

COLD MILL MECH MTCE- SSTP/BHEL/TRICHY-620014

TECHNICAL SPECIFICATIONS FOR
RETROFITTING OF SEAMLESS STEEL TUBE STRAIGHTENING MACHINE IN COLD MILL

SCOPE OF WORK: Retrofitting by study, design, manufacture, supply, erection and commissioning of Seamless Steel Tube Straightening Machine components for cold

SL.No	TECHNICAL SPECIFICATIONS	SSTP/BHEL requirement	Supplier's Response
1	DESCRIPTION	6 roll (3 sets) seamless steel tube straightening machine which * Includes tube inlet arrangement with singling mechanism * Entry roller conveyors of 9 Nos with IC Bauer make geared motors of capacity 0.75 KW each (bi-directional) with 11 KW inverter * With suitable PLC system of M/S SIEMENS make S7-300 model, * 2 Nos of 30 KW energy efficient and inverter duty SIEMENS/ABB motors to drive top and bottom rolls individually * Inverter with 75 KW rated SIEMENS/ABB make with 160 % overloading capacity with a suitable power and control panels of max height 1800 mm * Conveyor bed up and down mechanism with 2 pneumatic cylinders of Parker/ Veljan/Festo/Jenatics make * Charging troughs with Polyurethane / Vulkolan liners openable and closable by 2 pneumatic cylinders of Parker/Veljan/Festo/Jenatics make with kick in mechanism as in the existing machine * With required pneumatic valves fitted in the valve stands of Parker-Bellows/Veljan/Festo/Jenatics model with control coil voltage of 24 V DC * Exit table with CI liners which should have axial movement and angle tilting provision with tie rod mechanism as in the existing m/c * Main m/c bottom roll center height from ground level is to be 1200 mm and gap between of front and back main support columns is to be min 800 mm to avoid U/J shaft fouling with column as indicated in our sketch: CMM: 067 dt 09/11/09.	
2	For straightening of round seamless steel tubes max outside diameter	90.0 mm	
3	Minimum outside diameter	16.0 mm	
4	Wall thickness	2 mm min – 12.5 mm max	
5	Tube Length	4 m – 16 m	
6	Tube material	As per Annexure – 1	
7	No. Of work rolls	6 (3 pairs)	

mill as per the following specification.

8.0	MAIN MACHINE PARTICULARS		
8.1	Straightening speed	9--90 m/min (variable)	
8.2	Direction of Feed	From right to left (Will be confirmed at the design finalization stage, depend upon our layout finalization)	
8.3	Vertical adjustment of rolls	Manual by hand wheel with built in indicators .Vertical movement for all top rolls to be provided and for bottom only at middle roll with locking. The locking and unlocking operation should be smooth & simple and positive locking should be ensured.	
8.4	Angular adjustment of rolls	Manually by hand wheel with built in indicators. All top and bottom rolls are to be fitted with angular swiveling with locking. The locking and unlocking operation should be smooth & simple and positive locking should be ensured. Deposition of scales in roll gap and in angle changing mechanism should be avoided with suitable sealing arrangements.	
8.5	Roll assembly and roll cradle assy (SSTP/BHEL scope)	Roll for the machine is SSTP/BHEL scope. The machine should be designed to suit the existing roll cradle assembly. Required drawing for roll assembly (0-ST-232-01-010) and roll cradle assembly (20-ST-232-01075) will be supplied by SSTP/BHEL. Required cradle assy and rolls can be collected by the supplier on returnable basis for assy and trial at supplier's work.	
8.6	Achievable straightness	1 mm in 1000 mm, subject to max of 8 mm for 12.15 m from end to end.	
8.7	Input tube straightness	10 mm in 1000 mm or better	
8.8	Electrical system	Suitable to operate with 415 volts, 3 phases, 50 Hz power supply and all electrical controls to operate with 230V AC, and 110V DC for solenoid operations.	
8.9	Provision for tube entry guide mounting	There should be provision for mounting the tube entry guide and it is an integral part of the machine as available in the existing m/c. Required tube entry guide drawing for this purpose will be supplied by SSTP/BHEL. Supplier can collect one tube entry guide on returnable basis during assy at supplier's work. Tube entry guide is SSTP/BHEL scope.	
8.10	Main Gear box	Main gearbox should be of double input and three output type. The gear box should be made with hardened and ground gears. Gearbox should be of any standard make of M/S Elecon, M/S Shanthi gears, M/S Bon- Figliloi or M/S Premium Energy Tansmission. If it is custom built the detailed dimensional and sectional view drawing indicating all the parts, bearings, seals are to be given to SSTP/BHEL.	
9	Surface quality of output tube	Waviness in tubes (roll marks) should be avoided in the output tube.	
10	Tube loading platform and collecting troughs	Manufacture and erection is SSTP/BHEL scope.	
11	Electrical panels	Should be of power section, control section and operator desk with digital speed indicators, speed rise and lower buttons at operator desk. Processed tube counter unit to be provided at the operator desk.	

Note: The above referred drawings can be collected by the bidders from BHEL/SSTP/Purchase department

12	Inverter	Should have a capacity to give max torque at lower speeds less than 10% of rated.	
13	Electrical components	All internals of panels should be of SIEMENS make switch gears only.	
14	Drawing preparation	All the relevant drawings, assy drg, complete part drg, structural drg-to be submitted for SSTP/BHEL approval before starting the manufacture. Complete design values dimensions and the working performance of the machine is binding on the supplier only.	
15	Documentation	Operation and maintenance manual including all the bought out items details , seals , electrical circuits, PLC ladder logics and details of bill of materials are to be given in 4 sets hard copy and 1 soft copy in CD.	
16	Drawing Submission	All the relevant drawings, assy drg,complete part drg, structural drg to be submitted to SSTP/BHEL in 3 sets hard copy Xerox/ blue print and soft copy in CD auto cad 2008 version as per BHEL layer enclosed.	
17	Delivery	Overall delivery period should be 10 months. (With approximate break up for design 2 month and manufacture & supply 8 months.) Drawings. Shall be approved within 10 days from the receipt date if they are correct in all respects.	
18	Inspection	Stage inspection at suppliers work will be carried out by SSTP/BHEL during manufacture and also at assembly stage before dispatch.	
19	Dismantling	Dismantling the existing m/c and components will be done by SSTP/BHEL.	
20	Erection	Erection has to be carried out by the supplier within 30 days including electrical cabling PLC installation, testing and commissioning of equipment after BHEL/SSTP giving clearance for erection.Civil foundation and grouting will be done by SSTP/BHEL. Foundation drawing to be given by supplier in advance considering the loading pattern. Only flat shop floor will be given to the supplier.Erection by anchor fastening method. Supply of required anchor fasteners, drilling and fixing is supplier's scope. Only cable trench will be made in advance based on suppliers G.A.drg or civil drg.	
21	Required speeds and trial testing size : Each 200 nos in length range of 8-14 m is to be tested during trial testing of machine	<div> <div>21.3 x 2.5mm A1</div> <div>90m/min</div> </div> <div> <div>38.1 x 3.2mm A1</div> <div>80m/min</div> </div> <div> <div>44.5 X 7.1mm T22</div> <div>50m/min</div> </div> <div> <div>51.0 X 10.0mm Gr C</div> <div>45m/min</div> </div> <div> <div>76.1 X 7.1mm Gr C</div> <div>45m/min</div> </div> <div> <div>44.5 X 4.5mm A1</div> <div>70m/min</div> </div> <div> <div>88.9 x 5.49mm GrB</div> <div>40m/min</div> </div>	
22	Performance test & trial at SSTP	Performance test trial at SSTP for 44.5 dia size tube and length of 12. 15 m in 8 hours-1379 Nos to be processed.	
23	Gaurantee	Gaurantee of 12 months from the date of commissioning of the machine.	

DESCRIPTION OF MAIN STRAIGHTENING MACHINE

FUNCTION:

The multi cross roll tube straightening machine is based on the rotary principle of straightening which gives very high degree of straightness with the minimum amount of marking on both the inside and outside of the tubes. The multi cross roll arrangement allows a skin hardness to be imparted to the tube. The degree of hardness can be controlled by the amount of pressure applied.

DESCRIPTION:

General:

The rolls are mounted in 3 pairs, vertically disposed and supported by base and crown sections held together by substantial steel columns. The top & bottom rolls are driven by individual motors (one motor for top rolls and another motor for bottom rolls). The roll drives are through V-Belts and reduction transfer gear boxes. Final drive is through universal shaft to allow for vertical and angular adjustment of each roll.

The rolls are quickly and easily adjusted angularly to give line contact between tubes and roll over the maximum effective roll profile. This gives support to the tube during straightening over as great a length as possible and enables even very thin wall tubes to be straightened without being damaged.

Frame:

Base and crown section of the machine are of a substantial box section construction and held together by means of 5 numbers of steel columns as in the existing machine. This type of construction forms a very strong framework in keeping with the arduous duty and performance of the straightening process.

Rolls (BHEL/SSTP Scope)

The work rolls fitted to the straightening machine have an accurately generated hyperbolic profile and are manufactured from tool steel, hardened, ground and polished. They have great resistance to wear and can be redressed a number of times before replacement becomes necessary. All rolls are made from the same dimensions and their profiles are specially generated to give the best possible line contact setting for the widest possible range of tube diameters. The rolls may be supported by anti friction Plummer blocks.

Roll Adjustment:

The upper rolls are adjustable vertically to suit the tube dimensions. The centre bottom roll is also to be provided with vertical adjustment. By using the vertical adjustment to the center top and bottom rolls, the deflection of the tube is up or down, thus imparting the straightening action. All rolls are to be provided with angular adjustment to enable line contact.

Tube entry guide (BHEL/SSTP Scope)

An adjustable bell mouth-entering guide is to be provided to facilitate the feeding of the tubes into the straightening machine. With this guide assemblies tube inlet guide units of non- wear material to cover the entire range of tube diameters to be provided. There is a provision in the machine to accommodate the tube entry guide and this is the integral part of the main machine.

ANNEXURE-1

MATERIAL SPECIFICATIONS
(Chemical compositions & Mechanical properties)

S.No	Grade		C	Mn	Si	S	P	Cr	Mo	Ys	Ts	%E L	HR
01	SA 192	Min Max	0.06 0.18	0.27 0.63	-- 0.25	-- 0.035	-- 0.035	-- 0.20	-- 0.15	18.3 37	33 45	35 80	60 77
02	SA 210A1	Min Max	0.17 0.25	0.35 0.93	0.10 0.35	-- 0.035	-- 0.035	-- 0.20	-- 0.15	26 40	42. 2 50	30 --	70 79
03	SA 106 B	Min Max	0.19 0.25	0.29 1.06	0.10 0.35	-- 0.035	-- 0.035	-- 0.40	-- 0.15	24.6 50	42. 2 65	30 65	-- --
04	SA 179	Min Max	0.06 0.18	0.27 0.63	-- 0.10	-- 0.035	-- 0.035	-- 0.20	-- 0.15	18.3 --	33 --	35 --	55 72
05	SA210 C	Min Max	0.19 0.30	0.50 1.06	0.10 0.35	-- 0.035	-- 0.035	-- 0.20	-- 0.15	28.1 50	49. 2 65	30 70	72 89
06	SA106 C	Min Max	0.20 0.25	0.60 1.10	0.10 0.35	-- 0.035	-- 0.035	-- 0.40	-- 0.15	28.1 40	49. 2 58	30 70	-- --
07	SAE 1040	Min Max	0.37 0.44	0.60 0.90	0.10 0.40	-- 0.035	-- 0.035	-- 0.20	-- 0.15	53.5 --	63. 2 --	15 --	183 --
08	SAE 1541	Min Max	0.38 0.42	1.40 1.60	0.15 0.25	-- 0.025	-- 0.025	-- 0.20	-- 0.15	63.5 --	74 --	15 --	240 280
09	SA 209T1	Min Max	0.10 0.20	0.30 0.80	0.10 0.50	-- 0.025	-- 0.025	-- 0.20	0.44 0.65	21.1 --	38. 7 --	3- --	70 80
10	SA213T11	Min Max	0.05 0.15	0.30 0.60	0.50 1.00	-- 0.025	-- 0.025	1.00 1.50	0.44 0.65	21.1 50	42. 2 65	30 70	70 85
11	SA213T22	Min Max	0.05 0.15	0.30 0.60	0.10 0.50	-- 0.025	-- 0.025	1.90 2.60	0.87 1.13	21.1 50	42. 2 60	30 66	75 85
12	BS 3059 Part II	Min Max	0.08 0.15	0.40 0.70	-- 0.50	-- 0.030	-- 0.030	2.00 2.50	0.90 1.20	28 45	50 65. 3	20 --	-- --
13	SA 213 T 91	Min Max	0.07 0.14	0.30 0.60	0.20 0.50	-- 0.10	-- 0.020	8.00 9.50	0.80 1.05	60 --	85 --	20 --	25 HRC
14	AISI 602	Min Max	0.20 0.33	0.45 0.65	0.55 0.75	-- 0.03	-- 0.04	1.00 1.50	0.40 0.60	77.3 140.6	80 18 2.8	10 40	

Ys-Yield strength in Kg/mm2
Ts-Tensile strength in Kg/mm2
%EL-% Elongation
HR-Hardness in HRB

PART A

6 ROLL TUBE STRAIGHTENING MACHINE

SECTION – I : QUALIFYING CRITERIA

The BIDDER has to compulsorily meet the following requirements to get qualified for considering the technical offer for the 6 ROLL TUBE STRAIGHTENING MACHINE

S. No.	REQUIREMENTS	Vendor's Response
1	<p>Only those vendors who have supplied and commissioned at least one Tube Straightening Machine or any other special purpose machine or Reverse Engg of imported machines in the past ten years and such machine should be working satisfactorily for a minimum period of one year after commissioning, as on the date of opening of this Tender are eligible to quote.</p> <p><i>(However, if such machine is already supplied to BHEL, then that machine should be working satisfactorily for a minimum period of six months after commissioning, as on the date of opening of this Tender.)</i></p>	
The vendor should submit the following information where similar machine has been supplied, for qualification of this offer.		
1.1	Name and postal address of the customer or company where similar machine is installed.	
1.2	Name and designation of the contact person of the customer.	
1.3	Phone, FAX no and email address of the contact person of the customer.	
1.4	Month and Year of commissioning of the machine.	
1.5	Parameters of machine supplied, viz. Table size, Table load carrying capacity, Spindle power and the application for which the machine is supplied	
1.6	Along with the Technical offer, the Vendor should submit one Performance certificate from the customer for the satisfactory performance of the machine supplied to them. For obtaining the Performance certificate, a suggestive format is provided in SECTION – IV .	

2.0	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.	
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SECTION – II

The BIDDER / VENDOR is requested to provide the following information:

S. No.	REQUIREMENTS	Vendor's Response
3.0	The BIDDER/VENDOR to furnish Reference List of Customers, with full address, details of contact person, where above said machine have been supplied in the past.	
4.0	Details of such machine supplied to other BHEL units, if any. (Year of commissioning, Inlet /outlet table size, tube straightening capacity, Motor power).	
5.0	Details on SERVICE-AFTER-SALES Set-Up in India including the Address of Agents / Service Centers in South India.	
6.0	Any Additional Data to supplement the manufacturing capability of the BIDDER for the subject equipment.	

SECTION – III

The BIDDER to note:

S. No.	PARTICULARS	Vendor's Response
7.0	<p>The BIDDER / VENDOR shall submit the offer in TWO PARTS.</p> <ol style="list-style-type: none">1. Technical Offer [with PART A & PART B] and Commercial offer.2. Price Bid.	
8.0	<p>The Technical Offer shall contain a comparative statement of Technical Specifications demanded by BHEL and Offer Details submitted by the Bidder, against each clause.</p> <p>A just 'CONFIRMED' or 'COMPLIED' or 'YES' or 'NO-DEVIATION' or similar words in the technical comparative statement may lead to disqualification of the Technical Offer.</p>	
9.0	<p>The Technical Offer shall be supported by product Catalogues & Data Sheets and also technical details of Bought-Out-Items with copies of Product Catalogue to the extent possible.</p>	
10.0	<p>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.</p>	

SECTION – IV

The performance certificate should be produced **on Customer's Letter Head.**

PERFORMANCE CERTIFICATE

1. Supplier of the machine			
2. Make & Model of the M/C			
3. Month & Year of Commissioning			
4. Application for which M/C is used			
5	a) Inlet table length b) Outlet table length c) Min and max dia of tube can be straightened d) Motor Power e) Accuracy of straightening		
6. Performance of the Equipment (Tick whichever is applicable)		Best in the market	
		Satisfactory	
		Good	
		Average	
		Not Satisfactory	
7. Any Other remarks			
<div style="text-align: right; padding-right: 50px;">Signature & Seal of the Authority</div> <div style="text-align: right; padding-right: 50px;">Issuing the Performance Certificate</div> <div>Date:</div>			



An ISO 9001 Company

Bharat Heavy Electricals Limited
(Seamless Steel Tube Plant)
Tiruchirappalli-620014, Tamil Nadu, India

ANNEXURE-C

COMMERCIAL TERMS AND CONDITIONS APPLICABLE FOR OPEN TENDER

INSTRUCTIONS TO THE BIDDERS:

1.0 QUOTATIONS

Bidders shall submit the offer in **TWO INNER ENVELOPES** as indicated below which shall be sealed in one outer envelope.

Envelope I This sealed envelope should contain all the copies of technical bid together with un-priced commercial bid. This envelope should be clearly marked **“Part I - Technical and Un-priced commercial bid”**, indicating Tender No., Due Date and Address & Reference of the Bidder.

Envelope II This sealed envelope should contain **price details**. This envelope should be clearly marked **“Part II - Price bid”**, indicating Tender No., Due Date and Address & Reference of the Bidder.

Both the envelopes (Part I & II) shall be put in one cover, duly sealed, superscribing as Part I and Part II of Tender No., due date of opening and the address and reference of the Bidder.

The above offer should reach this office on or before the due date by 14.00 Hrs (IST).

Tender should not be addressed to any Individual's name but only by designation to:

**DGM / PURCHASE & CONTRACTS
BHARAT HEAVY ELECTRICALS LIMITED
SEAMLESS STEEL TUBE PLANT
TIRUCHIRAPALLI - 620 014
TAMIL NADU, INDIA**

Tenders should be free from **CORRECTION AND ERASURES**, Corrections if any, must be attested. All amounts shall be indicated both in words as well as in figures. Where there is difference between amount quoted in words and figures, amount quoted in words shall prevail.

Offers should be in **ENGLISH** and accompanied by detailed technical literature, catalogue and detailed dimensional drawings in **ENGLISH** or otherwise, the offers will not be considered.

2.0 PART I (TECHNICAL & UN-PRICED COMMERCIAL BID)

2.1 Technical

This part shall include / indicate the following:

- 2.1.1. Offer should contain complete scope of supply with all technical details, specifications, delivery and other commercial terms and conditions.

- 2.1.2. Point by point confirmation for the Technical Specification enclosed is to be provided. If there are any deviations, the same should be clearly specified. Offers received without confirmation to our specification will be rejected.
- 2.1.3. List of customers to whom same or similar equipment have been supplied along with performance certificates to be enclosed.
- 2.1.4. Relevant catalogues to be attached
- 2.1.5. List of spares parts (with part numbers) for two years operation and maintenance should be attached.
- 2.1.6. Information on shipping weight and cubage (length, width & height) to be provided.
- 2.1.7. Offers shall be submitted by the Original Equipment Manufacturer. In case of foreign bidder, the Principal's offer should be enclosed.**

2.2 Un-Priced Commercial

This part shall include / indicate the following:

- 2.2.1. Acceptance of commercial terms and conditions by the bidders
- 2.2.2. Port of shipment / Station of despatch
- 2.2.3. Terms of payment
- 2.2.4. CFR price upto Chennai port (for foreign bidders).
- 2.2.5. FOR /BHEL, Tiruchy price along with freight charges upto BHEL, Tiruchy
Indicated separately (for Indian bidders)
- 2.2.6. Taxes, Service tax & duties including cess applicable.
- 2.2.7. Delivery Schedule
- 2.2.8. Offer validity
- 2.2.9. Country of origin
- 2.2.10. Percentage of agency commission if any along with a copy of Agency agreement.
The CFR prices quoted shall include the agency commission.
- 2.2.11. A copy of "Un-Priced Part II" i.e., a copy of the Price Bid **without the price details** to be enclosed.

3.0 PART II (PRICE- BID)

This part should contain the schedule of price particulars and to be co-related to the technical details provided in Part I.

4.0 OPENING OF TENDERS

The Part I - Technical & Un-priced commercial bid alone would be opened on the Tender opening date.

The Part II - Price bid of Technically suitable Bidders alone would be opened. The Technically suitable Bidders would be informed about the Price Bid opening date. Clarifications if any required by BHEL for Technical evaluation / commercial evaluation would be sought from Bidders before opening of Part II - price bid.

5.0 GENERAL

- 5.1. Equipment offered shall be "New". Re-built / Re-conditioned / Used equipments will not be accepted. Incomplete offers will not be considered for further processing.
- 5.2. **Fixed price:** Prices quoted by the bidder shall be fixed and not subject to any escalation whatsoever during the period of bid validity and execution of the Purchase Order. A bid submitted with an adjustable price will be treated as non-responsive and rejected. Prices shall be written in words and figures. In the event of difference, the price in words shall be valid and binding. Unit prices shall be considered correct in the event of any discrepancy with regard to total price.

- 5.3. **Bid currency:** Indian bidders should submit the prices only in Indian Rupees. Foreign bidders may submit their bid in their home currency, which should be clearly indicated in the un-priced commercial bid as well as in the price bid.
- 5.4. **Terms of Delivery:** Bidders are required to quote their best delivery period. Foreign Bidders should submit their offer for net **CFR / Chennai Seaport / Airport**. Freight charges upto Chennai port to be indicated separately. Indian Bidders should submit their offer for **FOR/ BHEL, Tiruchy basis**. Freight charges from Supplier works to BHEL, Tiruchy to be indicated separately. Delivery from the date of Letter of Intent / Purchase Order to be mentioned in the offer.
- 5.5. **Taxes and Duties :** All Taxes and Duties payable as extra to the quoted price should be specifically stated in offers along with CST & TIN No / Tariff No. etc., failing which the purchaser will not be liable for payment of such Taxes and Duties. Our TIN No. 33243560005, TNGST No. 3560005, CST. No. 239383 Dt. 11-06-1991 & BHEL ECC No. AAACB4146PXM012, Assessment circle Tiruverambur
- 5.6. **Validity :** The offers for main equipment and spares shall be kept open for acceptance for a period of **180 days (one hundred and eighty days)** from the date of opening of the tender (Part I).
- 5.7. The bidder to provide Business Information Report incorporating the rating of the company by international credit rating agencies, viz., **DUNS** number of M/s DUN & Bradstreet (D&B) etc., along with your technical offer.
- 5.8. **Indian Agent & Agency commission:** An Indian Agent can represent only one Foreign Manufacturer against a particular Tender. The CFR price quoted by the Foreign bidder shall include the agency commission however, the agency commission component payable to their Indian Agents shall be shown separately in the Offer. This will be paid by BHEL in Indian Rupees, on satisfactory commissioning & acceptance of the equipment. The bidder shall furnish authenticated copy of the Agency Agreement detailing the precise relationship between them and their mutual interest in the business so as to consider the offer of the Indian Agent for the indigenous portion of the supply. For the main equipment, the offer should be from Principal / Original Equipment Manufacturer. The supplier to furnish original Authorization Letter for the Indian Agent along with the offer.
- 5.9. **Short shipment / Warranty replacement:** In case of any short shipment in the main equipment / spares, customs duty levied on such supplies, shall be borne by the supplier. Any warranty replacement during the warrantee period shall be on FOR/ BHEL, Tiruchirappalli, basis.
- 5.10. **Inspection & Testing:** All goods shall be subject to inspection by BHEL or its authorized representatives at supplier's works or at BHEL stores. The supplier will not charge for the facilities provided for inspection of goods. In case of machine tools, the machine would be inspected and proved at supplier's works prior to dispatch however; final inspection and acceptance of the machine will be carried after installation of the machine at BHEL, Tiruchirappalli.

- 5.11. **Cenvat & VAT credit** : (for Indigenous Bidders only) The quotation must indicate Tariff item number and rate of Excise Duty applicable. The original Excise Duty Gate Pass will be required to be furnished in case it is charged to BHEL. If the bidder is availing Cenvat credit for his input materials, the effect of proforma credit should be passed on to the purchaser.
- 5.12. **Packing**: The Supplier shall arrange for packing suitably in all respects considering the peculiarity of the material involved for normal transport by sea / air / rail / road and suitably protected against effect of tropical salt laden atmosphere in the event of shipment being delayed at ports.
- 5.13. **Salient points of HSE** (Health Safety & Environment) that are to be considered while submission of offer are:
- Consumption benchmarks related to output shall be provided wherever applicable for key input resources (energy/fuel/chemicals)
 - Competency requirements for operation, maintenance and calibration, if any, shall be communicated
 - If any hazardous chemicals as per MSIHC (Manufacturing, Storage and import of Hazardous Chemicals) Rules 1989/94/2000 are used, the MSDS shall be provided, along with On site & Off site emergency plan (as applicable)
 - The noise level at operator level shall be within 90 dBA
 - OH&S (Occupational Health and Safety) control measures for safe working of machine as applicable shall be specified.
 - The machine / equipment shall be fitted with guard for rolling and moving parts and shall comply with applicable OH&S legislations and Factories Act 1948
 - The supplier shall submit the layout drawing of operating controls, displays etc. and operating instructions to enable ergonomics evaluation and approval
 - The recommended PPE (Personal Protective Equipment) for the equipment shall be furnished
 - Alarm system (both visual and audible) and Automatic switch off of the equipment shall be provided for any intrusion, overloading, short circuiting or any malfunctioning of the equipment
 - Details of all hazardous / harmful substances discharged as by-products / wastes during operations of the machine / equipment, such as fumes, gases, dust particles, aerosols UV/IR (Ultra violet / infra red) radiations, etc. shall be furnished, along with their concentrations and their TLV, (Threshold Limit Value).
 - Appropriate pollution control measures shall be proposed to keep the emissions from the machinery / processes within the prescribed limit as stated in Environment Protection Rules 1986.
 - All furnaces, process units, DG sets, paint booths, shot blasting chambers, etc shall be provided with stack(s) of sufficient height as per guidelines laid down in the Environment Protection Rules 1986.
 - Wherever industry specific standards are not available for control of pollutants, general emission standards shall be used
 - Chemicals banned due to their negative impact on the environment shall not be used in the process
 - Fuels with sulphur content less than 0.05% shall be proposed

- Details regarding nature of waste generated and appropriate disposal practices available shall be provided, along with the operation procedure of the plant / process. Hazardous chemicals and flammable substances shall be transported only through authorized transporters and all safety practices as laid down in applicable legislative requirements such as Central Motor Vehicle Rules, Manufacture, Storage and Import of Hazardous Chemical 1989, etc. shall be followed
 - Primary materials used in the equipment shall be specified and they shall be eco – friendly
- 5.14. Evaluation of offers shall be on the basis of delivered cost (Net cash outflow to BHEL).
- 5.15. BHEL also reserve its right to allow to the Public Sector Enterprises ordering and price preference facilities as admissible under the existing policy.
- 5.16. BHEL reserves its right to reject a tender due to unsatisfactory past performance in the execution of a contract at any of BHEL projects / units.
- 5.17. BHEL shall be at liberty to reject or accept any tender, part or in full, at their own discretion and any such action is not liable for any question or claim against BHEL.
- 5.18. **BHEL reserves the right to go for a Reverse Auction (RA)** instead of Opening the submitted sealed bid, which will be decided after technical evaluation. Information and general terms and conditions governing RA are given below.

GENERAL TERMS AND CONDITIONS OF RA

Against this enquiry for the subject item/system with detailed scope of supply as per enquiry specifications, BHEL may resort to “REVERSE AUCTION PROCEDURE” i.e., ON LINE BIDDING ON INTERNET.

1. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.
2. BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on internet.
3. BHEL will inform the vendor in writing in case of reverse auction, the details of Service Provider to enable them to contact & get trained.
4. Business rules like event date, time, Start price, bid decrement, extensions etc. also will be communicated through service provider for compliance.
5. Vendors have to fax the Compliance form in the prescribed format (provided by Service provider) before start of Reverse auction. Without this, the vendor will not be eligible to Participate in the event.
6. BHEL will provide the calculation sheet (e.g., EXCEL sheet) which will help to arrive at “Total Cost to BHEL” like Packing & forwarding charges, Taxes and Duties, Freight charges, Insurance, Service Tax for Services and loading factors (for non-compliance to BHEL standard Commercial terms &

conditions) for each of the vendor to enable them to fill-in the price and keep it ready for keying in during the Auction.

7. Reverse auction will be conducted on scheduled date & time.
8. At the end of Reverse Auction event, the lowest bidder value will be known on the network.
9. The lowest bidder has to Fax the duly signed Filled-in prescribed format as provided on case-to-case basis to BHEL through Service provider within 24 hours of Auction without fail.
10. Any variation between the on-line bid value and the signed document will be considered as sabotaging the tender process and will invite disqualification of vendor to conduct business with BHEL as per prevailing procedure.
11. In case BHEL decides not to go for Reverse Auction procedure for this tender enquiry, the Price bids and price impacts, if any, already submitted and available with BHEL shall be opened as per BHEL's standard practice.

- 5.19. **Force Majeure clause:** If at any time during the continuance of this contract the performance in whole or in part by either party of any obligations under this contract shall be prevented or delayed by reason, of any war, hostilities, acts of the public enemy, civil commotion, sabotage, fires, explosions, epidemics, quarantine, restrictions or acts of GOD (hereinafter referred to as events) then provided notice of happening of any such events is given by either party to other within twenty one days from the date of occurrence thereof neither party shall reason of such events be entitled to terminate this contract nor shall either party have any such non performance and delay is resumed as soon as practicable after such events has come to an end or ceased to exist. If the performance in whole or part of any obligation under this contract is prevented or delayed by reason or any such event claims for extension of time shall be granted for period considered reasonable by the purchaser subject to prompt notification by the seller to the purchaser of the particulars of the events and supply to the purchaser if required of any supporting evidence. Any waiver of time in respect of partial instalment shall not be deemed to be a waiver of time in respect of remaining deliveries.
- 5.27 The correspondence exchanged against the tender from both tenderer and BHEL through email are considered as valid document legally though it is not signed. It is treated as valid confirmations made on behalf of the respective company and very much comes under the legal ambit of the business transaction and hence it is binding on both the parties to the business.
- 5.28 Any transaction pertaining to the tender from both the parties of business done round the clock irrespective of the office or business hours of the companies, are valid legally and binding on both the parties. This applies to the extent only in such cases where deadline time for transaction is not specifically declared by either or both the parties to the business.
- 5.29 In case Letter of Intent (LOI) is issued through email, the PC generated time and date of mail shall be construed as the official time and date of release of LOI. In as much as this date is within the last date of validity given by the bidder the LOI is said to have been issued within the validity period and shall be binding on both the parties to the business.

- 5.30 Bidders participating in the tender should declare in their technical bid that whether they have been black-listed / kept on hold for a specified period / given Business holiday for a specified period by any Public sector undertaking or Government departments. The reasons for such action with details and the current status of such hold shall be clearly furnished to BHEL. If no such details are mentioned in the offer then it will be construed that the subject bidder is not under any such hold. But at a later date if it comes to the notice of BHEL about any such hold under enforcement on the subject bidder, BHEL will have every right to reject the offer of such vendors at any point of time and also under any stage of the finalisation of the subject tender irrespective of the status of the subject bidder in that tender. Such bidders will not be permitted to participate in the further tender proceedings and will be communicated suitably. They will not be also considered for any on going tenders even if participated till the hold is officially lifted and confirmed in writing.
- 5.31 **Guarantee:** The equipment shall be guaranteed for a period of 24 months from the date of commissioning and acceptance.
- 5.32 **Contract Execution Bank Guarantee (CEBG):** The successful tenderer shall furnish a Bank Guarantee, from an Indian Bank approved by BHEL in the format enclosed, for 5% of the Letter of Intent value (FOR Dispatching station value – Excluding taxes, duties, freight & Bharat Heavy Electricals Limited TIRUCHIRAPPALLI CAPITAL PURCHASE insurance – for Indian bidders) & (FOB/FCA value – Excluding freight & insurance – for foreign bidders) confirming that the order will be executed as per the terms and conditions and this should be valid till final dispatch date (LR/GR/BL/AWB) with additional 2 months claim period. Purchase Order & Letter of Credit will be processed only after receipt of CEBG. The CEBG is to be furnished within 3 weeks from the date of Letter of Intent.
- 5.33 **Performance Bank Guarantee (PBG):** The supplier shall furnish a Bank Guarantee, from an Indian Bank approved by BHEL in the format enclosed, for 10% of the Purchase Order value (FOR Dispatching station value – Excluding taxes, duties, freight & insurance – for Indian bidders) & (FOB/FCA value – Excluding freight & insurance – for foreign bidders) valid for period of 24 months from the date of commissioning & acceptance of the equipment at BHEL, Tiruchirappalli, with additional claim period of 2 months.

Formats for execution of Bank Guarantees:

Important Note:- The formats for execution of Bank Guarantees (both CEBG & PBG) shall be kept valid to cover the period of BG plus an additional claim period of two months. The Bank Guarantee bonds (BG) are to be submitted on non-judicial stamp paper of Rs. 100/- and should be only from any one of the below mentioned Banks,

(1) State Bank of India, 2) State Bank of Hyderabad, 3) State Bank of Travancore, 4) Canara Bank, 5) Bank of Baroda, 6) Punjab National Bank, 7) Deutsche Bank AG, 8) HDFC Bank Ltd, 9) Standard Chartered Bank, 10) CITI Bank N.A., 11) ABN AMRO Bank N.V. 12) ICICI Bank Ltd. 13) IDBI Ltd. 14) The Hongkong and Shanghai Banking Corporation Ltd. 15) Syndicate Bank. 16) State Bank of Mysore. 17) State Bank of Maharastra. 18) UCO Bank. 19) Allahabad Bank. 20) Andhra Bank. 21) Corporation Bank. 22) Dena Bank 23) Union Bank of India. 24) United Bank of India. 25) Vijaya Bank. 26) Axis Bank (Unit Trust of India). 27) Bank of Maharastra. 28) Bharat Overseas Bank. 29) Bank of India. 30) Indian Bank. 31) Indian Overseas Bank. 32) Oriental Bank of Commerce. 33) Central Bank of India. 34) State Bank of Patiala. 35) Punjab & Sind Bank. 36) State Bank of Bikner & Jaipur

A. CONTRACT EXECUTION BANK GUARANTEE (CEBG)

This deed of guarantee made this day of 200.. by the in favour of **Bharat Heavy Electricals Limited, Tiruchirapalli** having its registered Office at New Delhi with its Unit Office at Tiruchirapalli (Hereafter called the first party) where as M/s..... having its registered office at (hereafter called the contractor) have entered in to contract with the first party for the supply of vide Letter of Intent No dated

And whereas the contractor M/s have approached the for a guarantee and at their request and in consideration of the arrangement arrived at between the contractor and the BHEL Tiruchirappalli the said has agreed to give such guarantee as herein after mentioned to the aforesaid first party.

Now therefore, these present witness that we the do hereby undertake to the first party a sum of Rs (Rupees only) without demur/on demand being made by the said first party and to keep the first party indemnified to the extent of Rs (Rupees only) by virtue of this guarantee against any breach in execution of contract without giving prior information to the party of the same (the decision in this respect being solely the discretion of the first party). We further undertake to pay the aforesaid amount in the lump sum on demand without demur or such part thereof as the first party may demand from time to time, irrespective of the fact whether the said contractor admits or denies such claim or questions its correctness in any court tribunal of arbitration proceedings or before any authority.

The aforesaid guarantee will remain in full force and we shall be liable under the same irrespective of any concession for time being granted by the said first party to contractor M/s in or for fulfilling the said agreement between the contractor M/s and the first party and the guarantee will remain in full force till irrespective of any change of terms, conditions or stipulation or any variations in the terms of said agreement irrespective of whether notice of such change or variation is given to us or not and claim to receive such notice of any change and/or variation of the terms and/or conditions of the said agreement is hereby specifically waived by us.

Further we shall not be released from this guarantee by any forbearance or the exercise or non exercise of any of the power or rights under the said agreement by the said first party against the contractor irrespective of whether notice of such forbearance enforcement or non-enforcement of any power or rights, modifications or changes made in the said agreement or concessions shown to contractor M/s by the first party is given to us or not.

The guarantee herein contained shall not be determined or affected by the liquidation of winding up or insolvency of or change in the constitution of the contractor M./s but shall in all respects and for all purposes binding and operative until all payments of all moneys dues or that may hereafter becomes due to the said first party is paid in respect of any liability or obligation for the contractor under this guarantee subject to however that the first party shall have no right under this guarantee after expiry of six months from the date of completion of the contract unless this guarantee is extended by mutual agreement.

And lastly we undertake not to revoke this guarantee during its currency except with the previous consent of the first party in writing. The hereby declares that it has power to issue this guarantee under the Company's memorandum and article of association and the undersigned has full power to do so on its behalf under the power of attorney dated granted to him by the proper authorities of the Company.

Notwithstanding anything contained here in before, our liability under this guarantee is restricted to Rs (Rupees only). Our guarantee shall remain in force till unless a claim in writing is presented to us and if unpaid a suit or action to enforce such claim is filed against within 6 months from the date, all your rights under this guarantee shall be forfeited and we shall be released and discharged from all liability there under.

Dated the by its constituted attorney.

B. PERFORMANCE BANK GUARANTEE (PBG)

1. In accordance of M/s Bharat Heavy Electricals Limited (A Government of India undertaking, a Company incorporated under the Companies Act 1956 having its Registered Office at 'BHEL House", SIRI Fort, New Delhi 110 049) through its High Pressure Boiler Plant Division located at Tiruverumbur, Tiruchirappalli 620014 (hereinafter called "the Company") having entered into a contract with hereinafter called "the said contractor" which term includes 'suppliers' for the purpose of this Bond and under the terms and conditions of the Contract No: dated between BHEL, Tiruchirappalli and as per the contract, the contractor/supplier is to furnish a Performance Bank Guarantee for Rs for the due performance of the equipment to be supplied under the above referred contract and for the fulfilment of all the terms and conditions of the contract. We (indicate the name of the Bank) (herein after referred to as the Bank) at the request of (contractor(s)) do hereby undertake to pay the Company an amount not exceeding Rs against any loss or damage caused to or suffered or would be

caused to or suffered by the Company by reason of any breach by the said contractor (s) of any of the terms and conditions contained in the said agreement.

2. We (indicate the name of the Bank with full address), do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the Company stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Company by reason of breach by the said Contractor(s) of any of the terms and conditions contained in the said Agreement or by the reason of the contractor(s) 'failure to perform' the said Agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs
3. We undertake to pay unconditionally to the Company any money so demanded notwithstanding any dispute(s) raised by the Contractor in any suit, or proceedings pending before any Court or Tribunal or Arbitration or before any other authority relating thereto our liability under this present being absolute and unequivocal. The payment under this guarantee would not wait till the disputes have been decided by any Court or Tribunal or in the arbitration proceedings or by any other authority. The payment so made by us under this Bond shall be a valid discharge of liability for payment there under and the Contractor (s) shall have no claim against us for making such payment.
4. We (indicate the name of Bank), further agree that the guarantee herein contained shall remain in full force and effect during the period that would betaken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Company under or by virtue of the said Agreement have been fully paid and its claim satisfied or discharged or till Office/Department/Division of the Company certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharges this guarantee.
5. (i) Unless a demand or claim under this guarantee is made on us in writing on or before the we shall be discharged from all the liability under this guarantee thereafter. But where such claim or demand has been preferred by the Company with the Bank before the expiry of the said date, the claim shall be enforceable notwithstanding the fact that the said enforcement is effected after the said date.

(ii) For the purpose of this clause, any letter making demand on the Bank by M/s BHEL will be dispatched by Registered Post with Ack. Due or by Telegram or by any Electronic media addressed to the above mentioned address of the Bank shall be deemed to be the claim/demand in writing referred to above irrespective of the fact as to whether and when the said letter reaches the Bank, as also any letter containing the said demand or claim is lodged with the Bank personally.
6. We (indicate the name of the Bank), further agree with the Company that the Company shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said agreement or to extend time of performance by the said Contractor(s) from time to time or to postpone for any time of from time to time any of the powers exercisable by the Company against the said Contractor (s) and to forbear or enforce any of the terms and conditions relating to the said Agreement

and we shall not be relieved from our liability by any reason of any such variation or extension being granted to the said contractor(s) or for any forbearance, act or omission on the part of the Company or any indulgence by the Company to the said Contractor(s) or by any such matter or thing whatsoever which under the law relating would, but for this provision, have effect of not so relieving us.

7. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s)
8. It shall not be necessary for the Company to proceed against the contractor before proceeding against the guarantor–Bank and the guarantee herein contained shall be enforceable against them notwithstanding any security, which the Company may have obtained or obtain from the Contractor shall, at the time when proceedings are taken against the guarantor hereunder be outstanding or unrealised.
9. Any claim or dispute arising under the terms of this document shall only be enforced or settled in the Courts at Tiruchirappalli.
10. The guarantor hereby declare that it has power to execute this guarantee and the executant has full powers to do so on its behalf under the proper authority granted to him/them by the guarantor
11. We (indicate the name of Bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Company in writing.

In witness whereof we (indicate the name of Bank) have hereunto set out Bank Seal the Day month 200.

ACCEPTANCE OF COMMERCIAL TERMS AND CONDITIONS BY THE BIDDERS

Description of the Equipment:	
BHEL Tender No. & Date	

Sl No.	Description	Vendor's confirmation
1	<p>Payment terms: 100% payment, within 45 to 90 days, after successful commissioning & acceptance of equipment at BHEL, Tiruchy, against submission of 10% Performance Bank Guarantee.</p> <p>or</p> <p>80% of the material cost to be paid against delivery / dispatch documents within 45 to 90 days. Balance 20% of the material cost along with Erection & Commissioning charges, if any, will be paid after successful commissioning & acceptance of equipment at BHEL, Tiruchy, against submission of 10% Performance Bank Guarantee. (options of "through Bank" for indigenous and "through L/C" in case of import are available)</p> <p>In case of import, an Irrevocable unconfirmed Letter of Credit shall be established for 80% of material cost 1½ months prior to shipment with a and validity of 3 months (including the document negotiation period). This L/C will be negotiable against shipping documents. For the balance 20% of material cost along with Erection & Commissioning charges, if any, an Irrevocable unconfirmed Letter of Credit shall be established 1 month prior to visit of the foreign technician (for commissioning) validity of 3 months (including the document negotiation period). This L/C will be negotiable against acceptance certificate and 10% Performance Bank Guarantee.</p> <p>All LC opening charges in India and outside India will be to to the supplier's account.</p> <p>Loading for deviation on payment terms if the above is not agreed by vendor will be @ 1.5% per month.</p> <p>Note: In case any bidder does not accept for payment of 20% payment after successful commissioning & acceptance of equipment at BHEL, Tiruchy and submission of Performance Bank Guarantee for 10%, their offer is likely to be rejected and the technical bid not processed.</p>	

2	<p>Currency of payment: In case of foreign bidders please indicate the currency like Euro / US\$ / GBP etc. For indigenous bidders the currency shall be Indian Rupees</p>	
3	<p>Taxes & Duties: All Taxes, Duties, Service Taxes etc. payable as extra to the quoted price should be specifically stated in offers along with CST & TIN No / Tariff No. etc., failing which the purchaser will not be liable for payment of such Taxes and Duties. Our TIN No. 33243560005, TNGST No. 3560005, CST. No. 239383 Dt. 11-06-1991 & BHEL ECC No. AAACB4146PXM012, Assessment circle Tiruverambur</p> <p>Income Tax applicable. Any service charges payable towards supervision of E&C, training, performance prove-out etc., will be released after deduction of Income Tax as per Indian Income Tax Act / as per the Govt. of India rules. The TDS certificate will be issued by BHEL.</p>	
4	<p>Contract Execution Bank Guarantee: The successful bidder shall furnish a Contract Execution Bank Guarantee (CEBG) equal to 5% in the format enclosed and from one of the banks mentioned therein. In case of import, the foreign vendor shall arrange to give a counter guarantee to State Bank of India (SBI), Kailasapuram and SBI will provide the CEBG to BHEL in the format enclosed. The CEBG shall be executed valid for the delivery period (FOR dispatching station for indigenous / FOB delivery for import) with additional 2 months as claim period. The CEBG shall be furnished within 1 month from the date of Letter of Intent. In case any bidder does not accept for submission of Contract Execution Bank Guarantee (CEBG), their offer is likely to be rejected and the technical bid not processed.</p>	
5	<p>Performance Bank Guarantee: Performance Bank Guarantee (PBG) for 10% of the total order value covering the agreed Guarantee period (with additional 2 months as claim period) has to be furnished. In case of indigenous bidder the PBG shall be in the format enclosed and from one of the banks mentioned therein. In case of import, the foreign vendor shall arrange to give a counter guarantee to State Bank of India (SBI), Kailasapuram and SBI will provide the PBG to</p>	

	<p>BHEL in the format enclosed.</p> <p>In case any bidder does not accept for submission of Performance Bank Guarantee (PBG), their offer is likely to be rejected and the technical bid not processed.</p>	
6	<p>Liquidated damages:</p> <p>Delivery of the goods specified in the purchase order should be made within the time prescribed. Failure to dispatch the materials in the time as per the delivery quoted in our Purchase Order would make the supplier liable to an un-conditional penalty at the rate of ½% of the value of goods for each week of delay subject to a maximum of 15% of the Purchase Order value. If any vendor does not accept LD ½% of the value of goods for each week of delay subject to a maximum of 5%, their offer is likely to be rejected by BHEL and the technical bid not processed. Bidders accepting for maximum LD percentages in between 5% to 15% will be loaded @ %age deviation from 15% and their accepted %age. Eg. If a bidder accepts for a max of 7% LD, their offer would be loaded @ 8% (15 – 7 = 8). As regards LD, the delivery date (FOR dispatching station for indigenous / FOB delivery for import) shall be considered.</p>	
7	<p>Risk purchase:</p> <p>If the supplier fails to deliver the goods within the delivery specified in the Purchase Order, BHEL will be entitled to terminate the contract and to purchase elsewhere at the risk and cost of the seller either the whole of the goods or any part which the supplier has failed to deliver or despatch within the delivery period mentioned in the Purchase Order.</p>	
8	<p>Delivery:</p> <p>Bidder shall indicate the delivery period required for the following activities.</p> <p>(a) Firm Time period, from the date of Letter of Intent (LoI), required for delivery of the equipment, (FOR dispatching station for indigenous / FOB delivery for import) to be indicated.</p> <p>(b) Commissioning, Prove-out and handing over of complete system to be indicated.</p> <p>Note: The above delivery periods indicated will not have bearing on activities such as submission of CEBG, drawing approval etc. It shall be the bidder's responsibility to have all technical clarifications sorted out before submission of price bid / participating in the RA. The Purchase Order (to be release after receipt of CEBG) will carry the above-indicated delivery period.</p>	

9	Agency Commission: Please specify the %age agency commissioning, if applicable or else please mention "not-applicable"	
10	Validity: Validity of the offer should be 180 days from the date of tender opening.	
11	Contacts: Details of contact person's name, designation, department with complete postal and email address along with phone and fax numbers to be mentioned	
12	Port of loading:	
13	Country of origin:	
14	Weight: Approximate Net weight of the total consignment Approximate Gross weight of the total consignment	

Date:

Signature:

Name:

Designation:

Department:

M/s