

TENDER SPECIFICATION

BHEL: PSSR: SCT: 1483

FOR

Construction of Single flue RCC Chimney 275M height with Brick liner including all civil, electrical and elevator work for unit- 3 of 1 x 700 MW

at

Bellary Thermal Power Station, Kudatini,
Bellary Dist, Karnataka

VOLUME-II RATE SCHEDULE



BHARAT HEAVY ELECTRICALS LIMITED

(A Government of India Undertaking)

Power Sector – Southern Region

690, Anna Salai, Nandanam, Chennai – 600 035.

**BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Power Sector, Southern Region
690, Anna Salai, Nandanam, Chennai – 35**

Tender Specification No. BHEL: PSSR: SCT: 1483

for

Construction of Single flue RCC Chimney 275M height with Brick liner including all civil, electrical and elevator work for unit- 3 of 1 x 700 MW at Bellary Thermal Power Station, Kudatini, Bellary Dist, Karnataka

One set of Tender documents consisting of Volume-I and Volume II

BOOK SLNO _____
Issued to
M/s

Refer NIT for Last date of submission

Please note this tender document is not transferable

For and on behalf of
BHARAT HEAVY ELECTRICALS LIMITED

ADDL GENERAL MANAGER / CONTRACTS

Place: Chennai -35

PREAMBLE TO THE SCHEDULE OF QTS. (SOQ)

- 1) Details of the items in this Schedule shall be read in conjunction with the corresponding BHEL's Customer specifications and other documents and shall have precedence over any contrary statement mentioned anywhere in this document.
- 2) The work shall be carried out as per construction drawings (which will be issued progressively during the execution), specifications, the description of the items in this schedule and / or Engineer's instructions., The layout, sizes and details of the building, structures and foundations may vary at a large extent during actual construction.
- 3) Items of work provided in this schedule but not covered in the specifications shall be executed strictly as per instructions of the Engineer.
- 4) Unless specifically mentioned otherwise in the contract, the bidder shall quote his rates for the finished items and shall provide for the complete cost towards fuel, tools, tackle, equipment, constructional plant , temporary works, labour, materials, levies , taxes , transport, layout, repairs, rectification, maintenance till handing over, supervision, shops, establishments, services , temporary roads, revenue expenses, contingencies, overheads, profits and all incidental items not specifically mentioned but reasonably implied and necessary to complete the works according to the contract.
- 5) The rate quoted shall be inclusive of cleaning the site of any vegetations, dressing and leveling etc., required for commencement of site activities. No separate payment will be made towards the same.
- 6) The rate shall also be inclusive of carrying out survey of site to establish levels and coordinates at suitable intervals, form existing grid levels and coordinates furnished by the owner, establish bench marks, setting out the location and levels of the proposed structures, constructions and making references , pillars and other identification marks etc. No separate payment will be made towards the same.
- 7) Engineers decision shall be final and binding on the contractors regarding clarification of items in this schedule with respect to the other section of the contract.
- 8) Unless otherwise specified in the schedule of items Structural and Reinforcement steel will be issued by BHEL as FREE ISSUE for incorporation in the permanent works as specified elsewhere in this tender document.
- 9) Incase of any discrepancy between item descriptions, relevant drawing and/or specification clarification shall be sought at tender stage itself. Otherwise it shall be assumed that the bidder has quoted for the more stringent requirement.
- 10) Refer the relevant clauses in the GCC for payment of additional items and Quantity variation.
- 11) Refer Clause 26.0 in NIT for order of precedence.



BHEL PSSR SCT 1483
BELLARY, UNIT-III (KPCL), 1X 700MW
SINGLE FLUE RCC CHIMNEY 275 M - HEIGHT WITH BRICK LINER

S.NO	DESCRIPTION	UNIT	QTY.	RATE (INR)		AMOUNT (INR)	
				In figures	In words	In figures	In words
1	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	2550				
b	Depth exceeding 2 m but not exceeding 4 m	CUM	640				
c	Depth exceeding 4 m but not exceeding 6 m	CUM	130				
3	Earth work in excavation in soft rock (rock without any recovery of excavated materials in the form of hard stone/boulder) including weathered rock which can be excavated by means of crow bar, pick axe, pneumatic rock breaker attachment with excavator machine etc but does not require chiselling or blasting including setting out, levelling, dewatering (wherever required), 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	140				
b	Depth exceeding 2 m but not exceeding 4 m	CUM	2780				
c	Depth exceeding 4 m but not exceeding 6 m	CUM	556				
5	Earth work in excavation in hard rock requiring controlled blasting including wedging, line drilling, pre shearing etc as required, setting out, levelling, dewatering (wherever required), shoring & strutting (wherever required), dressing the sides & bottom, all lifts, necessary licenses/statutory clearances for blasting, supply, storage & handling of blasting materials, stacking/disposal of surplus excavated material within a lead upto 500m, 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						

SIGNATURE OF BIDDER

a	Depth from ground level but not exceeding 2 m	CUM	21				
b	Depth exceeding 2 m but not exceeding 4 m	CUM	834				
c	Depth exceeding 4 m but not exceeding 6 m	CUM	4170				
d	Depth exceeding 6 m but not exceeding 8 m	CUM	208				
6	Earth work in excavation in hard rock requiring chiselling including wedging, line drilling, pre shearing etc as required, setting out, levelling, deawtering (wherever required), dressing the sides & bottom, all lifts, stacking/disposal of surplus excavated material within a lead upto 500m, 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						
c	Depth exceeding 4 m but not exceeding 6 m	CUM	265				
A7	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 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. (Stocking area need to be shown to agency at the nearest point of excavation.)						
a	Each layer compacted so as to achieve at least 95% modified procter density as per IS-2720 (Part-VIII)	CUM	700				
b	Each layer compacted so as to achieve at least 90% modified procter density as per IS-2720 (Part-VIII)	CUM	3000				
9	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	9000				
12	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	150				
A 13	Providing and laying design Mix plain cement concrete M15 (1:2:4) 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	380				

14	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)					
	a) Grade M-25 (foundations, etc)	CUM	4500			
	ii) For all other works					
	a) Grade M-20 (grade level slab)	CUM	120			
	b) Grade M-30 for chimney shell, corbels and external platforms and other shell attachments.	CUM	7000			
15	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	2000			
	(BHEL will supply Reinforcement Steel(High strength deformed bars only) as a free issue. However loading,transporting from BHEL stores,unloading at site are in agency's scope. The Steel will be issued to the agency in standard lengths. In some instances for 8mm, 10mm & 12mm dia steel will be supplied in coil form. Extra costs incurred due to non-standard lengths and de-coiling of 8mm,10mm & 12mm shall be in the scope of contractor.					
16	Providing, 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 (Reinforcement supply by BHEL at free of cost)	MT	380			
	ii) For all other works					
	a) Mild steel reinforcement bars	MT	27			
	b) High strength deformed bars (Reinforcement supply by BHEL at free of cost)	MT	800			

17	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.						
	i) For all works below ground level (except chimney shell)	SQM	1200				
	ii) For all other works						
	a) Inner and outer faces of wind shield with slip form shuttering	SQM	28000				
	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, flue duct secondary concrete, hopper etc.	SQM	3600				
18	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	60				
22	Preparing detailed fabrication drawings and after approval by the Engineer, 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				
A27	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) (G.I.) Mild steel ladders with cage, hood access hatch, bird screens, hood drain basin covers and other miscellaneous mild steel items not specifically mentioned.	MT	15				
	b) (G.I.) 32/40 mm nominal bore medium class tubular hand railing for stair case and internal and external platforms	MT	7				

29	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	8				
31	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	Kg	250				
34	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	2100				
36	Supplying and laying shaped/curved acid resisting bricks (conforming to class- I of IS:4860) in the liner basin using potassium silicate mortar including the cost of all labour, materials, mortar, raking joints, pointing with phenolic based acid resisting cement (conforming to IS:4832, Part II), curing, etc. complete as per drawings and specifications including design of the brick shapes by the Contractor and approval by the Engineer.	CU.M	45				
38	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	CU.M	45				
39	Supplying and laying acid resisting castable refractory lining as indicated in the drawings 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.	CU.M	52				

A40	Supplying, fabricating & installing, at all levels (G.I.) mild steel circumferential reinforcing bands around the brick liners at all elevations including the cost of all labour, transportation, materials & equipments, lifting to all heights, setting in place, a/r mortar fill behind bands, cutting, bending, drilling, grinding, bolts and bolting, priming, finish painting, etc. complete as per drawings and specification	MT	100				
41	Providing, fabricating and installing, at all levels, chemical lead sheet (2 mm thick) at expansion joints between brick lining segments including the cost of all labour, transportation, material & equipments, cutting, soldering of joints, testing etc. complete as per drawings and specifications.	Kg	4000				
42	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	15				
43	Providing, laying and packing, at all levels, asbestos ropes at expansion joints including the cost of all labour material, etc. complete as per drawing and specifications.						
	(a) 25 mm (diameter) at expansion joints between brick lining segments	RM	2300				
A44	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.						
	(c) 12 mm thick asbestos mill boards	SQ.M	250				
45	Supplying, fabricating and installing, on top of the mini shells, grey cast iron caps complete including the cost of all labour, material and equipment, transporting, test assembling, drilling, lifting to position, setting in place, bolts and bolting, inclusive of bronze rag bolts bronze bolts and nuts, brass washers, non-shrink grout, primer and finish painting, etc., complete as per drawings and specifications.	MT	5				
47	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.	CuM	900				

50	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	14500				
53	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	SQ.M	14000				
54	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	SQ.M	2000				
58	Providing and laying 50 mm thick cement concrete flooring (comprising of 12 mm thick mettalic 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	500				
60	Providing and installing at any level and location, mild steel, double plate, personnel access doors, in shell openings of size 1.0m by 2.1m, 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	2				

61	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 stiffeners, & 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	4				
ELEVATOR							
66	Supplying and erecting after approval by Engineer an Elevator from ground upto top of chimney with landing at various platform level complete as per specification and drawings.	LUMPSUM	1				
67	The louver fins of Z- shape in cross section and made from anodised aluminium plates of minimum thickness 4 mm as per specification	SQM	10				
68	Supply and fixing 75 mm thick insulation bricks confirming to IS2042 grade C	CuM	60				
69	Providing brick work in cement mortar 1:6 (1 cement 6 coarse sand) in works at all heights, places and position ground floor slab including raking out joints, curing, scaffolding complete excluding plastering and painting. Using bricks of class designation 5.0 of nominal demensions as per specification.	Cu.m	10				
70	Cement mortar plaster including making grooves wherever required including all labour, material, scaffolding, curing etc at any level as per specification, drawings and as directed by engineer-in-charge.						
	a) Providing 18 mm thick plaster in two layers inside the building/boundary wall in cement mortar 1:6 on walls, finished to a uneven side of the wall.	Sqm	50				
	b) Providing 20mm thick plaster in two layers outside the building/boundary wall in cement mortar 1:6 on walls, finished to a smooth finish including providing 3mmx3mm size grooves at junctions of two dissimilar materials all complete.	Sqm	50				
ELECTRICAL WORKS (Supply, installation and testing / commissioning of following items as per specification)							
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	Each	1				

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 contactors and 6 nos. 100A SFU (TPN) outgoing complete in all respects. In 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.	Each	1				
E3	Normal AC lighting panel outdoor type with degree of protection IP 55 with one no. 100A SFU (TPN) Incomer , 18 outgoing (16A SP MCBs)	Each	2				
E4	Emergency lighting panel outdoor type with degree of protection IP 55 with One no. of 100A TPN/SFU incomer and 12 outgoing (16A, SP MCBs)	Each	1				
E5	Aviation lighting panel outdoor type with degree of protection IP 55 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.	Each	1				
E6	Aviation obstruction lights :						
	a. Low intensity red aviation light similar to GEC Cat. No. ZA750(L) NEON (TYPE-B AS PER ICAO)	Each	16				
	c. High intensity flashing white light as per ICAO standard having intensity of 2000 to 2,00,000 candles depending upon background illuminance & flashing frequency 40-60/min with all accessories.(TYPE-B AS PER ICAO)	Each	12				
E7	Flood light with 250W HPSV lamps with all control gears & accessories	Each	4				
E8	Well glass type luminaries with 70W/150W HPSV lamp with all control gears & accessories	Each	80				
E9	63Amp welding switch socket with plug & other Mounting accessories	Each	8				
E10	3 pin, 1 ph, 240V,15Amp. Industrial Power socketscomplete with plug Switches etc.	Each	16				
E11	Al conductor, PVC insulated, Armoured, , PVC outer sheath, FRLS type 1100V grade conforming to IS-1554 Part I.						
	a. 3½ C x95mm ² Al for connection between ACDB/ELDB/ welding sockets	RM	550				
	b. 3½ Cx 95mm ² Al for Lighting panel incoming supply	RM	550				
	c. 3½ C x95mm ² Al Conductor, PVC insulated, Armoured, PVC outer sheath, FRLS type 1100V grade conforming to IS-1554 Part I for connection between ALP/ADB/Aviation Lights	RM	3600				
E12	PVC insulated 650/1100V grade stranded Cu Conductor lighting wires conforming to IS-694 for the following.						
	a. 2.5 mm ²	RM	2000				
	b. 4.0 mm ²	RM	1500				

E14	GI conduit 25mm dia with junction boxes, pull boxes & accessories	RM	1200			
E16	Lightning protection Air terminal SPIKES	RM	64			
E17a)	Electrical material etc,complete above ground earthing material	RM	1500			
E17 b)	Electrical equipment earthing materials including down conductors	LUMPSUM	1			
E20	GS cable trays. Cable trays shall be of ladder type constructed of minimum 2 mm thick mild steel hot dip galvanised.					
a)	600 mm wide	RM	100			
b)	300 mm wide	RM	150			
c)	150 mm wide	RM	500			
E21	Aviation Distribution Board (ADB) with one 32A SFU (TPN) incomer and 6 nos. SP 20A MCB. Construction is same as Lighting Panel.	Each	4			
			TOTAL			

SIGNATURE OF BIDDER