

BHEL:PS- WR
TS : BHE/PW/PUR/BORLI-CHIMNEY/615
PRICE BID- PART-II (VOL-III)

BOQ FOR BALANCE WORK OF 100 M HIGH MULTI FLUE CHIMNEY FOR CAPTIVE POWER PLANT- BINA REFINERY PROJECT						
SL.NO	DESCRIPTION	UNIT	QTY.	RATE IN RS IN FIG	RATE IN WORDS	AMOUNT
	PART-A					
1	(i) Excavation for all lifts, in all types of soil ,which includes providing of cofferdams, shoring strutting, sheeting, bracing, draining and pumping out water below ground water table, if required; clearing all grass, vegetation, etc. including trimming of excavation bottom, stacking, levelling, grading, etc. of excavated materials all complete as per specifications, drawings and instructions of the engineer including a lead upto 100 metres.					
	a) for depth upto 2 metre	CU.M	300			
2	Filling using selected excavated materials in trenches, plinths, sides of foundations and other, underground structures, pipes etc. in layers not exceeding 200 mm loose thickness for all leads and lifts and including loading from stock pile, carting, unloading, filling, watering and compacting / ramming each layer, all complete as per specifications, drawings and as directed by the engineer to achieve 95% standard proctor density.	CU.M	918			
3	Disposal of surplus excavated earth obtained from Item No. 1 including all lifts upto 5 KM lead & as per specifications and as directed by the Engineer with the cost of all labour, material and equipment complete.	CU.M	300			
4	Supplying and laying (inside chimney in the space below the grade level slab) sand fill in layers no more than 150 mm thick each and thoroughly compacted by compacting equipment and by water flooding to achieve maximum density for all leads and lifts including all labour, materials, equipment etc. complete as per drawings, specifications and directions of the engineer.	CU.M	1140			
5	Providing and laying Nominal Mix plain cement concrete (1:4:8) with graded aggregate (with maximum size of coarse aggregate not exceeding 40 mm) at all levels for all kinds of work like mass concrete, lean concrete, mudmat, filling etc. including all labour, materials, equipment, handling transporting, batching, curing, testing etc. complete as per specifications, drawings, and instructions of the engineer.	CU.M	35			

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6	Providing and laying design mix cement concrete with graded aggregate (maximum size of coarse aggregate not exceeding 20 mm) for reinforced concrete work at all levels for all kinds of work using Plasticizer(Conplast RP 264 manufactured by FOSROC) or equivalent suitable for Slipform system including labour, materials, equipment, handling transporting, batching, mixing, placing, levelling, compacting, curing, testing etc. rendering or cleaning to give smooth and even surface, all complete as per specifications, drawings, and instructions of the engineer, but excluding all formwork and reinforcing steel.					
	i) For works below ground level					
	a) Grade M-30 (foundations, etc) with minimum cement content as 450 kg/m ³	CU.M	50			
	ii) For works above ground level					
	a) Grade M-30 (grade level slab)	CU.M	50			
	b) Grade M-30 for chimney shell, mini shell, roof and external platforms and minishell, other shell attachments.	CU.M	1950			
	c) Grade M-30 for internal platform slab, enclosure wall, slab or any other component.	CU.M	95			
7	Straightening, cutting, bending, placing in position at any level, binding in position of mild steel reinforcements conforming to grade - 1 of IS - 432 (Part - 1) and TMT/HSD reinforcement conforming to IS: 1786, minimum of Grade Fe 415 including cost of binding wire, labour, transportations to & from BHEL stores/storage yard etc. complete as per specifications, drawings, and as directed by engineer following type of High strength Deformed (HSD) bars reinforcement/TMT and MS reinforcement of all diameters and at all elevations using approved quality binding wires as per specifications and drawings Note:- MS reinforcement and TMT/HSD reinforcement steel shall be provided by BHEL at free of cost and agency has to draw and transport from BHEL Stores/storage yard as per engineers instruction including all T & Ps and labours etc. complete.					

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	i) For works below ground level					
	a) High strength deformed bars	MT	10			
	ii) For works above ground level					
	a) Mild steel reinforcement bars	MT	4			
	b) High strength deformed bars	MT	135			
8	Providing and fixing formwork of approved quality for cast-in-situ, plain or reinforced concrete works of any type and section (including curved surfaces and chimney shell) for all elevations, including labour, materials, equipment, waste of forms, shoring, strutting, scaffolding, staging, tying, nailing, caulking, bolting, etc. and removal of form work and staging etc.all complete as per specifications, drawings, and instructions of the engineer,					
	i) For works below ground level	SQ.M	50			
	ii) For works above ground level					
	a) Inner and outer faces of wind shield with slip form shuttering	SQ.M	4500			
	b) All other components of the superstructure including slabs, beams, columns, walls, enclosures, forms, corbels, other shell attachments, chases/recesses in shell etc.	SQ.M	1000			
9	Providing and fixing formwork in shell openings (above 0.1 sq.m surface area) including cutting, formation of shapes and all other operations required for making the required shape and size, removal of formwork, all complete as per specifications, drawings, and instructions of the engineer,	SQ.M	100			

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10	Preparing detailed fabrication drawings and after approval by the Engineer, supplying, fabricating, erecting and installing miscellaneous steel parts to be embedded/cast in concrete (like staircase embedments, corbel face plates, etc) at all position and levels including the cost of all labour and equipments for setting materials in concrete, grouting, welding, bolts & bolting, expansion anchors, drilling, cutting, etc. complete as per drawings, and specifications. Note: Structural steel required shall be provided by BHEL at free of cost and the bidder has to draw from BHEL storage yard to site including loading, unloading and transportation. Bidder has to offer their rate excluding cost of structural material.	MT	2			
11	Preparing detailed fabrication drawings and after approval by the Engineer supplying, fabricating and erecting steel staircase (with tubular hand railing and grating treads and landings) from grade level to roof level including brackets alongwith fitting and fixture, posts, kick plates, including transporting, lifting setting material in place and welding to cast-in-fixing plates with cost of all labour, cutting, grinding, drilling, bolts and bolting, anchor fasteners, grouting, welding, pre-heating of welded joints, testing, primer and final finish painting complete as per specification 6227-00-16-49-sp-01 Rev.0 drawing no. 7-75-0037/R2 7-68-0561/R3.					
	a) 32 mm MS handrailing (quoted rate shall be including cost of hand rail material). Measurement shall be done for finished length of hand rails.	RM	250			
	b) Stair gratings & landing platform as per EIL Specification 7-68-0561/R3 (quoted rate shall be including cost of grating material)	MT	5			
	c) Main structural members (quoted rate shall be excluding cost of structural material). Structural steel shall be supplied by BHEL free of cost					
	(i) Fabrication	MT	20			
	(ii) Erection	MT	20			
	(ii) Painting as per EIL specification	MT	20			

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12	Preparing detailed fabrication drawings and after approval by the Engineer supplying, fabricating and erecting structural steel lintel beams and buckstays for liners and structural steel floors at various levels complete including structural members, beam support bearing on the shell, stiffeners, brackets along with other fitting and fixtures including transporting, blockout, lifting setting materials in place, high strength grout, grouting, HSFG bolts & bolting, anchor bolts, welding to cast-in- fixing plate with cost of all labour cutting, grinding, grinding smooth the support bearing plates, pre-heating or post-heating of welded joints, testing of primer and final finish painting complete as per specifications, drawings, and directions of the engineer,					
	(i) Fabrication	MT	220			
	(ii) Erection	MT	220			
	(ii) Painting as per EIL specification	MT	220			
	Note:- All structural materials required for the various floors shall be provided by BHEL at free of cost including chequered plates except for HSGF bolts, anchor bolts and grouts. All the misc. items required for completion of this work in totality has to be arranged by contractor					
13	Supplying, and placing in position elastomeric bearing plates of required size and thickness of 64mm (comprising of 3 layers of elastomeric layer each layer of 12mm thick and followed by 4mm thick stainless steel laminations in alternate layer with 6mm elastomeric cover on outside upper layer as per drawing (under the platform beams and over the mild steel bearing supports (to give a sliding surface) including the cost of all labour, materials, drilling, welding of stainless steel using compatible special electrode, machining flat & polishing the contact surfaces of stainless steel, coating the polished surfaces with silicon grease etc complete as per drawings and specification. (Note: Bidders has to procure this item through approved vendors mentioned under Annexure - IX of Vol. I Tech.Bid)	Sq.m.	12			

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14	Supplying and laying in position Cu.M shaped acid resisting bricks (conforming to Class-II of IS:4860) for liners at all elevations having strength not less than 70 N/sq.mm. with potassium silicate type chemical resistant mortar including the cost, for all leads and levels, of all labour materials, mortar, raking joints, pointing, curring, etc. complete as per drawings and specification.	CuM	250			
15	Supplying and laying in position Cu.M shaped fire bricks (conforming not less than 20N/Sq.mm. for liners at all elevations with suitable mortar including the cost, for all leads and levels, of all labour, materials, mortar, raking joints, pointing, curring, etc. complete as per drawings and specification.	CuM	580			
16	Supplying, fabricating and installing Galvanized mild steel circumferential and vertical reinforcing bands to the brick liners at all elevations including the cost of all labour, transportation, materials, bolts and bolting, priming, finish painting (rich zink epilux paint over welded portion), etc. complete as per drawings and specification. Note: Reinforcement steel required shall be provided by BHEL. Bidder has to quote excluding cost of reinforcement. However bidder has to arrange misc. items likes bolts wires etc. for completion of this item in totality.	MT	25			
17	Supplying and fixing resin bonded rock wool insulation slabs of density not less than 100 kg/cu.m on the outside surface of the brick liners, having maximum coefficient of thermal conductivity shall be 0.52 MW/CM/DegC at mean temperature of 100 degree C, inside surface of the shell, and wherever as directed by the engineer, in two layers (each 50 mm th.) the insulation shall be in the form of sabs warapped on the outermost surface with the galvanised wire mesh including the cost of all materials, comprising pins/studs/anchor embedded in the liner and mini shells, wire netting, spead washersb, tying wires etc. including the cost of all equipment, labour, transportation, lifting to all heights, fixing cutting, lapping, binding, testing etc. complete as per drawings and specification.	Cu.M	183			

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SL.NO	DESCRIPTION	UNIT	QTY.	RATE IN RS IN FIG	RATE IN WORDS	AMOUNT
18	Supplying, fabricating and installing chemical lead sheet (2mm thick) at expansion joints between lining segments at all elevations and at the liner basin including the cost of all labour transportation, materials, soldering of joints etc. complete as per drawings, and specifications.	MT	1.5			
19	Supplying and laying vermiculite concrete in the liner basin including the cost of all labour, material and equipment for handling, transporting, mixing, lifting, placing, curing, finishing of surface etc. complete as per drawings, and specifications.	CU.M	6			
20	Supplying and laying acid resisting castable refractory lining as indicated in the drawings including the cost of all labour, material, and equipment for handling, transporting, mixing, lifting, placing, curing, finishing of surface etc. complete as per drawings, and specifications.	CU.M	2			
21	Supplying and painting the external surface of the chimney shell at any elevation, including the cost of all labour, materials, equipment for handling and cleaning, protecting and cleaning etc. complete as per drawing and as per Note-2 of table 8.0 of specific no. 6743-31-0642-PT-C06-Rev0					
	a) 2 coats of F-6B (High build epoxy finish coating cured with polyamide hardner) @ 100 microns DFT/coat	SQ.M	4250			
22	Supplying and laying on the roof, 75 mm thick acid resisting bricks (conforming to Class II of IS:4860) with potassium silicate mortar over a bed of the same mortar including the cost of all labour, materials and equipment, preparing concrete, laying under bed of sand-cement sceed the slopes painting with black bitumastic paint, 2 layer of 6 mm th. bitumenmastic, 10 mm th. acid resisting cement bed and bricks, pointing with phenolic based acidresisting cement , protection and cleaning, providing movement control joints with flexible sealants, providing building paper, etc.complete as per drawings, and specifications.	SQ.M	110			

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23	Supplying and installing at the base of the chimney shell, a electrically operated steel rolling shutter complete with guides, hood, hardware, weather baffles, combination end locks and wind locks, fasteners, frames, all mechanisms and accessories as required for proper operation and weather protection including all labour, painting etc. complete as per drawings, and specifications.	SQ.M	16			
24	Supplying, fabricating and installing at the base of chimney shell, a mild steel personnel access door complete with locking arrangements and all other fittings and fixtures, fasteners including the cost of all painting etc. complete as per drawings, and specifications.	ITEM	3			
25	Supplying, fabricating and installing at various locations in the chimney system complete with locking arrangements, frames, insulation, fittings and fixtures and all mechanisms and accessories reqd. for proper operation including labour, painting etc. complete as per drawings, and specifications.					
	a) Hood Access Hatch	ITEM	1			
26	Supplying, fabricating and installing in the liners, gas sampling and gas oapacity measurement ports made from SS pipe including the cost of all labour, materials, bolts and bolting, asbestos gaskets, cover plate & all other accessories painting etc. complete as per drawings, and specifications.	ITEM	3			
27	Supplying, fabricating and installing, on top of the mini shells, grey cast iron caps complete with the cost of all material including asbestos mill boards, bronze bolts and nuts, brass washers, non-shrink grout, acid resistant mortar, insulation over the A/R mortar, etc. including the cost of all labour painting etc. complete as per drawings, and specifications.	MT	4.5			

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28	Supplying, fabricating and installing at various locations and elevations of the chimney system the following miscellaneous metal items complete with the cost of all labour, material and equipment, transporting, lifting, setting in place, anchor fasteners, anchoring, welding bolts and bolting, priming, painting or galvanising, grouting etc. complete as per drawings, and specifications.					
	a) Mild steel ladders with cage inside and outside the chimney, vent covers & guides, bird screens and other miscellaneous steel not specifically mentioned. Note:- Bidder has to quote including cost of material etc complete.	MT	1			
	b) 32 mm MS hand railing (for internal and external platforms) -- Bidder has to quote the rate including cost of hand rail)	RM	400			
29	Supplying, fitting and fixing roof drain heads (outlet/overflow) with gratings in chimney roof including sockets, adaptors, brackets, hangers, supports etc. casting-in place, grouting and jointing to rainwater pipe with all costs of labour, materials and equipment complete as per drawings, and specifications.	ITEM	4			
30	Supplying, fitting and fixing rainwater pipes at all elevations internally from the chimney roof to ground level upto the hood drain basin including shoes, bends, junctions, flanges, hoppers, sockets, adaptors, brackets, hangers, supports, spacers, pipe sleeve through shell, silicon or vulcanised butyl sealant, foam backing material, etc. jointing, grouting, caulking, welding, anchor fasteners, painting, etc.including all cost of labour, materials and equipment complete as per drawings, and specifications.					
	a) 150 mm dia. cast iron pipes	RM	200			
	b) 75 mm dia. cast iron pipes	RM	180			

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31	Providing, supplying, and laying metallic hardner flooring such as ironite flooring of minimum 50 mm thickness including preparation of base, laying underbed, finishing, rounding corners, curing, filling the gaps between the slab and chimney shell and pedestals through the slab with 15 mm th.asphalt etc. with all labour, materials, equipments, handling, etc. as per drawings, specifications and instructions of the engineer.	SQM	600			
32	Supplying and installing ready mix castable refractory concrete at opening of chimney shell baffle wall and at other locations including all necessary arrangement for keeping them in position as per drawings and approval of Engineer.	CUM	5			
33	40 mm thick heavy duty patent stone flooring with Ironite hardner topping. Under layer of 28mm thick cement concrete mix 1:1.5:3 and top layer of 12mm thick metallic concrete of mix 1:2 (1 cement hardner mix:2 stone aggregate 6mm nominal size) by volume with which metallic hardening compound of approved quality is mixed in the ratio 4:1(4 parts of cement and 1 part of metallic floor hardening compound of approved quality) by weight including cement slurry, rounding off edges and aluminium strips etc. complete.	SQ.M.	220			
34	Providing brick work in cement mortar 1:6 (1 cement 6 coarse sand) in works at all heights, places and position, ground floor slab including raking out joints, curing, scaffolding complete excluding plastering and painting. Using bricks of class designation 7.5 of nominal demensions as per specification.	Cu.M.	10			
35	Providing 15 mm thick plaster in cement mortar 1:6 on walls, finished to a smooth finish as per specification.	SQ.M.	60			
36	Providing, fabricating and laying in position asbestos mill boards , over the mini shells below the cast iron cap segments, in between the cap segments and wherever as directed by the engineer, including the cost of all labours, material and equipment, cutting drilling etc. complete as per drawings, and specifications.					
	(a) 25 mm thick asbestos mill boards	SQ.M	20			

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37	Providing & fixing 40mm dia GI pipes for drainage at all heights as per drawing	RMT	200			
38	Supplying & fixing 20mm dia. Branze RAG bolts at all heinghts as per drawing	KG	100			
39	Providing & laying non-shrink gout at all elevation as per drawing & specification using Fosroc/pedilite non shrink gout materials.	Cub.m.	2			
40	Supply and fixing in positing of high strength structural bolts (HSFG 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 complete as per specification, drawings and instructions of the Engineer.	Quintel	2			
41	Laying of earthing mats/rods including transportation from yard stores, loading, unloading, cutting to length, welding etc complete as per specification and as directed by Engineer. Earthwork excavation & backfilling shall be paid separately under relevant items. Earthing materials shall be supplied by BHEL free of cost.	MT	5			
42	Providing and grouting of pocket holes, pipe sleeves of any shape and size under base plates after erection and alignment if necessary of tie beams/structures/bearing plates etc. at any elevations including roughening surface, cleaning, ramming, curing, etc with CobextGP-2 of Fosroc or equivalent all complete as per specifications. (Cost of all material and cleaning the pocket by compressed air shall be in the scope of contarctor)	CUM	2			
43	Providing epoxy grouting (pressure grouting) using manufactured by FOSROC in RCC Chimney Shell of 350 mm thick RCC wall already completed by other agency upto a maximum height of 6.5 m from existing G.L. including UPV test of the grouted portion.	Sqm	400			

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44	Providing pressure grouting in RCC Chimney Shell already completed by other agency from +6.5M and upto a maximum height of 10m as per requirement using Non - Shrink cement like Shrinkcom/FOSROC/Pidilit (PIDI - Grout 10M) including UPV test of the grouted portion.	Sqm	200			
45	Minor modification(By cutting and welding) in fabricated structure done by other agency before erection. (Rate shall be on Average Man-Days Basis including consumables and T & P)	Head	200			
46	Erection of structure including consumables and all T & P etc.	MT	100			
47	Resetting of existing slipform systems before restart of concrete in chimney shell (at EL. 47.60m) and dismantling of slipform after completion of concrete and handing over the same to BHEL. Rate shall be inclusive of all consumable required during concreting through slipform systems for adjustment of slipform like nuts, bolts, turn buckle, head screw, jack rod etc. (Existing slipform systems presently available at EL. 47.60m shall only be used & contractor need not to bring new slipform set.	L.S.	L.S.			
	TOTAL OF PART-A					

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	PART-B					
14.0	ELECTRICAL WORK					
14.1	Supply, installation, testing and commissioning of the following Items of approved quality as per specification / IS : Codes					
	Lightning Protection & Earthing System Work shall be carried out as per EIL spec 7-51-0503 R2 (Copy enclosed)					
a.	70 sq.mm lead coated copper conductor	RM	50			
b.	Vertical air terminal (25 mm dia 2000 mm long copper rods lead coated)	Nos.	2			
c.	Test Link	Nos.	2			
d.	Erection hardware like Saddles with clamp for cleating lightning conductor	Lot	1			
e.	25 x 3 GI flat	RM	450			
f.	12 SWS GI wire	RM	220			
14.2	Lighting system					
a.	Twin Cluster LED type medium intensity (40W min) flashing lamps, maintenance free aviation lights as per aviation regulations and norms suitable for A.C (alternative current). Mounting of aviation lamps & accessories shall be as per typical installation standard No.7-51-0220-Rev 02 (attached). Supply shall include twin cluster aviation light/fixture, G.I. Pipe, reducers, suitable J B U bolts etc.	Set	9			
b.	Photo electric controller for aviation lighting	No.	1			
c.	Flash controller unit & all sub items for aviation lighting	No.	1			

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d.	Non integral Industrial type, well glass dust tight with 70W HPSV lighting fixtures with external reflector	Nos.	150			
e.	Wall mounting bracket (1.5 m long 40 GI conduit with clamps) for 70 W HPSV light fixtures including fixing works	Lot	1			
f.	Hand rail mounting bracket (2.5 m long 40 GI conduit with clamps) for 70W HPSV lighting fixtures	Lot	1			
14.3	240V, 1 phase, 32A weather proof power receptible with interlock switch	Nos.	12			
	Junction Boxes & Panels					
a.	4 Pole MCB for aviation lighting in a box	No.	1			
b.	Junction boxes for aviation lighting & light fixtures	No.	10			
c.	Lighting distribution board with 63A TPN MCB isolator as incomer & adquate no.of outgoing feeders for controlling the lighting fixtures provided with suitable rating outgoing MCBs. Loading of outgoing feeders maximum to 1000W & 25% of outgoing feeders to be left as spares.	No.	2			
14.4	Power distribution board with 63A TPN MCB isolator as incomer & no.of outgoing feeders of suitable rating MCBs for the control of power receptacles. Loading of outgoing feeders to maximum to 1000W & 25% of outgoing feeders to be left as spares.	No.	2			
	Cabling System :					
a.	4C x 2.5sqmm Cu. (1100 V grade HRPVC insulated armored cable)	mtr	500			
b.	4C x 4sqmm Cu. (1100 V grade HRPVC insulated armored cable)	mtr	350			
c.	Cable glands & lugs	Lot	1			
	Note:					

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	All accessories shall be provided by contractor(like junction boxes, clamps etc.) including cables as required for the approval of the Owner / Consultant and other statutory authorities. The contractor shall estimate the requirement and provide for the same in the price for the items for which the quantity is given as LOT.					
	TOTAL OF PART-B					
	TOTAL OF PART-A & PART-B in RS					
	TOTAL OF PART-A & PART-B IN WORDS (Rs.....)					