



भारत हेवी इलेक्ट्रिकल्स लिमिटेड

(भारत सरकार का उपक्रम)

**BHARAT HEAVY ELECTRICALS LIMITED**

(A Govt. of India Undertaking)

**TCN - 01**

Ref: PSER:SCT:KLN-T1976:TCN-01

Date: 20-07-2019

Sub	<b>Tender Change Notice (TCN)- 01.</b>	
Job	Erection, testing, commissioning, handing over, etc of steam turbine & aux, generator & aux, pumps, auxiliaries, etc. including Fire Protection System and LP Piping for both units at 2x660 MW Maitree STPP, Rampal, Bangladesh.	
Ref	1.0	Tender no PSER:SCT:KLN-T1976:19.
	2.0	BHEL's NIT, vide reference no PSER:SCT:KLN-T1976:7445 Date: 18-07-2019.
	3.0	Other References, if any.

With reference to above, following points/documents, relevant to tender, may please be noted and complied with while submitting the offer.

1. Revised VOLUME-III-PRICE SCHEDULE, R-01 attached superseding VOLUME-III-PRICE SCHEDULE, R-00, issued earlier along with NIT.
2. Revised VOL-IF-TCC-TS-WEIGHT SCH - PIPING OF FPS-R-01 & VOL-IF-TCC-TS-WEIGHT SCH - FPS EXCL. PIPING-R-01 attached superseding VOL-IF-TCC-TS-WEIGHT SCH - FPS INCL PIPING-R-0, issued earlier along with NIT.
3. Introduction of Technical specification, VOL-IF-TCC-TS-Wrapping & Coating Material-FPS.
4. Revised 'No deviation certificate' is attached. Bidder to submit 'No deviation certificate' as per attached format only.
5. All other terms & conditions shall remain unchanged.

Thanking you,

Yours faithfully,  
for BHARAT HEAVY ELECTRICALS LTD

Dy MGR (SCT)

Encl: As Above.

पावर सेक्टर पूर्वी क्षेत्र (मुख्यालय)

POWER SECTOR EASTERN REGION, DJ-9/1, SALT LAKE CITY, KOLKATA - 700 091

फैक्स/Fax : (033) 23211960 फोन/Phone : बोर्ड/EPABX : (033) 2339 8000

**VOLUME-III  
PRICE SCHEDULE, REV-01**

**Erection, testing, commissioning, handing over, etc of steam turbine & aux, generator & aux, pumps, auxiliaries, etc. including Fire Protection System and LP Piping for both units at 2x660 MW Maitree STPP, Rampal, Bangladesh**

**TENDER NO. PSER:SCT:KLN-T1976:19**

SL	PREAMBLE
1	This preamble forms part of tender document and schedule of items. The tenderer should read this preamble carefully before filling in rates for various items. Clauses under this preamble shall be read in conjunction with Volume-IB, ID, IE , Volume – IF and other tender sections as applicable and shall have precedence over any contrary statement mentioned any where in this document.
2	The work shall be carried out strictly as per specifications, description of the items in these schedule and / or engineer's instructions. Drawings enclosed with the tender are only preliminary and for tender purposes and giving some idea of the work involved. The work is to be executed as per drawings & documents, which shall be furnished during execution.
3	Items of work provided in this schedule but not covered in this specification shall be executed strictly as per instruction of the engineer.
4	Unless specifically mentioned otherwise in the tender document, the tenderer shall quote for the finished items and shall provide for the complete cost towards power, fuel, tools, tackles, equipment, constructional plants, temporary works, labour, dismantling of all temporary piping, structures, valves, pumps, tanks & other misc. equipment, strengthening of roads/culverts/bridges etc. including arranging all clearances etc. required for carrying out different activities & tests, materials, levies, taxes(except service tax), transport, layout, repairs, rectification, maintenance till handing over, supervisions, colonies, shops, establishments, overheads, profits and all incidental items not specifically mentioned but reasonably implied and necessary to complete the work according to the complete tender document and this schedule.
5	The quantities of the various items mentioned in this schedule of items are approximate, based on very preliminary information and may vary to any extent or be deleted altogether. The quoted rates of each item will remain firm throughout the period of execution including extension, for reasons whatsoever, as long as variation in the total value of work executed under any part of this contract including extra items, if any but excluding any price variation remains, within fifteen percent ( $\pm 15\%$ ) of the awarded price as per LOI .
6	Prior written approval of BHEL shall be sought by the contractor in case quantity variation of any item crosses +50% (plus fifty percent) limit during execution and approval to be obtained before execution of further quantity for this item.
7	In case Sealed /Paper Price Bids are opened for finalisation of the tender, for any Item Rate/BOQ based contract, possibility of variation of quantity/ addition/deletion of items can not be ruled out. Under such circumstances, after execution of work, if it is observed that standing as L-1 is changed based on actual quantity executed, the bidder shall give suitable rebate to maintain your standing as L-1. Since this aspect can be assessed at the end of execution, necessary adjustment will be effected at the end of execution in final bill.This condition shall not be applicable where the tender is finalised through Reverse Auction.
8	BHEL reserve the right to rationalize the rates, quoted by L-1 bidder against unit rate items and/ or other optional items with respect to item-wise lowest rates (amongst the participating bidders), before placement of order.
9	The rates quoted shall be inclusive of cleaning of site of any vegetation, dressing , clearing of old structures and leveling etc. including fixing of grid pillars, benchmarks etc. required for commencement of site activities. No separate payment will be made towards the same.However, if separate rate for such item is available in the rate schedule, the same shall be considered.
10	Rates shall be quoted in figures and in words in clear legible writing. No overwriting is allowed. All scoring and cancellations should be countersigned and in case of illegibility the interpretation of engineer shall be final. All entries shall be in English language.
11	All works item wise shall be measured upon completion and paid for at the rates quoted and accepted as per BHEL approved payment schedule/billing break-up.

**VOLUME-III  
PRICE SCHEDULE, REV-01**

**Erection, testing, commissioning, handing over, etc of steam turbine & aux, generator & aux, pumps, auxiliaries, etc. including Fire Protection System and LP Piping for both units at 2x660 MW Maitree STPP, Rampal, Bangladesh**

**TENDER NO. PSER:SCT:KLN-T1976:19**

SL	PREAMBLE
12	The tender shall be deemed to have visited site and made himself aware of all the site conditions, studied the specifications and details of work to be done within the time schedule attached and to have acquainted himself of the conditions prevailing at site.
13	No splitting of the job is envisaged. Decision of BHEL in this regard shall be final and binding to the bidders.
14	Bidders are not allowed to alter the Price Schedule format including item description, quantity etc. and the offer is liable for rejection if the bidders submit their prices in Price Schedules modified by them. BHEL reserves the right to reject the offers of bidders who submit offers in Price Formats which are modified/ altered by them. Also putting any comments instead of rates/price in the designated column of the rate schedule shall make the offer liable for rejection.
15	Bidders to note that for Civil &/Structural packages, against a particular item against a ST No. appearing in more than one schedule of the BOQ, same rate must be quoted in all schedules for that particular items with same descriptions. If by error, different rates are quoted in different schedules for same ST No.(i.e. item with same description), then the higher of the rates shall be considered for evaluation but awarding shall be done with the lower rate ,if the bidder becomes L-1.”
16	For Lumpsum Service Contract : The items/components indicated in the tender is indicative and may vary to any extent. No compensation shall be payable in case of any variation in the items/components listed in the bill of quantities if the executed weight remains within the variation limit. However, in case of deletion of any item or addition of new items over and above the items listed or variation of existing quantity beyond variation limit specified, adjustment (i.e. Payment or recovery as the case may be ) shall be done on pro-rata basis based on the Rate per MT worked out from the quoted lump-sum Price and the total weight of components listed /indicated in price schedule plus 15% weight variation limit.
17	Engineer's decision shall be final and binding on the contractor regarding clarification of items in the schedule with respect to the other sections/volumes of the contract.
18	In case of tender for Civil and/or Structural works, if the Non-schedule items are not quoted by the bidder, it will be treated at par with rate of corresponding item of CPI/CPWD/PWD/ Bangladesh schedules schedule as prescribed in the tender/BOQ cum Rate Schedule.
19	No interest, whatsoever, shall be payable by BHEL on the security deposit, any bank guarantee submitted or any amount due to successful bidder/contractor.
20	Size and weights of various items are mentioned in the attached BOQ cum rate/price schedule for reference purpose only & these shall not be taken into consideration for quoting/calculating amount in the rate schedule. These shall be utilised as per relevant sections of tender. Bidders shall quote for each item in the rate column, taking unit as mentioned in the quantity column. Rates shall be filled in both figures and words. Amount shall be calculated based upon these rates multiplied by the mentioned quantity for the respective items.
21	Bidder's Grand Total price will be shall be considered for evaluation unless stated otherwise.
22	In case of BOP packages, if Bidder does not quote/indicate the price for freight charges against indicated rate schedule, the same shall be considered as 2% of basic price and adjusted with the total quoted price against each item keeping the total quoted price unaltered.

VOLUME-III PRICE SCHEDULE, REV-01		
Erection, testing, commissioning, handing over, etc of steam turbine & aux, generator & aux, pumps, auxiliaries, etc. including Fire Protection System and LP Piping for both units at 2x660 MW Maitree STPP, Rampal, Bangladesh		
TENDER NO. PSER:SCT:KLN-T1976:19		
RATE SCH I: TOTAL PRICE		
SL NO	DESCRIPTION OF WORK	TOTAL PRICE (USD)
1.0	TOTAL PRICE FOR ERECTION, TESTING AND COMMISSIONING OF TG & AUX PKG, INCLUDING FIRE PROTECTION SYSTEM AND LP PIPING FOR BOTH UNITS AT 2X660MW MAITREE STPP, RAMPAL, BANGLADESH	
<b>NOTE</b>		
1.0	Bidder to note that total price at sl no 1.0 above shall be considered for evaluation & awarding. As such total price at sl no 1.0 should be complete in all respect for the full scope defined and considering all terms and conditions.	
2.0	Bidder to note that percentage break-up of above total price is frozen and indicated in SCH-II and subsequent schedules.	
3.0	Bidder shall note that while the allocated price of SCH-II correspond to their respective prices, rates of various components will be worked out by apportioning the amounts wrt respective indicated weight/quantities. As such, any uncalled figure / amount noted at any other place / schedule of Volume-III will not be reckoned, and will stand null & void.	
4.0	Based on mode of finalisation of contract, either through Reverse Auction or price bid opening, followed by negotiation, if any, while absolute price may change, percentage allocation as per the price schedule shall remain unchanged.	
5.0	Based on the item wise percentage allocations, the amount for the individual items of the Bill of Quantity shall be arrived at. The rates of individual items shall be derived from the amount against each items and its quantity after rounding off upto 3 decimal places. However, RA bill payment shall be done after rounding off the gross amount to two decimal points. Any adjustment, if required, due to such methodology, will be effected / adjusted in final bill.	
6.0	Any item as per scope of work, if not included in the price quoted above and shown separately will not be taken cognizance of and the offer shall be liable for rejection.	
7.0	Price format shall not be changed by bidder in any case, since it may lead to cancellation of bidder's offer.	

VOLUME-III PRICE SCHEDULE, REV-01				
Erection, testing, commissioning, handing over, etc of steam turbine & aux, generator & aux, pumps, auxiliaries, etc. including Fire Protection System and LP Piping for both units at 2x660 MW Maitree STPP, Rampal, Bangladesh				
TENDER NO. PSER:SCT:KLN-T1976:19				
SCH-II: TOTAL PRICE BREAK-UP				
SL. NO.	DESCRIPTION OF WORK	QTY	UOM	WEIGHTAGE
<b>1.0</b>	<b>TG &amp; AUX PKG - Unit #1</b>			
1.1	Total Lumpsum price for providing manpower, supervision, T&P, etc for unloading of <b>generator stator, generator rotor, HP turbine, IP rotor and LP rotor, LPC inner-outer upper half, LPC inner casing assembly (LH), exciter, turbine integral piping (TIP)</b> ; verification; transporting to place as directed by engineer; preservation; identification & arranging issue & taking delivery of materials from BHEL store/ storage yard, etc; transportation of these to pre-assembly yard/ place of erection; temporary storage; preservation as required prior to erection after receipt; watch & ward; erection; chemical cleaning of piping, etc; testing; commissioning; trial operation; PG test (assistance), commissioning manpower support after commercial run; handing over (including finish painting), etc, of steam turbine & aux, generator & aux, condenser, auxiliaries, pump, heaters, LP dosing system, colts; tanks; integral piping; TG piping; etc. of <b>Unit#1 and common systems</b> in line with specification/ drawings/ documents/ test procedures approved by BHEL/ owner, for the total scope defined in technical specification and terms & conditions of tender, taking into account all clarifications, confirmations, agreements till date.	1	LOT	<b>0.33367677</b>
<b>1.2</b>	<b>SHIFTING &amp; UNLOADING</b>			
	Total price for loading onto trailer (at site), shifting and unloading (in/near Unloading Bay of Power House) of Generator Stator.	1	No.	<b>0.00541734</b>
<b>2.0</b>	<b>TG &amp; AUX PKG - Unit #2</b>			
	Total Lumpsum price for providing manpower, supervision, T&P, etc for unloading of generator stator, generator rotor, HP turbine, IP rotor and LP rotor, LPC inner-outer upper half, LPC inner casing assembly (LH), exciter, turbine integral piping (TIP); verification; transporting to place as directed by engineer; preservation; identification & arranging issue & taking delivery of materials from BHEL store/ storage yard, etc; transportation of these to pre-assembly yard/ place of erection; temporary storage; preservation as required prior to erection after receipt; watch & ward; erection; chemical cleaning of piping, etc; testing; commissioning; trial operation; PG test (assistance), commissioning manpower support after commercial run; handing over (including finish painting), etc, of steam turbine & aux, generator & aux, condenser, auxiliaries, pump, heaters, LP dosing system, colts; tanks; integral piping; TG piping; etc. of <b>Unit#2</b> in line with specification/ drawings/ documents/ test procedures approved by BHEL/ owner, for the total scope defined in technical specification and terms & conditions of tender, taking into account all clarifications, confirmations, agreements till date.	1	LOT	<b>0.32202948</b>

<b>VOLUME-III</b>				
<b>PRICE SCHEDULE, REV-01</b>				
<b>Erection, testing, commissioning, handing over, etc of steam turbine &amp; aux, generator &amp; aux, pumps, auxiliaries, etc. including Fire Protection System and LP Piping for both units at 2x660 MW Maitree STPP, Rampal, Bangladesh</b>				
<b>TENDER NO. PSER:SCT:KLN-T1976:19</b>				
<b>SCH-II: TOTAL PRICE BREAK-UP</b>				
<b>SL. NO.</b>	<b>DESCRIPTION OF WORK</b>	<b>QTY</b>	<b>UOM</b>	<b>WEIGHTAGE</b>
<b>3.0</b>	<b>FIRE PROTECTION SYSTEM</b> Total price for providing manpower, supervision, T&P, etc for taking delivery of materials from BHEL store/ storage yard, etc; transportation of these to pre-assembly yard/ place of erection; temporary storage; preservation as required prior to erection after receipt; watch & ward; erection, painting (as required, including supply of complete paint); testing; commissioning; trial operation; PG test (assistance), commissioning manpower support after commercial run; handing over, etc, in line with specification/ drawings/ documents/ test procedures approved by BHEL/ owner, for the total scope defined in technical specification and terms & conditions of tender, taking into account all clarifications, confirmations, agreements till date, of Fire Protection system (excluding piping).	380.0	MT	<b>0.0327523</b>
<b>4.0</b>	<b>LP PIPE</b> Total price for Erection, testing, commissioning of LP PIPING consisting of Plant Water piping, Fire Protection system piping, and various balance piping systems such as instrument air, service air, drinking water, service water systems, DMCW, ACW, etc. of unit # 1 & 2.	1	LOT	<b>0.30612411</b>
<b>TOTAL</b>				<b>1.00000000</b>
<b>Note:</b>				
a	The erection work shall include necessary welding, fittings, clamps, fixtures, etc. including finishing work as may be required for completion of the work.			
b	20% of the package wise price at Sl. No. 1.1, 2.0, & 3.0 shall be considered against supply of consumables required for completion of the job and 80% shall be considered as E&C cost. In view of the same and above price break-up, on the basis of allocated weightage, separate orders shall be issued for supply and service: (a) On Lumpsum basis for sl. no. 1.0 & 2.0 and (b) Item BOQ basis for sl. no. 3.0. Refer Sch-III for LP pipe order break-up.			
c	The above BOQ is to be read in conjunction with technical specs and annexures provided with the tender.			
d	Sl. no. 1.2 may not be operated also and in that case this payment shall not be made. However, if required this may be operated for Unit-1 or Unit-2 or both.			

VOLUME-III PRICE SCHEDULE, REV-01			
Erection, testing, commissioning, handing over, etc of steam turbine & aux, generator & aux, pumps, auxiliaries, etc. including Fire Protection System and LP Piping for both units at 2x660 MW Maitree STPP, Rampal, Bangladesh			
TENDER NO. PSER:SCT:KLN-T1976:19			
SCH-III- LP PIPE PACKAGE			
SL NO	DESCRIPTION	QTY	WEIGHTAGE
<b>PRICE BREAK-UP OF SL. NO. 4.0 OF SCH-II</b>			
1.0	Handling from storage, erection, welding, non-destructive testing, inspection, internal cleaning & painting (incl supply as per scope), final painting, testing & commissioning of River/Canal water piping / DMCW piping / Plant Water piping, etc. <b>Carbon Steel piping (all sizes above 800mm OD and upto 1422mm OD)</b> and associated material (covering fittings and valves etc) as per tender. Payment shall be released as per following. (i) Erection - 35%; (ii) Alignment - 5%; (iii) Welding - 29.5%; (iv) NDT - 10%; (v) Hydraulic test - 5%; (vi) Painting completion - 15% and (vii) As-built drawing submission - 0.5%.	50 MT	0.00333133
2.0	Handling from storage, erection, welding, non-destructive testing, inspection, internal cleaning & painting (incl supply as per scope), final painting, testing & commissioning of ACW piping / DMCW piping / Seal Air/ Plant Water piping / DM Water / Service and Portable water piping <b>Carbon Steel piping (all sizes above 169mm OD and upto 800mm OD)</b> and associated material (covering fittings and valves etc) as per tender. Payment shall be released as per following. (i) Erection - 35%; (ii) Alignment - 5%; (iii) Welding - 29.5%; (iv) NDT - 10%; (v) Hydraulic test - 5%; (vi) Painting completion - 15% and (vii) As-built drawing submission - 0.5%.	484 MT	0.03227988
3.0	Handling from storage, erection, welding, non-destructive testing, inspection, internal cleaning & painting (incl supply as per scope), final painting, testing & commissioning of Fuel Oil Piping/ DMCW piping / Seal Air/ Plant Water piping / Service and Portable water piping / Condensate Transfer System / DM make-up water system - <b>Carbon Steel piping (all sizes below and up to OD 169mm )</b> and associated material (covering fittings and valves etc) as per tender. Payment shall be released as per following. (i) Erection - 35%; (ii) Alignment - 5%; (iii) Welding - 29.5%; (iv) NDT - 10%; (v) Hydraulic test - 5%; (vi) Painting completion - 15% and (vii) As-built drawing submission - 0.5%.	532 MT	0.0354533
4.0	Handling from storage, erection, welding, non-destructive testing, inspection, internal cleaning & painting (incl supply as per scope), final painting, testing & commissioning of <b>Duplex SS (stainless steel) LP piping system (Raw water, CW System, ACW system, Desalinated water, etc.) - for dia up to 450 NB)</b> and associated material (including fitting and valves etc) as per tender. Payment shall be released as per following. (i) Erection - 35%; (ii) Alignment - 5%; (iii) Welding - 29.5%; (iv) NDT - 10%; (v) Hydraulic test - 5%; (vi) Painting completion - 15% and (vii) As-built drawing submission - 0.5%.	109 MT	0.00868677
5.0	Handling from storage, erection, welding, non-destructive testing, inspection, internal cleaning & painting (incl supply as per scope), final painting, testing & commissioning of <b>Stainless Steel- LP piping system (DM water, Service water, Inst Air system, CW System, ACW system, Desalinated water, etc.) - for dia up to 450 NB)</b> and associated material (including fitting and valves etc) as per tender. Payment shall be released as per following. (i) Erection - 35%; (ii) Alignment - 5%; (iii) Welding - 39.5%; (iv) NDT - 10%; (v) Hydraulic test/ leakage test - 10%; and (vi) As-built drawing submission - 0.5%.	56 MT	0.00443893

<b>VOLUME-III PRICE SCHEDULE, REV-01</b>			
<b>Erection, testing, commissioning, handing over, etc of steam turbine &amp; aux, generator &amp; aux, pumps, auxiliaries, etc. including Fire Protection System and LP Piping for both units at 2x660 MW Maitree STPP, Rampal, Bangladesh</b>			
<b>TENDER NO. PSER:SCT:KLN-T1976:19</b>			
<b>SCH-III- LP PIPE PACKAGE</b>			
<b>SL NO</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>WEIGHTAGE</b>
6.0	Handling from storage, erection, welding/ jointing, non-destructive testing, inspection, internal cleaning & painting (incl supply as per scope), final painting, testing & commissioning of <b>instrument air and service air system piping (up to 200 NB galvanised &amp; threaded)</b> and associated material (including fitting and valves etc) as per tender. Payment shall be released as per following. (i) Erection - 35%; (ii) Alignment - 5%; (iii) Jointing - 39.5%; (iv) NDT - 10%; (v) Pnuematic test - 10%; and (vi) As-built drawing submission - 0.5%.	118	MT 0.00785926
7.0	Handling from storage, erection, welding/ jointing, non-destructive testing, inspection, internal cleaning & painting (incl supply as per scope), final painting, testing & commissioning of <b>PU coated CS piping of various system (900 NB to 3300 NB )</b> and associated material (including fitting and valves etc) as per tender. Payment shall be released as per following. (i) Erection - 35%; (ii) Alignment - 5%; (iii) Jointing - 30%; (iv) NDT - 10%; (v) PU coating (including PU coating material supply for joints) as per rqmt at joints - 9.5%; (vi) Pnuematic test - 10%; and (vii) As-built drawing submission - 0.5%.	100	MT 0.00666265
8.0	Handling from storage, erection, welding/ jointing, non-destructive testing, inspection, internal cleaning & painting (incl supply as per scope), final painting, testing & commissioning of <b>Rubber Lined CS piping of Intake water, PT Water, Blowdown system, ACW, etc. (300 NB to 800NB )</b> and associated material (including fitting and valves etc) as per tender. Payment shall be released as per following. (i) Erection - 35%; (ii) Alignment - 5%; (iii) Jointing - 39.5%; (iv) NDT - 10%; (v) Pnuematic test - 10%; and (vi) As-built drawing submission - 0.5%.	576	MT 0.03837687
9.0	Handling from storage, fabrication, erection, welding, inspection, fixing/ embedding, painting etc of <b>hangers, supports &amp; structures, misc supporting material etc.</b> all complete. Payment shall be released as per following. (i) Erection - 55%; (ii) Welding - 35%; (iii) Painting completion - 9.5% and (iv) As-built drawing submission - 0.5%.	200	MT 0.0133253
10.0	Handling from storage, erection, welding, inspection, fixing/ embedding, painting etc of <b>RE joints, expansion bellows, annubars &amp; flow elements</b> all complete. Payment shall be released as per following. (i) Erection - 60%; (ii) Welding - 35%; (iii) Painting completion - 3% and (iv) As-built drawing submission - 2%.	30	MT 0.0019988
11.0	Fabrication of <b>mitre bends, tees</b> of sizes NB 250 and above for various carbon steel LP piping system etc from straight pipes. Straight pipes will be supplied by BHEL free. Payment shall be released as per following. (i) Fabrication - 95%; (ii) Erection - 5%.	100	MT 0.00666265

<b>VOLUME-III PRICE SCHEDULE, REV-01</b>			
<b>Erection, testing, commissioning, handing over, etc of steam turbine &amp; aux, generator &amp; aux, pumps, auxiliaries, etc. including Fire Protection System and LP Piping for both units at 2x660 MW Maitree STPP, Rampal, Bangladesh</b>			
<b>TENDER NO. PSER:SCT:KLN-T1976:19</b>			
<b>SCH-III- LP PIPE PACKAGE</b>			
<b>SL NO</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>WEIGHTAGE</b>
12.0	Handling from storage, erection, welding, non-destructive testing, inspection, internal cleaning & painting (including complete supply), final painting, testing & commissioning of Piping System for below mentioned sizes of Pipes of 'Fire Protection system' and associated material (covering fittings and valves etc) as per tender:  Payment shall be released as per following: (i) Erection - 35%; (ii) Alignment - 5%; (iii) Welding - 19.5%; (iv) NDT - 10%; (v) Hydraulic test - 5%; (vi) Painting completion - 25% and (vii) As-built drawing submission - 0.5%.		
12.1	Pipe sizes upto 80 NB	621	MT 0.04138839
12.2	Pipe sizes beyond 80 NB	1,389	MT 0.09252524
13.0	Wrapping of burried pipe covering supply and application of <b>wrapping &amp; coating material (2 layers, each 2 mm thick)</b> of burried pipe as per tender specification, drawing/document and as per BHEL instruction. (Qty indicated is surface area of buried pipe in sq mtr). Payment shall be released as per following. (i) Supply - 80% and (ii) Application - 20%.	6250	SQM 0.01194067
14.0	Wrapping of burried pipe of Fire Fighting and Fire protection system with the application of <b>wrapping &amp; coating material</b> as per tender specification, drawing/document and as per BHEL instruction. (Qty indicated is surface area of buried pipe in sq mtr). (Wrapping coating materials shall be supplied by BHEL at free of cost)	625	SQM 0.00119407
<b>TOTAL</b>			<b>0.30612411</b>
<b>NOTE</b>			
a	Cathodic protection, wherever applicable, as per drawing shall be carried out by BHEL. The successful bidder shall co-ordinate for the smooth application of same with BHEL/ BHEL's Agency.		
b	20% of the price, except Sl. No. 13.0, shall be considered against supply of consumables required for completion of the job and 80% shall be considered as E&C cost. For Sl. No. 13.0, 80% shall be supply cost and 20% shall be E&C cost. In view of the same and above price break-up, on the basis of allocated weightage, separate orders shall be issued for supply and service.		

TECHNICAL DATA SHEET OF WRAPPING & COATING MATERIAL.																			
1.0	Make																		
2.0	Type	:	Anti Corrosion protection coal tar tape.																
3.0	Standard		AWWA: C-203/IS-15337/IS 10221																
4.0	Length	:	As per approved Drawing																
5.0	Thickness	:	2 layers of 2mm $\pm$ 10 % tolerance																
6.0	Nominal Thickness	:	2mm																
7.0	Width of tape	:	<table border="1"> <thead> <tr> <th>PIPE NB</th> <th>TAPE WIDTH (mm)</th> </tr> </thead> <tbody> <tr> <td>80mm</td> <td>100 / 125</td> </tr> <tr> <td>100mm</td> <td>100 / 125 / 166</td> </tr> <tr> <td>150mm</td> <td>125 / 166 / 200</td> </tr> <tr> <td>200mm</td> <td>125 / 166 / 200 / 250</td> </tr> <tr> <td>250mm</td> <td>166 / 200 / 250 / 333</td> </tr> <tr> <td>300mm</td> <td>166 / 200 / 250 / 333</td> </tr> <tr> <td>&gt;300</td> <td>333</td> </tr> </tbody> </table>	PIPE NB	TAPE WIDTH (mm)	80mm	100 / 125	100mm	100 / 125 / 166	150mm	125 / 166 / 200	200mm	125 / 166 / 200 / 250	250mm	166 / 200 / 250 / 333	300mm	166 / 200 / 250 / 333	>300	333
PIPE NB	TAPE WIDTH (mm)																		
80mm	100 / 125																		
100mm	100 / 125 / 166																		
150mm	125 / 166 / 200																		
200mm	125 / 166 / 200 / 250																		
250mm	166 / 200 / 250 / 333																		
300mm	166 / 200 / 250 / 333																		
>300	333																		
8.0	Details of Tape	:																	
8.a	Total thickness of tape	:	2 layers of 2mm with tolerance of $\pm$ 10 %.																
8.b	Pliability	:	Sufficient pliability at 25° C, Breaking Load to be measured at 20° C to 30° C)																
8.c	Longitudinal direction	:	5 N / mm																
8.d	Specific gravity (+25°C)	:	1.3 $\pm$ 0.05																
8.e	Penetration (+25°C)	:	1-20 x 0.1 mm																
8.f	Ash Content	:	0.5 % max.																
7.g	Service temperatur of tape	:	50°																
8.h	Material of Construction	:	Coal Tar pitch composed of coal tar pitch and Anthracene oil with inert filler are heated & digested to make coating material. The fibre glass tissue is dipped in coating bath and tape is cut to required size of customers. Tape is applied by hot torching.																
9.0	Primer Details	:																	
9.a	Viscosity on flow cup#4 at 20 deg. C	:	35-60 seconds																
9.b	Drying time in minutes	:	5-15 minutes																
9.c	Flash point	:	More than 23°C																
9.d	Volatile matter (%) (100-110°C)	:	75% by mass as per IS- 15337																
9.e	No. of Coat	:	As per IS- 15337 standard																

**PROJECT ::** 2x660 MW MAITREE STPP PROJECT

**CUSTOMER ::** BANGLADESH INDIA FRIENDSHIP POWER COMPANY (PVT.) LTD.

**DOC TITLE :** ERECTION BOQ OF FIRE PROTECTION AND DETECTION SYSTEM EXCL. PIPING

**DOC NO :** PEMC-07365

Rev No	1							Date	15.10.18	
Rev No	0							Date	10.10.18	

PROJECT :: 2x660 MW MAITREE STPP PROJECT

CUSTOMER :: BANGLADESH INDIA FRIENDSHIP POWER COMPANY (PVT.) LTD.

DOC TITLE : ERECTION BOQ FOR PUMP HOUSE EQUIPMENTS, HYDRANT BASED COMPONENTS AND SPRAY SYSTEM COMPONENTS

Sl.No	SYSTEM DESCRIPTION	Unit	Qty	Mass/Mtr or Unit Weight in Kgs	Total Mass (T) (Tonnes)	SUMMARY OF ERECTION WORKS TO BE CARRIED OUT AT SITE	SCOPE
<b>I FIRE WATER PUMP HOUSE EQUIPMENT AND HYDRANT BASED COMPONENTS</b>							
1	Electric Motor Driven, Horizontal, Centrifugal type Fire water Pumpsets of Cap. 795M3/Hr. x 125 MWC, complete with Electric Motor, Base plate and accessories - Main pump for Hydrant System	Sets	2	6,500.0	13.0	-Installing the spring isolator and subsequently Inertial plate above spring isolator -Installing the Fire pump Base (if already assembled in factory) on the inertial Plate. - Checking Alignment of coupling - Grouting & bolt fixation, as per approved foundation details from manufacturer. - Connecting the inlet and discharge pipes to the Pump set. - Installing the instruments and accessories.	FPS PKG
2	Diesel Engine Driven, Horizontal Centrifugal type Fire water Pumpset of Cap. 795M3/Hr. x 125 MWC, complete with Diesel Engine and Accessories.	Sets	2	7,000.0	14.0	-Installing the spring isolator and subsequently Inertial plate above spring isolator -Installing the Fire pump Base (if already assembled in factory) on the inertial Plate. - Checking Alignment of coupling - Grouting & bolt fixation, as per approved foundation details from manufacturer. - Connecting the inlet and discharge pipes to the Pump set. - Installing the instruments and accessories.	FPS PKG
5	Electric Motor Driven, Horizontal, Centrifugal type Jockey Pumpsets of Cap. 75 M3/Hr. x 125 MWC, complete with Electric Motor, Base plate and accessories	Sets	2	2,200	4.4	-Installing the spring isolator and subsequently Inertial plate above spring isolator -Installing the Fire pump Base (if already assembled in factory) on the inertial Plate. - Checking Alignment of coupling - Grouting & bolt fixation, as per approved foundation details from manufacturer. - Connecting the inlet and discharge pipes to the Pump set. - Installing the instruments and accessories.	FPS PKG
3	Hydro-pneumatic Tank of Cap. 18 Cu. Mtrs.	Nos.	1	15,000	15.0	- Installing the tank on foundation and alligning it - Grouting & bolt fixation. - Installing all accessories and instrumentation. - Dry Weight indicated	FPS PKG
4	Air Compressors Cap. 25M3 at 12.5 Kg/cm2 (Main and Stand-by)	Nos.	2	400.0	0.8	-Shifting the air compressor to desired location. -Installing the tank on foundation and alligning it - Grouting & bolt fixation. - Installing all accessories and instrumentation. - Dry Weight indicated	FPS PKG
5	HSD Transfer pump Cap-2.5 M3/HR, 35 MLC complete with Electric Motor, Base plate and accessories	Sets	2	1,000.0	2.0	-Installing the spring isolator and subsequently Inertial plate above spring isolator -Installing the pump Base (if already assembled in factory) on the inertial Plate. - Checking Alignment of coupling - Grouting & bolt fixation, as per approved foundation details from manufacturer. - Connecting the inlet and discharge pipes to the Pump set. - Installing the instruments and accessories.	FPS PKG
<b>TOTAL WEIGHT IN TONNE</b>					<b>49.20</b>		

PROJECT :: 2x660 MW MAITREE STPP PROJECT						
CUSTOMER :: BANGLADESH INDIA FRIENDSHIP POWER COMPANY (PVT.) LTD.						
DOC TITLE :: ERECTION BOQ FOR INERT GAS EXTINGUISHING SYSTEM						
Sl.No	Detailed Description	Unit	Quantity	Weight of Each unit (Kgs)	Total Weight (T)	SCOPE
1	Inert Gas Cylinder with pneumatic valve	Nos.	510	255	130.05	FPS PKG
2	Discharge Hose	Nos.	510	0.9	0.46	FPS PKG
3	Check Valve	Nos.	510	0.2	0.10	FPS PKG
4	Contact Pressure Gauge Unit	Nos.	475	0.7	0.33	FPS PKG
5	Release Unit with Solenoid, CPG & Actuator	Nos.	35	2.5	0.09	FPS PKG
6	Leak / Bleeder unit	Nos.	60	0.08	0.00	FPS PKG
7	Non Return Valve	Nos.	33	0.1	0.00	FPS PKG
8	Hi-flex hoses	Nos.	499	0.32	0.16	FPS PKG
9	Ball Valve with dual action pneumatic actuator	Nos.	35	17	0.60	FPS PKG
10	Pressure Relief device	Nos.	30	0.37	0.01	FPS PKG
12	Discharge Nozzle	Nos.	650	0.67	0.44	FPS PKG
13	Pressure Regulator	Nos.	30	4	0.12	FPS PKG
15	Restrictor	Nos.	35	3.6	0.13	FPS PKG
16	T-Piece for Pilot Line	Nos.	475	0.125	0.06	FPS PKG
17	Cros for Pilot Line	Nos.	35	0.2	0.01	FPS PKG
21	Cylinder Manifolds 100NB(ASTM A 106 Gr.B SCH-XXS)	Mtrs.	200	42.2	8.44	FPS PKG
22	DV manifold	Nos.	30	10	0.30	FPS PKG
23	Pilot Line Manifold	No.	30	10	0.30	FPS PKG
24	Structural Steel for Cyl. Mounting Frame Bracket	kg	5000	1	5.00	FPS PKG
37	Misc. for painting, primers, other finishes etc.	Lot	1	-		FPS PKG
<b>Total weight in Tonne</b>					<b>146.59</b>	

**Notes:**

- 1 The above is applicable for PE&SD supplied items.
- 2 The inputs are preliminary and are expected to change during detail engineering. Hence Margin of about 15% to be considered for above preliminary inputs.
- 3 All cables are to be terminated with cable termination accessories.
- 4 Erection activities like cutting/ threading/welding etc. of conduit/pipe/ISMC/ISA shall be carried out at site as per requirement for installation of illumination equipments.
- 5 Consumables like rawl plugs, screws, check nuts, nuts & bolts, saddles, saddle bars, cable (nylon) ties, washers,cable tags(strips), etc. which are not covered in the list but required for successful completion of above erection activity shall be considered in Erection agency.
- 6 Surface preparation and base coat of primer shall be carried and final painting shall be done after completion of structural steel erection.
- 7 Vendor shall arrange all the tools and facilities required for calibration, erection and testing required for Erection & Commissioning activities.
- 8 Obtaining statutory approvals from TAC, Electrical Inspector or any other Governing Agencies shall be in Vendor's scope. Documentation required like Layouts, Schemes shall be furnished by PE&SD.
- 9 Marked-up "AS-Built" documents/drawings have to be prepared and provided by Vendor to BHEL after E&C to enable submission of contractual 'As-Built" documentation.
- 10 Performance Tests if any for the system shall be considered in the scope of Erection agency.

<b>PROJECT :: 2x660 MW MAITREE STPP PROJECT</b>								
<b>CUSTOMER :: BANGLADESH INDIA FRIENDSHIP POWER COMPANY (PVT.) LTD.</b>								
<b>DOC TITLE : ERECTION BOQ FOR FOAM PROTECTION SYSTEM</b>								
Sl.No	Detailed Description	Unit	Quantity	Weight of Each unit (Kgs)	Total Weight (T)	SUMMARY OF ERECTION WORKS TO BE CARRIED OUT AT SITE	Location	SCOPE
1	Foam tanks and all its accessories -3000 ltr. Capacity (1 Working + 1 standby)	Nos.	2	360	0.72	Transportation of Material from store to site	Foam Pump House	FPS PKG
2	Foam Pumps with motor : 3.5 cum/hr @ 8 kg/cm2 head - Motor driven (Working)	Nos.	1	100	0.10	-Erection of equipment in Foam PH such as pumps, Foam conc. Tanks, diesel engine etc.	Foam Pump House	FPS PKG
3	Foam Pumps with engine and battery and battery charger 3.5 cum/hr @ 8 kg/cm2 head - Engine driven (standby)	Nos.	1	130	0.13	-Erection of field equipment & instrumentation such as S.S	Foam Pump House	FPS PKG
<b>TOTAL WEIGHT IN TONNE</b>					<b>0.95</b>			

PROJECT :: 2x660 MW MAITREE STPP PROJECT							
CUSTOMER :: BANGLADESH INDIA FRIENDSHIP POWER COMPANY (PVT.) LTD.							
DOC TITLE :: ERECTION BOQ FOR FIRE WATER TANK							
SL. NO.	BRIEF DESCRIPTION	QTY	UOM	UNIT WEIGHT (KG)	GROSS WEIGHT (KG)	Material of Construction	SCOPE
<b>A</b>	<b>Plates - ASTM A 36 Material</b>						
1	ASTM A 36 - 1500mm X6300mm X16mm	18	Nos	1179.36	21228.48	SA 36	FPS PKG
2	ASTM A 36 - 1500mm X6300mm X14mm	9	KG	1031.94	9287.46	SA 36	FPS PKG
3	ASTM A 36 - 1500mm X6300mm X12mm	18	KG	884.52	15921.36	SA 36	FPS PKG
4	ASTM A 36 - 1500mm X6300mm X10mm	85	KG	737.1	62653.5	SA 36	FPS PKG
5	ASTM A 36 - 1500mm X6300mm X6mm	40	KG	442.26	17690.4	SA 36	FPS PKG
<b>B</b>	<b>Structural Steel</b>						FPS PKG
6	ISMC 75 X 40	--	--	--	3000	ASTM A36 / A6	FPS PKG
7	ISA 65x65x6THK	--	--	--	4000	ASTM A36 / A6	FPS PKG
8	ISA 50x50x6THK	--	--	--	6000	ASTM A36 / A6	FPS PKG
9	ISMC 100 X 50	--	--	--	3000	ASTM A36 / A6	FPS PKG
10	ISA 75x75x6THK	--	--	--	2500	ASTM A36 / A6	FPS PKG
11	IS FLAT-100X6THK	--	--	--	1500	ASTM A36 / A6	FPS PKG
12	IS FLAT-50X6THK	--	--	--	1500	ASTM A36 / A6	FPS PKG
13	ISRO Ø16	--	--	--	2000	ASTM A36 / A6	FPS PKG
14	ISSQ 16	--	--	--	1500	ASTM A36 / A6	FPS PKG
15	STAIR TREAD(Galvanised)	80	Nos	--	--	ASTM A36 / A6(Galvanised)	FPS PKG
16	PLATFORM(Galvanised)	5	Nos	--	--	ASTM A36 / A6(Galvanised)	FPS PKG
82	Name Plates	1	Nos	--	--	SS 304	FPS PKG
83	EARTHING LUGS	1	Nos	--	--	SS 304	FPS PKG
84	450Ø WIRE MESH for Vents	1	Nos	--	--	SS 304 wire mesh	FPS PKG
81	Gauge Hatch - 1No. (200 NB)	1	Nos	--	--	Refer Notes Below	FPS PKG
<b>C</b>	<b>Nozzles(Pipes)</b>						
17	Tank Make-Up Line - 200 NB	35	mts	6.87974	240.7909	SA 53	FPS PKG
19	Recirculation Line - 300 NB	4	mts	10.16732	40.66928	SA 53	FPS PKG
20	Pump Suction Line - 400 NB	4	mts	12.76096	51.04384	SA 53	FPS PKG
21	Overflow line - 400 NB	250	mts	12.76096	3190.24	SA 53	FPS PKG
22	Drain Line - 100 NB	8	mts	3.58902	28.71216	SA 53	FPS PKG
24	Spare Inlet - 200 NB	35	mts	6.87974	240.7909	SA 53	FPS PKG
25	Spare Outlet - 400 NB	2	mts	12.76096	25.52192	SA 53	FPS PKG
26	Shell Manhole - 600 NB	2	mts	19.154	38.308	SA 36/SA 53	FPS PKG
27	Roof Manhole - 600 NB	2	mts	19.154	38.308	SA 36/SA 53	FPS PKG
28	Vent with goose neck - 2 Nos (300 NB)	3	mts	10.16732	30.50196	SA 36/SA 53	FPS PKG
30	Level Gauge - 1 No. with three nozzles (40NB)	5	mts	1.51662	7.5831	SA 53	FPS PKG
32	Hand Rail Pipe ( 32 NB)	300	mts	1.32508	397.524	ASTM A36 / A6, Galvanized.	FPS PKG

SL. NO.	BRIEF DESCRIPTION	QTY	UOM	UNIT WEIGHT (KG)	GROSS WEIGHT (KG)	Material of Construction	SCOPE
<b>D</b>	<b>Gaskets</b>						
35	Gasket Size: 750 O.D x 615 I.D x 3 Thk.	1	Nos	--	--	CNAF	FPS PKG
36	Gasket Size: 825 O.D x 623 I.D x 3 Thk.	1	Nos	--	--	CNAF	FPS PKG
							FPS PKG
<b>E</b>	<b>Blind Flange</b>						FPS PKG
37	Blind Flange for Spare Outlet - 400 NB	1	Nos	--	--	ASTM A36 / A6	FPS PKG
38	Blind Flange for Spare Intlet - 200 NB	1	Nos	--	--	ASTM A36 / A6	FPS PKG
39	Cover Flange for Shell Manhole - 600 NB	2	Nos	--	--	ASTM A36 / A6	FPS PKG
40	Cover Flange for Roof Manhole - 600 NB	2	Nos	--	--	ASTM A36 / A6	FPS PKG
41	Bolting Flange for shell Manhole - 600 NB	2	Nos	--	--	ASTM A36 / A6	FPS PKG
42	Bolting Flange for roof Manhole - 600 NB	2	Nos	--	--	ASTM A36 / A6	FPS PKG
<b>F</b>	<b>Fasteners</b>						
43	M33x150Lg	70	Nos	--	--	ASTM A307, Gr B or ASTM A325, Galvanized.	FPS PKG
44	M27x115Lg	25	Nos	--	--	ASTM A307, Gr B or ASTM A325, Galvanized.	FPS PKG
45	M24x100Lg	50	Nos	--	--	ASTM A307, Gr B or ASTM A325, Galvanized.	FPS PKG
46	M20x90Lg	50	Nos	--	--	ASTM A307, Gr B or ASTM A325, Galvanized.	FPS PKG
47	M16x150Lg	25	Nos	--	--	ASTM A307, Gr B or ASTM A325, Galvanized.	FPS PKG
48	M12x65Lg	50	Nos	--	--	ASTM A307, Gr B or ASTM A325, Galvanized.	FPS PKG
49	M20x60Lg	45	Nos	--	--	ASTM A307, Gr B or ASTM A325, Galvanized.	FPS PKG
50	M16x60Lg	500	Nos	--	--	ASTM A307, Gr B or ASTM A325, Galvanized.	FPS PKG
51	M12x60Lg	500	Nos	--	--	ASTM A307, Gr B or ASTM A325, Galvanized.	FPS PKG
52	U-Bolt to suit 100NB pipe	1	Nos	--	--	ASTM A307, Gr B or ASTM A325, Galvanized.	FPS PKG
53	M48 x 1000 Lg. Anchor bolts	45	Nos	--	--	ASTM A307, Gr B or ASTM A325, Galvanized.	FPS PKG

SL. NO.	BRIEF DESCRIPTION	QTY	UOM	UNIT WEIGHT (KG)	GROSS WEIGHT (KG)	Material of Construction	SCOPE
64	M33x150Lg	10	Nos	--	--	ASTM A307, Gr B or ASTM A325, Galvanized.	FPS PKG
65	M27x115Lg	6	Nos	--	--	ASTM A307, Gr B or ASTM A325, Galvanized.	FPS PKG
66	M24x100Lg	12	Nos	--	--	ASTM A307, Gr B or ASTM A325, Galvanized.	FPS PKG
67	M20x90Lg	8	Nos	--	--	ASTM A307, Gr B or ASTM A325, Galvanized.	FPS PKG
68	M16x150Lg	5	Nos	--	--	ASTM A307, Gr B or ASTM A325, Galvanized.	FPS PKG
69	M12x65Lg	10	Nos	--	--	ASTM A307, Gr B or ASTM A325, Galvanized.	FPS PKG
70	M20x60Lg	10	Nos	--	--	ASTM A307, Gr B or ASTM A325, Galvanized.	FPS PKG
71	M16x60Lg	6	Nos	--	--	ASTM A307, Gr B or ASTM A325, Galvanized.	FPS PKG
<b>G</b>	<b>Commissioing Spares</b>						FPS PKG
54	Gasket Size: 600NB	6	Nos	--	--	CNAF	FPS PKG
55	Gasket Size: 400NB	6	Nos	--	--	CNAF	FPS PKG
56	Gasket Size: 300NB	6	Nos	--	--	CNAF	FPS PKG
57	Gasket Size: 200NB	3	Nos	--	--	CNAF	FPS PKG
58	Gasket Size: 100NB	3	Nos	--	--	CNAF	FPS PKG
59	Gasket Size: 80NB	5	Nos	--	--	CNAF	FPS PKG
60	Gasket Size: 50NB	3	Nos	--	--	CNAF	FPS PKG
61	Gasket Size: 40NB	8	Nos	--	--	CNAF	FPS PKG
62	Gasket Size: 750 O.D x 615 I.D x 3 Thk.	1	Nos	--	--	CNAF	FPS PKG
63	Gasket Size: 825 O.D x 623 I.D x 3 Thk.	1	Nos	--	--	CNAF	FPS PKG
<b>H</b>	<b>Fittings</b>						FPS PKG
72	Elbows for Vent(Goose Neck) - 300 NB	8	Nos	--	--		FPS PKG
73	Elbow Size: (90deg for Drain Line) - 100 NB	2	Nos	--	--		FPS PKG
74	Elbow for Overflow Lines - 400 NB	12	Nos	--	--		FPS PKG
75	Elbow Size: (90deg for Make Up Line) - 200 NB	10	Nos	--	--		FPS PKG
76	Reducer Size: for overFlow - 500NB x 400NB	2	Nos	--	--		FPS PKG
77	Reducer for Make-Up line - 400NB x 300NB	4	Nos	--	--		FPS PKG
79	Reducer for Inter connection line - 400NB x 300NB	2	Nos	--	--		FPS PKG

SL. NO.	BRIEF DESCRIPTION	QTY	UOM	UNIT WEIGHT (KG)	GROSS WEIGHT (KG)	Material of Construction	SCOPE
80	Reducer for Spare Inlet - 400NB x 300NB	2	Nos	--	--		FPS PKG
81	Reducer for Recirculation - 250NB x 150NB	2	Nos	--	--		FPS PKG
<b>J</b>	<b>Valves</b>						
87	Butterfly Valve - 100 NB Size	1	Nos			Cast Steel	FPS PKG
<b>TOTAL WEIGHT IN TONNE</b>					<b>156.11</b>		
<b>Notes:</b>							
1	1 No of Fire Water Storage Tank of 2300 cu.m Net Capacity is applicable for this project.						
2	Supply of above material is in BHEL / PE&SD scope.						
3	Fabrication, erection, radiography testing (10% of T-Joints as per IS 803),						
4	hydrotesting, painting, commissioning of both the tanks are in Vendor's scope.						
5	Painting of Tank is in vendor's Scope including supply of paint.						

**PROJECT :: 2x660 MW MAITREE STPP PROJECT**

**CUSTOMER :: BANGLADESH INDIA FRIENDSHIP POWER COMPANY (PVT.) LTD.**

**DOC TITLE : ERECTION BOQ OF PIPING UNDER FIRE PROTECTION AND DETECTION SYSTEM**

**DOC NO : PEMC-07365**

Rev No	1						Date	15.10.18	
Rev No	0						Date	10.10.18	

**PROJECT ::** 2x660 MW MAITREE STPP PROJECT

**CUSTOMER ::** BANGLADESH INDIA FRIENDSHIP POWER COMPANY (PVT.) LTD.

**DOC TITLE :** ERECTION BOQ FOR PIPING, FITTINGS, VALVES, STRUCTURAL STEEL, FLANGES, GASKETS, FASTENERS, PAINTING, CATHODIC PROTECTION SYSTEM ETC FOR COMPLETE WATER BASED FIRE PROTECTION SYSTEM AND FOAM PROTECTION SYSTEM

Sl.No	Detailed Description	Unit	Quantity	Weight of Each unit (Kgs)	Total Weight (Tons)	SUMMARY OF ERECTION WORKS TO BE CARRIED OUT AT SITE( REFER NOTE BELOW)	SCOPE
1	BLIND FLANGE CS 8" CL150 B16.5 FF	No.	4	20.5	0.08		LP PIPE PKG
2	BLIND FLANGE CS 12" CL150 B16.5 FF	No.	4	50.0	0.20		LP PIPE PKG
3	CRDCR CS 8" X 4" SCH 20 X STD BW	No.	5	6.1	0.03		LP PIPE PKG
4	CRDCR CS 8" X 6" SCH 20 X STD BW	No.	5	4.7	0.02		LP PIPE PKG
5	CRDCR CS 12" X 8" SCH 30 X SCH 30 BW	No.	8	13.0	0.10		LP PIPE PKG
6	CRDCR CS 8" X 6" STD X STD BW	No.	2	6.5	0.01		LP PIPE PKG
7	CRDCR CS 12" X 10" STD X STD BW	No.	4	15.0	0.06		LP PIPE PKG
8	CRDCR CS 2" X 1" STD X XS BW	No.	15	0.4	0.01		LP PIPE PKG
9	ELBOW 45D LR CS 6" STD BW	No.	6	5.5	0.03		LP PIPE PKG
10	ELBOW 45D LR CS 8" 20 BW	No.	6	7.5	0.05		LP PIPE PKG
11	ELBOW 45D LR CS 12" 30 BW	No.	6	22.3	0.13		LP PIPE PKG
12	ELBOW 45D LR CS 16" STD BW	No.	6	44.2	0.27		LP PIPE PKG
13	ELBOW 90D LR CS (A234GRWPB) 3" STD BW	No.	145	2.3	0.33		LP PIPE PKG
14	ELBOW 90D LR CS (A234GRWPB) 4" STD BW	No.	208	4.2	0.88		LP PIPE PKG
15	ELBOW 90D LR CS (A234GRWPB) 6" STD BW	No.	222	11.0	2.44		LP PIPE PKG
16	ELBOW 90D LR CS (A234GRWPB) 8" 20 BW	No.	130	15.1	1.96		LP PIPE PKG
17	ELBOW 90D LR CS (A234GRWPB) 10" 20 BW	No.	6	23.6	0.14		LP PIPE PKG
18	ELBOW 90D LR CS (A234GRWPB) 12" 30 BW	No.	225	44.7	10.06		LP PIPE PKG
19	ELBOW 90D LR CS (A234GRWPBW) 16" STD BW	No.	10	88.4	0.88		LP PIPE PKG
20	TEE STRT CS 3" STD BW	No.	6	3.8	0.02		LP PIPE PKG
21	TEE STRT CS 4" STD BW	No.	30	6.0	0.18		LP PIPE PKG
22	TEE STRT CS 6" STD BW	No.	10	16.5	0.16		LP PIPE PKG
23	TEE STRT CS 8" 20 BW	No.	15	18.7	0.28		LP PIPE PKG
24	TEE STRT CS 12" 30 BW	No.	30	52.3	1.57		LP PIPE PKG
25	TEE STRT CS 16" 20 BW	No.	6	78.2	0.47		LP PIPE PKG
26	ERDCR CS 16" X 12" 30 X 30 BW	No.	4	34.0	0.14		LP PIPE PKG
27	FLANGE CS 3" CL150 B16.5 SOFF	No.	703	3.7	2.60		LP PIPE PKG
28	FLANGE CS 4" CL150 B16.5 SOFF	No.	32	5.9	0.19		LP PIPE PKG
29	FLANGE CS 6" CL150 B16.5 SOFF	No.	44	8.6	0.38		LP PIPE PKG
30	FLANGE CS 8" CL150 B16.5 SOFF	No.	40	13.7	0.55		LP PIPE PKG
31	FLANGE CS 10" CL150 B16.5 SOFF	No.	8	19.5	0.16		LP PIPE PKG
32	FLANGE CS 12" CL150 B16.5 SOFF	No.	70	29.0	2.03		LP PIPE PKG
33	FLANGE CS 16" CL150 B16.5 SOFF	No.	16	54.0	0.86		LP PIPE PKG
34	FLANGE CS 12" CL150 B16.5 SORF	No.	16	29.0	0.46		LP PIPE PKG
35	FLANGE CS 3" CL150 B16.5 SORF	No.	12	3.7	0.04		LP PIPE PKG
36	FLANGE CS 1" CL150 B16.5 SORF	No.	20	0.9	0.02		LP PIPE PKG
37	FLANGE CS 2" CL150 B16.5 SORF	No.	6	2.3	0.01		LP PIPE PKG
38	NAB SHEET (NRR) BS 7531 GR.X	No.	150	3.3	0.50		LP PIPE PKG
39	MSW GASKET (PTFE) 12" CL150 B16.5 RF	No.	16	1.4	0.02		LP PIPE PKG
40	MSW GASKET (PTFE) 3" CL150 B16.5 RF	No.	12	0.2	0.00		LP PIPE PKG
41	MSW GASKET (PTFE) 1" CL150 B16.5 RF	No.	20	0.1	0.00		LP PIPE PKG
42	MSW GASKET (PTFE) 2" CL150 B16.5 RF	No.	6	0.1	0.00		LP PIPE PKG
43	STUD WITH TWO NUTS M20X120	No.	352	0.5	0.17		LP PIPE PKG
44	STUD WITH TWO NUTS M24X130	No.	1080	0.7	0.79		LP PIPE PKG
45	STUD WITH TWO NUTS M27X140	No.	288	1.0	0.30		LP PIPE PKG
46	STUD WITH TWO NUTS M16X100	No.	248	0.3	0.07		LP PIPE PKG
47	STUD WITH TWO NUTS M20X110	No.	352	0.5	0.16		LP PIPE PKG
48	STUD WITH TWO NUTS M24X120	No.	96	0.7	0.07		LP PIPE PKG
49	STUD WITH TWO NUTS M12X80	No.	80	0.1	0.01		LP PIPE PKG
50	STUD WITH TWO NUTS M16X90	No.	2892	0.3	0.74		LP PIPE PKG
51	PIPE ERW 21.34X3.73 CS A53 TYPE E GRB	metre	30	1.6	0.05		LP PIPE PKG
52	PIPE ERW 33.4X3.38 CS A53 TYPE E GRB	metre	240	2.5	0.60		LP PIPE PKG
53	PIPE ERW 60.3X3.91 CS A53 TYPE E GRB	metre	200	5.4	1.09		LP PIPE PKG
54	PIPE ERW 114.3X4.78 CS A53 TYPE E GRB	metre	2792	12.9	36.04		LP PIPE PKG
55	PIPE ERW 168.3X5.56 CS A53 TYPE E GRB	metre	5700	22.3	127.17		LP PIPE PKG
56	PIPE ERW 219.1X5.56 CS A53 TYPE E GRB	metre	4200	29.3	122.98		LP PIPE PKG
57	PIPE ERW 273.0X5.56 CS A53 TYPE E GRB	metre	24	36.7	0.88		LP PIPE PKG
58	PIPE ERW 323.8X5.56 CS A53 TYPE E GRB	metre	5900	43.6	257.42		LP PIPE PKG
59	RCPLNG CS(GALV) 1"X1/2" CL3000 SC	No.	10	0.5	0.01		LP PIPE PKG
60	ELBOW 90D CS (A105) 2" CL3000 SW	No.	60	1.7	0.10		LP PIPE PKG
61	ELBOW 90D CS (A105) 1" CL3000 SW	No.	100	0.5	0.05		LP PIPE PKG
62	ELBOW 90D CS (A105) 0.5" CL3000 SW	No.	20	0.2	0.00		LP PIPE PKG
63	ELBOW 90D CS(A105-GALV) 1" CL3000 SC	No.	12	0.5	0.01		LP PIPE PKG

Sl.No	Detailed Description	Unit	Quantity	Weight of Each unit (Kgs)	Total Weight (Tons)	SUMMARY OF ERECTION WORKS TO BE CARRIED OUT AT SITE( REFER NOTE BELOW)	SCOPE
64	TEE STRT CS (A105) 2" CL3000 SW	No.	8	1.8	0.01		LP PIPE PKG
65	TEE STRT CS (A105-GALV) 1" CL3000 SC	No.	6	0.6	0.00		LP PIPE PKG
66	HALF COUPLING CS (A105) 0.5" CL3000 SW	No.	20	0.1	0.00		LP PIPE PKG
67	HALF COUPLING CS (A105) 1" CL3000 SW	No.	10	0.3	0.00		LP PIPE PKG
68	PIPE ERW 88.9X3.96 CS A53 TYPE E GRB	metre	654	8.3	5.42		LP PIPE PKG
69	BLIND FLANGE CS 16" CL150 B16.5 FF	No.	2	82.0	0.16		LP PIPE PKG
70	PIPE ERW 406.4X9.52 CS A53 TYPE E GRB	metre	98	93.2	9.13		LP PIPE PKG
71	8" BFLV CS (WCB) MO CL150 WAFER	No.	2	70.0	0.14		LP PIPE PKG
72	PIPE ERW 21.34X3.73 CS A53 TYPE E GRB	metre	540	1.6	0.87		LP PIPE PKG
73	PIPE ERW 33.4X3.38 CS A53 TYPE E GRB	metre	42408	2.5	106.02		LP PIPE PKG
74	PIPE ERW 60.3X3.91 CS A53 TYPE E GRB	metre	978	5.4	5.32		LP PIPE PKG
75	PIPE ERW 73.0 X 5.16CS A53 TYPE E GRB	metre	2136	8.6	18.43		LP PIPE PKG
76	PIPE ERW 88.9X3.96 CS A53 TYPE E GRB	metre	84	8.3	0.70		LP PIPE PKG
77	PIPE ERW 114.3X4.78 CS A53 TYPE E GRB	metre	1470	12.9	18.98		LP PIPE PKG
78	PIPE ERW 168.3X5.56 CS A53 TYPE E GRB	metre	168	22.3	3.75		LP PIPE PKG
79	PIPE ERW 21.34 X 3.73 CS A53-E-GRB(GAL)	metre	1116	1.6	1.80		LP PIPE PKG
80	PIPE ERW 26.67 X 3.91 CS A53-E GRB(GAL)	metre	8088	2.2	17.71		LP PIPE PKG
81	PIPE ERW 33.4 X 3.38 CS A53-E GRB(GAL)	metre	12504	2.5	31.26		LP PIPE PKG
82	PIPE ERW 42.2 X 3.56 CS A53-E GRB(GAL)	metre	8016	3.4	27.17		LP PIPE PKG
83	PIPE ERW 48.3 X 3.68 CS A53-E GRB(GAL)	metre	11214	4.0	45.30		LP PIPE PKG
84	PIPE ERW 60.3 X 3.91 CS A53-E GRB (GAL)	metre	13542	5.4	73.53		LP PIPE PKG
85	PIPE ERW 73.0 X 5.16 CS A53-E GRB (GAL)	metre	7002	8.6	60.43		LP PIPE PKG
86	PIPE ERW 88.9 X 3.96 CS A53-E GRB (GAL)	metre	4950	8.3	41.09		LP PIPE PKG
87	PIPE ERW 114.3 X 4.78 CS A53-E GRB(GAL)	metre	3630	12.9	46.86		LP PIPE PKG
88	PIPE ERW 168.3 X 5.56 CS A53-E GRB(GAL)	metre	4326	22.3	96.51		LP PIPE PKG
89	PIPE ERW 219.1 X 5.56 CS A53-E GRB(GAL)	metre	10296	29.3	301.47		LP PIPE PKG
90	ELBOW 90D LR CS (A234GRWPB) 6" STD BW	No.	44	11.0	0.48		LP PIPE PKG
91	ELBOW 90D LR CS (A234GRWPB) 4" STD BW	No.	564	4.2	2.39		LP PIPE PKG
92	ELBOW 90D LR CS (A234GRWPB) 3" STD BW	No.	108	2.3	0.25		LP PIPE PKG
93	ELBOW 90D LR CS (GALV) 8" S20 BW	No.	11	15.1	0.17		LP PIPE PKG
94	ELBOW 90D LR CS (GALV) 6" STD BW	No.	276	11.0	3.04		LP PIPE PKG
95	ELBOW 90D LR CS (GALV) 4" STD BW	No.	990	4.2	4.19		LP PIPE PKG
96	ELBOW 90D LR CS (GALV) 3" STD BW	No.	482	2.3	1.11		LP PIPE PKG
97	ELBOW 90D LR CS (GALV) 2.5" STD BW	No.	392	1.4	0.56		LP PIPE PKG
98	ELBOW 90D LR CS (GALV) 2" XS BW	No.	832	0.9	0.73		LP PIPE PKG
99	RED ELBOW 90D LR CS (GALV) 6"X4" STD BW	No.	4	10.0	0.04		LP PIPE PKG
100	RED ELBOW 90D LR CS (GALV) 4"X3" STD BW	No.	2	3.8	0.01		LP PIPE PKG
101	RED ELBOW 90D LR CS (GALV) 4"X2" STD BW	No.	2	3.8	0.01		LP PIPE PKG
102	RED ELBOW 90D LR CS (GALV)3"X2.5"STD B	No.	4	1.9	0.01		LP PIPE PKG
103	ELBOW 45D LR CS (GALV) 4" STD BW	No.	9	2.1	0.02		LP PIPE PKG
104	CRDCR CS (GALV) 8" X 4" STD X STD BW	No.	4	6.0	0.02		LP PIPE PKG
105	CRDCR CS (GALV) 8" X 6" STD X STD BW	No.	139	6.7	0.93		LP PIPE PKG
106	CRDCR CS (GALV) 6" X 4" STD X STD BW	No.	186	3.9	0.73		LP PIPE PKG
107	CRDCR CS (GALV) 6" X 3" STD X STD BW	No.	18	3.7	0.07		LP PIPE PKG
108	CRDCR CS (GALV) 4" X 3" STD X STD BW	No.	320	1.7	0.55		LP PIPE PKG
109	CRDCR CS (GALV) 4" X 2.5" STD X STD BW	No.	12	1.6	0.02		LP PIPE PKG
110	CRDCR CS (GALV) 4" X 2" STD X STD BW	No.	331	1.6	0.51		LP PIPE PKG
111	CRDCR CS (GALV) 4" X 1.5" STD X XS BW	No.	34	1.5	0.05		LP PIPE PKG
112	CRDCR CS (GALV) 3" X 2.5" STD X STD BW	No.	449	1.1	0.48		LP PIPE PKG
113	CRDCR CS (GALV) 3" X 2" STD X STD BW	No.	204	1.0	0.21		LP PIPE PKG
114	CRDCR CS (GALV) 3" X 1.5" STD X XS BW	No.	7	1.0	0.01		LP PIPE PKG
115	CRDCR CS (GALV) 3" X 1.25" STD X XS BW	No.	7	0.9	0.01		LP PIPE PKG

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116	CRDCR CS (GALV) 2.5" X 2" STD X STD BW	No.	628	1.1	0.71		LP PIPE PKG
117	CRDCR CS (GALV) 2.5" X 1.5" STD X XS BW	No.	29	1.1	0.03		LP PIPE PKG
118	CRDCR CS (GAL) 2.5" X 1.25" STD X XS BW	No.	130	1.1	0.14		LP PIPE PKG
119	CRDCR CS (GALV) 2.5" X 1" STD X XS BW	No.	7	1.0	0.01		LP PIPE PKG
120	TEE STRT CS 6" STD BW	No.	22	16.5	0.36		LP PIPE PKG
121	TEE STRT CS 4" STD BW	No.	217	6.0	1.30		LP PIPE PKG
122	TEE STRT CS 3" STD BW	No.	39	3.8	0.15		LP PIPE PKG
123	TEE STRT CS (GALV) 6" STD BW	No.	48	13.4	0.64		LP PIPE PKG
124	TEE STRT CS (GALV) 4" STD BW	No.	517	6.0	3.10		LP PIPE PKG
125	TEE STRT CS (GALV) 3" STD BW	No.	162	3.8	0.62		LP PIPE PKG
126	TEE STRT CS (GALV) 2.5" STD BW	No.	59	2.3	0.13		LP PIPE PKG
127	TEE STRT CS (GALV) 2" XS BW	No.	124	1.7	0.21		LP PIPE PKG
128	RDTEE CS (GALV) 8" X 6" STD X STD BW	No.	29	23.0	0.67		LP PIPE PKG
129	RDTEE CS (GALV) 8" X 4" STD X STD BW	No.	136	21.7	2.96		LP PIPE PKG
130	RDTEE CS (GALV) 6" X 4" STD X STD BW	No.	162	12.2	1.97		LP PIPE PKG
131	RDTEE CS (GALV) 6" X 3" STD X STD BW	No.	11	11.7	0.13		LP PIPE PKG
132	RDTEE CS (GALV) 4" X 3" STD X STD BW	No.	20	5.3	0.11		LP PIPE PKG
133	RDTEE CS (GALV) 4" X 2.5" STD X STD BW	No.	44	5.1	0.23		LP PIPE PKG
134	RDTEE CS (GALV) 3" X 2.5" STD X STD BW	No.	24	2.9	0.07		LP PIPE PKG
135	RDTEE CS (GALV) 3" X 2" STD X XS BW	No.	57	2.7	0.15		LP PIPE PKG
136	RDTEE CS (GALV) 2.5" X 2" STD X XS BW	No.	37	2.0	0.07		LP PIPE PKG
137	RDTEE CS (GALV) 2.5" X 1.5" STD X XS BW	No.	88	1.9	0.17		LP PIPE PKG
138	RDTEE CS (GALV) 2.5" X 1.25" STD X XS BW	No.	7	1.9	0.01		LP PIPE PKG
139	ELBOW 90D CS (A105) 1" CL3000 SW	No.	1965	0.5	0.96		LP PIPE PKG
140	ELBOW 90D CS(A105-GALV) 2" CL3000 SC	No.	7	1.7	0.01		LP PIPE PKG
141	ELBOW 90D CS(A105-GALV) 1.5" CL3000 SC	No.	800	1.1	0.84		LP PIPE PKG
142	ELBOW 90D CS (A105-GALV) 1.25" CL3000 SC	No.	616	0.8	0.47		LP PIPE PKG
143	ELBOW 90D CS(A105-GALV) 1" CL3000 SC	No.	591	0.5	0.29		LP PIPE PKG
144	ELBOW 90D CS(A105-GALV) 0.75" CL3000 SC	No.	3638	0.3	1.09		LP PIPE PKG
145	RED ELB90D CS 1"X0.5" CL3000 SC	No.	1484	0.5	0.73		LP PIPE PKG
146	RED ELB90D CS(GALV) 2"X1.5" CL3000 SC	No.	147	1.7	0.25		LP PIPE PKG
147	RED ELB90D CS(GALV) 2"X1" CL3000 SC	No.	2	1.7	0.00		LP PIPE PKG
148	RED ELB90D CS(GALV) 2"X0.75" CL3000 SC	No.	4	1.7	0.01		LP PIPE PKG
149	RED ELB90D CS(GAL) 1.5"X1.25" CL3000 SC	No.	86	1.1	0.09		LP PIPE PKG
150	RED ELB90D CS(GALV) 1.25"X1" CL3000 SC	No.	143	0.8	0.11		LP PIPE PKG
151	RED ELB90D CS(GAL) 1.25"X0.75" CL3000 S	No.	4	0.8	0.00		LP PIPE PKG
152	RED ELB90D CS(GALV) 1"X0.75" CL3000 SC	No.	452	0.6	0.26		LP PIPE PKG
153	RED ELB90D CS(GALV) 1"X0.5" CL3000 SC	No.	1737	0.5	0.85		LP PIPE PKG
154	RED ELB90D CS(GAL) 0.75"X0.5" CL3000 SC	No.	1353	0.3	0.41		LP PIPE PKG
155	ELBOW 45D CS (A105) 1" CL3000 SW	No.	8	0.4	0.00		LP PIPE PKG
156	ELBOW 45D CS (A105-GALV) 1" CL3000 SC	No.	31	0.8	0.03		LP PIPE PKG
157	ELBOW 45D CS (A105-GAL) 0.75" CL3000 SC	No.	358	0.5	0.18		LP PIPE PKG
158	ELBOW 45D CS (A105-GALV) 1.5" CL3000 SC	No.	4	1.7	0.01		LP PIPE PKG
159	RED ELB45D CS(GALV) 1"X0.75" CL3000 SC	No.	9	0.4	0.00		LP PIPE PKG
160	RED ELB45D CS(GALV) 1"X0.5" CL3000 SC	No.	29	0.4	0.01		LP PIPE PKG
161	RED ELB45D CS(GAL) 0.75"X0.5" CL3000 SC	No.	3153	0.2	0.73		LP PIPE PKG
162	TEE STRT CS (A105) 1" CL3000 SW	No.	1827	0.6	1.04		LP PIPE PKG
163	TEE STRT CS (A105-GALV) 2" CL3000 SC	No.	8	1.8	0.01		LP PIPE PKG
164	TEE STRT CS (A105-GALV) 1.5" CL3000 SC	No.	18	1.3	0.02		LP PIPE PKG
165	TEE STRT CS (A105-GALV) 1.25" CL3000 SC	No.	50	0.9	0.05		LP PIPE PKG
166	TEE STRT CS (A105-GALV) 1" CL3000 SC	No.	112	0.6	0.06		LP PIPE PKG
167	TEE STRT CS (A105-GALV) 0.75" CL3000 SC	No.	44	0.4	0.02		LP PIPE PKG
168	RDTEE CS (A105) 1" X 0.5" CL3000 SC	No.	9215	0.6	5.25		LP PIPE PKG
169	RDTEE CS (GALV) 2" X 1.5" CL3000 SC	No.	33	1.8	0.06		LP PIPE PKG
170	RDTEE CS (GALV) 2" X 1.25" CL3000 SC	No.	8	1.8	0.01		LP PIPE PKG

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171	RDTEE CS (GALV) 1.5" X 1.25" CL3000 SC	No.	123	1.3	0.16		LP PIPE PKG
172	RDTEE CS (GALV) 1.5" X 1" CL3000 SC	No.	81	1.3	0.10		LP PIPE PKG
173	RDTEE CS (GALV) 1.5" X 0.75" CL3000 SC	No.	1298	1.3	1.66		LP PIPE PKG
174	RDTEE CS (GALV) 1.5" X 0.5" CL3000 SC	No.	3115	1.3	3.99		LP PIPE PKG
175	RDTEE CS (GALV) 1.25" X 0.5" CL3000 SC	No.	2318	0.9	2.02		LP PIPE PKG
176	RDTEE CS (GALV) 1.25" X 1" CL3000 SC	No.	33	0.9	0.03		LP PIPE PKG
177	RDTEE CS (GALV) 1.25" X 0.75" CL3000 SC	No.	831	0.9	0.72		LP PIPE PKG
178	RDTEE CS (GALV) 1" X 0.75" CL3000 SC	No.	1005	0.6	0.57		LP PIPE PKG
179	RDTEE CS (GALV) 1" X 0.5" CL3000 SC	No.	1472	0.6	0.84		LP PIPE PKG
180	RDTEE CS (GALV) 0.75" X 0.5" CL3000 SC	No.	7	0.4	0.00		LP PIPE PKG
181	FULL COUPLING CS(A105) 1" CL3000 SW	No.	1484	0.3	0.40		LP PIPE PKG
182	FULL CPLNG CS (GALV) 0.75" CL3000 SC	No.	660	0.2	0.11		LP PIPE PKG
183	RCPLNG CS(GALV) 2" X 1 1/2" CL3000 SC	No.	1099	1.8	1.92		LP PIPE PKG
184	RCPLNG CS (GALV) 2" X 1.25" CL3000 SC	No.	188	2.0	0.38		LP PIPE PKG
185	RCPLNG CS(GALV) 2" X 1" CL3000 SC	No.	48	1.7	0.08		LP PIPE PKG
186	RCPLNG CS (GALV) 1.5" X 1.25" CL3000 SC	No.	1511	1.5	2.27		LP PIPE PKG
187	RCPLNG CS(GALV) 1 1/2"X1" CL3000 SC	No.	31	1.3	0.04		LP PIPE PKG
188	RCPLNG CS (GALV) 1.25" X 1" CL3000 SC	No.	1957	1.5	2.94		LP PIPE PKG
189	RCPLNG CS (GALV)1.25" X 0.75" CL3000 SC	No.	75	1.5	0.11		LP PIPE PKG
190	RCPLNG CS(GALV) 1"X3/4" CL3000 SC	No.	339	0.5	0.18		LP PIPE PKG
191	RCPLNG CS(GALV) 1"X1/2" CL3000 SC	No.	187	0.5	0.10		LP PIPE PKG
192	HALF CPLNG CS A105(GALV) 2" CL3000 SC	No.	2	1.0	0.00		LP PIPE PKG
193	HALF CPLNG CS A105(GALV) 1.5" CL3000 SC	No.	167	0.6	0.10		LP PIPE PKG
194	HALF CPLNG CS (A105-GALV)1.25"CL3000 S	No.	24	0.4	0.01		LP PIPE PKG
195	HALF CPLNG CS A105(GALV) 1" CL3000 SC	No.	157	0.3	0.05		LP PIPE PKG
196	HALF CPLNG CSA105(GALV) 0.75" CL3000 SC	No.	2924	0.2	0.58		LP PIPE PKG
197	HALF CPLNG CS A105(GALV) 0.5" CL3000 SC	No.	6234	0.1	0.87		LP PIPE PKG
198	FLNG SLIPON IS2062 6" CL150 B16.5 FF	No.	106	8.6	0.91		LP PIPE PKG
199	FLNG SLIPON IS2062 4" CL150 B16.5 FF	No.	1099	5.9	6.48		LP PIPE PKG
200	FLNG SLIPON IS2062 3" CL150 B16.5 FF	No.	48	3.7	0.18		LP PIPE PKG
201	FLNG SLIPON IS2062 2.5" CL150 B16.5 FF	No.	681	3.2	2.18		LP PIPE PKG
202	FLNG SLIPON IS2062 2" CL150 B16.5 FF	No.	435	2.3	1.00		LP PIPE PKG
203	FLNG SLIPON IS2062 1" CL150 B16.5 FF	No.	1282	0.9	1.15		LP PIPE PKG
204	FLNG IS2062(GALV) 6" CL150 B16.5 SO-FF	No.	84	8.6	0.72		LP PIPE PKG
205	FLNG IS2062(GALV) 4" CL150 B16.5 SO-FF	No.	892	5.9	5.26		LP PIPE PKG
206	FLNG IS2062(GALV) 3" CL150 B16.5 SO-FF	No.	93	3.7	0.34		LP PIPE PKG
207	FLNG IS2062(GALV)2.5" CL150 B16.5 SO-FF	No.	170	3.2	0.54		LP PIPE PKG
208	FLNG IS2062(GALV) 2" CL150 B16.5 SC-FF	No.	375	2.3	0.86		LP PIPE PKG
209	FLNG IS2062(GALV)1.5" CL150 B16.5 SC-FF	No.	366	1.4	0.51		LP PIPE PKG
210	FLNG IS2062(GALV)1.25" CL150 B16.5 SC-F	No.	287	1.4	0.41		LP PIPE PKG
211	FLNG IS2062(GALV) 1" CL150 B16.5 SC-FF	No.	183	0.9	0.16		LP PIPE PKG
212	STUD WITH TWO NUTS M14X70	No.	5979	0.1	0.84		LP PIPE PKG
213	STUD WITH TWO NUTS M16X80	No.	11044	0.2	1.99		LP PIPE PKG
214	STUD WITH TWO NUTS M16X150	No.	2096	0.4	0.74		LP PIPE PKG
215	U-BOLT GALVANIZED 8"	No.	121	2.1	0.25		LP PIPE PKG
216	U-BOLT GALVANIZED 6"	No.	644	1.0	0.67		LP PIPE PKG
217	U-BOLT GALVANIZED 4"	No.	6752	0.8	5.66		LP PIPE PKG
218	U-BOLT GALVANIZED 3"	No.	649	0.4	0.26		LP PIPE PKG
219	U-BOLT GALVANIZED 2 1/2"	No.	1194	0.4	0.44		LP PIPE PKG
220	U-BOLT GALVANIZED 2"	No.	1636	0.3	0.54		LP PIPE PKG
221	U-BOLT GALVANIZED 1 1/2"	No.	2594	0.3	0.76		LP PIPE PKG
222	U-BOLT GALVANIZED 1 1/4"	No.	2517	0.1	0.23		LP PIPE PKG
223	U-BOLT GALVANIZED 1"	No.	3988	0.2	0.86		LP PIPE PKG
224	U-BOLT GALVANIZED 3/4"	No.	4143	0.1	0.23		LP PIPE PKG

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225	NAB SHEET (NRR) BS 7531 GR.X	No.	185	3.3	0.61		LP PIPE PKG
226	STUD WITH TWO NUTS M20X90	No.	1584	0.4	0.66		LP PIPE PKG
227	ANCHOR FASTENER M10 X 150	No.	1184	1.5	1.78		LP PIPE PKG
228	ANCHOR FASTENER M10 X 100	No.	30823	1.5	46.23		LP PIPE PKG
229	STRUCTURAL STEELS				100.00		LP PIPE PKG
	<b>BHEL TRICHY SCOPE OF VALVES</b>						LP PIPE PKG
1	GLV CCS(WCB)3 INCH RATING#300	No.	4	113.0	0.45		LP PIPE PKG
2	GLV FCS(A105)1 INCH RATING#800	No.	2	2.3	0.00		LP PIPE PKG
3	GTV CCS(WCB)16 INCH RATING#150	No.	6	580.0	3.48		LP PIPE PKG
4	GTV CCS(WCB)12 INCH RATING#150	No.	21	307.0	6.45		LP PIPE PKG
5	GTV CCS(WCB)8 INCH RATING#150	No.	15	141.0	2.12		LP PIPE PKG
6	GTV CCS(WCB)6 INCH RATING#150	No.	20	91.5	1.83		LP PIPE PKG
7	GTV CCS(WCB)4 INCH RATING#150	No.	14	58.1	0.81		LP PIPE PKG
8	GTV CCS(WCB)3 INCH RATING#150	No.	7	30.5	0.21		LP PIPE PKG
9	GTV CCS(WCB)2 INCH RATING#150	No.	4	20.0	0.08		LP PIPE PKG
10	GTV FCS(A105)2 INCH RATING#800	No.	6	11.1	0.07		LP PIPE PKG
11	GTV FCS(A105)1.5 INCH RATING#800	No.	2	8.4	0.02		LP PIPE PKG
12	GTV FCS(A105)1 INCH RATING#800	No.	2	3.4	0.01		LP PIPE PKG
13	GTV FCS(A105)1 INCH RATING#800	No.	30	3.4	0.10		LP PIPE PKG
14	GTV FCS(A105)0.5 INCH RATING#800	No.	25	1.6	0.04		LP PIPE PKG
15	PLCV FCS(A105)1 INCH RATING#800	No.	2	2.3	0.00		LP PIPE PKG
16	SCV CCS(WCB)12 INCH RATING#150	No.	4	334.0	1.34		LP PIPE PKG
17	SCV CCS(WCB)8 INCH RATING#150	No.	1	167.0	0.17		LP PIPE PKG
18	SCV CCS(WCB)3 INCH RATING#150	No.	3	37.0	0.11		LP PIPE PKG
19	CI GATE VALVE-150NB	No.	40	91.5	3.66		LP PIPE PKG
20	CI GATE VALVE- 100NB	No.	421	58.1	24.47		LP PIPE PKG
21	CI GATE VALVE- 80NB	No.	21	30.5	0.64		LP PIPE PKG
22	BUTTERFLY VALVE-150 NB	No.	0	52.5	0.00		LP PIPE PKG
23	BUTTERFLY VALVE- 100NB	No.	100	35.0	3.50		LP PIPE PKG
24	BUTTERFLY VALVE- 80NB	No.	0	28.0	0.00		LP PIPE PKG
25	MS Y STRAINER WITH SS MESH-150NB	No.	20	109.0	2.18		LP PIPE PKG
26	MS Y STRAINER WITH SS MESH-100NB	No.	209	38.5	8.05		LP PIPE PKG
27	MS Y STRAINER WITH SS MESH-80NB	No.	10	35.5	0.36		LP PIPE PKG
28	15NB C.S.Gate VALVE (For Periodic testing of DV in QBD line)	No.	27	1.9	0.05		LP PIPE PKG
29	GATE VALVE-65 NB(S.S), #150	No.	4	11.1	0.04		LP PIPE PKG
30	GATE VALVE-50 NB(S.S), #150	No.	2	11.1	0.02		LP PIPE PKG
31	GATE VALVE-40 NB(S.S), #150	No.	2	8.4	0.02		LP PIPE PKG
32	GATE VALVE-25 NB(S.S), #150	No.	0	8.4	0.00		LP PIPE PKG
33	Y-STRAINER-65 NB(S.S)	No.	2	12.0	0.02		LP PIPE PKG
34	Y-STRAINER-50 NB(S.S)	No.	0	8.0	0.00		LP PIPE PKG
35	NON RETURN VALVE-100 NB(C.I)	No.	3	51.0	0.15		LP PIPE PKG
36	NON RETURN VALVE-80 NB(C.I)	No.	1	37.0	0.04		LP PIPE PKG
37	NON RETURN VALVE-50 NB(S.S)	No.	0	7.4	0.00		LP PIPE PKG
38	NON RETURN VALVE-40 NB(S.S)	No.	2	4.1	0.01		LP PIPE PKG
39	Painting for Fire water Tanks, Fire water Piping Above Ground Piping - MS ERW pipes - Always charged with water, G.I pipes - Normally empty but periodically charged with water, Weld joints on G.I pipes	LOT	complete System			<p>Apprx Paints:</p> <p>(a) For G.I. Pipes:</p> <ul style="list-style-type: none"> <li>· Etch Primer = 400 Liters</li> <li>· Finish Paint- Epoxy High solid = 3200 Liters</li> <li>· Final Shade : Signal Red (RAL 3001)</li> </ul> <p>(b) For M.S. Pipes:</p> <ul style="list-style-type: none"> <li>· Primer-Zinc Epoxy = 1800 Liters</li> <li>· Intermediate – Epoxy high solid = 2500 Liters</li> <li>· Finish Paint – Polyurethane = 900 Liters</li> <li>· Final Shade : Signal Red (RAL 3001)</li> </ul> <p>(c) For Structural Steel:</p> <ul style="list-style-type: none"> <li>· Primer-Zinc Epoxy = 2200 Liters</li> <li>· Intermediate – Epoxy high solid = 3200 Liters</li> <li>· Finish Paint – Polyurethane = 1100 Liters</li> <li>· Final Shade : Window Grey (RAL 7040)</li> </ul> <p>For Fire water Tank paints apprx surfaec area for painting is 5000 sq m</p>	LP PIPE PKG
41	<b>TESTS TO BE CONDUCTED</b>						LP PIPE PKG
41.1	Hydro Test of all the lines (Charged with water) - 1.5 times of the design pressure	LOT	For 100 % Piping				LP PIPE PKG
41.2	Radiography - 10 % of the welded joints	LOT	10 % of Butt welded Joints				LP PIPE PKG
41.3	Holiday test - Underground piping	LOT	For 100 % Piping				LP PIPE PKG
41.4	Flushing of all the line (Open to atmosphere)	LOT	For 100 % Piping				LP PIPE PKG
41.5	Die Penetration test for all longitudinal & cross weldings	LOT	100 % of Fillet welded Joints				LP PIPE PKG
41.6	Dry Film Thickness test for paint	LOT	For 100 % Piping.				LP PIPE PKG
41.7	TAC approval - for the total system after erection	LOT	For complete System				LP PIPE PKG

**TOTAL WEIGHT IN (TONNE)**

**1798**

PROJECT :: 2x660 MW MAITREE STPP PROJECT  
 CUSTOMER :: BANGLADESH INDIA FRIENDSHIP POWER COMPANY (PVT.) LTD.  
 DOC TITLE : ERECTION BOQ FOR PUMP HOUSE EQUIPMENTS, HYDRANT BASED COMPONENTS AND SPRAY SYSTEM COMPONENTS

Sl.No	SYSTEM DESCRIPTION	Unit	Qty	Mass/Mtr or Unit Weight in Kgs	Total Mass (T) (Tonnes)	SUMMARY OF ERECTION WORKS TO BE CARRIED OUT AT SITE	SCOPE
<b>I FIRE WATER PUMP HOUSE EQUIPMENT AND HYDRANT BASED COMPONENTS</b>							
viii	Air Release Valve	Nos.	-	-	-	As per Standard Practices	LP PIPE PKG
10	Pressure Relief Valve	Nos.	1	4	0.004	As per Standard Practices	LP PIPE PKG
11	300 NB Basket Stainer in M.S. Construction	Nos.	2	200	0.40	As per Standard Practices	LP PIPE PKG
12	Water Monitor- 2500 - 2700 lpm	Nos	30	40	1.2	- In standard practice, center line of water monitor inlet pipe line is maintained at height of 1.2 Mt from the FGL/FFL/FPL. - Accordingly, a 100 NB MS (Standpost) pipe tapoff from the main pipe is vertically drawn of desired length, by welding it to main Pipe. - An elbow is selected to suit 100 NB pipe tap-off and welded with the pipe. Elbow is welded such that, the downstream end of elbow is pointing towards the building. - Water Monitor as per approved datasheet is flanged joint to the pipe.	LP PIPE PKG
13	Single headed 63 mm dia hydrant landing valve						LP PIPE PKG
i	External	Nos	500	20	10.0	- In standard practice, center line of hydrant valves inlet pipe line is maintained at height of 1.2 Mt from the FGL/FFL/FPL. - Accordingly, a 80 NB MS (Standpost) pipe tapoff from the main pipe is vertically drawn of desired length, by welding it to main Pipe. - An elbow is selected to suit 80 NB pipe tap-off and welded with the pipe. Elbow is welded such that, the downstream end of elbow is pointing towards the building. - Fix the hydrant on the stand post using gaskets, bolts & nuts, with its outlet pointing towards the building wall.	LP PIPE PKG
ii	Internal	Nos	200	20	4.0	- In standard practice, center line of hydrant valves inlet pipe line is maintained at height of 1.2 Mt from Stair landing or Floor Landing. - Further as per approved FEH layout, an 80 NB horizontal tapoff of desired length and from desired height of Wet riser, is drawn by welding it to Wet riser. - Fix the hydrant on hydrant valve using gaskets, bolts & nuts, with its outlet pointing away from the building wall. - A clearance of 100 mm is left between the building wall and hydrant landing inlet flange.	LP PIPE PKG
14	63 mm Branch pipe Nozzle						LP PIPE PKG
i	Triple purpose Nozzle	Nos.	370	10	3.7	Kindly refer to Central Hose station Drawing for Mounting details.	LP PIPE PKG
ii	Fog type Nozzle	Nos.	30	10	0.3	This comes mounted in the Hose box. Kindly refer Hose Box Mouting Details.	LP PIPE PKG
15	Fire Hose with Coupling						LP PIPE PKG
i	25 Mtrs Hose Pipe	Nos.	630	15	9.5		LP PIPE PKG
16	Hose boxes						LP PIPE PKG
i	MS Hose Box( Size: 900x600x250)	Nos.	400	15	6.0	25 M hose pipe (2 Nos) shall be rolled into one hose box (Internal). These internal hose boxes are located in the buildings ( at staircase landings).	LP PIPE PKG
17	Air release valve with gun metal valve	Nos	38	1	0.038	As per standard Practice.	LP PIPE PKG
18	Wrapping & Coating	Sq.M	7,000			Shall be supplied in Bundles.	LP PIPE PKG
19	Hose reel	Nos	120	25	3.000	As per standard Practice.	LP PIPE PKG
<b>II MEDIUM VELOCITY WATER SPRAY SYSTEM (For Conveyors, Cable Galleries, Transfer Points, Fuel Tanks, Crusher House, Wagon Tippler etc.)</b>							
1	Cast iron Deluge Valve (wet pilot) complete with necessary trim, water gong						LP PIPE PKG
i	150 NB	Nos.	16	151	2.42		LP PIPE PKG
ii	100 NB	Nos.	178	97	17.27		LP PIPE PKG
iii	80 NB	Nos.	-	70	0.00		LP PIPE PKG
2	Spray Nozzle - Stainless Steel	No	18493	0.125	2.31		LP PIPE PKG
<b>III HIGH VELOCITY WATER SPRAY SYSTEM (ST, SAT, UAT &amp; UT TRANSFORMERS, BOILER BURNER, LUBE OIL CONSOLE, BFP LUBE OIL, TURBINE LUBE OIL)</b>							
1	Cast iron Deluge Valve (wet pilot) complete with necessary trim, water gong						LP PIPE PKG
i	150 NB	Nos.	4	151	0.60		LP PIPE PKG
ii	100 NB	Nos.	28	97	2.72		LP PIPE PKG
iii	80 NB	Nos.	9	70	0.63		LP PIPE PKG
2	Spray Nozzle - Stainless Steel	No	2198	0.200	0.44		LP PIPE PKG
<b>IV SPRINKLER SYSTEM FOR OFFICES</b>							
1	PIPE ERW CS A53 TYPE E GRB						
1.1	150 NB	M	-				LP PIPE PKG
1.2	100 NB	M	1,000	13	12.90		LP PIPE PKG
1.3	80 NB	M	3,000	9	27.00		LP PIPE PKG
1.4	65 NB	M	-	7			LP PIPE PKG
1.5	50 NB	M	200	5	1.08		LP PIPE PKG
1.6	40 NB	M	-				LP PIPE PKG
1.7	32 NB	M	-	3			LP PIPE PKG
1.8	25 NB	M	2,000	3	5.00		LP PIPE PKG
2	Gate Valve						
2.1	150 NB	No.	-				LP PIPE PKG
2.2	100 NB	No.	30	58	1.74		LP PIPE PKG
2.3	80 NB	No.	-	31			LP PIPE PKG
2.4	50 NB	No.	-	11			LP PIPE PKG
3	Alarm Valve						
3.1	150 NB	No.	-				LP PIPE PKG
3.2	100 NB	No.	15	90	1.35		LP PIPE PKG
3.3	80 NB	No.	-	70			LP PIPE PKG
3.4	50 NB	No.	-	60			LP PIPE PKG
4	Sprinkler						
4.1	79°C	No.	2,000	0	0.40		LP PIPE PKG
5	Flow Switch						
5.1	100 NB	No.	15	25	0.38		LP PIPE PKG
5.2	80 NB	No.	-	20			LP PIPE PKG
5.3	50 NB	No.	-	15			LP PIPE PKG
6	Fittings, Flanges, gaskets etc	Lot	1		5.00		LP PIPE PKG
7	Structural steels	Lot	1		5.00		LP PIPE PKG
<b>TOTAL WEIGHT IN TONNE</b>					<b>124</b>		

<b>PROJECT ::</b> 2x660 MW MAITREE STPP PROJECT						
<b>CUSTOMER ::</b> BANGLADESH INDIA FRIENDSHIP POWER COMPANY (PVT.) LTD.						
<b>DOC TITLE ::</b> ERCETION BOQ FOR INERT GAS EXTINGUISHING SYSTEM						
Sl.No	Detailed Description	Unit	Quantity	Weight of Each unit (Kgs)	Total Weight (T)	SCOPE
18	Pipes (20NB to 100NB)	Mtrs.	7000	7	49.00	LP PIPE
19	Pipe Fittings	Lot	1		0.00	LP PIPE
20	Pipe Supports	Lot	1	10000	10.00	LP PIPE
<b>Total weight in Tonne</b>					<b>59</b>	

**Notes:**

- 1 The above is applicable for PE&SD supplied items.
- 2 The inputs are preliminary and are expected to change during detail engineering. Hence Margin of about 15% to be considered for above preliminary inputs.
- 3 All cables are to be terminated with cable termination accessories.
- 4 Erection activities like cutting/ threading/welding etc. of conduit/pipe/ISMC/ISA shall be carried out at site as per requirement for installation of illumination equipments.
- 5 Consumables like rawl plugs, screws, check nuts, nuts & bolts, saddles, saddle bars, cable (nylon) ties, washers,cable tags(strips), etc. which are not covered in the list but required for successful completion of above erection activity shall be considered in Erection agency.
- 6 Surface preparation and base coat of primer shall be carried and final painting shall be done after completion of structural steel erection.
- 7 Vendor shall arrange all the tools and facilities required for calibration, erection and testing required for Erection & Commissioning activities.
- 8 Obtaining statutory approvals from TAC, Electrical Inspector or any other Governing Agencies shall be in Vendor's scope. Documentation required like Layouts, Schemes shall be furnished by PE&SD.
- 9 Marked-up "AS-Built" documents/drawings have to be prepared and provided by Vendor to BHEL after E&C to enable submission of contractual 'As-Built" documentation.
- 10 Performance Tests if any for the system shall be considered in the scope of Erection agency.

<b>PROJECT :: 2x660 MW MAITREE STPP PROJECT</b>									
<b>CUSTOMER :: BANGLADESH INDIA FRIENDSHIP POWER COMPANY (PVT.) LTD.</b>									
<b>DOC TITLE : ERECTION BOQ FOR FOAM PROTECTION SYSTEM</b>									
Sl.No	Detailed Description	Unit	Quantity	Weight of Each unit (Kgs)	Total Weight (T)	SUMMARY OF ERECTION WORKS TO BE CARRIED OUT AT SITE	Location	SCOPE	
1	Foam Monitors	Nos.	2	35	0.07		Dyke Area	LP PIPE PKG	
2	Ratio controller	Nos.	3	40	0.12		Foam Pump House	LP PIPE PKG	
3	Foam concentrate Bypass valve	Nos.	3	55	0.17		Foam Pump House	LP PIPE PKG	
4	Foam proportioners							LP PIPE PKG	
i	100 NB	Nos.	3	15	0.05		Dyke Area	LP PIPE PKG	
5	Foam Chamber							LP PIPE PKG	
i	100 NB	Nos.	4	25	0.10		Dyke Area	LP PIPE PKG	
6	Deluge valve with accessories							LP PIPE PKG	
i	100 NB	Nos.	3	45	0.14		Dyke Area	LP PIPE PKG	
ii	80 NB	Nos.	1	35	0.04		Dyke Area	LP PIPE PKG	
<b>TOTAL WEIGHT IN TONNE</b>					<b>0.670</b>				

**FORMAT FOR NO DEVIATION CERTIFICATE**  
**(To be submitted in the bidder's letter head)**

BHARAT HEAVY ELECTRICALS LIMITED,  
Power Sector - Eastern Region,  
Plot no 9/1, DJ Block, Sector – II, Salt Lake City,  
Kolkata – 700 091

Sub	No Deviation Certificate.	
Job	Erection, testing, commissioning, handing over, etc of steam turbine & aux, generator & aux, pumps, auxiliaries, etc. including Fire Protection System and LP Piping for both units at 2x660 MW Maitree STPP, Rampal, Bangladesh.	
Ref	1.0	Tender no PSER:SCT:KLN-T1976:19.
	2.0	BHEL's NIT, vide reference no PSER:SCT:KLN-T1976:7445 Date: 18-07-2019.
	3.0	BHEL's TCN-01, vide reference no PSER:SCT:KLN-T1976:TCN-01 Date: 20-07-2019
	4.0	All other pertinent issues till date.

Dear Sirs,

With reference to above, this is to confirm that as per tender conditions, we have visited site before submission of our offer and noted the job content & site conditions etc. We also confirm that we have not changed/ modified the tender documents as appeared in the website/ issued by you and in case of such observance at any stage, it shall be treated as null and void.

We hereby confirm that we have not taken any deviation from tender clauses together with other references as enumerated in the above referred NIT. We hereby confirm our unqualified acceptance to all terms & conditions, unqualified compliance to technical specification, integrity pact (if applicable) and acceptance to reverse auctioning process.

In the event of observance of any deviation in any part of our offer at a later date whether implicit or explicit, the deviations shall stand null & void.

We confirm to have submitted/uploaded offer/documents in accordance with tender instructions with acceptance of the terms & conditions of the tender by us and as per aforesaid references.

Thanking you,

Yours faithfully,

(Signature, date & seal of authorized  
representative of the bidder)