

TENDER SPECIFICATION BHEL PSSR SCT 2079

FOR

**Balance civil, structural & electrical works of RCC
Chimney at 2 x 660 MW, Ennore SEZ Supercritical
Thermal Power Project (Unit-1 & 2) at Ash Dyke of
NCTPS, Tamil Nadu**

PRICE BID VOLUME –II



BHARAT HEAVY ELECTRICALS LIMITED

(A Government of India Undertaking)

Power Sector – Southern Region

BHEL Integrated Office Complex, TNEB Road

Pallikaranai, Chennai -600100

TENDER SPECIFICATION CONSISTS OF

Tender Specification

Volume - I

Book-I

Notice Inviting Tender

Volume-IA : Technical Conditions of Contract

Part I

Part II

Book-II

Volume-IB: Special conditions of Contract

Volume-IC: General conditions of Contract

Volume-ID : Forms & Procedures

Volume – II: Price Bid

PRICE BID

CONTENTS	
Description	No. of pages
Part A : Instructions to the Bidders	01
Part B : Format for total amount (Enclosed as a separate Excel File in BHEL NIC e-Procurement portal for the subject tender)	(Separate Excel File)
Part C: Bill of quantities with weightage for amount of each items with respect to the total quoted price	22

PRICE BID

PART A

Instruction to Bidders:

1. The quantity indicated in the BOQ / Price bid (Part C) is approximate only and is liable for variation. Payment will be as per actual quantity executed as certified by BHEL Engineer.
2. Tenderers are requested to affix their company seal and authorized signature in all pages.
3. Bidders shall quote 'Total Amount' in the format enclosed as a separate Excel File in BHEL NIC e-Procurement portal for the subject tender and upload the same under 'Packet details - > Tender covers -> Finance '(Cover Type Description – Price Bid)' and same shall be taken into account for evaluation and awarding and hence, shall be complete in all respect for the full scope of work defined in specification and in accordance with terms & conditions of the tender. Any other entry elsewhere in the price bid shall be treated as Null and Void. Quoting of rates in any other form/ formats will not be entertained.
4. The above mentioned 'Total amount' is for the entire Bill of Quantity (BOQ) given in Part -C of the Price Bid.
5. BHEL has pre-fixed the weightages for the amount of individual items of Bill of Quantity with respect to the 'Total Amount' in Part-C.
6. Based on the pre-fixed weightages, the amount for the individual items of the Bill of Quantity shall be arrived at. This amount shall be rounded off to the nearest rupee.
7. Based on the quantities of individual item and the amount arrived in SI No: 6 above, unit rate of individual items shall be derived. This unit rate shall be rounded off to four decimal places.
8. Bidders to note that this is an item rate contract. Payment shall be made for the actual quantities of work executed at the unit rate arrived at as per SI No.7 above.

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:2079 for Balance civil, structural & electrical works of RCC Chimney at 2 X 660 MW Ennore SEZ Supercritical Thermal Power Project at Ash Dyke of NCTPS

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
--	Chimney Works	--		
1.0	Earth work in excavation in all types of soil including moorum, ash which can be excavated by any means including setting out, levelling, dewatering (but excluding special type of dewatering viz. well point method), shoring & strutting (wherever required), dressing the sides & bottom, all lifts, ramming/compacting the excavated bottom, stacking, disposal of surplus excavated materials within a lead upto 500 m, spreading/levelling of disposed materials etc all complete for following depths below ground level including necessary men/women, materials, equipment, loading, transportation, unloading etc as per specification, drawing and as directed by engineer- in-charge	--		
a	Depth from ground level but not exceeding 2 m	cum	100	.0001056
b	Depth exceeding 2 m but not exceeding 4 m	cum	100	.0001296
c	Depth exceeding 4 m but not exceeding 6 m	cum	100	.0001619
d	Depth exceeding 6 m but not exceeding 8 m	cum	100	.0002035
2.0	Extra over Item No. 1 for dewatering of ground water by well point method as per IS 9759.	cum	200	.0001768
7.0	Back filling upto any depth below ground level around foundations, plinths, trenches, drains etc to proper grade and level in layers not exceeding 250 mm thickness using/with selected materials from compulsorily excavated soil & ash available within a lead upto 500m and compacted as specified including re-excavation of stacked earth, watering, ramming/compaction by manual/mechanical means, dressing etc all complete.for the following including necessary men/women, materials, equipment, loading, transportation, unloading etc as per specification, drawing and as directed by engineer- in-charge.	--		
a	Each layer compacted so as to achieve at least 95% maximum dry density as per IS-2720 (Part-VII)	cum	500	.0004702

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Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
b	Each layer compacted so as to achieve at least 90% maximum dry density as per IS-2720 (Part-VII)	cum	500	.0003999
c	Each layer compacted so as to achieve at least 85% maximum dry density as per IS-2720 (Part-VII)	cum	200	.0001518
8.0	Back filling upto any depth below ground level around foundations, plinths, trenches, drains etc to proper grade and level in layers not exceeding 250 mm thickness using/with selected materials directly from excavation and compacted as specified including watering, ramming/compaction by manual/mechanical means, dressing etc all complete for the following including necessary men/women, materials, equipment, loading, transportation, unloading etc as per specification, drawing and as directed by engineer- in-charge.	--		
a	Each layer compacted so as to achieve at least 95% maximum dry density as per IS-2720 (Part-VII)	cum	500	.0004549
b	Each layer compacted so as to achieve at least 90% maximum dry density as per IS-2720 (Part-VII)	cum	100	.0000769
9.0	Extra over item No. 1 and 3 to 7 for carriage of excavated earth/selected materials for every 1 km or part thereof beyond an initial lead of 500m.	cum	100	.0000126
10.0	Back filling upto any depth below ground level around foundations, plinths, trenches, drains etc to proper grade and level in layers not exceeding 250 mm thickness using/with approved borrowed soil (borrowed soil/ morrum to be arranged by the bidder) and compacted as specified including supplying borrowed soil, royalty (if any), watering, ramming/compaction by manual/mechanical means, dressing etc all complete for the following including necessary men/women, materials, equipment, loading, transportation, unloading etc as per specification, drawing and as directed by engineer- in-charge.	--		
a	Each layer compacted so as to achieve at least 95% maximum dry density as per IS-2720 (Part-VII)	cum	1,800	.0047548
b	Each layer compacted so as to achieve at least 90% maximum dry density as per IS-2720 (Part-VII)	cum	200	.0005099

Part C : Bill of Quantities

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c	Each layer compacted so as to achieve at least 85% maximum dry density as per IS-2720 (Part-VII)	cum	200	.0004915
11.0	Supplying and filling sand upto any depth below grade slab, around foundations, etc. in layers not exceeding 250 mm thickness and compacted so as to achieve at least 80% relative density as per IS-2720 (Part-XIV) including spreading, watering, ramming/compaction by manual / mechanical means, dressing, royalty (if any) etc. all complete including necessary men/women, materials, equipment, loading, transportation, unloading etc as per specification, drawing and as directed by engineer- in-charge.	cum	100	.0010678
12.0	Supplying and laying (inside chimney in the space below the grade level slab) crushed rock (63mm down graded) and sand fill in layers no more than 150 mm thick each and thoroughly compacted by compacting equipment and by water flooding to achieve maximum density for all leads and lifts including all labour, materials, equipment etc. complete as per drawings, specifications and directions of the Engineer.	cum	650	.0057254
13.0	Providing and laying Nominal Mix plain cement concrete (1:3:6) with graded aggregate (with maximum size of coarse aggregate not exceeding 40 mm) at all levels for all kinds of work like mass concrete, lean concrete, mudmat, filling etc. including labour, materials, equipment, handling, transporting, batching, curing, testing etc. all complete as per specifications, drawings and instructions of the Engineer.	cum	250	.0063399
14.0	Providing and laying design mix cement concrete with graded aggregate (maximum size of coarse aggregate not exceeding 20 mm) for reinforced concrete work at all levels for all kinds of work, including labour, materials, equipment, handling, transporting, batching, mixing, placing, levelling, compacting, curing, testing etc. and rendering or cleaning and finishing the exposed surface with cement mortar (1:3) to give smooth and even surface, all complete as per specifications, drawings and instructions of the Engineer, but excluding all formwork and reinforcing steel:	--		
i	For all works below ground level (except chimney shell)	--		
b	Grade M-30 (foundations, etc)	cum	100	.0031863

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Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
ia	Extra over St. No. 14(i) for controlling of temperature of fresh concrete for raft/pilecap to less than 23 degree centigrade using ice, including all related arrangements for providing, storing and mixing of ice with water, cooling of aggregates etc. All complete as per specification, drawing and instruction of engineer in charge.	CUM	100	.0002051
ii	For all other works	--		
a	Grade M-20 (grade level slab)	cum	120	.0038161
b	Grade M-30 for chimney shell, corbels and external platforms and other shell attachments.	cum	155	.0062366
c	Grade M-35 for chimney shell, corbels and external platforms and other shell attachments.	cum	200	.0083688
d	Grade M-25 for all other components of the super structure, roof slab, mini -shells, beams, columns wall etc.	cum	20	.0007209
216.0	Chipping of concrete in reinforced concrete work, cutting pockets, making openings at all levels and according to shapes, disposal of waste materials upto a lead of 2 km as directed by engineer including equipment, safety precautions, making good the broken surface etc all complete as per specification, drawing, instructions of engineer in charge but excluding cutting of reinforcement .	CUDM	100	.0000523
217.0	Extra over and above St No 216 for cutting of reinforcement, all sizes and types including labour, equipment, return of cut reinforcement to store etc all complete as per specification, drawings and instructions of engineer in charge. Measurement shall be on the cross sectional area of reinforcement cut.	SQCM	100	.0000029
15.0	Providing and applying two coats of bitumen grade 85/25 as per IS 702 (@ 1.7kg/sqm) with 1% antistripping compound conforming to IS 6241 in foundation, shell, pedestal etc on concrete surfaces exposed to soil / ash including surface preparation etc. all complete.	Sqm	10	.0000158

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Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
16.0	Transportation from BHEL stores and placing reinforcement, for reinforced concrete work, at all levels, for all kinds of work, including transportation, cleaning, derusting, straightening, cutting, bending, binding in position with annealed wire and/or welding, providing concrete cover blocks, pins, separators, chairs, supports for reinforcement, etc. with all materials, labour, equipment, handling, transporting, testing, etc. preparation of bar bending schedules, all complete as per specifications, drawings and instructions of the Engineer.	--		
i	For all works below ground level (except chimney shell)	--		
a	High strength deformed bars (Supply by BHEL at free of cost)	MT	50	.0021209
16A	Providing and placing reinforcement, for reinforced concrete work, at all levels, for all kinds of work, including transportation, cleaning, derusting, straightening, cutting, bending, binding in position with annealed wire and/or welding, providing concrete cover blocks, pins, separators, chairs, supports for reinforcement, etc. with all materials, labour, equipment, handling, transporting, testing, etc. preparation of bar bending schedules, all complete as per specifications, drawings and instructions of the Engineer.	--		
ii	For all other works	--		
a	Mild steel reinforcement bars (Supply is in bidder's scope)	MT	84.84	.0207887
16B	Transportation from BHEL stores and placing reinforcement, for reinforced concrete work, at all levels, for all kinds of work, including transportation, cleaning, derusting, straightening, cutting, bending, binding in position with annealed wire and/or welding, providing concrete cover blocks, pins, separators, chairs, supports for reinforcement, etc. with all materials, labour, equipment, handling, transporting, testing, etc. preparation of bar bending schedules, all complete as per specifications, drawings and instructions of the Engineer.	--		
ii	For all other works	--		
b	High strength deformed bars (Supply by BHEL at free of cost)	Mt	200	.0090519

Part C : Bill of Quantities

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Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
16 (a)	Extra over ST No.16, 16A, 16B for providing fusion bonded epoxy coating by mechanised & qualified process including blast cleaning to white metal as per Swedish code, heating in induction heater, electrostatically spraying the epoxy powder, complete fusion to give minimum coating thickness of 200-300 microns, gradual cooling without affecting the properties of steel, testing as per ASTM 775 and IS:13620, flexibility & holiday test, proper packing, safe transportation, touchup at site, etc. complete to ensure proper resistance of FBE against corrosive environment including transport of the steel from BHEL site store to vendor plant and bringing back to site and special handling during straightening, cutting, bending, placing and providing PVC coating on binding wire.	--		
i	For all works below ground level (except chimney shell)	--		
a	High strength deformed bars	Mt	50	.0028126
ii	For all other works	--		
a	Mild steel reinforcement bars	Mt	84.84	.0047724
b	High strength deformed bars	Mt	200	.0112504
S16	Supply including delivery at site, steel reinforcements of TMT steel of grade Fe-500, Fe-500D or 500EQR as applicable conforming to IS:1786 complete all as per specifications, drawings and as directed by Engineer, from the Customer approved agencies. Note - This item shall be operated if required, at the discretion of BHEL.	MT	25	.0058518
17.0	Providing and fixing formwork of approved quality for cast-in-situ, plain or reinforced concrete works of any type and section (including curved surfaces and chimney shell) for all elevations, including labour, materials, equipment, waste of forms, shoring, strutting, scaffolding, staging, tying, nailing, caulking, bolting etc. and removal of form work and staging etc. all complete as per specifications, drawings and instructions of the Engineer.	--		
--	For all works below ground level (except chimney shell)	Sqm	500	.0014854

Part C : Bill of Quantities

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Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
--	For all other works	--		
a	Inner and outer faces of wind shield with slip form shuttering	Sqm	1,500	.0065154
b	All other components of the superstructure including slabs, beams, columns, walls, enclosures, mini shells, external platforms, corbels, other shell attachments, chases/recesses in shell etc.	Sqm	690.24	.0038083
17 i)	Removal of Slip formwork, staging etc along with required associated work for all elevations (including curved surfaces and chimney shell) as per direction of engineer in charge. Note: This item shall be applicable wherein formwork has been erected/ placed by M/s SIMPLEX, but not removed after execution of subsequent activities.	MT	50	.0048849
18.0	Providing and fixing formwork in shell openings (above 0.1 sq.m surface area) including cutting, formation of shapes and all other operations required for making the required shape and size, removal of formwork, all complete as per specifications, drawings and instructions of the Engineer.	Sqm	50	.0002042
19.0	Providing and placing in position at all levels, building paper (kraft paper), as per IS:1397, between concrete surfaces including the cost of labour, material, etc. complete as per drawings and instruction of the Engineer.	Sqm	80	.0000459
20(A)	Supplying and installation of Dura board HD100 or its equivalent as approved by the Engineer, as filler material in joints including nailing, installation as per manufacturer's recommendation etc. all complete.	--		
a	12 mm wide joints. SQM	Sqm	40	.000145
21.0	Providing and filling, at all levels, bitumen sealing compound (hot applied type) conforming to IS:1834, for sealing gaps and joints in concrete, including cleaning, mixing, heating, pouring or injecting, application of primer, cost of all labour, material and equipments etc., complete as per drawings, specifications and instructions of the Engineer.	Kg	605	.0003977

Part C : Bill of Quantities

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Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
22.0	Preparing detailed fabrication drawings and after approval by the Engineer, supplying, fabricating, erecting and installing miscellaneous steel parts to be embedded/cast in concrete (like staircase embedments, corbel face plates, etc) at all positions and levels including the cost of all labour, materials and equipments for setting materials in concrete, grouting, welding, bolts & bolting, expansion anchors, drilling, cutting, etc. complete as per drawings and specification.	Mt	2.16	.0008968
S23	Supply including delivery at site, structural steel with mild steel rolled sections, conforming to IS:2062, pipes conforming to IS:1161/ IS:1239, chequered plate conforming to IS: 3052, etc. complete all as per specifications, drawings and as directed by Engineer. Note - This item shall be operated if required, at the discretion of BHEL.	MT	25	.0063713
23.0	Preparing detailed fabrication drawings after approval by the Engineer, Transportation from BHEL stores, fabricating and erecting structural steel work for the stair case (from grade level to roof level), internal platforms, walkway gallery structures, chequered plate panels (for floors of internal and external platforms), treads and landings of the staircase including brackets, kick plates, structural members, beam support bearings on the shell, stiffeners, seats, blockouts, ready to bolt fixtures, cost of all labour, material and equipment, transporting, lifting to all heights, setting in place, welding to cast in fixing place, cutting, grinding, drilling, bolts and bolting, anchor fasteners, welding, preheating and post heating for welding , testing, primer and finish painting etc. complete as per drawing and specifications. (Structural steel for staircase shall be provided by BHEL free of cost)	--		
23(i)	Preparing detail fabrication drawing & approval	MT	133	.0006434
23(ii)	Fit-up/Fabrication	MT	133	.0092938
23(iii)	Erection	MT	240	.0161257
23(iv)	Alignment & welding	MT	450	.02657
23(v)	Painting	MT	300	.0124233

Part C : Bill of Quantities

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Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
24 (a)	Supplying, fabrication, erection and alignment of factory made galvanised grating units with mild steel conforming to IS:2062 in platforms, staircases with edge binding strips and anti-skid nosing in treads etc. including including hot dip galvanisation as per IS:4759, fixing clamps, fittings, fixtures, all taxes, duties, packing, grinding, drilling, welding, edge preparation, etc. all complete.	Mt	125	.0651778
25.0	Providing and fixing in positing of high strength structural bolts (of property class 8.8 and product grade `C' as per IS: 1367) and conforming to IS: 3757 and high strength structural hardened and tempered nuts (of property class `8' as per IS:1367) conforming to IS:6623 with hardened and tempered washers as per IS:6649 etc. up to and inclusive of 39 mm diameter and upto 300 mm long for structural steel work etc all complete.	Quintal	42.96	.0035412
26.0	Transportation from BHEL stores, Preparing detailed fabrication drawings and after approval by the Engineer, fabricating and erecting, at all levels, structural steel flues (liners) ,(Structural steel sections to be used for flue shall be corrosion resistant steel type COR-TEN-B having an yield stress 250MPa conforming to IS 2062 (E250) of minimum thickness 10mm unless noted, complete with all bends, flanges, stiffeners, all other flue attachments, support system, collars, access manholes and gas sampling ports alongwith gaskets and other accessories, staying system, including the cost of all labour, material (except COR-TEN-B structural steel section) and equipment, transporting, lifting to all heights, setting in place, cutting, grinding, drillings, bending, bolts and bolting, welding, preheating and post-heating for welding, testing, etc. complete as per drawings and specifications. (COR-TEN-B and other structural steel shall be supplied by BHEL free of cost)	--		
26(i)	Preparing of detailed fabrication drawing & approval	MT	50	.0003263
26(ii)	Fit-up/Fabrication	MT	886	.0713132
26(iii)	Erection, Alignment & welding	MT	1,275	.1664162

Part C : Bill of Quantities

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Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
27.0	Providing, fabricating and installing at various locations and elevations of the chimney system the following miscellaneous mild steel items complete with the cost of all labour, material and equipment, transporting, lifting, setting in place, cutting, grinding, drilling, welding, bolts and bolting, anchor fasteners and anchoring, priming, painting, grouting etc. complete as per drawings and specifications:	--		
a	Mild steel ladders with cage, hood access hatch, louvers, bird screens, hood drain basin covers and other miscellaneous mild steel items not specifically mentioned.	MT	17	.0082533
b	32/40 mm nominal bore medium class tubular hand railing for stair case and internal and external platforms.	MT	41	.0210045
c	Providing minimum 275 gsm Hot dipped galvanisation on mild steel parts as per specification.	MT	5	.0007399
d	Providing minimum 610 gsm Hot dipped galvanisation on mild steel parts as per specification/IS: 4759.	MT	55	.0143831
28.0	Preparing detailed fabrication drawings after approval by the Engineer, providing, fabricating and erecting, at all levels, mild steel strakes complete with all stiffeners, attachments, fasteners, pipe sleeves, etc. including the cost of all labour, material and equipment, transporting, lifting to all heights, setting in place, embedding components in concrete, fixing to cast-in embedments, cutting, grinding, drilling, bolts and bolting, welding, preheating and post heating for welding, testing, grouting, primer and finish painting of exposed components, etc. complete as per drawing and specifications.	MT	25	.010552
29.0	Supplying, fabricating and installing in the liners, gas sampling and gas opacity measurement ports made from SS grade 316L pipe including the cost of all labour, materials, bolts and bolting, asbestos gaskets, cover plates & all other accessories, painting etc., complete as per drawings and specifications.	Each	10	.0010828
30.0	Preparing detailed fabrication drawings after approval by the Engineer, providing, fabricating and erecting, at all levels SS Mini Shell at roof shell of grade A316L, etc. complete as per drawing and specifications. (SS steel shall be supplied by BHEL free of cost)	--		
30 (a)	Fabrication	MT	11.89	.004312

Part C : Bill of Quantities

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30 (b)	Erection	MT	32	.0063955
31.0	Preparing detailed fabrication drawings and after approval by the Engineer, providing, fabricating and installing at all levels, stainless plates (including stainless steel screws and fasteners) of grade AISI 316L and lead sheets beams and over the mild steel in the platform beam bearing, flue supports bearings, flue restraints brackets/ buffers etc. including the cost of all labour material & equipment, transporting, lifting to all heights, setting in place, cutting, grinding, drilling, welding of stainless steel using compatible & approved stainless steel electrodes, testing & machining flat and polishing the contact surfaces of stainless steel, coating the polished surfaces with silicone grease, etc., complete as per drawings and specifications.	--		
a	Stainless steel components.	Mt	0.24	.0006773
b	Lead Sheets.	Kg	80	.0002757
32.0	Preparing detailed fabrication drawings and after approval by the Engineer, providing, fabricating and installing expansion compensator joints including bolster in the flue liner including all labour, material and equipment transporting, hoisting, fixing in position, drilling, cutting, bolts and bolting, etc. along with the user handbooks (giving details of installation, dismantling and maintenance procedures for the expansion joints), testing, etc complete as per drawings and specifications.	Sqm	160	.0316237
33.0	Supplying ,Fabricated Ready to Install, spare expansion compensators alongwith bolster including the cost of all labour, material and equipment, accessories, transporting, proper packaging (for several years of storage), and delivery to site store complete in all respects as per drawings and specification.	Sqm	45	.0083311
34.0	Supplying and laying in position shaped acid resisting bricks conforming to class - I of IS:4860 at all elevations for liner, baffle wall construction (with sloped A/R mortar toppings over brick work) complete including the cost,of all labour, material and equipment, raking joints, flush pointing, cleaning, curing, etc. complete as per drawings and specifications.	Cum	25	.0043386

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:2079 for Balance civil, structural & electrical works of RCC Chimney at 2 X 660 MW Ennore SEZ Supercritical Thermal Power Project at Ash Dyke of NCTPS

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
35.0	Supplying and laying in position shaped fire bricks conforming to IS-6 group A at all elevations for liner, baffle wall construction (with sloped A/R mortar toppings over brick work) complete including the cost,of all labour, material and equipment, raking joints, flush pointing, cleaning, curing, etc. complete as per drawings and specifications.	Cum	25	.0032443
37 (a)	Supplying, and placing in position Load bearing insulation assembly including (i) a properly machined mild steel plate with recess at its top for seating PTFE (Poly Tetra Fluoro Ethylene) sheets conforming to BS:5400 (ii) saddle plate (MS) in the middle having stainless steel plate fixed at its bottom surface and lead / elastomeric sheet at top, and (iii) top late formed of two numbers insulation blocks each made of minimum 50 mm thick rigid, non-combustible asbestos fibre reinforced lime-silica board (SINDANYO BLOCKS NATURAL GRADE CS-51) or equivalent bonded to mild steel plates at top and bottom. For side restraints assembly of insulation blocks of SINDANYO Natural Grade CS-51 or equivalent and stainless steel plate shall be used. All stainless steel in these assemblies shall conform to AISI-316L and mild steel to IS:2062. SINDANYO BLOCKS or equivalent shall be suitable for operation at 320oC and shall primarily satisfy the following physical properties: i) Minimum compressive stress prior to onset of compression yield of not less than 12 N/sq.mm. ii) Minimum shear strength of 30 N/sq.mm when tested in accordance with BS:3497-1979. iii) Thermal conductivity shall not exceed 0.67 W/m Deg.C at a mean temperature of 200oC and its coeff. of linear expansion not to exceed 1.2x10-5 per Deg.C. iv) Adhesive used for bonding purposes shall be of material with equivalent high temperature properties as approved Foundation Engineer. It may be of Fortafix	Nos.	64	.0388713
38.0	Supplying and laying vermiculite concrete in the liner basin including the cost of all labour, material and equipment for handling, transporting, mixing, lifting, placing, curing, finishing of surface etc. complete as per drawings and specifications.	Cum	5	.0004945
42.0	Supplying and installing ready mix castable refractory concrete at opening of chimney shell baffle wall and at other locations including all necessary arrangement for keeping them in position as per drawings and approval of Engineer.	Cum	5	.0004196

Part C : Bill of Quantities

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44.0	Providing, fabricating and laying in position asbestos mill boards, over the mini shells below the cast iron cap segments, in between the cap segments and wherever as directed by the engineer, including the cost of all labours, material and equipment, cutting, drilling, etc., complete as per drawings and specifications.	--		
a	25 mm thick asbestos mill boards.	Sqm	15	.000057
46.0	Providing and installing, at all levels, resin bonded glass wool insulation slabs of density not less than 64 kg/m ³ with an installed thickness of not less than 100 mm, on the outside surface of steel flue liners, on the outside surface of brick liner, on the inside surface of concrete windshield, inside surface of concrete minishells, under the cast iron caps and wherever as directed by the Engineer, in two layers (each 50 mm thick) including the cost of all labour, material and equipment, transporting, lifting to all heights, etc., inclusive of plated or galvanised accessories such as pins/studs/anchors/wire netting, speed washers, tying wires, etc. welding of pins/studs to steel surfaces or embedding of pins/studs/anchors in concrete surfaces, fixing, cutting, cutting, lapping, binding, testing, etc. complete as per drawings and specifications.	Sqm	4,050	.0324804
46 (a)	Providing and installing, at all levels, resin bonded glass wool insulation slabs of density not less than 64 kg/m ³ with an installed thickness of not less than 50 mm, on the outside surface of steel flue liners, on the outside surface of brick liner, on the inside surface of concrete windshield, inside surface of concrete minishells, under the cast iron caps and wherever as directed by the Engineer, in two layers (each 25 mm thick) including the cost of all labour, material and equipment, transporting, lifting to all heights, etc., inclusive of plated or galvanised accessories such as pins/studs/anchors/wire netting, speed washers, tying wires, etc. welding of pins/studs to steel surfaces or embedding of pins/studs/anchors in concrete surfaces, fixing, cutting, cutting, lapping, binding, testing, etc. complete as per drawings and specifications.	Sqm	2,030	.0116132

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:2079 for Balance civil, structural & electrical works of RCC Chimney at 2 X 660 MW Ennore SEZ Supercritical Thermal Power Project at Ash Dyke of NCTPS

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
47.0	Providing and installing, at all levels, resin bonded rock wool insulation slabs of density not less than 100 kg/cu.m with an installed thickness of not less than 100 mm, on the outside surface of steel flue liners, on the outside surface of brick liner, on the inside surface of concrete windshield, inside surface of concrete minishells, under the cast iron caps and wherever as directed by the Engineer, in two layers (each 50 mm thick) including the cost of all labour, material and equipment, transporting, lifting to all heights, etc., inclusive of plated or galvanised accessories such as pins/studs/anchors/wire netting, speed washers, tying wires, etc. welding of pins/studs to steel surfaces or embedding of pins/studs/anchors in concrete surfaces, fixing, cutting, cutting, lapping, binding, testing, etc. complete as per drawings and specifications.	Sqm	4,050	.0244443
47 (a)	Providing and installing, at all levels, resin bonded rock wool insulation slabs of density not less than 100 kg/cu.m with an installed thickness of not less than 50 mm, on the outside surface of steel flue liners, on the outside surface of brick liner, on the inside surface of concrete windshield, inside surface of concrete minishells, under the cast iron caps and wherever as directed by the Engineer, in two layers (each 25 mm thick) including the cost of all labour, material and equipment, transporting, lifting to all heights, etc., inclusive of plated or galvanised accessories such as pins/studs/anchors/wire netting, speed washers, tying wires, etc. welding of pins/studs to steel surfaces or embedding of pins/studs/anchors in concrete surfaces, fixing, cutting, cutting, lapping, binding, testing, etc. complete as per drawings and specifications.	Sqm	2,030	.0107247
47 (c)	Providing and installing, for the exposed portion of flue at the top, the insulation material, having a minimum density of 200 kg/cum, consisting of 6 layers of insulation material each of a minimum thickness of 25 mm and all joints shall be staggered, wherever as directed by the Engineer, including the cost of all labour, material and equipment, transporting, lifting to all heights, etc., inclusive of plated or galvanised accessories such as pins/studs/anchors/wire netting, speed washers, tying wires, etc. welding of pins/studs to steel surfaces or embedding of pins/studs/anchors in concrete surfaces, fixing, cutting, cutting, lapping, binding, testing, etc. complete as per drawings and specifications.	Sqm	500	.0054712

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:2079 for Balance civil, structural & electrical works of RCC Chimney at 2 X 660 MW Ennore SEZ Supercritical Thermal Power Project at Ash Dyke of NCTPS

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
48.0	Providing and packing, at all levels, loose glass wool insulation to a density not less than 64 kg/m ³ between the insulated minishells and brick liners at expansion joints between the lining segments and wherever as directed by the Engineer including the cost of all labour, material and equipment, filling, ramming, testing, etc. complete as per drawings and specifications.	Cum	5	.0004586
49.0	Providing and packing, at all levels, loose rock wool insulation to a density not less than 100 kg/cu.m between the insulated minishells and brick liners at expansion joints between the lining segments and wherever as directed by the Engineer including the cost of all labour, material and equipment, filling, ramming, testing, etc. complete as per drawings and specifications.	Cum	5	.0002396
50.0	Providing and painting, at all levels, inside surface of chimney shell, inside and outside surfaces of minishells, underside of roof slab and other concrete components/surfaces of the chimney as indicated in the drawings and wherever as directed by the Engineer, with acid and heat resisting black bituminous paint (conforming to type I(i) of IS:158) in as many number of coats (not less than four coats in any case) as required to give a paint DFT of not less than 150 microns including the cost of all labour, materials, equipment, surface preparation, primer and finish painting, protecting, cleaning etc. complete as per drawings and specifications.	Sqm	19,250	.0565275
53.0	Providing and painting, at all levels, the external surfaces of chimney shell and wherever as directed by the Engineer, with synthetic enamel paint in alternate bands of colours 'signal red' and 'pure/bright white including the cost of all labours, material and & equipment, surface preparation, primer and finish painting, protecting, cleaning etc. complete as per drawings and specification.	Sqm	16,450	.0508355
54.0	Providing and painting, at all levels, the external surfaces of chimney shell and wherever as directed by the Engineer, with acid and heat resistant polyurethane paint in alternate bands of colours 'signal red' and 'pure/bright white including the cost of all labours, material and & equipment surface preparation, primer and finish painting, protecting, cleaning etc. complete as per drawings and specification.	Sqm	3,750	.012318

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:2079 for Balance civil, structural & electrical works of RCC Chimney at 2 X 660 MW Ennore SEZ Supercritical Thermal Power Project at Ash Dyke of NCTPS

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
55.0	Proving and laying over the chimney roof, a composite acid and heat protection treatment including providing of slopes for roof drainage including the cost of all labour, material and equipment, etc., complete as required for preparing the roof concrete, laying under bed of plain cement concrete screed to slopes, preparation of screed surface for painting, painting the screed surface with black bituminous paint, applying bitumenmastic in layers, laying acid resisting(A/R) mortar bed and laying 75 mm thick acid resisting(A/R) bricks with A/R mortar, curing, pointing(with phenolic based A/R cement), protection and cleaning, finishing, etc., complete as per drawing and specifications.	Sqm	270	.0033076
56.0	Providing, fitting& fixing, outlet and overflow, cast iron roof drain heads (with gratings) in chimney roof including sockets, adapters, brackets, hangers, supports, etc., casting-in and jointing to 150 mm nominal bore rainwater pipes, grouting, etc. including the cost of all labour material and equipment, transporting, lifting, setting in place, painting, etc. complete as per drawing and specifications.	Each	8	.000262
57.0	Providing, fitting and fixing rainwater pipes at all levels internally from the chimney roof to ground level upto the hood drain basin including shoes, bends, junctions, flanges,hoppers, sockets, adaptors, brackets, hangers, supports, anchor fasteners, spacers, pipe sleeve through shell, silicon or vulcanised butyl seaant, foam backing material, jointing, socketing, grouting, caulking, primer and finish painting etc. complete including the cost of all labour, material and equipment, complete as per drawing and specifications:	--		
a	150 mm nominal bore cast iron pipes.	Rm	25	.0004208
b	150 mm nominal bore medium class galvanised mild steel pipes.	Rm	550	.0067828
c	150 mm nominal bore UPVC.	Rm	25	.0001599

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:2079 for Balance civil, structural & electrical works of RCC Chimney at 2 X 660 MW Ennore SEZ Supercritical Thermal Power Project at Ash Dyke of NCTPS

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
58.0	Providing and laying 50 mm thick cement concrete flooring (comprising of 12 mm thick non-mettallic concrete hardener topping over 38 mm thick under bed of concrete) over the grade level slab inside the chimney, including the cost of all labour, material and equipment, etc. complete as required for preparation of base, laying underbed and topping, finishing, rounding of edges, corners and junctions, curing, testing, etc. complete as per drawing and specifications.	Sqm	790	.0023204
59.0	Providing and installing an electrically operated grill type steel roll-up door (with the bottom 0.5 metres of the curtain in solid type) at chimney base, in opening of size 7.8 m by 7.1 m, with all hardware and mechanisms, fittings and fixtures, locking arrangements, frames, fasteners, gear handle arrangement for standby manual operation, all electrical accessories such as motors, control systems, cables, etc. including the cost of all labour, material and equipment, fixing in position, grouting primer and finish painting, testing, etc., complete as per drawing and specifications.	Each	1	.0022544
60.0	Providing and installing at any level and location, mild steel, double plate, personnel access doors, in shell openings of size 1.1m by 2.15m, complete with all fittings and fixtures, locking arrangements, frames, fasteners including the cost all labour, material and equipment, lifting to all heights, setting in place, grouting primer and finish painting, etc., complete as per drawing and specifications.	Each	7	.0012
61.0	Supply, fabricating and fixing of cleanout door of size 650X825 mm. The door should be solid steel construction with inner plate 8mm and outer plate 6mm with suitable infill of stiffners, & filled with insulation mateterial and all other fittings, fixtures, fasteners including the cost of painting etc complete as per drawings and specification. The door should be hinged type and providing with locking device in addition to swivel studs with wing nuts on remaining 3 edges. The should be openable both from inside & outside and removable insulation to be provided around door opening. The door shall be provided with a minimum two coats of acid & alkali resistant paint confirming to IS158 type-I to give a DFT of 75microns. The outside surface shall be provided with minimum 2 coats of Zinc redoxide primer and two coats of synthetic enamil paint.	Each	2	.0001083

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:2079 for Balance civil, structural & electrical works of RCC Chimney at 2 X 660 MW Ennore SEZ Supercritical Thermal Power Project at Ash Dyke of NCTPS

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
63.0	Supplying, fabricating and installing mild steel/Stainless steel hatches at various locations in the chimney system complete with locking arrangements, frames, insulation, fittings and fixtures and all mechanisms and accessories reqd. for proper operation including all labour, painting etc. complete as per drawings and specifications.	--		
a	Hood Access Hatch	Each	1	.0002085
c	Liner Access Hatch	Each	2	.0003745
64.0	Conducting load testing on girders for 1.25 times the full load, on ground , including provision of test bed and jacks, dial gauges and other supplies complete as per specification and drawings and approval of engineer in-charge.	Pair	2	.004342
65.0	Designing, supplying, fabricating and installing after approval by the Engineer, non-metalic expansion joints to seal gaps between chimney components and to meet the service requirements as given in the specifications alongwith the cost of all components of the expansion joint, insulation, galvanised bolts, nuts, washers, anchor fasteners and retaining bars, packing materials and reinforcements at the connecting ends and flanges, lapping etc. including preparation of brick surface (to be connected to the expansion joint) with potassium silicate resisting mortar for proper leak tight bearing surface, with the cost of all labour and equipment, user hand books (giving details of installation, dismantling and maintenance procedures for the expansion joints) etc. complete as per drawings and specifications for:	--		
a	Expansion joint between ducts and liners.(2 Nos.)	Sqm	20	.0033004
66.0	Designing, supplying and erecting after approval by Engineer an Elevator from ground upto top of chimney with landing at various platform level complete as per spec. and approved drawings.	Lumpsum	1	.0241854
--	ELECTRICAL ITEM FOR THE BOQ:(The scope covers Design, procurement, installation, commissioning & testing for the same)	--		
E1	415V, 200A, 50 KA for 0.25 sec, 4 wire AC Distribution Board with 1No. incomer (SFU) & 9 nos. of 100A (TPN) outgoing complete in all respects	No.	1	.002402

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:2079 for Balance civil, structural & electrical works of RCC Chimney at 2 X 660 MW Ennore SEZ Supercritical Thermal Power Project at Ash Dyke of NCTPS

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
E2	415V, 200A, 4 wire AC Emergency Lighting distribution board alongwith 50KVA lighting transformer (415/433 V, Dyn11, Z=4%, +/- 2x2.5% Off Ckt. Tap) with 2 nos. of incomers with auto changeover facility using contacts and 6 nos. 100A SFU (TPN) outgoing complete in all respectsIn case load requirement of chimney can not be met by 50 kVA lighting transformer after considering loading of 80 to 85%, 100 kVA lighting transformer shall be provided alongwith suitably rated components without any commercial implications to the purchaser.	No.	1	.0029784
E3	Normal AC lighting panel outdoor type with degree of protection IP 65 with one no. 100A SFU (TPN) Incomer , 18 outgoing (16A SP MCBs)	No.	3	.00132
E4	Emergency lighting panel outdoor type with degree of protection IP 65 with One no. of 100A TPN/SFU incomer and 12 outgoing (16A, SP MCBs)	No.	3	.0010821
E5	Aviation lighting panel outdoor type with degree of protection IP 65 with one no. 100A SFU (TPN) Incomer , 8 outgoing 32A SFU (TPN), photodetector and timer circuit along with 100A contactor to control aviation lighting system.	No.	1	.0005208
E6	Aviation obstruction lights :	--		
a)	GEC Cat. No. ZA750(L) NEON WITH minimum 20 years maintenance free life.(Low intensity (Multi LED type- B as per ICAO)	No.	16	.0041429
b)	Medium intensity flashing RED light as per ICAO standard having intensity of 2000 to 20,000 candles depending upon background illuminance & flashing frequency 40-60/min with all accessories WITH minimum 20 years maintenance free life (Medium intensity Multi LED type- B as per ICAO)	No.	12	.0041539
E7	Aviation Distribution Board (ADB) with one 32A SFU (TPN) incomer and 8 nos. SP 20A MCB. Construction is same as Lighting Panel.	Each	3	.0011729
E8	250W metal halide Flood lights with fixtures, lamps and all control gears & accessories	No.	48	.0042218
E9	Metal halide Well glass type luminaries with 70W lamp with all controlgears & accessories(Metal Halide fixtures)	No.	110	.0046952
E10	Metal halide Well glass type luminaries with 150W lamp with all controlgears & accessories. (Metal Halide fixtures)	No.	50	.0026902

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:2079 for Balance civil, structural & electrical works of RCC Chimney at 2 X 660 MW Ennore SEZ Supercritical Thermal Power Project at Ash Dyke of NCTPS

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
E11	63Amp welding switch socket with plug & other Mounting accessories	No.	8	.0005795
E12	3 pin, 1 ph, 240V,15Amp. Power socketscomplete with plug Switches etc.	No.	8	.0002122
E13	AL conductor, XLPE insulated, Armoured, ST-2 outer sheath, FRLS type 1100V grade conforming to IS-7098 Part I.	--		
a.	3 1/2 C x95mm ² Al for connection between ACDB/ELDB/ welding sockets	RM	1,400	.0061552
b.	3 1/2 Cx35mm ² Al for Lighting panel incoming supply	RM	1,000	.002899
c.	4C x16mm ² Al Conductor, XLPE insulated, Armoured, PVC outer sheath, FRLS type 1100V grade conforming to IS-7098 Part I for connection between ALP/ADB/Aviation Lights	RM	1,600	.0036733
E14	PVC insulated 1100V grade stranded Cu Conductor lighting wires conforming to IS-694 for the following.	--		
a)	2.5 mm ²	RM	3,000	.0022707
b)	4.0 mm ²	RM	9,000	.0089211
E15	GI pipe conduit with minimum 25 mm dia with GI junction boxes, GI pull boxes & accessories etc. complete in all respects.	RM	7,000	.0153976
E16	PVC coated Flexible steel conduit 25mm dia with accessories	RM	500	.0004609
E17	Lightning protection Air terminal : Lead coated copper material of 20mm dia & 2 metre long each.	RM	25	.0015244
E18	Electrical equipment earthing materials including down conductors	--		
a)	Below ground earthing system	RM	150	.0007308
b)	Above ground earthing system	RM	1,500	.0054852

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:2079 for Balance civil, structural & electrical works of RCC Chimney at 2 X 660 MW Ennore SEZ Supercritical Thermal Power Project at Ash Dyke of NCTPS

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
E19	16 SWG GI wire for equipment earthing	RM	100	.0000297
E20	Test links for down conductors	nos.	4	.000116
E21	Earthpit with earthing electrode including brick chamber with cover, accessories etc. complete in all respect.	nos.	4	.0002545
E22	Telephone socket with junction box etc. complete as per drawings & specifications.	Each	10	.000148
E23	Telephone handsets complete as per drawings & specifications.	Each	10	.0001671
E24	Telephone cable (minimum 4 pair) of minimum 0.6 mm dia annealed high conductivity electro copper conductor, PVC insulated, twisted, PVC tape wrapped, screened, tip corded, PVC sheathed, conforming to relevant ITD (Indian Telephones department) specification	--		
a)	24 pairs	RM	150	.0003085
b)	4 pairs	RM	300	.0001621
E25	GS cable trays. Cable trays shall be of ladder type constructed of minimum 2 mm thick mild steel hot dip galvanise including cover, cabling material, accessories etc. complete as per drawings & specifications.	--		
a	600 mm wide	RM	150	.0024433
b	300 mm wide	RM	150	.0019485
c	150 mm wide	RM	100	.0011025
E26	100KVA lighting transformer (415/433 V, Dyn11, Z=5%, +/- 2x2.5% Off Ckt. Tap)	Nos.	1	.0010367
E27	Master Control Unit	Nos.	1	.0012478
E28	150W LED well glass lighting fixture (For Platform Normal lighting/Emergency lighting)	Nos.	44	.0010347

Part C : Bill of Quantities

**Tender Specification BHEL:PSSR:SCT:2079 for Balance civil, structural & electrical works of RCC Chimney
at 2 X 660 MW Ennore SEZ Supercritical Thermal Power Project at Ash Dyke of NCTPS**

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
E29	70W LED well glass lighting fixture (For staircase Normal lighting/Emergency lighting)	Nos.	110	.0021645
E30	250W LED Flood Light fixture (Normal/Emergency)	Nos.	8	.0003494
E31	J.B. suitable for 3.5Cx95Sq.mm. cable	Nos.	7	.0001478
E32	J.B. suitable for 3.5Cx35Sq.mm. cable	Nos.	11	.0002112
E33	J.B. suitable for 4Cx16Sq.mm. cable	Nos.	14	.0002419
E34	J.B. with 4nos. Terminals for 4Sq.mm. cable	Nos.	8	.0001305
E35	J.B. with 4nos. Terminals for 2.5 Sq.mm. cable	Nos.	155	.0023805
E36	Telephone junction box with 24pair terminal block crown type	Nos.	15	.000216
Note :	1. Ambient temperature for design of all electrical equipment shall be considered as 55 deg C for chimney electrical system. 2. Schedule of Equipment has been indicated for reference only. All electrical items shall be supplied on as required basis. 3. All cable termination shall be with required Cable glands & lugs for complete electrical systems of Chimney.	--		
TOTAL Weightage				0.9999999