PREAMBLE FOR BOQ CUM RATE SCHEDULE	
1	**Preamble for the Schedule of Quantities/BOQ Cum Rate Schedule:**
1.1	Details of the items in the BOQ Cum Rate Schedule shall be read in conjunction with the Corresponding Consultants/ Customer specifications, drawings and other documents and shall have precedence over any contrary statement mentioned anywhere in this document.
1.2	The work shall be carried out as per construction drawings, specifications, the description of the items in this schedule and/or Engineer's instructions, Drawings enclosed with these documents are only indicative giving some idea of the type of work involved. The layout, sizes and details of the building, structures and foundations shown in tender drawings may vary at a large extent during actual construction. Final drawings will be issued progressively during the execution of the work.
1.3	Items of work provided in this schedule but not covered in the specifications shall be executed strictly as per instructions of the Engineer.
1.4	Unless specifically mentioned otherwise in the contract, the contractor 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.
1.5	The rate shall also be inclusive of carrying out topography 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.
1.6	The quantities of the various items mentioned in the BOQ cum Rate Schedule are approximate and may vary up to any extent or be deleted altogether. The overall variation in contract value on execution shall be dealt as per GCC. Contractor has to obtain prior approval of BHEL/ Customer before procurement of bought out items/ building materials.
1.7	BHEL Engineer's decision shall be final and binding on the contractors regarding clarification of items in BOQ cum Rate schedule with respect to the other sections of the contract.
1.8	In case of any discrepancy between item description, relevant specification, clarification shall be sought at tender stage itself. Otherwise it shall be assumed that the contractor has quoted for the more stringent requirement.

PRICE SCHEDULE

JOB: BALANCE WORK OF CHIMNEY OF UNIT 1&2(1 NO 180 M TALL) WITH BOROSILICATE GLASS BLOCK LINING SYSTEM ON MS FLUE CAN (EXCLUDING PILE & RAFT) FOR FGD SYSTEM AT 4X210 MW STAGE-I & 3X500 MW STAGE-II NTPC KAHALGAON STPS , BIHAR.

SL No.	Description	Unit	Quantity	Rate	Amount	Weightage
Part-1A	**CIVIL WORKS**					
1	Earth work in excavation in all types of soil including 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 (but excluding Steel sheet piling), dressing the sides & bottom, all lifts, ramming/compacting the excavated bottom, stacking, disposal of surplus excavated materials within a lead up to 1 km, spreading/levelling of disposed materials etc all complete for following depths below ground level. **[Measurement of excavation shall be paid as per actual quantity at site as per direction of Engineer in charge)**					
a	Depth from ground level but not exceeding 2 m	CUM	125			0.00005911834693
7	Back filling upto any depth below ground level around foundations, plinths, trenches, drains etc to proper grade and level in layers not exceeding 300 mm compacted thickness using/with selected materials from compulsorily excavated soil available within a lead upto 1 km 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. **[Measurement of Backfilling shall be paid as per excavation quantity after deduction for concrete etc.]**					
b	Each layer compacted so as to achieve at least 90% maximum dry density as per IS-2720 (Part-VII)	CUM	5250			0.00215699459842
8	Back filling upto any depth below ground level around foundations, plinths, trenches, drains etc to proper grade and level in layers not exceeding 300 mm compacted 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. **[Measurement of Backfilling shall be paid as per excavation quantity after deduction for concrete etc.]**					
b	Each layer compacted so as to achieve at least 90% maximum dry density as per IS-2720 (Part-VII)	CUM	600			0.00020953661813
9	Extra over item No. 1 and 7 for carriage of excavated earth/selected materials for every 500 m or part thereof beyond an initial lead of 1 km.	CUM	5250			0.00030105225644
11	Supplying and filling sand upto any depth below grade slab, around foundations, etc. in layers not exceeding 300 mm compacted 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	250			0.00340749052573
12	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.	CUM	500			0.00803305740804
13	Providing and laying Nominal Mix plain cement concrete (M 7.5) 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.**[Cement will be provided by BHEL free of cost]**	CUM	59			0.00148597819649
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.**[Cement will be provided by BHEL free of cost]**					
i	For all works below ground level (except chimney shell)					
b	Grade M-30 (foundations, etc)	CUM	0			
ii	For all other works					
a	Grade M-25 grade level slab, pit, trenches,drain etc.	CUM	125			0.00332628543529
b	Grade M-30 for chimney shell, corbels and external platforms and other shell attachments.	CUM	50			0.00177381068064
c	Grade M-35 for chimney shell, corbels and external platforms and other shell attachments.	CUM	4400			0.16245349025942
14A	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	0			
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	0			

PRICE SCHEDULE						
JOB: BALANCE WORK OF CHIMNEY OF UNIT 1&2(1 NO 180 M TALL) WITH BOROSILICATE GLASS BLOCK LINING SYSTEM ON MS FLUE CAN (EXCLUDING PILE & RAFT) FOR FGD SYSTEM AT 4X210 MW STAGE-I & 3X500 MW STAGE-II NTPC KAHALGAON STPS , BIHAR.						
SL No.	**Description**	**Unit**	**Quantity**	**Rate**	**Amount**	**Weightage**
15A	Dismantling concrete work for all types of structures at all levels including stacking of servicable material to a lead of 1 KM and disposal of unserviable material upto a lead of 2km,cutting of reinforcement, labour, equipment, safety precautions etc all complete as per drawings, specification and instructions of engineer in charge.					
a	Plain cement concrete of all grades	CUM	1			0.00000355511722
b	Reinforced cement concrete of all grades	CUM	1			0.00000537952491
16	Providing and placing steel reinforcements of High yield strength deformed TMT steel bars of grade Fe-500 having minimum elongation of 14.5 % or Fe-500D, and conforming to other requirements of IS 1786 , 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.					
i	For all works below ground level (except chimney shell)					
a	High strength deformed bars **[Reinforcement bars will be issued by BHEL Free of cost]**	MT	11			0.00059585213735
ii	For all other works					
a	Mild steel reinforcement bars	MT	5			0.00179248951719
b	High strength deformed bars **[Reinforcement bars will be issued by BHEL Free of cost]**	MT	484			0.03670449166077
A17	Providing and fixing formwork of approved quality for cast-in-situ, plain or reinforced concrete works of any type and section for all works below ground level (except chimney shell) for all depths, 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.	SQM	225			0.00071478594568
B17	Inner and outer faces of wind shield with slip form shuttering: Providing and fixing formwork using slipform (inner and outer faces) for concreting in chimney for cast in situ, reinforced concrete works of any type and section for all elevations, including labour, materials, equipment, waste of forms, scaffolding, staging, tieing, nailing, caulking, bolting, mantainence, dismantling etc. all complete as per specifications, drawings and instructions of Engineer in charge. (Area of inner face and outer face shall be measured seperately.) Note:- To prevent surface problem in RCC Chimney Shell, 0.47 mm thick colour coated GI sheet should be used along with Slipform shutter plate as per direction of BHEL In-Charge. **Mode of Measurement:- Total formwork quantity in chimney shell applicable to Slipform work as per specifications & drawings shall be jointly measured and certified. Certified quantity(SQM) to be paid in line to the unit rate of B17a) i), B17a) ii) & B17a) iii).** **(The slipform arrangement material shall be the property of contractor)**					
a	Design, Engineering, Approval of Drawings, Supply & Installation of Slipform system as per approved drawings duly reviewed & vetted by approved Third Party/Engineering for chimney or silo or any other shell/structure work at site including all safety requirements/arrangements, installation of all supporting items like structural members, winch arrangement, wooden platforms, jacks(including testing by Third Party) & jack-rods, lighting arrangements, panels, passenger cage, nuts/bolts, manpower, all other arrangements necessary for concreting & material shifting, providing spares for smooth operation, dismantling, etc all complete. **Quantity measured for B17a) i), B17a) ii) & B17a) iii) shall be same and shall be restricted to the quantity measured in B17 a iii)**					
i)	For Mobilisation & Installation(Payment of the total certified quantity of the shell shall be made for mobilisation of slipform only after start of successful slipping as certified by Engineer in charge.)	SQM	19800			0.05732064946012
ii)	For Dismantling of the Slipform System(Payment of the total certified quantity of the shell shall be made only after complete dismantling of slipform as certified by Engineer in charge.)	SQM	19800			0.01437757364476
iii)	Slipping/Providing formwork at inner and outer faces of wind shield with slip form shuttering with slipform arrangement. (Cost for design, mobilisation, installation & dismantling of slipform shall be paid seperately in Item No B17 a i) & B17 a ii) and cost for slipping/providing & mantainence of slipform work to be paid in this item) Measurement for payment to be done progressively as per actual slipping executed at site.	SQM	19800			0.07169739856088
C17	Providing and fixing formwork of approved quality for cast-in-situ, plain or reinforced concrete works of any type and section for all other components of the superstructure like slabs, beams, columns, walls, enclosures, mini shells, external platforms, corbels, other shell attachments, chases/recesses in shell etc. including labour, materials, equipment, waste of forms, all complete as per specifications, drawings and instructions of the Engineer.	SQM	450			0.00295587778507
18	Providing and fixing formwork in shell openings and pockets (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	125			0.00082107716252
19	Providing and placing in position at all levels, building paper (kraft paper), as per IS:1397, between concrete surfaces incluing the cost of labour, material, etc. complete as per drawings and instruction of the Engineer.	SQM	65			0.00001627079329

PRICE SCHEDULE

JOB: BALANCE WORK OF CHIMNEY OF UNIT 1&2(1 NO 180 M TALL) WITH BOROSILICATE GLASS BLOCK LINING SYSTEM ON MS FLUE CAN (EXCLUDING PILE & RAFT) FOR FGD SYSTEM AT 4X210 MW STAGE-I & 3X500 MW STAGE-II NTPC KAHALGAON STPS , BIHAR.

SL No.	Description	Unit	Quantity	Rate	Amount	Weightage
20	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	30			0.00008541651136
21	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, appllication of primer, cost of all labour, material and equipments etc., complete as per drawings, specifications and instructions of the Engineer.	KG	425			0.00024160284260
22	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 preparation of fabrication drawings, galvanization as per IS:4736 (The minimum weight for galvanizing shall be 610 g/sq.m and shall comply with relevant IS Codes), 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			0.00094025233736
B23	Supply, fabrication (shop fabricated in customer approved shop as per specification) and erection of structural steel of grade E 250 in rolled/ built up section (rolled sections shall be of grade designation E250, Quality A/BR, Semi-killed/ killed conforming to IS 2062. All steel plates shall be of Grade designation E250, Quality BR (fully killed), conforming to IS 2062 and shall be tested for impact resistance at room temperature. Plates beyond 12mm thickness and up to 40mm thickness shall be normalized rolled. Plates beyond 40mm thickness shall be vacuum degassed & furnace normalised and shall also be 100% ultrasonically tested as per ASTM –A578 level B-S2.), mild steel rounds in columns, beams, struts, monorails, stays, safety chains, ladders, MS gratings, gantry girders, roof trusses, portals, laced purlins, space frames, hangers, wall beams, sheeting runners, brackets, stiffeners, stub columns, bracings, cleats, base plates, splice plates,gussets, end plates, steel frame grid over false ceiling, walkway platforms, ladders, stairs,stringers, treads, landings, decking and seal plates, galleries etc including blast cleaning, providing & applying primer,providing and applying intermediate, final and final finish coat of paint (blast cleaning,primer and paint shall be paid separately as per item no C23, D23 & E23), connection design, preparation of fabrication drgs and appointment of a seperate agency for review and approval of fabrication drgs in consultation with BHEL, straightening, cutting, bending, rolling, grinding, machining, drilling, welding, electrodes and other consumables, alignment, erection bolts & nuts (weight of erection bolts and nuts not payable), assembly, edge preparation, preheating / post heating if required, testing of welders, inspection of welds, visual inspection, non destructive and special testing, rectification and correction of defective welding works, production test plate, inspection and testing, erection scheme, protection against damage in transit, stability of structures, installation of temporary structures, setting column bases, surface preparation by means of manual or mechanical power tools as per IS:1477 part 1, touch-up painting, rectification, dismantling and removal of all temporary structures (weight of temporary structures not payable), etc all complete as per drawing and specifications. **(Payment Breakup - a) Supply of Fabricated Material - 70%, b) Erection-15% and c) Alignment including welding/bolting - 15%)**	MT	250			0.12507728574855
C23	Extra over ST NO. A23 & B23 for blast cleaning of steel structures to near white metal surface conforming to Sa 2 ½ finish of ISO 8501-1 with surface profile 40-60 Micron and providing and applying two component moisture curing zinc (ethyl) silicate primer coat (having minimum 80% of metallic Zinc content in dry film, solid by volume minimum 60% ±2%) of minimum 70 micron DFT including the cost of all labour, material, equipments, protection of surface and cleaning, scoffolding, touch-up painting etc., complete as per drawings, specifications and instructions of the Engineer. Zinc dust composition and properties shall be Type-II as perASTM D520-00. Primer coat shall be applied in Shop immediately after blast cleaning by airless spray technique.	MT(of steel)	250			0.00408940506723
D23	Extra over ST NO. A23 & B23 for providing and applying (by airless spray technique) intermediate coat of two component polyamide cured epoxy with MIO Content (containing lamellar MIO minimum 30% on pigment, solid by volume minimum 80% ±2%) of minimum 100 micron DFT after an interval of minimum 24 hours (from the application of primer coat) and of approved make including the cost of all labour, material, equipments, protection and cleaning, scoffolding, touch-up painting etc. all complete as per drawing and specifications.	MT(of steel)	250			0.00391616754096
E23	Extra over ST NO. B23 for providing and applying Finish coat of two-pack aliphatic Isocyanate cured acrylic finish paint (solid by volume minimum 55% ±2%) with Gloss retention (SSPC Paint Spec No 36, ASTM D 4587, D 2244, D 523) of Level 2 (after minimum 1000 hours exposure, Gloss loss less than 30 and colour change less than 2.0 ΔE) and minimum 70 micron DFT over steel sections already having intermediate coats, including the cost of all labour, material, equipments, protection and cleaning, scoffolding etc. all complete as per drawing and specifications. This coat shall be applied after an interval of minimum 24 hours (from the application of sealer coat) and within six (6) months (from the completion of Intermediate coat). Colour and shade of the coat shall be as approved by the Employer.	MT(of steel)	250			0.00322988041766
A24	Supplying, fabrication, erection and alignment of factory made chequered plate with mild steel conforming to IS:2062 in platforms, 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 as per drawing and specifications. **(Payment Breakup - a) Supply of Material - 70%, b) Erection, Alignment, all complete-30%)**	MT	50			0.02261333353380

PRICE SCHEDULE						
JOB: BALANCE WORK OF CHIMNEY OF UNIT 1&2(1 NO 180 M TALL) WITH BOROSILICATE GLASS BLOCK LINING SYSTEM ON MS FLUE CAN (EXCLUDING PILE & RAFT) FOR FGD SYSTEM AT 4X210 MW STAGE-I & 3X500 MW STAGE-II NTPC KAHALGAON STPS , BIHAR.						
SL No.	**Description**	**Unit**	**Quantity**	**Rate**	**Amount**	**Weightage**
25	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 1500 mm long for structural steel work etc all complete.	Quintal	80			0.00641899004982
26	Transportation from store/plant gate, fabricating and erecting at all levels, flues complete with all bends, flanges, stiffeners, all other flue attachments, support system, staying system, collars, cap, access manholes and gas sampling ports alongwith gaskets, cover plates, pipes, bends, fittings,condensate collection and withdrawal arrangement in line with gas-flow-model study report and any other appurtenances as required including material, equipment, transporting, lifting to all heights, setting in place, cutting, grinding, rolling, edge preparation, drilling, bending, electrodes and other consumables, alignment, erection bolts and bolting, welding, preheating and post-heating for welding, testing, etc. and other required accessories, connection design & preparation of fabrication drgs and appointment of a seperate agency for review and approval of fabrication drgs in consultation with BHEL, all complete as per specifications and drawings.					
i)	Components made of structural steel of grade E250 conforming to IS:2062 **[Structural steel shall be issued by BHEL free of cost]** **Payment breakup as follows:-** a) 50% for Fabrication and Fit-up b) 10% for Welding works at Fabrication Yard c) 5% for Testing (RT/UT) works at fabrication Yard d) 25% for Shifting to site and Erection works e) 10% for Alignment, Final welding / Bolting in position and Submission of Final Joint protocol with Customer as per FQP	MT	310			0.06450608022186
v)	Components made of titanium (Grade 2 as per ASME B265). **(Payment Breakup - a) Supply of Material - 70%, b) Erection, Alignment, all complete-30%)**	MT	10			0.11246102129459
vi)	Components made of C276. **(Payment Breakup - a) Supply of Material - 70%, b) Erection, Alignment, all complete-30%)**	KG	2700			0.05284577423949
vii)	Components made of SS of grade A316L. **(Payment Breakup - a) Supply of Material - 70%, b) Erection, Alignment, all complete-30%)**	KG	50			0.00011210466844
viii)	Components made of acid resistant FRP **(Payment Breakup - a) Supply of Material - 70%, b) Erection, Alignment, all complete-30%)**	KG	300			0.00140547271914
26 (i)	Supply & application including blast cleaning of outer surface of steel flue and stiffner to near white metal surface conforming to Sa 2 ½ finish of ISO 8501-1 with surface profile 40-60 Micron and providing and applying two component moisture curing zinc (ethyl) silicate primer coat (having minimum 80% of metallic Zinc content in dry film, solid by volume minimum 60% ±2%) of minimum 70 micron DFT including the cost of all labour, material, equipments, protection of surface and cleaning, scoffolding, touch-up painting etc., complete as per drawings, specifications and instructions of the Engineer. Zinc dust composition and properties shall be Type-II as perASTM D520-00. Primer coat shall be applied immediately after blast cleaning by airless spray technique.	SQM	3100			0.00522771303882
26 (ii)	Providing and applying (by airless spray technique) on outer surface of steel flue and stiffner, an intermediate coat of two component polyamide cured epoxy with MIO Content (containing lamellar MIO minimum 30% on pigment, solid by volume minimum 80% ±2%) of minimum 100 micron DFT after an interval of minimum 24 hours (from the application of primer coat) and of approved make including the cost of all labour, material, equipments, protection and cleaning, scoffolding, touch-up painting etc. all complete as per drawing and specifications.	SQM	3100			0.00346530438576
26 (iii)	Providing and applying on outer surface of steel flue and stiffner, Finish coat of two-pack aliphatic Isocyanate cured acrylic finish paint (solid by volume minimum 55% ±2%) with Gloss retention (SSPC Paint Spec No 36, ASTM D 4587, D 2244, D 523) of Level 2 (after minimum 1000 hours exposure, Gloss loss less than 30 and colour change less than 2.0 ΔE) and minimum 70 micron DFT over steel sections already having intermediate coats, including the cost of all labour, material, equipments, protection and cleaning, scoffolding etc. all complete as per drawing and specifications. This coat shall be applied after an interval of minimum 24 hours (from the application of sealer coat) and within six (6) months (from the completion of Intermediate coat). Colour and shade of the coat shall be as approved by the Employer.	SQM	3100			0.00346530438576

PRICE SCHEDULE

JOB: BALANCE WORK OF CHIMNEY OF UNIT 1&2(1 NO 180 M TALL) WITH BOROSILICATE GLASS BLOCK LINING SYSTEM ON MS FLUE CAN (EXCLUDING PILE & RAFT) FOR FGD SYSTEM AT 4X210 MW STAGE-I & 3X500 MW STAGE-II NTPC KAHALGAON STPS , BIHAR.

SL No.	Description	Unit	Quantity	Rate	Amount	Weightage
A26	Transportation from store & installation of borosilicate glass block lining system at all elevations, on ground or in erected position, with minimum 38 mm thick closed cell borosilicate glass block and two component adhesive membrane having a minimum thickness of 3 mm including preparation, blast cleaning of internal surface of steel flue liner to near white metal surface finish conforming to Sa 2 ½ finish as per ISO 8501-1 and application of suitable primer, testing, ten years full replacement guarantee, getting approval of design/drawings and installation procedure from BHEL/owner etc all complete as per specification, drawings and as directed by the Engineer-in-charge including cost of skilled labour, material, tools & tackles, equipments etc all complete. Installation of borosilicate glass block lining shall be done in supervision and as directed by and satisfaction of borosilicate glass block manufacturer under controlled temperature and humidity conditions as mentioned in specification including providing all equipments required to create controlled temperature & humidity conditions inside chimney during installation, hot air blow cleaning of internal surface before application etc. all complete. . **[borosilicate glass blocks, adhesive membrane with mixing machine, primer paint will be issued free of cost by BHEL]**	SQM	3100			0.03283422057062
27	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	10			0.00477330934167
b	32/40 mm nominal bore medium class tubular hand railing for stair case and internal and external platforms.	MT	14			0.00692668843961
d	Providing minimum 610 gsm Hot dipped galvanisation on mild steel parts as per specification.	MT	24			0.00482411207912
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 316Land 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.(**All material to be supplied by Contractor)**					
a	Stainless steel components.	KG	180			0.00044975127012
b	Lead Sheets.	KG	60			0.00007795688682
A32	Design, supply, fabrication and installation of expansion compensator joints, comprising of non-metallic material (elastomeric) suitable for wet stack operations and 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, including nuts, bolts, washers, screws and any other accessories as required, preparation of detailed fabrication drawings etc all complete as per specification, drawing and as directed by the Engineer-in-charge. Design of expansion joint shall comply EPRI guideline to avoid contact of condensate with expansion joint material and to ensure drainage of condensate and the same shall be approved by BHEL/owner.	SQM	54			0.01049472326145
33	Supply of fabricated ready to install expansion compensator in line with item no A32 as spare including nuts, bolts, washers, screws and any other accessories as required for successful installation.	SQM	18			0.00297054042606
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	5			0.00050909074476
43	Providing, and fixing asbestos ropes at expansion joints at all elevation for packing/sealing etc all complete as per specification, drawing and as directed by the Engineer-in-charge for the following.					
b	12 mm diameter	RM	350			0.00038623014976
49	Supply and packing/sealing of rock wool insulation with loose rock wool having a density not less than 100 kg/cu.m between the insulated minishells at expansion joints/ between the lining segments and wherever as required at all levels including filling, ramming, testing, etc. all complete as per specification, drawing and as directed by the Engineer-in-charge.	CUM	10			0.00056650128618
56	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	50			0.00016119835107

PRICE SCHEDULE						
JOB: BALANCE WORK OF CHIMNEY OF UNIT 1&2(1 NO 180 M TALL) WITH BOROSILICATE GLASS BLOCK LINING SYSTEM ON MS FLUE CAN (EXCLUDING PILE & RAFT) FOR FGD SYSTEM AT 4X210 MW STAGE-I & 3X500 MW STAGE-II NTPC KAHALGAON STPS , BIHAR.						
SL No.	**Description**	**Unit**	**Quantity**	**Rate**	**Amount**	**Weightage**
57	Providing and painting, with epoxy phenolic coating system in three coats having 220 microns DFT over the external surfaces of chimney shell and wherever as required at all elevation in alternate bands of 'signal red' and 'bright white' colours including surface preparation, primer etc so as to give a good finish all complete as per drawing and specification. The epoxy phenolic coating system shall be as follows:- All concrete surfaces shall be provided with two component transparent polyamide cured epoxy sealer coating (having solid by volume minimum 40% ±2%) of minimum 50 micron DFT to be applied over cleaned surface in multiple coats. Surface to be coated shall be absolutely dry, clean and dust free. Sealer coat shall be followed with the application of Intermediate coat of epoxy phenolic coating (solid by volume minimum 63%) of minimum 100 micron DFT. This coat shall be applied after an interval of minimum 24 hours (from the application of primer coat) by airless spray technique. Intermediate coat shall be followed with the application of finish coat of two-pack aliphatic Isocyanate cured acrylic finish paint (solid by volume minimum 55% ±2%) with Gloss retention (SSPC Paint Spec No 36, ASTM D 4587, D 2244, D 523) of Level 2 (after minimum 1000 hours exposure, Gloss loss less than 30 and colour change less than 2.0 ΔE) and minimum 70 micron DFT. This coat shall be applied after an interval of minimum 10 hours and within six (6) months (from the completion of Intermediate coat), Colour and shade of the coat shall be as approved by the Engineer-in charge.	SQM	9200			0.02696408781479
58	Providing and painting, with epoxy phenolic coating system in three coats having 220 microns DFT over the inside surface of chimney shell above roof/ horizontal surface of shell at top/underside of concrete roof slab and wherever as required at all elevation including surface preparation, primer etc so as to give a good finish all complete as per drawing and specification. The epoxy phenolic coating system shall be as follows:- All concrete surfaces shall be provided with two component transparent polyamide cured epoxy sealer coating (having solid by volume minimum 40% ±2%) of minimum 50 micron DFT to be applied over cleaned surface in multiple coats. Surface to be coated shall be absolutely dry, clean and dust free. Sealer coat shall be followed with the application of Intermediate coat of epoxy phenolic coating (solid by volume minimum 63%) of minimum 100 micron DFT. This coat shall be applied after an interval of minimum 24 hours (from the application of primer coat) by airless spray technique. Intermediate coat shall be followed with the application of finish coat of two-pack aliphatic Isocyanate cured acrylic finish paint (solid by volume minimum 55% ±2%) with Gloss retention (SSPC Paint Spec No 36, ASTM D 4587, D 2244, D 523) of Level 2 (after minimum 1000 hours exposure, Gloss loss less than 30 and colour change less than 2.0 ΔE) and minimum 70 micron DFT. This coat shall be applied after an interval of minimum 10 hours and within six (6) months (from the completion of Intermediate coat), Colour and shade of the coat shall be as approved by the Engineer-in charge.	SQM	250			0.00077748668641
59	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	160			0.00245279017867
60	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 equipement, transporting, lifting, setting in place, painting, etc. complete as per drawing and specifications.	EACH	8			0.00036677415968
61	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	32			0.00051654366468
b	150 mm nominal bore medium class galvanised mild steel pipes.	RM	360			0.00319879594192
62	Providing and laying 50 mm thick cement concrete flooring (comprising of 12 mm thick 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.**(Cement shall be supplied by BHEL free of cost)**	SQM	450			0.00131134352623
63	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 65 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			0.00181426372521
64	Providing and installing at any level and location, mild steel, double plate, personnel access doors, in shell openings of size 1.2m 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	1			0.00012590099687

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SL No.	**Description**	**Unit**	**Quantity**	**Rate**	**Amount**	**Weightage**
67	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 (approx 750mmx750mm size)	EACH	1			0.00016591973996
68	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			0.00143984350243
70	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	0.5			0.00010444375939
71	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. **(Except cement all other materials and cleaning the pocket by compressed air shall be in the scope of the contractor).(Cement shall be supplied by BHEL free of cost)**	CUM	0.5			0.00005315414537
72	Supplying and erecting after approval by Engineer a rack and pinion type Elevator of min 400 kg load carrying capacity of cabin floor size of 1100 mm x 1000 mm (min.) , from ground upto top of chimney with landing at various platform level, including all fixtures and accessories complete as per spec. and drawings. **(Payment Breakup - a) Supply of Elevator-70%, b) Erection & commissioning-20% and c) Supply of Mandatory Spare-10%)**	Lumpsum	1			0.02592890031358
Part-1B	**ELECTRICAL WORKS(Design, Engineering, Supply, Installation, testing & commissioning of following items as per specification)**					
E1	415V, 200A, 50 KA for 1 sec, 4 wire AC Distribution Board with 1No. incomer (SFU) , 12 nos. of 100A SFU (TPN) outgoing alongwith 100KVA lighting transformer (415/433) V in Incomer, Dyn11, Z=4%, ±2x2.5% off ckt. Tap) complete in all respects	Nos	1			0.00232267047324
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 SFU (TPN) incomers with auto changeover facility using contactors and 8 nos. 100A SFU (TPN) outgoings complete in all respects. In case load requirement of chimney can not be met by 50 kVA lighting transformer after considering loading, 100 kVA lighting transformer shall be provided alongwith suitably rated components without any commercial implications to the purchaser..	Nos	1			0.00393998074634
E3	Normal AC lighting panel outdoor type with degree of protection IP 55 with one no. 100A SFU (TPN) Incomer , 20 outgoing (16A SP MCBs)	Nos	3			0.00240304015070
E4	Emergency lighting panel outdoor type with degree of protection IP 55 with One no. of 100A SFU(TPN) incomer and 12 outgoings (16A, SP MCBs)	Nos	3			0.00199170725872
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.	Nos	2			0.00171038700639
E6	Aviation obstruction lights (mounted on door panel openable from interior) :					
a.	High intensity flashing white light Type-A as per ICAO standard having an effective intensity of 4000 to 200,000 cd (minimum) depending upon back ground illuminance.Obstacle lights shall have a day time effective intensity of minimum 200000 cd. The intensity of lights shall be 20000 cd ± 25% at twilight and shall reduce automatically to a night time intensity of 4000 cd ± 25% through the use of photocell. shall be provided with all accessories, photocell, timer etc.	Nos	24			0.03347785444948
b	Temporary obstruction light located at diametrically opposite points at the top of chimney during period of construction with four fixture each .	Nos	6			0.00266641312024
E7	Aviation Distribution Board (ADB) with one 32A SFU (TPN) incomer and 8 nos. SP 20A MCB. Construction is same as Lighting Panel.	Nos	2			0.00167662800975
E8	Flood light type 120W(approx) LED luminaire with fitting (integrated /retrofitted LED lamp) having an integral driver.The luminaire efficacy shall not be less than 80 Lm/W.	Nos	8			0.00122387781482
E9	Well glass type 30W(approx) LED luminaire with fitting (integrated /retrofitted LED lamp) having an integral driver.The luminaire efficacy shall not be less than 80 Lm/W.	Nos	80			0.00232285203950
E10	Well glass type 70W(approx) LED luminaire with fitting (integrated /retrofitted LED lamp) having an integral driver.The luminaire efficacy shall not be less than 80 Lm/W.	Nos	45			0.00264115496398
E11	Well glass type 50W(approx) LED luminaire with fitting (integrated /retrofitted LED lamp) having an integral driver.The luminaire efficacy shall not be less than 80 Lm/W.	Nos	25			0.00109659874674
E12	63Amp welding switch socket with plug & other Mounting accessories	Nos	12			0.00093097513468
E13	3 pin, 1 ph, 240V, 20Amp. Industrial Power sockets complete with plug Switches etc.	Nos	12			0.00031030139131
E14	Al conductor, HR PVC insulated, Armoured, PVC inner sheath,PVC outer sheath, FRLS type 1100V grade conforming to IS-1554 Part I.					
a	3½ C x95mm2 Al for connection between ACDB/ELDB/ welding sockets	Mtrs.	1500			0.00636316842134

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SL No.	**Description**	**Unit**	**Quantity**	**Rate**	**Amount**	**Weightage**
b	3½ Cx35mm2 Al for Lighting panel incoming supply	Mtrs.	1500			0.00323177520311
c	4C x16mm2 Al for connection between ALP/ADB/Aviation Lights	Mtrs.	500			0.00090289649659
b	4C x 2.5mm2 Cu Control cable for Aviation lighting system	Mtrs.	500			0.00080495066443
E15	Cu conductor, HR-PVC insulated, PVC inner sheath,PVC outer sheathed and FRLS type 1100V grade conforming to IS-1554 Part I.					
a	2.5 mm^2	Mtrs.	3000			0.00103942515762
b	4.0 mm^2	Mtrs.	6000			0.00361150269909
E16	GI pipe conduit with minimum 25 mm dia with GI junction boxes, GI pull boxes (Size 200x200x100mm of 16 SWG sheet steel for junction & pull boxes) & accessories etc. complete in all respects.	Mtrs.	3000			0.00315288133447
E17	PVC coated Flexible steel conduit 25mm dia with accessories	Mtrs.	100			0.00003009585583
E18	Lightning protection Air terminal : Lead coated copper material of 20 mm dia & 3 metre long.	Nos	6			0.00044854993451
E19	50x6 Lead Coated GI Strip for coronal band on flue and top platform	Mtrs.	150			0.00011178817681
E20	Electrical equipment earthing materials including down conductors 50x6 GI Strip	Mtrs.	700			0.00180575967827
E21	Electrical equipment earthing materials including down conductors 25x3 GI Strip	Mtrs.	700			0.00100989149088
E22	8 SWG GI wire for equipment earthing	Mtrs.	2000			0.00074525451205
E23	Test links for 50x6 down conductors enclosed in 200mm X 200mm X 100mm GI box of 16SWG sheet steel.	Nos	6			0.00034722721990
E24	40mm dia MS rod for earthing of down conductor	Mtrs.	200			0.00090574908567
E25	Earthpit with earthing electrode including brick chamber with cover, accessories etc. complete in all respect.	Nos	6			0.00021422777374
E26	Telephone socket with junction box etc. complete	Nos	6			0.00016191720351
E27	Telephone handsets complete	Nos	6			0.00003889673860
E28	Telephone cable of minimum 0.6 mm dia annealed high conductivity electro copper conductor, PVC insulated, twisted, PVC tape wrapped, screened, tip corded, PVC sheathed, confirming to relevant ITD (Indian Telephones department) specification					
a	24 pairs	Mtrs.	300			0.00104047457725
b	2 pairs	Mtrs.	100			0.00002054280570
E29	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.					
a	600 mm wide	Mtrs.	300			0.00220144501562
b	300 mm wide	Mtrs.	300			0.00122104971220
c	150 mm wide	Mtrs.	400			0.00136819333608
	TOTAL				**0**	**1.00000000000000**