BHARAT HEAVY ELECTRICALS LIMITED
Centralised Stamping Unit, New Delhi

EXPRESSION OF INTEREST
For
SUPPLY OF MACHINE TOOLS FOR MANUFACTURE OF ELECTRICAL STEEL STAMPINGS

1. Expression of Interest (EOI) is invited for the following work from reputed manufacturers as per enclosed Specification.

Scope of Supply & Services	Issue of Documents	Submission date & time	Opening date & time
Ref. No: BHE/CSU/EOI/01 Supply, erection & commissioning of Blanking Line of 5000 kN press capacity. **Quantity: 1 Number**	From 5th Oct, 06 to 26th Oct, 06	Up to 1500 Hrs on 26th Oct, 06	At 1530 Hrs on 26th Oct 06
Ref. No: BHE/CSU/EOI/02 Supply, erection & commissioning of Segment Notching machine of 320 kN press capacity. **Quantity: 1 Number**	From 5th Oct, 06 to 26th Oct, 06	Up to 1500 Hrs on 26th Oct, 06	At 1600 Hrs on 26th Oct 06
Ref. No: BHE/CSU/EOI/03 Supply, erection & commissioning of Varnishing Line of 1300 mm roller width. **Quantity: 1 Number**	From 5th Oct, 06 to 26th Oct, 06	Up to 1500 Hrs on 26th Oct, 06	At 1630 Hrs on 26th Oct 06

2. Address for purchase of documents; submission & opening of EOI:

   Office of the Engineer (CSU)
   Third Floor, BHEL House
   Bharat Heavy Electricals Limited
   Siri Fort Road
   New Delhi 110 049
   Tel : +91 11 2600 1010 Extension 2588
   Fax : +91 11 2600 1165
   Email: varun@bhel.co.in

3. Bidders may submit EOI for one or more machine tools. However, EOI for each machine shall be submitted separately quoting Reference No as above.

4. Specifications/ documents may be obtained from the above office by hand. Bidders may also download the same from the web page of BHEL www.bhel.com (Tender Notifications) and use the documents for submission of EOI.

5. General Terms and Conditions and brief technical specifications of the machine tools are given in the Annexures.

6. Based on the submission of Expression of Interest by the bidders, BHEL will shot list the parties for issue of detailed tender specifications for submission of their techno-commercial offer and price bids. Therefore, detailed techno-commercial offers and prices are not to be submitted at this stage.

7. The offers are to be submitted in a sealed envelope properly marked.

8. BHEL takes no responsibility for any delay / loss of documents or correspondence sent by courier or post.

9. BHEL reserves the right to accept or reject any of the bids / all bids with or without deviation, or cancel / withdraw the invitation for EOI without assigning any reason whatsoever and in such case no bidder shall have any claim arising out of such action by BHEL.

Enclosures:

Annexure EOI-1: General terms and Conditions (For All Machine Tools)
Annexure EOI-2: Brief Technical Specification of Blanking Line
Annexure EOI-3: Brief Technical Specification of Segment Notching Machine
Annexure EOI-4: Brief Technical Specification of Varnishing Line

For & on behalf of BHEL

(V P N Singh)
Engineer (CSU)
BHEL, New Delhi

Annexure: EOI-1

GENERAL TERMS AND CONDITIONS
(For All Machine Tools)

1. SUBMISSION OF OFFER

a) The EOI shall be addressed to the official as specified in the Notice Inviting EOI and shall be submitted with one original and two copies.

b) Sealed Offers may be submitted personally, by Courier or by registered post with due allowance for any transit/postal delay. The offers received after due date and time of opening are liable to be rejected.

c) Bidders must fill the schedules and furnish all the required information as per the instructions given in various sections of the Specification. Each and every page of the offer must be signed, stamped and submitted by the Bidder. The information furnished shall be complete by itself.

d) The offer shall be in English Language using international numerals. Metric system of units shall be used.

e) All entries in the Offer shall either be typed or be written in ink. Erasures and overwriting are not permitted and may render such Offers liable to summary rejection. The Bidder shall duly attest all cancellations and insertions.

2. OPENING OF BIDS

a) Authorised official(s) of BHEL at his office shall open the EOI at the time and date as specified in the notice in the presence of such of those Bidders or their authorised representatives who may be present.

3. SHORT LISTING OF BIDDERS

a) Only Bidders who have previous experience in the work of the nature and description detailed in the Specifications, who continue to be in business in this field and who are financially sound to undertake the work, are expected to be short listed for this work. Offer from Bidders who do not have proven and established experience in the field is not likely to be considered.

b) Offers will be accepted from the equipment manufacturers only and not from their agents.

4. SCOPE OF SUPPLY AND SERVICES

a) The scope of supply and services shall cover design, procurement, manufacture assembly and testing at supplier’s works, packing and forwarding, supply FOB Port of Despatch (for foreign supplies) / Ex-Works Station of Despatch (for domestic supplies), erection, commissioning and testing at BHEL works.

b) Marine/ inland transportation, unloading and storage at BHEL Works will be taken care of by BHEL/ other contractors.

c) Training of BHEL personnel in operation and maintenance of the machine tools is also to be provided at supplier's works as well at BHEL works.

d) Spares for two years operation to be provided.

5. DETAILED TECHNO-COMMERCIAL OFFER

a) BHEL will issue a detailed Tender to the short listed bidders at a later date and they will be asked to submit their detailed techno- commercial and price bid. Therefore, detailed techno-commercial offer and price bid is not to be submitted at this stage.

6. DELIVERY

a) The machine tools are required to be supplied FOB Port of Despatch (for foreign supplies) / Ex-Works Station of Despatch (for domestic supplies) by December 2007.

b) The machine tools are planned to be commissioned for commercial use at BHEL works progressively in February / March 2008.

c) Bidders are required to indicate the delivery period/ commissioning schedule keeping in mind their current and expected order execution program and BHEL's requirement.

7. TECHNICAL SPECIFICATIONS

a) Brief Technical Specifications of the machine tools are given in the Annexures. The Technical Specifications are preliminary and may undergo change at the time of issue of detailed tender documents.

b) Bidders may submit their comments for modification, if any, for improved performance, technical up gradation, maintenance facilities, cost reduction etc.

8. INFORMATION TO BE SUBMITTED

The Bidder shall give full information in respect of the following. Non-submission of this information may lead to rejection of the Offer.

a) Details of Company/ Firm:

Details of the company or the firm, its nature of business etc.

b) Financial Status:

Financial status of the company for the last three years (minimum) to show that the company is financially sound. Certified copies of audited accounts, bankers certificate etc can be submitted for this purpose.

DUNS number (allotted by M/s Dun & Bradstreet) shall be mentioned in the offer.

c) Organisation Details:

Information to show that company has qualified and competent persons to undertake the work called for in the Specifications.

d) Previous Experience:

I. A statement giving particulars of the various similar machine tools supplied/ under manufacture.

II. The following information is to be submitted about the companies where machines have been supplied.

i. Name of the customer / company where similar machine is installed.
ii. Complete postal address of the customer.
iii. Month & Year of commissioning.
iv. Application for which the machine is supplied with details of accuracies achieved on the job.
v. Name and designation of the contact person of the customer.
vi. Phone, Fax no. and email address of the contact person of the customer.
vii. Performance certificate from the customers regarding satisfactory performance of machine supplied to them.

III. BHEL reserves the right to verify the information provided by Vendor. In case the information provided by the vendor is found to be false/incorrect, the offer is liable to be rejected.

e) After Sales Setup

Existing and proposed after sales set up of the company giving details of how the company plans to support BHEL by way of supply of spares and services in case of order.

f) Delivery Schedule

Proposed delivery schedule to be given.

g) Supplier Registration Form

The Supplier Registration Form, duly filled up, with necessary enclosures, shall be submitted.

The form may be downloaded from BHEL website www.bhel.com (Supplier Registration – New Supplier – Registration Forms).

Annexure: EOI - 2

BRIEF TECHNICAL SPECIFICATION OF BLANKING LINE

(EOI Reference No: BHE/CSU/EOI/01)

1. PURPOSE

The Blanking line shall 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 shall be suitable for full automatic operation and shall be with CNC controls.

2. SPECIFICATION

a) Coil Feed Equipment

i) The Feed Line shall be used for feeding of strip material into the Press. The equipment shall consist of Coil Loading Station, Decoiler, Straightener, Loop Equipment and Control Panels.

Technical Data:	
Coil width	300 to 1300 mm
Sheet thickness	0.3 to 1.0 mm
Sheet cross section, max	1300 sq mm
Ultimate tensile strength of material, max	600 N/sq mm
Outer Diameter of coil, max	1500 mm
Outer Diameter of coil, min	700 mm
Inner Diameter of coil, Nominal	500 mm
Inner Diameter of coil, variation range	470 to 530 mm
Coil Weight, max	7000 kg

ii) Loading Platform shall be able to handle 2 coils with horizontal axis.

iii) Controls for the feed line shall be PLC based and shall be interlinked with the central data management of the Press.

iv) Operating panel for control of the feed line shall be provided in the area of the uncoiler / straightener with all necessary operating and control components.

b) Lamination Punching Press

Press Technical Data	
Press force, 3 mm before Bottom Dead Centre	5000 kN
Clearance between the uprights: • Looking in the direction of feed line • Looking in the direction perpendicular to the direction of feed line	 1600 mm 2600 mm
Die installation height between clamping plate and ram, stroke down, adjustment up	450 mm
Ram stroke	320 mm
Adjustment of ram	200 mm
Clamping area of table: • Width (Looking in the direction of feed line) • Depth (Looking in the direction perpendicular to the direction of feed line)	 1600 mm 2500 mm
Opening in the table (depending on die design - To be finalised later): • Width (Looking in the direction of feed line) • Depth (Looking in the direction perpendicular to the direction of feed line)	 500 mm 750 mm
Clamping area of ram: Width (Looking in the direction of feed line) Depth (Looking in the direction perpendicular to the direction of feed line)	1600 mm 2500 mm
Nominal stroking rate (variable)	10 - 40 strokes per minute
Stroking rate when punching 1 stamping per stroke	30 strokes per minute
Stroking rate when punching 2 stampings per stroke	25 strokes per minute
Die weight, max.	7500 kg

c) Lamination Unloading and Stacking Device

i) The unloading and stacking device shall 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.

Technical Data:	
Stroke of unloading shovel, approximately	2000 mm
Stroke rate (Variable)	10 - 40 per Min
Feed-in height over bolster plate, approximately	200 mm
Feed-in height adjustment	+75, -75 mm
Stacking height, approximately	800 mm

Weight of stack, max	4000 kg
Segment Dimensions:	
Length (in direction of coil width), max	1050 mm
Length (in direction of coil width), min	400 mm
Width (in coil run direction), max	1350 mm
Width (in coil run direction), min	300 mm
Circular Blank Dimensions:	
Diameter, max	1250 mm
Diameter, min	300 mm

ii) The unloading and stacking device shall be suitable for unloading and stacking of 1 or 2 laminations per stroke.

iii) Pallet transport system shall be provided

d) Operation and Control System:

i) Swivelling and sliding type operator's panel having complete CNC and machine control system with CRT of required configuration shall be provided.

ii) An open-type control system with a standard industrial PC and colour monitor for the visualization and control of the production process shall be provided.

iii) The CNC system shall be of Fanuc or Siemens make.

iv) Secondary programmable logic controller with distributed peripherals connected with a standard field bus system for machine control shall be provided.

Annexure: EOI - 3

BRIEF TECHNICAL SPECIFICATION OF SEGMENT NOTCHING MACHINE

(EOI Reference No: BHE/CSU/EOI/02)

1 PURPOSE

The Segment Notching Machine shall be capable of notching circular & segmental blanks of electrical sheet steel for stator and rotors of rotating electrical machines. It shall have CNC controls for the three axes. Loading and unloading of the blanks shall be manual.

2 SPECIFICATION

a) Capacity & Size

Nominal Press force	320 kN
Lamination Thickness	0.35 to 2 mm
Throat	280 - 350 mm
Distance between bed & slide, stroke down, slide adjustment up	240 mm
Stroke of Slide	40 mm
Slide Adjustment	40 mm
Stroking speed (infinitely adjustable)	50 – 500 spm
Working Height above bed	85 - 100 mm
Cord length of rotor & stator segments, measured at notching radius, between first and last punching, max	1400 mm
Minimum Center notch Diameter	350 mm
Maximum Center notch Diameter	20000 mm
Minimum Number of Slots / Circle	4
Maximum Number of Slots / Circle	400
Maximum Number of Segments / circle	36
Minimum Number of Segments / circle	2
Maximum Slot Size	50 x 270 mm
Maximum Core Length	2000 mm
Maximum Amount of skew in Stator or Rotor	± 40 mm
Maximum Number of Sub stacks	40
Minimum Outside Diameter Of Circular Blanks	400 mm
Maximum Outside Diameter Of Circular Blanks	1300 mm
Table Clamping Area, Approximately	400 x 500 mm
Slide Clamping Area, Approximately	160 x 280 mm
Maximum size of scrap	50 x 270 mm

b) Indexing System

The indexing system shall be numerically controlled in 3 axes for notching of various components (stator and rotor segments as well as full circle rotors and stators lamination).

The indexing accuracy shall be within +/- 0.03 mm. For circular laminations notched by rotating on a pivot, a value within +/-0.04 mm is acceptable.

It shall be possible to change the tool without changing the notching parameters.

c) Operation and Control System:

Swivelling and sliding type operator's panel having complete CNC and machine control system with CRT of required configuration shall be provided.

An open-type control system with a standard industrial PC and colour monitor for the visualization and control of the production process shall be provided.

The CNC system shall be of Fanuc or Siemens make.

Secondary programmable logic controller with distributed peripherals connected with a standard field bus system for machine control shall be provided.

d) Software Programs

Following software programs are required:

- Intermittent notching: for punching a sequence of notches with interrupted punching, at integral and non integral notch indexes related to 360 degrees.
- Punching of up to 2 rows of Notches: Different numbers of notches per 360 degrees and differing notching diameters.
- Parallel Skewing with Continuous Manufacture of Different part packs: For parallel skewing of the notches in the lamination pack. It shall run linear and the part pack heights shall be defined automatically regardless of lamination thickness and width of ventilation ducts.
- Spiral Skewing: Spiral skewing of the notches in the lamination pack shall run continuous and the part pack heights shall be defined automatically regardless of lamination thickness and width of ventilation ducts.
- End lamination with enlarged notch: With same notching tool.
- Non-Integral numbers of Segments: Where the number of segments per circle is not integral number.
- Asymmetrical Segment: Where the number of notches per segment is not an integral number.
- Correcting position of half notch: To correct parallel offset of the utmost left or right notch in case of slim punch.
- Removing the needles: at the edge of the segment, with the notching tool.

Annexure: EOI - 4

BRIEF TECHNICAL SPECIFICATION OF VARNISHING LINE

(EOI Reference No: BHE/CSU/EOI/03)

1 PURPOSE

i) The Varnishing Line is to be used for varnishing of stampings of electrical sheet steel for rotating electrical machines.

ii) The varnishing Line shall be a complete unit having facility for deburring, cleaning, varnishing, curing and cooling of stampings with manual loading and unloading. The line shall be suitable for continuous operation.

iii) The stampings to be varnished may be uncoated, coated with a thin layer of varnish or fully coated (for double coating).

2 SPECIFICATION

a) Technical Data

Work piece dimensions	
-Thickness	0.35 to 1.0 mm
- Width	400 to 1250 mm
- Length	400 to 1250 mm
Varnishing	
-Type of varnish	Stabolite 40 or equivalent
-Application of varnish	Double sided
-Thickness of dry varnish coating, on each side, single coat (adjustable)	(4 to 7) +/- 1 microns
-Thickness of dry varnish coating, on each side, double coat (adjustable)	(8 to 12) +/- 1 microns
- Quality requirements of varnish coating	As per Industry practice
Line size and output	
Roller Width, min	1300 mm
Working Width, min	1250 mm
-Line speed (variable)	5 to 15 Metres/min
-Output of varnished stamping	10 to 12 pieces/ min

b) Deburring Machine

i) Burr level after deburring shall be less than 3 microns.

ii) Facility for cleaning of segments after deburring on both sides by brush with dust extraction equipment shall be provided.

c) Varnish Coater

i) The coater shall be suitable for double side varnish application.

ii) A varnish supply tank with pump and accessories shall be provided. The net storage capacity of the tank shall be around 400 litres.

iii) An automatic system for measurement and control of viscosity shall be provided. The viscosity of varnish within the supply tank shall be measured regularly and water shall be added as required to maintain the viscosity levels within the specified range.

d) Curing Line

i) Conveyor

The conveyor system shall be in two parts - one for the hot section and the other for the cold section.

ii) Enamel Dryer

- Temperature of supply air – adjustable: 150 to 400 deg C
- The curing of the varnish on the stampings shall be by means of heating the segments to an appropriate temperature in the enamel dryer. The method of heating shall be by hot air convection.
- Natural Gas is proposed to be used as fuel for heating.
- The gas burners shall be energy efficient and shall be suitable for the fuel gas. Details of the burners shall be provided.
- The curing section shall be of adequate length and shall be divided into a number of sections.
- The housing shall be insulated to minimise heat radiation on the outside. The maximum temperature on outside surface of housing shall not be more than 15 deg C above ambient temperature of the shop floor.

iii) Buffer Section

- A buffer section shall be provided for dividing hot and cold zone, hot and cold conveyer and placing of an exhaust unit.
- Air exhaust unit shall be provided for discharge of used hot air to the atmosphere outside the plant. The capacity of air exhaust unit shall not be less than 4000 Cu M/hr.

iv) Cooling Section

- The cooling section shall be long enough to cool the cured stampings for handling.

- The temperature of stampings coming out of the cooling section shall not be more than 20 deg C above ambient temperature of the shop floor.

- Normally, the cooling air will be at the ambient temperature. If it is not possible to achieve the required stamping temperature after cooling with the supply air at ambient temperature, provision shall be made for cooling of the supply air. In such case, complete system for air cooling shall be provided.

e) Operation and Control System:

i) Swivelling and sliding type operator's panel having complete CNC and machine control system with CRT of required configuration shall be provided.

ii) An open-type control system with a standard industrial PC and colour monitor for the visualization and control of the production process shall be provided.

iii) The CNC system shall be of Fanuc or Siemens make.

iv) Secondary programmable logic controller with distributed peripherals connected with a standard field bus system for machine control shall be provided.

f) Operation Modes

i) Start up, warm-up, normal operation standby and shut down modes shall be provided.

ii) In start-up mode, functioning of all equipments and instruments shall be checked. Successful start-up shall lead to the warm-up mode in which the machine shall operate for achieving the required temperature. The stampings will be varnished and cured during normal operation mode. Whenever the flow of stampings is stopped for whatever reason, machine shall operate under standby mode to save energy.

g) Process Optimisation

i) In order to get quality product at minimum cost, the process parameters such as speed of conveyor, wet coating thickness, oven temperature, hot air temperature etc will have to be optimised for each size of stamping. Facility shall be provided for setting these parameters and their measurement on continuous basis for achieving best results. It shall be possible to store these parameters for a particular job and retrieve them for future use.