

# **TENDER SPECIFICATION**

## **BHEL PSSR SCT 2120**

**FOR**

**Civil, Structural and Architectural Works of Turbine Island Package of 2 X 700  
MWe PHWR Kaiga Atomic Power Project - Unit 5 & 6, Uttara Kannada  
District, Karnataka.**

### **PRICE BID**

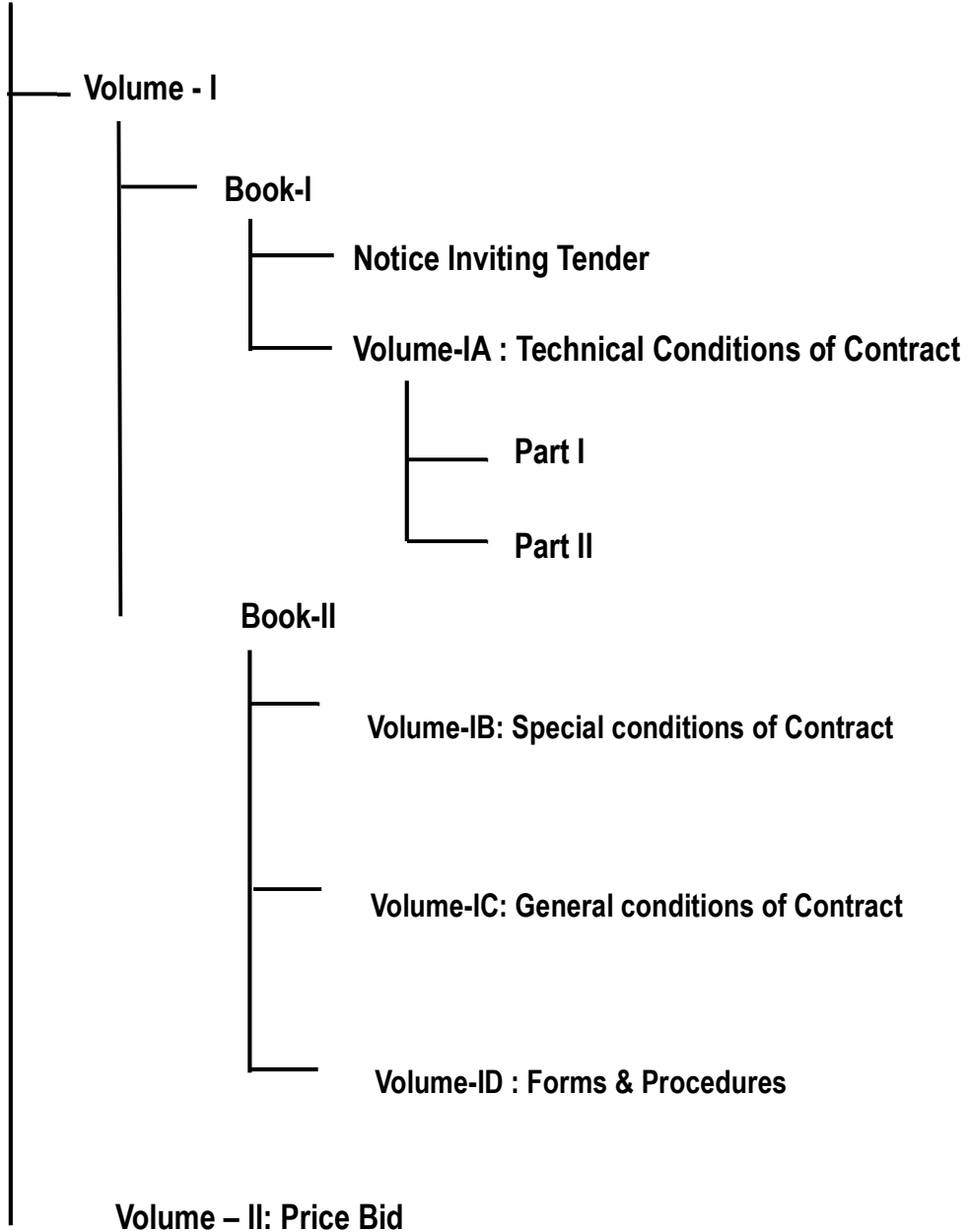
### **VOLUME –II**



**BHARAT HEAVY ELECTRICALS LIMITED**  
(A Government of India Undertaking)  
Power Sector – Southern Region  
BHEL Integrated Office Complex, TNEB Road  
Pallikaranai, Chennai -600100

**TENDER SPECIFICATION CONSISTS OF**

Tender Specification



## PRICE BID

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## PRICE BID

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### **PART A**

#### **Instruction to Bidders:**

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

**Part C : Bill of Quantities****Tender Specification for Civil, Structural and Architectural Works of Turbine Island Package of 2 X 700 MWe PHWR Kaiga Atomic Power Project - Unit 5 & 6, Uttara Kannada District, Karnataka****at 2 X 700 MWe - Kaiga Atomic Power Project # 5 & 6 - Turbine Island Package**

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
100.0	EARTH WORK: Earth work In excavation, backfilling, disposal, dewatering, ground improvement including all labour, equipments etc complete as per specification, drawing and as directed by engineer- in-charge for the following. (All the items are inclusive of sampling and testing of construction material, preparation of construction methodology, safety manual, job hazard analysis, work procedure, coordination in preparation, obtaining approval and compliance to quality assurance plan, quality assurance manual, testing methodologies, Inspection and testing plan and acceptance criteria for material qualification and coordination in preparation and submission of construction completion certificate & transfer docket containing necessary documents like test certificate, pour cards, inspection reports etc and obtaining approval from BHEL/NPCIL as per specifcaiton and as directed by engineer - in - charge)	--		
101.0	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), dressing the sides & bottom, all lifts, ramming/compacting the excavated bottom, stacking, disposal of surplus excavated materials within a lead upto 1 km, spreading/levelling of disposed materials etc all complete for following depths below ground level.	--		
a	Depth from existing ground level but not exceeding 2 m	CUM	4,062	.0001121
b	Depth exceeding 2 m but not exceeding 4 m	CUM	2,028	.0000701
c	Depth exceeding 4 m but not exceeding 6 m	CUM	1,000	.0000432

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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
103.0	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 1 km, spreading / levelling of disposed materials etc all complete for following depths below ground level.	--		
a	Depth from ground level but not exceeding 2 m	CUM	426	.0000138
b	Depth exceeding 2 m but not exceeding 4 m	CUM	250	.0000097
c	Depth exceeding 4 m but not exceeding 6 m	CUM	750	.000035
d	Depth exceeding 6 m but not exceeding 8 m	CUM	250	.000014
107.0	Earthwork in 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 compacted thickness using/with selected materials from compulsorily excavated earth 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.	--		
a	Each layer compacted so as to achieve at least 95% maximum dry density as per IS-2720 (Part-VIII)	CUM	2,505	.0000612
b	Each layer compacted so as to achieve at least 90% maximum dry density as per IS-2720 (Part-VIII)	CUM	2,543.2	.0000557

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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
A108	Earthwork in Back filling upto any depth below ground level around foundations, plinths, trenches, drains etc to proper grade and level in layers not exceeding 200 mm compacted thickness using/with selected earth directly from excavation within a lead upto 1Km and compacted as specified, watering, ramming/compaction by manual/mechanical means, dressing etc all complete.for the following.	--		
a	Each layer compacted so as to achieve at least 95% maximum dry density as per IS-2720 (Part-VIII)	CUM	24,920	.0002467
b	Each layer compacted so as to achieve at least 90% maximum dry density as per IS-2720 (Part-VIII)	CUM	20,243	.0001834
109.0	Extra over ST No. 101, A101 and 103 to 108 for carriage of material/earth for every 500 m or part thereof beyond an initial lead of 1 km.	--		
a	Carriage for stacking/backfilling of servieable material/earth/soil cement mix	CUM	510	.0000011
b	Carriage for disposal of servieable/unserviceable material/earth/soil cement mix	CUM	510	.0000011
A110	Earth work in backfilling upto any depth below ground level around foundations, plinths, trenches, drains etc to proper grade and level in layers not exceeding 250 mm compacted thickness so as to achieve required compaction with approved borrowed soil (borrowed soil to be arranged by the bidder) and compacted as specified including supplying boorowed soil, royalty/seignorage fee (if any), sorting, spreading, breaking clods, watering, ramming/compaction by manual/mechanical means, dressing, finishing to required lines, grades and slopes, tesing, all lead and lifts etc all complete as per specification, drawing and as directed by the engineer for the following:	--		
a	Each layer compacted so as to achieve at least 90% maximum dry density as per IS-2720 (Part-VIII)	CUM	228,427	.0183206
b	Each layer compacted so as to achieve at least 95% maximum dry density as per IS-2720 (Part-VIII)	CUM	36,444	.0032477

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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
111.0	Supplying and filling sand upto any depth under floors, around foundations, plinths 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.	CUM	6,640	.0043015
200.0	<p>CONCRETE WORK: Providing and placing concrete work including cost of labour, materials, (unless otherwise specified in BOQ/contract specification) and equipment for handling, transportation, batching, mixing, placing, vibrating, compacting and curing (excluding cost of centering, shuttering and reinforcement) with mechanised equipments like batching plant, ice plant, transit mixer, concrete pump etc. complete as per drawing, relevant codes, specifications and as per direction of engineer in charge for the following.</p> <p>(All the items are inclusive of sampling and testing of construction material, preparation of construction methodology, safety manual, job hazard analysis, work procedure, coordination in preparation, obtaining approval and compliance to quality assurance plan, quality assurance manual, testing methodologies, Inspection and testing plan, source qualification of construction material and coordination in preparation and submission of construction completion certificate &amp; transfer docket containing necessary documents like test certificate, pour cards, inspection reports etc and obtaining approval from BHEL/NPCIL as per specification and as directed by engineer - in - charge)</p> <p>(Cement shall be supplied by BHEL as a free issue).</p>	--		
A203	Concrete of grade M15 at temperature not exceeding 38 deg C for PCC using coarse aggregate of maximum size not exceeding 20 mm, as lean concrete, levelling course, mud mat under and around foundations, floors, roads, drain etc at any depth below finished floor level etc.	CUM	10,488	.0115802
A204	Concrete under floors, paving, lean concrete, levelling course, mud mat under and around foundations/floors, plinth protection, pipe encasing, roads, drain etc. with fine aggregate and graded hard stone aggregate of 20mm nominal size at any depth below/above finished ground floor level for the following grades.	--		



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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	M15 Grade	CUM	8,170.8	.0090217
c	M20 Grade	CUM	162	.0001789
B204	FILCRETE: Design, supply and place filcrete of pumpable consistency for backfilling below ground level, with cement, sand and fly ash mix of M 5 grade inclusive of all materials, tools, formwork, plants etc. complete as per drawings, specifications and direction of the Engineer.	CUM	16,980	.0187733
A205	Providing and laying Design Mix cement concrete conforming to IS:456 & IS 10262 for reinforced concrete works with fine aggregate and graded hard stone aggregate of 20mm nominal size in foundations/substructure, grade slab, paving, drains, under floors etc. at any level below finished ground floor level, any shape, position or thickness, F3/U3 finish of concrete surfaces, green cutting using coloured surface retarder at construction joints, testing & preparation of construction joint, etc. including use of mineral admixture, plasticizer/ superplasticizer/chemical admixtures conforming to ASTM C-494/IS:9103 to achieve required slump, strength, durability, quality etc. in concrete all complete as per specification & drawing for the following.	--		
b	M 35 Grade	CUM	83,943	.1213284
A206	Providing and laying Design Mix cement concrete conforming to IS:456 & IS 10262 for reinforced concrete works with fine aggregate and graded hard stone aggregate of 20mm nominal size in superstructure at any level above finished ground floor level, any shape, position or thickness, F3/U3 finish of concrete surfaces, green cutting using coloured surface retarder at construction joints, testing & preparation of construction joint etc. including use of mineral admixture, plasticizer/ superplasticizer/admixtures conforming to ASTM C-494/IS:9103 to achieve required slump, strength, durability, quality etc. in concrete all complete as per specification & drawing for the following.	--		
b	M 35 Grade	CUM	47,073	.0680377

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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
A207	Providing and laying Design Mix cement concrete conforming to IS:456 & IS 10262 for reinforced concrete works of M35 grade with fine aggregate and graded hard stone aggregate of 20mm nominal size in machine foundations for TG, BFP at all elevations below/above finished ground floor level except TG deck, any shape, position or thickness, F3/U3 finish of concrete surfaces, green cutting using coloured surface retarder at construction joints, testing & preparation of construction joint etc. including use of mineral admixture, plasticizer/ superplasticizer/admixtures conforming to ASTM C-494/IS:9103 (latest) to achieve required slump (more than 125mm in concrete as per manufacturer s recommendation), strength, durability, quality etc. in concrete all complete as per specification & drawing.	CUM	17,180	.0248314
A208	Providing and laying Design Mix cement concrete as per IS:456 & IS 10262 of grades mentioned below for reinforced concrete works with fine aggregate and graded hard stone aggregate in top deck of TG foundation at all elevations, any shape, position or thickness, F3/U3 finish of concrete surfaces, green cutting using coloured surface retarder at construction joints, testing & preparation of construction joint etc. including use of mineral admixture, plasticizer/ superplasticizer/admixtures conforming to ASTM C-494/IS:9103 to achieve required slump, strength, durability, quality etc. in concrete all complete as per specification & drawing.	--		
a	M 35 Grade	CUM	3,870	.0055936
A209	Extra over St. No. A205 to A208 for controlling of temperature of fresh concrete 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	21,050	.0059912
B209	Extra over St. No. A205 to A208 for controlling of temperature of fresh concrete to less than 29 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	83,382	.0183041

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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
C209	Extra over St. No. A205 to A208, A213, A214 for controlling of temperature of fresh concrete to less than 38 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	55,665	.0067431
A210	Extra over ST Nos. A205 to A208 for conducting UPV test for concrete at all levels including all equipments, making necessary arrangements, staging, submission of report etc. all complete as directed by engineer in charge and as per specification.	CUM	12,120	.0009805
A211	Providing and encasing of structural steel member with following grade of concrete using fine aggregate and nominal hard stone aggregate size of 12.5mm down at all elevations, any shape, position or thickness, F3/U3 finish of concrete surfaces, etc. including use of mineral admixture, plasticizer/ superplasticizer/admixtures conforming to ASTM C-494/IS:9103 to achieve required slump, strength, durability, quality etc. in concrete all complete as per specification & drawing. Encased member shall be wrapped with welded wire mesh/chicken wire mesh with proper lap etc. complete as per specifications. (Payment of welded wire mesh, chicken wire mesh shall be made separately)	--		
a	M 35	CUM	190	.0002101
A212	Providing and laying of Screed concrete conforming to IS 456 with fine aggregate and graded hard stone aggregate 10mm nominal size on the roof, drains, sumps etc. at any level, any shape, position or thickness, F3/U3 finish of concrete surfaces including use of mineral admixture, plasticizer/ superplasticizer/admixtures conforming to ASTM C-494/IS:9103 to achieve required slump, strength, durability, quality etc. in concrete all complete as per specification & drawing for the following..	--		
b	M 20	CUM	1,505	.0016639

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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
A213	Providing and laying Design Mix cement concrete as per IS:456 & IS 10262 for reinforced concrete works with fine aggregate and graded hard stone aggregate (20/12.5/10 mm) for Concrete in precast works like floors, roof slabs, trench covers, fins, lintels, chajas, beams, columns, wall panels, facias etc. at all levels in all kinds of works, any shape, position or thickness, F3/U3 finish of concrete surfaces, including formwork/moulds, curing, handling, storing, transpoting, all leads, marking, making of holes for bolts for fixing, welding, erection without damage, setting in position with cement sand mortar (1:3), filling the gaps between adjacent precast units with M35 grade concrete or cement sand mortar (1:3) including use of mineral admixture, plasticizer/ superplasticizer/admixtures conforming to ASTM C-494/IS:9103 to achieve required slump, strength, durability, quality etc. in concrete all complete as per specification and drawing for following grades.	--		
a	M35	CUM	648	.0012286
B213	Extra over ST NO. A213 for providing and filling the gaps with polystyrene backing and poly sulphide sealant instead of cement sand mortar/M35 grade of concrete etc. all complete as per specfication and drawing.	CUM	90	.0001241
A214	Providing and laying Design Mix cement concrete as per IS:456, IS 3370 & IS 10262 for reinforced concrete works with fine aggregate and graded hard stone aggregate for Concrete in water retaining/conveying structures/tunnels at any level, any shape, position or thickness, F3/U3 finish of concrete surfaces, green cutting using coloured surface retarder at construction joints, testing & preparation of construction joint etc. including use of mineral admixture,water proofing admixture as per IS:2645, plasticizer/ superplasticizer/admixtures conforming to ASTM C-494/IS:9103 to achieve required slump, strength, durability, quality etc. in concrete all complete as per specification & drawing for the following. Watertightness is to be ensured including structural grouting if required.	--		
a	M35	CUM	8,690	.0135823

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**at 2 X 700 MWe - Kaiga Atomic Power Project # 5 & 6 - Turbine Island Package**

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
215.0	Dismantling concrete work for all types of structures at all levels including stacking of servicable material to a lead of 500 m and disposal of unservicable material upto a lead of 2 km, 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	45	.0000109
b	Reinforced cement concrete of all grades	CUM	65	.000025
216.0	Chipping of concrete in reinforced concrete work, cutting pockets, making openings at all levels and according to shapes, disposal of waste materials upto a lead of 2 km as directed by engineer including equipment, safety precautions, making good the broken surface etc all complete as per specification, drawing, instructions of engineer in charge but excluding cutting of reinforcement .	CUDM	100,180	.0017517
217.0	Extra over and above St No 216 for cutting of reinforcement, all sizes and types including labour, equipment, return of cut reinforcement to store etc all complete as per specification, drawings and instructions of engineer in charge. Measurement shall be on the cross sectional area of reinforcement cut.	SQCM	21,620	.0000319
218.0	Cutting Reinforced concrete with mechanised tools like Core drilling machine etc. for cutting pockets, holes, cores in slab, beam, column or foundation as per direction of engineer in charge.	CUDM	40,540	.0027928
219.0	Providing and applying curing compound (water based) of approved make where ever required as per manufacturer s specification.	SQM	2,820	.0000909
A222	Cutting in construction joints, expansion joints, in RCC walls, slabs, paving, hatch covers etc. of V groove size varying from 12 mm X 12 mm to 25 mm X 40 mm and for rectangular gap varying from 25 mm X 10 mm to 75 mm X 10 mm thick using groove cutting machine in concrete etc. all complete as per specification & drawing.	RM	7,110	.0006422

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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
A223	Cutting of existing concrete/ RCC slab (total thickness upto 250mm including floor finish & deck sheet if any) in buildings or structures or anywhere inside boundary using power tools of (DD2E of HILTI/ BOSCH make or equivalent) with low noise and dust including cutting reinforcements, removing the rubbish within a lead of 1 km, including making good the broken edges/ surface with cement mortar, painting, finishing to match with existing finishing, scaffolding/ supporting at all level, all complete and as directed by Engineer (measurements shall be taken as per cutting surface area).	SQM	380	.0002512
300.0	<p>FORMWORK: Providing, designing, fabrication, erection, fixing and removing formwork at all elevations for all structures, as per specifications and including all labour, material, scaffoldings, supporting system, working platform and centering etc. complete as per drawing, specifications and as per direction of engineer in charge for the following.</p> <p>(All the items are inclusive of sampling and testing of construction material, preparation of construction methodology, design, working drawings and scheme, details of erection methods, safety manual, job hazard analysis, work procedure, coordination in preparation, obtaining approval and compliance to quality assurance plan, quality assurance manual, testing methodologies, Inspection and testing plan and coordination in preparation and submission of construction completion certificate &amp; transfer docket containing necessary documents like test certificate, pour cards, inspection reports etc. and obtaining approval from BHEL/NPCIL as per specification and as directed by engineer - in - charge)</p>	--		

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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
A301	Fairface form work with good quality water proof plywood of minimum 12mm thickness conforming to IS:4990 and smooth concrete surface finish of F3/U3, backed with steel framework Acro/DOKA or equivalent including braces, props, shores, H frames, built-up sections, rolled sections, struts, anchors, inserts, hangers, false works, wedges, ties, baffle plates, walers, ledges, temporary openings, recesses filling with caulking compound or epoxy mortar, stopper formwork, supporting system etc., below finished ground floor level at all heights for foundations, footings, base of columns, walls, columns, pilasters, beams, mass concrete, trenches, tunnels, floors, suspended floor, chamfering of edges etc. including preparation of scheme, submission and approval of design & drawing etc. all complete as per drawing, specification and instruction of engineer in charge.	SQM	182,852	.0621553
A302	Fairface form work with good quality water proof plywood of minimum 12mm thickness conforming to IS:4990 and smooth concrete surface finish of F3/U3, backed with steel framework Acro/DOKA or equivalent including braces, props, shores, H frames, built-up sections, rolled sections, struts, anchors, inserts, hangers, false works, wedges, ties, baffle plates, walers, ledges, temporary openings, recesses filling with caulking compound or epoxy mortar, stopper formwork, supporting system etc., above finished ground floor level at all heights for columns, beams, suspended floors, roofs, lintels, cantilevers, staircases, landings, balconies, mass concrete, chamfering of edges etc. including preparation of scheme, submission and approval of design & drawing etc. all complete as per specification, drawing and instruction of engineer in charge.	SQM	175,428	.0710148
B302	Fairface suspended formwork by providing structural steel trusses / beams spanning across the entire width of slab and keeping the area below free of obstructions with good quality water proof plywood backed with steel/DOKA framework and support of minimum 12mm/16mm thickness and smooth surface below finished ground floor/above finished ground floor for columns, beams, suspended floors, roofs, lintels, cantilevers, staircases, landings, balconies, etc. including chamfering of edges as per drawing.for all heights as per specification, drawing and instruction of engineer in charge. The rate shall be inclusive of structural steel supporting arrangement.	SQM	16,195	.0112632

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**at 2 X 700 MWe - Kaiga Atomic Power Project # 5 & 6 - Turbine Island Package**

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
A303	Fairface form work with good quality water proof plywood of minimum 18mm thickness conforming to IS:4990 and smooth concrete surface finish of F3/U3, backed with steel framework Acro/DOKA or equivalent including braces, props, shores, H frames, built-up sections, rolled sections, struts, anchors, inserts, hangers, false works, wedges, ties, baffle plates, walers, ledges, temporary openings, recesses filling with caulking compound or epoxy mortar, stopper formwork, supporting system etc., at all heights for TG superstructure (above base raft level), chamfering of edges including preparation of scheme, submission and approval of design & drawing etc. all complete as per drawing, specification and instruction of engineer in charge.	SQM	10,300	.0073001
304.0	Providing, fixing and removing formwork in block-outs/pockets and openings (below 0.1 sqm plan area) at all elevations including cutting, formation of all shapes and all other operations required for making the required shape and size all complete as per specification, drawing and instruction of engineer in charge.	--		
a	Upto 150 mm depth	Each	1,820	.0001077
b	Pockets of depths more than 150mm and upto 300 mm depth	Each	920	.0000901
c	Pockets of depths more than 300mm and upto 600 mm depth	Each	770	.0001332
d	Pockets of depths more than 600mm and upto 1000 mm depth	Each	710	.0001913
e	Pockets of depths more than 1000mm and upto 1500 mm depth	Each	390	.000151
f	Pockets of depths more than 1500mm and upto 2000 mm depth	Each	390	.0001991
A305	Extra over item no.A301, A302 and B302 for curved form work for foundations, footings, beams, walls, trenches, domes, arches etc as per specification.	--		
a	Extra for Curve Shuttering for Item No. A301	SQM	2,820	.0002869
b	Extra for Curve Shuttering for Item No. A302	SQM	895	.0001142



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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
c	Extra for Curve Shuttering for Item No. B302	SQM	290	.0000514
400.0	<b>REINFORCEMENT WORK :</b> Reinforcement work including all labour, material (unless otherwise specified in BOQ/contract specification), equipment, transportation, handling etc at all level as per specification, drawings and as directed by engineer - in - charge for the following: (All the items are inclusive of sampling and testing of construction material, preparation of construction methodology, design, working drawings and scheme, details of erection methods, safety manual, job hazard analysis, work procedure, coordination in preparation, obtaining approval and compliance to quality assurance plan, quality assurance manual, testing methodologies, Inspection and testing plan and coordination in preparation and submission of construction completion certificate & transfer docket containing necessary documents like test certificate, inspection reports etc and obtaining approval from BHEL/NPCIL as per specificaiton and as directed by engineer - in - charge)	--		
401.0	Providing, straightening, cutting, bending, placing in position at all level, binding of mild steel reinforcements conforming to grade 1 of IS:432 part 1 in concrete including cost of reinforcement steel, binding wire, labour, scaffolding, transportation to & from stores etc. all complete as per specifications & drawings.	MT	80	.0014576
A402	Transportation from BHEL stores, straightening, cutting, bending, placing in position at all level, binding in position of steel reinforcements of HYSD TMT steel of grade Fe-500 confirming to IS:1786 including cost of reinforcement steel, 1.6 mm dia soft annealed iron binding wire, labour, scaffolding, cover blocks, protection of exposed ends of reinforcement bars with adequate coat of cement wash and plastic tape, transportation to & from stores, test, test report, preparation of bar bending schedules etc. complete all as per specifications, drawings and as directed by Engineer. For Fe 500 grade steel, the total elongation shall be more than 14.5 % and the ultimate tensile strength of the bar shall be 15 % more than the specified 0.2 % proof stress/ yield stress. This requirement is over and above the requirements specified in IS 1786. (BHEL to supply steel free of cost)	MT	20,860	.0817448

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**Tender Specification for Civil, Structural and Architectural Works of Turbine Island Package of 2 X 700 MWe PHWR Kaiga Atomic Power Project - Unit 5 & 6, Uttara Kannada District, Karnataka**

**at 2 X 700 MWe - Kaiga Atomic Power Project # 5 & 6 - Turbine Island Package**

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
405.0	Providing & fixing of Rebar in existing concrete surface by inserting reinforcement bar with Epoxy based suitable bonding compound of Hilti or equivalent make (HIT-RE-500 of Hilti or equivalent make) for interconnection of new R.C. structure with existing R.C. structure. Depth of drilled hole should be suitable to develop maximum recommended strength as per approved manufacturer's recommendation. This item includes supply of all materials including bonding chemicals, T&P required to execute the work, cost of all labour, transportation of chemical, staging to reach work place etc. all complete as directed by Engineer - in - Charge. Random Pull out non destructive test as directed by engineer shall be conducted to ensure strength of bond and same is included in this item. Reinforcement bar shall be measured and paid separately under relevant BOQ item.	--		
b	12mm Reinforcement bar	Each	500	.0000488
c	16mm Reinforcement bar	Each	500	.0000765
d	20mm Reinforcement bar	Each	500	.0001068
A406	Providing and fixing parallel square threaded reinforcement couplers for mechanical splices of rebars (HYSD TMT) for concrete reinforcement including supply of couplers qualified as per ASME, Section III, Div.2. and IS 16172, threading on rebars to be coupled with coupler, enlargement at connection by forging, protecting the prepared reinforcement bars, cleaning, fitting & fixing of couplers under specialized supervision, quality tests & checks (for couplers and coupled joints), couplers shall be of same quality or superior quality than the quality of material of parent bars (i.e. Reinforcement bars as mentioned under Item No. A402), mobilisation, demobilisation, loading/unloading of required plant/ machinery at site for threading & forging works, tools & tackles, transportation to & from stores, scaffolding, labour & supervision, training, consumables and all incidental expenses for satisfactory execution of the works etc. all complete as per specification and direction of Engineer in charge.	--		
a	Coupler of class H for 12 mm diameter reinforcement bar.	Each	1,120	.0000533

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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	Coupler of class H for 16 mm diameter reinforcement bar.	Each	1,120	.0000574
c	Coupler of class H for 20 mm diameter reinforcement bar.	Each	1,120	.0000666
d	Coupler of class H for 25 mm diameter reinforcement bar.	Each	2,160	.0001558
e	Coupler of class H for 28 mm diameter reinforcement bar.	Each	2,160	.0001911
f	Coupler of class H for 32 mm diameter reinforcement bar.	Each	2,160	.0002171
g	Coupler of class H for 36 mm diameter reinforcement bar.	Each	2,160	.0003138
h	Coupler of class H for 40 mm diameter reinforcement bar.	Each	2,040	.0003559
407.0	Providing, straightening cutting, bending, placing in position at any level, binding of mild steel reinforcements in brickwork including cost of reinforcement and binding wire, labour, scaffolding etc. complete all as per specifications & drawings.	MT	35	.0006377
408.0	Transportation from BHEL stores, straightening, cutting, bending, placing in position at any level, binding in position high yield strength steel TMT reinforcements in brickwork including cost of reinforcement and binding wire, labour, scaffolding etc. complete all as per specifications & drawings. (BHEL to supply steel free of cost)	MT	65	.0002547
500.0	Water proofing works:Water proofing of underground works, water proofing of roof treatment works including all labour, material (unless otherwise specified in BOQ/contract specification), equipment, transportation, handling, curing, sampling, testing, preparation of work procedure & inspection and test plan, reports etc. submission and obtaining approval from BHEL/NPCIL at all levels as per specification, drawings and as directed by engineer - in - charge for the following. (Cement shall be supplied by BHEL as a free issue)	--		

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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
A503	Providing and laying 75 mm thick polyurethane foam (PUF) thermal insulation of approved make with two component high density spray applied polyurethane resin foam complying with class B2 of DIN 4102 Part 1 and properties, test methods & acceptance values specified in specifications including preparation of surface, spray application using specially designed spraying machine etc. as per specifications, approved drawing or as directed by the Engineer in charge. Cost shall also include making of fillets, water ponding test & rectification of leakage/seepage of roof slab prior to laying of insulation, cleaning & preparation of surface, expansion joints and sealing at suitable intervals etc. all complete as per specifications and direction of engineer in charge.	SQM	15,335	.0079536

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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
A506	Providing and applying solvent free, spray applied, two component polyurethane (PU) membrane with high solid content (minimum 90%) of approved make comprising of (Total DFT 2200 micron exluding DFT of primer) 2000 micron thick (DFT) aromatic/aliphatic PU membrane base coat with 200 micron thick (DFT) protective UV resistant aliphatic PU top coat over one coat of two pack epoxy primer 75 micron DFT including broadcasting of dried graded silica sand (0.3 to 0.9 mm) at the rate of 0.8 to 1.0 kg/sqm on primer coat prior to its hardening. Properties of materials, test methods & acceptance values shall be as per specifications and relevant IS/ASTM standards.The coating shall have high viscosity, min.450% elongation and forming a perfectly smooth permanently flexible seamless membrane which should have good adhesion to roof substrates.The cured film should have a very low water absorption rate (0.5% maximum at ambient temperature after 7 days).Cost shall also includes surface preparation, polyscrim cloth /fabric(non woven polyscrim cloth of 100% polyester with min. weight of 40gsm/sqm), polymerised mortar base preparation, making of fillets, conduting tests like solid content, density, tensile strength, compressive strength, bond strength, elongation, hardness etc in laboratories like IITs, ICT or Government approved/NABL accredited labs, pull out adhesion test at site using pull out adhesion tester, water ponding test after roof water treatment & suitable rectification (if required), cleaning & preparation of surface, vaccum removal of loose sand, expansion joints & sealing at suitable intervals, application by using a pneumatic machine as per manufacturer s specifacaitons etc. all complete as per specifications, drawings and direction of engineer in charge. (Measurement shall be of the concrete surface area covered by water proofing membrane).	SQM	15,335	.0062869

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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
--	<p>GUARANTEE for item A503 &amp; A506:</p> <p>The Contractor shall be responsible for maintaining the roof top insulation for a period of 10 years from the date of acceptance of the water proofing work by the Engineer. The Contractor shall make periodical inspection especially before start of the rainy season and repair the waterproofing for any apparent defects to ensure effectiveness of water proofing during the guarantee period.</p> <p>The Contractor shall submit a bank guarantee from a scheduled commercial bank (other than co-operative bank) for 10% of the cost of roof insulation and water proofing works carried out. The bank Guarantee shall be valid for a period of five years from the date of acceptance of the water proofing work by NPCIL.</p>	--		
A508	Providing and laying wearing course consisting of 50mm thick concrete of grade M15 with graded aggregate of maximum 10 mm size cast in panels of maximum size 2 mx 2 m with an expansion groove of 10 mm wide and 15 mm deep between the panels including sealing of expansion groove with polyurethane sealant etc. all complete as per specifications and direction of engineer in charge.	SQM	15,335	.0015491
511.0	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, wall, column etc on concrete surfaces exposed to soil / ash including surface preparation etc. all complete.	SQM	18,720	.0007375
513.0	Providing and mixing water proofing compound conforming to IS:2645 in concrete or cement mortar all complete.	KG	3,600	.0000933
514.0	Providing and applying concrete structures two coats of ERPB (Epoxy rasin based anticorrosive and chemical resistant paint) over a coat of CPCI (concrete penetrating bipolar corrosion inhibitor) with 300 to 325 micron DFT for protection of concrete against carbonation and chloride penetration in saline/marine environment all complete of approved make and as per manufacturer s recommendation.	SQM	1,570	.0001025

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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
A518	<p>Providing and laying single ply twin colored of minimum 2.0 mm thick plasticized PVC waterproofing membrane system with two layers (one layer before and one layer after PVC membrane ) of geo-textiles made of needle punch 100 % pure polypropylene yarns with minimum weight 300 gsm for all horizontal and vertical surfaces of underground structures i.e. basement, sumps, pits, tunnerls, trenches etc. including preparing the concrete surface, fixing the overlaps of PVC membrane with hot air welding, including compartmentalisation using 320 mm wide and 2.5 mm thick PVC surface water stop having minimum 4 ribs of 15 mm depth, hot air welding of water stop with PVC membrane, roundels (max spacing 1.0 m c/c) with mechanical fixtures, testing of joints, dressing up of pile head with pvc membrane and encapsulated with high strength flowable epoxy mortar minimum 10 mm below the membrane and 20 mm top of it and extended to the edge of outer surface of interface etc. all complete as per specifications, manufacturer s reccomendation, drawings and as directed by the Engineer. Cost shall also include conduting tests like ultimate tensile strength, elongation and puncture resistance, thickness etc. in laboratories like IITs, ICT or Government approved/NABL accredited labs, preparation of detailed scheme including layout of pvc water storp arragement, compartmentalisation etc. all complete as per specifications, drawings and direction of engineer in charge. The laying of membrane shall be got done through the authorised applicator of the manufacturer of membrane. The testing of material shall be done from authorised lab same shall be furnished before execution of work,as directed by engineer in charge.Performance Guarantee should be given by the manufacturer after completion of the water proofing work for 10 years for material and workmanship. (Measurement shall be of the concrete surface area covered by water proofing membrane).</p> <p>'GUARANTEE FOR WATERPROOFING OF UNDERGROUND CONCRETE STRUCTURES- The Contractor shall make periodical inspection and repair the waterproofing for any apparent defects to ensure complete waterproofing during the guarantee period. The Contractor shall submit a bank guarantee from a scheduled commercial bank (other than co-operative bank) for an amount of 10% of the cost of water proofing works carried out. The bank Guarantee shall be valid for a period of ten (10) years from the date of acceptance of the water proofing work by NPCIL.</p>	SQM	59,295	.0209208

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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
A519	Providing and laying minimum 50mm thick screed concrete of M20 grade with maximum size of aggregate of 10 mm over layer of Geotextile on horizontal surfaces to protect the water proofing membrane complete as per drawing, specification and direction of Engineer. (Payment of geotextile is covered under Item No A518)	SQM	29,290	.0026166
A520	Providing and fixing 25 mm thick expanded polystyrene protective board over layer of Geotextile on vertical surfaces to protect the water proofing membrane complete as per drawing, specification and direction of Engineer. (Payment of geotextile is covered under Item No A518)	SQM	15,000	.0018924
A521	Supplying and constructing 115 mm thick brick wall with cement sand mortar 1:6 over 2nd layer of Geotextile on vertical surfaces to protect the water proofing membrane complete as per drawing, specification and direction of Engineer. (Payment of geotextile is covered under Item No A518)	SQM	15,000	.00279
600.0	JOINTS AND FILLERS: Joints & fillers including all labour, material, equipment, transportation, handling, preparation of work procedure & inspection and test plan, reports etc. submission and obtaining approval from BHEL/NPCIL at all level as per specification, drawings and as directed by engineer - in - charge. (Cement shall be supplied by BHEL as a free issue)	--		
601.0	Supplying & installation of bitumen impregnated fibre board conforming to IS 1838 as joint filler at joints in concrete including nailing, coating of both faces with coal tar pitch/bitumin etc. all complete.	--		
a	12 mm wide joints.	SQM	205	.0000271
b	20 mm wide joints.	SQM	205	.0000378
c	25 mm wide joints	SQM	205	.0000488
d	50 mm wide joints	SQM	205	.0000939



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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
602.0	Supplying and installation of Dura board HD100 or its equivalent as approved by the Engineer, as filler material in joints including nailing, installation as per manufacturer s recommendation etc. all complete.	--		
a	12 mm wide joints.	SQM	205	.0000263
b	20 mm wide joints.	SQM	205	.0000412
c	25 mm wide joints	SQM	205	.000048
d	50 mm wide joints	SQM	205	.0000897
A604	Supplying and filling in position caulking/sealing compounds of approved make in trapezoidal or triangular groove or any other shape of all sizes at expansion joints, around embedded parts, penetrations and construction joints at various locations including cleaning, surface preparation, mixing, heating, pouring/injecting in gaps in joints, primer, testing etc. all complete as per specification and direction of engineer in charge. Payment shall be made as per consumption of polysulphie caulking compound/epoxy quartz sand caulking compound/bituminuous sealing compound.	--		
a	Polysulphide caulking compound	Kg	22	.0000036
b	Epoxy quartz sand caulking compound	Kg	18	.0000016
c	Bituminuous sealing compound (bitumen-polymer cold mastic)	Kg	18	.0000008
605.0	Supplying and installation of commercial quality of expanded polystyrene products from reliable manufacturers as approved by the Engineer, as filler material in joints including nailing, installation as per manufacturer s recommendation etc. all complete.	--		
a	12 mm wide joints.	SQM	550	.0000054
b	20 mm wide joints.	SQM	550	.0000082

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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
c	25 mm wide joints	SQM	590	.0000112
d	50 mm wide joints	SQM	610	.0000217
A605	Supplying and installation of high density expanded polystyrene board of minimum density 35 Kg/cum conforming to IS:4671 wrapped in 250 micron thickness polythene sheets conforming to IS:5210 in floors, walls and all forms of structures including surface preparation, adhesive etc. all complete as per specification and direction of engineer in charge.	--		
a)	25 mm thick	SQM	700	.0000822
b)	50 mm thick	SQM	700	.0001443
c)	75 mm thick	SQM	610	.0001798
d)	100 mm thick	SQM	2,330	.0008934
e)	150 mm thick	SQM	1,050	.0005818
608.0	Supplying and filling in position hot applied bitumin sealing compund (Grade B) confirming to IS 1834 including cleaning, mixing, heating, pouring/injecting sealing compound in gaps in joints including application of primer etc. all complete.	--		
a	10mm X 40mm	RM	700	.0000087
b	12mm X 25mm	RM	700	.000008
c	20mmX25mm	RM	800	.000011

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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
A610	Providing and fixing PVC water stops (with or without centre bulb) of approved make including making all types of joints by fusing or welding to establish continuity between segments of the water stop and between water stop and embedded parts by splicing, pvc fix cap, testing of joint and DPT for 100% weld length etc. all complete as per specification and direction of engineer in charge.	--		
a)	150 mm wide and 8 mm thick	RM	3,845	.0001652
b)	230 mm wide and 8 mm thick	RM	9,705	.0006359
A611	Providing, fabricating and fixing MS metallic water stop of 3.15 mm thickness conforming to IS 2062 galvanised for dry film thickness of 60-100 micron thickness at all type of joints including bending to form V-notch, brazing, lap welding, testing of joint and DPT for 100% weld length etc. all complete as per specification and direction of engineer in charge.	SQM	5,170	.0021478
612.0	Providing and applying approved fire retardant sealant in joints/openings including cleaning of joints/openings, raking out groove, application of primer, scaffolding etc. all complete.	--		
a	25mmX25mm	RM	1,730	.0005595
b	50mmX25mm	RM	1,750	.0011016
A613	Supply, fabrication and erection of minimum 22 gauge GI sheets for expansion joints including drilling of holes in RCC / masonry with taper nut type anchor bolts of size M-6 x 50 mm at 650 mm c/c, caulking with polysulphide compound between sheet and concrete / masonry surface etc. complete as per specification, drawing and as directed by the Engineer.	SQM	2,910	.0007572

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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
A614	Providing, designing and fixing of fire rated expansion joint system related with floor locations. The joints system shall be of extruded aluminum base members, self aligning / self centering arrangement and support plates etc. as per ASTM B221. Aluminium sheets and plates shall conform to ASTM-B209. Alloy material shall confirm to ASTM 6063-T5 or Indian equivalent IS:63400.The system shall be such that it provides floor to floor /floor to wall expansion control system for various vertical location in load application areas that accommodates multi directional seismic movement without stress to it's components. System shall consist of metal profiles with a universal aluminum base member designed to accommodate various project conditions and finish floor treatments. The cover plate shall be designed of width and thickness required to satisfy projects movement and loading requirements and secured to base members by utilizing manufacturer s pre-engineered self- centering arrangement that freely rotates / moves in all directions. The Self - centering arrangement shall exhibit circular sphere ends that lock and slide inside the corresponding aluminum extrusion cavity to allow freedom of movement and flexure in all directions including vertical displacement. Provision of Moisture Barrier Membrane in the Joint System to have watertight joint is mandatory requirement. The item includes all material, fitting fixtures, lubricant, adhesive, seal, sealant, elastomeric joint system, bronze extrusions, steel component, SS components etc. all complete per the manufacturer s design,specifications and as approved by Engineer -in-Charge. The Expansion joint materials shall be procured from manufacturers such as Sanfield (India) Ltd. / Z. Tech (India) Pvt. Ltd/ BASF or any other equivalent as approved by the Engineer and shall be installed by the manufacturer themselves and not by any distributor / agent / any other externally appointed agency so as to guarantee the quality of workmanship.	--		
a)	Joint of upto 100 mm gap	RM	100	.0000813
b)	Joint of above 100mm and upto 200 mm gap	RM	100	.0001207
c)	Joint of above 200mm and upto 300 mm gap	RM	200	.0003443

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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
B614	Providing, designing and fixing of fire rated expansion joint system related with wall joints (internal/external). The joints system shall be of extruded aluminum base members, self aligning / self centering arrangement and support plates etc. as per ASTM B221. Aluminium sheets and plates shall conform to ASTM-B209. Alloy material shall confirm to ASTM 6063-T5 or Indian equivalent IS:63400. The material shall be such that it provides an expansion joint system suitable for vertical wall to wall/wall to corner application, both new and existing construction with no slipping down tendency amongst the component of joint system. The joint system shall utilize light weight aluminium profiles exhibiting minimal expose aluminium surfaces mechanically snap locking the multicellular to facilitate movement etc. The item includes all material, fitting fixtures, lubricant, adhesive, seal, sealant, elastomeric joint system, bronze extrusions, steel component, SS components etc. all complete as per the manufacturer s design, specifications and as approved by Engineer -in-Charge. The Expansion joint materials shall be procured from manufacturers such as Sanfield (India) Ltd. / Z. Tech (India) Pvt. Ltd/ BASF or any other equivalent as approved by the Engineer and shall be installed by the manufacturer themselves and not by any distributor / agent / any other externally appointed agency so as to guarantee the quality of workmanship.	--		
a)	Joint of upto 100 mm gap	RM	100	.0000774
b)	Joint of above 100mm and upto 200 mm gap	RM	100	.0000928
c)	Joint of above 200mm and upto 300 mm gap	RM	200	.0002155

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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
C614	Providing, designing and fixing of fire rated expansion joint system related with roof locations. The joints system shall be of extruded aluminum base members, self aligning / self centering arrangement and support plates etc. as per ASTM B221. Aluminium sheets and plates shall conform to ASTM-B209. Alloy material shall confirm to ASTM 6063-T5 or Indian equivalent IS:63400. The system shall provide water tight roof to roof/roof to corner/roof to wall joints cover expansion control system for various vertical localtion in load application areas that accommodates multi directional seismic movement without stress to it's components. System shall consist of metal profiles that incorporates with a universal aluminum base member designed to accommodate various project conditions and roof treatments. The cover plate shall be designed of width and thickness required to satisfy projects movement and loading requirements and secured to base members by utilizing manufacturer s pre-engineered self- centering arrangement that freely rotates / moves in all directions. The Self - centering arrangement shall exhibit circular sphere ends that lock and slide inside the corresponding aluminum extrusion cavity to allow freedom of movement and flexure in all directions including vertical displacement. The joint system shall resists damage or deterioration from the impact of falling ice,exposure to UV,airborne contaminants and occasional foot traffic from maintenance personnel. Provision of Moisture Barrier Membrane in the Joint System to have watertight joint is mandatory requirement. The item includes all material, fitting fixtures, lubricant, adhesive, seal, sealant, elastomeric joint system, bronze extrusions, steel component, SS components etc. all complete per the manufacturer s design,specifications and as approved by Engineer -in-Charge. The Expansion joint materials shall be procured from manufacturers such as Sanfield (India) Ltd. / Z. Tech (India) Pvt. Ltd/ BASF or any other equivalent as approved by the Engineer and shall be installed by the manufacturer themselves and not by any distributor / agent / any other externally appointed agency so as to guarantee the quality of workmanship.	--		
a)	Joint of upto 100 mm gap	RM	50	.0000482
b)	Joint of above 100mm and upto 200 mm gap	RM	50	.0000538

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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
c)	Joint of above 200mm and upto 300 mm gap	RM	150	.0001724
615.0	Providing and fixing 300 mm wide Stainless steel strips over expansion joints with minimum lap of 50mm length including stainless steel screws, rawl plugs etc. all complete.	Kg	600	.000089
A615	Providing, designing and fixing Airseal/Aladin type system for structural sealing joint gap upto 100 mm. The joints shall be designed utilizing neoprene profile, air pressurization and bonding in place with a specially formulated epoxy adhesive. The material shall be preformed, watertight, ozone and UV resistant, resilient and flexible neoprene profile with ribs on side faces for proper adhesion and bonding with the surface. The Joint shall be installed by air-pressurization technique only. Complete adhesion of the Epoxy to the neoprene seal profile and Joint Gap walls shall be achieved by air inflation during the installation. The relaxed (uncompressed) width of the seal shall be equal to the Joint Gap value and the Seal shall be always installed in uncompressed position so as to allow maximum expansion & contraction movements. The Joint system should be able to sustain water pressures upto 2 Bars minimum.. The item includes all material, fitting fixtures, lubricant, adhesive, seal, sealant, testing etc. all complete as per the manufacturer s design, specifications and as approved by Engineer -in-Charge. All materials shall be procured from manufacturers such as Sanfield/ Kanta Flex// BASF or any other equivalent as approved by the Engineer and shall be installed by the manufacturer themselves and not by any distributor / agent / any other externally appointed agency so as to guarantee the quality of workmanship.	RM	500	.0006081

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**Tender Specification for Civil, Structural and Architectural Works of Turbine Island Package of 2 X 700 MWe PHWR Kaiga Atomic Power Project - Unit 5 & 6, Uttara Kannada District, Karnataka**

**at 2 X 700 MWe - Kaiga Atomic Power Project # 5 & 6 - Turbine Island Package**

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
B615	Providing, designing and fixing Meta zeal type joint system for structural sealing joint gap upto 100 mm. The joints shall be designed utilizing a low density, closed cell, expanded polyethylene joint material and specially formulated epoxy adhesive for bonding purpose. The material shall be a preformed, waterproof, ozone and UV resistant, resilient and flexible expansion joint material. No Halocarbon gases or volatile hydrocarbons shall be used in the manufacturing of the product. The product should have a working movement range of 60% compression and 30% tension. The Joint system should be able to sustain water pressures up to 2 Bars minimum. The same shall be demonstrated conducting water hold tests simulating site conditions. The product should be suitable for potable water applications and should have ADA Compliance. The item includes all material, fitting fixtures, lubricant, adhesive, seal, sealant, testing etc. all complete as per the manufacturer s design, specifications and as approved by Engineer -in-Charge. All materials shall be procured from manufacturers such as Metazil of M/s Sanfield / M/s Z-tech or any other equivalent as approved by the Engineer and shall be installed by the manufacturer themselves and not by any distributor / agent / any other externally appointed agency so as to guarantee the quality of workmanship.	RM	500	.0005756
A617	Providing and filling hydro-swelling polymeric paste of 1.5kg/ litre mix density including making/ cutting 20 mm square groove at top of concrete around pipe sleeve etc. all complete as per manufacturer s specification, specifification and direction of the Engineer in charge. (Payment shall be made as per consumption of hydro-swelling polymeric paste).	Litre	100	.0000296
A618	Providing and fixing 250 micron thick polyethelene sheets conforming to IS 2508 for separation joints as per specification, drawings and as directed by the Engineer in charge.	SQM	400	.0000125
A619	Providing and fixing the following for sealing of expansion joint including fixing using M6 x 30 mm long bolt @ 300mm c/c through the hole of 7.5 mm diameter etc. all complete as per drawings, specifications and direction of the Engineer in charge. .	--		
a)	3mm thick L shape continuous copper sheet bent to a radius of 25 mm and sealing with polysulphide seelant at both ends.	SQM	100	.0000431



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**Tender Specification for Civil, Structural and Architectural Works of Turbine Island Package of 2 X 700 MWe PHWR Kaiga Atomic Power Project - Unit 5 & 6, Uttara Kannada District, Karnataka**

**at 2 X 700 MWe - Kaiga Atomic Power Project # 5 & 6 - Turbine Island Package**

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)	8 mm thick x 75 mm wide continuous Neoprene sheet on both vertical and horizontal surfaces between EP and copper sheet.	RM	800	.0002506
c)	10 mm thick x 90 mm wide continuous MS plate on both vertical and horizontal surfaces over copper sheet.	RM	800	.0002617
700.0	MS EMBEDMENTS: Embedments including all labour, material (unless otherwise specified in BOQ/contract specification), equipment, transportation, handling, preparation of work procedure, inspection and test plan, testing, reports etc. submission and obtaining approval from BHEL/NPCIL at all level as per specification, drawings and as directed by engineer- in - charge.	--		
A701	Supply, fabricating and fixing of mild steel/carbon steel embedments, inserts, pipe sleeves, angle pieces, rungs of various diameters, plates of dimensions as required etc. including welding, testing, bolting, cutting, drilling, scaffolding, setting, connection design & preparation of fabrication drgs, appointment of a seperate independant agency, approved by BHEL, for review and approval of fabrication drgs, in consultation with BHEL etc. all complete as per specification and direction of engineer in charge.	MT	1,434	.0321554
A702	Supply, Fabrication, transportation, delivery at site and erection, installation and alignment of mild steel foundation bolt assembly conforming to IS:2062 and grade 1 of IS:432 in concrete along with nuts, lock nuts (as per IS:1363, 1364 and IS:3138), washers, anchor plates, stiffner plates, protective tape, pipe sleeves, templates etc. including welding, testing, cutting, grinding, threading, drilling etc. all complete as per specification and direction of engineer in charge.	MT	40	.0010942
B702	Extra over ST NO. A701, B701 and A702 for shot /grit blasting of steel surfaces to white metal (Sa 2 1/2) and applying one or more coat of zinc silicate primer with minimum total DFT of 80 micron of approved make including including touch-up painting etc. all complete as per specification and direction of engineer in charge.	MT of steel	722	.0009887

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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
C702	Extra over ST NO. A701, B701 and A702 for shot /grit blasting of steel surfaces to white metal (Sa 2 1/2) and applying one or more coat of zinc phosphate primer with minimum total DFT of 80 micron of approved make including including touch-up painting etc. all complete as per specification and direction of engineer in charge.	MT of steel	722	.0013842
A703	Fixing of embedments, inserts, pipe sleeves, angle pieces, anchor bolts of various diameters, plates of dimensions as required etc. including scaffolding, setting in position, transportation from BHEL site stores to work spot etc. all complete.	MT	295	.0019171
704.0	Supplying, fabricating, erecting and installing following items in concrete/brickwall for all kind of works, including setting material in concrete, layout, scaffolding, cutting, forming, grinding, drilling, bolting, welding, jointing, testing etc. all complete.	--		
a	MS pipes of all diameters	kg	9,300	.0001783
b	PVC pipes / conduits of all diameters	kg	7,100	.0005669
c	UPVC pipes / conduits of all diameters	kg	7,100	.0007
d	Expansion anchor fasteners (galvanised) of HILTI make(HRD Universal Fastners) or equivalent of safe tensile capacity as specified below for brick work with expansion sleeve of A6 polyamide:	--		
i	8mm Dia	EACH	810	.0000096
ii	10mm Dia	EACH	510	.0000068
iii	12mm Dia	EACH	360	.0000054
iv	14mm Dia	EACH	350	.0000068
e	Expansion fasteners (mechanical galvanised) of HILTI make or equivalent of safe tensile capacity as specified below for concrete work with expansion sleeve of stainless steel:	--		

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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
i	HST3 M8	EACH	495	.0000191
ii	HST3 M10	EACH	495	.0000279
iii	HST3 M12	EACH	555	.0000511
iv	HST3 M16	EACH	555	.0000891
v	HST3 M20	EACH	555	.0001847
vi	HST3 M24	EACH	500	.0002718
f	Chemical Expansion fasteners (galvanised)of HILTI make or equivalent of safe tensile capacity as specified below for concrete work with anchoring rod,nuts,washers,chemicals all complete,etc:	--		
i	HAS-E5.8 M8	EACH	495	.0000417
ii	HAS-E5.8 M10	EACH	495	.0000481
iii	HAS-E5.8 M12	EACH	495	.0000571
iv	HAS-E5.8 M16	EACH	555	.0001072
v	HAS-E5.8 M20	EACH	555	.0001698
vi	HAS-E5.8 M24	EACH	460	.0001865
Ag	Seismically qualified Ductile Anchors fasteners of HILTI make or equivalent of safe tensile capacity as specified below for concrete work with anchoring rod,nuts,washers,chemicals all complete,etc:	--		
i	10 mm dia	EACH	425	.0001421

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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
ii	12 mm dia	EACH	475	.00022
iii	16 mm dia	EACH	575	.0010418
Ah	Seismically qualified Non-Ductile Anchors fasteners of HILTI make or equivalent of safe tensile capacity as specified below for concrete work with anchoring rod,nuts,washers,chemicals all complete,etc:	--		
i	10 mm dia	EACH	290	.0000262
ii	12 mm dia	EACH	290	.0000386
iii	16 mm dia	EACH	370	.0001055
iv	20 mm dia	EACH	410	.0002001
v	24 mm dia	EACH	410	.0003923
706.0	Supply and installation of approved 25mm thick vibration damping resilient pads on/around foundation of vibrating equipment and at other locations all complete.	SQM	350	.000148
707.0	Providing, laying and fixing rails(52kg/rm) and guide rails in concrete for transformer, rail track including cutting of rails, joining of rails, anchoring lugs etc all complete.	MT	200	.0043737
800.0	GROUTING/DRY PACK: Grouting including all labour, material (unless otherwise specified in BOQ/contract specification), equipment, roughening surface, cleaning, ramming, curing, preparation of work procedure, inspection and test plan, testing, reports etc. submission and obtaining approval from BHEL/NPCIL at all level as per drawings, specifications and as directed by engineer - in - charge. (OPC Cement will be supplied by BHEL free of cost.)	--		

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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
801.0	Providing & grouting with cement slurry mix of approved ratio using pressure pump for water retaining concrete structures as per approved procedure including cost of nipples/ nozzles, cement, admixture, curing, pressure pumps, slurry agitator etc. all complete. Cost shall include fixing of nipples at maximum 500 mm centre to centre spacing, cutting of nipples after completing of grouting, making good of the nipple hole with appropriate non-shrink cement paste, water tightness test etc. all complete wherever specified in the drawing.	SQM	820	.0001289
802.0	Providing & grouting of pocket holes, pipe sleeves under base plates, machinery, pipe supporting structures etc. with mix 1:1 (1 cement :1 sand ) using non shrink admixture etc. all Complete.	CUM	28	.0001533
803.0	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 fine aggregate: 2 aggregate of 6 mm down graded stonechips ) using non shrink admixture as per specification, drawing and direction of engineer-in-charge. (Cost of all material and cleaning the pocket by compressed air shall be in the scope of the contractor).	CUM	26	.0001433
804.0	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 ConbextraGP-1 or equivalent as per specification, drawing and direction of engineer-in-charge. (Cost of all material and cleaning of the pockets by compressed air shall be in the scope of the contractor).	CUM	10	.0000985
A804	Providing & grouting with 1:2.5 cement : heavy sand dry pack at all places for equipment base plate, end sheild base plates and other areas using anti-shrink compound, preparation of surface including roughening of surface, cleaning, ramming, curing etc. all complete as per drawings, specifications and as directed by the Engineer in charge.	CUM	70	.0002972

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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
805.0	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-2 or equivalent as per specification, drawing and direction of engineer-in-charge.(Cost of all material and cleaning of the pockets by compressed air shall be in the scope of the contractor).	CUM	10	.0001087
A805	Providing & grouting of pocket holes, pipe sleeves and under base plates of structural steel work/ machinery/ pipe supporting structures including roughening of surface, cleaning by compressed air, ramming, curing, etc. all complete with non-shrink, high strength, free flow cementitious grout of approved make complying with the requirements of ASTM C348 & C109 that expands in two stages to counteract the plastic as well as the drying shrinkage, compressive strength of the grout at optimum W/C ratio shall not be lesser than 55MPa, 65MPa & 75 MPa at 3days, 7days and 28 days respectively etc. all complete as per drawing, specifications and direction of Engineer in charge .	CUM	14	.0001239
A806	Providing injection grouting with solvent free, aggregate free, ultra low viscosity free flowing two component (region/hardner) epoxy injection resins epoxy grout of approved make through GI nozzle or non-return type nozzle with pressure pump for water retaining concrete structures, underground basement etc. conforming to ASTM C-881-1987 Type I-Grade I Class (B+C) & class F as applicable, epoxy resin constituent of component A shall have an epoxy equivalent of 160-275 g/g mole, including fixing nozzles, drilling of holes, chemical, admixture, curing, cutting of nipple/nozzles after completing of grouting, making good of the nipple hole with appropriate non-shrink dry pack, water tightness test etc. all complete as per drawing, specifications and direction of Engineer in charge. Payment shall be made as per the consumption of epoxy grout.	Kg	3,410	.0008091

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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
A807	Providing injection grouting with one component of high grade, low viscosity, polyurethane injection resin swelling type hydrophillic compound of approved make through GI nozzle or non-return type nozzle with pressure pump for water retaining concrete structures, underground basement etc. including fixing nozzles, drilling of holes, chemical, admixture, curing, cutting of nipple/nozzles after completing of grouting, making good of the nipple hole with appropriate non-shrink dry pack, water tightness test etc. all complete as per drawing, specifications and direction of Engineer in charge. Payment shall be made as per the consumption of polyurethane based hydrophillic grout.	Litre	8,780	.0013731
900.0	DOORS & WINDOWS: Doors, windows, ventilators, louvers, roof ventilators, rolling shutters, partitions including all labour, material (unless otherwise specified in BOQ/contract specification), equipments, transportation, handling, preparation of working drawings, fabrication drawings etc. submission and obtaining approval from BHEL/NPCIL at all level as per specification, drawings and as directed by engineer - in - charge.	--		

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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
A904	Providing and fixing single or double leaf steel door conforming to IS 4351 with or without top removable panels, factory made swing-in /swing-out 45 mm thick hollow galvanised heavy duty MS pressed steel flush doors along with frame, comprising of best quality 18G galvanized mild steel sheets, door frame using 16G pressed steel, mastic caulking and grouting the frame, reinforcing vertically and horizontally with steel sections spaced not over 150 mm c/c, door frame made with 45 mmx45mmx6 mm MS angle section, shutter with 43 mm rolled steel channel section framework with stiffeners 40 mm x 40 mm x 3 mm MS angle sections spaced not over 450 mm c/c, insulating with spun mineral wool or polyurethane foam, min 6mm clear sheet glass vision panel of 240 mm x 340mm in each leaf, louvers wherever required, heavy duty SS hinges, thresholds, bottom ties, fittings etc. complete with frame, heavy duty type fixtures and all hardwares such as aldrops, tower bolts, handles, buffers, door stopers, necessary rubber gaskets / seal for achieving air-tightness, all fittings, mortice lock/cylinder type with handle on both sides of approved make and type etc. as a complete package including one coat of zinc phosphate primer, one coat of rust resisting paint and two coats enamel paint of best quality and approved make etc. all complete as per drawings, door schedules, specifications and as directed by Engineer.	SQM	564	.0009501



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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
A907	<p>Providing and fixing (single/double leaf) fire rated hollow galvanized MS pressed steel flush doors along with frame of approved make conforming to IS : 3614 (part 1) &amp; tested to IS/ISO 3008 and shall carry a unique label with certification/test report number, fire rating embossment, fixed at all elevations, with or without removable panels, with panic bar, panic trim with following fire rating using galvanised MS sheets for frames conforming to IS 277, made out of minimum 1.6mm (16 SWG) for both frame and shutter, G.I. sheet (min. zinc coating 120 gsm), and leaves, mineral wool / PUF/ any other fire retardant insulation material filled with required density, mastic caulking and grouting the frame, reinforcing and insulating the shutters with fire retardant material. The door stiles should be interlocked, for pairs of doors integral astragals has to be provided on the meeting stile. Vision lite, vision panel in each leaf using borosilicate fire rated float glass or approved equivalent of size 240 mm x 340 mm or as specified in drawing, on shutter, fixing with clipon arrangement. EPDM smoke seal to be provided along with frame as standard, including heavy duty ball bearing SS 304 hinges, mortise dead lock, thresholds, fittings complete with frame, fittings, fixtures, handles, necessary gaskets, drop seal, smoke seal etc. for air tightness, , provisions for installation of access control devices, mastic cement, cleaning , all hardware as per door schedule, testing of fire proof door as per IS : 3614 (Part 2) including one coat of approved primer and two coats of approved fire resistant/intumescent paint as necessary all complete as per drawings, specifications and direction of engineer in charge.</p> <p>All the doors shall have provisions for installation of access control devices such that these devices if installed at a later date shall not impair the basic functions of the door as a fire barrier. These provisions shall be in the form of providing a separate steel plate of approved dimensions of the same material as the parent door, fixed to the main door at an approved location.</p>	--		
b	2 Hours Fire Rating	SQM	698	.0013925
c	3 Hours Fire Rating	SQM	200	.0005026

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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
B907	Extra over St. No. A907 for testing of fire proof doors as per IS:3614 Part-II standards for approved fire rating, for full size door with vision panel and all fittings and fixtures at approved laboratory etc. all complete as per drawings, specification and direction of engineer in charge.	--		
b	2 Hours Fire Rating	EACH	3	.0000452
c	3 Hours Fire Rating	EACH	3	.0000534
908.0	Providing and fixing steel windows/ventilator with steel sections as per IS:1038, IS:1361 & IS:7452 latest revision including all fittings, metal beadings, hold fasts, shop and final painting ,glazing etc. all complete. (Glazing shall be paid separately)	--		
a	Openable type	SQM	518.4	.0003206
b	fixed type	SQM	520.4	.0002143

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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
A909	Providing and fixing anodised aluminium work of Jindal,Bhoruka, Hindalco, Indian Aluminium Co. Ltd. or equivalent approved make for door frames, windows, ventillators, partitions, railing, grills, stair case tread nosing, etc with extruded standard tubular and other sections having minimum 3mm wall thickness including all fittings & fixtures and accessories of approved make conforming to IS733 and IS1285, alumilited, 0.015 mm thickness, satin finished in natural aluminium colour, protective transparent coating, fixed with rawl plugs, expansion fasteners, SS screws or with fixing clips, all hardwares & fixtures of heavy duty type, including necessary filling of gaps at junctions, at top, bottom and sides with required PVC/neoprene felt for bi-mettalic protection, heavy coat of alkali resitant bitimunous paint, zinc chromate primer etc.including aluminium cleat angle, aluminium snap-on-beading for glazing/panelling with all fittings and fixtures (like tower bolts, handles, door stopper with rubber shoes, 'L' drops, stays, floor springs, hydraulic door closures etc.), CP brass/stainless steel screws, providing and fixing hinges/pivots, and making provision for fixing of fitting wherever required including cost of PVC/neoprene gasket, all complete as per drawing, specification and instructions of engineer in charge. (Glazing shall be paid seperately). Weight of aluminium section only shall be measured.	Kg	17,679	.0025029

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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
B910	Providing,designing, Fabricating, supplying and fixing of Aluminium composite panel cladding (ACP) in pan shape in solid or metallic colour of approved shades made out of 4mm thick aluminium composite panel (min.weight of panel should be 7.5 kg/sqmt) material consisting of 3mm thick FR grade ClassA as per EN 13501,mineral core sandwiched between two Aluminium sheets (each 0.5mm thick).The aluminium composite panel cladding sheet shall be coil coated, with Kynar 500 based PVDF conforming to AAMA 2605 or Lumiflon based fluoropolymer resin coating of approved colour and shade on face # 1 and polymer (Service) coating on face # 2 as specified using stainless steel screws, nuts, bolts, washers, cleats, weather silicone sealant, backer rods etc. The top coated surface of ACP shall comply with the specification for coated coil for the exterior building application issued by ECCA (European Coil Coating Association). The aluminium composite panel top and bottom skin should conform to Aluminium Alloy 5005 (AlMg 1) marine grade series and H 22/24 temper with mechanical properties confirming to EN 485-2 standard. The ACP product must conform to either BS 476 part 6 & 7 or ASTM E 84 standards along with EN-13501-1. The manufacturer must furnish Class 1A certificate for this ACP produced in the plant from which it is going to be supplied. The panel shall be designed for 12mm groove in horizontal & in verticals with close joint system. Vertical & Horizontal groove shall be filled by non-staining high performance weather sealant. ACP panel shall have sub frame all around panel and aluminium stiffener profile as per structural requirements. The finished surface of ACP shall be protected with a self-adhesive (Rubber based) peel off foil with 70 microns thickness white or black, tested to withstand up to 6 months exposure to local weather condition without losing the original peel off characteristic or causing stain or other damages on the coated surface of the aluminium composite panel. Installation of ACP Coping/facia at terrace level sealing the top gap of the parapet wall and ACP Panel shall have GI stiffeners below with required aluminium grid work with necessary MS HDG / aluminium alloy brackets & SS fasteners.2nd barrier of 1mm thk GI sheet laid continuously below the coping to seal the parapet wall. Overlap of GI sheet shall be properly sealed with weather sealant.All shade approval shall be as per Architect's Approval.as per approved sample from Alucobond Plus, Aludecor, Alubond, or equivalent. The system shall be	--		

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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
	designed to withstand a wind pressure of 200kg/Sqm or as per design requirement and shall be fixed to the Masonry/RC walls or aluminium frame with necessary clamps, brackets and anchor fasteners etc. All clamps and brackets shall be Hot dip galvanized minimum 80 microns thick and shall conform to IS: 4759-1996. The extruded aluminium section shall be anodized in approved colour with a anodic coating of minimum 20 microns. Extruded section shall be 6063 T5 or T6 alloy conforming to ASTM B221. Any other festering straps, nuts, bolts, rivets, washers, etc. shall be in stainless steel SS316 grade. EPDM gaskets, open cell polyethylene backer rods, weather sealant etc. shall be provided as per requirement. Item shall include aluminium base frame with all fixing arrangements to wall/RC members, fastening material and hardware(festering straps, nuts, bolts, rivets, washers etc.), EPDM gaskets, open cell polyethylene backer rods, weather sealant, scaffolding, approach to all height, material handling, transportation, labour, T&P, preparation of working drawings etc.all complete as per drawing, specification & instructions of engineer in charge. Measurement of payment shall be outer finished area of ACP panel.			
a	4mm	SQM	340	.0003049
A911	Providing and fixing of door closers as per specification of approved make & quality all complete of following type :	--		
a	Over head extra heavy duty type hydraulic door closures as per IS 3564	Each	180	.0000868
b	Floor mounted extra heavy duty type Hydraulic door closers as per IS 6315	Each	190	.0001447
912.0	Providing and fixing pressed steel frames fabricated from 16 gauge M.S sheet mortised, reinforced drilled and tapped for hinges and locks bolts strikes, hold fasts adjustable floor anchors, floor tiles/weather bars ,paintings etc all complete as per specifications.	Kg	15,376	.0006252

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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
A913	Providing, designing and fixing in position of approved make rolling shutter made from tested bright cold rolled, annealed M.S. strips not less than 18G thickness, machine rolled at 75mm rolling centres interlocked together through their entire length and jointed together at the end by heavy type end locks mounted on specially designed pipe shaft with brackets, rolling grills with min 6 mm dia rods @35 mm c/c running horizontally flexible connected with vertical link spaced not more than 200 mm c/c, 20G steel hood, side guides and arrangements for inside and outside cylinder type locking with push and pull operation including wire springs, operating chain, grave cast iron reduction gear, bracket plate, top cover, bottom lath coupled to a lock plate fabricated from 3mm thick galvanised steel plate and securely rivetted with stiffening angles (partly coiled and lath/full lath), testing, one coat of zinc phosphate primer & two coats of synthetic enamel paint of approved make, rolling shutter shall be designed to withstand minimum wind pressure of 150 kg/sqm and steel pipe shaft deflection span/360 shall not exceed span/360, etc. all complete as per IS 6248 and specification and direction of enigneer in charge of following types:	--		
a	Hand Operated	SQM	20	.0000143
b	Mechanically Operated	SQM	220	.0003408
c	Mechanically and Electrically Operated	SQM	280	.0004866
d	Extra over St. No. A913 for providing and fixing Wicket Door with handel, lock and other hardware as required all complete as per drawing,specification and direction of enigneer in charge in the rolling shutter.	SQM	70	.000056

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**Tender Specification for Civil, Structural and Architectural Works of Turbine Island Package of 2 X 700 MWe PHWR Kaiga Atomic Power Project - Unit 5 & 6, Uttara Kannada District, Karnataka**

**at 2 X 700 MWe - Kaiga Atomic Power Project # 5 & 6 - Turbine Island Package**

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
A914	Supply and Fixing solid core PVC frame with PVC door shutter minimum 30mm thick and shall be factory fabricated made from min.5 mm PVC sheet.PVC Door Frames shall be made from min.50 x 47 mm section and fabricated from 5 mm PVC sheet having density of 600 kg./cum. Frames shall have smooth surface, without any warping or bending in any member. All the parts of the door frame are to be jointed to each other using solvent adhesive conforming to IS 14182.The sheets used for frame and shutters may be in plain colour, printed design or prelam veneer shade as approved sample, including all fitting & fixtures as per specification, drawing and instructions of engineer in charge.	SQM	280	.0002704
A915	Providing, fixing and fitting of glazing of superior quality from approved manufacturers like Modiguard or equivalent having uniform refractive index and free from flaws, streaks, laminations, bubbles, wavy and rainbow formation etc. in steel/aluminium/wooden frames, where ever required, cleaning after fixing including hardware, gaskets, mastic cement, putty, clips, beadings etc. all complete as per specifications, drawings and direction of engineer in charge.	--		
a	4 mm thick clear sheet glass	SQM	450	.0001748
b	4 mm thick clear float glass	SQM	20	.0000081
Aj	One outer 6mm thick tinted heat-reflecting type toughened glass and one inner 6mm thick plain float glass hermetically sealed and seperated by 12 mm thick gap for thermal insulation (only single elevation area to be measured).The glazing to be used in all exterior walls shall be of ,Asahi,Glavebel ,Saint Gobain or equivalent . The glazing to be used should comply to mentioned standards ( VLT (Visible Light Transmittance) less than or equal to 62 %, SHGC/ SF (Solar Heat Gain Coefficient/ Solar Factor) less than or equal to 0.32 and U- Value 1.2 to 2.5 W/MSq K.The values varies as per detail engineering.The properties of performance glass,colour,specification shall be as per detail design values as approved by engineer incharge.	SQM	1,100	.0010607
Ap	6 mm thick clear float glass	SQM	1,012	.0006059

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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
An	6 mm thick double toughened glass for effective thermal insulation	SQM	1,000	.0011377
Ao	6 mm thick wire glass fire rated	SQM	1,500	.0014315
Ap	6 mm thick clear glass	SQM	1,300	.0009075
916.0	Supplying and fixing weather stripping of approved make and quality to doors as per instructions of engineer in charge and specification complete.	RM	7,800	.0004026
918.0	Providing and fixing steel louvered window with ISMC 100 frame all round including verticals with 18G pressed steel louvers, painting etc. all complete.	SQM	1,614	.0011857
A921	Supply, fabrication, detailing and installing in position and testing Galvanized MS SLIDING doors of approved size and design, made out of channels, joists, angles, flats, plates, pipes, CI bracket, tubular sections (conforming to IS: 1161), bracings, locking arrangement, tempered steel pivot, guide track of MS Tee, roller trolley, Galvanised/SS Wheels of required dia as per opening with ball bearings, SS pin and axle with lubrication point, Galvanised adjustable upper guide brackets with guide post constructed from a steel square hollow section of required dimension of 50 x 100 x 3mm profile, bronze aluminium ball bearing arrangements, paintings with one coat of zinc chromate/red lead primer and two coat of enamel paint, fixing to post etc. all complete as per specification, drawing and as directed by Engineer.	SQM	40	.0000674



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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
A923	Providing & fixing 120 minutes Fire Rated,Fully Glazed non load bearing fixed partition with valid fire test certificate from national or international lab with Partition Frame manufactured from 1.6 mm galvanized steel sheet (zinc coating not less than 120 gm/sqm) pressed to form a suitable profile & fixed to the supporting construction by means of M 10 X 120 or bigger steel bolts at 150mm from the edges & every 500mm c/c. The frame shall be finished with etch primer for scratch resistance and shall be powder coated of min. 30 micron of approved shade and color. The glass panels shall be insulated/uninsulated minimum 11mm thick, 120 minute fire rating and partially insulated (EW120), with 20 minute or more full insulation, Non Wired Toughened Glass having a sound reduction of greater than 37dB, light transmission of 85% and compliant to class 2(B)2 category of impact resistance as per EN 12600. The glass should be manufactured in UL & TUV audited Facility and including UL-EU Certification. The glass shall be held in position with 1.2mm x 19mm GI clip-on beading, clamped or bolted to the frame profile by 4mm x 35mm steel screws at every 250 mm c/c and a ceramic tape of cross section of 5mm x 20mm on both sides of the glass. The item shall include intumescent putty and fire resistant acrylic sealants and the total assembly shall satisfy the fire resistance criteria of stability, integrity & radiation control and partial insulation (EW120). All frame shall be finished polyester powder coated to minimum 50microns, of approved colour. Test certificates should be made available for a complete assembly. all complete as per specification. Glazed system shall be tested to IS/ISO 3009-1 or IS16947: 2019 for integrity & insulation. Shop drawings for the item with all construction and anchoring details along with fire rating test reports shall be got approved from Engineer-in-Charge before execution.	SQM	140	.0003695

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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
A924	Providing & fixing minimum 29mm thick Hermetically sealed double glass (DGU) consisting of Fire resistant glass of minimum 11mm thick or more, clear, toughened, borosilicate glass,120 minutes fire rated for both integrity & radiation control ,remain transparent under both fireand non fire condition and 6mm thick toughened tinted glass with 7mm gap. The partitions shall be 120 minutes Fire Rated,Fully Glazed non load bearing fixed partition with valid fire test certificate from national or international lab with Partition Frame manufactured from 1.6 mm galvanized steel sheet (zinc coating not less than 120 gm/sqm) pressed to form a suitable profile to accomodate the glass & fixed to the supporting construction by means of M 10 X 120 or bigger steel bolts at 150 mm from the edges & every 500mm c/c .The frame shall be finished with etch primer for scratch resistance and shall be powder coated of min. 30 micron of approved shade and color. The glass panels shall be interlayered minimum 11mm thick, 120 minute fire rating and partially insulated (EW120), with 15 minute full insulation, Non Wired Toughened Interlayered or monolithic glass having a sound reduction of greater than 37dB, light transmission of 87% and compliant to class 1(B)1 category of impact resistance as per EN 12600. The glass should be manufactured in UL & TUV audited Facility and including UL-EU Certification. The glass shall be held in position with minimum 1.6 mm G.I Beading, clamped or bolted to the frame profile by 4mm x 35mm steel screws at every 250 mm c/c and a ceramic tape of cross section of 5mm x 20mm on both sides of the glass. All frame shall be finished polyster powder coated to minimum 50microns, of approved colour. Test certificates should be made available for a complete assembly.The item shall include intumescent putty and fire resistant acrylic sealants and the total assembly shall satisfy the fire resistance criteria of stability, integrity & radiation control and partial insulation (EW120) all complete as per specification. Shop drawings for the item with all construction and anchoring details along with fire rating test reports shall be got approved from Engineer-in-Charge before execution.	SQM	120	.0010729

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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
A925	Providing and fixing of fully glazed steel door with 120 minutes fire rating, of integrity and radiation control (EW 120) fabricated with 1.6 mm thick galvanized steel sheet. The door frames are manufactured from 1.6 mm galvanized steel sheet (zinc coating not less than 120 gm/sqm ) pressed to form a profile of 35 mm x 60 mm on the vertical sides and 50 x 60 mm on the horizontal side. The door shutter would have a top rail and side rail 60 mm x 60 mm and a bottom rail of 110 mm x 60 mm. The frame shall be finished with approved fire resistant primer or Powercoating of min. 50 micron as per approved shade. The sections have a special insulating infill. The test is conducted in IFTS as per EN 1634 and EN1363. The insulated glass should be min. 11mm thick or more, clear, toughened, borosilicate glass, 120 min fire rated for both integrity & radiation control (EW 120) Non Wired toughened glass with a light transmission of 85% and sound reduction of 37 dB and manufactured in UL & TUV audited facility and including UL-EU Certification. The glass should be compliant to class 1(B)1 category of Impact Resistance as per EN 12600. The glass should be held in its place with the help of 1.6 mm GI beading and a special ceramic tape with cross section of 5 x 20 mm as per the test evidence. The shutters should be fixed to the frame using Dorma SS Ball Bearing Hinges of size 100 mm x 89 mm and 3 mm thickness or equivalent. Beading should be attached using 4 mm x 35 mm SS screws at distance of 75 mm from the edges and 150 mm c/c henceforth. The door should be fitted with Dorma Mortise Sash lock 952F and door closer TS 68 of Dorma make or equivalent. The inactive leaf should be fixed to the frame using 1200mm long tower bolt. all complete as per specification and approved by Engineer incharge.	SQM	140	.0012517
A926	Providing and fixing of 0.6mm thick metal panel sheets door in local control room, with door spring and locking arrangements and both way handle, cavity filled with glass wool insulation etc. all complete as per specification, drawing and as directed by Engineer. Material of the partition and that of metal door shall be same.	SQM	130	.0003187
A927	Providing and fixing of metal door with toughened Glass Vision Panel. The door shall have 100mm frame (made of same material as that of wall Paneling /partition) and shall have 12mm thick glass pane in between. The door shall complete with all fitting, fixture etc. all complete as per specification, drawing and as directed by Engineer.	SQM	50	.0001167

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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
A928	Providing and fixing of 12mm thick tempered clear glass door with door spring and locking arrangements and both way handle and patch fittings etc. all complete as per specification, drawing and as directed by Engineer.	SQM	50	.0001299
1000.0	CONCRETE BLOCK MASONRY AND BRICKWORK: Concrete block masonry, Brickwork masonry including all labour, material (unless otherwise specified in BOQ/contract specification), testing, equipment, transportation, handling, scaffolding etc. preparation, submission of work procedure and obtaining approval from BHEL/NPCIL at all levels as per specification, drawings and as directed by engineer - in - charge. (Cement shall be supplied by BHEL as a free issue)	--		
A1001	Providing brick work in cement mortar 1:4 (1 part cement: 4 parts fine aggregate conforming to IS 2116) in walls, chambers etc. in thickness varying from 230mm to 460mm at all depths, places and positions below plinth including raking out joints, curing, scaffolding etc. complete excluding plastering and painting.	--		
a	Using burnt clay bricks of class designation 7.5 of nominal dimension and conforming to specifications, IS :1077	CUM	1,236	.0022521
B1001	Providing concrete block masonry works consisting of solid concrete blocks having minimum average compressive strength of 5 MPa and minimum density of 1800 kg/m <sup>3</sup> , in cement mortar 1:4 (1 part cement: 4 parts fine aggregate conforming to IS 2116) by volume with blocks manufactured as per IS:2185 (part-1), construction as per IS 2212, at all depths, places and positions below plinth including raking out joints, curing, scaffolding etc. complete excluding plastering and painting.	CUM	1,845.2	.0032071
A1002	Providing brick work in cement mortar 1:4 (1 part cement: 4 parts fine aggregate conforming to IS 2116) in walls, chambers etc. in thickness 230mm at all heights, places and positions above plinth including concrete mullion/transom, reinforcement anchoring, reinforcement, formwork, raking out joints, curing, scaffolding etc. complete excluding plastering and painting. (Payment of concrete, reinforcement anchoring, reinforcement and formwork shall be made separately)	--		
a	Using burnt clay bricks of class designation 7.5 of nominal dimension and conforming to specifications, IS :1077	CUM	468	.0010283

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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
B1002	Providing concrete block masonry works consisting of solid concrete blocks having minimum average compressive strength of 5 MPa and minimum density of 1800 kg/m <sup>3</sup> , in cement mortar 1:4 (1 part cement: 4 parts fine aggregate conforming to IS 2116) by volume with blocks manufactured as per IS:2185 (part-1), construction as per IS 2212, at all heights, places and positions above plinth including concrete mullion/transom, reinforcement anchoring, reinforcement, formwork, raking out joints, curing, scaffolding etc. complete excluding plastering and painting. (Payment of concrete, reinforcement anchoring, reinforcement and formwork shall be made separately)	CUM	13,035	.028005
A1003	Providing brick work in cement mortar 1:4 (1 part cement: 4 parts fine aggregate conforming to IS 2116) in partition walls, vertical walls for waterproofing system, chambers etc. in thickness 115mm at all heights, places and position above or below plinth/graded level including providing two nos. 8 mm diameter MS bars at every fourth layer, reinforcement bar securly anchored at ends, raking out joints, curing, scaffolding etc complete excluding plastering and painting as per specification.	--		
a	Using burnt clay bricks of class designation 7.5 of nominal dimension and conforming to spcifications , IS :1077	SQM	372	.0001001
B1003	Same as above item no B1002 but for half concrete block masonry wall (min. 110 mm thickness).	SQM	740	.0001749
1005.0	Breaking of existing brick work at all levels including plastering, removing the rubbish up to a distance of 500 m including transportation, loading, unloading etc. all complete as directed by the engineer.	CUM	110	.0000521
A1005	Breaking of existing concrete block masonry work at all levels including plastering, removing the rubbish up to a distance of 500 m including transportation, loading, unloading etc. all complete as directed by the engineer.	CUM	132	.0000625

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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
A1007	Providing and laying fly ash brick pitching 70mm thick using bricks of nominal size of 230x110x70 mm having compressive strength minimum 75Kg/Sq.cm. conforming to IS:3495 (Part-II) laid over sloped/ flat surfaces of drains preparation of the bed by compaction of insitu soil, filling the joints with 1:6 cement mortar and making provision of weep holes with filter media etc. all complete as per requirement and the direction of the Engineer.	SQM	500	.0001633
1008.0	Making openings in existing brick wall or partition wall including making good the broken edges/surface with cement mortar 1:6 etc. complete.	CUM	34	.0000187
A1008	Making openings in existing concrete block masonry, brick wall or partition wall including making good the broken edges/surface with cement mortar 1:4 etc. complete.	CUM	38	.0000251
A1009	Supply and placing in position mild steel wire fabric of square mesh 25 mm size and wire diameter of 2 mm for encasing of steel sections in brick/concrete block/concrete including cutting, bending, fixing etc. complete.	SQM	220	.0000106
1010.0	Filling existing brick wall/ partition wall opening at all level including making good the broken edges/surface with cement mortar 1:6, painting, finishing to match with existing finishing, scaffolding/supporting at all level, removal of debris upto a lead of 1 km including loading, unloading, transportation etc. all complete.	SQM	50	.0000135
A1010	Filling existing concrete block wall, brick wall, partition wall opening at all level including making good the broken edges/surface with cement mortar 1:4, painting, finishing to match with existing finishing, scaffolding/supporting at all level, removal of debris upto a lead of 1 km including loading, unloading, transportation etc. all complete.	SQM	100	.0000289
1011.0	Providing and filling brick bats in soak pits all complete.	CUM	70	.0000211
A1012	Supplying & laying at all elevations aerated concrete blocks conforming to IS 2185 (Part 3); Grade I with minimum 5 MPa compressive strength for 150 mm thick wall in cement mortar 1:4 by volume and as per drawings and direction of Engineer etc. complete.	SQM	140	.0000575

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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
1100.0	DAMP PROOF COURSE: Damp proof course including all labour, material (unless otherwise specified in BOQ/contract specification), equipment, transportation, handling, shuttering, centering, curing etc. preparation, submission and obtaining approval from BHEL/NPCIL at all level as per specification, drawings and as directed by engineer - in - charge. (Cement shall be supplied by BHEL as a free issue)	--		
1101.0	Providing Damp Proof Course of following thickness with 1:1.5:3 concrete (10mm and down graded aggregate) with 2% of approved admixture of water proofing compound all complete. Two layers of hot bitumen coating 85/25 grade as per IS:702 @ 1.7Kg./sqm shall be applied one before & one after the DPC.	--		
Aa	50mm thick	SQM	1,232	.000116
1200.0	PLASTERING: Cement mortar plaster including making grooves wherever required including all labour, material (unless otherwise specified in BOQ/contract specification), scaffolding, curing etc at all level as per specification, drawings preparation, submission of work procedure and obtaining approval from BHEL/NPCIL and as directed by engineer - in - charge. (Cement shall be supplied by BHEL as a free issue)	--		
A1201	Provide and laying minimum 20 mm thick 1:4 cement sand plaster with approved waterproofing compound @ 2% by weight of cement or as specified by manufacturer in foundation, wall and plinth at all depths/levels including mixing, laying, finishing to smooth surface, curing, materials, labour, tools, including providing 3mmx3mm size grooves at junctions of two dissimilar materials etc. all complete as per drawing, specification or as directed by Engineer.	SQM	7,850	.0006235
B1201	Providing 20mm thick rough cast/sand faced plaster in two coats over exterior masonry and concrete surfaces at all heights with 12mm thick base coat and 8mm thick finished coat in cement sand mortar 1:3 with waterproofing compound conforming to IS: 2645 of approved make and manufacturer recommendation, including 3mmx3mm size grooves at junctions of two dissimilar materials, surface preparation, joint preparation, chamfering, hacking of concrete surfaces, scaffolding, curing, tools, labour, rendering etc. all complete as per drawing, specification or as directed by Engineer in charge.	SQM	65,554	.008742

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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
A1202	Providing 15mm thick plaster to interior masonry / concrete surfaces in cement sand mortar 1:3 at all heights to a smooth finish including surface preparation, joint preparation, chamfering, hacking of concrete surfaces, scaffolding, curing, tools, labour, rendering etc. all complete as per drawing, specification or as directed by Engineer in charge.	SQM	78,452	.0044129
1204.0	Providing 6mm thick plaster on ceiling in cement mortar 1:4 finished to a smooth all complete.	SQM	37,236	.0018906
A1205	Providing and laying 20 mm thick cement sand plaster (1:3) by volume over concrete / masonry surface of drains, culverts, tunnel, trenches etc. complete as per drawing, specification and direction of the Engineer.	SQM	6,774	.0003696
A1206	Providing neat cement finish @ 1kg/sqm over plastered surfaces and rubbed smooth with trowel etc. all complete as per drawing, specification and direction of the Engineer.	SQM	7,610	.0002245
1208.0	Providing and laying encasement to box type steel beams at all levels with lath plaster 50 mm nominal thickness with cement plaster (1:4) over chicken wire mesh including all labour, materials, equipment, handling, transporting, mixing, placing, leveling, curing and cleaning, finishing the exposed surfaces etc including centering and shuttering all complete as per specification, drawing and instructions of engineer in charge (chicken wire mesh to be paid separately)	SQM	474	.0000746
1209.0	Ruled pointing in masonry in Cement Mortar 1:3 (1 cement and 3 fine sand) including raking out joints, curing etc. complete.	SQM	364	.0000175
A1210	Providing drip coarse on plastered surface at all elevations for all type of work such as chajjas, parapet,,canopy, projections etc over window, doors heads etc including scaffolding, finishing etc. complete with all labour, tools and plants as per specification, drawing and instructions of engineer in charge.	RM	1,650	.0000237



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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
1300.0	FINISHES TO CONCRETE / PLASTERED SURFACES: Finishes, painting to concrete, plastered surfaces including all labour, material (unless otherwise specified in BOQ/contract specification), equipment, surface preparation, F3 surface finish, scaffolding, testing, preparation of work procedure & inspection and test plan, submission of reports preparation, submission of work procedure and obtaining approval from BHEL/NPCIL at all level as per specification, drawings and as directed by engineer - in - charge.	--		
A1302	Providing and applying two or more coats of single component, solvated aliphatic acrylic resin based anti-carbonation, anit-corrosive and waterproof paint of approved make & shade over a coat of approved primer (each coat of protective paint coating shall have minimum 75 micron DFT and total DFT inclusive of primer shall not less than 225 micron) on external concrete/ plastered surfaces, including primer, polymer modified cement putty mortar, surface preparation/cleaning / scrubbing of the surfaces with wire brushes, soft brushes, sand papers, steel sheet scrappers and mechanical grinder etc. for removing all kind of burrs, imperfections, undulations and other such defects existing in the surface, material testing in approved independent laboratories, filling surface imperfections such as holes, dents, cracks by using polymer modified cement putty mortar to achieve smooth and level surface, cleaning of all surfaces surrounding to painted area like window frames & glasses using suitable thinners, detergents, chemical cleaners etc, all complete as per specification, manufacturer s specification, drawing and direction of Engineer in charge.	SQM	55,998	.0039143
1304.0	Two or more coats of acrylic distemper of approved brand and manufacture to give an even shade including a priming coat with distemper primer complete.	SQM	42,000	.0010423

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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
A1305	Providing and applying two or more coats of premier quality acrylic plastic emulsion (water-based acrylic co-polymer emulsion with rutile titanium dioxide, other selected pigments and fungicide) paint conforming to IS:15489 of approved make & shade over a coat of approved primer to interior concrete/plaster surfaces, including primer, white cement & fine sand, surface preparation, cleaning / scrubbing of the surfaces with wire brushes, soft brushes, sand papers, steel sheet scrappers and mechanical grinder etc. for removing all kind of burrs, imperfections, undulations and other such defects existing in the surface, material testing in approved independent laboratories, filling surface imperfections such as holes, dents, cracks by using mixture of white cement & fine sand (in the ratio of 1:3) to achieve plain & even surface, cleaning of all surfaces surrounding to painted area like window frames & glasses using suitable thinners, detergents, chemical cleaners etc. all complete as per specification, manufacturer s specification, drawing and direction of Engineer in charge.	SQM	76,282	.004151
A1306	Providing and applying two or more coats of acid and alkali resistant paint of approved make and shade conforming to IS:9862 of minimum 500 micron DFT over a coat of approved primer on flooring, ceiling, walls and other surfaces at all elevations including primer, preparation of the surface, protecting & cleaning etc. all complete as per specification, manufacturer s specification, drawing and direction of Engineer in charge.	SQM	2,608	.000326
A1307	Providing and applying 250 micron DFT epoxy paint (high build solvent free, 3 component i.e base, hardner and pigment) of approved make and shade over approved primer on concrete/plastered surfaces of wall, interior walls, ceiling etc. at all elevation using airless spray equipment including primer, surface preparation, masking of embedded parts, covering of installed equipments, pipe lines, if any, & removal of the same after completion of painting etc., all complete as per drawing, specifications and as directed by the Engineer.	SQM	6,400	.0006078

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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
B1307	Providing and applying 500 micron DFT self-levelling epoxy coating (heavy duty high build solvent free, selfsmoothing, 4 component i.e. base, hardener, filler & pigment material) of approved make and shade over approved primer on concrete/plastered surfaces of floors etc. at all elevation using airless spray equipment including primer, surface preparation, masking of embedded parts, covering of installed equipments, pipe lines, if any, & removal of the same after completion of painting etc., all complete as per drawing, specifications and direction of engineer in charge..	SQM	32,000	.0043368
C1307	Providing and applying 1200 micron DFT self-levelling epoxy coating (heavy duty high build solvent free, selfsmoothing, 4 component i.e. base, hardener, filler & pigment material) of approved make and shade over approved primer on concrete/plastered surfaces of floors etc. at all elevation using airless spray equipment including primer, surface preparation, masking of embedded parts, covering of installed equipments, pipe lines, if any, & removal of the same after completion of painting etc., all complete as per drawing, specifications and direction of engineer in charge.	SQM	10,000	.0030969
1309.0	Two or more coats of fire resistant transparent paint (@3.5 litre per sqm per coat) as per IS 162 on all woodwork over french polish as per IS 348 or flat oil paint as per IS 137 of approved grade and manufacture to give an even shade as per specifications. French polish payment will be made seperately.	SQM	2,560	.0002094
1317.0	Providing and applying minimum 2 mm thick white cement punning on walls including preparation of surface, staging, etc to achieve a smooth even surface all complete as per specification and as directed by engineer.	SQM	4,000	.0000962
1400.0	FLOORING AND SKIRTING: Flooring and skirting at all level including base layer, labour, material (unless otherwise specified in BOQ/contract specification), equipments, transportation, handling, curing, polishing, testing, preparation of work procedure & inspection and test plan, submission of reports and getting approval preparation, submission of work procedure and obtaining approval from BHEL/NPCIL at all level as per specification, drawings and as directed by engineer - in - charge. (Cement shall be supplied by BHEL as a free issue)	--		

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**at 2 X 700 MWe - Kaiga Atomic Power Project # 5 & 6 - Turbine Island Package**

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
A1401	Providing and laying 40 mm thick vacuum dewatered hardonite flooring of cement concrete mix 1:1.5:3 (1 cement: 1.5 sand : 3 stone aggregates 10 mm well graded) with 28 mm thick base coat and 12 mm thick top wearing coat with metallic floor hardner , 1 part metallic hardener mixed dry with 4 part of cement, 6 mm nominal size stone chips shall be added in proportion of 1 part cement (mixed with hardener) to two parts of stone chips, ready mix non-metallic hardner compound @ approximately 6 Kg/sqm for a thickness of 3 mm surfacing, aluminium joint strips, plasticizer like Plastiment BV 40 or equivalent, vacuum dewatering etc. including cleaning, surface preparation, guide rails, levelling and compacting, draining out excess water, rubbing and polishing etc. all complete. as per drawings, specification and direction of the Engineer.	SQM	38,044	.0152619
B1401	Providing and laying cement skirting and dado with underbed cement mortar 1:3 (1 cement : 3 fine aggregate ) finished with 6 mm thick neat cement paste at all elevations of specified height having 6 mm projection beyond pastering surface and total thickness of minimum 19 mm including preparation of base, curing, rubbing, rounding of junction with 25 mm radius, polishing etc. all complete as per drawings, schedule and specifications and as directed by the Engineer.	SQM	2,800	.0006856
A1404	Providing and laying 80 mm thick precast cement concrete M40 grade factory made interlocking pavers blocks conforming to IS 15658 of approved colour, shape and pattern laid over 50mm thick compacted bed of fine sand including filling the joints with fine sand etc. all complete as per specification & direction of the Engineer.	SQM	810	.0002062
A1406	Providing and laying minimum 20 mm thick machine cut and double machine polished kota stone in flooring of approved size, pattern & quality. Underbed shall be 20 mm (average) thick base of cement mortar 1:4 (1 cement : 4 fine aggregate )and brought to proper level pattern and jointed with white cement slurry mixed with pigment to match the shade of the slab including cleaning, surface preparation, rubbing and polishing etc. all complete. as per drawings, specification and direction of the Engineer.	SQM	2,100	.0008366

**Part C : Bill of Quantities****Tender Specification for Civil, Structural and Architectural Works of Turbine Island Package of 2 X 700 MWe PHWR Kaiga Atomic Power Project - Unit 5 & 6, Uttara Kannada District, Karnataka****at 2 X 700 MWe - Kaiga Atomic Power Project # 5 & 6 - Turbine Island Package**

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
A1408	Providing and laying minimum 20 mm thick machine cut and double machine polished kota stone in skirting and dado at various elevations laid on 12 mm thick cement mortar 1:3 (1 cement : 3 fine aggregate) and jointed with white cement slurry mixed with pigment to match the shade of the slab including rubbing and polishing, making groove, finishing & curing work etc. all complete as per drawing, specification and direction of Engineer-in-charge.	SQM	1,410	.0006179
B1408	Providing and laying minimum 25 mm thick kota stone in treads using machine cut and double machine polished kota stone slabs in single piece or as directed with edging / nosing rounded off, providing anti skid groove & laid over 20 mm thick cement mortar 1:4 bedding, close jointed and pointed with matching pigmented white cement slurry finished to levels, slope as required & curing, polishing etc. all complete as per drawings, specifications and direction of Engineer-in-charge.	SQM	3,520	.0016915
C1408	Providing and laying 25 mm thick kota stone in risers using machine cut and double machine polished kota stone slabs in single piece or as directed and laid on and including 12 mm thick cement mortar 1:3, close jointed and pointed with matching pigmented white cement slurry finished to plumb as required & curing, polishing etc all complete as per drawings, specifications and direction of Engineer-in-charge.	SQM	1,760	.000812
A1412	Providing and laying 20 mm nominal thick granite slab of 1st quality in flooring of approved colour, shade and size (Minimum 600mmX600mm) of stone slab, with inlay for the border as flooring design, laid in approved pattern over base 20 mm thick cement mortar 1:4 (1 cement : 4 fine aggregate) and jointed with white cement slurry mixed with pigment to match the shade of the slab including surface preparation, rubbing, curing, moulding and mirror polishing etc all complete as per drawings, specifications and direction of Engineer-in-charge.	SQM	830	.0005999

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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
A1414	Providing and laying 20 mm nominal thick granite slab of 1st quality in dado, skirting, wall cladding with approved colour, shade and size (to cover the entire height of the dado in single piece without any joint and minimum 600mm width) laid in approved pattern over a base of 20 mm thick cement mortar 1:4 (1 cement : 4 fine aggregate) jointed with white cement slurry mixed with pigment, filling the gaps between the base mortar and granite slab with 1 : 2 cement slurry and making 'V' grooves wherever required, stainless steel fisher clamp with expansion bolts at least 2 nos. for each slab wherever necessary, including rubbing, curing, mirror polishing etc all complete as per drawings, specifications and direction of Engineer-in-charge. .	SQM	190	.000144
A1416	Providing and laying premium quality non-skid full body vitrified tiles non-porous,homogenous, abrasion resistant, floor tiles of 1st quality of size 600mm x 600mm of reputed / approved manufacturer varmora,simpolo or equivalent make and shade, conforming to IS: 15622 having minimum thickness of 9 mm in approved pattern laid in floor over underbed of 20mm thick cement mortar 1:4 bedding, close jointed & pointed with matching pigmented white cement slurry and finished to levels / slope as required including cutting of tiles, curing, washing, covering of floor tiles with PVC sheet for protection etc all complete as per drawings, specifications and direction of Engineer-in-charge.	SQM	1,600	.0004712
B1416	Providing and laying premium quality non-skid full body vitrified tiles non-porous,homogenous, abrasion resistant, floor tiles of 1st quality vitrified tile of size 600mm x 600mm of reputed / approved manufacturer varmora,simpolo or equivalent make and shade, conforming to IS: 15622 having minimum thickness of 9 mm in approved pattern laid in skirting and dado over underbed of 12 mm thick cement mortar 1:3 (1 cement : 3 fine aggregate) and jointed with neat white cement slurry with pigment of matching of the tile including cutting of tiles, curing, washing etc all complete as per drawings, specifications and direction of Engineer-in-charge.	SQM	180	.0000557

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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
A1417	Providing and laying premium quality mat finish non-skid ceramic tile flooring using 6mm thick ceramic tiles floor tiles of 1st quality conforming to IS: 15622 of approved size ( minimum 300 mm X 300), make and approved color and design shade laid as per approved pattern over 20mm thick cement mortar 1:4 bedding, close jointed & pointed with matching cement slurry using white cement mixed with pigment, finished to levels / slope or plumb as required including cutting of tiles, curing, acid washing, covering of floor tiles with PVC sheet for protection etc all complete as per drawings, specifications and direction of Engineer-in-charge.	SQM	1,200	.0005205
B1417	Providing and laying premium quality glazed ceramic tiles of 6mm thickness of approved size (Min 450mmx300mm),400x400mm , shade from reputed / approved manufacturer varmora,simpolo or equivalent make conforming to IS: 15622 in skirting and dado with approved color and design,projecting 6mm uniformly from adjacent plaster or wall finish with 50 mm wide matching moulded ceramic trims fixed with average 10 mm thick underbed cement mortar 1:3 (1 cement : 3 fine aggregate) and 6 mm thick setting mortar, jointed with white cement slurry with matching pigment, final surface shall be 6 mm beyond the plastering and total thickness including underbed shall not be less than 20 mm, including cutting of tiles, curing, acid washing, covering of tiles with PVC sheet for protection etc all complete as per drawings, specifications and direction of Engineer-in-charge.	SQM	1,000	.0004287
1419.0	Providing and laying granite stone slab of 20mm thickness single piece for wash basin / sink slab /facia of black or approved colour including 20mm underbed of cement mortar 1:3 with cutting,making corners,moulding and opening etc. all complete.	SQM	100	.0001057
A1422	Providing and laying acid and alkali resistant flooring using non absorbing, without stains, non fading 3 mm thick thermo plastic polypropylene glass lining, two component based pasting compound, pasting mixture on surface and back side of PPG, fibre mat, hardner etc. including warranty/guarantee, surface preparation, pasting, applying dead weight with sand bags, fusion welding, laying, as per the manufacturer s recommendation and by specialised agency etc all complete as per drawings, specifications and direction of Engineer-in-charge.	SQM	1,628	.0005911

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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
A1423	Providing and laying acid and alkali resistant dado and skirting using non absorbing, without stains, non fading 3 mm thick thermo plastic polypropylene glass lining, two component based pasting compound, pasting mixture on surface and back side of PPG, fibre mat, hardner etc. including warranty/guarantee, surface preparation, pasting, applying pressure by jacks on vertical surfaces, fusion welding, laying as per the manufacturer s recommendation and by specialised agency etc all complete as per drawings, specifications and direction of Engineer-in-charge.	SQM	236	.0000857
A1427	Providing and laying 6 mm thick premium quality mat finish glazed tile flooring conforming to IS: 15622 of approved size, make and shade with 20 mm thick underbed cement mortar 1:3 (1 cement : 3 fine aggregate) and 6 mm thick setting mortar (1 part portland cement:1 part lime putty: 3 part sand), jointed with white cement slurry with matching pigment, finished to levels / slope or plumb as required including cutting of tiles, curing, washing, covering of floor tiles with PVC sheet for protection etc all complete as per drawings, specifications and direction of Engineer-in-charge.	SQM	550	.0002239
A1428	Providing and laying 3 mm thick PVC tile flooring of approved make and shade including preparation of base, laying with approved adhesive, jointing etc. all complete as per drawings, specifications and direction of Engineer-in-charge.	SQM	600	.0001935
B1428	Providing and laying 3 mm thick PVC tiles in skirting and dado of approved make and shade including preparation of base, laying skirting with approved adhesive, jointing etc all complete as per drawings, specifications and direction of Engineer-in-charge.	SQM	150	.000005
1430.0	Providing and fixing dividing strips in joints of cast in situ floorings at various elevations, finishing, all labour, material etc. complete as per drawing, specification and instructions of engineer in charge.	--		
a	Glass strips 40 mm wide and minimum 6 mm thick.	RM	4,000	.0000556
A1432	Providing non-skid finish to concrete surfaces in ramps, external open stair etc. by forming chequered surfaces having 150 mmx 150 mm rules all complete . Payment of concrete shall be made separately in the relevant item of BOQ.	SQM	200	.0000597



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#### at 2 X 700 MWe - Kaiga Atomic Power Project # 5 & 6 - Turbine Island Package

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
A1433	Providing and laying 2 mm thick PVC fire retardant electrostatic conductive flooring/tile/skirting of approved make and shade, size, pattern including preparation of base, laying with approved conductive adhesive, copper grounding strips, welding rods,heat welding, fillers, jointing, flexible, resilient, dimensionally stable, wear resistant, slip resistant, fire retardant, fungus & bacteria resistant, water & chemical resistant, nominal resistance between any locations on the conductive floor to the earth pads shall be between 104 to 106 ohms,required physical & electrical properties,installation & performance testing,copper strip network shall be suitably connected to the nearest available station-earthing pad, preparation of drawings, inspection manual, maintenance instruction manual , supply of spare floor tiles with adhesives & flooring accessories, testing etc. all complete as per specifications and direction of Engineer-in-charge.	SQM	2,474	.0015694
A1434	Providing and installation of minimum 2 mm thick PVC electrostatic conductive skirting at various elevations inside main plant buildings over concrete / plaster surfaces satisfying all the requirements laid down in NPCIL technical specification PP-E-2273 including all accessories / material required for installation of the same such as copper grounding strips, welding rods, surface preparation / levelling of floor, adhesive etc. as per requirements and testing at site all complete as per drawing, specifications and direction of the Engineer.	SQM	192	.0001536
A1435	Providing and laying Acoustic & Antistatic (shall reduce impact sound by 14dB and an electrical resistance of more than 30M-Ohm) decorative type flooring of approved shade, pattern, texture, etc. all complete as per drawing, specifications and direction of the Engineer. The Floor Surface material shall be Green guard (UL) certified to avoid VOC free / low emitting surface.	SQM	2,706	.0017301
1500.0	ROOFING / SIDE CLADDING: Roofing / side cladding work including all labour, material (unless otherwise specified in BOQ/contract specification), equipment, transportation, handling, scaffolding, laps, hooks, washers, corner pieces, preparation of work procedure & inspection and test plan, reports etc. preparation, submission of work procedure and obtaining approval from BHEL/NPCIL at all level as per specification, drawings and as directed by engineer - in - charge.	--		

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**Tender Specification for Civil, Structural and Architectural Works of Turbine Island Package of 2 X 700 MWe PHWR Kaiga Atomic Power Project - Unit 5 & 6, Uttara Kannada District, Karnataka**

**at 2 X 700 MWe - Kaiga Atomic Power Project # 5 & 6 - Turbine Island Package**

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
A1502	Designing, providing, erection and fixing troughed permanently metal deck sheet of approved profile, sectional properties and drawing grade conforming to IS 513 over roof purlins for cast-in-situ roof slab. Bare metal thickness of deck plate shall be minimum 1.0mm with minimum trough depth of 51 mm having minimum yield strength of 250 MPa (percentage elongation 23% as per IS:2062), galvanisation to grade 275 as per IS:277 and shall serve as permanent shuttering to the floor/roof slab as per manufacturer s recommendations/ calculations/ test certificates etc. for below mentioned spans including side lapping, end lapping, fixing of sheet to purlin with self drilling and taping type fasteners of minimum 5.5 mm dia @ maximum 390mm c/c in the trough considering the wind load, self load and other associated loads, neoprene washers, sealing, lapping, weather tight arrangement etc. all complete as per specifications and direction of engineer in charge. The sectional modulus and moment of inertia of troughed profile per meter width shall be so as to limit the deflection of sheets to span/250 under total super imposed loading (DL +LL). of minimum 1000 kg per Sq.M. Measurement of profile sheeting shall be of the plan area of roof covered by MS trough metal decking. Supply and installation of the deck sheeting shall be done by same agency.	--		
a	Span Upto 1800mm	SQM	11,830	.0047357
b	Span Exceeding 1800mm and upto 2500 mm	SQM	1,000	.0006134
B1502	Extra over ST No. A1502 for providing and applying Intumescent coating/painting on deck sheet comprising of 3 layers (anticorrosive primer, base coat and seal coat or decorative coat) of approved make, coating thickness and fire rating etc. including fire testing of coating system by independent approved laboratory, application by certified applicator, protection and cleaning, scaffolding etc. all complete as per specifications, drawings and direction of engineer in charge. The Primer & Seal/Top coat shall be compatible with base coat. The product proposed for use shall be manufactured by a reputed & experienced company having in-house R&D & fire test facility. The Coating shall be certified from reputed agencies like UL (USA) & Warrington (UK) etc.	SQM	11,830	.0053672

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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
1503.0	Providing and fixing shear connectors of mild steel studs having 16mm dia and minimum 75 mm projected length above purlin passing through metal decking as per relevant IS codes and specification.	QUINTAL	60	.000367
A1511	Providing and fixing under deck insulation of 50 thick PUF material of density 36 kg/cubic meter backed with 0.05 mm thick aluminum foil and 24 Gx25 mm wire mesh netting fixed to ceiling or wall as the case may be with 100x50x6 slotted mild steel plate welded to M.S. plate inserts embedded at the soffit of the slab at 600 mm c/c and 14 G steel wire drawn through slots and fixed to wire netting all complete as per specification.	SQM	13,998	.004591
1517.0	Providing and fixing 1 mm thick corrugated/semicorrugated G.I. sheet in roofs, cladding of minimum galvanisation of 275 gsm total on both sides with minimum 150mm overlapping, 8 dia G.I. hook bolts or 'J' Bolts and nuts @305 mm c/c along with G.I. and bitumen washers including cutting of sheets for opening etc. all complete.	SQM	320	.0000874
1518.0	Supply & fixing FRP (fibre reinforced plastic) sheets 2 mm thick including GI hooks/ J or L bolts, nuts, washers, bitumen washers etc. complete including overlap 100mm .	SQM	160	.0000514

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**at 2 X 700 MWe - Kaiga Atomic Power Project # 5 & 6 - Turbine Island Package**

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
A1519	Designing, providing, erection and fixing of factory made removable modular type self inter lockable metal panels of preformed textured hot dip galvanized strips and sheets of low carbon steel, non reflective/glare free of approved colour, shade and pattern with supporting structure. Cladding panels to be made up of combination of two sheets locked and rivetted together and suitably infilled to achieve strength and acoustics. Front panel shall be fire retardant precoated GI sheet (bare metal thickness = 0.6 mm and coating thickness = 0.15 mm), Back Cover shall be power coated GI sheet 0.6 mm thick (bare metal thickness) with power coating. Supporting structure shall be made from heavy duty powder coated modular steel frame (Minimum sheet thickness 1.6 mm). Overall system thickness for panelling shall be 70mm to 85mm and for partition shall be 85mm to 110mm. Sound transmission class (STC) value shall be of 35 for wall paneling & partition etc. all completed including all fitting, fixture, surface finishes, support structure of panel, insulation, testing, panels, corner cap, floor mounting arrangement with C Channel, bend resistant tiles, anchor fastner, test reports/certification, preparation of scheme, submission and approval of design & drawing, etc. all complete as per specification, drawing and direction of engineer in charge.	SQM	1,028	.0013571
A1520	Designing, providing, erection and fixing of modular type cladding for mounting the LVS/Screen with sturdy metal understructure, green guard complying/certified having fire retardant top finish, insulated, water & scratch resistant with high hardness, thickness of cladding shall be 12 mm, ends shall have curvilinear design duly filleted/rounded, flame spread index (FSI)<25 as per ASTM- E84 etc. including all fitting, fixture, surface finishes, support structure of panel, insulation, testing, panels, corner cap, anchor fastner, test reports/certification, preparation of scheme, submission and approval of design & drawing etc. all complete as per specification, drawing and direction of engineer in charge.	SQM	200	.0002688

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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
1600.0	FALSE CEILING: False ceiling including all labour, material (unless otherwise specified in BOQ/contract specification), equipment, transportation, handling, suspension system, preparation of fabrication working drawings, preparation of work procedure & inspection and test plan, submission of reports/drawings and getting approval from BHEL/NPCIL etc at all level as per specification, drawings and as directed by engineer - in - charge.	--		
1601.0	Providing and fixing glass fibre reinforced gypsum plaster board (GRG) ceiling (having gypsum core mixed with glass fibre) system consisting of metal supporting grid system forming panels of specified size, suspended from RCC slab/structural steel or catwalkway grid above with 4 mm (minimum) galvanised wires (rods) with special height adjustment clips, including preparation of working drawing, providing openings for AC ducts, return air grills, light fixtures etc (but excluding the cost of catwalkway grid) all complete as per drawings, specification and instructions of the engineer.	--		
a	12 mm thick GRG board with galvanised light gauge steel load bearing supporting GI frame and finished flat (seamless).	SQM	400	.0000798
b	12 mm thick GRG board in profile (dome ,curved profiled etc.) with galvanised light gauge steel load bearing supporting GI frame and finished smooth (seamless).	SQM	400	.0001197
A1603	Providing, designing, fixing and laying permanently colour coated aluminium false ceiling of approved colour, any shape, of Hunter Douglas Luxalon 84C or 84R, 150C, 300C or approved equivalent , plain or micro perforated with corrosion resistant aluminium alloy panels of minimum thickness 0.5mm, closed type including acoustic pads consisting of 25 mm thick glass wool (density 32 kg/cum) wrapped in glass cloth on top of panels, 4 mm dia enamelled aluminium of satin black colour panel carrier, adjustable suspension steel rods of 4 mm dia with fixing arrangement, including all accessories, fittings, seismic anchoring and isolation, carrier splice, edge cover profile, coner splices, cross	SQM	3,518	.0023019

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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
A1609	Providing, designing fixing and laying fire rated demountable translucent stretch ceiling, ready to install corners, manufactured from non-toxic material upon burning, 100% recyclable, transmit around 80% light and absorb around 20% of light including ceiling suspension system, fitting, fixture, finishes, insulation, testing, anchor fastner, test reports/certification, preparation of scheme, submission and approval of design & drawing, etc. all complete as per specification, drawing and direction of engineer in charge.	SQM	800	.0010025

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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
A1610	Providing,designing and fixing Grid type factory made Acoustic modular Metal False Ceiling System of 600x600 mm.600X1200 module comprising of perforated and non-perforated metal luxalon panels of Hunter Douglas or equivalent approved make, shade and colour, acoustically sound with fire rated acoustic fleece, includes providing and fixing C wall angle of size 20x30x20mm made of min.0.5mm thick pre- painted steel along the perimeter of the room with help of nylon sleeves and wooden screws at 300mm centre to centre, suspending the main C carrier of size 10x38x10mm made of G. I. steel 0.7mm thick from the soffit of RCC slab / structural steel or catwalk steel channel grid above with help of soffit cleat 37x27x25x1.6 mm, rawl plugs of size 38x12 mm and C carrier suspension clip and main carrier bracket at 1000mm c/c. Inverted triangle shaped Spring Tee having height of 24 mm and width of 34mm made of GI steel 0.45 mm thick is then fixed to the main C carrier and in direction perpendicular to it at 600mm centres with help of suspension brackets with special height adjustment clips,. Wherever the main C carrier and spring T have to join, C carrier and spring T connectors have to be used. All sections to be galvanized @ 120 g/m2 (both side inclusive) Fixing with clip in tiles into spring 'T' with GI Metal Ceiling Clip in plain Beveled edge global white colour tiles of size 600x600 and 0.5mm thick with 25mm height, made of G I sheet having galvanizing of 100 g/m2 (both sides inclusive) as per IS 277 and 20% perforation area with 1.8mm diameter holes and having NRC of 0.5, electrostatically polyester powder coated of thickness 60 microns (minimum), including factory painted after bending and perforation and backed with a black Glass fibre acoustical fleece, providing anchor fasteners for making suspension arrangement from RCC slab,steel struture,openings for AC ducts, return air grills, insulation,cut out for light fixtures,provision for integrated lighting,fire detection/ fighting system,preparation of scheme, submission and approval of design & drawing etc., all complete as per specification and approved by engineer incharge.	SQM	600	.0006886

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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
A1611	Providing Design and Fixing 8 mm thick Calcium silicate acoustic board of Hilux or equivalent for false ceiling in plan or elevation with aluminium grid, metal suspension system, anchor fastener adjustable hangers etc. including plastic emulsion painting of approved colour to give an even shade and smooth finish all complete as per architectural design and detail, metal suspension system as per ASTM C-635 shall be hot dipped M.S.galvanized (grade 180 as per is :277) and nominal size of T-section shall be 24 x 38 mm or 24 x 25 mm cross runners, 24mm wide exposed flange surface shall be permanently color coated. Suspension system shall be as per manufacturer's specification.The size of tiles shall be 600 X 600 mm or seamless as per detail design and drawing.Movement platform of structural steel shall be provided if required for the movement of personnel to facilitate maintenance of lighting fixtures, AC ducts etc.including ceiling suspension system of GI perimeter channels, wood screws, metal expansion raw plug, fire & moisture resistant, fitting, fixture, insulation, testing, anchor fastener, test reports/certification, preparation of scheme, submission and approval of design & drawing,etc. all complete as per specification, drawing and direction of engineer in charge. (Structural steel works for platform for movement is separately payable under relevant items of BOQ). etc. all complete as per specification, drawing and direction of engineer in charge.	SQM	400	.0002951
1700.0	RAIN WATER DOWN TAKE PIPES, DRAINS, SEWERAGE SYSTEM: Rain water down take pipes, drains, sewerage system at all level including all labour, material (unless otherwise specified in BOQ/contract specification), transportation, 2 coats of approved paint over one primary coat, fixtures, accessories, preparation of work procedure & inspection and test plan, testing, submission of reports/drawings and getting approval from BHEL/NPCIL etc. as per specification, drawings and as directed by engineer - in - charge. (Cement shall be supplied by BHEL as a free issue).	--		
A1706	Providing and fixing down take ultra violet stabilised Un Plasticized Rigid PVC Rain water pipes of approved make conforming to IS:13592 type A including shoes, bends, clamps, all fittings & fixtures, leak testing, jointing the pipe with suitable material in line and level with seal ring conforming to IS:5382/IS:14735, fixes with holder etc. all complete as per specification.	--		



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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)	160 mm OD	RM	5,908	.0016415
b)	110 mm OD	RM	3,768	.0006085
A1709	Providing, fixing and laying in position above ground/underground works HDPE pipes for drains works, conforming to IS:4984, grade PE 100, pressure rating PN 6, including jointing of pipe to pipe or pipe to long neck pipe ends by electric heating mirror at site, joints to be flanged joints, jointing conforming to IS : 7634 (Part-2), cutting and trimming of pipes, all accessories, fittings & fixtures, preparation of bends as per requirement at site, testing, preparation of bed for laying the pipes etc. all complete as per specification, drawing and directed by Engineer-in-charge	--		
a)	Nominal diameter 160 DN	RM	1,060	.0002066
A1711	Providing, laying and fixing in position underground double walled corrugated pipe for drains works, conforming to IS:16098, Part 2, stiffness class SN 8, including jointing of pipe to pipe or pipe to long neck pipe ends by electric heating mirror at site, joints to be flanged joints, laying and jointing conforming to IS : 7634 (Part-2), cutting and trimming of pipes, all accessories, fittings & fixtures, preparation of bends as per requirement at site, testing, preparation of bed for laying the pipes etc. all complete as per specification, drawing and directed by Engineer-in-charge.	--		
a)	Nominal diameter 225 DN	RM	500	.0001461
b)	Nominal diameter 300 DN	RM	300	.0001068
c)	Nominal diameter 400 DN	RM	300	.0001954
d)	Nominal diameter 500 DN	RM	1,396	.0013131
e)	Nominal diameter 800 DN	RM	300	.0007896
f)	Nominal diameter 1000 DN	RM	80	.0002792

**Part C : Bill of Quantities**

**Tender Specification for Civil, Structural and Architectural Works of Turbine Island Package of 2 X 700 MWe PHWR Kaiga Atomic Power Project - Unit 5 & 6, Uttara Kannada District, Karnataka**

**at 2 X 700 MWe - Kaiga Atomic Power Project # 5 & 6 - Turbine Island Package**

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
A1712	Providing, laying or fixing in position elevated HDPE pipes for Roof drains works, conforming to IS:4984, grade PE 100, pressure rating PN 6, including jointing of pipe to pipe or pipe to long neck pipe ends by electric heating mirror at site, joints to be flanged joints, laying and jointing conforming to IS : 7634 (Part-2), cutting and trimming of pipes, preparation of bends as per requirement at site, preparation of bed for laying the pipes etc. all complete as per specification and directed by Engineer-in-charge.	--		
--	Nominal diameter 315 DN	RM	420	.0001985
--	Nominal diameter 400 DN	RM	320	.0002116
--	Nominal diameter 450 DN	RM	320	.0002598
--	Nominal diameter 560 DN	RM	320	.000369
--	Nominal diameter 630 DN	RM	880	.0012576
--	Nominal diameter 710 DN	RM	320	.0005607
--	Nominal diameter 800 DN	RM	50	.0001067
--	Nominal diameter 1400 DN	RM	50	.0003184
1800.0	MISCELLANEOUS: Miscellaneous works including all labour, material (unless otherwise specified in BOQ/contract specification), equipment, preparation of work procedure & inspection and test plan, submission of reports/drawings and getting approval etc. from BHEL/NPCIL at all level unless otherwise specified as per specification, drawings and as directed by engineer - in - charge. (Cement shall be supplied by BHEL as a free issue).	--		

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**Tender Specification for Civil, Structural and Architectural Works of Turbine Island Package of 2 X 700 MWe PHWR Kaiga Atomic Power Project - Unit 5 & 6, Uttara Kannada District, Karnataka**

**at 2 X 700 MWe - Kaiga Atomic Power Project # 5 & 6 - Turbine Island Package**

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
A1801	Providing and Filling in trenches, plinths, area paving and other underground structures with hand packed rubble soling having graded stone aggregate in layers not exceeding 230 mm in thickness including breaking of stone boulders to required sizes, filling voids and interstices filled in solidly by wedging with hard chips small stones, interstices finished with cement sand mortar(1:10) minimum of required thickness and compacting to 85 % of original volume of stone stack for all lifts, compaction with power roller, surface blinding with sand etc. all complete as per specification, drawing and direction of engineer in charge. Payment shall be made for the measurement of the volume of the compacted fill.	CUM	8,994	.0066829
B1801	Rubble soling shall be laid to the specified thickness closely packed by hand and firmly set with their broadest face downwards. The interstice between adjacent stones shall be wedged with 40 mm to 75 mm stone jelly(25% of soling by volume) and well driven with wooden mallet to ensure a tightly packed layer.After hand picking and wedging, compaction of the soling shall be done throughly with long hammers, thereafter the small interstices shall be blinded with gravel(20% of soling by volume) and compacted with hand roller.	SQM	1,062	.0002197
1802.0	Supply and laying approved quality Stone aggregate 40mm size in transformer yards.	CUM	100	.0000975
1803.0	Supply and laying approved quality rounded pebbles / gravels of 40mm size in transformer yards.	CUM	100	.0000988
1807.0	Anti termite chemical treatment of soil with Chlorpyriphos/Lindane E.C. 20% with 1% concentration conforming to IS:8944 and as per IS 6313 all complete. (Plinth area of building at ground floor only shall be measured for payment).	SQM	14,294	.0005812
1808.0	Laying of earthing mats/rods including risers, transportation from yard stores, loading, unloading, cutting to length, welding, protective painting of joints etc. all complete as per specification, drawing and directed by Engineer-in-charge. (Excavation & Back filling shall be paid separately under respective item of earth work. Earthing mats/rods shall be supplied by BHEL free of cost.	MT	180	.0005304

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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
1809.0	Construction of below ground earthing system test pits as per drawing / sketches including concreting, reinforcement, formwork, providing & fixing GI strip etc as per drawing and specification (excavation & backfilling only will be paid under applicable BOQ items).	NO	64	.0001896
1810.0	Construction of below ground earthing system test links as per drawing/ sketches including concreting, reinforcement, formwork, providing & fixing GI strip etc as per drawing & specification (excavation & backfilling only will be paid under applicable BOQ items).	NO	64	.0001391
1811.0	Construction of below ground earthing system earth electrodes as per drawing and specification. ( Excavation and backfilling only will be paid under applicable BOQ items)	NO	64	.0000393
1812.0	Construction of below ground earthing system - Earth connection and riser pig tails as per drawing and specification. ( Excavation and backfilling only will be paid under applicable BOQ items& steel shall be supplied by BHEL free of cost.)	NO	58	.0000302
1813.0	Providing Earthing pit as per drawing with charcoal & salt, GI pipes, GI earth electrodes, GI wire, GI strips, brick chamber with covers including associated earthwork etc. all complete.	NO	64	.0004148
1814.0	Construction of below ground earthing system test pits as per drawing/ sketches including brickwork, plaster, concreting, reinforcement, formwork, providing & fixing GI strips/pipes, GI wires, covers etc as per drawing & specification including associated earthwork.	NO	64	.0003068
A1814	Providing and installation of 50 x 6 mm GS flat ground conductor embedded in concrete.	RM	4,200	.0003069
B1814	Providing, fabrication and installation of wall / floor / neutral pads of 200x60x10 mm MS wall / floor / column pads flushing its face fully with wall/floor surface including welding of pads to MS rod / GS flat and supporting it in the concrete, painting of pads with two coats of approved anti-corrosive paint after welding etc. all complete.	NO	740	.0013005

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### Tender Specification for Civil, Structural and Architectural Works of Turbine Island Package of 2 X 700 MWe PHWR Kaiga Atomic Power Project - Unit 5 & 6, Uttara Kannada District, Karnataka

#### at 2 X 700 MWe - Kaiga Atomic Power Project # 5 & 6 - Turbine Island Package

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
1815.0	Providing and fixing GI rungs in concrete/brick walls having zinc coating of minimum 900 g/sqm etc. all complete.	Kg	4,600	.0001134
1817.0	Providing and laying dry stone pitching of 230 mm thickness for slope protection in cement mortar 1:6 including hammer dressing, raking of joints, pointing, preparing the bedding surface and voids filling with stone aggregate etc. all complete.	SQM	200	.0001706
1819.0	Supply & fixing expanded metal steel sheet conforming to IS:412. Size of mesh shall be 10mmX40mm with strands of 2.5mm width and 1mm thickness to the structural steel for facilitating fireproofing works.	SQM	900	.0000855
1821.0	Sprinkling of water by water tanker fitted with perforated GI pipe (portable tanker minimum 3000 litre capacity) for roads and miscellaneous area within plant boundary, for dust suppression and reduction of suspended material at site for day to day work, as directed by BHEL site engineer (water for this purpose shall be provided by BHEL free of cost and utilisation of machine will be in terms of Tank-hour put in actual use for water sprinkling).	TANK-HR	2,000	.0003017
1823.0	Providing and laying cinder filling in the toilets,etc complete as directed by engineer in charge.	CUM	20	.0000107
1824.0	Disposal of scrap steel, scrap wood, broken packing crates, cable scrap, debris and other civil waste, electrical waste materials etc. from project site to a designated place within 5 KM range, with all manpower T & P etc. including loading and unloading as and when directed by BHEL.	--		
a)	Steel scrap / metal scrap	MTÂ	32	.0000042
b)	Debris & Other waste materials.	CUM	40	.000001
1827.0	Anti weed chemical treatment of soil with suitable chemical pertaining to the types of weeds found in the vicinity including providing anti-weed/ soil sterilization test certificate, performance guarantee of three years etc. all complete.	SQM	17,478	.0000221

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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
1836.0	Providing & fixing flame arrestor of approved specification at the end of vent pipes upto 160 mm dia in Oily water manholes in hazardous zone of refinery area.	EACH	100	.0002031
A1842	Providing and fixing in position GI chicken wire mesh of min 22 gauge dia and 25 mm mesh at the junction of steel, RCC, brickworks for plastering, for steel encasement etc. including materials, scaffolding, labour, tools, cutting, bending, fixing etc. all complete as per specification and direction of engineering In charge.	SQM	4,000	.000433
A1843	Providing and fixing in position fire proof welded wire mesh conforming to IS:1566 of approved size and pattern in beams, columns and slabs etc. including materials, scaffolding, labour, tools, cutting, bending, fixing etc. complete as per specification and direction of engineering In charge.	MT	4	.000049

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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
A1844	Providing engineering consultancy services for Architectural design & drawings for ergonomically compliant Control Room in turbine building/Annexe Building considering aesthetics, functionality, considerations for physiological aspects such as line of sight, field vision, cognitive factor, satisfactorily environment conditions, human factor engineering to improvise efficiency, submission of various options for approval etc. in harmony with the overall plant and presented in the form of presentation drawings, including 3-D perspective rendered views, preparation of ergonomic compliance report as per ISO 11064, colour pallets, panoramic views, walkthrough, with color schemes, energy simulation, lighting design, external & internal finishes, false ceiling, internal partitions, panelling, glazing, acoustic design, interior architecture etc. including preparation of integrated services drawings in co-ordination with electrical, HVAC & fire systems and taking approval on drawings from BHEL/custome, preparation of BOQ and specficiations in consultation with BHEL etc. all complete as per specification and direction of engineer in charge. Approximate area of control room is 500 sqm however for any variation during detailed engineering stage, no extra payment is admissible.The 3-D model shall be compliant with customer specification for transfer to complete plant design model. The scope of bidder shall also include coordination with respect to HVAC, electrical , mechanical system, fire fighting systems, C&I etc. for all facilities for control room in consultation with BHEL/customer. Structural design & drawing of buildings and control room are in scope of BHEL and not included in scope of bidder.	LUMP SUM	1	.0026545
A1845	Providing of following OEM documents along with the design and engineering work carried out under item no A1844 all complete as per specification.	--		
a	Certificate for ISO 9001-2015 quality certification.9001 a proof of quality system implementation in manufacturing processes.	L.S	1	.0015484
b	Ergonomic compliance report for control room layout as per ISO 11064	L.S	1	.0015484

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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
A1846	Providing 50mm thick premix carpet surfacing laid to slope in two layers 30mm and 20mm respectively with 12mm downgraded stone chips mixed with 80/100 grade bitumen @ 52 Kg/Cu.M including compaction etc. all complete.	SQM	1,026	.0001373
A1847	Plantation of premium variety of plant as per specification and direction of engineering In charge.	EACH	100	.000042
2000.0	FENCING AND GATES: Fencing and gates including all labour, material (unless otherwise specified in BOQ/contract specification), equipment, preparation of work procedure & inspection and test plan, submission of reports/drawings and getting approval etc from BHEL/NPCIL at all level as per specification, drawings and as directed by engineer - in - charge.	--		
A2004	Supplying and erecting in position 3m high chain link fencing with GI welded wire mesh 50x50 of 3 mm diameter with 4 mm dia. 3 no.s of line wires having high tensile wires and Concertina Razor Barbed tape coil of height of 600 mm at top of fencing in the	RM	400	.0001664
A2005	Supplying and erecting in position of Concertina Razor Barbed tape coil in the	RM	400	.0001778
A2007	Supply and fixing of hot dip galvanised mild steel posts for fencing having coat of zinc phosphate primer, two coats of aluminium enamel paint etc. all complete	MT	12	.0002455
A2009	Supply, fabrication and installing in position and testing galvanised MS Gates out of channels, joists, angles, flats, plates, GI pipes, welded steel wire mesh & sheets including stiffeners, bracings, fabricated hinges, MS Aldrops with locking arrangement, tempered steel pivot, guide track of MS Tee, hasp & staple for locking, pull handle, bronze aluminium ball bearing arrangements, castor wheels, paintings with two coats of aluminium enamel paint over a coat of approved primer etc. all complete.	MT	30	.0007576
2100.0	WATER SUPPLY: Water supply work including men, material (unless otherwise specified in BOQ/contract specification), equipment, preparation of work procedure & inspection and test plan, submission of reports/drawings and getting approval from BHEL/NPCIL etc. at all level as per specification, drawings and as directed by engineer - in - charge. (Cement shall be supplied by BHEL as a free issue)	--		



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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
A2101	Providing and fixing premium quality 15 mm dia heavy duty type chromium plated (CP) brass screw down Bib cock (latest model) easy clean variety on GI lines conforming to IS: 781.	EACH	550	.0001078
A2102	Providing & fixing heavy quality 15 mm dia heavy duty type chromium plated (CP) brass screw down Stop cock (latest model) easy clean variety on GI lines conforming to IS: 781.	EACH	550	.0000674
A2103	Providing and fixing in position best quality gun metal sluice valves of screw down type with cast iron hand-wheel of approved quality including fixtures & fittings etc. all complete for following sizes.	--		
a	25mm nominal bore.	EACH	280	.0000399
b	50mm nominal bore.	EACH	270	.0000647
A2104	Providing and fixing in position and testing MS galvanised pipes heavy quality (Red; class 'C') as per IS: 1239 & fittings conforming to IS: 1879 like tees, elbows, collars, unions, nipples, enlargers, reducers, bends, coupling & all other fittings required to complete the work, including laying under the floors, in walls where required, exposed surface of pipes to be coated with oil paint/anticorrosive paint, cutting chase through brick or concrete work and making good after erection of the pipe lines, roof slabs, including all jointing materials like teflon tape, clamps, wooden gutties, screws, cement, sand, testing the pipes with clean water as per the code of practice water supply in building of IS: 2065 etc. all complete.	--		
a	15 mm nominal bore	RM	1,000	.0000312
b	20 mm nominal bore	RM	500	.00002
c	25 mm nominal bore	RM	850	.0000486
d	50 mm nominal bore	RM	250	.0000288

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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
A2105	Providing, laying, jointing, fixing and testing external work with MS galvanised pipes heavy quality (Red; class 'C') as per IS: 1239 & fittings conforming to IS: 1879 like tees, elbows, collars, unions, nipples, enlargers, reducers, bends, coupling & all other fittings required to complete the work, including two coats of oil paint/anticorrosive paint, making good after erection of the pipe lines, all jointing materials like teflon tape, clamps, wooden gutties, screws, cement, sand, testing the pipes with clean water as per the code of practice water supply in building of IS: 2065 etc. all complete.	--		
a	15 mm dia	RM	700	.0000225
b	20 mm dia	RM	400	.0000165
c	25 mm dia	RM	250	.0000147
d	32 mm dia	RM	250	.0000178
e	40 mm dia	RM	250	.0000225
f	50 mm dia	RM	250	.0000299
A2106	Providing and fixing cut edge mirror 6mm thick of overall size 600X450mm especially fabricated with superior glass (of approved quality) with designer acrylic PVC frame of approved colour and make mounted alround with 6mm thick non-water absorbant Acrylic/PVC material backing fixed with cleats using C.P. brass screws and washers etc. all complete.	EACH	260	.0004488
A2107	Prviding & fixing 600 x 125 mm sheet glass shelves 6 mm thick or equivalent with CP brass brackets and guard rails, fixed to wooden cleat with CP brass screws including all fixtures and fittings etc. all complete.	EACH	120	.0000244
A2109	Providing & fixing CP brass heavy quality towel rods of size 600 x 20mm with a pair of CP brass brackets, wall flanges etc. fixed to wall with CP brass screws, screwed on to rawl plugs including all fixtures and fittings etc all complete.	EACH	120	.0000236

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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
A2110	Providing and fixing best quality white glazed vitreous china ware recessed soap tray of 150 x 76 mm or equivalent of approved make including cutting hole in wall, rectifying the surface and all fixtures and fittings etc. all complete.	EACH	50	.0000048
2111.0	Providing and fixing stainless steel / C.P. liquid soap dispenser. Dispenser shall be round and easily revolving with removable threaded nozzle and mounted on C.P. brackets etc all complete.	EACH	240	.0000637
A2112	Providing and fixing 150 mm x 150 mm or equivalent recess type toilet roll holder in white glazed vitreous chinaware including cutting into wall and making good the same etc. all complete.	EACH	240	.0000304
A2113	Providing & fixing easy clean CP brass shower rose including Shower arm 190mm long and wall flange of superior quality with 15 mm inlet of 100 mm dia revolving type etc. all complete.	EACH	116	.0000149
2114.0	Providing & fixing in position P.V.C. water tank of Syntex or approved equivalent including making all necessary inlet & outlet pipes, fixture, ball cocks, valves etc all complete for following capacities. GI pipes shall be paid separately under respective items.	--		
--	500 litres capacity	EACH	8	.0000088
b	1000 litres capacity	EACH	4	.0000088
c	2000 litres capacity	EACH	4	.0000176
A2115	Providing and fixing electric operated hand dryer with photo voltaic control.etc all complete..	EACH	40	.0001566
A2116	Providing and fixing approved quality CP brass two pronged coat hooks fixed to wall / door with CP brass screws and rawl plugs including cutting and making good the wall etc. all complete.	EACH	220	.0000262

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**at 2 X 700 MWe - Kaiga Atomic Power Project # 5 & 6 - Turbine Island Package**

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
A2117	Providing, hoisting at required level and fixing 25 litres capacity or equivalent stationary type electric storage water heater conforming to IS 2082/ IS302 Part-2 Section 21 of approved make including all accessories like brass connector, fusible plug, non-return valve, pressure release valve, thermostat, stop cock for inlet and outlet and all fittings and fixtures etc. all complete.	EACH	10	.0000382
2200.0	SANITARY: Sanitary work including all labour, material (unless otherwise specified in BOQ/contract specification), equipment, preparation of work procedure & inspection and test plan, submission of reports/drawings and getting approval from BHEL/NPCIL etc. at all level as per specification, drawings and as directed by engineer - in - charge. (Cement shall be supplied by BHEL as a free issue).	--		
A2201	Providing and fixing premium quality glazed vitreous chinaware wash basin of approved make and colour having size 550 mm x 400 mm or equivalent including, one pair of wall bracket of 35mm x 35mm x 5mm M.S. angle painted with two coats of white enamel paint of approved quality and make, 32 mm NB CP brass waste coupling heavy quality with rubber plug and chain, angle valve and PVC connector, 32 mm NB CP casted brass bottle trap with extension piece and wall flange and connected C.P. pipe as approved, 15 mm NB, CP brass pillar tap heavy deluxe type with triangular / roundish knob for hot & cold water and 15 mm NB CP inlet connection with all brass unions and wiped solders joints, one no. central hole C.P. brass basin mixer without popup waste system with 450mm long braided hoses of superior quality as approved., 32mm dia B class G.I. waste pipe (concealed) of required length (from bottle trap to nahani trap) including painting with anti corrosive bituminous paint.etc. all complete.	--		
a	White	EACH	80	.0001773
b	Colored	EACH	20	.0000469

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**Tender Specification for Civil, Structural and Architectural Works of Turbine Island Package of 2 X 700 MWe PHWR Kaiga Atomic Power Project - Unit 5 & 6, Uttara Kannada District, Karnataka**

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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
B2201	Providing and fixing premium quality glazed vitreous chinaware wash basin oval type of approved make and colour having size 560 mm x 450 mm or equivalent including One pair of wall bracket of 35mm x 35mm x 5mm M.S. angle painted with two coats of white enamel paint of approved quality and make., 32 mm NB CP brass waste coupling heavy quality with C.P. grating, rubber plug and chain, angle valve and PVC connector, 32 mm NB CP casted brass bottle trap with extension piece and wall flange and connected C.P. pipe as approved., 15 mm NB, CP brass pillar tap heavy deluxe type with triangular / roundish knob for hot & cold water and 15 mm NB CP inlet connection with all brass unions and wiped solders joints, One no. central hole C.P. brass basin mixer without popup waste system with 450mm long braided hoses of superior quality as approved., 32mm dia B class G.I. waste pipe (concealed) of required length (from bottle trap to nahani trap) including painting with anti corrosive bituminous paint.etc. all complete.	--		
a	White	EACH	20	.0000443
b	Colored	EACH	20	.0000469
A2202	Providing and fixing premium quality glazed vitreous chinaware laboratory sink (conforming to IS: 771 Part-2) of bowl size 600mm x 400mm x 200mm with integrated drain board of approved make including all fittings, CI brackets, CP brass chain with rubber plug, angle valve and connector etc. complete with 40 mm CP brass waste fitting and 40 mm CP brass trap with necessary CP brass union, CP brass connecting pipes etc. all complete.	EACH	20	.0000249
A2203	Providing and fixing premium quality stainless steel sink of SS grade 304 glossy finish having size 600 x 400 x 200 mm (24	EACH	20	.0000434

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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
A2204	Providing and fixing premium quality European water closet of approved make, size (710x390x765) comprising of double siphonic pattern coupled water closet with integral 'P' or 'S' trap in white glazed vitreous chinaware, 10 litres capacity PVC slim type single flushing low level flushing cistern (Dual Flush Tank white) with all fittings complete, 15 mm NB heavy quality CP inlet connection pipe with brass unions and wiped solder joints at ends, 15 mm NB screw down easy clean variety heavy quality CP brass angle valves with C.P. flange of superior quality, germfree EWC solid seat cover (white) with C.P. brass hinges and rubber buffers of approved brand, jet spray provision with 1 Meter PVC tube (stainless steel) with 01 nos 15mm dia CP brass angle valve with CP flange as approved, 15 mm NB heavy quality GI pipes and specials for overflow from cistern upto 150 mm above floor level, concealed in wall and terminated with 15 mm NB brass mosquito proof jali etc. all complete.	--		
a	Floor mounted	EACH	40	.00006
b	Wall mounted	EACH	20	.0000409
A2205	Providing and fixing premium quality Orissa type water closet of approved make with 'P' or 'S' trap in vitreous chinaware best quality first grade with or without vent, having size 580mm x 440 mm or equivalent, including 10 liters capacity PVC slim type single flushing low level flushing cistern Dual Flush Tank with all fittings fitted over a pair of CI or MS bracket etc. complete with all specials, fittings such as lead valve loss syphon 15 mm nominal size, 32 mm NB GI flush pipe heavy quality of appropriate length with brass unions at end, wiped solder joints, 15 mm NB GI overflow pipe concealed in wall and brought down to 15 cm above floor level with mosquito proof jali at end as per specification, 15 mm NB heavy type CP brass inlet connection with brass unions and wiped solder joints at ends, 15 mm NB heavy type CP brass screw down angle valve with C.P. brass flange of superior quality on inlet connection, recess concreting using 1:5:10 nominal mix as per site requirements, including all accessories, necessary brackets, supports, fittings, screws, gratings etc. cutting and making good necessary opening chases etc. all complete.	EACH	50	.0000725

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**Tender Specification for Civil, Structural and Architectural Works of Turbine Island Package of 2 X 700 MWe PHWR Kaiga Atomic Power Project - Unit 5 & 6, Uttara Kannada District, Karnataka**

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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
A2206	Providing and fixing premium quality white vitreous chinaware flat back lipped front urinal of approximate basin size 465 x 355 x 265 mm of approved make with PVC flushing cistern with all fittings, fitted on CI brackets, standard size galvanised iron flush pipe, waste pipe and CP brass spreaders with brass union, push cocks, specials, connectors & stopcock, CP brass fittings etc. and GI clamps, painting of fittings and brackets, cutting chase and making good the walls etc. all complete.	--		
a)	One urinal basin with 5 litres automatic or equivalent with PVC flushing cistern.	EACH	80	.0000725
b)	Two urinal basins with 10 litres automatic or equivalent with PVC flushing cistern.	EACH	20	.0000281
c)	Supplying, fitting & fixing complete automatic photo voltaic urinal flushing system alongwith the urinal of size 610x500x310 mm or equivalent including all piping, fittings, accessories, chasing & making good the same etc. all complete.	EACH	100	.0003133
A2207	Providing, laying or fixing in position underground double walled corrugated pipe for sewer drains works, conforming to IS:16098, Part 2:2013, stiffness class SN 8, including jointing of pipe to pipe or pipe to long neck pipe ends by electric heating mirror at site, joints to be flanged joints, laying and jointing conforming to IS : 7634 (Part-2), cutting and trimming of pipes, preparation of bends as per requirement at site, preparation of bed for laying the pipes etc. all complete.	--		
--	Nominal diameter 150 DN	RM	200	.0000349
B2207	Providing, laying or fixing in position underground HDPE pipes for sewerage works, conforming to IS:14333, grade PE 80, pressure rating PN 6, including jointing of pipe to pipe or pipe to long neck pipe ends by electric heating mirror at site, joints to be flanged joints, laying and jointing conforming to IS : 7634 (Part-2), cutting and trimming of pipes, preparation of bends as per requirement at site, taking suitable supports from Celing and walls etc. all complete.	--		
a	Nominal diameter 140 DN	RM	400	.0000697
b	Nominal diameter 160 DN	RM	400	.0000798

**Part C : Bill of Quantities**

**Tender Specification for Civil, Structural and Architectural Works of Turbine Island Package of 2 X 700 MWe PHWR Kaiga Atomic Power Project - Unit 5 & 6, Uttara Kannada District, Karnataka**

**at 2 X 700 MWe - Kaiga Atomic Power Project # 5 & 6 - Turbine Island Package**

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
c	Nominal diameter 180 DN	RM	400	.0001109
d	Nominal diameter 200 DN	RM	400	.000133
C2207	Providing, laying or fixing in position under floors or against walls HDPE pipes for sewerage works, conforming to IS:14333, grade PE 100, pressure rating PN 12.5, including jointing of pipe to pipe or pipe to long neck pipe ends by electric heating mirror at site, joints to be flanged joints, laying and jointing conforming to IS : 7634 (Part-2), cutting and trimming of pipes, preparation of bends as per requirement at site, taking suitable supports from Celing and walls/ preparation of bed etc. all complete as per drawings, specifications and direction of the Engineer.	--		
a	Nominal diameter 63 DN	RM	200	.0000121
b	Nominal diameter 75 DN	RM	200	.0000156
c	Nominal diameter 90 DN	RM	100	.0000096
d	Nominal diameter 110 DN	RM	100	.0000133
2208.0	Providing, laying light duty non pressure NP3 class RCC pipes with collars jointed with stiff mixture of cement mortar 1:2 including testing of joints etc all complete for following.	--		
a	200mm dia	RM	200	.0000357
b	300mm dia	RM	200	.0000614
c	450mm dia	RM	200	.0001014
d	600mm dia	RM	600	.0004123
e	900mm dia	RM	960	.0011556



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**Tender Specification for Civil, Structural and Architectural Works of Turbine Island Package of 2 X 700 MWe PHWR Kaiga Atomic Power Project - Unit 5 & 6, Uttara Kannada District, Karnataka**

**at 2 X 700 MWe - Kaiga Atomic Power Project # 5 & 6 - Turbine Island Package**

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
2210.0	Providing, laying light duty non pressure NP4 class RCC pipes with collars jointed with stiff mixture of cement mortar 1:2 including testing of joints etc complete for following:	--		
a	450mm dia	RM	25	.0000144
b	600mm dia	RM	25	.000019
c	900mm dia	RM	25	.0000349
2211.0	Providing and fixing C.I Manhole heavy duty cover of size 600mmx450mm including frame from reputed manufacture etc. all complete.	EACH	25	.0000582
2212.0	Providing and fixing circular heavy duty C.I. manhole cover of 600 mm dia with frame etc. all complete.	EACH	35	.000081
A2213	Providing & fixing in position best quality salt glazed stone ware Gully trap with 150 x 150mm square inlet & 100mm NB outlet conforming to IS: 651 including embedding the trap in 1:4:8 cement concrete, 150 x 150mm size grating at top, construction of brick/ concrete block masonry chamber 300 x 300mm (internal dimension) in 230mm thick brick/ concrete block masonry, embedding the trap, plastering with cement mortar 1:4, 20mm thick inside, outside & all exposed faces, finished with a floating coat of neat cement, providing & fixing CI frame and cover weighing not less than 7 Kgs., painting the grating, frame & cover with two coats of approved bitumastic paint etc. all complete.	EACH	140	.0000885
A2214	Providing and fixing in position deep seal C.I. floor trap of self cleaning design 100mm NB inlet and 75 mm NB outlet with C.P. brass hinged grating on top including embedding in cement concrete 1:2:4 (1 cement : 2 fine aggregate : 4 graded stone aggregate of 20 mm nominal size) etc. complete as per drawings, specifications and as directed by Engineer.	EACH	160	.0000354

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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
A2218	Providing and fixing premium quality black granite of 18mm thick for urinal partition with rounded exposed corners etc. as approved by Engineer (size 600 x 1000 mm or equivalent) including cutting the wall & making good the same after fixing the partitions in approved pattern including fittings and fixtures etc. all complete.	EACH	100	.0000524
2219.0	Providing and fixing eye and face drinking water fountain (combined unit with receptacle conforming to IS: 10592) all complete as per specification.	EACH	6	.0000149
A2223	Providing and fixing CP brass heavy duty hot and cold mixer for showers including all fixtures and fittings etc. all complete.	EACH	20	.0000118
A2224	Supplying, fitting and fixing CI grating on vertical surface for the following rain water pipe etc. all complete.	--		
--	100 mm dia. Pipe	EACH	40	.0000034
--	150 mm dia. Pipe	EACH	40	.0000041
A2225	Providing & fixing CI Nahani trap of self cleaning design with 75mm NB outlet having a minimum water seal of 30mm with SS grating on top including necessary 1:1.5:3 cement concrete for embedding the trap and making good the floor connecting trap to the waste pipe forming circular hole upto floor level and rendering smooth etc. all complete.	EACH	150	.0000168
2300.0	STRUCTURAL WORKS: Structural steel works including all labour, material (unless otherwise specified in BOQ/contract specification), equipments unless otherwise specified, transportation, handling etc. at all level as per specification, drawings and as directed by engineer - in - charge. (All items are inclusive of preparation of erection plan, construction methodology, preparation of fabrication drgs and connection design calculations, work procedure, inspection and testing plan, necessary documents like test certificate, inspection reports etc. and obtaining approval from BHEL/NPCIL as per specification and as directed by engineer - in - charge)	--		

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**Tender Specification for Civil, Structural and Architectural Works of Turbine Island Package of 2 X 700 MWe PHWR Kaiga Atomic Power Project - Unit 5 & 6, Uttara Kannada District, Karnataka**

**at 2 X 700 MWe - Kaiga Atomic Power Project # 5 & 6 - Turbine Island Package**

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
A2301	Transportation from BHEL stores, Fabrication,erection and alignment of structural steel with mild steel rolled section / built up section / combination of both conforming to IS:2062, pipes conforming to IS:1161/ IS:1239/IS:3589, chequered plate conforming to IS: 3052, mild steel rounds, monorails, stays, safety chains, ladders, MS grating etc. in columns, beams, gantry girders, bunkers, silos, hoppers, roof trusses, portals, laced purlins, space frames, hangers, struts, monorails, galleries, stiffeners, wall beams, sheeting runners, brackets, stub columns, bracings, cleats, trestles, base plates, splice plates, chequered plate flooring, decking and seal plates, steel frame grid over false ceiling, walkway platforms, ladders, stairs, stringers, treads, landings, hand-rails etc including connection design & preparation of fabrication drgs, counter sunk cadmium plated MS screws, collection of steel from stores, fabrication, straightening, cutting, bending, rolling, grinding, machining, drilling, welding, electrodes and other consumables, alignment, erection bolts & nuts (weight of erection bolts,nuts, and welds not payable), assembly, edge preparation, preheating (min preheat and interpass temperature of 200 C for welding over 20 mm and upto 40 mm & 660 C for welding over 40 mm and upto 50 mm & 1100 C for thickness over 50 mm & use of low hydrogen/ radiogenic electrodes), post heating, 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 & 2, touch-up painting, rectification, dismantling and removal of all temporary structures (weight of temporary structures not payable), return of surplus / waste steel materials to store etc all complete. Including appointment of a seperate independent agency, approved by BHEL, for review and approval of fabrication drgs, in consultation with BHEL. (BHEL to supply steel free of cost)	MT	3,102	.0228146
A2302	Extra over ST NO. A2301 for blast cleaning of steel structures to near white metal surface Sa 2 1/2 or equivalet as per Swedish standard SIS-055900/ISO-8501-1 etc. all complete.	MT of Steel	3,102	.0050435

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**at 2 X 700 MWe - Kaiga Atomic Power Project # 5 & 6 - Turbine Island Package**

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
B2302	Extra over ST NO. A2301/A2302 for providing and applying one or more coat of epoxy based approved zinc silicate primer of minimum 75 micron (DFT) at shop including touch-up painting etc all complete.	MT of Steel	3,102	.0038198
C2302	Extra over ST NO. A2301/A2302/B2302 for providing and applying one coat of epoxy based approved zinc silicate primer of minimum 25 micron (DFT) at site after erection over a base coat of primer including touch-up painting etc all complete.	MT of Steel	8	.0000051
A2303	Extra over above ST NO. A2302 for providing and finishing with zinc coating as per IS: 4759, IS:4736 on chequered plate units/bolts/inserts/pipes etc. all complete.	MT of Steel	2	.0000044
A2304	Extra over ST No. A2301 for providing and applying two coats of premium quality mat/glossy finish synthetic enamel paint with minimum 50 micron total dry film thickness (DFT) 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 110 microns including protection and cleaning, scaffolding etc. all complete.	MT of Steel	360	.0002912
A2305	Providing and applying one or more coat of epoxy paint (high build solvent free, 3 component i.e base, hardner and pigment) of approved make and shade on structural steel using airless spray equipment after its erection having minimum DFT of 200 micron (excluding primer DFT) at all elevations after erection including surface preparation and touch up with zinc silicate primer wherever required, providing and removing scaffolding, surface preparation, masking of embedded parts, covering of installed equipments, pipe lines, if any, & removal of the same after completion of painting etc., all complete.	MT of Steel	3,100	.0083432
B2305	Providing and application of approved Polyurethane paint on liners and steel surfaces with minimum DFT of 125 micron (excluding primer) at all elevations after erection including surface preparation and touch up with compatible primer, providing and removing scaffolding, all as per manufacturer's specifications, drawings and direction of the Engineer.	MT of Steel	228	.0007145

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**at 2 X 700 MWe - Kaiga Atomic Power Project # 5 & 6 - Turbine Island Package**

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
C2305	Extra over ST No. A2301/A2302 for providing and applying Intumescent coating/painting on structural steel comprising of 3 layers (anticorrosive primer, base coat and seal coat or decorative coat) of approved make, coating thickness and fire rating etc. including fire testing of coating system by independent approved laboratory, application by certified applicator, protection and cleaning, scaffolding etc. all complete as per specifications, drawings and direction of engineer in charge The Primer & Seal/Top coat shall be compatible with base coat. The product proposed for use shall be manufactured by a reputed & experienced company having in-house R&D & fire test facility. The Coating shall be certified from reputed agencies like UL (USA) & Warrington (UK) etc.	MT of Steel	3,100	.0555451
2306.0	Providing, laying and clamping of crane rails over the crane girder at all elevations as per IS 3443 including all fixtures, clamps, testings etc. all complete as per drawing and specification.	MT	54	.0016245
A2307	Supplying, fabrication, erection and alignment of factory made electroforged grating units (having hot dip galvanisation/high building epoxy painting) with mild steel in flooring, platforms, drain and trench covers, walk-ways, passages, staircases with edge binding strips and anti-skid & non-slip abrasive nosing in treads etc. including fixing clamps, fittings, fixtures, saddle clip, serrated bearing bars, all taxes, duties, packing, grinding, drilling, welding, edge preparation, etc. all complete.	--		
a	Minimum 610 g/sqm hot dip galvanisation conforming to IS:4759	MT	1,014	.0309541
A2307	Extra over ST No. 2307 for providing and applying approved epoxy paint conforming to NPCIL specification PP-M-1219 with minimum DFT of 200 micron (excluding primer) over 75 micron zinc silicate primer etc. all complete as per drawings, specifications and direction of the Engineer.	MT of Steel	1,014	.0019066

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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
2308.0	Supplying, fabrication, erection and alignment of factory made galvanised welded grating units with mild steel 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 High build epoxy paint with minimum DFT of 200 micron and 75 micron zinc silicate primer, fixing clamps, fittings, fixtures, all taxes, duties, packing, grinding, drilling, welding, edge preparation, etc. all complete.	MT of Steel	10	.0002435
2309.0	Extra over above ST NO. 2307 for finishing the grating units/bolts/inserts with hot dipped galvanisation @ 610 gm/sqm over blast cleaned steel surfaces instead of painting with two coats of red oxide zinc-chromate primer all complete.	MT of Steel	20	.0001187
2311.0	Providing and fixing in position of permanent mild steel bolts (class 4.6 as per IS : 1367 and grade 'C' as per IS: 1363) and nuts, washers etc. up to and inclusive of 39 mm diameter and upto 300mm long for structural steel work etc all complete.	KG	1,000	.0000251
A2312	Providing and fixing in positing of high strength structural/HSFG bolts (of property class 8.8 and product grade 'C' as per IS: 1367) and conforming to IS: 3757 or equivalent 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.	KG	56,150	.0020346
2313.0	Dismantling of steel structure, lowering of material and carriage of the dismantled material up to field fabrication shop / projects storage including temporary dismantling, cutting, re-welding, supporting, and restoring to correct position all temporarily dismantled members, re-alignment of all adjacent connected members to their correct positions ( weight of such adjacent members and temporarily dismantled members not payable), scaffolding, staging, tools & tackles, gas cutting, welding, consumables etc all complete.	MT	22	.00005
2314.0	Addition to, alterations in and/or modification of	--		
a	In erected position	MT	22	.0001392

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**at 2 X 700 MWe - Kaiga Atomic Power Project # 5 & 6 - Turbine Island Package**

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	In fabrication yard	MT	22	.0001153
2315.0	Re-erection of dismantled fabricated structural steel members including carriage of modified	MT	22	.0000859
A2320	Supply, fabrication and fixing of SS grade 304 stainless steel handrail brush finish 32mm/40 mm with machine bended edges for snap fitting including stainless steel balusters and shoes, providing and fixing with hand rail support using SS flat of approved shape and size with necessary fixing arrangement including transportation, loading/unloading etc. all complete as per specifications and direction of engineer in charge.	MT	14	.0013272
A2321	Supply, fabrication and fixing of MS pipe hand railing of 32 mm/40 mm dia including transportation, loading/unloading, painting etc.all complete as per specifications and direction of engineer in charge.	MT	24	.0010618
A2323	Conducting radiography test as per ASTM-E94 on welds over and above the work already specified in the specification including equipments, measuring devices, gauges, test report etc. all complete.	RM	200	.0000572
A2324	Conducting ultasonic test as per ASME, Sec-V, Article 5 on welds over and above the work already specified in the specification including equipments, measuring devices, gauges, test report etc. all complete.	RM	200	.0000557
A2325	Conducting ultasonic test on steel plates as per ASTM-A435 or equivalent over and above the work already specified in the specification including equipments, measuring devices, gauges, test report etc. all complete.	SQM	400	.0001239
A2326	Conducting magnetic particle test as per ASTM-E709 on welds over and above the work already specified in the specification including equipments, measuring devices, gauges, test report etc. all complete.	RM	200	.0001136
A2327	Conducting dye penetration test on welds as per ASTM-E165 over and above the work already specified in the specification including provision of necessary equipments, measuring devices, gauges etc. all complete.	RM	200	.0000578

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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
2328.0	Supply, fixing lightning arrester and air terminal over roof of power house building, pump house and other structures including all materials, labour, electrodes etc complete (all materials to be supplied by the contractor).	EACH	40	.0000483
34.0	Drilling vertical holes in hard rock / PCC/Re-drilling in grouted holes, supply & fabrication of anchor rod assembly (fabrication of anchor plate with rods of TMT bars of minimum Fe-500 grade with HDPE sheathing), shot blasting, painting one coat of minimum 75 micron DFT of Zinc silicate primer followed by approved epoxy paint of minimum 200 micron DFT and installation of fabricated anchor assembly, grouting by using approved non-shrink compound and sand cement grout, sealing with polysulphide compound, including all materials, labour, DP test on welding, testing to working load/ultimate load etc. complete as per drawings, specifications and instructions of Engineer. Note: The quoted rate should include for the qualification of the anchor system as per the specifications.	--		
34.1	Rock anchor of 2 nos. of 45 dia bars in 175 mm (minimum) size hole. Units in Running metre of Rock anchor.	RM	500	.0007036
34.2	Rock anchor of 1 no. of 45 dia bar in 125 mm (minimum) size hole. Units in Running metre of Rock anchor.	RM	1,250	.0012212
34.3	Rock anchor of 1 no. of 36 dia bar in 125 mm (minimum) size hole. Units in Running metre of Rock anchor.	RM	1,250	.0011659
2400.0	Road Works	--		



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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
1.0	Subgrade: Providing, laying, spreading and compacting Road Subgrade with crushed rock mixed with selected earth, including compaction by rolling with a minimum of 10 T vibratory roller in proper width and depth, consolidating with power roller, including spreading, watering and rolling etc. all complete as per specifications and drawings. The item rate shall also include the field testing of CBR and Compaction test requirements (Modified Proctor Density Test) as per specifications at a frequency of conducting one test (comprising of 10 specimens) per 2000 sq.m. area for each layer. The samples for the testing shall be selected randomly by the Engineer-In-Charge. The item includes cost for general site clearance, preparation of surface to the required camber and gradient, marking etc. Note: 1. The CBR value of the compacted sub-grade shall not be not less than 8%. 2. Modified Proctor Density shall not be less than 98%. 3. Thickness of each of compacted layer not to exceed 200 mm.	CUM	3,825	.0004442
2.0	Granular Subbase: LAYER-1- In two courses each of 100 mm thickness to a compacted thickness of 200 mm over subgrade. Providing and laying granular sub-base course in proper width and depth, consolidating with power roller, to the required camber and gradient, including spreading, watering and rolling etc. all complete as per specifications and drawings (Grading -III Material)	CUM	765	.0005817
3.0	Granular Subbase: LAYER-2- In two courses each of 100 mm thickness to a compacted thickness of 200 mm over subgrade. Providing and laying granular sub-base course in proper width and depth, consolidating with power roller, to the required camber and gradient, including spreading, watering and rolling etc. all complete as per specifications and drawings (Grading -I Material)	CUM	765	.0005817

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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
8.0	Wet Mix Macadam : Providing, laying, spreading and compacting graded stone aggregate (size range 53 mm to 0.075 mm ) to wet mix macadam (WMM) in one course to a consolidated thickness of 175 mm as per specification including premixing the material with water at OMC in for all leads & lifts, laying in uniform layers in sub- base / base course on well prepared surface and compacting with vibratory roller of 8 to 10 tonne capacity to achieve the desired density, complete as per specifications and directions of Engineer-in-Charge.	SQM	3,375	.000594
9.0	Bitumen Macadam : Supplying and laying bitumenous macadam binder course of 150 mm compacted thickness in two courses each in 75 mm compacted thickness to correct width, depth and camber, all complete as per specifications and as directed by the Engineer.	SQM	3,375	.0010082
10.0	Providing and laying 25mm thick Close Graded Premix Surfacing/Mixed Seal Surfacing on Bituminuos macadam course complete as per Drawings and Technical Specification and clause 512 of MORTH specification and as directed by the Engineer.	SQM	3,375	.0002011
11.0	Supply, casting, curing, handling, fixing precast PCC M20 grade kerb stones along the roads	RM	900	.0001738
15.0	Providing & laying 400mm x400mm x35 mm thick precast (M35 Grade) interlocking concrete pavers of approved colour and pattern as per specification and recommendation of manufacturer.	SQM	2,025	.0003879
19.0	Providing and laying 20mm thick sand layer below concrete pavers including compaction etc all complete as per specification, drawing and as directed by Engineer.	SQM	2,025	.0000262
20.0	Providing and installation of Variable message signs including Cantilever type MS supports etc. all complete as per drawings, specifications, manufacturer s recommendations, indian standards.	EACH	4	.0000767
23.0	Providing and laying 300mm thick stone pitching including caulking with 1 cement: 4 sand mortar on the slopes of earth fill/cut with approved quality of rock fragments including materials, testing, necessary excavations if any, compaction etc all complete as per specification, drawing and as directed by the engineer.	CUM	810	.0005188

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<b>Ref.No.</b>	<b>Description</b>	<b>Unit of Measurement</b>	<b>Qty.</b>	<b>Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount</b>
<b>TOTAL Weightage</b>				1.0