



ರೈಲು ಮೂಲಸೌಲಭ್ಯಅಭಿವೃದ್ಧಿ ಕಂಪನಿ (ಕರ್ನಾಟಕ) ನಿಯಮಿತ

रेल इन्फ्रास्ट्रक्चर डेवलपमेंट कंपनी (कर्नाटक) लिमिटेड

Rail Infrastructure Development Company (Karnataka) Limited  
**(K-RIDE)**

(A Joint Venture of Govt. of Karnataka and Ministry of Railways)

TENDER NO. KRIDE/2025-26/IND0002

DATE:05.07.2025

## TENDER DOCUMENT

NAME OF THE WORK

“DESIGN, MANUFACTURE, SUPPLY, TESTING & COMMISSIONING OF SELF- PROPELLED 8-WHEELER INSPECTION & MAINTENANCE CAR OF DIESEL ELECTRIC UNDER SLUNG TYPE FOR OPERATION ON BROAD GAUGE (1676MM) ELECTRIFIED (25 KV A.C.) ROUTES OF INDIAN RAILWAYS.”

**RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED (K-RIDE)**

Samparka Soudha,  
1st Floor, Dr. Rajkumar Road,  
Opposite Orion Mall,  
Rajajinagar 1st Block, Bengaluru-560010  
Email: [gmprocurement@kride.in](mailto:gmprocurement@kride.in)



**TENDER DOCUMENT**  
(Through e-Tendering Mode)

Tender for the work of:

**DESIGN, MANUFACTURE, SUPPLY, TESTING & COMMISSIONING OF SELF- PROPELLED 8-WHEELER INSPECTION & MAINTENANCE CAR OF DIESEL ELECTRIC UNDER SLUNG TYPE FOR OPERATION ON BROAD GAUGE (1676MM) ELECTRIFIED (25 KV A.C.) ROUTES OF INDIAN RAILWAYS**

<b>TENDER NO:</b>	KRIDE/2025-26/IND0002, Dated 11.06.2025
Date and time of and availability of Tender Document	11.06.2025
Pre-Bid meeting date and Time	As Per Date and Time Specified in e-procurement portal.
Last date for submission of online Tenders on Karnataka Public Procurement Portal	As Per Date and Time Specified in e-procurement portal.
Date and Time for opening of Technical Tender on the Karnataka Public Procurement Portal	The opening of the Technical Bid shall take place at e-procurement portal of K-RIDE i.e., <a href="https://kppp.karnataka.gov.in">https://kppp.karnataka.gov.in</a> .
Date and Time for opening of Financial Tender on the Karnataka Public Procurement Portal <sup>9</sup>	The opening of the Financial Bid shall take place at e-procurement portal of K-RIDE i.e., <a href="https://kppp.karnataka.gov.in">https://kppp.karnataka.gov.in</a>
Validity of Tenders	180 Days
Period for Contract	6 Months
Earnest Money Deposit (EMD) Amount	<b>Rs.9.83</b> Lakh payable as provided in Clause 12 of ITT
Address for Communications	GM/Procurement K-RIDE (Rail Infrastructure Development Company (Karnataka) Limited) #8, 1st Floor, Samparka Soudha, Dr. Rajkumar Road, Opposite Orion Mall Rajajinagar 1st Block, BENGALURU-560010 E Mail <a href="mailto:gmprocurement@kride.in">gmprocurement@kride.in</a>

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## SECTION I: INVITATION FOR TENDERS (IFT)

**Tender Reference No: KRIDE/2025-26/IND0002**

**Dated: 11.06.2025**

1. The General Manager/ Procurement (Referred to as the "**Purchaser**") invites Tenders on behalf of Rail Infrastructure Development Company (Karnataka) Limited through Karnataka Public Procurement Portal from eligible Tenderer for procurement of Goods and related services more fully detailed in **Appendix A** - Schedule of Requirements (hereinafter referred to as "**the Goods and related services**"). The Tenderers are advised to go through the same.
2. The Tender documents may be downloaded from the Karnataka Public Procurement Portal <https://kppp.karnataka.gov.in> free of cost till the last date and time or extended date and time for submission of Tenders. The Tenderers shall go through the Tender document for details before submission of their Tenders.
3. The Tenderer has to deposit an Earnest Money Deposit amount of Rs.9.83 Lakhs (Rupees Nine Lakhs Eighty Three Thousand Only) through Karnataka Public Procurement Portal by any of the modes specified in the Karnataka Public Procurement Portal. The EMD instrument, if any as specified in clause 12.4 should be submitted by the Tenderer in original as instructed by the Purchaser after the last date for submission of Tenders but before opening of the Technical Tender.
4. Tenderer who are specifically exempted from submitting the EMD should submit the EMD Declaration Form as provided in this Tender Document. Tenders without EMD Declaration and documentary proof of such exemption will be summarily rejected and such Tender shall not be considered for any further evaluation.
5. Tenders must be submitted through Karnataka Public Procurement Portal within the last date and time for submission of Tenders. Two Electronic Tender Document System procedure will be followed, wherein the Tenderer are required to submit Technical Tender and Financial Tender simultaneously. No physical submission of Tender shall be accepted.
6. The Tenderers are advised to note the Eligibility criteria and Qualification criteria specified in the Clause 3 and 4 of the Tender Document to qualify for award of the Contract.
7. A Pre-bid meeting will be held as per Date and Time specified in e-procurement portal at RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED (K RIDE), 1st Floor, Samparka Soudha, Dr. Rajkumar Road, Opposite Orion Mall, Rajajinagar 1st Block, Bengaluru-560010 16 for providing any clarifications sought by the Tenderer for the submission of Tenders. The last date for submission of Tenders is as per date and time specified in e-procurement portal.
8. Technical Tender will be opened in the Karnataka Public Procurement Portal as per date and time Specified in e-procurement portal. If the office of the Purchaser happens to be closed on the date of opening of the Tenders as specified, the Tenders will be opened on the next working day at the same time.
9. **DELETED**
10. All notifications, changes and amendments to the Tender Document will be posted only on the Karnataka Public Procurement Portal <https://kppp.karnataka.gov.in>, which shall form part of the Original Tender Document.
11. Other details can be seen in the Tender documents.
12. For any additional information or clarification regarding the Tender, the interested Tenderer, may contact office of the undersigned at the address given below on all working days during office hours.
13. The Purchaser reserves the right to accept or reject or cancel any or all the Tenders or to abandon the procurement without assigning any reasons thereof.

### **RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED (K RIDE)**

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E-mail: [gmprocurement@kride.in](mailto:gmprocurement@kride.in)

## SECTION II: INSTRUCTIONS TO TENDERER (ITT)

### A. Introduction

#### 1. Scope of Tender

1.1 The Purchaser invites Tenders following Two Electronic Tender Document System procedure from eligible Tenderer for procurement of Goods and related services as detailed in Appendix A- Schedule of Requirements for Bangalore Division of South Western Railway.

1.2 **DELETED.**

#### 2. One Tender Per Tenderer

2.1 Each Tenderer shall submit only one Tender (comprising Technical Tender and Financial Tender). Tenderer who submits more than one Tender will be disqualified.

2.2 All Tenderer are required to register in Karnataka Public Procurement Portal. The Tenderer, who submits their Tender after digitally signing using their Digital Signature Certificate (DSC), accept that they have clearly understood and agreed the terms and conditions including all the Forms/Annexure/ Appendices of this Tender.

#### 3. Eligible Tenderer

3.1 For determining the eligibility of Tenderer, the following conditions are required to be satisfied:

- a. The Tenderer should not be under order of debarment from participating in a Tender, and as on the last date of submission of Tenders.
- b. Tenderer's contracts should not have been terminated during the last [3 (three)] financial years due to non-fulfillment of contractual obligations as evidenced by imposition of a penalty by any procurement entity or by an arbitral or judicial authority or a judicial pronouncement or arbitration award against the Tenderer.
- c. Tenderer 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 Tenders.
- i. The Tenderer should be a single business entity and may either be a proprietorship Firm, or company, or partnership firm, or Limited Liability Partnership firm, or Society which is registered under the relevant statutory law or public entity (State-owned enterprises or institutions).

#### Note:

State-owned enterprises or institutions may be eligible to participate in the tendering process and be awarded a contract only if they can establish, in a manner acceptable to the Client, that they: (i) are legally and financially autonomous, (ii) operate under commercial law, and (iii) are not under supervision of the Client.

- d. Group of single business entities (Consortium) is **NOT** allowed to participate in this Tender process.
  - e. Tenderer must not be insolvent, in receivership, bankrupt are being wound up, not have its affairs administered by a Court or Judicial Officer, not have its business activities suspended and must not be the subject of legal proceeding for any of these reasons
- 3.2 Conditions for submission of Proposal by a Bidder/Tenderer/Supplier from a Country which shares Land Border with India
- i. Any Bidder from a country which shares a land with India will be eligible to bid in this Tender only if the Bidder is registered with the Competent Authority. Further, any Bidder (including Bidder from India) having Specified Transfer of Technology (ToT) arrangement with an entity from a country which shares a land border with India, shall also require to be registered with the same competent authority.

"Bidder" (including the term 'tenderer', 'consultant' or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or

firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.

- ii. "Bidder (or entity) from a country which shares a land border with India" for the purpose of this Tender means:
  - a. An entity incorporated, established or registered in such a country; or
  - b. A subsidiary of an entity incorporated, established or registered in such a country; or
  - c. An entity substantially controlled through entities incorporated, established or registered in such a country; or
  - d. An entity whose beneficial owner is situated in such a country; or
  - e. An Indian (or other) agent of such an entity; or
  - f. A natural person who is a citizen of such a country; or
  - g. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above.
- iii. The beneficial owner for the purpose of above clause will be as under:
  - a. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has a controlling ownership interest or who exercises control through other means.

**Explanation-**

- i. "Controlling ownership interest" means ownership of or entitlement to more than twenty-five percent of shares or capital or profits of the company;
- ii. "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholder's agreements or voting agreements;
  - b. In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership;
  - c. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of individuals;
  - d. Where no natural person is identified under (a) or (b) or (c) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;
  - e. In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.
- iv. An Agent is a person employed to do any act for another, or to represent another in dealings with third person.
- v. A certificate for having read the above clauses is required to be submitted / uploaded by the Tenderer separately in the prescribed format at **Tech Form - 7**:

**Note:**

1. The registration shall be valid at the time of submission of Tender and at the time of acceptance of the Tenderer.
2. If the Tenderer was validly registered at the time of acceptance/placement of order, registration shall not be a relevant consideration during the contract execution.

**3.3 Regulation for participation of Indian Agents/Associates of Foreign Principals - DELETED**

3.4 The Tenderer should have the following:

- a. Registration under the applicable law for establishing their legal identity.

- b. Registration under the Goods and Service Tax (GST) of the State.
- c. Permanent Account Number (PAN) issued by the Board of Direct Taxes under the Income Tax Act, 1961.
- d. Udyam Registration (online registration for MSME).

#### 4. Qualification Criteria

- 4.1 The Tenderer should establish their competence and capacity based on the following qualification criteria (the “**Qualification Criteria**”). The qualification information should be submitted in the format prescribed at Tech Form 3 and Tech Form- 4.

##### A. Technical Capacity

[The Tenderer should establish their experience (the “**Technical Capacity**”) as set out below:

- i. The Tenderer should be the Original Equipment/Goods Manufacturer (OEM) or an authorized dealer of the Original Equipment/Goods Manufacturer (OEM) of the tendered item.
- ii. If Tenderer is an Original Equipment/Goods Manufacturer (OEM), he should have manufactured, tested, and supplied the equipment (s) as specified in the ‘Schedule of Requirements’ up to 100% of the quantity in any one of the last 3 (three) completed Financial Years (i.e. Financial Year 2023-2024, 2022-2023 and 2021-2022). The equipment offered for supply must be of the most recent series models incorporating the latest improvements in design as per the Specification no. TI/SPC/OHE/8WDETC/0092.
- iii. Tenders of Tenderers quoting as authorized representative of a manufacturer, meeting with the above requirement in full, can also be considered provided:
  - a. the manufacturer furnishes authorization in the prescribed format at Tech Form - 3- Annexure C assuring full guarantee and warranty obligations as per GCC and SCC; and
  - b. the Tenderer, as authorized representative, has supplied, installed and commissioned satisfactorily 100% of the quantity similar to the type specified in the Schedule of Requirements in any one of the last three years which must be in satisfactory operation for at least last 18 months on the date of Tender opening.

##### Note:

1. The Tenderer should furnish the information on all past supplies and satisfactory performance for both (ii) and (iii) above, in the prescribed format at Tech Form - 3- Annexure A, Annexure B, Annexure C and Annexure D.
2. The Tenderer should furnish details of Service Centres and information on service support facilities that would be provided after the warranty period in the prescribed format at Tech Form 3- Annexure B 2.

##### B. Financial Capacity

The Tenderer should have the following financial capacity (the “**Financial Capacity**”).

- i. If the Tenderer is OEM of the Goods being sought to be procured as per this Tender process, then the Average Annual Turnover of the Tenderer should be **Rs. 9.83 Cr.** (Rupee Nine Crore Eighty Three Lakhs Only) for the last 3 (three) preceding financial years (i.e. Financial Year 2023-2024, 2022-2023 and 2021-2022 ending on the relevant financial year.

OR

- ii. If the Tenderer is an authorized dealer of the OEM duly authorized to participate in the Tender, then the average annual turnover of such Tenderer shall not be less than **Rs. 9.83 Cr.** (Rupee Nine Crore Eighty-Three Lakhs Only) for the last 3 (three) preceding Financial Years (i.e. Financial Year 2023-2024, 2022-2023 and 2021-2022) ending on the relevant financial year.

##### Note:

1. Technical Capacity and Financial Capacity of parent/subsidiary/associate company (ies) of the Tenderer will not

be considered for the purpose of evaluation.

2. The Tenderer should submit details of the Annual Turnover and a certificate for average annual turnover from a Statutory Auditor / Chartered Accountant along with audited annual accounts for the respective financial years in the prescribed format at Tech Form - 4.
  3. Year 1 will be the latest completed financial year, preceding the last date for submission of Tenders. Year 2 shall be the year immediately preceding Year 1 and so on. In case, the last date for submission of Tenders falls within six months of the close of the latest financial year, it shall ignore such financial year for the purposes of its Tender and furnish all its information and certification with reference to the three years preceding the latest financial year.
- 4.2 The Tenderer should fulfill all the criteria detailed in this Clause to qualify in the Technical Tender. If a Tenderer does not fulfill the minimum criteria prescribed herein, the Tenderer shall be disqualified. On such disqualification the Financial Tender of such Tenderer will not be opened & will not be considered for further evaluation.
- 4.3 Though the Tenderer fulfills the above conditions, they are subject to be disqualified if they have made any misleading or false representation in the forms, statements, any attachments in proof of the requirements specified in the eligibility or qualification criteria.
- 4.4 The documentary evidence of the Tenderer's qualifications to perform the Contract if its Tender is accepted, shall establish to the Purchaser's satisfaction:
- (a) **DELETED**
  - (b) That the Tenderer has the financial, technical, and production capability necessary to perform the Contract and meets the criteria outlined in the Qualification requirements specified in Clause 4 (A.) To this end, all Tenders submitted shall include the following information:
    - (i) The legal status, place of registration and principal place of business of the company or firm or partnership, etc.
    - (ii) Details of experience and past performance of the Tenderer on equipment offered and on those of similar nature within the past three years in the prescribed format at Tech Form 3-- Annexure A to Annexure D.
- 4.5 **Documents Establishing Goods' Eligibility and Conformity to Tender Documents**
- 4.5.1 The Tenderer shall furnish, as part of its Tender, documents establishing the eligibility and conformity to the Tender Documents of all goods and services which the Tenderer proposes to supply under the Contract.
- 4.5.2 The documentary evidence of conformity of the goods and services to the Tender Documents may be in the form of literature, drawings and data, and shall consist of:
- (a) A detailed description of the essential technical and performance characteristics of the goods;
  - (b) 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
  - (c) 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.
  - (d) a confirmation that, if the Tenderer offers system and/or other software developed by another company, such software operates effectively on the system offered by the Tenderer; and the Tenderer is willing to accept responsibility for its successful operations; and
  - (e) a confirmation that the Tenderer is either the owner of the Intellectual Property Rights in the hardware and software items offered, or it has the proper authorization and/or license from the owner to offer them. Willful misrepresentation of these facts will lead to the cancellation of the Contract without prejudice of other remedies that the Purchaser may take.
- 4.5.3 For purposes of the commentary to be furnished pursuant to ITT Clause 4.5.2 (c) above, the Tenderer 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 Tenderer may substitute alternative standards, brand names and/or catalogue numbers in its Tender, provided that it demonstrates to the Purchaser's satisfaction that the substitutions ensure substantial equivalence to those designated in the Technical Specifications - **DELETED**

## 5. Cost of Tendering

- 5.1 The Tenderer shall bear all direct or consequential costs, losses and expenditure associated with or relating to the preparation, submission, presentations or demonstrations which the Purchaser may require and processing of its Tender, and the Purchaser will in no case be responsible or liable in any manner for these costs, regardless of the conduct or outcome of the Tender process.

## B. The Tender Documents

### 6. Contents of Tender Documents

- 6.1 The Tendering procedures and contract terms are prescribed in the Tender documents. In addition to the Invitation for Tenders, the Tender Documents shall include:
- a. Notice Inviting Tender;
  - b. Instruction to Tenderer (ITT);
  - c. Formats for Submission of Tenders
  - d. Form of Contract
  - e. General Conditions of Contract (GCC);
  - f. Special Conditions of Contract (SCC);
  - g. Appendices
    - a. Schedule of Requirements;
    - b. Technical Specifications;
    - c. Contract Price (Price schedule);
    - d. Form of Bank Guarantee for Performance Security Deposit
    - e. Bank Guarantee for Annual Maintenance Security; if any
    - f. Notification of Award and Letter of Acceptance/Letter of Intent and
    - g. Any modifications, clarifications, addendum/ corrigendum issued to the original Tender Document, pre-bid meeting proceedings.
- 6.2 The Tenderer is expected to examine all instructions, forms, terms, and specifications in the Tender Documents. Failure to furnish all information required by the Tender Documents or submission of a Tender not substantially responsive to the Tender Documents in all respect will be at the Tenderer's risk and may result in rejection of its Tender.

### 7. Amendment to Tender Documents

- 7.1 Before the deadline for submission of Tenders, the Purchaser may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Tenderer, may make any modifications or amendments to the Tender Documents. Such modifications or amendments shall be notified on the Karnataka Public Procurement Portal through issue of Addendum or Corrigendum or Clarification. Any Addendum or Corrigendum

or Clarification issued by the Purchaser shall form part of the original Tender Document.

- 7.2 In order to allow prospective Tenderer, reasonable time, to take the amendment into account in preparing their Tenders, the deadline for the submission of Tenders as necessary may be extended. Information about extension of the deadline for the submission of Tenders will be published on Karnataka Public Procurement Portal.
- 7.3 The Tenderer is responsible to check the Karnataka Public Procurement Portal for any corrigendum/addendum/Clarification.

## 8. Pre-Bid Meeting and Clarification of Tender Documents

- 8.1 A prospective Tenderer requiring any clarification of the Tender Documents may notify the Purchaser in writing or by email at the mailing address indicated in the Invitation for Tenders in the format provided below.
- 8.2 The Purchaser will respond in writing to any request for clarification of the Tender Documents which it receives not later than 15 days prior to the last date and time for submission of Tenders. The Purchaser's response will be uploaded in the Karnataka Public Procurement Portal including a description of the enquiry but without identifying its source.

	Tender Document reference (Section, Clause No and Page No)	Content of the Tender Document Clause	Points of Clarification Required

- 8.3 If the pre-bid meeting is to be held, the Tenderer or his authorized representative is invited to attend a pre-bid meeting which will take place at venue and time as specified in the Karnataka Public Procurement portal.
- 8.4 The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage. The Tenderer may submit any queries in writing or by email at the mailing address, prior to the date of pre-bid meeting.
- 8.5 Minutes of the meeting, including the text of the questions raised (without identifying the source of enquiry) and the responses given will be uploaded on the Karnataka Public Procurement Portal without delay. Any modification to the Tender Documents listed in Sub-Clause 6.1, which may become necessary as a result of the pre-bid meeting shall be made by the Purchaser exclusively through the issue of an Addendum/Corrigendum/Clarification pursuant to Clause 7 and not through the minutes of the pre-bid meeting.

## C. Preparation of Tenders

### 9. Language of Tender

The Tender prepared by the Tenderer, as well as all correspondence and documents relating to the Tender exchanged by the Tenderer and the Purchaser, shall be written in English language. Supporting documents and printed literature furnished by the Tenderer may be in another language provided they are accompanied by an accurate translation of the relevant passages in the English language in which case, for purposes of interpretation of the Tender, the translation shall govern.

### 10. Document Constituting the Tender

- 10.1 The Tender should be uploaded in the Karnataka Public Procurement Portal under a two Tender document system comprising the following documents.
- A- **First Electronic Document - Technical Tender documents** shall comprise of scanned copy of all pre-qualification information about the Tenderer namely; Letter of Tender in the format prescribed at Tech Form- 1.
- i. Details of Tenderer in the format prescribed at Tech Form- 2 along with supporting documents;
  - ii. Technical Capacity of the Tenderer in the format prescribed at **Tech Form - 3 - Annexure A, Annexure B, Annexure C and Annexure D** along with supporting documents;
  - iii. Financial Capability of the Tenderer in the format prescribed at **Tech Form - 4** along with Statutory Auditor certificate and supporting documents;
  - iv. Statement of Legal Capacity of the Tenderer in the format prescribed at Tech Form 5;
  - v. Power of Attorney for Signing of Proposal in the format prescribed at **Tech Form - 6**;
  - vi. Undertaking Regarding Restrictions on Procurement from A Bidder/Tenderer/Supplier of a Country Which Shares a Land Border with India in the format prescribed at **Tech Form - 7**;
  - vii. Earnest Money Deposit in the manner and form at **Tech Form - 8- Annexure A** or **Tech Form – 8 Annexure B** as specified in Clause 12;
  - viii. Checklist of Documents in the format prescribed at **Tech Form -9**;
  - ix. Documentary evidence established in accordance with ITT Clause 4.4 and 4.5 that the goods and ancillary services to be supplied by the Tenderer are eligible goods and services and conform to the Tender Documents;
  - x. Any other information considered relevant.

Note: Tenderer should not furnish the Financial Tender along with the Technical Tender. A Technical Tender containing any details of Financial Tender shall be declared as non-responsive.

**B- Second Electronic Document named as Financial Tender Document**

1. **Contents of Financial Tender document:** The Financial Tender document shall comprise of the appropriate Price Schedule for Goods (Part A). A specimen of the Financial Tender is provided in the slot in the Karnataka Public Procurement Portal is prescribed at **FIN FORM -1**.
2. Price Components:
  - a. To include comprise of the appropriate Price Schedule for Goods (Part A).
  - b. Although the software in the Karnataka Public Procurement Portal may convert the amount in numerical digits in Tenders towards, the Tenderers are advised to ensure that there is no ambiguity in this regard. The rate or price quoted by the Tenderer shall be inclusive of all taxes, duties, overheads and incidental services for the whole procurement as described in Clause 1 of the ITT Including GST.
  - c. Items for which no rate or price is entered by the Tenderer will not be paid for by the Purchaser when executed and shall be deemed to have covered by the other item rates and prices in the slot.
  - d. The Tenderer not allowed the option to submit the Tenders for any one or more schedules specified in the 'Schedule of Requirements' and to offer discounts for combined schedules. However, Tenderer shall quote for the complete requirement of goods and services specified under each schedule on a single responsibility basis, failing which such Tenders will not be taken into account for evaluation and will not be considered for award.
  - e. The break up for the Prices indicated in the Price Schedule shall be provided separately in the slot in the Karnataka Public Procurement Portal in the following manner:
    - (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 other taxes already paid or payable and including GST (SGST, CGST, IGST, Cess).
    - a. On components and raw material used in the manufacture or assembly of goods quoted ex-works or ex-factory; or

- b. On the previously imported goods of foreign origin quoted ex-showroom, ex-warehouse or off-the-shelf.
- (ii) The price for inland transportation, insurance and other local costs incidental to delivery of the goods to their final destination; and
- (iii) DELETED
- (iv) DELETED
- f. The Tenderer's separation of the price components in accordance with ITT Clause 10.1 (B) above will be solely for the purpose of facilitating the comparison of Tenders by the Purchaser and will not in any way limit the Purchaser's right to contract on any of the terms offered.
- g. Prices quoted by the Tenderer shall remain firm and fixed during the period of Contract and shall not be subject to variation on any account. A Tender submitted with an adjustable price quotation will be treated as non-responsive and rejected.
- h. Submission of scanned copies of Financial Tender will not be considered for evaluation and the same will be rejected.

## 10.2 DELETED

- 10.3 Tenders submitted by fax, e-mail or any other electronic modes other than through Karnataka Public Procurement Portal shall not be entertained and shall be rejected.
- 10.4 If a Tenderer submits a zero offer (at no cost to the Purchaser i.e. NIL charges) or offers zero discount or quotes higher than the prices decided by the government, such Tender shall be treated as non-responsive and will not be considered.

## 10.5 Annual Maintenance Contract (AMC) - DELETED

## 11. Tender Currency

- 11.1 The Financial Tender should be quoted in Indian Rupees only. All payments shall be made in Indian Rupees.
- 11.2 DELETED

## 12. Earnest Money Deposit (EMD)

- 12.1 The Tenderer shall furnish, as part of his Tender, an earnest money deposit (the "EMD") of ₹. **9.83 Lakhs (Rupee Nine lakhs Eighty-Three Thousand only)**.

Out of this ₹**9.83 Lakhs (Rupee Nine lakhs Eighty-Three Thousand only)**, ₹ **98,300/-** (Rupees Ninety-Eight Thousand Three Hundred Only) shall have to be paid through any of the four e-payment modes mentioned in the KPP Portal. For payment of EMD through KPP portal.

The Balance EMD amount of ₹ **8,84,700/-** shall be paid through Bank Guarantee in favour of Managing Director/K-RIDE, Bengaluru.

The scanned copy of the Bank Guarantee shall be uploaded along with the other documents provided in the "Upload Documents" Link and the original Bank Guarantee which have been uploaded shall be sealed and super scribed the Bid Enquiry No, EMD amount and Due date of opening on the cover and shall be dropped into the tender box provided at the office General Manger/Procurement/K-RIDE, Bengaluru.

- 12.2 Tenderer who are specifically exempted for submitting the EMD should submit supporting documents along with provide a declaration as per Tech Form- 8 Annexure B of this Tender Document. The exemption and relaxation in EMD is subject to the validity & acceptance of the supporting documents by the Purchaser.
- 12.3 The EMD may be provided in the form of Demand draft/irrevocable Bank Guarantee including E-Bank Guarantee, if specified by the Purchaser, online or offline modes of payment and/or specified Small Savings Instruments pledged to Managing Director/K-RIDE, Bengaluru in the name of Government/authority payable at Bengaluru and issued by a Scheduled Bank or nationalized bank in India or deposited in given heads of account through

e-banking (if any) to the satisfaction of the Purchaser safeguarding the interest of the purchaser in all respects.

- 12.4 The Bank Guarantee should be submitted in the format provided at Tech Form 8- Annexure A issued by a Scheduled Bank or nationalized bank in India and drawn in favour of Managing Director/K-RIDE, Bengaluru payable at. For the avoidance of doubt, Scheduled Bank shall mean a bank as defined under Section 2(e) of the Reserve Bank of India Act, 1934.
- 12.5 Instruments like Bankers cheque/Demand draft/Bank Guarantee including E-Bank Guarantee having fixed validity issued as earnest money deposit for the Tender shall be valid for 45 (forty-Five) days beyond the validity of the Tender, and may be extended as may be mutually agreed between the Purchaser and the Tenderer from time to time.
- 12.6 In case the Tenderer is required to make offline payment of EMD, in the form of in the form of Banker's cheque/ Demand draft, irrevocable Bank Guarantee/E- Bank Guarantee, and/or specified Small Savings Instruments pledged, the Tenderer should upload the scanned copy of the instruments furnished as EMD in the Karnataka Public Procurement Portal and original of such instruments should be submitted to the Purchaser/ the General Manager/Procurement & contracts in K-RIDE office after the last date and time for submission of Tender but before the opening of the 1<sup>st</sup> Electronic Tender Document- the Technical Tender. Failure to submit such instruments will amount to treat such Tenders as non- responsive.
- 12.7 The EMD to be paid through online or offline modes shall be made on any of the following payment options:

**Online Payments:**

- i. Debit Card,
- ii. Credit Card,
- iii. Internet Banking
- iv. NEFT (National Electronic Fund Transfer)

**Offline Payments:**

- i. Remittance at the Bank Counter using challan (ICICI Bank only) and

**Note:**

The Purchaser shall not take any responsibility for non-payment of EMD amount due to declaration of Bank Holiday. In such case the Tenderer may use other alternative modes of payment.

For further details regarding e-payment, please refer to the Karnataka Public Procurement Portal.

- 12.8 Any Tender not accompanied by EMD or EMD Declaration and not secured as indicated in Sub-Clauses 12.1 and 12.2 shall be rejected as non-responsive.
- 12.9 The Earnest Money Deposit submitted through online or offline modes of payment will be returned through the Karnataka Public Procurement Portal without any interest:
- i. To the successful Tenderer, upon the Tenderer executing the Contract and furnishing of the Performance Security Deposit
  - ii. To the unsuccessful Tenderer, as promptly as possible and in any case within 30 (thirty) days from the date of declaration of the successful Tenderer by the Purchaser.
  - iii. In the event of rejection of all tenders or cancellation of Tender process by the Purchaser, within 15 (fifteen) days of such cancellation.
- 12.10 The EMD Declaration of unsuccessful Tenderer shall expire on the award of Tender to the successful Tenderer or rejection of all tenders or cancellation of tender process by the Purchaser.

- 12.11 Under the following conditions, the EMD shall be forfeited and the Tenderer shall be debarred in case the EMD Declaration has been submitted by the Tenderer:
- i. if a Tenderer withdraws/ amends/ impairs/ derogates, its Tender during the Tender Validity Period specified in this Tender Document and or as extended by the mutual consent of the respective Tenderer(s) and the Purchaser; or
  - ii. if the successful Tenderer fails or refuses to:
    - a. produce the original documents for scrutiny; or
    - b. Furnish Performance Security Deposit in accordance with ITT Clause 31; Or
  - iii. sign the Contract within the period specified in accordance with ITT Clause 30.4; In case a Tenderer is under order of debarment from participating in a Tender in accordance with Clause 33 and Clause 34 of ITT.

### **13. Period of Validity of Tenders**

- 13.1 The Tender shall remain valid for a period of 180 days from the last date of submission of Tender<sup>54</sup>. The Tenderer is not allowed to modify, vary, revoke or withdraw, the Tender during the said original or extended validity period.
- 13.2 In case the last day on which the Tender are to remain valid falls on/subsequently declared a holiday or closed day for the Purchaser, the Tender Validity shall automatically deemed to be extended to the next working day.
- 13.3 A Tender valid for a shorter period than the period specified in Clause 13.1 above shall be rejected by the Purchaser as non-responsive.
- 13.4 Before the expiry of original validity period, the Purchaser may solicit the Tenderer's consent to an extension of the period of validity. The request and the responses thereto shall be made in writing (or by e-mail or fax or through Karnataka Public Procurement Portal. The Earnest Money Deposit/EMD declaration provided under ITT Clause 12 shall also be suitably extended. A Tenderer may refuse the request without forfeiting its Earnest Money Deposit. A Tenderer granting the request will not be required or permitted to modify its Tender.
- 13.5 A Tenderer who agree to the extension of the period of validity of Tenders shall also extend the period of validity of the Earnest Money Deposit/EMD Securing Declaration provided under ITB Clause 12 to cover the extended period of validity of their Tenders.

## **D. Submission of Tenders**

### **14. Format and Signing of Tender**

- 14.1 The Tenderer shall provide all the required information sought under this Tender Document. The Purchaser will evaluate only those Tenders that are received in the required formats and complete in all respects. Incomplete and/or conditional/ alternative Tenders shall be liable to rejection as non-responsive.
- 14.2 All the documents of the Tender should be uploaded on the Karnataka Public Procurement Portal <https://www.eproc.karnataka.gov.in> using digital signature with their valid Digital Signature Certificate (DSC) as issued under the Information's Technology Act, 2000.
- 14.3 The documents to be uploaded shall be typed or written in indelible ink and signed by the Authorized Signatory (the "Authorized Signatory") of the Tenderer who shall also initial each page, in blue ink with stamp as an acceptance of the terms and conditions written therein. In case of printed and published Documents, only the cover page shall be initialed. The person signing the submissions shall initial all the alterations, omissions, additions, or any other amendments made to the submissions. The submissions must be properly signed by the Authorized signatory of the Tenderer holding a Power of Attorney or the Board Resolution.
- 14.4 A copy of the Power of Attorney certified by the authorized signatory of the Tenderer in the form specified in Tech Form - 6, as the case may be, should accompany the Tenders.
- 14.5 The Tenderer shall submit through Karnataka Public Procurement Portal two separate files. First Electronic Document – Part 1- Technical Tender documents and the Second Electronic Document – Part 2- Financial Tender

document as specified in Clause 10 above. After submission of Tenders, the system would generate a unique Tender identification number which is time stamped. This shall be treated as acknowledgment of Tender submission.

- 14.6 Instructions for e-tendering is specified in Appendix B and in Karnataka Public Procurement Portal. The Tenderer must acquaint and train themselves with the rules, regulations, procedure and implied conditions/agreement of the respective Karnataka Public Procurement Portal. The Tenderer shall settle clarifications and disputes if any, regarding the Karnataka Public Procurement Portal directly with Karnataka Public Procurement Portal helpdesk.

### **15. Deadline for Submission of Tenders**

- 15.1 It shall be the responsibility of the Tenderer to ensure that their Tender is submitted in the Karnataka Public Procurement Portal within the last date and time specified<sup>56</sup> for the receipt of Tenders in complete manner<sup>57</sup>. The Purchaser will not be held responsible for technical glitches and internet connectivity issues confronted by Tenderer in uploading their Tender or for any failure on part of the Tenderer to make the payment of EMD or submission of any documents as required to be submitted or for rejection of Tenders by Karnataka Public Procurement Portal for whatsoever reasons. No correspondence shall be entertained in this regard.
- 15.2 The last date and time for submission of Tenders may be extended by amending the Tender Documents in accordance with ITT Clause 7 after giving adequate notice on the Karnataka Public Procurement Portal, in which case all rights and obligations of the Purchaser and Tenderer previously subject to the deadline will thereafter be subject to the deadline as extended. Information about extension of the deadline for the submission of Tenders will be published on Karnataka Public Procurement Portal.

### **16. Late Tenders**

The Karnataka Public Procurement Portal will not accept any Tenders after the last date and time for submission of Tenders.

### **17. Modification and Withdrawal of Tenders**

- 17.1 The Tenderer may modify the contents of the Technical Tender or Financial Tender or withdraw its Tender prior to deadline for submission of Tenders in Karnataka Public Procurement Portal.
- 17.2 No Tender may be modified subsequent to the deadline for submission of Tenders. For Tender modification, the Tender submitted by the Tenderer within the last date and time for submission of Tender shall be considered as the Tender.
- 17.3 The Tenderers may withdraw his Tender by uploading their request before the last date and time of submission of Tenders. No Tender may be withdrawn in the interval between the deadline for submission of Tenders and the expiration of the original Tender Validity Period or extended period in pursuant to Clause 13. Withdrawal of a Tender during this interval shall result in forfeiture of the Tenderer's Earnest Money Deposit/initiation of action for debaring the Tenderer as per EMD declaration.

## **E. Tender Opening and Evaluation of Tenders**

### **18. Opening of Technical Tender**

- 18.1 The Technical Tender shall be opened in the Karnataka Public Procurement Portal at the designated date and time, without requiring the presence of the Tenderer(s). In the event of the specified date of Technical Tender opening being declared a holiday, the Technical Tender shall be opened at the appointed time on the next working day.
- 18.2 List of submitted Tenders termed as RECEIVED and list of incomplete Tenders termed as DRAFT shall be displayed in Karnataka Public Procurement Portal. All Tender payments successfully received shall be displayed. Only the Tenders which have been submitted in Karnataka Public Procurement Portal and whose Tender payments were successfully received in Karnataka Public Procurement Portal shall be opened. The name of the Tenderer shall be published in the Karnataka Public Procurement Portal.

## 19. Process of Tender Evaluation to be Confidential until the award of the Contract is Notified

- 19.1 The Purchaser shall ensure the confidentiality of the process of Tender evaluation until orders on the Tenders are passed.
- 19.2 Information relating to the examination, clarification, evaluation and comparison of Tenders and recommendations of award of Contract shall not be disclosed to Tenderer or any other persons not officially concerned with such process until award of the successful Tenderer has been announced in the Karnataka Public Procurement Portal. Any effort by a Tenderer to influence, the Purchaser in processing of Tenders or award decision may result in rejection of Tender.

## 20. Clarification of Tenders

- 20.1 During evaluation of Tenders, the Purchaser or the Tender Accepting Authority or the Tender Scrutiny Committee, may at its discretion, seek Bonafide clarifications from the Tenderers relating to the Tenders submitted by them including the details of price<sup>63</sup>. If the Tenderer does not comply or respond by that date, their Tender shall be liable to be rejected. Depending on the outcome, such Tenders shall be ignored or considered further; The request for clarification and the response shall be in writing. The Purchaser shall not offer or permit any change in the price or substance of Tender.
- 20.2 During the evaluation of tenders, the Purchaser may at its discretion, seek justification for the Contract Price quoted by the Tenderer to assess fulfilment of the requirement of the Tender. The Purchaser shall not offer or permit any change in the price or substance of a Tender.
- 20.3 No substantive change to qualification information or to a submission, including changes aimed at making an unqualified Tenderer, qualified or an unresponsive submission, responsive shall be sought, offered or permitted under any circumstances.

## 21. Initial Examination of Tenders

- 21.1 The Purchaser shall cause preliminary examination of the Tenders submitted to determine their substantial responsiveness and following factors shall be considered, namely:
- i. Whether the Tenderer meets the eligibility criteria laid down in the Tender Documents;
  - ii. Whether the crucial documents have been duly signed;
  - iii. Whether the requisite Earnest Money Deposit/ EMD Declaration, if exempted has been furnished;
  - iv. Whether the Tender is substantially responsive in terms with the Tender Documents without material deviation or reservation or inconsistent with the Purchaser's right or tenderer's obligations under the Contract. Tenders from Authorised Dealers, without proper authorization from the manufacturer as per Annexure C of Form Tech - 3, shall be treated as non-responsive
- 21.2 Tenders which on initial examination are found not to be substantially responsive under any of the Clauses under Clause 21.1 above, shall be rejected.
- 21.3 [Where the Tenderer has quoted for more than one schedule, if the EMD furnished is inadequate for all the schedules, the Purchaser/Technical Tender Scrutiny Committee shall take the Contract Price into account only to the extent the Tender is secured. For this purpose, the extent to which the Tender is secured shall be determined by evaluating the requirement of EMD to be furnished for the schedule included in the Tender (offer) in the serial order of the Schedule of Requirements of the Tender Document.]
- 21.4 The Purchaser/Technical Tender Scrutiny Committee may waive any minor informality or non-conformity or irregularity in a Tender which does not constitute a material deviation, provided such a waiver does not prejudice or affect the relative ranking of any Tenderer.
- 20.5 Prior to the detailed evaluation, pursuant to ITB Clause 22, the Purchaser/ Tender Scrutiny Committee will determine the substantial responsiveness of each Tender to the Tender Documents. For purposes of these Clauses, a substantially responsive Tender is one which conforms to all the terms and conditions of the Tender Documents without material deviations. Deviations from or objections or reservations to critical provisions such as those concerning Performance Security (GCC Clause 6). Warranty (GCC Clause 14), Force Majeure (GCC Clause

24), Limitation of liability (GCC Clause 28), Applicable law (GCC Clause 30), and Taxes & Duties (GCC Clause 32) will be deemed to be a material deviation. The Purchaser/ Tender Scrutiny Committee's determination of a Tender's responsiveness is to be based on the contents of the Tender itself without recourse to extrinsic evidence. Tender not responsive shall not be made subsequently responsive by correction of non-conformity.

## 22. Evaluation of Technical Tender

- 22.1 The Tender Accepting Authority may constitute a Tender Scrutiny Committee as it deems fit to carry out scrutiny and evaluation of Tenders strictly in accordance with the evaluation criteria indicated in Clause 3 and 4 of this Tender Document.
- 22.2 Tenderer whose Technical Tenders are adjudged as responsive in terms of Clause 21 and who fulfils the conditions of eligibility and qualification in terms with Clause 3 and 4 will be declared as qualified Tenderer ("**Qualified Tenderer**"). If a Tenderer does not fulfil the eligibility and qualification criteria prescribed as above, the Tenderer shall be disqualified. The Financial Tenders of only the Qualified Tenderer shall be considered for opening in the Karnataka Public Procurement Portal and further evaluation in the manner set out in Clause 23 below.
- 22.3 The list of Qualified Tenderer and the date, time of opening of Financial Tender of Qualified Tenderer shall be published by the Purchaser in the Karnataka Public Procurement Portal.
- 22.4 After the evaluation of the Technical Tender is completed, the Purchaser shall notify the details of the Tenderer whose tenders are considered as non-responsive and not qualified in Karnataka Public Procurement Portal. It shall also be indicated that their Financial Proposal will not be opened.

## 23. Opening and Evaluation of Financial Tender

- 23.1 The Financial Tender of all the Qualified Tenderer will be opened in the Karnataka Public Procurement Portal at the designated date and time notified. If the specified date of Financial Tender opening is declared a holiday subsequently the Financial Tenders shall be opened at the appointed time on the next working day.
- 23.2 The Contract price should provide the cost towards supply of goods-

## 24. Evaluation and Comparison of Tenders

- 24.1 The Purchaser may evaluate and compare the Tenders which have been determined to be substantially responsive. No Tender will be considered if the complete requirements is not included in the Tender. However as stated in ITT Clause 10.1(B), Tenderer are allowed the option to submit Tender for any one or more schedules and to offer discounts for combined schedules. These discounts will be taken into account in the evaluation of the tenders so as to determine the Tender or combination of Tenders offering the lowest evaluated cost for the Purchaser in deciding award(s) for each schedule.
- 24.2 The Purchaser's evaluation of a Tender will take into account, in addition to the Contract price (Ex-factory/ex-warehouse/off-the-shelf price of the goods offered from within India, such price to include all costs as well as applicable taxes paid or payable on components and raw material incorporated or to be incorporated in the goods and on the finished goods, if payable) and price of incidental services, the following factors, in the manner and to the extent indicated in ITT Clause 24.4 and in the Technical Specifications:
- (a) Cost of inland transportation, insurance and other costs within India incidental to the delivery of the goods to their final destination;
  - (b) Delivery schedule offered in the Tender;
  - (c) Deviations in payment schedule from that specified in the Special Conditions of Contract;
  - (d) The availability in India of spare parts and after-sales services for the goods / equipment offered in the Tender;
  - (e) **The Consideration of applicable GST is as below:**
    - (i) The bidder should quote the rate including GST and all other applicable duties and taxes.
- 24.3 Pursuant to ITT Clause 24.2, one or more of the following evaluation methods will be applied:

- (a) Inland Transportation, Insurance and Incidentals:
- (i) Inland transportation, insurance and other incidentals for delivery of goods to the final destination as stated in ITT Clause 10.1 (B)(iii). The above costs should be included in the quoted contract price.
- (b) Delivery Schedule:
- (i) The Purchaser requires that the goods under the Invitation for Tenders shall be delivered at the time specified in the Schedule of Requirements. The estimated time of arrival of the goods at the project site should be calculated for each Tender after allowing for reasonable transportation time. Treating the date as per schedule of requirements as the base, a delivery "adjustment" will be calculated for other Tenders at 2% of the ex-factory price including GST and other applicable taxes for each month of delay beyond the base and this will be added to the Contract price for evaluation. No credit will be given to earlier deliveries and Tenders offering delivery beyond 6 (SIX) months of stipulated delivery period will be treated as unresponsive.
- (c) **DELETED**
- (d) **DELETED**
- (f) **DELETED**

**24.4** The goods manufactured by Micro and Small Enterprises located in the State shall be given fifteen percent price preference against the large and Medium Industries of the State and Industries of other States during Government Departments purchases, subject to the following conditions, namely:-- **Deleted.**

- a) An enterprise shall be registered with the Director of Industries and Commerce, Government of Karnataka as a Micro or Small Enterprises, under Micro Small and Medium Enterprises Development Act, 2006 (Central Act 27 of 2006); and – **Deleted**
- b) An enterprise shall produce a certificate obtained from the said authority certifying that it is a Micro or Small Enterprises.- **Deleted**

**Note:**

This Clause is applicable only for Government's Purchases.

24.5 In the event that two or more Tenderers offer the total lowest evaluated cost to the Purchaser (the "Tie Tenderers), the Tenderer having the highest Average Annual Turnover shall be identified and declared as the Successful Tenderer.

24.6 The evaluation of Tender and award of Contract shall be completed, as far as possible, within the period for which the Tenders are held valid. The Purchaser shall seek extensions of the validity of Tenderer as per the rules from the Tenderer for the completion of evaluation. In case the evaluation of Tenders and award of Contract is not completed within this extended period, all the Tenders shall be deemed to have become invalid and fresh Tenders may be called for.

**24.7 DELETED**

**24.8 Evaluation process in e-Reverse Auction - DELETED**

**25. Contacting the Purchaser**

25.1 The Tenderer shall not make attempts to establish unsolicited and unauthorized contact with the Tender Accepting Authority, Tender Inviting Authority/Purchaser or Tender Scrutiny Committee after the opening of the Tender and prior to the notification of the Award and if any attempt by the Tenderer to bring to bear extraneous pressures on the Purchaser shall be sufficient reason to disqualify the Tenderer.

**26. Tenderer's Responsibility for Quoting the Contract Price.**

Although the details presented in this Tender Document have been compiled with, with all reasonable care, it is the Tenderer responsibility to ensure that the information provided is adequate and clearly understood. Claims and objections due to ignorance of existing conditions will not be considered after submission of the Tender and during

the period of Services as per the Contract. Tenderer is responsible for the Tender submitted and no relief or consideration can be given for errors and omissions.

## **F. Award of Contract**

### **27. Preparation of evaluation report and Award of Tenders**

- 27.1 The system shall auto generate a statement of evaluation of the Tenders with comparative statement for consideration of the Purchaser.
- 27.2 The detailed evaluation report shall be prepared in accordance with the eligibility and qualification criteria, which shall be considered by the Tender Accepting Authority for taking a final decision on the Tender.
- 27.3 After evaluation of the Tenders, the order of acceptance of Tender along with the comparative statement shall be uploaded in the Karnataka Public Procurement Portal.
- 27.4 Subject to Clause 27.1 above and Clause 28 below, the Contract will be awarded to the successful Tenderer whose Tender has been determined to be substantially responsive and has been determined as the lowest evaluated tender, provided further that the Tenderer is determined to be qualified to perform the Contract satisfactorily.
- 27.5 The Letter of Intent (LoI) shall be issued to the successful Tenderer(s) only through Karnataka Public Procurement Portal. Before issuing such LOI, the Purchaser may, at its discretion, ask the Successful Tenderer to submit the originals of all such documents for verification whose scanned copies were submitted in Karnataka Public Procurement Portal along with the Technical Tender. If the Tenderer fails to provide originals or if there are any substantive discrepancies between such documents, the same shall be considered as corrupt and fraudulent practices including misleading the Purchaser and action shall be initiated to debar such Tenderer in accordance with Clause 33 and Clause 34 of ITT.

### **28. Purchaser's right to vary Quantities at the Time of Award**

The Purchaser reserves the right to increase or decrease by up to 25 percent of the quantity of Services originally specified in the Schedule of Requirements without any change in the rate or other terms and conditions.

### **29. Purchaser 's Right to Accept Any Tender and to Reject Any or All Tenders**

- 29.1 The Purchaser reserves the right to accept or reject any Tender or all Tenders, and to annul the selection process and reject all tenders at any time prior to the award of contract, without thereby incurring any liability to the affected Tenderer or Tenderer or any obligation to inform the affected Tenderer of the grounds for the Purchaser's action and such action also caused to be published in the Karnataka Public Procurement Portal.

### **30. Publication of Award and Signing of Contract**

- 30.1 The Tenderer whose Tender has been accepted will be notified by the Purchaser prior to expiration of the Tender validity period through the Karnataka Public Procurement Portal and through email to the successful Tenderer. This Letter of Intent (LOI) generated in the Karnataka Public Procurement Portal will state the sum that the Purchaser will pay the Supplier in consideration of the whole of the procurement by the Supplier as prescribed by the Contract (hereinafter and in the Contract called the "**Contract Price**"). The Tenderer, shall confirm acceptance by returning a signed copy of the Letter of Intent through Karnataka Public Procurement Portal and email.
- 30.2 The notification of award will constitute the formation of the Contract.
- 30.3 Upon the successful Tenderer's furnishing of Performance Security Deposit pursuant to ITT Clause 31, the Purchaser will promptly notify the name of the winning Tenderer in Karnataka Public Procurement Portal and shall discharge its earnest money deposit, pursuant to ITT Clause 12.4.
- 30.4 The Contract Form provided in the tender documents, incorporating all agreed terms and conditions between the Purchaser and the successful Tenderer, will be sent by the Purchaser duly completed and signed to the successful Tenderer for signature within [7 (Seven) working days of receipt of the Performance Security. Within [7 (Seven)]

days thereof, the successful Tenderer will sign the Contract and deliver it to the Purchaser.

### **30.5 Stamp duties and charges:**

The Supplier has to bear the stamp duties and charges for agreements/registration as per Karnataka stamp Act.

### **31. Performance Security Deposit**

- 31.1 Within [14 (fourteen)] days of the receipt of LOI from the Purchaser, the successful Tenderer shall furnish the Performance Security Deposit for the amount as specified in the Special Conditions of Contract, in the Performance Security Deposit Form provided in the Tender Documents or in the form of E-Bank Guarantee or in any other form acceptable to the Purchaser.
- 31.2 Failure of the successful Tenderer to comply with the requirement of ITT Clause 30.4 or and ITT Clause 31.1 shall constitute sufficient grounds for the annulment of the award and forfeiture of the Earnest Money Deposit.

### **32. Corrupt or Fraudulent Practices**

- 32.1 The Purchaser requires that Tenderer/ Supplier/ Contractor observe the highest standard of ethics during the procurement and execution of Government contracts. In pursuance of this policy, the Government:
- (i) defines, for the purposes of this provision, the terms set forth as follows:
    - a. "corrupt practice" means the offering, giving, receiving or soliciting of anything of value to influence the action of the public official in the procurement process or in contract execution; and
    - b. "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 Purchaser, and includes collusive practice among the Tenderer either prior to or after Tender submission, designed to establish Contract prices at artificial non-competitive levels and to deprive the Purchaser of the benefits of free and open competition;
  - (ii) will reject a proposal for award if it determines that the Tenderer recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;
  - (iii) in pursuance of clause 34 and 35 of ITT an action may be initiated to debar the Tenderer from participating in the Tender or executing the Contract if it is determined that the firm has engaged in corrupt or/and fraudulent practices in competing for, or in executing, a Government contract in question.

### **33. Debarment of Tenderer by the Procurement Entity**

- 33.1 The Procurement Entity may proceed with debarring such Tenderer or contractor or supplier or any of the successor of the Tenderer or contractor or supplier who has engaged directly or through an agent in a corrupt or fraudulent practices in participating or competing or executing the contract including misleading the Procurement Entity at any stage of procurement and executing activity.
- 33.2 The Committee constituted by the Procurement Entity, consisting of such officers not below the rank of the Purchaser will be the Debarment Committee to consider the tenders/proposals for debarring bidder/Tenderer or contractor or supplier and to take a decision thereof.
- 33.3 The Debarment Committee on the receipt of information shall provide a reasonable opportunity, including an oral hearing, to the concerned for making representations before taking a decision.
- 33.4 For consideration of debarment, Tender Inviting Authority/Purchaser or any other officer authorized by Tender Accepting Authority shall furnish the details of such bidders/tenderers or contractors or suppliers who have engaged in corrupt practice and fraudulent practices to the Debarment Committee constituted under sub clause 33.2 above.
- 33.5 The Debarment Committee will make recommendations with reasoning in writing, within thirty days from date of receipt of information.

Provided that, the said period may be extended by another fifteen days by Procurement Entity for the reasons to be recorded in writing.

- 33.6 On the recommendations of the Debarment Committee, the Procurement Entity shall by notification debar any of Tenderer or contractor or supplier for a period not exceeding 3 (three) years and publish the same on its website and Karnataka Public Procurement Portal and also maintain the list of such Tenderer or contractor or the supplier or any of its successors.
- 33.7 The order of debarment shall be deemed to have been automatically revoked on the expiry of the period specified in the debarment order.

#### **34. Debarment by the Government**

- 34.1 The Government may debar a Tenderer or contractor or supplier, in the public interest and on the grounds of, but not restricted to, criminal offence, corruption, integrity, honesty, work ethics as specified in the KTPP Act.
- 34.2 The State Level Debarment Committee will consider the tenders/proposals for debarring bidder/tenderer or contractor or supplier and to take a decision thereof.
- 34.3 The State Level Debarment Committee, on the receipt of the information, shall provide a reasonable opportunity, including an oral hearing, to the concerned for making representations before taking a decision on the debarment.
- 34.4 For consideration of debarment of the Tenderers or contractors or suppliers, the officer authorized by the Procurement Entity shall furnish the details of such Tenderers or contractors or suppliers to the State Level Debarment Committee constituted under Clause 34.2 above;
- 34.5 The State Level Debarment Committee will make recommendation to the State Government to such an effect, within thirty days, from the date of receipt of the information:  
Provided that, the said period may be extended by another fifteen days for the reasons to be recorded in writing by the Debarment Committee.
- 34.6 On the recommendation of the State Level Debarment Committee, the Government shall debar by notification such Tenderer or contractor or supplier for the period not exceeding (three) years and publish the same on the Department website as well as Karnataka Public Procurement Portal and shall maintain the list of such bidder/tenderer or contractor or the supplier or any of its successor.
- 34.7 The debarred Tenderer or contractor or supplier shall be removed from the list of registered contractors or vendors.
- 34.8 The order of debarment shall be deemed to have been automatically revoked on the expiry of the specified period in the debarment order.

#### **35. Measures to be taken after Debarment**

The Procurement Entity may take appropriate measures in respect of debarred Tenderer or contractor or supplier including one or more of the following, namely: -

- (i) reject the tenders and forfeit or encash EMD or Performance Security;
- (ii) terminate the contract; forfeit or encash the performance guarantee; recover the compensation of loss incurred by Procurement Entity;
- (iii) forfeit or encash any other security or guarantee or bond provided by such Tenderer or contractor or supplier in relation to the such procurement; and
- (iv) recover payments including advance payments, if any, made by the Procurement Entity along with the interest thereon at the prevailing rate of Nationalized Bank.

#### **36. Appeals**

- 36.1 Tenderer aggrieved by an order passed by the Tender Accepting Authority pursuant to Clause 30.1 of ITT may appeal online to;
- (i) The Head of the Department concerned if the order is passed by the Tender Accepting Authority subordinate to the Head of the Department.
  - (ii) To the Government if the order is passed by the Tender Accepting Authority which is Head of the Department or Local Authority or State Government Undertaking or a Board, Body Corporation or any other authority owned or controlled by Government.
  - (iii) Such appeal shall be made within 15 (fifteen) days from the date of receipt of the order.

- (iv) The Appellate Authority may after giving opportunity of being heard to both the parties pass such order thereon as it deems fit, as far as possible within 30 (thirty) days from the date of filing of the Appeal and such order shall be final.

**[Signature and Designation of the Purchaser]**

## **SECTION III: FORMATS FOR SUBMISSION OF TENDERS**

**TECH FORM - 1**

**Letter of Tender**

**(To be uploaded in the letter head of the Tenderer) (Refer Clause 10.1 of the ITT)**

To  
**GM/Procurement  
K-RIDE**

**Dated:**

**Sub: [Tender for Procurement of Goods and related services for \_\_\_\_]**

- 1 With reference to your Tender document dated \*\*\*\*\* I/We, having examined the Tender Documents and understood their contents, hereby submit I/we have no reservations to the Tender Documents, including Addenda issued in accordance with Instructions to Tenderers (ITT).
- 2 We undertake, if our Tender is accepted, to deliver the goods in accordance with the delivery schedule specified in the Schedule of Requirements and for the sum or such other sums as may be ascertained in accordance with the Schedule of Prices for supply of Goods, if specified as provided by us in the Karnataka Public Procurement Portal.
- 3 I/We acknowledge that the Purchaser will be relying on the information provided in the Tender and the documents accompanying the Tender for selection of the Agency for the aforesaid Service, and we certify that all information provided therein is true and correct; nothing has been omitted which renders such information misleading; and all documents accompanying the Tender are true copies of their respective originals.
- 4 I/We shall make available to the Purchaser any additional information/clarification it may find necessary or require to supplement or authenticate the Tender.
- 5 I/We acknowledge the right of the Purchaser to reject our Tender without assigning any reason or otherwise and hereby waive, to the fullest extent permitted by applicable law, our right to challenge the same on any account whatsoever.
- 6 I/We declare that in the last [3 (**three**)] years, we have neither failed to perform on any contract, as evidenced by imposition of a penalty by any procurement entity or by an arbitral or judicial authority or a judicial pronouncement or arbitration award, nor been expelled from any service or contract by any public authority nor have any contract terminated by any procurement entity for breach on our part.
- 7 We declare that we do not have any conflict of interest and that we are not insolvent bankrupt in according with clause 3.1(f) of ITT.
- 8 I/We understand that you may cancel the selection process at any time and that you are neither bound to accept any Tender that you may receive nor to invite the Tenderers to Tender for the Services, without incurring any liability to the Tenderer.
- 9 I believe that we satisfy the Eligibility Criteria and Qualification Criteria (Technical Capacity and Financial Capacity) and meet(s) the requirements as specified in the Tender Document.
- 10 I certify that in regard to matters other than security and integrity of the country, we have not been convicted by a Court of Law or indicted or adverse orders passed by a regulatory authority which could cast a doubt on our ability to undertake the Service or which relates to a grave offence that outrages the moral sense of the community.
- 11 In the event of us being declared as the Successful Tenderer, I/we agree to enter into a Contract in accordance with

the draft that has been provided by the Purchaser. We agree not to seek any changes in the aforesaid draft Contract and agree to abide by the same.

- 12 I/We have studied all the Tender Documents carefully and also understand where the goods are required to be supplied. We understand that except to the extent as expressly set forth in the draft Contract, we shall have no claim, right or title arising out of any documents or information provided to us by the Purchaser or in respect of any matter arising out of or relating to the selection process including the award of the Contract.
- 13 [I/We offer an Earnest Money Deposit of [Rs. \_\_\_\_\_/-] (Rupees \_\_\_\_\_ Only) for the Supply of Goods for which we have submitted the Tender (s) in accordance with the Tender Document.  
  
I/We are hereby exempted from payment of EMD. The supporting documents to substantiate the exemption along with the EMD Declaration in the required manner is attached.]
- 14 The documents comprising the Tender, as specified in Clause 10.1 of the Tender Document, have been submitted in the manner set out in the Tender Document.
- 15 The Contract price has been quoted by me after taking into consideration all the terms and conditions stated in the Tender Document; draft Contract, our own estimates of costs and revenues and after a careful assessment of the place where the Goods are required to be supplied and all the conditions that may affect the supply of Goods.
- 16 I/We agree and undertake to abide by all the terms and conditions of the Tender Document.
- 17 I/We shall keep this offer valid for 180 (one hundred and eighty) days from the last date of submission of Tenders as specified in the Tender Document.
- 18 I/We certify that I/We have not been debarred by Procurement Entity, State Government or any entity controlled by it, from participating in any Tender, for indulging in corrupt, or fraudulent practices or deficiencies of services or for indulging in unfair trade practices or for any other reasons as on the last date for submission of Tenders.
- 19 We agree to abide by this tender for the Tender validity period specified in Clause 13.1 of the ITT and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
- 20 I/we confirm that our Financial Tender is unconditional and that we accept all terms and conditions specified in the Tender Document
- 21 This tender, together with your written acceptance thereof and your notification of award, shall constitute a binding Contract between us.
- 22 I/We confirm that if I/We are the successful Tenderer shall within [14 (fourteen)] days of the receipt of LOI from the Purchaser, furnish the Performance Security Deposit in accordance with the Conditions of Contract, in the Strikeout whichever provision is not applicable. Performance Security Deposit Form provided in the Tender Documents or in any other form acceptable to the Purchaser.
- 23 I/We confirm that if I/We are the successful Tenderer, we shall obtain GST registration Certificate in the State of Karnataka, within one month from the date of receipt of LOI or before release of any payment by the Purchaser, whichever is earlier, failing which I/We shall be responsible for any delay in payments which will be due towards me/us on account of the supply of goods and /or for any action taken by the Purchaser or GST department in this regard.
- 24 I/We declare that we are submitting this Tender:
  - o on my/our behalf, and there are no agents/dealers involved in this tender, and hence no agency agreement or

payments/commissions/ gratuity is involved. Our company law and taxation regulatory requirements and authorization for signatories and related documents are submitted in Tech Form - 2.

Or

- o as authorized dealer offering goods manufactured by our OEMs. Our OEM's law and taxation regulatory requirements and authorization for signatories and related documents are submitted in Annexure C of Tech Form -3 C

Or

- o as agents/associates of our foreign principals. Our foreign principal's law and taxation regulatory requirements, as well as authorization for signatories and related documents, are submitted in Annexure D 4 of Tech Form -3 – Deleted.

25 I/We.....hereby certify that we our Principals/OEM/s.....are proven, established, and reputed manufacturers with factories at..... which are fitted with modern equipment and where the production methods, quality control, and testing of all materials and parts manufactured or used by us shall be open to inspection by the representative of the Purchaser.

26 I/We understand that you are not bound to accept the lowest or any Tender you may receive.

27 I / we agree to be bound by this offer if we are the Successful Tenderer for the aforementioned Service.

In witness thereof, I/we submit this Tender under and in accordance with the terms of the Tender document.

Yours Faithfully,

Date:

Place:

(Signature of the Authorised Signatory)

Name and Seal of Tenderer

## TECH FORM – 2

### Details of the Tenderer

*(To be uploaded in the letter head of the Tenderer) (Refer Clause 10.1 of the ITT)*

1.
  - (a) Name:
  - (b) Country of incorporation: Corporate
  - (c) Identity Number:
  - (d) Address of the office/corporate headquarters and its branch office(s), if any, in India:
  - (e) Address of the office/ corporate headquarters or its branch office(s), in Karnataka:
  - (f) Date of incorporation and/or commencement of business:
2. **Bank Details**
  - (a) Name of the Holder
  - (b) Bank Account No.
  - (c) Name of the Bank
  - (d) Branch Name
  - (e) IFSC Code
3. Brief description of the Tenderer including details of its main lines of business and proposed role and responsibilities in these Services:
4. **Details of individual(s) who will serve as the point of contact/communication for the Purchaser:**
  - (a) Name:
  - (b) Designation:
  - (c) Company:
  - (d) Address:
  - (e) Telephone Number:
  - (f) E-Mail Address:
  - (g) Fax Number:
  - (h) Mobile:
5. **Particulars of the Authorised Signatory of the Tenderer:**
  - (a) Name:
  - (b) Designation:
  - (c) Company:
  - (d) Address:
  - (e) Telephone Number:
  - (f) E-Mail Address:
  - (g) Fax Number:
  - (h) Mobile:

6. **Taxation Registrations:**

- (a) PAN number:
- (b) Type of GST Registration as per the Act (Normal Taxpayer, Composition, Casual Taxable Person, SEZ, etc):
- (c) GSTIN number.....in Consignor and Consignee States
- (d) Registered/Certified Works/Factory where the Goods would be mainly manufactured and Place of Consignor for GST Purpose:
- (e) Contact Names, Nos. & email IDs for GST matters (Please mention primary and secondary contacts).

7. **The following information shall also be provided:**

No.	Criteria	Yes	No
1.	Has the Tenderer been barred by Procurement Entity/ State Government, or any entity controlled by it, from participating in any Tender.		
2.	If the answer to 1 is yes, does the bar subsists as on the date of submission of the Tender.		
3.	If the answer to 1 is no, the Tenderer are required to furnish Self-Declared Certificate in their letter head to substantiate the same.		
4.	Whether the Tenderer belongs to a country which shares Land Border with India. The Tenderer are required to furnish an undertaking in the prescribed format at Tech Form - 7 in their letter head to substantiate the same.		

8. A statement by the Tenderer disclosing material non-performance or contractual non-compliance in past Assignment, contractual disputes and litigation/ arbitration in the recent past is given below (Attach extra sheets, if necessary).

Year	Name of Work/ Assignment	Name of Purchaser with Contact details	Contract No. and Date	Value of Contract in Rs.	Date Completed	Nature of Litigation	Final Award

I / We confirm that all the registrations submitted are under operation presently and shall be used for all related activities.

**Note:**

Tenderer shall fill in this Form in the format provided above. No alterations to its format shall be permitted, and no substitutions shall be accepted.

**SIGNATURE OF TENDERER WITH DATE AND OFFICIAL SEAL**

**(Name and Designation)**

**Duly authorized to sign the Tender on  
behalf of (Name & address of the Tenderer and Seal  
of the Company**

### TECH FORM - 3

#### Technical Capacity of the Tenderer

(To be uploaded in the letter head of the Tender) (Refer Clause 4.1 (A) of the ITT)

#### Annexure A- Format for Performance Statement for the last three years

Orders placed by (Full address of Purchaser)	Order No and Date	Description of Goods ordered	Quantity of Goods ordered	Value of Order	Date of Completion of Delivery		Remarks indicating reasons for late delivery, if any	Has the goods/ equipment been satisfactorily functioning. (Attach a Certificate from the Purchaser)
					As per contract	Actual		
1	2	3	4	5	6	7	8	9

#### General Instructions:

- The experience cited must comply with the qualification criteria specified in Clause 4(A) of the ITT.
- Along with the above format and information, the Tenders for demonstrating the Technical Capacity as provided in Clause 4 (A) of the ITT is required to submit the supporting documentary proofs as provided at **Clause 4.4 and 4.5 of the ITT**:
- [In case the Tenderer is registered outside India. For conversion of US Dollars to Rupees, the rate of conversion shall be the rate prevailing as on the date of issue of Tender Document. In case of any other currency, the same shall first be converted to US Dollars as on the date of issue of Tender Document, and the amount so derived in US Dollars shall be converted into Rupees at the aforesaid rate. The conversion rate of such currencies shall be the daily representative exchange rates published by the International Monetary Fund for the relevant date.]
- The list above is indicative only, tenderer may attach more documents as required to showcase its past performance.

..... (Signature with date)

..... (Name and designation)

Duly authorized to sign tender for and on behalf of

.....

.....

### Annexure B - Capability Statement (Goods/Equipment's)

1. Name & Address of the Tenderer Phone:
2. Classifications
  - (1) Original Equipment Manufacturer
  - (2) Authorized Agent
  - (3) Dealer
  - (4) Others (please specify)
3. Plant:
  - (a) Location
  - (b) Description, Type & size of building
  - (c) Is property on lease or free hold? If on lease indicate date of expiry of lease in such case
4. Type of goods/equipment manufactured and supplied during last 3 years.

Name of Goods/equipment	Capacity/Size	Quantity manufactured	No. of orders on hand	Quantity to be supplied as per the orders on hand

5. Types of Goods/equipment supplied during last 3years other than those covered under 4 above.

Name of Goods/equipment's	Capacity/Size and model	Name of Manufacturer	Quantity supplied in India	Quantity orders on hand

6. Turnover for similar goods/equipment's sold in last three years.
7. Details of Testing facilities available
  - a) List testing equipment available
  - b) Give details of tests which can be carried out on items offered.
  - c) Details of the testing organization available.
  - d) Details of quality control results
8. Personnel/Organization:
 

Give Organization chart for following indicating clearly the No. of employees at various levels.

  1. Quality assurance
  2. Production
  3. Marketing
  4. Service
  5. Spare parts
  6. Administrative
9. Nearest service centers to each of the destination installations: Location \_\_\_\_\_  
Phone No. \_\_\_\_\_

Year of Establishment \_\_\_\_\_

## 10. Details of Organization at Service Centre

- a) No. of skilled employees \_\_\_\_\_
- b) No. of Unskilled employees \_\_\_\_\_
- c) No. of Engineering employees \_\_\_\_\_
- d) No. of Administrative employees \_\_\_\_\_
- e) List of special repair/workshop facilities available \_\_\_\_\_
- f) The storage space available for spare parts (sq.m.) \_\_\_\_\_
- g) Value of minimum stock of spares available at all the service centres in respective currency \_\_\_\_\_
- h) Value of the modes/types by number of equipment serviced by the centre in the last 3 years \_\_\_\_\_

## 11. Details of Service Support Form

Name of the Service Centre	Number of Technical staff available	Location with address and telephone	Service support facilities that would be provided

12. Names of two buyers to whom similar equipment was supplied in the past and to whom reference may be made by the Purchaser regarding the Supplier's technical and delivery ability.

1) \_\_\_\_\_

2) \_\_\_\_\_

13. Technical Details (Clause 4.1(A) of ITT) of the Goods and related services, if applicable should be specified by the Purchaser before issue of Tender Documents hereunder and for each type of goods/equipment, the details to be furnished in the Schedule of Requirements-Appendix A)

### Annexure C- Original Equipment Manufacturers' Authorization Form

(Refer to Clause 4.4 (A) of the Tender Document)

(To be uploaded in the letter head of the Manufacturer)

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

To  
GM/Procurement  
K-RIDE

Dear Sir:

Reference : IFT No.....for .....goods/equipment's

We \_\_\_\_\_ who are established and reputable manufacturers of  
(name and description of goods offered) having factories at \_\_\_\_\_ (address of factory) do hereby authorize M/s  
(Name and address of Agent/Authorised dealer) to submit a Tender, and sign the Contract with you for the goods  
manufactured/to be manufactured by us against the above IFT. The Agents/Authorised dealers registration no. with  
us is....., dated/since.....

No company or firm or individual other than M/s \_\_\_\_\_ are authorized to Tender, and conclude the  
contract for the above goods manufactured/to be manufactured by us, against this specific IFT. (This para should be  
deleted in simple items where manufacturers sell the product through different stockists.)

We hereby extend our full guarantee and warranty as per Clause 14 of the General Conditions of Contract for the  
goods and services offered for supply by the above firm against this IFT.

Our details are as under:

- (a) Name of the Company.....
- (b) Complete Postal Address:.....
- (c) Pin code/ZIP code.....
- (d) Telephone nos.(With country/area codes):.....
- (e) Fax No.:(with country/area codes):.....
- (f) Mobile Nos (with country/area codes):.....
- (g) Contact persons/Designation:.....
- (h) Email IDs:.....

Yours faithfully,

.....  
[Signature with date, name, and designation]

For \_\_\_\_\_ and \_\_\_\_\_ on behalf of  
Messrs..... [name  
& address of the OEM and seal of company]

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 legally bind the manufacturer. It should be submitted by the  
Tenderer in its Tender.

**Annexure D- Declaration by Agents/ Associates of Foreign Principals**

*(Required only for Agents/ Associates of Foreign Principals)*

*(To be submitted on Supplier Letter Head along with supporting documents, if any as part of Technical Tender) (Ref Clause 3.3 of ITT)*

**NOT APPLICABLE**

**TECH FORM – 4 Financial Capacity of the Tenderer**
*(Refer to Clause 4.1(B) of the ITT)*
*(To be submitted on the letter head of the Tenderer)*

(In Rs.)

Turnover			
Financial Year [2023-2024]	Financial Year [2022-2023]	Financial Year [2021-2022]	Average Annual Turnover

**Instructions:**

1. The Tenderer should provide details of its own Financial Capacity duly certified by its Auditor.
2. Annual Turnover = Annual Income as indicated in the audited annual financial statement  
Year 1 will be the latest completed financial year, preceding the last date for submission of Tender. Year 2 shall be the year immediately preceding Year 1 and so on. In case the last date for submission of Tenders falls within three months of the close of the latest financial year, it shall ignore such financial year for the purposes of its Tender and furnish all its information and certification with reference to the three years preceding its latest financial year.
3. Along with the above format and information, the Tenderer for demonstrating the Financial Capacity as provided in Clause 4(B) of the ITT should furnish the supporting documentary proofs along with the Certificate from Statutory Auditor for Financial Capacity of the Tenderer in the following format.
4. DELETED

**Format for Certificate from Auditor for Financial Capacity of the Tenderer**  
**(To be submitted on the Letterhead of the Auditor)**

We have verified the relevant statutory and other records of M/s \_\_\_\_\_ [Name of the Tenderer], and certify that the Average Annual Turnover for the last three completed financial Year is as follows:

(Rs. \_\_\_\_\_)

Turnover (Rs. _____)			
Financial Year [2023-2024]	Financial Year [2022-2023]	Financial Year [2021-2022]	Average Annual Turnover

This certificate is being issued to be produced before [Name of the Purchaser], for the ["Procurement of Goods and related services for \_\_\_\_\_"].

**Place:**

**Date**

**Signature and Seal of the Auditor clearly indicating his/her  
membership number**

**TECH FORM - 5**

**Statement of Legal Capacity**

(To be provided in the letterhead of the Tenderer)

(Refer Clause 10.1 of the ITT)

Ref.

Date:

To,

\_\_\_\_\_  
Phone: +91 \_\_\_\_\_

Fax: +91 \_\_\_\_\_

E-mail: \_\_\_\_\_

Dear Sir,

We hereby confirm that we satisfy the terms and conditions laid out in the Tender Document.

We have agreed that..... (Insert individual's name) will act as our representative/ on its behalf\* and has been duly authorized to submit the Tender Document. Further, the authorised signatory is vested with requisite powers to furnish such letter and authenticate the same.

Thanking you,

Yours faithfully,

Signature,  
Name and Designation of the Authorised

Signatory For and on behalf of\_\_\_\_

\*Please strike out whichever is not applicable.

## TECH FORM – 6

### Power of Attorney for Signing of Tender

(To be submitted on 200 rupees Non-Judicial Stamp Paper)

(Refer Clause 10.1 of the ITT)

Know all men by these presents, We, \_\_\_\_\_ (name of the firm and address of the registered office) do hereby irrevocably constitute, nominate, appoint and authorise Mr. / Ms (Name), son/daughter/wife of \_\_\_\_\_ and presently residing at \_\_\_\_\_, who is [presently employed with us and holding the position of ], as our true and lawful attorney (hereinafter referred to as the “Attorney”) to do in our name and on our behalf, all such acts, deeds and things as are necessary or required in connection with or incidental to submission of our “Tender for Procurement of Goods and related services for\_\_\_”, proposed by the [Name of the Purchaser] (the “Purchaser”) including but not limited to signing and submission of all applications, Tenders and other documents and writings, participate in Tenderer’s and other conferences and providing information/responses to the Purchaser, representing us in all matters before the Purchaser, signing and execution of all contracts including the Contract and undertakings consequent to acceptance of our Tender, and generally dealing with the Purchaser in all matters in connection with or relating to or arising out of our Tender for the said Service and/or upon award thereof to us and/or till the entering into the Contract with the Purchaser.

AND we hereby agree to ratify and confirm and do hereby ratify and confirm all acts, deeds and things lawfully done or caused to be done by our said Attorney pursuant to and in exercise of the powers conferred by this Power of Attorney and that all acts, deeds and things done by our said Attorney in exercise of the powers hereby conferred shall and shall always be deemed to have been done by us.

IN WITNESS WHEREOF WE, \_\_\_\_\_, THE ABOVE NAMED PRINCIPAL HAVE EXECUTED THIS POWER OF ATTORNEY ON THIS \_\_\_\_\_ DAY OF \_\_\_\_\_, 2025.

For \_\_\_\_\_ (Signature)

(Name, Title and Address) Witnesses:

Accepted [Notarised] (Signature)

(Name, Title and Address of the Attorney)

#### Notes:

*The mode of execution of the Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and when it is so required, the same should be under common seal affixed in accordance with the required procedure.*

*Also, wherever required, the Tenderer should submit for verification the extract of the charter documents and documents such as a board or shareholders’ resolution/power of attorney in favour of the person executing this Power of Attorney for the delegation of power hereunder on behalf of the Tenderer.*

*[For a Power of Attorney executed and issued overseas, the document will also have to be legalised by the Indian Embassy and notarised in the jurisdiction where the Power of Attorney is being issued. However, the Power of Attorney provided by Tenderer from countries that have signed the Hague Legislation Convention, 1961 are not required to be legalised by the Indian Embassy if it carries a conforming Apostille certificate.]*

## TECH FORM – 7

**FORMAT FOR UNDERTAKING REGARDING RESTRICTIONS ON PROCUREMENT  
FROM A BIDDER/SUPPLIER/TENDERER OF A COUNTRY WHICH SHARES A LAND  
BORDER WITH INDIA**

*(To be submitted on the letterhead of the  
Tenderer) (Refer Clause 10.1 of the ITT)*

[ Date]

FROM: (Name of Entity)

---



---

TO: (Name and Address of the Purchaser)

---



---

Dear Sir:

**Subject: Undertaking Regarding Restrictions on Procurement from a Bidder of a Country Which Shares a Land Border with India**

I have read the clause regarding restrictions on procurement from a Bidder of a country which shares a land border with India. I certify that this Bidder is not from such a country or, if from such a country, has been registered with the Competent Authority. I hereby certify that this Bidder fulfills all requirements in this regard and is eligible to be considered. (Where applicable, evidence of valid registration by the Competent Authority shall be attached.)"

[I have read the clause regarding restrictions on procurement from a Bidder having Transfer of Technology (ToT) arrangement. I certify that this Bidder does not have any TOT arrangement requiring registration with the competent authority

OR

I have read the clause regarding restrictions on procurement from a Bidder having Transfer of Technology (ToT) arrangement. I certify that this Bidder has valid registration to participate in this procurement"]

Yours Faithfully, Authorized Signature:

Name and Title of Signatory:

Name of the Tenderer:

## TECH FORM – 8

## Earnest Money Deposit Appendix A

## Bank Guarantee for EMD

(Refer Clause 12.4 of the ITT)

B.G. No.

Dated:

1. In consideration of you, K-RIDE (Rail Infrastructure Development Company (Karnataka) Limited) having its office at #8, 1st Floor, Samparka Soudha, Dr. Rajkumar Road, Opposite Orion Mall Rajajinagar 1st Block, Bengaluru:560010, (hereinafter referred to as the “Purchaser”, which expression shall unless it be repugnant to the subject or context thereof include its, successors and assigns) having agreed to receive the Tender of \_\_\_\_\_(a \_\_\_\_\_ registered under the \_\_\_\_\_, ) and having its registered office at \_\_\_\_\_(hereinafter referred to as the “Tenderer” which expression shall unless it be repugnant to the subject or context thereof include its/their executors, administrators, successors, and assigns), for \_\_\_\_\_(hereinafter referred to as “the Services”) pursuant to the Tender Document dated \_\_\_\_\_ issued in respect of the Service and other related documents including without limitation the draft Contract (hereinafter collectively referred to as “Tender Documents”), we (Name of the Bank) having our registered office at \_\_\_\_\_ and one of its branches at \_\_\_\_\_(hereinafter referred to as the “Bank”), at the request of the Tenderer, do hereby in terms of Clause 12.3 of the Tender Document, irrevocably, unconditionally and without reservation guarantee the due and faithful fulfilment and compliance of the terms and conditions of the Tender Documents by the said Tenderer and unconditionally and irrevocably undertake to pay forthwith to the Purchaser an amount of Rs. \*\*\*\*\* (Rupees \*\*\*\*\* only) (hereinafter referred to as the “Guarantee”) as our primary obligation without any demur, reservation, recourse, contest or protest and without reference to the Tenderer if the Tenderer shall fail to fulfil or comply with all or any of the terms and conditions contained in the said Tender Documents.
2. Any such written demand made by the Purchaser stating that the Tenderer is in default of the due and faithful fulfilment and compliance with the terms and conditions contained in the Tender Documents shall be final, conclusive and binding on the Bank.
3. We, the Bank, do hereby unconditionally undertake to pay the amounts due and payable under this Guarantee without any demur, reservation, recourse, contest or protest and without any reference to the Tenderer or any other person and irrespective of whether the claim of the Purchaser is disputed by the Tenderer or not, merely on the first demand from the Purchaser stating that the amount claimed is due to the Purchaser by reason of failure of the Tenderer to fulfil and comply with the terms and conditions contained in the Tender Documents including failure of the said Tenderer to keep its Tender open during the Tender validity period as set forth in the said Tender Documents for any reason whatsoever. Any such demand made on the Bank shall be conclusive as regards amount due and payable by the Bank under this Guarantee. However, our liability under this Guarantee shall be restricted to an amount not exceeding Rs. \*\*\*\*\* (Rupees \*\*\*\*\* only).
4. This Guarantee shall be irrevocable and remain in full force for a period of 45 (forty-five) days beyond the validity of the Tender or for such extended period as may be mutually agreed between the Purchaser and the Tenderer, and agreed to by the Bank, and shall continue to be enforceable till all amounts under this Guarantee have been paid.
5. We, the Bank, further agree that the Purchaser shall be the sole judge to decide as to whether the Tenderer is in default of due and faithful fulfilment and compliance with the terms and conditions contained in the Tender Documents including, *inter alia*, the failure of the Tenderer to keep its Tender open during the Tender validity period set forth in the said Tender Documents, and the decision of the Purchaser that the Tenderer is in default

as aforesaid shall be final and binding on us, notwithstanding any differences between the Purchaser and the Tenderer or any dispute pending before any Court, Tribunal, Arbitrator or any other Purchaser.

6. The Guarantee shall not be affected by any change in the constitution or winding up of the Tenderer or the Bank or any absorption, merger or amalgamation of the Tenderer or the Bank with any other person.

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7. In order to give full effect to this Guarantee, the Purchaser shall be entitled to treat the Bank as the principal debtor. The Purchaser shall have the fullest liberty without affecting in any way the liability of the Bank under this Guarantee from time to time to vary any of the terms and conditions contained in the said Tender Documents or to extend time for submission of the Tenders or the Tender validity period or the period for conveying acceptance of Letter of Award by the Tenderer or the period for fulfilment and compliance with all or any of the terms and conditions contained in the said Tender Documents by the said Tenderer or to postpone for any time and from time to time any of the powers exercisable by it against the said Tenderer and either to enforce or forbear from enforcing any of the terms and conditions contained in the said Tender Documents or the securities available to the Purchaser, and the Bank shall not be released from its liability under these presents by any exercise by the Purchaser of the liberty with reference to the matters aforesaid or by reason of time being given to the said Tenderer or any other forbearance, act or omission on the part of the Purchaser or any indulgence by the Purchaser to the said Tenderer or by any change in the constitution of the Purchaser or its absorption, merger or amalgamation with any other person or any other matter or thing whatsoever which under the law relating to sureties would but for this provision have the effect of releasing the Bank from its such liability.
8. Any notice by way of request, demand or otherwise hereunder shall be sufficiently given or made if addressed to the Bank and sent by courier or by registered mail to the Bank at the address set forth herein.
9. We undertake to make the payment on receipt of your notice of claim on us addressed to [name of Bank along with branch address] and delivered at our above branch which shall be deemed to have been duly authorised to receive the said notice of claim.
10. It shall not be necessary for the Purchaser to proceed against the said Tenderer before proceeding against the Bank and the guarantee herein contained shall be enforceable against the Bank, notwithstanding any other security which the Purchaser may have obtained from the said Tenderer or any other person and which shall, at the time when proceedings are taken against the Bank hereunder, be outstanding or unrealised.
11. We, the Bank, further undertake not to revoke this Guarantee during its currency except with the previous express consent of the Purchaser in writing.
12. The Bank declares that it has power to issue this Guarantee and discharge the obligations contemplated herein, the undersigned is duly authorised and has full power to execute this Guarantee for and on behalf of the Bank.
13. For the avoidance of doubt, the Bank's liability under this Guarantee shall be restricted to Rs. \*\*\* (Rupees \*\*\*\*\* only). The Bank shall be liable to pay the said amount or any part thereof only if the Purchaser serves a written claim on the Bank in accordance with paragraph 9 hereof, on or before [\*\*\* (indicate date falling 180 days after the last date for submission of Proposal)].

Signed and Delivered by ..... Bank

By the hand of Mr./Ms. ...., its.....and authorised official.

(Signature of the Authorised  
Signatory) (Official Seal)

**TECH FORM - 8****Appendix B EMD Declaration**

*(Refer Clauses 12.2 of the ITT and to be submitted on the letterhead of the Tenderer)*

Tenderer's Name \_\_\_\_\_ [Address and Contact Details]

Tenderer's Reference No. \_\_\_\_\_ Date.....

To

[Name of the Procuring Entity]

[Complete address of the Procuring Entity]

Ref: Tender Document No. \_\_\_\_\_

Tender No./ xxxx;

Tender Title: Supply of Goods Sir/ Madam

We, the undersigned, solemnly declare that:

We understand that according to the conditions of this Tender Document, the Tender must be supported by a EMD Declaration in lieu of EMD.

We unconditionally accept the conditions of this EMD Declaration. We understand that we shall stand automatically debarred from being eligible for Tendering in any Tender with the Purchaser for ONE year from the date of opening of this Tender if we breach our obligation(s) under the Tender conditions if we:

1. withdraw/ amend/ impair/ derogate, in any respect, from our Tender, within the Tender validity period and or as extended by the mutual consent of the respective Tenderer(s) and the Purchaser; or
2. being notified within the Tender validity of the acceptance of our Tender by the Purchaser:
  - a. refused to or failed to produce the original documents for scrutiny or
  - b. refused to or failed to furnish the required Performance Security within the stipulated time under the conditions of the Tender Document.
  - c. Fail or refuse to sign the contract within the period specified in accordance with ITT.

We know that this EMD Declaration shall expire if the contract is not awarded to us, upon:

1. receipt by us of your notification of cancellation of the entire Tendering process or rejection of all Tenders or of the name of the successful Tenderer or
2. forty-five days after the expiration of the Tender validity period or any extension to it.

(Signature with date)

..... (Name and designation)

Duly authorized to sign Tender for and on behalf

of..... [name & address of Tenderer and seal  
of company]

Dated on ..... day of..... [insert date of signing]

Place ..... [ insert place of signing]

DA:.....

**TECH FORM – 9 M**  
**CHECKLIST OF DOCUMENTS TO BE SUBMITTED BY THE TENDERER ALONG WITH THE**  
**TENDER**  
*(Refer Clause 3 , 4 11 of the ITT)*

SI No	Reference Clause	Heading	Documentary Proofs	Submitted YES/NO
1.	10.1 A	First Electronic Document – Technical Tender documents	Tech Form- 1 to Tech Form – 9	
2.	10.1 B	Second Electronic Document – Part 1- Financial Tender documents	FIN Form - 1	
3.	3.1 (a)	Statement of not been debarred	Furnish a self-declared Certificate to this effect in their letter head	
4.	3.1.(d)	Legal Status of the Tenderer	<ul style="list-style-type: none"> <li>i. A <b>proprietorship firm</b> should furnish self-declaration or self-certificate supported by PAN in the proprietor name, PAN and IT returns for the last 3 (three) financial years preceding last date for submission of Tenders.</li> <li>ii. A <b>company</b> should furnish copy of the certificate of incorporation and memorandum of association, PAN and IT returns for the last 3 (three) financial years preceding the last date for submission of Tenders.</li> <li>iii. A <b>partnership firm</b> or a limited liability partnership firm should submit copy of registration certificate, PAN and IT returns for the last 3 (three) financial years preceding the last date for submission of Tenders.</li> <li>iv. A <b>registered society</b> should furnish a copy of PAN and the IT returns for the last 3 (three) financial years preceding the last date for submission of Tenders and registration certificate as a proof of identity.</li> <li>v. If a State-owned enterprises or institutions to establish, in a manner acceptable to the Client, that they: (i) are legally and financially autonomous, (ii) operate under commercial law, and (iii) are not under supervision of the Client.</li> </ul>	

SI No	Reference Clause	Heading	Documentary Proofs	Submitted YES/NO
5.	4.3 (v)	Details of Registration	<p>Furnish a copy of the following valid registration certificate issued by the concerned authority</p> <ol style="list-style-type: none"> <li>Registration under the applicable law for establishing their legal identity.</li> <li>Registration under the Goods and Service Tax (GST) of the State of Karnataka.</li> <li>Permanent Account Number (PAN) issued by the Board of Direct Taxes under the Income Tax Act, 1961.</li> <li>Udyam Registration (online registration for MSME).</li> </ol>	
6.	4.1.(A)	Technical Capacity Demonstration	<p>Furnish a copy of the following documents</p> <ol style="list-style-type: none"> <li>Original Equipment/Goods Manufacturer (OEM) Certificate</li> <li>Information on all past supplies and satisfactory performance in the prescribed format at Tech Form 3- Annexure A, Annexure B, Annexure C and Annexure D.</li> <li>Details of Service Centres and information on service support facilities that would be provided after the warranty period in the prescribed format at Tech Form 3- Annexure B.</li> <li>It is instructed that copy of work order/ Agreement or any other documentary proof shall not be considered as documentary proof for the purpose of evaluation.</li> </ol>	
7.	5 (B)	Financial Capacity Demonstration	<p>Furnish a copy of the following documents</p> <ol style="list-style-type: none"> <li>Audited balance sheets, financial statements for the financial year immediately preceding the last date for submission of Tenders In case the annual accounts for the latest financial year [i.e, 2023-2024] are not audited and the Tenderer could not make it available, the Tenderer shall give an undertaking to that effect and the statutory auditor shall certify the same. In such a case, the Tenderer may provide the unaudited Annual Accounts (with Schedules) for the latest financial year [i.e, 2023-2024] In any case, the Audited Annual Financial Statements for the year preceding the latest financial year would have to be provided, failing which the</li> </ol>	

SI No	Reference Clause	Heading	Documentary Proofs	Submitted YES/NO
			<p>Tender will be rejected as non- responsive</p> <p>b) Annual Audited Reports for 3 (three) years preceding the last date for submission of Tenders. The financial statements shall:</p> <ol style="list-style-type: none"> <li>i. reflect the financial situation of the Tenderer;</li> <li>ii. be audited by a Statutory Auditor;</li> <li>iii. be complete, including all notes to the financial statements; and</li> <li>iv. correspond to accounting periods already completed and audited (no statements for partial periods shall be requested or accepted).</li> </ol> <p>c) Statutory Auditor's certificate specifying the net worth of the Tenderer and also specifying the methodology adopted for calculating such net worth in the format provided at Tech Form - 4.</p>	

### FIN FORM 1 - SAMPLE FORMAT FOR FINANCIAL TENDER

(Sample format to be prescribed in excel of the slot provided in the Karnataka Public Procurement Portal) (Refer Clause 4.1 B of the ITT)

#### Part A: Price Schedule for Goods

[The Tenderer shall fill in the Price Schedule Form for Goods in accordance with the instructions indicated. The list of line items in column 1 of the Price Schedules shall coincide with the List of Goods specified by the Purchaser in the Schedule of Requirements and may be appropriately modified as per requirement of particular Goods]

Serial Number	Brief Description of Goods	Unit	Quantity	Unit price	Total Price for related services, including IGST/SGST/CGST paid or payable on related services (Col. 3 x 4 x 5)
1	2	3	4	5	6
<i>Schedule I</i>					
1	Design, manufacture, supply, testing & commissioning of one (1) number of self-propelled 8- Wheeler Inspection & Maintenance car of Diesel Electric Under slung type for operation on broad gauge (1676mm) electrified (25 kV A.C.) routes of Indian Railways as per TI/SPC/OHE/8WDETC/0092 including transportation, handling, other incidental charges, taxes and duties including GST.	NO.	1		

#### Note:

- 1) The total Contract price quoted for supply of goods shall be inclusive of all taxes, duties, incidental services and GST
- 2) The breakup for the total price shall be provided in the slot of Karnataka Public Procurement Portal (as detailed in 10.1.B.1).

#### Part B: Price Schedule for Annual maintenance Cost (maintenance and repair) after warranty period PRICE SCHEDULE FOR ANNUAL MAINTENANCE AND REPAIR COST AFTER WARRANTY PERIOD, if Any - DELETED

**APPENDIX A SCHEDULE OF REQUIREMENTS**  
**(To be filled by the Purchaser before upload of Tender Document)**  
*(Refer Clause 1.1 of the ITT)*

The Schedule of Requirements are as under:

**Part - I – For Supply of Goods**

Serial Number	Brief Description	Unit	Quantity	Delivery Schedule (from the date of issue of LOA)	EMD (in Rs)
<b>Schedule I</b>	<b>[Description of Schedule]</b>				
1	Design, manufacture, supply, testing & commissioning of one (1) number of self-propelled 8- Wheeler Inspection & Maintenance car of Diesel Electric Under slung type for operation on broad gauge (1676mm) electrified (25 KV A.C.) routes of Indian Railways as per TI/SPC/OHE/8WDETC/0092 including transportation, handling, other incidental charges, taxes and duties and including GST.	<b>No.</b>	<b>1</b>	<b>6 months</b>	<b>9.83 Lakhs</b>

**Part – II (Incidental Services), if any - DELETED**

**Part-III (Annual Maintenance), if Any - DELETED**

**1. Technical Specifications**

**The detailed specification is enclosed in Section -V Appendix -B**

## APPENDIX B INSTRUCTIONS ON E-TENDERING

*(Refer Clause 14.6 of the ITT)*

1. The Tendering process for this Tender Document will be completed online through the Karnataka Public Procurement Portal.
2. The Tender document can be downloaded free of cost from the Karnataka Public Procurement Portal.
3. The Tenderer must register with his/her Digital Signature Certificate (DSC) in the Karnataka Public Procurement Portal and subsequently he/she will be allowed to carry out his/her Tender submission activities. Registering the Digital Signature Certificate (DSC) is a one-time activity. Before proceeding to register his/her DSC, the Tenderer should first log on to the Karnataka Public Procurement Portal using the User Login option on the home page with the Login Id and Password with which he/ she has registered.
4. For successful registration of DSC on Karnataka Public Procurement Portal <https://kppp.karnataka.gov.in> the Tenderer must ensure that he/she possesses Class-3 DSC issued by any certifying authorities approved by Controller of Certifying Authorities, Government of India, as the e-Procurement website <https://kppp.karnataka.gov.in> is presently accepting DSCs issued by these authorities only. The Tenderer can obtain User Login Id and perform DSC registration exercise even before e-Tender submission date starts.
5. The Tenderer shall be required to use his/her own Digital Signature while uploading Tender. The Tenderer shall be required to upload the Tender using its Digital Signature only. Failure to comply or usage of Digital signature of other firm shall be liable for rejection of the Tender.
6. Tenders must be submitted to the Purchaser through Karnataka Public Procurement Portal by the last date and time for submission of Tenders<sup>101</sup>. Two Tender Document System<sup>102</sup> procedure shall be followed, wherein the Tenderer are required to submit Technical Tender and Financial Tender. The First electronic document i.e Technical Tender, will be opened first and the Second electronic document i.e the Financial Tender, will be opened only if the Technical Tender submitted by the Tenderer is found to be qualified in accordance with the terms of this Tender Document.
7. The Tenderer must upload all the required documents electronically in the Karnataka public procurement portal in the prescribed format except the Financial Tender Submission (Financial Tender/Contract Price) in prescribed format only on the Karnataka Public Procurement Portal.
8. It is suggested that the files to be uploaded should be made in grey scale using the minimum readable appropriate resolution so that the size of the files is minimized for fast uploading on the Karnataka Public Procurement Portal <https://kppp.karnataka.gov.in>. The required electronic documents for each document label of Technical (Fee details, Annexure etc) schedules/packets can be clubbed together to make single different files for each label. The size of Single label file should not exceed 70 MB size.
9. Along with the Tenders, the stipulated Tender processing fees and EMD/ EMD Declaration must be submitted as mentioned in Karnataka Public Procurement Portal.
10. Any queries relating to the process of online Tender submission or queries relating to the Karnataka Public Procurement Portal in general may obtained from the KPPP Helpdesk.
11. Regarding submission, the server time (which is displayed on the Tenderer dashboard) will be considered as the standard time for referencing the deadlines for submission of the Tenders by the Tenderer, opening of Tenders etc. The Tenderer should follow this time during Tender submission.

12. Upon the successful and timely submission of Tenders (ie after Clicking “Freeze Tender Submission” in the portal), the Karnataka Public Procurement Portal will give a successful Tender submission message & a Tender summary will be displayed with Tender no. and the date & time of submission of the Tender with all other relevant details.
13. The Tender summary has to be printed and kept as an acknowledgement of the submission of the Tender. This acknowledgement may be used as an entry pass for the Technical Tender opening meetings.
14. All the documents being submitted by the Tenderer would be encrypted using PKI encryption techniques to ensure the secrecy of the data. The data entered cannot be viewed by unauthorized persons until the time of Tender opening. The confidentiality of the tenders is maintained using the secured Socket Layer 128 bit encryption technology. Data storage encryption of sensitive fields is done. Any Tender Document that is uploaded to the server is subjected to symmetric encryption using a system generated symmetric key. Further this key is subjected to asymmetric encryption using buyers/tenders openers’ public keys. Overall, the uploaded Tender Documents become readable only after the Tender Opening by the authorized Tender openers.
15. At any time after the uploading of the Tender Documents and prior to the deadline for submission of Tenders, the Authority may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Tenderer, may make any modifications or amendments to the Tender Documents. Such modifications or amendments shall be notified on the Karnataka Public Procurement Portal through issue of Addendum or Corrigendum or Clarification. Any Addendum or Corrigendum or Clarification issued by the Authority shall form part of the original Tender Document. The Authority’s response to any queries of the Tenderer post pre-bid meeting will be published in Karnataka Public Procurement Portal.
16. The Tenderer must acquaint and train themselves with the rules, regulations, procedure and implied conditions/agreement of the Karnataka Public Procurement Portal.
17. The Tenderer shall settle clarifications and disputes if any, regarding the Karnataka Public Procurement Portal directly with Karnataka Public Procurement Portal helpdesk. In case of conflict between provisions of the Karnataka Public Procurement Portal with the Tender Document, provisions of the Karnataka Public Procurement Portal shall prevail.
18. The Tenderer shall be responsible to see the Karnataka Public Procurement Portal till last date of submission of Tender for any clarification/amendment which shall be part of the Tender Document.

**APPENDIX C**  
**INSTRUCTIONS TO E-REVERSE AUCTION PROCESS**  
*(Refer Clause 1.2 of the ITT)*

**DELETED**

# **SECTION IV**

# **FORM OF CONTRACT**

## SECTION IV FORM OF CONTRACT

This CONTRACT (hereinafter called the "Contract") is made the \_\_\_\_\_ day of the month of \_\_\_\_\_, 2025, between, on the one hand, The Governor of Karnataka through \_\_\_\_\_ (hereinafter called the "**Purchaser**") and, on the other hand, \_\_\_\_\_ (hereinafter called the "**Supplier**").

WHEREAS

- a. Purchaser is desirous to procure certain Goods and ancillary services viz., ..... (Brief Description of Goods and Services) and has accepted a tender by the Supplier for the supply of those goods and services on the terms and conditions set forth in this Contract for a sum of Rs. \_\_\_\_\_/- (Rupees \_\_\_\_\_ Only) (hereinafter called as the

"**Contract Price**"); NOW THEREFORE the parties hereto hereby agree 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 attached hereto shall be deemed to form and be read and construed an integral part of this Contract:
  - a. The General Conditions of Contract (hereinafter called "GCC");
  - b. The Special Conditions of contract (hereinafter called "SCC");
  - c. The following Appendices:
 

Appendix A:	Schedule of Requirements
Appendix B:	Technical Specifications
Appendix C:	Contract Price
Appendix D:	Form of Guarantee for Performance Security Deposit/ E-Bank Guarantee
Appendix E:	Form of Guarantee for Annual Maintenance Security
Appendix F:	Notification of Award and Letter of Intent.
Appendix G:	Any Modification, Addendum, Pre-Bid Meeting Proceedings

*[Note: If any of these Appendices are not used, the words "Not Used" should be inserted below next to the title of the Appendix on the sheet attached hereto carrying the title of that Appendix.]*

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 in 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:

## FOR SUPPLY OF GOODS

<b>Serial Number</b>	<b>Brief Description</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit price</b>	<b>Total Price for related</b>
<b>Serial Number</b>	<b>Brief Description of Goods</b>	<b>Unit</b>	<b>Quantity</b>	<b>Unit price</b>	<b>Total Price for related services including IGST/SGST/CGST paid or payable on related services (Col. 3 x 4 x 5)</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<i>Schedule I</i>					
1	Design, manufacture, supply, testing & commissioning of one (1) number of self-propelled 8- Wheeler Inspection & Maintenance car of Diesel Electric Under slung type for operation on broad gauge (1676mm) electrified (25 kV A.C.) routes of Indian Railways as per TI/SPC/OHE/8WDETC/0092 including transportation, handling, other incidental charges, taxes, and duties including GST.	NO.	1		

N WITNESS WHEREOF, the Parties hereto have caused this Contract to be signed in their respective names as of the day and year first above written.

FOR AND ON BEHALF OF [GOVERNOR OF KARNATAKA]

By (Signature and Designation of the Authorized Representative of the Purchaser)

FOR AND ON BEHALF OF [NAME OF SUPPLIER]

By (Signature and Designation of the Authorized Representative of the Supplier)

## **SECTION V: GENERAL CONDITIONS OF CONTRACT (GCC)**

## SECTION V: GENERAL CONDITIONS OF CONTRACT (GCC)

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## SECTION V – GENERAL CONDITIONS OF CONTRACT

### 1. Definitions

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

- (a) "**Contract**" means the agreement entered into between the Purchaser and the Supplier, as recorded in the Contract Form signed by the parties, including all the attachments and appendices thereto and all documents incorporated by reference therein;
- (b) "**Contract Price**" means the price including applicable GST payable to the Supplier under the Contract for the full and proper performance of its contractual obligations;
- (c) "**Day**" means calendar day.
- (d) "**Effective Date**" means the date on which this Contract is signed and executed by the parties hereto;
- (e) "**GCC**" means the General Conditions of Contract contained in this section.
- (f) "**Government**" means the Government of Karnataka State.
- (g) "**Goods**" means all goods including articles, the equipment, sub-systems, hardware, software, products accessories, software, machinery, and/or other materials etc and shall be deemed to be including specific small work or some services that are incidental or consequential to the supply of such goods which the Supplier is required to supply to the Purchaser under the Contract;
- (h) "**Party**" means the Purchaser or the Supplier, as the case may be, and Parties means both of them;
- (i) "**Performance Security**" (includes the terms 'Security Deposit' or 'Performance Bond' or 'Performance Bank Guarantee' or 'E-Bank Guarantee' or any other specified financial instruments in specific contexts, means a monetary guarantee to be furnished by the successful Tenderer or Supplier in the form prescribed for the due performance of the contract;
- (j) "**Purchaser**" means the organization purchasing the Goods,
- (k) "**Purchaser's country**" is the country named in SCC.
- (l) "**Project Site**", where applicable, means the place or places named in SCC.
- (m) "**Quarterly Payment**" means fees that the Supplier may be entitled to be paid by the Purchaser on the quarterly basis for the services rendered during maintenance period.
- (n) "**Supplier**" means the individual or firm supplying the Goods and Services under this Contract and the term includes Bidder/tenderer.
- (o) "**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;
- (p) "**SCC**" means the Special Conditions of Contract by which these General Conditions of Contract may be supplemented.

- (q) **“Third Party”** means any person or entity other than the Government, the Purchaser and the Supplier.

## 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; Inspection and Audit by the Government

- 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.
- 4.2 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.
- 4.3 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.
- 4.4 The supplier shall permit the Government to inspect the Supplier's accounts and records relating to the performance of the Supplier and to have them audited by auditors appointed by the Government, if so required by the Government.

## 5. Supplier's Obligations:

### 5.1 Patent Right

- a) 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. The Purchaser shall retain all right, title and interest in and to the licensed technology, including all worldwide technology and intellectual property and proprietary rights. The Supplier shall ensure that while supplying any software, hardware, processes, document or material in the course of performing the services, it does not infringe the intellectual property rights of any person/company. The Supplier shall keep the Purchaser indemnified against all costs, expenses and liabilities howsoever, arising out of any illegal or unauthorized use (piracy) or in connection with any claim or proceedings relating to any breach or violation of any permission/license terms or infringement of any intellectual property rights by the Supplier during the course of performance of services.
- b) If the Purchaser desires, the Supplier shall be obliged to ensure that all approvals, registrations, licenses, permits and rights etc. which are inter-alia necessary for use of the goods supplied/installed by the

Supplier, the same shall be acquired in the name of the Purchaser, prior to termination of this Contract. Subsequent to the term of this Contract, such approvals, registrations, licenses, permits and rights etc. shall endure to the exclusive benefit of the Purchaser.

## 5.2 **Changes in Constitution/financial stakes/responsibilities of Supplier's Business**

The Supplier must proactively keep the Purchaser informed of any changes in its constitution/financial stakes/responsibilities during the execution of the contract. Where the supplier is a partnership firm, the following restrictions shall apply to changes in the constitutions during the execution of the contract:

- a) A new partner shall not be introduced in the firm except with the previous consent in writing of the Purchaser, which shall be granted only upon execution of a written undertaking by the new partner to perform the contract and accept all liabilities incurred by the firm under the contract before the date of such undertaking.
- b) On the death or retirement of any partner of the supplier firm before the complete performance of the contract, the Purchaser, may, at his option, terminate the contract for default as per the Contract and avail any or all remedies thereunder.
- c) If the contract is not terminated as provided in Sub-clause (ii) above notwithstanding the retirement of a partner from the firm, that partner shall continue to liable under the contract for acts of the firm until a copy of the public notice given by him under Section 32 of the Partnership Act, has been sent by him to the Purchaser, in writing or electronically.

## 5.3 **Obligation to Maintain Eligibility and Qualifications**

- a) The contract has been awarded to the supplier based on specific eligibility and qualification criteria. The supplier is contractually bound to maintain such eligibility and qualification during the execution of the contract. Any change which would vitiate the basis on which the contract was awarded to the supplier should be pro-actively brought to the notice of the Purchaser, within 7 days of it coming to the Supplier's knowledge. These changes include but are not restricted to:
- b) Change regarding information furnished by it in its Tender Documents.

## 5.4 **Permits, Approvals and License**

Whenever the supply of Goods and incidental Works/Services (including preventive and breakdown maintenance) requires that the supplier obtain permits, approvals and licenses from local public authorities, it shall be the supplier's sole responsibility to obtain these and keep these current and valid. Such requirements may include but not be restricted to export licence or environmental clearance if required. If requested by the supplier, the Purchaser shall make its best effort to assist the supplier in complying with such requirements in a timely and expeditious manner, without any dilution of the Supplier's responsibility in this regard.

## 5.5 **Confidentiality**

All documents, drawings, samples, data, associated correspondence or other information furnished by or on behalf of the Purchaser to the supplier, in connection with the contract, whether such information has been furnished before, during or following completion or termination of the contract, are confidential and shall remain the property of the Purchaser and shall not, without the prior written consent of Purchaser neither be divulged by the supplier to any third party, nor be used by him for any purpose other than the design, procurement, or other services and work

required for the performance of this Contract. If advised by the Purchaser, all copies of all such information in original shall be returned on completion of the supplier's performance and obligations under this contract.

#### 5.6 **Secrecy**

The subject matter of this contract is secret as per the Official Secrets Act, 1923 or if the contract is marked as "Secret", the supplier shall take all reasonable steps necessary to ensure that all persons employed in any connection with the contract, have acknowledge their responsibilities and penalties for violations under the Official Secrets Act and any regulations framed thereunder.

#### 6. **Performance Security**

6.1 Within 14 (fourteen) days of receipt of the Letter of Intent, the Supplier shall furnish Performance Security to the Purchaser in the form of Bank Guarantee or E-Bank Guarantee for an amount stated in the SCC provided in **Appendix D** of this Contract excluding annual Maintenance Cost, valid upto 60 days after the date of completion of performance obligations including Warranty obligations. In the event of any correction of defects or replacement of defective material during the Warranty period, the Warranty for the corrected/replaced material shall be extended to a further period of 36 months and the Performance Bank Guarantee/E-Bank Guarantee for proportionate value shall be extended 60 days over and above the initial Warranty period.

6.2 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.

6.3 The Performance Security shall be denominated in Indian Rupees and shall be in one of the following forms:

- (a) A Bank guarantee or irrevocable Letter of Credit, issued by a nationalized/scheduled bank in the form provided in the tender documents or another form acceptable to the Purchaser; or
- (b) A cashier's check or Banker's certified check, or crossed demand draft or pay order drawn in favour of the Purchaser; or
- (c) Specified small savings instruments pledged to the Purchaser.

6.4 The Performance Security will be discharged by the Purchaser and returned to the Supplier not later than 60 days after (Supply, Testing and Commissioning) satisfactorily certificate issued by the Engineer - In-charge.

6.5 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, rendering the same valid for the duration of the Contract as amended for 60 days after the completion of performance obligations including Warranty obligations.

6.6 Failure to submit the bank guarantee for annual maintenance service in the period specified above will constitute sufficient ground for forfeiture of the performance guarantee.

6.7 The Purchaser shall be entitled, and it shall be lawful on his part,

- b) to deduct from the performance securities or to forfeit the said security in whole or in part in the event of;
  - i) any default, or failure or neglect on the part of the supplier in the fulfilment or performance in all respect of the contract under reference or any other contract with the Purchaser or any part thereof.

- ii) for any loss or damage recoverable from the supplier which the Purchaser may suffer or be put to for reasons of or due to above defaults/failures/neglect.
  - iii) for corrupt and fraudulent practices of supplier.
  - c) And in either of the events aforesaid to call upon the supplier to maintain the said performance security at its original limit by making further deposits, provided further that the Purchaser shall be entitled, and it shall be lawful on his part, to recover any such claim from any sum then due or which at any time after that may become due to the supplier for similar reasons.
- 6.8 The Purchaser shall release the performance security subject to the sub-clause above without any interest to the supplier on completing all contractual obligations, including the warranty obligations, if any. Alternatively, for the duration of Warranty obligations, upon the supplier submitting a suitable separate Warranty Security, the original Performance Guarantee Security shall be released mutatis mutandis.

## 7. Inspections and Tests

- 7.1 The Purchaser or its representative shall have the right to inspect and/or to test (including special or third party test, raw materials, and stage of inspection) the Goods to confirm their conformity to the Contract specifications at no extra cost to the Purchaser. SCC and the 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/appointed for these purposes.
- 7.2 The inspections and tests may be conducted on the premises of the Supplier or its authorised agent(s), at point of delivery and/or at the Goods final destination. If conducted on the premises of the Supplier or its authorised agent(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.
- 7.3 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.
- 7.4 The inspecting authority has no authority to modify the governing specifications, approved drawings, or samples during inspection without the Purchaser's approval.
- 7.5 The supplier shall put up the goods for inspection well ahead of the delivery period to complete the inspection in respect of the conditions of pre dispatch inspection of ordered goods at supplier's premises provided in the contract.
- 7.6 The Purchaser's right to inspect, test and, where necessary, reject the Goods after the Goods' arrival at Project 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.
- 7.7 Nothing in GCC Clause 7 shall in any way release the Supplier from any warranty or other obligations under this Contract.
- 7.8 **Manuals and Drawings**
- 7.8.1 Before the goods and equipment are taken over by the Purchaser, the Supplier shall supply operation and maintenance manuals together with drawings of the goods and equipment. These shall be in such detail as will

enable the Purchaser to operate, maintain, adjust and repair all parts of the equipment as stated in the specifications.

7.8.2 The manuals and drawings shall be in the ruling language (English) and in such form and numbers as stated in the contract.

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

7.9 For the System & Other Software the following will apply:

The Supplier shall provide complete and legal documentation of hardware, all sub-systems, operating systems, compiler, system software and the other software. The Supplier shall also provide licensed software for all software products, whether developed by it or acquired from others. The supplier shall also indemnify the purchaser against any levies/penalties on account of any default in this regard.

7.10 Acceptance Certificates:

7.10.1 On successful completion of acceptability test, receipt of deliverables etc, and after the purchaser is satisfied with the working of the system/supplied goods, the acceptance certificate signed by the supplier and the representative of the purchaser will be issued. The date on which such certificate is signed shall be deemed to be the date of successful commissioning of the systems/completion of the supply.

7.10.2 The training as per Clause 16 of Special Conditions of Contract shall be conducted on the dates mutually agreed upon and within two months from the date of acceptance of supply.

## 8. Packing

8.1 The marking of the Goods must comply with the Goods of the laws relating to merchandise marks for the time being in force in India.

8.2 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 heavy handling facilities at all points in transit.

8.3 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.

8.4 Packing Instructions: The Supplier will be required to make separate packages for each Consignee. Each Package will be marked on three sides with proper paint/indelible ink the following:

- i. An iconic graphical mark to visually identify a particular consignment.
- ii. Name of the Purchaser; contract number and date
- iii. Brief description of Goods including quantity.
- iv. The gross weight of the package

- v. Serial number of this package and the total number of packages in the consignment
- vi. Packing list reference number
- vii. Country of origin of goods
- viii. Consignee's name and full address and
- ix. Contractor's/Supplier's name and address

## 9. Delivery and Documents

- 9.1 Delivery of the Goods shall be made by the Supplier in accordance with the specifications and terms specified by the Purchaser in the Notification of Award. The details of shipping and/or other documents to be furnished by the supplier are specified in SCC.

## 10. Insurance

- 10.1 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. For delivery of goods at site, 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 details in case of domestic supply of goods on CIF/FOR destination basis and in case of import of goods by the supplier are specified in SCC.
- 10.2 Unless otherwise specified in the SCC, the Goods supplied under the Contract shall be fully insured against loss or damage incidental to manufacture or acquisition, transportation, storage, and delivery, in accordance with the applicable Incoterms or in the manner specified in the SCC.

## 11. Transportation

- 11.1 Where the Supplier is required under the Contract to transport the Goods to a specified place of destination within India defined as Project site, 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.
- 11.2 [Unless otherwise specified in the SCC, responsibility for arranging transportation of the Goods shall be in accordance with the specified Incoterms.]

## 12. Incidental Services

- 12.1 The supplier may be required to provide any or all of the following services, including additional services, if any, specified in SCC:
- (a) performance or supervision of the on-site assembly and/or start-up of the supplied Goods;
  - (b) furnishing of tools required for assembly and/or maintenance of the supplied Goods;
  - (c) furnishing of detailed operations and maintenance manual for each appropriate unit of supplied Goods;
  - (d) 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

- (e) 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.

12.2 Prices charged by the Supplier for incidental services, if not included in the Contract Price for the Goods, shall be agreed upon in advance by the parties and shall not exceed the prevailing rates charged to other parties by the Supplier for similar services.

### 13. Spare Parts

13.1 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:

- (a) 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
- (b) In the event of termination of production of the spare parts:
  - i. advance notification to the Purchaser of the pending termination, in sufficient time to permit the Purchaser to procure needed requirements; and
  - ii. following such termination, furnishing at no cost to the Purchaser, the blueprints, drawings and specifications of the spare parts, if requested.

13.1 The 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 3 months of placement of order.

### 14. Warranty

14.1 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.

14.2 This warranty shall remain valid for hours of operation or 24 months after the Goods or any portion thereof as the case may be, have been delivered to and accepted at the destination indicated in the Contract, or for 39 months after the date of shipment from the place of loading whichever period concludes 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 either:

- (a) 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 in accordance with SCC ; OR
- (b) pay liquidated damages to the Purchaser with respect to the failure to meet the contractual guarantees. The rate

of these liquidated damages shall be as specified in the Technical Specifications.

- 14.3 The Purchaser shall promptly notify the Supplier in writing of any claims arising under this warranty.
- 14.4 Upon receipt of such notice, the Supplier shall, within the period of 3 days and with all reasonable speed, 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. In the event of any correction of defects or replacement of defective material during the Warranty period, the Warranty for the corrected or replaced material shall be extended to a further period of 36 months.
- 14.5 If the Supplier, having been notified, fails to remedy the defect(s) within 3 days, the Purchaser may proceed to take such remedial action as may be necessary, at the Supplier's risk and expense and without prejudice to any other rights which the Purchaser may have against the Supplier under the Contract.
- 14.6 The Supplier shall guarantee a 90% uptime of systems/peripherals/equipment's
- 14.7 If any equipment/ system (s)/ gives continuous trouble, say six times in a month during the Warranty period, the Supplier shall replace the equipment/system(s) with new equipment/system(s) without any additional cost to the Purchaser.
- 14.8 **Annual Maintenance Service:**
- i. Free maintenance services shall be provided by the Supplier during the period of warranty. After warranty period, for next three years, annual maintenance and repairs of the entire system including supply of spares etc. will be done by the Supplier. The annual maintenance and repair cost (after warranty period) shall be paid in equal quarterly instalments at the end of each quarter from the date of completion of the warranty subject to satisfactory services rendered as specified in the Tender document and the resultant contract as per the rates quoted in the Contract Price.
  - ii. The maximum response time for maintenance complaint from any of the destinations specified in the Schedule of Requirements (i.e. time required for supplier's maintenance engineer to report at the installation after a request call/telegram is made or letter is written) shall not exceed 24 hours.
  - iii. It is expected that the average downtime of the item (system) will be less than half the maximum downtime (i.e. defined as number of days for which an item of equipment is not usable because of inability of the supplier to repair it) as mentioned in the form of technical details. In case an item is not usable beyond the stipulated maximum downtime the supplier will be required to arrange for an immediate replacement of the same till it is repaired. Failure to arrange for the immediate repair/replacement will be liable for a penalty of Rs. 100 per day per item. The amount of penalty will be recovered from the Performance Security guarantee during warranty period. During annual maintenance contract period, the penalty of Rs. 100 per item per day will be recovered from the amount of annual maintenance charges.
  - iv. The Purchaser reserves the right to terminate maintenance and repairs contract, after warranty period, at any time without assigning any reasons and the Supplier cannot claim any compensation in this respect.

## 15. Payment

- 15.1 The method and conditions of payment to be made to the Supplier under this Contract shall be specified in the SCC.

15.2 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, documents submitted pursuant to GCC Clause 9, and upon fulfilment of other obligations stipulated in the contract.

15.3 Payments shall be made promptly by the Purchaser but in no case later than thirty (30) days after submission of the invoice or claim by the Supplier. In the event that the Purchaser fails to pay the Supplier any payment by its due date or within the period set forth above, the Purchaser shall pay to the Supplier interest on the amount of such delayed payment at the rate shown in the SCC, for the period of delay until payment has been made in full, whether before or after judgment or arbitration award.

15.4 Payment shall be made in Indian Rupees.

## **16. Prices**

16.1 Prices payable to the supplier as stated in the contract shall be firm during the performance of the contract.

## **17. Change Orders**

17.1 The Purchaser may at any time, by written order given to the Supplier pursuant to GCC Clause 31, make changes within the general scope of the Contract in any one or more of the following:

- (a) drawings, designs, or specifications, where Goods to be furnished under the Contract are to be specifically manufactured for the Purchaser;
- (b) the method of shipping or packing;
- (c) the place of delivery; and/or
- (d) the Services to be provided by the Supplier.

17.2 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 thirty (30) days from the date of the Supplier's receipt of the Purchaser's change order.

## **18. Contract Amendments**

18.1 Subject to GCC Clause 17, no variation in or modification of the terms of the Contract shall be made except by written amendment signed by the parties.

## **19. Assignment**

19.1 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.

## **20. Subcontracts**

20.1 No subcontracts are allowed.

## 21. Delays in the Supplier's Performance

- 21.1 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 Schedule of Requirements.
- 21.2 If at any time during performance of the Contract, the Supplier 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). 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 liquidated damages, in which case the extension shall be ratified by the parties by amendment of the Contract.
- 21.3 No increases in price on account of any statutory increase in or fresh imposition of GST, customs duty or on account of any other taxes/duty/cess/levy), leviable in respect of the Goods and incidental Works/Services stipulated in the said contract which takes place after the original delivery date, shall be admissible on such of the said Goods, as are delivered after the said date;
- 21.4 Not with standing any stipulation in the contract for an increase in price on any other ground, including price variation clause or foreign exchange rate variation, or any other variation clause, no such increase after the original delivery date shall be admissible on such goods delivered after the said date and
- 21.5 Nevertheless, the Purchaser shall be entitled to the benefit of any decrease in price on account of reduction in or remission of GST, customs duty or on account of any other Tax or duty or any other ground as stipulated in the price variation clause or foreign exchange rate variation or any other variation clause which takes place after the expiry of the original delivery date.
- 21.6 Except as provided under GCC Clause 24, a delay by the Supplier in the performance of its delivery obligations shall render the Supplier liable to the imposition of liquidated damages pursuant to GCC Clause 22, unless an extension of time is agreed upon pursuant to GCC Clause 21.2 without the application of liquidated damages.

## 22. Liquidated Damages

- 22.1 Subject to GCC Clause 24, 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 liquidated damages, a sum equivalent to 0.5% of the delivered price (including elements of GST and freight) 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 10% of the Contract Price. Once the maximum is reached, the Purchaser may consider termination of the Contract pursuant to GCC Clause 23.

## 23. Termination for Default

- 23.1 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:
- If the Supplier fails to deliver any or all of the Goods within the period(s) specified in the Contract, or within any extension thereof granted by the Purchaser pursuant to GCC Clause 21; or
  - If the Supplier fails to perform any other obligation(s) under the Contract.
  - If the Supplier fails to adhere to the Quality requirements/specification and non-replacement of the

required goods within the stipulated time.

- (d) If the Supplier, is debarred under the KTPP Act and the Rules thereunder for corrupt or fraudulent practices in competing for or in executing the Contract.

For the purpose of this Clause:

“Corrupt practice” means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution; and “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 Procurement Entity/Purchaser, and includes collusive practice among Tenderer either prior to or after tender submission, designed to establish Contract prices at artificial non-competitive levels and to deprive the Procurement Entity/Purchaser of the benefits of free and open competition.

- (e) If the contractor is a company being wound up voluntarily or by order of a Court or a Receiver, Liquidator or Manager on behalf of the Debenture-holders is appointed, or circumstances shall have arisen which entitle the Court or Debenture-holders to appoint a Receiver, Liquidator or Manager.

- (f) if the Purchaser, in its sole discretion and for any reason whatsoever, decides to terminate this Contract.

- 23.2 In the event the Purchaser terminates the Contract in whole or in part, pursuant to GCC Clause 23.1, 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.

## 24. Force Majeure

- 24.1 Notwithstanding the provisions of GCC Clauses 21, 22, 23, 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.
- 24.2 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, hostilities, acts of the public enemy, sabotage, wars or revolutions, fires, floods, epidemics, pandemic, explosions, strikes, lockouts, quarantine restrictions and freight embargoes.
- 24.3 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. If the force majeure condition(s) mentioned above is in force for 90 (ninety) days or more at any time, either party shall have the option to terminate the contract on expiry of 90 (ninety) days of commencement of such force majeure by giving 14 days' notice to the other party in writing. In case of such termination, no damages shall be claimed by either party against the other, save and except those which had occurred under any other clause of this contract before such termination.

## 25. Termination for Insolvency

25.1 The Purchaser may at any time terminate the Contract by giving written notice to the Supplier, if the Supplier or if a firm, any partners thereof 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.

## 26. Termination for Convenience

26.1 The Purchaser, by written notice sent to the Supplier, may terminate the Contract, in whole or in part, at any time for its convenience. The notice of termination shall specify that termination is for the Purchaser's convenience, the extent to which performance of the Supplier under the Contract is terminated, and the date upon which such termination becomes effective. Such termination shall not prejudice or affect the rights and remedies accrued and/or shall accrue after that to the Parties.

26.2 The Goods that are complete and ready for shipment within 30 days after the Supplier's receipt of notice of termination shall be accepted by the Purchaser at the Contract terms and prices. For the remaining Goods, the Purchaser may elect:

- (a) To have any portion completed and delivered at the Contract terms and prices; and/or
- (b) To cancel the remainder and pay to the Supplier an agreed amount for partially completed Goods and for materials and parts previously procured by the Supplier.

26.3 All warranty obligations, if any, shall continue to survive despite the termination

## 27. Settlement of Disputes

### 27.1 Amicable Settlement

The Parties shall use their best efforts to settle amicably all disputes excluding the excepted matters specified in the SCC arising out of or in connection with this Contract or its interpretation.

### 27.2 Dispute Settlement

- a. Any dispute between the Parties as to matters arising pursuant to this Contract excluding the excepted matters stated in clause 27.1 above that cannot be settled amicably within thirty (30) days after receipt by one Party of the other Party's request for such amicable settlement may be submitted by either Party for settlement in accordance with the provisions specified in the SCC.
- b. Any dispute or difference in respect of which a notice of intention to commence arbitration has been given in accordance with this Clause shall be finally settled by Arbitration.
- c. Arbitration proceedings shall be conducted in accordance with the rules of procedure specified in the SCC.

27.3 Notwithstanding any reference to arbitration herein,

- (a) The parties shall continue to perform their respective obligations under the Contract unless they otherwise agree; and
- (b) The Purchaser shall pay the Supplier any monies due the Supplier.

## 28. **Limitation of Liability**

28.1 Except in cases of criminal negligence or willful misconduct, and in the case of infringement pursuant to Clause 5,

- (a) The Supplier shall not be liable to the Purchaser, whether in contract, tort, or otherwise, for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, provided that this exclusion shall not apply to any obligation of the Supplier to pay liquidated damages to the Purchaser; and
- (b) The aggregate liability of the Supplier to the Purchaser, whether under the Contract, in tort or otherwise, shall not exceed the total Contract Price, provided that this limitation shall not apply to the cost of repairing or replacing defective equipment.

## 29. **Governing Language**

29.1 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.

## 30. **Applicable Law**

30.1 The Contract shall be interpreted in accordance with the laws and any other instruments having the force of law in India, as they may be issued and in force from time to time.

## 31. **Notices**

31.1 Any notice given by one party to the other pursuant to this Contract shall be sent to other party in writing or by cable, telex or facsimile and confirmed in writing to the other Party's address (includes e-mail id) specified in SCC.

31.2 A notice shall be effective when delivered or on the notice's effective date, whichever is later.

## 32. **Taxes and Duties**

- a. The Supplier shall be entirely responsible to pay for all taxes, duties, fees, levies etc., incurred until delivery of the services to the Purchaser.
- b. Payment of GST Tax under the contract:
  - i. The payment of GST and GST Cess to the Supplier shall be made only on the latter submitting a GST compliant bill/invoice indicating the appropriate HSN code and applicable GST rate thereon duly supported with documentary evidence as per the provision of relevant GST Act and the Rules made there under. The delivery of Service shall be shown being made in the name, location/state, and GSTIN of the Supplier only; the location of the procurement office of the Purchaser has no bearing on the invoicing.
  - ii. While claiming reimbursement of duties, taxes etc. (like GST) from the Purchaser, as and if permitted under the contract, the Supplier also agree and confirm that in case he gets any refund out of such taxes and duties from the concerned authorities at a later date, the Supplier shall refund to the Purchaser, the Purchaser's share out of such refund received by the Supplier. The Supplier shall also refund the appropriate amount to the Purchaser immediately on receiving the same from the concerned authorities.

- iii. The Liquidated damages or any other recoveries should be shown as deductions on the invoice, and GST shall be applicable only the net balance payment due.
- iv. GST shall be paid as per the rate at which it is liable to be assessed or has been assessed provided the provision of services is legally liable to such taxes and is payable as per the terms of the contract subject to the following conditions:
  - The Purchaser shall not pay a higher GST rate if leviable due to any misclassification of HSN number or incorrect GST rate incorporated in the contract due to Supplier's fault. Wherever the Supplier invoices at GST rate or HSN number, which is different from that incorporated in the contract, payment shall be made as per GST rate, which is lower of the GST rates incorporated in the contract or billed.
  - However, the Purchaser shall not be responsible for the Supplier's tax payment or duty under misapprehension of the law.
  - In case of profiteering by the Supplier relating to GST tax, the Purchaser shall treat it as a violation of the code of integrity in the contract and avail any or all punitive actions thereunder, in addition of recovery and action by the GST authorities under the Act.

## SECTION VI: SPECIAL CONDITIONS OF CONTRACT

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. The date on which this Contract shall come into effect is: \_\_\_\_\_ [ Fill the date of execution of this Contract].

### 2. **Inspection and Tests (GCC Clause 7)**

Inspection and tests prior to shipment of Goods and at final acceptance are as follows:

- i. The inspection of the Goods shall be carried out to check whether the Goods are in conformity with the technical specifications attached to the contract and shall be in line with the inspection/test procedures laid down in the Technical Specifications and the General Conditions of contract. Following broad test procedure will generally be followed for inspection and testing of machine. The supplier will dispatch the goods to the ultimate consignee after internal inspection testing along with the supplier's inspection report and manufacturer's warranty certificate. The purchaser will test the equipment after completion of the installation and commissioning at the site of the installation. For site preparation, as stated in Clause 21 of SCC. The supplier should furnish all details to the purchaser sufficiently in advance so as to get the works completed before receipt of the equipment. Complete hardware and software as specified in Section V should be supplied, installed, and commissioned properly by the supplier prior to commencement of performance tests.
- ii. In the event of the hardware and software failing to pass the acceptance test, a period not exceeding two weeks will be given to rectify the defects and clear the acceptance test, failing which the purchaser reserves the rights to get the equipment replaced by the supplier at no extra cost to the purchaser.
- iii. The Third-Party Inspection is mandatory in respect of all goods and equipment contracts where the estimated value is more than Rs.50 Lakhs for an item of goods and equipment.
- iv. The Employer's Personnel shall at all reasonable times:
  - a) have full access to all parts of the Site and to all places from which natural Materials are being obtained, and
  - b) during production, manufacture and construction (at the Site and elsewhere), be entitled to examine, inspect, measure and test the materials and workmanship, and to check the progress of manufacture of Plant and production and manufacture of Materials.

The Contractor shall give the Employer's Personnel full opportunity to carry out these activities, including providing access, facilities, permissions and safety equipment. No such activity shall relieve the Contractor from any obligation or responsibility.

The Contractor shall give notice to the Engineer whenever any work is ready and before it is covered up, put out of sight, or packaged for storage or transport. The Engineer shall then either carry out the examination, inspection, measurement or testing without unreasonable delay, or promptly give notice to the Contractor that the Engineer does not require to do so. If the Contractor fails to give the notice, he shall, if and when required by the Engineer, uncover the work and thereafter reinstate and make good, all at the Contractor's cost.

#### TESTING:

**FAT (Factory Acceptance Test):** The FAT for the Tower Wagon will be conducted by M/s. RITES

The Supplier shall provide all apparatus, assistance, documents and other information, electricity, equipment, fuel, consumables, instruments, labour, materials, and suitably qualified and experienced staff, as are necessary to carry out the specified tests efficiently. The Supplier shall agree, with the Engineer, the time and place for the specified testing of any Plant, Materials and other parts of the Works.

The Engineer/Purchaser may, vary the location or details of specified tests, or instruct the Contractor to carry out additional tests. If these varied or additional tests show that the tested Plant, Materials or workmanship is not in accordance with the Contract, the cost of carrying out this Variation shall be borne by the Contractor, notwithstanding other provisions of the Contract.

The Engineer/Purchaser shall give the Supplier not less than 24 hours' notice of the Engineer's intention to attend the tests. If the Engineer/Purchaser does not attend at the time and place agreed, the Supplier may proceed with the tests, unless otherwise instructed by the Engineer, and the tests shall then be deemed to have been made in the Engineer/Purchaser's presence.

The Contractor shall promptly forward to the Engineer/Purchaser duly certified reports of the tests. When the specified tests have been passed, the Engineer/Purchaser shall endorse the Contractor's test certificate, or issue a certificate to him, to that effect. If the Engineer/Purchaser has not attended the tests, he shall be deemed to have accepted the readings as accurate.

The cost of all Testing (FAT,SAT) including commissioning, any trials shall be borne by Supplier and quoted rate shall be inclusive of these costs

v. Details of inspections and tests required (*Purchaser needs to specify the inspections and tests required specifically for the Procurement being done*):

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_

### 3. Delivery and Documents (GCC Clause 9)

Upon delivery of the Goods, the supplier shall notify the purchaser and the insurance company by cable/telex/fax the full details of the shipment including contract number, railway receipt number and date, description of goods, quantity, name of the consignee etc. The supplier shall mail the following documents to the purchaser with a copy to the insurance company:

- i. Four Copies of the Supplier invoice showing contract number, goods' description, quantity, unit price, total amount (GST Compliant format);
- ii. Certificate of pre-despatch inspection by the Purchaser's representative/ nominee, if applicable;
- iii. Performance/ Warrantee Bond, if applicable;
- iv. Railway receipt/acknowledgment of receipt of goods from the consignee(s);
- v. Clean on Bill of lading/ Airway bill/ Rail receipt or any other despatch document,
- vi. in case of payment against dispatch documents, if so provided;
- vii. Four Copies of packing list identifying the contents of each package;
- viii. Insurance Certificate;
- ix. Manufacturer's/Supplier's warranty certificate;
- x. Inspection Certificate issued by the nominated inspection agency, and the Supplier's factory inspection report; and
- xi. Any other document specified.

The above documents shall 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.

**Table for Delivery Schedule**

SI No	Activity	Commencement Date	Ready for Pre-Delivery	Delivery	Delivery Within Period	Penalty for Delay

#### 4. Transportation (GCC Clause 11)

**The rate quoted by the bidder is inclusive of transportation charges.**

- a) the supplier shall give the Purchaser not less than 21 days' notice of the date on which any Plant or a major item of other Goods will be delivered to the Site;
- b) the Contractor shall be responsible for packing, loading, transporting, receiving, unloading, storing and protecting all Goods and other things required for the Works; and
- c) the Contractor shall indemnify and hold the Employer harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from the transport of Goods, and shall negotiate and pay all claims arising from their transport.

**5. Payment (GCC Clause 11.3)**

Payments shall be made promptly by the Purchaser but in no case later than thirty (30) days after submission of the invoice or claim by the Supplier.

**6. Incidental Services (GCC Clause 12)**

The following services shall be furnished and the cost shall be included in the contract price:

- (a) Performance of the on-site assembly, commissioning and start-up of the equipment.
- (b) Furnishing the detailed operation and maintenance manuals for each items of supply at each location.
- (c) Training of the Purchaser's personnel at the Supplier's office or other facility, in the installation and operation of the goods hardware, utilities and all contracted software, as specified in the Clause 16 of S.C.C.
- (d) Maintenance and repair of the equipment at each location during the warranty period including supply of all spares. This shall not relieve the supplier of any warranty obligations under this contract.
- (e) Maintenance and/or repairs of the supplied goods for a period of three years after the end of the warranty period. The Supplier should indicate the spares and their costs, if any, which are not included in the maintenance contracts.

**7. Performance Security (GCC Clause 6)**

The successful bidder immediately after the receipt of the Purchase order shall furnish Security Deposit of 03% value of the contract price in the form of Bank Guarantee. The Bank Guarantee shall be in favour of Managing Director/KRIDE through a Nationalised / Scheduled Bank on Rs.500/- stamp paper as per the format prescribed by the Corporation and same shall be valid for entire Warranty/Guaranty period in addition 03 months extra for clearance of BG for the due and faithful performance of the contract. No interest is payable to the contractor for the Performance Security amount so furnished.

**8. Insurance (GCC Clause 10)**

- a) In case of domestic goods supply on CIF/FOR destination basis, the supplier shall be responsible until the entire Goods contracted arrive in good condition at destination. The supplier shall cover the transit risk in this respect by getting the goods duly insured at its own cost. The supplier shall obtain the insurance cover in its name and not in the name of the Purchaser or its Consignee.
- b) In FOB and CFR offers for the import of Goods, the insurance shall be arranged by the Purchaser. However, the supplier must give sufficient notice to the Purchaser before the date of shipment so that the Insurance Cover

for the shipment can be activated. The supplier must co-ordinate to ensure that the Shipment sails only with Insurance cover in place.

- c) In case of import of goods, even when the Purchaser pays the insurance, it shall entirely be the supplier's responsibility to make good loss/damage without waiting for settlement of insurance claim so that equipment is commissioned within the time stipulated in the contract. After the insurance claim settlement, reimbursement shall be made by the Purchaser to the supplier.

**9. Warranty (GCC Clause 14.2)**

This warranty shall remain valid 24 months after the Goods or any portion thereof as the case may be, have been delivered to and accepted at the destination indicated in the Contract, or for 39 months after the date of shipment from the place of loading whichever period concludes 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 either:

- (c) 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 in accordance with SCC; OR
- (d) pay liquidated damages to the Purchaser with respect to the failure to meet the contractual guarantees. The rate of these liquidated damages shall be as specified in the Technical Specifications.

**10. Annual Maintenance Service: (GCC Clause 14.8) - DELETED**

**11. Payment (GCC Clause 15)**

- a) Supply payments: The contractor shall be entitled to be paid against supply of item/equipment supplied in terms of the contract. All payments shall be subject to deductions. Payments provided always that the engineer may withhold if the works or part thereof are not being carried out to his satisfaction.
- b) Contractor shall take prior approval of Engineer-in-charge before supplying of the item/equipment along with the approval of drawings.
- c) Dispatch: Tower wagon to be dispatched to SBC division i.e., Bangalore.
- d) Trial Run: A trail run will be conducted during the Commissioning phase of the Tower wagon.
- e) Testing & commissioning: Both K-RIDE and Railways will jointly conduct the testing and commissioning of the Tower wagon.

**A. For Supply of Goods**

**Step-1: 80% Payment:**

Design, manufacture, supply of self-propelled 8- Wheeler Inspection & Maintenance car of Diesel Electric Under slung type for operation on broad gauge (1676mm) electrified (25 kV A.C.) routes of Indian Railways as per TI/SPC/OHE/8WDETC/0092 shall be as approved by Engineer-in-charge of the work and Purchaser. Payment of 80% of the accepted price shall be paid on the receipt of item/equipment at site required destination after inspection and production of documents as listed below:

- i. E-way bill.
- ii. Supplier's Delivery Challans and supplier's Tax invoice/GST.
- iii. Inspection certificate granted by the authorized /approved agency/Purchaser's representative as per contract.
- iv. Certificate of receipt of material at work sites duly accepted by the Engineer.
- v. Quality Assurance Documents including Guarantee/Warranty, if any.
- vi. Insurance certificate of 100% value valid till liability period.
- vii. Indemnity bond.

NOTE: The above payment is inclusive of watch and ward, safe custody of equipment by supplier/contractor till

commissioning and handing over to the employer.

**Step-2: 20% Payment:**

The 20% against testing and commissioning of self-propelled 8 - Wheeler Inspection & Maintenance car of Diesel Electric Under slung type for operation on broad gauge (1676mm) electrified (25 kV A.C.) routes of Indian Railways as per TI/SPC/OHE/8WDETC/0092 including statutory approvals from EIG/CRS and supply of spares, tools, testing kit, training and handing over to employer as per the BOQ.

**FINAL SETTLEMENT:** On expiry of the defect liability period /Warranty and issue of the taking over certificate of the entire installation, the Bank Guarantee for Performance security Deposit shall be released to the contractor after adjustment of any dues payable by the contractor.

**RECOVERIES FROM THE CONTRACTOR:** All the recoveries for materials supplied and services rendered by Purchaser to the Supplier, if any and other refunds due from the Contractor shall be made by deductions from payments due to the Contractor covering the value of supply and erection in the progress payment.

**TAXES AND DUTIES:**

All taxes, duties, and levies (including octroi, works contract tax, etc..) arising out of the transactions for this work will be deemed to be included in the accepted rates including GST, unless otherwise specified in the BOQ or technical specification.

Where the law makes it statutory for the Purchaser to deduct any amount towards GST or any other taxes on works contract, the same shall be deducted and remitted to the concerned authority.

After preliminary scrutiny and certifications by the Engineer, payment of 70% of the certified net payment due (after recoveries and deductions), shall be made by the Employer/Purchaser within 15 days of receiving a statement and supporting documents by the Engineer.

Remaining 30% of the payment shall be released within 45 days after detailed scrutiny and as certified by the Engineer/Purchaser.

**B. For Annual Maintenance - DELETED**

**C. For payments in respect of International Tender-DELETED**

**12. Interest for Delayed Payment (Clause 15.3) – DELETED**

**13. Settlement of Disputes (Clause 27)**

[At the time of finalizing the Contract, the respective applicable clause should be retained in the Contract. The following explanatory note should therefore be inserted as a header to GCC 27.2 in the Tender document.]

A. The dispute settlement mechanism to be applied pursuant to GCC Clause 27.2 with respect to Contracts with Supplier national of the Purchaser's shall be as follows:

**(i) Rules of Procedure**

The disputes so referred to arbitration shall be settled in accordance with the Indian Arbitration & Conciliation Act, 1996 and any statutory modification or re-enactment thereof. \*

**(ii) Place of Arbitration**

The place of arbitration shall be Bengaluru [the place from where the contract is executed], the arbitration hearings, if required, may be held elsewhere.

(\*As per the GOK Circular No Law-LAC/198/2024 dated 16.11.2024.)

**(iii) Enforcement of Award**

The Parties agree that the decision or award resulting from arbitration shall be final and binding upon the Parties and shall be enforceable in accordance with the Provision of the Arbitration Act & Rules subject to the rights of the aggrieved parties to secure relief from any higher forum.

**(iv) Performance during Dispute Resolution**

Pending the submission of and/or decision on a Dispute and until the arbitral award is published; the Parties shall continue to perform their respective obligations under this Contract without prejudice to a final adjustment in accordance with such award.

**(v) Excepted Matters**

Matters for which provision has been made in any Clause of the contract shall be deemed as 'excepted matters' (matters not disputable/ arbitral), and decisions of the Purchaser, thereon shall be final and binding on the Supplier. The 'excepted matters' shall stand expressly excluded from the purview of the sub-clauses below, including Arbitration. However, where the Purchaser has raised the dispute, this sub- clause shall not apply. Unless otherwise stipulated in the contract, excepted matters shall include but not limited to:

- 1) any controversies or claims brought by a third party for bodily injury, death, property damage or any indirect or consequential loss arising out of or in any way related to the performance of this Contract ("Third Party Claim"), including, but not limited to, a Party's right to seek contribution or indemnity from the other Party in respect of a Third-Party Claim.
- 2) Issues related to the pre-award tender process or conditions
- 3) Issues related to ambiguity in Contract terms shall not be taken up after a Contract has been signed. All such issues should be highlighted before the signing of the contract by the Supplier.
- 4) Provisions incorporated in the contract, which are beyond the purview of the Purchaser or are in pursuance of policies of Government, including but not limited to
  - i. Provisions regarding restrictions on Entities from Countries having land borders with India in terms of the Government's policies in this regard.
  - ii. Purchase preference policies regarding MSMEs.

The foreign supplier is allowed to choose either the Indian Arbitration and Conciliation Act, 1996 or arbitration

in accordance with the provisions of United Nations Commission on International Trade Law (UNCITRAL) arbitration rules - **DELETED**

**14. Notices (Clause 31)**

For the purpose of all notices, the following shall be the address of the Purchaser and Supplier (includes e- mail id).

Purchaser: .....

Supplier: (To be filled in at the time of Contract signature)

.....

**15. Progress of Supply:**

Supplier shall regularly intimate progress of supply, in writing, to the Purchaser as under<sup>16</sup>:

- Quantity offered for inspection and date;
  - Quantity accepted/rejected by inspecting agency and date;
  - Quantity dispatched/delivered to consignees and date;
  - Quantity where incidental services have been satisfactorily completed with date;
  - Quantity where rectification/repair/replacement effected/completed on receipt of any communication from consignee/Purchaser with date;
  - Date of completion of entire Contract including incidental services, if any; and
  - 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 equipment/goods:**

If after delivery, acceptance and installation and within the guarantee and warranty period, the operation or use of the equipment/goods proves to be unsatisfactory, the Purchase shall have the right to continue to operate or use such equipment/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:**

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. Supplier's Obligations:**

The Supplier is obliged to work closely with the Purchaser's staff, act within its own authority and abide by directives issued by the Purchaser and implementation activities.

The Supplier will abide by the job safety measures prevalent in India and will free the Purchaser from all demands or responsibilities arising from accidents or loss of life the cause of which is the Supplier's negligence. The

Supplier will pay all indemnities arising from such incidents and will not hold the Purchaser responsible or obligated.

The Supplier is responsible for managing the activities of its personnel or sub-contracted personnel and will hold itself responsible for any misdemeanors.

The Supplier will treat as confidential all data and information about the Purchaser, obtained in the execution of his responsibilities, in strict confidence and will not reveal such information to any other party without the prior written approval of the Purchaser.

19. **[Patent Rights:**

In the event of any claim asserted by a third party of infringement of copyright, patent, trademark or industrial design rights arising from the use of the Goods or any part thereof in the Purchaser's country, the supplier shall act expeditiously to extinguish such claim. If the supplier fails to comply and the Purchaser is required to pay compensation to a third party resulting from such infringement, the supplier shall be responsible for the compensation including all expenses, court costs and lawyer fees. The Purchaser will give notice to the supplier of such claim, if it is made, without delay.

20. **Site Preparation and Installation:**

The Purchaser will designate the installation sites before the scheduled installation date to allow the Supplier to perform a site inspection to verify the appropriateness of the sites before the installation of the hardware.

21. **Equipment/Hardware Installation:**

The Supplier is responsible for all unpacking, assemblies, wiring, installations, cabling between equipment's/ hardware units and connecting to power supplies. The Supplier will test all equipment's/hardware operations and accomplish all adjustments necessary for successful and continuous operation of the equipment's/ hardware at all installation sites.

22. **Equipment/Hardware Maintenance:**

The Supplier will accomplish preventive and breakdown maintenance activities to ensure that all equipment's/ hardware execute without defect or interruption for at least 98% uptime for 24 hours a day, 7 days a week of operation of the machine worked on a quarterly basis.

If any critical component of the entire configuration is out of service for more than three days, the Supplier shall either immediately replace the defective unit or replace it at its own cost.

The Supplier will respond to a site visit and commence repair work on the equipment/hardware within 24 hours of being notified of equipment malfunction.

23. **Training:**

For each hardware and software component installed, the Supplier is required to train the designated Purchaser's technical and end-user personnel to enable them to effectively operate the total system. The training schedule will be agreed to by both parties during the performance of the Contract.]

**24. Technical Documentation:**

The Technical Documentation involving detailed instruction for operation and maintenance is to be delivered with every unit of the equipment supplied. The language of the documentation should be English.

## **SECTION V: APPENDICIES**

### **Appendix A Schedule of Requirements**

*Details of Schedule of Requirements to be inserted in the Tender Documents by the Purchaser in Appendix G of the ITT, as applicable. The same is required to be reproduce in this Appendix A.*

### **Appendix C Contract Price**

*[Reproduce the Financial Tender submitted by the selected Tenderer]*

**APPENDIX D**

**Form of Bank Guarantee for Performance Security Deposit**

(Reference SCC Clause 7 of Contract)

**(PROFORMA OF BANK GUARANTEE)**

\_\_\_\_\_ [name of Purchaser]  
 \_\_\_\_\_ [address of Purchaser]

WHEREAS \_\_\_\_\_ [name and address of Supplier] (hereafter called the "Supplier") has undertaken, in pursuance of Letter of Acceptance (LOA) No. \_\_\_\_\_ Dated \_\_\_\_\_ for Supply of Goods and related Services \_\_\_\_\_ (hereinafter called the "Services").

AND WHEREAS the Contract requires the Supplier to furnish an {Performance Security/ Additional Performance Security} for due and faithful performance of its obligations, under and in accordance with the Contract, during the {Installation/Commissioning Period/ Defects Liability Period and Maintenance Period} in a sum of Rs..... cr. (Rupees ..... crore) (the "Guarantee Amount").

AND WHEREAS we, ..... through our branch at ..... (the "Bank") have agreed to furnish this Bank Guarantee (hereinafter called the "Guarantee") by way of Performance Security.

NOW, THEREFORE, the Bank hereby, unconditionally and irrevocably, guarantees and affirms as follows:

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful performance of the Supplier's obligations during the {Installation/Commissioning Period/ Defects Liability Period and Maintenance Period} under and in accordance with the Contract, and agrees and undertakes to pay to the Purchaser, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Supplier, such sum or sums up to an aggregate sum of the Guarantee Amount as the Purchaser shall claim, without the Purchaser being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.
2. A letter from the Purchaser, under the hand of an officer not below the rank of [\_\_\_\_\_], that the Supplier has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Contract shall be conclusive, final and binding on the Bank. The Bank further agrees that the Purchaser shall be the sole judge as to whether the Supplier is in default in due and faithful performance of its obligations during and under the Contract and its decision that the Supplier is in default shall be final and binding on the Bank, notwithstanding any differences between the Purchaser and the Supplier, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Supplier for any reason whatsoever.
3. In order to give effect to this Guarantee, the Purchaser shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Supplier and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.

4. It shall not be necessary, and the Bank hereby waives any necessity, for the Purchaser to proceed against the Supplier before presenting to the Bank its demand under this Guarantee.

5. The Purchaser shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Contract or to extend the time or period for the compliance with, fulfillment and/ or performance of all or any of the obligations of the Supplier contained in the Contract or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Purchaser against the Supplier, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Contract and/or the securities available to the Purchaser, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Purchaser of the liberty with reference to the matters aforesaid or by reason of time being given to the Supplier or any other forbearance, indulgence, act or omission on the part of the Purchaser or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.

6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Purchaser in respect of or relating to the Contract or for the fulfillment, compliance and/or performance of all or any of the obligations of the Supplier under the Contract.

7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Purchaser on the Bank under this Guarantee all rights of the Purchaser under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.

8. The Guarantee shall cease to be in force and effect on \*\*\*\*\$. Unless a demand or claim under this Guarantee is made in writing before expiry of the Guarantee, the Bank shall be discharged from its liabilities hereunder.

9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Purchaser in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.

10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorized to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Purchaser that the envelope was so posted shall be conclusive.

11. This Guarantee shall come into force with immediate effect and shall remain in force and effect for up to the date specified in paragraph 8 above or until it is released earlier by the Purchaser pursuant to the provisions of the Contract.

12. This Guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC

Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

Signed and sealed this ..... day of ....., 20..... at ..... SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by: (Signature)

(Name) (Designation) Code Number) (Address)

**APPENDIX E**

**Form of Bank Guarantee for Annual Maintenance Security**

(To be stamped in accordance with Stamp Act if any, of the Country of the

Issuing Bank) Bank Guarantee No.: .....

Date:.....

To..... (Name of the Purchaser)

Whereas..... (Name of the Purchaser) 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 recognised Bank for the sum specified therein as security for compliance with the Supplier's performance obligations under the contract for Annual Maintenance and Repairs of the entire system including cost of spares after warranty period for next five years.

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 Rs ..... (Amount of guarantee in words and figures) being 2.5% of the total cost of equipment 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 Rs..... (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 ..... day of ..... 20.....

Signature and Seal of Guarantors

..... Date: ..... 20.....

**NOTE:**

1. SUPPLIERS SHOULD ENSURE THAT SEAL AND CODE No. OF THE SIGNATORY IS PUT BY THE BANKERS, BEFORE SUBMISSION OF THE BANK GUARANTEES.

**APPENDIX F**  
**Notification of Award and Letter of Intent**

**APPENDIX G**  
**Any Modification, Addendum, Pre-Bid Meeting Proceedings**

**Appendix B**  
**Technical Specifications**

**SPECIFICATION NO.  
TI/SPC/OHE/8WDETC/0092**

## CHAPTER-I

### GENERAL CONDITIONS

#### 1.1 SCOPE

- 1.1.1 This specification covers the design, manufacture, and supply, testing & commissioning of self-propelled 8-Wheeler Inspection & Maintenance OHE car for operation on broad gauge (1676mm) electrified (25 kV a.c.) routes of Indian Railways. The 8-Wheeler Inspection & Maintenance OHE car is a self-propelled 4-axle vehicle and is used for periodical inspection, patrolling and maintenance of traction overhead equipment (OHE). It shall also be used for attending to sites of break down, restoration and damaged OHE etc. It is also required to erect small lengths of catenary and contact wire by way of repairs of damaged OHE. The 8-Wheeler Inspection & Maintenance OHE car uses the power generated by the Diesel Alternator set provided in the OHE car for propulsion and not the power from live OHE.
- 1.1.2 In case of difference between the specification and / or exhibited drawings, the tenderer shall get an immediate clarification from RDSO which shall be final authority for clarification.

#### 1.2 CLIMATIC CONDITIONS

- 1.2.1 The power pack & electrics of the OHE car shall be in continuous operation under the following atmospheric and climatic conditions: -

1	Atmospheric temperature	Metallic surface temperature under Sun: 75° C max. and in shade: 55 °C max. Minimum temperature: - 10°C (Also snow fall in certain areas during winter season).
2	Humidity	100% saturation during rainy season.
3	Reference site conditions	i) Ambient Temp: 50° C ii) Humidity: 100% iii) Altitude: 1000m above mean sea level.
4	Rain fall	(i) Ranging from 1750 mm to 6250 mm. (ii) Number of rainy days/annum 120
5	Atmosphere during hot weather	Extremely dusty and desert terrain in certain areas. The dust concentration in air may reach as high as of 1.6 mg/m <sup>3</sup> . In many iron ore and coalmine areas, the dust concentration is very high affecting the filter and air ventilation system.
6	Coastal area	OHE car and its equipments shall be designed to work in coastal areas in humid and salt laden atmosphere with maximum pH value of 8.5, sulphate of 7mg per liter, max. concentration of chlorine 6 mg per liter and maximum conductivity of 130 micro siemens/cm.
7	Vibration	The equipment, sub-system and their mounting arrangement shall be designed to withstand satisfactorily the vibration and shocks encountered in service as specified in clause 1.2.2.
		High level of 50 g vibration and shocks. Accelerations over 500 m/s <sup>2</sup> have been recorded at axle box levels for long periods during run. Vibrations during wheel slips are of even higher magnitude.
8	Wind speed	High wind speed in certain areas, with wind pressure reaching 200kg/m <sup>2</sup>

1.2.2 The equipment and their arrangement shall withstand satisfactorily, the vibration and shocks normally encountered in service which are as below: -

(a) Maximum Vertical Acceleration	3.0g
(b) Maximum Longitudinal Acceleration	5.0g
(c) Maximum Train Acceleration	2.0g [Where 'g' is acceleration due to gravity]

1.2.3 The OHE car shall be able to negotiate water logged tracks at 10 kmph, with water level of 102 mm above the rail top, for which the Equipment shall be suitably designed.

1.2.4 The OHE car and its principal assemblies shall be designed and manufactured to give satisfactory performance in the tropical climate, having very dry & dusty regions in arid zones of the country, to humid coastal areas and extreme cold climate of the northern region.

### 1.3 Examination of the Tender Offer:

1.3.1 DELETED

1.3.2 DELETED

1.3.3 DELETED

### 1.4 Design Development:

1.4.1 The successful tenderer (hereafter called as contractor) shall develop the design based on the details given in this specification and sound engineering practices. The entire design & technical data along with calculations shall be submitted to RDSO for approval before commencing construction of OHE car or placing orders on sub-contractors.

1.4.2 The design shall be based on S.I. Units.

1.4.3 From the information given in this specification and instructions of RDSO, the contractor shall prepare a full set of engineering drawings and submit the same to RDSO for approval.

1.4.4 When submitting drawings of a particular detail, other details depending on it shall be shown in juxtaposition.

1.4.5 Material specifications, manufacturing tolerances and other details, which are necessary for manufacture for each component shall be indicated on the drawings.

### 1.5 Approval of Drawings:

1.5.1 "Approval" to the drawing means the approval to the general adoptability of the design features. RDSO shall not be responsible for the correctness of dimensions on the drawings, materials used, strength or performance of the components. The contractor shall be wholly and completely responsible for all these variables. The contractor, when submitting proposals or designs for approval of the RDSO, shall draw attention to any deviation or departure from the specification involved in his proposals or drawings.

1.5.2 Drawing for approval shall be submitted in standard size (s) as per IS: 696 along with main calculation details in triplicate. List of drawings/calculations to be submitted to RDSO for approval before undertaking manufacture of prototype DETC are given in ANNEXURE-2. Any other drawings of which manufacturer desire to obtain approval of RDSO shall also be submitted to RDSO.

## 1.6 Prints:

1.6.1 One set of tracing, two sets of their prints & two DVD of the RDSO approved drawings/ calculations shall be supplied by the successful contractor with each tower wagon. The tracings shall be on RTF of durable quality. Drawings shall be made on Auto CAD. Two sets of tracing, two sets of prints and two copies of approved drawings & calculations along with 3 DVDs shall be supplied to RDSO.

1.6.2 Each set of tracings shall form a complete set of working drawings, the first sheet being the index and the following sheets being arranged properly to show the various assemblies, sub- assemblies and components of complete works in the following sequence:-

- (a) Diagram sheets show the overall dimensions of the equipment, weights and the relation of overall dimensions to the space in the OHE car.
- (b) Lists of all parts grouped in to major assembly with details of numbers per set, weight, specification material and drawing reference against each item.
- (c) General arrangement drawings of complete equipment sets. Diagram of lubrication points indicating type of lubricant. Sub-assembly arrangement, drawing in proper and logical sequence.
- (d) Detailed drawings:- On detailed drawing sheets, each part shall be identified by an alphabetic letter and the list of all parts forming the sub-assembly shall be tabulated just above the title block on the same sheet giving details against each alphabetic letter.

## 1.7 Contractor's responsibility:

1.7.1 The contractor shall be entirely responsible for the execution of the contract strictly in accordance with the terms of this specification and the conditions of contract, notwithstanding any approval which RDSO or the Inspecting officer may have given:

- (a) Of the detailed drawing prepared by the contractor.
- (b) Of the sub-contractors for materials.
- (c) Of other parts of the work involved by the contractor.
- (d) Of the tests OHE carried out either by the contractor or by the RDSO or the Inspecting Officer.

## 1.8 Warrantee:

Warranty shall be as per IRS standard conditions of contract.

## 1.9 Exhibited Drawings and standard Specifications:

1.9.1 "Exhibited Drawings" means the drawings which are exhibited or provided by RDSO for the guidance of the contractor.

1.9.2 The exhibited drawings, illustrative of a range of standardized dimensions and fittings, are

listed in Annexure -1. The design of the OHE car must comply with the dimensions, and fittings included in the exhibited drawings as far as possible. Any deviation from there shall be clearly mentioned in the form of a table on the drawing.

- 1.9.3 The exhibited drawings are not guaranteed to be free from discrepancies. The contractor while preparing the engineering drawings shall ensure that these are free from discrepancies. He shall also incorporate all modifications desired by the RDSO, subsequently, without prejudice to the date of delivery or contracted price, except as provided for under the conditions of contract.
- 1.9.4 To improve upon the performance, modifications and corrections are made in the specification and drawings from time to time. The contractor must, therefore, satisfy himself that the drawings being used by him are of the latest version. In case of any doubt, he must get it clarified from RDSO.
- 1.9.5 The Contractor shall procure at his own expense all the drawings and specifications required for the manufacture of the OHE car.
- 1.9.6 Copies of drawings referred to in this specification and given in Annexure-1 may be obtained from RDSO/ICF on payment.
- 1.9.7 Indian Railways Standard (IRS) specifications and Schedules of Maximum Moving Dimensions may be obtained on payment from the Manager, Government of India Publications, Civil Lines, Delhi 110 006 (INDIA).
- 1.9.8 Indian Standard Specifications (ISS) are available from Bureau of Indian Standards, 9- Bahadur Shah Zafar Marg, Delhi 110 002.
- 1.10 **Materials:**
- 1.10.1 Materials used in the construction of the OHE car shall comply with the relevant IRS specifications or Indian Standard Specifications. Where IRS or ISS do not exist for specific components, the contractor shall submit proposed material specification for approval of RDSO.
- 1.11 **Service Engineering:**
- 1.11.1 The Contractor shall arrange for the supervision of commissioning of the OHE car immediately after their receipt at ultimate destination. He is also required carry out ` check of the receipt of components regarding short shipment or transit damages.
- 1.11.2 The contractor shall ensure commissioning of the OHE car within 30 days from the date of intimation by the consignee.
- 1.11.3 The performance of OHE Car shall be demonstrated by the contractor after its successful commissioning at the consignee's works.
- 1.11.4 The contractor shall provide and ensure servicing facilities in India throughout the warranty period. After the warranty period is over, he shall, on call, give service support for troubleshooting and for obtaining spare parts.
- 1.11.5 DELETED

### 1.12 **Training:**

- 1.12.1 The Contractor shall arrange to provide training in operation & maintenance of the OHE car for two men for four days at their works and user's place respectively per tower wagon. The training material shall be supplied as per Annexure 8-D. The cost of training shall be included in the price of tower car. -The charges for travel, boarding and lodging of trainees shall be borne by the consignee.
- 1.12.2 Technical experts of the manufacturer, during commissioning of OHE car at consignee's premises, shall also adequately train operators/ maintenance staff nominated by the consignee for minimum period of 3 days.

### 1.13 **Service Manuals and Spare Parts Catalogues:**

- 1.13.1 Detailed Maintenance & Service Manuals including the manual for trouble shooting & operational requirement, spare parts catalogues for the driver and maintenance staff for the OHE car shall be prepared and three copies supplied free of charge, per OHE car, to the consignee. Before printing the final version of the manual, the draft of the Manuals shall be got approved from RDSO.
- 1.13.2 Three copies per OHE cars of Spare Parts Catalogues & list of must change items with periodicity & sources of supply shall also be supplied to the consignee.
- 1.13.3 In addition, three copies each of the Maintenance/Service and troubleshooting manual along with shall be supplied to RDSO.

### 1.14 **Electric Arc Welding:**

- 1.14.1 Indian Railways Standard Code of Practice for Electrical Arc Welding shall be followed. If the contractor desires to follow any other code of practice, it shall first be submitted for approval of RDSO.
- 1.14.2 Welding symbols shall be in accordance to IS:813. Drawings on which such symbols appear, are to bear a note on the bottom left-hand corner, "WELDING SYMBOLS AS PER IS:813".
- 1.14.3 **Railway Initial Letters:** Where parts are required to be marked with Railway initial letters, they shall be 'I.R'
- 1.15 **Sublet Orders for Materials:** Any subletting of orders for materials/work shall have prior approval of RDSO.

### 1.16 **Spare Parts:** Deleted

1.16.1 Deleted.

1.16.2 Deleted

1.16.3 Deleted

**1.17 Tools:**

List of tools & special tools for maintenance and overhaul of OHE Cars shall be supplied as per Annexure-8-A, 8-C by the Tenderer in accordance with Clause 6.1 of this specification. The cost of tools shall be included in the price of tower car. The successful Tenderer shall submit the drawings and specification of tools required for the maintenance of the OHE Car.

**1.18 Testing Kit:**

1.18.1 The tenderer shall supply testing equipment with tower car required for ensuring optimum performance and trouble-free service of the major equipments & accessories provided in the OHE car (e.g. Diesel Engine, Traction Alternator, Traction Motor and other Equipments with accessories). The testing Equipment shall be supplied as per annexure-8-B. The cost of testing equipment shall be included in the price of tower car.

1.18.2 The Tenderer shall also offer separately special jigs, tools and instruments, which shall essentially be required for maintenance of OHE Car body. Essential Equipments and facilities required for attending local damage to Stainless Steel structures, OHE Car interiors etc. in case of accidental damages should also be furnished.

1.18.3 The contractor shall demonstrate to the IR/Employer, the satisfactory functioning of the tools, jigs & instruments supplied by him. The Specification of testing equipment shall be provided by successful Tenderer.

**1.19 OHE Maintenance equipment :**

The tenderer shall supply the following maintenance equipment along with each tower car. The cost of maintenance equipment shall be included in the price of tower car.

- a) The technical specification No. TI/SPC/OHE/TIPS/1031 with latest amendment for infra-red imaging system suitable for monitoring and measurement of hot spot temperature for different applications.
- b) One Hydraulic Jack of 5 t capacity,
- c) One tifer 3t, Two tifer 1.5 t, (As per RDSO's Specification No. TI/SPC/OHE/TOOLPL/0990).
- d) Three pull-lift 0.75 t, Two pull-lift 1.5 t, One pull-lift 3t (As per RDSO's Specification No. TI/SPC/OHE/TOOLPL/1990).

**1.20 Quality Assurance Plan**

1.20.1 The contractor should possess valid ISO-9001:2000 certificate for his work's address, covering the items for which he is participating in the contract. The contractor shall formulate Quality Assurance program (QAP) detailing the methodology proposed to be followed to ensure a quality product. QAP shall cover quality assurance procedures and procedures to be followed during all stages of design, manufacture, testing and commissioning of the equipment. The Contractor shall define the role of each functional group in the Organisation for achieving the required quality of the product and submit a comprehensive document "Quality assurance manual" in accordance with IS 10201-1982 as the basic guideline. The preparation of necessary charts and proforma shall be to IS: 7200 (Part-III)-82.

1.20.2 The Tenderer whose bid is accepted, shall be required to submit a "Quality Assurance Manual" by giving details as to how the quality of specific product is proposed to be assured. Supply of the equipment shall commence only after "Quality Assurance Plan" has been approved by RDSO.

The above shall apply to the main contractor as well as sub- contractors.

**1.21 Annual Maintenance Contract (AMC) :Deleted**

## Chapter -II

### DIMENSIONAL OPERATING AND OTHER REQUIREMENTS FOR OHE CAR

2.0 The OHE Car shall dimensionally conform to the following:

(i)	Track gauge	1676 mm
(ii)	Minimum radius of curve	Normally 175 meters, sharper curves with radius less than 175 meter are also available at isolated location. Regarding minimum radius of curvature for slip points, turnouts or crossover roads, para 17 of chapter II of Schedule-I of IRSOD (BG) Revised 2004 with latest ACS shall be applicable which provides for minimum of 175 m radius curves in case of 1 in 8.5 scissors cross over.
(iii)	Maximum super elevation	165 mm
(iv)	Maximum Super - elevation deficiency	100mm
(v)	Maximum wind pressure	200 kg/m <sup>2</sup>
(vi)	Maximum moving Dimensions	Maximum moving dimensions shall conform to diagram 1D of Indian Railway Schedule of Dimension (SOD) 1676 mm gauge (BG) revised 2004 with the pantograph and platform in lock down condition. Infringements, if unavoidable and fully justified, may be considered, if within the limits shown in SOD 1676 mm gauge (BG) revised 2004.
(vii)	Maximum permissible wheel base length of the OHE car, over hang beyond bogie center, buffer height draw bar height	These shall conform to Indian railway, schedule of dimension 1676 mm gauge (BG) Revised 2004. Adequate clearance shall be allowed so that no component of the OHE car shall infringe a minimum of 102 mm above rail level with wheels in fully worn conditions, full deflection of springs and effect of dynamics.

(viii)	Maximum Axle load	20.32 t	
(ix)	(a) Maximum Speed when coupled to a train	110Km/h	
	(b) Max operating speed under its own power	110 km/h	
(x)	Brakes	All wheels with clasp brakes.	
(xi)	Service Braking	Pneumatic	
(xii)	Performance capabilities:-	i) Pay load (excluding Power equipment and hydraulic platform)	12tonnes (Approximately)
		ii) Period of continuous running at 110 km/h on generally tangent track followed by frequent to and fro movement at walking pace for 1-1/2 h).	5-1/2h total (4h+1-1/2h)
		iii) Period of continuous running at 40 km/h up or down gradient of 1 in 60 to be followed by frequent to and fro movement up to 5 km/h for 1-1/2 h on same gradient with speed control.	5-1/2h total (4h+1-1/2h)
		iv) Performance in monsoon and squally conditions.	Un- restricted
		v) OHE Car shall be capable of running at a speed of 75kmph with 2- loaded flat wagons weighing 120t at tangent track.	
		vi) The OHE Car shall be capable of running at a speed of 25 km/h on 1 in 33 up gradient.	
		vii) The OHE car shall be capable of starting and hauling Two wagons weighing 60t each in gross load condition (Total 120 tonnes) on an up gradient of 1 in 33. Maximum operating speed of the OHE car for level and 1 in 33 up gradients shall be indicated with the offer.	

		viii) With the hydraulic platform in raised condition the OHE car shall run at a maximum speed of 10 km/h.
		ix) The emergency braking distance (EBD) for fully loaded (20.32x4=81.28 t) OHE car from maximum speed of 110km/h to zero shall not be more than 800m on flat section. The contractor shall also submit calculation for EBD on 1 in 33 down gradient.

2.1 The purchaser may at his option revise the layout so as to provide for an arrangement for front opening on one side to load and unload collapsible ladders from the trackside. Tenderer may offer alternative proposals with full details of the advantages of his system.

2.2 The OHE car shall be an 8-wheeler vehicle. The disposition of equipment storage space shall be such as to ensure equal axle loads. Design shall be such as to afford easy inspection and maintenance.

2.3 Provision shall be made for the following in the OHE Car:

#### 2.3.1 Driving Cabs:

- i) Two driving cabs shall be provided, one at each end, with complete operating & driving control with dash boards to facilitate operation from either cab. Driver's seat shall be on the left side. Adequate leg space shall be provided for the driver when he is seated. The general layout and arrangement of equipment in Driver's cab shall follow UIC CODEX 651 with respect to dimensions, safety features, furnishing, lighting, ventilation, noise level, field of view, driver's desk, seats etc. Spot lights shall be provided at suitable locations. The cab shall be ergonomically designed for better view and comfort and also the various panels /equipments meant for Driver shall be so laid that they are easily readable and Driver is not required to move physically for any operation during run.
- ii) Foldable cushion sheet shall be provided in each of the driving cabs for 4 persons in addition to the Driver.
- iii) All controls, brake handle, hand brake, Dead Man's device for horn and indication lamps/meters shall be within easy access and view of the Driver.
- iv) The OHE car shall be equipped with inter-communication equipment between cabs, Inspection compartment, working platform through hand free sets with their own battery.
- v) Each driving cab shall be provided with one number 6 Inch TFT monitor connected with one number portable CCTV camera for viewing roof activities during OHE maintenance.
- vi) 2 numbers, 110 V sockets for hand signals in each cab.
- vii) Head Light, Flasher lights search lights and marker lights at both ends of the cab, refer para 4.5.

- viii) Non-contact type OHE voltage sensing device in both the cabs.
- ix) Full width single piece Stone proof lookout glass with Sun Screen shall be provided at the end wall of each Driver's compartment and these shall be glazed, clear, colourless polycarbonate to ICF Specification No.ICF/MD/SPEC-159 (latest revision).
- x) Provision of wind screen Wiper arm and blade Assembly to be provided as per RDSO Specification no.C-K306 (Rev 01).
- 2.3.2 It is proposed to keep one drum each of contact and catenary wire, duly mounted on the stand, for erection during the restoration of breakdowns. Provision shall be made for rotating the contact wire drum by 180 degree for matching contact wire groove in either direction is possible so that it shall be possible to pay out the wire in either direction. Stands shall be provided with hand brakes to control the tension in the wires during the laying out process. It shall be possible to lay-out wires in either direction and therefore these drum shall preferably be in the middle of the OHE car. The drums be loaded from a sliding door of adequate size on both sides. The laying out of the wire shall be from two of the openings of suitable size in the roof vertically above each of the drums. These openings shall normally be covered so as to prevent water falling into the OHE car.
- 2.3.3 Successful tenderer shall submit mounting drawings for conductor drum as per principle details given below for approval of RDSO.  
The principal details of the conductor drums are-
- |  |                |
|--|----------------|
| (a) Diameter   | 1900 mm        |
| (b) Width-   | 950 mm         |
| (c) Bore for mounting on the stand-  | 105 mm x 105mm |
| (d) Facility shall be provided to rotate the conductor drums to enable pay out the conductor in either direction |                |
- 2.3.4 The facilities to be provided in the OHE Car shall be as described briefly in the following Clauses.
- 2.3.4.1 **Material Cabin:** A material cabin shall be provided adjoining one of the driving cabs having adequate space and proper locking arrangement for the storage of costly equipments and fittings. A reasonable number of cup-boards having sufficient number of pigeon holes shall be provided inside the material cabin for storage of fittings, tools and tackles, lighting equipment and other fragile spares. Suitable shelves/racks shall also be provided for storage of about 50 MS tubes of upto 47 mm dia and upto 4m long, hangers for insulators, apart from these two steel almirah (with five shelves) shall be provided for keeping costly items & essential records.
- 2.3.4.2 **Workshop:** A well-ventilated workshop shall be provided in the middle equipped with exhaust fans, ceiling fans and windows, with a room for 4 persons to stand and work. On one side a workbench of size 2500mm x 900mm shall be provided. It shall be fitted with two vices to under take minor repair work along with one drilling machine. On the side opposite the workbench, racks/cup board shall be provided for tools and plant. Design/ drawings of these equipments shall be submitted to RDSO for approval.

2.3.4.3 **Storage space:** Adequate space shall be provided for installation and storage of equipment such as emergency lighting equipment and other items supplied with the OHE Car.

2.3.4.4 **Staff Cabins:** One cabin for Officers with four cushioned Berths and one Cabin for staff (if possible) with two cushioned Berths shall be provided. The Cabins shall have separate entry and have windows on both sides. The Cabins shall preferably be not over the wheels as far as possible. An Indian style WC with separate over head Tank, Stainless Steel Sink and other accessory fitting and a folding cushioned seat including shower with flexible Hose shall be provided. The WC shall be provided with an exhaust Fan. Provision of two Mobile Charging points to be made in Officer and Staff's Cabin as well as in both the driving cab and working area. In addition two folding berths shall be provided at suitable location without cabin.

2.3.4.5 **Communicating doors:** Each driving cab shall have independent entry from both sides. The OHE car lobby shall have entry from both the cab. Through communication inside the OHE car shall be provided. It shall be possible to isolate the cabins using sliding doors with locking arrangements.

#### 2.3.5 Facilities on roof:

- i) The OHE car shall be provided with a pantograph similar to AM-12 type or latest with foot insulators and its complete actuating mechanism on one bogie center. Pantograph shall be graduated to enable manual measurement of stagger on either side of track center.
- ii) For illumination of roof for night inspection four water proof industrial plug points shall be provided for fixing portable lights.
- iii) Two pneumatic points for connecting pneumatic operated/driven tools and fasteners shall be provided.
- iv) **Observation dome:** An observation dome shall be provided in the roof near the pantograph so as to observe interaction between the contact wire of the OHE and the pantograph. Two to three persons shall be able to sit comfortably in the observation dome. The upper portion of the dome shall be of polycarbonate /FRP with reinforcement if required for adequate strength and shall also be insulated for 25 KV. The arrangement shall be such that an unobstructed view of the contact between contact wire and pantograph is obtained by the persons in the observation dome without any strain. For this it is essential to have suitable ergonomical design of sitting arrangement. The chair provided in the observation dome shall have adjustable height, back rest with back and front adjustment just like in an automobile OHE car.
- v) **Lifting and swiveling platform:** A lifting and swiveling platform with hydraulically operated mechanized adjustment for height and rotation and capable of taking minimum 600 kg load with under-noted features shall be provided over the fixed platform:-

(a) Length 5700 mm

(b) Width	1500 mm
(c) Platform floor level above rail when elevated.	6150 mm
(d) Maxim lifting time to full height	45 s
(e) Rotation range of Platform towards sides.	90°
(f) Side shifting reach of platform	4200 mm
(g) Full height of collapsible railing above platform floor	800 mm
(h) Maximum time of rotation from 0° position to 90°	45 s

**NOTE:**

- (i) Control for lifting, lowering and swiveling shall be provided on the platform. The raising and swiveling of the platform shall be gradual and without jerks. In addition two emergency stop switches shall be provided on each side of the platform to bring the OHE Car to an emergency halt.
  - (ii) Two search lights of 250 W metal halide lamps shall be provided on the platform for inspection of the overhead equipment while on the run. Searchlights shall be capable of swiveling on universal joints type support and swiveling control shall be from inside of the either cab.
  - (iii) Except space for pantograph and observation dome the remaining roof shall be covered with a 2325mm wide fixed working platform at maximum possible height but within the maximum moving dimensions. This fixed platform shall be provided with four approach ladders, two on each side to climb on to the platform from the ground.
- 2.3.6 Provision shall be made to OHE carry 3 OHE masts of 9.5 m and 1 of 12 m lengths. The masts may either be rolled I beam of 150mm x 200mm size or fabricated structure of 250mm x 300mm.
- 2.3.7 Suitable safety measures including interlocks between various equipments, access doors and line equipment shall be provided to ensure.
- (i) Safety of men and

(ii) Stability of the OHE Car while in operation.

The tenderer shall indicate the proposed interlocking and safety aspects.

- 2.3.8 The entire OHE Car including bogies, superstructure alongwith equipment is to be effectively earthed as per standard practice for rolling stock. Schematic and other detailed drawings for earthing shall be got approved by RDSO.
- 2.3.9 The equipment fixed to the underframe shall be secured properly by providing extra metallic chains of adequate strength to safeguard the equipment and to perform efficiently.
- 2.3.10 Fire prevention OHE Car shall suitably be provided as per RDSO's Specification No.RDSO/PE/CP/EMU/0001 Rev.0 of Aug.'2003 (Amendment No.1 of July'2006) and with latest revision

## Chapter - III

## 3.0 MECHANICAL DESIGN

## 3.1 Superstructure:

3.1.1 **General:** The OHE Car shall be of welded light weight construction, generally to maximum moving dimensions to diagram 1D of Indian Railways Schedule of Dimension 1676 mm gauge (BG) revised 2004 (SOD) with pantograph and platform in lowered condition. Infringements, if unavoidable and fully justified, may be considered, if within limits shown in the SOD. Weight of the OHE Car shall be kept as low as possible, without compromising with the strength. The structure shall withstand end load of 200 t (divided equally between the two buffers) applied in conjunction with full payload. Under such loading no permanent deformation should occur and stresses should remain below the yield point. The design shall be sufficiently rigid to withstand stresses imposed due to lifting with overhead or breakdown cranes or by jacks applied to the headstocks. The super-structure shall be designed as a tubular girder for the purpose of withstanding vertical loading, but the inner sheeting of the roof and walls shall not be stress-bearing members.

3.1.2 The under frame shall be designed to meet the following loads:

- i. A vertical load of 4 t/meter run uniformly distributed. The weight of the various equipment mounted in the OHE car shall be considered as concentrated load and shall be simulated as such during load/strain testing.
- ii. A horizontal squeeze load of 100 t applied at each buffers.
- iii. A combination of loads specified at (i) & (ii).

3.1.3 The stresses estimated by an approved method shall not exceed 139.3 MPa (14.2 kgf /sq.mm) for members made from Steel to IS:2062 Fe 410CuWC and

221.7 Mpa (22.6Kgf/ sq.mm) for members made from corrosion resistant steel to IRS:M 41 for the uniformly distributed vertical load. Also, for the squeeze load referred to above, the stress should not exceed 90% of the lower yield point or proportional limit of the material in the load OHE carrying member of the shell and 95% of the lower yield point or proportional limit of the material in the end construction. The estimated vertical deflection of the shell at the center of the OHE car shall also not exceed 10mm under any loading condition detailed at (i) to (iii) above.

Completed shell of prototype OHE car shall be strain gauged for stress analysis under tare and loaded conditions with squeeze load. OHE Car shall be tested for leakage through roof and body sides and ends at the works of the manufacturer. To OHE carry out this test, the manufacturer shall provide a test rig to the satisfaction of the inspecting authority.

### 3.1.4 Side and End Wall:

- (i) **Material:** The frame work shall be of low alloy high tensile corrosion resistant steel to IRS M-41 with latest revision/amendment.
- (ii) **Side wall and pillars:** The material of body pillar shall be IRS M-41. Pillars shall be continuous from sole bar to cant-rail, except below window openings, and shall be braced by longitudinal members between adjacent pillars. Bracing being designed to act as integral part of the exterior sheeting. Manufacturer can use better material than IRS: M- 41 for body pillar but without cost implication and supplier shall provide proof of better material.
- (iii) The frame work shall be of low alloy high tensile corrosion resistant steel to IRS: M-41 with latest revision.

3.1.5 **Body shell Structure :** The body shell including sheathing shall be of IRS: M 41 steel.

3.1.6 **Underframe:** The underframe material shall be of corrosion resistant structural steel to IRS: M 41 or copper bearing quality steel to IS: 2062 Cu WC, of welded integral structure. The under-frame design shall be developed by the successful Tenderer keeping in mind the layout of DETC. The successful Tenderer shall submit under frame design to RDSO for approval at the time of design approval stage. They shall be assembled in jigs and fabricated by welding. Trough floor of 2.0 mm thick of steel to IRS: M 41 steel shall be provided in covered area.

3.1.7 **Headstocks:** These shall be of robust design suitable for coupling and buffing gear arrangements as detailed in this specification. Head stock material shall be IRS:M 41 steel.

3.1.8 **Draw gear members:** The members provided for OHE carrying the trimmer casting shall be of strong and rigid construction capable of transmitting buffing forces specified in Clause - 3.1 under the most adverse operating conditions. They shall be braced together to the main sills in such a manner as to form, in conjunction with the flooring system between the transom and headstock a rigid assembly capable of withstanding all cross- racking forces, which may occur in service. The design shall, as far as possible, ensure that the load is applied symmetrically about the neutral axis of the longitudinal and is concentric to them.

3.1.9 **Draw & Buff Gear:** The OHE Car shall be provided with high tensile centre buffer transition coupler conforming to RDSO Specification No.56-BD-07 along with the side buffers arrangement to RDSO's Drawing No. SK-98145. The arrangement shall be such that OHE Car shall be able to couple with existing BG rolling stock of Indian Railways.

- 3.1.10 **Lifting Pads:** The OHE Car body shall lend itself to repeated lifting in workshop by overhead cranes or jacks without risk or damage. Suitable lifting pads shall be provided and marked in a readily distinguishable manner on the OHE car body.
- 3.1.11 **Solebar:** These shall be continuous members from headstock to headstock, adequately braced together to withstand the head on loading and cross racking forces and shall be capable to withstand jacking for the purpose of lifting the OHE Car. The sole bar shall be of corrosion resistant structural steel to IRS: M 41 Steel. The successful Tenderer shall submit the design/drawing of Sole Bar to RDSO for approval at the time of Design/Drawing approval stage.
- 3.1.12 **Body bolster:** These may be fabricated from pressed section and shall have suitable pads on which lifting slings may be placed. Body bolster shall be of copper bearing quality steel to IS:2062 Cu WC of welded integral structure.
- 3.1.13 **Floor bearers:** The design of floor bearers shall include robust main floor bearers placed transversely between the main sills and an adequate numbers of racking panels between the main sills and diagonal braces. The transverse floor bearers shall be so designed to OHE carry the maximum super-imposed load under maximum load conditions as well as bracing between the main sills, and shall be flushed with the top faces of the main sills, and a suitable surface for the floor covering. The design shall generally ensure adequate drainage, so that corrosion is avoided, or is confined to parts, which can be readily renewed without affecting the main flooring members. Floor bearers shall be conforming to IRS: M 41 steel.
- 3.2 **Roof:**
- 3.2.1 The roof shall be designed to form a satisfactory chord to the superstructure considered as a girder, and to take a concentrated load of 6 men standing (450 kg), close together at any point. The structure shall consist generally of two main longitudinal members running from end to end of the OHE Car, braced at frequent intervals along their lower flanges, and rigidly connected to the arch bars, and to the grab pillars by rigid transverse members. At partition and semi bulkheads, the sills shall be attached to vertical pillars within or forming part of the partitions or semi-bulk-heads. The roof top at both ends i.e. back & front ends shall be flat. Roof should be so designed that no water is accumulated in cavities to avoid the damage/rusting. Proper channels to be provided for easy exit of rain water. The construction through out shall be absolutely watertight and shall permit easy renewal of corroded sheets. The material of the roof shall be of IRS: M 41 steel sheet.
- 3.2.2 Two (02) openings shall be provided in the roof for erection of catenary and contact wires in either direction. The openings shall be of suitable size to permit paying out of the conductors in any direction, when the OHE car is moving slowly at 5-10 km/h speed, without any obstruction, rubbing or scrapping.
- 3.2.3 **Roof Ventilators:** Roof ventilators shall be provided as per the ICF Drawing No WL.RRM4-7-3-401 with latest alteration shall be used. The ventilator shall not violate the schedule of dimensions & drawings to be got approved from RDSO.
- 3.2.4 **Air Space:** The air space between the outer and inner sheeting of the roof shall be suitably ventilated as also the air space inside walls and end walls. Attachments may pass through the air space as required,

but must be designed, so that they do not cause sections to form sealed chambers or lodgments for condensed moisture. The successful Tenderer shall submit the design/drawing to RDSO at the time of design/drawing approval stage.

### 3.3 **Windows:**

Lift type window made of powder coated aluminum to ICF drawing No EMU/4C/ASR-5- 4-402 with latest alteration with fixed type poly carbonate louver on top and movable glass window at the bottom.

- 3.3.1 All window and door glasses shall be of laminated plate glass set in sun heat resistant synthetic rubber section.
- 3.3.2 All window openings shall be true to dimensions square and of uniform width. The window opening shall not at any point exceed 2mm over or under the specified dimensions and shall not be out of square by more than 2mm.
- 3.3.3 The windowsills of the body side windows shall have an outward slope of approximately 5°.
- 3.3.4 The body side windows shall have two shutters, one louver on the outside and a glass on the inside.
- 3.3.5 The glass used for windows/shutters shall be of safety laminated quality to IS: 2553, weighing not less than 9.76 kg/m<sup>2</sup>. Gravity safety latches of approved design shall be provided at two intermediate positions to arrest the glass and louver shutters from falling down. The shutters should be balanced by balancers of suitable Design.
- 3.3.6 The louver shutters shall be provided with shoot bolt type safety latches to secure the shutters firmly in closed and open position.

### 3.4 **Doors:**

- 3.4.1 All door openings shall be true to specified dimensions and perfectly square. The openings shall be tested for size and squareness with templates so that doors open and close freely and when closed shall be reasonably weather proof and dust proof.
- 3.4.2 Hinged doors provided on the side walls for entry of drivers from outside of the OHE Car shall be of inward opening type and will give an opening of 750 mm approx.
- 3.4.3 Single leaf inward opening hinged or sliding doors with locking arrangement shall be provided in driver's compartment for entry in the corridor and shall have a clear opening of 550 mm.
- 3.4.4 Other doors on sidewalls shall preferably be of sliding type with a clear opening of 1300

mm. The door leaves shall slide on roller bearing OHE carriers suspended from top rail and shall work in retaining guides on the doorsills. Each leaf shall have a window opening. Since the tenderer is expected to develop layout, location of doors may be decided in the most suitable manner.

- 3.4.5 Latches shall be fitted on all doors so as to secure them from inside in the closed position.
- 3.4.6 **Door locks:** All doors shall be fitted with reliable locks to be operated from outside and inside. Hasps for external padlocking shall also be provided on all doors opening out of the OHE car.
- 3.4.7 **Door Footsteps:** The door footsteps assembly shall be of mild steel chequered plate of 6.0 mm thick edges shall be protected with metallic treads. Any other suitable arrangement shall also be considered.
- 3.4.8 **Door handholds:** Door hand holds of chromium plated steel tube, with malleable cast iron brackets shall be provided on either side of all body side doors and shall be so fitted as to clear the side walls sufficiently to prevent injury to knuckles. Hand holds shall also be within the OHE car profile.
- 3.5 **Roof Water Tank:** Roof water tank 4 mm thick of aluminum not less than 450 liters capacity shall be provided. The tank shall be mounted so as to be readily removable for repairs. Side filling arrangement only shall be provided for water filling. The water tank shall be tested to hydraulic pressure of 0.35 kg/cm<sup>2</sup>. The inside of all water tank shall be painted with bituminous, black lead free, acid, alkali, water and chlorine resisting paint to IS:9862-1981 and properly dried before assembly in the car.
- 3.6 **BOGIES:**
- 3.6.1 **General Design:** OHE Car shall have two 4-Wheeled Bogies of robust welded design suitable for taking brake gear, suspension etc. and capable of withstanding the maximum static and dynamic stresses under its full load condition. The weight of the Bogie shall be as low as possible, consistent with strength and robustness. The bogie frame shall be of copper bearing steel plates to IS: 2062 Fe 410 Cu WC and shall be fabricated by welding.
- 3.6.2 **Bogie suspension Design** shall be coil steel suspension in primary and air spring suspension in secondary stage. The Bogie Design shall be as per ICF Drawing No AC/EMU/M/ASR-0-0-001 with latest Alteration.
- The manufacturer of diesel electric tower car shall purchase bogie frame along with its accessories from the approved Vendors of Indian Railways.
- 3.6.3 The design shall be capable of negotiating curves of 175 m radius, turnout of 1 in 8 and 1/2 and gradients of 1 in 100.

### 3.7 WHEEL, AXLES AND AXLE BOXES

- 3.7.1 Wheel and axle dimensions shall meet the requirements of Indian Railways Schedule of Dimensions 1676 mm gauge-(BG) revised 2004.
- 3.7.2 Wheel assembly shall be 952 mm diameter and shall be provided with roller bearing no.22328 C/C3. The wheels of tower car shall be solid forged wheels to RDSO drawing no.SK-K4004 with latest alteration. All wheel sets shall be machined to take a speedometer drive.
- 3.7.3 Axles shall be to IRS-R43/92 stress calculations /FEM of wheel and axles shall be submitted. The calculation shall be done as per ARR/UIC Specification.
- 3.7.4 The wheel profile shall be to RDSO sketch No. 91146 with latest alteration.
- 3.7.5 40% dynamic augmentation of the vertical journal in a load will be used in calculating the axle stress in addition to vertical and horizontal forces and movements.
- 3.7.6 All wheel and gear seats and traction motor suspension bearing journals are required to be cold rolled together with stress relieving groves machined in the axle, between wheel seat and gear seat and between the wheel and traction motor suspension bearing journal of the axles.
- 3.7.7 Facilities for oil injection for removal of wheel shall necessarily be provided.
- 3.7.8 Standard axle boxes shall be used. Roller bearings will be grease lubricated and of type which have given satisfactory performance/ service on railway stock. Special attention shall be paid to sealing arrangement of the ends of axle, to prevent ingress of water, dirt and loss of lubricants. This aspect requires special attention as the axle box may remain submerged in flood water during heavy rains. The sealing arrangement shall ensure that axle box will not need special maintenance even if it is submerged in water. The design of labyrinth will be such as to prevent the ingress of dust in to or outflow of grease from axle boxes.
- 3.7.9 One of the axle box and cover (not the leading one) shall house speedometer generator with suitable adopter. OHE care shall be taken to provide special protection arrangement for the generator and cable connection against flying ballast and any other extraneous objects. The connection shall preferable be taken from the top of the axle box.
- 3.7.10 Complete working drawing of the axle box, guide arrangement with bearing and its components shall be submitted for approval along with maintenance instructions.
- 3.7.11 The axle box body shall preferably be of cast steel.
- 3.7.12 The contractor will be required to provide recommended lubricants which should have been proven in similar railway service of the axle bearings.

3.7.13 An alternative lubricant, manufactured in India shall also be identified by the contractor in conjunction with the bearing manufacturer, and the lubricants manufacturing industry.

3.7.14 Design calculation for the powered axle shall be submitted for approval of RDSO.

### 3.8 Brake System:

3.8.1 The OHE Car shall be fitted with graduated release air brakes. The brake system shall be of UIC approved type and shall meet all UIC requirements. It shall have the following distinct positions.

- i) Release Position
- ii) Minimum reduction position.
- iii) Full service position.
- iv) Emergency position.

Note Panel mounted air brake system of approved make conforming to Specification. No. MP-0.01.00.19 (Rev-01), June'2010 as approved by RDSO should be provided in order to achieve high reliability, low weight, better sensitivity and easy maintainability.

3.8.2 **Brake Blocks:** The composition 'K' type non-asbestos brake blocks to RDSO Specification No. C-9508 with latest revision/amendment shall be used. Brake rigging shall be as per ICF drawing No. EMU/M-3-2-064 with latest alteration shall be provided to prevent the brake blocks riding down the wheel tapers.

3.8.3 The Emergency Braking Distance (EBD) for fully loaded (20.32x4=81.28 t) OHE car from maximum speed of 110 km/h to zero shall not be more than 800 meter on flat section. The Tenderer shall also submit calculation for EBD on 1 in 33 down gradient.

3.8.4 It is proposed to use the OHE Car for hauling two wagons weighing 60t each in gross load condition [see Item-11 (vii & ix) of table at Clause 2.12(vii)]. The manufacturer shall indicate the Emergency Braking Distance that can be obtained with above loaded wagons in the rear in un-braked state.

3.8.5 The OHE car shall be provided with the following additional brake requirements:

- i) A D-1 Emergency Brake valve in both driving cab on extreme right hand side for emergency brake application.
- ii) Stand-by brakes, in case of failure of distributor valve or any component in the main brake system. This shall be decided at the design approval stage.
- iii) Parking brake to RDSO Specification No. CK 408 (latest revision) capable of holding fully loaded OHE Car with 120 t trailing load of two loaded bogie Flat Wagons in un-Braked state on 1 in 33 down gradient under wet condition.

iv) Flexible Hose connection shall conform to SAE 100R1

3.8.6 Application of any type of brake provided on the OHE car shall result in simultaneous cutting of the power to the driving axles. Interlock for this arrangement may be included in governor system for safety precaution.

3.8.7 The brake rigging arrangements shall be light and as simple as possible with minimum number of levers and fulcrum points permitting easy access to brake blocks and other wearing parts. Composite brake block shall only be used as per the standard approved drawing.

3.8.8 Brake system shall be provided with automatic slack adjuster built into the brake cylinder.

3.8.9 Adequate safety straps shall be provided below the moving components of the brake rigging and other components to prevent falling on the track in the event of failure of any component.

3.8.10 The supplier shall submit details of brake system covering brake schematic diagram, working principle, brake power diagram calculation for EBD, number, dimension and type of brake blocks and literature on brake equipments proposed along with offer and get the brake system approved from RDSO before manufacture of the prototype.

3.8.11 Air dryer of approved make conforming to Spec. No. MP-0.01.00.09 (Rev-05), March'2011 shall be provided. (In line with latest equipment on EMU/DEMU)

3.8.12 Main air reservoirs of adequate capacity shall be provided. In addition, a separate braking reservoir and a non-return valve be provided for braking only. Suitable drain valves/cocks shall be provided to drain off the condensate in the reservoir (s). Cut off cock may be provided at inlet of auto drain valve.

3.8.13 The tenderer shall be required to supply the detailed drawings, specifications and testing procedure for rubber components/parts of all the valves/cocks used in the brake system.

3.8.14 The supplier shall get the brake schematic approved by the RDSO.

3.8.15 Stand-alone VCD of approved make conforming to specification No. MP-0.34.00.04 (Rev.04) Dec 2008 shall be provided.

3.8.16 Brake system shall be such that in dead condition of 8WDETW can be hauled by another air brake stock.

### 3.9 Piping & Pipe fittings:

3.9.2 Seamless stainless steel pipe bright annealed to ASTM A 269 Gr. 304, which can be bent cold shall be used. The layout of piping shall be designed to keep all pipes, especially the brake cylinder pipes, as short and straight as possible Bends should be used throughout, but where elbows have to be used; they shall

be of round type. Where the pipes itself are bent, their internal area shall be maintained uniformly.

- 3.9.3 Double ferule pipe fitting consisting of body, front ferrule, back ferrule and nut shall be provided. The body and nut shall be of carbon steel of ASTM:A-108 Grade –II with electro cobalt zinc plating with chromic passivation. The ferrule and back ferrule shall be made from stainless steel to ASTM A276 TP 316 SS and conforming to ICF Specification No. ICF/MD/SPEC-166 with latest revision/amendment.
- 3.9.4 All pipes shall be adequately clamped to the frame assembly. Compreg to RDSO Specification No. C-9407-type II shall be used for clamp.
- 3.9.5 Pipes, ducts and conduits shall conform to an identification colour scheme with polyurethane paint as per RDSO's Specification, which shall be approved by RDSO.
- 3.9.6 Chart showing the colours for identification of pipes shall be displayed in cab at a prominent place where it is likely to be needed for reference.
- 3.10 **Interior furnishing:** The OHE Car shall be furnished with light weight fire retardant material. The material used for finishing and furnishing shall be suitable for use under Indian climatic conditions and shall be as for as possible fire proof, non-hygroscopic and vermin and rot proof. The furnishing shall be as agreed between the contractor and RDSO. It may be noted that Indian Railways are presently using 3 mm decorative/ resin bonded thermo-setting laminated plastic sheets of approved shades, possessing resistance to spread of flame as indicated in para 5.16 of IS:2046. With a view to retarding the spread of fire, the continuity of LP sheets shall be broken by the provision of suitable metal barriers. The laminated plastic sheets conforming to STR No. C-K-514 (Latest Revision) may be used for thermosetting resin bonded Laminated Sheet for OHE Car.
- 3.11 **Ceiling and paneling:** The ceiling in compartments shall be of minimum 2 mm thick NFTC to RDSO Specification No. C-K 511 (Latest Revision). The ceiling material shall be IRS M-41, wherever required.
- 3.12 **Flooring Construction:** Floor of the vehicle shall be as per ICF drg. No. EMU/MASR- 41-001 with latest alteration. The opening in the flooring for passage of pipes and cables through the floor shall be so constructed as to prevent any seepage of the oil. In addition to give effective protection against the spread of fire originating beneath the body.
- 3.13 **Extra Fitting:**
- (i) Door steps shall be provided at all body side doors.
  - (ii) Continuous water wriggles from one end of the OHE Car to the other shall be provided.
  - (iii) Tail lamp bracket to IRS Drawing No.C.BF-113 shall be fitted at each end of the shell.
  - (iv) Rain water channels of suitable design over the doors & windows way shall be provided.
  - (v) Tenderers may note that the OHE Car may be washed mechanically. Tenderers may also note

that the exterior of the OHE Car may be washed in automatic OHE car washing plants. Exterior of the OHE Car shall be designed keeping this in view.

- 3.14 **Cattle Guard:** Detachable type cattle guards shall be provided under each buffer beam. The cattle guard shall be fitted with adjustable rail guards so as to maintain the minimum free space above the rails under all conditions (see item 7 of clause 2.0). Cattle guard shall be as per RCF Drawing No. EM26108 with Latest Revision.
- 3.15 **Insulation:** An insulation layer of suitable thickness of non-asbestos material shall be provided inside the OHE car shell. End walls and sidewalls shall be provided with suitable anti-drumming and anti-corrosive compound. Underside of the under frame over the engine area shall be properly insulated to minimize heat transfer to the compartment. The material used for insulation shall be non-inflammable type. All other parts shall be provided with anti-corrosive compound.
- 3.16 **Noise Suppression:** The tenderers shall indicate noise suppression features incorporated in the design. Maximum noise level should not exceed 75 dB inside the cab.
- 3.17 **Trap Doors:** Suitable trap doors shall be provided on the flooring for attention of underslunge equipments, during service. The design of trap door shall be such that it can be conveniently lifted when attention to equipment is required but strong enough to withstand normal passenger loading. The trap door shall remain in level to the floor of the OHE car.
- 3.18 **Anti-pilferage measures:** While securing compartment fittings, anti-pilferage measures shall be incorporated.
- 3.19 **Fire extinguishers and first aid equipment:** Four fire extinguishers CO<sub>2</sub> type of 5 kg capacity shall be provided, one each in both the cabs and two in workmen's lobby. Space shall be provided for keeping a first aid box and one stretcher.
- 3.20 **Corrosion protection:**
- i) Sheets and plates (other than Stainless Steel) used for OHE Car construction shall be suitably treated against corrosion before fabrication.
  - ii) Sub- assemblies shall be treated against corrosion as per UIC Code 842-5 after they are manufactured.
  - iii) OHE Car shall be treated after fabrication as per UIC Code 842-5.
  - iv) In addition to above, the OHE Car design shall be such as to minimize the incidence of corrosion. Indian Railways experience is that most corrosion takes place due to seepage of water from the floor and window openings.
  - v) The Tenderer may suggest any better corrosion protection system that he may have adopted with success in OHE Cars manufactured by him.
  - vi) The Tenderer shall note that OHE car floors are washed regularly at certain time intervals. Hence the floor construction should be such that it does not permit water to seep through the floor and cause corrosion to trough floor and under frame members.
  - vii) Tenderers may note that Indian Railway have noticed heavy corrosion on OHE Car under the lavatories. As such, corrosion resistant steel shall be used for construction of floor and adjacent members under

lavatories and the neighboring bays.

### 3.21 Information to be submitted by the tenderer

- (a) The following information shall be furnished by the tenderer along with the offer:
- (i) Transverse cross section of the proposed OHE Car along with principal dimensions so as to illustrate the general construction of the shell. Also superimposed upon this should be the schedule of dimensions as embodied in the Indian Railways Schedule of dimensions – 1676 mm gauge, revised 2004. Infringements, if any, should be accurately defined in the sketch.
  - (ii) A “Section” view of the plan of the OHE Car, showing the layout of the major equipments along with principal dimensions.
  - (iii) Side elevation of the proposed OHE car.
  - (iv) A “Sectional” side elevation of the OHE Car underframe showing the disposition of the major equipments on the underframe.
  - (v) To demonstrate his capability for designing OHE car body, the tenderer shall submit a set of actual calculations pertaining to OHE car structure for any bogie vehicle, designed by him in the past. These shall be submitted alongwith his tender offer.
  - (vi) The schematics of the brake pneumatic alongwith the internal schematics of the valves proposed to be used shall be furnished alongwith the tender. The schematics shall be accompanied with a write up on sequence of events during application, release and emergency.
  - (vii) Type of compressor and its capacity shall be indicated along with tender. This will be accompanied with a technical justification for the compressor capacity selected.
  - (viii) Estimated weight of the OHE car structure shall be furnished alongwith the tender. Also weights of principal assemblies mounted on the OHE car structure shall also be furnished.
- (b) The other relevant information but not limited to following shall be furnished at design approval stage by the successful tenderer.
- (i) A representative sectional view of the OHE car floor, illustrating the floor construction. The specifications of the materials used in its construction should be identified.
  - (ii) Furnishing material intended to be used by the tenderers-specifications should be identified.
  - (iii) Insulating material proposed by the manufacturer specifications should be identified.
  - (iv) Ceiling material proposed to be used by the manufacturer specifications should be identified.
  - (v) Principal features of noise suppression shall be identified and submitted.
  - (vi) Principal features showing adequate fire redundancy shall be identified and submitted.
  - (vii) Tentative brake rigging diagram alongwith details of brake cylinder and slack adjuster proposed to be used shall be submitted.
  - (viii) In case parking brakes are proposed the features of the proposed parking brake actuator, its type and the schematics shall be furnished.

3.22 The guaranteed technical particulars of the inspection OHE car shall be submitted as per Annexure-7.

## Chapter - IV

### ELECTRICAL EQUIPMENTS

- 4.0 **Illumination:** Driving Cabs, officers/Staff cabins, Workshop & Storage space shall be provided with level of Illumination of at least 30 Lux at the working plane level (1m above the floor level).OHE Car lighting shall be provided with 18 W, 600 mm x 26 mm double capped Fluorescent/LED tube lights with wire mesh guard along with its fittings and Electronic Lamp ballast as per RDSO Specification No. RDSO/PE/SPEC/TL/0011-2000 (Rev.1) with the latest revision shall be used.
- 4.1 Driving cabs, officers/staff cabins and workshop shall be provided with two, 110V, 300 mm sweep fans conforming to IS: 6680.
- 4.2 **BATTERY:** Lead Acid maintenance free storage battery of capacity as mentioned at Clause no.5.3.2.20 of Chapter-V, conforming to IS: 6848-1972 shall be provided in under slung Battery boxes. The Battery fuses shall be located close to the battery terminals.
- 4.2.1 Terminals for charging the batteries from external charging equipment shall also be provided. The location of the batteries shall be such that there is no danger of their getting damaged due to tools and equipment inadvertently falling on them. If the cells are packed in two rows in the battery box, a hylam sheet shall separate the two rows.
- 4.3 **Alternator for battery charger & DG sets:**
- 4.3.1 An engine mounted alternator with rectifier and regulating equipment of suitable capacity for charging of 24 V DC 290 Ah Battery shall be provided. The output of the generator shall cater for battery charging for diesel engine starting (battery voltage 24V). The maximum power demand will be required when the OHE car is stationary and with engine running at low idling speed.
- 4.3.2 An engine mounted alternator with Rectifier and regulating equipment of suitable capacity for charging of 24 V DC 290 Ah Battery shall be provided. The output of the Alternator shall cater for battery charging for diesel engine starting battery, 24V.
- 4.3.3 Battery charger for charging batteries of 110 V of 120 Ah capacity Lead acid maintenance free storage battery of capacity as mentioned at Clause No.5.3.2.20. The battery charger shall be from RDSO's approved vendors complying to the RDSO's Specification No. RDSO/ PE/SPEC/AC/0008 (Rev.2) with Latest alteration.
- 4.3.4 A 10 kVA, 3-phase, 415V, low noise Diesel Generating set for power supply to lifting platform and machines in workshop shall be provided with OHE Car. The Gen set shall be mounted on anti-vibration mounting to reduce the vibrations.
- 4.3.5 A skid mounted portable Diesel Generator similar to Honda make (petrol start kerosene run or petrol start petrol run) of 3kVA (minimum), 240V, 50 Hz along with transformer shall be provided to meet 150 Amps

light weight IGBT based welding machine load and other auxiliary load of search lights (2x250 watts), emergency light and for other such purposes. Design of Transformer shall be decided at design approval stage.

#### 4.4 Circuitry

- 4.4.1 The load shall be suitably distributed based on standard practice.
- 4.4.2 Electrical equipment such as switches, lamp holders and other items shall conform to the following latest Specifications:
- IS:6965: Switches for use in Railway stock.
- IS:1258: Bayonet lamp holders.
- IS:1293: Three pin plug and socket outlets.
- IRS: EA-199: For ceiling light fittings like CFL within transparent enclosure.

#### 4.5 Power for head lights, tail lights

- 4.5.1 Following lights shall be worked on the alternator/ rectifier provided with diesel engine. This is to ensure that failure in the other lighting system does not affect the mobility of the OHE car.
- 4.5.2 **Twin beam Head light:** Twin Beam head lights shall be provided at both ends. The head light shall conform to RDSO's Specification No. ELRS/SPEC/PR/0024 (Rev-1) Oct. 2004. The operating voltage of head light shall be 24 V DC. 24 V DC, supply for twin beam head light shall be taken from 110/24 DC-DC convertor. DC-DC Convertor shall be as per RDSO's Specification No. ELRS/SPEC/DC-DC Convertor/0021 Rev.1.
- 4.5.3 **Tail light:** Tail lamp (Red aspect) of LED type 24 V 15 W as per RDSO's Specification No. RDSO/PE/SPEC/TL/0119-2000 (with latest revision) shall be provided at each end to comply with General & Subsidiary Rules of Indian Railways.
- 4.5.4 **Flasher light:** One flasher light each of LED type as per RDSO's Specification No ELRS/SPEC/LFL/0017 (Rev-1) Sept, 2004 shall be provided on the roof at either end of the OHE car.
- 4.5.5 **Marker Light:** Marker light of LED type (Red aspect) as per RDSO's Specification No ELRS/SPEC/PR/0022 (Rev-1) Oct. 2004 shall be provided on either end of the OHE car.
- 4.5.6 **Search Light:** OHE car shall be provided with two 250 Watts searchlights with Metal Halide lamps, one on each end, for inspection of the OHE while on the run. Searchlights shall provide a high intensity illuminating beam and capable of swiveling on universal joint type supports. Design details shall be finalized at the time of design approval stage.
- 4.5.7 **Wiring-**All Electrical wiring in the tower wagon shall be done with e-beam cables conforming to RDSO's Specification No ELRS/SPEC/ ELC/0019 Rev.-1 dated 06.07.2010 with latest amendment.

- 4.5.8 **Horns:** The OHE car shall be fitted with two horns at the roof with different tones on both sides. Horns shall be operated on compressed air. These shall be operated by a hand switch provided within the access of the Driver. Horn cover to RDSO Drawing No. CG- K5056.
- 4.5.9 **SPEED INDICATOR / RECORDER:** Speed Indicator and Recording Equipment of 0 - 160 km/h range shall conform to RDSO's Specification No.MP-0.3700-07 (Rev.03) of April'2003. One cab of OHE Car shall have one recorder-cum-indicator and the other cab shall have one speed indicator only.
- 4.5.10 **Mobile Charging:** Four mobile charging points one each in Staff Cabin and both the Driver's Cab shall be provided as per RDSO approved source.
- 4.5.11 **Cab Heaters:** Both the cabs shall be provided with electrical heaters to keep cab environment warm during winter season. The power supply to heater shall be given from the auxiliary alternators as specified in clause 5.9.1
- 4.5.12 **Flood lights:** Four flood lights giving diffused light of 75 watts shall be provided with each OHE car. Detailed design of it shall be finalized at the design approval stage.
- 4.5.13 **Emergency push-buttons (Mushroom Type):** Five emergency push-buttons shall be fitted on the chassis sides and one on the roof. When activated, they provoke:-
- (i) Idling of the engine & removal of excitation of alternator.
  - (ii) Stop of elevating platform.
  - (iii) Braking of the vehicle.

#### 4.5.14 **Earthing Arrangement of Tower OHE Car:**

All metallic parts of tower wagon including the working platform, shell structure & bogie shall be integrated electrically to ensure proper earthing of tower OHE car through wheels to Rail. The body of the lifting motor, control panels, swiveling motor at platform and other electrical equipment shall be connected to the earth. Traction motor shall be provided with earth brush. The schematic diagram of earthing arrangement to be provided for the tower OHE car& equipment in it shall be submitted by the successful tenderer for approval of RDSO.

## Chapter - V

### 5.0 POWER EQUIPMENT & CONTROL

- 5.1 The different speeds of the twin-power pack from idle to maximum speed and the corresponding power developed should be so selected that all the conditions mentioned in Clause - 2.0 of Chapter-II can be satisfactorily met. However the number of speeds and power levels chosen should not be less than 8 (herein after referred to as notch positions) in addition to the idle position. The performance of the power pack shall be optimum in each notch position in addition to being able to meet the traction load and demand by the auxiliaries.
- 5.2 Detailed calculations shall be submitted along with tender indicating the power demand by the traction motors for different conditions and the demand on the power pack. These calculations shall indicate whether adequate reserve power has been provided. Characteristic curves for the Traction Alternator & Rectifier indicating the performance for different notch positions should be furnished. These curves, inter-alia, should indicate speed, BHP, power consumption by auxiliaries, excitation voltage and a.c. and d.c. currents. These characteristics should clearly indicate the extent of matching or mismatching of power.

### 5.3 DIESEL ENGINE AND TRANSMISSION SYSTEM

- 5.3.1 The OHE Car will have two independent diesel electric transmission systems, each comprising a diesel engine, an alternator along with its power rectifier, two traction motors mounted on one bogie, auxiliary alternators with their rectifier-cum regulator units, engine and traction controls, synchronised for operation from a common master controller from the driving cab(s). In case of failure of one of the transmission systems, provision shall be made so that the same can be isolated and the OHE car can still be worked at reduced power from the healthy transmission.

#### 5.3.2 Diesel Engine

- 5.3.2.1 Two independent under-slung naturally aspirated, turbo-charged and after cooled Diesel Engines of proven design of Cummins make NTA-855R or similar other reputed make suitable for 8-Wheeler Diesel Electric Tower Car, complete with all accessories, suitable for traction service under the climatic and operating conditions obtained in India, shall be provided.

The continuous traction rating of each engine shall be 340 hp (approximately) or higher at 1800 rpm after due de-rating for environmental temperature of 55°C. It shall be battery started. Specific Fuel Consumption (SFC) shall be low. Robust construction, low maintenance and satisfactory record of past performance are of paramount importance. Tenderer shall furnish full particulars of the engine with the offer. Adequate allowance shall be made in the power of the diesel engine for the de-rating under most adverse climatic conditions stated in Clause-1.2 of Chapter-I of this specification. Successful tender shall give detailed calculations for engine's suitability and its rating.

- 5.3.2.2 The supplier shall indicate the total horse power required for the auxiliaries with the break up power for each of the auxiliary machines at rated output.

- 5.3.2.3 The tenderer shall indicate the net horse power available for input to traction under the conditions mentioned under para-1.2 of Chapter - I of this specification.
- 5.3.2.4 The idling speed of the diesel engine shall be such so as to match the requirement of various auxiliary machines driven by the engine.
- 5.3.2.5 The Diesel Engine shall work satisfactorily with fuel oil to Indian Standard Specification No.1460-grade A, but shall also be able to function in a trouble free manner even with Grade B fuel oil to the same Specification.
- 5.3.2.6 Suitable hand priming pump shall be provided to avoid air lock in the fuel system.
- 5.3.2.7 The engine shall be provided with suitable end on mounting arrangement to SAE-O dimensions for coupling with and driving the traction alternator. The mounting and coupling arrangement shall be of adequate capacity to withstand high deflection and torque (at starting, stopping and due to misfiring of cylinders) so that no damage is caused to the alternator and engine components in service.
- 5.3.2.8 The drive gear for driving compressor, auxiliary alternator and electric fan drive for the radiator shall also be in the scope of supply of the tenderer.
- 5.3.2.9 Detailed torsional vibration analysis of the complete system under normal engine working as well as under conditions of one cylinder misfiring for the complete operating range including 10% over speed shall be furnished.
- 5.3.2.10 Air inlet to the engine shall be from inside the OHE car with proper ducting arrangement from the filters.
- 5.3.2.11 Piping from the air cleaner to the turbo-driven air handling unit shall be in the scope of supply.
- 5.3.2.12 The exhaust pipe shall not leave carbon soot on important assemblies like traction motors, axle drive etc. The exhaust pipe shall be taken horizontally and located under floor avoiding the position near footsteps of the vehicle with adequate insulation to with stand 700°C.
- 5.3.2.13 Filters shall be of adequate air flow capacity/filtering efficiency to ensure satisfactory performance under dusty environment.
- 5.3.2.14 The tenderer shall submit graphs showing the BMEP/engine output torque and SFC at all notch positions from idling speed to rated speed.
- 5.3.2.15 Lube oil consumption at rated output as a percentage of the fuel oil consumption should also be indicated.
- 5.3.2.16 The tenderer shall furnish a copy of the Type Test report of the engine by a statutory body in support of

their claim regarding performance, reliability and specific fuel consumption. In case the engine offered is not type tested earlier, the testing shall be done in the presence of RDSO's representative. In case engine is already type tested and found satisfactory then routine test report is to be submitted for all the engines by the firm to the purchaser. RDSO may like to conduct acceptance test, if required.

- 5.3.2.17 Fuel tank of at least 700 liters capacity indicating tower wagon's operating time with 700 liter fuel oil to be given.
- 5.3.2.18 The noise level in the driver's cabin with the doors and windows in closed condition shall be less than 75 db (A) and in the inside of the OHE car shall not exceed 80 db (A) at maximum output and speed of the engine.
- 5.3.2.19 The exhaust emission shall be below the limit laid down in UIC/ORE No. B13/RP22/E Clause-4 of the entire engine range of operation from idle to full power and shall be measured as per UIC/ORE/B13/RP21E. The exhaust opacity shall not exceed 20 as measured by Hartridge smoke Meter or equivalent scale under all conditions including acceleration of the engine. A suitable catalytic converter shall be connected in exhaust pipe to limit the emission.
- 5.3.2.20 The tenderer shall supply the complete system including engine starter and battery chargers. Batteries shall be of following ratings:-
- (i) 24 V, 290 Ah batteries of RDSO's approved make for Engine cranking.
  - (ii) 110 V, 120Ah battery of RDSO's approved make for Control and auxiliary circuits.
- 5.3.2.21 Suitable anti-vibration mountings for the engine, alternator, auxiliary alternator, and compressor shall be used. The anti-vibration mountings (AVMs) shall be of approved make. The type and number of AVMs offered shall be specified. To meet the vibration limit, any increased numbers if required shall be to the contractors account. The deflection characteristics of the AVMs shall be submitted.
- 5.3.2.22 Drawings for the suspension brackets shall be got approved by RDSO before manufacture/ supply.
- 5.3.2.23 All threaded fasteners shall be of RDSO approved make.
- 5.3.2.24 The engine manufacturer shall provide necessary safety devices to protect the engine against hot engine, low lube oil pressure, engine over speed and low water levels etc. two high water temperature thermostats with 5°C difference in setting shall be provided.
- 5.3.2.25 List of all accessories that are offered with the diesel engine, clearly indicating those mounted on the engine and those supplied loose shall be furnished by the tenderers.
- 5.3.2.26 Electrically operated gauges for the various indication requirements and fault indication lamps shall be provided in each driving cab.
- 5.3.2.27 The stopping of the engine shall be by de-energising a fuel solenoid valve.

5.3.2.28 The initial fill of lube oil for the engine as recommended by the engine manufacturer shall be in the tenderer's scope of supply.

5.3.2.29 The tenderer shall submit along with the offer, complete engine data as per Annexure - 3, as applicable to the Engine offered.

#### 5.4 COOLING EQUIPMENT

5.4.1 The Cooling Equipment shall be guaranteed to work efficiently under the climatic conditions specified in para-1.2 of Chapter- I of the specification. The radiator and fan shall be of adequate capacity with 30% choked condition of the radiator used. Air flow required for the radiator fan shall be at least 15% more than that actually required to make up for any reduction in air flow due to train movement. The limiting ambient capability of the cooling system shall be minimum 55 °C with 30% choked condition

5.4.2 The complete technical details of the radiator and its fan shall be furnished.

5.4.3 Two independent sets of cooling equipment (i.e roof mounted radiator, hydraulic tank, hydraulic oil cooler and water pipes) shall be provided. The individual radiator will take care of the cooling requirements of respective engines and the hydraulic cooler.

5.4.4 The maximum operating water temperature shall normally not exceed 95°C. There should be provision of alarm and shut off at higher temperature.

5.4.5 The radiator shall be roof mounted either with proven electric fan drive system or hydraulic fan drive arrangement which shall have thermostatic control to regulate the fan speed depending upon the water temperature shall be provided. Complete technical details of the radiator and its type of fan & drive shall be furnished to RDSO. The most suitable and reliable design and type of fan & drive shall be selected at the design approval stage. If there is any cost differential for electric driven radiator cooling fan and hydraulic driven radiator cooling fan shall be clearly indicated by the tenderer.

5.4.6 Suitable water raising apparatus, using mono block pumps for topping up the water in the radiator shall be in the scope of supply. A stainless-steel tank for the radiator of not less than 100 litres capacity shall also be provided.

5.4.7 The installation drawings of the radiator and fan with details of fan drive shall be supplied by the tenderer.

5.4.8 Cooling Proving trials shall be carried out in a test bed at the firm's premises (OEM) to prove the adequacy of the cooling system comprising of radiator and hydraulic oil cooler for the prototype in the presence of RDSO's representative. The procedure for such testing shall be submitted and got approved from RDSO.

- 5.4.9 The following calculations in support of offered cooling system shall be submitted:
- Cooling requirement for all sources of heat (with break up)
  - Heat dissipation characteristics of the radiator and its resistance characteristics.
  - Radiator fan characteristics showing the air flow Vs total heat at different speeds.
  - Cooling system-matching calculations.
  - Schematic cooling circuit diagram showing water, oil and air flow through each equipment.
- 5.4.10 The tenderer shall submit drawing for mounting details of radiator assembly, fan drive arrangement and ensure that these fit completely within the overall dimensions of OHE car and shall be got approved by RDSO.
- 5.4.11 **Compressor**
- 5.4.11.1 Two engine driven air-cooled compressors (one with each engine) of adequate capacity and complete with all accessory suitable for continuous operation at a nominal maximum pressure of 8 kg/cm<sup>2</sup> shall be offered. The capacity of the air compressor shall not be less than 10 cfm at engine low idling speed. The essential accessories as under shall also be in the tenderer's scope of supply:
- i) Suitable after cooler.
  - ii) The compressor shall be provided with suitable governor to cut in and cut out at 7kg/cm<sup>2</sup> and 8 kg/cm<sup>2</sup> respectively and a safety valve set at 8.5 kg/cm<sup>2</sup>.
- Note:
- i) The compressor capacity and expected power consumption shall be specified at low idle and max operating speed of the engine.
  - ii) The compressor offered shall be of proven capability in Railway Rolling stock application.
- 5.5 **Engine Control**
- 5.5.1 The engine shall be electronically controlled using suitable and proven ECUs.
- 5.5.2 The engine control system should return the engine to idling (no traction load) position in case of emergency brake application.
- 5.5.3 Electronic Governing system for engine control (LCC) as well as main traction alternator excitation control shall be provided.
- 5.5.4 Tenderers shall indicate notch wise speed and power of the engine offered.
- 5.5 A **Tests on Diesel Engine:**
- i) Type, Routine and acceptance Tests on the Diesel Engine shall be performed in accordance with International Union of Railway Code No. UIC-623 OR with latest Edition. Para nos 4.3.2, 4.3.3, 4.3.5 of UIC-623-2 OR should be followed for test on Diesel Engine.
  - ii) The type tests shall comprise of 12 hours running of Engine load cycle 100%, 110%, 75% and 50%.
  - iii) At the end of run, the parameters like high idle rpm, low idle rpm and lube oil pressure at high and low idle rpm shall be recorded.
  - iv) The Oil consumption test and Exhaust smoke shall be measured in accordance with BS standards.
  - v) All the performance parameters shall be recorded measured in accordance with UIC-623-2 OR with latest edition.

- vi) The type test/routine test schedule shall be submitted and got approved from RDSO. The tests shall be carried out in presence of RDSO's representative.

## 5.6 TRANSMISSION SYSTEM

Three phase a.c./d.c. transmission system shall be used. The tenderer shall furnish full technical details as per Annexure-4 for the transmission system offered. Tenderer shall

submit block diagram of power circuit for approval of RDSO.

## 5.7 Alternator

- 5.7.1 A three phase variable speed self-ventilated, self-excited, brushless and under slung traction alternator shall be provided (two Alternators per OHE Car). The Alternator shall either be end on mounted or connected to the engine through a flexible coupling. The alternator shall have a load regulation system that shall ensure optimum utilisation of the installed power of the diesel engine at all notch positions. Each Traction Alternator shall have power output of 230 KW (approximately).
- 5.7.2 The Alternators offered shall be with Single Bearing, which will be self locating type ball bearings.
- 5.7.3 The winding of the traction alternator for both stator and rotor shall be with Class H (180 °C). Insulation withstanding the dusty working conditions without deterioration of electrical and other properties. The tenderer shall give details of the insulation scheme, proposed to be used for approval by RDSO. Filters if felt necessary by the alternator manufacturer shall be provided at the alternator intake. The filter shall be of dry fire retardant type. Details shall be indicated in the tender. It is, however, preferable not to use filters. One hour rating of Traction Alternator shall be 10 percent higher of continuous rating. Field proven suitable to 8WDETC TA shall be offered by successful tenderer.
- 5.7.4 The alternator shall have minimum rating of 230 kW to meet the full specified traction load under the prescribed site conditions, besides capability to meet the higher starting load and sustained and momentary over loads.

**NOTE:** The tenderer shall clearly specify.

- i) The VI characteristics of the Traction Alternator in d.c. at full load.
- ii) The continuous rating near the top of the VI curve (higher voltage, low current) and near the bottom of the VI curve (higher current, low voltage) at 1800 rpm and the corresponding one hour ratings.
- iii) Overload capability as a percentage of the full load and deviations.
- iv) Short circuit capability and deviations thereof.

### 5.7.5 External cables

- 5.7.5.1 For connecting the alternator with the rest of the associated traction equipment, the thin-walled e-beam cables as per RDSO approved specification No ELRS/SPEC/ELC/0019(Rev.1) with latest amendment shall be provided. However, the cable sizes and the voltage grade for the power and control cables shall be given by the manufacturer.
- 5.7.5.2 The Cables from traction alternator to power rectifier should be suitable for carrying out current of 800A (rms).
- 5.7.5.3 The location of terminal box shall be on the periphery of Traction Alternator. Suitable cutaway with a cover plate having cable entry holes with suitable cable glands/ grommets to permit entry of insulated cables as selected above, shall be provided. The internal and external cable terminations shall be on a terminal board made of fiber glass SMC or better material, suitably mounted inside the alternator terminal box. The galvanized/ cadmium coated MS terminal studs of adequate size shall be located across each other without criss-crossing and they shall be suitable for crimped terminations connected palm to palm. The head of the terminal studs (preferably hexagonal) shall be embedded on the rear side of the terminal board and shall be further secured on top by a nut. For securing cable lugs, nuts, locknuts, flat and spring washers shall be provided. Adequate number of crimping sockets suitable for recommended size and number of output cables shall be supplied along with the alternator. The Crimping sockets shall be of Dowell's make only.

**NOTE:** The Terminal box location, internal and overall arrangement and dimensions shall have prior approval of RDSO.

- 5.7.5.4 The alternator housing shall be of fabricated steel construction designed to withstand high torsional stresses, shocks and vibrations. The minimum ground clearance in half worn wheel wear condition under tare weight shall not be less than 230 mm.
- 5.7.5.5 The provisions shall be made for driving the auxiliary alternator and Air Compressor through a common shaft extension from Diesel Engine through V-Belts and pulley on the extended shaft of the Diesel Engine. Pulley of C-section to IS: 3142 shall have a suitable PCD to be approved during design approval stage. The material of pulley shall steel forged conforming to IS: 2004 Gr.III. The pulley shall be push-fit with suitable securing arrangement.

5.7.6 **TESTS:**

- 5.7.6.1 Type, routine and acceptance tests on the alternator if required, shall be performed in accordance with IEC 60-349.
- 5.7.6.2 The type test procedure for prototype power pack (engine plus alternator) testing shall be submitted and got approved from RDSO. Type testing of prototype power pack shall be carried out in the presence of RDSO's representative. If already type testing is done for the power pack, routine/acceptance tests shall be done in the presence of RDSO's representative after getting the procedure approved from RDSO by the contractor.

**NOTE:-**

- (i) The temperature rise for the windings allowed by IEC:60-349 shall be reduced by 30 °C to allow

for higher ambient temperatures.

- (ii) The characteristics curves as applicable to the traction alternator shall be submitted, duly indicating therein, the selected locations corresponding to the different notch positions.
- (iii) The successful Tenderer shall submit the bearing life and shaft calculations and get them approved before offering the alternator for inspection.
- (iv) The Tenderer shall clearly indicate the rating, weight, current, voltage and power and also dimensional details.
- (v) The excitation system adopted shall be explained in detail giving all relevant characteristics for different notch positions of the engine and their matching with engine characteristics.
- (vi) The detailed calculations for arriving at the alternator rating to meet the specified requirements shall be furnished.
- (vii) Any special item (for e.g. Screened cables) required for any signal/ control feed between engine, alternator and electronic governor shall be in the scope of supply.

5.7.6.3 **Auxiliary Drive:** An auxiliary drive of adequate capacity shall be provided to meet all the auxiliary loads of DETC. The drive shall be suitable for minimum of 8 kW auxiliary alternator.

5.7.6.4 **Power Rectifier:** Each alternator power output shall be rectified by a full wave 3 phase silicon diode bridge rectifier (two rectifiers per Intelligent OHE recording car). The rectifiers shall be suitable for under slung forced cooled and well protected. In case there is a space constraint in fitting under slung rectifier, the same shall be provided on board and this aspect shall be decided at design approval stage. The technical constructional requirements along with testing as given in Annexure-5 shall be complied with. The output of bridge shall be connected to suitable filter chock if considered necessary. The design should adequately take care of the service conditions of the Traction Motors.

5.7.6.5 Power Rectifier should have power loss not more than 400 Watt. It should be able to work in N-1 condition. This indication "Rectifier fuse blown off" should be available on driver desk.

5.7.6.6 The OGA drawings shall be got approved prior to manufacture and supply against each contract.

## 5.8 TRACTION MOTOR

5.8.1 Four axle hung, nose suspended and self-ventilated DC series Traction Motors of proven design and approved by RDSO two on each Bogie, shall be provided on the OHE car. The Armature coils shall be formed of polyimide (kapton) covered copper conductors and suitably impregnated. TIG/MIG welding shall be used for the commutator. The technical/ constructional requirements as given in Annexure – 6 shall be complied with the traction motor of similar design and construction with proven performance in traction application on IR will be preferred. Traction motors shall be 4601 BX type of M/s. BHEL or TM 2141 A of M/s CGL type or similar proven design with taper roller suspension bearings. Class of insulation of TM shall be "H class" (180 °C Class). Output of each Traction Motor shall be 115 KW (Approximately).

5.8.2 **Motor rating:** The one hour rating of traction motor shall be of 97% excitation and continuous rating shall be adequate to give the required performance. The motor will be provided with 3% permanent ohmic field shunting.

5.8.3 The temperature rise for the windings allowed by IEC-60349 shall be reduced by 30°C to allow for higher ambient temperatures.

- 5.8.4 **Motor Suspension & Axle Drive:** The Traction Motor shall be nose suspended with taper roller bearing arrangement. Each traction motor shall drive one axle of its motor bogie through a single reduction gear drive enclosed in a rigid and water tight gear case firmly secured to prevent damage by movement and vibration under the most severe operating condition but easily removable for attention to the gear.
- 5.8.5 The Traction Motor shall be designed to comply with the operating requirements stipulated in chapter-II without exceeding the temperature rise limit.
- 5.8.6 The lubricants to be used for the suspension bearings and the gear case shall be specified by the manufacturer.
- 5.8.7 The gear wheels and pinion shall be as per RDSO's Specification No. C-K-303 with latest revision.
- 5.8.8 The single reduction gear with gear ratio 20:91 shall be provided.
- 5.8.9 The traction motor should be a complete assembly including gears, pinions, gear case, nose suspension rubber sandwich, taper roller suspension bearings, dust guard and axle shield, earth brush etc. Adequate length of the Traction Motor cables shall be brought out from the motor for termination in the under frame mounted cable connection box with provision for connecting the cables from the coach. Provision of a well covered terminal box on the traction motor such that the connection between the traction motors and the junction box is made through separate cables shall be preferred. The design of suspension shall ensure no leakage or ingress of gear case compound in the roller bearing under any circumstances.
- 5.8.10 Motor Contactor**  
Motor contactor of BHEL make or similar proven make, duly type tested and approved by RDSO/ICF/CLW, one contactor for each motor, suitable for operation in combination with overload relays, for opening the traction motor circuit in overload and under fault conditions shall be provided. These contactors shall be located in dust-proof cubicle mounted on the underframe in such a way as to prevent all risk and damage to other apparatus from arcs formed by their operation.
- 5.8.11 Traction motor contactors, reversers, protective relays and other control gears shall be as specified in Annexure-6 They shall be housed in box and dust proof enclosures to be mounted in the underframe, however, alternate location may also be considered subject to clearance of the offered layout by RDSO.
- 5.8.12 The Motor contactor shall open the circuit, they protect automatically on overload and shall be capable of clearing the resultant arcs under all conditions of overload.
- 5.8.13 Bearings: The Armature shall be mounted on anti-friction roller bearing of RDSO approved make. The inner race shall have adequate interference for the duty.
- 5.8.14 All motor contactor on OHE car shall be suitable for remote operation from any driving cab through the traction motor overload 'reset' switch. The motor contactors shall be of electro-pneumatic type of RDSO/ICF/CLW approved make or similar proven make duly type tested and approved by RDSO/ICF/CLW shall be provided with blow out coils and arcing horns, etc to brake the current without detriment to their working

parts or adjacent equipment. All contact trip, interlocks, pins and plungers etc. shall be easily accessible for maintenance.

- 5.8.15 The Tenderer shall submit the following characteristic and performance curves:
- i) Speed Vs Tractive Effort
  - ii) Current Vs Speed
  - iii) Tractive Effort Vs Current
- 5.8.16 Suspension Bearing: taper roller suspension Bearings from RDSO's approved source shall be provided. Material composition and properties of plain sleeve bearings shall be as laid down in RDSO's Drawing No. RDSO/PE/SK/EMU/0052-2003 Rev.0.
- 5.8.17 First four (04) Traction Motors of 8 wheeler DETC shall be type tested by RDSO accordance with IEC-60349. Routine and acceptance tests if required on the traction motors, shall also be performed in accordance with IEC-60349.
- 5.8.18 The Traction Motor's thermal capability shall be adequate to meet the operational requirement of lowest road speed (i.e. 5 kmph) for 90 minutes. A special test shall be carried out at the time of type test to establish/confirm this aspect. For this purpose, at an output equal to one fourth of the calculated power required for the lowest road speed and the corresponding cooling available, the temperature rise shall not exceed the limit prescribed above.

## 5.9 AUXILIARY ALTERNATOR WITH RECTIFIER-REGULATOR

Two auxiliary self-cooled, brushless pulley driven alternators of RDSO's approved make, one with each engine shall be provided in the inspection OHE Car with suitable regulating equipment and Battery Charger to supply 122 V d.c.  $\pm$  5% regulated voltage from idle speed to max. Speed of the engine for meeting the following loads:-

- i. Battery charging (110 volts, 120 Ah batteries) provided on the OHE car- 10 amps.
  - ii. Lights and fans load of the OHE Car-25 amps.
  - iii. Flood Lights
  - iv. Search lights
  - v. Control system 10 amps.
  - vi. Twin beam head light of 250 watts, 110 V d.c. as specified in Chapter-IV of this specification.
  - vii. Power required for forced cooling motor for rectifier shall be of 1 kW approximately.
  - viii. Cab Heater load one each of 1 kW in both the cab.
  - ix. The alternator shall have a rating of minimum 8 kW (Electrical load requirement shall be got approved from RDSO)
- 5.9.1 The insulation of the alternator shall be class "F" or better and the same shall not be affected by the Engine area environment, which may have traces of Diesel and Lube oil fumes.
- 5.9.2 Mounting: Suitable base frame and mounting arrangement shall be supplied alongwith the auxiliary alternator. The base frame shall have suitable belt tensioning provision. The base frame drawing shall be got approved by RDSO before manufacture. Driving and driven pulley dimensions, pulley groove details, material specification, box dimensions etc. Shall be furnished in a drawing and got approved.

**NOTE:** Alternatively, companion alternator made as an integral part of the main alternator may also be offered.

**5.10 Rectifier-Regulator:**

- 5.10.1 The rectifier-regulating equipment will be under frame mounted. The crimping sockets shall be of Dowell's make only. The rectifier regulator box shall have an openable front cover, which shall be capable of being closed and locked in position by suitable hinged bolts of M12 size and wing nuts.
- 5.10.2 The Rectifier-Regulator box shall be of protection level IP: 65 (Completely protected against dust and jet of water from all directions).
- 5.10.3 The Rectifier-Regulator box shall be Electro-galvanised and painted gray.
- 5.10.4 The Regulator shall have provision of potentiometers for current and voltage setting for adjustment depending upon the service conditions.
- 5.10.5 The overall efficiency of the alternator alongwith its Rectifier-Regulator shall not be less than 70%.
- 5.10.6 The Rectifier-Regulator shall conform to IEC: 60-571.
- 5.10.7 Details of the equipment shall be as per Annexure- 5.

**5.11 TESTING:**

The following tests shall constitute type tests which are to be carried out at the manufacturer's works to ensure compliance of the specifications.

**5.11.1 Type Test:**

- i. Verification of dimensions of assemblies of alternator, rectifier and regulating equipment.
- ii. Temperature rise test at minimum speed for full output as well as the maximum speed without Air over the auxiliary Alternator and the rectifier regulator box.
- iii. Insulation resistance test.
- iv. High voltage test
- v. Load test
- vi. Mechanical over speed and induced voltage test.
- vii. Drooping voltage characteristics test.
- viii. Current limiting characteristics test.
- ix. Surge protection test.
- x. Measurement of stator and field resistance.
- xi. Water tightness test for rectifier – regulator.

5.11.2 **ROUTINE TESTS:** All tests other than those indicated at serial nos. ii, vii and ix of type tests mentioned above, shall be OHE carried out.

5.12 **CONTROL AND INSTRUMENTATION:** The basic control scheme shall ensure matching of traction load with that of the diesel engine output preventing any overloading. The two power packs will independently feed two motors each (the motors fed from one power pack being on the same bogie). In case of failure of one power pack, it shall be possible to isolate the same, on line, by the driver, and the OHE car shall continue to be worked with the healthy power pack, at reduced power.

- 5.12.1 Motor speed will be controlled by varying the applied voltage. The two Traction Motors fed from one power pack shall be connected in parallel.
- 5.12.2 The tenderer shall furnish, along with schematic circuit diagrams, the power, auxiliary and control scheme proposed to be followed.
- 5.13 **Traction Control Gear:** General Design Consideration: Control gear for the motors and other switch gear shall comply with IEC:60-77 and shall be suitable for 110V D.C. supply.
- 5.13.1 The winding of all magnet coils shall be properly dried, impregnated, baked and moulded with epoxy resins.
- 5.13.2 All auxiliary machines operated on 110V D.C. supply shall be provided with adequately rated dc contactors.
- 5.13.3 All the contactors used for breaking dc current of value 10 A and above shall have properly designed arc chutes and blow out coils.
- 5.13.4 DC contactors shall be operated for one million operations during endurance test for an electrical endurance capability of 1 million operations at the rated voltage and current.
- 5.14 **SCOPE OF CONTROL GEARS:** Control gears which are in the scope of supply of the contractor shall comprise of all apparatus and connections necessary for the safe and efficient operation of the equipment and shall include the following.
- 5.14.1 The Control Gears shall include:
- i) Driver Desk
  - ii) Control Cubicle-1
  - iii) Control Cubicle-2
  - iv) Motor Switch group cubicle
  - v) Resistor Panel
- 5.14.2 Energizing and controlling Traction Alternator and main motor circuits and protecting these circuits from overload or short circuits.
- 5.14.3 Operating traction motor contactors, reversers, etc. By means of low voltage control circuits through any master controller and automatically regulating the same as required for operation.
- 5.14.4 Providing means for annunciation of different healthy and fault conditions, through necessary auxiliary contacts and LED indication lamps, for traction and brake circuits at the driving cab.
- 5.14.5 Providing low tension supply of the main lighting circuits, ventilation equipments, charging the 120 Ah, 110 V battery and driving of the auxiliary machines.
- 5.14.6 Earthing in an approved manner, all equipment boxes and cases supporting or containing live parts and

of the main traction motor and auxiliary machine circuits.

- 5.14.7 Protecting and isolating all auxiliary circuits by means of circuit breakers and by manually operated isolating switches or links and fuses.

## 5.15 CONTACTOR BOX(S)

- 5.15.1 All the power contactors of a power pack shall be housed and inter-connected through bus bar in a separate cubicle called "CONTACTOR BOX", which shall preferably be under slung however, alternate location may also be considered subject to clearance of the offered layout by RDSO and designed for IP-55 (hose proof) protection. For each OHE car, two such boxes shall be supplied (one per power pack).

- 5.15.2 **REVERSER:** Electro pneumatically operated reverser of proven design of reputed make duly tested and approved by RDSO/ICF/CLW for changing the direction of rotation shall be provided in each motor circuit. These shall be mounted in cubicle on the underframe and shall be of robust design, remote controlled and suitably interlocked to ensure that no movement can take place while they carry current. Provision shall be made for hand operation, in emergency. The reverser contact shall have self-wiping action.

- 5.15.3 Mounting arrangement shall be finalized at design approval stage.

- 5.15.4 **Motor Cut out Switch:** Two four position rotary switches, of RDSO/ ICF/CLW approved make one for motor 1&3 and other for motor 2 & 4 shall be provided. The first switch will have position marked as 'normal', '1 out', '1 & 3 out' and '3 out'. The second switch shall have markings 'normal', '2 out', '2 and 4 out' and '4 out'. The switches shall have sufficient contacts to provide various facilities for control as required including the following.

- (i) To energise the shunt coils of the current limit Relay to reduce the drop out power current value suitably, if any motor is cut out.
- (ii) To prevent operation of 'motor switches trip' lights when motor have been deliberately cut out.
- (iii) To permit operation of the unit while CABR is tripped provided that a pair of motors has been cut out.
- (iv) To control feeds to the individual motor contactors, to isolate the contactors and cut the motors out of the circuit.
- (v) All pneumatic equipments used in the power circuit shall be able to perform satisfactorily at minimum pressure of 5.0 kg/cm<sup>2</sup>.

- 5.15.5 **RELAY PANEL:**

- 5.15.6 **Alternators:**  
Earth fault relay – for earth faults in the traction circuit.

- 5.15.7 **Traction motor:**

- (i) Overload relay/ over current protection-resetting type with reset in the Driver's cab -Contactor Box

- (ii) Earth fault relay -Control Panel-1

- (iii) Scheme for isolation of faulty motor: A scheme of isolation shall be provided individually for all the

four traction motors to facilitate their isolation by the driver quickly. –Control Panel-1

5.15.8 All the control relays required for the system shall be supplied duly mounted on a panel, name-tagged, wired and properly terminated.

#### 5.15.9 INSTRUMENTS AND SAFETY DEVICES:

5.15.9.1 The following instruments & safety devices shall be part of supply for safe and satisfactory operation of the OHE car. The equipment and controls shall be arranged in both the driving cabs of the OHE car so that the OHE car can be worked from any one of the driving cabs. Interlocks shall be provided such that OHE car can be operated from one cab only at a time. The driver should be able to start or shut down the engine from his cab.

##### 5.15.9.2 Instruments:

##### 5.15.9.3 Diesel Engines.

##### 5.15.9.4 Switches, meters and gauges

- (i) Engine starting switch/ push buttons
- (ii) Lube oil pressure gauges
- (iii) Lube oil temperature gauges
- (iv) Cooling water temperature gauges
- (v) Battery charge/ discharge ammeter for 24 V battery.
- (vi) Engine hour meter and engine speed indicators
- (vii) Engine stop switch/push buttons
- (viii) Low cooling water level indicators
- (ix) Over speed devices
- (x) Emergency stop for engine by Borden wire

#### 5.16 Safety Devices:

- a) Water temperature too high- engine to idle. However, driver shall be able to raise the engine speed during the operation of the hot water temperature switch.
- b) Low lube oil pressure engine to shut down
  - c) Engine over speed - engine to shut down
  - d) Radiator water level low - engine to shut down
  - e) Low Hydraulic oil level - engine to shut down

#### A. Traction Alternator:

- a) Control battery (110 V) Voltmeters.
- b) Control battery (110 V) Ammeter
- c) For protecting the source, earth fault relay shall be provided.
- d) Earth fault relay – for earth faults in the traction circuit

**B. Rectifiers:**

- a) Traction Ammeter - To indicate the current drawn from rectifiers.
- b) Voltmeters reading phase to phase voltage

**C. Traction motor:**

- (i) Overload relay/ over current protection-resetting type with reset in the Driver's cab.
- (ii) Earth fault relay.
- (iii) Scheme for isolation of faulty motor: A scheme of isolation shall be provided individually for all the four traction motors to facilitate their isolation by the driver quickly.

**NOTE:** Recommended settings for all the aforementioned relays shall be specified by the tenderer.

5.17 **Control and Auxiliary Circuits:** All circuits shall be protected by MCBs of appropriate ratings and type. Ratings of the MCBs to be provided shall be furnished by the tenderer.

5.17.1 All coils of contactors and relays shall be provided with suitably rated freewheeling diodes.

**5.18 DRIVER'S CONTROL DESK.**

5.18.1 The Driver's Desk complete in all respect with all the control gear items duly fitted, wired and terminated on a terminal board shall form the scope of supply of contractor.

5.18.2 **DRIVER'S CONTROL SWITCH:** The driver's control circuit shall be energized through the driver's control key. The interchangeability provided shall be such that the key can be removed from the lock only when the switch is turned to off position and when the key has been removed, the switch cannot be turned to the ON position. The key shall be common for both drivers' key switches.

**5.18.3 MASTER CONTROLLER :**

- i) The number and arrangement of step shall be marked on the master controller.
- ii) Contacts and operating mechanism shall be easily accessible and of suitable design for railway service. All live portions and contacts, cables and terminal mountings within the master controller shall be kept well clear of exhaust from all pipe unions to, any pneumatic equipment.
- iii) The reversing drum operating boss shall be fenced in such a manner that the key can only be inserted and withdrawn when the drum is in the neutral/off position and the drum shall be mechanically interlocked so that it can only be placed in this position when the master controller handle is in the OFF position.

- iv) The master controller shall be fitted with a Dead Man's handle (depression type) designed to switch OFF power and apply brakes automatically whenever the driver releases his pressure on the handle, if it is in any but the OFF position and in the OFF position if the reverser key is in FORWARD or REVERSE positions. The Dead Man's handle mechanism shall be suitably enclosed to prevent interference with it or the insertion of any form of packing to wedge the handle down.
- v) Spare contacts provided to be paralleled to prevent the tower wagon from not responding in case of any bad contacts on any of the interlocks.

### 5.19 INDICATION LIGHTS :

- 5.19.1 The indications of LED type shall be provided in both driving cabs of the OHE Car as given in Clause – 5.20. Built in redundancy (with spare LED) should be there so that in case of failure of one LED the indication is available.
- 5.19.2 The "LED" indication provided in the OHE Car shall have illumination level of minimum 30 mcd High intensity type LED, capable of being seen even against Direct Sunlight. The arrangement of LED indication panel with LEDs connected with series resistor is NOT preferred.
- 5.19.3 The Driver's desk shall be fabricated preferably in single unit, however two parts can be considered at the time design drawing approval for ease of loading.

### 5.20 CONTROL PANEL

- 5.20.1 A suitably designed control panel shall be provided in the OHE car for housing all the control accessories. The panel shall be so situated so as to provide easy access to all the components for their maintenance /service.
- 5.20.2 Adequate Control Equipment including gauges, instruments and cab safety devices shall be provided for safe and satisfactory operation of the DETC. The controls shall be so arranged in the driver's cab that it will be within easy reach of the driver from all drivers' position. All gauges shall be of proven, reliable design and of LED lit type. Gradations of all gauges shall be in metric unit. Following gauges shall be provided in the cab:-
  - i) Diesel Engine lube oil pressure gauge.
  - ii) Cooling water temperature gauge (Electronic)
  - iii) Traction Motor load ammeter.
  - iv) Air brake gauges.
  - v) Battery charge and discharge ammeter.
  - vi) Water level indicator (Electronic)
  - vii) Speedo Meter.

The following audio-visual signals or reference panel lights shall be provided in the cab for operation of the inspection OHE Car:

- i) Low lubricating oil pressure
- ii) Lube oil temperature too high

- iii) Radiator water temperature too high
- iv) Engine 1 ON
- v) Engine 2 ON
- vi) Engine shut-down
- vii) Wheel slip indication
- viii) Battery discharge indication
- ix) Aux Gen failure indication
- x) Low idle rpm indication
- xi) Power ground
- xii) Cranking contactor welding indication
- xiii) Traction control supply ON
- xiv) Alternator 1 Excitation ON
- xv) Alternator 2 Excitation ON
- xvi) Alternator overload
- xvii) Alternator winding temp
- xviii) Alternator bearing temp
- xix) Engine 1 Trip
- xx) Engine 2 Trip
- xxi) Rectifier 1 fuse failure
- xxii) Rectifier 2 fuse failure
- xxiii) Rectifier 1 fan failure
- xxiv) Rectifier 2 fan failure
- xxv) Aux . Alternator failure.
- xxvi) Motor over load.
- xxvii) Motor Earth fault.
- xxviii) Parking Brake applied.
- xxix) Emergency Brake applied
- xxx) Drive function released.
- xxxii) Common annunciation.

The following safety devices, inter alia, shall be provided:

- i) Water temperature too high - Transmission cut off and engine returned to idle.
- ii) Low water in radiator-Power to transmission cut-off and engine shut down.
- iii) Low lube oil pressure- Power to transmission cut-off and engine shut down.
- iv) Engine speed too high (over speed trip)- Power to transmission cut-off and engine shut down Adequate protection of an approved design shall be provided against electrical over loads and grounding.

#### 5.21 **Surge suppression capacitors:**

Capacitors of suitable rating shall be wired in the control circuits to reduce the arcing at contacts of the relays to a minimum.

#### 5.22 **Operating Keys and Locks :**

One set of operating keys of the approved design and dimensions having the following function shall be provided with each unit:-

- (i) Door lock key.

- (ii) Driver's control Switch key.
- (iii) Master controller locking key, (Reverser key)
- (iv) Any other control key offered as necessary.
- (v) Brake controller key.

## Chapter – VI

### MISCELLANEOUS:

#### 6.0 Tools

- 6.1 Each OHE Car shall be supplied with a complete kit of tools and testing equipment required by a driver in an emergency and for normal working of the OHE Car. These will be arranged in a tool box provided in a cab. These tools are listed in annexure 8-A & 8-B.
- 6.2 A list of tools to be provided for use in Maintenance Depot shall include tools necessary for maintenance and repair of the entire OHE car including specified equipment for auxiliary and ancillary equipment. The tenderer should list and quote for these tools. The rate shall however not be used for tender evaluation purpose. It shall not be mandatory for railways to buy these tools.
- 6.3 All special tools shall be listed and catalogued illustrating the method of application.
- 6.4 Maker's test certificate -Copies of maker's test certificates guaranteeing the performance of the equipment/accessories shall be supplied in duplicate alongwith the delivery of each OHE Car.

#### 6.5 Weighment:

- 6.5.1 Each completed OHE car shall be weighed 4 times successively and vertical load exerted by each wheel on the track shall be measured, with due regard as to the accuracy of the measuring equipment. The pre-weighment run shall be over a section of track containing difference of levels. No alteration or adjustment shall be made to the OHE car after passing or adjustment shall be made to the OHE car after passing over this section of track and before weighment. The arithmetic mean of the values taken during 4 successive weighment shall be the value of measurements.
- 6.5.2 After weighment, a check shall be made to ensure the following:
- i) Total weight is within the nominal weight.
  - ii) Axle load is within +/- 2 % of the nominal axle load.
  - iii) The difference between the two wheel loads of any axle is not more than 4% of the axle load. First completed prototype OHE car shall be subjected to squeeze test to ensure that it shall withstand a maximum end load of 200 t without any signs or permanent distortion. The test conditions is specified in Clause-3.1.1.

## Chapter-VII

### INSPECTION

- 7.1 The whole of the materials or fittings used for works covered by this specification shall be subjected for inspection by the Inspecting officer to be nominated by the purchaser and shall be to his entire satisfaction.
- 7.2 The Inspecting officer shall have the power to: -
- a. Adopt any means he may think advisable to satisfy himself that the materials for fittings specified are actually used throughout the construction.
  - b. Take samples for such tests as he may consider necessary by an approved Metallurgist selected by him, whose report shall be final and binding on the contractors.
  - c. Visit at any reasonable time and without previous notice the contractor's works to inspect the progress and quality of the work and the contractor shall provide free of charge all equipment and labour required by him for this purpose.
  - d. Reject any material or fittings that do not conform to the relevant specification or good practice, which shall be marked in a distinguishable manner, and shall be disposed off in such a manner as the Inspecting Officer directs. Such rejected parts shall be replaced by the contractor without extra charge.
- 7.3 Tests of materials and fittings shall as far as possible be OHE carried out at the works of the maker's of the materials or fittings. The contractor shall provide such additional materials or fittings as may be required or arrange for test pieces to be incorporated in forgings and castings as required by the Inspecting Officer and for their removal in his presence for test purposes. All tests in the works of the contractors and their sub- Contractors shall be at the cost of the contractors.
- 7.4 No material shall be dispatched or packed until it has been passed by the Inspecting Officer. Such passing shall in no way exonerate the contractor from their obligation in respect of quality and performance of the OHE car.
- 7.5 In the event of dispute between the Inspecting Officer and the Contractor, the decision of the purchaser shall be final and binding.
- 7.6 **Radiographic testing of steel castings.**
- 7.6.1 All steel castings wherever used and welding joints shall be subjected to radiographic testing after manufacture / repair, to a suitable scheme/ standard suggested/approved by RDSO.
- 7.7 One of the power bogies shall be subjected to exhaustive stationary tests at Contractor's works in the presence or RDSO representative. The tests on bogies shall include dynamic fatigue testing and strain measurement. The test shall be under simulated loading conditions to represent the service load. The body shell shall also be subjected to loads for validating the design calculations of shell. The contractor shall afford all facilities for conducting these tests at his cost.

## 7.8 **Acceptance tests.**

Besides the checking and testing OHE carried out during manufacture and before dispatch of the OHE car to India it shall be subjected to the following tests before final acceptance.

### 7.8.1 **Performance capability tests.**

The OHE car shall be subjected to tests to establish its performance based on the supply by the tenderer against the specification. The contractor shall at his own expense provide the services of competent Engineers/Supervisors and supporting staff during the performance capability tests of the prototype.

### 7.8.2 **Riding quality tests.**

The riding quality tests shall be based on detailed oscillation trial conducted at a speed 10% higher than the maximum specified operating speed on a section of mainline track conforming to test stretch as mentioned in 3<sup>rd</sup> criteria committee report to establish the performance at the specified maximum operating speed.

7.8.3 Emergency Braking Distance (EBD) and haulage capability Test shall be conducted.

7.8.4 The following shall be the track standards of the test section:

(i) **Track structure:**

The track shall be to a minimum standard of 90 R rail on sleepers with M+ 4 densities and minimum depth of ballast cushion below sleeper of 200 mm, which may consists of at least of 75 mm clean and the rest in caked up condition on compact and stable formation. However speed will depend on the axle load, Axle spacing, dynamic augment value the rolling stock etc.

(ii) **Permitted irregularities:**

The track is maintained as per Indian Permanent Way Manual and para 607 (i) gives details of track category for various parameters. Third report of criteria committee shall be considered for number of peaks per kilometer, if specified any.

## ANNEXURE - 1

## LIST OF EXHIBITED DRAWINGS

Sl.No	Drawing No.	Description	Clause Ref.
1.	Diagram ID 1676 mm gauge (BG) of IR schedule of dimension	Maximum moving dimension.	2.2.6
2.	RDSO/SK.No.99003	Draw gear arrangement	3.8.4
3.	RDSO/SK.No.98145	Side buffer arrangement	3.8.4
4.	RDSO/SK.No.99001	Screw coupling assembly.	3.8.4
5.	C/BF/113	Tail lamp bracket.	3.14 (iii)
6.	W/WL-1660	Wheel	3.21.2
7.	RDSO STR No.56-BD-07	For CBC	3.19
8.	ICF Drg No WL.RRM4-7-3-401 with latest alteration	Roof Ventilators	3.2.3
9.	ICF Drawing No ICF Drawing No.AC/EMU /M/ASR-0-0-001 with latest Alteration.	Bogie design	3.6.2
10.	RDSO Drawing No. SK-K4004	Wheels	3.7.2
11.	ICF Drawing No. EMU/M-3-2-064 (Latest)	Brake Rigging	3.8.2
12.	ICF EMU/4C/ASR-5-4-402 with latest alteration	Lift type window made of powder coated aluminum	3.3
13.	RCF Drawing No.EM.26108 (Latest)	Cattle Guard	3.15
14.	ICF Drawing No. EMU/M.ASR-41-001 with latest alteration.	Flooring construction of the vehicle	3.13
15.	RDSO sketch No 91146 with latest alteration	The wheel profile.	3.7.4
16.	RDSO's approved source	Tapper Roller Suspension Bearing	5.8.16

## ANNEXURE - 2

**List of Drawings/calculations to be submitted to RDSO for approval before undertaking manufacture of prototype inspection OHE car**

Sl.N.	Drawing/Documents to be submitted to RDSO for approval
1	Layout of OHE car
2	Suspension arrangement.
3	Helical coil spring
4	Load vs deflection diagram of helical coil spring
5	Suspension calculation
6	Enlarged View of Driver's window
7	Normal Visibility diagram of Driver
8	Cooling circuit diagram
9	Axle Box Guide arrangement
10	Brake rigging assembly
11	Schematic Diagram of Brake system
12	Braking effort and Emergency Braking Distance calculation on plane section with maximum load and without load.
13	Wheel and axle (non powered)
14	Wheel Diameter 952 (machined)
15	Shell arrangement
16	Side wall assembly ( Right)
17	End wall (Right)
18	Roof Assembly
19	Transverse cross section
20	Vogel Diagram
21	Alignment of OHE car
22	Power pack arrangement
23	Under frame arrangement
24	Trammeling diagram
25	OHE Car lifting arrangement
26	Details of weight transfer calculation.
27	Loading Diagram
28	Roof Equipment layout
29	Estimated weight of the OHE Car structure and weight of principal assembly mounted on the OHE Car
30	FEM calculation of body shell and bogie.
31	Un sprung mass OHE car
32	Calculation of centre gravity from rail level and Balancing calculation under tare and loaded condition.
33	Power pack arrangement

34	Axle (powered)/ Motorised Bogie.
35	Axle drive Gear box assembly
36	Fuel Tank
37	Enlarged view of drivers window
38	Ant pilferage measure
39	Checking of squareness of door and end wall
40	Measurement of deflection of underframe.
41	Measurement of distortions of doorways along the length of OHE car
42	Measurement of distortions of shell across width at door way
43	Drawing showing location of strain gauges on the under frame.
44	Speed v/s Tractive Effort characteristics of OHE Car
45	The block diagram showing power circuit.
46	Calculation for safety against derailment. Calculation for stability of the OHE car against wind force.
47	Details of weight transfer calculation.
48	Electrical wiring diagram for electrical gadgets.

## ANNEXURE-3

The following details pertaining to electrical equipment shall be submitted by the tenderer :

## I. Diesel Engine

1. Exact description and model of the engine
2. Rated output under UIC site conditions
3. Site Conditions
  - Ambient Temperature 55 °C
  - Altitude above mean sea level 1000 m
  - Relative humidity above 40%
4. Rated speed at continuous rating
5. Type of cycle (two/four stroke)
6. Method of pressure charging
  - Pressure ratio of compressor at the rated output
  - Single stage/two stage
  - No. of turbochargers used
  - Make and model of turbocharger
7. Type of exhaust system  
Constant pressure/pulse type/multi pulse type
8. Method of cooling the charge air
9. Type of combustion chamber
10. Fuel injection equipment
  - Type of injection system
  - Diameter of pump plunger
  - Nozzle opening pressure
  - Maximum duration of injection in degrees of crank
11. Number, arrangement and angle of cylinder.
12. Cylinder bore
13. Piston stroke
14. Cubic capacity/cylinder
15. Compression ratio
16. Firing order
17. Mean piston speed at rated speed
18. Brake mean effective pressure
19. Maximum combustion pressure at no load at minimum idling speed
20. Compression pressure at rated output
21. Minimum no-load idling speed – whether a low idle feature is provided on the engine
22. Minimum no load speed under steady conditions
23. Speed ranges which should not be used continuously
24. Break away torque when the cooling water temperature is 5 °C

25. Minimum firing speed when the cooling water temperature is 5°C or at the lowest possible temperature of air intake air in rev/minute.
26. Torque resistance to the firing speed required to turn the engine when the cooling water temperature is 5 °C at the lowest temperature of intake air.
27. Piston
  - i. Type of Piston used – whether single piece or composite
  - ii. No. of piston rings used.
  - iii. configuration of the rings
  - iv. whether all the rings are located above the gudgeon pin
  - v. method of cooling required for the piston
  - vi. oil flow rate and temperature of oil at the piston outlet
28. Cooling system
  - i. Single/double cooling circuit
  - ii. Whether cooling system is pressurized
  - iii. Coolant temperature at outlet from the engine
  - iv. Heat absorbed by the cooling water at the rated output
  - v. Rate of flow of water
  - vi. Inter cooler coolant temperature at entry to the cooler
  - vii. Treatment recommended for water
29. Lube Oil System
  - i. Temperature of cooling oil with the indication of the point of measurement
  - ii. Maximum permissible temperature of cooling oil
  - iii. Heat absorbed by the cooling oil at rated output
  - iv. Swamp capacity
  - v. Quantity required to commission
  - vi. Brand of oil recommended
30. Consumption of lubricating oil at the rated output in litres/hour and as a percentage of fuel consumption.
31. Total capacity of lubricating oil pump (s) at the rated output speed in litres/min
32. Lubricating oil pressure at rated speed on entering the engine and at the normal operating temperature
33. Maximum pressure of charge air in the intake manifold at the rated output.
34. Maximum pressure of gases at the turbo inlet at the rated output
35. Maximum speed of the turbocharger at rated output
36. Maximum permissible speed of the turbocharger.
37. Temperature of exhaust gases at turbo inlet at the rated output under UIC and site conditions.
38. Maximum permissible temperature for which the turbocharger components have been designed
39. Heat balance of the engine
40. Weight of the engine complete with all items excluding water and lubricating oil.
41. Weight of water contained in the engine
42. Weight of oil contained in the engine
43. Weight of major components to be handled during maintenance
  - i. Turbocharger
  - ii. Inlet cooler
  - iii. Crank case bare

- iv. Crank shaft
  - v. Piston and connecting rod
  - vi. Cylinder liner
  - vii. Cylinder head
  - 44. Specific fuel consumption with the tolerance band under UIC and site conditions – indicate the lower heating value of the fuel used in arriving at the specific fuel consumption figures
  - 45. Fuel oil consumption at idle in litres/hour
  - 46. Requirement of fuel specification or any other restriction on the use of fuel with different sulphur contents
  - 47. Number of such engines used in rail traction and the period since the engines have been in service and their performance
  - 48. Safety devices provided on the engine
    - i. Over speed
    - ii. low lube oil pressure
    - iii. overload
    - iv. high exhaust temperature
    - v. high intake temperature
    - vi. any other
  - 49. Specification of lube oil suitable for engine
  - 50. Method of starting
  - 51. Governor
    - i. Make and type
    - ii. Full load speed and drop characteristics
    - iii. Torque required at the output shaft
  - 52. Estimated period between top and major overhauls
  - 53. periodicity of overhauling the following critical components
    - i. Turbocharger
    - ii. Piston and piston rings
    - iii. Cylinder liner
    - iv. Air and exhaust valves
    - v. Fuel pump
    - vi. Injector/Nozzle assembly
    - vii. Main bearings
    - viii. Connecting rod bearings
  - 54. Whether the diesel engine is suitable for satisfactory sustained operation under :
    - i. Site conditions mentioned in para 2
    - ii. Dusty environment
    - iii. Frequent starting and stopping of diesel engine
    - iv. Average load factor 60%
  - 55. Inlet and exhaust valve timings
  - 56. Special design features of diesel engine highlighting the measures which have been taken to achieve :
    - i. Low specific fuel oil consumption
    - ii. Low lubricating oil consumption
    - iii. Low idling fuel oil consumption
    - iv. High reliability
- Maximum availability
- Reduced level of thermal and mechanical loading of critical components

57. General arrangement and dimensional details.
58. Characteristic curves of diesel engine under UIC and site conditions-
- i) Curves for torque, output and specific fuel consumption expressed and guaranteed without upper tolerance for different settings of the injector pump, i.e.
    - Setting at which the engine develops the rated output at its rated speed.
    - Setting at which the engine develops  $\frac{3}{4}$  of the rated output at its rated speed.
    - Setting at which the engine develops  $\frac{1}{2}$  of the rated output at its rated speed.
    - Setting at which the engine develops  $\frac{1}{4}$  of the rated output at its rated speed. rated speed.
  - ii) The torque speed curve which the manufacturer considers to be the maximum torque that should be used for rail traction. This should cover the range from idling speed to the point corresponding to the international rated output at the rated speed.
  - iii) The curve of fuel consumption for no-load running, commencing from the minimum idling speed, expressed in litre/h

## ANNEXURE -4

**TRANSMISSION SYSTEM PARTICULAR**

- I Alternator**
1. Description Make & type
  2. Drive – Details of arrangement of bearings and coupling
  3. Classification – No. poles, number of phases and phase connections
  4. Maximum permissible speed –  
Max. voltage a.c.  
D.C. (i.e. rectified) Max.  
current a.c..
  5. Rating -
    - i) One hour rating – Voltage, current, output & speed
    - ii) Continuous rating –
      - (a) High voltage
      - (b) Low voltage
  6. Class and type of insulation
    - a) Stator
    - b) Rotor
  7. Temperature rise
    - a) Rotor winding
    - b) Stator winding
  8. Resistance at 25 °C
    - a) Rotor winding
    - b) Stator winding
  9. Synchronous impedance at max. frequency and load
  10. Stator details
    - a) Overall dimensions
    - b) No. and size of slots
    - c) Winding
      - i) Type
      - ii) Conductor size and material
      - iii) Turns per coil
      - iv) Pitch
  11.
    - a) Rotor-type, No. of poles, length, bore, size and air gap
    - b) Details of rotating armature exciter and rectifier assembly
  12. Bearing:
    - a) Single or double
    - b) Type-sealed or open
    - c) Grease-type, capacity and time interval for regreasing
    - d) Bearing life and shaft size calculations.
  13. Mountings – Details of mounting arrangement.
  14. Coupling-Type and details
  15. Cooling  
Calculations of cooling capacity

16. Weight
  - a) Complete unit with accessories
  - b) Alternator only
  - c) Rotor (with fan if any)
17. Characteristic curves
  - a) Natural curves
  - b) V-I curves (Notch wise)
  - c) Efficiency vs. current
18. Tests : Results of –
  - a) Type test
    - i) Temp. rise test and its calculation
    - ii) Rating
    - iii) Characteristic curves
  - b) Routine test
    - i) Temperature Rise Test
    - ii) Over speed Test
    - iii) Dielectric Test
19. Tractive Efforts vs. Road Speed curve along with Alternator Rectifier Current vs. Voltage curve showing method of calculations.

## II Auxiliary Alternator with Rectifier – Regulator

1. Make
2. Model
3. Continuous & short time rating and details of voltage and current regulation
4. Bearing life and shaft size calculations.
5. Weight

## III Traction Motor

### 1.1 Type

1. V - volts
2. I - Amps
3. N – rpm
4. S – km/h
5. N max/N
6. N shaft
7. N max

### 1.2 Armature

1. Diameter.
2. Length

3. Air ducts – surface  
- section
4. No. of slots.
5. Conductor size.
6. Conductor area.
7. A) Continuous..... for.....amps  
1 Hour .... for ..... amps
8. Continuous ..... A/sq.mm for.....A  
1 Hour..... A/sq. mm for.....A
9. A) Continuous .....  
1 Hour .....
10. ADNL  $10^{-9}$ ..... at cont FF  
.....at 1 hr rating  
.....at S max.
11. B (B/A) ..... at cont FF  
.....at 1 hr rating  
.....at S max.
12. S max..... km/h
13. N max..... rpm
14. Wheel dia (half worn)
15. Gear Ratio (New)
16. Suspension
17. Armature bearing – commutator end  
- pinion end
18. Turns/coil
19. Type of winding
20. Coil Throw
21. Length mean turn
22. Resistance at  $110^{\circ}\text{C}$
23. Inductance at 30 cps.
24. Weight of copper (kg)
25. Tooth volume
26. Core volume
27. Arm. Turns/pole
28. Arm. At/pole - FF
29. Arm. Core int.dia
30. Net core depth
31. Arm. Steel tech. spec.
32. Banding material
33. No. of bands cc
34. Band width.
35. S (cont) ..... M/s ..... rpm ..... km/h

- 1.3 Main poles
1. Insulation
  2. Number
  3. External ..... D Internal ..... D
4. Number of turns per pole.
- Frame end Arm  
end
5. Conductor dimension – Frame end  
- Arm. end
  6. Current density - Frame end  
- Armature end.
  7. Length of mean turn - Frame end  
- Armature End
  8. Resistance at 110°C
  9. Inductance at 50 cps
  10. Radial gap length - Tip  
Centre  
Mean  
Eff
  11. Field At  
----- @ FF  
Arm. AT
  12. Pole Arc.
  13. Total fringe
  14. Eff. Pole arc
  15. Eff gap area
  16. Pole flux density.
  17. Pole copper weight.
  18. Pole steel tech spec.
  19. Yoke steel tech. spec.
- 1.4 Commutation poles
1. Insulation
  2. Number
  3. External ..... D Internal ..... D
  4. Number of turns per pole – Frame end  
- Arm end

- |     |                             |                                      |
|-----|-----------------------------|--------------------------------------|
| 5.  | Conductor dimensions        | - Frame end<br>- Arm end             |
| 6.  | Current density             | - Frame end<br>- Arm end             |
| 7.  | Length of mean turn         | - Frame end<br>- Arm end             |
| 8.  | Resistance at 110° c        |                                      |
| 9.  | Inductance at 50 cps        |                                      |
| 10. | Radial gap length           | - Tip<br>- Centre<br>- Mean<br>- Eff |
| 11. | Int. Pole flux density      |                                      |
| 12. | Copper weight               |                                      |
| 13. | Pole steel tech. spec.      |                                      |
| 1.5 | Equalizers (commutator end) |                                      |
|     | 1. Total number             |                                      |
|     | 2. Copper weight            |                                      |

- 1.6 Ventilation
1. Number of fans
  2. .... Flowm<sup>3</sup>/min (at continuous speed)
  3. N ..... rpm      N max  
(overspeed)
- 1.7 Commutator and brushes
1. Useful diameter
  2. Useful length
  3. No. Of commutator bars.
  4. Bar pitch
  5. Average bar/brush
  6. Voltage between segments
  7. Reactance voltage
  8. Insulation thickness between bars.
  9. Number of brush arms
  10. Brush/arm
  11. Brush/size
  12. Quality
  13. Current density  
For..... Amps (cont)  
For..... Amps (1Hr.)  
For..... Amps (start)
  14. S (cont) ..... m/s.....rpm
  15. S (1hr) ..... m/s ..... rpm
  16. S (max ) ..... m/s.....km/h
  17. Type of commutator construction
- 1.8 Weight
- |    |                         |               |      |
|----|-------------------------|---------------|------|
| 1. | Motor without gearing   | ..... kg..... | N    |
| 2. | Armature without pinion | .....kg.....  | N    |
|    |                         | CONT          | 1 Hr |
|    |                         | kg            | N    |
|    |                         | kg            | N    |
3. Wt/kw
  4. Wt/hp
  5. Pinion (kg)
  6. Gear wheel (kg)
  7. Gear case (kg)
  8. Frame (kg)
  9. Total weight (kg)
- 1.9 Losses and Efficiency  
1 Hour Continuos

1.  $I^2 R$  (ARM)
2.  $I^2 F$  (Series)
3. Core
4. Brush drop
5. Brush friction
6. Bearing F and W

#### 1.10 Magnetic Circuit

1. 1 hr rating values

	<u>Magnetic</u>	<u>FF<sub>Leakage</sub></u>
	Area	length
Tooth		B
Core Pole		AT
Yoke Gap		
Total AT		

#### 2.0 Gears and pinions

1. Type of gearing
2. Module
3. Grade of steel used for pinions and gears
4. Particulars of heat treatment
5. Kilometerage guarantee for bull gears

6. Kilometerage guarantee for pinions
7. Material and type of construction for gear case.

#### IV. Power Rectifier

1. Diode – Make & type
2. No. of parallel paths & no. Of diodes /path
3. Overall dimensions of rectifier unit
4. Ratings
  - a) Current Rating
    - max. Cont. (direct) forward current
  - b) Thermal Rating
    - Max. & Min. Operating junction temp
    - Max. & Min. Storage temperature
5. Resistance
  - a) Forward
  - b) Reverse
6. Details of damping circuit
  - a) Resistance value & circuit
  - b) Capacitance value & connection
7. Bus bar arrangement
8. Weight
9. Mounting arrangement
10. Characteristic curves
  - a) Voltage vs. Current
  - b) Power dissipation as a function of reference point temperature
11. Semi-conductor fuses
  - a) Make
  - b) Fusing characteristics
  - c)  $I^2 t$  characteristic

## ANNEXURE-5

## POWER RECTIFIER SPECIFICATION

**1.0 Technical requirements including the design features.**

1.1 The rectifier unit shall comprise of three phase full wave bridges using silicon diodes. It shall preferably consist of three separate bridges connected in parallel on the input and output side.

**1.2 Device Rating**

1.2.1 The current rating of the devices shall be such that even under one bridge (n-1) failure condition the rectifier, with two remaining effective three phase bridges shall be capable of meeting the full Tractive power duty/duty cycles and abnormal conditions including short circuit.

1.2.2 An unbalance of 20% shall be considered in the sharing of the load between the bridges, for design purposes, though, in actual testing the unbalance shall be limited to 10% only.

1.2.3 The diodes shall have a PIV rating of not less than 3000 V or not less than 2.8 times the maximum crest working voltage whichever is higher.

1.2.4 Characteristics curves of the diodes indicating power loss, forward voltage drop, slope resistance, thermal resistance characteristics and characteristics curves of the fuse shall be submitted in A4 size.

1.2.5 The permissible junction and case temperature for the device shall be declared.

1.2.6 Diodes in the cubicle shall belong to one FVD group while they shall be in three consecutive FVD groups for all the units to be supplied. FVD shall have a band width of 50 milli-volts at the full rated diode current.

1.2.7 The semiconductor device junction temperature shall be calculated for (n-1) condition operation at rated permissible current for three duty cycles after temperature stabilisation in heat run test at a current value equal to the one hour rating of the traction motors.

For this purpose, RMS value of the starting current over the notching up duration for 1 minute followed by RMS value of the steady state one hour rating current for eight minutes, followed by zero current for thirty seconds will form one cycle. At the end of three such successive cycles the junction temperature shall be computed. There shall be enough margin.

1.2.8 The devices shall meet all the requirements as per IS:7788.

1.2.9 The use of capsule type diodes are acceptable.

**1.3 Snubber and Damping Networks**

1.3.1 Each diode shall be provided with RC network to overcome the hole storage effect.

- 1.3.2 RC damping networks shall be provided to protect against switching surges expected. Supporting calculations shall be furnished.
- 1.3.3 The resistors and capacitors for the RC network shall be respectively of silicon coated, non-bursting type suitable for traction duty duly approved by RDSO.
- 1.3.4 Resistances – Silicon coated, non-inductive, wire wound resistors and stud mounting type with lug terminals shall be used. The wattage ratings shall be three times the calculated maximum wattage in the circuit under worst loading and high ambient conditions.
- 1.3.4 Capacitors – shall be of non- bursting type. The clearance and creepage distance between the live terminals and also the body shall comply with table 5 of IS-7788. The maximum working voltage across any capacitor shall not exceed 50% of the rated repetitive voltage. In the case of hole storage capacitors, the voltage rating shall not to be less than PIV rating of the semiconductor device. The capacitors shall be designed for operation at 85 °C. The capacitors will be of IOHE CAR of GE make. Use of indigenous make shall have the prior approval of RDSO.

#### 1.4 Fuses

- 1.4.1 The diodes shall be protected by semi-conductor fuses whose selection shall be supported by the calculation to ensure their matching with the diodes.  $I^2 t$  values for the diode shall be more than the  $I^2 t$  for the fuse. Diode and fuse characteristics shall be furnished along with the tender. The fuse selection shall withstand the short circuit current expected.

**Note:** The expected short circuit current/impedance with duration shall be specified.

- 1.4.2 The semiconductor fuses used for the diode protection shall be of approved makes. Fuses of la Ferraz, Bussman or English Electric make only are approved at present.
- 1.4.3 Since the rectifier unit consists of multi-bridges connected in parallel, signaling fuses, associated suitable relays and micro switches shall be provided to given an indication in case of single bridge failure and to trip the load on the alternator in case of double bridge failure.

#### 1.5 Constructional Features

- 1.5.1 The tenderer shall submit details of the overall dimensions of the rectifier along with the offer.
- 1.5.2 The cubicle as well as internal sub-assemblies shall be interchangeable from one unit to the other.
- 1.5.2.1 The cubicle shall be of cold rolled steel metal sheet with strong frame work suitable for underframe mounting to withstand shocks and vibrations encountered in service run with a maximum speed of 105 kmph. This shall be protected against damages due to ballast hitting. The minimum thickness of panels shall be 12.0mm and may be increased as panel width increases as mentioned below.

<u>Maximum Panel Width</u>	<u>Thickness</u>
Upto 750 mm	2.0 mm
> 750mm but < 1500 mm	2.5 mm
>1500 mm but < 2000 mm	3.2 mm

1.5.2.3 The cubicle shall be provided with two numbers of earthing bosses with M12x20 tapped hole on each side. The bosses shall have 5 mm thick copper/brass plate brazed.

1.5.3 Easily interchangeable inspection doors with locking arrangement shall be provided to facilitate easy access to vital parts like fuses, diodes etc.

1.5.4 Withdrawable bridge racks consisting of diodes, fuses and associated components shall be provided on rails for withdrawing during maintenance.

1.5.5 The equipment layout shall provide easy accessibility for maintenance.

1.5.6 Suitable ventilating louvers shall be provided for air outlet.

1.5.7 The devices with heat sink shall be mounted of FRP (SMC)/ Epoxy panels of adequate thickness (not less than 10mm) with hand holds for easy removal and insertion in position.

1.5.7.1 Heat sinks shall be of extruded constructions. The sand casted or gravity die casted are not acceptable. OHE care shall be taken to have proper surface finish and surface flatness. Current collection through heat sink shall be avoided. In case it is not possible, the heat sink device mounting surface and the current collection contact area shall be treated to prevent electro corrosion and bimetallic action.

1.5.7.2 Recommended optimum pressures for mounting the devices on the heat sink shall be furnished. Suitable thermal compound having low thermal resistance shall be used to fill up the void between the mating surfaces of heat sink and device. The same shall seal the joint against moisture.

**Note :** Transient thermal impedance characteristics curves of the heat sink at different cooling air rate shall be submitted for approval.

1.5.8 Blower shall be mounted as an independent unit connected suitably to the duct with adequate resistance to reduce vibrations. Blower Motor shall be easily accessible for maintenance.

1.5.9 The unit shall be painted with two coats of red oxide followed by two coats of white stove enamel on inside and aircraft grey on outside to IS-5:1961.

1.5.10 Fasteners used in the cubicle shall be of minimum M6 and screws of M10 and above shall be of high tensile strength.

- 1.5.10.1 Studs of the terminal board shall have adequate current rating with minimum size not less than M6 and shall be coated with cadmium plating. The method of connections shall be such that the current should not pass through the studs. Number of connections per stud shall be limited to two. The insulating boards shall be fire retarding FRP sheet moulding type. They shall pass the fire retardant test as per specification IS – 2046. Separate terminal board shall be provided for different voltages. Positive and negative terminals shall be separately located. All the terminal studs shall be legibly identified with their circuit numbers.
- 1.5.11 The bus sizes on the a.c. & d.c. sides shall be such that the final temperature when corrected to 47 °C ambient is not more than 100 °C copper bus bar must be tin plated after bending/drilling the required holes, with thickness of plating not less than 8 microns.
- 1.5.11.1 The bus bars used shall be of high conductivity electrolytic copper as per IS:613 with current density not exceeding 4 A/mm<sup>2</sup>. The bus bar shall have colour code with red, yellow and blue on the a.c. side and brown and black respectively for positives and negatives on the d.c. side. Bus bars supports shall be made with insulators and be identified by engraving the respective circuit numbers with contrast colour paint applied on the engraved marking.
- 1.5.12 All the cable wire ends shall be terminated with suitable sockets using proper dies and tools.
- 1.5.13 Cables – All the cables/wires shall be multi-strand flexible insulated cables conforming to E/14-01/parts I,II and III. PTFE insulated cables of adequate voltage rating and size shall be used for inter-connection snubber circuits and signaling fuses.
- 1.5.14 All the wires shall be numbered with cables ferrules of approved design on both ends of the cables.
- 1.5.15 Wiring layout- The quality of workmanship and layout of wiring shall be of high standard to ensure long life. The following guidelines shall be kept in view.
- a) Complete separation of low, medium and high voltages.
  - b) Separation temporarily and permanently energised cables with separate bunching.
  - c) Avoiding of sharp bends.
  - d) Provision of grommets for cables entries.
  - e) Supporting of cable bunches with insulated supports using nylon ties.

## 2.0 Tests :

- 2.1 Type tests on silicone diodes – At least ten diodes shall be subjected to type tests as per IS-7788 in the presence of RDSO Inspecting Official sufficiently in advance to avoid delay of prototype testing of the rectifier unit.
- 2.2 Routine tests on each diode shall be conducted as per IS-7788 and the results recorded by the

manufacturer. 10% of the lot offered selected at random shall be subjected to routine tests in the presence of inspecting official of RDSO.

### **2.3 Type test on Rectifier assembly:**

- 2.3.1 Temperature rise test – with normal ventilation, the rectifier shall be subjected to the duty cycle expected on the traction motors with the temperature maintained at 47°C and until steady temperature is obtained. The temperature stabilisation can be deemed when three successive readings taken at 15 minutes intervals do not vary by more than 0.5 °C. The maximum diode junction temperature arrived shall be less than the permissible junction temperature as declared by the diode manufacturer after the duty cycles as described in clause 1.2.7 of Annexure-5. The temperature rise test shall be conducted both for n and (n-1) bridge conditions.
- 2.3.2 Heat run test with (n-1) parallel paths will be conducted on first prototype and afterwards the test may be conducted corresponding to normal duty cycle with all bridges in operation.
- 2.3.3 Fuse blade temperature and bus temperature shall not exceed 100 deg. C for (n-1) parallel paths.
- 2.3.4 Instruments used for type testing shall be of 0.5 class accuracy and shall have been calibrated within 6 months from the date of testing.
- 2.3.5 Power losses measured for the diodes shall not exceed 10% of the declared value.

### **3. Guarantee:**

The diodes of the main Rectifier shall be guaranteed for satisfactory working for a period of five years from the date of commissioning.

**ANNEXURE - 6****DESIGN OF TRACTION MOTORS AND SWITCH GEARS**

- 1.0 Number and arrangement of motors
- 1.1 Each OHE car shall be fitted with four numbers of DC series traction motors, two on each bogie. The motors shall be axle hung nose suspended type and shall be series wound, working on the pulsating current. The motors shall be designed to comply with the conditions stipulated in IEC-60349. The temperature rise allowed by IEC shall be reduced by 30 Deg. C, to allow for higher ambient temperatures. All motors shall be permanently connected in parallel.
- 1.2 The motor shall be designed to comply with the operating requirements specified with exceeding the temperature-rise limits.
- 1.3 The motors shall be so designed that severe damage will be avoided in case of transients such as fluctuations of the voltage, switching surges. The traction motor circuit shall comprise all the protective devices which will prevent any damage to them due to transients. The general design and maintenance of the motors shall be of the highest standard in accordance with the modern traction practices. The particulars of the motors shall be furnished as per Annexure 4.
- 1.4 The motor contactor shall be of Electro-pneumatic type with blow out coils and arcing horns etc. to break the current without detriment to their working parts or adjacent equipment. All contact tips, interlocks, pins and plungers shall be easily assessable for maintenance. The motor contactor shall be capable to open the circuit on overload and under fault condition.

## ANNEXURE -7

## PARTICULARS TO BE SUPPLIED FOR THE INSPECTION OHE CAR

The following data shall be supplied for the OHE car along with the tender offer:

1	Length of the OHE car over head stock.	...mm
2	Total wheel rigid base	...mm
3	Height of OHE car floor (under tare)	...mm
4	Distance between bogie centers.	
5	Distance between side buffers	...mm
6	Height of buffers when wheels are:	
	(i) New .....	mm
	(ii) Fully worn out.....	mm
7	Maximum height of the OHE car with wheels in new condition.	...mm
8	Maximum height of the cab at corners with wheels in new condition.	...mm
9	Maximum width of the OHE car.	...mm
10	Minimum height above rail level of any component with the OHE car wheels in maximum worn conditions.	...mm
11	Reduction in the above height in the event of spring rigging failure.	...mm
12	Diameter of wheels over tread	...mm (new) ...mm (worn out)
13	Axle load	...t (max.) ...t (min.)
14	Total weight of the OHE car.	
	- in fully loaded condition	...t
	- in empty condition	...t
15	Maximum speed of the OHE car.	
	- attached to a train	...km/h
	- Self-propelled	...km/h
16	Maximum Tractive effort at rail	...kg
17	Maximum continuous Tractive effort	...kg
18	Maximum speed of operation at maximum continuous Tractive effort.	...km/h
19	(a) Fuel oil consumption at 75% of rated output of the diesel engine.	...litre/h
	(b) Lubricating oil consumption at 75% of rated output of the diesel engine.	...litre/h

## Annexure-8-A

List of tools for maintenance work and repair of minor fault.

Sl.No.	Tool description	Make	Quantity
1	Box spanner set 10-34 mm		1 set
2	Ring Spanner 6-33 mm		1 set
3	Double end spanner set 6-36 mm		1 set
4	Grease gun		1
5	Torque wrench EVT 2000@		1
6	Pipe wrench 18"		1
7	Hammer 2 Lbs		1
8	Screw Driver 6"		1
9	Screw Driver 12"		1
10	Chisel 6"		1
11	Cutting plier		1
12	L N key set 3 to 17		1 set
13*	Emergency Spares		1 Kit
*Emergency Spares: consists of Fuses, Control Panel lamps, MCBs and Critical Hoses.			
Make to be indicated in the column			

## Annexure-8-B

Testing Kit for 8-wheeler Diesel electric Inspection & Maintenance Car.

Sl.No.	Tool description	Make	Quantity(Nos)
1	Injector adjustment Kit		1
2	Vacuum gauge 90-30 inch of Hg)		1
3	Pressure Gauge( 0-30 PSI)		1
4	Hand tacho Meter(0-3000 RPM)		1
5	Dial gauge (Least Count=0.001")		1
6	Magnetic gauge		1
7	Megger 500 V		1
8	Multi-Meter (DC Range: 400 mV AC Range: 400mV-750 V) Resistance: 400 ohm to 40 Mega ohms)		1
Make to be indicated in the column			

## Annexure-8-C

Special tools.

Sl.No.	Tool description	Make	Quantity
1	Axle Box Hydraulic Bearing puller		0

## Annexure-8-D

Training material in Hindi and English with each 8-wheeler Diesel Electric Inspection & Maintenance Car.

Sl.No.	Tool description	Quantity
1	Training notes/ Write up with diagrams	2 Nos
2	Slides/Wall charts	2 Nos