. 01 shows the various arrangements that will be used for manufacture of stampings. The supplier should check and confirm that it will be possible to manufacture these stampings on the proposed blanking line. (Drgs. are attached)	Vendor to confirm & specify		
2	SPECIFICATION:			
2.1	COIL FEED EQUIPMENT			
2.1.1	The Feed Line should be used for feeding of strip material into the Press. The equipment should consist of Coil Loading Station, Decoiler, Straightener, Loop Equipment and Control Panels.	Vendor to confirm		
2.1.2	Technical Data:			
2.1.2.1	Coil width	Vendor to confirm		
2.1.2.2	Sheet thickness	Vendor to confirm		
2.1.2.3	Sheet cross section, max	Vendor to confirm		
2.1.2.4	Ultimate tensile strength of material, max	Vendor to confirm		
2.1.2.5	Outer Diameter of coil, max	Vendor to confirm		

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2.1.2.6	Outer Diameter of coil, min	700 mm	Vendor to confirm		
2.1.2.7	Inner Diameter of coil, Nominal	500 mm	Vendor to confirm		
2.1.2.8	Inner Diameter of coil, variation range	470 to 530 mm	Vendor to confirm		
2.1.2.9	Coil Weight, max	8000 kg	Vendor to confirm		
2.1.3	Coil Loading Station				
2.1.3.1	Loading Platform should be able to handle 2 coils with horizontal axis. It should be driven by electrical brake motor and should have hydraulic lifting and lowering device. It should have arrangement to safeguard toppling of the coil. Loading of coil via crane onto the loading car. Hydraulic activated lifting ramp should be provided for lifting up the coil to the middle of the decoiler mandrel in order to be picked up by the decoiler. guidings to be provided to avoid tilting in case of eccentric loading . Coil tilt protectors via coil restrictive rods , manually pluggable to be provided to avoid tilting of narrow coils .		Vendor to confirm		
2.1.4	Decoiler				
2.1.4.1	The decoiler should be provided with controlled brake mandrel shaft running in anti friction bearings. It should be laterally movable for loading and positioning of the unit towards the centre line of the press according to the coil width. The preset feeding speeds should be reached at any time (empty or full coil). Decoiler mandrel to be equipped with break function. The requested feeding speed should be guaranteed. Drive via spur-gear-motor. Circuit integrated in the band transfer table (monitoring from above) over the band loop with sensor, with lateral band restrictions. Incl. " Line stop", via light sensors when the band loop is too small or the end of the coil is reached.		Vendor to confirm		
2.1.4.2	The expansion mandrel should be provided with three dovetailed segments, expanded centrally with the help of hydraulic cylinder and sliding dogs. Uniform transmission of tension force should be ensured. Clamping force to be adjusted automatically according to the diameter of coil via contact less sensor. The expansion pressure reduction should be in two steps via adjustable pressure reduction valves.		Vendor to confirm		

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2.1.4.3	Arrangement should be provided for holding down the coil in position and for threading of the coil front end in to the straightener. Coil lateral guide for ensuring concentric position of the coil and coil tip over protection should also be provided.	Vendor to confirm		
	Decoiler should be robust such that jerkless rotary motion to be possible . The speed of decoiler should be automatically synchronized wrt SPM of RAM .	Vendor to confirm		
2.1.5	Loop control equipment			
2.1.5.1	Loop control should be provided for an uninterrupted straightening process to minimize plastic material deformation (caused through the loop weight) the loop radius of the roller cage to be adapted to the respective coil sheet thickness and flow limit area. It should consist of roller cage , loop bridge and a sensor system to control the loop.It must always provide enough loop reserve to guarantee the synchronized feeding of the coil. Catenary rolls should be provided for support of the strip at the exit side of the straightener and at the entry side of the roll feed. It should be located between straightener (almost continuously running) and the roller feed (Start – stop operation) . Exit side to be with adjustable lateral band guidance.	Vendor to confirm		
2.1.5.2	Threading table should be provided at the exit side of the straightener and the intake side of the roll feed. It should be hydraulically actuated during threading of the strip front end towards the roll feed. Dampening arc to be provided to avoid jumping of the strip due to high deceleration of the roll feed.	Vendor to confirm		
2.1.6	Straightener			
2.1.6.1	Number of straightener rollers, mm ,	Vendor to confirm		
2.1.6.2	Diameter of straightener rollers	Vendor to specify		
2.1.6.3	Upper straightening rolls setup accuracy	Vendor to confirm		
2.1.6.4	Number of tension rolls	Vendor to specify		
2.1.6.5	Diameter of tension rolls	Vendor to specify		

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2.1.6.6	Strip speed	To suit press speed	Vendor to specify		
2.1.6.7	Pass line height, Approximately , max.	1600 mm	Vendor to confirm		
2.1.6.8	The peeler table should be hydraulically actuated for the remote controlled threading of the strip front end in to straightener. Strip lateral guide should be provided at the intake side.		Vendor to confirm		
2.1.6.9	<p>All side walls are easy to dismount. The backside of the straightener to be designed as swiveling door in case of maintenance at the straight head and the gear box .Circuit integrated in the swivel table over the coil loop with an ultrasonic sound approximate switch with lateral coil restrictions.</p> <ul style="list-style-type: none"> • With admittance information from the press. • With inching forward / backward to set up the coil • For "out" for press over lift sensors if the coil loop is too small and at the end of the coil. 		Vendor to confirm & specify		
2.1.6.10	For an easy input of the sheet material the upper tensile roll to be liftable. The upper rolls should be adjusted according to the sheet thickness; also the pressure should also to be adjusted. The drive of all rolls should be synchronous and simultaneous .Sheet guidance at the exit site of the straightener.Straightening and tensile rolls hardened and grinded.Straightening machine with central lubrication.		Vendor to confirm & specify		
2.1.6.11	Tension rollers and straightening rollers of sufficient diameter and in sufficient number should be provided so that the sheet can be leveled without any bow. Provision should be made for cleaning of the rollers in position.		Vendor to confirm & specify		
2.1.6.12	Inlet guide to be provided for feeding of the sheet material into the straightening / roller feed device without manual intervention of an operator. Inclusive central inside adjustment in the decoiler crown (support segments) via hydraulic sliding- wedge system with inching operation, Press on roll via press on arm to the middle of the band with, pressure is adjustable via pressure control valve. Includes end switch for band centre adjustment and additional pendant control panel.		Vendor to confirm & specify		

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2.1.6.13	Coil end recognition – coil end processing , the line to be recognized the end of the coil. At the end of the coil the swivel tables should be turned upwards and message should occur.	Vendor to confirm & specify		
2.1.7 Roll Feed Unit				
2.1.7.1	Number of feed rolls	Vendor to specify		
2.1.7.2	Diameter of feed rolls	Vendor to specify		
2.1.7.3	Feed length, adjustable	Vendor to specify		
2.1.7.4	Feed accuracy, minimum	Vendor to confirm		
2.1.7.5	Height adjustment manually	Vendor to confirm		
2.1.7.6	Working feed length	Vendor to specify		
2.1.7.7	Pass line above floor, approximately	Vendor to confirm		
2.1.7.8	Feed rolls should be provided for feeding the sheet in to the press. A strip lateral guide should be provided for guiding the strip. The drive should be by means of an digital AC drive motor (Siemens/ Fanuc make) with servo control. A back stop to clamp the strip after shut off of the line should also be provided. Roller pair should be driven by a backlash free intermediate gear via maintenance free rotary current servo drive. Synchronization of the feeder to the press cycle via control cam of the press .Intermediate lifting of the upper roll via cam with dynamic function. Upper roll can be lifted for band insertion.	Vendor to confirm & specify		

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2.1.8	Hydraulic supply			
2.1.8.1	To generate the oil pressure for all hydraulic functions / operations of the complete Feedline , including reservoir on floor level, pumps, filters, valves and connections to the units. Consisting of • Pump, drive and control block • Pressure control valves, manometer and oil tank .	Vendor to confirm & specify		
2.1.8.2	Vendor should ensure the make of the followings			
2.1.8.2.1	Hydraulic Valve & Pumps	Hawe or Rexroth	Vendor to confirm & specify	
2.1.8.2.2	Pneumatic Valves for clutch & brake	Ross	Vendor to confirm & specify	
2.1.8.2.3	Other pneumatic valves	Festo	Vendor to confirm & specify	
2.1.9	Control Panels			
2.1.9.1	Controls for the feed line should be Sinumerik 840 D or latest Fanuc CNC system based and should be interlinked with the central data management of the Press.	Vendor to confirm & specify		
2.1.9.2	Operating panel for control of the feed line should be provided in the area of the uncoiler / straightener with all necessary operating and control components.	Vendor to confirm & specify		
2.1.9.3	Electric control			
	With switch board and separate switch cabinet. • With additional switch elements for the adding of a safety fence , • Network supply input via main switch of the press . • Separate safety control	Vendor to confirm & specify		

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATION	REMARKS
2.2	LAMINATION PUNCHING PRESS			
2.2.1	Press Technical Data			
2.2.1.1	Number of pressure points	2 pcs.	Vendor to confirm	
2.2.1.2	Press force, 3 mm before Bottom Dead Centre, minimum	4000 kN	Vendor to confirm	
2.2.1.3	Drive type	Eccentric	Vendor to confirm	
2.2.1.4	Power Of Main Drive		Vendor to specify	
2.2.1.5	Clearance between the uprights:			
2.2.1.6	.Clearance between the uprights (in feed direction) between oil collection trays, minimum	1700 mm	Vendor to confirm	
2.2.1.7	.from left to right , minimum	2100 mm	Vendor to confirm	
2.2.1.8	in feed direction , minimum	1400 mm	Vendor to confirm	
2.2.1.9	Die installation height between clamping plate and ram, stroke down, adjustment up, minimum	550 mm	Vendor to confirm	
2.2.1.10	Ram stroke, minimum	250 mm	Vendor to confirm	
2.2.1.11	Adjustment of ram , min.	200 mm	Vendor to confirm	
2.2.1.12	Ram Clamping plate area , minimum	1600 mm X 1600 mm	Vendor to confirm	
2.2.1.13	Ram Clamping plate thickness , minimum	200 mm	Vendor to confirm	
2.2.1.14	Nos. of T Slots, sizes and pitch on Ram clamping Plate	indenter to provide details	indenter	
2.2.1.15	Table Clamping plate area , minimum	1600 mm X 1600 mm	Vendor to confirm	
2.2.1.16	Table Clamping plate thickness , minimum	200 mm	Vendor to confirm	

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2.2.1.17	Opening in the table (depending on die design - To be finalised later): To be made such that suitable adpater pale can be fitted as per the tool profile to fall the scrap on the pit	700 mm X 600 mm	Vendor to confirm & specify		
2.2.1.18	Opening in the Bad Bolster plate (depending on die design - To be finalised later): To be made such that suitable adpater pale can be fitted as per the tool profile to fall the scrap on the pit	680 mm X 580 mm ,	Vendor to confirm & specify		
2.2.1.19	Stroking rate for contineous run , infinitely variable	10 - 60 strokes per minute	Vendor to confirm		
2.2.1.20	Maximum total Die Weight , (Upper Die Weight)	6000 Kg , (3000) Kg	Indentor to confirm		
2.2.1.21	Height upper edge of clamping plate down to floor level	1300 mm	Vendor to confirm & specify		
2.2.1.22	Total height over floor level approx		Vendor to specify		
2.2.1.23	Necessary air pressure	5 bar	Vendor to specify		
2.2.2	Construction Features				
2.2.2.1	The press frame should be of very rigid low bending welded construction , annealed for sress relieving . Press frame in closed monoblock monobloc design . The press feet should be machined for easy installation.		Vendor to confirm & specify		
2.2.2.2	The drive of the press should be via flat belt, flywheel, clutch, brake and heavy-duty planetary gear directly on the eccentric shaft. Mass counter balance of the rotating masses should be ensured for vibration free running of the press. Press main drive gear wheel pair with helical gearing running maintenance free in enclosed oil bath.		Vendor to confirm & specify		

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2.2.2.3	The ram should be welded steel structure, stress-relieved & annealed, and should be driven by two connecting rods. The ram guide should be with roller guides. The weight of the slide and upper die should be balanced via pneumatic cylinders. Pressure setting via regulating valve with pressure gauge.	Vendor to confirm & specify		
2.2.2.4	8 – way guidance to be provided, guided by precision roller guidance on hardened guidance strips, clearance – free, ensuring accurate guidance behaviour .	Vendor to confirm & specify		
2.2.2.5	Ram adjustment should be by means of geared brake motor. Mechanical digit type shut-height indication should be provided. Range of adjustment should be controlled by limit switches. Limitation of end position by initiators. Reading accuracy should be 0.1 mm .	Vendor to confirm & specify		
2.2.2.6	Disc clutch and spring-operated brake system with electro-pneumatically actuators should be provided.	Vendor to confirm & specify		
2.2.2.7	When switching off the press drive, the flywheel should automatically be stopped by the braking action of the drive motor. Standstill of flywheel should be indicated on the control desk of the press.	Vendor to confirm & specify		
2.2.2.8	Bed and Ram plates should be provided with T-slots to fasten dies. T slot size will be informed after order.	Indentor to specify		
2.2.2.9	Hydraulic oil cushion under two pressure points of the slide should be provided for easy freeing of jammed press. Reloading should be by oil pressure supplied from central hydraulic units.	Vendor to confirm & specify		
2.2.2.10	for protection of the press Hydraulic Overload Safety device in the press ram should be provided . Safety distance should be 40 mm minimum.	Vendor to confirm & specify		
2.2.2.11	The slide locking system should serve as guard for tool space. It should be possible to lock the slide throughout the complete stroking range . Locking should be electrically protected and lock position should be displayed on the control desk.	Vendor to confirm & specify		
2.2.2.12	A peak force measuring unit should be provided as a passive overload protection for control of the draw process and symmetrical loading of the machine. It should be possible to adjust and pre select the press force.Display in kN in the visualization system . According to the die a maximum and minimum press force should be programmable and storable .	Vendor to confirm & specify		

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2.2.2.13	Automatic oil circulation lubrication to be provided with electric control .	Vendor to confirm & specify		
2.2.2.14	For the production of the oil pressure for all hydraulically operated functions Hydraulic and lubrication unit with heating should be provided. It should be Combined with high pressure part, for maintenance easy accessible .	Vendor to confirm & specify		
2.2.2.15	Covering of the uprights to be provided on the front and rear side of the press for protecting against vibration and acoustic emission.	Vendor to confirm & specify		
2.2.2.16	Ejectors should be provided in the slide for ejecting the parts out of upper die by transmitting the ejector force via ejector pins into the tool. It should be possible to adjust the time of ejection.	Vendor to confirm & specify		
2.2.2.16.1	Ejector force, max	Vendor to specify		
2.2.2.16.2	Ejector travel, max	Vendor to specify		
2.2.2.17	Ejector unit should be maintenance free with minimum breakages of Knockout studs and setting.	Vendor to confirm		
2.2.2.18	The press should stop at end of the cycle when switched off. The press should stop immediately when the emergency stop is actuated.	Vendor to confirm & specify		
2.2.2.19	The press unit should have the facility of lubricating the sheet before punching to reduce die wear.	Vendor to confirm & specify		
2.2.2.20	The press should be equipped with automatic oil recirculating lubrication system.	Vendor to confirm & specify		
2.2.2.21	The press should be placed on several vibration damping blocks mounted below the press feet. The press feet should be suitably sized.	Vendor to confirm & specify		

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2.2.2.22	Die space illumination should be provided.	Vendor to confirm & specify		
2.2.2.23	Die space screening – safety guard with windows to be provided at the front and back side of the press. It should be activated via push – button switch and End switch controlled • Operation mode “ . Continuous run” Only possible with closed screening .	Vendor to confirm & specify		
2.2.2.24	A foldable - Hinge type die changing equipment / brackets mounted on the bolster plate through hinge should be provided for easily tool loading and unloading from the machine . The brackets should be folded in minimum three folds on the hinges and should be covered under the machine enclosure. These brackets should have the sufficient nos. of rollers to care the load of the tool for smoothe rolling on brackets .	Vendor to confirm & specify		
2.2.2.24.1	Die weight, max.	indentor to confirm		
2.2.2.24.2	Total Projection of brackets with three folds min. , approx	indentor to confirm		
2.2.2.25	Proper arrangement for pneumatic air connections should be provided for activating the controllable punches for progressive tools that can be used for disorientation purpose in 90 ,120,180 degree . These Punches to be operated Sequential at regular interval that interval can be selectable.	Vendor to confirm & specify		
2.2.2.26	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 & specify		
2.2.2.27	Scrap generated by air holes, slots and other small cuts should be discharged to the bottom of the press through the holes provided in the die. Large scrap of the sheet (scrap web) should be separated at the runout of the die and should be removed through the side of the press where it should fall on to a conveyor belt. The magnetic roller arrangement should be provided after tool so that scrap can be pulled and fall smoothly on the belt conveyor , in case the tool length is smaller than the machine bolster. The conveyor belt for scrap disposal should be provided by BHEL as per the design provided by the Supplier.	Vendor to confirm & specify		

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2.3	LAMINATION UNLOADING AND STACKING DEVICE			
2.3.1	The unloading and stacking device should be provided for automatic removal of the upper die cut blanks (segment and circular blanks) out of the die space, as well as for automatic stacking on to pallets.	Vendor to confirm & specify		
2.3.2	Technical Data:	Vendor to confirm		
	Shovel :	Vendor to confirm		
2.3.2.1	Stroke of unloading shovel, approximately	1600 mm		
2.3.2.2	Width of shovel	450 mm		
2.3.2.3	Blank thickness	0.35 to 1.0 mm		
2.3.2.4	Stroke rate (Variable)	10 - 40 per Min		
2.3.2.5	Distance between bottom edge of shovel and Bed Bolster	160 - 210 mm		
2.3.2.6	Thickness of shovel, min.	55 mm		
2.3.2.7	Weight of Blank	10 Kg		
2.3.2.8	Feed-in height adjustment	+75, -75 mm		
2.3.2.9	Width of destacking belt conveyor , min.	1270 mm		
2.3.2.10	Variable speed of destacking conceyor belt	40 - 120 m/min		
2.3.2.11	number of stacking stations in direction of material flow	one		
2.3.2.12	Stacking height, approximately	800 mm		
2.3.2.13	Weight of stack, max	4000 kg		

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2.3.2.14	Pallet magazine , storing capacity of pallets min.		4 Vendor to confirm		
2.3.2.15	pallets size to accommodate the circular punchings and Segmental punchings , min. 3 variety of pallets to suit the different kinds of Blanks . Drg. of existing pallets of two sizes 460X 460 and 950 x 950 mm size will be provided by BHEL that can be used for the jobs of upto 1000 mm dia. For blanks larger than 1000 mm should be designed and developed by the supplier and one piece to be supplied by the supplier alongwith the drawing.		Vendor to confirm		
2.3.2.16	Height of Lifting for Elevator device , min	600 mm	Vendor to confirm		
2.3.2.17	Adjustment speed of elevator device	80 mm / s	Vendor to confirm		
2.3.2.18	lowering size (step by step)	20-30 mm	Vendor to confirm		
2.3.2.19	stacking Belt conveyor width , min.	1250 mm	Vendor to confirm		
2.3.2.20	Variable speed of stacking conceyor belt	6 - 30 m / min	Vendor to confirm		
	Segment Dimensions				
2.3.2.21	Length (in direction of coil width), max	1050 mm	Vendor to confirm		
2.3.2.22	Length (in direction of coil width), min	800 mm	Vendor to confirm		
2.3.2.23	Width (in coil run direction), max	550 mm	Vendor to confirm		
2.3.2.24	Width (in coil run direction), min	150 mm	Vendor to confirm		
	Circular Blank Dimensions:				
2.3.2.25	Diameter, max	1250 mm	Vendor to confirm		
2.3.2.26	Diameter, min	400 mm	Vendor to confirm		

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2.3.3	Construction Features				
2.3.3.1	The unloading and stacking device should be suitable for unloading and stacking of the laminations per stroke .		Vendor to confirm & specify		
2.3.3.3	The changeover from one stacking device to another should be automatic when the first stacking device is full. The filled up stacking device should move out for unloading of stack and then move in with an empty pallet. Thus the production of laminations should continue uninterrupted .		Vendor to confirm & specify		
2.3.4	Unloading Shovel and Belt				
2.3.4.1	The unloading shovel should be mounted on a stable frame. Electric magnets should be used for picking the punched laminations. It should be equipped with electric controllable magnets to secure the blanks during acceleration and braking phases . The control of the magnets to be via control units . Synchronization of the shovel with the press should be maintained via mechanical engagement through hydraulic valve .		Vendor to confirm & specify		
2.3.4.2	Magnetic unloading belt / Destacking conveyer belt should be used for moving stampings from unloading shovel to the Stacking conveyer belt from where the blanks will be deposit on the pallet , It should be with guided laces to avoid blending .		Vendor to confirm & specify		
2.3.4.3	The height of the unloading shovel and the transfer belt should be adjustable by power driven mechanism to match the height of the lower die.		Vendor to confirm & specify		

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2.3.5	Unloading Station			
2.3.5.1	A stop and guiding system should be provided for correct stacking of the blanks. The stops and guidance will be manually adjusted corresponding to the outer shape of the segment blanks.	Vendor to confirm & specify		
2.3.5.2	The lamination stacking device should be provided with automatically controlled lifting platform for stacking of the blanks. One lifting platform should be provided under each stacking station. Stacking of the circulars blanks to be done on pallets and a liftable mandrel and stacking of the segment blanks is done on pallets the system is liftable . The lifting of the stacks is controlled via signals from the light barriers.	Vendor to confirm & specify		
2.3.5.3	The pallet transport should be by means of chain conveyor in respective areas before the stacking stations. The filled pallets should be driven out of the stacking station and the empty pallets should be driven into the stacking station.	Vendor to confirm & specify		
2.3.5.4	The stacking device should be suitable for 3 sizes of pallets as mentioned earlier . The largest size should be decided on the basis largest stamping.	Vendor to confirm & specify		
2.4	OPERATION AND CONTROL SYSTEM:			
2.4.1	OPERATOR'S PANEL:			
2.4.1.1	Swiveling and sliding type operator's panel having complete machine control system with display of required configuration (WITHOUT TOUCH SCREEN) should be provided on the operators platform for safe, convenient and efficient operation . All switches should be within reach of operator of average height (Indian) for easy operation. All displays/indications should also be conveniently placed accordingly. Layout showing complete details should be submitted.	Vendor to confirm		

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2.4.2	CNC SYSTEM & FEATURES :			
2.4.2.1	Make : Sinumeric 840 D / Fanuc	Vendor to confirm		
2.4.2.2	Type : PC based latest version	Vendor to confirm		
2.4.2.3	Model: (Latest version, as available at the time of ordering, should be supplied)	Vendor to confirm		
2.4.2.4	Details of Standard features	Vendor to confirm		
2.4.2.5	Details of optional features, recommended by Vendor.	Vendor to confirm		
2.4.2.6	The system should have full alphanumeric keyboard, TFT color display(10.4" or more), additional draw-out type Query Key Board and mouse in suitable enclosure. RS232C serial interfaces, parallel interface for printer, COM port for tele-diagnostics, network ready with LAN, electronic hand wheels for all axes, USB port for data input/output, hard disk of sufficient capacity, and preinstalled system software & other required softwares etc. (Details should be submitted by Vendor)	Vendor to confirm		
2.4.2.7	An open-type control system with a standard Siemens/ Fanuc HMI and colour monitor for the visualization and control of the production process should be provided.	Vendor to confirm		
2.4.2.8	All servo drives and servo motors should be of same make as CNC control.	Vendor to confirm		
2.4.2.9	Secondary programmable logic controller (Siemens/ Fanuc make) with distributed peripherals connected with a standard field bus system for machine control should be provided.	Vendor to confirm		

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2.4.2.10	The input should be by means of soft keys as well as by an alphanumeric keyboard. During the different operating modes such as set-up, automatic continuous run or tool change, the operator should be guided step-by-step by graphical representation or actual pictures	Vendor to confirm		
2.4.2.11	For process visualisation, dynamic representation by bars, symbols, digital values and alphanumeric text should be used.	Vendor to confirm		
2.4.2.12	The control system should be designed such that there is no manual access to danger points. The guards should be locked and prevent reaching in. Positions of the safety guards should be monitored by press control.	Vendor to confirm		
2.4.2.13	A module for the extensive tool data organization, in which it should be possible to enter, edit and store all parameters required for tool-independent setting of machine should also be provided.	Vendor to confirm		
2.4.2.14	The maintenance messages generated by the machine control system should inform the operator by flashing of a maintenance symbol that maintenance work is due to be carried out.	Vendor to confirm		
	2.4.3 MANUAL CONTROL :			
2.4.3.1	Complete manual control of machine with required switches / keys should be provided on operator's panel.	Vendor to confirm		
	2.5 UPS FOR CNC SYSTEM:			
2.5.1	UPS of 30 minutes for CNC system with inbuilt cooling and charge status display should be supplied. (Battery charging /discharging time should be specified by Vendor)	Vendor to confirm		

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATION	REMARKS
2.6	MACHINE LIGHTS:			
2.6.1	Machine Lights for sufficient illumination of complete working area on both sides of operator's platform should be provided for clear visibility.	Vendor to confirm		
2.6.2	A magnetic base portable spot light with sufficiently long cable should also be provided.	Vendor to confirm		
2.6.3	Any lights required in the foundation/ pit area should also be foreseen and supplied by the Vendor.	Vendor to confirm		
2.6.4	All light fittings, consumables, adapters/receptacles should have compatibility with Indian equivalents	Vendor to confirm		
2.7	AIR CONDITIONERS:			
2.7.1	Air Conditioners with Dehumidifiers of suitable / sufficient capacity using HFC-gas is to be provided for all Electrical / Electronic Panels / Cabinets including Operator's Panel considering specified ambient conditions. Detailed specifications of the same are to be submitted. Panel AC, Oil Chiller & Refrigerated-type Air Dryer should be of reputed make with continuous 24 hour operation duty cycle. Consideration of desired stand-by unit with automatic operation & visible/ audible fault-indication is to be incorporated.	Vendor to confirm		

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATION	REMARKS
2.8	HYDRAULIC SYSTEM : Details should be Submitted by the Vendor			
2.8.1	The System should be centralised. Hydraulic Tank should preferably be located at floor level. The system should consist of pump, drive and control block, Pressure control valves, manometer and oil tank.	Vendor to confirm		
2.8.2	Make Rexroth /Hawe (Details to be submitted)	Vendor to confirm		
2.8.3	Filtration System, Details should be submitted.	Vendor to confirm		
2.8.4	Failure indication	Vendor to confirm		
2.8.5	Automatic shut off provision, Details should be submitted.	Vendor to confirm		
2.8.6	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 45 deg C irrespective of the ambient conditions. Complete details should be submitted .	Vendor to confirm & specify		
2.8.7	Hydraulic pump capacity (flow / pressure)	Vendor to confirm		
2.8.8	Each pump should have an independent motor. Tandem pumps should not be used	Vendor to confirm		
2.8.9	Main Drive : Suitable Digital AC Drive & AC motor (Siemens/Fanuc make)sufficient to punch with 400 ton pressure:	Vendor to confirm		
2.8.9.1	Protection type IP 54	Vendor to confirm		
2.8.9.2	Pre – selection of stroke rate via keyboard, adjustable during the production process	Vendor to confirm		
2.8.9.3	Full motor protection With dynamic brake and energy recovery	Vendor to confirm		

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATION	REMARKS
2.8.9.4	Automatic return to start – up stroke rate and speeding – up to set reference stroke rate. This is done automatically after every clutch in or out with operation mode continuous run	Vendor to confirm		
2.8.9.5	Change of rotating direction is possible	Vendor to confirm		
2.9	ELECTRICAL :			
2.9.1	Power Supply: 415 V: - 10%, +10%, 50 Hz: ± 3%, 3 phase AC(3 wire supply without neutral). 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 parts of the machine/control cabinets, should be in the scope of the 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		
2.9.2	All electrical / electronic equipment should be tropicalized , ambient temperature from 05 to 50 ° C , Average Relative humidity - 80 %	Vendor to confirm		
2.9.3	All electrical & electronic control cabinets & panels should be dust and vermin proof . Switch cabinet with internal cooling for sensible electronic components . Protection type IP 54 with oil resistant seals .With switch cabinet lights .Mounting of the switch cabinet on floor.	Vendor to confirm		
2.9.4	Motors should conform to IEC or Indian Standards . All AC & DC motors should be siemens make .	Vendor to confirm		
2.9.5	Oil-proof cables should be used for power and control supply. Connection lines between control cabinet and press should be of plug-in type. Main drive cables should be routed via terminal boards.	Vendor to confirm		
2.9.6	All cables moving with traversing axes should be installed in Caterpillar/ Drag chain. Additionally, all the cable trays required for laying of cables should be included in the offer.	Vendor to confirm		

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATION	REMARKS
2.9.7	Vendor should ensure double earthing for the machine and its peripherals.	Vendor to confirm		
2.9.8	All light fittings, consumables, adapters/receptacles should have compatibility with Indian equivalents.	Vendor to confirm		
2.9.9	All electrical components in the cabinets should be mounted on DIN Rail.	Vendor to confirm		
2.10	SAFETY ARRANGEMENTS:			
	Following safety features in addition to other standard safety features should be provided on the machine:			
2.10.1	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. 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		
2.10.2	A detailed list of all alarms / indications provided on machine should be submitted by the Vendor.	Vendor to confirm & specify		
2.10.3	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.	Vendor to confirm		
2.10.4	All the rotating parts used on machine should be statically & dynamically balanced to avoid undue vibrations.	Vendor to confirm		
2.10.5	Emergency Switches at suitable locations as per International Norms should be provided.	Vendor to confirm		
2.10.6	Oil & water pipe lines should not run with electrical cable in the same tray / trench.	Vendor to confirm		

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATION	REMARKS
2.10.7	Safety Fence			
2.10.7.1	Swiveling and electrically secured safety fence should be provided around coil feed line. An operation of the machine in continuous run should be possible only with closed fence.	Vendor to confirm & specify		
2.10.7.2	Safety guards should be installed on the front and rear side of the press for protection of the die space. When opening any of the guards, the press should be automatically stopped by interlock with the press control.	Vendor to confirm & specify		
2.10.7.3	Safety fence around the unloading and stacking device should be of swiveling type and should be electrically secured. Operation of the machine in continuous run should only be possible with closed fence.	Vendor to confirm & specify		
2.11	ENVIRONMENTAL PERFORMANCE OF THE MACHINE :			
	The Machine should conform to following factors related to environment :			
2.11.1	The noise level during operation of the machine should be as low as possible. Maximum noise level under normal load condition, 1 M away from the machine with correction factor for back ground noise should be indicated. This will be measured as per international standards like DIN 45635-16. Vendor to demonstrate compliance to noise level, if so required. Machine must equipped with sound enclosure to keep cutting noise at the lowest possible.	Vendor to confirm & specify		
2.11.2	Vendor should quote optional price for a noise absorbing enclosure for the Press with adequate dampening. The noise level achievable with sound enclosure should also be specified.	Vendor to confirm & specify		
2.11.3	There should not be any harmful emissions from the machine, the machine should not produce any harmful effluents and no hazardous chemicals should be used in the machine.	Vendor to confirm		

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATION	REMARKS
2.11.4	There should not be any effluent from the machine. In case there are any effluents from the machine, requisite effluent treatment plant or pollution control device should be built into the machine by the Vendor and details should be given in the offer .	Vendor to confirm & specify		
2.11.5	No hazardous chemicals should be required to be used in the machine.	Vendor to confirm		
2.11.6	If any safety / environmental protection enclosure is required it should be built in the machine by the Vendor and details should be given in the offer .	Vendor to confirm & specify		
2.11.7	Paint of the machine should be oil / coolant resistant and should not peel off and mix up with coolant.	Vendor to confirm		
	2.12 FIRST FILL OF OILS AND GREASES			
2.12.1	First filling of all required lubricating oils & grease etc. should be supplied by Vendor. Indian source or Indian equivalent and specifications of oils/ greases are also to be provided by the Vendor.	Vendor to confirm		
	2.13 NETWORKING:			
2.13.1	Machine control should have necessary hardware and software for interfacing with Local Area Network. The networking should have following capabilities.	Vendor to confirm & specify		
2.13.2	The machine should appear as a node in the Entire Network. (Network Neighbourhood)	Vendor to confirm & specify		
2.13.3	The program transfer should be by simple copy and paste method provided sharing access is allowed between any PC and the machine across the network.	Vendor to confirm & specify		
2.13.4	The program transfer between CNC system and network should also be possible in CNC Mode.	Vendor to confirm & specify		

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATION	REMARKS
2.14	DIE DESIGN			
2.14.1	Complete tool design information should be supplied for the manufacture of the dies to suit the press and its control system. One compound blanking tool of Segmental stator punchings of the drg. no. To be supplied by vendor along with machine and all tool drgs. are to be provided by vendor.	Vendor to confirm		
2.14.2	The Vendor should quote optional price for supply of dies as per enquiry.	Vendor to confirm		
3	ULTRA ISOLATION TRANSFORMER			
3.1	Indian make Ultra Isolation Transformer suitable for complete machine , its drives, controls, PLC etc. should be supplied	Vendor to confirm & specify		
3.1	Model and Rating	Vendor to confirm & specify		
3.1	Spare for the Ultra Isolation Transformer for 2 years working should also be offered.	Vendor to confirm & specify		
3.1	Catalogue of the Ultra Isolation Transformer should be submitted with the offer.	Vendor to confirm & specify		
4	PNEUMATIC SYSTEM:			
4.1	AIR COMPRESSOR:			
4.1.1	The compressed air supply will be available at one point near the machine at a maximum pressure of 50 N/mm2. Air required for operation of the machine at a pressure higher than the above should be obtained by providing booster compressor at a suitable location. The booster compressor of suitable capacity with refrigerator, dryer & filters should be in the scope of the Vendor.	Vendor to confirm & specify		
4.1.2	Make & Model of Air Compressor	Vendor to specify		
4.1.3	Make & Model of Refrigerated Air Dryer	Vendor to specify		
4.1.4	Capacity (Flow, Pressure & KW)	Vendor to specify		

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATION	REMARKS
5	DIAGNOSTIC SYSTEM			
5.1	TELE-DIAGNOSTIC SERVICE :			
5.1.1	Tele-diagnostic service should be provided through International telephone lines along with required Hardware / Software package for the supplied CNC system for remote diagnosis and correction of the problems in both CNC System and PLC of the machine. This should be provided free of charge for the guarantee period.	Vendor to confirm & specify		
5.2	FAULT DIAGNOSTIC SYSTEM:			
5.2.1	Vendor'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 & specify		
5.2.2	Help guide should be provided to use both diagnostic systems. Complete alarm list for PLC faults should be provided which should have description of the problem, probable causes & remedies, connected input and output numbers, switches & solenoids and also where to look in the PLC ladder.	Vendor to confirm & specify		
6	LEVELING & ANCHORING SYSTEM			
6.1	Complete anchoring system including foundation bolts, anchoring materials, fixators, leveling shoes etc should be supplied	Vendor to confirm		
7	TOOLS FOR INSTALLATION, OPERATION & MAINTENANCE :			
7.1	Special tools and equipment required for Installation of the machine should 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 & specify		

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATION	REMARKS
	8 ACCESSORIES:			
8.1	Any additional items/ accessories, recommended by the vendor for improved performance of the machine should be described in the offer with complete details.	Vendor to confirm		
	9 SPARES & SERVICES:			
9.1	Itemised break-up of mechanical, hydraulic, electrical and electronic spares in sufficient quantity as per recommendation of Vendor for 2 years of 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) One number each of all types of Encoders, HMI module, CPU module, Operator's panel with Display Unit, I/O Cards for PLC, Power Module & Control Card for Main Drive as well as highest rating Feed Drive.	Vendor to confirm & specify		
9.2	In addition to other recommended spares, the option spare list should include the following: Mechanical & Hydraulic Spares: All types of pumps, Valves, pressure switches / transducers, filters, seals etc.&	Vendor to confirm & specify		
9.3	Electrical /Electronic Spares: All types of Relays, Contactors, Proximity Switches, Push Buttons, Indicating Lamps, Semiconductor Fuses, Special Fuses, Circuit Breakers, Main Power Switch. Electrical contactors & relays should be Siemens make .	Vendor to confirm & specify		
9.4	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 & Vendors to enable BHEL to procure these in advance, if required.	Vendor to confirm & specify		

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATION	REMARKS
9.5	Complete list of spares for machine and accessories, along with specification / type / model, and name & address of the Vendor should be furnished along with documentation to be supplied with the machine.	Vendor to confirm & specify		
9.6	The after sales service backup should be provided by the supplier at least for 10 years for trouble free service of the notching press.	Vendor to confirm & specify		
9.7	Vendor to confirm that complete list of spares for press 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 & specify		

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATION	REMARKS
10	DOCUMENTATION:			
10.1	Descriptive leaflets, technical literature, drawings, schematic diagrams, electrical wiring diagram, hydraulic circuit diagrams, spare parts manuals, Installation and commissioning drawing etc should be supplied.	Vendor to confirm		
10.2	Layout drawing, major assembly drawings, schematic diagrams, control philosophy etc should be subject to approval of BHEL. Approval of drawings/ documents by BHEL will not relieve the Vendor of his responsibility of meeting the requirements of the specification.	Vendor to confirm		
10.3	The technical documentation should include documentation of outsourced items also.	Vendor to confirm		
10.4	All Specifications and Design Documents should be neatly printed on A4 size paper. All drawings should be of standard sizes (A0 ,A1, A2 etc). The title block should be as approved by BHEL.	Vendor to confirm		
10.5	Upon completion of construction, the design drawings should be revised to reflect accurately the facilities as built. The drawings should be issued under the appropriate revision and marked "AS BUILT".	Vendor to confirm		
10.6	The number of copies of design documents and drawings required to be submitted should be as follows: -	Vendor to confirm		
10.6.1	For approval :	Vendor to confirm		
10.6.1.1	Design Calculations / reports / documents	Vendor to confirm		
10.6.1.2	Drawings / documents required for Construction/ Procurement	Vendor to confirm		
10.6.2	After completion of work:	Vendor to confirm		
10.6.2.1	Drawings ("As Built")	Vendor to confirm		
10.6.2.2	Drawings in Soft copies in CD	Vendor to confirm		

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATION	REMARKS
10.7	OPERATING AND MAINTENANCE MANUALS:			
10.7.1	The O & M manual should be in English Language and should include the following:	Vendor to confirm		
10.7.2	Operating manuals of Machine & CNC system	Vendor to confirm		
10.7.3	Programming Manuals of Machine & CNC system	Vendor to confirm		
10.7.4	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 should be supplied with the part list also.	Vendor to confirm		
10.7.5	Maintenance, Interface & commissioning manuals for CNC system	Vendor to confirm		
10.7.6	Catalogues, O&M Manuals of all bought out items including drawings, wherever applicable.	Vendor to confirm		
10.7.7	Detailed specification of all rubber items and hydraulic / lube fittings	Vendor to confirm		
10.7.8	PLC program print-outs with comments in English.	Vendor to confirm		
10.7.9	PLC program on CD, NC data & PLC data on CD .	Vendor to confirm		
10.7.10	Complete back-up of hard disk on CD and clear written Instructions (3 copies) to take back-up and reloading of a new hard disk.Spare system hard disk with complete backup .	Vendor to confirm		
10.7.11	Complete Master List of parts used in the machine along with part numbers and ordering numbers.	Vendor to confirm		

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATION	REMARKS
11	TRAINING			
11.1	TRAINING AT BHEL PLANT			
11.1.1	The Vendor should undertake training of Mechanical, Electronics & Control persons in operation and maintenance of the machine at BHEL's works for a period of 2 weeks. The training program should be as follows:	Vendor to confirm		
11.1.2	Construction and functioning of the system	Vendor to confirm		
11.1.3	Presentation of individual components by means of sectional views and schematic drawings	Vendor to confirm		
11.1.4	Safety instructions	Vendor to confirm		
11.1.5	Setting up of system	Vendor to confirm		
11.1.6	Demonstration of machine in operation	Vendor to confirm		
11.1.7	Resetting of system	Vendor to confirm		
11.1.8	Operator control of system in all operating modes	Vendor to confirm		
11.1.9	Programming of all required data	Vendor to confirm		
11.1.10	Going through all operating instructions	Vendor to confirm		
11.1.11	Display and control system	Vendor to confirm		
11.1.12	Fault location by means of programming unit	Vendor to confirm		
11.1.13	CNC Part Programming/ Technology, Use of all CNC Features.	Vendor to confirm		
11.1.14	Electrical, Electronic & CNC maintenance for machine & other supplied equipments	Vendor to confirm		
11.1.15	Mechanical & Hydraulic maintenance of the machine & other supplied equipments	Vendor to confirm		
11.1.16	Other operational requirements	Vendor to confirm		

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATION	REMARKS
12.2	TRAINING AT VENDOR'S WORKS			
12.2.1	The Vendor should undertake training of 3 persons in operation and maintenance of the machine at Vendor's works for a period of 2 weeks. The training program should include construction and operational features of the machine, it's operational requirements, programming and fault analysis etc.	Vendor to confirm		
12.2.2	The training should include: - CNC Part Programming/ Technology, Use of all CNC Features, Programming for Measuring Systems & supplied accessories etc. - Electrical, Electronic & CNC maintenance for machine & other supplied equipments - Mechanical & Hydraulic maintenance of the machine & other supplied equipments - Operation of the machine & other supplied equipments.	Vendor to confirm		
12.2.3	Air-fare, boarding & lodging for the trainees should be borne by BHEL. All training expenses should be born by the Vendor. Vendor to quote for training on per man per week basis	Vendor to specify		
12.2.4	Competent, English speaking experts should be arranged by the Vendor during training for satisfactory & effective training of BHEL personnel.	Vendor to confirm		
12.2.5	Vendor should be ready to organize and quote for training of Electronics Engineer and Programmer at the CNC System Manufacturer's works for advanced features and specialised training if so required by BHEL	Vendor to confirm		
13	FOUNDATION :			
13.1	Vendor should submit the preliminary layout drawing for BHEL's approval. Soil condition data will be furnished by BHEL along with the approval. After approval of layout drawing, complete Foundation Design including details, like Static/ Dynamic load details etc. and final Layout Drawings should be submitted by the Vendor. BHEL should construct complete foundation for the machine as per instructions of the Vendor and at Vendor's responsibility. Vendor may supervise the construction of foundation if he so desires.	Vendor to confirm & specify		
13.2	The Vendor should also indicate detailed specifications of grouting compound and grouting procedure etc. for foundation bolts of the machine.	Vendor to confirm & specify		

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATION	REMARKS
14	INSTALLATION & COMMISSIONING			
14.1	Vendor should be fully responsibility for carrying out the Installation, start up, testing and commissioning of machine, it's control system & all other supplies etc. Service requirement like power, air & water should be provided by BHEL at only one point to be indicated by Vendor in their foundation/layout drawings. Other requirements like crane and helping personnel should also be provided by BHEL. Details of these requirements should be informed by Vendor in advance.	Vendor to confirm		
14.2	Successful completion of performance tests should also be part of commissioning tests.	Vendor to confirm		
14.3	Tools, Tackles, instruments and other necessary equipment including Laser equipment required to carry out Installation and commissioning activities should be arranged by the Vendor.	Vendor to confirm		
14.4	Commissioning spares, required for commissioning of the machine within stipulated time, should be brought/ arranged by the Vendor.	Vendor to confirm		
14.5	If any paint on the machine has rubbed off or peeled during transit or Installation the area should be repainted and merged with the original surrounding paint by the . For this purpose, the Vendor should supply sufficient quantity of touch-up paint of various colours of paint used.	Vendor to confirm		
14.6	Schedule of Installation and Commissioning should be submitted with the offer.	Vendor to specify		
14.7	Charges, duration, terms & conditions for Installation & Commissioning should be furnished in detail by Vendor along with offer.	Vendor to specify		
14.8	Successful proving of BHEL components by the vendor should be considered as part of commissioning. All tests, as mentioned at clause 19 (Machine Acceptance) should form part of the commissioning activity.	Vendor to confirm		

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATION	REMARKS
15.8	ASSEMBLY AND TESTING AT VENDOR'S WORKS			
15.8.1	The machine should be completely installed and tested at Vendor's works. BHEL Engineers may witness the test of the machine at Vendor's works with the tool developed by the vendor.	Vendor to confirm		
15.8.2	Tests should be performed to show that the machine meets the requirement of the specifications.	Vendor to confirm		
15.8.3	The Machine should be dispatched only after acceptance of tests and clearance for dispatch in writing by BHEL	Vendor to confirm		
16	ACCURACY TESTS:			
16.1	GEOMETRICAL ACCURACIES :			
16.1.1	Geometrical Accuracy should be in accordance with JIS B 6402, Grade-I or equivalent international standard. Detailed Test Charts for the same, clearly showing the accuracies to be achieved on the machine, should also be submitted with the offer.	Vendor to specify		
16.1.2	All the above accuracies should be demonstrated to BHEL engineers during pre-acceptance at Vendors works and during Installation & Commissioning at BHEL Works.	Vendor to confirm		
16.2	MACHINE POSITIONING ACCURACIES & REPEATABILITY:			
16.2.1	Positioning accuracy in roll feed servo axis	Vendor to confirm		
16.2.4	Standard for measuring of positioning accuracy should be submitted.	Vendor to specify		

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATION	REMARKS
17	AMBIENT CONDITIONS & THERMAL STABILITY :			
17.1	The machine including CNC system and all supplied items should work trouble free and efficiently under following operating conditions.	Vendor to confirm		
17.2	Power Supply:	Vendor to confirm		
	Voltage: 415 V - 10%, +10%			
	Frequency: 50 Hz +3%, - 3%			
	No. of phases = 3 (3 wire supply without neutral)			
17.3	Control Power Supply:	Vendor to confirm		
17.3.1	AC - 220 V +10%, -10%	Vendor to confirm		
17.3.2	DC - 24 V +10%, -10%	Vendor to confirm		
17.4	Ambient Conditions: Temperature = 5 to 48 degree Celsius	Vendor to confirm		
17.5	Relative Humidity = 95% max.	Vendor to confirm		
17.6	Altitude: 600 M above Mean Sea Level	Vendor to confirm		
17.7	Weather conditions are tropical, Atmosphere may be dust laden during some part of the year. Machine should be kept in the normal shop floor condition. Max. temperature variation is up to 25 deg Celsius in 24 hours.	Vendor to confirm		

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATION	REMARKS
17.8	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		
17.9	The machine, including attachments and accessories, should be suitable for 24 hrs. continuous operation throughout the year.	Vendor to confirm		
18	PROVEOUT OF BHEL COMPONENTS :			
18.1	Sketch showing the various components to be manufactured on the machine is attached. Proveout to be done on any one of the components to be specified by BHEL. 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 process of proveout components shall be done by the vendor at BHEL works to the specified design accuracy, using cutting tools and CNC programs (to be provided by the vendor to prove the machine after complete installation & test.) 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 proveout components. Vendor shall be fully responsible for proveout of the components as per drawing, speed of operation for various component 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 & specify		
18.2	Vendor shall be responsible for any deviation/rejection in proveout component due to malfunctioning of the machine during proveout and also for the delay due to improper recommended tooling etc.	Vendor to confirm		
19	MACHINE ACCEPTANCE: (Tests/Activities to be Performed by Vendor)			
19.1	Tests/Activities to be carried out at Vendor's works on the machine before dispatch :			
19.1.1	Geometrical & Positioning accuracies as per test chart.	Vendor to confirm		
19.1.2	Demonstration of all features of the machine, control system & accessories	Vendor to confirm		

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATION	REMARKS
19.2	Tests/Activities to be carried out at BHEL works while commissioning the machine :			
19.2.1	Geometrical & Positioning accuracies as per test chart.	Vendor to confirm		
19.2.2	Full load test to demonstrate the maximum power & cutting capacity of the machine.	Vendor to confirm		
19.2.3	The machine should be tested for continuous working 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		
19.2.4	Demonstration of all features of the machine, control system & accessories to the satisfaction of BHEL for efficient and effective use of the machine	Vendor to confirm		
19.2.5	Two weeks supervision of independent operation of machine by BHEL after job proveout	Vendor to confirm		
19.2.6	Training of BHEL machine operators in operation of complete machine & accessories etc by the Vendor's experts / engineers during their stay at BHEL works	Vendor to confirm		
19.3	PERFORMANCE TESTS AT VENDOR'S WORKS AND BHEL PLANT			
	The performance of the machine shall be checked under various operating conditions such as:	Vendor to confirm		
19.3.1	Production of various laminations (minimum 2 types) as specified by BHEL	Vendor to confirm		
19.3.2	Check for dimensional accuracy of the stampings produced.	Vendor to confirm		
19.3.3	Check for press capacity and speed of operation (strokes per minute).	Vendor to confirm		
19.3.4	Check for satisfactory operation of various systems under manual and auto mode.	Vendor to confirm		
19.3.5	Check for operation and interlocking of control system and its visualisation by operator induced faults.	Vendor to confirm		

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT		SPECIFIED / TO BE CONFIRMED BY	DEVIATION	REMARKS
19.4	PERFORMANCE GUARANTEE				
19.4.1	The Vendor shall guarantee the performance of the machine on continuous basis under shop floor working conditions as follows:		Vendor to confirm		
19.4.2	Press Capacity:	4000 kN	Vendor to confirm		
	(To be measured by a suitably calibrated press force measuring device)				
19.4.3	Speed of Operation of Press:	20-50 SPM	Vendor to confirm		
20	PROGRESS REPORTS				
20.1	The Vendor shall submit monthly progress reports showing progress of design, material procurement, manufacturing, assembly etc and any advancement/ delays with respect to the scheduled delivery date.		Vendor to confirm & specify		
21	PACKING:				
21.1	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 shall be provided. When machine is dispatched in containers, all small loose items shall be suitably packed in boxes.		Vendor to confirm		
22	PAINTING:				
22.1	All the machine components shall be painted with high quality Polyurethane Paint. The paint shall have good protection against corrosion and high resistance against chemicals and oil.		Vendor to confirm		
22.2	Main Machine / Electrical panels: Apple Green		Vendor to confirm		
22.3	Safety equipment: Yellow		Vendor to confirm		
22.4	Operator console: Light gray		Vendor to confirm		

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23	GUARANTEE :			
23.1	24 months from the date of acceptance of the machine.	Vendor to confirm		
24	QUALIFYING CONDITIONS :			
24.1	Only those vendors, who have supplied and commissioned at least one Blanking line press of same or higher sizes (as per clause no.2.0) for similar applications 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) , should quote. However if such machine(s) has/had been supplied to BHEL, then such machine should be presently working satisfactorily for more than six months after is commissioning and acceptance (on the date of opening of tender) in BHEL should quote. The following information is to be submitted by the vendor about the companies where similar press have been supplied. This is required from all the vendors for qualification of their offer.	vendor to confirm & specify		
24.2	Name of the customer / company where similar notching press is installed.	vendor to specify		
24.3	Complete postal address of the customer.	vendor to specify		
24.4	Month & Year of commissioning.	vendor to specify		
24.5	Name and designation of the contact person of the customer.	vendor to specify		
24.6	Phone, FAX no. and email address of the contact person of the customer.	vendor to specify		

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	DEVIATION	REMARKS
25	GENERAL :			
25.1	Machine Model No.	Vendor to specify		
25.2	Total connected load (KVA):	Vendor to specify		
25.3	Floor area required (Length, Width, Height) for complete machine & accessories	Vendor to specify		
25.4	Total weight of the machine	Vendor to specify		
25.5	Weight of heaviest part of machine	Vendor to specify		
25.6	Dimensions and weight of largest piece for shipment	Vendor to specify		
25.7	Weight and Dimensions of the heaviest assembly / sub-assembly of the Machine	Vendor to specify		
25.8	Dimensions and weight of heaviest piece for shipment	Vendor to specify		
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. Speed of operation, bed size, Load Capacity, etc	Vendor to specify		
25.10	Drawing showing overall dimensions of the machine	Vendor to specify		
25.11	Detailed catalogues , sketch/ photographs of the m/c and accessories/ attachments should be submitted with the offer.	Vendor to specify		
25.12	Hydraulic, Pneumatic & oil piping should be preferably metallic except places where flexible piping are essential. All the pipes required for the same shall be included in the standard scope of the machine.	Vendor to specify		