An ISO 9001 Company

Bharat Heavy Electricals Limited
(High Pressure Boiler Plant)
Tiruchirappalli – 620014, TAMIL NADU, INDIA
CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

ENQUIRY **NOTICE INVITING TENDER**	Phone: +91 431 257 79 38 Fax : +91 431 252 00 31 Email : tvenkat@bheltry.co.in Web : www.bhel.com

TWO PART BID Tender to be submitted in two Parts	**Enquiry Number:** **2851300040**	**Enquiry Date:** **12.12.2013**	**Due date for submission of quotation:** **20.01.2014**

You are requested to quote the Enquiry number date and due date in all your correspondence. This is only a request for quotation and not an order.

Please note that under any circumstances both delayed offer and late offers will not be considered. Hence vendors are requested to ensure that the offer is reaching physically our office before 14.00 hrs on the Date of tender opening.

Item	Description	Quantity	Delivery Schedule
10	**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)	**1.00 No**	**8 months from date of PO**

Important points to be taken care during submission of offer

1. **Checklist No. BND/IMP/02 & BND/IND/02A and to be filled and enclosed along with the offer failing which, the Offer will not be considered for evaluation.**
2. **Material shall be delivered to FOR, BHEL Stores, POWER EQUIPMENT FABRICATION PLANT, BHARAT HEAVY ELECTRICALS LIMITED, Mundipar- 441804, Taluka: Sakoli, District: Bhandara, Maharashtra State.**
3. **Time period required for Erection & Commissioning shall be 1 Month from the date of intimation by BHEL requesting supplier to depute Service Engineers about site readiness.**
4. **EMD for this Tender will be (₹) : 1,50,000.00**
5. **All updates, amendments, corrigenda, etc., (if any), for each tender will be posted only on the above websites from time to time, as and when required, until each tender is opened. There will be no publication of such updates, amendments, corrigenda, etc., through newspapers or any other media.**

BHEL's General guidelines / instructions (refer MM / CE / GENL / 001 - EMD) including bank guarantee formats and list of consortium banks, commercial terms check-list 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 "2851300040".

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** Sr. Manager / Capital Equipment / MM

T. VENKATESWARAN
Senior Manager
Capital Equipment / MM
BHEL, Tiruchirappalli - 620 014.

VERTICAL HYDRAULIC PRESS FOR TUBE OFFSET BENDING
PART - A

SECTION- 1: Qualifying Criteria

The BIDDER has to compulsorily meet the Qualifying Criteria indicated in **Section 1** to get qualified. Otherwise the technical offer will not be considered.

S NO.	REQUIREMENTS	VENDOR'S RESPONSE
1.1	The BIDDER / VENDOR (OEM) shall have a minimum of TEN Years of Continuous Experience in the Design, Manufacture & Supply of "**VERTICAL HYDRAULIC PRESS**". Vendor shall indicate the actual no. of years of experience in the field	
1.2	Only those vendors (OEMs) should quote, who have commissioned in the past (10) years (on the original date of opening of Tender) at least ONE '**VERTICAL HYDRAULIC PRESS OF MINIMUM 100 TON CAPACITY'** **EITHER** (i) in at least one country other than the country of origin to establish vendor's (OEM's) global business activity **OR** (ii) in India; and the referred Hydraulic Press is presently working satisfactorily for more than one year after commissioning (as on the original date of opening of Tender). The name and contact addresses of the customers to whom the Hydraulic Press has been supplied has to be furnished with details. BHEL reserves the right to accept or reject the OEMs based on the assessment of their technical and financial capability.	
1.3	Vendor has to submit at least ONE PERFORMANCE CERTIFICATE from their customers in India or from the customers to whom the Hydraulic Press was supplied outside the country of origin, for satisfactory performance of the Hydraulic Press as given under Clause 1.2 above, for a minimum period of one year from the date of commissioning (as on the original date of opening of Tender) {Original Certificate or through E-mail directly from the customer}. The original performance certificate may be returned after verification by BHEL, if required. For obtaining the Performance certificate, a suggestive format is provided.	
1.4	BHEL reserves the right to verify the information provided by the Vendor for the referred Hydraulic Press at their referred customer's works. It shall be the responsibility of the vendor to facilitate the visit of BHEL's team at their referred customer works .The Travel, Board and Lodging expenses for BHEL Personnel shall be borne by BHEL. In case the information provided by vendor is found to be false/ incorrect, the offer shall be rejected.	

SECTION - 2:

The BIDDER / VENDOR are requested to provide the following information:-

S NO.	REQUIREMENTS	VENDOR'S RESPONSE
2.1	The BIDDER / VENDOR to furnish Reference List of Customers, with complete address, details of contact person, where Hydraulic Press has been supplied in the past.	
2.2	Specify details of Hydraulic Press supplied to other units of BHEL, if any (Year of commissioning with details etc.	
2.3	Details on SERVICE-AFTER-SALES Set-up in India including the Address of Agents / Service Centres in India.	
2.4	Any Additional data to supplement the manufacturing capability of the BIDDER for the subject equipment.	

SECTION – 3:

The BIDDER to note:

S NO.	REQUIREMENTS	VENDOR'S RESPONSE
3.1	The BIDDER / VENDOR shall submit the offer in TWO parts. 1. Technical Offer [**with PART A & PART B**] 2. Commercial Offer and Price bid.	
3.2	The Technical Offer shall contain complete details against all clauses of Technical Specifications given by BHEL.	
3.3	The Technical Offer shall be supported by copies of product Catalogues, DataSheets and technical details of Bought- Out- Items.	
3.4	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.	

Suggestive Format of Performance Certificate:

The Performance certificate should be produced on **Customer's Letter Head** and submitted along with the offer.

PERFORMANCE CERTIFICATE

1.0	Hydraulic Press Supplied by(Manufacturer's name)		
2.0	Make & Model number of the Press		
3.0	Month & Year of Commissioning		
4.0	Application for which Hydraulic Press is used		
5.0	**Hydraulic Press Details**		
5.1	Capacity of Press (in Tons)		
5.2	Sizes of Jobs Performed in the Press (Description of Jobs done)		
6.0	Performance of the Hydraulic Press (Please tick the appropriate option)	Not Satisfactory	
		Average	
		Good	
		Satisfactory	
7.0	Service after sales (Please tick the appropriate option)	Not Satisfactory	
		Average	
		Good	
		Satisfactory	
8.0	Other remarks (if any)		
Date:		Signature & Seal of the Authority Issuing the Performance Certificate	

PART B

TECHNICAL SPECIFICATIONS FOR VERTICAL HYDRAULIC PRESS FOR TUBE OFFSET BENDING

Note:-

1.0 The Column **"Vendor's offer with Technical details & Remarks"** of this format shall be filled in by the Vendor and submitted along with the offer. Inadequate / incomplete, ambiguous or unsustainable information against any of the clauses of the specifications / requirements shall be treated as non-compliance.

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

Name & Address of the Vendor:	Name & Address of the Indian agent:
Telephone no.:	Telephone no.:
Fax no.:	Fax no.:
e-mail:	e-mail:

3.0 Scope: - Design, Manufacture, Supply, Erection & Commissioning of VERTICAL HYDRAULIC PRESS FOR TUBE OFFSET BENDING for BHEL complying with the specification as below.

<table>
<tr><th>S. No.</th><th colspan="3">PARTICULARS AND BHEL SPECIFICATIONS</th><th>Vendor's OFFER</th></tr>
<tr><td>1.0</td><td colspan="2">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="4">TUBE SPECIFICATIONS and RADII OF BENDS:</td></tr>
<tr><td>2.1</td><td colspan="4">MATERIALS:</td></tr>
<tr><td>2.1.1</td><td colspan="4">a. Carbon Steel :SA192, SA210A1, SA210C (ASTM)
b. Alloy Steel: SA209T1, SA213T11, SA213T22, SA213T91, T-23, T-93 (ASTM)
c. Stainless Steel :SA 213 TP304H, SA 213 TP321H, SA 213 TP347H (ASTM)</td></tr>
<tr><td>2.2</td><td colspan="3">TUBE OUTER DIAMETER AND THICKNESS:
All are OD (Outer Diameter) Controlled tubes with thickness tolerance of Max. +15 %</td><td></td></tr>
<tr><td>2.2.1</td><td colspan="2"><table>
<tr><th>S.No.</th><th>OD, in mm</th><th>THICKNESS, in mm</th></tr>
<tr><td>1</td><td>28.0</td><td>4.0 to 5.6 (rifle tubes)</td></tr>
<tr><td>2</td><td>31.8</td><td>4.0 to 4.57</td></tr>
<tr><td>4</td><td>38.1</td><td>4.57 to 11.0</td></tr>
<tr><td>5</td><td>41.3</td><td>7.4 to 8.2</td></tr>
<tr><td>6</td><td>42.4</td><td>4.57 to 9.1</td></tr>
<tr><td>7</td><td>44.5</td><td>4.19 to 10.92</td></tr>
<tr><td>9</td><td>51.0</td><td>4.19 to 10.0 (Rifle / Plain Tubes)</td></tr>
<tr><td>10</td><td>54.0</td><td>9.14 to 13.49</td></tr>
<tr><td>11</td><td>57.0</td><td>4.19 to 15.09</td></tr>
<tr><td>12</td><td>63.5</td><td>3.81 to 12.7 (Rifle / Plain Tubes)</td></tr>
<tr><td>13</td><td>69.85</td><td>4.57 to 16.51</td></tr>
<tr><td>14</td><td>76.1</td><td>4.57 to 5.5</td></tr>
</table></td><td colspan="2"></td></tr>
</table>

<table>
<tr><th>S. No.</th><th>PARTICULARS AND BHEL SPECIFICATIONS</th><th>Vendor's OFFER</th></tr>
<tr><td>2.3</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>2.4</td><td>JOB DETAILS: Refer Annexure 1</td><td></td></tr>
<tr><td>3.0</td><td>MACHINE CONFIGURATION</td><td></td></tr>
<tr><td>3.1</td><td>Machine Base - 1 Set</td><td></td></tr>
<tr><td>3.2</td><td>Main Offsetting Press with height adjustment and stroke adjustment – 1Set</td><td></td></tr>
<tr><td>3.3</td><td>Clamping Roller Press with height adjustment and coupled movement – 2 Sets</td><td></td></tr>
<tr><td>3.4</td><td>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</td><td></td></tr>
<tr><td>3.5</td><td>Bottom Supporting Press with stroke adjustment – 1 Set</td><td></td></tr>
<tr><td>3.6</td><td>Bending Roller mounting Carriage with sliding arrangement – 2 Sets</td><td></td></tr>
<tr><td>3.7</td><td>Hydraulic Power Pack – 1 Unit</td><td></td></tr>
<tr><td>3.7</td><td>All Tools, Dies, Adaptors, formers, Fixtures etc. - I Set</td><td></td></tr>
<tr><td>3.9</td><td>Electrical Controls with Remote Pendant - 1 Unit</td><td></td></tr>
</table>

S. No.	PARTICULARS AND BHEL SPECIFICATIONS		Vendor's OFFER
3.10	Electric Control Panel - 1 No		
3.11	Centralized Lubrication System - 1 No		
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	Maximum allowed ovality is 10%	
4.3	PERCENTAGE THINNING		
4.3.1	% of Thinning = { (T1-T2) / T1} X 100 where T1 is the thickness measured at the end of the tube after bending, by drawing a line parallel to tube bend axis from T2 is the minimum thickness observed in the tube after bending.	%Thinning shall not exceed [100 / {(4R/D)+2}] where R is the mean radius of bend to the center line of the tube (in mm) D is the Nominal outside diameter of the tube (in mm)	
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	$\pm$ 0.5 deg	
4.6	BEND RADIUS TOLERANCE	$\pm$ 2 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 AND BHEL SPECIFICATIONS		Vendor's OFFER
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 AND BHEL SPECIFICATIONS		Vendor's OFFER
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 x Radius 63.5 x 8.64 x R 160mm (40 deg bend in Alloy steel)	
8.0	**PRODUCTIVITY**		
8.1	No. of jobs per shift in OD 63.5 x 8.64 mm / Alloy Steel Tubes for batch production jobs with Radius 160mm - Angle 30 deg bends	200 bends in one 8 hour shift	

S. No.	PARTICULARS AND BHEL SPECIFICATIONS		Vendor's OFFER
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	
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	

S. No.	PARTICULARS AND BHEL SPECIFICATIONS	Vendor's OFFER
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. 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. A steel rule with 'mm' graduation shall be fixed throughout the length of the bed for conveniently setting the distance between the Bending rollers.	
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. A steel rule with 'mm' graduation shall be fixed throughout the vertical cylinder actuating direction for additional reference required for operator setting. Stroke/Depth for offsetting – minimum 4 different settings to be provided through PLC.	

S. No.	PARTICULARS AND BHEL SPECIFICATIONS	Vendor's OFFER
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. (Considering the range of dies used from minimum to maximum –details to be furnished). The fixtures shall be movable and sliding on the machine base. The movement shall be motorized. The fixture shall be easily detachable.	
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 at convenient location for minimum piping and easy approach for Maintenance. Hydraulic system layout to be provided.	

S. No.	PARTICULARS AND BHEL SPECIFICATIONS	Vendor's OFFER
11.2	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 (1.0 to 1.5m length) to be provided. Vendor to confirm.	
11.3	Maximum Operating Pressure of hydraulic system. The maximum pressure of the system should preferably not to exceed 315 bar. Vendor to specify	
11.4	It should be possible to replace hydraulic elements like valves, manifolds etc without disturbing the associated pipelines. The positioning of hydraulic elements should allow easy maintenance. Vendor to specify	
11.5	The Power pack should be designed taking into account the energy efficiency (Hi-low pump system, proper unloading during idling, etc.). The motor used for pumps shall be of energy efficient ones. Vendor to specify	
11.6	Each pump should have an independent motor. Tandem pumps shall be avoided. Vendor to specify	
11.7	Pump unloading feature during idle running to be provided for energy conservation.	
11.8	Hydraulic circuit is to be designed with minimum number of control valves. It should be possible to replace hydraulic elements like valves, manifolds etc., without disturbing the associated pipelines. The positioning of hydraulic elements should allow easy maintenance. Vendor to furnish details	
11.9	All oil pipelines shall be of seamless steel and should undergo pickling process.	
11.10	All cylinders used in the machine should have standard bore and rod sizes. The piston rod shall be hard chrome plated. Vendor to specify	
11.11	Cylinder design shall be such that the lock nut on rod end can withstand the full load even the piston is at its extreme position. Cylinder seals also should not get affected during the above operation. Vendor to confirm	

S. No.	PARTICULARS AND BHEL SPECIFICATIONS	Vendor's OFFER
11.12	Refrigerant type Cooling system of sufficient capacity to maintain complete Hydraulic System at a temperature not exceeding 40 deg C irrespective of the ambient conditions. Vendor to confirm & furnish details. The components used in Chiller unit should be of reputed standard make acceptable to BHEL. The hydraulic oil cooling unit shall be tropicalized.	
11.13	Main Pump flow in lpm and Motor Power in kW Vendor to specify	
11.14	Hydraulic Oil Tank / Reservoir capacity (in litres) Vendor to specify	
11.15	Maximum Operating Pressure of hydraulic system. Vendor to specify	
11.16	Servo valves, if any, should be mounted close to their actuators Vendor to confirm	
11.17	The control voltages for all the Solenoids of the valves shall be of 24- V DC and all solenoid operated DC valves should have manual override provision and LED indications. Vendor to specify	
11.18	All the pipe / hose end fittings shall be of standard weld nipple with O ring seating type (DIN 3865 or equivalent). No ferrule joints are to be used in the hydraulic system. All threaded connections shall be of metric sizes. Vendor to confirm	
11.19	Hydraulic power pack and Oil tank shall be separate from the Machine and positioned behind the machine conveniently to attend to any maintenance problems	
11.20	All hydraulic pipelines, hoses and electrical control cables to be neatly laid out with proper clamps and flexible hose conveyors wherever required. Vendor to confirm	
11.21	The pipelines to be painted with standard colors as per the color coding accepted internationally for hydraulic systems. Vendor to furnish details.	
11.22	All oil pipelines shall be of seamless steel and should undergo pickling process. Vendor to confirm	
11.23	All hydraulic Tube lines to be neatly laid out.	
11.24	All the components in the hydraulic power pack shall be provided with identification numbers, as per the hydraulic circuit and should be pasted with metallic identification number plates. Vendor to confirm	

S. No.	PARTICULARS AND BHEL SPECIFICATIONS		Vendor's OFFER
11.25	Suitable filtration system should be provided with Duplex / standby filter units. It is preferable to use re-usable type of filter elements in the system. Vendor to specify		
11.26	Failure indication for oil level, temperature, pressure, filter clogging should be provided. Vendor to confirm & furnish details		
11.27	Safety interlock / automatic shut off provision during hose failures, chiller failure, low oil level etc. Details should be submitted. Vendor to specify		
11.28	First fill of Hydraulic oil to be provided by Vendor. Vendor to confirm		
11.29	Safety interlocks like auto shutoff during low oil level , sudden hose failure etc,. shall be incorporated. Vendor to specify and give details		
11.30	Pressure gauge at the working level of the operator is to be provided for indicating working pressure.		
11.31	Pressure setting adjustment (Pressure relief valve) has to be provided at operator level, to adjust the pressure based on requirement. Vendor to confirm.		
11.32	Suitable leakage oil collection metallic tray to be provided wherever required. Vendor to confirm		
11.33	Suitable vibro-mounts, compensators (flexible bellows), flexible hose at the pump outlet, polypropylene clamps for pipes & hoses, etc are to be provided to minimize the vibration induced and transmitted to the hydraulic joints. Vendor to confirm		
12.0	**LUBRICATION :**		
12.1	Machine lubrication: Automatic centralized lubrication system with timer control and suitable metering cartridges to be supplied.	Vendor to confirm	
12.2	First filling of Lubrication Oil & Grease shall be vendor's. Indian equivalent shall be mentioned.	Vendor to specify	

S. No.	PARTICULARS AND BHEL SPECIFICATIONS		Vendor's OFFER
13.0	**PNEUMATIC SYSTEM:**		
13.1	The pneumatic operated elements of the machine shall work efficiently with BHEL compressed air supply at a pressure of 4.5 to 5 kg/cm2. If higher air pressure is required for efficient operation of the machine, vendor shall furnish the information for Air Compressor of suitable capacity.	Vendor to confirm	
13.2	BHEL will provide compressed air at only one point near / on the machine. Vendor shall provide suitable filter-regulator-lubrication (FRL) unit, fitted with hand wheel valve, at this point.	Vendor to confirm	
13.3	Hydraulic, Pneumatic & Lubricating oil piping should be preferably metallic except places where flexible piping is essential. All the pipes required for the same shall be included in the standard scope of the machine.	Vendor to confirm	
14.0	**ELECTRICAL & ELECTRONICS SYSTEMS**		
14.1	415 V with a voltage fluctuation of +/- 10%, 50HZ with a fluctuation of +/-3%, 3 Phase AC (3 wire system without neutral) power supply will be provided by BHEL at a single point near the machine, as per layout recommended by Vendor. All cables, connections, circuit breakers etc. required for connecting BHEL's power supply to the machine shall be in the scope of vendor.	**Vendor to confirm**	
14.2	Tropicalization: All electrical / electronic equipment shall be tropicalized and shall have IP54 degree of protection	Vendor to confirm	
14.3	All electrical & electronic control cabinets & panels should be vermin and dust proof.	Vendor to confirm	
14.4	All electrical components in the cabinets should be mounted on DIN Rail	Vendor to confirm	
14.5	All electrical and electronic panels should be provided with fluorescent lamps for sufficient illumination and power receptacles of 220 Volts, 5/15 Amp AC. All adapters /receptacles should have compatibility with Indian equivalents.	Vendor to confirm	

S. No.	PARTICULARS AND BHEL SPECIFICATIONS		Vendor's OFFER
14.6	Control panel shall have built in 230V, 5 amps, 3 pin plug.	Vendor to confirm	
14.7	Motors & other electrical components shall conform to IEC or Indian Standards	Vendor to confirm	
14.8	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	
14.9	All alarm tripping logics and control logics incorporated in the machine to be listed out by the vendor.	Vendor to confirm	
14.10	Control circuit voltage should be 24 V DC.	Vendor to confirm	
14.11	Vendor should ensure the proper earthing for the machine and its peripherals. Earth electrode with connecting conductors with suitable earth resistance value (preferably less than 1.5 ohm) shall be supplied with the machine. The location for earth pit shall be indicated in the machine foundation drawing. Accordingly Earth pit will be provided by BHEL. Earth Electrode maintenance shall be mentioned in the O&M manual.	Vendor to confirm	
14.12	Cables shall be routed through totally enclosed cable trays. There shall not be cable trenches.	Vendor to Confirm	
14.13	Type of drives used for motors to be indicated.		
14.14	All feedback systems & field sensors, limit switches, proximity switches, pressure switches, temperature controllers, should be for heavy duty application and wired up with flexible PVC insulated screened cables. All field elements shall have easy accessibility for maintenance.	Vendor to Confirm	
14.15	Encoders, limit switch, feedback devices shall be suitably placed for easier accessibility rigidly.	Vendor to Confirm	
14.16	All components/devices/terminals are to be incorporated with ferrules.	Vendor to Confirm	

S. No.	PARTICULARS AND BHEL SPECIFICATIONS		Vendor's OFFER
14.17	Air Conditioners with Dehumidifiers of suitable capacity to be provided for all Electrical / Electronic Panels / Cabinets considering specified ambient conditions. **Make:** RITTAL / WARNER & FINLEY or any other reputed make acceptable to BHEL. Detailed specifications to be submitted. Vendor to Specify	Vendor to Confirm	
15.0	**Controls:**		
15.1	Type of controls provided - PLC	Vendor to specify	
15.2	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	
15.3	Offset Cylinder Stroke Control to be provided - The operator should be able to set the stroke length in 4 different positions.	Vendor to specify	
15.4	A digital display of the offset Stroke length to be provided	Vendor to confirm	
15.5	Pendant operator control of all the machine operation by Manual / Auto / Semi-Auto mode to be provided	Vendor to confirm	
15.6	Pendant operator control shall be provided with joy stick controls for hydraulic up / down movements. Pendant control shall be housed in dust proof enclosure.	Vendor to confirm	
15.7	The Offset bending process field sensors, such as encoders, limit switch, feedback devices shall be suitably placed for easier accessibility and rigidly mounted.	Vendor to confirm	
16.0	**PREFERRED MAKES OF COMPONENTS**		
16.1	The PLC system used in the machine shall be of Siemens/Allen Bradley/ Mitsubishi/ Delta / Messung or other reputed makes acceptable to BHEL.		

S. No.	PARTICULARS AND BHEL SPECIFICATIONS		Vendor's OFFER
16.2	All hydraulic elements such as Pumps, valves, accessories etc. shall be of EATON-VICKERS / BOSCH-REXROTH or any international reputed make acceptable to BHEL.		
16.3	All hydraulic hoses shall be preferably of GATES / PARKER HANFFIN / AEROQUIP make or reputed makes acceptable to BHEL.		
16.4	The seals used in cylinders shall be of Merkel / Parker / Bushak + Shamban / Hunger / Simrit make and shall withstand an over-loading of 25 % Vendor to confirm & furnish details.		
16.5	The filter unit used in the hydraulic power pack shall be of Hydac / Parker / Rexroth/EATON-Vickers or equivalent reputed make acceptable to BHEL.		
16.6	Lubrication system used in the machine should be of SKF/CENLUB or reputed make acceptable		
16.7	All Pneumatic components used in the machine should be of FESTO/SMC makes only		
16.8	All motors shall be from makers like SIEMENS, ABB, Allen Bradley, Crompton Greaves, Kirloskar, Hindustan, Bharat Bijlee, GEC Allen Bradley, Mitsubishi, Toshiba, Baldor or any other internationally reputed makes conforming to IEC/IS Standards, acceptable to BHEL. Electrical motors should be of Energy efficient EFF1/IE2 class.		
16.9	All electrical items shall be of from SEW / ROCKWELL Allen Bradley/ Telemechanique / Delta/ L&T/ Siemens/ GE or reputed makes acceptable to BHEL.		
16.10	Encoders and digital display units shall be of HEIDENHAIN / FAGER /ASM make		
16.11	All the VFDs used in the machine shall be of Siemens/ ABB/ Mitsubishi/ Allen Bradley/ Yaskawa/ Danfoss or other reputed makes acceptable to BHEL.		
16.12	All components/devices/terminals are to be incorporated with numbered ferrules.		
17.0	**MACHINE LIGHTS**		
17.1	Machine Spot Lights for sufficient illumination to be provided for clear visibility at the bending area. Vendor to Confirm	Vendor to Confirm	
17.2	All light fittings, consumables, adapters/receptacles should have compatibility with Indian equivalents. Vendor to Confirm	Vendor to Confirm	
17.3	A magnetic base 24- volt portable spotlight with sufficiently long cable should be provided.	Vendor to Confirm	

S. No.	PARTICULARS AND BHEL SPECIFICATIONS	Vendor's OFFER
18.0	**DRAWING APPROVAL**	
18.1	GA drawings, Machine detailed constructional (main & sub assembly) drawings with dimensions Hydraulic / Pneumatic / Lubrication / Electrical / Electronic circuits with detailed BOM, are to be submitted within 45 days from the date of ordering (in case of an order) for approval by BHEL before start of manufacturing. BHEL shall provide approval within 15 days after all the clarifications sought have been submitted by supplier.	
19.0	**FOUNDATION:**	
19.1	Supplier to submit Civil Foundation layout drawing with details of static & dynamic loads, within one month after BHEL approval of manufacturing drawings. The shop floor at BHEL works has 200mm concrete thickness with M15 concrete mix. Based on the submitted foundation layout, BHEL shall prepare Civil Foundation drawing. Civil foundation work is under the scope of BHEL.	
20.0	**Machine Levelling & Anchoring System:** Complete anchoring system including foundation bolts, anchoring materials, fixators, levelling shoes etc. should be supplied with the machine	
21.0	**Infeed & Out Feed Stands:**	
20.1	**Tube Storage system**	
20.1.1	Tubes will be loaded to the storage rack in the form of bundles. At a time, TWO bundles may be loaded (max wt. 10 metric ton) on the storage rack. Each tube bundle size will be equivalent to that formed by 20 tubes of OD 63.5 mm or 40 tubes of 38.1mm.	
20.1.2	Storage rack shall have a flat portion of minimum width: 1000mm, length: 16m and at suitable height (vendor to specify) from the ground to load the bundles. Storage Rack shall have suitable Bundle Stopper arrangement pneumatically operated to hold the tubes in bundle form. Vendor to provide supports for minimum tube length of 2000mm.	
20.1.3	A Sloping rack of width: 1500mm and length: 16m shall be provided after the storage rack. The angle of slope shall be 4-5 degrees. Vendor to specify the angle. Also the in feed stand shall be lined with Teflon / nylon so that the noise generated during tubes roll over is minimum.	

S. No.	PARTICULARS AND BHEL SPECIFICATIONS	Vendor's OFFER
20.1.4	Release of Bundle Stop shall spread the bundled tubes (as single layer of tubes) on the sloping stand, without causing damage to the tubes and the storage rack system.	
20.1.5	A tube stopper mechanism should be provided before tube kick-off facility. Vendor to specify	
20.1.6	A Pneumatically operated 'Lift and tube roll type' tube kick-off system to be provided to lift one tube at a time from storage rack and deliver to the pinch roller conveyor for in-feed to the machine. Vendor to furnish details.	
20.1.7	**Constructional Details** a) Storage rack shall be made of stands & supports and the storage rack including bundle stops should be designed such that no damage occurs due to the impact loading and rough handling of tubes. b) The minimum thickness of sections and plates used for the structure construction should not be less than 7.5 mm. c) Vendor to specify the Speed and Rating of Electric Motors and details of the Drives selected.	
20.2	**Tube conveying system**	
20.2.1	Pinch roller conveyor of Heavy Duty type provided with a tension adjuster, so as to maintain a constant roller & tube contact to achieve the feed rate should be provided.	
20.2.2	The pinch roller conveyor should have a two way drive i.e. forward and reverse for feeding the tubes into the machine and reversing it. Type of drive for the conveyor – vendor to provide details.	
20.2.3	Suitable height adjustment feature in the pinch roller system/tube conveyor for accommodating various tubes of diameter ranging from 38.1 mm to 76.1 mm. Vendor to specify.	
20.2.4	Vendor to specify details such as dia. of roller, pitch between rollers, Width of the roller etc.	
20.2.5	Suitable Guide roller arrangement on in-feed conveyor system. Vendor to specify and furnish details.	

S. No.	PARTICULARS AND BHEL SPECIFICATIONS	Vendor's OFFER
20.2.6	Conveyor Line Speed (Tube Feed Rate). To match the expected productivity level. Vendor to specify	
20.2.7	The vendor shall furnish a schematic diagram for the tube conveying System & Roller and Drive Arrangements.	
20.2.8	After the pressing of the bend, the tube shall be rotated manually by 90° so that the tube bend comes on to horizontal plane and then pushed out.	
20.2.9	Vendor shall submit the full details of Infeed stand along with tube conveying system as mentioned above clause from 18.1 to 18.2 – Vendor to confirm	
21.0	**TOOLINGS:**	
21.1	Complete set of toolings as listed below shall be provided: 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 following sizes: **1. Tube Dia. 44.5 – R143** **2. Tube Dia. 47.63 – R152** **3. Tube Dia. 54 – R165** **4. Tube Dia. 63.5 – R160** Sizes mentioned in specification and any optional tooling should be listed and quoted out item wise separately. Note: Detailed Manufacturing drawings for all Toolings are to be submitted for BHEL approval before manufacturing. Three sets of Tooling drawings are to be submitted with machine documents in case of an order.	

S. No.	PARTICULARS AND BHEL SPECIFICATIONS	Vendor's OFFER
22.0	**AMBIENT CONDITIONS & THERMAL STABILITY**	
22.1	Total machine and all supplied items should work trouble free and efficiently under following operating conditions and should give specified accuracies. Ambient Conditions: Temperature: +5 to +50 Degree Celsius and Relative Humidity: 90% maximum, both do not occur simultaneously.	
22.2	The entire equipment shall be Tropicalized in Design and Construction	
22.3	The offered equipment, Hydraulic system has to work in a normal fabrication shop environment in ambient conditions.	
22.4	The machine, including attachments and accessories, should be suitable for 24 hrs. Continuous operation to its full capacity for 24 hour a day and 7 days a week throughout a year. Vendor to ensure and confirm the same.	
23.0	**ENVIRONMENTAL PERFORMANCE OF THE MACHINE:**	
23.1	Maximum noise level shall be 85 dB (A) at normal load condition, 1 metre away from the machine with correction factor for back ground noise, if necessary. Vendor to confirm	
23.2	If any safety / environmental protection enclosure is required it shall be built in the machine by the vendor. Vendor to confirm	
23.3	Paint of the machine should be oil / coolant resistant and should not peel off and mix up with coolant. Vendor to confirm	
24.0	**SAFETY**	
24.1	All safety features and safety interlocks provided in the machine shall be listed out by the vendor.	
24.2	Vendor to specify the safety features incorporated in the machine during pressing	
25.0	**TOOLS FOR OPERATION & MAINTENANCE:**	
25.1	Necessary tools like Torque Wrench, Spanners, Keys, Grease guns etc. for operation & maintenance of the machine should be supplied. List of such tools shall be submitted with offer.	

S. No.	PARTICULARS AND BHEL SPECIFICATIONS	Vendor's OFFER
26.0	**SPARES (to be recommended by the vendor)**	
26.1	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)**	
26.2	**Mechanical & Hydraulic Spares:** Bearings, Couplings, Gears and all types of Pumps, Valves / Pressure switches / transducers/ gauges / Flow Switches / Filters / Cylinder seal kit / All O- rings & Oil seals, Each type of Hydraulic Hoses,etc. <u>The vendor has to quote the following essential Spares compulsorily</u>: a) For Mechanical wearing components due to linear movements & rotation, couplings, bearings etc. - 2 Sets b) For Hydraulic Power Pack, Each type of hydraulic valves & pump, Complete Seal kit for all hydraulic cylinders, filters and each type of hydraulic hoses used in the machine etc., - 2 Sets	
26.3	**Electrical / Electronic / Control System Spares:** All types of Relays, Contactors, Proximity Switches, Push Buttons, Indicating Lamps, Semiconductor Fuses, Special Fuses, Circuit Breakers, Main Power Switch, Encoders, Spares for CNC, Servo Motors for Feed Drives, Drive and Power Module & Control Cards for Main Drive as well as Feed Drives etc. <u>Essential Spares for vendor has to quote compulsorily</u> a) **Each type** of PLC / NC - PCBs (I/O card, digital to analogue card, CPU card, power supply board etc.) display unit, HMI etc., - **2 sets** each b) **Each type** of Field sensors, such as encoders, optical sensors, proximity switch, limit switches, push buttons, indicating lamps etc. - **2 sets** each	

S. No.	PARTICULARS AND BHEL SPECIFICATIONS	Vendor's OFFER
26.4	All types of spares for total machine and accessories should be available for at least seven 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	
27.0	**DOCUMENTATION:**	
	The following documents in English language should be supplied along with the machine: **Hard Copies - 3 Sets** **In CD form - 1 Set** **Vendor to confirm** 1. Operating manuals of Machine & its Control System 2. One set of approved drawings (GA, mechanical, electrical, hydraulic, pneumatic & lubrication) 3. Programming manuals of Machine & its Control System 4. Maintenance manuals with drawings of machine assemblies / sub-assemblies with parts list 5. Electrical circuit diagrams with bill of materials, component layout drawings for operator and control panels clearly indicating arrangement of electrical components in the panels 6. Hydraulic circuit diagrams with bill of materials 7. Pneumatic circuit diagrams with bill of materials 8. Lubrication circuit diagram with bill of materials 9. Maintenance & Interface manuals, Installation support guides etc for Machine Control System 10. Manufacturing drawings for all tooling's ordered with machine under clause 10.0 11. Catalogues, O&M manuals for all bought out items used in the machine. 12. Detailed specification of all rubber items / hydraulic / lubrication fittings 13. Complete master list of parts used in the machine 14. PLC program print-outs/ladder logic with comments in English 15. PLC program backup and data, PLC software (installable on any PC/laptop) on CD 16. Complete list of Alarm log, Error code, error messages & remedies and on line fault diagnostics to be provided by the vendor.	

S. No.	PARTICULARS AND BHEL SPECIFICATIONS	Vendor's OFFER
28.0	**MACHINE PRE-DESPATCH INSPECTION AND ACCEPTANCE:**	
	Complete machine shall be assembled and offered for inspection and performance trials to test the design capabilities of the machine, by BHEL Engineers before Dispatch at Supplier's works. <u>Acceptance Criteria during pre-dispatch inspection:</u> a) Physical Inspection and Design/Constructional/Dimensional Compliance as per the approved drawings. b) All the features of the machine construction shall be operated and shown in good working condition as per the Technical Specification and Drawings approved by BHEL. c) Prove-out trials shall be done on tubes that are supplied by BHEL and bends as required by BHEL during technical discussion. d) Quality tests are to be conducted by the supplier, on the bends made during prove-out trials and the results should be within the tolerance limits as per Clause 4.0.	
29.0	**MACHINE INSPECTION AND TESTS TO BE CARRIED FOR COMMISSIONNG AT BHEL WORKS**	
	After the machine has been erected and energized, a few idle runs have to be done to demonstrate the good working condition of the machine. Successful proving of BHEL components by the Vendor shall be considered as part of commissioning. <u>Acceptance Criteria during commissioning:</u> a) Physical Inspection and Design/Constructional/Dimensional Compliance. Ensuring proper working of all components and accessories of the machine erected. b) Prove out trials to be conducted on the tubes given by BHEL with the toolings supplied along with the machine. c) Quality tests will be conducted by BHEL, on the bends made during prove-out trials at BHEL and the results should be within the tolerance limits as per Clause 4.0. d) Actual jobs shall be loaded to see the performance of the machine during continuous running for two 8 hr shifts. e) Productivity should be proven as per clause 5.1 on actual jobs or test pieces.	

S. No.	PARTICULARS AND BHEL SPECIFICATIONS	Vendor's OFFER
30.0	**ERECTION AND COMMISSIONING**	
30.1	The supplier shall depute his engineer(s) for supervising & execution of the erection and commissioning of the machine at BHEL works and prove-out trials Supplier shall be responsible for carrying out the erection and commissioning of the Vertical Offset Press. Required technical personnel and labour required for the same shall be provided by the vendor. Tools, tackles, required for the same shall be a arranged for by the vendor.	
30.2	Service requirement like power, air & water shall be provided by BHEL at only one point to be indicated by vendor in their foundation / layout drawings.	
30.3	Successful proving of BHEL components by the Vendor shall be considered as part of commissioning. All tests, as mentioned at Specification Clause No. 30.0 (Machine Acceptance) shall form part of the commissioning activity.	
30.4	Portion, if any, of the machine, accessories and other supplied items where paint has rubbed off or peeled during transit or erection should be repainted and merged with the original surrounding paint by the vendor. For this purpose, the vendor should supply sufficient quantity of touch-up paint of various colors of paint used.	
31.0	**TRAINING**	
31.1	The supplier shall train Three BHEL's Engineers in Operation and Maintenance (Mechanical, Hydraulics, Electrical/ Electronics) of the Machine at supplier's works for a period of 3 working days.	
31.2	Travel, board & lodging for the BHEL Engineers who will be visiting supplier's works for pre-dispatch inspection and training, shall be borne by BHEL. Vendor to note.	
31.3	The supplier shall impart training to BHEL's Machine Operators and Maintenance crew in Operation and Maintenance (Mechanical, Hydraulics Electrical/ Electronics) during commissioning of the Machine at BHEL works for not less than 5 working days.	

S. No.	PARTICULARS AND BHEL SPECIFICATIONS	Vendor's OFFER
31.4	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	
32.0	**PAINTING:**	
32.1	The heavier machine parts are to be heat-treated after fabrication (including castings and forgings) and shot blasted for surface preparation prior to painting.	
32.2	One coat of Primer with 25microns of DFT (Dry Film Thickness)	
32.3	Finish coat by Polyurethane Paint. Colour shade: RAL 6011 (Reseda Green)	
33.0	**PACKING**	
33.1	Sea worthy and Rigid packing for all items of complete machine, all Accessories and other supplied items to avoid any damage/loss in transit. All loose and small parts to be packed in sealed boxes. All electrical and electronic items to be packed separately to prevent any damage during transit. Vendor to confirm	
34.0	**GENERAL POINTS**	
34.1	Make and Model of the machine to be mentioned. Detailed catalogs of the machine to be sent with the offer.	
34.2	Complete description of all systems & sub-systems shall form part of the technical bid.	
34.3	A schematic diagram showing the layout of the machine & associated systems with salient dimensions shall be submitted along with the offer. Hydraulic system layout to be provided.	
34.4	The operating sequence of the machine with broad outline of various operations involved should be furnished with the offer.	

S. No.	PARTICULARS AND BHEL SPECIFICATIONS	Vendor's OFFER
34.5	Quality plan followed in Vendor's works	
34.6	Standards for Design, Manufacture and testing of the machine shall be in accordance with internationally accepted standards.	
34.7	The factor of safety considered for designing the machine, for certain load bearing components shall be furnished with the offer.	
34.8	Floor area required (Length, Width, Height) for complete machine & accessories	
34.9	Total connected load in kVA	
34.10	Total weight of the machine	
34.11	Weight of heaviest part of machine	
34.12	Weight of the heaviest assembly/subassembly of Machine	
34.13	Dimensions of largest part/ subassembly/ assembly of the machine	
35.0	**GUARANTEE**	
35.1	Equipment has to be guaranteed for its performance, for a minimum of 12 months from the date of commissioning OR 18 months from the date of supply whichever is earlier	
36.0	**SCOPE OF SUPPLY**	
36.1	**Supplier Scope** 1. Design, Manufacture, Supply, Erection, Commissioning and prove out of Vertical Hydraulic Press 2. Infeed stand along with tube conveying system. 3. Toolings & Spares as per PO 4. All anchoring & foundation bolts, levelling plates for the complete machine 5. First fill of Hydraulic Oil, Lubrication Oil, Grease 6. Levelling Instruments, Power Tools / Hand Tools for erection. 7. Welding machines and consumables required for erection 8. Commissioning Engineer with erection crew 9. Job Quality and Productivity Prove-out	

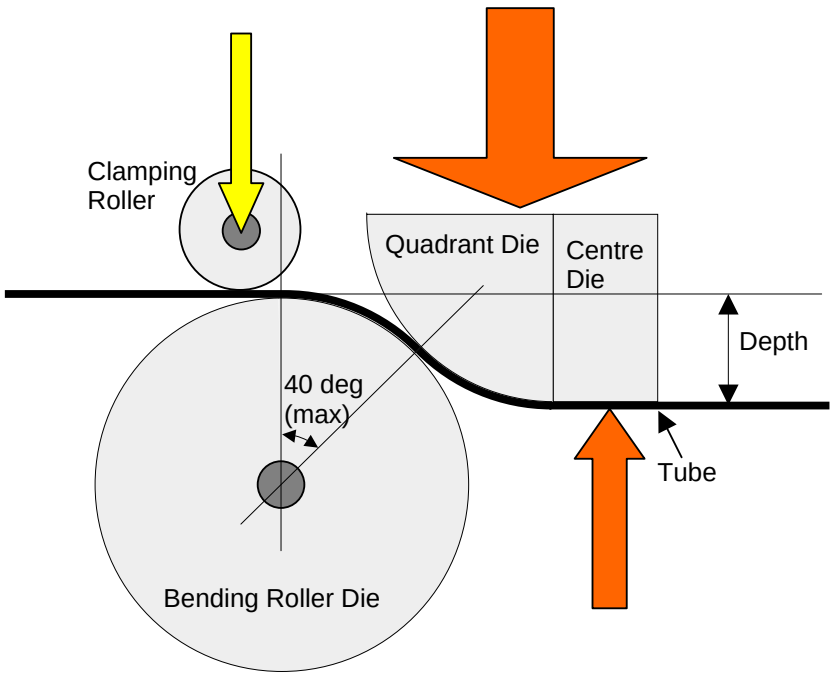
S. No.	PARTICULARS AND BHEL SPECIFICATIONS	Vendor's OFFER
36.2	**BHEL Scope** 1. Drawings approval 2. Civil foundation work as per manufacturer's drawing 3. Tube materials for trials and prove out 4. EOT Crane inside shop 5. Single Compressed air point at the location indicated in the drawing 6. Single Electrical Supply point at the location indicated in the drawing	

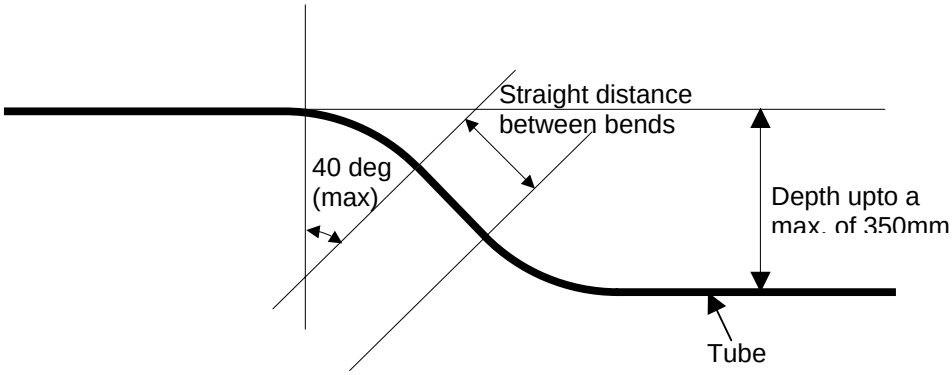
Enclosures:

Annexure-1 - Offset Configurations

ANNEXURE – I

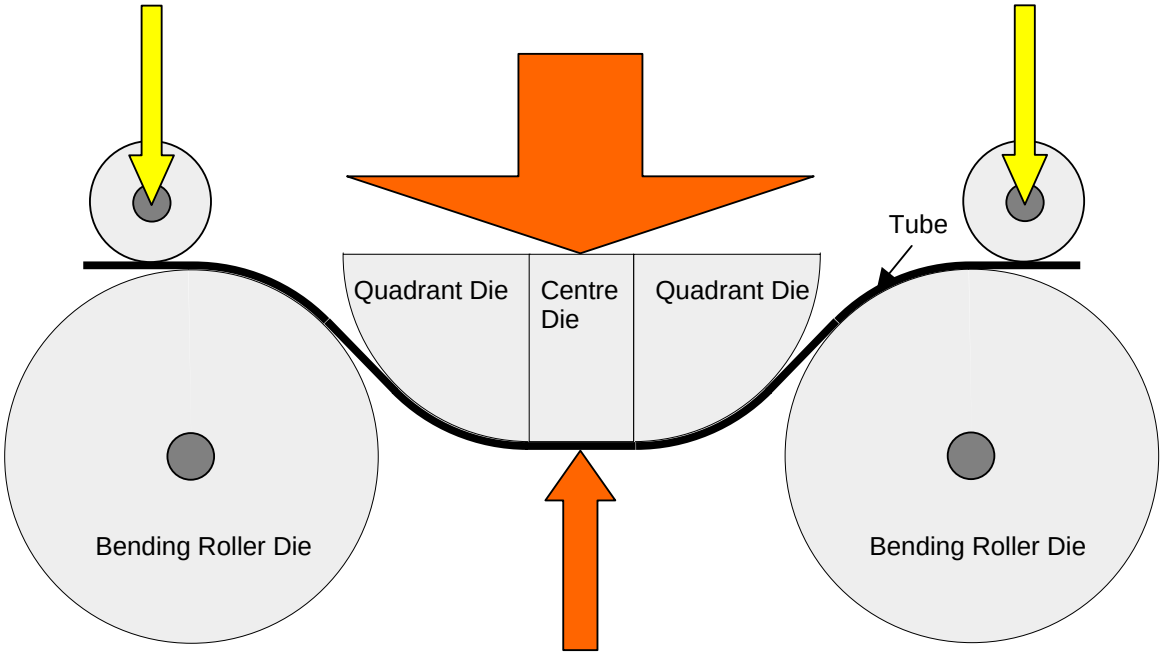
VERTICAL OFFSET PRESS - BEND CONFIGURATIONS

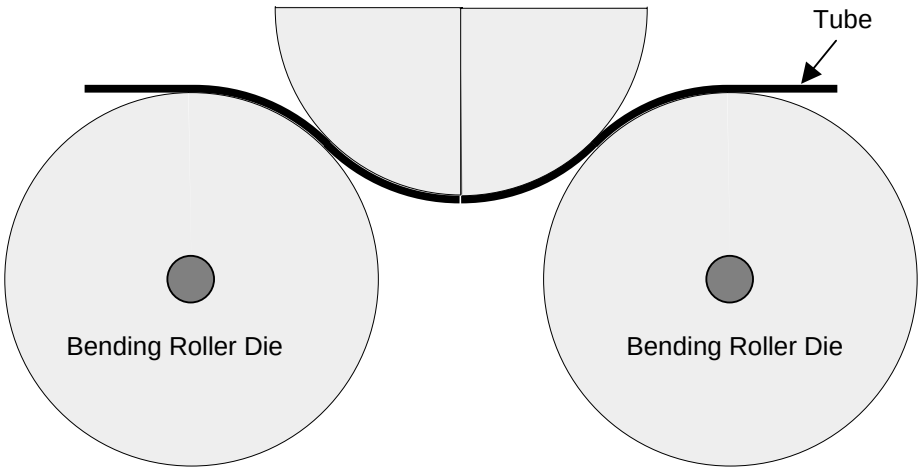




VOP – Bend Configuration
CABS - 2 - 14N – 01
BHEL, TIRUCHIRAPPALLI

VERTICAL OFFSET PRESS - BEND CONFIGURATIONS





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