



# CENTRE FOR CELLULAR & MOLECULAR BIOLOGY

UPPAL ROAD, HYDERABAD (AP) INDIA – 500 076

## BID DOCUMENT

**Hard Copy of the Bid to be submitted to:**

**Stores & Purchase Officer  
Centre for Cellular & Molecular Biology  
Uppal Road, Hyderabad – 500 007 (AP) INDIA**

**Ph: +91-40-271602691, 2687 Fax: +91-40-27160996**

**E-Mail: [fpurinst@ccmb.res.in](mailto:fpurinst@ccmb.res.in), [spo@ccmb.res.in](mailto:spo@ccmb.res.in)**

**Website: <http://www.ccmb.res.in>**

**NB: THIS BID DOCUMENT IS **FREE OF COST** IF DOWNLOADED FROM THE WEBSITE**

## CHAPTER – I: NOTICE INVITING TENDER

Director CCMB (CSIR) Hyderabad (AP) India invites *sealed* offers from reputed manufacturers or their authorized agents for the supply/installation/commissioning of the following items:

S. N.	ITEM & ENQUIRY/TENDER REF. NO.	Bid Type	EMD
01	CCMB/PUR/AP/F/3785/010 <b>Diesel Generator Sets (03 Nos. of 650 KVA each)</b> Supply / Testing / Installation / Commissioning including electrical modification work	Two Bid	INR 4,00,000/-

### **IMPORTANT DATES & TIME**

<b>Pre Bid Conference / Inspection of Installation Site</b>	<b>February 05, 2010 (1000 HRS onwards)</b>
<i>It is suggested that interested bidders must inspect the DG Sets installation site and discuss / clarify doubts with our engineers. For this they should plan a visit on Feb.05, 2010 at 10AM. Pre Bid meeting shall take place on the same day at 2:30PM. Changes / clarifications if any shall be hosted on CCMB website in 2 – 3 working days afterwards and original tender shall have stood modified to that extent.</i>	
Please schedule inspection meeting by sending a mail to <a href="mailto:rkgupta@ccmb.res.in">rkgupta@ccmb.res.in</a> with a cc to <a href="mailto:spo@ccmb.res.in">spo@ccmb.res.in</a>	
<b>Pre Bid Conference / Inspection of Installation Site</b>	<b>February 05, 2010 (1000 HRS onwards)</b>
<b>Last Date &amp; Time For Submission</b>	<b>February 15, 2010 (1230 HRS)</b>
<b>Date / Time of Opening of Bids</b>	<b>February 16, 2010 (1530 HRS)</b>
<b>Venue of Bid Opening at CCMB</b>	<b>Stores &amp; Purchase Building (First Floor)</b>
<b>Tenders to be submitted at</b>	<b>First Floor, Administrative Block CCMB</b>

### **IMPORTANT NOTE:**


- PLEASE STRICTLY ADHERE TO THE DATES / TIMES MENTIONED IN THIS DOCUMENT
- PLEASE FILL & ENCLOSE THE BRIEF SUMMARY OF QUOTATION & CHECKLIST AS PROVIDED AT THE END OF THIS CHAPTER & ENCLOSE WITH YOUR BID (WITH PRICE BID IN CASE OF TWO BID SYSTEM)

The bids (Technical Bids in case of Two Bid Tenders) will be opened in the presence of representatives of tenderers, if any. **If any unscheduled holiday occurs on the date of submission/opening, then next working day shall be the prescribed date of submission/opening. Requests for postponement will not be entertained.** Fax/email bids may not be accepted. Late/Delayed tenders shall not be opened. Please send your bids to the **Stores & Purchase Officer** at the address mentioned above.

Thanking you,  
Yours faithfully,

(Y Chauhan)  
Stores & Purchase Officer

## COPY OF PRESS ADVERTISEMENT

	<b>CENTRE FOR CELLULAR &amp; MOLECULAR BIOLOGY (CSIR)</b> Uppal Road, HYDERABAD – 500 007 (AP) INDIA
<b>05/2009</b>	
Director CCMB invites <b>sealed</b> offers for supply of the following items:	
<b>Diesel Generator Sets (650 KVA) – 03 Nos.</b> Supply / Testing / Installation / Commissioning including electrical modification work as per details of the tender document	
<b>TWO BID TENDER / EMD Rs.400,000/-</b>	
<b>Pre Bid Meeting / Site Inspection Visit</b>	<b>05-02-2010 (10AM onwards)</b>
<b>Last Date For Submission</b>	<b>15- 02- 2010</b> (1230 hrs)
For detailed information please visit Tender section of website: <a href="http://www.ccmb.res.in">www.ccmb.res.in</a>	
<b>Stores and Purchase Officer</b>	

**BRIEF SUMMARY OF QUOTATION & CHECKLIST (Enclose with Price Bid)****Most entries relevant to IMPORTED items only, For Indigenous items write NA wherever applicable****(Information provided in this sheet shall not to be used for evaluation/comparison purpose)****FOR Rs. QUOTE FILL RELEVANT INFORMATION IN Rs.**

Quotation Ref. No.		Date
01	Name of the Item (Equipment / System etc.)	
02	Main Item Model NUMBER	
03	Total FCA/FOB Value Of The Offered Package (Inclusive of Indian Agency Commission, if any)	
04	Insurance & Airfreight Charges	
05	CIF / CIP Value Of The Package	
06	Payment Terms <i>(Conditional Payment Terms Will NOT Be Accepted)</i>	
07	Delivery Time (Weeks/Months)	
08	Warranty (Months/Years)	
09	Validity of Quotation (Days/Months)	
10	Product Import Code* ( ITC HS Code of the item / main item) <b>(Please consult any Export / Import / Customs Agent or ITC Handbook)</b>	
11	Country of Origin (product)	
12	Port(s) of Shipment	
13	Approx. Shipment Wt. (Chargeable Wt.) of the Item (kg)	
14	Approx. Dimensions (LXBW)/Vol. of The Packed Consignment	

**CHECKLIST****CHECKLIST****CHECKLIST**

01	Following Things Are Mentioned On The Main (Outer) Envelope •Item Name •CCMB Reference No. •Last Date For Submission Of Tender •Date Of Opening Of Tender •Firm's Name & Address	
02	EMD is <b>Enclosed</b> (with Technical Bid Envelope In Case Of Two Bid)	
03	Demand Draft / TDR is in Favour of Director CCMB, Hyderabad And <b>Payable</b> At Hyderabad. <b>Bidding Firm's Name/Ref. No. etc. has been mentioned on the back side of Demand Draft</b>	
04	Prices have been quoted keeping in view clauses C8, C13, C23 of Chapter II (ITB) and SCC clauses 3,7,8, and 9 of Chapter IV	
05	The Bid Papers Have Been <b>PUNCHED</b> With A Hole <input checked="" type="checkbox"/> On The <b>Top Left Hand Corner Side</b> And <b>Properly Tagged</b> .	
06	Only <b>Relevant</b> Documents (Technical Brochures/Leaflets Etc.) Required In Support Of The Quoted Item Have Been Enclosed. <b>No</b> Irrelevant Papers like ITCC, User Recommendations, and Order Copies etc. Have Been Enclosed Unless Specifically Asked For	
07	Quotation Have Been Duly Signed And Stamped By the <b>Authorized &amp; Competent</b> Person. All Cuttings/Over Writings Have Been Duly Checked, Initialled And Stamped. (If Applicable)	
08	In Case of Two Bid, Single Combined Quote Has Not Been Submitted <b>OR</b> 'Price Bid' Has Not Been Enclosed In The Envelope Marked 'Technical Bid'	
09	<b>In Case of Two Bid Tender This Page Will Be Enclosed With The Price Bid</b>	

*We have read and understood the tender terms and conditions. The undersigned is competent to sign the tender document including this page on behalf of the quoting firm.*

Date

(Signature with Seal)

## CHAPTER – II: INSTRUCTION TO BIDDERS

### A. INTRODUCTION

#### 1 Eligible Bidders

- 1.1 This Invitation for Bids is open to all manufacturers or their dealers specifically authorised by the manufacturers (see Chapter VII of this document) to quote on their behalf for this tender and Indian agents of foreign principals, if any.
- 1.2 Bidders should not be associated, or have been associated in the past, directly or indirectly, with a firm or any of its affiliates which have been engaged by the Purchaser to provide consulting services for the preparation of the design, specifications, and other documents to be used for the procurement of the goods to be purchased under this Invitation of Bids.

#### 2 Cost of Bidding

- 2.1 The Bidder shall bear all costs associated with the preparation and submission of its bid, and "the Purchaser", will in no case be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process.

### B. THE BIDDING DOCUMENTS

#### 3 Cost of Bid Document

- 3.1 The complete bid document can be downloaded **FREE OF COST** from our website <http://www.ccmb.res.in>.

#### 4 Contents of Bid Document

- 4.1 The goods required, bidding procedures and contract terms are prescribed in **this** Bid Document which includes the following:

S. No.	Title	Chapter No.
01	Notice Inviting Tender (NIT)	I
02	Instructions to Bidder (ITB)	II
03	General Conditions of Contract (GCC)	III
04	Special Conditions of Contract (SCC)	IV
05	Bid Form	V
06	Bid Security Form	VI
07	Manufacturer's Authorisation Form	VII
08	Bidder's Performance Statement Form	VIII
09	Service Support Details	IX
10	Deviation Statement Form (ITB/GCC/SCC)	X
11	Technical Compliance Statement Form	XI
12	Contract Form	XII
13	Performance Security Form	XIII
14	Qualification Requirements	XIV
15	Technical Specifications & Other Important Requirements	XV

- 4.2 The Bidder is expected to examine all instructions, forms, terms (ITB/GCC/SCC etc.), and specifications in the bidding documents. Failure to furnish all information required by the bidding documents or submission of a bid not substantially responsive shall result in rejection of the bid.

#### 5 Amendment To Bid Document

- 5.1 At any time prior to the deadline for submission of bids, the Purchaser may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder, modify the Bid Document by amendment. Such amendments shall form an integral part of bid documents and it shall amount to an amendment of relevant clauses of the Bid Document.
- 5.2 The prospective bidders are **required** to keep a watch on the CCMB website for any amendment to the tender document or to clarification to the queries raised by the bidders till 05 (five) days prior to the opening of the tender. The Purchaser reserves the right to reject the bids if the bids are submitted without taking into account these amendments/clarifications. Further bidder will be fully responsible for downloading of the tender document and amendments thereto if any for their completeness.
- 5.3 In order to allow prospective bidders reasonable time in which to take the amendment into account in preparing their bids, the Purchaser, at its discretion, may also extend the deadline for the submission of bids.

## C. PREPARATION OF BIDS

### 6 Language of Bid

6.1 The Bid prepared by the Bidder and all correspondence and documents relating to the bid exchanged by the bidder and the purchaser shall be written in English language, provided that any printed literature furnished by the bidder may be written in another language but it is to be accompanied by an English translation of its pertinent passage(s) duly signed and verified as true English translation. The responsibility for the correctness of the translation will be solely and completely on the bidder and CCMB shall not be responsible for any loss/likely loss due to error in translation whatsoever. In such cases, for the purpose of interpretation of the bid, the English translation shall only govern.

### 7 Documents Comprising the Bid

The bid is required to be submitted in **TWO PARTS**. One part is the Techno-Commercial Unpriced Bid and the other part is the Financial / Price Bid.

- 7.1 The **Techno-Commercial Unpriced Bid** prepared by the Bidder shall include the following without indicating the price in the Bid Form.
- (i) Bid Security/EMD As Specified In the Invitation to Bids (ITB)
  - (ii) Service Support Details Form
  - (iii) T&C Deviation Statement Form
  - (iv) Technical Specification Compliance Form
  - (v) Performance Statement Form
  - (vi) Manufacturer's Authorization Form
  - (vii) Documentary evidence establishing that the bidder is eligible to bid and is qualified to perform the contract if its bid is accepted as per qualification requirements/criteria
  - (viii) Bid Form
  - (ix) The Comprehensive Annual Maintenance Contract (CAMC) terms & conditions detailing the exclusions, if any and the estimated life of the equipment offered.
  - (x) If demonstration of the goods is deemed essential to ascertain conformity with the tendered specifications, then confirmation reflecting willingness to arrange demonstration of the equipment offered free of charge at CCMB or any other location on a mutually agreeable date, prior to opening of priced bid.
- 7.2 The **Price/Financial Bid** shall comprise the Techno Commercial Bid with price indicated and the format of BRIEF SUMMARY OF QUOTATION & CHECKLIST included at the beginning of this document.

### 8 Bid Prices

- 8.1 The Bidder shall indicate the unit prices and total bid prices of the goods it proposes to supply under the order and enclose it with the priced bid. CCMB is a public funded scientific R&D centre and institute of higher studies (PhD & Post Doctoral). Please consider quoting special **prices applicable to academic institutions** as per your company policies.
- 8.2 Prices indicated shall be entered separately in the following manner **(For Indigenous Items)**:
- (i) The price of the goods, quoted (ex-works, ex-factory, ex-showroom, ex-warehouse, or off-the-shelf, as applicable), including all duties and sales and other taxes already paid or payable
  - (ii) **Taxes:** CCMB is exempted from payment of Excise Duty under notification number 10/97 dated 01.03.1997 and Customs Duty under notification No.51/96 dated 23.07.1996. **Hence Excise Duty and Customs Duty, if any, should be shown separately.** Please mention the applicable taxes (VAT/Service Tax etc.) clearly. We don't issue any 'Form C' or 'Form D'. However, being R&D Organization Concessional Sales Tax Forms can be issued, if it is applicable in your State from where the material is being supplied. If there is no explicit mention of taxes in your offer then quoted price will be **deemed inclusive** of such taxes. **No other charges except those mentioned clearly in the quotation will be paid.**
  - (iii) Rates should be quoted FOR at CCMB, Hyderabad inclusive of packing, forwarding, installation and commissioning charges etc. If ex-works prices are quoted then packing, forwarding, documentation, freight and insurance charges must be clearly mentioned separately. Vague terms like "packing, forwarding, transportation etc. extra" without mentioning the specific amount/percentage of these charges will NOT be accepted. Such offers shall be treated as incomplete and rejected. **Where there is no mention of packing, forwarding, freight, insurance charges, such offers shall be summarily rejected as incomplete.**
- 8.3 Prices indicated shall be entered separately in the following manner **(For Imported Items)**:
- (i) The price of the goods, quoted FOB/FCA port of shipment. Notwithstanding financial obligations under INCOTERMS 2000 FCA, all charges such as Export Packing, Loading Charges, Inland Freight, Warehousing and Export Clearance etc. in the shipper country will have to be paid by the Supplier to the foreign associate of our duly appointed freight forwarding agent. Items as per the purchase order duly cleared for export in shipping country would be required to be handed over to our nominated freight forwarder.
  - (ii) CIF/CIP rates for shipping items upto Hyderabad (India) preferably through AIR INDIA should also be mentioned. If facility of Air-India is not available in your country, specific intimation to this effect should be mentioned in your proforma invoice. Items are to be Packed, Marked & Labeled as per international norms. Small individual boxes must be **palletized** for easy handling & movement. Therefore state packing/ forwarding/ documentation charges etc. (each one) separately, if applicable. Order shall normally be placed on FOB/FCA basis but Director CCMB reserves the right to place the order on CIF/CIP basis also.
- 8.4 Prices quoted by the bidder shall remain fixed during the entire period of contract and shall not be subject to variation on any account. A bid submitted with an adjustable price quotation will be treated as non - responsive and rejected.

### 9 Bid Currencies

9.1 Prices shall be quoted in Indian Rupees (INR) or in freely convertible foreign currency preferably in **USD (\$), Euro (€), Yen (¥), GBP (£)** wherever possible for correct evaluation during comparison.

### 10 Documents Establishing Bidder's Eligibility and Qualifications

- 10.1 Pursuant to ITB 7, the bidder shall furnish, as part of its bid, documents establishing the bidders' eligibility to bid and its qualification to perform the contract if its bid is accepted
- 10.2 That the bidder meets the Qualification Requirements listed in Chapter XIV and elsewhere in this document.

## 11 Documents Establishing Goods' Eligibility and Conformity to Bid Document

- 11.1 The documentary evidence of the goods and services eligibility shall consist of a statement on the country of origin of the goods and services offered which shall be confirmed by a certificate of origin at the time of shipment.
- 11.2 Specifications are basic essence of the product. It must be ensured that the offers are strictly as per our specifications. At the same time it must also be kept in mind that merely copying our specifications in their quotation shall not make firms eligible for consideration. The documentary evidence of conformity of the goods and services to the Bid Document may be in the form of literature, drawings and data, and shall consist of:
- (i) A detailed description of the essential technical and performance characteristics of the goods;
  - (ii) A list giving full particulars, including available sources and current prices, of spare parts, special tools, etc., necessary for the proper and continuing functioning of the goods for a period of two years, following commencement of the use of the goods by the Purchaser; and
  - (iii) An item-by-item commentary on the Purchaser's Technical Specifications demonstrating substantial responsiveness of the goods and services to those specifications or a statement of deviations and exceptions to the provisions of the Technical Specifications.
- 11.3 For purposes of the commentary to be furnished pursuant to above, the Bidder shall note that standards for workmanship, material and equipment, and references to brand names or catalogue numbers designated by the Purchaser in its Technical Specifications are intended to be descriptive only and not restrictive. The Bidder may substitute alternative standards, brand names and/or catalogue numbers in its bid, provided that it demonstrates to the Purchaser's satisfaction that the substitutions ensure substantial equivalence to those designated in the Technical Specifications. Technically unsuitable offers, offers not conforming to tender schedule shall be rejected.

## 12 Bid Security/EMD

- 12.1 The Bidder shall furnish, as part of its bid, a bid security for an amount as specified in the Invitation for Bids/NIT. The bid security is required to protect the Purchaser against the risk of Bidder's conduct, which would warrant the security's forfeiture.
- 12.2 The bid security shall be in Indian Rupees or USD (\$) and shall be in one of the following forms:
- (i) A bank guarantee issued by a Nationalized /Scheduled bank, in the form provided in the Bid Document (Chapter VI) and valid for 45 days beyond the validity of the bid; or
  - (ii) A Banker's cheque/demand draft or TDR in favour of the purchaser.
- 12.3 Any bid not secured in accordance with Clauses 12.1 and 12.2 above will be **rejected** by the Purchaser as **non-responsive**.
- 12.4 Unsuccessful bidder's bid security will be discharged/returned as promptly as possible but not later than 15 days after the expiration of the period of bid validity or placement of order which ever is later.
- 12.5 The successful Bidder's bid security will be discharged upon the Bidder furnishing the performance security.
- 12.6 The bid security may be forfeited:
- (i) If a Bidder withdraws its bid during the period of bid validity specified by the Bidder on the Bid Form; or
  - (ii) In case of a successful Bidder, if the Bidder fails to furnish order acceptance within 21 days the order and/or fails to furnish Performance Security in the prescribed format.

## 13 Period of Validity of Bids

- 13.1 Bids must remain valid for at least **90 days** after the date of bid opening prescribed by the Purchaser. A bid valid for a shorter period may be rejected by the Purchaser as non-responsive.
- 13.2 In exceptional circumstances, the Purchaser may solicit the Bidder's consent to an extension of the period of validity. The request and the responses thereto shall be made in writing (or by cable, telex, fax or e mail). The bid security provided under Clause 12 shall also be suitably extended. A Bidder may refuse the request without forfeiting its bid security. A Bidder granting the request will not be required nor permitted to modify its bid.
- 13.3 Bid evaluation will be based on the bid prices without taking into consideration the above corrections.

## 14 Format and Signing of Bid

- 14.1 The Bidder shall submit the bids in two separate envelopes. One envelop shall contain Techno commercial un-priced bid and the other shall contain the priced bid.
- 14.2 The original and all copies of the bid shall be typed or written in indelible ink and shall be signed by the Bidder or a person or persons duly authorized to bind the Bidder to the Contract. All pages of the bid, except for un-amended printed literature, shall be initialled by the person or persons signing the bid.
- 14.3 Any interlineations, erasures or overwriting shall be valid only if the persons or persons signing the bid initial them.
- 14.4 The Bidder shall furnish information on commissions or gratuities, if any paid or to be paid to agents relating to this Bid, and to contract execution if the Bidder is awarded the contract as per the bid form.

## D. SUBMISSION OF BIDS

## 15 Sealing and Marking of Bids

- 15.1 The bidder shall seal the **Techno Commercial Unpriced Bid** and the **Price/Financial Bid** in two separate envelopes duly marked as "Techno Commercial Unpriced Bid" and "Price/Financial Bid" respectively. Both the envelopes shall then be sealed in one outer (main) envelope.
- 15.2 **The inner and outer envelopes shall:**
- (i) Be addressed to the Purchaser at the following address:  
  

**The Stores & Purchase Officer  
Centre for Cellular & Molecular Biology,  
Uppal Road, Hyderabad – 500 007 (AP) INDIA**
  - (ii) Bear the Item Name /Reference No. / Last Date For Submission Of Tender / Date Of Opening Of Tender / Firm's Name & Address and a statement "Do not open before Time hrs (IST) on Date." As per the NIT details.
- 15.3 If the outer envelope is not sealed and marked as required Clause 15.2, the Purchaser will assume no responsibility for the bid's misplacement or premature opening.
- 15.4 **Telex, Cable, Fax or e-mail bids will be rejected.**

## **16 Deadline for Submission of Bids**

- 16.1 Bids must be received by the Purchaser at the address specified under Clause 15.2 no later than the time and date specified in the NIT. In the event of the specified date for the submission of Bids being declared a holiday for the Purchaser, the Bids will be received upto the appointed time on the next working day.
- 16.2 The Purchaser may, at its discretion, extend this deadline for submission of bids by amending the bid documents in accordance with Clause 5, in which case all rights and obligations of the Purchaser and Bidders previously subject to the deadline will thereafter be subject to the deadline as extended.

## **17 Late Bids**

- 17.1 Any bid received by the Purchaser after the deadline for submission of bids prescribed by the Purchaser, pursuant to Clause 16, will be rejected and/or returned to the Bidder.

## **18 Modification and Withdrawal of Bids**

- 18.1 The Bidder may modify or withdraw its bid after the bid's submission; provided that written notice of the modification or withdrawal is received by the Purchaser prior to the deadline prescribed for submission of bids.
- 18.2 The Bidder's modification or withdrawal notice shall be prepared, sealed, marked and dispatched in accordance with the provisions of Clause 15. A withdrawal notice may also be sent by telex or cable or fax or e mail but followed by a signed confirmation copy, post marked not later than the deadline for submission of bids.
- 18.3 No bid may be modified subsequent to the deadline for submission of bids.
- 18.4 No bid may be withdrawn in the interval between the deadline for submission of bids and the expiration of the period of bid validity specified by the Bidder on the bid form. Withdrawal of a bid during this interval may result in the Bidder's forfeiture of its bid security, pursuant to Clause 12.6.

## **E. OPENING AND EVALUATION OF BIDS**

### **19 Opening of Bids by the Purchaser**

- 19.1 The Purchaser will open bids (Techno Commercial Unpriced Bids in case of Two Bids), in the presence of Bidders' representatives who choose to attend, as per the schedule given in invitation to bids.
- 19.2 The Bidders' representatives who are present shall sign the quotation opening sheet evidencing their attendance. In the event of the specified date of Bid opening being declared a holiday for the Purchaser, the Bids shall be opened at the appointed time and location on the next working day.
- 19.3 The bidders' names, bid modifications or withdrawals, specifications, and the presence or absence of requisite bid security and such other details as the Purchaser, at its discretion, may consider appropriate, will be announced at the opening. No bid shall be rejected at bid opening, except for late bid.
- 19.4 Bids (and modifications sent pursuant to Clause 18.1) that are not opened and read out at bid opening shall not be considered further for evaluation, irrespective of the circumstances.
- 19.5 **If in response to our TWO BID enquiry, a single combined bid is submitted, it will be rejected straightway.** Similarly if 'PRICE BID' has been found enclosed in the envelope marked 'TECHNICAL BID' the same shall also be rejected summarily.

### **20 Clarification of Bids**

- 20.1 To assist in the examination, evaluation and comparison of bids, the Purchaser may, at its discretion ask the bidder for any clarification(s) of its bid. The request for clarification and the response shall be in writing and no change in the price substance of the bid shall be sought, offered or permitted. However no post Bid clarifications at the initiative of the Bidder shall be entertained.

### **21 Preliminary Examination**

- 21.1 The Purchaser will examine the bids to determine whether they are complete, whether required sureties have been furnished, whether the documents have been properly signed, and whether the bids are generally in order. Bids from suppliers, without proper Authorization from the manufacturers and from Indian agents without DGS&D Registration Certificate in case the items fall under the restricted list of the current EXIM/Foreign Trade Policy shall be treated as non-responsive and rejected summarily.
- 21.2 Arithmetical errors in the priced bids will be rectified on the following basis. If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected. If the supplier does not accept the correction of errors, its bid will be rejected. If there is a discrepancy between the price quoted in words and figures, whichever is the higher of the two shall be taken as the bid price for comparison.
- 21.3 The Purchaser may waive any minor informality, non-conformity, or irregularity in a bid, which does not constitute a material deviation, provided such a waiver, does not prejudice or affect the relative ranking of any Bidder.
- 21.4 Prior to the detailed evaluation, the Purchaser will determine the **substantial responsiveness** of each bid to the Bid Document. For purposes of these Clauses, a substantially responsive bid is one, which conforms to all the terms and conditions of the Bid Document without material deviations. Deviations from or objections or reservations to critical provisions such as those concerning Bid Security/ Performance Security, Warranty, Force Majeure, Applicable Law and Taxes & Duties will be deemed to be a material deviation. The Purchaser's determination of a bid's responsiveness is to be based on the contents of the bid itself without recourse to extrinsic evidence.
- 21.5 If a bid is not substantially responsive, it will be rejected by the Purchaser and may not subsequently be made responsive by the Bidder by correction of the non-conformity.
- 21.6 After downloading, the language of standard clauses etc. mentioned in this 'Bid Document' should not be tempered with/ changed/modified in any manner whatsoever. If any such modification etc. comes to our knowledge at any stage, the bid shall be rejected immediately and EMD shall also be forfeited.
- 21.7 **Bidders must quote for all components (viz. A,B,C,D) of this tender. If any bidder does not quote for even any one of these components then the bid shall be summarily rejected as non-responsive after opening of the technical bid.**

### **22 Conversion to Single Currency**

- 22.1 To facilitate evaluation and comparison, the Purchaser will convert all bid prices expressed in the amounts in various currencies in which the bid prices are payable to Indian Rupees at the selling exchange rate established by RBI or any nationalized bank in India as notified in the Newspapers/banks' website on the date of Price/Financial Bid opening.

## 23 Evaluation & Comparison Of Bids

23.1 For the bids surviving the technical evaluation which have been found to be responsive the evaluation & comparison shall be made as under:

- (i) **Indigenous Offers**  
The final landing cost of purchase after all discounts, freight, forwarding, insurance, taxes etc. shall be the basis of evaluation.
- (ii) **Imported Offers**  
The FOB/FCA price shall be the basis of evaluation.
- (iii) **Imported Vs. Indigenous Offers**  
The final landing cost of purchase taking into account, freight, forwarding, insurance, taxes etc. (CIF/ CIP with customs clearance charges, Bank/LC charges, transportation upto CCMB as per available records with CCMB for imported goods) shall be the basis of evaluation

23.2 Conditional tenders/discounts etc. shall not be accepted. Rates quoted without attached conditions (viz. Discounts having linkages to quantity, payment terms etc.) will only be considered for evaluation purpose. Thus conditional discounted rates linked to quantities and prompt/advance payment etc, will be ignored for determining *inter-se* position. The Purchaser however reserves the right to use the discounted rate/rates considered workable and appropriate for counter offer to the successful tenderers.

23.3 Where there is no mention of packing, forwarding, freight, insurance charges, taxes etc. such offers shall be rejected as incomplete. **Therefore quotations showing only Ex-Works (EXW) prices shall be rejected summarily.**

23.4 THE INTER-SE COMPARATIVE POSITION OF BIDDERS (L1 POSITION) SHALL BE DECIDED BASED ON THE OVERALL TOTAL OF ALL THE FOUR QUOTED COMPONENTS (VIZ. A, B, C, D). DIRECTOR CCMB HOWEVER RESERVES THE RIGHTS TO EITHER ACCEPT OR REJECT ANY OR ALL OF THE QUOTED COMPONENTS OF ANY BIDDER OR TO AWARD THESE COMPONENTS WHOLLY TO ONE BIDDER OR INDIVIDUALLY TO SEPARATE BIDDERS.

## 24 Contacting the Purchaser

24.1 Subject to ITB Clause 20, no Bidder shall contact or attempt to contact the Purchaser or anyone related to the Purchaser on any matter relating to its bid, from the time of the bid opening to the time the Contract is awarded. If the bidder wishes to bring additional information to the notice of the Purchaser, it should do so in writing.

24.2 Any effort by a Bidder to influence the Purchaser in its decisions on bid evaluation, bid comparison or contract award may result in rejection of the Bidder's bid.

## 25 Post Qualification

25.1 In the absence of pre-qualification, the Purchaser will determine to its satisfaction whether the Bidder that is selected as having submitted the lowest evaluated responsive bid is qualified to perform the contract satisfactorily, in accordance with the criteria listed in ITB Clauses 10 & 11.

25.2 The determination will take into account the Bidder's financial, technical and production capabilities. It will be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to ITB Clauses 10 & 11, as well as such other information as the Purchaser deems necessary and appropriate.

25.3 An affirmative determination will be a prerequisite for award of the contract to the Bidder. A negative determination will result in rejection of the Bidder's bid.

## 26 Award Criteria

26.1 Subject to ITB Clause 28, the Purchaser will award the contract to the successful Bidder whose bid has been determined to be substantially responsive and has been determined to be the lowest evaluated bid, provided further that the Bidder is determined to be qualified to perform the contract satisfactorily.

## 27 Purchaser's Right To Vary Quantities At Time Of Award

27.1 The Purchaser reserves the right at the time of Contract award to increase or decrease the quantity of goods and services originally specified in the Schedule of Requirements without any change in unit price or other terms and conditions.

## 28 Purchaser's Right To Accept Any Bid And To Reject Any Or All Bids

28.1 The Purchaser reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids at any time prior to award of Contract, without thereby incurring any liability to the affected Bidder or bidders or any obligation to inform the affected Bidder or bidders of the grounds for the Purchaser's action.

## 29 Notification of Award

29.1 Prior to the expiration of the period of bid validity, the Purchaser will notify the successful bidder in writing by registered letter or by cable or telex or fax or e mail that the bid has been accepted by way of a Purchase Order.

29.2 Upon the successful Bidder's furnishing of performance security pursuant to ITB Clause 30, the Purchaser will promptly notify each unsuccessful Bidder and will discharge its bid security, pursuant to Clause 12.

## 30 Performance Security

30.1 Within 21 days of the receipt of notification of award/purchase order from the Purchaser, the successful Bidder shall furnish the performance security (10% of the order value unless mentioned otherwise) in the Performance Security Form provided in the Bid Document.

30.2 Failure of the successful bidder to accept the order shall constitute sufficient grounds for the annulment of the award and forfeiture of the bid security and call for new bids.

## 31 Order Acceptance

31.1 The successful bidder should submit acceptance of the Purchase Order immediately but not later than 21 days in any case from the date of issue of the Purchase Order failing which it shall be presumed that the vendor is not interested and his bid security is liable to be forfeited pursuant to clause 12. 6 of ITB.

## 32 Buy Back Items

32.1 If the goods are to be quoted on 'Buy Back' basis, then **bidders must offer a separate buy back price for the old item.** The Purchaser reserves the right to place the order with or without 'buy back' option. If required the condition of old buy back goods may be examined on the date of Pre Bid Conference by the bidder before submission of its bid. If buy back price is not mentioned, then it will be assumed 'zero' for the purpose of price bid comparison.

## **CHAPTER – III: GENERAL CONDITIONS OF CONTRACT (GCC)**

### **1 Definitions**

1.1 In this Contract, the following terms shall be interpreted as indicated:

- (i) "The Order" means the Purchase Order placed by the Purchaser including all the attachments and appendices thereto and all documents incorporated by reference therein;
- (ii) "The Contract Price" means the price payable to the Supplier under the Order for the full and proper performance of its contractual obligations;
- (iii) "The Goods" means all the equipment, machinery, and/or other materials, which the Supplier is required to supply to the Purchaser under the Contract;
- (iv) "Services" means services ancillary to the supply of the Goods, such as transportation and insurance, and any other incidental services, such as installation, commissioning, provision of technical assistance, training and other obligations of the Supplier covered under the Contract;
- (v) "GCC" mean the General Conditions of Contract contained in this section.
- (vi) "SCC" means the Special Conditions of Contract.
- (vii) "The Purchaser" as specified in Special Conditions of Contract.
- (viii) "The Purchaser's country is "India".
- (ix) "The Supplier" means the individual or firm supplying the Goods and Services under this Contract.
- (x) "Day" means calendar day.

### **2 Application**

2.1 These General Conditions shall apply to the extent that they are not superseded by provisions in other parts of the Contract.

### **3 Standards**

3.1 The Goods supplied under this Contract shall conform to the standards mentioned in the Technical Specifications, and, when no applicable standard is mentioned, to the authoritative standard appropriate to the Goods' country of origin and such standards shall be the latest issued by the concerned institution.

### **4 Use of Contract Documents and Information**

- 4.1 The Supplier shall not, without the Purchaser's prior written consent, disclose the Contract, or any provision thereof, or any specification, plan, drawing, pattern, sample or information furnished by or on behalf of the Purchaser in connection therewith, to any person other than a person employed by the Supplier in performance of the Contract. Disclosure to any such employed person shall be made in confidence and shall extend only so far, as may be necessary for purposes of such performance. The Supplier shall not, without the Purchaser's prior written consent, make use of any document or information enumerated in GCC Clause 4.1 except for purposes of performing the Contract.
- 4.2 Any document, other than the Contract itself, enumerated in GCC Clause 4.1 shall remain the property of the Purchaser and shall be returned (in all copies) to the Purchaser on completion of the Supplier's performance under the Contract if so required by the Purchaser.
- 4.3 The purchaser may be under obligation to make any document / information submitted by the bidder in response to this bid public if required under the provision of Indian Right to Information Act 2005. Therefore, bidder may explicitly indicate if any document / information in his tender include information of commercial confidence, trade secrets or intellectual property, the disclosure of which would jeopardize the competitive position of the bidder.

### **5 Patent Rights**

5.1 The Supplier shall indemnify the Purchaser against all third-party claims of infringement of patent, trademark or industrial design rights arising from use of the Goods or any part thereof in India.

### **6 Submission of the bids**

- 6.1 All bids complete in every respect must reach this office within the last date and time of receipt of bid. No extension shall be allowed for any reason whatsoever. Late tenders, Tenders received without Bid security/Earnest Money, cost of bidding documents, if applicable etc. shall be rejected summarily.
- 6.2 Tender documents are available free of cost or for sale as per the information specified in NIT. Interested bidders may purchase the tender documents on payment of the cost there of or download directly from our website. The Purchaser is not liable for either non-receipt of the tender document or for late receipt of the tender documents.

### **7 Performance Security**

- 7.1 Within 21 days of receipt of the notification of contract award/purchase order, the Supplier shall furnish performance security for the amount specified in SCC.
- 7.2 The proceeds of the performance security shall be payable to the Purchaser as compensation for any loss resulting from the Supplier's failure to complete its obligations under the Contract.
- 7.3 The Performance Security shall be submitted in one of the following forms:
  - (i) Indian manufacturers/suppliers or Authorized Indian Agents of the Foreign Principals can submit the performance security on behalf of their foreign principals in the form of Bank Guarantee issued by a Nationalized/Scheduled bank located in India on the format provided in the bidding documents. **Or**
  - (ii) Foreign Principals can also submit performance security directly on the prescribed format through any foreign or Indian bank having office preferably in Hyderabad (India) or in the form of Standby Letter of Credit which must be advised and confirmed by any bank in India located preferably in Hyderabad (Andhra Pradesh).
- 7.4 The performance security/Standby LC will be discharged by the Purchaser and returned to the Supplier not later than 60 days following the date of completion of the Supplier's performance obligations, including any warranty obligations, unless specified otherwise in SCC.
- 7.5 In the event of any contract amendment, the supplier shall, within 21 days of receipt of such amendment, furnish the amendment to the performance security/SLC, rendering the same valid for the duration of the contract, as amended for further period of 60 days thereafter.

## 8 Inspections and Tests

- 8.1 The Purchaser or its representative shall have the right to inspect and/or to test the Goods to confirm their conformity to the Contract specifications **at no extra cost** to the Purchaser. SCC and / or Technical Specifications shall specify what inspections and tests the Purchaser requires and where they are to be conducted. The Purchaser shall notify the Supplier in writing in a timely manner of the identity of any representatives retained for these purposes.
- 8.2 The inspections and tests may be conducted on the premises of the Supplier or its subcontractor(s), at the point of delivery and/or at the Goods final destination. If conducted on the premises of the Supplier or its subcontractor(s), all reasonable facilities and assistance, including access to drawings and production data - shall be furnished to the inspectors at no charge to the Purchaser.
- 8.3 Should any inspected or tested Goods fail to conform to the specifications, the Purchaser may reject the goods and the Supplier shall either replace the rejected Goods or make alterations necessary to meet specification requirements free of cost to the Purchaser.
- 8.4 The Purchaser's right to inspect, test and, where necessary, reject the Goods after the Goods' arrival at Purchaser's Site shall in no way be limited or waived by reason of the Goods having previously been inspected, tested and passed by the Purchaser or its representative prior to the Goods shipment.
- 8.5 Nothing in GCC Clause 8 shall in any way release the Supplier from any warranty or other obligations under this Contract.

## 9 Packing

- 9.1 The Supplier shall provide such packing of the Goods as is required to prevent their damage or deterioration during transit to their final destination as indicated in the Contract. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the Goods' final destination and the absence of specialized handling facilities at all points in transit.
- 9.2 The packing, marking and documentation within and outside the packages shall comply strictly with such special requirements as shall be provided for in the Contract including additional requirements, if any, specified in SCC and in any subsequent instructions ordered by the Purchaser.
- 9.3 The purchaser reserves the rights to arrange to carry out packing and value inspections through their freight forwarding agents particularly in case of high value and sensitive items.

## 10 Delivery and Documents

- 10.1 Delivery of the Goods shall be made by the Supplier in accordance with the terms specified by the Purchaser in the order within the period as indicated in the SCC. The details of shipping and/or other documents to be furnished by the supplier are specified in SCC.

## 11 Insurance

- 11.1 Wherever required, the Goods supplied under the Contract shall be fully insured in Indian Rupees against loss or damage incidental to manufacture or acquisition, transportation, storage and delivery in the manner specified in SCC.

## 12 Transportation

- 12.1 Where the Supplier is required under the Contract to transport the Goods to a specified place of destination within India, transport to such place of destination in India including insurance, as shall be specified in the Contract, shall be arranged by the Supplier, and the related cost shall be included in the Contract Price.

## 13 Incidental Services

- 13.1 The supplier may be required to provide any or all of the following services, including additional services, specified in SCC, if any:
  - (i) Performance or supervision of the on-site assembly and/or start-up of the supplied Goods;
  - (ii) Furnishing of tools required for assembly and/or maintenance of the supplied Goods;
  - (iii) Furnishing of detailed operations and maintenance manual for each appropriate unit of supplied Goods;
  - (iv) Performance or supervision or maintenance and/or repair of the supplied Goods, for a period of time agreed by the parties, provided that this service shall not relieve the Supplier of any warranty obligations under this Contract; and
  - (v) Training of the Purchaser's personnel, at the Supplier's plant and/or on-site, in assembly, start-up, operation, maintenance and/or repair of the supplied Goods.

## 14 Spare Parts

- 14.1 As specified in the SCC, the Supplier may be required to provide any or all of the following materials, notifications, and information pertaining to spare parts manufactured or distributed by the Supplier:
  - (i) Such spare parts as the Purchaser may elect to purchase from the Supplier, providing that this election shall not relieve the Supplier of any warranty obligations under the Contract; and
  - (ii) In the event of termination of production of the spare parts:
  - (iii) Advance notification to the Purchaser of the pending termination, in sufficient time to permit the Purchaser to procure needed requirements; and
  - (iv) Following such termination, furnishing at no cost to the Purchaser, the blueprints, drawings and specifications of the spare parts, if requested.
- 14.2 Supplier shall carry sufficient inventories to assure ex-stock supply of consumable spares for the Goods, such as gaskets, plugs, washers, belts etc. Other spare parts and components shall be supplied as promptly as possible but in any case within six months of placement of order.

## 15 Warranty

- 15.1 The Supplier warrants that the Goods supplied under this Contract are new, unused, of the most recent or current models and that they incorporate all recent improvements in design and materials unless provided otherwise in the Contract. The Supplier further warrants that all Goods supplied under this Contract shall have no defect arising from design, materials or workmanship (except when the design and/or material is required by the Purchaser's Specifications) or from any act or omission of the Supplier, that may develop under normal use of the supplied Goods in the conditions prevailing in the country of final destination. **The warranty should be comprehensive and on site.**

- 15.2 This warranty shall remain valid for 12 months after the Goods or any portion thereof as the case may be, have been delivered to and accepted at the final destination indicated in the Contract, or for 16 months after the date of shipment whichever period concludes earlier, unless specified otherwise in the SCC or along with specifications.
- 15.3 The Purchaser shall promptly notify the Supplier in writing of any claims arising under this warranty. Upon receipt of such notice, the Supplier shall immediately within in 02 days arrange to repair or replace the defective goods or parts thereof free of cost at the ultimate destination. The Supplier shall take over the replaced parts/goods at the time of their replacement. No claim whatsoever shall lie on the Purchaser for the replaced parts/goods thereafter. The period for correction of defects in the warranty period is 02 days. If the supplier having been notified fails to remedy the defects within 02 days, the purchaser may proceed to take such remedial action as may be necessary, at the supplier's risk and expenses and without prejudice to any other rights, which the purchaser may have against the supplier under the contract.

## **16 Payment**

- 16.1 The method and conditions of payment to be made to the Supplier under this Contract shall be as specified in the SCC.
- 16.2 The Supplier's request(s) for payment shall be made to the Purchaser in writing, accompanied by an invoice describing, as appropriate, the Goods delivered and the Services performed, and by documents, submitted pursuant to GCC Clause 10, and upon fulfillment of other obligations stipulated in the contract.
- 16.3 Payments shall be made promptly by the Purchaser normally within sixty days after submission of the invoice or claim by the Supplier.
- 16.4 Payment shall be made in currency as indicated in the order.

## **17 Prices**

- 17.1 Prices charged by the Supplier for Goods delivered and Services performed under the Contract shall not vary from the prices quoted by the Supplier in its bid.

## **18 Change Orders**

- 18.1 The Purchaser may at any time, by written notice given to the Supplier pursuant to GCC Clause 30, make changes within the general scope of the Contract in any one or more of the following:
- (i) Drawings, designs, or specifications, where Goods to be furnished under the Contract are to be specifically manufactured for the Purchaser;
  - (ii) The method of shipping or packing;
  - (iii) The place of delivery; and/or
  - (iv) The Services to be provided by the Supplier.
  - (v) The delivery schedule.
- 18.2 If any such change causes an increase or decrease in the cost of, or the time required for, the Supplier's performance of any provisions under the Contract, an equitable adjustment shall be made in the Contract Price or delivery schedule, or both, and the Contract shall accordingly be amended. Any claims by the Supplier for adjustment under this clause must be asserted within fifteen (15) days from the date of the Supplier's receipt of the Purchaser's change order.

## **19 Contract Amendments**

- 19.1 Subject to GCC Clause 18, no variation in or modification of the terms of the Contract shall be made except by written amendment signed by the parties.

## **20 Assignment**

- 20.1 The Supplier shall not assign, in whole or in part, its obligations to perform under the Contract, except with the Purchaser's prior written consent.

## **21 Subcontracts**

- 21.1 The Supplier shall notify the Purchaser in writing of all subcontracts awarded under this Contract if not already specified in the bid. Such notification, in his original bid or later, shall not relieve the Supplier from any liability or obligation under the Contract.
- 21.2 Sub-contract shall be only for bought-out items and sub-assemblies.

## **22 Delays in the Supplier's Performance**

- 22.1 Since time is the essence of the contract, delivery of the Goods and performance of the Services shall be made by the Supplier in accordance with the time schedule specified by the Purchaser in the Contract.
- 22.2 If at any time during performance of the Contract, the Supplier or its sub-contractor(s) should encounter conditions impeding timely delivery of the Goods and performance of Services, the Supplier shall promptly notify the Purchaser in writing of the fact of the delay, its likely duration and its cause(s).
- 22.3 As soon as practicable after receipt of the Supplier's notice, the Purchaser shall evaluate the situation and may, at its discretion, extend the Supplier's time for performance with or without penalty, in which case the extension shall be ratified by the parties by amendment of the Contract.
- 22.4 Except as provided under GCC Clause 25, a delay by the Supplier in the performance of its delivery obligations shall render the Supplier liable to the imposition of penalty pursuant to GCC Clause 23, unless an extension of time is agreed upon pursuant to GCC Clause 22.2 without the application of penalty clause.

## **23 Penalty**

- 23.1 Subject to GCC Clause 25, if the Supplier fails to deliver any or all of the Goods or to perform the Services within the period(s) specified in the Contract, the Purchaser shall, without prejudice to its other remedies under the Contract, deduct from the Contract Price, as penalty, a sum equivalent to the percentage specified in SCC of the delivered price of the delayed Goods or unperformed Services for each week or part thereof of delay until actual delivery or performance, up to a maximum deduction of the Percentage specified in SCC. Once the maximum is reached, the Purchaser may consider termination of the Contract pursuant to GCC Clause 24.

## **24 Termination for Default**

- 24.1 The Purchaser may, without prejudice to any other remedy for breach of contract, by written notice of default sent to the Supplier, terminate the Contract in whole or part:
- (i) If the Supplier fails to deliver any or all of the Goods within the period(s) specified in the order, or within any extension thereof granted by the Purchaser pursuant to GCC Clause 22; or
  - (ii) If the Supplier fails to perform any other obligation(s) under the Contract.
  - (iii) If the Supplier, in the judgment of the Purchaser has engaged in corrupt or fraudulent practices in competing for or in executing the Contract.
- 24.2 For the purpose of this Clause:
- (i) "**Corrupt practice**" means the offering, giving, receiving or soliciting of any thing of value to influence the action of a public official in the procurement process or in contract execution.
  - (ii) "**Fraudulent practice**" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Borrower, and includes collusive practice among Bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Borrower of the benefits of free and open competition;"
- 24.3 In the event the Purchaser terminates the Contract in whole or in part, pursuant to GCC Clause 24.1, the Purchaser may procure, upon such terms and in such manner, as it deems appropriate, Goods or Services similar to those undelivered, and the Supplier shall be liable to the Purchaser for any excess costs for such similar Goods or Services. However, the Supplier shall continue the performance of the Contract to the extent not terminated.

## **25 Force Majeure**

- 25.1 Notwithstanding the provisions of GCC Clauses 22, 23 and 24, the Supplier shall not be liable for forfeiture of its performance security, liquidated damages or termination for default, if and to the extent that, its delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure.
- 25.2 For purposes of this Clause, "Force Majeure" means an event beyond the control of the Supplier and not involving the Supplier's fault or negligence and not foreseeable. Such events may include, but are not limited to, acts of the Purchaser either in its sovereign or contractual capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions and freight embargoes.
- 25.3 If a Force Majeure situation arises, the Supplier shall promptly notify the Purchaser in writing of such conditions and the cause thereof. Unless otherwise directed by the Purchaser in writing, the Supplier shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.

## **26 Termination for Insolvency**

- 26.1 The Purchaser may at any time terminate the Contract by giving written notice to the Supplier, if the Supplier becomes bankrupt or otherwise insolvent. In this event, termination will be without compensation to the Supplier, provided that such termination will not prejudice or affect any right of action or remedy, which has accrued or will accrue thereafter to the Purchaser.

## **27 Resolution of Disputes**

- 27.1 The Purchaser and the supplier shall make every effort to resolve amicably by direct informal negotiation any disagreement or dispute arising between them under or in connection with the Contract.
- 27.2 If, after thirty (30) days from the commencement of such informal negotiations, the Purchaser and the Supplier have been unable to resolve amicably a Contract dispute, either party may require that the dispute be referred for resolution to the formal mechanisms specified in the SCC. These mechanisms may include, but are not limited to, conciliation mediated by a third party, adjudication in an agreed national or international forum, and national or international arbitration.

## **28 Governing Language**

- 28.1 The contract shall be written in English language. Subject to GCC Clause 30, English language version of the Contract shall govern its interpretation. All correspondence and other documents pertaining to the Contract, which are exchanged by the parties, shall be written in the same language.

## **29 Applicable Law**

- 29.1 The Contract shall be interpreted in accordance with the laws of the Union of India and all disputes shall be subject to place of jurisdiction as specified in SCC.

## **30 Notices**

- 30.1 Any notice given by one party to the other pursuant to this contract/order shall be sent to the other party in writing or by cable, telex, FAX or e mail and confirmed in writing to the other party's address specified in the SCC.
- 30.2 A notice shall be effective when delivered or on the notice's effective date, whichever is later.

## **31 Taxes and Duties**

- 31.1 Suppliers shall be entirely responsible for all taxes, duties, license fees, octroi, road permits, etc., incurred until delivery of the contracted Goods to the Purchaser. However, VAT in respect of the transaction between the Purchaser and the Supplier shall be payable extra, if so stipulated in the order.

## **CHAPTER – IV: SPECIAL CONDITIONS OF CONTRACT (SCC)**

The following Special Conditions of Contract shall supplement the General Conditions of Contract. Whenever there is a conflict, the provisions herein shall prevail over those in the General Conditions of Contract. The corresponding clause number of the General Conditions is indicated in parentheses.

### **1 Definitions (GCC Clause 1)**

1.1 The Purchaser is 'The Director, Centre for Cellular & Molecular Biology (CCMB), Hyderabad (AP), INDIA.

### **2 Performance Security (GCC Clause 7) Substitute clause 7.1 of the GCC by the following:**

2.1 Within 21 days after the Supplier's receipt of order, the Supplier shall furnish Performance Security to the Purchaser for an amount of 10% of the contract value, valid upto 60 days after the date of completion of performance obligations including warranty obligations.

2.2 If the performance security is not furnished within the stipulated time as per 2.1 above, the contract shall be deemed terminated in pursuance of GCC Clause 24.

### **3 Inspection and Tests: Inspection and tests prior to shipment of Goods and at final acceptance are as follows:**

3.1 After the goods are manufactured and assembled, inspection and testing of the goods shall be carried out at the supplier's plant by the supplier, prior to shipment to check whether the goods are in conformity with the technical specifications attached to the purchase order. Manufacturer's test certificate with data sheet shall be issued to this effect and submitted along with the delivery documents. The purchaser shall be present at the supplier's premises during such inspection and testing if need is felt. The location where the inspection is required to be conducted should be clearly indicated. The supplier shall inform the purchaser about the site preparation, if any, needed for installation of the goods at the purchaser's site at the time of submission of order acceptance.

3.2 The acceptance test will be conducted by the Purchaser, their consultant or other such person nominated by the Purchaser at its option after the equipment is installed at purchaser's site in the presence of supplier's representatives. The acceptance will involve trouble free operation and ascertaining conformity with the ordered specifications and quality. There shall not be any additional charges for carrying out acceptance test. No malfunction, partial or complete failure of any part of the equipment is expected to occur. The Supplier shall maintain necessary log in respect of the result of the test to establish to the entire satisfaction of the Purchaser, the successful completion of the test specified.

3.3 In the event of the ordered item failing to pass the acceptance test, a period not exceeding one weeks will be given to rectify the defects and clear the acceptance test, failing which the Purchaser reserve the right to get the equipment replaced by the Supplier at no extra cost to the Purchaser.

3.4 Successful conduct and conclusion of the acceptance test for the installed goods and equipments shall also be the responsibility and at the cost of the Supplier.

### **4 Manuals and Drawings**

4.1 Before the goods and equipments are taken over by the Purchaser, the Supplier shall supply operation and maintenance manuals. These shall be in such details as will enable the Purchaser to operate, maintain, adjust and repair all parts of the works as stated in the specifications.

4.2 The Manuals shall be in the ruling language (English) in such form and numbers as stated in the contract.

4.3 Unless and otherwise agreed, the goods equipment shall not be considered to be completed for the purposes of taking over until such manuals and drawing have been supplied to the Purchaser.

### **5 Packing (GCC Clause 9) Add as Clause 9.3 of the GCC of the following:**

5.1 Packing Instructions: Each package will be marked on three sides with proper paint/indelible ink, the following:

- (i) Item Nomenclature
- (ii) Order/Contract No.
- (iii) Country of Origin of Goods
- (iv) Supplier's Name and
- (v) Consignee details
- (vi) Packing list reference number

### **6 Delivery and Documents (GCC Clause 10)**

6.1 Delivery of the goods should be made within a maximum of 08 weeks from the date of placement of purchase order. Within 24 hours of shipment, the supplier shall notify the purchaser and the insurance company by cable/telex/fax/e mail the full details of the shipment including contract number, railway receipt number/ AAP etc and date, description of goods, quantity, name of the consignee, invoice etc. The supplier shall mail the following documents to the purchaser with a copy to the insurance company:

- (i) 4 Copies of the Supplier invoice showing contract number, goods' description, quantity, unit price, total amount;
- (ii) Acknowledgment of receipt of goods from the consignee(s) by the transporter;
- (iii) Insurance Certificate if applicable;
- (iv) Manufacturer's/Supplier's warranty certificate;
- (v) Inspection Certificate issued by the nominated inspection agency, if any, and the Supplier's factory inspection report; and
- (vi) Certificate of Origin.
- (vii) Two copies of the packing list identifying the contents of each package.

6.2 The above documents should be received by the Purchaser before arrival of the Goods (except where the Goods have been delivered directly to the Consignee with all documents) and, if not received, the Supplier will be responsible for any consequent expenses.

### **7 Insurance (GCC Clause 11)**

7.1 For delivery of goods at the purchaser's premises, the insurance shall be obtained by the Supplier in an amount equal to 110% of the value of the goods from "warehouse to warehouse" (final destinations) on "All Risks" basis including War Risks

and Strikes. The insurance shall be valid for a period of not less than 3 months after installation and commissioning. ***In case of orders placed on FOB/FCA basis, the purchaser shall arrange Insurance.***

**8 Incidental services (GCC clause 13)** The incidental services also include:

- 8.1 Furnishing of 01 set of detailed operations & maintenance manual.
- 8.2 Arranging the shifting/moving of the item to their location of final installation within CCMB premises (including LaCONES and CRF premises in Hyderabad) at the cost of Supplier through their Indian representatives.

**9 Warranty (GCC Clause 15)**

- 9.1 Warranty period shall be 36 months from date of acceptance of Goods or 16 months from the dates of Shipment, whichever occurs earlier. The Supplier shall, in addition, comply with the performance and/or consumption guarantees specified under the contract. If for reasons attributable to the Supplier, these guarantees are not attained in whole or in part, the Supplier shall at its discretion make such changes, modifications, and/or additions to the Goods or any part thereof as may be necessary in order to attain the contractual guarantees specified in the Contract at its own cost and expense and to carry out further performance tests. **The warranty should be comprehensive on site.**
- 9.2 If a different period of warranty has been specified in the 'Technical Specifications' Chapter then the period mentioned in Clause 9.1 above shall stand modified to that extent.

**10 Payment (GCC Clause 16)**

- 10.1 100% payment shall be made by the Purchaser against delivery, inspection, successful installation, commissioning and acceptance of the equipment at CCMB in good condition and to the entire satisfaction of the Purchaser and on production of unconditional performance bank guarantee as specified in Clause 2.1 of SCC.
- 10.2 Agency commission, if any shall be paid after satisfactory installation & commissioning of the goods at the destination at the exchange rate prevailing on the date of negotiation of LC documents, subject to DGS&D registration for restricted items.

**11 Penalty Clause (GCC Clause 23)**

- 11.1 For delays: GCC Clause 23.1 -- The applicable rate is 1% per week and the maximum deduction is 10% of the contract value / price.

**12 Resolution of Disputes (Clause 27):** Add as GCC Clause 27.3 the following:

- 12.1 The dispute resolution mechanism to be applied pursuant to GCC Clause 27 shall be as follows:
  - (i) In case of Dispute or difference arising between the Purchaser and a domestic supplier relating to any matter arising out of or connected with this agreement, such disputes or difference shall be settled in accordance with the Indian Arbitration & Conciliation Act, 1996, the rules there under and any statutory modifications or re-enactments thereof shall apply to the arbitration proceedings. The dispute shall be referred to the Director General, Council of Scientific & Industrial Research (CSIR) New Delhi and if he is unable or unwilling to act, to the sole arbitration of some other person appointed by him willing to act as such Arbitrator. The award of the arbitrator so appointed shall be final, conclusive and binding on all parties to this order.
  - (ii) In the case of a dispute between the purchaser and a Foreign Supplier, the dispute shall be settled by arbitration in accordance with provision of sub-clause (a) above. But if this is not acceptable to the supplier then the dispute shall be settled in accordance with provisions of UNCITRAL (United Nations Commission on International Trade Law) Arbitration Rules.
  - (iii) The venue of the arbitration shall be the place from where the order is issued.

**13 Applicable Law (GCC Clause 29)** Add as Clause 29.2 of the GCC the following:

- 13.1 The place of jurisdiction would be Hyderabad (Andhra Pradesh) INDIA.

**14 Notices (GCC Clause 30)**

- 14.1 For the purpose of all notices, the following shall be the address of the Purchaser and Supplier.

- (i) **Purchaser:** The Director,  
Centre for Cellular & Molecular Biology,  
Uppal Road, Hyderabad – 500 007 (Andhra Pradesh) INDIA
- (ii) **Supplier:** (To be filled in by the supplier)  
.....  
.....  
.....

**15 Progress of Supply**

- 15.1 Wherever applicable, supplier shall regularly intimate progress of supply, in writing, to the Purchaser as under:
  - (i) Quantity offered for inspection and date;
  - (ii) Quantity accepted/rejected by inspecting agency and date;
  - (iii) Quantity dispatched/delivered to consignees and date;
  - (iv) Quantity where incidental services have been satisfactorily completed with date;
  - (v) Quantity where rectification/repair/replacement effected/completed on receipt of any communication from consignee/Purchaser with date;
  - (vi) Date of completion of entire Contract including incidental services, if any; and
  - (vii) Date of receipt of entire payments under the Contract (In case of stage-wise inspection, details required may also be specified).

**16 Right to Use Defective Goods**

- 16.1 If after delivery, acceptance and installation and within the guarantee and warranty period, the operation or use of the goods proves to be unsatisfactory, the Purchaser shall have the right to continue to operate or use such goods until rectifications of defects, errors or omissions by repair or by partial or complete replacement is made without interfering with the Purchaser's operation.

**17 Supplier Integrity**

17.1 The Supplier is responsible for and obliged to conduct all contracted activities in accordance with the Contract using state of the art methods and economic principles and exercising all means available to achieve the performance specified in the contract.

**18 Training**

18.1 The Supplier is required to train the designated Purchaser's technical and end user personnel to enable them to effectively operate the total equipment.

## **CHAPTER – V: BID FORM**

**The Director  
Centre for Cellular & Molecular Biology  
Uppal Road, Hyderabad – 500 007 (AP) India**

Sir,  
Having examined the bidding document, we the undersigned offer to supply and deliver \_\_\_\_\_  
(Description of Goods) in conformity with the said bidding documents for a sum or such other sums as may be ascertained from the bid.

We undertake that if our bid is accepted to deliver the goods in accordance with the delivery schedule specified and submit the performance security as specified in SCC for the due performance of the contract.

We agree to abide by this bid for requisite period of time after the date fixed for bid opening as per the instructions to the bidders and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

Until a formal contract is prepared and executed, this bid, together with your written acceptance thereof and your notification of award shall constitute a binding contract between us.

We understand that you are not bound to accept the lowest or any bid you may receive.

Dated this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_\_

Signature \_\_\_\_\_

In the capacity of \_\_\_\_\_

Duly authorized to sign the bid for and on behalf of \_\_\_\_\_

## CHAPTER – VI: BID SECURITY FORM

Whereas .....<sup>1</sup> (*hereinafter called the “tenderer”*) has submitted their offer dated ..... (*Date of submission of bid*) for the supply of ..... (*Name and/or description of the goods*) (Hereinafter called the “tender”).

KNOW ALL PEOPLE by these presents that WE ..... (*Name of bank*) of ..... (*Name of country*), having our registered office at ..... (*Address of bank*) (Hereinafter called “the Bank”), are bound unto **Director, Centre for Cellular & Molecular Biology, Hyderabad (AP) India** (Hereinafter called “the Purchaser”) in the sum of \_\_\_\_\_ for which payment well and truly to be made to the said Purchaser, the Bank binds itself, its successors, and assigns by these presents. Sealed with the Common Seal of the said Bank this \_\_\_\_ day of \_\_\_\_\_ 19 \_\_\_\_.

THE CONDITIONS of this obligation are:

1. If the Bidder withdraws its Bid during the period of bid validity specified by the Bidder on the Bid Form; or
2. If the Bidder, having been notified of the acceptance of its bid by the Purchaser during the period of bid validity:
  - (a) Fails or refuses to execute the Contract Form if required; or
  - (b) Fails or refuses to furnish the performance security, in accordance with the Instruction to Bidders.

We undertake to pay the Purchaser up to the above amount upon receipt of its first written demand, without the Purchaser having to substantiate its demand, provided that in its demand the Purchaser will note that the amount claimed by it is due to it, owing to the occurrence of one or both of the two conditions, specifying the occurred condition or conditions.

This guarantee will remain in force up to and including forty-five (45) days after the period of the bid validity, and any demand in respect thereof should reach the Bank not later than the above date.

(Signature with Seal of the Bank)  
(Complete Contact Details with Tel./Fax/email etc)

---

<sup>1</sup> \_\_\_\_\_  
*Name of Bidder*

## CHAPTER – VII: MANUFACTURERS' AUTHORIZATION FORM

No. \_\_\_\_\_

Dated \_\_\_\_\_

**The Director,  
Centre for Cellular & Molecular Biology,  
Uppal Road, Hyderabad – 500 007 (AP) India**

Dear Sir:

We \_\_\_\_\_ who are established and reputable manufacturers of having factories at \_\_\_\_\_ (*address of factory*) do hereby authorize M/s \_\_\_\_\_ (*Name and address of Agent*) to submit a bid, negotiate and receive the order from you against your tender enquiry.

No company or firm or individual other than M/s \_\_\_\_\_ is authorized to bid, and conclude the contract in regard to this business.

We hereby extend our full guarantee and warranty as per Clause 15 of the General Conditions of Contract and Clause 9 of the Special Conditions of Contract for the goods and services offered by the above firm.

Yours faithfully,

(Name)

(Name of manufacturers)

**Note:** This letter of authority should be on the **letterhead of the manufacturer** and should be signed by a person competent and having the power of attorney to bind the manufacturer. It should be included by the Bidder in its techno-commercial unpriced bid.

**CHAPTER – VIII: BIDDER'S PERFORMANCE STATEMENT FORM**  
**(For A Period of Last 3 Years)**

Name of the Firm.....

Order placed by (full address of purchaser)	Order No. and date	Description and quantity of ordered equipment	Price	Date of completion of delivery as per Contract/Actual	Remarks indicating reasons for late delivery, if any	Has the equipment been installed satisfactory? (Attach a certificate from the purchaser/Consignee)	Contact Person alongwith Tel. NO., Fax No. & e-mail address

Place :  
Date :

Signature  
Rubber stamp

**CHAPTER IX: SERVICE SUPPORT DETAILS FORM**

S. N.	Nature of training imparted	List of similar type equipments serviced in the past 3 years	Address, Telephone Nos. , Fax and e mail address of the firm located in Hyderabad	Value of minimum stock of consumable spares held at all times.

Signature and Seal of the manufacturer/Bidder.....

Place :

Date :

**CHAPTER – X: DEVIATION STATEMENT FORM (ITB/GCC/SCC)**

The following are the particulars of deviations (ITB, GCC, and SCC Clauses) from the requirements of the tender document and specifications:

CLAUSE	DEVIATION	REMARKS (INCLUDING JUSTIFICATION)

Place:

Date:

Signature and seal of the  
Manufacturer/Bidder

**NOTE:**

Where there is no deviation, the statement should be returned duly signed with an endorsement indicating “No Deviations”.

## **CHAPTER – XI: TECHNICAL COMPLIANCE STATEMENT FORM**

An item-by-item commentary on the Purchaser's Technical Specifications demonstrating substantial responsiveness of the goods and services to those specifications or a statement of deviations and exceptions to the provisions of the Technical Specifications.

<b>ITEM NAME</b>			
<b>S.No.</b>	<b>Tender Specifications</b>	<b>Bidder's Specifications</b>	<b>Remarks/Deviation If any</b>

(Technical literature/brochures/manuals should be attached alongwith this format)

**Please note:**

1. Compliance/Deviation statement comparing the specifications of the quoted model to the required specifications. This statement should also give the page number(s) of the technical literature where the relevant specification is mentioned.
2. Bids must have supporting documents ( technical literature or copies of relevant pages from the service manual or factory test data) for all the points noted above, failure regarding which may result in rejection of bid.

## CHAPTER – XII: CONTRACT FORM

**THIS AGREEMENT** made the .....day of .....200....between..... Director, Centre for Cellular & Molecular Biology, Hyderabad (AP) India (hereinafter “the Purchaser”) of the one part and .....(Name of Supplier) of .....(City and Country of Supplier) (hereinafter called “the Supplier”) of the other part:

**WHEREAS** the Purchaser invited bids for certain Goods and ancillary services viz., .....(Brief Description of Goods and Services) and has accepted a bid by the Supplier for the supply of those goods and services in the sum of .....(Contract Price in Words and Figures) (hereinafter called “the Contract Price”).

**NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:**

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz:
  - (a) the Bid Form and the Price Bid submitted by the Bidder;
  - (b) the Technical Specifications;
  - (c) the General Conditions of Contract;
  - (d) the Special Conditions of Contract; and
  - (e) the Purchaser’s Notification of Award/Purchase Order.
3. In consideration of the payments to be made by the Purchaser to the Supplier as hereinafter mentioned, the Supplier hereby covenants with the Purchaser to provide the goods and services and to remedy defects therein conformity in all respects with the provisions of the Contract.
4. The Purchaser hereby covenants to pay the Supplier in consideration of the provision of the goods and services and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

Brief particulars of the goods and services which shall be supplied / provided by the Supplier are as under:

ITEM DESCRIPTION & QTY.		AMOUNT
		FOB/FCA/CIF/CIP
<b>Payment Terms</b>		<b>Agency Commission</b>
<b>Delivery Schedule</b>		<b>[TO BE PAID IN EQUIVALENT INR]</b>

IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with their respective laws the day and year first above written.

Signed, Sealed and Delivered by the

Said.....(For the Purchaser)

In the presence of .....

Signed, Sealed and Delivered by the

Said.....(For the Supplier)

In the presence of .....

**CHAPTER – XIII: PERFORMANCE SECURITY FORM**

**The Director  
Centre for Cellular & Molecular Biology  
Uppal Road, Hyderabad – 500 007 (AP) India**

**WHEREAS** ..... (Name of Supplier)  
Hereinafter called "the Supplier" has undertaken, in pursuance of Contract no..... dated,..... 20... to supply.....(Description of Goods and Services) hereinafter called "the Contract".

**AND WHEREAS** it has been stipulated by you in the said Contract that the Supplier shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with the Supplier's performance obligations in accordance with the Contract.

**AND WHEREAS** we have agreed to give the Supplier a Guarantee:  
**THEREFORE WE** hereby affirm that we are Guarantors and responsible to you, on behalf of the Supplier, up to a total of ..... (Amount of the Guarantee in Words and Figures) and we undertake to pay you, upon your first written demand declaring the Supplier to be in default under the Contract and without cavil or argument, any sum or sums within the limit of ..... (Amount of Guarantee) as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

This guarantee is valid until the .....day of.....20.....

Signature and Seal of Guarantors

(Complete Address/Contact Details with Tel./Fax/email etc)

Date

## **CHAPTER XIV: QUALIFICATION REQUIREMENTS**

- 1 The Bidder should be a manufacturer or their dealer specifically authorised by the manufacturer to quote on their behalf for this tender as per manufacturer authorisation form and Indian agents of foreign principals, if any who must have designed, manufactured, tested and supplied the equipment(s) similar to the type specified in the "Technical Specification". Such equipments must be of the most recent series/models incorporating the latest improvements in design. Similar models should be in successful operation for at least one year as on date of Bid Opening.
- 2 The Indian Agents of foreign manufacturers/ suppliers quoting directly on behalf of their principals for items appearing in the restricted list of the current Foreign Trade Policy must be registered with DGS&D. One Indian Agent cannot represent two different foreign principals for the same item in one tender.
- 3 The bidder should have supplied at least one such or similar system/equipment to any Central Govt./State Govt./PSUs/Autonomous bodies. The details should be incorporated in the performance statement form along with documentary evidence.
- 4 If required, the bidder may be asked and should be willing to arrange demonstration of the equipment offered, free of charge at on a mutually agreeable place and date prior to opening of priced bids to ascertain their conformity with tendered specifications.
- 5 Details of service support facilities that would be provided after the warranty period should be submitted in the Service Support Details Form.
- 6 That, in the case of a Bidder not doing business in India, the Bidder is/or will be (if successful) represented by an Agent in India who shall be equipped and able to carry out the Supplier's maintenance, repairs and spare parts, stocking obligations prescribed by the conditions of the contract.
- 7 That adequate and specialized expertise is already available or will be made available following the execution of the contract in the Purchaser's country, to ensure that the support services are responsive and adequate.
- 8 That the Bidder will assume total responsibility for the fault-free operation of equipment, application software, if any, and maintenance during the warranty period and provide necessary maintenance services for five years after end of warranty period if required.
- 9 Bidders who meet the criteria given above are subject to be disqualified, if they have made untrue or false representation in the forms, statements and attachments submitted in proof of the qualification requirements or have a record of poor performance, not properly completing the contract, inordinate delays in completion or financial failure, etc.
- 10 ***Any additional bid participation criteria / eligibility conditions etc. mentioned in the Technical Specifications (Chapter XV) sheet will also form part of the Qualification Requirements alongwith those mentioned in this chapter.***

**CHAPTER XV: TECHNICAL SPECIFICATIONS & OTHER IMPORTANT REQUIREMENTS**

**"BROAD SCOPE OF WORK" For  
SITC of 650 KVA DG SETS & RELATED WORKS AT CCMB SUB-STATION**

S.NO.	DESCRIPTION OF ITEMS	QTY.	UOM
1)	SITC OF 650 KVA DG Set		
	Supply, installation, testing and commissioning of 650 kva Diesel Generating set with Electronic Governor, Radiator, Accoustic Enclosure, Battery, DG Control Panel, Manual Electrical Panel with 1600 Amps Micro Processor based EDO ACB with interlock, Digital Metering (V, A, Kw, PF, Frequency, Kwh), Protection relays, Auto cum manual Synchronisation facility and all other accessories complete in all manners ready for installation as per the specifications enclosed in Annexure-III.		
	<b>PART: A</b>		
	Supply	3	Set
	<b>Important Remark:</b>		
	i) In case of above specified rating of DG Set is not available in manufacturing range, then bidders are suggested to offer nearest higher size rating DG Set. LOWER RATING DG SET OFFER SHALL NOT BE CONSIDERED.		
	ii) Enclosed Technical Data Sheet for Engine and Alternator as given in Annexure-I & II respectively has to be invariably filled and submitted with the offer supported with manufacturer's technical brochures.		
	iii) The rates shall include packing & forwarding, transporting, transit insurance and unloading the Set at CCMB Hyderabad.		
	<b>PART: B</b>		
1)	ITC OF DG SET & CONTROL PANELS:		
a)	Dismantling of Existing old 500 kva DG sets, Cooling coil, Panels, Pipe lines, Silencer, Fuel tank and accessories, removal of internal partition wall for extension of main panel, rolling shutters, shifting the scrap & debris to the designated place, making the finishing good and any other work involved to make the site clear for installation of new DG sets & Electrical panels complete in all manners.	3	Set
b)	Installation, Testing & Commissioning of DG set under Part-A, item no. 1 above including shifting to the place, modification in foundation and any other related civil works, extension of cable trenches, chequered plate, pipe lines, exhaust ducting, silencer, fuel tank, battery charger, Generator control panel, Electrical and Synchronisation Panels installation and interconnecting, interlocking, Power & Control cabling, Busduct, Busbar, Earthing, Neutral isolation, Battery installation & charging including supply of material what ever required as per specifications, load testing and any other work involved complete in all manners for satisfactory commissioning of DG set.	3	Set
	<b>PART: C</b>		
1)	SITC OF OUTGOING PANEL:		
	Supply, Installation, Testing and Commissioning of Outgoing Panel consisting of 3 nos. 400 amps Microprocessor based MCCB and 3 phase digital Ammeter cum Power meter [Conzerv EM6433 or equivalent model], interlinking with main busbar as Outgoing feeders as per specifications complete in all manners and site requirement.	1	No.
2)	CONVERSION OF INCOMER PANEL AS OUTGOING PANEL:		

	Supply of material and modification of existing DG-1,2,3 Common Incoming Panel (P-2) on sub-station Main LT Panel as Outgoing Feeder complete as per site requirement.	1	No.
3)	<b>SHIFTING &amp; INTERCONNECTING OF CAPACITOR PANEL:</b>		
	Shifting of existing 200 kvar APF Capacitor panel to a new position, shifting of loose capacitors on a frame on wall, interconnecting capacitors including supply and fixing of frame, cables, earthing, painting and all necessary interconnected work as per site requirement.	1	LS
<b>PART: D</b>			
1)	<b>BUY BACK OF EXISTING DG SETS</b>		
	Buy back of Existing 500 KVA DG Set of Cummins Engine model VTA1710G coupled with Kirloskar Electric 415V 3 ph Alternator model 4AB 450/2, year of manufacturing 1983 in "as it is where it is" condition with battery, fuel tank, header tank, exhaust pipe, silencer but without Electrical Control Panel and without Cooling coils set.		
i)	In Working condition	2	No.
ii)	In Dismantled condition	1	No.
2)	<b>BUY BACK OF EXISTING COOLING COIL SETS:</b>		
	Buy back of Existing Coil Coolers connected in Primary Circuit of Engine Cooling System model Coil Company FCW 050 in working condition in "as it is where it is" condition alongwith the interconnected pipe lines, motors, cables but without starter panel.	3	No.
3)	<b>BUY BACK OF ELECTRICAL PANELS &amp; BUS DUCT:</b>		
	Buy back of Existing 500 KVA DG Set Electrical control Panels and Busduct in "as it is where it is" condition.		
i)	DG-1 Panel with GE M-pact MWS 610 ACB, AVR, Battery charger & AMF control gear, Metering etc.	1	No.
ii)	DG- 2 & 3 Panel with GE M-pact MWS 610 ACB, AVR, Battery charger and Manual control gear, Metering, Relays etc.	2	No.
iii)	DG- 1,2,3 outgoing Panel with CDG31 relay but without ACB	1	No.
iv)	Mains Breaker Panel without ACB	1	No.
v)	Synchronisation panel DG-1 with reverse power relay and metering	1	No.
vi)	Synchronisation panel DG-2&3	1	No.
vii)	Cooling Coil starter panel	1	No.
viii)	DG 1, 2&3 Outgoing Busduct	1	LS
ix)	Rolling Shutters	3	No.

## Annexure - I

TECHNICAL DATA SHEET FOR PROPOSED 650 kVA Engine be submitted with the Offer)			(Filled sheet to
S.No.	Particulars of Specifications	Unit	Data Value
	<b>Make</b>		
	<b>Engine Model</b>		
1	Power rating of the engine @ 1500 rpm	EkW	
2	Gross Engine BHP	BHP	
3	Gross Engine KW	kW	
4	Ambient Capability	Deg C	
5	Available EKW at 50 Deg. C	kW	
6	Typical Alternator Efficiency @ 100% load	%	
7	Power Drawn from engine w/o radiator fan	BKW	
8	Radiator fan power	kW	
9	Length(Engine Alone W/O Cooling System)	mm	
10	Width (Engine Alone)	mm	
11	Height (Engine Alone)	mm	
12	Total dry weight of engine (w/o cooling system)	kg	
13	Dry Weight of Radiator	kg	
14	Package Length - Radiator Cooled with Acoustic	mm	
15	Package Width - Radiator Cooled with Acoustic	mm	
16	Package Height - Radiator Cooled with Acoustic	mm	
17	Total wet weight of Package with Acoustic	kg	
18	Wet weight of the radiator	kg	
19	No. of Cylinders	No.	
20	Bore & Stroke	mm	
21	Displacement	L	
22	Compression ratio	No.	
23	BMEP of the engine	kPa	
24	Direction of rotation (SAE Std.) - FW End		
25	V' angle	Deg.	
26	Firing order		
27	Aspiration of engine		
28	Piston speed of engine	m/sec	
29	Max. overspeed allowed (Trip set at)	rpm	
30	Max. allowable static bending moment at the rear face of flywheel housing	Nm	
31	Friction horse power lost	kW	
32	Mechanical efficiency of the engine	%	
33	Thermal efficiency of the engine (Considering HHV)	%	
34	Reference Standards for Engines		
35	Guaranteed output at site continuous running for 12 hours under the worst atmospheric conditions		
	<b>Exhaust System</b>		
1	Exhaust System back pressure (max.)	kPa	
2	Diameter of engine exhaust outlet (inside)	mm	
3	Muffler/Silencer Restriction (Residential) Ps	"H20	

4	Exhaust flange details		
a)	No. of holes	No.	
b)	Dia.of holes	mm	
c)	PCD	mm	
d)	No. of exhaust outlets	Nos	
5	No. of exhaust outlets	No.	
6	Max. weight of exhaust system on engine	kg	
7	No. of residential silencers supplied	No.	
8	Noise reduction silencer(s)-Typical	dB(A)	
9	Weight of muffler (Horizontal /Vertical mtg. allowed)	kg	
10	Exhaust gas flow rate with tolerance	CFM	
11	Exhaust gas flow rate with tolerance	M3/Min	
12	Exhaust gas temp. (stack) with tolerance	Deg.C	
<b>LUBOIL CONSUMPTION OF THE ENGINE</b>			
1	Lub oil consumption @ 100% load	L/Hr.	
2	Lub oil consumption @ 75% load	L/Hr.	
3	Lub oil consumption @ 50% load	L/Hr.	
4	Lub oil consumption @ 25% load	L/Hr.	
5	Lub oil change period	Hrs.	
6	Recommended Lube Oil		
<b>HEAT REJECTION DETAILS</b>			
1	Heat rejection to coolant	kW	
2	Heat rejection to atmosphere	kW	
3	Heat rejection to exhaust	kW	
4	Heat that can be recovered from exhaust	kW	
5	Heat rejection to the lub oil	kW	
6	Heat rejection to aftercooler	kW	
7	Fuel LHV	kW	
8	Fuel HHV	kW	
<b>DERATION DETAILS</b>			
1	Deration of the engine - Altitude @ normal temp.	M	
2	Deration of the engine - Humidity		
3	Deration at 50 Deg. C ambient at 100% loading	%	
<b>INTAKE SYSTEM</b>			
1	Air intake restriction - with clean element	kPa	
2	Air intake restriction - with dirty element	kPa	
3	Filtration capacity in microns	Microns	
4	Intake manifold temperature	Deg. C	
5	Intake Manifold pressue with tolerance	kPa	
6	Combustion air inlet flow rate with tolerance	CFM	
7	Combustion air inlet flow rate with tolerance	M3/Min	
<b>FUEL SYSTEM</b>			
1	Fuel system type		
2	Filter type		
3	Filtration capacity (particle size)	Microns	
4	Fuel Transfer Pump Type (Mechanical Lift/Feed)		
5	Priming pump type		
6	Fuel supply line restriction (Max. Allowable)	kPa	
7	Fuel return line restriction (Max. Allowable)	kPa	
8	Fuel filter change recommended (Check gauge)	Hours	

9	Fuel Transfer Pump Flow (Max.)	lph	
10	Fuel Transfer Pump Pressure (Min.)	kPa/psi	
11	Max. lift of fuel transfer pump	ft	
12	Type of Water Separator		
13	Fuel Injectors recalibration frequency	Hrs.	
14	Fuel Pump recalibration frequency	Hrs.	
15	Fuel Injector resetting cost as on today	Rs.	
<b>Fuel consumption (litres)</b>			
1	@100% Load	lph	
2	@90% Load	lph	
3	@80% Load	lph	
4	@75% Load	lph	
5	@70% Load	lph	
6	@60% Load	lph	
7	@50% Load	lph	
8	@40% Load	lph	
9	@30% Load	lph	
10	@25% Load	lph	
11	@20% Load	lph	
12	@10% Load	lph	
13	Density of fuel considered	kg/l	
14	Tolerance as per ISO 3046 (0-5%)		
<b>Specific fuel consumption gms/kwh</b>			
1	@100% Load	g/bkw-hr	
2	@90% Load	g/bkw-hr	
3	@80% Load	g/bkw-hr	
4	@75% Load	g/bkw-hr	
5	@70% Load	g/bkw-hr	
6	@60% Load	g/bkw-hr	
7	@50% Load	g/bkw-hr	
8	@40% Load	g/bkw-hr	
9	@30% Load	g/bkw-hr	
10	@25% Load	g/bkw-hr	
11	@20% Load	g/bkw-hr	
12	@10% Load	g/bkw-hr	
<b>LUB OIL SYSTEM</b>			
1	Refill volume with filter change	L	
2	Lube oil system capacity (Total with filters)	L	
3	Sump Capacity - Low Mark Level	L	
4	Sump Capacity - High Mark Level	L	
5	Sump angle - Front down	Deg. C	
6	Sump angle - Front up	Deg. C	
7	Sump angle - Side to side	Deg. C	
8	Oil temp. - max	Deg. C	
9	Oil pressure - rated speed (Range)	kPa	
10	Oil pressure - low idle (Range)	kPa	
11	Oil pressure - Full Load (Typical)	kPa	
12	Oil pressure - Low idle (Typical)	kPa	
13	Filter type		
14	Filtration capacity	Microns	
15	Filtration system		
16	Crankcase ventilation type		

17	Oil cooler type		
<b>STARTING SYSTEM</b>			
1	System voltage	V DC	
2	Battery capacity for 90 sec. cranking @0° C (Min)	CCA	
3	No. of Starter motors provided	No.	
4	Rating of Starter Motor	KW	
5	Battery charging alternator capacity	Amps.	
6	Battery Rating	Ah	
7	No. of Plates in Battery	No.	
8	Battery Make/Type		
9	Is Battery stand provided	Y/N	
10	Is Battery Charger provided	Y/N	
11	Is Charging Alternator Auto cut-off provided	Y/N	
<b>SAFETIES &amp; INSTRUMENTATION</b>			
1	Fuel Shutoff Solenoid (Standard)	Type	
2	Low Lube Oil Pressure Shutoff	kPa	
3	High Water Temperature Shutoff	°C	
4	Overspeed Trip	rpm	
5	Crank Termination Signal	rpm	
6	Lube Oil Pressure Gauge		
7	Water Temperature Gauge		
8	Battery Charging Ammeter		
9	Fuel Pressure Gauge		
10	Tachometer (with non-contact magnetic pickup)		
11	Air Inlet Restriction (Vacuum) Indicator		
12	Service Hour Meter (SMU/Service Meter Unit)		
13	Other standard safety accessories offered with the Engine		
14	Is V/A/Kw/KVAR/PF/KWH Metering provided		
15	Under/Over Voltage relay		
16	Under/Over Frequency relay		
17	Over Current relay		
18	Reverse power relay		
19	kW level control		
20	Diagnostic features		
21	Engine cool down timer		
22	Over Crank protection		
<b>JACKET WATER SYSTEM</b>			
1	Engine jacket water coolant capacity	L	
2	System Coolant Pressure	PSI	
		kPa	
3	Coolant outlet temp. max. allowed	Deg. C	
4	Coolant inlet temp. min. allowed	Deg. C	
5	Max. Coolant Frictional head	M	
6	Coolant Pump Flow	LPM	
7	Start to open temp. thermostat	Deg. C	
8	Fully open temp - thermostat	Deg. C	
9	Min. coolant fill rate (if applicable)	LPM	
10	Min. coolant expansion space (% of sys. Capacity)	%	
11	Water pump Drive	Belt/Gear	
12	Corrosive Resistor type		
<b>HEAT EXCHANGER DETAILS- If Applicable</b>			
1	Heat exchanger capacity - Jacket Water	L	
2	Fluid flow rate - raw water side	LPM	
3	No. passes made	No.	
4	Max. Raw water inlet pressure (at HEX inlet)	kg/ cm2	
5	Weight of heat exchanger (Dry)	kg	
6	Raw water IN/OUT Diameter at HEX Inlet	Inch	

7	Temperature IN/OUT	Deg. C	
8	Pressure drop max.	psi	
9	Raw water pressure	kg/ cm2	
<b>ENGINE MOUNTED RADIATOR DETAILS</b>			
1	Coolant capacity of radiator	L	
2	Ambient capability of the radiator	Deg. C	
3	Air Flow across Radiator	m3/min	
4	Fan Diameter	inches	
5	Fan Power	KW	
6	Air Flow Restriction (after radiator)	kPa	
7	Radiator cap pressure	PSI	
8	Weight of radiator (Dry)	kg	
<b>EXHAUST EMISSION</b>			
<b>NOISE LEVEL DETAILS</b>			
1	Noise level at 1 mt. distance		
a)	At No load	dbA	
b)	at Full load	dbA	
2	Accoustic Details		
a)	Type of sheet & thickness	mm	
b)	Quality of Painting & thickness	Micron	
c)	Accoustic insulation type & thickness	mm	
d)	Insulation Density	Cu/m	
e)	Overall size of Accoustic encloser	mm	
f)	Accoustic Manufacture by	Name	
<b>MOUNTING SYSTEM</b>			
1	Flywheel housing	SAE#	
2	Flywheel dimension		
	- Diameter	mm	
	- Width	mm	
	- No. of teeth	No.	
3	Type of coupling (for 2 bearing)		
<b>GOVERNING SYSTEM</b>			
1	Type of governor		
2	Class of Governor		
3	Steady State Speed Band of regulation	%	
4	Droop (+/-1%)	%	
5	Temporary & Permanent variation		
a)	Full load thrown off	% Rpm	
b)	Full load put on	% Rpm	
6	Cyclic variation	cy./sec	
<b>MISCELLANEOUS:</b>			
1	Joints in Oil, Fuel, Air circuits	Flange/Hose	
2	Name of AMC Agency for servicing of:		
a)	Engine		
b)	Alternator		
c)	Electrical Panels & circuits		

## Annexure - II

<b>TECHNICAL DATA SHEET FOR PROPOSED 650 kVA ALTERNATOR</b> (Filled sheet to be submitted with the Offer)		
<b>S. No.</b>	<b>Particulars of Specifications</b>	<b>Data Value</b>

	<b>Make</b>	
	<b>Alternatro Model</b>	
1	Alternator Ratings (kVA) (ekW) at 0.8 PF	
2	RPM & Frequency	
3	Frame	
4	Volts	
5	Pitch	
6	Full load current (amps)	
7	Efficiency @ 100% @ 75% @ 50%	
8	Main Stator resistance (ohms)	
9	Main Rotor resistance (ohms)	
10	Overload Capacity in Hrs.	
a)	at 10% overloading	
b)	at 15% overloading	
11	Temperature rise of the winding after continuous run of full rated output and with surrounding ambient temperature at 45 Deg. C	
12	Inherent Voltage regulated (increase in voltage from full load to no load with constant speed and excitation)	
13	Are damper windings fitted on poles ?	
14	Radial clearance between stator and rotor (air gap)	
15	Peripheral speed of the rotor	
16	Critical speed of the rotor	
17	Method of lubrication	
18	Excitation voltage	
19	Alternator excitation current at full load on	
a	at Unity PF	
b	at 0.8 PF	
20	Whether DG set is suitable for Rectifiers / Inverter / UPS and Computer type loads ?	
21	What is the maximum motor rated load for starting of which the DG set can be used ?	
a)	with DOL starter	
b)	with Star-Delta starter	
22	Wave Form Distortion (<5%) Total Harmonic Factor (THF)	
23	<b>Reactance (per unit)</b>	
i)	Sub transient Direct axis (x"d)	
ii)	Sub transient Quadrature axis (x"d)	
iii)	Transient Saturated (x'd)	
iv)	Synchronous Direct axis (xd)	
v)	Synchronous Quadrature axis (xq)	
vi)	Negative Sequence ( $X_2$ )	
vii)	Zero Sequence ( $X_0$ )	
24	<b>Time Constants (ms)</b>	
i)	Open circuit transient direct axis ( $T'd_0$ )	
ii)	Short circuit transient direct axis ( $T'd$ )	
iii)	Open circuit sub transient - direct axis ( $T''d_0$ )	
iv)	Short circuit sub transient direct axis ( $T''d$ )	

v)	Open circuit sub transient Quad axis ( $T''_{q0}$ )	
vi)	Short circuit sub transient Quad axis $T''_q$	
vii)	Short circuit ratio	
viii)	Armature short circuit $T_a$	
ix)	Motor Starting Capacity @ 30% Vdip skVA	

## SPECIFICATIONS FOR DG SET

### 1 SCOPE

This specification defines the minimum requirements for the supply of self excited Internal Combustion Engine driven emergency generator complete with automatic voltage regulator, engine control panel and other accessories as specified.

### 2 CODES AND STANDARDS

Unless they are in variance with the clause of this specification the Internal Combustion Engine driven generator system and its components shall comply with the latest edition of the applicable standards listed below. For imported electrical equipment corresponding local codes and standards shall apply.

IS – 2253	Designation for type of construction and mounting arrangement of rotating electrical machines.
IS – 4691	Degree of protection provided by enclosures of Rotating Electrical Machinery
IS – 4722	Rotating electrical machines.
IS – 4728	Terminal marking and direction of rotation for rotating electrical machinery.
IS – 4889	Methods of determination of efficiency of rotating electrical machine.
IS – 6362	Designation of Methods of Cooling of Rotating Electrical Machines.
IS – 7132	Guide for testing synchronous machines.
IS – 7306	Methods of determining synchronous machines quantities from tests.
IS – 7816	Guide for testing of insulation of rotating machines.
IS – 12065	Permissible limits of noise level for rotating electrical machines.
IS – 12075	Mechanical vibration of rotating electrical machines with shaft heights 56 mm and higher - measurements, evaluation and limits of vibration severity.
IS – 12802	Temperature rise measurement of rotating electrical machines.
IS – 13364	AC Generators driven by reciprocating internal combustion engines.
IS – 13947	Low voltage Switchgear and Control gear : General Rules.
IEC – 34	Rotating Electrical Machines.

The equipment shall also conform to the provisions of Indian Electricity rules and other statutory requirements currently in force.

In case of any contradiction between the standards listed above and this specification, the requirement laid down in this specification shall prevail.

### 3. PERFORMANCE REQUIREMENTS

#### 3.1 Site Conditions

Generator shall be suitable for operating satisfactorily in humid and corrosive atmospheres. Ambient conditions shall be suitable for Hospitals & Research Institutes located at **Hyderabad**. Generator rating indicated in the Schedule shall be the net output of the set at specified site conditions after accounting for all auxiliaries for the prime mover and generator.

#### 3.2 Voltage Regulation

The voltage regulation of the machine shall not be more than  $\pm 1\%$  of the rated voltage under following conditions

- between no load and full load with P.F. 0.8 lag to unity.
- with the machine cold or warm.
- at a speed drop of approximately 3% of the nominal speed.

**3.3 Voltage setting range**

The generator terminal voltage shall be adjustable with a continuously variable potentiometer. The adjustment range shall be  $\pm 5\%$  of the nominal voltage.

**3.4 Unbalanced Load**

The generator shall be capable of withstanding without injury the effects of a continuous current unbalance corresponding to a negative - phase sequence current of 8 % of the rated current for cylindrical rotor machines and 10% for salient pole machines provided none of the phase current exceeds rated current.

**3.5 Waveform Distortion**

The Total Harmonic Factor (THF) of the line terminal voltage (generator tested on open circuit at rated speed and voltage) shall not exceed the following values:

S.No	Machine Rating	THF.
1.	Article I. Above 300 kW and up to 1000 kW	2%

The computation and measurement of THF shall be as per IS : 4722

**3.6 Frequency Limits**

The generator shall be suitable for continuous operation at rated load for a frequency variation of  $\pm 3\%$  of rated value. In addition the vendor shall furnish the short time under-frequency operating limits.

**3.7 Over Current Requirement**

The generator shall be capable of withstanding without injury stator current of 1.5 pu for 30 seconds and 1.1 p.u. for one hour in any 12 hours continuous operation.

**3.8 Short circuit conditions**

The generator shall be capable of withstanding without damage, three phase or a line to line or line to earth or two line to earth short circuit for a period of 3 seconds when operating at rated speed and rated load and with an excitation corresponding to 5 % over voltage.

**3.9 Parallel Operation**

**The Generator set shall be suitable for parallel operation with other generating sets or with other sources at operating voltage and under load conditions upto rated value.**

**3.10 Excitation support system**

Excitation system shall be provided with short-circuit support equipment to maintain three times the rated current for three seconds in case of short-circuit to ensure proper fault clearance in outgoing feeders.

## **4 DESIGN AND CONSTRUCTION**

- 4.1 The generator design shall meet the ambient conditions of Hyderabad and operating condition up to 50deg c ambient.
- 4.2 The generator shall be mounted on a common base frame together with prime mover unless otherwise agreed. The generator shall be provided with necessary lifting hooks and two earth terminals on opposite sides for connection to main earth grid.
- 4.3 The generator winding shall be of class 'H' insulation with temperature limitation for class 'B'. The windings and overhangs shall be braced to withstand the short circuit forces.
- 4.4 The stator winding shall be star connected and all windings shall be brought out to six insulated terminals in a terminal box. The stator neutral side connection shall be brought in neutral cubicle. The terminal boxes for the line terminals and neutral shall have sufficient space for the terminals of cable size as specified in schedule and attachment of adopter box wherever necessary.
- 4.5 All parts and accessories shall be suitable to withstand stresses due to over speed / overload /short circuit conditions specified.
- 4.6 Bearings shall be anti friction, shielded and pre lubricated. Grease in the bearing enclosure shall provide additional lubrication to bearing as well as provide sealing against dust and moisture.
- 4.7 The generator shall be air cooled unless otherwise specified.
- 4.8 The direction of rotation of the rotor of the machine shall be compatible with that of the prime mover. A clear indication of the direction of rotation shall be given on either end of the machine.
- 4.9 Field winding shall have class "H" insulation with temperature limitations for Class-B. The field winding shall be capable of operating at a field voltage of 125 % of field voltage at rated load for at least one minute starting from stabilized temperatures at rated conditions.
- 4.10 All cabling on the generator set skid shall be in Cable trays / Pipe. All cables shall be identified close to their termination point. Compression type cable glands shall be used for cable termination.
- 4.11 A rating plate of stainless steel shall be fixed on the generator frame and shall give the information as per IS : 4722.

## **5 EXCITATION SYSTEM**

- 5.1 The generator shall be provided with brushless type solid state self-excitation system with automatic voltage regulator.
- 5.2 The rotor winding of the AC exciter, the rectifier assembly, main field winding of the generator and other accessories on rotor parts shall be rigidly fastened to the shaft and the connection with different items shall be anti-loosening type. All components shall be mounted considering the effects of the centrifugal forces.
- 5.3 Automatic solid state voltage regulator shall be provided with the following features as a minimum.
  - o Short circuit protection
  - o Manual voltage control
  - o Voltage build up circuitry
  - o Test mode
  - o Single / Parallel operation

## **6 GENERATOR CONTROL PANEL**

- 6.1 The local generator control panel for the generator set shall comprise of the following unless otherwise specified.
  - a) Automatic voltage regulator
  - b) Metering / Indicating Display
  - c) Fault annunciation

d) Protection relays

- 6.2 Any other accessory required to make the generator set operational as a package shall be included in scope of supply. If required the generator control panel shall be split into various functional sections viz. metering, control, and regulation etc.
- 6.3 Unless otherwise specified, the DC control supply required for Local control panel and for any other purpose shall be met by DC system consisting of battery and battery charger of suitable capacity.
- 6.4 The battery shall be high discharge automotive type suitable for engine starting duty and conforming to IS:7372 and other relevant IS. The battery shall be placed on battery stands insulated from earth. The battery capacity shall be adequate for three consecutive starts of the engine under cold engine condition, without recharging, with additional 10 % spare capacity.

## 7 TECHNICAL SPECIFICATIONS

### 7.1 Diesel Engine :

- a) Diesel Engine shall be suitable for generating set application developing suitable BHP at 1500 RPM under NTP conditions of ISO 3046 / BS:5514 or equivalent in IS, water cooled, turbocharged with after coolers, powered by multi cylinder with engine performance requirement as specified above. The engine shall be of heavy duty type suitable for cold starting.
- b) Rating of Engine should be sufficient enough for performance without deration up to 50 deg c ambient Temp.
- c) Simple adjustments free Fuel System without periodic calibration of Fuel Injectors & no tappet setting.
- d) Lowest Lube oil consumption and high specific Fuel consumption.
- e) Minimum operating & maintenance cost

#### 7.1.1 The engine equipped with the following standard accessories.

- a) Gear Driven Centrifugal Radiator design for 50 deg c ambient air temp with expansion Tank & Level Indicator
- b) Element filters
- c) PT self adjusting direct fuel injection system
- d) Fly wheel housing and Fly wheel to suit flexible couplings with guard
- e) Engine barring mechanism
- f) Air cleaner element with service indicators
- g) Residential Silencer
- h) Electronic Fuel Control Governor (EFC) with +/- 0.25% steady state speed band of regulation
- i) Stainless steel exhaust flexible elbow
- j) Priming pump
- k) Electric starter
- l) Charging Alternator with Auto Cut off
- m) Solid state speed potentiometer
- n) Thermostats & Housing Jacket water pump, gear driven centrifugal after cooler pump
- o) Lubricant oil cooler
- p) Turbo charger
- q) Battery of suitable AH capacity with Battery stand

#### 7.1.2 Electronic Modular Control Panel (EMCP) shall consist of following indications :

- a) Digital Ammeter, Voltmeter, KW, PF meter, Frequency meter
- b) Digital DC Voltmeter & Battery charging Ammeter
- c) Tachometer with non-contact magnetic pickup
- d) Engine Running Hours & Service Hour meter
- e) Starting switch with key
- f) Lubricating oil Temperature & Pressure
- g) Coolant Water temperature
- h) Fuel Pressure
- i) Fault Annunciation Alarm
- j) Cycle Crank & Cool down Timer
- k) Emergency Stop Push Button
- l) Voltage Adjustment Potentiometer

m) Speed adjustment potentiometer

**7.1.3 Safety Control Trip & Indication / Annunciation**

- a) Low lubricating oil pressure shut off (LLOP)
- a) High water temperature shut off (HWT)
- b) Over speed Trip
- c) Engine Overload
- d) Over Crank
- e) Low Coolant Level
- f) System Diagnostic Codes
- g) Programmable Protective Relays for under/over voltage, under/over frequency, Reverse power, kw level control

**7.2 ALTERNATOR:**

Standard design alternator conforming to BS:5000 / IS:4722 suitably rated at 0.8 PF at NTP conditions, 415 volts, 3 phase, 4 wire, 50 cycles/sec., 1500 RPM, self excited, self regulated, self ventilated in brushless excitation as per specifications and performance requirement as detailed above.

**7.3 AVR**

Solid state Electronic 3 phase sensing AVR with Load Adjustment Module,

**7.4 ESSENTIAL ACCESSORIES:**

**7.4.1 Base frame :**

The engine alternator shall be perfectly aligned and assembled on a sturdy fabricated adequately machined base frame made out of high quality Rolled Steel. The base frame should be provided with lifting facilities and pre-drilled foundation holes suitable for installation either on concrete foundation or with anti-vibration mountings.

**7.4.2 Fuel tank :**

Fuel tank of 990 Ltrs capacity with inlet-outlet pipe connections, filling cap with fill filter, drain plug, dial type / magnetic level indicator, Air vent, pedestal / floor mounted or with mounting bracket as per site requirement.

**7.4.3 Battery :**

Suitable rating Dry, Uncharged Batteries with connecting leads, terminals and battery stand required for Electrical Control circuit and for Electrical Starting of DG set.

**8. SOUND ATTENUATED SYSTEM**

8.1 Acoustic enclosure should be designed and approved, factory installed to meet the most stringent noise level and emission norms as specified by the Government of India and certified for noise control level of 75 dbA at 1 meter distance / as per CPCB norms in open environment by government nodal agency / CPCB approved.

8.2 Acoustic enclosure should be flush type, compact, fully integrated, weatherproof suitable for outdoor application, wide access doors for easy servicing and maintenance, lesser noise level and user friendly features. Durable cast steel with Teflon Bushing hinges and easy access for Radiator Water filling.

8.3 Enclosure made out of minimum 1.6 mm gauge CRCA steel sheet, EPDM gasket fitting, automated welding, QD coating of 60 micron of superior finish.

8.4 Provision for a recessed, easily accessible Emergency push button for safe operation on two sides of the enclosure.

8.5 Acoustic insulation should be non-igniting, 100 mm thick self extinguishing acoustic high class quality mineral wool conforming to relevant IS specifications.

8.6 Acoustic enclosure is designed in such a way that there are no hot pockets around engine and does not allow the temperature to rise more than 7 deg c.

8.7 Suitable opening with acoustic hoods are to be provided for increasing the flow of air required for combustion and ventilation. Air intake system as per the recommendations and engine requirement are to be designed.

## 9 TESTS AND INSPECTION

9.1 The purchaser or his authorized Representative may visit the works during manufacture of equipment to assess the progress of work as well as to ascertain that only quality raw materials are used for the same and before the dispatch for testing. He shall be given all assistance to carry out the inspection.

### 9.2 Minimum Acceptance tests :

On completion and before handing over of the work, the following tests shall be carried out by the contractor to the entire satisfaction of the Engineer-in-Charge.

#### a) Phase-I Test :

- i) Insulation resistance test - Sectional and overall
- ii) Continuity resistance test - sectional and overall
- iii) Earth resistance test
- iv) All instruments and relays shall be tested under normal operating conditions.
- v) Visual examination to ensure that the plant equipment and accessories are provided and the finish and general appearance of the work are as per contract specification.
- vi) No load test for a period of minimum 30 minutes continuously to see that the engine, alternator and other accessories are functioning normally. The duration of the test may be increased if necessary and as directed by the authorized representative of the accepting officer.

#### b) Phase-II Test :

On completion of the Phase-I tests to the entire satisfaction of the authorized representative of the accepting officer, a full load test will be carried out for 6 hours continuously and for a period of three days by direct loading or artificial loading.

The overall efficiency of the set at 1/4 load, 1/2 load and full load shall be worked out and compared with the figures given in tender documents. If there is any reduction in the efficiency of the plant, the contractor shall make suitable adjustments to bring up the efficiency to the specified limit.

#### c) Tests on Alternator

- a) Routine tests for alternator as per IS: 4722.
- b) Power frequency voltage test on switchgear and mechanical / electrical operational check.
- c) Wave form test
- d) Phase sequence test.
- e) Vibration test.

## 10 BATTERY CHARGER:

The battery charger shall have full wave controlled rectifier bridge with their protective devices. The charger shall be of solid state design, constant voltage type with current limiting feature suitable for automatic and manual, normal and quick charging of batteries. A suitable filter circuit shall be provided at the rectifier output to obtain a smooth DC output voltage. The maximum ripple content in the charger output voltage shall be lower than the safe value recommended by battery manufacturer. The charger shall be sized for boost charging the battery within 10 -14 hours.

## 11 PAINTING, PACKING AND DESPATCH

- 11.1 All metal surfaces shall be thoroughly cleaned of scale, rust and grease etc. prior to painting. Cleaned surfaces shall be given two coats of primer and prepared for final painting. Final finish shall be free from all sorts of blemishes.
- 11.2 The equipment shall be shipped to site suitably packed to prevent any damage during transit. Each package shall have labels to show purchaser's name, purchase order and equipment number. Suitable lifting lugs etc. shall be provided and lifting points shall be clearly marked on the package. Packing shall be suitable for storage at site for a minimum period of 6 months.

12. **GUARANTEE:**

The DG set should have guarantee for a period of minimum two years after the supply or one year after the installation from the date of satisfactory acceptance for its perfect functioning for all manufacturing parts and workmanship.

13. **MISCELLANEOUS:**

The quoted rates should be inclusive of supply, loading/unloading, packing and forwarding, insurance, free delivery at clients site safely and unloading etc.. Nothing extra will be paid on this account.

## GENERAL SPECIFICATIONS FOR PANEL

### 1.0 Scope:

This specification is to cover the requirement of design, supply, installation, testing and commissioning of LT power control centers / AMF panel with all components, Instruments, fittings and accessories for efficient operation without any trouble.

### 2.0 Standards:

The PCC specified herein, unless otherwise stated shall conform to the relevant and latest revisions of Indian standards and Indian Electricity Rules.

### 3.0 Design and construction:

#### 3.1 Design requirements:

The power control centers shall be suitable for operation on 440 volt, 3 phase, 4wire 50HZ system to withstand a short circuit level of 50 KA RMS symmetrical.

The PCC shall be designed for operation in high ambient temperature up to 45 degrees centigrade and high humidity up to 95% and tropical atmospheric conditions. Means shall be provided to facilitate ease of inspection, Maintenance and Servicing.

#### 3.2 Constructional requirements:

- i) The power control center shall be of Metal clad, cubicle, indoor, free standing, flush type suitable for Mounting on Trenches with U Channels of adequate size.
- ii) Made up of the requisite vertical sections, which when coupled together shall form continuous dead front switchboard.
- iii) Dust and damp protected, the degree of protection shall be better than IP - 54 as specified in IS-2147, if specified in schedule
- iv) Readily extendable on both sides by the addition of vertical sections after removal of the end covers.
- v) Single front construction with the circuit breaker feeder suitable for operation from the front of the panel.

The PCC shall have the feeder ratings as per the specifications in the schedule and constructed only of materials capable of withstanding the mechanical, electrical and thermal stresses as well as the effects of humidity, which are likely to be encountered in normal service.

- #### 3.3 Vertical Sections :
- Each vertical section shall comprise a front framed structure rolled folded sheet steel channel section of minimum 2 mm thickness rigidly bolted together. This structure shall house the components contributing the major weight of the equipment such as circuit breaker, switch fuse units, main horizontal bus bars, vertical risers and other front mounted accessories. The structure shall be mounted on a rigid base frame of folded sheet steel of minimum of 2.5mm thickness and 100mm height. The design shall ensure structural stability during transit and also during operation after commissioning. Suitable cable chamber housing the cable end connections and power / control cable terminations shall be provided. The design shall ensure generous availability of space for ease of installation and maintenance of cabling and adequate safety for working in one vertical section without coming into accidental contact with live parts in the adjacent section.

A cover plate at the top of the vertical section shall be provided with necessary ventilating arrangements. Any aperture for ventilation shall be covered with a perforated sheet having less than 1 mm diameter perforations to prevent entry of vermin.

#### 3.4 Sheet Steel Cubicle :

- ##### 3.4.1
- The sheet steel cubicle shall be designed in fully segregated multi tier formation. Each cubicle shall have hinged front access door with easy operating fasteners. All the doors and covers shall be heavily gasketed to make the compartment dust tight. Each cubicle shall have a covering at the bottom to make a dust and vermin proof construction. Door hinges shall be of concealed type.

The cubicle shall be of minimum 2 mm thick sheet steel. Sheet steel shrouds and partitions shall be of minimum 1.6 mm thickness. All sheet steel work forming the exterior of switch boards shall be smoothly finished, leveled and free from flaws. The corners shall be rounded. The minimum Thickness of Gland plates shall be 3mm.

- 3.4.2 The apparatus and circuits in the power control centers shall be so arranged as to facilitate their operation and maintenance at the same time to ensure the necessary degree of safety.

Apparatus forming part of the control centers shall have the following minimum clearance.

- i) between phases - 25 mm,
- ii) between phase and neutral - 25 mm,
- iii) between phases and earth - 25 mm,
- iv) Between neutral and earth - 19 mm,

When, for any reason, the above clearances are not available suitable insulation shall be provided. Clearance shall be maintained during normal service conditions. Creepage distances shall comply with those specified in relevant standards.

- 3.4.3 All insulating materials used in the construction of the equipment shall be non hygroscopic duly treated to withstand the effect of high humidity, high temperature and tropical ambient service conditions.

- 3.4.4 Functional units such as circuit breakers and fuse switches shall be arranged in multitier formation, except that not more than One air circuit breaker housed in a single vertical section.

- 3.4.5 Metallic/insulated barriers shall be provided within vertical sections and between adjacent sections to ensure prevention of accidental contact with :

- i) Main busbars and vertical risers during operation, inspection or maintenance of functional units and front connected accessories.
- ii) Cable terminations of one functional unit, when working on those of adjacent unit/units.

- 3.4.6. All doors / covers providing access to live power equipment / circuits shall be provided with tool operated fasteners to prevent unauthorized access.

- 3.4.7 Provisions shall be made for permanently earthing the frames and other metal parts of the switchgear by two independent connections. The earth connections shall be extended to the bases of SFUs

- 3.5 Metal treatment and finish :

All steel works used in the construction of the switch boards shall have undergone a suitable rigorous metal treatment process so as to remove oxide scales and rust formation and to facilitate a durable coating of the paint on the metal surfaces and also to prevent the spreading of rust, in the event of the paint film being mechanically damaged.

Two coats of Anti Corrosive primer followed by a finishing coat of Epoxy powder coating of the shade 631 of IS : 5 (i.e; Siemens grey) shall be given. The total thickness of paint shall not be less than 25 micron.

- 3.6 Bus Bars :

- 3.6.1 The busbars shall be housed in non-segregated sheet steel compartments in the cubicle at convenient locations with provision for access to the buses from the front of the panel. The busbar shall be suitably braced with DMC/SMC supports to provide a through fault withstand capacity of 50 KA RMS symmetrical for one second and a peak short circuit withstand capacity 150 KA minimum. The neutral as well as the earth bus shall be capable of withstanding the above fault level.

- 3.6.2 Large clearance and creeping distance shall be provided on the busbar system to minimise the possibility of a fault.

- 3.6.3 High tension bolts, nuts and spring washers shall be provided at all busbar joints.

3.6.4 The continuous rating of the bus bar shall be 0.8Amps/Sq.mm. Maximum temperature of the bus and the connections shall not exceed 85 degrees centigrade. The busbars shall be of liberal design The main phase busbars shall have continuous current rating through out the length of each power control center and the neutral busbars shall have continuous rating of at least 50% of phase busbars.

3.6.5 Connections from the main busbars to functional circuits shall be arranged and supported so as to withstand without any damage or deformation, the thermal and dynamic stresses due to short circuit currents.

All busbars and tappings shall be provided with colour coded heat shrinkable sleeves for phase identification.

All joints/tapping points of the buses shall be suitably shrouded to prevent accidental contact.

#### 4.0 **Air Circuit Breakers :**

##### 4.1 General :

4.1.1 Circuit breakers shall be of three/four pole, air break, horizontal draw out, as given in the schedule of work and comply with the requirements of relevant IS with latest amendments confirming to IS-13947/1&2 and shall have conform to Isolation standard and shall have the following:

- i) A short circuit breaking capacity( $I_{cs}$  r.m.s of not less than 50 KA RMS at 500 volts, 50 Hz AC.
- ii) A short circuit making capacity ( $I_{cm}$  peak)of 105 KA.
- iii) Rated ultimate short circuit breaking capacity , ( $I_{cu}$  r.m.s )of 50 KA
- iv) A short time withstand capacity( $I_{cw}$  of 50 KA for one second.
- v) Electrical overload performance at 6 times the rated current, 100% of the rated voltage as recovery voltage at 0.5 power factor.
- vi) Dielectric test of 2.5 KV applied for one minute on main circuits.

4.1.2 The circuit breakers shall be fitted with detachable arc chutes on each pole designed to permit rapid dispersion, cooling and extinction of the arc. Inter phase barriers shall be provided to prevent flash over between phases.

4.1.3 Arcing contacts shall be of hard wearing material copper tungsten or silver tungsten and shall be easily replaceable. Main contacts shall be of silver plated copper of high pressure type and generous cross section.

##### 4.2 Operating Mechanism :

The operating mechanism shall be of robust design, with minimum number of linkages to ensure maximum reliability. Manually operated circuit breakers shall be provided with spring operated closing mechanism which are independent of speed of manual operation. Electrically shall be independent of the motor which shall be used slowly for charging the closing spring.

The operating mechanism shall be such that the breaker is at all times free to open immediately when the trip coil is energized.

Mechanical operation indicators shall be provided to show open and close positions of the breaker. Electrically operated breakers shall be additionally provided with mechanical indications to show charged and discharged conditions of the charging spring.

Means shall be provided for slow closing and opening of the breaker for maintenance purposes, and for manual changing and closing of electrically operated breakers during emergencies,

##### 4.3 Protection :

Provisions shall be available for fitting a minimum of five trip devices - three over current, a shunt trip and an under voltage release or two over current and earth fault release, a shunt trip and one under voltage release. The breakers shall be of the shunt or series trip type as specified in the schedule. The protection release must be Electronic /Micro Processor based , True RMS sensing compatible to EMC and with a provision of malfunctioning indications.

Following setting must be available on the relay :

- i) Over current setting( $I_r$ )            70% to 100% of  $I_n$
- ii) Short circuit setting ( $I_d$ )        1.25 to 10 of  $I_r$

#### 4.4 Housing of Circuit Breaker :

Circuit breakers shall be individually housed in sheet metal castle provided with hinged doors. The breaker along with its operating mechanism shall be mounted on a robust carriage moving on guide rollers with in the castle. Isolating contacts for both power and control circuits shall be of robust design and fully self aligning. The assembly shall be designed to allow smooth and easy movement of the breakers within its castle.

The breaker shall have three distinct positions within the castle as follows :

- i) `Service' position : With main and auxiliary contacts connected.
- ii) `Test' position : with power contacts fully disconnected and control circuit contacts connected.
- iii) `Isolated' position : with both power and control circuit contacts fully disconnected.

It shall be possible to achieve any of the above positions with the castle doors closed. Mechanical position indicators shall be provided for the three positions of the breakers.

#### 4.5 Interlocking :

##### 4.5.1. The moving portion of the circuit breaker shall be interlocked so that :

- i) It shall not be possible either to isolate it from the connected position, or to plug it in from the isolated position with the breaker closed.
- ii) The circuit breaker can be closed only when it is in one of the three positions or when it is fully out of the castle.
- iii) It shall not be possible to open the hinged door of the castle unless the breaker is drawn to the isolated position.
- iv) Inadvertent withdrawal of the circuit breaker too far beyond the supporters is prevented by the suitable stops.

##### 4.5.2 Provisions shall be available for the padlocking of the circuit breaker accessible in any of the three positions.

##### 4.5.3 Automatically operated safety shutters shall be provided to screen the fixed isolating contacts when the breaker is drawn out from the castle.

##### 4.5.4 The moving portion of the circuit breaker shall be provided with a heavy duty, self aligning earth contact, which shall make before and break after the main isolating contacts during insertion into withdrawal from the service position of the breaker. Even in the isolated position positive earthing contact should exist.

##### 4.5.5 Auxiliary switches directly operated by the breaker operating mechanism and having 4 `NO' and 4 `NC' contacts, shall be provided on each breaker. The auxiliary switch contacts shall have a minimum rated thermal current of 10 amps.

#### 5.0 Moulded Case Circuit Breakers (MCCBs)

- 5.1 If specified in the BOQ, MCCB's shall be provided in the switchboards for the circuit protection. MCCBs rating shall be as indicated in the switchboard data sheet.
- 5.2 MCCB shall be of triple pole /four pole as given in the schedule of work and comply with the requirements of relevant IS with latest amendments confirming to IS 13947/1&2 and shall conform to isolation standard and shall have the following Rated ultimate short circuit breaking capacity (Icu r.m.s) of not less than 20 KA RMS at 415 volts, 50 Hz Ac for rating upto 250A and 50KA for rating above 250A.  
Rated short circuit breaking capacity upto 600V DC (Ics ) of 20KA.

- 5.3 MCCB shall be provided with adjustable type overload (70-100% of In) and S.C. setting of 2 to 10times of Ir tripping device with inverse time characteristics for over load protection and instantaneous characteristics for short circuit protection.

The protection release must be Electronic /Microprocessor based, True RMS sensing ,inbuilt with adjustable threshold and time delay, compatible to EMC and with a provision of malfunctioning indications.

- 5.4 MCCBs shall be provided with spring assisted quick make/break manually operated trip mechanism. Wherever specified, MCCB shall be suitable for remote tripping operation and the tripping device shall be suitable for the specified control supply voltage.

- 5.5 'ON' and 'OFF' position of the operating handle of MCCB shall be displayed and the operating handle shall be mounted on the door of the compartment housing.

- 5.6 MCCB shall be provided with minimum 1 NO + 1NC auxiliary contacts.

If specified in the data sheet , the MCCBs shall be provided with solenoid /Motorised closing solenoid /motor shall be suitable for specified control supply voltage.

Wherever specified in the schedule, the MCCB shall be provided with Earth leakage relays .

However all MCCBs whether specified or not shall have shunt trip device.

- 6.0 Current Transformers.

Current transformers shall comply with the requirements of relevant latest IS. They shall have ratios, outputs and accuracy as specified in the schedule.

- 7.0 Indicating / Integrating Meters:

All indicating instruments shall be of flush mounted industrial pattern Digital type (if not mentioned otherwise) conforming to the relevant latest amended IS. The instrument shall have non-reflecting bezels, clearly, divided and indelibly marked scales, and shall be provided with zero adjusting devices in the front. Integrating instruments shall be of flush mounted switchboard pattern complying with the requirements of relevant latest IS.

- 8.0 Control switches/Selector switches:

Control switches/Selector switches shall be of the heavy-duty rotary type with plates clearly marked to show the operating position. They shall be of semi-flush mounted type with only the front plate and the operating handle projected. Circuit breakers control switches shall be of the spring return to neutral type.

- 9.0 Indicating lamps and push buttons :

Indicating lamps shall be of the LED type of low watt consumption, provided with series resistors where necessary and with translucent lamp covers. Bulbs and lenses shall be easily replaceable from the front.

Push buttons shall be of the momentary contact, push to actuate type fitted with self-reset contacts and provided with plates marked with its junctions.

- 10.0 Cable Terminations:

Cable entries and terminals shall be provided in the switchboard to suit the number, type and size of aluminum conductor power cables and copper conductor control cables as indicated in the schematic diagram.

Provision shall be made for top or bottom entry of cables as required. Generous size of cabling chambers shall be provided, with the position of cable glands and terminals such that cables can be easily and safely terminated. Barriers or shrouds shall be provided to permit safe working at the terminals of one circuit without accidentally touching that of another live circuit. Cable riser shall be adequately supported to withstand the effects of rated short circuit currents without damage and without causing secondary faults. Cable sockets shall be of Bimetallic crimping type.

#### 11.0 Control wiring :

All control wiring shall be carried out with 1100/650 V grade single core Copper cable conforming to relevant IS having stranded copper conductors of minimum 2.5 sq.mm section for CT Circuit and 1.5sq.mm for other Control wiring. Wiring shall be neatly bunched, adequately supported and properly routed to allow easy access and maintenance.

Wires shall be identified by numbered ferrules at each end. The ferrules shall be of the ring type of non-deteriorating material. They shall be firmly located on each wire so as to prevent free movement.

All Metering and control circuit to be protected with MCB (Fuse is not acceptable). MCB shall be mounted in front of the panel and shall be easily accessible.

#### 12.0 Terminal blocks and labels :

Terminal block shall be of 500 volts grade of the stud type. Insulating barriers shall be provided between adjacent terminals.

Terminal block shall have minimum current rating of 10 amps and shall be shrouded. Provisions shall be made for label inscriptions.

Labels shall be made of anodized aluminum, with white engraving on black background. They shall be properly secured with fasteners. Danger plate of size and descriptions as recommended in the relevant IS shall be provided on the PCC.

#### 13.0 Testing

Before electrical panel is energized, the insulation resistance of each bus shall be measured from phase to ground. Measurement shall be repeated with circuit breakers in operating positions and contact open.

Before switchgear is energized, the insulation resistance of all DC control circuits shall be measured from line to ground.

The following tests shall be performed on all circuit breakers during erection:

- a) Contact alignment and wipe shall be checked and adjusted where necessary in accordance with the breakers manufacturer's instructions.
- b) All adjustable direct acting trip devices shall be set using values given by the Engineer-in-Charge/manufacturer.
- c) Each circuit breakers shall be drawn out of its cubicle closed manually and its insulation resistance measured from phase to phase and phase to ground.
- d) The dielectric strength of insulating wherever applicable shall be checked.

Before switch gear is envisaged the following tests shall be performed on each circuit breaker in its position.

- a) Close and trip the circuit breaker from its local control switch push button or operating handle. Switchgear control bus may be energized to permit test operation of circuit breaker with AC closing with prior permission of the Engineer-in-Charge.
- b) Test tripping of the electrically operated circuit breaker by operating mechanical trip device.

- c) Test operation of circuit breakers latch check carriage limit switch if provided.
- d) Test proper operation of lockout device in the closing circuit wherever provided by simulating conditions which would cause a lockout to occur.
- e) Trip breaker either manually or by applying current or voltage to each of its associated protective relays.

Before switchgear is energized, the test covered above shall be repeated with each breaker in its normal operating position.

The supplier shall arrange testing and calibrations of relays. The testing equipment including primary and secondary injection sets (if required) etc. shall also have to be arranged by the supplier. Payment for above work shall be deemed to have been included in the erection of switch boards/control panels.

#### 14.0 Drawings :

14.1 After the award of the contract, the contractor shall submit three copies of the following drawings for approval of the Department.

a) Outline dimensional drawing of the PCC showing the general arrangement indicating the following :

- a) Busbar clearances;
- b) power and control cable entry points;
- c) Configuration of busbars;
- d) Details of support insulations and spacing;
- e) Outgoing power cable termination arrangements.

ii) Single line diagram of power control centre showing Protection, Metering etc.

iii) Cubicle wiring diagram.

iv) List of Fitments with Ratings & makes / Models

#### 15.0 Installation Testing and commissioning :

The power control centre shall be installed over the cable trench/cable pit using suitable size of MS channel including grouting of the channel with necessary bolts and nuts. Proper earthing of PCC shall be done using two independent copper/GI strip of sizes as indicated in the schedule. The channel shall be painted with one coat of red oxide primer and two coats of anticorrosive enamel paint of proper shade as directed by the Engineer-in-charge.

The pre-commissioning tests as required shall be done and the PCC shall be commissioned.

### PROFORMA FOR PCC TEST

SI No.	Description	Remarks
1.0	Circuit No. (breaker or supplier module designation/bus no.)	
2.0	Insulation resistance test (contacts open, breaker racked in position)	
3.0 (a)	Between each phase of bus	Mega ohm
(b)	Between each phase to Neutral	Mega ohm
4.0	Between each phase and earth	Mega ohm
5.0	DC and AC control & auxiliary circuits	Mega ohm
6.0	Between each phase of CT/PT and between CT & PT circuit if any	Mega ohm
	CT Checks	
7.0	CT ratio	
8.0	CT secondary resistance	
9.0	CT polarity check	
10.0	Check for contact alignment and wipe	
11.0	Check/test all release/relays	
12.0	Check mechanical interlocks	
13.0	Check electrical interlocks	
14.0	Check switchgear/control panel wiring	
15.0	Checking of breaker/supplier circuits for	
16.0	Closing	Local and remote (wherever applicable)
17.0	Tripping	Local/remote (as applicable)
18.0	Opening time for breaker/contractor	
19.0	Closing time for breaker/contractor	
20.0	Functioning of Indication lamps	
21.0	Functioning of Indication meters	
22.0	Functioning of Operation, Control & Protection circuits	
23.0	Functioning of all Electrical & Mechanical Interlocking	

## MEDIUM AND HIGH VOLTAGE CABLES & ACCESSORIES

### 1.0 SCOPE

**This specification along with data sheets covers requirements for design, manufacturer and supply of PVC /XLPE cables and cable jointing / terminating accessories for high voltage systems.**

Important criteria for Selection of cable Size:

- a) **Cables size for feeders to select having 50% additional loading capacity and for motors 25% additional capacity after deration as per standard practices of laying the cables.**
- b) **All HT Cables and LT cables of size greater then 35 sqmm XLPE U/G cables as far as possible.**
- c) **Cables to be laid through underground, or masonry cable trench, on cable tray or concealed in pipe.**
- d) **Control and power cables up to 6 sqmm Copper conductor only. Beyond this capacity, Aluminium cables are to be used except for DC / Battery wiring or otherwise specified for a particular application.**

### 2.0 STANDARDS

The cables shall comply with the latest edition of the following standards as applicable:

- |      |                   |   |           |
|------|-------------------|---|-----------|
| 2.1  | IS : 1554         | PVC insulated (heavy duty) electric cables.   |           |
| 2.2  | IS : 7089         | Cross-linked polyethylene insulated PVC sheathed cables.  |           |
| 2.3  | IS : 8130         | Conductors for insulated electric cables and flexible cords.  |           |
| 2.4  | IS : 5831         | PVC insulation and sheath of electric cables.   |           |
| 2.5  | IS : 3975         | Mild steel wires, strips and tapes for armouring of cables.   |           |
| 2.6  | 10810(part - 41)  | Methods of test for cables : Mass of zinc coating on steel armour   |           |
| 2.7  | IS : 209          | Specification for zinc.   |           |
| 2.8  | IS : 3961(Pt-2)   | Recommended current ratings for cables: Part - 2 PVC and PVC sheathed heavy duty cables.  | insulated |
| 2.9  | IS : 10418        | Drums for electric cables.  |           |
| 2.10 | IS : 10462(Pt-1)  | Fictitious calculation method for determination of dimensions of protective of cables: Part - 1 Elastomeric and thermoplastic insulated cables. |           |
| 2.11 | IS : 10810(Pt-58) | Method of test for cables: Part 58 Oxygen Index test.   |           |
| 2.12 | IS : 10810(Pt61)  | Method of test for cables: Part 61Flame retardant test.   |           |
| 2.13 | IS : 10810(Pt 62) | Method of test for cables: Part 62 Fire retardance test for bunched cables.   |           |
| 2.14 | IS : 13573        | Joints and terminals for polymeric cables for working voltages from 6.6KV upto and including 33KV. Performance requirements and type tests.     |           |
| 2.15 | IEC : 332-2       | Tests on electric cables under fire conditions.   |           |
| 2.16 | IEC : 502         | Extruded solid dielectric insulated power cables for rated voltages from 1 KV upto 30 KV.   |           |
| 2.17 | IEC : 540& 540A   | Test methods for insulation and sheaths of electric cables and cords.   |           |
| 2.18 | ASTM: D2863       | Standard method of test for Flammability of plastics using oxygen index method  |           |

**The cables and accessories shall also conform to the provisions of Indian Electricity Rules and other statutory regulations, as applicable.**

### 3.0 GENERAL CONSTRUCTION

**3.1 The cables shall be suitable for laying in trays, trenches, ducts, and conduits and for underground buried installation with uncontrolled backfill and possibility of flooding by water and chemicals.**

**3.2 Outer sheath of all PVC and XLPE cables shall be black in color and the minimum value of oxygen index shall be 29 at  $27 \pm 2$  deg. C. In addition suitable chemicals shall be added into the PVC compound of the outer sheath to protect the cable against rodent and termite attack.**

**3.3 All cables covered in this specification shall be flame retardant (FR) unless specified otherwise in the data sheet. The outer sheath of PVC and XLPE cables shall possess flame propagation properties meeting requirements as per IS-10810 (part-62) category AF.**

**3.4 Sequential marking of the length of the cable in meters shall be provided on the outer sheath at every one meter. The embossing / engraving shall be legible and indelible.**

**3.5 The overall diameter of the cables shall be strictly as per the values declared in the technical information furnished along with bids subject to a minimum tolerance of  $\pm 2$  mm upto overall diameter of 60 mm and  $\pm 3$  mm for beyond 60 mm.**

#### 3.6 PVC Cables

**3.6.1 All power/ control cables for use on medium voltage systems shall be heavy duty type, 650/1100 V grade with aluminum / copper conductor, PVC insulated, inner sheathed, armoured and overall PVC sheathed. Cables used in mines shall be of copper conductor only.**

**3.6.2 The conductor shall be solid for conductor of nominal area upto and including 6 mm and stranded beyond 6 mm. Conductors of nominal area less than 25 sq.mm shall be circular shaped. Cables with reduced neutral conductor shall have sizes as per Table 1 of IS 1554(part - 1).**

#### 3.7 XLPE Cables

**3.7.1 The dimensions of the insulation, inner sheath shall be governed by values given in IS : 7098 Part - 2.**

**3.7.2 Where specified, 1100 V grade power cables may also be XLPE insulated and shall meet the requirement specified in IS - 7098(Part- 1).**

### 4.0 TESTING AND INSPECTION

All the materials employed in the manufacture of the cable shall be subjected, both before and after manufacture, to examination, testing and approval by PURCHASER / Owner. Manufacturer shall furnish all necessary information concerning the supply to PURCHASER / owner's inspectors. The inspector shall have free access to the manufacturer's works for the purpose of inspecting the process of manufacture in all its stages and he will have the power to reject any material which appears to him to be of unsuitable description or of unsatisfactory quality. The vendor shall give at least 4 weeks advance notice to the purchaser, regarding the date testing to enable him or his representative to witness the tests.

#### 4.1 PVC & XLPE Cables

**4.1.1 After completion of manufacture of cables and prior to dispatch, the cables shall be subjected to type, routine, acceptance and special tests as detailed below. PURCHASER / Owner reserves the right to witness all tests with sufficient advance notice from vendor. The test reports for all cables shall be got approved from the Engineer before dispatch of the cables.**

**4.1.2 All routine tests, acceptance tests, type tests and additional type tests for improved fire performance shall be carried out on cables as listed in IS : 1554 Part - 1 , and IS : 7098 Part - 2.**

### 5.0 PACKING AND MARKING

**5.1 Cables shall be dispatched in non-returnable wooden or returnable steel drums of suitable barrel diameter, securely battened, with the take-off end fully protected against mechanical damage. The wood used for construction of the drum shall be properly seasoned, sound and free from defects. Wood preservatives**

shall be applied to the entire drum. Ferrous parts used shall be treated with a suitable rust preventive finish or coating to avoid rusting during transit or storage.

- 5.2 On the flange of the drum, necessary information such as project title, manufacturer's name , type size, voltage grade of cable, length of cable in meters, drum no., cable code, BIS certification mark, gross weight etc. shall be printed. An arrow shall be printed on the drum with suitable instructions to show the direction of rotation of the drum.

## LAYING OF CABLES

### 1.0 Scope :

This specification is intended to cover the requirements of installation and energising of PVC/XLPE/PILCDSTA power cables including jointing of cables.

### 2.0 Standards :

The power cable and its fixing accessories shall comply with the latest relevant Indian Standards and National Electrical Code.

### 3.0 Laying of Cables :

#### 3.1 General :

3.1.1 Before the commencement of cable laying, it shall be ensured by the Engineer-in-Charge that only ISI marked cables are used. It shall be the responsibility of the contractor to check the soundness and correctness of the size of the cable while taking delivery of the cable from stores. Any defect noticed shall be brought to the notice of the issuing authorities immediately. If any defects is noticed after the cable is laid or during the process of laying, it shall be brought to the notice of the Engineer-in-Charge and upon his satisfaction, that the cable is not damaged due to bad handling, it will be the entire responsibility of the contractor to retrieve the cable already laid and return the defective cable to store and take fresh length of the cable from the store and relay the same.

3.1.2 The material such as bricks, sand, cable route markers, RCC slab of best quality as approved by the Engineer-in-Charge only shall be used for cable laying works.

3.1.3 The contractor shall provide all the necessary labour, tools, plants and other requisites at his own cost for carrying out pumping of water and removing of water from trenches, if any, where required.

3.1.4 Installation shall be carried out in a neat, workman like manner by skilled, experienced and competent workman in accordance with standard practices.

3.1.5 While laying the cable care shall be taken to avoid formation of kinks and also damage to the cable. In the case of cable bends, it shall not have bent radius lesser than 20 times the overall diameter of the cable.

3.1.6 A cable loop of about three meters length and as directed by the Engineer-in-Charge shall be provided at the following locations.

- a) Near the termination points
- b) Near to the straight through joint

3.1.7 The method of cable laying and routing of cables, shall in every case be as directed by the Engineer-in-Charge / consultant.

3.1.8 Whenever cable passes through hume pipes / GI pipes embedded across the wall in a building, both the ends of the pipe shall be suitably sealed.

3.1.9 Identification tags indicating the size of the cable and feeder designation shall be securely attached at both ends of the cable. Such tags shall also be attached to the cable at intervals of 250 Mtrs. The materials of the tag shall be of either 12 SWG GI sheet or plastic. In case of plastic, the details have to be engraved and in case of GI sheet, the details should be punched. Cable route markers shall be provided at the intervals of 200 M with a minimum of one number route marker. The details of the route makers shall be as per the drawing. At the locations of straight through joints, necessary joint-markers shall be provided.

3.1.10 When cable runs vertically, it shall be clamped on mild steel flats or angle iron fixed on walls and are spaced at such intervals as to prevent buckling of the cables. All steel work shall be painted with a coat of red oxide and thereafter finished with suitable anticorrosive paints.

#### 3.2 Cable laid in ground :

- 3.2.1. All MV cables (up to 1.1 KV) shall be laid at a minimum depth of 0.75 M & HT cables (1.1 KV to 11 KV) shall be laid at a depth of 1.0 M when laid in ground. When cable pass through roads, nallahs etc. they must be protected by either hume pipe or GI pipe of suitable dimensions.
- 3.2.2. While removing the cable from the drum, it shall be ensured that the cable drum is supported on suitable jacks and the drum is rotated to unwind the cable from the drum. The cable should never be pulled while unwinding from the drum. It shall be ensured that the cables are run over the wooden rollers placed in the trench at intervals not exceeding 2 M.
- 3.2.3. After placing the cables in the trench shall be filled in layers ensuring that each layer is well rammed by spraying water and consolidated. The extra earth shall be removed from the place of trench and deposited at a place as directed by the Engineer-in-Charge/consultant.
- 3.2.4. The LT Cables shall be provided with protection using class 1 bricks at sides and top as indicated in Drawing and the HT cables shall be provided with RCC slabs (marked HT cable) on top and class1 bricks on sides as protection.

### 3.3 Cables laid in built up trench :

- 3.3.1. Before the commencement of cable laying the cable trench shall be drained properly. Cable shall be laid as explained in item 3.2. Cable shall be properly clamped to the cable supports which are provided in the cable trench. The method of clamping shall suit the size of the cable and the cable supports which are provided in the cable trench. The method of clamping shall suit the size of the cable and the cable supports, as directed by the Engineer-in-Charge.

Care shall be taken while removing and replacing the trench cover slab. It is the responsibility of the contractor to make good any damaged trench covers.

### 3.4. Cable terminations and straight through joints :

- 3.4.1. All cable jointing materials such as straight through joint boxes, cable compound, cable lugs, insulation tapes etc. shall be of best quality and as approved by the Engineer-in-Charge.
- 3.4.2. Cable glands for strip / armoured cables shall include a suitable armour clamp for receiving and securely attaching the armouring of the cable in a manner such that no movement of the armour occurs when the assembly is subjected to tension forces.

The cable gland shall not impose on the armouring, a bending radius not less than the diameter of the cable. The clamping ring shall be solid and of adequate strength.

Provision shall be made for attachment of an external earthing bond between the metallic covering of the cable and the metallic structure of the apparatus to which the cable box is attached.

### 3.4.3 Laying of Cables on Building Surface/ Structure

Cable laying directly on building surface is not acceptable in general. However if in any special case, it is permitted by the engineer-in-charge, Cables shall be rigidly supported on structural steel / masonry using individual cast / malleable iron galvanized saddles and these supports shall be approximately 400 to 500mm for cables up to 25mm overall diameter and maximum 1000mm for cables larger than 25mm. Unsightly sagging of cables shall be prevented. Only aluminium/GI clamps with GI bolts/nuts shall be used.

If drilling of steel structure must be restored to approval must be secured from the Engineer-in-charge and steel must be drilled where the minimum weakening of the structure will result.

### 3.4.4 Dressing of Cable inside the Equipment

After fixing of cable glands, the individual cores of cable shall be dressed and taken along the cableways (if provided) or shall be fixed to the panels with polyethylene straps. Cable shall be dressed in such a manner that small loop of each core is available inside the panel.

### 3.4.5 Identification of cables / wires / cores

Power cables shall be identified with red, yellow and blue PVC tapes for trip circuits identification, additional red ferrules shall be used only in the particular cores of control cable at the termination points in the switchgear / control panels and control switches.

In case of control cables all cores shall be identified at both ends by their wire numbers by means of PVC ferrules or self sticking cable markers, wire numbers shall be as per schematic / connection drawing. For power circuit also wire numbers shall be provided if required as per the drawings of switchgear manufacturer.

**4.0 Testing**

Once cable is laid, following tests shall be conducted in the presence of Engineer-in-Charge, before energising the cable:

- i) Insulation resistance test (Sectional and Overall).
- ii) Sheathing continuity test.
- iii) Continuity and conductor resistance test.
- iv) Earth test.
- v) High voltage test.

Tests conducted shall be as per Indian Standards and National Electrical Code.

a) DC high voltage test shall be made after installations on the following:

- 1) All 1100 volts grade cables in which straight through joints have been made.
- 2) All cables 1100V grade
- 3) For record purposes test data shall include the measured values of leakage current versus time
- 4) The DC high voltage test shall be performed as detailed below
- 5) Cables shall be installed in final position with the entire straight through joints complete. Terminations shall be kept unfinished so that motors, switchgear, transformer etc are not subjected to test voltage.

<b>Proforma for Testing Cables</b>	
Drum No. from which cable taken	<b>Date of Test</b>

Duty of Cable : from ----- to -----	
Length of Run of this cable	
<b>Insulation Resistance Test</b>	
Voltage of Meggar	Volts
Between core 1 to earth	Mega Ohm
Between core 2 to Earth	Mega Ohm
Between core 3 to earth	Mega Ohm
Between core 1 to core 2	Mega Ohm
Between core 2 to core 3	Mega Ohm
Between core 3 to core 1	Mega Ohm
<b>High voltage test</b>	
Voltage	Duration
Between cores and earth	
Between individual cores	
This Proforma shall be jointly signed by the Engineer-in-Charge and the supplier	

## 5.0 Cable Trays

These shall be channel type, fabricated from MS angle & Flat / slotted MS sheets (14 gauge minimum), hot dip galvanized, complete with all accessories such as bends, tees and reducers. Only aluminium flat clamps with G.I./Chromeplated bolts-nuts/screws to be used for clamping cables. Sizes of these trays shall be as specified in schedule of quantities submitted subsequent to design, duly approved by CCMB.

## **EARTHING**

### **1.0 SCOPE:**

This specification is intended to cover the requirements of supply, installation, testing and commissioning of

- a) Plate earthing
- b) Strip earthing

#### **Important:**

Body Earthing of Electrical Machines (DG, Transformer, PCC, MCC, Motors) to be GI plate and GI strip for earth connection.

Neutral Earthing with Copper plate.

GI / CI pipe Earthing is not acceptable.

### **2.0 STANDARDS:**

Earthing installations shall conform to the Indian Electricity Rules - 1956, as amended from time to time and IS 3043-1989 "code of practice for earthing", with latest amendments.

### **3.0 Earth electrode arrangement :**

#### **3.1 Plate electrode :**

For plate electrodes, minimum dimensions of the electrode shall be as under.

3.1.1 GI plate electrode : 600 x 600 x 6 mm thick.

3.1.2 Copper plate electrode : 600 x 600 x 3.0 mm thick

3.1.3 The electrode shall be buried in ground, with its faces vertical and top not less than 2.5 M from the surface of the ground.

3.1.4 Earthing using plate electrode shall be done as per details, indicated in drawing.

3.1.5 Plate electrodes shall have a galvanized iron water pipe, buried vertically and adjacent to the electrode. One end of pipe shall be at least 5 cm above the surface of the ground and need not be more than 10 cm. The internal diameter of the pipe shall be at least 19 mm. The length of pipe under the earth's surface shall be such that it shall be able to reach the center of the plate. The earthing lead shall be securely bolted the plate with two bolts, nuts, check nuts and washers.

#### **3.2. Strip or conductor electrodes :**

3.2.1. Strip electrode shall not be smaller than 20 x 3 mm, if of copper and 25 x 4 mm, if of galvanized iron and steel. If round conductors are used as earth electrodes, their cross sectional area shall not be smaller than 3 sq.mm , if of copper and 6 sq.mm , if galvanized iron and steel.

3.2.2. Conductor shall be buried in trenches not less than 0.5 m deep.

### **4.0 General :**

The entire earthing insulation shall be done in accordance with the earthing drawings, specification and instructions of the Engineer-in-Charge. The entire earthing system shall fully comply with the Indian Electricity Act and Rules framed there under. The supplier shall carry out any changes desired by the electrical inspector or CCMB in order to make the insulation conform to the Indian Electricity Rules, at no extra cost. The exact location of the earth pits, earth electrode and conductors and earthing points of the equipments shall be determined at site, in consultation with the Engineer-in-Charge. Any change in the

methods, routing, size of conductor etc. shall be subject to approval of CCMB / Engineer-in-Charge before execution.

- i) All materials used for connecting the earth lead with electrode shall be of GI in case of GI pipe and GI plate electrodes, and of tinned brass in case of copper plate electrode. The earthing lead shall be securely connected at the other end to the main board.
- ii) The earthing lead from electrode onwards shall be suitably protected against mechanical injury by routing the earth wire/strip through a suitable size of GI pipe.
- iii) All medium voltage equipments shall be earthed by two separate and distinct connections with the earth. In the case of high and extra high voltages, the neutral points shall be earthed by not less than two separate and distinct connections with the earth, each having its own electrode at the generating station or substation.
- iv) Earthing systems for computers, electronic instruments and laboratory equipment is to be fully independent of any earthing system for power circuits.
- v) All materials, fittings etc. used in earthing shall conform to Indian standard specifications wherever they exist. In the case of materials for which Indian standard specifications do not exist, such materials shall be approved by the Engineer-in-Charge.
- vi) The earth electrode shall be kept free from paint, enamel and grease.
- vii) It shall be ensured that similar materials for respective earth electrodes and earth conductors are used.
- viii) Earth electrode shall not be installed in proximity to a metal fence.
- ix) Copper/GI strip shall be connected to the respective earth electrodes, either by brazing or welding respectively. The Copper/GI strip shall be jointed only either by brazing or by riveting at the end of overlapping portions. The over lap shall not be less than 50 mm.
- x) Earthing clamps used for supporting earth strips shall be made of such materials so as to avoid bimetallic action between strip and clamps.

#### 5.0 **Testing :**

Earth resistance maximum 1 ohm in overall loop and less than 5 ohm as individual earth pits are desirable.

Special treatment to be provided wherever necessary to obtain the desired Earth resistance value.

The earth resistance of each electrode shall be measured by using a reliable and calibrated earth Meggar and the value shall be as per IS/IE rules.

## RECOMMENDED MAKES OF MATERIALS

List of makes of various major components are detailed below. The supplier shall consider the 1<sup>st</sup> preference make while offering bid price. In case 2<sup>nd</sup> or subsequent preference is opted for pricing, the reason for the same has to be mentioned categorically.

1. Alternator : Caterpillar / equivalent superior quality
2. Engine : Caterpillar / equivalent superior quality
4. Accoustic Enclosure : Design & approved by Engine Manufacturer
5. Protecting Relays : GE (EE) / Siemens / AVK SEGC
6. Batteries : Exide / Amron / Nife
7. ACBs/MCCBs/Contactors : GE / Schneider (M-G) / Siemens
8. MCBs : MDS / L&T- Hager / Schnider
9. PVC wires : Finolex / Qflex / Havell's
10. Under ground Cables : CCI/Unistar/Incab/Nicco
11. Cable Glands : HMI/Comet
12. Cable Lugs : Dowell's/3D
13. MV Panels (PCCs) : Manufacturers with CPRI Test Certificate.
14. Indicating Meters : Conzerve (Enercon)/AE
15. Selector switches : Kaycee / Vaishno / Salzer
16. Current Transformers(MV) : Kappa / AE
17. Lamp Holders : Anchor/SSK/Eqvt.
18. Indication LampsLED (protected type): Schneider/ Vaishno/ Binay
19. Time switch : L&T / GE / MDS

## **SPECIAL CONDITIONS FOR ELECTRICAL WORKS**

### **1. General**

- 1.1 These special conditions shall be read in conjunction with the description of the item of work in the Bill(s) of Quantities, the particular Specifications, Local Statutory Regulations, Indian Standards Specifications/Codes and the drawings. All the above quoted documents, shall be considered supplementary to each other. However, in the case of conflict amongst the various provisions, the owner's and the Engineer/ Consultants opinion will be final and shall be adopted.
- 1.2 The tenderer is advised to inspect the site to ascertain the nature of site, access thereto, local facilities for procurement of materials and working labour rates prevalent in the area, in fact all matters affecting his prices and execution of the work. The tenderer shall be deemed to have full knowledge of the site and drawings whether or not he actually inspects them.
- 1.3 The scope of work needs a modification of the existing system at electrical Main Panel board without much disturbance to the normal functioning of the institute. The down time of the regular electrical supply to the Building shall be restricted to the bare minimum. The scope of work includes taking all the possible measures to continue the power supply with temporary provisions to maintain emergency services during the execution of work.
- 1.4 The works related to power shut down of the system to be undertaken preferably on the Holidays with prior permission of the concern authority.
- 1.5 The project time schedule / PERT Chart to be provided before execution of work.

### **2. Rates**

- 2.1 The rates quoted shall be deemed to allow for all minor extras and constructional details which are not specifically shown on drawings or given on the specifications but are essential in the opinion of the Engineer-in-charge to the execution of works to conform to good workmanship and sound engineering practice. The Engineer / Consultant / Employer reserves the right to make any minor changes during the execution without any extra payment.
- 2.2 The Engineer/ Consultants decision to clarify any item under minor changes, minor extras and constructional details shall be final, conclusive and binding on the Contractor.
- 2.3 The bidders has to provide the alternative rates of different size of items (AB, MCCB, MCB, cables etc; of different rating to facilitate the alteration in design, if any required, during the subsequent discussion.

### **3.0 Materials**

- 3.1 The Contractor shall ensure to the satisfaction of the Engineer / Consultant / Employer that the materials are packed in original sealed containers / packing bearing manufacturer's markings and brands etc., except where the gross quantity required is a fraction of the smallest packing. Materials not complying with this requirement shall be rejected.
- 3.2 Testing of Materials:
  - a) When required by the Engineer / Consultant, the Contractor shall provide all facilities at site or at manufacturer's works or in an approved laboratory for testing the materials and/or workmanship. All the expenditure in respect of this shall be borne by the Contractor unless specified otherwise in the Contract. The Contractor shall, when required to do so by the Engineer/ Consultant shall submit at his own cost, manufacturer's certificate of tests, proof sheets, mill sheets etc., showing that the materials have been tested in accordance with requirements of these specifications.
  - b) Neither the omission by the Engineer/ Consultant to test the materials nor the production of manufacturer(s) certificate etc., as aforesaid shall affect the right of the Engineer/ Consultant to reject, after delivery the materials found unsuitable or not in accordance with the specifications.

### **4 Drawings:**

- 4.1 Clarifications required or discrepancies, if any, noted by the Contractor in the various drawings supplied by the Engineer/ Consultant must be obtained well before execution, failing which the decision of the

Engineer/ Consultant shall be final and binding on the Contractor with regard to detailing and general acceptance of the Contract.

#### 5.0 **Rectification of Defects:**

5.1 Any defect in the work done or materials used in the works pointed out by the Engineer/ Consultant shall be rectified within a week or such extended time as may be allowed in this failing which the said defect shall be got rectified by the Engineer/ Consultant at the risk and cost of the Contractors.

#### 6.0 **Conduits/Cables Layout:**

6.1 Prior to the laying of the Conduits/cables, the Contractor shall submit to the Engineer/ Consultant detailed layout plans of the Conduit/cable network and get the same approved. The layout plans shall contain particulars regarding size and routes of the Conduits/cables, Junction boxes etc. The Cables shall be procured only after approval of Layout Drawings.

#### 7.0 **Regulations & Standards:**

7.1 The installation shall conform in all respects to Indian Standard Code of Practice for Electrical Wiring Installation IS: 732 and IS: 2274. It shall also be in conformity with the current Indian Electricity Rules and Regulations and requirements of the local Electric Supply Authority in so far as these become applicable to the installation. Wherever this specification calls for higher standard of material and/or workmanship than those required by any of the above regulations then this specification shall take precedence over the said regulations and standards.

#### 8.0 **Shop Drawings:**

8.1 The Contractor shall prepare and submit to the Engineer/ Consultant for the approval of detailed fabrication drawings for Main LT Panels/Switchgears/Rising Mains special boxes and Distribution Board, switch board, special any other equipment to be fabricated by Contractor before taking up the actual fabrication

#### 9.0 **Completion Drawings:**

9.1 At the completion of the work and before issuance of certificate of virtual completion the contractor shall submit to the Engineer layout drawings drawn at approved scale indicating the complete wiring system "As Installed". These drawings shall in particular, give the following information.

(a) A complete wiring diagram, as installed and schematic drawings showing all connections in the complete electrical system.

(b) Locations of all earthing stations, routs and size of all earthing conductors, manholes etc.

(c) Layout and particulars of all cables, Panels, Control circuit wiring etc.

Five Sets of Blue Prints / Printouts hardcopy and Soft copy on CD of Drawings shall be submitted after completion of work.

#### 10.0 **Manufacturer's Instructions:**

10.1 Where manufacturers have furnished specific instructions, relating to the materials used in this job, covering points not specifically mentioned in the documents, these instructions should be followed in all cases.

#### 11.0 **Completion Certificate:**

11.1 On completion of the Electrical Installation a certificate shall be furnished by the Contractor counter signed by a licensed supervisor, under whose direct supervision the installation was carried out.

This certificate shall be in the prescribed form as required by the local supply authority. **The Contractor shall be responsible for getting the drawings and Electrical Installation inspected and approved by the local Authority concerned/CEA.** Only Statutory Fees, if any applicable, only will be paid and Incidental expenses will not be paid.

**12.0 Qualified Competent Supervision:**

12.1 The Contractor shall employ competent fully licensed, qualified full time Engineer to direct the work of Electrical installation in accordance with drawings and specifications. The Engineer shall be available at all times on the site to receive instructions from Engineer/ Consultant in the day-to-day activities, throughout the duration of the contract. The foremen shall co-relate the progress of the work in conjunction with all relevant requirements of the supply authorities.

**13. Approval from AP Transco / Electrical Inspectorate / APPCB:**

13.1 The Contractor shall prepare and submit all the relevant drawings as per the Requirement of AP Transco / APCPDCL / Electrical Inspectorate / Central Electricity Authority / AP Pollution Control Board / Local Municipal Authority or any other statutory authority. No extra payment will be made for this approval except statutory fees if any applicable. The Contractor is also responsible to obtain the Approvals for Drawings and Final approval from AP Transco / Electrical Inspectorate / CEA, Chennai / AP Pollution Control Board for energisation of the installation.