

Section-IV
Assembly shed for ceralin
Bill of Quantities

Name of Work- Construction of Assembly shed for ceralin

S.No	Contents	Quantity	Unit	Rate	Amount
1	Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 60 cm measured at a height of 1 m above ground level and removal of rubbish upto a distance of 50 m outside the periphery of the area cleared	471.15	100Sq.m.		
2	Layout of building including making of reference pillars etc. complete.	402.59	Sqm.		
3	Earth work in excavation by mechanical means (Hydraulic excavator) / manual means over areas (exceeding 30cm in depth. 1.5m in width as well as 10 sqm on plan) including disposal of excavated earth, lead upto 50m and lift upto 1.5m, disposed earth to be leveled and neatly dressed. All kind of soil including filled insulator.	681.13	Cum.		
4	Anti-termite treatment by injecting chemical emulsion and creating a chemical barrier under foundations and floors, junction of wall and floor, along the external perimeter of expansion joints, as per IS 6313 (part-II 1981) at the rate as specified.	694.36	Sqm.		
5	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - all work up to plinth level. 1:4:8 (1cement: 4 coarse sand: 8 stone aggregate 40 mm nominal size.)	92.81	Cum.		
6	Providing and laying in position specified grade of reinforced cement concrete in Foundation & Pedestals excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level. in proportion 1:1½:3 (1 cement : 1½ coarse sand : 3 graded stone aggregate 20 mm nominal size).	125.88	Cum.		
7	Reinforced cement concrete work in Columns, pillars, posts and struts etc. up to floor five level excluding cost of centering, shuttering, finishing and reinforcement in proportion 1:1:2 (1 cement : 1 coarse sand : 2 graded stone aggregate 20 mm nominal size)	3.50	Cum.		
8	Reinforced cement concrete work in Beams and Bends etc. up to floor five level excluding cost of centering, shuttering, finishing and reinforcement in proportion 1:1½:3 (1 cement : 1½ coarse sand : 3 graded stone aggregate 20 mm nominal size)	22.45	Cum.		

S.No	Contents	Quantity	Unit	Rate	Amount
9	Reinforced cement concrete work in Slabs, Sunshades, suspended floors, roofs having slope up to 15° landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases up to floor five level excluding the cost of centering, shuttering, finishing and reinforcement with 1:1½:3 (1 cement : 1½ coarse sand :3 graded stone aggregate 20 mm nominal size).	6.16	Cum.		
10	Centering and shutter including form work, propping and removal of form for RCC work :				
(a)	Foundations, footings :	60.00	Sqm.		
(b)	Columns :	118.80	Sqm.		
(c)	Lintels, Beams, plinth beams, girders, bressumers & cantilevers etc :	210.71	Sqm.		
(e)	Suspended floors, roofs, landing, balcony and access platforms :	81.68	Sqm.		
11	Brick work with F.P.S. bricks of class designation 75 in superstructure above plinth level up to floor V level in all shapes and sizes in : 1 :4 (1cement :4 coarse sand mortar.)	60.64	Cum.		
12	Brick work with F.P.S. bricks of class designation 75 in foundation & plinth level in all shapes and sizes in : 1 :3 (1cement :3coarse sand mortar).	0.22	Cum.		
13	Reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete. Cold twisted bars. Labour rate (Only reinforcement bar will be provided by BHEL.	76.28	Qntls.		
14	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete: Labour rate (only structural steel will be provided by BHEL.	295.00	Qntls.		
15	Providing and fixing M.S. round holding down bolts with nuts and washer plates complete.	7.70	Qntls.		
16	As item 14 above but for Sag rods, Nuts & washers etc.	1.65	Qntls.		
17	As item 14 above but supply and fixing of Bolts with Nuts of High Carbon steel.	0.25	Qntls.		
18	As item 14 above but Fabrication & supply of Gantry Girder of ISMB 450, ISMC 200 & 60 lbs. Rail Labour rate (only Structural steel will be provided by BHEL.	80.19	Qntls.		
19	Steel work in hot finished built up tubular Frame, Trusses including cutting, hoisting fixing in position and applying a priming coat of approved steel primer, welded and bolted including special shaped washers etc. complete. Labour rate (only Structural steel will be provided by BHEL.	70.49	Qntls.		

S.No	Contents	Quantity	Unit	Rate	Amount
20	Providing & fixing TRACKDEK HI-RIB in BARE GALVALUME steel profiled sheeting 1000mm cover width, 28mm crests @ 250mm c/c manufactured out of 0.47mm total coated thickness high tensile BARE GALVALUME steel (blue colour). The sheets shall have a hot dip metallic coating of Zinc & Aluminum (150 grams/sqm.) on both sides as per AZ-150 as per AS-1397, (550 MPA yield stress) passivated & clear resin coated complete including Galvanized HEX HEAD self driven FASTENERS and fixing to Purlins & Runners, and including cost of all materials and T&P required for proper completion of work.	837.25	Sqm.		
21	Providing & fixing TRACKDEK HI-RIB Polycarbonate corrugated clear sheet or equivalent fixed with self driven FASTENERS and fixing to Purlins & Runners, and including cost of all materials and T&P required for proper completion of work.	147.75	Sqm.		
22	Providing & fixing TRACKDEK HI-RIB Gutters or Gutters made of GI sheet 18 gauge including cost of jointing with nuts and bolts and connecting to down pipes with providing necessary supports and including cost of all materials and T&P required for proper completion of work.	52.10	Rm		
23	Providing & fixing TRACKDEK HI-RIB Close fitting adjustable Ridges made of pre-coated galvanized steel sheet in 240mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 microns using self drilling/ self tapping screws or with polymer coated J or L hooks, bolts and nuts and or G.I. seam bolts and nuts, G.I. plain and bitumen washers complete.	26.05	Rm		
24	Providing & fixing TRACKDEK HI-RIB Close fitting adjustable Flashings/ Aprons.(Upto 600 mm) made of pre-coated galvanized steel sheet in 240mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 microns using self drilling/ self tapping screws or with polymer coated J or L hooks, bolts and nuts and or G.I. seam bolts and nuts, G.I. plain and bitumen washers complete.	274.68	Sqm.		

S.No	Contents	Quantity	Unit	Rate	Amount
25	Providing and fixing aluminum work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/appropriate Z sections and other sections of approved make conforming to IS:733 and IS :1285, fixed with rawl plugs and screws or with fixing clips, or with expansion hold fasteners including necessary filling up of gaps at junctions, at top, bottom and sides with required PVC/neoprene felt etc. Aluminum sections shall be smooth, rust free, straight, mitered and jointed mechanically wherever required including cleat angle, Aluminum snap beading for glazing/paneling stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge For shutters of doors, windows & ventilators including providing and fixing hinges/ pivots and making provision for fixing of fittings wherever required including the cost of PVC / neoprene gasket required (Fittings shall be paid for separately), Powder coated aluminum (minimum thickness of powder coating 50 micron	38.88	sqm		
26	Windows Aluminum fittings ISI marked anodized (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade with nuts and screws etc. complete :				
(i)	Providing and fixing ISI marked aluminum butt hinges 75x63x4 mm	96.00	Nos		
(ii)	Providing and fixing aluminum tower bolts ISI marked 250x10 mm at top.	48.00	Nos		
	Providing and fixing aluminum tower bolts ISI marked 150x10 mm at bottom. [48.00	Nos		
(iii)	Providing and fixing aluminum handles ISI marked 100 mm	48.00	Nos		
(iv)	Providing and fixing aluminum casement stays ISI marked anodized (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour and shade with necessary screws etc. complete	48.00	Nos		
27	Fixing of Windows & Gate	14.00	Nos		
28	Filling available excavated earth (excluding rock/insulator) in trenches, plinth, sides of foundations etc. in layers not exceeding 20cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 m and lift upto 1.5 m.	177.28	Cum.		
29	Supplying and filling in plinth with Jamuna/local sand under floors including, watering, ramming consolidating and dressing complete including supply of all material, labour and T&P required for proper completion of work	60.10	Cum.		
30	Providing and laying in position cement concrete under Floors of specified grade excluding the cost of centering and shuttering - all work up to plinth level. 1:4:8 (1cement : 4 coarse sand : 8 stone aggregate 40mm nominal size.)	66.53	Cum.		

S.No	Contents	Quantity	Unit	Rate	Amount
31	120mm thick cement concrete flooring in 1:2:4 cement, coarse sand and 20mm nominal gauge stone grit laid in panels not exceeding 25 sqm, with K-control joints provided between two adjacent panels with 50mm thick topping of "HARDCRETE" concrete in 1:½:3 cement, coarse sand and 20mm nominal gauge store grit including top layer of 12mm thick "HARDCRETE" cement hardner consisting of a mix of 1:2 cement and 8mm nominal size stone aggregate with which HARDCRETE hardening compound is mixed @2 litre Hardcrete per 50kg of cement including cement slurry and including cost of all material, labour and T&P required for proper completion of work.	48.08	Cum.		
32	40mm thick C.C floor in 1:2:4,(1 cement, 2coarse sand, and 4- 20mm nominal size stone grit layed in panesls, finished with floating coat of neat cement slurry including cost and fixing of glass strips & cost of all material, labour and T&P required for proper completion of work.	87.60	Sqm.		
33	12mm thick plastering in 1:4(1 cement and 4coarse sand (FM 2.2) mortar over brick work and RCC including rounding, chamfering, etc. finished smooth including cost of all material labour and T&P required for proper completion of work.	640.02	Sqm.	101.24	
34	12mm thick plastering in 1:3 cement and coarse sand (FM 2.2) mortar in ceiling including rounding, chamfer, etc. finished smooth including cost of all material labour and T&P required for proper completion of work	149.07	M2	140.14	
35	Wall painting with plastic emulsion paint of approved brand and manufacture to give an even shade: Two or more coats on new work	323.36	Sqm.	130.46	
36	Finishing walls with textured exterior paint of required shade, New work (Two or more coats applied @ 3.28 ltr/10 sqm) over and including base coat of water proofing cement paint applied @ 2.20kg/10 sqm.	536.11	Sqm.	125.13	
37	Painting with synthetic enamel paint of approved brand and manufacture of required colour to give an even shade: Two or more coats on new work over an under coat of suitable shade with ordinary paint of approved brand and manufacture	1,278.38	Sqm.	66.69	
38	Supplying and fixing of 150mm dia. Cast Iron Down Pipes with M.S. holder bat clamps of approved design to C.I. or S.C.I, along with bend/head and shoe rain water pipes embedded in and including cement concrete blocks 10x10x10cm of 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) and cost of cutting holes and making good the walls and connecting to man hole as required.	60.60	Rm	418.86	

S.No	Contents	Quantity	Unit	Rate	Amount
39	Constructing masonry Chamber 60x60x75 cm, inside with 75 class designation brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for sluice valve, with C.I. surface box 100mm. top diameter, 160 mm bottom diameter and 180 mm deep (inside) with chained lid and RCC top slab 1:2:4 mix (1 cement :2 coarse sand : 4 graded stone aggregate 20mm nominal size) necessary excavation foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick finished with a floating coat of neat cement complete as per standard design with F.P.S Bricks:	6.00	Nos		
40	Providing and laying 30cms dia. NP2 Hume Pipe with collar for drain over and including 150 thick base conc. 1:4:8 in cement fine sand and 40mm gauge stone ballast including filling joints, and connecting to man holes as required including cost of all material, labour and T&P required for proper completion of work.	82.00	Rm		
41	Providing and fixing 1mm thick M.S. sheet door with frame of 40x40x6mm angle iron and 3mm M.S. gusset plates at the junctions and corners, all necessary fittings complete, including applying a priming coat of approved steel primer. Using M.S. angels 40x40x6 mm for diagonal braces.	32	Sqm.		
42	Demolition of RCC work manually/ by mechanical means including stacking of steel bars and disposal of unserviceable material within 2 kms lead or as directed. 1:3:6 or richer mix.	22.00	Cum.		
43	Demolition of Brick work manually/ by mechanical means including stacking of steel bars and disposal of unserviceable material within 2 kms lead or as directed. In cement mortar.	25.30	Cum.		

Total Rs.

TERMS AND CONDITIONS

1. Only cement, Reinforcement steel and structural steel will be given free of cost as per actual consumption from our central store and nothing shall be paid extra for carriage.
2. All T&P will be arranged by the contractor.
3. All the safety precaution will be taken by contractor at site.
4. The BHEL General terms and condition of contract will be applicable as stipulated by BHEL.
5. All construction materials sample got approved by Engineer in charge before collection at site. If any inferior quality material reached at site same will be lift up by party on same day at own cost.
6. All the welding work of structure testing will be arrange by the contractor.
7. All the construction material like brick, grits, and coarse sand will arrange by contractor.
8. The consumable gas, electrodes ISI brand arrange by the contractor.
9. Parties are requested to see the site and working conditions before quoting the rate.
10. While execution of the work, if there is any damage to the pre-existing pipeline and cable at the site will be repaired by contractor only `on his own cost.

Signature of contractor
And full address

Sr. Addl. Engr.
Civil (F)



BHARAT HEAVY ELECTRICALS LIMITED

**Tender for Construction of
ASSEMBLY SHED FOR CERALIN**

Tender Enquiry No: 42

DATED-31/10/2011

SECTION V

TECHNICAL SPECIFICATION

PART A: SPECIFIC TECHNICAL REQUIREMENTS

BHARAT HEAVY ELECTRICALS LIMITED
(A GOVERNMENT OF INDIA UNDERTAKING)

SECTION V
PART - A
SPECIFIC TECHNICAL REQUIREMENTS

1.0 GENERAL

Part-A covers specific technical requirements of contract and should be read in conjunction with BOQ, Part-B and other sections of the contract. In case of any conflict between the contents of BOQ and Part-A, BOQ will prevail over Part-A. In case of any conflict between Part-A and Part-B, Part-A will prevail over Part-B.

2.0 FREE ISSUE MATERIALS

Cement, reinforcement steel and structural steel shall be supplied as free issue material by BHEL.

3.0 DISMANTLING OF EXISTING STRUCTURES

The contractor will have to carryout dismantling of buried/ semi buried structures, if any, encountered within the battery limit and disposal of it within plant boundary as directed by BHEL at no extra cost to BHEL.

4.0 STATUTORY REQUIREMENTS

Bidder shall comply with all the applicable statutory rules pertaining to Factories Act, Fire Safety Rules of Tariff Advisory Committee, Water Act for pollution control, Explosives Act, etc.

Provisions of safety, health and welfare according to Factories Act shall be complied with. These shall include provision of continuous walkway minimum 500 wide along the crane-girder level on both sides of building, comfortable approach to EOT crane cabin, railing, fire escape, locker room for workmen, pantry, toilets, rest room, etc.

Provisions for fire proof doors number of staircases, fire separation wall, lath plastering/encasing the structural members (in the fire prone areas), type of glazing etc. shall be made according to the recommendations of Tariff Advisory Committee.

Statutory clearances and norms of State Pollution Control Board shall be followed.

Bidder shall obtain approval of Civil/Architectural drawings from concerned authorities before taking up the construction work.

5.0 LAYOUT

Before starting the work, the Contractor shall carry out the setting out of foundation and structures and provide levels, with reference to general existing grid and bench mark. If the contractor uses the grid, bench mark and reference pillar made by other Contractors, he shall coordinate with the Contractor and shall satisfy himself of the accuracy of the reference marks. If he is required to set out the foundation afresh, he shall do so independently with reference to the one existing grid and bench mark which has been followed by other agency at the instruction of the Engineer. In case any discrepancy be found. It shall be immediately brought to the notice of the engineer for any rectification/modification necessary. No complaint shall be entertained at a later stage. The Contractor shall accurately set out the position for holding down bolts and inserts.

If required, in the opinion of the Engineer, he shall construct and maintain pillars for Grid, references and bench marks and maintain them till the completion of the construction. He shall also help the Engineer with instruments, materials and labours for checking the detailed lay outs and levels. The Contractor shall be solely responsible for the correctness of the layout and levels, and Engineer's approval shall not be deemed to imply any warranty in carrying out the work correctly.

6.0 WORKMANSHIP

Workmanship shall be of the best possible quality and all work shall be carried out by skilled workmen except for those which normally require unskilled persons. Welding shall be done by experienced and certified welders in proper sequence using necessary jigs and fixtures. Fabrications shall be done in shops having proper equipment for accurate edge planning and milling of column shall ends, base late surfaces etc. and shaping and dimensioning of anchor bolt assembly, inserts and other misc. items. In addition to the requirement specified above, if the bye-laws of the local Govt., Municipal or other authorities require the employment of licensed or registered workmen for various traders, the contractor shall arrange to have the work done by such registered or licensed personnel. In case of manufactured materials, the Contractor shall have, with no additional cost the owner, the services of the supervisors of the manufacturers to achieve that the work is being done according to the manufacturer's specifications.

7.0 TEMPORARY WORK

All scaffoldings, staging, temporary bracing and other necessary temporary work required for proper execution of the Contract shall be provided by the Contractor at his own cost and inclusive of all materials, labour, supervision and other facilities.

The layout and details of such Temporary work shall have the prior approval of the Engineer as agreed, but the Contractor shall be responsible for proper strength and safety of the same. All Temporary work shall be so constructed as not to interfere with any permanent work or with the work by other agencies. If it is necessary to remove any of the temporary work at any time to facilitate execution of the work or with the work of other agencies, such removal and re-erection, if required, shall be carried out by the Contractor at the discretion of the Engineer without any delay and any extra cost on this account shall be borne by the Contractor.

8.0 INTERFACE WITH STRUCTURES UNDER OTHER'S SCOPE

a) In cases of interface e.g. structures under other's scope of supply being supported on structures under scope of this contractor, the same will be discussed and suitably addressed.

b) Modification in layout of foundation/structure during detail engineering stage may be necessary to avoid fouling with those under other's scope. Necessary changes on this account will be made without any extra cost to Owner.

c) Necessary engineering is to be done and provisions are to be kept accordingly by the Contractor to construct foundations/underground structures, etc. without disturbing/ endangering the constructions done under the scope of other contracts.

9.0 INSPECTION, TESTING AND QUALITY CONTROL FOR CIVIL WORKS

Sampling and testing for major items of civil works viz earthwork, concreting, structural steel work (including welding) etc. shall be carried out in accordance with the requirements of this specification and field quality plan (FQP).

The bidder shall submit for BHEL's approval a detailed field quality assurance programme for civil works before starting of the construction work. This shall include frequency of sampling and testing nature/type of test, method of test, setting of a testing laboratory, arrangement of testing apparatus/equipment, deployment of qualified/experienced manpower, preparation of format for record, Field Quality Plan, etc. Tests shall be done in the field and/or at a laboratory approved by the Engineer and the Bidder shall submit to the Engineer, the test results in triplicate. In addition, the bidder shall furnish the original test certificate from the manufacturer's of various materials to be used in the construction.

If any work found to be of inferior quality or sub-standard, the same shall be dismantled and shall be redone as per approved quality or relevant standard. BHEL reserve the rights to reject the work of inferior quality. All expenses on account of dismantling and rework shall be born by contractor.

Contractor shall arrange for conducting the initial and field CBR test for the road construction as per latest IRC guidelines. The contractor's finally accepted rates shall include cost of such field tests with standard equipments and IMTEs

10.0 CONSTRUCTION / ERECTION METHODOLOGY

- Construction excavation activities shall be fully mechanized from the start of the work.
- All excavation and backfilling work shall be done using excavators, loaders dumpers, dozers, poclains, excavator mounted rock breakers, rollers, sprinklers, water tankers, etc. Manual excavation can be done only on isolated place with specific approval of engineer.
- Dewatering shall be done using the combination of electrical and stand-by diesel pumps.
- For concreting, weigh batching plants, transit mixers, concrete pumps, hoists, etc. shall be used.
- All fabrication and erection activities of structural steel shall be carried out using automatic submerged arc welding machines, cutting machine, gantry cranes, crawler / wheel mounted heavy cranes and other equipments like heavy plate bending machines, shearing machines, lathe, milling machines etc. Use of derricks shall not be permitted.
- All handling of materials shall be with cranes. Heavy trailers shall be used for transportation.
- Mechanized modular units of scaffolding and shuttering shall be used.
- Grouting shall be carried out using hydraulically controlled grouting equipment.
- Roadwork shall be done using pavers, rollers and premix plant.
- All finishing items shall be installed using appropriate modern mechanical tools.
- Manual punching etc. shall not be permitted.
- Heavy duty hoist for lifting of construction materials shall be deployed.
- Compressors for cleaning of foundations and other surfaces shall be used.
- Field laboratory shall be provided with all modern equipment for survey, testing of aggregates, concrete, welding etc. For testing of steel works, ultra sonic testing

- machines, radiographic testing machines, dye penetration test equipment, destruction testing equipment, etc shall be deployed.
- All persons working at site shall be provided with necessary safety equipment and all safety aspects shall be duly considered for each construction/erection activity. Moreover, only the persons who are trained in the respective trade shall be employed for executing that particular work.
 - Fabrication and Erection of all fabricated columns shall be done in single piece unless otherwise provided for in the approved drawings. Main columns of the power house building can have maximum of one number of the erection splice. All shop and site splice shall suitably staggered. The erection splice shall be provided with full strength splice cover plate over the butt weld. Contractor shall submit the erection scheme for the erection of all type of structures and carryout the erection work only after approval of the scheme by the owner.

11.0 FIELD LABORATORY FACILITIES AT SITE FOR MATERIAL TESTING:

Contractor shall provide field testing facilities at site laboratory built by the contractor

12.0 MAKE OF BOUGHT OUT MATERIAL:

Contractor shall supply bought out items as per BOQ