Civil Projects & Services
**Bharat Heavy Electricals Limited,**
Boiler Auxiliaries Plant, Ranipet - 632 406, **INDIA.**
(A Government of India Undertaking)

Phone No. 04172-254694 / 254615 / 254995

## NOTICE INVITING TENDERS

1. Tender Number : BAP:CF&D:42/2008-09
2. Name of work : Design, Detailed engineering & submission of construction drawings for Pipavav, Pragati & North Chennai Desalination Projects.
3. Completion Time : 8 months.
4. Estimated Cost : 34.50 Lakhs
5. Cost of tender document : Rs. 500/-
6. Earnest Money Deposit : 50,000/-
7. Last Date & Time for receipt Of Completed Tender.
   - Technical bid : Before 2.30 P.M. on 22.04.09.
8. Date & Time of tender Opening:
   - Technical bid : At 2.30 P.M. on 22.04.09.
9. Place of submission of Tender: To be dropped in Tender box at Office of Sr. DGM (Civil Projects & Services), Ranipet 632 406.

This tender document contains 113 pages including the following.

Issued to M/s:

## STANDARD TERMS & CONDITIONS
## (FOR GUIDANCE TO THE CONSULTANTS)

### A] ELIGIBILITY CRITERIA FOR ENGINEERING CONSULTANCY WORKS FOR BHEL, RANIPET

1) Experience of having successfully completed similar works during the last 7 years as on 31.01.2009 for Government Departments, Government Undertakings **reputed private sectors** etc.

   a) Three similar completed consultancy works costing not less than the amount equal to 14 Lakhs within the proportionate period.

   b) Two similar completed consultancy works costing not less than the amount equal to 17 Lakhs within the proportionate period.

   c) One similar completed consultancy work costing not less than the amount equal to 28 Lakhs within the proportionate period.

2) The tenderer should have designed equipments for use in Fertilizer / Power plant , chemical industry of similar works.

### B] MANDATORY COMMERCIAL ACCEPTANCE TERMS

**Terms of Payment:**

1) No advance will be paid on any account.

2) Being an item rate contract payment will be made upon completion of each item as indicated in the schedule. Interim payment shall be released as detailed below:

- 60% on submission of design & detailed drawing for preliminary approval
- 30% on submission of design & detailed drawing for final approval
- 10% on submission of as built drawings.

3) Security Deposit recovered from running bills will be released against submission of performance bank guarantee valid up to the warranty period of one year.

### C] Submission of Offer

**TENDERS**

Sealed tenders super-scribed with Tender Number, Due Date, Item Name & Firm's Name shall be addressed to Sr. Dy. General Manager / Civil Projects & Services, Bharat Heavy Electricals Limited, Ranipet – 632 406, Tamilnadu, so as to reach him on or before the date and time specified in the tender. It shall contain two separate sealed covers put in a common envelope.

**Sealed envelope super-scribed, with Tender Number, Item Name, Tender Due Date & Supplier's Name containing:**

**Cover I: Qualifying Requirements, Techno-Commercial and Unpriced Bid**

***Sealed Cover super-scribed "Cover I – Qualifying Requirements,* Techno-Commercial and Unpriced Bid*" containing:***

***Submittals:***

a) ***Non-Refundable Tender Fee*** favouring Bharat Heavy Electricals Ltd., Ranipet – 632 406 for value of tender document, as called for,

b) ***Supporting documents*** to substantiate their capacity viz manpower, machineries, financial statements, etc., as called for in the check list.

c) ***Customer list*** with their full address including detail of contact person with phone no., fax no. & e-mail ID (if any) to whom the work has been done for the past five years. The date of completion should also be indicated,

d) ***Annual Reports*** giving the audited Profit & Loss account and Balance Sheet for the last three financial years.,

e) **Certificate** from customers/end users for satisfactory performance of the work.

f) ***BHEL registered Contractors:*** Vendors registered with any unit of BHEL, shall give details of their registration along with the category registered for. Such Contractors may be exempted from submitting their annual reports.

g) ***Authorization Letter:*** Such of those tenderers who wish to participate in the Tender Opening, should attach an authorization letter which shall be duly signed and stamped in original, identifying the representative to be deputed for tender opening.

h) ***Technical qualification:*** The vendors who have experience in designing structures for thermal power plants / Desalination plants are only eligible to quote for this work.

i) ***EMD :*** The EMD for this work is Rs. 50,000/- . The EMD shall be in the form of DD in favour of "Bharat Heavy Electricals Limited, payable at Ranipet 632406" through any nationalized bank.

EMD by the tenderer will be forfeited if:

i. After opening the tender, the tenderer revokes his/their tender within the validity period or increases his earlier quoted rates.

ii. The tenderer does not commence the work within the period as per LOI / Contract. In case the LOI / contract is silent in this regard then within 15 days after award of contract.

EMD given by all unsuccessful tenderers shall be refunded normally within the period of acceptance of award of work by the successful tenderer.

EMD shall not carry any interest.

j) Complete technical Offer with details, catalogues, drawings,

k) Un-priced bid (i.e. Price bid without Price),

l) Filled-in BHEL's Technical Specification format enclosed with the Tender document,

m) All relevant enclosures of above documents / formats.

***Note:***

(i) Cover I received without Tender Fee, EMD and / or all Supporting Documents as specified above will lead to rejection of the offer.

(ii) The Cover II of such offerors shall not be opened and they would not be eligible to participate in the tender further.

(iii) The Tender fee would be separate for Indian Suppliers.

(iv) The Applicable Tender Fee would be available in the Inquiry Sheet of the Tender Document

(v) Optional items offered, if any, would not be considered for evaluation. Procurement of such optional item/s will be at the sole discretion of BHEL.

(vi) No changes shall be entertained once the bid is opened unless otherwise specifically agreed to by BHEL.

**Sealed envelope super-scribed (Price bid), with Tender Number, Item Name, Tender Due Date & Name of the Supplier, containing:**

**Sealed Cover super scribed "Cover II –Price Bid" containing:**

***Price Bid*** (i.e., Un-priced bid but with Price duly filled-in) in conformance with the commercial terms as per Envelope I).

The Prices shall be indicated in both figures and words.

Unit rates should be quoted in figures as well as in words in Indian Currency only – i.e., Rupees and Paise with reference to each item and for all the items shown in the attached schedule. The rates shall include all taxes and duties payable on account of Service Tax, Sales Tax etc., and also expensed towards PF and ESI contributions **(see clauses 8, 39 and Annexure 'C')**. Amount of each item and the total on each sheet as also the grand total amount of the whole contract shall be filled by the tenderers. No corrections would be permitted. Error statements should be completely erased / struck out and fresh values given in the offer, which should be initialled and attested by the tender submitting authority. Offers without the above may become liable for rejection.

***Note***

(i) No Price Variation Clause will be entertained.

(ii) In case, there is a discrepancy in the term quoted in techno-commercial bid and price bid, the term as per the techno-commercial bid (Envelope I) shall hold good and the commercial term quoted in the Price Bid (Envelope II) shall not be considered.

(iii) In their own interest, all Tenderers are advised to double check their prices, applicable duties and taxes.

(iv) The quotation should be valid at least for a period of 90 days from the tender opening date.

(v) All the pages of the offers should invariably contain Signature (ink-signed) & Office Stamp of the Supplier. Any corrections / erasures in the offers should be initialled and stamped.

**Both the covers I & II shall be submitted in a common cover super scribing Tender No., Name of work, Date of tender opening etc.**

**D] Opening of Offers**

a) **Tenders shall be received up to 14.30 Hours on the said due date and be opened on the same day at 14.30 Hours. Tenders received after 14.30 Hours would not be opened. The times indicated are Indian Standard Time (IST).**

b) Tenders, which were posted through 'India Post's Registered Post before the opening date but received after tender opening shall be treated as regular tenders.

c) If a Supplier submits only one envelope / cover containing all the bids or combined bids e.g. techno-commercial bid & price bid together, the bid is liable for rejection. The decision to accept such bids shall be the sole discretion of BHEL, which may be done by BHEL after segregating the bids so received.

d) Such of those Tenderers who wish so, may participate in the Tender Opening by deputing their representatives. The representatives would be allowed to participate in the Tender opening only on submission of a signed and stamped authorization letter issued by the Supplier. Representatives without the Authorization Letter would not be allowed to participate in the Tender Opening. Representatives who turn up after the Tender opening time / start of the Tender opening would not be allowed to participate. After tender opening the details would not be given to such suppliers who choose to be absent at the Tender opening.

e) One more original of the authorization letter should be kept in the Cover I. Authorizations received by fax / e-mail would not be acceptable.

f) Details such as the Technical Specification, Price, Delivery Terms, and Delivery Period alone would be read out by the Tender Opening Officer.

g) In exceptional cases, at the discretion of BHEL, in the event of the named representative (named in the Tender Document) is unable to come due to unavoidable circumstances, then an alternative representative would be allowed, where the alternative representative should carry a revised original authorization certificate. Suppliers are advised to avoid such situations to avoid embarrassments on both sides and

h) If so required, BHEL reserves the right to open the Price-Bids, *'in-camera'.* Intimation to this effect would be given to the Supplier by BHEL, before the opening of the Price-Bids.

***Note***

(i) At its option, BHEL may consider extending the due date/s for the tender openings. Sufficient notice would be given by BHEL for such extensions.

**E] Evaluation of Offers**

a) The price bids of the technically acceptable offers alone, contained in Cover II shall be opened.

b) All bidders shall submit their offers by filling-in the format of the BHEL tender documents. Offers received in any other format are liable to be rejected. Offers are asked in BHEL's format for purpose of standardisation - to help in the offer evaluation.

d) Offer with any pre-conditions (like conditional discounts) for price are liable to be not considered / rejected.

e) BHEL reserves the right to reject without assigning any reasons / load any offer with factors other than already specified for such offers having deviations to BHEL Specifications, Standard Terms & Conditions at its discretion. The decision of BHEL in this regard shall be final.

f) BHEL reserves the right to reject an offer due to unsatisfactory past performance during tender finalisation / execution of a contract at any of BHEL projects / units.

g) BHEL reserves the right to conduct negotiations on the "Price" and "Other Commercial Terms and Conditions" with the lowest ranked offeror and

h) If so required by BHEL, Consultant may have to share their cost data / costing sheet with BHEL.

**F] Placement of Orders**

a) Orders would be placed on technically acceptable financially lowest offer, based on the evaluation of BHEL.

b) For acceptable payment terms, guarantees and warranties, and other commercial terms and conditions, please see the detailed standard commercial terms of BHEL.

c) Income tax, Service Tax and any other similar tax / duties /levies imposed by the Government of India, or the State Government, where the BHEL Unit is located, deductible at Source, during the tenure of the Order shall be deducted by BHEL. Such taxes are presently applicable on E & C Charges / Services Charges / Technical Fees and are to be borne by and are to the account of the Consultant / Service Provider. If such taxes / duties / levies / imports become applicable on any other component of the order the same shall be deducted by BHEL as per the rules and regulations prevailing.

d) Where ever applicable, Necessary Tax Deduction at Source (TDS) would be issued.

e) Contractors shall make their own arrangements for the stay of their Engineers / Technicians deputed to BHEL for execution of works.

f) The Guarantee period shall start from the "Date of the Completion of the work ".

## G] Security Deposit:

**a)** The rate of Security Deposit (SD) will be as below:

- Up to Rs. 10 lakhs: 10%
- Above 10 lakhs up to 50 lakhs: Rs. 1.lakh + 7.5% of amount exceeding Rs. 10 lakhs.
- Above 50 lakhs: Rs. 4 lakhs + 5% of the amount exceeding Rs. 50 lakhs.

**b)** The security deposit will be collected before start of the work from the contractor.

**c)** The security deposit may be furnished in any one of the following forms:

1) Cash (as permissible under the Income Tax Act)

2) Pay order, Demand draft in favour of BHEL,

3) Local cheques of scheduled banks, subject to realization.

4) Securities available from Post offices such as National Savings Certificates, Kisan Vikas Patras etc. (Certificates should be held in the name of Contractor furnishing the security and duly pledged in favour of BHEL and discharged on the back).

5) Bank guarantee from Scheduled Banks / Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format should have the approval of BHEL.

6) Fixed Deposit Receipt issued by Scheduled Banks / Public Financial Institutions as defined in the Companies Act. The FDR should be in the name of the contractor, A/c BHEL, duly discharged on the back.

7) Security Deposit can also be recovered at the rate of 10% from running bills. However in such cases at least 50% of the Security Deposit should be paid before start of the work and the balance 50% may be recovered from the running bills.

8) EMD of the successful tenderer can be converted and adjusted against the security deposit.

9) The security deposit shall not carry any interest.

(Note: Acceptance of Security Deposit against Sl. No. 4 & 6 above will be subject to hypothecation or endorsement on the documents in favour of BHEL. However, BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith.)

## H] Termination of Inquiry / Orders:

a) BHEL reserves the right to cancel any inquiry before opening of the tender, without assigning any reason.

b) BHEL reserves the right to cancel any tender and refloat a fresh tender, at any time after opening of the tender, in case it finds the response to its tender as not meeting its requirement. This shall be at the sole discretion of BHEL.

c) BHEL reserves the right to cancel the order for delay in supply beyond penalty period without any monetary or legal obligations and at the risk and cost of the Consultant.

d) BHEL will levy penalty as Liquidated Damages (LD), for delay in delivery as per Clause 43 of BHEL General conditions of contract (GCC).

## I] Others

a) In case of any contradiction in the terms and conditions given here and elsewhere in the other documents of the tender, it shall be the responsibility of the tenderer to get it clarified from BHEL. The officer authorized to provide such clarifications is the Sr. Deputy General Manager / Civil Projects & Services, Phone: 04172 – 254694, e-mail ccdurai@bhelrpt.co.in.

b) Alterations to the conditions of the Tender can be done only by the authorized officer, at any time before the date and time of tender opening. Such changes, if any, would be communicated in writing and / or hosted in the web-page.

c) If any Supplier attempts to bribe, or pay commission, gift or any advantage or bring in undue influence either by himself or on his behalf any one including a stranger to the tender, in addition to instituting legal proceedings as per the extant laws prevailing, will disqualify the supplier from this tender and all future tenders of BHEL. Decision of the Purchaser would be final in this matter.

d) The laws governing this transaction shall be the laws in India.

e) Wherever not specified, INCO Terms 2000 shall be used to interpret the Commercial terms and conditions and

f) In the event of an order, Consultant shall agree to settlement of disputes or differences, if any, by way of arbitration, in accordance with the “Rule of Arbitration” of the Indian Council of Arbitration.

***g) The offer/s of such of those bidders who do not accept for levy of liquidated damages (LD) for delay in Contract period and who do not accept for submission of the Security deposit for the value and period specified herein above is likely to be summarily rejected. No correspondence would be entertained by BHEL in this regard, on this subject. BHEL specifically draws the need of this mandatory requirement to the notice of all Bidders. The Price Bid of such of those offerers failing to meet this requirement, would not be considered for the Price-Bid Opening.***

*h) The language in the tender downloaded by the Bidders shall at no point of time be changed, altered or modified in any manner by the Tenderer. If such changes are made by any tenderer, it shall be considered as tampering with BHEL’s specifications and the offer shall be summarily rejected, whenever it is noticed by BHEL. Such Bidders would be disqualified from the Bidding Process and their offers would be forfeited / Bank Guarantees invoked. They would not be allowed to participate in future tenders of BHEL.*

*i) BHEL reserves the right to split the work into two parts in the proportion of 60% to the L1 party and 40% to the L2 party at the rate of L1 party (counter offered) or two projects to the original L1 tenderer and one project to the L2 offerer at the rate of L1 offer.*

### J] Specific technical requirements:

I. This clause specifies the special technical requirements for the work in the scope of this Contract. All works shall conform to Indian Standards and Codes and all local and state regulations. Where requirements are at variance, the more stringent of them shall govern.

II. The Contractor’s plans and drawings submitted with the bid, show the location and sizes of various buildings. These plans and drawings will be finalized during the detailed design stage taking into consideration the actual size of the equipment, the specific features of operation, maintenance and safety as detailed in the specification. The contractor shall incorporate all changes suggested by the Owner at no extra cost to the Owner and with no extension of time. The contractor shall begin further works like preparation of design criteria only after obtaining approval of the report.

III. Detailed design calculations / drawings shall be commenced by contractor only after approval is obtained fro the owner on the basic design criteria for building / structure / areas to be submitted by the contractor. No later deviation for the approved design criteria shall be permitted unless specifically approved by the owner in writing, prior to its adoption.

IV. Civil assignment drawings showing all details such as equipment loads, live loads, erection and maintenance loads, cutouts, crane capacity and wheel loads and wheel spacing, point loads due to piping / pipe hangers, ventilations duct, cable trays etc., shall be submitted for information. Vertical bracing, brick wall location, etc. shall be based on approved general arrangement (GA) drawings and all construction drawings of the equipment, piping / cable tray / ventilation duct layout drawings and shall be submitted by the contractors for owner's approval. Interferences shall be indicated in civil GA drawings. Civil GA drawings submitted without prior approval of relevant GA drawings for equipment, piping / cable tray / ventilation duct layout shall not be considered for review and approval.

V. Design calculations and drawings and other documents shall be submitted sequentially after obtaining approval as indicated in items ii, iii & iv in a phased manner. Contractor shall ensure that design calculations / drawings for several structures are not submitted at one time. For this purpose, design / drawing submission schedule furnished during bidding stage and agreed upon by owner shall be followed. Owner will reviews and furnish comments / approval, if any, to the designs and drawings, generally within a period of two weeks fro the date of receipt of the same in the owner's office. Timely submission of designs / drawings to the owner for review / approval is the sole responsibility of the contractor and postal or other delays as reasons for late / non-submission shall not be entertained by the owner.

VI. Should there be a requirement for preparation of separate drawings to show enlarged details to facilitate construction / erection, then such drawings shall also be prepared by the contractor at no extra cost.

VII. Preparation and review of structural steel fabrication drawings is entirely of the responsibility of the contractor and shall be submitted for approval.

VIII. Bar bending schedule for all concrete / structural steel works shall be prepared by the contractor and submitted to the owner for his reference.

IX. All architectural features of buildings shall be detailed by the contractor's qualified Architect. Detailed drawings along with schedule of doors / windows etc. floor / wall finishes including colour scheme shall be submitted for obtaining approval from the owner.

X. Design drawings showing typical connection details conforming to design assumptions shall be submitted for approval before starting fabrication drawings.

XI. All construction drawings shall include total quantity of concrete (grade wise), reinforcement (diameter wise) and structural steel (section wise).

XII. Design drawings shall indicate structural arrangements, member sizes, member forces, splice location, details of base plate, anchor bolts, details of moment connection, construction joints, water stops, loading etc. so that the drawings indicate clearly all the necessary information brought out in relevant design calculations. Proposed bracing patterns shall be subject to approval by owner. In framing plan of RO hall foundation / misc. building foundations, end sheet of all secondary beams and end shear and end moment of frame beams are to be furnished in a tabular form.

XIII. The designs shall clearly spell out the erection scheme for various structures envisaged by the contractor and resulting additional loadings, if any, shall be duly accounted for. Before taking up actual erection work, detailed erection scheme proposed to be followed by the contractor shall be submitted for owner's approval.

XIV. Approval / comments conveyed by the owner neither relieves the contractor of his contractual obligations and his total responsibility for correctness of dimensions, materials of construction loadings, quantities, design details assembly fits, performance particulars, safety and stability of the structure including foundation / appurtenances and conformity of supplies with the statutory laws as may be applicable, not does it limit the owner's right under this contract. No change in the approved designs / drawings shall be permitted without prior written approval of the owner.

XV. Owner or his representative has every right to go to the contractor's design office to check the quality control being implemented at their design office to ensure that the documents being prepared are of approved quality. The contractor shall provide all assistance required by owner for carrying out the audit.

XVI. All design calculations and drawings shall be in English and shall be in SI units.

XVII. Designs, drawings and other documents submitted by the contractor shall be thoroughly checked and approved by the authorized contractor's engineers. Any unchecked / unsigned documents will not be reviewed by the owner. Also design calculations not accompanied by supporting engineering drawings, incomplete or shabbily done design calculations, design calculations without adequate reference or back up data and documents where previous comments have not been incorporated will not be reviewed by the owner. No claim from the contractor for extension of time or extra cost on this account shall be entertained by the owner under any circumstances.

XVIII. No check will be specifically carried out by the owner to verify arithmetical / numerical accuracy of the calculations, input data, compatibility of dimensions among various drawings or between drawings and design calculations. These shall remain entirely the contractor's responsibility.

XIX. All modification suggested by the owner to meet specification requirements and sound engineering practice shall be incorporated by the contractor at no extra cost to the owner. In this respect, the decision of the owner shall be binding on the contractor. Owner will accord his approval only after the contractor has incorporated in the design and drawings all modifications required by the owner.

XX. Soft copies of all design calculation and drawings shall be submitted for records after approval of the owner.

XXI. All structural analysis has to be done adopting STAAD Pro / SAP. The complete input (soft copy with editable format) and output data (soft copy) is to be submitted by successful bidder for owner's review and approval, all the drawings shall be of standard sizes (Metric system) and shall be made on AUTOCADD latest version. The software above mentioned is not exhaustive.

# DESIGN CRITERIA

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## 1.0 GENERAL

This part generally outlines the design basis to be followed for all the structures listed in Sec. All buildings / structures shall be designed as framed structures with brick cladding or with insulated metal cladding as described elsewhere. Load bearing brick built structures shall not be adopted.

All buildings / structures shall be designed for all possible load combinations that it can experience during its lifetime. However the works load combinations shall be adopted for designing the buildings / structures.

The foundation system shall be decided as per geotechnical investigation to be carried out by the contractor.

Some basic loadings have been indicated below, however any other loadings not indicated but found necessary to be considered during detail engineering and shall be adopted in addition to the listed loadings. Load combination in accordance with the loadings shall be considered.

## 1.1 GENERAL REQUIREMENTS FOR ALL BUILDING AND STRUCTURES

Design and construction of buildings, structure etc., shall take into account requirement for operation and maintenance of all equipment and its users. The buildings will have good architectural features. The surrounding area shall be properly micro levelled and graded.

### 1.1.1 ARCHITECTURAL CONCEPTS FOR BUILDINGS

The architectural design concept of buildings structure shall be evolved considering the functional, technological and other requirements for efficient operation, ensuring comfortable working environment for personnel, satisfying the aesthetic requirements. Special care shall be taken to provide elegance and finishes. To achieve above objective CONTROR shall employ a qualified architect / architectural firm to carryout all designs and hold all other architectural responsibilities for the project.

The contractor shall obtain and be conversant with all laws, by-laws, regulations of local and statutory bodies as applicable to the project. The architectural concept evolved should also take care of these requirements. The contactor shall provide the drawings and documents for such statutory approvals.

### 1.1.2 ROOF ACCESS

All roofs shall be provided with access thorough a – staircase cage ladder. Minimum 1000mm wide access path shall be provided with tiles to approach equipment on roof.

### 1.1.3 PLATFORMS AND WALKWAYS

Platforms shall be provided to all major equipment, not directly accessible from the floors, for maintenance. Platforms and connecting walkways shall have a minimum width of 1000mm. however, in case of space restriction, the minimum allowable clear width shall be 750mm. platforms in front of the entry shall be at least 1000mm wide. Platforms located close to each other shall be connected with walkways.

All steel platforms above grade level shall be constructed with kick plates at edge of the platform to prevent tools or materials from falling off. It shall consists of 8mm thick steel plate projecting 100mm above the platform surface. Kick plate shall be painted with the same type of coating as the material to which it is attached.

Continuous walkway at least 750 mm wide shall be provided along the crane girder level with handrails, on both side of the building. Approach to EOT crane shall be ensured by staircase.

1.1.4 STAIRS & LADDERS

Steel stairs

All steel staircases shall normally have minimum clear width (back to back of stringer) of 2500 mm and minimum inclination with horizontal of 35.75º. however, in case of space restriction, minimum clear width up to 750 mm and slope up to 45º may be provided. The vertical height between successive landings shall not exceed 5m. channels (min MC 150) shall be provided as stair stringers. Treads shall be minimum 250 mm wide of chequered plate / grating, with suitable nosing, and spaced equally so as to restrict the rise to a maximum 180 mm (200 mm in exceptional cases).

Steel ladders

Ladders shall be provided to platforms, walkways, instruments and equipments which do not require frequent access. Ladders shall preferably be vertical and its angle with vertical shall not exceed 5º. Ladders shall be of minimum 450 mm clear width with 20mm dia. MS rungs spaced at 300 mm (maximum).

Ladders shall be provided with a safety cage of minimum 750 mm dia. Clear when the top of ladder is more than 4.50 m above the landing level. However, safety cages shall start at 2.10 m above the lower landing level.

RCC stairs

All stairs shall have maximum riser of 180 mm and a minimum tread of 250 mm. However, for public buildings riser shall be limited to 150 mm and tread width of 300 mm. Minimum width of stairs shall 12500 mm generally. All stairs normally shall have not more than 15 risers in one flight. Aluminium angle nosing with minimum 50 x 25 s 3 angle shall be provided for edge protection of RCC stairs.

1.1.5 HANDRAILS

Handrails shall be provided at appropriate places to ensure safety. E.g. around all floors roof openings, projections / balconies, walkways, platforms, steel stairs etc.

All handrails shall be of 32 mm nominal bore MS pipes (medium class) as per IS: 1161 galvanized using 610 gm / sq.m of zinc. Stub members and members for grillage type footings shall have a heavier zinc coating not less than 800 gm/sq.m. Hand railing shall be a two-rail system with the top rail 100 mm above the walkway surface and the intermediate rail 450mm below the top rail. Handrail post spacing shall be limited to 1500 mm as far as possible but can be proportioned to the length of the opening. In such case shall not exceed 1850 mm centre to centre of posts. Hand railing shall be shop fabricated for specific locations and field welded or bolted to the erected structural steel. However material used for handrails shall be approved by owner without any extra cost.

For RCC stairs, hand railing with 20 mm square MS bar balustrade with suitable MS flat and Aluminium / Teakwood handrail shall be provided, unless specifically mentioned otherwise. The overall provision of this component shall be aesthetically impressive.

### 1.1.6 EDGE PROTECTION

Wherever possible around floor openings an RCC kerb of 100 mm wide 150 mm high shall be provided. All concrete edges, where breakage of concrete corners expected shall be provided with angles of minimum size L 50 x 50 x 6 with lugs for edge protection e.g all round the cut-outs openings in floor slab, edges of drains supporting grating covers, edges of RCC cable I pipe trenches supporting covers, edges of manholes supporting covers and supporting edges of pre-cast covers etc.

### 1.1.7 ANCHOR BOLTS AND INSERT PLATES

Anchor bolts shall be designed for working stress, in tension and shear, for embedded length of the anchor bolts and pipe sleeves. Shear and crushing strength of concrete shall also be checked. Increase in allowable stress for loading including seismic and wind loads shall not be permitted in design of anchor bolts.

Insert plates shall be designed / checked for shear and bending moment. All lugs shall be checked for tension. Bond strength of concrete shall be checked. Lugs using steel bars shall preferably be fillet welded to the plate to transfer full strength of the lug.

### 1.1.8 VERTICAL HEAD ROOM

All accessible areas shall be provided with minimum clear headroom as follows, unless otherwise specified.

| | |
|---|---|
| Finished floors to ceiling (buildings) | 3000 mm |
| Doors, Walkways, Platforms, Stairs etc. | 2100 mm |
| False ceiling of office areas | 2400 mm |
| Above false ceiling | 1000 mm |
| Safety cage for ladders | 2500 mm |
| Access for fork lift trucks | 2800 mm |
| Main roads / Railway crossings & crane access | 7500 mm |
| Other plant roads and truck access | 5000 mm |
| Cable & pipe rack (except at road and rail crossings) | 3000 mm. |

### 1.1.9 EXPANSION / CONSTRUCTION JOINTS

Expansion and construction joints shall be provided wherever required. All expansion and construction joints of water retaining structures in RCC shall be made water tight using PVC ribbed water stops with central bulb. However, kicker type (externally placed) PVC water stops may be used for the base slabs and in other areas where it is required to facilitate concreting. The minimum thickness of PVC water stops shall be 10mm and minimum width 225 mm. At other joints these shall be 150 mm wide.

Two part polysulphide sealant conforming to IS:12118 shall be used for sealing of joints in cont with water. For other cases, bitumen sealing compound conforming to IS:1834 can be used. Performed bitumen impregnated fibre board conforming to IS:1838 shall be used as joint filler.

1.1.10 BRICK / STONE MASONRY AND PARAPET WALL

All masonry works shall be designed in accordance with IS: 1905, IS: 2112, IS: 4326 and other relevant IS codes as applicable. Structural design of load bearing and non-load bearing walls constructed with solid or perforated burnt clay bricks or concrete blocks shall be in accordance with National Building Code of India Part VI.

All ways shall be non-load bearing in-filled panels walls. External walls of all buildings shall be at least one brick thick. All internal walls shall be at least one brick thick except for internal partition walls for office area, canteen, change rooms, first aid rooms and toilets which may be half brick thick. RCC bands shall be provided wherever necessary.

50 mm thick DPC (1:1.5:3) with water proofing admixture shall be provided at plinth level before staring masonry work.

Minimum 50 kg/ sq.cm compressive strength brick shall be used for non-load bearing super structure brick work. Cement sand mortar 1:5 for one brick thick wall and 1:4 for half brick thick wall shall be used. For half brick walls, RCC transoms and mullions shall be provided.

Type, thickness and height of external walling, facing the transformer yard to take care of the accidents in transformer yard shall be according to the requirements of Tariff Advisory Committee.

Even where metal claddings specified, for initial 3 m height from the ground level, minimum 355 mm thick brick masonry wall or 230mm RCC wall shall be provided.

1.1.11 WATER PROOFING OF UNDERGROUND STRUCTURES

All underground structures like basements, pump houses, water retaining structures etc., shall have plasticizer cum water proofing cement additives confirming to IS:9103, In addition, limits on permeability as given in IS:2545 shall also be met with. the concrete surface of these structures in cont with soil shall be provided with minimum two costs of bituminous painting of grade 85/25 conforming to IS: 702 @ 1.7 kg/sq.m (minimum) for water damp proofing. Also provision shall be made on the inner surface of walls and base slab, so that water proofing grouting can be injected later in case of leakage.

1.1.12 ANTI TERMITE TREATMENT

Pre-constructional anti termite treatment shall be given to all vulnerable areas susceptible to termite attack and shall include column pits, wall trenches, foundations filling below the floors etc., as per IS:6313 and other relevant Indian Standards.

1.1.13 PLINTH LEVEL

Finished ground floor level (plinth level) of all buildings and pump houses shall be minimum 500 mm above the formation level / grade level.

All cable vaults shall be located above ground level i.e., vaults shall not be provided as basements in the buildings.

1.1.14 STATUTORY REQUIREMENTS

All the applicable statutory rules pertaining to Indian Factories Act, Factory rules of State Government, Fire safety rules of Tariff Advisory committee. Water of Pollution Control boards, Explosives Act etc.., and stipulations of other relevant statutory authorities shall be taken in to consideration at the time of design and construction.

Provisions of safety, health and welfare according to Factories Act shall be complied with at design stage. These shall include provision of continuous walkway (minimum 750 mm wide) along crane-girder at crane girder level on both sides of the building, comfortable approach to EOT crane cabin, railings, fire escape locker room for workmen, pantry, toilets, rest rooms etc.

Adequate no. of fire escapes shall be provided in a building. Fire proof doors, no. of staircase, fire separation walls, lath plastering on structural steel member (in fire prone areas) shall, be made according to the recommendation of TAC. For fire safety requirements of buildings IS:1641 and IS: 1642 shall be followed in addition to TAC requirements. All masonry firewalls shall be minimum 345 thick and RCC firewall shall be minimum 200 mm thick.

### 1.1.15 MISCELLANEOUS REQUIREMENTS

Doors and windows on external walls of buildings shall be provided with RCC sunshade over the openings with 300 mm, projection on either side of the opening. Projection on sunshade from the wall shall be minimum 450 mm over window opening and 750 mm over door opening.

Doors and windows on the external walls of buildings with metal cladding shall be fixed by creating recesses in the cladding system.

Duct banks consisting of MS/PVC conduits for cables shall be provided with proper sealing arrangement consisting of fire retardant sealing compound.

All floor openings for cables below electrical panel shall be sealed with fire sealing compound after cables are laid.

All openings in external walls provided for pipes, cables, ducts etc. shall be effectively sealed to prevent water seepage, after the routing of the services are completed.

Separate sewage treatment plant linking all toilets shall be provided.

Natural lighting & Ventilation

The area of windows shall be a minimum 15% of the floor area to ensure adequate natural lighting.

Fans shall be provided I general office areas as per standard norms.

Sewerage system shall be provided with adequate ventilation for the pipe work as well as manhole.

## 2.0 LOADING

### 2.1 DEAD LOADS

Dead loads shall include the weight of structure complete with finishes, fixtures & partitions and shall be taken as per IS:875(Part-I).

### 2.2 LIVE LOADS

Live loads shall consist of uniform live loads and equipment live loads. Uniform live loads are assumed unit loads which are sufficient to provide for movable and transitory loads, such as the weight of people, portable equipment and tools, planking and small equipment, or parts which may be moved over or placed on floors during maintenance operations. These uniform live loads should not be applied to floor areas which shall be permanently covered with equipment.

Equipment live loads shall be calculated based upon the actual weight and size of the equipment and parts to be placed on floors during dismantling and maintenance, or t be temporarily placed on or moved over floors during installation, whichever is most severe.

Floors and supporting members which are subject to heavy equipment live loads shall be designed on the basis of the weight of the equipment in addition to a uniform load of 5 $kN/m^2$, or specifically defined live loads, whichever is greater. Each member in the floor which may carry these loads shall be designed for the heaviest piece or pieces of equipment arranged in the most critical position. For loads caused by moving equipment over the floor for installation, consideration shall be given to the shoring of beams and floor from floors below. Permissible stresses for beams ad columns shall be increased by 25% for temporary loads during installation of equipments.

| Sl.No. | Location | Live loads (Minimum) |
|---|---|---|
| A) | General (unless specified otherwise) | |
| | i) Ground floor (Supporting equipments) | 15 $kN/m^2$ |
| | ii) Ground floor and suspended floors (office block) | 5 $kN/m^2$ |
| | iii) Suspended floors (Supporting equipments) | 10 $kN/m^2$ (min.) (or) actual requirement whichever is more. |
| | iv) Roofs | 1.5 $kN/m^2$ + Hung loads |
| | v) Stairs, Landings and Balconies and Platforms | 5 $kN/m^2$ + Hung loads |
| | vi) Corridors | 5 $kN/m^2$ + Hung loads |
| | vii) Toilets | 2 $kN/m^2$ |
| | viii) Chequered plates, grating floors, etc. | 5 $kN/m^2$ |
| | ix) Inclined Roofs | As per IS 875 |
| | x) Walkways (General) | 5 $kN/m^2$ |
| B) | RO-DM building: | |
| | i) Ground floor | 30 $kN/m^2$ (min.) |
| | ii) Ground floor (Maintenance area) | 30 $kN/m^2$ |
| | iii) Ground floor (Heavy equipment storage area) | Actual load of stored material or 15 $kN/m^2$ |
| | iv) Mezzanine floor | 15 $kN/m^2$ |
| | v) Operating floor | |
| | a) Suspended floors and control room floor | 15 $kN/m^2$ |
| | b) Other areas | 20 $kN/m^2$ + Hung loads. |
| | vi) Gratings, chequered floors, walkways, platforms stairs etc., | 7.5 $kN/m^2$ for grating, checquered plate<br>5 $kN/m^2$ fro supporting beam. |
| | vii) Roof (Wherever no equipment or located and | |

| | | |
|---|---|---|
| | non-accessible) | 1.50 kN/$m^2$ + Hung loads. |
| | Roof (Wherever equipment or located and accessible) | 5 kN/$m^2$ + equipment loads + Hung loads. |
| | ix) Cable spreader floor | 7.50 kN/$m^2$ + Hung loads. |
| | x) MCC & Control building floors | 10 kN/$m^2$ |
| C) | Pump houses | |
| | i) Operating floor | 15 kN/$m^2$ |
| | ii) MCC room | 10 kN/$m^2$ |
| | iii) Roof | 15 kN/$m^2$ (Where no equipment are located)<br>5 kN/$m^2$ + Equipment load (Where equipment is located) |
| D) | Under ground structures such as channels, sumps Under ground pump house, tanks, trenches, Reservoirs, tunnels, cooling water ducts etc. | In addition to earth pressure and ground water pressure, the surcharge load of 20 kN/$m^2$, shall also be considered for design of all underground structures. |
| E) | Road Culverts / Bridges and its allied structures Including RCC pipe crossings, Tunnels & Road Crossing of trenches etc. | Design for class 'AA' loading (wheeled & tracked both) and checked for class A loading as per IRC standard. |

2.3 IMPACT LOAD

Impact loads shall be added to other loads for components supporting reciprocating or rotating machines, elevators, hoists, cranes, or other equipment creating dynamic forces. The following impact loads shall be used, unless analysis indicates higher or lower values:-

| | | | |
|---|---|---|---|
| a) | Hoists and cranes: | | |
| | i) Vertical | -- | 25% of the maximum static wheel load. |
| | ii) Horizontal –lateral | -- | 20% of the sum of the lifted load plus the weight of the hoisting component. |
| | iii) Horizontal-longitudinal | -- | 10% of the total moving load. |
| b) | Rail roads and road ways | -- | 20% of the wheel or crawler loads. |
| c) | Rotating and reciprocating | -- | 50% of the machine wt. |
| d) | Hangers supporting floors and platforms. | -- | 33% of the sum of the dead and reduced live load. |

2.4 EQUIPMENT LOADS

Equipment loads shall be specifically determined and located. For major equipment, structural members and bases shall be specifically located and designed to carry the

equipment load into the structural system. For equipment weighing less than the live load, the structural system shall be designed for the live load. Equipment loads shall be noted in the design calculations to permit separation in calculation of uplift and stability.

1. Static and dynamic loading of major equipments including HP pump shall be obtained from manufacturer certified drawings of specific equipments.
2. All equipment, tank and piping design loadings will include hydraulic testing loads.
3. Air and gas duct loadings will include weight of insulation duct attachments, dust accumulation loads, seismic, wind and other load as applicable.
4. Crane girders and supporting columns will be designed for vertical and horizontal forces (including impact forces) as developed from the crane weights and wheel loads. Unless otherwise specified, the vertical and horizontal loadings will conform to the applicable sections of the IS specification.
5. Weight of equipments, ducts, tanks, pipes, conduits etc. supported by structure shall include maximum possible loading conditions i.e. flooded material contents and associated impacts test loadings, anchorage and constraint effects.
6. All structural components shall be designed to accommodate anticipated concentrated loads, which will or may be applied during the life of the plant. Where both concentrated and uniform loads cannot act simultaneously, the structure or component shall be analyzed for both conditions of loading and shall be designed for more critical condition.
7. Jet forces resulting from guillotine type pipe ruptures shall be considered in the design.

## 2.5 PIPE HANGER LOADS

Piping loads to account for miscellaneous piping systems shall initially be estimated as uniform loads per unit floor area based on the expected density and size of piping being supported in a specific floor area. These loads shall be carried to the columns and foundation as dead loads, but shall not be considered as reliable dead load for uplift. In addition to the uniform area load, a concentrated “phantom” load shall be placed on all primary beams for the purpose of sizing the member. This load shall not be carried over to the sizing of other members. The magnitude of the phantom load shall be based on the mechanical piping engineer’s experience for the miscellaneous piping systems to be routed in a specific floor area.

## 2.6 TEST LOAD

The test load shall be defined as the gravity load imposed by method necessary to test vessels, tanks, equipment or piping.

## 2.7 CONSTRUCTION LOADS

The integrity of the structures shall be maintained without use of temporary framing struts or ties and cable bracing in so far as possible. However, construction or crane access considerations may dedicate the use of temporary structural systems. Special studies shall be made and documented to ensure the stability and integrity of the structures during any periods involving use of temporary bracing systems.

## 2.8 ESTIMTED LOADS

Loadings imposed by equipment shall be specifically determined or estimated before detailed structural design. Estimated loadings shall be substantiated by vendor drawings and relevant documents approved by owner.

2.9 WHEEL AND CRAWLER LOAD

Loads exerted on bridges, roadway pavements, parking and unloading areas, buried piping, box culverts, and embankments shall be reviewed and selected prio9r to design of the underlying items. The loads as recommended for IRC class AA loading and Class A live load shall be utilized for the design of bridges, roadways, and parking and unloading areas. However, exact loadings shall be considered in areas where appropriate, loadings such as loaded scrapers, crawler cranes, stator transport trailers etc. might exceed these loadings.

2.10 DUST LOADS

All buildings/structures shall be designed for a dust load of 0.50 kN/$m^2$ on flat roof.

2.11 CRANE LOADS

Fr crane loads, an impact factor of 25% and lateral crane surge of 10% (of lifted weight + trolley weight) shall be considered in the analysis of frame according to the provisions of IS: 875. The longitudinal crane surge shall be 5% of the static wheel load. Longitudinal surge and lateral surge shall not be considered to act simultaneously.

2.12 LOADS ON UNDERGROUND STRUCTURES

In addition to other loads, the following loads shall also be considered for underground structures:-

a) **Earth Pressure** – Earth pressure for all underground structures shall be calculated using co-efficient of earth pressure at rest, co-efficient of active or passive earth pressure (whichever is applicable).

b) **Ground water pressure** - Ground water pressure due to the highest water table assessed up to finished grade level shall be considered.

c) **Surcharge load** – Minimum surcharge load of 20 kN/$m^2$ shall be considered for the design of all underground structures located in the vicinity affected by vehicular traffic including channels, sumps, cable & pipe trenches etc to provide for increase in earth pressure due to vehicular traffic.

d) **Dynamic Increment** – Dynamic increment of earth pressure under seismic condition shall be considered along with hydrodynamic effect for water/liquid storage structures.

2.13 THERMAL LOAD

Thermal loads shall be defined as forces caused by changes in temperature. The primary source of thermal loads in an industrial plant is the expansion or contraction of vessels and piping. Another source of thermal loads in a redundant structure is the expansion or contraction of the entire structure or individual structural components.

2.14 HYDROSTATIC LOAD AND BUOYANCY

Hydrostatic load is the load due to water pressure. The design of structures shall include hydrostatic loads when applicable. The buoyancy load is equal to the weight of the volume of displaced water. Water table up to finished grade level shall be considered.

2.15 DYNAMIC LOADS

Each structure shall be designed to withstand the effects of vibration and impact to which it may be subjected. Each structure and foundation supporting a compressor and other machinery having significant dynamic unbalance shall be designed to resist the peak loads

specified by the manufacturer. Vibration amplitudes of the supporting structure or foundation shall be kept within acceptable limits for dynamic forces that occur during normal machine operation. In the case of a tall and slender structure, there may be a need to investigate the dynamic effects of wind gusts.

2.16 FURTURE LOAD

Loads from future expansion shall be considered when so directed by the owner. Future loads may include any of the loads listed above.

2.17 SURGE LOAD

Surge loads may occur in some vessels or equipment. In such cases, the magnitude and direction of the load shall be given by the equipment supplier.

2.18 MISCELLANEOUS LAOD

Miscellaneous loads shall be defined as loads that do not fit into the categories listed in this section. Typical miscellaneous loads are loads, during erection, maintenance and repair or forces due to creep, shrinkage, or settlement.

For the design of individual structural components, realistic load combinations in accordance with the relevant design standards shall be considered.

All loadings considered in the design shall be justified with supporting details.

2.19 SEISMIC LOAD

Appropriate zone shall be selected for the sites as per IS:1893 – 2002

Zone factor z = 0.16

Importance factor = 1.5

Response reduction factor = 5.0 (for MRF), 3.0 (for OMRF)

2.20 WIND LOAD

Basic wind speed at project site shall be selected as per IS:875 Part-3.

Probability factor ($k_1$, Risk coefficient), Terrain, height and Structure size factor, $k_2$ and Topography factor, $k_3$ shall be as per IS:875.

2.21 DAMPING IN STRUCTURES

The damping factor to be adopted shall not be more than as indicated below:

| | **Type of Structure** | **Wind load** | **Seismic load** |
|---|---|---|---|
| a) | Welded steel structure | 1% | 2% |
| b) | Bolted steel structure | 2% | 2% |
| c) | RCC structure | 1.6% | 5% |

2.22 TEMPERATURE LOAD

For temperature loading, the total temperature variation shall be considered as 2/3 of the average maximum annual variation in temperature for this purpose shall be taken as the difference between the mean of the daily minimum ambient temperature during the coldest month of the year and mean of daily maximum ambient temperature during the hottest month of the year. The structure shall be designed to withstand stresses due to 50% of the total temperature variation.

Suitable expansion joints shall be provided in the longitudinal direction wherever necessary with provision of twin columns. The maximum distance the expansion joint shall be as per the provisions of IS:800 and IS:456 for steel and concrete structures respectively.

Systems and system component design criteria, which require ambient temperature extreme shall use the range from 22ºC to 40ºC for dry-bulb temperatures.

## 3.0 BASIC DESIGN CONCEPTS TOBE ADOPTED FOR RCC / STEEL STRUCTURES

3.1 BASIC DESIGN CONCELPTS TO BE ADOPTED FOR RCC STRUCTURES

Individual members of the frame shall be designed for the worst combination of forces such as bending moment, axial force, shear force, torsion, etc. Criticality of erection/maintenance loads shall also be checked separately in combination with other simultaneously occurring loads for possible design loadings.

3.1.1 The different load combinations shall be taken as per IS:875 (part – 5) and other relevant IS codes.

a. Wind and seismic forces shall not be considered to act simultaneously.

b. For the design of main plant structures during seismic condition, the de-aerator feed water tank shall be considered full up to operating level. However, for other load combinations, de-aerator feed water tank in flooded condition shall be considered.

c. “Lifted load” of crane shall not be considered during seismic condition.

d. In case two cranes are provided and tandem operation is not envisaged, the load shall be taken as one crane fully loaded and second crane without lifted load but standing idle adjacent to first crane.

e. In case two cranes are provided and tandem operation is envisaged for some bays, then the load shall be taken as both the cranes fully loaded and standing side for these bays. For other bays, load shall be taken as one crane fully loaded and second crane without lifted load but standing idle adjacent to first crane.

f. Permissible stresses for different load combinations shall be taken as per relevant IS codes.

g. Deflection criteria.

**Limiting deflection for RCC members**

The following deflection criteria shall be considered in sizing of structures as per respective clause of IS-456.

Horizontal deflection : h/325

Vertical deflection : Span / 325

The final deflection due to all loads including effects of temperature, creep and shrinkage measured from as cast level of the supports of floors, roofs & all other horizontal members shall not exceed span / 250.

The deflection including effects of temperature, creep & shrinkage occurring after erection of partitions and the application of finishes should not normally exceed span / 350 or 20mm whichever is less.

3.1.2 CONCRETE & REINFORCED CONCRETE FOR STRUCTURES

3.1.2.1 Concrete work shall secure a dense, homogeneous, smooth mass including required finishes, possessing required strength and resistance to weathering and abrasion for the structures and foundations.

3.1.2.2 Unless otherwise specified, minimum grades of concrete to be used shall be as follows:

| Sl. No. | Class | Grade of concrete |
|---|---|---|
| 01 | Plain concrete used for lean concrete, screeds and backfill | M20 |
| 02 | a) Reinforcement concrete for structural work in foundation & superstructure.<br>b) Reinforced concrete for water retaining structure | M25<br>M25 |
| 03 | Water Retaining structures | M35 |
| 04 | Pump foundations | M35 |

3.1.2.3 Design of RCC structure shall be by limit state method as per IS:456. foundation shall be sized for working loads and designed by limit state method considering appropriate partial safety factors as per IS: 456.

3.1.2.4 All reinforcements shall be TMT bars conforming to IS:1786 and proof stress 415 N/mm$^2$ however under special cases mild steel bars conforming to IS:432 (Part-2) can be used.

3.1.2.5 Minimum percentage of reinforcement shall conform to relevant codes.

3.1.2.6 Detailing shall conform to SP:34 and special care to be taken to prevent congestion of reinforcement and formation of honeycomb. Proper access to be provided for pouring of concrete and facilitate use of vibrator needles without hindrance.

3.1.2.7 Minimum clear cover to reinforcement for concrete structural elements shall be as follows:

a) Concrete parts above ground (external surface) : 40 mm

b) Concrete exposed to underground & groundwater

Non-corrosive : 50 mm

Corrosive : 65 mm

c) Slabs : 20 mm

d) Beams : 25 mm

e) Columns : 40 mm.

**Minimum thickness of RCC structural elements**

The following minimum thickness shall be followed:

a) Roof slab / walkways / canopy slabs etc. : 150 mm

b) Floor slab (suspended / slab on grade) : 150 mm

c) Water Retaining slabs / walls : 200 mm

d) All footings (including raft foundations) : 300 mm

e) Parapets : 125 mm

f) Sunshades : 100 mm at fixed end
and 75 mm at free end.

g) Pre-cast louvers / fins : 50 mm

h) Pre-cast trench cover slabs / floor slabs / louvers : 75 mm

i) Under ground reservoir

Below ground water table : 200 mm

Above ground water table : 150 mm

3.1.3 FOUNDATION

3.1.3.1 Foundations for structures and equipment shall be proportioned to resist the worst conditions of loading and shall be generally designed as per the provisions of IS:1904. The depth of foundation shall be determined based on loading on foundation, safe bearing capacity at the founding level, constructional and technological requirements. The allowable bearing pressure for design of foundation shall correspond to values confirmed by results of detailed soil investigation taking in to account limits of allowable settlement considered for design of structures and equipment.

Safe bearing capacity shall be determined from shear failure and settlement criteria and least value shall be considered.

3.1.3.2 The foundations shall be designed for the following factors of safety:-

i) Shallow foundations : 3.0

ii) Deep foundation systems: 2.5

3.1.3.3 For this purpose, any foundation depth of more than 4.0 metres shall be treated as deep foundation.

3.1.3.4 Static, dynamic and integrity tests shall be performed by an independent testing analyst.

Settlement criteria for shallow foundations shall be generally as follows, subject to specific equipment requirement & differential settlement.

i) Total settlement : 38 mm

ii) Differential settlement : 6 mm.

Generally foundations for buildings & equipment shall not be structurally connected to ground floor slab. The top level of the stem for building structural column foundations shall be so provided that no part of the steel column base assembly protrudes over finished floor level.

3.1.3.5 Supporting structures and foundations for equipment that may cause vibration shall be designed for the dynamic effect of equipment together with the direct loads. The dynamic loads and other relevant data required for analyzing the dynamic effect shall be taken as per manufacturer's data and recommendations. Foundations of equipment subjected to dynamic loading shall be isolated from adjoining floors / foundations to prevent propagation of vibration to adjoining structures. Structures and foundations supporting vibrating, equipment shall be proportioned to avoid resonant frequencies. The dynamic analysis shall be done as per the stipulations as recommended by respective IS codes as well as the stipulations recommended by equipment manufacturer.

3.1.3.6 75 mm thick lean concrete 1:3:6 shall be provided below footings, pile caps, base slab etc. as blinding concrete layer.

3.1.4 FOUNDATIONS FOR VIBRATORY EQUIPMENT

3.1.4.1 The foundation systems for rotating equipment shall be sized and proportioned not to exceed the bearing and settlement criteria and to assure satisfactory performance of the equipment. In addition to a static analysis, a dynamic analysis shall be performed to determine the fundamental frequencies of the foundation system. To preclude resonance, the fundamental frequency of the foundation shall be 25% away from the operational frequency of the equipment. The dynamic behavior of the foundation shall meet the requirements of IS: 2974 (Part I to IV).

3.1.4.2 If minor equipments are to be supported on building structures, floors etc. suitable vibration isolation shall be provided.

3.1.5 UNDERGROUND WATER RETAINING STRUCTURES

3.1.5.1 Based on the data on subsoil and underground water, adequate precautions shall be taken for design of foundation and underground structure. Water retaining structures shall be designed as per provision of IS: 3370. All under ground structures such as sumps, pits, trenches etc. shall be designed considering soil, water and surcharge pressures.

3.1.5.2 The water retaining structures shall be checked for three loading conditions:

a) With water inside up to full level and no earth fill outside.

b) Water in one compartment and other compartment empty (where two compartments are provided).

c) With outside earth and ground water up to maximum level and inside empty.

3.1.5.3 Walls of reservoir with top slab shall be designed as propped cantilever slab between top and bottom slabs (where L/h >2.5) or as a two way slab with four sides fixed (where L/h <2.5).

3.1.5.4 For design of walls of basement, trenches, channels etc. below ground, lateral pressure due to vertical surcharge of 20 $kN/m^2$ shall be considered in addition to earth and ground water pressure etc. in case of heavy wheel loads, lateral surcharge due to actual wheel loads shall be substituted. When a portion or whole of the adjacent soil is below free water surface, computations shall be based on submerged weight of soil plus full hydrostatic pressure.

3.1.5.5 The structure shall also be checked for stability and factor of safety shall not be less than those specified under applicable Clause of IS 456 against overturning and sliding. Proper considerations in design shall be taken to prevent any possibility of floatation due to upward thrust caused by underground water. Factor of safety against uplift shall be at least 1.2 as per IS 3370 (Part-1). Pressure release valves of any form or type that allow ingress of water into the structure shall not be permitted. Special care shall also be taken to prevent floatation during construction period.

3.1.5.6 For all underground structures such as basement, sump etc., and water retaining structures special care shall be taken to water proof them. Approved integral water proofing shall be added to concrete mix to ensure water tightness. 150 / 225 mm wide PVC water stop shall be provided at all construction joints as required. Water retaining structures shall be hydro-tested as per IS: 3370 for leakage and in case leakage is noticed pressure grouting or any other approved procedure shall be adopted to rectify it. Sumps with pumping

arrangements shall be provided at suitable location in underground structures to collect and pump out any incidental water collection to nearest storm water drainage outlet.

3.1.5.7 For the design of pipe / cable supporting structure, the soil weight shall be considered as back filled up to grade level for the condition of pipe running full / cable in position.

3.1.5.8 Frictional forces between the pipes and supporting structure in longitudinal direction need not be considered along with seismic or wind forces.

## 3.2 BASIC DESIGN CONCEPTS TO BE ADOPTED FOR STRUCTURAL STEEL WORKS

3.2.1 Structural steel design will be carried out as per the National Building Code with specific consultation to IS: 800 (latest) unless noted otherwise. All work shall be done as per relevant latest IS codes, unless otherwise specified.

3.2.2 Lateral forces along with the length of the building will be resisted by bracings in horizontal and vertical frames. The transverse lateral load will be resisted by stiff jointed frame action. Additional bracing or moment connection will be used to assure stability of the structures.

3.2.3 Steel will conform to Grade-A of IS: 2062 (latest) for rolled steel members or plates up to 20 mm thickness and welded construction steel conforming to Grade-B (killed and normalized) of IS: 2062 (latest) shall be used except for crane girders where Grade-C (IS: 2062) steel shall be used. Steel shall be procured from SAIL or any other approved main producers.

3.2.4 Chequered plate shall conform to IS: 3502 (latest) and minimum thickness of chequered plate for floorings, covers etc shall be 8 mm O/P.

3.2.5 Hand-railings shall conform to IS: 1239 (latest) (medium) black steel pipe and flush welded construction, ground smooth using 32 mm nominal bore of 42.2 mm outside diameter pipe, provided with double rail and pipe posts. Top rail shall be provided at 1065 mm above platform and intermediate rail 535 mm below the top rail or as approved and pipe posts spaced not more than 1200 mm centre to centre.

3.2.6 Shop connections will be all welded and field connections will generally be bolted unless otherwise if specifically indicated by owner. Field bolts, wherever provided shall be high tensile of 20 mm diameter or of higher diameter and of property class 8.8 (minimum) as per IS: 1367 (latest) for all major connections. All bolts, nuts and washers shall be procured from the manufacturers as approved by Owner. The bolted joints shall be designed for friction type connection and the HT bolts shall be tightened to develop the required pretension during their installation. However, the nominal connections inn the field like purlins, stairs, wall beams shall be carried out by using MS black bolts not less than 16mm diameter (minimum property class 4.6) conforming to IS:1363 (latest) unless specified otherwise. All removable type connections shall be wit bearing type HT bolts or grade 8.8 (minimum).

3.2.7 Welding shall be in accordance with the recommendations of IS: 816 (latest) code of practice for arc of metal arc welding for general construction in mild steel and IS:9595 (latest) recommendation for metal arc welding of carbon and carbon manganese steels. Built-up members will be fabricated using submerged arc welding procedure. All electrodes, flux, bare wire etc shall be procured by the contractor only from manufacturers approved by owner. All butt-welds in beams, girders & columns will be of full penetration. All but-welds will be radiographically or ultrasonically tested as per IS: 822 and standard practice.

Minimum tests to be carried out during fabrication & Erection of structural steel.

STEEL

| | |
|---|---|
| 1. Ultrasonic test: | Plates above 25 mm thick shall be subject to ultrasonic test as per ASTM-A435 or equivalent to check the presence of lamination. |
| 2. **Fillet weld** | |
| Dye-penetration test: | 5% of the total length, dye-penetration test shall be carried out to the root run. |
| 3. **Butt-weld** | |
| a) Dye- penetration test: | 10% of the total length, dye-penetration test shall be carried out to the root run after back gauging. |
| b) Radiography: | Generally, splicing shall not be provided in tension flange of bunker girder. Spot radiography shall be carried out on 100% joints in tension zone and 10% joints in compression zone. Minimum 300 mm length shall be spot radiographed. When radiograph is not possible, ultrasonic test shall be carried out after grinding the surface with prior approval of Owner. |
| c) Ultrasonic test: | 10% of all other butt-welds shall be subject to spot radiographic test and the entire balance butt-weld for ultrasonic test. |

3.2.8 The bare wire electrodes for submerged arc welding shall conform to IS: 7280 (latest). The combination of wire and flux for submerged arc welding shall be as follows:

Filler wire shall be of classification AWS-A-5.17-EH14 and flux shall be of agglomerated type of classification AWS-A-5.17F7 A2-EH14.

3.2.9 Low hydrogen electrodes as approved by the owner shall invariably be used in the following cases:-

a) For welding of all important joints such as butt-joints in columns (flange or web), butt-joints in main frame beams (flange or web) etc.

b) For welding steel members having thickness more than 20 mm.

3.2.10 In case of fillet weld between two components, the thickness of the thinner part shall be considered.

3.2.11 For all field connections whether welded or bolted, 80% of the shop design strength shall be considered.

3.2.12 Deflection criteria

3.2.12.1 Vertical deflection

The permissible deflections of various steel members under normal loading conditions shall be as specified below. For calculation of deflections in structures and individual members dynamic effects shall not be considered, unless specified otherwise. Also, no increase in deflection limits shall be allowed when wind or seismic loads are acting concurrent with normal loading conditions:

a) For beams supporting dynamic equipment : Span / 500

b) For beams supporting floors / masonry : Span / 325

c) For roofing and cladding components : Span / 250

d) For gratings and chequered plates : Span / 200 subject to a maximum of 6 mm

For crane gantries or any member subjected to working loads, the maximum deflection under dead load and live load excluding impact shall not exceed the following values:

a) For manually operated cranes & monorails : Span 1/500

b) For electric overhead cranes

i) Up to 50 t capacity : Span 1/750

ii) Over 50 t capacity : Span 1/1000

3.2.12.2 Horizontal deflections

The permissible horizontal deflections shall be as per following unless specified otherwise.

a) Buildings : Height / 325

b) Open structures : Span /2000 limited to maximum deflection of 15 mm.

c) Crane gantry girder due to surge : Height / 200

d) Building main columns at crane rail level due to action of crane surge load only : Height / 2500 limited to maximum of 10 mm.

e) Open gantry columns at crane rail level due to action of crane surge load only : Height / 4000 limited to maximum of 10 mm.

Provisions of IS: 800 and relevant IS code shall be followed for limiting deflections of structural elements not listed above.

3.2.12.3 Minimum thickness of structural steel elements.

Minimum thickness

The minimum thickness of various components of a structure and hot rolled sections shall be as follows. The minimum thickness of rolled shapes shall mean flange thickness regardless of web thickness. Structural steel members exposed to significantly corrosive environment shall be increased suitably in thickness of suitably protected otherwise as per good practice and sound engineering judgment in each instance.

a) Trusses, purlins, girts and bracing : 6 mm

b) Columns and beams : 8 mm

c) Gussets : 8 mm

d) Stiffners : 8 mm

e) Base plates : 10 mm and above.

f) Chequered plates : 8 mm o/p & above

g) Grating flats : 5 mm

Minimum thickness of structural members other than gratings and chequered plate directly exposed to weather and inaccessible for painting and maintenance shall be 8 mm.

Minimum sizes

The flange width of purlins supporting light weight concrete slab shall not be less than 65mm and for those supporting roof sheeting and wall cladding it shall not be less than 50 mm. width of steel rolled section connected to other member shall be at least 50 mm. the depth of beams for platform of all structures shall not be less than 125 mm.

**SLENDERNESS AND DEPTH RATION**

The slenderness ratio of main members in tension, compression or bending shall be in accordance with IS: 800.

The following limiting ratios of depth to span shall be considered as a general guide.

a) Truss : 1/10

b) Rolled beams and girders for ordinary floors and rafters : 1/24

c) Supporting floor beams for vibrating machinery 1 equipment: 1/15

d) Roof purlins & girts : 1/45

e) Gable column : 1/30.

3.3 DESIGN OF CONNECTION

3.3.1 Fabrication drawings shall be prepared according to the provision of IS: 800, IS:816, IS: 9595. IS: 1367 & IS: 9178.

3.3.2 Connection of vertical bracings with connecting members and diagonals of truss members shall be designed for full tensile capacity of the bracings / approved design loads as appropriate.

3.3.3 Size of fillet weld for flange to web connection for built-up section shall be as follows:-

a) Full shear capacity or actual shear whichever is more for box section.

b) 80% of full shear capacity or actual shear (if indicated in drawings) or 0.5 times of the web thickness whichever is more for I section weld shall be double fillet.

c) All welds shall be continuous. The minimum size of the fillet weld shall be 6 mm.

3.3.4 Shear connections shall be designed for 75% of section strength or actual shear for rolled sections and 80% of section strength or actual shear whichever is higher for built-up section or rolled section with cover plates. Moment connections between beam and column shall be designed for 100% of moment capacity of the beam section.

3.3.5 All butt-welds shall be full penetration butt-welds.

3.3.6 The connection between top flange & web of crane girder shall be full penetration butt-weld and for bottom flange, connection may be fillet weld.

3.4 SPLICING:

All splicing work shall be full strength. Field splicing shall be done with web / flange cover plates. For exceptional cases, the field splicing shall be designed for 50% of load carried by the cover plates and remaining 50% load through full penetration butt-weld. Shop splicing for

all sections other than rolled shall be carried out by full penetration butt-welds with no cover plates. Splicing for all rolled sections shall be carried out using web and flange cover plate.

3.5 PAINTING

Shop primer paint shall be one coat of red oxide zinc chromate. The surface preparation shall be done in accordance with IS: 1477 (Part I & II) – Code of practice for finishing of ferrous metals in buildings.

3.6 HOLDING DOWN BOLTS AND SHEAR KEY

All structural steel members subjected to tension shall be connected to pedestals with holding down bolts. The bolts shall be grade 4.6 with 125 x 125 x 12 mm (minimum) thick anchor plates. Anchor plates shall be fillet welded to bolts with 8mm (minimum) weld at 100 mm above the bolt bottom. Anchorage shall be determined based on bond stress developed between embedded bolt and concrete.

All column base plate at braced bay shall be provided with shear key to transfer lateral load to the pedestals.

## 4.0 Site grading and drainage

4.1. GRADING AND DRAINAGE

4.1.1 The site Grading and Drainage System shall be designed to comply with all applicable state regulations. Topographic modifications to the site area may be required to provide positive overall drainage. The general floor level of the building in main plant area shall be raised to a minimum of 50 cm above from other areas, to avoid flooding of storm water during rainy seasons.

4.1.2 Surface drainage onsite shall consist of overland and open channel flow. Drainage through a catch basin and under ground pipe system shall be provided in some areas to avoid having trenches within that area.

4.1.3 Road crossing over trenches shall be constructed with reinforced concrete box culverts to pass the design flow. Loading conditions as per IRC Class A. Wheel and Crawler loads shall be applied as necessary during design.

4.1.4 Site drainage facilities shall be designed for the flow resulting from a 1 in 50 year frequency rainfall event.

4.1.5 All buildings and paved areas shall be provided with garland drains leading to the nearest main drainage.

4.1.6 The main plant complex area shall be graded with moderate slopes (1 percent minimum preferred) for effective drainage.

4.1.7 STORM WATER DRAINS

a) The plant and storm water drainage shall take into account the topography of the plant area, area drainage pattern, intensity of rainfall. All storm water drains shall be designed for the maximum hourly rainfall intensity.

b) The maximum velocity for pipe drains and open drains shall be limited to 2.5 m/sec and 1.5 m/sec respectively. However, minimum velocity for self cleansing of 0.60 m/sec. shall be ensured.

c) The contractor shall furnish a comprehensive layout of drainage system, taking consideration of different construction phase for the approval of the owner.

d) Drainage shall be provided for all roads, pavements, side walks, buildings, structures ad wet areas including cable/pipe trenches, tunnels, basement of buildings and pits etc. where gravity flow is not possible. Pumps shall be installed for lifting and / or diverting pressurized water to location of discharge. Pump sumps and pumps shall; be provided at all necessary locations.

e) Plant equipment drainage may be connected to storm drainage system after treatment and passed through guard pond.

f) Proper drainage of floors, basements, cable/pipe trenches tunnels and pits shall be provided for fire water, operation and leakage water.

g) The outdoor storm water may be drained through concrete lined open ditches ultimately connecting to nearest drainage channel of the area outside the plant boundary. All building roof and non-contaminated floor drainage, drainage of cable / pipe trenches, tunnels, pits, basements etc., shall be provided with suitable buried piping system (gravity flow) for discharging ultimately in to the common outdoor drainage system. The sanitary sewage shall be drained through suitable gravity flow buried piping system.

4.1.8 FLOOR DRAINAGE

a) For all buildings and areas, suitable arrangement for draining out water collected from equipment blow downs, leakage, floor washing, fire fighting etc., shall be provided on each floor. Gully traps, inspection pits, collecting pits etc., shall be located suitably and designed considering flow volume, easy access, maintenance and safety.

b) All drains inside the building shall have a minimum 40 mm thick grating covers. In areas where heavy equipment loads would be coming, precast RCC covers shall be provided in place of steel grating. These drains shall lead the water to drain sump.

c) Garland drains shall; be provided around all buildings and connected to the plant storm water drainage system.

4.1.9 ROOF DRAINAGE

a) Roof drainage system shall be provided for quick and efficient draining of rain water from roof to avoid seepage and damage to roof. The runoff gradient for the roof shall not be less than 1 in 100. Roof drainage system shall consist of roof drain heads, rainwater down corners and fixtures. System shall be designed t handle design rainfall for the specific site and shall be in accordance to stipulations of IS:1742 and IS: 2527.

b) Rainwater down corners shall be of HDPE pipe conforming to IS: 4984.

c) Rainwater collected in roof shall be let in to a storm water drains.

4.1.10 SUMPS

In case of underground structures, sumps with pumping arrangement shall be provided at suitable location to collect and pump out any incidental water collection to nearest storm water drain.

4.1.11 SANITARY SEWER DRAINS

a) Sanitary sewers shall be designed for a minimum self cleansing velocity of 0.75 m/sec. and the maximum velocity shall not exceed 2.5 m/sec.

b) The sanitary sewer system shall be independent of plant and storm drainage system. The treatment of sanitary sewage shall be through a common sewage treatment plant. The number of septic tank shall be kept minimum and their location shall be away from

plants, buildings and facilities. The size of the septic tanks shall be designed based on fixture units and for a minimum storage of 5 years but not less than 2.0 Cu.m.

c) Very hot (over 60º) water shall be first cooled down to less than 60º in collecting basin by mixing with cold water before connecting to storm drainage system.

d) The maximum temperature, quality, quantity and location of drain water of individual equipment shall be tabulated and furnished to the owner's representative.

e) All underground piping below concrete slab shall be cast iron of minimum 100 mm dia and for outdoors it shall be reinforced concrete pipe of minimum 200 mm diameter. In buried piping system manholes shall be placed at every change in direction and at every SOM (max.) interval in straight run. Suitable clean outs shall be provided for buried piping under floor slab.

f) Following minimum drainage slope shall be provided:

- ❖ Pipes of diameter less than 200 mm : 1 (vertical) : 100 (horizontal)
- ❖ Pipes of diameter 200 mm & above : 1 (vertical) : 100 (horizontal)

4.1.12 Effluent drains

a) Chemically soiled waste water shall be led to the neutralization pit and the neutralized water shall be directed to the effluent treatment plant.

b) Industrial oily waste water shall be passed through oil water separator system before connecting to the storm drainage system after passed through guard pond.

c) The drainage of oily waste water from transformers shall be provided with dual system. The oily water during normal operation shall be passed through oil water separator system and then connected to drainage system. The oily water during emergency operation shall be led through another system of pipes connecting to central blind sump. The blind sump shall have sufficient capacity to store transformer oil and fire fighting water for half an hour duration.

## 4.2. PLANT AREA ROADS, ACCESS ROADS AND PAVEMENTS

Access within the plant site shall be provided by a system of roadways.

Roads shall be three types: Type I, Type II, Type III. All the roads inside the plant area shall be with reinforced cement concrete (RCC).

Type I roads shall consist of 7.5 metres wide RCC paved carriageway with 2.5 m wide hard shoulders. The main plant access road and a portion of the main plant complex circumferential road shall be Type I.

Type II roads shall consist of one 4.0 metre wide RCC paved carriageway with 1.5 m wide hard shoulders with drains on either side. A turning area at blind ends shall be provided. Plant areas where infrequent access is needed shall be served by Type II roads. Examples of Type II roads are the lay-down area roads.

Type III roads shall be 3.0 m wide with 1.0 m hard shoulders on either side. Type III roads shall be provided along the plat boundary for access for security and maintenance.

All roads shall be surfaced with gravel during the construction period. Occasional applications of a dust palliative material shall be used to minimize the dust problem during the dry seasons.

All Type I roads shall have a minimum turning radius of 10 metres and for Type II and Type III roads shall have a minimum turning radius of 7.0 meter.

Bollards shall be provided along side all type roadways near equipment which requires protection. Spare duct banks shall be provided under all type roads spaced at 100 meter intervals.

Signs shall be provided for vehicle management and shall meet Indian standards. All signs shall be dual worded in both English and the local Indian language.

Finished top (crest) of roads shall be 250 mm above the surrounding grade level.

Geometric design of road shall be in accordance with IRC: 73. The ruling gradient for roads longitudinal shall not exceed 1 in 20.

Main roads shall be designed for movement of heaviest equipment of the plant.

California Bearing Ratio (CBR) method shall be followed for the design of roads as per IS: 2720 (Part XVI). CBR test shall be carried out in re-moulded soil samples under soak condition.

The shoulder shall be laid with slope of 1 in 30.

All the culverts shall be designed for IRC Class ‘AA’ loading and shall be checked for class ‘A’ loading. The equipment moving load shall also be properly considered.

All building shall be approached by access road, which shall either be single or double lane road depending upon the functional requirement.

No underground service piping except for drainage and sewage system shall run directly below the road (including up to 1.0 m fro the edge of road) along its longitudinal direction.

Surface drainage of roads shall be provided by giving proper longitudinal slopes and cross falls.

The roads and pavements shall be constructed as per MOST standards.

## 4.3. FENCING AND SECURITY

### 4.3.1. Boundary wall and gate

a) The boundary wall / perimeter fencing around the plant complex shall be in accordance with the requirements of the state government. The boundary wall fencing shall be 3.0 m tall topped with 600 mm high MS angle. Y frame fixed to each pillar and provided with 6 strings or barbed 6 gauges, 8 strand wires.

b) Gate latches shall be arranged for padlocking with the pad lock accessible from both sides of the gate. Padlocks shall be provided and the key shall be in accordance with the Purchasers requirement.

c) Cantilever type motorized sliding gate shall be furnished at the main plant entrance. The gate shall be operable by push button at both the guardhouse and the security office.

d) The boundary wall shall be of stone masonry or RCC post with in-filled RCC pre-cast planks.

## 4.4. PLINTH PROTECTION

All buildings shall be provided with 1000 mm wide and 100 mm thick plain cement concrete paving all round the outside. Plinth protection shall be laid to a thickness of 150 mm.

## 4.5. Codes & Standards

1. The engineering of all Civil, Structural & Architectural works shall be based on the latest edition or revision of the applicable portion of the following codes and specifications.
   a) I.S. Codes of practice
   b) National Building standard
   c) Environmental protection agency
   d) Indian Road Congress Standards
   e) Indian Railway Standards
   f) Statutory regulations of Tariff Advisory Committee
   g) Rules and Regulations of local authorities.
2. In absence of any Indian Codes & Specifications for any portion of work, appropriate American / British Standards may be followed subject to prior approval of owner.

5.0 Service Tax:

The rates are to be quoted exclusive of service Tax. You will have to submit the Service Tax Registration Certificate to BHEL . You will have to claim the Service Tax from BHEL by sumitting Tax invoice as per the Rules and Regulations of Service Tax and the documentary evidence will have to be submitted along with the next bill. If for any reason , tenderer has to pay penalty, interest on service tax, the tenderer has to bear such additional payment. BHEL will pay only the Service Tax at actual. The Bharat Heavy Electricals Limited will not entertain any claim in this regard.

ANNEXURE – 1

**(To be filled by Tenderer and submitted along with Tender document )**

| S.No. | PARTICULARS | YES | NO |
|---|---|---|---|
| **01** | **SERVICE TAX** | | |
| **a.** | Service Tax Registration No. of Tenderer (copy to be enclosed) | | |
| **b.** | Issue of Service Tax Invoice as per Rule 9 of Cenvat Credit rules2004 | | |
| **c.** | Whether Tenderer is taking Service Tax Credit for their Inputs | | |
| **d.** | Under which Service Head is Service provided | | |
| **e.** | If Service Tax is Exempted , furnish reasons | | |
| **f.** | BHEL Service Tax Registration No. ( To indicate in your Invoice) **:AACB/4146/PST/008** | | |
| **02** | **INCOME TAX** | | |
| **a.** | PAN No. of Tenderer | | |
| **b.** | If Exempted , furnish exemption Certificate | | |
| **c.** | PAN No. of BHEL **: AAACB/4146/P** | | |
| **03** | **WC ST** | | |
| **a.** | CST Registration No. | | |
| **b.** | VAT Registration No. | | |
| **c.** | Whether Tenderer is availing VAT Credit | | |
| **d.** | If Exempted , furnish Reasons | | |
| | **NOTE :** | | |
| | 1. Rates Quoted shall be clearly indicated whether they are INCLUSIVE or EXCLUSIVE of specific Taxes & Duties. Otherwise generally it is presumed that the ratesare inclusive and the Contractor has to issue invoice accordingly. Also refer clause 8.0 of Tender specification regarding Taxes & Duties | | |
| | 2. Payment will be made only through e-payment to your account. No Cheque payment is entertained. | | |

| 04. | | **Tenderer** | **BHEL** |
|---|---|---|---|
| **a.** | Name & Address | | BHEL, BAP, Ranipet-406 |
| **05.** | **Details of Bank Account** : | | |
| **a.** | Centre | | RANIPET |
| **b.** | Name of the Bank | | S.B.I |
| **c.** | Branch Code & Name | | 7013, Mukundarayapuram |
| **d.** | Account Number | | 10664849171 |
| **e.** | Type of Account | | Cashcredit |
| **f.** | Beneficiary's Name | | BHEL , Ranipet |
| **g.** | IFSC Code of the Branch | | SBIN0007013 |

**Tenderer has to submit Banker's Certificate as per format specified by BHEL at the time of award of work.**

**Agreed to the Above Conditions**

**Signature of the Tenderer :**

**ACCEPTANCE FOR ELECTRONIC FUND TRANSFER / RGTS TRANSFER**

| SL No. | DESCRIPTION | DETAILS |
|---|---|---|
| 01. | NAME & ADDRESS OF THE SUB-CONTRACTOR | |
| 02. | DETAILS OF BANK ACCOUNT | |
| a. | CENTRE | |
| b. | NAME OF THE BANK | |
| c. | NAME OF THE BRANCH | |
| d. | BRANCH CODE | |
| e. | ACCOUNT NO. | |
| f. | TYPE OF ACCOUNT | **SAVING / CURRENT / CASH CREDIT** |
| g. | BENEFICIERY'S NAME | |
| h. | IFSC CODE OF THE BRANCH | |
| i. | MODE OF TANSFER | **EFT / RTGS** |

*CERTIFICATE*

I / We hereby agree to receive the payments due from BHARAT HEAVY ELECTRICALS LIMITED, RANIPET by the Electronic Funds Transfer / RTGS Transfer mode by credit to my / our above mentioned Bank Account. I / We also agree that payments made to the above mentioned Account is valid discharge of the liability of BHARAT HEAVY ELECTRICALS LIMITED, RANIPET. I / We also agree to bear the applicable Bank charges for the above mode of transfer.

| | |
|---|---|
| _____<br>Banker's Attestation<br>(Manager / Officer's Signature Under Bank Stamp) | *AUTHORISED SIGNATORY*<br>OF SUB-CONTRACTOR WITH SEAL |
| PLACE :<br>DATE : | |

# GENERAL CONDITIONS OF CONTRACT
# FOR
# LUMP SUM, ITEM RATE AND PERCENTAGE CONTRACT

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## Bharat Heavy Electiicals Limited
### BOILER AUXILIARILS PLANT
### RANIPET

GENERAL CONDITIONS OF CONTRACT
FOR
LUMP SUM, ITEM RATE AND
PERCENTAGE CONTRACT

# Bharat Heavy Electricals Limited

BOILER AUXILIARIES PLANT
RANIPET - 632 406.

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## CHAPTER - III

## SCOPE OF CONTRACT

## CHAPTER -IV VALUATION AND PAYMENT



## ANNEXURE

## CHAPTER -1

## DEFINITIONS IN THE CONTRACT AS HERE IN AFTER DEFINED

The following terms shall have the meanings hereby assigned to them, except here the context otherwise requires:-

a. **'CONTRACT'** means and includes the conditions of contract, the documents forming the tender and acceptance thereof, specifications, drawings, bill of quantities, schedule of rates and prices if any, general and special conditions of contract, MOMs drawn, schedules A,B,C,D and or general summary attached to the form of tender and contract agreements. All these terms and conditions and documents as applicable taken together shall be deemed to form one contract and thereby complementary to one another.

b. '**TENDER DOCUMENTS'** means and includes the form of tender, the applicable schedules A, B, C, D and / or general summary, general and special conditions of contract and specifications and drawings as given to the contractors on payment.

c. **'THE CONTRACTOR**' means the person or persons, firm or company whether incorporated or not, whose tender is being accepted and includes the contractor's Legal / personal representatives, successors and permitted assignees.

d. **'THE WORK**' means the work described in the tender documents and / or individual work orders, drawings and specifications as may be issued from time to time to the contractor by the Engineer - in - Charge within the powers conferred upon them including modified or additional works and obligations to be carried out either at the site or at any factory, workshop or any other place as required for the performance of the contract.

e. '**THE SITE'** means the lands and other places on, under, in or through which the work has to be executed under the contract and any other lands and places provided by the company for the purpose of carrying out the contract.

f. '**THE COMPANY'** referred to as BHEL in this contract shall mean M/s. Bharat Heavy Electricals Limited including its Board of Directors, Director, Executive Director, Group General Manager, General manager, Dy. General Manager and / or the Officers of the company Including Sr. Manager, Manager, Dy. Manager, Sr. Engineer and Engineer authorized on behalf of Bharat Heavy Electricals Limited, Boiler Auxiliaries Plant, Ranipet.

g '**THE ACCEPTING OFFICER'** means the official who signs the contract agreement on behalf of Bharat Heavy Electricals Limited and includes his successors.

h. **'ENGINEER- I N - CHA RGE'** means the Officer / Engineer of BHEL who is in-charge of works under the contract and includes such other Officer / Engineer as may be notified by BHEL from time to time.

i '**APPROVED AND DIRECTED'** means approval and / or directions of the Officers / Engineers of BHEL issued from time to time with regard to the contract.

j. In the case of Lump-sum Contracts **'**CONTRACTOR's PERCENTAGE' means the percentage offered by the Contractor as addition / deduction from the cost of building, or other works listed in Schedule "A" to provide a Lump-sum quotation for performance of the contract inclusive of all extra costs, profit, establishment charges, carriage, insurance etc., complete.

In the case of Percentage rate contracts "Contractor's Percentage" shall, if the context so permits mean the uniform percentage tendered by the Contractor and accepted by the Accepting Officer, and the expression **'CONTRACT RATE'** shall likewise mean the rates in the BHEL Schedule of Rate applicable as on date as adjusted by the said Contractor's percentage, if any.

k. '**THE CONTRACT SUM'** means the sum accepted or the sum calculated in accordance with the prices accepted in the tender and / or the contract rates as payable to the contractor for the execution and full completion of the work to the satisfaction of the Company.

l. The **'FINAL SUM'** means the actual amount payable under the Contract by BHEL, to the Contractor for the entire Execution and full completion of the work to the satisfaction of the Company.

m. The **"DATE OF COMPLETION"** is the date or dates for completion of the whole or any part of the work as the case may be set out in or ascertained in accordance with the individual work orders of the tender documents, or any subsequent agreed amendments thereto.

n. **A 'WEEK'** means seven days without (regard to the number of hours worked or not in any day in that week.

0. A **'DAY'** means a day of 24 (Twenty Four) hours irrespective of the number of hours worked or not in that day.

p. A **'WORKING DAY*** means any day other than the holidays declared by BHEL, Ranipet.

q. **'DEVIATION ORDER'** means an order given by the Engineer- in-Charge to effect an alteration, addition or deduction which does not radically affect the scope or nature of the contract.

r. **'EMERGENCY WORKS'** means any urgent measures which in the opinion of the Engineer-in-Charge, become necessary during the progress of the work to obviate any risk of accident or failure which become necessary for security,

s. **'PROVISIONAL SUM'** or "Provisional Lump-sum" means a Lump-sum included by the BHEL in the tender documents and represents the estimated value of work for which details are not available at the time of inviting the tender.

1. **'PROVISONAL ITEMS'** means items for which approximate quantities have been included in the tender documents.

**u.** **'DAY WORK'** means an item of work requiring the employment of labour with, or without materials as the case may be which in the opinion of the Engineer-in-charge, is not capable of being evaluated by the accepted methods of measurement or assessment and is paid for on the basis of the actual labour and materials utilized on the particular item of work referred to.

v. Heading of these terms and conditions shall not affect the interpretation or construction thereof,

w. The **'DATE OF CONTRACT'** shall mean the date /dates on which the parties to the contract have signed the contract agreement.

x. **MAINTENANCE PERIOD / GUARANTEE PERIOD** shall mean the period during which the contractor shall remain liable for satisfactory performance of the work under the contract, repair or replacement of any part of the work performed under the contract.

y. **'COST'** shall mean and include any liability, expenditure, overhead costs whether on the site or off the site incurred by BHEL.

The contractor shall be deemed to have carefully examined all the documents to his satisfaction. If he shall have no doubt as to the manner of the contract document, he shall obtain the details / clarification from **the Company** before signing the contract.

## MANNER OF EXECUTION OF CONTRACT

The contract shall be deemed to have come into force from the date of Letter of Intent unless otherwise provided in the Letter of Intent. Unless and until the contract agreement is executed, the Letter of Intent read in conjunction with the tender documents will constitute a binding contract.

**BACK**

# CHAPTER - II

## SCOPE OF CONTRACT

**2. Heading to the Contract**

The heading to these conditions shall not affect the interpretation thereof.

**3. Contract Documents:**

The Accepting Officer shall furnish to the Contractor on demand "FREE OF COST" three copies of signed Drawings and one copy of the signed agreement comprising of preamble to agreement, General and Special Specification, Schedule A,B,C & D etc., (but excluding General Conditions of Contract and Drawings) and three copies of all further drawing issued the progress of work.

However, for any additional copies of the agreement of drawings required by the Contractor, the same will be supplied on payment of the specified cost.

The Contractor shall keep one copy of all the Drawings and the Specifications in the site and the Engineer-in-Charge or his representative shall be at all reasonable times to have access to them.

None of these documents shall be used by the contractor for any purpose other than that of this contract.

**3a. Secrecy**

The Contractor shall take necessary steps to ensure that all persons employed by them on any work in connection with this contract have noted that the Indian Officials Secret Act 1923 (XIX of 1923) & any Company's guidelines issued from time to time applies to them fully and shall continue so to apply even after the execution of such work under this contract.

All classified documents furnished to the contractor shall be returned to the Engineer-in-charge on the completion of works or the earlier determination of this Contract.

**4. Works to be carried out**

The Contractor shall mobilize, except as provided under Schedules "B" and "C" included all labour materials, tools, plant, equipment, and transport which may be required in preparation for and in the entire execution and full completion of the work. Schedule "A" shall be deemed to have been prepared in accordance with good practice and recognized principles and unless otherwise stated, the descriptions given therein shall be held to include waste on materials, carriage, cartage, lead, hoisting, setting and fixing in position and all other labour necessary for the entire execution and full completion aforesaid. Any error in description or quantity in Schedule "A" 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 work comprised therein according to the Drawings and Specifications, or from any of his obligations under the Contract.

The insertion of the name of any firm of suppliers in the Tender Documents is for the purpose of obtaining a particular class or quality of materials or workmanship but the articles or materials specified may be obtained from any other firm subject to prior written approval of the Engineer-in-Charge.

In the case of a discrepancy between schedule "A" and the specification and / or the Drawings, the Accepting Officer shall be the sole deciding authority as to which shall prevail and his decision shall be final and conclusive. If neither drawings nor specifications contain any mention of minor details of construction, which is in the opinion of the Accepting Officer, whose decision shall be final and conclusive, are reasonable and obviously and fairly intended for the satisfactory completion of the 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.

The Contractor will be deemed to have satisfied himself as to the nature of the site, local facilities of access and all matters affecting the execution and completion of the work. No extra charges consequent on any mis-understanding in these respects or otherwise will be allowed.

## 5. Provisional Items

The full amount of provisional Lump-sums and the value annexed to each provisional item inserted in the Tender Documents shall be deducted from the contract sum and the value of work ordered and executed there under shall be ascertained by measurement of valuation as for deviations.

No work under these items is to be begun without instructions in writing from the Enginee -in-charge.

The extent of quantities or items described as "Provisional" shall not be held to guarantee or limit the amount and description of the work to be executed by the Contractor either in respect of the items concerned or the work as a whole.

No addition or deduction shall be made by the Contractor to the amount of the provisional Lump-sum as included in the tender documents.

## 6. Deviations

The contractor shall not make any alteration in addition to or omission from the work as described in the tender documents except in pursuance of the written instructions of the Engineer-in-charge. No such deviation from the work described in the tender documents shall be valid unless the same has been specifically confirmed and accepted by the Accepting Officer in writing and incorporated in the contract.

The Accepting Officer may deviate either by way of addition or deduction, from the work so described, provided that the contract sum is not thereby varied on the whole by not more than percentage set out in the tender documents. The value of all additions and deductions will be added to or, deducted from the contract sum, whenever the Accepting Officer intends to exercise such a right, his intentions shall specify the deviations which are to be made, the lump-sum assessment or the proposed basis of payment, the extra time allowed if any, and the date for completion of the entire contract.

Any objection to the Contractor to any matter concerning the order shall be communicated by him in writing to the Engineer-in-charge within seven days from the date of such order, but under no circumstances shall the work *be* stopped (unless so ordered by the Engineer-in-charge in writing) owing to differences or controversy that may arise from such an objection. In the absence such communication of objection by the contractor, he will be deemed to have accepted the order and the conditions stated therein, in the event of the contractor failing to agree with the Engineer-in-charge regarding the terms of the proposed deviation, the objection shall be referred to the Head of Civil Engineering Department whose decision shall be final, conclusive and binding on the contractor

## 7. Time

Time is **the essence of the contract** and is specified in the tender documents or in each individual Work Order.

As soon as possible after the contract is let or any substantial Work Order is placed and before work order is to begin, the Engineer-in-charge and the Contractor shall agree to a Time and progress Chart. The Chart shall be prepared in direct relation to the time stated in the tender documents or the Work Order for the completion of the individual items thereof and the contract or order as a whole. It shall indicate the forecast of the dates for the commencement of the various trade processes or sequence of the work and shall be amended as may be required by agreement between the Engineer-in-charge and the Contractor within the limitation of the time imposed in the tender, document or order.

In the absence of any specific Time and Progress chart to be agreed to between the Contractor and Engineer-in-charge the contractor shall ensure and maintain uninterrupted progress of the work such that the entire work shall be completed within the time imposed in the Tender documents or Order and that the proportion of the work completed up to any time in relation to the entire work to be under the Contract or Order shall not be less than the proportion that the time elapsed bears to the total time of completion provided in the Tender documents or Order.

The Contractor shall suspend the execution of the work, or any part or parts thereof whenever call upon in writing by the Engineer-in-charge to do so, and shall not resume work thereon until so directed in writing by the Engineer-in-charge. The Contractor will be allowed an extension of time for completion not less than the period of suspension. However, no other claim in this respect for compensation or otherwise, however will be admitted. Provided the cause for suspension is not attributable to any default of the contractor's part to proceed with or fulfill the contractual obligations. This may also be extended to allow for alteration of work made by the deviation order.

## 8. Stores and Materials

### 8.1 Materials to be supplied by the Contractor

The Contractor shall at his own cost and expense provide all materials required for the work other than those listed in Schedule-B which are to be supplied by Bharat Heavy Electricals Ltd.

All materials to be provided by the Contractor shall be brand new and in conformity with the specifications laid down in the contract and the Contractor shall if requested by the Engineer-in-charge furnish proof, to the satisfaction of the Engineer-in-change, that the materials so comply.

The Contractor shall at his own cost and expense and without delay, supply to the Engineer - in -charge samples of materials proposed to be used in the works. The Engineer-in-charge shall within seven days of supply of samples or within such further period as he may require and intimate to the Contractor in writing, inform, the Contractor whether samples are approved by him or not. If samples are not approved, the Contractor shall forthwith arrange to supply to the Engineer-in-charge for his approval fresh samples complying with the specification laid down in the contract.

The Engineer-in-charge shall have full powers to requires removal of any or all of the materials brought to site by the Contractor which are not brand new and not in accordance with the contract specifications or do not confirm in character or quality to samples approved by him. In case of default on the part of the Contractor in removing rejected materials, the Engineer-in-charge shall be at liberty to have them removed by other means at the Contractor's expense and risk. The Engineer-in-charge shall have full power to require other proper materials to be substituted for rejected materials and in the event of the contractor refusing to comply, he may cause the same to be procured by other means. All costs, charges and expenses which may attend such substitution shall be borne by the contractor. All charges on account of Octroi, terminal or sales tax and other duties on materials obtained for the work from any source (excluding materials supplied by BHEL) shall be borne by the Contractor.

The Engineer-in-charge shall be entitled to have tests carried out as specified in the Contract for any materials supplied by the Contractor other than those for which, as stated above, satisfactory proof has already been furnished, at the cost of the Contractor and the Contractor shall provide at his expense all facilities which the Engineer-in-charge may require for the purpose.

### 8.2 Materials to be supplied by BHEL

Materials which BHEL are prepared to supply are shown in Schedule-B which also stipulates place of issue and rate(s) to be charged in respect thereof soon after acceptance of the tender the Contractor shall agree in writing with the Engineer-in-charge *on* a phased programme of his requirements with regard to deliver of materials. The Contractor shall collect the materials from the Issue Place indicated in the authorizing document issued under the seal and signature of the Engineer-in –Charge in time.

In the event of delay in supply of any Stores and materials mentioned in Schedule-B the contractor shall be entitled to reasonable extension of time as provided for under condition-9 but no claim for compensation or damage on any ground whatsoever shall be entertained by BHEL.

For the materials listed in Schedule-B the contractor shall give a reasonable notice in writing of his requirement to the Engineer-in-charge in accordance with the phased programme.

All materials issued to the Contractor by BHEL for incorporation or fixing in the works shall on completion or on foreclosure of the works and before submission of bills, be returned by the Contractor at his expense, at the place of issue, after making due allowance for actual consumption reasonable wear and tear and / or waste. If the Contractor is required to deliver such materials at a place other than the place less the transportation charges which would have been incurred by the Contractor had such materials been delivered at the place of issue, shall be borne by BHEL.

The Contractor shall bear the cost of loading, transporting to site, unloading storing under covered area as necessary, assembling and joining the several parts together as necessary and incorporating or fixing materials in the work including all preparatory work of whatever description as may be required and of dosing preparing, loading and returning empty cases or containers to the place of issue.

If, in the opinion of the Engineer-in-charge (which shall be final and conclusive) any stores supplied by BHEL have either during currency of the work or after completion of the work whilst under the custody, of the contractor, becomes damaged to such an extend that they cannot be usefully utilized, either in the same work or in other works, the Engineer-in-charge shall not accept the stores and will recover the cost at the rates specified in the contract. The contractor shall not be entitled to any claim whatsoever on this account.

The Engineer-in-charge shall have access to the stores where materials issued by BHEL as per schedule -B of the contract is stored to ensure the balance stock of materials on hand after taking into consideration the materials used on the work is as per the issue and usage. If there be any discrepancy, the cost towards the same will be recovered at the **double recovery rate** indicated for the material concerned. This is without prejudice to and in addition to the overall reconciliation of materials to be made at the completion of work.

If on completion of works, the Contractor fails to return surplus materials out of those supplied by BHEL then, in addition to any other liability, which the Contractor would incur, the Engineer-in-charge may, by written notice to the Contractor, request him to pay within a fortnight of receipt of the notice for such un-returned surplus materials given in sub para-4.

The Contractor shall have to build a weather-proof shed for the storage of Cement (required for 15 days consumption of the work).

## 8.3 General

Materials required for the works, whether brought by the Contractor or supplied by BHEL shall be stored by the Contractor only at places approved by the Engineer-in-charge. Storage and safe custody of materials shall be at the risk, cost and the responsibility of the Contractor.

Officials concerned with contract shall be entitled at any time to inspect and examine any materials intended to be used in or in the works either on the site or at factory or workshop or other places where such materials are assembled, fabricated or manufactured or at any place(s) where these are lying or from which these are being obtained and the Contractor shall give such facilities as may be required for such inspection and examination.

All materials brought to the site shall not be removed off the site without the prior written approval of the Engineer-in-charge. But whenever the works are finally completed and advance if any, in respect of any such materials is fully recovered the Contractor shall at his own expense forthwith remove from the site all surplus materials out of originally supplied by him and upon such removal the same shall revert in and became the property of the Contractor

Should the Engineer-in-charge consider at any time during the construction or re-construction prior to the expiry of the MAINTENANCE PERIOD that the stores or materials provided by the Contractor are unsound or of a quality inferior to that contracted for or otherwise not in accordance with Contract (in respect where of the decision of the Engineer-in-charge shall be final and conclusive) the contractor shall on demand in, writing from the Engineer-in-charge specifying the Stores or materials complained of not withstanding that the same may have been inadvertently passed, certified and paid for, forthwith remove the Stores or materials so specified and provide other proper and suitable stores or materials at his own expense, to the entire satisfaction of the Engineer-in-charge and in the event of his failing to do so within a period to be specified by the Engineer-in-charge in his demand aforesaid the Engineer-in-charge may replace with others the Stores or materials complained of at the risk and expense in all respects of the Contractor. The liability of the Contractor under this condition shall not extend beyond the maintenance period aforesaid except as regards Stores or materials which the Engineer-in-charge shall have previously given notice to the Contractor to replace.

9. **Delay and Extension of Time**:

If, in the opinion of Engineer-in-charge the work is delayed:

i) by reason of abnormally bad weather, OR

ii) by reason of serious loss or damage by fire OR

iii) by reason of Civil commotion local combination of workmen, strike or lockout, affecting any of the trades employed on the work, OR

iv) by delay on the part of the agency or tradesman engaged by BHEL in executing work not forming part of this Contract OR

v) by reason of any other cause which in the absolute discretion of the Engineer-in-charge is (when he is the Accepting Officer of the Contract), beyond the Contractor's reasonable control, then in such cases the Accepting Officer, on the recommendation of the Engineer-in-charge or higher authority may make fair and reasonable extension in the completion dates of the individual items of work of the Contract as a whole. Such extension which will be communicated to the Contractor by the Engineer-in-charge in writing shall be final and binding on the Contractor. No other claim in this respect for compensation or otherwise howsoever is admissible. Upon the happening of any such event causing delay, the Contractor shall immediately give notice thereof in writing to the Engineer-in-charge but shall nevertheless use constantly his best endeavor to prevent or make good the delay and shall do all that may reasonably be required to the satisfaction of the Engineer-in-charge to proceed with the work.

## 10. Patent Rights

The Contractor shall fully indemnity BHEL or the agent, servant, employee of BHEL against any action, claim or proceeding relating to infringement or the use of any patent or design *or* any alleged patent of design rights, and shall pay any royalties which may be payable in respect of any article / or part thereof included in the Contractor. In the event of any claim, being made or action brought against BHEL or any agent, or servant or employee of BHEL in respect of the matters aforesaid the Contractor shall immediately be notified thereof for taking necessary action provided that payment of indemnity shall not apply when such infringement has taken place in complying with the specific directions issued by the **BHEL** but the Contractors shall pay any royalties payable in respect of any such use.

## 11. Taxes and Duties

Expenditure on account of Octroi, Entry Tax, Sales Tax and / or other taxes & duties on materials brought for the Work by the Contractor (excluding materials provided by BHEL on payment) shall be borne by the Contractor.

All taxes, duties, levies that are payable to the Government or to any Other Authorities in respect of the works under the contractor at the time of contract or becomes payable in future shall be exclusively borne by the contractor and BHEL is not liable for any reimbursement/ Payment thereof.

The Contractor shall have been registered under Sales TAX, Service Tax, Excise Act and Service Tax relevant for the work contracted and provide a copy of the same as a part of the tender document.

If the contractor avails or otherwise of any credit(such as CENVAT,VAT etc.), the same is to be intimated to the Company in writing by the Contractor.

For claiming Service Tax, Tax invoices under Service Tax Rules to be submitted in Original and duplicate duly signed by the Authorised Persons of the Contractor.

Inclusion of Service Tax or not in the rates quoted shall be exclusively indicated by the Contractor. Otherwise it is presumed that the same is inclusive in the rate and accordingly evaluated .

If the contractor is exempted from the payment of Works Contract Sales tax,

required exemption certificate is to be received from their jurisdictional Commercial Tax Authorities. Otherwise the works contract sales tax at applicable rate will be recovered and certificate to the effect will be given.

## 12. **Royalties**

Royalties fixed from time to time as per prevalent local rules will be recovered for materials, which the Contractor may be allowed to remove from quarries situated on land which is in charge of the BHEL authorities.

**13. Plant and Equipment**

The Contractor, shall at his own cost and risk, supply all tools, plant and equipment (here-in-after referred to as T & P) required for the execution of the contract other than those listed in Schedule - C which subject to their availability may be supplied by BHEL to the Contractor or Issued free for use in the execution of the work, as specified in Tender documents. In case of not provision by the Company, the Contractor may arrange the same at the agreed terms with the Company.

**14. Assignments or Transfer of Contract**

The Contractor shall not without the prior written approval of the Accepting Officer assign or transfer the Contract or any part thereof, or any share, or interest there in to any other person. No sum of money which may become payable under the Contract shall be payable to any person other than the Contractor unless the prior written approval of the Accepting Officer *to* the assignment or transfer of such money is given.

**14 (a) Sub - Contract**

The Contractor shall not sub-let any portion of the Contract without the prior written approval of the Accepting Officer.

**15 Compliance to the Regulations and Bye - Laws**

The Contractor shall confirm to the provision of any statute relating to the work and regulations and bye-laws of any local authority and of any water and lighting Companies or Undertakings with whose system the work is opposed to be connected, He shall, before making an/ variation from the drawings or, the specifications that may be necessitated for such connections give the Engineer - in - charge notice, specifying the variation proposed to be made and the reasons there for and shall not carryout any such variation until he has received instructions from the Engineer-in-charge in respect thereof. The Contractor shall be bound to give all notice required by Statute Regulations of Bye-laws as aforesaid and to pay all fees and taxes payable to any authority in respect thereof.

16. BLANK

17. **BLANK**

**BACK**

## CHAPTER -III

# PERFORMANCE OF THE CONTRACT

**Security Deposit**

**18.1.1** Security Deposit should be collected from the successful tenderer. The rate of Security Deposit will be as below:

| | |
|---|---|
| Up to Rs, 10 lakhs | :10% |
| Above Rs. 10 lakhs up to Rs.50 lakhs | :Rs1 Lakh + 7.5% of the amount Exceeding Rs, 10 lakhs. |
| Above Rs, 50 lakhs | Rs.4 lakhs + 5% of the Amount Exceeding Rs, 50 lakhs. |

**The security Deposit should be collected before start of the work from the contractor.**

**18.1.2** Security Deposit may be furnished in any one of the following forms:

i) Cash (as permissible under the Income Tax Act).

ii) Pay Order, Demand Draft in favour of BHEL.

iii) Local cheques of scheduled banks, subject to realization.

iv) Securities available from Post Offices such as National Savings Certificates, Kisan Vikas Patras etc, (Certificates should be held in the name of Contractor furnishing the security and duly pledged in favour of BHEL and discharged on the back),

v) Bank Guarantee from Scheduled Banks / Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format should have the approval of BHEL.

vi) Fixed Deposit Receipt issued by Scheduled Banks / Public Financial Institutions as defined in the Companies Act. The FDR should be in the name of the contractor, A/C BHEL, duly discharged on the back.

vii) Security deposit can also be recovered at the rate of 10% from the running bills. However in such cases at least 50% of the Security Deposit should be collected before start of the work and the balance 50% may be recovered from the running bills.

viii) **EMD of the successful tenderer can be converted and adjusted against the security deposit.**

ix) The security deposit shall not carry any interest.

**(NOTE:** Acceptance of Security Deposit against SI No. (iv) and (vi) above will be subject to hypothecation or endorsement on the documents in favour of BHEL, However, BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith).

18.1.3 Security deposit shall not be refunded to the contractor except in accordance with the terms of the contract,

18.1.4 All compensation or other sums of money payable by the contractor to BHEL, under the terms of this contract or under any other contract with BHEL, may be deducted from the security deposit or realized by the sale of the securities or from the interest arising there from or from any sums which may be due or may become due to the contractor payable by BHEL on any account whatsoever against this contract or any other contract with BHEL, and in the event of his security deposit being reduced by reason of such deduction or sale as aforesaid, the contractor shall within seven days thereafter make good in cash or in securities endorsed as aforesaid, any sum or sums by which the security deposit has been so reduced.

18.1.5 50% of the security deposit may be refunded on completion of the work after payment of the final bill and the balance 50% of the security deposit is refundable only after the expiry of the maintenance period of six (6) months from date of completio n of work as stipulated in the contract concerned.

provided the Contractor shall have rendered a "No - Demand" Certificate. In case of work where maintenance period is not involved 100% of the Security Deposit may be refunded after payment or final bill provided that the Contractor shall have rendered a "No Demand" Certificate.

## 19. Orders Under the contract

All orders, notices, etc., to be given under the contract shall be in writing, typescript or printed and if sent by registered post to the address given in the tender of this Contractor, shall be deemed to have been served on the date when in the
ordinary course they would have been delivered to him.

The Contractor shall carry out without delay all orders given to him.

## 20, Admission to Site

The contractor shall not enter on (other than for inspection purposes) or take possession of the site unless permitted to do so by the Engineer-in-charge. The portions of the site to be occupied by the Contractor will be clearly defined and marked on the site plan, and the contractor will not be allowed to extend his operations beyond these areas The Contractor shall provide if necessary or required at the site, temporary access thereto and shall alter, modify and maintain the same as required from time to time. He shall clear away the access route when no longer required restoring th**e** area to its original condition[1]:

The Engineer-in-charge shall have power to execute other works (whether or not connected with the 'work, in the contract agreement) at the site contemporaneously with the execution of the original work and contractor shall give reasonable facilities for this purpose.

BHEL reserves the right of taking *over,* at any time, any portion of .the site which they may require and the contractor shall at his own expense clear such portion forthwith. No photographs of the site or of the work or any part there of shall be taken or published or otherwise circulated without the prior approval of the Engineer-in-charge.

No such approval shall however exempt the Contractor from complying with any statutory provision in regard to the taking and publication of such photographs.

BHEL Officials connected with the Contract shall have the right of entry to the site at all times.

Engineer-in-change shall have the power to exclude from the site any person whose admission there to may, in his opinion is undesirable for any reason whatsoever.

The Contract shall be governed by the security regulations of BHEL including the entry or exit timings as may be in force from time to time. The Contractor should follow these regulations strictly and no claims for any additional payment whatsoever will be entertained in this regard under any circumstances.

## 21. Contractor's Supervision

The Contractor shall either himself supervise the execution of the Contract or shall appoint a competent person approved by the Engineer-in-charge to act in his stead .The Contractor shall employ an Engineer/Agent having at least a Degree of Bachelor of Civil Engineer from a recognized University/on any work with a Contract value exceeding rupees two lakhs, and having atleast a Diploma in civil Engineering from a recognized college, on work with a contract value exceeding Rs. 50,000 but not exceeding rupees two lakhs.

The Employment of an Engineer/Agent as aforesaid shall not be necessary if the Contractor himself is in possession of a recognized technical qualification and is, in opinion of the Engineer-in-charge, capable of the receiving instructions of the Engineer-in-charge and of the executing the work to the satisfaction of the Engineer-in-charge. If the Contractor fails to appoint a suitable Engineer/Agent as aforesaid, the Engineer-in-charge shall have full powers to suspend the execution of work and stop payment of any advances that may have become due until such date as a suitable Engineer/Agent is appointed and the Contractor shall be held responsible for the delay caused to the work and no extension of time on this account shall be given to him as stipulated in condition (9) above.

Orders given to the Contractor's Agent Engineer shall be considered to have the same force as if they had been given contractor himself.

The Contractor or his Agent shall be in attendance at the site during all working hours and shall superintend the executing of work with such additional assistance in each trade as the Engineer-in-charge may consider necessary.

The Contractor or his accredited agent shall attend when required and without making any claim for doing so, either the Office of the Engineer-in-charge or the work site to receive instructions.

The Engineer-in-change shall have full powers, and without assigning any reason to require the Contractor immediately to cease to employ in connection with the Contract, any Agent, servant or employee whose continued employment is, in his opinion undesirable.

The contractor shall not be allowed any compensation on this account

**22. Labour**

The contractor shall employ labour in sufficient numbers either directly or through sub-contractors to maintain the required date of progress and of quality to ensure workmanship to the degree specified in the contract and to the satisfaction of the Engineer – in – charge. The contractor shall not employ, in connection with the works, any person who has not completed eighteen years of age.

The Contractor shall pay to labour employed by him, either directly or through sub-contractors, wages not less than fair wages, as defined in the Contractor's Labour Regulations.

The Contractor shall in respect of labour employed by him, either directly or through sub-contractors, comply with or cause to be complied with contractor's labour Regulations in regard to all matters provided therein.

The Contractor shall comply with the provisions of the payment of Wages Act, 1936, Minimum Wages Act, 1948, Workmen's Compensation Act 1923, Industrial Disputes Act, 1947, Maternity Benefit Act 1961, or any modifications thereof or any other law relating there to and rules made there under from time to time.

The Contractor shall be liable to pay his contribution and the employee's contribution of the State Insurance Scheme in respect of all labour employed by him for the execution of the contract, in accordance with the provision of "The Employees' State Insurance Act, 1948" as amended from time to time. The Contractor shall apply to the ESI Authorities, get himself registered with them and obtain a code Number. He shall pay the remittances under his Code Number only.

The Contractor shall be liable to his contribution and the employees contribution towards PF as per Provident Fund Rules and Regulations, in respect of all labour employed by him for the execution of the contract. The Contractor shall apply to the PF Authorities, get himself registered and obtain a code number from them. He shall pay the remittances towards PF under his code number only.

The Engineer-in-charge shall, on a report having been made by an Inspecting Officer as defined in the Contractor's Labour Regulations, have the power to deduct from the moneys due to the contractor any sum required or estimated to be required, for making good the loss suffered by a worker or workers by reason of non fulfillment of the conditions of the contract for the benefit of workers, non-payment of wages or of deductions made a from his or their wages which are not justified by the terms of

the Contract of non observance of the said Contractor's Labour Regulations.

The Contractor shall indemnify BHEL against any payment to be made under and for observance of the Regulations aforesaid without prejudice to his right to claim indemnity from his sub-contractors.

In the event of the Contractor committing a default or breach of any of the provisions of the aforesaid contractor's Labour Regulations, as amended from time to time or furnishing any information or submitting or filling any form/Register/Slip under the provisions of these Regulations which is materially incorrect, then, on the report of the Inspecting Officers as defined in the Contractors Labour Regulations, the Contractor shall without prejudice to any other liability pay to BHEL a sum not exceeding Rs. 50/- as liquidated damages for every default, breach, or furnishing, making, submitting, filling materially incorrect statements as may be fixed by the Engineer-in-charge and in the event of the contractor's default continuing in this respect, the liquidated damages may be enhanced to Rs. 50/- per day for each day of default subject to a maximum percent of the estimated cost of works put to tender. The Contractor shall defend the case by himself any action brought in by such Government Agencies for non-compliance of any Labour Regulations and / or reimburse the expenses incurred by BHEL in this regard.

The Engineer-in-charge shall deduct such amount from bills or security deposit of the Contractor and credit the same to the welfare fund constituted under Regulations. The decisions of the Engineer-in-charge in this respect shall be final and binding.

## MODEL RULES FOR LABOUR WELFARE

The Contractor shall, at his own expense, comply with or cause to be complied with Model Rules for Labour Welfare as appended to these conditions or rules framed by Government from time to time, for the protection of health and for making sanitary arrangements for workers employed directly or indirectly on the works. In case the Contractor fails to make arrangements as aforesaid, the Engineer-in-charge shall be entitled to do so and recover the cost there from the contractor.

The contractor shall employ labour in sufficient number either directly or through sub-contractors to maintain the required rate of progress and of quality ensure
Workmanship of the degree specified in the contract and to the satisfaction of the Engineer-in-charge. The contractor shall comply with all (REF in force from time to time.(ref:Annexure I)

## 23. Safety Rules

The Contractor shall comply with all safety rules of BHEL

## SAFETY CODE

RESPONSIBILITIES OF THE CONTRACTOR IN RESPECT OFSAFETY OF MEN, EQUIPMENT, MATERIAL AND ENVIRONMENT

1. Before commencing the work, the contractor is required to submit a "SAFETY PLAN" to the authorized BHEL official. The 'safety plan' shall indicate, in detail, the measure that would be taken by the contractor to ensure safety of

men, equipment, material and environment during execution of work. The plan shall take care to satisfy all requirements specified hereunder. The contractor shall submit safety plan along with his offer. During negotiations before placing of work order and during execution of the contract, BHEL shall have right to review and suggest modification in the safety plan. The contractor shall abide by BHEL's decision in this respect.

2. The contractor shall take all necessary safety precautions and arrange for appropriate appliances as per direction of BHEL, or its authorized officials, to prevent loss to human lives, injuries to personnel engaged, and damage to property and environment.

3. The contractor shall provide to its work force and ensure the use of the following personal protective equipment as found necessary and as directed by the authorized BHEL officials:-

   (i) Safety helmets conforming to IS-2925: 1984.

   (ii) Safety Belts conforming to IS-3521:1983

   (iii) Safety Shoes conforming to IS-1989:1978.

   (iv) Eye and Face protection devices conforming to IS-8520:1977. and IS-8940:1978.

   (v) Hand and body protection devices conforming to

   (1) IS-2573:1975 ( 2) IS-6994:1973 (3) IS-8807:1978 (4) IS-8519:1977.

All tools, tackles, lifting appliances, material handling equipment, scaffolds, cradles, safety nets, ladders, equipment etc. used by the contractor shall be of safe design and construction. These shall be tested and certificate of fitness obtained, before putting them to use and from time to time as instructed by authorized BHEL official who shall have the right to ban the use of any item.

All the electrical equipment, connections and wiring for constructions, power, its Distribution and use shall conform to the requirement of Indian Electricity Act and Rules. Only electricians licensed by the appropriate statutory authority shall be employed by the contractor to carry out the all types of electrical works. All electrical appliances including portable electric tools used by the contractor shall have safe plugging system to source of power and be appropriately earthed.

The contractor shall not use any hand – lamp energized by electric power with supply voltage of more than 24 Volts. For work in confined spaces, lighting shall be arranged with power source of not more than 24 Volts.

The contractor shall adopt all fire safety measures as laid down in the "Code for Fire Safety at Construction sites" issued by the safety department of BHEL and as per the directions of the authorized BHEL official. A copy of the above referred "Code for Fire Safety at Construction sites" shall be made available by BHEL to the contractor for reference, on demand by the contractor, during tendering stage itself.

Where it becomes necessary to provide and/or store Petroleum Products, explosives, chemicals and liquid or gaseous fuel or any other substance that may cause fire or explosion, the contractor shall be responsible for carrying out such

provisions and / or storage in accordance with the rules and regulations laid down in the relevant government acts, such as Petroleum Act, Petroleum and Carbides of Calcium Manual of the Chief Controller of Explosives, Govt. of India etc., Prior approval of the authorized BHEL official at the site shall also be taken by the contractor in all such matters.

The contractor shall arrange at his cost (wherever not specified), appropriate illumination at all work spots for safe working when natural daylight may not be adequate for clear visibility.

The contractor shall be held responsible for any violation of statutory regulations local, state or central and BHEL instructions, that may endanger safety of men, equipment, material and environment in his scope of work or another contractor's or agency's. cost of damages if any, to life and property arising out of such violation of statutory regulations and BHEL instructions, shall be borne by the contractor.

In case of fatal or disabling injury/accident to any person at construction sites due to lapses by the contractor, the victim and/or his/her dependents shall be compensated by the contractor as per statutory requirements. However, if considered necessary, BHEL have the right to impose appropriate financial penalty on the contractor and recover the same from payments due to the contractor for suitably compensating the victim and/or his/her dependents. Before imposing any such penalty, appropriate enquiry shall be held by BHEL giving opportunity to the contractor to present his case.

In case of any damage to property due to lapses by the contractor, BHEL shall have the right to recover cost of such damages from payments due to the contactor after holding an appropriate enquiry.

In case of any delay in the completion of a job due to mishaps attributable to lapses by the contractor, BHEL shall have the right to recover cost of such delay from payments due to the contractor, after notifying the contractor suitably and giving him opportunity to present his case.

If the contractor fails to improve the standards of safety in its operation, to the satisfaction of BHEL, after being given a reasonable opportunity to do so and / or / if the contractor fails to take appropriate safety precautions or to provide necessary safety devices and equipment or to carry out instructions regarding safety issued by the authorized BHEL official, BHEL shall have the right to take corrective steps at the risk and cost of the contractor, after giving a notice of not less than seven days, indicating the steps that would be taken by BHEL.

The contractor shall submit report of all accidents, fires and property damage, dangerous occurrence to the authorized BHEL official immediately after such occurrence, but in any case not later than twelve hours of the occurrence. Such reports shall be furnished in the manner prescribed by the contractor to the authorized BHEL official from time to time as prescribed.

Before commencing the work, the contractor shall appoint/nominate a responsible office to supervise implementation of all safety measures and liaison with his counterpart of BHEL.

If the Safety record of the contractor is to the satisfaction of Safety

Department of BHEL, issue of an appropriate certificate to recognize the safety performance of the contractor may be considered by BHEL after completion of the job.

**24. Water,Power and Compressed Air**

The Contractor shall allow in his Tender and provide at his cost all water, power, compressed air required for the work or his employees on the work, together with all pipes and fittings or other means that may be necessary or required to ensure a proper and ample supply of water etc for all purposes connected with the work.

In the event of a provision existing in the Tender documents for supply of water, power and compressed air on payment by Bharat Heavy Electricals Limited, the same will be supplied from the BHEL supply system or other sources. at any points fixed by the Engineer-in-charge on the site of work, the contractor shall make necessary arrangement for lifting, pumping, carrying or Conveying the the same as .'required at his own cost. **The levy of charges to be borne by the contractor in such case shall be specifically mentioned in the tender documents.**

**In the case of work to be carried at BHEL'S customer's site, the terms and conditions on the provision of power, water and compressed air will be subjected to BHEL contract with customer and tender conditions.**

**25. Temporary workshops, store Etc,**

The Contract shall, during the progress of the work provide, erect and maintain at his own expense all necessary temporary workshops. Offices etc., required for the proper and efficient execution of the work. The planning, and erection of these buildings shall have the approval of the Engineer-in-charge and the Contractor shall at times keep them tidy and in a clean and sanitary condition to the entire satisfaction of the Engineer- in -charge.

On completion of the work all such temporary building shall be cleared away and the site restored and left in a dean and tidy condition to the entire satisfaction of the Engineer - in - charge.

**26. Tool and Plant on site**

All tools, plant and equipment brought to. the site shall not be removed from the site without the prior written approval or the Engineer-in-charge. When the work is finally completed or the contract is determined for reasons other than the default of the contractor he shall, forth with remove from the site all tool plant, equipment etc.. (other than those as may have been provided by BHEL)

**27. Statements of Hire Charges**

A monthly detailed statement of the hire charge incurred in respect of BHEL tools, plant, equipments etc. shall be given to the Contractor by the Engineer-in-charge.

**28. Precaution Against risks**

The Contractor shall be responsible for providing at his own expense, for all precaution to prevent loss or damage and for the necessary steps to be taken for the said purpose until the works have been handed over complete, in all respects to the Engineer-in-charge.

The Contractor shall provide all watchmen necessary for the protection of the site, the work, the materials, tools, plant, equipment and anything else lying on the site during the progress of the work. He shall solely be responsible for and shall take all reasonable and proper steps for protecting, securing, lighting and watching all places on or about the work and the site which may be dangerous to any person whomsoever.

**29. Notices and fees**

The Contractor shall give all notices required by any Statutory provision or by the regulations and for bye-laws of any local / or of any same are or will be connected. The contractor shall pay and indemnify BHEL against any statutory fees and charges payable under such Acts, Regulation and / or bye-laws in respect of the work and shall make and supply all drawings and plans required in connection with any such notice.

## 30. Setting out of the works and Protective and Maintaining signals and works

The Engineer-in-charge shall supply dimensioned drawings, levels and other information necessary to enable the contractor to set out the work, the contractor shall at his own expense set accurately according to the drawings and figured dimension thereon, all the work comprised in the contract and any extras or additions there to and shall be solely responsible for their being so set out and executed.

All bench marks, pegs, signals on the surface alignment stones, milestones and all similar marks whether put in by BHEL Authorities for the purpose of checking the Contractor's work or in the nature of permanent survey marks will during the tenure of the contract, be under the care of the Contractor who shall at his own expense take all proper and reasonable precautions and care to preserve and maintain them in their true position. In the event of these marks being disturbed or obliterated by accident or due to any other cause whatsoever, the same may, if deemed necessary be replaced by the Engineer-in-charge at the Contractor's expense and the cost thereof be deducted from any money then or thereafter becoming due to the Contractor

Where requested by the Contractor, the level marks, centre line and chain age pegs corresponding to those shown on the Drawing will be pointed out to the Contractor on the ground but all bench marks or chain age pegs additional to those shown on the Drawing will be set out by BHEL authorities.

## 31. Site Drainage

All water that may accumulate on the site during the progress of the work, or in trenches and excavations shall be removed to the entire satisfaction of the Engineer-in-charge and at Contractor's expense.

## 32. Excavation, Relics, etc.

Materials of any kind obtained from excavation on the site shall remain the property of BHEL and shall be disposed off as Engineer-in-charge directs.

All gold, silver, oil! and other minerals of any description and all precious stones coins treasures, relice, antiquities and other similar items which may be found in or. upon the site shall be the property of Bharat Heavy Electrical Limited and the contractors shall duly preserve the same to the satisfaction of the BHEL and shall from time to time deliver thy same to such person or persons as the BHEL may appoint to receive the same.

## 33. Foundations

The Contractor shall not lay any, foundations until the excavations for the same have been examined and approved in writing by the Engineer - in-charge.

## 34. Covering in work

The Contractor shall give reasonable notice in writing to the Engineer - in-charge whenever any work is to be permanently covered up or concealed, whether by earth or other means so that it can finally be inspected or measured, if necessary. In default of so doing, the Contractor shall if required by the Engineer-in-charge un-cover such work at his own expense.

## 35. Approval of Works by Stages

All work embracing more than one process shall be subject to examination and approval at each stage thereof and the Contractor shall give due notice in writing to the Engineer-in-charge when each stage is ready. In default of such notice being received, the Engineer-in-charge shall be entitled to approve the quality and extent thereof at any time he may choose and in the event of any dispute, the decision of the Engineer-in-change thereon shall be final conclusive.

## 36. Execution of the work

The work shall be executed in a workman like manner and to the satisfaction in all respects of the Engineer-in-charge.

The Engineer-in-charge will communicate or confirm his instructions to the Contractor in respect of the execution of the works in a "**Work Site Order Book**" maintained at his office and the Contractor shall visit this office daily and shall confirm receipt of such instruction by signing the relevant entries in this book. Such entries will rank as order to notices in writing the intent and meaning of these conditions.

## 37. Day Work

No 'day – work' shall be performed without the prior written instructions of the Accepting Officer.

The Contractor shall give to the Engineer-in-charge reasonable notice of the start of any work ordered to be executed by day-work and shall deliver to the Engineer-in-charge within two days of the end of each pay week a return in duplicate giving full detailed accounts of labour and materials for the pay week. One copy of each of these returns, if found correct will be certified by the Engineer-in-charge and returned to the Contractor and must be produced at the time of adjustment of accounts.

An Invoice in duplicate signed by the Contractor or his agent shall be sent with each delivery of materials for day-work and the Contractor will be furnished with receipt signed by the Engineer-in-charge specifying the description, quantities, weight or measurement (as the case may be) of the articles approved, reference will made in this receipt in the return aforesaid and the Contractor's Bill.

In the case of Lump sum Contracts, the rates to be charged and the percentage addition for profit and establishment charges etc. will be agreed upon between the Accepting Officer and the Contractor prior to the execution of the work.

## 38. Inspection of the Work

BHEL Officers concerned with the contract shall have power at any time to inspect and examine any part of the work and the Contractor shall give such facilities as may be required to be given for such inspection and examination.

Should Engineer-in-charge consider, at any time during the expiry of the maintenance period, that any work has been executed with unsound, imperfect or unskilled workmanship or of a quality inferior to that contracted for or not otherwise in accordance with the contract (in respect}. Where of the decision of the Engineer-in-charge shall by final and conclusive the contractor shall, on demand in writing from the Engineer-in-charge specifying the fault not withstanding that the same may have been inadvertently passed, certified and paid for, forthwith rectify or removed and reconstruct the work so specified in whole or in part a& the case may require at his own expense to the entire satisfaction of the Engineer-in-charge and in the event of his failing to do so within a period lo be specified by the Engineer-in-charge in his demand as aforesaid, the Engineer-in-charge whose decision shall be final and binding may carry out the work by other means at the risk and expense in all respects of the Contractor. However, the liability of the Contractor under this condition shall not extend beyond the maintenance period except as regards workmanship which the Engineer-in-charge shall have previously given notice of to the Contractor to rectify.

## 39. Responsibility for Building

In the event of any building or part of any building being handed over to the' Contractor for the execution of work there to under the provisions of the Contract he shall give a written receipt for all fixtures, glass etc., and he shall be required to make good at his own expense all damages resulting from the cause whatsoever while in his charge and on completion of the work to deliver the said building or part thereof in a clean state complete in every particular to the entire satisfaction of the. Engineer-in-charge.

## 40. Insurance

The contractor shall, within one month after the date of acceptance of the contract, insure the work on **"all risks" basis** against loss and damage by fire, tempest, floods, earthquake, riots, strike and against damage by aircraft with an insurance office approved by the accepting officer, from the date of acceptance of work or actual commencement of work whichever is earlier. Such insurance shall be effected in the name of BHEL and shall be for the full value of the contract sum. The contractor shall lodge with BHEL the policies and receipts of the premiums for such insurance and shall maintain such policies in force until the entire completion of the work as certified by the Engineer-in-charge. The cover shall also include whenever necessary the risks of testing including breakdown or explosion or plant and machinery undergoing testing, trial and commissioning operations. The insurance shall also specifically cover removal of debris cost. The sum Insured shall represent the estimated full value of the contract work inclusive of value of free supply materials by BHEL, transport charges, customs dues, express freight, overtime charges, cost of erection, value of constructional plants and machinery; removal of the debris

and excavation of costs. Where the contract includes a maintenance period, the Insurance cover shall specifically include the Contractor's liabilities during the maintenance period. The insurance shall also be extended to cover third party personal injury and property damage for a sum to

be specified by BHEL.

If the contractor fails to comply with the terms of this condition, the accepting officer may insure the work and may deduct the amount of premiums from any money that may become payable to the contractor or may at his discretion refuse payment of any advance payment to the contractor until the contractor shall have complied with the terms of this condition.

Such insurance whether effected by the Accepting officer or the Contractor shall not be a limit or bar to the liability and obligation of the contractor to complete the entire work in all respects as certified by the Engineer-in-charge.

In case of such a loss or damage as aforesaid, the money payable under any such insurance shall be received and may be retained by BHEL until the work is finally completed and shall then be credited to the contractor in the final statement of accounts in the event of the contract not having been previously cancelled under these conditions, after taking into account the delay in completion, settlement to his workers for damages, damage to BHEL's property etc.

41. **Damage and Loss to Private Property and Injury to Workmen**

The Contractor shall at his own expense reinstate and make good to entire satisfaction of the Engineer-in-charge and pay compensation for any injury, loss or damage occasioned to any property or rights whatever including property and rights of BHEL (or agents, servants to employees of BHEL) the injury loss of damage arising out of or in any way in connection with the execution of *the* contract and further the Contractor shall indemnify BHEL against all claims enforceable against BHEL or any agent, servant, or employee of BHEL ,a private person, in respect of any such injury (including injury resulting in death loss or damage to any person) whomso ever or property, including all claims which may arise under the Workmen's Compensation Act or otherwise, or which would be enforceable against BHEL.

42 **Completion:**

The works shall completed to the entire satisfaction of the Engineer - in -charge and in accordance with the Contractor's forecast of Time and progress where operative, and all unused stores and materials, tools, plants equipment, temporary Building and things shall be removed from the site and work cleared of rubbish and all waste materials and leveled up clean and tidy to the satisfaction of the Engineer-in-charge at the Contractor's expense and/or before the Schedule date of completion.

The BHEL shall have power to take over from the Contractor from time to time such sections of the Work as have been completed to the satisfaction of the Engineer-in-charge. I n such an event, the contractor is not entitled for any extension of time or any other compensation for executing the balance work In case the Contractor fails to remove any of his properties, assets or fails to clear the rubbish and waste materials within 30 days of the completion of the contract, it is lawful for the contracted, that is BHEL to take such action as it deems fit to clear, dispose of such properties, assets or such waste materials and charge the Contractor any expenses Incurred thereon.

The Engineer-in-charge shall certify to the Contractor the date on which the work is completed and the state thereof.

The Engineer-in-charge shall also certify to the Contractor the state of the work at the end of maintenance period, where applicable.

43, **Compensation for delay**

If the Contractor fails to maintain the required progress in terms of condition 7 or to complete the work and clear the site on or before the contracted or extended period of completion, he shall, without prejudice to any other right or remedy of the BHEL on account of such breach pay as agreed compensation an amount calculated as stipulated below or such smaller amount as may be fixed by the BHEL on the contract value of the work for every week that the progress remains below that specified in condition 7 or that the work remains incomplete.

This will also to items or groups of items for which separate period of completion has been specified.

For the purpose me term "Contract Value" shall be the value at contract rates of the work or ordered,

| | |
|---|---|
| a) Completion period (as originally stipulated) not exceeding 6 months | at 1 per cent per week |
| b} Completion period (as originally stipulated) exceeding 6 mo nth s and not exceeding 2 Years | at ½ per cent per week |
| c) Completion period (as originally stipulated) exceeding 2 years | at ¼% per cent per week |

Provided always that the total amount of compensation for delay to be paid under this condition shall not exceed the under noted percentage of the contract value or of the item or group of items of work for which a separate period of completion is given

| | |
|---|---|
| a) Completion period *(as* originally stipulated) not exceeding 6 months | 10 per cent |
| b) Completion period (as originally stipulated) exceeding 6 months and not exceeding 2 Years | 7½ per cent |
| c) Completion period (as originally stipulated) exceeding 2 years | 5 per cent |

The amount of compensation may be adjusted or set-off against any sum payable to the contractor under this or any other contract with the BHEL.

**44. Laws Governing the Contract**

This Contract shall be governed by the Indian Laws for the time being in force.

## 45. Cancellation of Contract for Corrupt Acts

The Accepting Officer, whose decision shall be final and conclusive, shall without prejudice to any other right or remedy which shall have accrued or shall accrue thereafter to Bhart Heavy Electricals Limited, cancel the Contract in any of the following cases and the contractor shall be liable to make payment to BHEL for any loss or damage resuiting from any such cancellation for default.

If the Contractor shall:

a) Offer or give or agree to give to any person in BHEL service any gift or consideration of any kind as an inducement or reward for doing or for bearing to do or for having done or forborne to do a day act in relation to the obtaining or execution of this or any other contract for BHEL service OR

b) Enter into a contract with BHEL in connection with which commission has been paid or agreed to be paid by him or with his knowledge, unless the particulars of any such commission and the terms of payment thereof have previously been disclosed in writing to the Accepting Officer, OR

c) Obtain a contract with BHEL as a result of ring tendering or by non-bonafide methods of competitive tendering without first disclosing the fact in writing to the Accepting Officer.'

## 46. Cancellation of Contract for Insolvency, Assignment or Transfer or Sub-Letting of Contract

The Accepting Officer; without prejudice to any other or remedy which shall accure thereafter to BHEL shall cancel the contract in any of the following cases:

If the Contractor

a) being an individual, or if a firm any partner thereof shall at any time be adjudged bankrupt or have a receiving order or orders for administration, of his Estate made against him or shall take and proceedings, for liquidation or composition under any Bankruptcy Act for the time being in force or make any conveyance of assignment of his effects composition or arrangement for the benefit of his credit or purport to do so, or if any application be made under any Bankruptcy Act for the time being in force for sequestration of his Estate or if a trust deed be granted by him on behalf of his creators, OR

b) Being a company shall pass a resolution or the court shall make on order for the liquidation of its affairs, or a Receiver or Manager on behalf of the debentures holders shall be appointed or circumstances shall arise which entitle the court or debentures holders to appoint a Receiver or Manager OR

c) assigns, transfer, sub-lets or attempts to assign, transfer or sub-let any portal of the work without the prior written approval of toe Accepting Officer OR

d) Shall suffer an execution being levied on his goods and allow it to be continued for a period of 21 days.

Whenever the Accepting Officer, exercises his authority to cancel the contract under this condition, he may complete the work by any means at the Contractors expense provided always to that in the event of the cost of completion as certified by Engineer-in-charge which is final and conclusive) being less than that contract cost, the advantage shall accure to the BHEL and that if the completion exceeds the moneys due lo the Contractor under the contractor shall either pay the excess amount ordered by the Engineer-in-charge or the same shall be recovered from the Contractor by other means.

Engineer-in-charge will have powers to take possession of the site and any materials constructional plant, implements, stores, etc. thereon and carryout the work by any means at the risk and cost of the Contractor.

In case the BHEL completes the work under the provisions of this condition the cost of such completion to be taken into account in determining the excess cost to be charged to the contractor under this condition shall consist of the cost of materials purchased and or labour provided by the BHEL with an addition of such percentage or cover superintendence and establishment charges as may be decided by the General Manager whose decision shall be final and conclusive.

In the Contractor fails to pay the excess sum within a period of 30 days, the Engineer-in-charge shall have the right lo sell any or all of the Contractor's unused materials, constructional plant implements, temporary buildings etc. and apply the proceeds of sale thereof towards the satisfaction of any sum due from the Contractor under the contract and if thereafter be any balance outstanding from the Contractor, it shall be recovered in accordance with the provisions of the Contract.

47. **CANCELLATION OF CONTACT IN PART OR FULL FOR CONTRACTOR'S DEFAULT IF THE CONTRACTOR**:

a) makes default in commencing the within a reasonable time from the date of handing over of the site and continue in that state a reasonable notice from Engineer-in-charge OR

b) in the opinion of the Engineer-in-charge at any time, whether before or after the date extended date for completion, make default in proceeding with the work with due diligenec and continue in the state after a notice of seven days from Engineer-in-charge OR

c) fails to comply with any of the terms and conditions of the contract or after 7days notice in writing with orders properly issued there under, OR

d) fails to complete the work order and items of work individual dates for completion and clear the site on or before the date of completion or fails to achieve the progress at set out under clause 7 of these General conditions of contract.

The Accepting Officer may, prejudice to any other right or remedy which shall have accrued or shall accrue after BHEL, Cancel the contract as a whole or in part there or only such work Order items of work in default from the contract. Whenever the Accepting officer exercises his authority to cancel the contract as a whole or in part under this condition he may complete the work at the contractor's risk and

cost provided always that in the event of the cost of completion (as certified by Engineer-in-charge which is final and conclusive) being less than the contract cost the advantage shall accrue to the BHEL if the cost of completion exceeds, the money due to the contractor under this contract the contractor shall either pay the excess amount ordered by General Manager or the same shall be recovered from the contractor by other means. Engineer-in-charge will have power to take possession of site and materials, constructional plant, implements, stores etc there on.

In case the BHEL completes the work or any part there of under the provisions, of the condition the of such completion to be taken in to account in determining the excess cost to be charged to the contract under this condition shall consist of the cost of materials purchased and /or labour provided by the BHEL. with an addition of such percentage to cover superintendance and establishment charges as may be decided by the General Manager whose decision shall be final and conclusive.

If the contract fails to pay the excess sum within a period of 30 days the Engineer-in-charge shall have the right to sell any or of the contractor's unused materials, construction plant, implements, temporary buildings etc and apply the proceeds of sale there of towards the satisfaction of any sum due from the contractor under the contract and if there be any balance out-standing .from the contract, it shall be recovered i n accordance with the provisions of the contract.

**48. Termination of Contract for death**

Without perjudice to any of the rights or remedies under this contract, if the contractor dies, the Accepting officer shall have the option of terminating the contract without compensation to the contractor,

**49. Special Powers of Determination**

**If** at any time after the acceptance of the tender BHEL shall whatsoever not require the whole or any part of the work to be Manager shall give notice in writing of the fact to the contractor who shall have no claim to any payment of compensation or otherwise howsoever on account of any profit or advantage which he might have derived from the execution of the work in full but which he did not derive in consequence of the foreclosing of the work.

He shall be paid at contract rates for the full amount of the executed including such additional works, e, g. clearing of site, etc., as may be rendered necessary by the said foreclosing. ***He shall also be allowed a reasonable payment (as*** **decided by the Accepting office)** for any expenses sustained on account of labour and 'materials collected but which could not be utilized on the work, as verified by the Engineer-in-charge. Neither shall the contractor have any claim for compensation on account of any alterations have been made fn the original specifications, drawings, designs and instructions, involving any curtailment of the work as original contemplated.

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# CHAPTER -IV

# VALUATION AND PAYMENT

## 1. RECORDS AND MEASUREMENTS:

All items having a financial value shall be entered in the BHEL Measurement Book (MB)so that a complete record is obtained of all works performed under the contract. Buildings, etc., priced in schedule 'A' as a unit Lump-sum will be entered by number at the unit Lump-sum.

Work carried out for agreed Lump-sum will be described and similarly recorded

Lump-sum omissions will be entered for deduction. Measurement shall be restricted to that required to ascertain the financial liability of BHEL "under the contract"

Work, which fails to be measured in detail shall be measured physically, without reference to any local custom that may obtain excepting where it may otherwise be directed in the tender documents. The measurements **shall be taken jointly** by any person duly authorized on the part of the BHEL and-by the contractor.

The engineer -in-charge shall give reasonable notice in writing to the contractor the date of appointment of measurement.

The contractor shall without, extra charge, provide assistance with appliance and other things necessary for-measurement.

The contractor shall bear all the cost of measurements of his work.

Measurements shall be entered in the BHEL measurement book and sjgned and dated by both parties each day at the site, on completion of measurement. If the contractor objects to any of the measurements recorded on behalf of the BHEL, a note to that effect to be made in the BHEL measurement book or against the item or items objected to; and such note shall be signed and dated by both the parties' engaged in taking the measurement.

If as a result of such objection, it becomes necessary to re-measure the work wholly or impart the expense of such measurement shall be borne by the party requiring the measurement.

Measurement to be re-taken provided that a net error is found by this re measurement to amount to less than 5% (Five percent) of the value as-recorded by the first measurement .But where the net errors amount to 5% and over of the said value then the cost is to be borne by the other party. In any case if the net value of errors found exceeded to Rs. 500 the expense or re-measurement is said to be borne by th other party. If the contractor's representative fails to attend when required, the Engineer-in-charge shall have power to proceed by himself to take measurement and in that case those measurements shall be considered as accepted by the contractor as final. The contractor shall, once in every month submit to the engineer-in-charge with a copy to the Accepting officer details, of his claims for the work done by him up to and including the previous month, which are covered by his contract agreement in any of the following respects.

a) Deviation from the items and specifications provided in the contract documents.

b) Extra Items / Items of work,

c) Quantities in excess of those provided in the contract schedule.

d) Items in respect of which rates have not been settled. He should, in addition furnish a clear certificate to the effect **that** the claims submitted by him as aforesaid cover all his claims and that no further claims shall be raised by him in respect of work done up to and including the period under report.

Except where any general to detailed description of the work in quantities expressly shows to contrary, schedule of quantities shall be deemed to have been prepared and measurements shall be taken in accordance with the procedure set forth in the schedule of rates specification not withstanding any provision in the relevant standard method of measurement or any general or local custom. In the case of items which are not covered by the schedule of rates / specification, measurement shalll be taken in accordance with relevant standard method of measurement issued by the Indian Standard institution or as per Standard engineering practice,

## 2 VALUATION OF DEVIATIONS

Rates for deviated items of work will be fixed as follows:

1) For any item of work required to be carried out after the contract has been awarded and which is not covered by Contractor's Schedule but is covered by B.H.E.L schedule of Rates the payable for such a fresh item will be derived from B.H.E.L. Schedule by the method of proportion as follows:

   a) In the same proportion to the **BHEL** Schedule of rates as the tendered rate for the nearest analogous item of work in contractor's schedule bears to rate for the particular analogous item of work in BHEL schedule of rates. However in case of nearest analogous item of work in contract schedule forms part of individual chapter of the BHEL schedule of rates the above proportion will be worked out only for such items which are found both in contract schedule and BHEL Schedule of rates as group of items under the chapter.

   b) If a single appropriate analogous item of work is not available in both schedule (contractor's and BHEL schedule) then the method of proportion will be applied to the nearest analogous group items available in both the schedule referred to i,e., in the same proportion as the total tendered cost of that particular group of item (the sum of the products of the tendered rates and the quantities for which orders are placed) bears to the total cost of the same items and quantities and BHEL Schedule of Rates.

c) If even an appropriate analogous group of items is not available in contractor's schedule and BHEL Schedule, then the methods of proportion will be applied to all those items of the whole work, which are available in both the schedule and for which orders have been placed on the contractor i. e., in the same proportion as the total cost of all these items of work (the work of the products of the tendered rates and the quantities for which order are placed) bears to the total cost of the same items and quantities all the BHEL schedule of rates.

The selection of analogous items or analogous group of items referred to above shall be done by the Engineer-in-charge. Where the rates for deviated items or new items of work car be derived by the selection of different analogous items or analogous group of items, the lowest of all such derived rates shall be taken as the correct rate.

In the case of the contracts for which the Engineer-in-charge is the Accepting officer ail disputes regarding the settlement of rates of deviated or new items or work shall be referred to the Head of Civil Engineering Department whose decision shall be final and conclusive as the case may be.

II. If any work not covered by any of the foregoing is ordered of the contractor, the basis of payment shall be decided by the Accepting Officer whose decision shall be final and conclusive and binding en the parties.

## 53. REIMBURSEMENT / REFUND ON VARIATION IN PRICE, MATERIALS

If after submission of the tender and / or during the progress of the works, the price of any material (not being a material supplied from the BHEL store in accordance with the conditions of the contract) is increased or decreased by an Act of Legislature (central or state )and / or any notification there under or on account of new duties or levies such as Octroi or on account of increase or decrease in such duties affecting the price of materials required for incorporation in the works and made from materials of which the price has increased or decreased as aforesaid and the contractor has thereupon to pay in respect of such material or item, a price which is higher or lower than the price of that material or item as prevailing immediacy before the passing of such act or levying, increasing / decreasing of such duty, then BHEL shall increase in price or the duly reimbursed to the contractor the increase in price *at* additional or increased duty paid by the contractor and in case of decrease in price the BHEL shall be entitled to a refund of the reduction in the price or the reduction in duty. **This will be applicable only for material, which are directly incorporated on the work**, the contractor shall however indicate the assumption he has made while submitting the tender. However no reimbursement or refund shall be made if the increase / decrease is not more than + 10% of the said price, and if so the reimbursement or refund shall be made only / on the excess over + 10% provided always that any such increase shall not be payable if, in the opinion of the Accepting officer (whose decision shall be final and conclusive ) the increase is attributable to the delay in the execution of the contract with the control of the contractor or that any such Increase has become operative after the contracted/ or extended dated of completion of the works or items of work in question.

The Contractor shall, for the purpose of this condition, keep such books of account and other document as are necessary to show the amount of any increase claimed or any reduction available and shall allow inspection of the same by any duly authorized representative of the BHEL and further shall at the request of the Engineer-in-charge furnish for verification such other information as the Engineer-in-charge may require.

The Contractor shall within a reasonable time of his becoming, aware of any alteration in the prices of any such materials give notice thereof in writing to-the Engineer-in-charge stating that the rate is submitted in pursuance to this condition together with all information relating thereto which he may be in a position to supply.

**54. Advance on account**

No payment shall be made for work estimated to cost less than Rupees ONE THOUSAND till after the whole of the work shall have been completed and a certificate of completion given by the Competent authority.

In the case of work estimated to cost more than Rupees FIVE THOUSAND the contractor may at intervals of not less than one month or as otherwise provided for in the Contract documents, counting from the date on which order to commence work is given by Engineer-in-charge submit claims on BHEL forms for payment of advances on account of work done and of materials delivered in connection with the Contract.

The Contractor shall be paid in respect of such claims to the extent approved and passed by the Engineer-in-charge subject to a maximum of 90% of the value of the work actually executed to the satisfaction of the Engineer-in-charge. The certificate of the Engineer-in-charge regarding such approval and passing of the sums so payable shall be final and conclusive against the contractor.

**Notes:**

**"After the full amount of Security Deposit is made up through the 10% deduction from On account bills,** 100% payment of all subsequent bills may be made to the contractor.

The Contractor may also be paid during the progress of the work 75% of the value of any materials which are in the opinion *of* the Engineer-in-charge in accordance with the Contract, and are actually required for incorporation in the work and which have reasonably been brought to the site in connection there with and are adequately stored and or protected against damage by weather or other, causes, but which have not at the time of payment of the advance been incorporated the work on furnishing a formal **hypothecation deed**. Payment of such advances, however shall be purely at the discretion of the Accepting Officer provided always that payment shall not be made under these periodical certificate in respect of perishable materials like lime, cement, timer, sand, kankar, etc.

Any sums, due from the Contractor on account of Tools and Plant, stores or any other items provided by BHEL shall be deducted from the respective advances. The Engineer-in-charge shall from time *to* time certify the sums payable to the Contractor after retaining the reserves.

Any certificate relating to work done or materials delivered may be modified *or* corrected by any subsequent interim certificate or by the final certificate of the Engineer-in-charge supporting an advance payment shall itself be conclusive evidence that any work or materials it relates are in accordance with the contract. All such intermediate payments shall be regarded as advance against the final payment only and shall not be considered an admission of the performance of the contract or any part thereof in any respect or the accruing of any claim whatsoever.

Such intermediate payment shall not conclude, determine or affect in any way the powers of the Engineer-in-charge as to the final settlement and adjustment of the account or otherwise or in any way vary or affect the contract.

55. **Final Bill**

As soon as possible after the completion of the work to the satisfaction of the Engineer-in-charge, the contractor shall forward a certified final account on BHEL forms, in duplicate.

It shall be accompanied by all abstracts, vouchers, etc, in support there of add shall be prepared in the manner prescribed by the Engineer-in-charge.

No claims will be entertained after the receipt of the final bill.

The Final bill is to be submitted within 90 days of completion of work or within the time period extended by the Officer –In-Charge. No claim of any nature will be entertained thereafter.

The Contractor shall be entitled to be paid the final sum less the value of payments already made on account, subject to certification of the final bill by the Engineer-in-charge. Any sums due from the Contractor on account of Tool and Plant, Stores or any other items provided by BHEL not yet recovered from the contractor shall be deducted from the final sum aforesaid.

No charge shall be allowed to the Contractor on account of the preparation of the final bill.

**56. Payment of Bills**

All payment to be made to the Contractor under this contract shall be made within fifteen days of submission of all documents and after the certification by the Engineer-in-charge through e mode only. For this purpose the contractor has to submit duly filled in Authorisation form(as prescribed by THE Company) and as certified by their Bankers.

**57. Recovery from Contractor**

Whenever under the contract any sum of money shall be recovered from or payable by the Contractor the same may be deducted any sum than due or which at any time thereafter may became due to the Contractor under the contract or under any other contract with BHEL or from his Security Deposit or he shall pay the claim on demand.

## 58. Post Technical Audit of work and Bills

BHEL reserve the right to carry out a post-payment audit and technical examination of the work and final bill including all supporting vouchers, abstracts etc., and to enforce recovery of any sums becoming due as a result thereof in the manner provided in the preceding sub-paragraphs provided. However, no such recovery shall be enforced after three years of passing the final bill.

## 59. DELETED

## 60. Arbitration

Except where otherwise provided for in the contract, all questions and disputes relating to the meaning of the specifications, designs, drawings and instructions herein before mentioned and as to the quality of workmanship or materials used on the work or as to any other question, claim, right, matter or thing whatever in any way arising out of or relating to the contract, designs, drawings, specifications, estimates, instructions, orders or these conditions or otherwise concerning the works, or the execution or failure to execute the same whether arising during the progress of the work or after the completion or abandonment thereof shall be referred to the sole arbitration of the Executive Director/Group General Manager of BHEL and if the Executive Director/Group General Manager, willing to act as such Arbitrator. There will be no objection if the arbitrator so appointed is an employee of BHEL-Ranipet or an employee of any other unit of BHEL and that he had to deal with the matters to which the contract relates and that in the course of his duties as such he had expressed views on all or any of the matters in dispute or difference. The Arbitration to whom the matter is originally referred being transferred or vacating his office or being unable to act for any reason, such Executive Director/Group General Manager as aforesaid at the time of such transfer, vacation of office or inability to act, shall appoint another person to act as Arbitrator in accordance with the terms of the contract. Such person shall be entitled to proceed with the reference from the stage at which it was left by his predecessor. It is also a term of this contract that no person other than a person appointed by such Executive Director/Group General Manager or an employee appointed as Arbitrator as aforesaid should act as Arbitrator and the Arbitrator shall give reasons for the award.

Subject as aforesaid the provision of the Arbitration Act, 1940 or any statutory modification or re-enactment thereof and the rules made there under and for the time being in force shall apply to the arbitration proceeding under this clause.

It is a term of the contract that the party invoking arbitration shall specify the dispute or disputes to be referred to arbitration under this clause, together with the amount or amounts claimed in respect of each such dispute.

The arbitrator(s) may from time to time with consent of the parties extend the time, for making and publishing the award.

The work under the contract shall, if reasonably possible, continue during the arbitration proceedings and no payment due or payable to the contractor shall be withheld on account of such proceedings.

The arbitrator shall be deemed to have entered on the reference on the date he issues notice to both the parties fixing the date of the first hearing.

The arbitrator shall give a separate speaking award in respect of each dispute or difference referred to him.

The venue of arbitration shall be such place as may be fixed by the arbitrator in his sole discretion.

The award of the arbitrator shall be final, conclusive and binding on all parties to

this contract.

61, **Jurisdiction of Court**

For the purpose of Court proceeding if any, same shall be in the Court having jurisdiction over Ranipet - 632 406. (Vellore District, Tamilnadu).

62 Deleted

## 63 HEALTH, SAFETY & ENVIRONMENT POLICY

The management is committed to be an environmentally sound company in its activities, products, services and to provide safe and healthy working environment covering its employees, products & services as an integral part of business performance through:

- Compliance with applicable Legislation and Regulations.
- Setting objectives and targets to eliminate/control/minimize environmental pollution, risks due to Occupational Health and Safety Hazards.
- Promotion of activities for conservation of resources by environmental management with focus on oil, electrical energy and chemicals,
- Enhancement of Environmental, Safety and Occupational Health awareness amongst employees, customers, suppliers, contractors by pro-active communication.
- Regular evaluation and pro-active measures for prevention & control environmental pollution/accidents/occupational diseases.
- Appropriate training of employees and interested parties on Health, Safety & Environmental (HSE) aspects.
- Formulation and maintenance of HSE Management Programs for continual improvement.
- Periodic review & audit of HSE Management System to ensure its continuing suitability, adequacy and effectiveness.
- Communication of HSE Policy to all employees and interested parties.
- Co-operation with concerned agencies/regulatory bodies engaged in HSE activities.

## ANNEXURE-1

TERMS AND CONDITIONS REGARDING COMPLIANCE WITH VARIOUS LABOUR LAWS BY THE CONTRACTORS FOR BHEL
(Please See Condition – 22)

1. The Contractor shall not employ in connection with the work any person who has not completed 18 years of age.

2. The Contractor shall in respect of labour employed by him either directly or through sub-contractor's comply with or cause to be complied with the following statutory provisions and rules and in regard to all matters provided therein.

a) The Contract Labour (Regulation & Abolition) Act 1970 and the related Tamilnadu rules.

b) The Minimum wages Act 1948 and the related Tamilnadu Rules

c) The payment of wages Act 1936 and the related Tamilnadu Rules

d) The factories Act 1948 and the related Tamilnadu Rules

e) The Employee's Provident Fund & Miscellaneous Provisions Act 1952.

f) The Employees State Insurance Act 1948.

g) The workman's Compensation Act 1923.

**BACK**

h) The Industrial Disputes Act 1947 and any other Law or modifications to the above or to the rules made there under from time to time-

i) Pay met of Bonus Act 1965.

**REGISTRATION AMD LICENSING**

3. Every Contractor shall register his name with the Welfare Section of BHEL before taking up the work award to him by giving the following information and getting a code Number

   a) The Name of the Contractor.

   b) Nature of Contract Work.

   c) Period of Work.

   d} Number of maximum labour employed by him on anyone day

   e) License No. & Date (applicable in case of Contractors employing 20 or more workers)

   f) Whether enrolled for PF, ESI, etc., and enrolment No.

This Information is called for the purpose of informing the Inspectorate of Factories whenever they call for information regarding Contracts,

4. The Contractor employing 20 or more workmen is required to obtain license from the authorities (The Deputy Chief Inspector of Factories / Assistant Commissioner of Labour as the case may be). This license shall be amended and /or renewed wherever there is an increase in the workmen employed by him or in the event of contract being extended or renewed. The Contractor shall inform the license number to the BHEL Management before taking up the work.

5. The Contractor (licensed or unlicensed) shall promptly furnish every information and document required by BHEL authorities for the purpose of fulfilling their obligations as principal Employer and / or occupier of the factory and shall render all necessary assistance for the same.

WAGES

6. The Contractor shall pay wages to the workmen employed by him at the rate which shall not be less than the minimum wages applicable under Law from time to lime.

7. The Contractor shall fix wage periods in respect of which wages shall be payable. No wage period shall exceed one month.

8. The Contractor shall tonsure payment of wages to the Contract labour employed by him within three days from the end of wage period in case the wage period, is one week or a fortnight and in ail other cases before 10th day of the following month.

9. All payment of wages shall be made on working days at the work site and during the working time and on dates notified in advance. In case the work is completed before the expiry of the wage period, final payment shall be made within 48 hours of the last working day.

10. Where the employment of any works is terminated by or on behalf of the Contractor, the wages earned by him shall be paid before the expiry of the second working day from the day on which him employment is terminated.

11. Wages due to every worker shall be paid to him direct or to the person authorities by him in this behalf. All wages shall be paid in current coin or currency or in both.

12. The Contractor shall ensure the disbursement of wages in the presence of such authorized representatives of. BHEL Management.

13. The above payment shall be verified by the authorized Officers/representative of BHEL with the following certificates on the payment sheet Certified that the amount shown in Column No has been paid to the workmen concerned in my presence on at A certificate of payment shall be furnished in duplicate by the Contractor to the Engineer-in-charge each month in Form "A"

14. A Notice of showing the wage period and the place and time of disbursement of wages shall be displayed at the place of work and a copy lo be sent Ed the welfare department by the Contractor under acknowledgement.

15. Notices showing the rates of wages, weekly rest days, wage period, hours of work, date of payment of wages, and addressed of the Inspectors having jurisdiction the date of unpaid wages shall be displayed in Tamil and English in conspicuous places at the establishment and at worksite the contractor.
The contractor shall inform the BHEL Management every month the details of contract labour engaged for each contract in the following form :-

a) Serial Number

b) Location

c) Period of Work

d) No, of Contract labour engaged during the work

e) No. of days worked

f) Mo. of Man days worked

g) Wages paid to his workers

The above statement shall be furnished to BHEL Management at the end of every month,

## REGISTERS AND RECORDS AND COLLECTION OF STATISTICS

16. The following documents/formats under contract labour {Regulation and Abolition) Act 1970 and Tamil Nadu Rules there under shall be maintained by each Contractor,

    a) Register of Persons employed by the Contractor

    *b)* Employment Card

    c) Service Certificate

    d) Muster Roll, Wage Register, Deduction Register, Wage Slip, Over Time Register, Register of Fines. Register of Advances etc.

18. The Contractor shah display the abstract of the contract labour (Regulation and Abolition) Act and the Rules there under both in English and in Tamil.

19. Half Yearly Return shall be sent by the Contractor in duplicate to the Licensing Officer.

20. The Contractor shall submit the returns required under the Contract Labour (Regulation and Abolition) Act 1970 periodically to BHEL Management

21. The Contractor shall without fail give up to date information in writing of the attendance of the workers employed by him.

22. The Contractor shall ensure that his workers keep and produce the Employment Card when coming to duty and lake them back when leaving duty.

23. All the above registers and records shall be preserved in original for a period of Three years. All the Registers, Records and notice maintained under the Act and rules shall be produced on demand by Inspector or any authority under the Act,

WORKING HOURS AND WORKING CONDITIONS

24. NO WORKER SHALL BE REQUIRED OR ALLOWED TO WORK ON SUNDAY UNLESS HE HAS OR WILL HAVE A HOLIDAY ON ANYONE OF THE THREE DAYS BEFORE OR AFTER THE SAID DAY

25. The contractor shall inform BHEL Management in the prescribed from details of the contract workers scheduled to work on Sunday, the day of rest and also indicate the substituted holiday in lieu there of. this shall be intimated two days in advance before his workmen are booked for work on Sunday

26. The contract labour working for more than nine hours in nay or for more than 48 hours in any week shall be paid wages at the rate of twice the ordinary rates of wages in accordance with the provisions of section 59 of the factories Act 1948

27. The contractor shall provide all safety devices and personal protective equipment to his workmen at his own cost and shall ensure that his workmen wear/use such devices or equipment provided to them while doing the work and there should not be any relaxation on this.

28. The contractor shall give four paid National Holidays to his workers, viz, 26th January, 1st, May, 15th August and 2nd October.

29. The contractor shall ensure that his workmen vacate the premises after the shift is over.

30. No woman worker shall be required or allowed to work in the factory except between the hours of 6.00 am and 7.00 pm.

31. T he contractor shall comply within the provisions relating to welfare and Health facilities as provided in the contract labour ( Regulation and Abolition ) Act 1970 read with the Tamil Nadu contract labour Rules 1975,

## NOTICES OF ACCIDENTS

32. Notwithstanding any thing contrary to this, in the event of accident the contractor shall be required to fill injury report and submit the Engineer-in-charge immediately and ensure the compliance of ESI/Workmen's Compensation Act, Factories Act and Rules made there under. He shall also maintain a register of accident as per Act.

33. The contractor shall get the contract labour engaged by him insured under workmen's Compensation Policy from General Insurance Corporation of India before actually starting the work of contract. The Insurance coverage should be for the entire period of contract. The contractor shall comply with the provision of the Workmen's Compensation Act 1923 [This should be read in conjunction with the provision of ESI Act]

34. The contractor shall ensure that all his workmen are covered under the Employees State Insurance Act and produce to BHEL such Registration Number/ Enrolment Number before executing the contract work.

35. The contractor shall regularly pay the amount of contribution i.e. employers contribution as well as employees contribution in pursuance of the above scheme as fixed from time to time The contribution payable presently is 1.75% of wages to be recover from the workmen and 4.75% of wages to be contributed by the contractor. Contribution recovered from employee and contribution made by the contractor may be rounded to the next higher multiples of five parse

36. The contractor shall take note of any amendment that may be brought forth in the above contribution rate and accordingly.

37. The contractor shall ensure that his workmen are covered under the EPF & miscellaneous Provision Act 1952, and accordingly produce to the BHEL Management the registration / enrolment number before awarding at contract work. As per the existing provision every worker who has completed three months continuous service or has actually worked for not less than 60 days within a period of three months or less shall be entitled and required to become a member of the fund. The employees, contribution payable at present is 12% of wage which will be recovered by the contractor from the wages of his workmen and the contractor should pay equal contribution The contractor is also liable to pay any administrative charges in this behalf that may be decided from time to time, it will be the responsibility of the contractor to ensure such contribution payable in respect of workmen employed through sub-contractors also.

38. The contractor shall take note of any amendment in the rate of contribution payable under the scheme from time to time.

39. The contractor shall within seven days of the close of every month submit to BHEL a statement showing the amount to contribution payable/paid for employees engaged by him or through him and shall also furnish to BHEL such information as Principal Employer is required to furnish under the provision of the ESI Act and PF as well as the schemes made there under to the authorities concerned.

40. Whenever any sum of shall sum of money is found to be recoverable from or payable by the contractor under the above Acts the same shall be deducted from any sum that may be due or which at any time there after may become due to the contractor under this contract or under any other contract or from his security deposit in case the recoveries are not sufficient to satisfy the claims, the contractor shall pay the balance there of on demand. In case any recoveries are made this clause from the as may be required to replace the shortage caused by such recoveries in the amount of Security Deposit.

41. The contractor shall abide by all the labour and other laws applicable to contractor labour/workmen under this contraband shall at all times Keep BHEL indemnified against- all losses, claims, prosecutions under any law.

42. in case of non compliance of any of the provisions of the Acts and in case BHEL Having complied with the same BHEL wilf be entitled to recover the same from the contractor *1* sub contractor.

43. Non exercise of any of the power of or rights available to BHEL here under or under any Jaw, shall not any way operate as waiver thereof.

FORM - IV

(See Rule 21 (1) of Tamil Nadu Contract Labour Rules)

## Application for License

1. Name and Address of the Contractor (including his Father's Name in case of Individuals)

2. Date of Birth and age {in case of Individuals)

03. Particulars of Establishment where Contract Labour is to be employed

   a) Name and Address of the Establishment

   b) Type of business .trade industry manufacture

   c) Number and date of certificate of Registration of occupation, which is carried on the Establishment under the Act.

   d) Name and address of the Principal Employer

4. Particulars of contract labour :

   a) Nature of work in which contract labour is employed or is to be employed in the establishment

   b) Duration of the proposed contract work (give particulars of proposed date of commencing and ending)

   c) Name and address of the agent or Manager of contractor at the worksite

   d) Maximum No. of contract labour proposed to be employed in the establishment on any date

5 Whether the contractor was convicted of any offence within the proceeding rive years, jf so give details :

6. Whether there was any order against the contractor revoking or suspending license or forfeiting security deposit in respect of an earlier contract if so the date of such order:

7. Whether the contactor has worked in any other establishment within the past five years, if so, give details of the principal employer Establishment and nature of work:

8. whether a certificate by the principal Employer in form V is enclosed

:

9. Amount of license fee paid No of Treasury challan and Date :

10 Particulars of security deposit if any, requested to be adjusted, including Treasury Receipt number :

11. The amount of security deposit or balance if any after adjustment of amount to be refunded under rule 31 deposited with treasury Receipt Number and date :

DECLARATION

I hereby declare that the details above are correct to the best of my knowledge and belief.

PLACE :
DATED :

SIGNATURE OF THE APPLICANT
[CONTRACTOR]

NOTE : The application should be accompanied by a treasury Receipt for the appropriate amount and a certificate in Form V From the principal employer.

(To be filled in the office of the Licensing officer) Date of receipt of the application with challan for fees / security Deposit.

SIGNATURE OF THE LICENSING OFFICER CONTRACTOR

**FORM-XIII**

**See Rule 75 of Tamil Nadu Contract Labour Rules 1975}**

## Register of workman employed bv contractor

Name and Address of the Contractor :

Name and location of work :

Name and address of establishment in, /under which contract is carried on

Name and address of Principal Employer

1. Serial Number
2. Name and surname of workman
3. Age and sex
4. Father's / Husband's Name
5. Nature of Employment /Designation
06. Permanent Home address of workman (village Taluk and District)
7. Local Address :
8. Dale of commencement of Employment :
9. Signature or Thump Impression of workman
10. Date of termination of Employment :

FORM - XIV

(See Rule 76 of Tamil Nadu Contract Labour Rules)

# EMPLOYMENT CARD

Name and Address of contractor : Name and address of Establishment in/under which contract is carried on___ ._____

Mature of work and location of work : Name and address of Principal Employer

1. Name of the workmen
2. SI. No. of register of workmen employed
3. Name of Employment / Designation
04. Wage rate (with particulars of unit in case of Piece work) :
5. Wage period
6. Tenure of Employment
7. Remarks

**SIGNATURE OF CONTRACTOR**

FORM - XV

Rule 77 of Tamil Nadu Contract Labour Rules}

# SERVICE CERTIFICATE

Name and Address of the contractor

Name and address of Establishment in/under which contract is carried on

Name and location of the work

Name and address of the workman

Name and address of Principal Employer

Age or Date of Birth

Identification

marks Father's /

Husband's Name

| Sl.No | Total period for which employed | | Nature of work done | | Rate of wage (with particulars units in case of piece of work | Remarks |
|---|---|---|---|---|---|---|
| | From | To | | | | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |

SIGNATURE

**FORM - XVI**

**(See Rule 78 of Tamil Nadu Contract Labour**

**Rules)** MUSTER ROLL

**Name and Address of contractor** of : Name and address

Establishment in/under which contract is carried on _____

_____

**Nature of location** of **the** work of : Ma me and address

Principal Employer __

For the Month of

| **Sl. No** | Name of workmen | Father's/Husbands Name | Sex | Dates 1 2 3 4 5 | Remarks |
|---|---|---|---|---|---|
| (01) | (02) | (03) | (04) | (05) | (06) |

**SIGNATURE OF CONTRACTOR**

**FORM - XVII**

**(See Rule 78(1) (a) (i) of Tamil Nadu Contract Labour Rules)**

# Register of wages

Name and Address of the Contractor :

Nature and location of work :

Name and address of establishment in/under

which contractor is carried on :

Name and address of Principal Employer :

Wage Period : MONTHLY

1. Serial Number :
2. Name of workman :
3. SL No. in Register of workman :
4. Designation / Nature of work done :
5. No, of days worked :

06 Units work done :

07. Daily rate of wages / Piece rate ;

6. Basic wages :
9. Dearness allowance :
10. Overtime :
11. Other cash Payment
    (Nature of payment to be indicated ) :
12. Total :
13. Deductions, If any [indicate nature ] :
14. Net amount paid :
15. Signature / Thump impression of workman :
16. Initials of contractor or his representative :

CONTRACTOR

FORM - XIX

(See Rule 78(1) (b) of Tamil Nadu Contract Labour (Rules)

# Wage Slip

Name and Address of Ihe Contractor

Name and Father's / Husband Name of the workman _____

Name and location of work

For the week / Fortnight / Month ending

01. No of days worked

02- No. of units worked in case of piece rate workers

03. Rate of daily wages /piece rate

04. Amount of over time wages

05, Gross wages Payable

06, Deductions, if any

07. Net amount of wages paid

**INTIALS OF THE CONTRACTOR OR HIS REPRESENTATIVE**

FORM - XX

(See Rule 78(1) (a) (i) of Tamil Nadu Contract Labour Rules)

## Register of deductions to damage

Name and Address of the Contractor :

Mature and location of work ;

Name and address of establishment in/under which contractor is carried on :

Name and address of Principal Employer :

1. Serial Number ;
2. Name of workman :
3. Father's / Husband's Name :
4. Designation / Nature of employment :
5. Particular of damage or loss :

0B- Date of damage or loss :

07. Whether workman showed cause against deduction ;

8. Name of person in which presence employee's explanation was heard :
9. Amount of deduction imposed :

Date of Recovery

10. No. of installments imposed :
11. First Installments :
12. Final Installments. :
13. Remarks :

## FORM-XXI

(See Rule 78(1) (a) *(ii)* of Tami Nadu Contract Labour Rules)

### Register of Fines

Name and Address of the Contractor

Nature and location of work

Name and address of establishment in/under which contractor is carried on

Name and address of Principal Employer

1. Serial Number
2. Name of workman
3. Father's / Husband's Name
4. Designation / Nature of employment'
5. Act / Omission for which fine imposed

06 Date of offence

07. Whether workman showed cause against fine

03. Name of the person in whose presence employee's explanation was heard

9. Wage period & Wage payable

10. Amount off me imposed

11. Date on which fine realized

12 Remarks

FORM - XXII

(See Rule 78 (1) (a) (ii) of Tamil Nadu Contract Labour Rules)

## Register of Advance

Name and Address of the Contractor ;

Nature and location of work :

Name and address of establishment in/under which contractor is carried on :

Name and address of Principal Employer :

1. Serial Number :
2. Name of workman :
3. Father's / Husband's Name :
4. Designation / Nature of employment :
5. Wage period and wages payable :
6. Date and amount of advance given :
7. Purposes (s) for which advance made :

08 No, of installments by which advance to be repaid

9. Date and amount of each installment repaid :
10. Date on which installment was repaid :
11. Remarks :

FORM-XXIII

(See Rule 78(1) (a) (iii) of Tamil Nadu Contract Labour Rules)

## Register of Overtime

Nam e and Address of the Contractor :

Nature and location of work :

Name and address of establishment in/under which contractor is carried on :

Name and address of Principal Employer :

1. Serial Number :

2. Name of workman :

03 Father's / Husband's Name :

4. Sex :

5. Designation / Nature of employment :

6. Dates on which overtime worked ;

07. Total overtime worked or production in case of piece -rated

8. Normal rate of wages

9. Overtime rate of wages

10. Overtime earning

11. Date on which Overtime wages paid

12. Remarks

# PAYMENT **CERTIFICATE**

**FORM** "A"

Certified that :

1. I as contractor of ..... have made payment to all contract Labourers in full in respect of contract No..... as per terms of my contract and in no case less than the rates applicable up to the period ending.

2. *The* above payment have been made by me in the presence of the authorized representative of..... of .....for .....: ..... Employees amounting to Rs .....

3. The necessary payment registers attendance register / Form *A?. .* Leave register/ book under Labour and industrial Law and other relevant have been maintained by me and available with ma for production *-an* : when required .

4. No payment is due / outstanding to any contract Labourers engaged by me in respect of the aforesaid contract up to the period ending

**CONTRACTOR**

**NAME**
**DATE**

**SUPERVISOR**

**NAME**
**DESIGN**
**DATE**

**COUNTERSIGNED**
**OFFICER INCHARGE**

**NAME**
**DESIGN**
**DEPT.**

## ANNEXURE II

## SAFETY RULES

**(See Condition 2)**

### A BHEL SAFETY CODE

A

1. Suitable scaffolds shall be provided for workmen for all work that con not safely be done from the ground, or from solid construction except such short period of work as can be done safely from ladder When a ladder is used an extra mazdoor shall be Engaged for holding the ladder and if the ladder is used for carrying metals as well suitable footholds and handholds shall be provided on the ladder and the ladder shall be give an inclination not steeper than Vito 1($^{1}$/a horizontal and 1 vertical)

2. Scaffolding or staging more than 3.25 metres above the ground or floor swing or suspended from an overhead support or erected with stationary support, shall have a guard rail properly attached. bolted braced and otherwise secured at least 1 metre high above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends there of with only such opening as may be neccessary for the delivery of materials , Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.

3. Working platform, gangways and stairways shall be so constructed that they do not sag unduly or unequally , and it height of a platform or gangway or stairway Is more than 3.25 metres above ground level or floor level it shall be closely boarded have adequate width and be suitably fenced, as described in 2 above.

4. Every opening In floor of a building or in a working platform shall be provided with suitable means to prevent falling of persons or materials by providing suitable
fencing or railing with a minimum height of 1 metre

5. Safe means of access shall be provided to all working platform and other working places. Every ladder shall be securely fixed, no portable single ladder shall be over 9 metres in length. Width between side rails in a rung ladder shall in no case be less than 30 cm for ladders up to and including 3 metres in length, For longer ladder this width-shall be increased by at least 6mm for each additional 30cm of length. Uniform step spacing shall not exceed 30cm,

   Adequate precautions shall be taken to prevent danger from electrical equipment. No materials on any of the sites shall be so stacked or placed as to cause danger or inconvenience to any person or the public The contractor shall provide all necessary fencing and light to protect public from the accident and shall be bound to bear expenses of defiance of every suit-action or other proceeding at law that may be brought by any person for injury sustained owing to neglect of the above precautions, and pay any damages and cost which may be awarded in any such suit, action or proceeding to any such person or which may with the consent of the contractor be paid to compromise any claim by such person.

6 Excavation and Trenching

All trenches 1.5 metres or more in depth, shall at all time be supplied with at least one ladder for each 30m length or fraction there of ladder shall be extended from bottom of trench to at least 1 metre above surface of the ground . Sides of the trench 1.5 metres or more in depth shall be stepped back to give suitable slope or securely held by timber bracing. so as to avoid the danger of sides collapsing. Excavated materials shall not be placed within 1.5 metres of the edge of trench or half the depth of trench, whichever is more. Cutting shall be from top to bottom under no circumstances shall under mining or under - cutting be done.

7. Demolition:

Before any demolition work is commenced and also during the progress of work.

a] All roads and open areas adjacent to the work site shall be closed or suitably protected.

b] No electric cable or apparatus which is liable to be a source of danger over a cable or apparatus, used by the operator shall remain electrically charged.

c] Alt practical steps shall be taken to prevent danger to person employed from the risk of fire or explosion ,r or flooding no floor, or roof or other part of building shall Lie so overloaded with debris or materials as to render it unsafe.

8. All necessary personal safety equipment as considered adequate by the Engineer-in-charge shall be /available for use of person employed on the site and maintained in a condition suitable for immediate use and the contractor shall take adequate steps to ensure proper use of equipment by those concerned.

a] Workers employed on mixing asphaltic materials cement and lime mortars concrete shall be provided with protective foot ware and protective gloves.

b] Those engaged in handling any material which is injurious to the eye shall be provided with protective goggles.

c] Those engaged in welding work shall be provided with welder's protective eye shields

d] Stone breaker shall be protective goggles and protective clothing and seated at sufficiently safe intervals.

e] When workers are employed in sewers and manholes which are in use, the contractor shall ensure that manhole covers are opened and manholes are verified at least for an hour before the workers are allowed to get into them manholes so opened shall be cordoned off with suitable railing and provided with warning signals or boards to prevent accident to public.

i] No paint containing lead or lead products shall be except in the form of paste or ready-made paint.

li] Suitable face masks shall be supplied for use by workers when paint applied in the form of spray or surface having lead paint is dry rubbed-and scrapped.

f) The contractor shall not employ men below the age of 18 and women on' the work of painting with products containing lead in any form . Whenever men above the age of 13 are employed on the work 'of lead[1] painting- the following precaution shall be taken:

i) No paint containing lead or lead products shall be used except in the form of paste or ready- made paint.

i i) Suitable face masks shall be supplied for use by workers when paint is applied in the form of spray or surface having lead paint is dry rubbed and scrapped

iii) Over all shall be supplied by the contractor to workmen and adequate facilities shall be provided to enable working painters to wash during or cessation of work,

&. When work is done near any place where is risk of drawing, all necessary equipment shall be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provision made for prompt first aid treatment of all injuries likely to be sustained during the during the course of the work.

10. Use of hoisting machine. and tackles including their attachments .anchorage and supports half conform to the following

a)

i) These shall be of good mechanical construction, sound materials and adequate strength and free from defects and shall be kept in good working order,
ii] Every rope used in hoisting or I owe ring materials or as a means of suspension shall be of durable quality and adequate strength and free from defects,

b) Every crane driver or hoisting appliance operator shall be properly qualified and no person under the age of 21 yrs shall be incharge of any hoisting machine including any scaffolding winch or give signals to operator.

c) In case of every hoisting machine and or every chain ring, hook, shackle swivel and pulley block used in hoisting or lowering as means of suspension safe working load shall be ascertained by adequate means. Every hoisting machine and all gear referred to above shall have the safe working load plainly marked there on In case of a hoisting machine having a variable safe working load each safe working toad at the condition under which it is applicable shall be clearly indicated. No part of any machine or gear referred to above in this paragraph shall be loaded be yond the safe working load except for the purpose of testing.

d) In case of department machine, safe working load shall be notified, by the Engineer- in -charge. As regards contractor's machine the contractor shall notify safe working load of each machine to the Engineer-in-charge when ever he brings it to site of work and get it verified by the Engineer-in-charge.

11. Motors, gearing, transmission electric wiring and other dangerous parts *of* hoisting appliances shall be provided with efficient safeguards, hoisting appliances shall be provided with such means as will reduce to the minimum risk of accident descent of load. Adequate precaution shall be taken to reduce to the minimum risk of any part of a suspended load becoming accidentally displaced. When workers are employed on electrical installations which are already energised insulating mats, working apparel such as gloves, sleeves and boots as may be necessary shall be provided. Workers shall not wear any rings watches .carry keys or other materials which are good conductors of electricity.

12. All scaffolds, ladders and other safely devices mentioned or described here in shall be maintained in a safe condition and no scaffold, ladder or equipment shall be altered or removed while it is use. Adequate washing facilities shall be provided at or near the places of work.

13. These safety provision shall be brought to the notice of all concerned by display on a notice board at a prominent place at the work spot persons responsible for immuring compliance with the safety code shall be named thereon by the contractor.

14. To ensure effective enforcement *oi* the rules and regulations relating to safety precaution, arrangement made by the contractor shall be open to inspection be the Engineer-in-charge or his representation and the inspecting officers as defined in the contractor's Labour Regulations.

15. Not withstanding the above conditions 1 to 14, th contractor is not exempted from the operation of any other Act or Rule in force.

## B. GENERAL SAFETY PRECAUTIONS TO BE FOLLOWED AT WORK SITES DURING EXECUTION

The following safety measures should be strictly adhered to during execution of works al sites:

1. Providing the working platform with toe-board and handrail for continuous working at heights.

2. Providing safely belt and lifeline at all times for men working at heights.

3. Providing dust or fume respirator in places where dust and fume concentration exists.

4. Providing goggles and welding screens.

5. Providing acid and alkali proof rubber gloves for handling acids, alkali and chemicals, which are corrosive.

6. Providing rubber gloves for working on electrical works.

7. Ensuring proper lashing of the components while being transported in vehicles,

8. The vehicles must have side supports or have body to support the materials conveyed.

9. The materials should not be allowed to extend or overflow the sides of vehicles.

10. Materials should not be allowed to overhang from the rear edge of the body of the vehicle.

11. Driver of the vehicle must posses license.

12. Vehicle must not be overloaded prescribed limits.

13. Red flags and lights for parts projecting from the body of the vehicle must be provided.

14. The speed restrictions with m the factory must be strictly adhered to,

15. The gas cylinders must always be handled on trolleys or kept tied down not in use. They should never be rolled as Roller for conveying,

16. Cylinders should not used without regulators.

17. All excavations may be barricaded and red belts/ lamps must be provided. All electrical connections must be properly earthed.

18. No work should be taken up for execution inside shop floor, with out obtaining necessary work permit.

19. Providing helmet for high level work.

20. The contractor should maintain EI register regarding the driver license particulars.

21. All Personnel Protective tk| ui pin cuts (PPli) conform to standard specification as per the

22. Details given in the code of conduct,

(i) Safety helmets confirming to IS-2925: 1984
(ii) Safety Belts confirming to IS-3521: 1983
(iii) Safety Shoes confirming to 1S-19S9: 1978
*(iv)* Eye iind face protection devices confirming to IS - 8520:1977 & IS - 8940:1978
(vi) Hand and body protective devices confirming to: IS - 2573: 1975
IS - 6994: 1973 IS-8807: 1973 IS - 8519: 1977

Contractor including the subcontractors, agents and labours engaged on work are required to scrupulously adhere to the safety regulations, safety precautions and measures. Any violation thereof will invite punitive action being taken against them. Also con tractors with frequent violations of safety regulations will not entrusted with further work in this organization.

General:

All tools, tackles, lifting appliances, material handling equipment, scaffolds, cradles, safety nets, ladders, equipment etc, used by the contractor shall *be* of safe design and construction. These shall be tested and certificate of fitness obtained, before putting them to use and from lime to time as instructed by authorized BHEL official who shall have the right to ban the use of any item.

## C. SAFETY PRECAUTION TO BE OBSERVED WHILE TRANSFORATING MATERIALS

### I. Vehicle

1. Vehicle carrying materials should have proper registration documents and must be produced on demand by our Security staff.

2. The light on right side i.e. over the driver's cabin shall be in working condition

3. Both the head light as well as park lamps must be in working condition.

### II. Movement of Vehicle

1. The vehicle should not travel a! more than 20KMPH in our premises

2. The driver of the vehicle must possess heavy duty license and produce on demand by the Security Staff.

3. Vehicles carrying inflammable liquids in the tanks containers should have grounding chain or the tank container should be coated with insulating materials to avoid static electricity

4. In road junction, speed breaker and Railway crossing the speed should be lowered and vehicles should proceed cautiously.

5. **The** driving should be ' keep to the left' at all places.

6. The vehicles should not parked on the road which could obstruct the vehicular traffic.

7. No person other than driver should be allowed to sit or stand on the prime mover or trailer.

8. The vehicle should pass only through the approved routes. Short cuts should be forbidden.

9. There must be a safe distance behind another moving truck.

10. The driver should avoid making quick starts, jerk stop or quick turns at excessive speed.

III Shipping

1. Strong side supports should be provided on both sides of the trailer. The side supports should be fixed in such a way that it cannot be removed even temporally.

2. Adequate packing must be given for easy slinging operations. The packing materials should be good enough to withstand the load.

3. The stacking of loads on the truck should be evenly placed, This load should not be heaped together or dumped over the chassis.

4. The load on the truck should not be beyond its standard capacity. The carrying capacity must be clearly marked on the trailers also.

5. The loaded materials should be fastened tightly with "WIRE ROPE ". Manila rope or coir rope should not at all be used. There must be side packing
such as gunny or rubber tyre between the sharp edges of the job and wire rope in order to avoid cut in the wire rope.

6. There must be minimum two fastening and it should be more in case of lengthier loads.

7 The wire rope should be in sound condition i.e. , there Should not be Links,

knots or bristles etc.

8. The wire rope ends should be clamped with 'U' clamps.

9. The loose pieces should be bundled before loading on the truck.

10. There must be red flags or red lamps for the lengthily loads which extend beyond chassis.

11. The materials should not be stacked too high to avoid hitting against live electric lines.

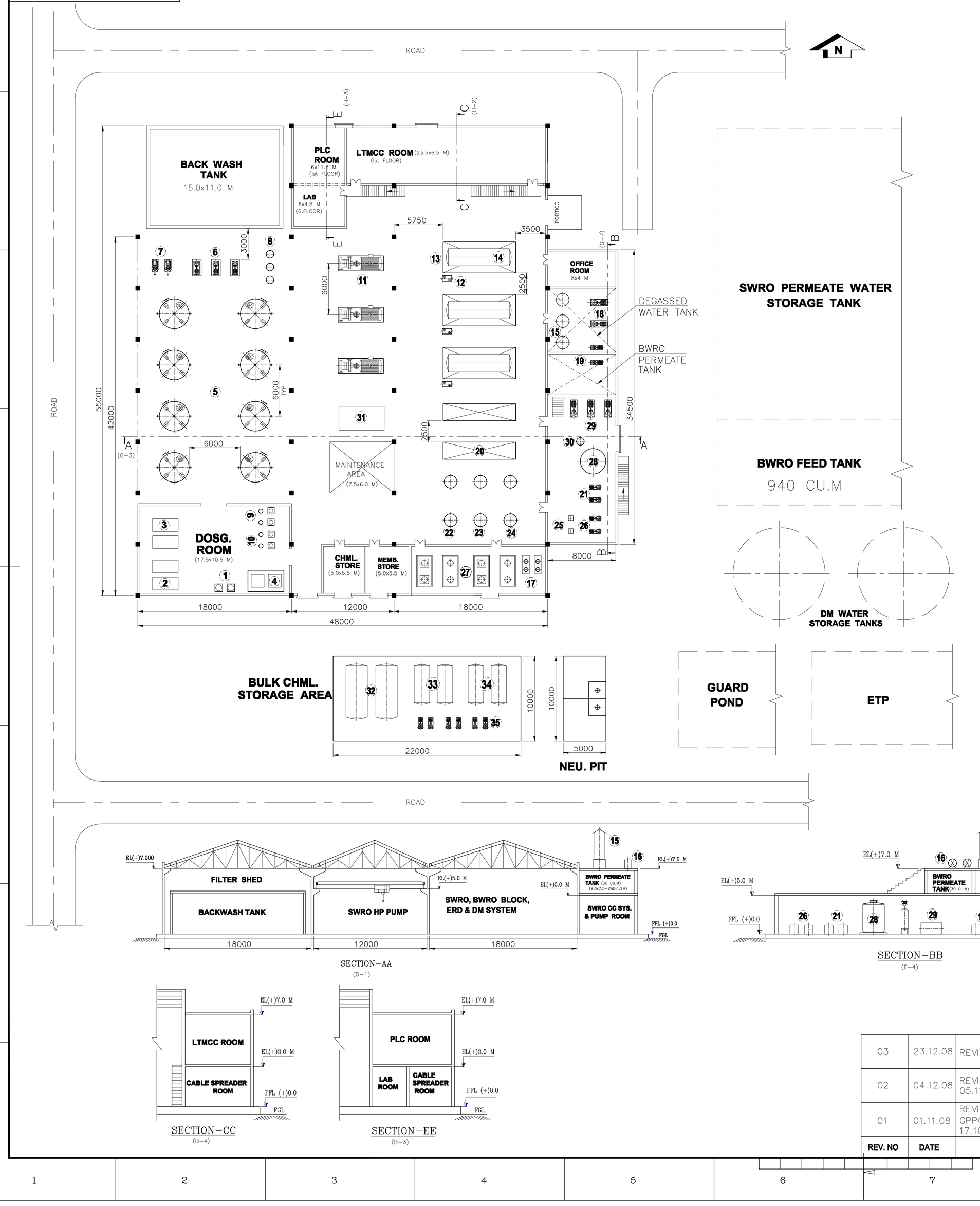
12. The load should hot be overhanging more than 0.9 metres from the end of body.

13. While transporting the scraps, there must be wire net cover to prevent failing of scrap.

IV General

1, The vehicles should not be moved directly inside the production building in case the materials are to be unloaded there But the vehicles should be parked outside the building and the driver should ascertain the passage as well as the unloading points, with the. help of[1] the shop officals. This will avoid the congestion of blocking of traffic in the gangway,

DRAWING NO. 1-SW-220-00226

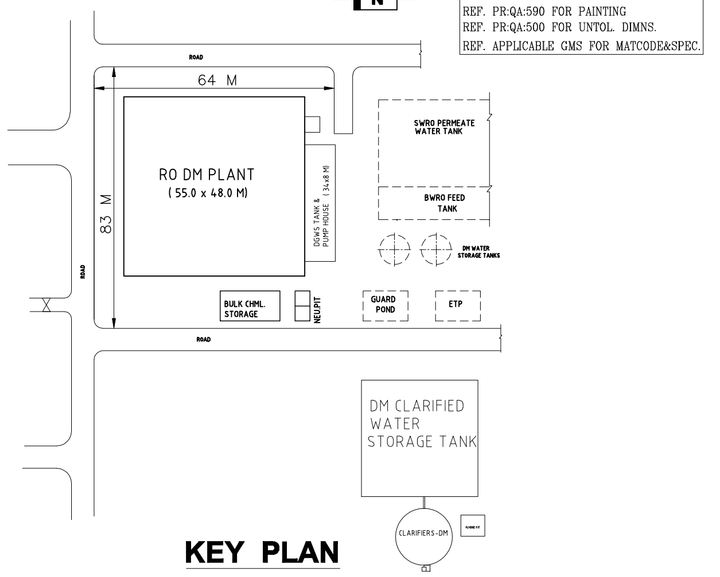



## EQUIPMENT DETAIL:

| EQUIP. NO. | EQUIPMENT NAME | QTY IN NO. | APPROX SIZE IN 'M' | LOC. |
|---|---|---|---|---|
| 1 | SEC. CHLORINATION SKID. | 2 | 1.25x0.68 | E-2 |
| 2 | COA.DOSING SKID | 2 | 1.25x0.68 | E-2 |
| 3 | COA. AID DOSING SKID | 2 | 1.3x0.5 | D-2 |
| 4 | ACID DOSING SKID | 2 | 0.7x0.5 | E-2 |
| 5 | PRESSURE SAND FILTER | 8 | ø3.5 | C-2 |
| 6 | BACK WASH PUMP | 3 | 2x1 | C-2 |
| 7 | AIR BLOWERS | 2 | 1.4x0.7 | C-2 |
| 8 | CART.FILTERS | 3 | ø0.9 | C-2 |
| 9 | SBS DOSING SKID | 2 | 1.3X0.5 | D-2 |
| 10 | ANTI-SCALANT DOSG.SKID. | 2 | 2.65X1.2 | D-2 |
| 11 | SWRO HP PUMP | 3 | 5.4x1.4 | C-3 |
| 12 | ERD | 3 | 1.2x0.7 | C-4 |
| 13 | SWRO BLOCK | 3 | 8.5x4 | C-4 |
| 14 | SUCK BACK TANK | 3 | ø1.2x6 | C-4 |
| 15 | DEGASSER TOWER | 3 | ø2x3.5 | C-4 |
| 16 | DEGASSER BLOWER | 6 | 1.4x0.7 | F-5 |
| 17 | NaOH DOSING SYSTEM | 2 | 1.3x0.5 | E-4 |
| 18 | FLUSHING PUMP | 2 | 2x1 | C-5 |
| 19 | BWRO FEED PUMP | 2 | 0.6x1.3 | C-5 |
| 20 | BWRO SKID | 2 | 8.7x2 | D-4 |
| 21 | DM FEED PUMPS | 2 | 0.6x1.6 | D-5 |
| 22 | SAC | 2 | ø1.5 | D-4 |
| 23 | SBA | 2 | ø1.5 | D-4 |
| 24 | MB | 2 | ø1.5 | D-3 |
| 25 | MB BLOWER | 2 | 0.5X0.6 | D-5 |
| 26 | DM WATER REGEN PUMP | 2 | 2x1 | D-5 |
| 27 | CDT / AMT SYSTEM | 4ST | 3.75x1.75 | E-4 |
| 28 | SWRO CC TANK | 1 | ø3 | D-5 |
| 29 | SWRO CC PUMP | 3 | 2x1 | D-5 |
| 30 | SWRO CC FILTER | 1 | ø1.0 | D-4 |
| 31 | BWRO CC SYSTEM | 1 | 5.0x2.75 | D-3 |
| 32 | BULK ACID TANK | 2 | ø2.5;L-6 | E-3 |
| 33 | BULK FeCl3 TANK | 2 | ø1.8;L-4 | E-4 |
| 34 | BULK NaOH TANK | 2 | ø1.8;L-4 | E-4 |
| 35 | CHML. UNLOAD PUMPS | 6 | 1.3x0.8 | E-4 |

ALL DIMENSIONS ARE IN MILLIMETRES

FOR PRODUCTION
REF. PR:QA:590 FOR PAINTING
REF. PR:QA:500 FOR UNTOL. DIMNS.
REF. APPLICABLE CMS FOR MATCODE&SPEC.




## KEY PLAN

### NOTES:

1. TANK AND BUILDING DIMESION FURNISHED ARE PRELIMINARY. MINOR CHANGES MAY BE REQUIRED AFTER FINALISATION OF VENDOR.
2. EQUIPMENT LOCATION WILL BE FINALISED AFTER ORDERING
3. FINISHED GRADED LEVEL (FGL), CO-ORDINATES OF ROAD AND TANKS WILL BE FURNISHED LATER

### LEGEND :

—— —— PEM'S SCOPE

FGD – FINISHED GRADED LEVEL
FFL – FINISHED FLOOR LEVEL
RS – ROLLING SHUTTER

### REF. DRAWING & DOCUMENT :

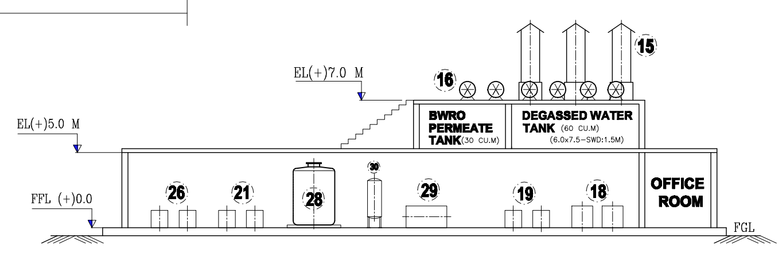
1. PLOT PLAN – DRG. NO : PE-DG-292-100-M001, Dt. 11.11.08
2. TENDER/CONTRACT SPEC. – FOR CIVIL REQUIREMENT

**PRELIMINARY**

**PROGRESSIVE PRINT DT: 09.02.09**




SECTION–AA
(D-1)




SECTION–BB
(E-4)




SECTION–CC
(B-4)




SECTION–EE
(B-3)

| REV. NO | DATE | DESCRIPTION | REVD. BY | CHKD. BY | APPD. BY |
|---|---|---|---|---|---|
| 03 | 23.12.08 | REVISED TO SUIT PEM'S PLOT PLAN | GR | MN | MN |
| 02 | 04.12.08 | REVISED AS DISCUSSED IN THE PRM ON 05.11.08 AT PEM NOIDA. | | | |
| 01 | 01.11.08 | REVISED AS PER CUSTOMER LETTER REF. GPPC/BHEL/T-1/40403-022/131 DT. 17.10.08 | | | |

FILE NAME : -

OWNER : GSPC PIPAVAV POWER COMPANY LIMITED

OWNER'S CONSULTANT : TCE Consulting Engineers Limited

PROJECT:- 700 MW CCPP AT KOVAYA, PIPAVAV, GUJARAT
SWRO PLANT - 112 Cu.M/Hr. PER STREAM ( 2W+1S )
BWRO PLANT - 33 Cu.M/Hr. PER STREAM ( 1W+1S )
DM PLANT - 31.5 Cu.M/Hr. PER STREAM ( 1W+1S )

EPC CONTRACTOR : BHARAT HEAVY ELECTRICALS LTD
BOILER AUXILIARIES PLANT
RANIPET - 632 406

| | NAME | DATE |
|---|---|---|
| DRAWN BY: | GR | 24.08.08 |
| CHECKED BY: | MN | 24.08.08 |
| APPROVED BY: | KSK | 24.08.08 |

TITLE: **RO - DM PLANT EQUIPMENT LAYOUT**

DOCUMENT STATUS: ☒ FOR INFORMATION ☐ FOR APPROVAL ☐ FOR CONSTRUCTION: ☐ AS BUILT

| ALL DIMENSIONS ARE IN MILLIMETERS | SCALE : – | DWG. NO. | SHEET NO. | REV. NO. |
|---|---|---|---|---|
| | | 1 - SW - 220 - 00226 | SH. 2 OF 2 | 03 |

Size A1

DRAWING NO. 1 - BW - 220 - 00222

ALL DIMENSIONS ARE IN IMETRES

FOR PRODUCTION
REF. PR:QA:590 FOR PAINTING
REF. PR:QA:500 FOR UNTOL. DIMNS.
REF. APPLICABLE GMS FOR MATCODE&SPEC.


## EQUIPMENT DETAIL:

| EQUIP. NO. | EQUIPMENT NAME |
|---|---|
| 1 | BASKET STRAINER |
| 2 | COA.DOSING SYSTEM |
| 3 | FLASH MIXER |
| 4 | FLOCCULATION TANK |
| 5 | MEMBRANE TANK |
| 6 | AIR BLOWERS |
| 7 | PERM./BACK PULSE PUMP |
| 8 | CIP/BACK PULSE TANK |
| 9 | WAC FEED PUMP |
| 10 | ACID MEAS. TANK |
| 11 | WAC VESSEL |
| 12 | DEGASER TOWER |
| 13 | DEGASER BLOWER |
| 14 | RO-1 FEED PUMP |
| 15 | SBS DOSING SYS. |
| 16 | ANTI-SCALANT DOSG.SYS |

| EQUIP. NO. | EQUIPMENT NAME |
|---|---|
| 17 | RO SKID (STAGE-1) |
| 18 | RO-1 PERM. STORAGE TANK |
| 19 | RO-2 FEED PUMP |
| 20 | RO SKID (STAGE-2) |
| 21 | MB FEED PUMPS |
| 22 | MIXED BED |
| 23 | MB BLOWER |
| 24 | FORWARDING PUMP |
| 25 | ACID/ALKALI FILLING PUMP |
| 26 | ACID/ALKALI STORAGE TANK |
| 27 | ACID/ALKALI MEAS. TANK |
| 28 | MB REGEN. PUMPS |
| 29 | RO SYS. CIP TANK |
| 30 | RO SYS. CIP/PERM. FLUSH PUMPS |
| 31 | RO SYS CIP CART. FILTER |
| 32 | W.W DISPOSAL PUMPS |
| 33 | BRINE TRANSFER PUMPS |
| 34 | DM WATER TRANSFER PUMPS |

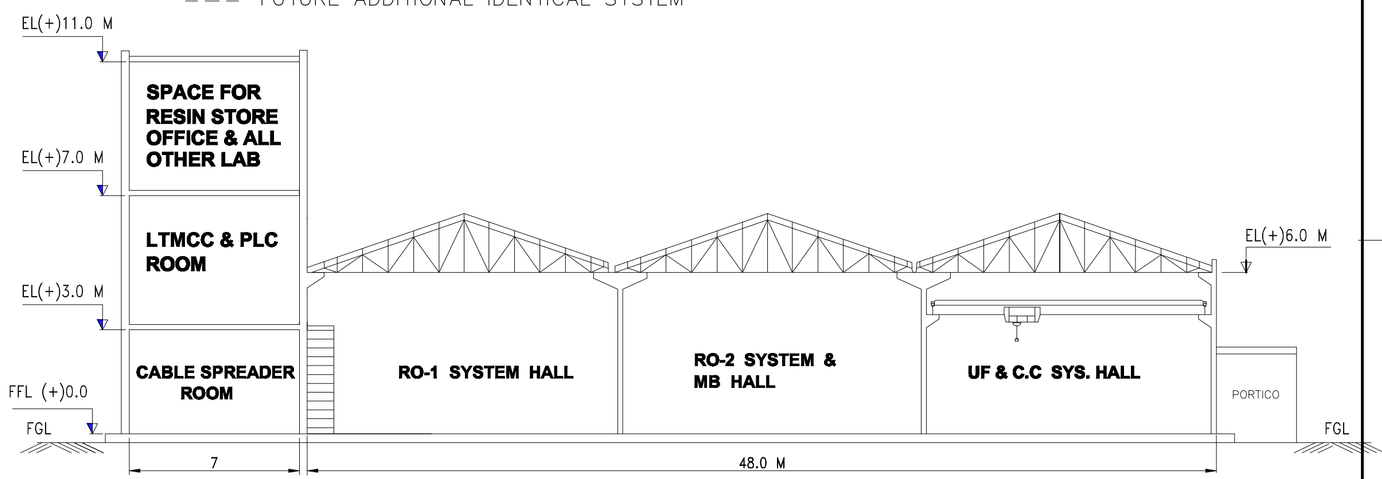
**NOTES :**

1. TANK AND BUILDING DIMENSION FURNISHED ARE PRELIMINARY. MINOR CHANGES MAY BE REQUIRED AFTER FINALISATION OF VENDOR.
2. EQUIPMENT LOCATION INDICATED IS TENTATIVE

REF. DRAWING :

PLOT PLAN – DRG. NO. : PE-DG-314-100-M-001 REV. OB

--- FUTURE ADDITIONAL IDENTICAL SYSTEM




SECTION-CC

**PROGRESSIVE PRINT** – REV. B Dt. 05.09.08

| REV | DATE | ALTERED | CHECKED | |
|---|---|---|---|---|
| B | 05.09.08 | GR | TA | LAYOUT REVISED AS PER THE DISCUSSION HELD AT PEM OFFICE ON 26.08.08 |
| A | 22.08.08 | GR | TA | LAYOUT REVISED TO SUIT WITH THE SPACE ALLOTED FOR RO-DM PLANT. |



TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT: **RO-DM PLANT - 50 Cu.M/Hr. 1500 MW PRAGATI-III CCPP**

BHARAT HEAVY ELECTRICALS LTD., UNIT: BOILER AUXILIARIES PLANT, RANIPET – 632 406.

| | NAME | SIGN | DATE | NO.OF VAR. |
|---|---|---|---|---|
| DRN | GR | | 02.07.08 | |
| CHD | TA | | 02.07.08 | |
| APPD | KSK | | 02.07.08 | |

| DEPT | GRADE OF UNTOL.DIM | SCALE | WEIGHT (KG). | REF. TO ASSY/OLD DRG. | ITEM NO. | NO. OF ITEMS |
|---|---|---|---|---|---|---|
| FANS | | | | 1 – BW – 220 – 00238 | | |
| CODE 864 | PR:QA:500 | | | | | |

TITLE: **RO-DM PLANT LAYOUT**

CARD CODE: U 01

DRAWING NO.: **1 - BW - 220 - 00222**

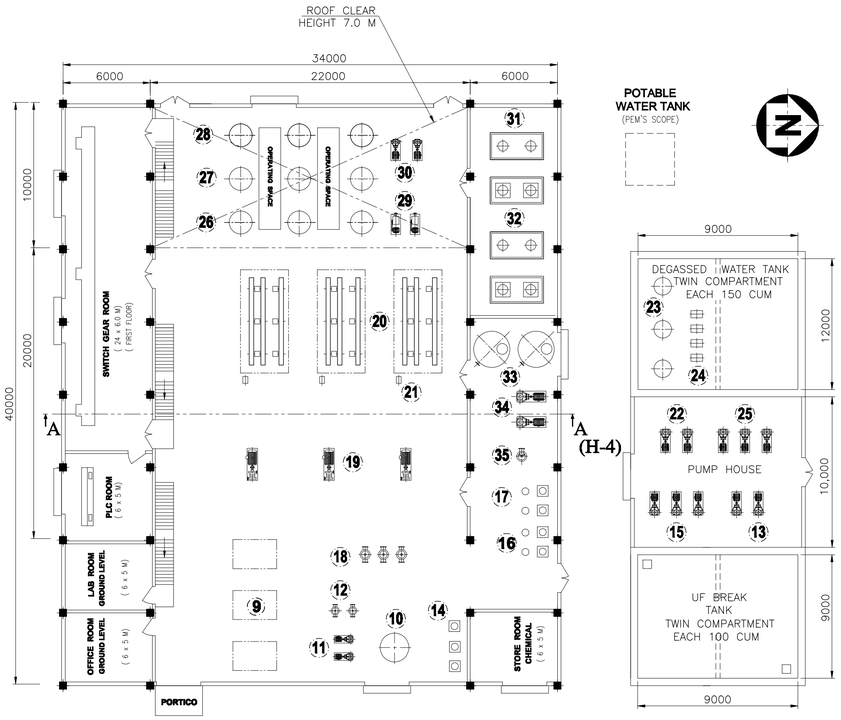
REV: B

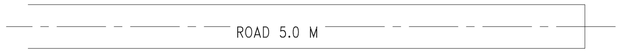
Size A1

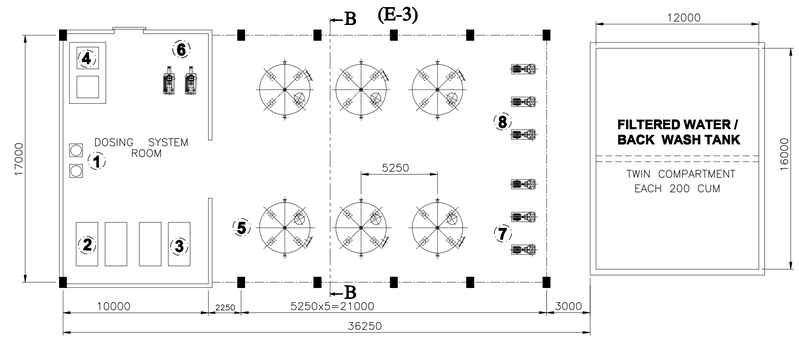
DRAWING NO **1-BW-220-00241**

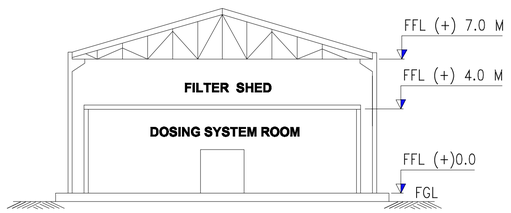
ALL DIMENSIONS ARE IN MILLIMETRES

FOR PRODUCTION
REF. PR:QA:590 FOR PAINTING
REF. PR:QA:500 FOR UNTOL. DIMNS.
REF. APPLICABLE GMS FOR MATCODE&SPEC.

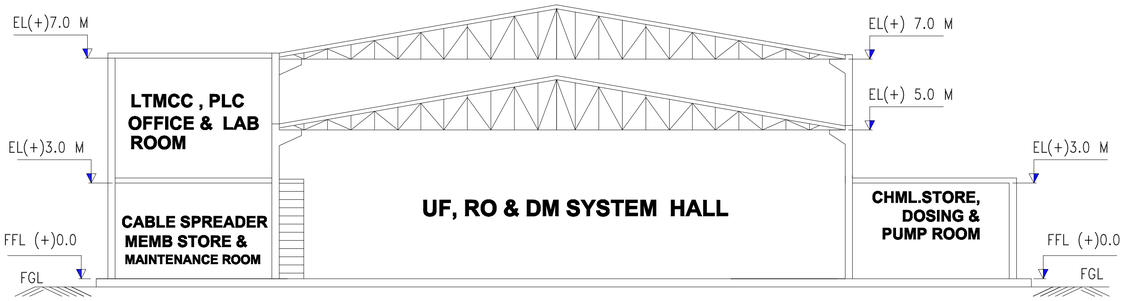


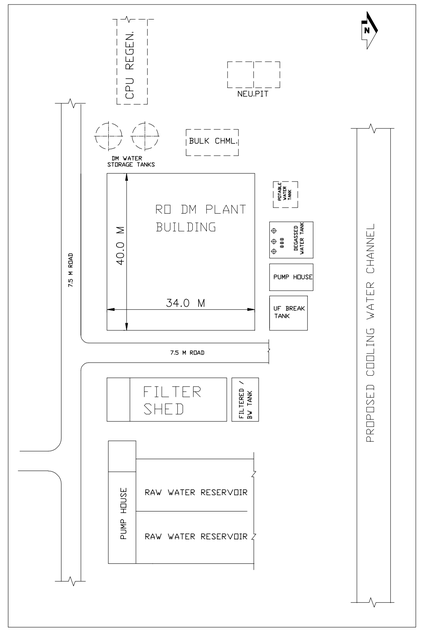

SECTION–BB
(E-3)




SECTION–AA
(C-4)

## EQUIPMENT DETAIL:

| EQPT. NO. | EQUIPMENT NAME | QTY. (NOS.) | APPROX. SIZE IN 'Mts' (L X B X H) | LOCAT. CO-ORDINAT |
|---|---|---|---|---|
| 1 | SEC. CHLORINATION SYS. | 2 | 3.2X1.6 | E–2 |
| 2 | COA.DOSING SYSTEM | 2 | 3.2X1.6 | F–2 |
| 3 | COA. AID DOSING SYSTEM | 2 | 3.2X1.6 | F–2 |
| 4 | ACID DOSING SYSTEM | 2 | 2.8X1.6 | E–2 |
| 5 | DMF | 6 | ø 3 X 3.7ht | F–3 |
| 6 | AIR BLOWERS | 2 | 1.6 X 0.5 X 0.5 | E–2 |
| 7 | BACK WASH PUMP | 3 | 1.8 X 0.5 X 0.5 | F–4 |
| 8 | UF FEED PUMPS | 3 | 1.8 X 0.5 X 0.8 | E–4 |
| 9 | UF MEMBRANE BLOCK | 3 | 3.0 X 2.0 | D–2 |
| 10 | UF CC TANK | 1 | ø 1.0 | D–3 |
| 11 | UF CC PUMP | 2 | 1.9 X 0.6 X 0.8 | D–3 |
| 12 | UF CC FILTER | 2 | ø 1.3 X 1.5ht | C–3 |
| 13 | UF BACKWASH PUMP | 2 | 1.6 X 0.5 X 0.5 | C–5 |
| 14 | UF DOSING SYSTEM | 3 | 1.0 X 1.0 | D–3 |
| 15 | RO FEED PUMP | 3 | 1.6 X 0.5 X 0.5 | C–5 |
| 16 | ANTI–SCALANT DOSG. SYS. | 2 | 3.2 X 1.6 | D–4 |
| 17 | ANTI–OXIDANT DOSG. SYS. | 2 | 3.2 X 1.6 | C–4 |
| 18 | CARTRIDGE FILTER | 3 | ø1.0 m X 1.5 ht | D–3 |
| 19 | RO HP PUMP | 3 | 2.7 X 0.7 X 0.8 | C–3 |
| 20 | RO STREAMS | 3 | ø 0.3M , 7.0M | B–3 |
| 21 | ERD | 3 | 1.2 x 0.7 | B–3 |
| 22 | FLUSHING PUMP | 2 | 1.8 X 0.5 X 0.5 | C–5 |
| 23 | DEGASSED WATER TANK | 3 | 2 X 150 m3 | B–4 |
| 24 | DEGASSER AIR BLOWER | 4 | 0.9 X 0.4 X 0.5 | B–5 |
| 25 | DM FEED PUMP | 3 | 1.9 X 0.6 X 0.8 | C–5 |
| 26 | SAC | 3 | ø 1.6 X 3.0 ht | B–2 |
| 27 | SBA | 3 | ø 1.6 X 3.0 ht | B–2 |
| 28 | MB | 3 | ø 1.6 X 3.0 ht | B–2 |
| 29 | MB AIR BLOWER | 2 | 1.6 X 0.5 X 0.5 | B–3 |
| 30 | DM REGEN. PUMPS | 2 | 1.6 X 0.5 X 0.5 | B–3 |
| 31 | AM TANK | 2 | ø 1.2 | B–4 |
| 32 | CD TANK | 2 | ø 1.2 | B–4 |
| 33 | CC TANK | 2 | ø 2.0 X 5.0 ht | B–4 |
| 34 | CC PUMPS | 2 | 1.9 X 0.6 X 0.8 | C–4 |
| 35 | CC CART.FILTERS | 1 | ø 0.5 X 1.5 ht | C–4 |




## KEY PLAN

## NOTES:

1. TANK AND BUILDING DIMESION FURNISHED ARE PRELIMINARY. MINOR CHANGES MAY BE REQUIRED AFTER FINALISATION OF VENDOR.
2. EQUIPMENT LOCATION WILL BE FINALISED AFTER ORDERING

## REF. DRAWING & DOCUMENT :

1. PLOT PLAN – DRG. NO : PE–DG–307–100–M001, REV. 00

**PRELIMINARY**

**PROGRESSIVE PRINT - Dt. 07.01.09**

| REV | DATE | ALTD | CHD | APPD | REV | DATE | ALTD | CHD | APPD |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |

CUSTOMER: TAMILNADU ELECTRICITY BOARD
CUSTOMER'S CONSULTANT: DCPL, CHENNAI
JOB No.: 2 X 600 MW NORTH CHENNAI TPP (STAGE–II, UNIT # 1 & 2)
STATUS: CONTRACT
DISTRIBUTION
TO
No.OFF

BHARAT HEAVY ELECTRICALS LTD
BOILER AUXILIARIES PLANT
RANIPET - 632 406

| DEPT CODE | | NAME | SIGN | DATE |
|---|---|---|---|---|
| M | DRN | G.R | | 21.02.2009 |
| | DESN | G.R | | 07.01.2009 |
| | CHD | M.N | | 07.01.2009 |
| | APPD | K.S.K | | 07.01.2009 |

TITLE: **PLANT EQUIPMENT LAYOUT**

| MPL | C | MSE | I | MAX | E | DEPT. SIGN DATE |
|---|---|---|---|---|---|---|
| | | | | | | |

SCALE NTS

DRAWING No. **1 - BW - 220 - 00241**

SHEET 1 OF 1 REV 00

Size A1