

**TENDER SPECIFICATION
BHEL: PSSR: SCT: 1882**

FOR

**Construction of Single Steel Flue RCC
Chimney of 275M height including all
civil (excluding foundation), electrical
and elevator works for Unit 5 at
5x800MW Yadadri Power project,
Veerlapalem village, Dameracherla
Mandal, Nalgonda District, Telangana
State.**

VOLUME-II

PRICE BID



BHARAT HEAVY ELECTRICALS LIMITED

(A Government of India Undertaking)

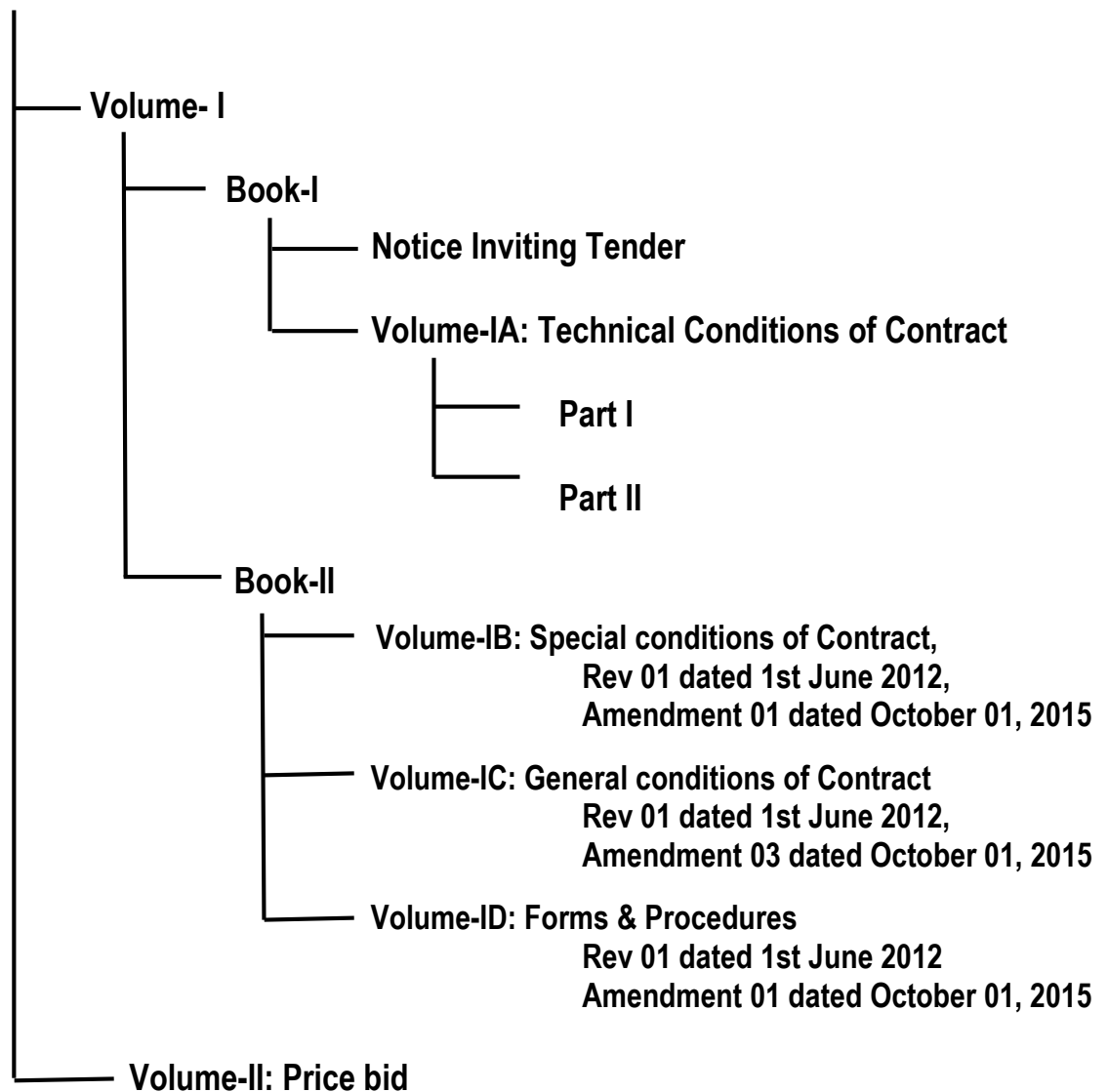
Power Sector – Southern Region

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

PRICE BID

TENDER SPECIFICATION CONSISTS OF

Techno-Commercial Bid



PRICE BID

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PRICE BID

PART-A-INSTRUCTIONS TO BIDDERS:

1. The 'Total amount' mentioned in Part-B of the Price Bid corresponds to the entire Bill of Quantities (BOQ) given in Part -C of the Price Bid.
2. Bidders shall quote 'Total Amount' in the format for Price Bid available in the e procurement portal.

Bidders may also quote 'Total Amount' in the format given in Part -B of this document (Optional).

Any other entry elsewhere in the price bid shall be treated as Null and Void.
3. 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.
4. 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.
5. Based on the quantities of individual item and the amount arrived in SI No: 4 above, unit rate of individual items shall be derived. This unit rate shall be rounded off to four decimal places.
6. 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.5 above.
7. Schedule of Electrical equipments/ items have been indicated for reference only. All electrical items shall be supplied on as required basis.
8. Only brief description of items of work is given in the PRICE SCHEDULE. All the works are to be done as per tender specifications, descriptive notes and drawings to establish the complete facilities in all respects.
9. Unless otherwise specified rate against each item must be quoted for manufacture, fabrication, supply, loading, transportation, unloading, cartage, laying, construction, erection, painting, etc. including necessary statutory duties.

Part B: Format to quote Total Amount

**Tender Specification BHEL:PSSR:SCT:1882 for Chimney
at 5 X 800 MW Yadadri TPS**

Total Amount for the entire Bill of Quantities(BOQ) given in Part C

In Figures

In words

Note :

Bidders to quote Total Amount in this format given above, which shall be taken into account for evaluation and awarding and hence, shall be complete in all respect for the full scope defined in specification and in accordance with all terms & conditions of tender.

Date

SIGNATURE OF BIDDER WITH SEAL

Part C : Bill of Quantities

**Tender Specification BHEL:PSSR:SCT:1882 for Chimney
at 5 X 800 MW Yadadri TPS**

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
--	Civil 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 labour, 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	.0000214
3.0	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 labour, 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	.0000318

Part C : Bill of Quantities

**Tender Specification BHEL:PSSR:SCT:1882 for Chimney
at 5 X 800 MW Yadadri TPS**

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
4.0	Earth work in excavation in hard rock requiring blasting (but excluding controlled blasting) including wedging, line drilling, pre shearing etc as required, setting out, levelling, dewatering (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 labour, 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	50	.0000264
b	Depth exceeding 2 m but not exceeding 4 m	cum	50	.0000318
5.0	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 labour, 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	50	.000026
b	Depth exceeding 2 m but not exceeding 4 m	cum	50	.0000313
c	Depth exceeding 4 m but not exceeding 6 m	cum	50	.0000375
d	Depth exceeding 6 m but not exceeding 8 m	cum	1	.0000009

Part C : Bill of Quantities

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at 5 X 800 MW Yadadri TPS**

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
6.0	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 labour, 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	76	.0004328
d	Depth exceeding 6 m but not exceeding 8 m	cum	1	.0000068
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 available within a lead upto 500m and compacted as specified including re-excavation of stacked material, watering, ramming/compaction by manual/mechanical means, dressing etc all complete.for the following including necessary labour, materials, equipment, loading, transportation, unloading etc as per specification, drawing and as directed by engineer- in-charge.	--		
b	Each layer compacted so as to achieve at least 90% maximum dry density as per IS-2720 (Part-VII)	cum	100	.0000162
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 labour, materials, equipment, loading, transportation, unloading etc as per specification, drawing and as directed by engineer- in-charge.	--		
b	Each layer compacted so as to achieve at least 90% maximum dry density as per IS-2720 (Part-VII)	cum	100	.0000055

Part C : Bill of Quantities

**Tender Specification BHEL:PSSR:SCT:1882 for Chimney
at 5 X 800 MW Yadadri TPS**

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
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	500	.0000117
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 earth (borrowed earth to be arranged by the bidder) and compacted as specified including supplying borrowed earth, royalty (if any), watering, ramming/compaction by manual/mechanical means, dressing etc all complete for the following including necessary labour, materials, equipment, loading, transportation, unloading etc as per specification, drawing and as directed by engineer- in-charge.	--		
b	Each layer compacted so as to achieve at least 90% maximum dry density as per IS-2720 (Part-VII)	cum	1,176	.0012162
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 labour, materials, equipment, loading, transportation, unloading etc as per specification, drawing and as directed by engineer- in-charge.	cum	370	.0021841
12.0	Supplying and laying (inside chimney in the space below the grade level slab) crushed rock range 63 mm to 45 mm in layers not exceeding 200 mm in thickness including breaking of stone boulders to required sizes, filling the interstices with selected sand and compacting to 85 % of original volume of stone stack for all lifts etc. all complete. Payment shall be made for the measurement of the volume of the compacted fill. Hard rock excavated and stacked in site shall be used for this work.	cum	774	.0014578
13.0	Providing and laying Nominal Mix plain cement concrete (M7.5) 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	10	.0000868

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
13A	Concrete of grade M15 (1 part cement, 2 part sand, 4 parts of 20 mm graded aggregate by volume) as lean concrete, levelling course, mud mat under and around foundations/floors at any depth below finished floor level etc.	cum	10	.0000868
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)	--		
a	Grade M-25 (foundations, etc)	cum	50	.0004639
b	Grade M-30 (foundations, etc)	cum	50	.0004659
c	Grade M-35 (foundations, etc)	cum	5	.0000468
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	50	.000108
ii	For all other works	--		
a	Grade M-20 (grade level slab)	cum	110	.0009548
b	Grade M-35 for chimney shell, corbels and external platforms and other shell attachments.	cum	10,500	.1440381
d	Grade M-25 for all other components of the super structure, roof slab, mini -shells, beams, columns wall etc.	cum	40	.0005466

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
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	500	.0001524
16.0	Placing steel reinforcements of TMT steel of grade Fe-500 conforming to IS:1786 and having minimum elongation 14.5% 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, testing, transportation to & from stores etc., preparation of bar bending schedules, all complete as per specifications, drawings and instructions of the Engineer. (Reinforcement steel shall be provided by BHEL free of cost for incorporation in permanent work).	--		
i	For all works below ground level (except chimney shell)	--		
a	High strength deformed bars	MT	25	.0008574
ii	For all other works	--		
a	Mild steel reinforcement bars Note: Supply of mild steel reinforcement bar is in the scope of contractor.	MT	15	.0020023
b	High strength deformed bars	MT	1,200	.0493882
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, tieing, 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	400	.000547

Part C : Bill of Quantities

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at 5 X 800 MW Yadadri TPS**

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
ii	For all other works	--		
a	Inner and outer faces of wind shield with slip form shuttering	Sqm	32,800	.086042
A1	Mobilisation & installation of slip-form work and start of slipping operation with all materials, tools & plants, accessories, consumables, labour, etc. all complete	Lumpsum	1	.013025
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	992	.003101
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	115	.0003595
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	55	.0000021
20.0	Providing and installing, at all levels, bitumen impregnated fibre boards, 12 mm thick, conforming to IS:1838, as joint filler at joints in concrete, including nailing, coating of both faces with coal tar pitch/bitumen, including the cost of all labour, material and equipments etc., complete as per drawings, specifications and instructions of the Engineer.	Sqm	37	.000041
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	548	.0001487

Part C : Bill of Quantities

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at 5 X 800 MW Yadadri TPS

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. Supply of structural steel is in the scope of contractor.	MT	5	.0008447
23.0	Preparing detailed fabrication drawings after approval by the Engineer, collection of structural steel from BHEL store, fabricating and erecting structural steel of grade E250 conforming to IS2062 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, surface preparation, primer and finish painting etc. complete as per drawing and specifications. (surface preparation, primer and finish painting is payable separately) Structural steel shall be supplied by BHEL free of cost for incorporation in permanent work. Payment: Fabrication- 65% Erection - 35%	MT	470	.0289326
A23	Blast cleaning of steel structures to near white metal surface(Sa 2 1/2) as per specification and standard and applying epoxy resin based zinc rich primer of grade 2 as per IS:14589 in 2 coats including touch-up painting etc all complete.	MT	470	.0060446
B23	Providing and applying two coats of epoxy paint with minimum 25 micron dry film thickness (DFT) per coat of approved make and shade to achieve an even shade over steel sections already having primer coats and keeping overall DFT with primer not less than 115 microns including protection and cleaning, scaffolding etc. all complete.	MT	470	.0059993

Part C : Bill of Quantities

**Tender Specification BHEL:PSSR:SCT:1882 for Chimney
at 5 X 800 MW Yadadri TPS**

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
24.0	Supplying, fabrication, erection and alignment of factory made electroforged galvanised grating units with mild steel having minimum galvanisation conforming to IS:2062 in flooring, platforms, drain and trench covers, walk-ways, passages, staircases with edge binding strips and anti-skid nosing in treads etc. including fixing clamps, fittings, fixtures, all taxes, duties, packing, grinding, drilling, welding, edge preparation, etc. all complete. Minimum galvanisation of 610 g/sqm.	MT	1	.0002005
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	45	.0017107
A26	Preparing detailed fabrication drawings and after approval by the Engineer, collection of steel from BHEL store, fabricating and erecting, at all levels, Mild Steel flues (liners) 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 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. Structural steel shall be supplied by BHEL free of cost. Payment: Fabrication - 65% Erection- 35%	MT	560	.0554489
A26A	Blast cleaning - Surface finish of Sa 2 1/2 and application of suitable zinc rich epoxy primer over all heights on ground or in erected position on internal surface of mild steel flue can, SS minishell including cost of labour, material, tools & tackles etc. all complete as per drawings, specification, manufacturer's recommendation and engineer-in- charge.	SqM	5,443	.005723

Part C : Bill of Quantities

**Tender Specification BHEL:PSSR:SCT:1882 for Chimney
at 5 X 800 MW Yadadri TPS**

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
AA26 A	Supply & application of suitable epoxy primer application, including blast cleaning to near white metal surface conforming to Sa 2.5 finish, on outer surface of flue can, to fully cover the substrate material over all heights of chimney including cost of labour, material, tools & tackles etc. all complete as per drawings, specification, manufacturer's recommendation and engineer in charge.	SqM	5,443	.005723
A26B	Providing and applying two coats of epoxy paint with minimum 25 micron dry film thickness (DFT) per coat of approved make and shade to achieve an even shade over outer surface of steel flue can already having primer coats and keeping overall DFT with primer not less than 115 microns including protection and cleaning, scaffolding etc. all complete.	SqM	5,443	.0043423

Part C : Bill of Quantities**Tender Specification BHEL:PSSR:SCT:1882 for Chimney
at 5 X 800 MW Yadadri TPS**

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
B26	<p>Supplying and installation of borosilicate glass block lining system, including closed cell borosilicate glass blocks, adhesive membrane, compatible primer and onsite QA supervision during installation, over all heights, on ground or in erected position, on internal surface of mild steel flue can, SS minishell, using two component suitable adhesive membrane material under controlled temperature and humidity conditions mentioned in specification, including cost of skilled labour, material, tools & tackles, equipment required to create controlled temperature & humidity conditions inside chimney or at ground during installation, hot air blow cleaning of internal surface before application, in expert supervision by borosilicate glass manufacturer during installation, mixing of two components adhesive membrane by automated mixing machines etc. all complete. The borosilicate glass blocks shall be of 51 mm nominal thickness (minimum) conforming to physical & chemical properties & operating conditions mentioned in specification, offering chemical resistance to most acids, solvents & weak bases, should have proven resistant to thermal shock, suitable for running both in FGD inline and bypass mode of operation, in moisture proof packaging, having minimum density of 0.144 X 103 kg/m3, minimum compressive strength of 1.0 N/mm2, minimum flexural strength of 0.62 N/mm2, minimum co-efficient of linear thermal expansion of 5.5 X 10-6 / 0C.</p> <p>Adhesive membrane should be two component mix, having minimum tensile strength at 23degreeC of 1.0 N/mm2 conforming to ASTM D412. Supply of two component adhesive membrane, compatible primer and full-time onsite QA supervision during installation and full-time onsite QA supervision during replacement of blocks in guarantee period is also included in this item and shall not be paid separately.</p> <p>Nominal adhesive/ membrane thickness shall be minimum 3 mm behind & between each block. A 1.5 mm thick layer should be troweled onto the liner as well as to the sides and back of each block before installation. Double buttering technique shall be used to ensure full bond of each block to the liner and to each other. Installation of blocks shall be carried out as per specification, drawings, direction of engineer in charge, in expert supervision by borosilicate glass manufacturer and accepted by the customer. Contractor shall get installation procedure approved by BHEL/TSGENCO before installation including verification of installation procedure & workmanship standards of the lining system.</p>	SqM	5,443	.4487937

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:1882 for Chimney

at 5 X 800 MW Yadadri TPS

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
	<p>This item includes the cost of surface cleaning (after priming) using hot air, application of adhesive membrane and installation of borosilicate glass block at any height on ground or over erected position in flue can including cost of skilled labour, material, tools & tackles, equipment etc all complete required to complete the job at any height. The surface preparation (before priming) of internal surface of flue can and application of primer is not in the scope of this item.</p> <p>Area of payment for the item shall be calculated by multiplying the height of flue can over which blocks are installed with inner perimeter of flue can over that height.</p> <p>The supplier shall provide a ten (10) year full replacement guarantee, including cost of supply, erection, enabling works, all labour, material, adhesive, primer, surface preparation, arrangement for application etc. all complete and full-time onsite QA supervision, during erection & commissioning.</p>			
D26	Providing (supplying), fabricating, erecting including labour, equipment etc. all complete, C276 material in steel flue cans, expansion joint, acid withdrawal system, inspection doors, gas sampling ports etc. including TIG or other specialised welding, all weldables /consumables (including electrodes), equipment, material, surface finishing, sealing, testing for quality and correction of defective works, all complete at all elevation as per drawings, specification and instruction of the engineer. Measurement for payment shall be done for net weight of C276 material installed.	Kg	1,000	.006361
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, primer, 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	15	.0036072
b	Providing minimum 275 gsm Hot dipped galvanisation on mild steel parts as per specification.	MT	15	.0008653
A27	Supply, fabrication and fixing of GI pipe hand railing of 32 NB (Medium duty) including transportation, loading/unloading, painting etc. all complete..	MT	22	.0051392

Part C : Bill of Quantities

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at 5 X 800 MW Yadadri TPS**

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
B27	Providing minimum 610 gsm Hot dipped galvanisation on mild steel parts as per specification.	MT	20	.0011538
29A	Supplying, Fabricating and installing in the liners, gas sampling and gas opacity measurement ports made from C-276 pipe including the cost of all labour, materials, bolts and bolting, non metallic gaskets, cover plates & all other accessories, painting etc., complete as per drawings and specifications. Measurement for payment shall be done for net weight of C276 pipe including flange plate/cover plate only (weld thickness not to be considered) which is welded over liner surface.	kg	100	.0006361
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 AISI 316L or BS:1449 , etc. complete as per drawing and specifications.	MT	20	.0229412
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	0.15	.000218
b	Lead Sheets.	Kg	40	.0000895

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at 5 X 800 MW Yadadri TPS

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
A32	Preparing detailed fabrication drawings and after approval by the Engineer providing, fabricating and installing expansion compensator joints of acid and heat resistant elastomeric fabric in the flue liner, comprises of non-metallic material suitable for both wet stack operations and by-pass operations, shall be acid resistant to withstand acidic flue gas condensates arising out of flue gas parameters & operating conditions as per specification and shall also prevent dust accumulation. The space between the expansion joint material and the liner shall be packed and sealed by providing a bolster made up of light weight compressible material suitable for wet stack operations and acid resistant to withstand acidic flue gas condensates arising out of flue gas parameters & operating conditions as per the specification. The bolster shall be confined in texturized glass fabric having a final covering of stainless steel wire mesh. Design of expansion joint shall comply EPRI guideline to avoid contact of condensate with expansion joint material and to ensure drainage of condensate. 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 maintainance procedures for the expansion joints), testing, approval from BHEL/TSGENCO etc complete as per drawings and specifications.	Sqm	75	.0037039
A33	Supplying ,Fabricated Ready to Install, spare expansion compensators of acid and heat resistant elastomeric fabric alongwith bolster as specified in item no. A32 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	20	.0008889
37.0	Supplying, and placing in position (at the beam supports bearings) Neoprene pads between concrete surface and mild steel including the cost of all labour materials, cutting to shape, grinding, drilling etc., complete as per drawings and specifications.	Cum	1	.001455
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	.0005076
43.0	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.	--		

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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	12 mm (diameter) at expansion joints between brick lining segments.	kg	482	.0003754
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	50	.0012598
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	50	.0014271
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	.000126

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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
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	.0001427
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 two 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	16,000	.01045
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 as many number of coats (not less than two coats in any case) as required to give a paint DFT of not less than 150 microns over a coat of primer, 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	14,140	.0092352
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 as many number of coats (not less than two coats in any case) as required to give a paint DFT of not less than 150 microns over a coat of primer, 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	2,490	.0033807

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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
55.0	Providing 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	145	.0010576
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	.0001848
57.0	Providing, fitting and fixing rain water 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	30	.000243
b	150 mm nominal bore medium class galvanised mild steel pipes.	Rm	540	.0024688
58.0	Providing and laying 50 mm thick cement concrete flooring (comprising of 12 mm thick metallic 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	737	.0009215

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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
59.0	Providing and installing an electrically operated semi-grill type steel roll-up door (with the bottom one third of the curtain in solid type) at chimney base, in opening of approx size of 56 square 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	.0006022
60.0	Providing and installing at any level and location, mild steel, double plate, personnel access doors, in shell openings of size 1.2m X 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	7	.000444
63.0	Supplying, fabricating and installing mild 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 (750mm x 1000 mm)	Each	1	.0000721
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	1	.0008605
65.0	Designing, supplying, fabricating and installing after approval by the Engineer, non-metallic 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:	--		

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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
a	Expansion joint between ducts and liners	Sqm	50	.0024693
66.0	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 drawings.	Lumpsum	1	.0123542
67.0	Lettering with approved colour synthetic enamel paint including preparation of surface and painting work of base area for lettering on external face of RCC windshield of Chimney. Item includes for all tools & plants, staging, supporting, hanging platforms, safety arrangements, labours, materials etc. to complete the work in all respect.	--		
a	Lettering TSGENCO or similar (letter size: height approx. 2M and distance between two letter shall be approx. 13M. lettering width, location and pattern (i.e horizontal or vertical) shall be as decided at site by Engineer in charge.	Each	1	.0002411
b	Logo BHEL approx. 6.0M X 4.5M size as per per pattern decided at site by Engineer in charge.	Each	1	.0002411
68.0	Providing & grouting of pocket holes, pipe sleeves and under base plates of structural steel work/ machinery/ pipe supporting structures including roughening of surface, cleaning, ramming, curing etc. all complete with Conbextra GP-1 or equivalent. (Cost of all material and cleaning of the pockets by compressed air shall be in the scope of the contractor).	Cum	1	.0001117
69.0	Providing & grouting of pocket holes, pipe sleeves and under base plate of structural steel work/ machinery/ pipe supporting structures including roughening of surface, cleaning, ramming, curing etc. all complete with mix 1:1:2 (1 cement : 1 coarse sand : 2 aggregate of 6 mm down graded stonechips) using non shrink admixture. (Cost of all material and cleaning the pocket by compressed air shall be in the scope of the contractor).	CUM	1	.0000453
--	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 Lighting distribution board alongwith 50KVA lighting transformer (415/433 V, Dyn11, Z=4%, (plus or minus) 2x2.5% off ckt. Tap)Distribution Board with 1No. incomer (MCCB) & 9 nos. of 100A MCCB (TPN) outgoing complete in all respects	No.	1	.0010557

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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
E2	415V, 200A, 4 wire AC Emergency Lighting distribution board alongwith 50KVA lighting transformer (415/433 V, Dyn11, Z=4%, (plus or minus) 2x2.5% off ckt. Tap) with 2 nos. of MCCB (TPN) 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.	No.	1	.0018765
E3	Normal AC lighting panel outdoor type with degree of protection IP 55 with one no. 100A MCCB (TPN) Incomer , 18 outgoing (16A SP MCBs)	No.	3	.0011362
E4	Emergency lighting panel outdoor type with degree of protection IP 55 with One no. of 100A TPN/MCCB incomer and 12 outgoing (16A, SP MCBs)	No.	6	.001888
E5	Aviation lighting panel outdoor type with degree of protection IP 55 with one no. 100A MCCB (TPN) Incomer , 8 outgoing (20A SP MCBs)	No.	1	.0004168
--	Aviation obstruction lights :	--		
--	a) High intensity flashing white XENON Type-A light having intensity 2000-200000 candles & flashing frequency 40-60/min (as per ICAO), shall be of type FTB 205 and FTC 110N of Flash Technology Corporation of USA or equivalent; including all accessories, controller, flasher etc. complete in all respects.	No.	6	.003589
--	b) Medium intensity Type B flashing RED light having flashing frequency 20-60/min & intensity as per ICAO .including all accessories, controller, flasher etc. complete in all respects.	No.	3	.0004863
--	c) Temporary obstruction light located at diametrically opposite points at the top of chimney during period of construction	No.	2	.0003733
E6	a)Flood light with 250W HPSV lamps with all controlgears & accessories	No.	8	.0002162
--	b) Well glass type luminaries with 150W/HPSV lamp with all controlgears & accessories	No.	177	.002435
E7	63Amp welding switch socket with plug & other Mounting accessories	No.	18	.0007751

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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
E8	3 pin, 1 ph, 240V,15Amp. Power sockets complete with plug Switches etc.	No.	20	.0002379
E9	AL conductor, XLPE insulated, Armoured, ST-2 outer sheath, FRLS type 1100V grade conforming to IS-7098 Part I.	--		
--	a. 3.5C x95mm ² Al for connection between ACDB/ELDB/ welding sockets	RM	1,400	.0032239
--	b. 3.5Cx35mm ² Al for Lighting panel incoming supply	RM	1,000	.0011618
--	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	.0014171
E10	Control cable shall have annealed tinned copper conductor, 1100grade, PVC insulation, extruded PVC inner sheath ,GS Wire Armoured, , Overall extruded PVC outer sheath, FRLS type .	--		
--	a. 2.5 mm ²	RM	500	.000396
E11	PVC insulated 650/1100V grade stranded Cu Conductor lighting wires conforming to IS-694 for the following.	--		
--	a. 1CX6 mm ² Al from lighting panel to junction boxes	RM	2,000	.000521
--	b. 1CX2.5 mm ² Al from junction boxes to lighting fixtures(no. of wires per lead as required)	RM	1,500	.0003556
--	c. 1CX6 mm ² Al from lighting panel to Receptacles	RM	2,000	.0006304
E12	The ground conductor sizes for grounding of electrical equipment, lighting fixtures, junction boxes etc. shall be as follows :	--		
a	50 mm x 6 mm GI Flat for earthing of Distribution Boards, Lighting Panels and motors above 90 KW	RM	300	.0004396
b	35 mm x 6 mm GI Flat for Motors above 30 KW upto 90 KW :	RM	100	.0001131
c	25 mm x 3 mm GI Flat for Motors above 5 KW upto 30 KW :	RM	100	.0000102

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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
d	Motors upto 5 KW : 8 SWG GI wire	RM	100	.0000102
e	Lighting Fixtures, junction boxes, : 16 SWG G.I. wire conduits, etc.	RM	2,000	.0001563
E13	Galvanised steel conduit 32mm dia with junction boxes, pull boxes & accessories etc complete in all respects.	RM	2,000	.0017714
E14	Lightning protection Air terminal Lead coated copper material of 20 mm dia rod & 3 metre long.	No.	6	.0002915
E15	75 x 10 mm galvanised steel flat for down conductors and circumferential band .	RM	1,600	.0023067
E16	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	.0006397
b	450 mm wide	RM	100	.000273
c	300 mm wide	RM	150	.000336
d	150 mm wide	RM	350	.0006592
E17	Aviation Distribution Board (ADB) with one 32A MCCB (TPN) incomer and 8 nos. SP 20A MCB. Construction is same as Lighting Panel.	No.	4	.0023664
E18	Test links for 150x75x10 down conductors enclosed in 150mm X 150mm X 150mm GS box	no.	6	.0000523
E19	Earthpit with earthing electrode including brick chamber with cover, accessories etc. complete in all respect.	no.	6	.0001079
E20	40mm dia MS rod for earthing of down conductor	RM	100	.0002282

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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
TOTAL Weightage				1.0