

# **TENDER SPECIFICATION**

**BHEL PSSR SCT 1869**

**FOR**

Civil, Architectural, Mechanical, Electrical, C&I  
And Other Allied Works of Natural Draught  
Cooling Towers (NDCTs) including Supply of  
Materials, Labour, Tools & Plants, etc. required

**At**

**2X660 MW Udangudi STPP**

## **PRICE BID**

**VOLUME –II**



**BHARAT HEAVY ELECTRICALS LIMITED**

(A Government of India Undertaking)

Power Sector – Southern Region

690, Anna Salai, Nandanam, Chennai – 600 035

# NOTICE INVITING TENDER

---

## **BHARAT HEAVY ELECTRICALS LIMITED**

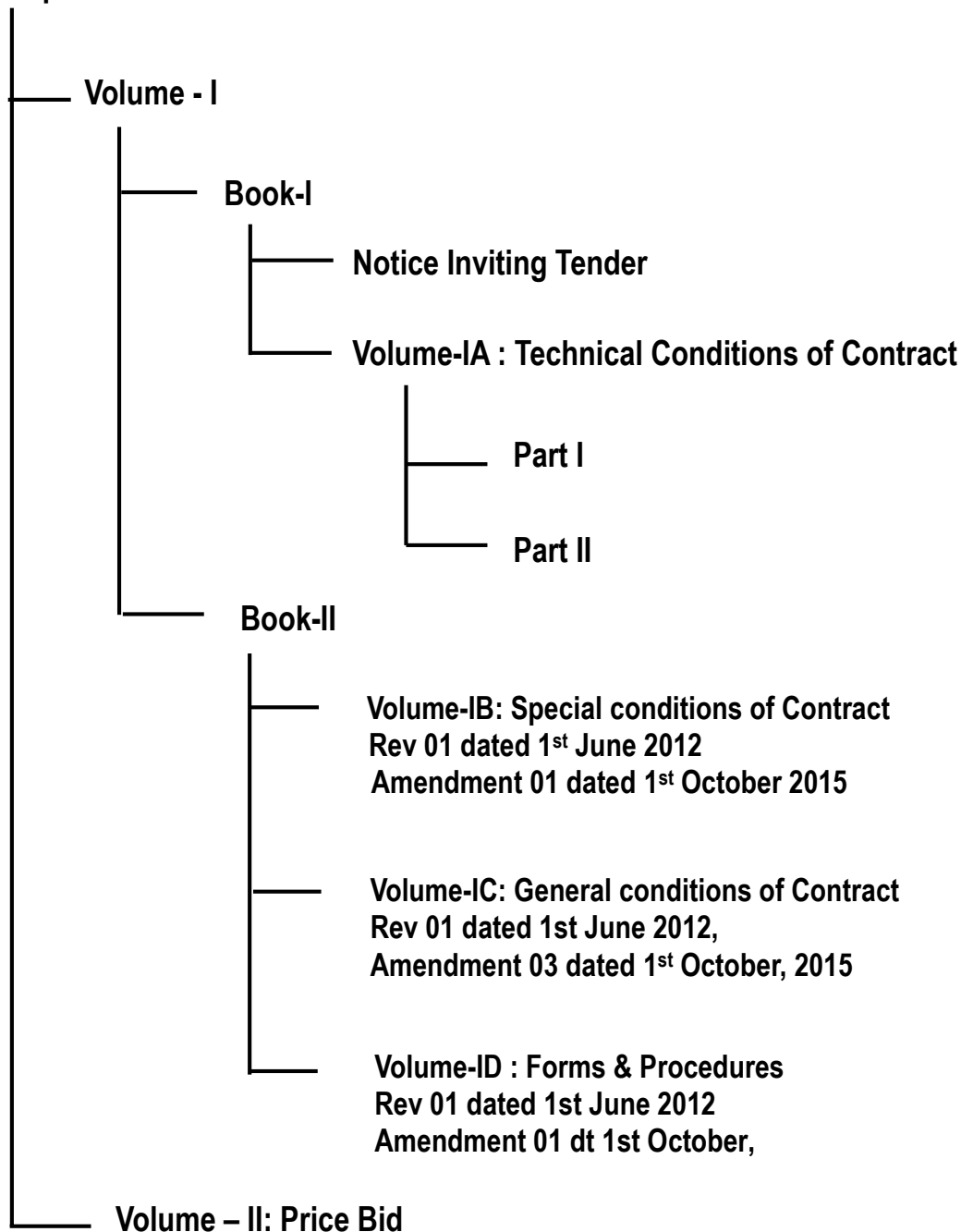
(A Government of India Undertaking)

Power Sector – Southern Region

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

## **TENDER SPECIFICATION CONSISTS OF**

### **Tender Specification**



## NOTICE INVITING TENDER

---

CONTENTS	
Description	No. of pages
Part A : Instructions to the Bidders	01
Part B : Format to quote total amount	01
Part C: Bill of quantities with weightage for amount of each items with respect to the total quoted price	26

# NOTICE INVITING TENDER

---

## **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. The 'Total amount' mentioned in Part-B of the Price Bid corresponds to the entire Bill of Quantities (BOQ) given in Part -C of the Price Bid.
3. Bidders shall quote 'Total Amount' in the format for Price Bid available in the e-procurement portal. Bidders may also quote 'Total Amount' in the format given in Part -B of this document (Optional). Bidders shall only quote 'Total Amount' in the format given in PART -B of the price bid. 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. 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.
5. 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.
6. Based on the quantities of individual item and the amount arrived in SI No: 4 above, unit rate of individual items shall be derived. This unit rate shall be rounded off to four decimal places.
7. 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.6 above.

**Part B: Format to quote Total Amount**

**Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower  
at Udangudi Thermal Power Station**

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

In Figures

In words

**Note :**

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

**Date**

**SIGNATURE OF BIDDER WITH SEAL**

**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower  
at Udangudi Thermal Power Station**

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
2600.0	Site clearing and stripping works including all labour, material (unless otherwise specified in BOQ/contract specification), equipment etc. as per specification, drawings and as directed by engineer - in - charge.	--		
A2602	Earth work in stripping of top soil upto a minimum depth of 0.20 m below ground level so as to exclude all debris, grass, vegetation, bushes, trees having girth upto 300mm including roots and organic materials etc for leveling and grading including dressing to specified levels & grades and compacting the graded/stripped surface by manual/mechanical means, disposal of stripped materials within a lead upto 1km etc all complete as per specification, drawing and as directed by the engineer-in-charge.	Sq.M	51,200	.0003996
100.0	EARTH WORK: Earth work In excavation, backfilling and disposal including all labour, equipments (unless otherwise specified in BOQ/contract specification) etc complete as per specification, drawing and as directed by engineer- in-charge for the following.	--		
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 1Km, spreading/levelling of disposed materials etc all complete for following depths below ground level.	--		
a	Depth from ground level but not exceeding 2 m	Cu.M	102,400	.0058224
b	Depth exceeding 2 m but not exceeding 4 m	Cu.M	96,100	.006857
c	Depth exceeding 4 m but not exceeding 6 m	Cu.M	54,000	.0048163
102.0	Extra over ST No. 101 for dewatering of ground water by well point method as per IS 9759.	Cu.M	127,546	.0222051

## Part C : Bill of Quantities

### Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower at Udangudi Thermal Power Station

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	Cu.M	40	.0000026
b	Depth exceeding 2 m but not exceeding 4 m	Cu.M	40	.0000032
c	Depth exceeding 4 m but not exceeding 6 m	Cu.M	36,000	.0034099
d	Depth exceeding 6 m but not exceeding 8 m	Cu.M	78,400	.0089112
e	Depth exceeding 8 m but not exceeding 10 m	Cu.M	19,600	.002562
104.0	Earth work in excavation below ground level in hard rock requiring blasting (but excluding controlled blasting) including wedging, line drilling, pre shearing etc as required for grading, setting out, levelling, dewatering (wherever required), dressing the sides & bottom, all lifts, necessary licenses/statutory clearances for blasting, supply, storage & handling of blasting materials, stacking/disposal of surplus excavated material within a lead upto 1 Km, spreading / levelling of disposed materials etc all complete as per specification, drawing and as directed by the engineer-in-charge.	--		
b	Depth exceeding 2 m but not exceeding 4 m	Cu.M	40	.0000074
c	Depth exceeding 4 m but not exceeding 6 m	Cu.M	40	.0000089
d	Depth exceeding 6 m but not exceeding 8 m	Cu.M	40	.0000106
e	Depth exceeding 8 m but not exceeding 10 m	Cu.M	40	.0000122

**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower  
at Udangudi Thermal Power Station**

<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>
105.0	Earth work in excavation in hard rock requiring controlled blasting including wedging, line drilling, pre shearing etc as required, setting out, levelling, dewatering (wherever required), shoring & strutting (wherever required), dressing the sides & bottom, all lifts, necessary licenses/statutory clearances for blasting, supply, storage & handling of blasting materials, stacking/disposal of surplus excavated material within a lead upto 1Km, spreading / levelling of disposed materials etc all complete for following depths below ground level.	--		
b	Depth exceeding 2 m but not exceeding 4 m	Cu.M	20	.0000038
c	Depth exceeding 4 m but not exceeding 6 m	Cu.M	20	.0000046
d	Depth exceeding 6 m but not exceeding 8 m	Cu.M	20	.0000055
e	Depth exceeding 8 m but not exceeding 10 m	Cu.M	20	.0000063
106.0	Earth work in excavation in hard rock requiring chiselling including wedging, line drilling, pre shearing etc as required for grading, setting out, levelling, dewatering (wherever required), dressing the sides & bottom, all lifts, stacking/disposal of surplus excavated material within a lead upto 1Km, spreading / levelling of disposed materials etc all complete for following depths below ground level.	--		
b	Depth exceeding 2 m but not exceeding 4 m	Cu.M	20	.0000245
c	Depth exceeding 4 m but not exceeding 6 m	Cu.M	20	.0000295
d	Depth exceeding 6 m but not exceeding 8 m	Cu.M	20	.0000353
e	Depth exceeding 8 m but not exceeding 10 m	CUM	20	.0000406



**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower  
at Udangudi Thermal Power Station**

<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>
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 250mm thickness using/with selected materials from compulsorily excavated earth (includes soil, soft rock boulder excluding hard rock and mixture of both) 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.	--		
Aa	Each layer compacted so as to achieve at least 98% maximum dry density as per IS-2720 (Part-VII)	CUM	271,252	.0148032
108.0	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 thickness using/with selected materials directly from excavation within a lead upto 500m and compacted as specified including re-excavation of stacked earth, watering, ramming/compaction by manual/mechanical means, dressing etc all complete.for the following.	--		
Aa	Each layer compacted so as to achieve at least 98% maximum dry density as per IS-2720 (Part-VII)	CUM	30,200	.0006481
109.0	Extra over ST No. 101 and 103 to 107 for carriage of material/earth for every 500m or part there of beyond an initial lead of 1km.	--		
a	Carriage for stacking/ backfilling of serviceable material/ earth	Cu.M	76,597	.0003416
b	Carriage for disposal of serviceable/unserviceable material/ earth	Cu.M	8,511	.000038

**Part C : Bill of Quantities****Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower  
at Udangudi Thermal Power Station**

<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>
A110	Earth work in backfilling upto any depth below FINISHED ground level around foundations, plinths, trenches, drains etc to proper grade and level in layers not exceeding 250 mm thickness so as to achieve compaction at least 95% maximum dry density as per IS-2720 (Part-VIII) 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.	CUM	13,920	.003841
B110	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 thickness so as to achieve compaction at least 98% maximum dry density as per IS-2720 (Part-VII) 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.	CUM	3,480	.0010563
A111	Supplying and filling sand upto any depth under floors, around foundations, plinths,surrounding pipe and in pipe beds etc. in layers not exceeding 300 mm thickness and compacted so as to achieve at least 75% relative density as per IS-2720 (Part-XIV) including spreading, watering, ramming/compaction by manual / mechanical means, dressing, royalty (if any) etc. all complete.	Cu.M	100	.0000962

## Part C : Bill of Quantities

### Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower at Udangudi Thermal Power Station

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
200.0	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 and curing (excluding cost of centering, shuttering and reinforcement) with mechanised equipments like batching plant, transit mixer, concrete pump, tower cranes of suitable capacity and all accessories, including demobilisation of the same after completion of works etc and passenger lift to be installed at outer shell with all accessories & safety arrangement required for safe movement of labourers. the scope inclusive of transportation of the equipments, mobilization, demobilization, maintenance, operator charges, and necessary foundations etc. all complete as per drawing, specifications and as per direction of engineer in charge . (Cement shall be supplied by BHEL as a free issue).	--		
201.0	Concrete of grade M7.5 (1 part cement, 4 part sand, 8 parts of 40 mm graded aggregate by volume) as mass filling course, lean concrete, levelling course, mud mat under and around foundations/ floors, at any depth below finished floor level etc.	Cu.M	100	.000166
A202	Concrete of grade M10 (1 part cement, 3 part sand, 6 parts of 20 mm graded aggregate by volume) as lean concrete, levelling course, mud mat under and around foundations/floors at any depth below finished floor level etc.	Cu.M	100	.000166
A203	Concrete of grade M15 (1 part cement, 2 part sand, 4 parts of 20 mm graded aggregate by volume) as lean concrete, levelling course, mud mat under and around foundations/floors at any depth below finished floor level etc.	Cu.M	4,740	.0078661
A212	Screed concrete conforming to IS 456 with sand and graded hard stone aggregate 12.5mm/6 mm nominal size of any thickness over basin floor, drains etc. complete as per following.	--		
a	1:2:4 (1 part cement, 2 part sand, 4 parts of aggregate by volume)	Cu.M	100	.000166

**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower  
at Udangudi Thermal Power Station**

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
A205	Providing and laying Design Mix cement concrete conforming to IS:456 & IS 10262-2009 for reinforced concrete works with sand and graded hard stone aggregate of 20mm nominal size in foundations/substructure, grade slab, paving, drains, under floors etc at all level below basin wall top level, any shape, position or thickness etc complete including use of plasticizer/ superplasticizer conforming to IS:9103 (latest) to achieve required slump in concrete all complete as per specification & drawing for the following.	--		
Aa	M 20 Grade	CUM	100	.0001822
a	M 25 Grade	CUM	100	.0001835
b	M 30 Grade	CUM	13,020	.02406
c	M 35 Grade	CUM	100	.0001861
A214	Providing and laying Design Mix cement concrete as per IS:456, IS 3370 & IS 10262-2009 for reinforced concrete works using graded aggregate for Concrete in water retaining/conveying structures (such as basin floor slab, basin wall, partition wall, CW outlet, sumps, hot water ducts etc.) including addition of suitable plastisizer cum waterproofing cement additives confirming to IS 9103 latest to achieve a slump more than 125 mm in concrete as per manufacturers recommendation and conforming to limits of permeability as per IS 2545 and specification with 20 mm nominal size graded aggregate for following grades. Watertightness is to be ensured including structural grouting if required.	--		
b	M 30	CUM	12,280	.0420681
Cc	M 35	CUM	2,090	.007303

**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower  
at Udangudi Thermal Power Station**

<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>
A206	Providing and laying Design Mix cement concrete of grade conforming to IS:456 & IS 10262-2009 for reinforced concrete works with sand and graded hard stone aggregate of 20mm nominal size in superstructure at all level above finished floor level (all structures above top of basin wall), any shape, position or thickness etc complete including use of plasticizer/ superplasticizer conforming to IS:9103 (latest) to achieve required slump in concrete all complete as per specification & drawing for the following.	--		
a	M 25 Grade	CUM	100	.0002714
b	M 30 Grade	CUM	100	.0002727
c	M 35 Grade	CUM	11,400	.0312433
Ae	M 40 Grade (For shell, ring beam, corbel, platform, walkway etc.)	CUM	30,200	.0832387
Ag	M 50 Grade (For Raker column)	CUM	1,780	.0051514
A213	Providing and laying Design Mix cement concrete as per IS:456 & IS 10262-2009 for reinforced concrete works using graded aggregate for Concrete in precast works like roof slabs/trench covers, fins, lintels, chajjas, beams, columns, bracings, wall panels, facias etc.at all levels in all kinds of work including formwork/moulds, curing, rendering the top exposed surface with cement sand mortar (1:3), handling, storing, transporting, all leads, erection without damage, setting in position with cement sand mortar (1:3), filling the gaps between adjacent pre-cast units with M30 grade concrete or cement sand mortar (1:3) and including making of holes for bolts for fixing, welding etc.complete with graded aggregate (20/12.5/10 mm) and as per specification and drawing for following grades.	--		
b	M 30	CUM	920	.0038599
c	M 35	CUM	100	.0004279

**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower  
at Udangudi Thermal Power Station**

<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>
215.0	Dismantling concrete work for all types of structures at all levels including stacking of serviceable material to a lead of 500 m and disposal of unserviceable 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	40	.0000152
b	Reinforced cement concrete of all grades	CUM	40	.0000243
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	200	.0000099
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	200	.0000006
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	100	.0000113
219.0	Providing and applying curing compound (water based) of approved make wherever required as per manufacturer's specification.	SQM		
300.0	FORMWORK: Providing, fixing and removing formwork at all elevations for all structures, as per specifications and including all labour, material, scaffoldings and centering etc. complete as per drawing, specifications and as per direction of engineer in charge for the following:	--		
301.0	Fairface form work with good quality water proof ply wood of minimum 12mm thickness and smooth surface below basin wall top level for foundations, footings, base of columns, walls, columns, pilasters, beams, mass concrete, trenches etc.including chamfering of edges as per drawing, specification and instruction of engineer in charge..	SQM	16,260	.0052934

## Part C : Bill of Quantities

### Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower at Udangudi Thermal Power Station

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
302.0	Fairface form work with good quality water proof ply wood of minimum 12mm thickness and smooth surface above top of basin wall 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.	SQM	99,900	.0393718
A302	Fairface Formwork for smooth surface for Raker columns including preparation of scheme, designing, submission and approval of staging drawing with sufficient props, braces and ties for all heights complete including chamfering of edges, deshuttering as per drawing,specification, and instruction of engineer in charge.	SQM	5,900	.004417
B302	Fairface formwork for smooth surface of shell by providing and using jump form shuttering of approved quality with plastic coated plywood shuttering and minimum three working platforms internally and minimum two working platforms externally, with continuous spray curing arrangement with automatic system including lifting arrangement, adjustment as per shell profile , access system, hoisting, strutting, propping, adequate illumination and safety arrangements etc. and other temporary supports/structures as required including dismantling and removal of formwork for tower shell, peripheral top platform, peripheral inner walkway etc. as per specifications and as directed by engineer-in-charge including all plant and machinery, accessories etc. Tie rod holes & holes due to jumpform arrangement are to be plugged/filled up with mortar and shuttering impression are to be made good.	SQM	184,300	.1268799
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	200	.000026
b	Pockets of depths more than 150mm and upto 300 mm depth	EACH	200	.0000439
c	Pockets of depths more than 300mm and upto 600 mm depth	EACH	200	.0000789
d	Pockets of depths more than 600mm and upto 1000 mm depth	EACH	20	.0000124

## Part C : Bill of Quantities

### Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower at Udangudi Thermal Power Station

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
e	Pockets of depths more than 1000mm and upto 1500 mm depth	EACH	20	.000018
400.0	REINFORCEMENT WORK: Reinforcement work including all labour, material (unless otherwise specified in BOQ/contract specification), equipment, transportation, handling including cleaning, derusting, straightening, cutting, bending, binding in position with soft drawn annealed binding wire or tack welding, providing concrete cover blocks, pins, separators, chairs, supports for reinforcement etc. at all level as per specification, drawings and as directed by engineer - in - charge including all plant and machinery, accessories etc.	--		
403.0	Collection and Transportation from BHEL stores, straightening, cutting, bending, placing in position at all level, binding in position of HCRM steel reinforcements of grade Fe-500 confirming to IS:1786 including cost of binding wire, labour, scaffolding, transportation to & from stores etc complete all as per specifications, drawings and as directed by Engineer.(BHEL to supply HCRM steel free of cost)	--		
a)	For all works except shell	MT	4,910	.041162
b)	For all works in shell	MT	4,720	.0439575
c)	Mild steel reinforcement bars (including supply of mild steel bars by bidder)	MT	100	.0040848
600.0	JOINTS AND FILLERS: Joints & fillers including all labour, material, equipment, transportation, handling etc at all level as per specification, drawings and as directed by engineer - in - charge.	--		
601.0	Supplying & installation of bitumen impregnated fibre board confirming to IS 1838 as joint filler at joints in concrete including nailing, coating of both faces with coal tar pitch/bitumen etc. all complete.	--		
c	25 mm wide joints	SQM	440	.0002149
603.0	Providing and applying polysulphide based sealant conforming to IS:12118 in joints in concrete including cleaning of joints, raking out groove, application of primer, scaffolding etc. all complete for following size grooves:	--		



**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower  
at Udangudi Thermal Power Station**

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	25mmX25mm	RM	6,400	.0021334
b	50mmX25mm	RM	100	.0000632
A610	Providing and fixing PVC water stops in joints conforming to IS 12200 & IS 15058 all complete for the following: (Bulb type)	--		
Ab	230 mm wide and 6 mm thick	RM	100	.0000196
Ac	230 mm wide and 8 mm thick	RM	100	.0000259
Ad	230 mm wide and 10 mm thick	RM	6,400	.0021821
700.0	MS EMBEDMENTS: Embedments 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.	--		
701.0	Supply, fabricating and fixing of mild steel embedments, inserts, pipe sleeves, angle pieces, rungs of various diameters, plates of dimensions as required etc. including welding, bolting, cutting, drilling, scaffolding, setting etc. all complete.	MT	10	.0003829
702.0	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, stiffener plates, protective tape, pipe sleeves, templates etc. including welding, cutting, grinding, threading, drilling etc. all complete.	MT	2	.0000936
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.	--		
Ae	Mechanical expansion fasteners, cold formed stud type having 3 way expansion sleeve of SS 316 grade approved for use in cracked concrete and seismic design with ETA C1/C2 approval or equivalent of safe tensile capacity as specified below for concrete work.	--		

## Part C : Bill of Quantities

### Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower at Udangudi Thermal Power Station

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	(SS.316) Candorr M6*100 M.A.F. (Mechanical Anchor Fastener with nut & washer, HSN: 73181900)	EACH	400	.0000303
ii	(SS.316) Candorr M8*100 M.A.F. (Mechanical Anchor Fastener with nut & washer, HSN: 73181900)	EACH	400	.0000303
iii	(SS.316) Candorr M10*100 M.A.F. (Mechanical Anchor Fastener with nut & washer, HSN: 73181900)	EACH	400	.0000437
iv	(SS.316) Candorr M12*125 M.A.F. (Mechanical Anchor Fastener with nut & washer, HSN: 73181900)	EACH	200	.0000351
800.0	GROUTING: Grouting including all labour, material (unless otherwise specified in BOQ/contract specification), equipment, roughening surface, cleaning, ramming, curing etc. at all level , drawings and as directed by engineer - in - charge.	--		
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 Conbextra GP-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	14	.0003684
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, scaffolding etc. at all level as per specification, drawings and as directed by engineer - in - charge.	--		
A1310	Providing and applying High Performance Moisture compatible Corrosion Resistant coating system approved by CERC, Karaikudi on all surfaces in contact with water/moisture/soil/earth, including required scaffolding, cleaning and preparing the surface, etc complete as per specifications and as directed by the engineer	--		
a)	For all works except shell	Sq.M	169,266	.0553116
b)	For all works in shell	Sq.M	91,800	.0330068

**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower  
at Udangudi Thermal Power Station**

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
A1312	Providing and applying 2 coats of Aliphatic Acrylic Protective Coating System of approved make and color on complete exterior surface of shell at all heights plus raker columns including cleaning and preparing the surface, material, labour, scaffolding, curing etc including primer coat complete as per specification and as directed by engineer-in-charge to give an even shade.	SQM	92,460	.0332441
1800.0	MISCELLANEOUS: Miscellaneous works including all labour, material (unless otherwise specified in BOQ/contract specification), equipment etc. at all level unless otherwise specified as per specification, drawings and as directed by engineer - in - charge.	--		
1801.0	Providing and Filling in trenches, plinths, area paving and other underground structures with graded stone aggregate of size range 63 mm to 45 mm in layers not exceeding 230 mm in thickness including breaking of stone boulders to required sizes, filling the interstices with selected sand and compacting to 85 % of original volume of stone stack for all lifts etc. all complete. Payment shall be made for the measurement of the volume of the compacted fill.	CUM	700	.0006033
1805.0	Providing and mixing approved Bipolar Concrete penetrating Corrosion inhibiting admixture phenolic base (krishna conchem or equivalent) in concrete as per detail specification of manufacturer etc. all complete. Payment shall be made per cum of concrete.	CUM	71,690	.0298524
1815.0	Providing and fixing GI rungs in concrete/brick walls having zinc coating of minimum 900 g/sqm etc. all complete.	Kg	1,000	.000039
A1850	Providing and installing FRP access door, in shell with clear opening size of 1.2m x 2.1m, complete with all fittings and fixtures, locking arrangements, frames, fasteners, auto door closure, including the cost all labour, material and equipment, setting in place, grouting primer and finish painting of 3 coats of epoxy paint etc. complete as per drawing and specifications.	Each	4	.0000191

**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower  
at Udangudi Thermal Power Station**

<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>
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	2,880	.0008942
A1872	Lettering with approved colour synthetic enamel paint including preparation of surface and painting work of base area for lettering on external face of NDCT at any height. Item includes for all tools & plants, staging, supporting, hanging platforms, safety arrangements, labours, materials etc. to complete the work in all respect.	--		
a	Lettering 'TANGEDCO' or similar (Letter size: height approx. 2M and distance between two letter shall be approx. 13M. lettering width, location and pattern (i.e horizontal or vertical) shall be as decided at site by Engineer in charge.	L.S.	2	.0001115
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.	--		

## Part C : Bill of Quantities

### Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower at Udangudi Thermal Power Station

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	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, chequered plate conforming to IS: 3052, mild steel rounds, monorails, stays, safety chains, ladders, MS grating etc. in columns, beams, portals, hangers, struts, monorails, stiffeners, brackets, stub columns, bracings, cleats, base plates, splice plates, chequered plate flooring, walkway platforms, ladders, stairs, stringers, treads, landings, hand-rails etc, connection design & preparation ofÂ fabrication drgs, 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 ofÂ 20o C for welding over 20 mm and upto 40 mm & 66o C for welding over 40 mm and upto 63 mm & 110o C for thickness over 63 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, 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 separate agency, approved by BHEL, for review and approval of fabrication drgs, in consultation with BHEL. (Structural steel for the above shall be supplied by BHEL free of cost as per the terms and conditions specified elsewhere in the contract)	MT	4	.0000494
A2302	Extra over ST No. A2301 for surface preparation by blast cleaning of steel structures as per IS:1477 (Part 1 and 2) and applying epoxy resin based zinc rich primer as per IS:14589 in 2 coats, one at shop and second coat after erection, including touch-up painting etc all complete.	MT	4	.0000094

**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower  
at Udangudi Thermal Power Station**

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
A2305	Providing and applying two coats of epoxy paint with minimum 25 micron total dry film thickness (DFT) per coat of approved make and shade to achieve an even shade over steel sections already having primer coats and keeping overall DFT with primer not less than 115 microns including protection and cleaning, scaffolding etc. all complete.	MT	4	.0000105
2307.0	Supplying, fabrication, erection and alignment of factory made electroforged galvanised grating units with mild steel having minimum galvanisation conforming to IS:2062 in flooring, platforms, drain and trench covers, walk-ways, passages, staircases with edge binding strips and anti-skid nosing in treads etc. including fixing clamps, fittings, fixtures, all taxes, duties, packing, grinding, drilling, welding, edge preparation, etc. all complete.	--		
a	Minimum galvanisation of 610 g/sqm	MT	1	.0000468
A2322	Supply, fabrication and fixing of GI pipe hand railing (1000 mm high) of 32/40 mm dia (Medium/Heavy Grade) including transportation, loading/unloading, painting etc. all complete..	MT	68	.0036703
A2309	Extra over above ST NO. A2301 for finishing the structural steels, chequered plate, bolts, inserts etc. with hot double dipped galvanisation @ 610 gm/sqm all complete.	MT	2	.0000262
A2323	Supply, fabrication and fixing of GI Cage Ladders conforming to IS: 3696 with Width - 600mm, ladder side flats - 60mm x 10 thk., Rungs - 20mm dia @ 300mm c/c., ladder stays @ 2.25m c/c, Circumferential cage rings @ 800c/c - 50mm x 6thk, Cage vertical flat - 50mm x 6 thk x 5 nos. The cage ladders shall be complete with all the necessary accessories, embedded parts, hardware, etc. as directed engineer and as per drawings including transportation, loading/unloading, painting etc. all complete..	MT	72	.0035664
21.0	MECHANICAL	--		

## Part C : Bill of Quantities

### Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower at Udangudi Thermal Power Station

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
A2329	Design, supply, fabrication, erection of stoplog gates, Sluice gates etc. with embedments required, lifting beams, special tools & plants, spare parts for three years, machining, casting, all materials such as structural steel, cast steel, stainless steel, brass used for seals, rubber seals, gears, ball and roller bearing, branch bushings, greasing, bolts, nuts, lugs, threaded fastners etc., cleaning, sand blasting, hot double dip galvanised with minimum coating of zinc 750 gms/sqm., following by an application of etching primer and dipping in black bitumen as per B.S. 3416, erection along with a second stage concreting to true plumb and levels, submission of drawings / fabrication drawings for engineers approval etc all complete. The leakage through rubber seal shall not be more than 5 lit/min/metre length of seal under maximum head. (Stoplog gate shall be designed as per IS:5620 and shall be of clear size 4m wide x 4m deep approx., minimum 6 thk skin plate in SS316 L, SS316L seal plate, SS316L guide frame, EPDM side seal and Duplex SS hardware)  (supply of structural steel is in the scope of bidder only)	Sets	4	.0020068
A2332	Design, Supplying, fabricating, erecting in position and testing / examining bolted and / or welded structural steel work for stationary screens made out of rolled sections and / or plates including cutting, straightening if required, edge preparation, bolting / welding of joints, cleaning, sand blasting, hot double dip galvanised with minimum coating of zinc as 900 gms./sqm. followed by application of an etching primer and dipping in black bitumen as per BS 3416, etc all complete. (SS316L screen of 4m x 4m approximate clear opening size fabricated out of minimum 6mm thick wire mesh of 25mm x 25mm apertures including SS316L guide frame and Duplex SS hardware) ( supply of structural steel is in the scope of bidder only)	Sets	6	.0018396
c	Chain Pulley Block (in corrosion resistant construction) with trolley conforming to IS:3832 with load chain conforming to IS: 3109 complete with necessary accessories such as hooks, slings etc with corrosion resistant hardware as per specifications and as directed or as per drawings	--		
i)	3 Ton capacity with 15 m chain for Stop Log Gates as per specifications, drawings and as directed by engineer	Sets	2	.0000725

## Part C : Bill of Quantities

### Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower at Udangudi Thermal Power Station

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)	2 Ton capacity with 15 m chain for Screens as per specifications, drawings and as directed by engineer	Sets	2	.0000502
d	Electric Hoist (in corrosion resistant construction) with trolley conforming to IS:3938, class 2 duty, complete with necessary accessories including DSL for power supply, slings etc with corrosion resistant hardware as per specifications and as directed or as per drawings	--		
i)	3 Ton capacity with 15 m chain for Stop Log Gates as per specifications, drawings and as directed by engineer	Sets	2	.000223
ii)	2 Ton capacity with 15 m chain for Screens as per specifications, drawings and as directed by engineer	Sets	2	.0001672
21.7	Providing & fixing handling Facilities on top of cooling tower including fabrication, erection complete with all the necessary accessories, hardware, etc. as per specifications, as directed by engineer and as per drawings	--		
a	Swivelling type lifting arm complete with swivelling brackets, pins, etc. along with 250 mm diameter CS pulleys, and all the necessary hardware, etc. as per specifications, drawings and as directed by engineer	Sets	2	.0000167
b	75 NB pipe inserts for top platform slab as per specifications, drawings and as directed by engineer	Sets	20	.0000557
22.0	PIPING AND VALVES	--		
22.1	Providing & fixing 300 NB flanged Duplex SS pipe in Sludge Pit as per specifications, drawings and as directed by engineer	RM	40	.0006522
22.2	Providing & fixing 300 NB double flanged Knife Edged Gate Valve in Duplex SS construction in Sludge Pit as per specifications, drawings and as directed by engineer	Sets	4	.0004816
22.3	Providing & fixing Fabricated MS piping (Min. 16 mm thk of dia 3.8 m header and 2.8 m riser for hot water supply) conforming to IS: 3589 and MS plates as per IS: 2062 including bends, Ts, elbows, reducers, etc. complete with all the necessary HDGS hardware, gaskets, etc. including fabrication, cutting, aligning, welding, lowering, laying, hydro-testing, etc. as per specifications, drawings and as directed by engineer	MT	500	.032053



## Part C : Bill of Quantities

### Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower at Udangudi Thermal Power Station

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
22.4	Providing & fixing 2800 NB Double Flanged Moto Actuated Butterfly valves of approved make conforming to AWWA C-504 / BS: 5155 in CI construction with Rubber/Ebonite lining (for corrosion protection against Sea Water) with mating flanges, and complete accessories and Duplex SS Shaft and Duplex SS hardware as per specifications and data sheets including aligning, erecting, testing etc complete as per specifications, drawings and as directed by engineer	Sets	4	.0167233
22.5	Providing & fixing Fabricated MS piping (12 thk of dia 1.2 m for by-pass line during commissioning) conforming to IS: 3589 and MS plates as per IS: 2062 including bends, Ts, elbows, reducers, etc. complete with all the necessary HDGS hardware, gaskets, etc. including fabrication, cutting, aligning, welding, lowering, laying, hydro-testing, etc. as per specifications, drawings and as directed by engineer	MT	22	.0014103
22.6	Providing & fixing 150 NB Duplex SS drain nipple with suitable drain plug for flushing of HW ducts and complete with accessories and hardware as per specifications and data sheets including aligning, erecting, testing etc.	Sets	8	.0001003
22.7	Fixtures on Piping	--		
a)	Providing & fixing 100 NB x 200 long MS heavy duty Stub connections as per IS: 1289 with isolating Duplex SS flanged type Ball Valves of 150 NB as per IS:9890 for flow measurement in HW pipe and complete with accessories & Duplex SS hardware as per specifications and data sheets including aligning, erecting etc.	Sets	6	.0001405
b)	Providing & fixing Dial type pressure guage of 150 mm dial size in Duplex SS material as per IS:3624 including stub connection with isolation Duplex SS Ball Valve (1/2 inch) as per IS:9890 and complete accessories, Duplex SS hardware as per specifications and data sheets including erecting, testing etc necessary for installing & operating the system	Sets	4	.0000446
23.0	PAINTING / PROTECTIVE COATING ON PIPING	--		
a	Surface preparation, providing & applying coating as per specifications and as directed by engineer	Sq.M	500	.0001394

**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower  
at Udangudi Thermal Power Station**

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	Surface preparation, providing & applying painting on outside surface of above-ground HW pipe as per specifications (2 coats of 50 micron DFT each Epoxy Primer followed by 2 finish coats of 50 micron DFT each High Build Epoxy Paint to achieve a total DFT of 200 to 250 microns) and as directed with approved make and type of paints	Sq.M	3,400	.0024639
c	Surface preparation, providing & applying painting on inside surface of HW pipe as per specifications (1500 micron DFT Poly Urea or Glass Flake or Corro Coat) and as directed with approved make and type of paints	Sq.M	5,400	.0066224
d	Surface preparation, providing & applying painting of steel surfaces as per specification with approved make and type of paints	Sq.M	2,000	.0011595
24.0	FILLS AND FILLS SUPPORTING ARRANGEMENT	Lump Sum	2	.1252731
25.0	DISTRIBUTION SYSTEM AND SUPPORTING ARRANGEMENT	Lump Sum	2	.0667341
26.0	PUMP	--		
26.1	Providing & fixing Submersible Sludge Pumps (in Duplex SS material) of minimum 450 Cu.M/hr capacity @25MWC head, complete with associated 300m long discharge piping, valves and accessories up to nearest plant drain, including control panel as per specification & as directed	Sets	4	.0055744
26.2	Providing and fixing tripod for handling sludge pump including 2T capacity chain pulley block with minimum 8m chain length along with pipe inserts as per sludge pit drawing for mounting the system	Sets	2	.0000557
27.0	Tests	--		
27.1	Thermal Performance Guarantee Test as per ATC-105 by Contractor (Class B Test with data collection system and logger)	LS	2	.0008362
III	ELECTRICAL & INSTRUMENTATION	--		
1.0	AVIATION WARNING LIGHT SYSTEM	--		

**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower  
at Udangudi Thermal Power Station**

<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>
a	Providing & fixing Hi Intensity LED twin-type (double fixtures) white flashing Aviation Obstruction Lights as per ICAO, FAA and DGCA, India specifications. The fixtures shall be in corrosion resistant aluminum casting finished in stove enameled control gear suitable for 200/240V, 50Hz supply, complete as per specifications with all the necessary fixing accessories. Expected life is required to be more than 10 years.	Sets	16	.0049933
b	Providing & fixing 1.5 m long SS 316 ISMC 100 with brackets/clamps, nuts and bolts for mounting the light fixtures as per drawings and/or manufacturer recommendations and as directed by engineer	Sets	16	.0001338
c	Providing & fixing JB's with necessary brackets, bolts & nuts for cabling to the fixtures	Sets	24	.0000669
d	Providing & fixing Aviation Lighting Panel cum Controller with Photoelectric light detectors to monitor north sky to control the aviation warning lights. The lights should be switched on when the ambient light goes below 35 candelas and should be switched off when the intensity is more than 58 candelas. The AOLs should not switch off due to short time increase in sky light due to lightning flashes or any other short bursts of light. The detectors should be complete with all the accessories, hardware, etc. necessary for installation. The provision for Auto manual operation shall also be provided	Sets	2	.0000892
e	Providing & fixing 250W HPSV well glass fixture with built in capacitor/ballast and controller with IP:55 protection along with 3 m pole for staircase lighting as per specification and/or as directed by engineer	Sets	248	.0088199
f	Cables	--		
	All cables shall be 1.1 KV grade, PVC inner sheathed, FRLS-HRPVC insulated, armoured PVC outer sheathed copper cable conforming to IS:1554 part-I and including lugs etc. and subject to BHEL approval. The cables shall be clamped to Cage Ladders at every 750 c/c along its run and will include all the hardware required for its fixing and terminations, etc. The Junction/Terminal boxes should be provided as and where required during erection and/or as directed by engineer	--		
i	Providing & fixing power Cable for Receptacless: 4Cx10sq.mm AL	RMT	920	.0004103

## Part C : Bill of Quantities

### Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower at Udangudi Thermal Power Station

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	Providing & fixing 4C x 6 sq.mm Copper cable for power supply from AOLP to AOL JB's & Staircase Lighting	RMT	1,574	.0010801
iii	Providing & fixing 3C x 2.5 Sq.mm copper cable for local connection from local Junction box to aviation warning lights	RMT	80	.0000283
iv.	40 dia PVC Conduits for cables	RMT	1,000	.0000424
g	Providing & fixing 240V x 63A single phase 3-pin outdoor, weather proof, industrial type switch- -socket outlets with inter-lock switches and fitted with metal cap as per specifications, drawings and as directed by engineer	Sets	10	.0000279
h	Providing & fixing weather & dust proof (IP-55) 200 mm x 150mm x 100mm deep junction box (2/3/4 way) made out of 2mm thk G.S. with ELMEX type terminals, glands etc. complete as per specifications, drawings and as directed by engineer	Sets	260	.0002296
i	Providing & fixing 415 V Lighting Distribution Board fabricated from 2 thk sheet steel, dust and vermin proof and removable gland plates at top and bottom with ELMEX type connectors and with suitable earthing including 2 nos. 63A TPN incomers, HRC fuses and 2 nos. 63A, 4 nos. 16 A outgoing connections with HRC fuses. Two incomers from CWPB will have to be connected to this LDB by the contractor. Automatic change over with suitable delay timers with Auto/Manual operation will have to be provided The DB shall be designed for 50 KVA Fault Level and must also include a transformer of 100 KVA rating	Sets	2	.0001394
j	Providing & fixing Temporary aviation warning lights as per specifications, during construction, once the construction reaches beyond 50m level from general ground level as per specifications, drawings and as directed by engineer	LS	2	.0001115
--	LIGHTNING PROTECTION SYSTEM conforming to IS: 2309	--		
a	Providing & fixing Air terminator / Lightning arrestor made of 20mm dia. x 2.0m ht Cu rod with pointed end and welded to base plate for fixing on top platform complete as per specifications and as directed by Engineer	Sets	56	.0002497

**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower  
at Udangudi Thermal Power Station**

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	Providing & fixing of 75 x 10 thk GI flat Coronal band connecting all air terminator on one side and to the down conductor on the lower side as per specification complete with all the necessary fixtures, hardware, etc. required for installation. The clamps used shall be GI and heavy duty and shall be fixed approx 1m below the top of the cooling tower and clamped at the spacing not more than 750 mm C/C	RMT	554	.0001581
c	Providing & fixing of 75 x 10 thk GI flat Down conductor complete with all the necessary fixtures, hardware, etc. required for installation. The down conductors on the top shall be connected to the coronal band and on the lower side they shall be connected to the test links. The clamping shall be at 750 mm C/C with heavy duty GI clamps. The down conductors shall be in one piece as far as possible. The necessary joints shall be of fully welded type and not bolted type except at the test link. These conductors shall be laid over the concrete surface so that visual inspection and repair, if necessary during maintenance is possible	RMT	5,082	.0014505
d	Providing & fixing 75x10 thk GS flat Test links (complete assembly) with enclosure anchored to Raker column as directed by engineer	Sets	28	.000078
e	Providing & fixing 4.5 m long, Dia. 40mm MS rod buried down conductor as per specifications and as directed by engineer	Sets	28	.000045
f	Providing & fixing 100 dia. x 1.5m Class-1 grade PVC pipe to be filled with PCC after enclosing down conductor below test link (approx. 10m length) as per specifications, drawings and as directed by engineer	Sets	28	.0000937
--	EARTHING conforming to IS :3043	--		
a	Providing & fixing of Earth conductor made out of 40 mm Dia. MS round bar complete with all the necessary fixtures, hardware, etc. required for installation shall be supplied and installed between test link on one side and to the earth mat on the other side as per specifications, drawings and as directed by engineer	RMT	200	.0000705
b	Providing & fixing 70x10 thk GS flat coronal band on top platform cleated at 750mm c/c complete with all the necessary fixtures, hardware, etc. required for installation as per specifications, drawings and as directed by engineer	RMT	554	.0001581

## Part C : Bill of Quantities

### Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower at Udangudi Thermal Power Station

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	Providing & fixing 70x10 thk GS flat down conductors from top platform to earth mat, cleated at 750mm c/c complete with all the necessary fixtures, hardware, etc. required for installation as per specifications, drawings and as directed by engineer	Sets	728	.0002078
d	Laying of Earthing Mat (Main Grounding Conductor @ 1m below FGL approx. at about 6 m outside the NDCT periphery), transportation from yard stores, loading, unloading, cutting to length, welding, protective painting of joints etc. all complete. (Excavation & Back filling shall be paid separately under respective item of earth work. Earthing mats/rods shall be supplied by BHEL free of cost)	RMT	948	.000334
e	Construction of Treated Earthing pit as per drawing with charcoal & salt, GI pipes (40 dia, 3 m long) as per IS- 3043, earth electrodes, GI wire, GI strips, brick chamber with covers including associated earthwork etc. all complete.(Material for GI pipes, earth electrodes, GI wire, GI strips shall be supplied by BHEL free of cost).	Sets	10	.0000836
f	Providing & fixing Dia. 40mm MS rod buried grounding inter connector between cooling towers and to nearest main plant grounding mat as per specifications, drawings and as directed by engineer	RMT	400	.0001409
g	Providing & fixing 25x6mm thk GS flat for cage ladders, hand rails and all non-current carrying metal parts as per specifications, drawings and as directed by engineer	RMT	130	.0000067
h	Providing & fixing 50x6 thk GS flat for non-metal parts such as basin, CWC, drain box etc. and cable trays as per specifications, drawings and as directed by engineer	RMT	200	.0000205
i	Providing & fixing 25x3mm thk.GS flat for control panels (AWL) as per specifications, drawings and as directed by engineer	RMT	20	.0000005
j	Providing & fixing 8 SWG GI wire for Junction boxes / pull boxes, receptacles, conduits etc. as per specifications, drawings and as directed by engineer	RMT	50	.0000001
--	--	--		
a	Providing & fixing of Temporary lightning protection system during construction as per specifications, complete with all the necessary fixtures, hardware, etc. required for installation as per specifications, drawings and as directed by engineer	LS	2	.0000557
b	Conducting tests on circuit as per specifications, drawings and as directed by engineer	LS	2	.0000279

**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:1869 for Cooling Tower  
at Udangudi Thermal Power Station**

<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>
--	INSTRUMENTATION	--		
a	Providing & fixing Duplex SS Thermowells complete with all the necessary fixtures, hardware, etc. required for installation as per specifications, drawings and as directed by engineer	Sets	8	.0000491
b	Providing & fixing Duplex SS Temperature Guages complete with all the necessary fixtures, hardware, etc. required for installation as per specifications, drawings and as directed by engineer	Sets	4	.0000513
c	Providing & fixing Duplex SS Pressure Gauges complete with all the necessary fixtures, hardware, etc. required for installation as per specifications, drawings and as directed by engineer	Sets	4	.0000446
d	Providing & fixing of 3-hole type Pitot Tube procured from IIT Delhi, complete with all the necessary fixtures, hardware, etc. required for installation as per specifications, drawings and as directed by engineer	Sets	1	.0002542
e	Providing & fixing Duplex SS Level Switches in Sludge Pit complete with all the necessary fixtures, hardware, etc. required for installation as per specifications, drawings and as directed by engineer	Sets	2	.0000413
f	Providing & fixing rotating type Anemometer for wind speed measurement as per specifications, drawings and as directed by engineer	Sets	1	.0000067
g	Providing & fixing Mechanically Aspirated Psychrometer for wetbulb temperature measurement as per specifications, drawings and as directed by engineer	Sets	1	.0001603
4.0	Mandatory spares as per Annexure 4 of Technical Specifications	Lot	1	.0008362
<b>TOTAL Weightage</b>				1.0