

**Conditions Of the contract for Erection works
(Total pages -38)**

**BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02**

LIST OF TEST EQUIPMENTS TO BE ARRANGED BY ETC CONTRACTOR

All measuring and testing instrument shall be pre-calibrated through a certifying agency before use. The certificate of calibration shall be submitted to BHEL Site Engineer for records. Also see clause E.4.2 & E.6.3 under Section E of the tender specification for more details.

<u>A -</u>	<u>General purpose</u>	<u>Qty.</u>
1.	Digital multimeter - 4½ digits Accuracy $\pm 1\%$ (Any reputed make - preferably Fluke - make)	4 Nos.
2.	Megger 2.5 kV - 5kV, range 0.5 MΩ - 10,000 MΩ (Motorised/Electronic) (Any reputed make)	1 No.
3.	Megger having voltage multiplier 0-500V- 1000V, (Motorised / Electronic) Range 0.5 MΩ - 1000 MΩ (Any reputed make)	1 No.
4.	Single phase variac 8 A, 0.-250V, 50 HZ	2 No
5.	Three phase variac 15A, 0-440V, 50 HZ	1 No
6.	Single phase transformer 220V / 4000V, 500VA, 50HZ	1No
7.	Stop watch	1No
8.	Micro- ohm- meter (mV drop test kit) 0-200ADC, 0-2000 micro ohm with suitable calibrated cable leads for current injection and mV drop.	1 No
9.	Phase sequence meter	1 No
10.	Two way intercom set with 50 to 100 M cables for checking of cable continuity	2 sets
11.	Walkie - Talkie sets with battery charging sets Receiver + Transmitter, Type GP 300 - Motorola - make	1 set
12.	Variable D.C. power supply 0-220VDC, 10 A	2 Nos
13.	4 pole Miniature moulded case breaker 16 A	3 No
14.	Capacitance meter having range 20 PF- 100mfd $\pm 1\%$	1 No
15.	Isolation Transformer 1KVA, 240V AC, 1 phase, 50Hz	2 Nos

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

B **For testing of current transformer**

- | | | |
|----|---|--------|
| 1. | Primary injection test kit, range 0-2000A with a pair of leads & C clamps for testing of CT's | 1 No |
| 2. | Secondary injection test kit suitable for 5A& 1A with banana plug cable leads. | 1 No |
| 3. | Digital Tongue tester 0-2000A, 600VAC, 50 Hz
(Any reputed make). | 1 No |
| 4 | Digital Tongue tester 0-20A, 600V AC, 50 Hz
(Any reputed make). | 1 No |
| 5. | Digital Tongue Tester, 0-1A, 600V AC, 50Hz | 2 Nos. |

C - **For testing of oil cooled transformer and AC reactor**

- | | | |
|----|--|------|
| 1. | Transformer winding resistance meter or Kelvin's double bridge | 1 No |
| 2. | Transformer turns ratio meter | 1 No |
| 3. | PPM tester for transformer oil | 1 No |
| 4. | BDV tester for transformer oil | 1 No |

D **For testing of relays**

- | | |
|---|------|
| Single phase / 3 phase relay test kit having timer current source 5A, 1A, voltage source 0-220VDC, 0-110 VAC 50 HZ.
(Any reputed make) | 1set |
|---|------|

E- **For time measurement of breaker**

- | | |
|--|------|
| Breaker closing and / opening time measurement timer | 1 No |
|--|------|

F **For testing of relays and distance protection**

- | | | |
|----|---|-------|
| 1. | CFB kit or equivalent - of any reputed make | 1 Set |
| 2. | ZFB kit or equivalent - of any reputed make | |

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

G For testing of transformer bushings CT, CVT & Circuit Breaker used in HV System

Capacitance and tan Delta kit suitable for 12KV (Any reputed make)	1 Set
---	-------

H. Safety / protective means

- Protective earth rod suitable for 220Kv / 400 KV system having leakage current meter, 70MM² copper cables and C clamps (Any reputed make). 2 Nos
- Helmets and hand globes etc.

I. For PLCC Equipment:

- b) Digital time interval meter and frequency counter, 8 digits with frequency range 10 Hz to 10MHz.
- c) 200Hz to 620KHz Selective level meter.
- d) 200Hz to 620KHz Selective level generator.

Note:

1. Above is only a specimen/indicative list and any other test equipment (s) as may be required by Owner / BHEL at site during the execution of work will be arranged by the contractor well in time.
2. The status of tools, plants and instruments mentioned in annexure C of section - A does not relieve the subcontractor of his responsibility to make available all the test equipments and tools & tackles mentioned in annexure N of section B as per requirement of project.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02



ACTIVITIES FOR TESTING AND COMMISSIONING BY ETC CONTRACTOR

1. Preparation of joint inspection records / observation by BHEL, BHEL customer and the contractor on the pending activities of erection holding for starting of testing and commissioning.
2. Issue of certificate for completion of erection activities to the satisfaction of BHEL customer.
3. Compilation of documents (scheme, cable schedules, FQP, technical literature, operation and maintenance manuals, technical reports, works test certificate for the equipments / components, and other relevant documents to expedite commissioning) in a systematic manner to present to customer/owner to meet the contractual requirement.
4. To expedite the testing activities contractor has to arrange the engineers and his staff and instruments at site for testing and commissioning of switchyard equipments as follows:
 - 4.1 Testing of individual relay, energy meter, transducer and meters for their satisfactory operation.
 - 4.2 Protection devices / relays will be tested with appropriate current and voltage injections.
 - 4.3 Individual control and protection panels testing for their satisfactory operation as per scheme.
 - 4.4 Individual CT, PT, CVT, Breaker, Transformer and Isolator LA, MB, Battery Charger etc. where ever possible to test them independently.
 - 4.5 Wiring check as per scheme and cable schedule preferably in the following sequences:
 - Between marshalling Kiosk in the yard to other yard equipments.
 - Between equipments in the yard.
 - Yard equipments to control room equipments.
 - Inter connection between control room equipments.
5. All cables to be properly glanded, identified and terminated suitably.
6. Cables should have proper / accurate cross reference ferruling and necessary cable tags for identifications as per recommendation by BHEL/ Customer.
7. Green marking in cable schedule and scheme after wiring check. Contractor to make also “As Built” scheme and cable schedule for submission to BHEL/Customer.
8. List of wiring mistakes, component damage and mal-operation of components.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

9. Successful completion of equipment level testing operative from local and remote and desired FQP filled up and approved by ultimate customer. Approval/acceptance on FQP results by customer has to be obtained by Contractor. For any technical clarifications, BHEL will only assist.
10. In case the contractor is finding difficulty to understand the technicalities to undertake testing and commissioning of a particular equipment, subsystem and system he has to inform BHEL in advance with in 2 months from the date of award of contract for necessary information and explanation.
11. For erection/commissioning of SF6 Circuit Breakers (If called for in BOQ), the services of experts +for supervision will be extended by BHEL free of cost. Contractor will provide adequate support by providing skilled manpower and tools & tackles. However the complete responsibility for erection and commissioning lies with subcontractor.
12. Contractor has to keep a senior and experienced person in the area of testing and commissioning associated with his skilled staff till charging and handing over of complete switchyard to the satisfaction of BHEL customer.
13. Contractor has to be well equipped at site with testing instruments and safety measures (like helmet and hand globes) while doing testing and commissioning.
14. Contractor will also carry out design validation tests as per BHEL / BHEL customer documents.
15. If the contractor fails to take up testing and commissioning work as per the requirement of contract or project requirement, then BHEL will be at liberty to hire services of third agency for this work at the risk and cost of subcontractor.
16. Testing of mandatory spares or any other spare (if required by customer / BHEL), cleaning and handing over to customer's stores is also included in the scope of this Tender Specification. The site Test Reports of these mandatory spares will also be generated by subcontractor in such a case.
17. In case contractor fails to arrange Test equipments as referred in Annexure 'N' (as per requirement of equipment covered in BOQ), BHEL will arrange the instruments at the risk and cost of contractor for providing such instruments.
18. Contractor has to repeat any tests free of cost, even if already conducted, whenever required to prove and check the healthiness of system before power flow, such tests could be primary injection and secondary injection in CT, CVT, meggering, and functional tests or any other tests as required by BHEL/customer.

**BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.**

Conditions of Contract for Erection Works, Rev-02

19. Oil processing/filtering in a transformer, CT and CVT shall also be repeated free of cost if required before charging and handing over of the switchyard to the owner in case BDV and PPM of oil is not satisfactory.
20. As isolator is a rotating equipment and its alignment is likely to get disturbed. Therefore contractor has to do alignment of isolators and measurement of contact resistance repeatedly free of cost as and when required till handing over of the station.
21. Commissioning means charging of total system in a sub-station and inter connected equipments by power flow. Accordingly the payment will be made to the contractor as per payment terms.
22. Contractor has to deploy adequate and experienced man power at site as per project requirement and advice of BHEL site in-charge. Non compliance of this requirement will be treated as indiscipline and non cooperation of the contractor. Accordingly BHEL will hire the man power as required at the risk and cost of the contractor after giving a single notice.
23. Based on site requirement, for the works not stipulated in the contract, the contractor has to provide assistance of skilled manpower with required tools and test instruments.
24. If any Expert services of manufacturer for commissioning supervision of special protection relays / numerical relays / equipment is felt necessary by the contractor, the same shall be arranged by the contractor themselves at their cost. Contractor shall provide testing & Commissioning, Engineer, electrician, other tools tackles and consumables for these equipments and for total system.

Any delay in arranging special testing & commissioning equipment and expert supervisor shall not entitle the contractor to any claim (idle labour, additional time etc.) whatsoever.
25. Any idle days of the expert supervisor at site due to reasons attributable to the contractor, due to lack of readiness in erection, delay in arranging of manpower, tools etc. shall be to contractor's account.

NOTES :-

- (1) Above is only an indicative list. Contractor has to mobilise and keep adequate competent commissioning staff at site to ensure that all mile stones & events and relevant commissioning activities are completed successfully in a scheduled time.
- (2) In case contractor is not finding competent and adequate staff with him, he can hire the commissioning services from out side agencies approved and accepted by BHEL. Contractor will furnish the details (experience, qualification) of all commissioning staff and the commissioning tools and instruments available with the contractor OR obtained on loan basis with in 60 days from the date of award of the work.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02



LIST OF TOOLS & TACKLES TO BE ARRANGED BY CONTRACTOR

<u>Sl. No.</u>	<u>PARTICULARS</u>
01.	Electrical Drilling Machine & Hand drilling Machine.
02.	Hydraulic Bending Machine for Al. pipes.
03.	Gas Welding Set & Gas Cutting Set.
04.	Hand Operated Winches.
05.	Electric Welding machine.
06.	Jack with axle for lifting Cable Drum.
07.	Jointers Tool Box.
08.	Blow Lamps.
09.	Compression Tools suitable for Cables.
10.	Pull Lifts.
11.	Pulley Blocks.
12.	Hooks/Chains
13.	Cable Rollers.
14.	Hydraulic Jacks
15.	Aluminium Rollers.
16.	D- Shackles.
17.	Dynamometers.
18.	TIG, Welding machine (for Aluminium welding).
19.	High Vacuum 1000 GPH Oil Filtration Machine for Transformer / Reactor oil suitable for 760mm vacuum. In case 250 MVA / 315 MVA transformer ETC work is covered in the scope, Oil filtration equipment of 1500 GPH suitable for High Vacuum along with 30 kL capacity storage tank for oil storage and processing of oil should be provided.
20.	Hydraulic cranes including accessories (20 tonne or more and boom height of 15mts. Vertical or more) suitable for erection of transformer bushings accessories and other equipments.
21.	Hydraulic Crimping tools for conductor / Shield wire.
22.	Crimping tools for cable termination.
23.	Torque wrenches of different ranges in sufficient numbers.
24.	All general purpose hand tools in sufficient quantities.
25.	Shearing Machine for cutting of Earthing Flat.



- For cable laying.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

26. Tool Kit for fitters.
27. Tool Kit for Electrician.
28. Bench Vice.
29. 'A' type collapsible Al. ladder height 8M.
30. 'H' type Al. ladder height 5M.
31. Pressure Gauge 0-1kg/Sq.cm for measurement of N2 pressure.
32. Vacuum gauges for measuring fire vacuum of less than 1 torr in transformer.
33. Nylon slings for 4T capacity with different lengths.
34. Turper
35. Angle meter for measurement of bushing angle during erection.
36. Nylon hammer.
37. Wedge for cutting of 'O' rings/neoprene gaskets.
38. Die/Drill tool for making holes in gland plates (All sizes in sufficient numbers)
39. Phoenix screw drivers for handling of Terminal Blocks.

IMPORTANT NOTE:

1. The Contractor shall submit the copies of latest test certificate of lifting tackles, slings, pulleys etc. after mobilisation at site to the ENGINEER-IN-CHARGE.
2. Above is only a specimen/indicative list and any other Tools & Tackles as may be required by Owner/ BHEL at site during the execution of work will be arranged by the contractor promptly.
3. The status of tools, plants and instruments mentioned in annexure C of section - A does not relieve the subcontractor of his responsibility to make available all the test equipments and tools & tackles mentioned in the annexures of section B as per requirement of project.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

SECTION-C

SPECIAL CONDITIONS OF **CONTRACT**

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

SECTION - C

SPECIAL CONDITIONS OF THE CONTRACT

C.1.0 QUALIFICATION OF THE CONTRACTOR :

- C.1.1 The contractor must have the experience of execution of identical work in the past as specified in the tender documents and must have executed contracts of similar nature. The contractor must furnish enough evidence to establish his capacity in erection, testing and commissioning of similar equipments covered under this specification.
- C.1.2 The contractor should be able to obtain clearance from the Electrical Inspector/ State Authorities on completion of the installations. If required, the Contractor is supposed to obtain such clearances on part completion of the installation as required by BHEL / Owner time to time. Also, before the start of work the contractor should obtain the supervisory license from the concerned Electrical Authorities.
- C.1.3 The Contractor will have following certificates.
- a) Contractor electrical licence.
 - b) Supervisor competency certificates to deal with Electrical high voltage equipments for their installation and for their installation and testing.
- Such certificates from two persons of subcontractors representatives who will be posted at site will be required.
- C.1.4 The contractor should be aware of the local conditions and be well acquainted with the site.
- C.1.5 The contractor shall be preferred who has worked for State Electricity Boards/BHEL/Steel Authorities/Public Undertakings.
- C.1.6 The contractor should have a very good engineering background and capability of carrying out erection and commissioning work of large scale.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

C.6.0 RECEIPT/ UNLOADING, HANDLING, TRANSPORTATION, SECURITY AND PRESERVATION OF EQUIPMENT AT SITE:

- C.6.1 The contractor shall take the delivery of all the equipment, structures and materials etc. at site and their security shall be the responsibility of the contractor. Further transportation of materials to work place as per requirements will be in the scope of the contractor. For any delay, demurrage/wharfage/detention charges will be borne by the contractor.

In order to ensure timely completion of project, some of the equipment/material as covered under clause no. E.10.0 of Section-E (Schedule of equipment) may arrive at site and are unloaded and stacked/stored prior to mobilisation of ETC Contractor for the work covered under this Tender Specification. In such a case, the amount actually spent by BHEL on unloading and storage till the time of mobilisation by the ETC contractor shall be debited to their account. Immediately after mobilisation, the contractor shall take these into their custody and all the conditions as applicable for the material directly received by the contractor will be applicable for these material.

C.7.0 FACILITIES TO BE PROVIDED AT SITE BY THE CONTRACTOR:

- C.7.1 Watch and ward by authorised/licensed agency for the safe custody of the equipment shall be responsibility of the contractor.
- C.7.2 It is the responsibility of the contractor to dismantle and take away all the materials of his office accommodation as soon as the project is handed over to BHEL/Owner and clean the area off debris.

C.8.0 TESTING AND COMMISSIONING:

- C.8.1 All the electrical/mechanical test of the materials and equipment will be arranged by the contractor as per standard Specification/Field Quality Plan/ Erection Manual/Directive of the Site Engineer and Owner. The contractor shall have to fill the check list (site inspection record forms) for receipt, storage, erection, testing and commissioning of all the equipments as per BHEL systems to ensure proper quality of work.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

- C.8.2 All the testing equipment required to carry out the site test for all the equipment or the erected equipment shall be calibrated and shall be arranged by the contractor at his own cost. However, necessary instruction and the guidelines will be given by BHEL/owner.
- In case Contractor is unable to provide the calibrated measuring and test instruments to the satisfaction of 'ENGINEER' then as per his own wisdom/ judgement can recommend a deduction of maximum limit up to 5% from the Contractor's bill. But this in no way relieves the Contractor from arranging the test & measuring instruments / equipment as required for completion of the 'PROJECT' without affecting the quality of work and meeting any Contractual obligation whatsoever.
- C.8.3 The contractor shall be completely responsible for the satisfactory erection and providing Test Equipment and skilled manpower for testing, commissioning of all equipment, notwithstanding the fact that he may be assisted by BHEL or its authorised representative.
- C.8.4 The installation of all electrical equipment shall be carried out only by an electrical contractor holding a valid License for carrying out installation work of the voltage classes involved, under the direct supervision of and by persons holding valid certificates of competency for the same voltage classes, issued or recognised by the State Government. Contractor shall submit the particulars of the License held by him.
- C.8.5 The contractor shall furnish to BHEL the names and particulars of certificates of competency of the supervisors and workmen to be engaged for carrying out installation work against this specifications.
- C.8.6 The work shall be executed in a workman like manner in accordance with the requirements specified in the General Specification of Electrical Equipment installation, testing and commissioning specifications. Copy of such specifications/ drawings will be given to successful bidder before starting the work.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

- C.8.7 All electrical work shall also comply with standard norms and practices adopted by the State Electricity Board. Site test reports shall be prepared and submitted by the contractor.
- C.8.8 Before charging the installation in part or full, this shall have to be approved by Statutory Govt. Authorities like Electrical Inspector, other concerned agency and the contractor has to arrange approval for the same as and when required by BHEL/Owner.
- C.8.9 Any feasible modification in the equipment or installation that may be demanded by Electrical Inspector shall have to be carried out by the contractor at no extra charges to BHEL. The contractor shall take all necessary steps to enable BHEL/Owner to get the installation approved by the above authorities & shall render all necessary assistance to BHEL/Owner in the matter.
- C.9.0 **COMPLETION OF CONTRACT:**
- C.9.1 All equipment, mountings, fittings accessories or apparatus which may not have been specifically mentioned but which are usual or necessary for completing the erection and commissioning work of system, shall be done by the contractor without any extra charges.
- C.10.0 **TRIAL OPERATION AND HANDING OVER:**
- C.10.1 On completion of erection of the equipment and before pre-commissioning tests of the equipment, each of the equipment shall be inspected by the BHEL/Owner for the correctness and completeness of the installation. Thereafter commissioning engineers shall carry out all pre-commissioning tests. The results of such pre-commissioning tests shall be signed jointly by the contractor's representative and BHEL/Owner.
- C.10.2 On conclusion of satisfactory pre-commissioning tests, the trial operation of the equipments shall start. The equipment shall be on trial operations during which period all necessary adjustments shall be made.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

- C.10.3 After completion of trial operation, the plant will be handed over to the owner, after the period to be specified by BHEL. On taking over the plant, the owner shall issue a certificate to that effect.
- C.10.4 BHEL/Owner shall be at liberty from time to time or at any time before the completion of the works to take possession and use any part of the completed works and in such case the contractor shall completely finish the said uncompleted part or parts of the works as and when the engineer shall direct whether before or after the respective prescribed time or extended time (if any) for the completion of the works and if required by the engineer while the owner is in possession of the said part or parts, of the site or works.
- C.10.5 If due to reason of any default on the part of Contractor, a taking over certificate has not been issued in respect of any portion of the works, within one month after the time for completion or extended time as the case may be, the Owner/BHEL shall be at liberty to use the works or any portion thereof in respect of which a taking over certificate has not been issued, provided that the works or the portion so used as aforesaid shall be reasonably capable of being used and that the Contractor shall be afforded the earliest opportunity of taking such steps as may be necessary to permit the issue of the taking over certificate.

C.11.0 **ADDITIONAL EXPENDITURE:**

In case any additional expenditure is incurred in the works arising out of the faulty execution of the works by the contractor, such additional expenditure shall be borne by the contractor.

C.12.0 **SPLITTING THE WORK:**

BHEL reserves the right to split the work and award any part of the work to any agency without assigning any reason whatsoever.

C.13.0 **SUPPLY OF MATERIAL:**

- C.13.1 The Contractor shall in no case be entitled to any compensation or damage on account of any delay in supply or non-supply thereof for all or any such materials and stores but the contractor shall be entitled to suitable extension of time as may be determined by the Engineer whose decision shall be final and binding.

**BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.**

Conditions of Contract for Erection Works, Rev-02

- C.13.2 The contractor shall satisfy himself of the quantity and quality of the materials at the time of taking delivery from the BHEL/Owner. No claim whatsoever will be entertained by the BHEL/Owner on account of quality or quantity after the materials are taken by the contractor from the BHEL/Owner.

C.14.0 ELECTRICITY AND WATER:

- C.14.1 Electricity for construction work shall be provided at one point on chargeable basis at the rate prevailing at the time of drawal of power, unless specified otherwise. The contractor shall have to make their own arrangements, at their cost, for distribution to various locations for their works including proper switch/fuse units, distribution boards, cables, poles etc. to ensure safety of men and equipment. Where required the contractor shall employ diesel operative equipment in addition to electric operated ones to ensure timely completion of work.

In case BHEL is unable to provide Electricity on chargeable basis then the contractor has to arrange same at his end.

- C.14.2 The contractor shall indicate in his offer the power load required by him along with the load details for which power is required.
- C.14.3 The owner shall not be responsible for any inconvenience caused due to any failure of lighting and power supply and no compensation for delay in works can be claimed by the contractor due to such non-supply on the grounds of idle labour, machinery or any other grounds.
- C.14.4 The contractor should ensure that the work in critical areas is not held up in the event of lighting and power breakdown and for the same he should have some standby arrangement at his cost. In the event of breakdown in the electric supply, if the progress of work is hampered, it will be the responsibility of the contractor to step up the progress after restoration of electric supply so that over all progress of work is not affected. The contractor shall make proper arrangement of illumination at work place while working in late hours or in darkness.
- C.14.5 Unless stated otherwise in the scope of works, the contractor shall make his own adequate arrangement for procuring clear water to be used in the works.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

C.15.0 INSURANCE :

C.15.1 Contractor shall take insurance cover(s) to cover his Tools and Plants, Assets, workmen compensation and third party liability. The contractor shall make available the original insurance cover(s) to the Engineer for necessary verification before commencement of work.

C.16.0 ESCALATION/PRICE VARIATION :

C.16.1 Under this contract, **No escalation/ Price variation** is allowed. The quoted prices are FIRM till complete commissioning and handing over of the Project to Customer/Owner.

C.18.0 CONSTRUCTION SCHEDULE:

C.18.1 While submitting the offer the contractor shall furnish Bar Chart detailing out all major activities, as to how he proposes to complete the work maintaining the completion schedule as given in Notice Inviting Tender. If the contractor fails to achieve any milestone indicated in the Bar Chart/completion schedule mentioned elsewhere, the contractor shall be levied penalty as per clause C.5.0.

C.19.0 HEAVY MATERIAL HANDLING EQUIPMENT:

The contractor must clearly indicate the details of all Heavy Materials Handling Equipment owned by him in Annexure-C of Section-A, General Instructions to the Tenderer. The boom length, capacity of handling load and other relevant details must also be given.

C.20.0 CALIBRATED TEST INSTRUMENTS:

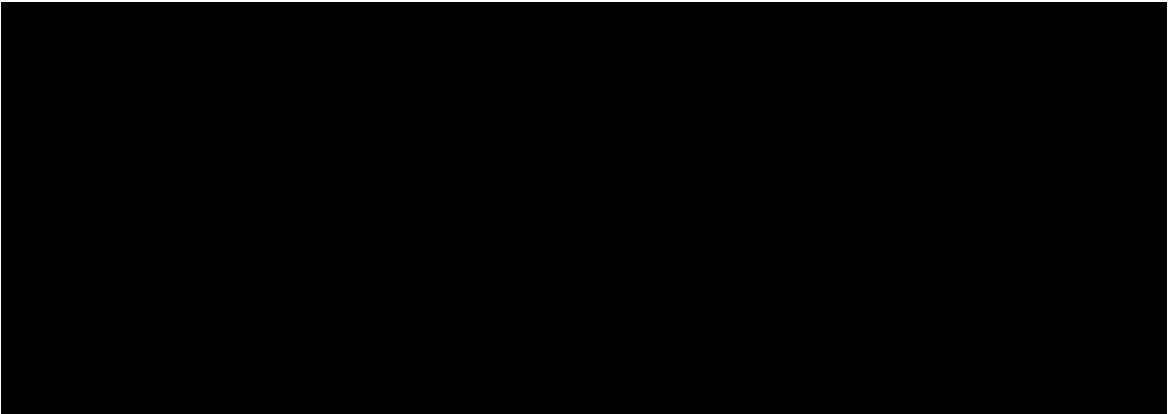
Contractor is required to bring all the required testing equipments and instruments for conducting pre-commissioning test. All instruments should be calibrated as this is an ISO System requirement and the contractor should furnish test certificate for calibration. Also, please see clause E.4.2 and E.6.3 of Section-E for more details.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

- C.21.0 Contractor should maintain moisture free store.
- C.21.1 Illumination system in & around store should be maintained by the contractor.
- C.21.2 All the material stored in the open yard shall be covered by tarpaulins to be arranged by the contractor.
- C.22.0 **PROTECTION OF WORK :**
- C.22.1 Contractor shall effectively protect his work, equipment, material from theft, damage or tempering at his own expenses till the work is finally taken over by the BHEL/Owner.
- C.22.2 Finished work where required, shall be suitably covered to keep it clean and free from defacement or damage.
- C.22.3 Necessary fire protection arrangement is to be made by the contractor for store and place of work.
- C.23.0 **SAFETY MEASURES :**
- C.23.1 All safety rules and codes as applicable to work shall be followed without exception.
- C.23.2 All safety appliances and protective devices including safety belt, hand gloves, aprons, helmets, shield goggles etc. shall be provided by the contractor to his personnel. Also, the Contractor must follow BHEL Quality system to ensure safety in all activities of site work.
- C.24.0 **QUALITY RECORDS (FQPs, MATERIAL MANAGEMENT ETC.)**
- C.24.1 Contractor should follow field quality plan furnished by BHEL to ensure quality in all activities of work performed at site.
- C.24.2 The contractor shall have to maintain records pertaining to Material Verification on receipt at site as well as Daily Receipt Register, Stock Register as per the various quality systems of BHEL.

**BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.**

Conditions of Contract for Erection Works, Rev-02

- C.25.0 The contractor shall remove all scaffolding, ladders, temporary structures etc. erected by him during erection in order to leave place neat and clean to the satisfaction of the owner.
- C.26.0 All packing/items are to be checked immediately on receipt at site. Any shortages, damages are to be reported to BHEL within a week's time in writing.
- C.26.1 All parts shall be thoroughly cleaned, all rust removed and surface polished as required before erection of any equipment.
- C.26.2 Cleaned and polished parts shall be coated with anti-corrosive paints wherever necessary.
- C.27.0 After completion of work, reconciliation is to be done for all the material issued to the contractor. Balance materials are to be returned to BHEL/Owner.
- C.28.0 **WORKING HOURS:**
If in the opinion of BHEL, the progress of the erection work by the contractor at any stage needs expediting so as to ensure completion of work within stipulated time, BHEL shall have the right to instruct the Contractor to increase the Contractor's manpower and working hours and the contractor shall comply with such instructions without any Extra Charges.
- C.29.0 **DIVISION OF WORK:**
Prices are to be quoted for schedule of Equipment - E.10.0 of Section-E. Work can be split-up and awarded to more than one contractor as per requirement of BHEL/Owner for timely completion of Project.
- 

**BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.**

Conditions of Contract for Erection Works, Rev-02

C.31.0 DISCREPANCIES AND ADJUSTMENT OF ERRORS

- C.31.1 The several documents forming the contract are to be taken as mutually explanatory of one another, detailed drawings being followed in preference to small scale drawings & figures dimensions in preference to scale & special conditions in preference to general conditions.
- C.31.2 In case of discrepancies between schedule of quantities, the specification and/or the drawings the following order of preference shall be observed.
- a) Description in Schedule of Quantities.
 - b) Special Conditions.
 - c) Drawings
 - d) Technical Specifications.
 - e) General Conditions of Contract.
- C.31.3 If there are varying or conflicting provisions made in any one document forming part of the contract, the Engineer shall be deciding authority with regard to the document.
- C.31.4 Any error in the description, quantity in schedule of quantities or any omission there from shall not vitiate the contract or release the contractor from the execution of the whole or any part of the works comprised therein according to the drawings and specifications or from any of his obligations under the contract.
- C.31.5 If on check there are found to be differences between the rates given by the contractor in words and figures or in the amount worked out by him in the schedule of quantities and general summary, the same shall be adjusted in accordance with the following rules. :
- a) In the event of discrepancies between description in words and figures quoted by tenderer, the description in words shall prevail.
 - b) In event of an error occurring in the amount column of schedule of quantities as a result of wrong extension of the unit rate and the quantity, the unit rate shall be regarded as firm and extension shall be amended on the basis of the rates.
 - c) All errors in totalling in the amount column and in carrying forward totals shall be corrected.

**BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.**

Conditions of Contract for Erection Works, Rev-02

- d) The totals of sections of bill of quantities amended shall be carried over to the general summary and the tendered sum amended accordingly. The tendered sum so altered shall, for the purpose of tender be substituted for the sum originally tendered and considered for acceptance instead of the original sum quoted by the tenderer. Any rounding of quantities or in sections of bill of quantities or in general summary, by the tenderer, shall be ignored.

- C.31.6 If neither drawings nor specifications contain any mention of minor details of construction which in the opinion of the Engineer, whose decision shall be final and conclusive, are reasonable and obviously and fairly intended for satisfactory completion of work, such details shall be provided by the contractor without any extra cost, as if they were specially mentioned and shall be deemed to be included in the contract.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

SECTION-D

ERECTION CONDITIONS **OF CONTRACT**

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

SECTION - D

ERECTION CONDITIONS OF CONTRACT

D.1.0 GENERAL:

D.1.1 The following shall supplement the conditions already contained in the other parts of these specifications and documents and shall govern that portion of the work of this contract to be performed at site.

D.1.2 The contractor upon signing of the contract shall, in addition to a Project Coordinator, nominate another responsible officer as his representative at site suitably designated for the purposes of overall responsibility and co-ordination of the works to be performed at site. Such person shall function from the site office of the contractor during the pendency of the contract.

D.2.0 REGULATION OF LOCAL AUTHORITIES AND STATUTES:

D.2.1 The contractor shall comply with all the rules and regulations of local authorities during the performances of his field activities. He shall also comply with the **Minimum Wages Act, 1948 and the Payment of Wages Act** (Both of Government of India) and the rules made there under in respect of any employee or workman employed or engaged by him or his sub-contractor.

The Contractor should note that all instructions of Engineer shall be binding for example display of Minimum Wages paid to the workmen, construction of toilets etc. in the vicinity of working area from health and sanitation standpoint etc.

D.2.2 All registration and statutory inspection fees, if any in respect of his work pursuant to this contract shall be to the account of the contractor. However any registration, statutory inspection fees lawfully payable under the provision of the statutory laws and its amendments from time to time during erection in respect of the plant equipment ultimately to be owned by the Owner/BHEL shall be to the account of the Owner/BHEL. Should any such inspection or registration need to be rearranged due to the fault of the Contractor or his sub-contractor, the additional fees for such inspection and/or registration shall be borne by the contractor.

**BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.**

Conditions of Contract for Erection Works, Rev-02

D.3.0 OWNER'S LIEN ON EQUIPMENT :

The owner/ BHEL shall have lien on all equipments including those of the contractor brought to the site for the purposes of erection, testing and commissioning of the plants. The Owner/ BHEL shall continue to hold the lien on all such equipments through out the period of contract. No material brought to the site shall be removed from the site by the contractor and/ or his Sub-contractors without the prior written permission of BHEL.

D.4.0 RE-WORKS ETC. :

In case Owner/BHEL/consultant during inspection at site rejects an item already agreed and the same is agreed to by BHEL and any re-execution of works of other contractors and/or his agencies, which might have got damaged or affected by the replacements will have to be attended to by the contractor free of cost.

D.5.0 ACCESS TO SITE AND WORKS ON SITE :

D.5.1 Suitable access to and possession of the site shall be provided to the contractor by Owner/ BHEL in reasonable time.

D.5.2 The works so far as it is carried out on the owner's premises shall be carried out at such time as the owner/BHEL may approve and the Owner/ BHEL shall give the contractor reasonable help/ facility for carrying out the works.

D.5.3 In the executions of the works, no persons other than the Contractor or his duly appointed representative, Sub- contractor and workmen shall be allowed to do work on the site except by the special permission in writing by BHEL.

D.6.0 CONTRACTOR'S SITE OFFICE ESTABLISHMENT:

The contractor shall establish site office at the site and keep posted an authorised representative for the purpose of contract. Any written order or instruction of BHEL or his duly authorised representative shall be communicated to the contractor at the site office and the same shall be deemed to have been communicated to the contractor at his legal address.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

D.7.0 CO-OPERATION WITH OTHER CONTRACTORS:

D.7.1 The contractor shall co-operate with all other contractors or tradesmen of the owner/BHEL who may be performing other works on behalf of them and the workmen who may be employed by the owner/BHEL doing work in the vicinity of the works under the contract. The contractor shall also arrange to perform his work as to minimise to the maximum extent possible interference with the work of other contractors and his workmen. Any injury or damage that may be sustained to the employees of the other contractors, BHEL and the owner due to the contractor's work shall promptly be made good at contractors own expenses. The owner/ BHEL shall determine the resolution of any difference or conflict that may arise between the contractor and other contractor's or between the contractor and workmen of the owner and BHEL in regard to their work. If the works of the contractor is delayed because of any acts or omission of another contractor, the contractor shall have no claim against the owner/ BHEL on that account other than an extension of time for completing his works.

D.7.2 BHEL shall be notified promptly by the contractor of any defects in the other contractor's works that could affect to the contractor's works. The owner/BHEL shall determine the corrective measures if any, required to rectify this situation which shall be binding on the contractor.

D.8.0 DISCIPLINE OF WORKMEN:

D.8.1 The contractor shall adhere to the disciplinary procedure set by the owner in respect of his employees & workman at site. The owner/BHEL shall be at liberty to object to the presence of any representatives or employee of the contractor at the site, if in the opinion of the owner/ BHEL such employee has misconducted himself or be incompetent or negligent or otherwise undesirable and then the contractor shall remove such a person objected to and provide in his place a competent replacement.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

D.9.0 CONTRACTOR'S FIELD OPERATION:

D.9.1 The contractor shall keep informed in advance regarding his field activity plans & schedule for carrying out such part of the works. Any review of such plan or schedule or method of work by the BHEL shall not relieve the contractor of any of his responsibilities towards the field activities and its schedule. Such reviews shall also not be considered as an assumption of any risk or liability by the owner/BHEL or consultant or any of his representatives and no claim of the contractor will be entertained because of the failure or inefficiency of any such plan or schedule or method or work reviewed. The contractor shall be solely responsible for the safety adequacy and efficiency of plant and equipments and his erection methods.

D.9.2 The contractor shall be completely responsible for the conditions of the work-site including the safety of all persons employed by him or his sub-contractor and all the properties under his custody during the performance of the work. This requirements shall apply continuously till the completion of contract and shall not be limited to normal working hours.

D.10.0 PHOTOGRAPH AND PROGRESS REPORT:

D.10.1 The Contractor shall furnish to BHEL photographs of the progress of work / work done at site. Photographs shall be taken as & when indicated by BHEL representative. Photograph shall be adequate in size & number to indicate various stages of erection. Each photograph shall contain the date, the name of the Contractor and the title of the Photograph. The cost of photographs is to be born by the Contractor.

D.10.2 The above Photographs along with the soft copy (on floppy/CD) shall accompany the monthly progress report detailing out the progress achieved on all erection activities as compared to the schedules. The report shall also indicate the reasons for the variance between the scheduled and actual progress and action proposed for corrective measures wherever necessary.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

D.11.0 MANPOWER REPORT:

- D.11.1 The Contractor shall submit to BHEL from the first working day of every month, a Manpower report of the previous month detailing the number of persons scheduled to have been employed and actually employed skill-wise and the areas of employment of such labour.

D.12.0 PROTECTION OF WORK:

The Contractor shall have total responsibility for protecting his works till it is finally taken over by the owner. No claim will be entertained by the BHEL for damage or loss to the Contractor's works & the contractor shall be responsible for the complete restoration of the damaged work to its original condition to comply with the specification & drawings. Should any such damage to the Contractor's works occur because of other party not under him directly, & if disagreement or

conflict or dispute develops between the contractor & the other party or parties concerns works the same will be resolved as per the provisions of the clause D.7.0 above entitled cooperation with other contractors. The contractor shall not cause any delay in the repair of such damaged works because of any delay in the resolution of such dispute. The contractor shall proceed to repair the work immediately & no cause thereof will be assigned pending resolution of such dispute.

D.13.0 EMPLOYMENT OF LABOUR:

- D.13.1 The Contractor will be expected to employ on the work only his regular skilled employees with experience of his particular work. No female labour shall be employed after darkness. No person below the age of eighteen years shall be employed.
- D.13.2 All travelling expenses including provision of all necessary transport to and fro for Site, lodging allowance and other payments to be Contractor's employees shall be the sole responsibility of the contractor.
- D.13.3 The hours of work on the Site shall be decided by the owner/BHEL and the Contractor shall adhere to it. Working hours will normally be eight (8) hours per day Monday through Saturday or depending upon the situation/ requirement.

**BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.**

Conditions of Contract for Erection Works, Rev-02

D.13.4 Contractor's employees shall wear identification badges while on the work at site.

D.13.5 In the case of owner/BHEL become liable to pay any wages or dues to the labour or to any Government agency under any of the provisions of the Minimum Wages Act, Workmen Compensation Act, Contractor Labour Regulation Abolition Act or any other law due to act or omission of the Contractor, BHEL may make such payment and recover the same from the Contractor's bills or from any amount which is already under process of payment to the Contractor.

D.14.0 FACILITIES TO BE PROVIDED BY OWNER:

D.14.1 Space: The Contractor shall advise BHEL within Fifteen (15) days from the date of acceptance of the Letter of Intent about his exact requirement of space for his office, storage area. The above requirements shall be reviewed by the Owner/BHEL & space will be allotted to the Contractor for construction of his temporary structures like office and storage sheds.

D.14.2 Construction water and power (Electricity) (Refer Clause C.14.0).

D.15.0 FACILITIES TO BE PROVIDED BY THE CONTRACTOR:

D.15.1 CONSTRUCTION EQUIPMENTS, TOOLS, TACKLES AND SCAFFOLDINGS:

The Contractor shall provide all the construction equipments, tools, tackles and scaffoldings required for pre-assembly, erection, testing and commissioning of the equipments covered under the contract. He shall submit a list of all such materials to the BHEL before the commencement of work at Site. These tools and tackles shall not be removed from site without the written permission of the owner/BHEL.

D.15.2 COMMUNICATION:

The Contractor will make his own arrangement for all his communication needs such as telephone, fax etc., at his site office and his residential accommodation.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

D.15.3 FIRST AID:

The Contractor shall provide necessary first aid facilities for all the employees, representatives and workmen working at the Site. Enough number of contractor's personnel shall be trained in administering first aid.

D.15.4 CLEANLINESS:

D.15.4.1 The Contractor shall be responsible for keeping the entire area allotted to him clean and free from rubbish, debris, etc. during the period of contract. The Contractor shall employ enough number of special personnel to thoroughly clean his work-area at least once in a day. All such rubbish and scrap material shall be stacked or disposed in a place to be identified by the owner/BHEL. Materials and stores shall be so arranged to permit easy cleaning of the area. In areas where equipment might drip oil and cause damage to the floor surface, a suitable protective cover of the flame resistant, oil proof shield shall be provided to protect the floor from such damage.

D.15.4.2 Similarly the labour colony, the office & the residential areas of the Contractor's employees and workmen shall be kept clean & neat to the entire satisfaction of the Owner/BHEL. Proper sanitation arrangements shall be provided by the contractor in the workmen areas, office and residential areas of the contractor.

D.16.0 LINES AND GRADES:

All the works shall be performed to the lines, grades and elevations indicated on the drawings. The Contractor shall be responsible to locate the layout of the works. Basic horizontal and vertical control points as required will be established & marked by the Owner/BHEL at Site at suitable points.

These points shall be used as datum for the works under the contractor. The contractor shall inform the Engineer well in advance of the time and places at which he wishes to do work in the area allotted to him, so that suitable datum points may be established and checked by Owner/BHEL to enable the contractor to proceed with his works. Any work done without being properly located may be removed and/or dismantled by the Owner/BHEL at Contractor's expenses.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

D.17.0 FIRE PROTECTION:

- D.17.1 The work procedures that are to be used during erection shall be those which minimise fire hazards to the extent practicable. Combustible materials, combustible waste and rubbish shall be collected and removed from the site at least once each day. Fuels, oils and volatile or flammable materials shall be stored away from the construction and equipments and material storage and areas in safe containers. Untreated canvas paper, plastic or other flammable materials shall not at all be used at site for any other purpose unless otherwise specified, if any such materials are received with the equipment at the Site, the same shall be removed and replaced with acceptable materials before moving in to the construction area or storage.
- D.17.2 Similarly corrugated paper fabricated cartons etc., will not be permitted in the construction area either for storage or for handling of materials. All such materials used shall be of water proof and flame resistance type. All other materials such as working drawings, plants etc. which are combustible but are essential for the works to be executed shall be protected against combustion resulting from welding sparks, cutting flames and other similar fire sources.
- D.17.3 All the contractors supervisory personnel and sufficient number of workers shall be trained for fire-fighting and assigned specific fire protection duties. Enough of such trained personnel must be available at the Site during the entire period of the Contract.
- D.17.4 The contractor shall provide enough fire protection equipment of the types and number for the ware-houses, office, temporary structures, labour colony area etc., access to such fire protection equipment shall be easy and kept all times.

D.18.0 SECURITY:

The Contractor shall have total responsibility for all equipments & materials in his custody stored, loose, semi assembled and/or erected by him at site. The contractor shall make suitable security arrangements including employment of security personnel to ensure the protection of all materials, equipments and works from theft, fire, pilferage & other damages and losses. All materials belonging to the Contractors shall enter and leave the project site only with the written permission of the Owner/BHEL in the prescribed manner.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

D.19.0 CONTRACTOR'S AREA LIMITS:

The Owner will make out the boundary limits of access roads, parking spaces, storage and construction areas for the contractor and the contractor shall not trespass the areas not so marked out for him. The contractor shall be responsible to ensure that none of his personnel move out the areas marked out for his operations. In case of such a need for the contractor's personnel to work in the areas not marked out for him, the same shall be done only with written permission of the Owner/BHEL.

D.20.0 CONTRACTOR'S COOPERATION WITH THE OWNER/ BHEL:

In cases where the performances of the erection work by the contractor affects the operation of the system facilities of the Owner/BHEL such erection work of the contractor shall be scheduled to be performed only in the manner stipulated by the Owner/BHEL and the same shall be acceptable at all times to the contractor. The Owner/BHEL may impose such restriction on the facilities provided to the contractor such as electricity, water etc., as he may think fit in the interest of the Owner/BHEL and the contractor shall strictly adhere to such restrictions and cooperate with the Owner/BHEL. It will be responsibility of the contractor to provide all necessary temporary instrumentation and other measuring devices required during start up and operation of the equipment system which are erected by him. The contractor shall also be responsible for flushing and initial filling of all the oil and lubricant required for the equipment furnished and erected by him, so as to make such equipments ready for operation. The contractor shall be responsible for supplying such flushing oil & other lubricants unless otherwise specified elsewhere in these documents and specifications.

D.21.0 PRE-COMMISSIONING TRIALS AND INITIAL OPERATIONS:

The pre-commissioning trials and initial operations of the equipments furnished and erected by the contractor shall be the responsibility of the contractor as detailed in relevant clauses. The contractor shall provide in addition, test instruments calibrating devices etc. and the labour required for the successful performance of these trials. If it is anticipated that the above test may prolong for a long time, the Contractor's workmen required for the above test shall always be present at site during such trials.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

D.22.0 MATERIAL HANDLING AND STORAGE:

D.22.1 All the equipments furnished under this contract arriving at site shall be promptly received, unloaded, transported and stored in the storage spaces by the contractor.

D.22.2 Contractor shall be responsible for examining all the shipments immediately on receipt at site and notify BHEL immediately if any damage, shortage, discrepancy. Filling of material verification reports on receipt of materials shall be carried out by the Contractor as per the instructions of Engineer. For any shortages or damages in transit, handling and/or in storage and erection of the equipments at site shall be intimated to BHEL/ equipment supplier promptly to enable them lodge claim with the underwriters. Any financial and/or time loss happened due to contractor's negligence in this regard shall be to the account of the contractor. Any demurrage, wharfage and any other charges claimed by the Transporter or Railways due to any reason attributable to the contractor such as delay in taking delivery in time shall also be to the account of the contractor.

D.22.3 The Contractor shall maintain an accurate and exhaustive record detailing out the list of all equipments received and keep such record open for the inspection of the Owner/BHEL at any time.

BHEL is an ISO Company and the contractor shall extend all help in maintaining records of receipts, issue and stock in line with Material Management System issued by BHEL. Also, he shall assist in periodic inspection of equipment/materials in stores as per this system.

The Contractor shall carryout all field activities related with ETC work as per Field Quality Plans (FQPs) provided by Engineer to ensure Quality of work at site as well as meet the contractual obligation to BHEL/Owner.

D.22.4 All equipments shall be handled very carefully to prevent any damage or loss. No bare wire ropes, slings etc. shall be used for unloading and/or handling of the equipments without the specified written permission of BHEL. The equipment stores shall be properly protected to prevent damage either to the equipment or to the floor where they are stored. The equipment from the store shall be moved to the actual location at the appropriate time so as to avoid damage of such equipment at site.

**BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.**

Conditions of Contract for Erection Works, Rev-02

- D.22.5 All electrical panels, control gears, motors and such other devices shall be properly dried by heating before they are installed and energised. Motor bearings, slip rings, commutators and other exposed parts shall be protected against moisture ingress and corrosion during storage and periodically inspected. Heavy rotation parts if any, in assembled conditions shall be periodically rotated to prevent corrosion due to prolonged storage.
- D.22.6 All the electrical equipment, such as motors, transformers etc. shall be tested for insulation resistance at least once in three months from the date of receipt till the date of commissioning and record for such measured insulation values maintained by the contractor. Such records shall be open for inspection by the Owner/BHEL.
- D.22.7 The contractor shall ensure that all the packing materials and protection devices used for the various equipments during transit and storage are removed before the equipments are installed.
- D.22.8 The consumable and other supplies likely to deteriorate due to storage must be thoroughly protected and stored in a suitable manner to prevent damage or deterioration in quality by storage.
- D.22.9 All the materials stored in the open or dusty location must be covered with suitable weather proof & flame proof covering materials wherever applicable.
- D.22.10 If the materials belonging to the contractor are stored in areas other than these earmarked for him, the Owner/BHEL will have the right to get it removed to the area earmarked for the contractor at the contractor's cost.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

D.22.12 STORAGE INSTRUCTION FOR GAS FILLED EQUIPMENTS:

- D.22.12.1 All transformers despatched to site are fitted with Nitrogen cylinder in the tank to maintain positive pressure. It will be the responsibility of the contractor to maintain the pressure and replace the empty Nitrogen cylinder with Nitrogen filled cylinder of required purity at his own cost whenever such cylinders are become empty. Contractor should also maintain the periodic record of the pressure of Nitrogen in the transformer in a register for this purpose.
- D.22.12.2 For all other gas filled equipments, like CTs, VTs, CVTs etc. the contractor should also maintain the gas pressure & if it falls below the required value, contractor should refill the leaked gas of required purity at his own cost.

D.23.0 CONSTRUCTION AND ARRANGEMENTS:

- D.23.1 The field activities of the contractors working at site, will be coordinated by BHEL and BHEL decision shall be final in resolving any dispute or conflicts between the contractor and other contractor's and tradesmen of the BHEL regarding scheduling and coordination of work. Such decisions shall not be cause for extra compensation for time to the contractor.
- D.23.2 The Owner/Consultant shall hold weekly meetings of all the contractors working at the site at a time and a place so designated. The contractor along with BHEL shall attend such meetings and take notes of discussions during the meeting and the decisions of the Owner/BHEL/Consultant shall be strictly adhered to in performing his works. In addition to the above weekly meetings, the Owner/Consultant/BHEL may call for other meetings either with individual contractors or with selected number of contractors and in such a case the contractor, if called will also attend such meetings with BHEL.
- D.23.3 Time is the essence of the contract & the contractor shall be responsible for performance of his work in accordance with the specified construction schedule. If at any time the contractor is falling behind the schedule, he shall take necessary action to make good for such delay by increasing his work force or by working overtime or otherwise accelerate the progress of the work to comply with the schedule and shall communicate such actions in writing to the BHEL satisfying them that his action will compensate for the delay. The contractor shall not be allowed any extra compensation for such action.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

- D.23.4 BHEL shall however not be responsible for provision of additional labour and/or materials or supply or any other service to the contractor except for the coordination work between various contractors as set out earlier.

D.24.0 **FIELD QUALITY PLANS AND RECORDS:**

The contractor shall maintain at his Site Office upto date copies of all drawings, specifications, FQPs and other contract documents and any other supplementary data complete with all the latest information thereto. The contractor shall also maintain in addition the continuous record of all changes to the above contract documents, drawings, specifications, supplementary data etc. effected at the field and on completion of his total assignment under the contract, shall incorporate all such changes on the drawings and other engineering data to indicate as installed/build conditions of the equipments furnished and erected under the contract.

Such "AS BUILT DRAWINGS" and "ENGINEERING DATA" shall be submitted to BHEL in required number of copies.

D.25.0 **CONTRACTOR'S MATERIALS BROUGHT ON TO SITE:**

- D.25.1 The contractor shall bring to site all equipments, components, parts, materials, including construction equipment, tools & tackles for the purpose of the works under intimation to the owner/BHEL. All such goods shall, from the time of there being brought to site but may be used for the purpose of the works only and shall not on any account be removed or taken away by the contractor without the written permission of the BHEL.
- D.25.2 After the completion of the works the contractor shall remove from the site under the direction of the BHEL the material such as construction equipment, erection tools and tackles, scaffolding etc. with the written permission of BHEL. If the contractor fails to remove such materials within fifteen (15) days of issue of a notice by the BHEL to do so, then BHEL shall have the liberty to dispose/remove such materials and expanses incurred by BHEL in this regard will be recovered from the Contractor.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

D.26.0 PROTECTION OF PROPERTY AND CONTRACTOR'S LIABILITY:

- D.26.1 The contractor shall be responsible for any damage resulting from his operation. He shall also be responsible for protection of all persons including members of public and employees of the Owner/BHEL and the employees of other contractors and subcontractors building, other plants and equipments and utilities either above or below the ground.
- D.26.2 The contractor will ensure provisions of necessary safety equipments such as barriers, sign-boards, warning lights and alarm etc. to provide adequate protection to persons and property. The contractor shall be responsible to give reasonable notice to Owner/BHEL of public or private property and utilities when such property and utilities are likely to get damaged or injured during the performance of his work shall make all necessary arrangements with such owners related to removal and or replacement or protection of such property and utilities.

D.27.0 PAINTING:

All exposed metal parts of the equipment including pipings, structures, railings etc. wherever applicable shall be first painted with at least one coat of suitable primer after thoroughly cleaning all such parts off dirt and rust scales, greases, oil and other foreign materials by wire brushing, scraping or/and blasting and the same being inspected and approved by the Engineer for painting. After wards the above parts shall be finished with two coats of enamel paint. The quality of the finish paint shall be as per the standards of ISI equivalent and to be of the colour as approved by the Owner/BHEL.

D.28.0 PROTECTION OF MONUMENTS AND REFERENCE POINTS:

The contractor shall ensure that at points such as relic, antiquity, coins, fossils etc. which he may come across during the course of performance of his works either during excavation or elsewhere are properly protected & handed over to the owner under intimation to BHEL. Similarly the contractor shall ensure that the bench marks reference points etc. which are marked out either with the help of owner or by BHEL shall not be disturbed in any way during the performance of his works. If any work is to be performed which may disturb such references, the same shall be only after these are transferred to other suitable locations under the direction of BHEL. The contractor shall provide all necessary materials and assistant for such relocation of reference points etc.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

D.29.0 WORK AND SAFETY REGULATIONS:

- D.29.1 The contractor shall ensure the safety of all the workmen, materials, and equipment either belonging to him or to others working at site.
- D.29.2 The contractor will notify the BHEL office of his intention to bring on to site any equipment or any container with liquid or gases, fuel or other substances which may create hazards. BHEL shall have the right to prescribe the conditions under which such equipment or container may be handled and used during the performance of the works and the contractor shall strictly adhere to such instructions. BHEL shall have strictly the right to inspect any construction plant and to forbid its use, if in his opinion it is unsafe. No claim due to such prohibition shall be entertained by BHEL.
- D.29.3 Where it is necessary to provide and/or store petroleum products or petroleum mixtures & explosive, the contractor shall be responsible for carrying out such provision and/or storage in accordance with the rules and regulations laid down in Petroleum Act, 1934. Explosively Act, 1948 and petroleum and carbide of calcium manual published by the Chief Inspector Of Explosive of India. All such storage shall have prior approval of BHEL in case any approval are necessary from the Chief Inspector of Explosive of any statutory authorities, the contractor shall be responsible for obtaining the same.
- D.29.4 The contractor shall be responsible for the safe storage of his & his sub-contractor's radio-active source if any.

D.30.0 ELECTRICAL SAFETY REGULATIONS:

- D.30.1 In no circumstances will the contractor interfere with fuses and Electrical Equipment belonging to BHEL/Owner or to the other contractors.
- D.30.2 Before the contractor connects any electrical appliances to any plug or sockets belonging to the other contractor or Owner, he shall:
- (a) Satisfy the Owner/BHEL that the appliances are in good working conditions.
 - (b) Inform the Owner/BHEL of the maximum current, relating, voltage etc. of the appliances.
 - (c) Obtain permission of the Owner detailing the sockets to which the appliances may be connected.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

- D.30.3 The BHEL will not grant permission to the contractor until he satisfies that:
- (a) The appliance is in good conditions and fitted with suitable plug.
 - (b) The appliance is fitted with a suitable cable having proper earthing provisions.
- D.30.4 No cable in use will be disturbed by the contractor without prior permission. No weight of any description will be imposed on any such cable and no ladder or similar equipment will rest against or attached to it.
- D.30.5 No work shall be carried out on any live equipment. The equipment must be made safe by the BHEL/Owner and a permit to work issued before any work is carried out.
- D.30.6 The contractor shall employ the necessary number of qualified full time electrician to maintain his temporary electrical installation.
- D.31.0 **CONSUMABLES:**
- The contractor shall make arrangements for an adequate inventory at site of necessary consumable prior to erection so that the requirements of the same will not come in the way of timely completion of the works under the contract.
- D.32.0 **MILD STEEL AND ALUMINIUM WELDING & OTHER SPECIAL PROCESSES :**
- D.32.1 Only an approved and qualified welder shall be employed by the contractor. The welder will be subjected to pre-qualification test by Owner/BHEL.
- D.32.2 The Contractor shall ensure that personnel employed for doing other special processes like tube/pipe bending etc. are having proper experience and are qualified for doing such work.
- D.32.3 Erection of Aluminium tubular bus bar shall include cutting, bending, aluminium welding with sleeves (sleeves supplied by BHEL), Radiographic testing and D.P test of 100% welded joints, fixing corona end bells etc to complete.

BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION BUSINESS GROUP, NEW DELHI.
Conditions of Contract for Erection Works, Rev-02

- D.32.4 For MS welding, red lead paint shall be applied followed by aluminium paint and bitumen after welding. For GS welding , two coats of cold galvanising anti-corrosive paint shall be applied after welding. In case any special process is indicated in customer's specification, then the same shall be applicable.
- D.32.5 10% welded joints in earthing shall be tested for Dye penetration test.
