Bharat Heavy Electricals Limited

(High Pressure Boiler Plant**)**
Tiruchirappalli – 620014, TAMIL NADU, INDIA
An ISO 9001 Company
CAPITAL PURCHASE / MATERIALS MANAGEMENT / MANUFACTURING

ENQUIRY	Phone: +91 431 257 79 38 Fax : +91 431 252 07 19 Email : tvenkat@bheltry.co.in Web : www.bhel.com

	Enquiry Number:	**Enquiry Date:**	**Due date for submission of quotation:**
	2620700084	**21.08.2007**	**04.10.2007**
You are requested to quote the Enquiry number date and due date in all your correspondences. This is only a request for quotation and not an order			

Item	**Description**	**Quantity**	**Delivery (Item required at BHEL on)**
10	Vertical Offset Press for Tubular Coils (Vertical Hydraulic Press for Tube Offset Bending) as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)	1 No.	30.09.2008

BHEL commercial terms & conditions with Price Bid and Bank Guarantee formats along with technical specifications can be downloaded from BHEL web site http://www.bhel.com or from the Government tender website http://tenders.gov.in (public sector units > Bharat Heavy Electricals Limited page) under Enquiry reference "2620700084".

Tenders should reach us before 14:00 hours on the due date Tenders will be opened at 14:30 hours on the due date Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present	Yours faithfully, For BHARAT HEAVY ELECTRICALS LIMITED Manager / Capital Purchase / MM / Manufacturing

PART A

SECTION – I QUALIFYING CRITERIA

The Bidder / Vendor (OEM) has to compulsorily meet the following requirements to get qualified for consideration of the technical offer for the VERTICAL HYDRAULIC PRESS FOR TUBE OFFSET BENDING.

S.No	REQUIREMENTS	VENDOR's COMMENTS
1.0	The Bidder / Vendor (OEM) shall have a minimum of TEN Years of Continuous Experience in the field of Design, Manufacture and Supply of VERTICAL HYDRAULIC PRESSES. Vendor to provide details of the usage of Hydraulic presses supplied by them.	
2.0	Only those vendors (OEMs), who have supplied and commissioned at least ONE VERTICAL HYDRAULIC PRESS OF MINIMUM 100 TON CAPACITY in the past ten years (on the date of opening of Tender) and such press 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 its commissioning and acceptance (on the date of opening of Tender) in BHEL. Performance certificate from the customers regarding satisfactory performance of VERTICAL HYDRAULIC PRESS supplied to them in attached format to be enclosed along with technical offer.	
3.0	BHEL reserves the right to verify the information provided by vendor. In case the information provided by vendor is found to be false/ incorrect, the offer shall be rejected.	

SECTION – II

The Bidder / Vendors are requested to provide the following details

S.No	PARTICULARS	VENDOR's RESPONSE
4.0	Number of Years of Experience of the Bidder / Vendor in the field of design, manufacture, supply, erection & commissioning of HYDRAULIC PRESSES.	
5.0	Number of HYDRAULIC PRESSES supplied, installed and commissioned till date (with details on machine type / model, configuration, customer and quantity)	
6.0	Details on International Standards / Design Process Codes followed in Design and Manufacture of the Equipment.	
7.0	Details on SERVICE-AFTER-SALES Set-Up in India including the Addresses of Agents / Service Centers in India and competency & Experience of the Local Service Agency are to be provided.	
8.0	Any Additional Data to supplement the manufacturing capability of the BIDDER for the subject equipment.	

SECTION – III

Bidder / Vendor to note the following

S.No	REQUIREMENTS	VENDOR's COMPLIANCE
9.0	The BIDDER / VENDOR shall submit the offer in TWO PARTS -Technical **[with PART A & PART B]** & Commercial and Price Bid.	
10.0	The Offer shall contain a comparative statement of Technical Specifications given by BHEL and the Offer Details submitted by the Bidder, against each clause. A mere 'CONFIRMED' or 'COMPLIES' or 'YES' or 'NO-DEVIATION' or similar words in the technical comparative statement (without any supporting technical write-ups, photos and datasheets] may lead to disqualification of the Technical Offer.	
11.0	The Technical Offer shall be supported by Product Catalogue and Data Sheets in ORIGINAL and complete technical details of 'Bought-Out-Items' with copies of Product Catalogue and Selection Criteria	
12.0	The Commercial Offer (given with the Technical Offer) shall contain the Scope of Supply and the Un-Priced Part of the Price-Bid, for confirmation	
13.0	BIDDER has to indicate the Country of Origin for the supply of equipment.	

PERFORMANCE CERTIFICATE

(On Customer's Letter Head)

1. Supplier of the machine :

2. Make & Model of the Equipment :

3. Month & Year of Commissioning :

4. Application :

5. Capacity of Press (in Tons) :

5. Sizes of Jobs Performed in the machine
   Description of Jobs done :

6. Performance of the Machine : Best in the market /
   (Strike off whichever is not applicable) Satisfactory /
   Good /
   Average /
   Not Satisfactory

7. Any other remarks:

Date:

Signature & Seal of the Authority
Issuing the Performance Certificate

PART B

TECHNICAL SPECIFICATIONS FOR VERTICAL HYDRAULIC PRESS FOR TUBE OFFSET BENDING

<table>
<tr><th>S. No.</th><th>PARTICULARS</th><th>BHEL SPECIFICATIONS</th><th>Bidder's OFFER [With Complete Technical Details]</th></tr>
<tr><td>1.0</td><td>APPLICATION</td><td>The machine is meant for making offset bends by cold pressing of seamless steel tubes in Single-plane. These are used in manufacturing Power boiler and Industrial boiler components.

The tube offset bending shall be by Vertical Stroke with support rollers by Electro-Hydraulic means</td><td></td></tr>
<tr><td>2.0</td><td colspan="3">TUBE SPECIFICATIONS and RADII OF BENDS:</td></tr>
<tr><td>2.1</td><td colspan="2">TUBE OUTER DIAMETER AND THICKNESS:
All are OD (Outer Diameter) Controlled tubes with thickness tolerance of Max. +18 %</td><td></td></tr>
<tr><td>2.2</td><td colspan="2"><table>
<tr><th>S.No</th><th>Tube OD, mm</th><th>Tube wall Thickness, mm</th></tr>
<tr><td>1</td><td>38.1</td><td>3.2 / 4.0 / 5.0 / 6.3 /7.1/8.6</td></tr>
<tr><td>2</td><td>44.5</td><td>4.0 / 4.5 / 5 / 6.3 / 8 / 9 / 10/11</td></tr>
<tr><td>3</td><td>47.63</td><td>5 / 6.3 / 8 / 10</td></tr>
<tr><td>4</td><td>51.0</td><td>3.6 / 4 / 4.5 / 5 / 6.3 / 8 / 10 / 12</td></tr>
<tr><td>5</td><td>54.0</td><td>3.6 / 4 / 4.5 / 5 / 6.3 / 8</td></tr>
<tr><td>6</td><td>57.0</td><td>4 / 5 / 6.3 / 8</td></tr>
<tr><td>7</td><td>63.5</td><td>4.8 / 5.6 / 6.3 / 10 / 12.5</td></tr>
<tr><td>8</td><td>76.1</td><td>7.1 / 10 / 12.5</td></tr>
</table></td><td></td></tr>
</table>

<table>
<tr><th>S. No.</th><th>BHEL SPECIFICATIONS</th><th>Bidder's OFFER [With Complete Technical Details]</th></tr>
<tr><td>2.3</td><td>MATERIALS:</td><td></td></tr>
<tr><td>2.4</td><td>a. Carbon Steel:
SA192, SA210A1, SA210C
b. Alloy Steel:
SA209T1, SA213T11,
SA213T22, SA213T91, T-23, T-93
c. Stainless Steel
SA 213 TP304H, SA 213 TP321H, SA 213 TP347H</td><td></td></tr>
<tr><td>2.5</td><td>RADII OF BENDS:</td><td></td></tr>
<tr><td></td><td>
<table>
<tr><th>S.No</th><th>Tube OD, mm</th><th>Radius of Bend, mm</th></tr>
<tr><td>1</td><td>38.1</td><td>R 65</td></tr>
<tr><td>2</td><td>44.5</td><td>R 65, 89, 100, 143</td></tr>
<tr><td>3</td><td>47.63</td><td>R 152, 245</td></tr>
<tr><td>4</td><td>51.0</td><td>R 100, 151, 225, 265</td></tr>
<tr><td>5</td><td>54.0</td><td>R 165</td></tr>
<tr><td>6</td><td>57.0</td><td>R 100</td></tr>
<tr><td>7</td><td>63.5</td><td>R 100, 160, 200,320</td></tr>
<tr><td>8</td><td>76.1</td><td>R 200, 225, 300</td></tr>
</table>
</td><td></td></tr>
<tr><td>2.6</td><td>JOB DETAILS: Refer Annexure 1</td><td></td></tr>
</table>

S. No.	BHEL SPECIFICATIONS	Bidder's OFFER [With Complete Technical Details]
3.0	**MACHINE CONFIGURATION;**	
3.1	Machine Base - 1 Set	
3.2	Main Offsetting Press with height adjustment and stroke adjustment – 1Set	
3.3	Clamping Roller Press with height adjustment and coupled movement – 2 Sets	
3.4	Alternative, if any, to the height adjustment such as direct hydraulic stroke without the need for height adjustment, if possible, may be suggested by the vendor for Sl.No. 3.2 & 3.3	
3.5	Bottom Supporting Press with stroke adjustment – 1 Set	
3.6	Machine Base - 1 Set	
3.7	Bending Roller mounting Carriage with sliding arrangement – 2 Sets	
3.8	Hydraulic Power Pack – 1 Unit	
3.9	All Tools, Dies, Adaptors, formers, Fixtures etc. - I Set	
3.10	Electrical Controls with Remote Pendant - 1 Unit	
3.11	Electric Control Panel - 1 No	
3.12	Centralized Lubrication System - 1 No	

S. No.	BHEL SPECIFICATIONS		Bidder's OFFER [With Complete Technical Details]
4.0	**QUALITY TOLERANCES FOR JOBS**		
4.1	**VISUAL DEFECTS**		
4.1.1	It shall be free from harmful surface visual defects such as wrinkles, tool marks and depressions etc		
4.2	**PERCENTAGE OVALITY**		
4.2.1	% Ovality = (Max.OD - Min.OD)/ Original OD} x100	To be Less than 10%	
4.3	**PERCENTAGE THINNING**		
4.3.1	% Thinning = {(t1 - t2)/ t1}x100 where, t1–actual wall thickness before bending t2–actual wall thickness after bending	Maximum allowed Thinning is 10%	
4.4	**FLATNESS**		
4.4.1	Cold Bending operation	Flat Land width over the bend portion does not exceed 12.5mm.	
4.5	**BENDING ANGLE TOLERANCE**	± 0.5 deg	
4.6	**BEND RADIUS TOLERANCE**	± 0.3 mm	
4.7	**% FLOW AREA** = Actual flow area / Nominal Flow Area * 100	90% minimum	
4.8	**Minimum OD (At any point of Bend)**	=0.895 x OD (Nom) + 0.233 x Min. Wall thickness	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	Bidder's OFFER [With Complete Technical Details]
5.0	**TOOLINGS**		
5.1	List of tooling (Clamping rollers, Bend Rollers, Tube pressing dies -Quadrant Die and Centre Dies, Dies mounting Adapters, Bottom Support Die, Bottom Support die mounting adapter etc) for the sizes mentioned in specification and any optional tooling should be listed and quoted out item wise separately.		
6.0	**DIMENSIONAL DETAILS:**		
6.1	Tube length handled	Minimum: 750mm Maximum: 16000mm	
6.2	Maximum Degree of Bend	40°	
6.3	Tube Offset Bending (pressing) Direction	Vertical Stroke	
6.4	Maximum **stroke** of main offsetting cylinder for forming tube offset - Hydraulically operated	400 mm	
6.5	Maximum **stroke** of bottom support cylinder for forming tube offset - Hydraulically operated	800 mm	
6.6	Maximum **stroke** of Hydraulic operated Clamping Rollers	130mm	
6.7	Centre line distance between Clamping Rollers - Motorized adjustment	Minimum: Vendor to specify Maximum: Vendor to specify	
6.8	Height adjustment of main offsetting die - Motorized adjustment	Distance of 350mm	
6.9	Height adjustment of Clamping Roller - Motorized adjustment	Distance of 350mm	
6.10	Width between centre line of Bending Rollers - Motorized adjustment	Minimum: 120mm Maximum: 1500mm	
6.11	Tube Working height	1200mm from Floor level	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	Bidder's OFFER [With Complete Technical Details]
7.0	**TOOLING (MAX, MIN) DIMENSIONS**		
7.1	Bottom support die Width	Minimum: 76 mm Maximum: 200 mm	
7.2	Bottom support die Height	Minimum: 51 mm Maximum: 76 mm	
7.3	Pressing / Offsetting die - Quadrant die - Radius	Minimum: 65 mm Maximum: 340 mm	
7.4	Pressing / Offsetting die - Quadrant die - Height	Minimum: 65 mm Maximum: 195 mm	
7.5	Pressing / Offsetting die - Centre die - Width	Minimum: 76mm Maximum: 150mm	
7.6	Pressing / Offsetting die - Centre die - Height	Minimum: 65 mm Maximum: 195 mm	
7.7	Clamping Rollers Diameter (with shallow groove for clamping all tube diameters)	190mm	
7.8	Bending Rollers Diameter	Minimum: 130 mm Maximum: 680 mm	
7.9	Suitable Pressing/Offsetting dies mounting adapter	Vendor to Specify.	
7.10	Reference tube size for establishing the machine capacity	Diameter x thickness 63.5 x 7.1 R 160mm (40 deg bend in Alloy steel)	
8.0	**PRODUCTIVITY**		
8.1	No. Of jobs per shift in OD 63.5 x 7.1 mm / Alloy Steel Tubes for batch production jobs with Radius 160mm - Angle 40 deg bends	200 bends in one 8 hour shift	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	Bidder's OFFER [With Complete Technical Details]
9.0	**MACHINE PARAMETERS**		
9.1	**Main Offsetting Press parameters**		
9.1.1	Main Offsetting press capacity in Tons.	Vendor to specify	
9.1.2	Main Cylinder vertical Load Stroke Speed in mm/min	Vendor to specify	
9.1.3	Main Cylinder Vertical Return Stroke Speed in mm/min	Vendor to specify	
9.1.4	Main Cylinder Operating Pressure	Vendor to specify	
9.2	**Bottom Support cylinder parameters**		
9.2.1	Bottom Support Cylinder capacity in Tons	Vendor to specify	
9.2.2	Bottom Support Cylinder Load stroke speed - Shall be synchronized with Main cylinder vertical load stroke speed.	Vendor to specify	
9.2.3	Bottom Support Cylinder idle stroke speed	Vendor to specify	
9.2.4	Bottom Support Cylinder Holding Pressure	Vendor to specify	
9.3	**Clamping cylinder parameters**		
9.3.1	Clamping cylinder capacity in Tons	Vendor to specify	
9.3.2	Clamping cylinder up / down speed in mm / min	Vendor to specify	
9.3.3	Clamping Cylinders Holding Pressure	Vendor to specify	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	Bidder's OFFER [With Complete Technical Details]
9.4	**General parameters**		
9.4.1	Maximum Bending Force	Vendor to specify	
9.4.2	Maximum Operating Pressure	Vendor to specify	
9.4.3	Main Pump Motor capacity in kW	Vendor to specify	
9.4.4	Total Power Requirement in kVA	Vendor to specify	
9.4.5	Hydraulic Tank Capacity	Vendor to specify	
10.0	**MACHINE CONFIGURATION DETAILS:**		
10.1	**Machine base - 1 Set**		
10.1.1	Suitable length of fabricated machine base shall be provided, having sliding arrangement for the bending roller mounting fixture. The Bending roller-mounting fixture shall have motorized movement to adjust the distance between left and right rollers. A steel rule with 'mm' graduation shall be fixed throughout the length of the bed for conveniently setting the distance between the Bending rollers. The base shall be of rigid construction to withstand the forces during pressing. The Frame shall be fabricated with steel plates of suitable thickness of which vendor has to provide details with the offer. The base shall also support Offsetting press, Clamping roller press and Bottom Supporting press.		
10.2	**Main Offsetting Press with sliding arrangement- 1Set**		
10.2.1	The Main Offsetting press is positioned vertically to support the offsetting cylinder with sliding guide plate. The cylinder positioning before pressing shall be motorized (Any alternative arrangement, such as direct hydraulic stroke without height adjustment may be suggested by the vendor). The stroke of piston shall be able to be set for the required depth. The piston shall have the provision to mount the 'quadrant die and centre die' mounting adapter. The frame housing the hydraulic cylinder shall be of rigid construction.		

S. No.	BHEL SPECIFICATIONS	Bidder's OFFER [With Complete Technical Details]
10.3	**Clamping Press with sliding arrangement – 2 Sets**	
10.3.1	Clamping rollers support during offset bending. They are positioned on either side to support and guide the tube withstanding the reactionary forces that are developed as a result of bending. The hydraulic cylinder vertical positioning shall be motorized (Any alternative arrangement, such as direct hydraulic stroke without height adjustment may be suggested by the vendor). The Clamping cylinder housing on either side shall be movable to adjust the distance between the clamping rollers. The movement shall be coupled w.r.t the centre of the offsetting cylinder (i.e the clamping cylinders have to move away from or move towards each other in a coupled manner). This movement shall be motorized. The Clamping press shall have the provision for mounting the Clamping roller mounting adapter.	
10.4	**Bottom supporting post with Sliding arrangement – 1 Set**	
10.4.1	A bottom supporting cylinder has to be provided to support the tube at the centre during bending. The tube can buckle without this support. The Supporting cylinder shall have the provision for mounting the Support die mounting adapter.	
10.5	**Bending rollers mounting fixtures – 2 Sets**	
10.5.1	The Bending rollers mounting fixtures shall have provision for mounting various sizes of bending rollers maintaining the tube working height. The Bending rollers shall be mounted by means of centre pin. Several pin locations may be provided to change the centre point of the bending rollers to maintain tube working height. The fixtures shall be movable and sliding on the machine base. The movement shall be motorized. The fixture shall be easily detachable.	

S. No.	BHEL SPECIFICATIONS	Bidder's OFFER [With Complete Technical Details]
11.0	**Hydraulics**	
11.1	All Hydraulic valves to be of modular construction. All hydraulic operating components to be mounted on the manifold in a centralized place in convenient location for easy approach for Maintenance. Preferably away from the frame and on the side of the machine.	
11.2	Hydraulic power pack and Oil tank shall be separate from the Machine and positioned behind the machine conveniently to attend to any maintenance problems	
11.3	Vendor to specify the size of Hydraulic oil tank, capacity in litres	
11.4	First fill of Lubrication Oil & Grease shall be vendor's scope	
11.5	Hydraulic hose end fittings shall be welded nipple joints of suitable material	
11.6	Hydraulic circuits shall be designed with minimum number of control valves and to suit oil of ISO VG 46 or 68 only. Also minimum number of check-points to be provided wherever pressure is required to be read for setting and trouble shooting. Minimess Pressure Gauge - 1 No with Connecting Hose to be provided.	
11.7	Vendor to provide hydraulic Oil chiller unit - Refrigeration type for required tank capacity to maintain oil temperature not exceeding 40 deg C. – Vendor to provide details of Oil Chiller.	
11.8	All hydraulic tubelines to be neatly laid out.	
11.9	Lubricator, Regulator, Filter fitted with hand wheel valve shall be fitted at the centralized location for any pneumatic circuits	
12.0	**Lubrication**	
12.1	Centralized Automatic Lubrication system with a provision for adjusting the timer shall be provided for the machine.	

S. No.	BHEL SPECIFICATIONS		Bidder's OFFER [With Complete Technical Details]
13.0	**Foundation:**		
13.1	Foundation of the machine shall be designed suitably. Vendor to furnish details of the type of foundation required with force diagram.	Vendor to specify	
14.0	**Controls:**		
14.1	Type of controls provided	Vendor to specify	
14.2	Machine shall be operated in three modes viz., Manual, Semi-Automatic and Automatic Under Automatic option the complete Clamping and Offsetting cycle shall be automatic from tube setting.	Vendor to specify	
14.3	Offset Cylinder Stroke Control to be provided - The operator should be able to set the stroke length.	Vendor to specify	
14.4	A digital display of the offset Stroke length to be provided	Vendor to confirm	
14.5	Pendant control of all the machine operation by Manual / Auto / Semi-Auto mode to be provided	Vendor to confirm	
14.6	Pendant control shall be provided with joy stick controls for hydraulic up / down movements.	Vendor to confirm	
14.7	The Offset bending process field sensors, such as encoders, limit switch, feed back devices shall be suitably placed for easier accessibility and rigidly mounted.	Vendor to confirm	

S. No.	BHEL SPECIFICATIONS	Bidder's OFFER [With Complete Technical Details]
15.0	**Electrical Points:**	
15.1	Wiring: All electrical motors, limit switches etc, on the machine shall be Wired using PVC sheathed cable running in conduits to cable ducts to common terminal block. External wiring from / to control panel, control desk, external motors etc shall be by means of screened multi-core cables.	
15.2	Encoders, limit switch, feed back devices shall be suitably placed for easier accessibility rigidly.	
15.3	All alarm tripping logics and control logics incorporated in the machine to be listed out by the vendor.	
15.4	Control circuit voltage should be 24 V DC.	
15.5	Control panel shall have built in 230V, 5 amps, 3 pin plug.	
15.6	Electrical control panel shall be adequately illuminated for maintenance purpose.	
15.7	Type of drives used for motors to be indicated.	
15.8	The machine shall be suitable for 415V with voltage fluctuation of +/-10%, 50Hz with frequency fluctuation of +/- 3%, 3 Phase, 3 wire system	
15.9	Electrics shall have IP 54 protection.	

S. No.	BHEL SPECIFICATIONS	Bidder's OFFER [With Complete Technical Details]
16.0	**Components used:**	
16.1	All motors shall be from reputed makers like SIEMENS, ABB, Allen Bradley conforming to IEC Standards.	
16.2	All hydraulic elements shall be of VICKERS / REXROTH, DENISONS make.	
16.3	All oil seals shall be PARKER, MERKEL make	
16.4	All hydraulic hoses shall be preferably of GATES make.	
16.5	All electrical items shall be of reputed make like SEW / ROCKWELL Allen Bradley/ Telemechanique / Delta	
16.6	Encoders and digital display units shall be of HEIDENHAIN / FAGER make	
16.7	All components/devices/terminals are to be incorporated with ferrules.	
17.0	**GENERAL POINTS**	
17.1	Make and Model of the machine to be mentioned. Detailed catalogs of the machine to be submitted with the offer.	
17.2	Complete description of all systems & sub-systems shall form part of the technical bid.	
17.3	A schematic diagram showing the layout of the machine & associated systems with salient dimensions shall be submitted along with the offer.	
17.4	The operating sequence of the machine with broad outline of various operations involved should be furnished with the offer.	
17.5	Standards for Design, Manufacture and testing of the machine shall be in accordance with internationally accepted standards.	
17.6	The factor of safety considered for designing the machine, for certain load bearing components shall be furnished with the offer.	

S. No.	BHEL SPECIFICATIONS	Bidder's OFFER [With Complete Technical Details]
18.0	**TOOLINGS:**	
18.1	List of tooling as follows: i. Bending Rollers with holding pins ii. Clamping Rollers with holding pins iii. Quadrant Dies iv. Centre Die between Quadrant dies v. Supporting Die vi. Supporting Die adapter vii. Quadrant Dies and Centre Die mounting adapter etc for the tube sizes mentioned in specification and any optional tooling should be listed and quoted out item wise separately.	
19.0	**AMBIENT CONDITIONS**	
19.1	The Vertical Offset Press with all Sub-Systems shall be suitable for operation in an ambient temperature varying from 25 to 50°C and with a relative humidity varying from 45% to 90% at the factory location.	
19.2	The entire equipment shall be Tropicalized in Design and Construction	
19.3	The offered equipment, Hydraulic system has to work in a normal fabrication shop environment in ambient conditions.	
20.1	**SAFETY**	
20.2	All safety features and safety interlocks provided in the machine shall be listed out by the vendor.	
20.3	Vendor to specify the safety features incorporated in the machine during pressing	

S. No.	BHEL SPECIFICATIONS	Bidder's OFFER [With Complete Technical Details]
21.0	**PAINTING:**	
21.1	The heavier machine parts are to be heat-treated after fabrication (including castings and forgings) and shot blasted for surface preparation prior to painting.	
21.2	One coat of Primer with 25microns of DFT (Dry Film Thickness)	
21.3	Finish coat by Polyurethane Paint. Colour shade: RAL 6011 (Reseda Green)	
22.0	**SPARES (to be recommended by the vendor)**	
22.1	Item wise 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 shall be offered by vendor. The list to include following, in addition to BHEL recommended spares: **(Unit Price of each item of spare should be offered)**	
22.2	**a) Mechanical & Hydraulic Spares:** All types of Pumps, Valves, Pressure Switches, Transducers, Flow Switches, Filters, Seals, O-rings, Hydraulic Hoses etc.	
22.3	**b) Electrical /Electronic:** All types of Relays, Contactors, Proximity Switches, Push Buttons, Indicating Lamps, Semiconductor Fuses, Special Fuses, Circuit Breakers, Main Power Switch, Encoders, Power Module & Control cards etc.	
22.4	All types of spares for total machine and accessories should be available for at least ten years after supply of the machine. If machine or control is likely to become obsolete in this period, the vendor should inform BHEL sufficiently in advance and provide drawings of parts / details of spares & suppliers to enable BHEL to procure these in advance, if required	

S. No.	BHEL SPECIFICATIONS	Bidder's OFFER [With Complete Technical Details]
23.0	**DOCUMENTATION:**	
23.1	**Three** sets (hard copies) of following documents, in English language should be supplied along with the machine:	
23.2	Operating manuals of Machine	
23.3	Detailed Maintenance manual of machine with all drawings of machine assemblies/sub-assemblies/parts including Electrical / Pneumatic/ Hydraulic circuit diagrams. All Assembly/ Sub Assembly Drawings shall be supplied with the part list.	
23.4	Machine data/ Commissioning data to be provided.	
23.5	Complete list of spares for machine and accessories, along with item part no / specification / type / model and name & address of the bought out item supplier shall be furnished along with documentation to be supplied with the machine	
23.6	Manufacturing drawings for all supplied toolings as mentioned under Clause 18.1	
23.7	Catalogues, O&M Manuals of all bought out items including drawings, wherever applicable.	
23.8	Detailed specification of all rubber items and hydraulic/lube fittings	
23.9	PLC program print-outs with comments in English, if PLC is used.	
23.10	PLC program and data on CD, if PLC is used	
23.11	Complete Master List of parts used in the machine shall be submitted by the vendor.	
23.12	Complete list of Alarms and Remedies to be provided by the vendor.	
23.13	One additional set of all the above documentation on CD.	
24.0	**INSPECTION**	
24.1	The Machine shall be offered for inspection and performance trials to test the design capabilities of the machine, by BHEL Engineers at Supplier's works before Dispatch.	

S. No.	BHEL SPECIFICATIONS	Bidder's OFFER [With Complete Technical Details]
25.0	**ACCEPTANCE CRITERIA**	
25.1	All the features of the machines shall be operated and shown and to work as given in the specification, at supplier's works during inspection and during commissioning at BHEL works.	
25.2	The prove-out trials shall be for the Tube sizes given by BHEL during the technical discussions or at the time of releasing the Purchase Order. The tubes shall be supplied by BHEL for performing trials. The finished jobs have to pass all the quality tests as mentioned in the specification under Clause: 4.0	
25.3	The production output of the machine shall be proved out by the commissioning Engineer at BHEL works for the Production rate mentioned in the specification under Clause: 8.0	
25.4	Tube Offset pressing shall be proved out during commissioning at BHEL works for all the tube sizes for which Toolings have been ordered.	
26.0	**ERECTION AND COMMISSIONING**	
26.1	The supplier shall depute his engineer(s) for supervising the erection and commissioning of the machine at BHEL works and prove-out trials	
27.0	**TRAINING**	
27.1	The supplier shall train Four BHEL's Engineers in Operation and Maintenance (Mechanical, Electrical/ Electronics) of the Machine at supplier's works for a period not less than 5 working days. Vendor to quote on Manday basis.	
27.2	The supplier shall impart training to BHEL's Machine Operators and Maintenance crew in Operation and Maintenance (Mechanical, Electrical/ Electronics) after the commissioning of the Machine at BHEL works for not less than 5 working days. Vendor to quote on Manday basis.	

S. No.	BHEL SPECIFICATIONS	Bidder's OFFER [With Complete Technical Details]
27.3	The training shall include the following: a. Safety b. Operation of the machine c. Trouble-Shooting, d. All special features of the machine e. Electrical / Mechanical / Electronics systems	
28.0	**GUARANTEE**	
28.1	Equipment has to be guaranteed for its performance, for a minimum of 24 months from the date of commissioning.	

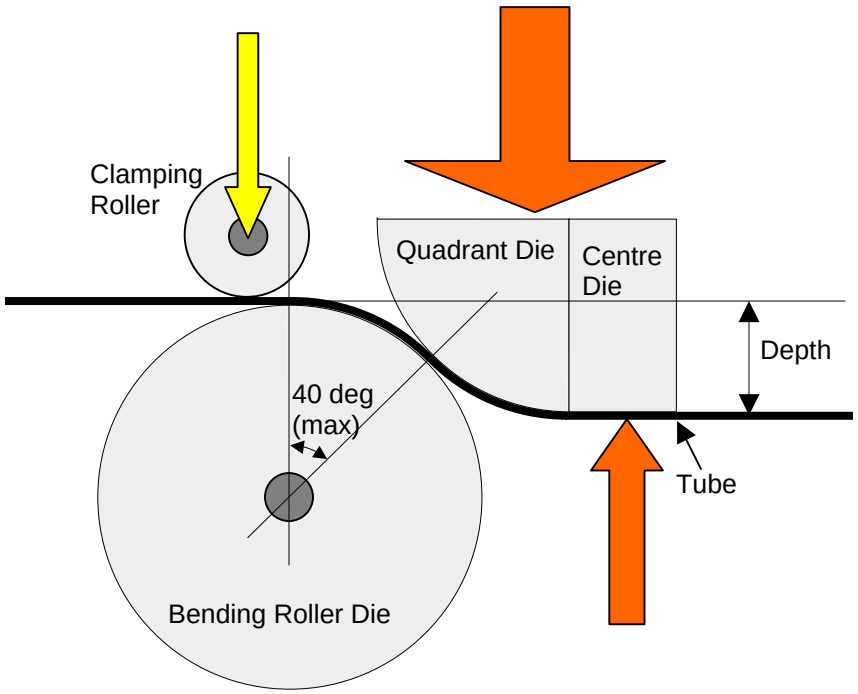
Enclosures:

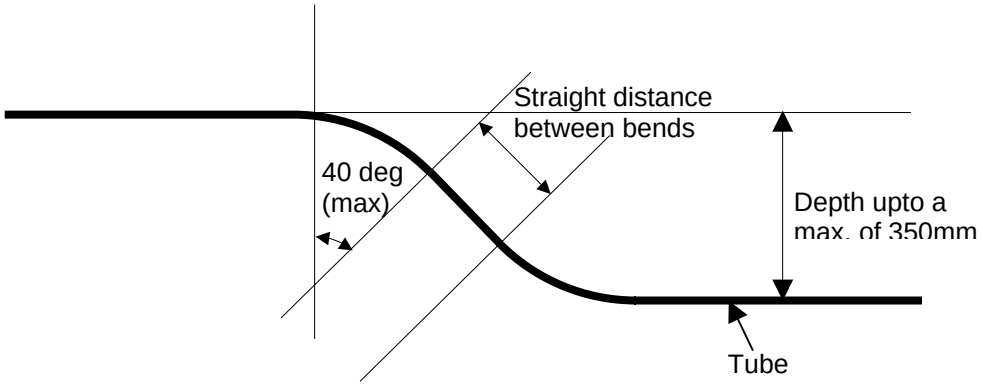
Annexure-1 - Offset Configurations

Sri S Ramakrishnan DGM / M&S	Sri M Balasubramanian DGM / BPN / TP	Sri S Kumarappan SM / OP&C / TP	Sri G Subramanian DM / Tool Engg	A.Venkateshwarlu SM / Modernisation

ANNEXURE – I

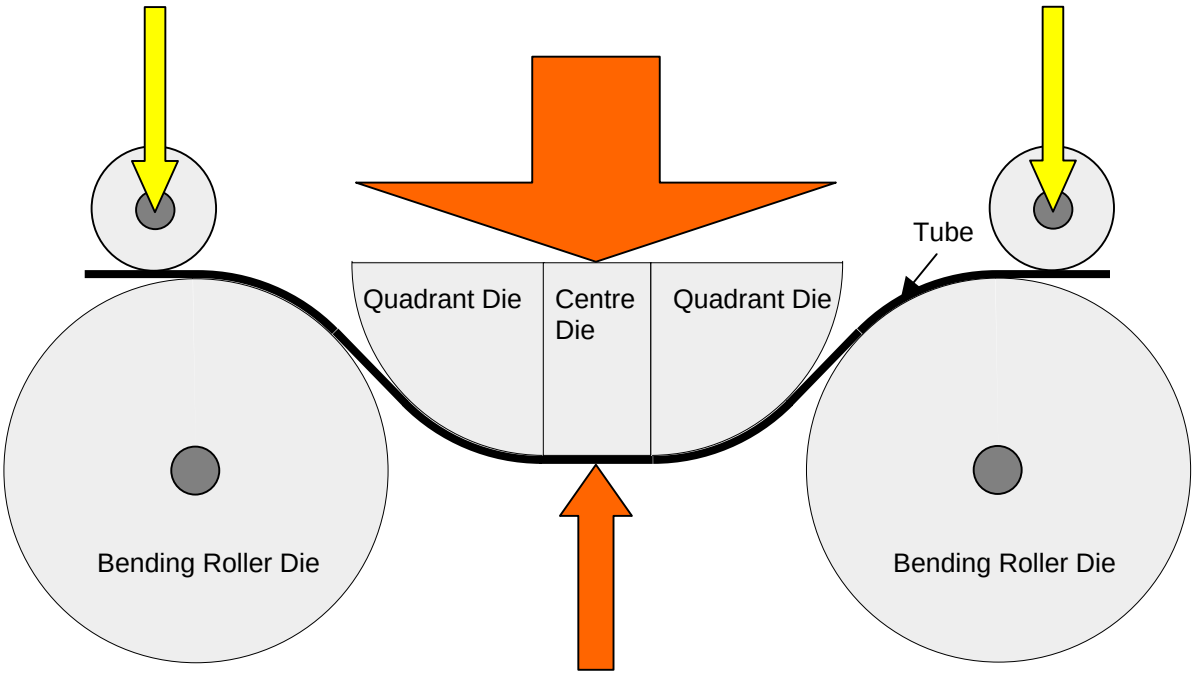
VERTICAL OFFSET PRESS - BEND CONFIGURATIONS

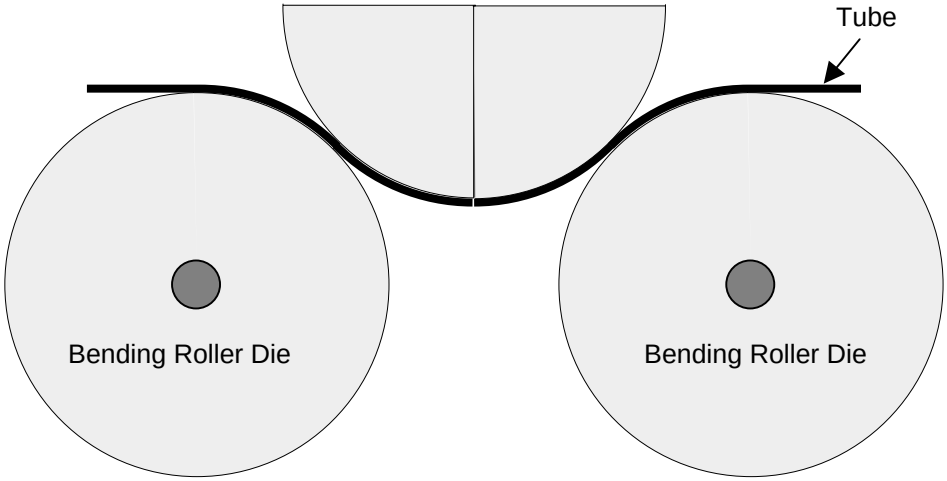




VOP – Bend Configuration
CABS - 2 - 14N – 01
BHEL, TIRUCHIRAPPALLI

VERTICAL OFFSET PRESS - BEND CONFIGURATIONS





VOP – Bend Configuration
CABS - 2 - 14N – 01
BHEL, TIRUCHIRAPPALLI