

TENDER SPECIFICATION

BHEL: PSSR: SCT: 1972

FOR

Mechanical Works including Material handling, Erection, Testing & commissioning of Boiler & Aux, Rotating Equipments, SCR system, ESP, FGD, Steam Turbine, Generator & auxiliaries, complete Piping, BOI Items & Misc items and Civil works & Fabrication & erection of structures, racks & trestles structure as mentioned in the specification and application of Insulation & refractory, supply and application of preservative & final painting and etc including obtaining statutory clearances if any, for 5th Stream Alumina Refinery Expansion at Damanjodi, Odisha of NALCO.

VOLUME-II
PRICE BID



BHARAT HEAVY ELECTRICALS LIMITED

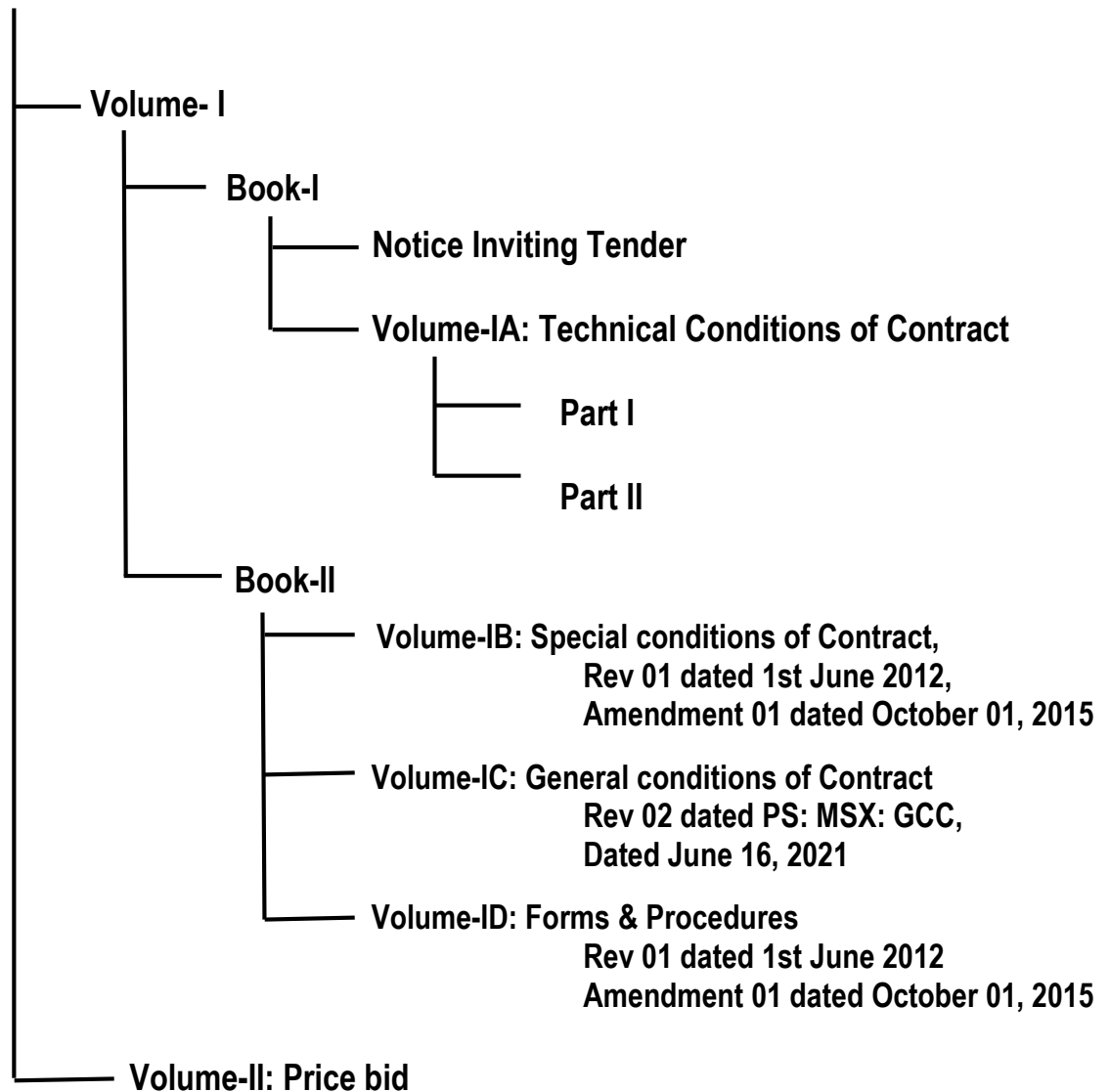
(A Government of India Undertaking)

**Tek Towers, No.11, Old Mahabalipuram Road,
Okkiyam Thoraipakkam, Chennai - 600097.**

PRICE BID

TENDER SPECIFICATION CONSISTS OF

Techno-Commercial Bid



PRICE BID

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PRICE BID

PART-A-INSTRUCTIONS TO BIDDERS:

1. The 'Price bid contains the consolidated list of BOQ with brief description of items. The quantity indicated in the BOQ / Price bid is approximate only and is liable for variation. Payment will be as per actual quantity executed as certified by BHEL Engineer.
2. 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.
3. Before filling the Rates in the Price bid, the bidder shall go through the detailed specification of all items of BOQ as well as Scope of Work as specified in relevant Clause of this document
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 BHEL:PSSR:SCT:1972 for Boiler & Aux, ESP, LP Piping, Material Management, Misc Items & CCivil Structural & Erection Works, Power Cycle Piping/Critical Piping/Piping in case of CCP/Nuclear PP, Steam Turbine Generator set & Aux

at NALCO Damanjodi 18.5 MW BTG

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
--	Complete work of receipt, unloading and handling of materials from Trucks/ Trailers etc. to project stores sheds / storage yards, loading and transporting from Stores/storage yards to site of erection or pre-assembly yard and unloading at pre-assembly area/erection site, checking, cleaning chipping and leveling of foundations, providing packers and shims/pre-assembling of equipments at the pre-assembly yard, inspection, minor rectification, preservation, erection, leveling, and other adjustments, cutting, edge / surface preparation, welding, grinding, radiography, LPI/ MPI/ UT testing wherever needed, heat treatment, carrying out air tightness test by soap solution / kerosene, hydraulic test, steam / air blowing, light up, chemical cleaning, passivation, steam blowing and safety valve floating including inter connection of all the termination points, erection and dismantling of all temporary piping, valves, pumps, tanks etc., required for the above operations, all pre-commissioning tests and trial runs of the Boiler & Aux, Rotating Equipments, SCR , ESP, FGD, Steam turbine, Generator & auxiliaries, complete Piping, BOI Items & Misc items and Civil works & Fabrication & erection of structures, racks & trestles structure as mentioned in the specification and application of Insulation & refractory, supply and application of preservative & final painting and etc including obtaining statutory clearances if any, for 5th Stream Alumina Refinery Expansion at Damanjodi, Odisha of NALCO.	--		
1.0	Boiler & Aux.	--		
1.1	Boiler - Structures	MT	2,620.33	.1232548
1.2	Boiler - Pressure Parts	MT	699.8	.0459635
1.3	Boiler - Non Pressure Parts (Boiler ducting is upto ESP inlet gate)	MT	1,775.24	.0916503
2.0	Rotating Machines	--		
2.1	Rotating Machines	MT	631.74	.0202212

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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
2.2	Rotating Machines- Handling Equipment	MT	15.4	.0006837
3.0	ESP	--		
3.1	ESP	MT	1,648	.0546411
3.2	ESP - Non Pressure Parts (ESP Outlet Funnel to Chimney)	MT	1,684.9	.0699756
4.0	Piping	--		
4.1	Piping - AS	MT	198.45	.0278902
4.2	Piping - CS HP	MT	145.13	.0172747
4.3	Piping - CS LP	MT	1,016.05	.1069511
4.4	Piping - SS	MT	109.71	.033984
4.5	Piping - Hangers & Supports	MT	9.5	.0005559
4.6	Piping - Steam Blowing Piping (Temporary)	MT	9	.0006195
4.7	Piping - Chemical Cleaning Piping (Temporary)	MT	27	.0018586
5.0	Insulation	--		
5.1	Insulation - Castable & Pourable refractory	MT	65.18	.0022247
5.2	Insulation - Iron Parts	MT	115.43	.0071512
5.3	Insulation - Aluminium Sheets	MT	47	.0031544

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Structural & Erection Works, Power Cycle Piping/Critical Piping/Piping in case of CCP/Nuclear PP, Steam Turbine
Generator set & Aux**

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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
5.4	Insulation - Mineral Wool	MT	313	.015082
6.0	STG & Aux.	--		
6.1	E&C of STG with TG & Generator	MT	466.82	.0776019
7.0	Misc Items	--		
7.1	Fuel Oil System & Tanks	MT	22.79	.0027584
7.2	Misc Pumps, Cranes, Elect. Hoists, Air Dryers & Receivers & Sump Pumps	MT	38.5	.0030367
8.0	Material Handling	--		
8.1	For consignments received in trucks / trailers through road	MT	13,913.75	.0427004
8.2	For equipments from trucks / trailers received with your own cranes and other unloading equipments like jacks, winches, slings and sleepers etc.	--		
8.2.1	Boiler Upper Drum	MT	60	.0007239
8.2.2	Boiler Lower Drum	MT	30	.000452
8.2.3	Upper Part of Outer Casing & Exhaust Hood	MT	22	.0002648
8.2.4	Lower Part of Outer Casing & Exhaust Hood	MT	18.5	.0001927
8.2.5	Mill body (in one piece) Wt. 35 MT. Total 2 Nos.	MT	70	.0006723
8.2.6	Condenser Complete Assembly	MT	46	.0006351
8.2.7	Generator Assembly	MT	46	.0006351

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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
8.3	Non-erectable materials received from other sites such as office furniture, T & P etc.	MT	50	.0001592
8.4	Delivery from railway stations	--		
8.4.1	From Damanjodil railway station to site stores:- distance 6 kms approx.	MT	20	.0002317
8.5	Delivery from transport or godown	--		
8.5.1	From Koraput City to site storage area:- distance 36 kms approx.	MT	50	.0008604
8.6	Shifting of materials already stored and restacking at storage yard / stores	MT	500	.0014771
8.7	For providing services for preservation painting of Boiler, T.G. and all other erection components at storage yard/stores including supply of all consumables	MT	1,000	.0032118
8.8	Packing and loading of materials on trucks / trailers using your own crane and T & Ps at site for transporting from site to other places	MT	100	.0006511
9.0	Civil & Structural Works	--		
100.0	EARTH WORK: Earth work In excavation, backfilling and disposal including all labour, equipments 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	CUM	200	.0000489

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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
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 1Km 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 90% maximum dry density as per IS-2720 (Part-VII)	CUM	200	.0000513
200.0	Concrete work	--		
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	500	.0000495
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	500	.0000194
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	500	.0001205
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	5	.0010325

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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
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, stiffner plates, protective tape, pipe sleeves, templates etc. including welding, cutting, grinding, threading, drilling etc. all complete.	MT	12	.0027362
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.	--		
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:	--		
i	HST M12	Nos	20	.0000189
ii	HST M16	Nos	25	.0000387
iii	HST M20	Nos	20	.0000499
iv	HST M24	Nos	15	.000049
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 M12	Nos	20	.0000327
ii	HAS-E5.8 M16	Nos	25	.0000645
iii	HAS-E5.8 M20	Nos	20	.0000706
iv	HAS-E5.8 M24	Nos	15	.0000671

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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
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	1	.0002022
800.0	Grouting work	--		
805-A	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 Shrinkkomp ACC/ GP 2 Fosroc 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	.0016865
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 etc. at all level as per specification, drawings and as directed by engineer - in - charge.	--		
904.0	Providing and fixing single or double steel door shutters with 45mm thk flush design shutter comprising of two outer sheets of 18 gauge steel sheets rigidly connected and reinforced inside with continuous vertical 20 gauge stiffeners, spot welded in position at not more than 150mm on centres including void filled with mineral wool (density as per specification), all fittings, Godrej or equivalent approved make mortice lock with handle on both sides, shop and final painting etc all complete.	SQM	10	.000142

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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
906.0	Providing and fixing anodized extruded aluminium doors (single or double shutter) conforming to IS:1948, IS:1949 fabricated from extruded sections of HINDALCO/JINDAL or equivalent approved make having minimum 3mm wall thickness as per IS:1285, IS:733 and anodized and electro color coating of required shade as per IS 1868 (minimum anodized coating of grade AC15). fixed with rawl plugs, expansion fasteners,SS screws / fixing clips necessary filling of gaps at Junctions, at top, bottom & sides with required PVC / neoprene felt for bi-metallic protection etc. Glazing shall be clear float glass of 6mm thickness including snap fit type beading, concealed screws, fixtures, Godrej or equivalent make Mortice lock with handle on both sides, etc all complete. Aluminium section shall be smooth, free of stains, straight, mitred & jointed mechanically wherever required. (Glazing shall be paid separately)	KG	30	.000031
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	345	.0028201
b	fixed type	SQM	160	.0011014

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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
909.0	Providing and fixing anodised aluminium work of Jindal, Hindalco or other equivalent approved make for door frames, windows, ventilators, partitions, railing etc with extruded standard tubular and other sections including all fittings & fixtures and accessories of approved make conforming to IS733 and IS1285, anodised and electro color dyed to required shade according to IS 1868 (minimum anodic coating of grade AC15), fixed with rawl plugs, expansion fasteners, SS screws or with fixing clips, including necessary filling of gaps at junctions, at top, bottom and sides with required PVC/neoprene felt for bi-metalic protection etc. including preperation of working drawings, aluminium cleat angle, aluminium snap-on-beading for glazing/panelling, stair case tread nosing, 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 and panelling shall be paid seperately).Weight of aluminium section only shall be measure.	Kg	300	.0003098
913.0	Providing and fixing in position rolling shutter of hot rolled double dipped galvanised steel lath section of 18 SWG tested mild steel strips at 75mm rolling centres interlocked together through their entire length and jointed together at the end by end locks mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation including wire springs, top cover, primer & shop coats of approved enamel paint etc, all complete as per IS 6248 and specification of approved make of following types: The bottom lath shall be coupled to a lock plate fabricated from 3mm thick galvanised steel plate and securely rivetted with stiffening angles.(partly coiled and lath/full lath).	--		
b	Mechanically Operated	SQM	9	.0000681
c	Electrically operated	SQM	18	.0001549

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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
915.0	Providing, fixing and fitting of glazing of first grade class in steel/aluminium/wooden frames, where ever required, cleaning after fixing including hardware, gaskets, clips, beadings etc. all complete.	--		
h	6 mm thick clear toughened safety glass	SQM	404	.0016338
i	Two nos. 6 mm thick clear toughened float glass hermetically sealed and separated by 12 mm thick air gap for thermal insulation (only single elevation area to be measured)	SQM	5	.0000409
917.0	Providing and fixing 12 mm thick BWP particle board, decorative veneer (prelaminated) on both sides, as panels in aluminium framed door shutter, fixed with necessary snap-on-beading etc. all complete (excluding aluminium works).	SQM	15	.0000542
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	20	.0001721
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 etc. 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
1502.0	Designing, providing, erection and fixing permanently color coated galvanised MS troughed metal sheet decking plate of approved colour and conforming to class3 of IS 14246 over roof purlins for cast-in-situ roof slab as per relevant IS code and specification. Bare metal thickness of deck plate shall be minimum 0.8mm with minimum trough depth of 44 mm having minimum yield strength of 250 MPa and shall serve as permanent shuttering to the roof slab 100mm thick measured over crest of metal decking & shall have adequate strength to support weight of green concrete and imposed loads of min 150 kg/sqm during construction between purlins as per manufacturer's recommendations/ calculations/ test certificates for approval including fixing of plates to purlins, side lapping, end lapping etc. all complete for below mentioned spans. The sheet shall be permanently coated with silicon modified polyester paint of minimum 20 micron DFT on exposed surface (facing operating floor) and minimum 7 micron on other face over epoxy primer applied over hot dipped galvanising @ 275 gm/sqm including fixing of sheet to purlin with self drilling white zinc plated heat treated carbon steel screws of minimum 5.6 mm dia @ 260mm c/c in the trough and stich screws between two adjacent sheets and sealing with epoxy sealant. Measurement of profile sheeting shall be of the plan area of roof covered by MS trough metal decking.	--		
a	Span Upto 1800mm	SQM	500	.0020651
b	Span Exceeding 1800mm and upto 2500 mm	SQM	70	.0003132
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	6	.0003872

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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
1508.0	Designing, providing and fixing Permanent colour coated metal cladding with troughed M.S. sheets of 0.6mm bare metal thickness having minimum yield strength 250 MPa and with zinc coating to class Z275 / aluminium-zinc alloy coating to class AZ150 total on both sides of both sheets including fixing to supports / rails by concealed fixing system (Z Purlin) , corrosion resistant self tapping / self drilling type fasteners with suitable cap, flashing etc. all complete. The exposed surface of the sheet shall be permanently colour coated with silicon modified polyester paint of minimum dry film thickness (DFT) 20 microns over suitable primer. Other face of the sheet shall be provided with suitable pre-coating of minimum DFT 7 microns over suitable primer. The permanent colour coated sheet shall meet the general requirements of IS : 14246 and shall conform to class 3 for the durability. The sheet shall be fixed directly to side runners and Z spacers as per IS : 277. The sheet shall be fixed at the rate not more than 1500mm center to center.	SQM	9,140	.0275258
1511.0	Providing and fixing insulation of resin bonded mineral wool of 50 mm nominal thickness conforming to IS 8183 having a density of 32 kg/cum glass wool or 48 kg/cum for rock wool, for cladding/under deck insulation including application of glue and tying with lacing wire, for glass/rock wool as per manufacturer's recommendations.	--		
a)	For insulation in Sandwich Cladding	SQM	50	.0000624
1520.0	Providing & fixing permanently at all heights and elevations, troughed sheets over roof purlins/beams/side runners etc for roofing and side cladding (internal & external) including all labour, material, equipment, transportation, handling, scaffolding, laps, hooks, washers, corner pieces etc. at any level as per specification, drawings and as directed by engineer - in - charge. Quoted rate shall include cost of all labour, material, tools and plants, consumables, lead, lift etc complete. Fixing fire resistant and UV resistant polycarbonate translucent sheets of minimum 3MM thickness on roof & side cladding as per the specification and approved drawings and directions of engineer in charge	SQM	400	.0014111

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1700.0	RAIN WATER DOWN TAKE PIPES	--		
1704.0	Providing and fixing galvanised MS down take pipes of 150 mm dia- Medium quality as per IS:1239(part-I) all complete.	RM	80	.0003648
1800.0	MISCELLANEOUS WORKS	--		
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. (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	30	.000963
2000.0	FENCING AND GATES: Fencing and gates including all labour, material (unless otherwise specified in BOQ/contract specification), equipment etc at all level as per specification, drawings and as directed by engineer - in - charge.	--		
2001.0	Supplying and erecting in position 2.4 m high PVC coated galvanised chain linked fencing of minimum 8 gauge (including PVC coating) of mesh size 75mm x 75mm. The diameter of the hot dip galvanised steel wire for chain link fencing excluding PVC coating shall not be less than 12 gauge. GI barbed wire fencing of height of 600 mm conforming to IS 298 at top of chain link fencing shall be provided with 4 strands of barbed wire hot dip galvanised wire of 12G comprising of 2 ply of wires with barbs of 16G spaced at 100mm. Cost to include for GI hook bolts, rings & washers, hot dip galvanised tension wires, 25X6 mm GI flat stretcher bar at end posts, accessories etc. all complete. (Structural post shall be paid separately under item 2007)	RM	15	.0000671
2007.0	Supply and fixing of hot dip galvanised mild steel posts for fencing. Rate of zinc coating shall not be less than 710 g/m2 on steel posts.	MT	1	.0002323

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at NALCO Damanjodi 18.5 MW BTG

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
2100.0	WATER SUPPLY: Water supply work including men, material (unless otherwise specified in BOQ/contract specification), equipment etc. at all level as per specification, drawings and as directed by engineer - in - charge.	--		
2105.0	Providing and fixing GI pipes class B complete for external work with GI sockets, unions, elbows, tees, nipples etc including trenching & refilling, anti-corrosive paint etc all complete for following sizes:	--		
a	15 mm nominal bore.	RM	5	.0000034
b	20 mm nominal bore.	RM	5	.0000043
c	25 mm nominal bore.	RM	5	.0000052
d	50 mm nominal bore.	RM	5	.0000086
e	40 mm nominal bore.	RM	5	.0000086
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 ST No. 2105.	--		
a	500 litres capacity	NOS	2	.0000181
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.	--		

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at NALCO Damanjodi 18.5 MW BTG

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
2301.0	Supply, Fabrication, erection and alignment of structures ,of 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, 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, 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 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, surface preparation by means of manual or mechanical power tools as per IS:1477 part 1, touch-up painting, rectification, dismantling and removal of all temporary structures (weight of temporary structures not payable), return of surplus / waste steel materials to store etc all complete. Including appointment of a seperate agency, approved by BHEL, for review and approval of fabrication drgs, in consultation with BHEL.	MT	40	.0086045

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at NALCO Damanjodi 18.5 MW BTG

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
2301(A)	Fabrication, erection and alignment of structures ,of 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, 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, 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 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, surface preparation by means of manual or mechanical power tools as per IS:1477 part 1, touch-up painting, rectification, dismantling and removal of all temporary structures (weight of temporary structures not payable), return of surplus / waste steel materials to store etc all complete. Including appointment of a seperate agency, approved by BHEL, for review and approval of fabrication drgs, in consultation with BHEL (BHEL to supply steel free of cost).	MT	2,004	.1293255
A2302(a)	Extra over ST NO. 2301 & 2301 (A) for blast cleaning of steel structures to near white metal surface(SA 2 1/2) and application of two coats of PVC- CoPolymer based primer (or) alkyed resin based primer prior to despath to site, including touch up painting etc. all complete. Total DFT shall be minimum 60 microns	MT	2,004	.0258651

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at NALCO Damanjodi 18.5 MW BTG

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
A2302 (b)	Extra over ST No. 2301 & 2301 (A) for providing and applying two coats of PVC-Copolymer paint (or) synthetic enameling alkyd resin paint applied at site with minimum 60 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 120 microns including protection and cleaning, scaffolding etc. all complete. Combination of primer and paint shall either be (i) PVC CoPolymer Primer + PVC Copolymer Paint (or) (ii) Alkyed resin Primer + Synthetic Enamelling Alkyd Resin Paint	MT	2,004	.0155191
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	31	.0070686
2308. 0	Supplying, fabrication, erection and alignment of factory made galvanised fabricated floor grating units of diamond pattern 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 2 coats of redoxide zinc-chromate primer (one coat at shop and one coat after erection), fixing clamps, fittings, fixtures, all taxes, duties, packing, grinding, drilling, welding, edge preparation, etc. all complete.	MT	4	.0007744
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.	QTL	6	.0001291

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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
2312.0	Providing and fixing in positing of high strength structural bolts (of property class 8.8 and product grade `C' as per IS: 1367) and conforming to IS: 3757 and high strength structural hardened and tempered nuts (of property class `8' as per IS:1367) conforming to IS:6623 with hardened and tempered washers as per IS:6649 etc. up to and inclusive of 39 mm diameter and upto 300 mm long for structural steel work etc all complete.	QTL	84	.0021683
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	4	.0001101
2314.0	Addition to, alterations in and/or modifiction of	--		
a	In erected position	MT	10	.0003872
b	In fabrication yard	MT	8	.0002409
2315.0	Re-erection of dismantled fabricated structural steel members including carriage of modified	MT	18	.000697
2318.0	Providing and fixing in position PTFE type sliding bearings of reputed manufacturer, individual bearing suitable for required vertical loads as per the construction drawings and for maximum displacement of +/-50 mm including all taxes, duties, transportation, installation, drilling, bolting, erecting, aligning etc all complete for following vertical loads.	--		
a	20 Tons	EACH	2	.0000774

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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	25 Tons	EACH	2	.0000912
c	40 Tons	EACH	2	.0001101
d	50 Tons	EACH	2	.0001308
2321.0	Supply, fabrication and fixing of MS pipe hand railing of 32 mm/40 mm dia including transportation, loading/unloading etc. all complete. Payments terms - a)on receipt of materials at site - 65%; b) Erection & fixing - 35%;	MT	12	.0028911
2323.0	Conducting radiography test on welds wherever specified including equipments, measuring devices, gauges, test report etc. all complete.	RM	9	.0000658
2324.0	Conducting ultasonic test on welds wherever specified including equipments, measuring devices, gauges, test report etc. all complete.	RM	9	.0000139
2326.0	Conducting magnetic particle test on welds wherever specified including equipments, measuring devices, gauges, test report etc. all complete.	RM	9	.0000124
2327.0	Conducting dye penetration test on welds wherever specified by the engineer including provision of necessary equipments, measuring devices, gauges etc. all complete (over and above the work already specified in the specifications.)	RM	9	.0000093
TOTAL Weightage				1.0