



**ई-निविदा क्रमांक – भुसावल-एल-डब्लू-टी-55-2026**

**कार्य का नाम**

**Name of work – Electrification work in connection with following : Sch. A - Development of Track machine siding at Kuram station. ; Sch. B - Development of Track machine siding at Murtizapur station.**

**टेण्डर जारी किया :**

**टेण्डर दिया गया :**

वरिष्ठ मंडल विद्युत अभियंता (सामान्य),  
मध्य रेल, भुसावल

मेसर्स \_\_\_\_\_  
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**E-Tender No:-BSL-L-W-T-55-2026**

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## CENTRAL RAILWAY

### E-TENDER NOTICE NO BSL-L-W-T-55-2026 (ELECT. GEN) OPEN TENDER

**Senior Divisional Electrical Engineer (General Services) Central Railway, Bhusawal** for & on behalf of President of India invites **E-TENDER** from reputed & experienced contractors on website [www.ireps.gov.in](http://www.ireps.gov.in) for the following work –

SN	Tender No.	Description of work	Approx. Cost Rs.	Bid Security	Validity of offer	Completion period
1	BSL-L-W-T-55-2026	Electrification work in connection with following : Sch. A - Development of Track machine siding at Kuram station. ; Sch. B - Development of Track machine siding at Murtizapur station.	43,93,293	87,900	60 days	6 Months

**Notes-(I)** Tender Closing Date Time of aforesaid tender up to 15.00 Hrs. of **15/07/2026**.

(II)The prospective tenderers are requested to visit the website – [www.ireps.gov.in](http://www.ireps.gov.in) for details of tenders & Corrigendum, if any.

(III)The tender notice is also displayed on **Notice Board** of Sr.DEE(G) Office, Bhusawal.

(IV)Tenderer may participate in above E- tender electronically through website [www.ireps.gov.in](http://www.ireps.gov.in) only & submission of manual offers against e-tender are not allowed & if any manual offers submitted shall neither be opened nor considered.

(V) **Bid Security** :- The Bid Security shall be deposited either in cash through e-payment gateway or submitted as Bank Guarantee bond from a scheduled commercial bank of India or as mentioned in tender documents. The Bank Guarantee bond shall be as per **Annexure-VIA** and shall be valid for a period of 90 days beyond the bid validity period.

**Exemptions:**

- (i) Any firm recognized by Department of Industrial Policy and Promotion (DIPP) as ‘Startups’ shall be exempted from payment of Bid Security detailed above.
- (ii) Labour Cooperative Societies shall submit only 50% of above Bid Security detailed above.

**Note:-** Subject to exemptions provided above, the tender must be accompanied by a Bid Security as mentioned in tender document, failing which the tender shall be summarily rejected.

(VI) The contractor shall submit self-attested/digitally signed copy of valid Electrical Contractor License as per Clause No. 45 IE Rule 1956 along with the offer. The offer will be summarily rejected in absence of valid Electrical Contractor License.

- (VII) **Special Condition** - Tenderer, in case of other than Company / Proprietary Firm, Annexure-V(A) shall be submitted by the each member of a Partnership Firm / Joint Venture (JV) / Hindu Undivided Family (HUF) / Limited Liability Partnership (LLP) etc. as the case may be. **Non submission of Annexure-V(A) by the bidder shall result in summarily rejection of his/their bid.** It shall be mandatorily incumbent upon the tenderer to identify state and submit the supporting documents duly self-attested/digitally signed by which they/he is qualifying the Qualifying Criteria mentioned in the Tender Document.

SENIOR DIVISIONAL ELECTRICAL ENGINEER.  
(GENERAL SERVICES)  
CENTRAL RAILWAY, BHUSAWAL  
On behalf of President of India

## PREAMBLE AND SCOPE OF WORK

### E-Tender No:- BSL-L-W-T-55-2026

**NAME OF WORK :-** Electrification work in connection with following : Sch. A - Development of Track machine siding at Kuram station. ; Sch. B - Development of Track machine siding at Murtizapur station.

#### **SCOPE OF WORK :-**

The scope of work involves supply, erection, testing and commissioning of point wiring with various switches, sockets, fans, switchgears, LED lights/ fittings, earthing, lighting circuit board, tubular pole, Online UPS, LT panel, LT XLPE cables along with their transportation, laying and other necessary accessories, pump sets along with accessories etc in Bhusawal Divn:

1.0 APPROXIMATE COST OF THE WORK	:-Rs. 43,93,293
TIME AND DATE OF CLOSING	:-15.00 Hrs on 15/07/2026
COMPLETION PERIOD	:- 6 Months
VALIDITY OF OFFER	:-60 days.

**2.0 FOREIGN EXCHANGE:** No foreign exchange and/or import license shall be released/provided to the Contractor in connection with this contract.

**3.0 “Tenderer should participate electronically in E- tender through website www.ireps.gov.in& submission of manual offers against e-tender are not allowed & if any manual offers submitted shall neither be opened nor considered.”**

#### **4.0 GENERAL**

- i) Water / electricity / transport shall be arranged by the Contractor at his own cost. The Purchaser shall not provide the same under any circumstances. The site for depot / workshop can be provided to the Contractor on his request.
- ii) The Contractor shall arrange at his own cost, all tools & plants, facilities required for erection, testing and commissioning of all the equipment in compliance with the respective specifications.
- iii) The schedule of rates and quantities enclosed should be read in conjunction with the explanatory notes given in the tender papers.
- iv) **Contractor who has done similar type of work shall be preferred. The Tenderer should submit their credential of work done with Govt./Semi-Government organization along with the offer.**
- v) Firm should submit their offer with full credentials regarding working capacity, testing facilities and other financial capabilities.

**5.0 Bid Security:** The Bid Security shall be deposited either in cash through e-payment gateway or submitted as Bank Guarantee bond from a scheduled commercial bank of India or as mentioned in tender documents. The Bank Guarantee bond shall be as per **Annexure-VIA** and shall be valid for a period of 90 days beyond the bid validity period.

#### **Exemptions :-**

- (i) Any firm recognized by Department of Industrial Policy and Promotion (DIPP) as ‘Startups’ shall be exempted from payment of Bid Security detailed above.
- (ii) Labour Cooperative Societies shall submit only 50% of above Bid Security detailed above.

**5.1 In case, submission of Bid Security in the form of Bank Guarantee, following shall be ensured:**

- i. A scanned copy of the Bank Guarantee shall be uploaded on e-Procurement Portal (IREPS) while applying to the tender.
- ii. The original Bank Guarantee should be delivered in person to the official nominated as indicated in the tender document before closing date for submission of bids (i.e. excluding the last date of submission of bids)
- iii. Non submission of scanned copy of Bank Guarantee with the bid on e-tendering portal (IREPS) and/or non-submission of original Bank Guarantee within the specified period shall lead to summary rejection of bid.
- iv. The Tender Security shall remain valid for a period of 90 days beyond the validity period for the Tender.
- v. The details of the BG, physically submitted should match with the details available in the scanned copy and the data entered during bid submission time, failing which the bid will be rejected
- vi. The Bank Guarantee shall be placed in an envelope, which shall be sealed. The envelope shall clearly bear the identification “**Bid for the \*\*\*\*\* Project**” and shall clearly indicate the name and address of the Bidder. In addition, the Bid Due Date should be indicated on the right hand top corner of the envelope.
- vii. The envelope shall be addressed to the officer and address as mentioned in the tender document.
- viii. If the envelope is not sealed and marked as instructed above, the Authority assumes no responsibility for the misplacement or premature opening of the contents of the Bid submitted and consequent losses, if any, suffered by the Bidder.
- ix. Bank guarantee shall be in the name of “Senior Divisional Finance Manager, Central Railway Bhusawal” on minimum Rs. 500 stamp only.
- x. Successful tenderer will deposit Rs. 200 legal vetting charges before execution of work.

**Note :- (a)** Subject to exemptions provided under para 5.0 above, the tender must be accompanied by a Bid Security as mentioned in tender document, failing which the tender shall be summarily rejected.

**(b)** The Tenderer(s) shall keep the offer open for a minimum period of 60 days (in case of two packet system of tendering 90days) from the date of closing of the Tender. It is understood that the tender documents have been issued to the Tenderer(s) and the Tenderer(s), is / are permitted to tender in consideration of the stipulation on his / their part that after submitting his / their tender subject to the period being extended further, if required by mutual agreement from time to time, he will not resile from his offer or modify the terms and conditions thereof in a manner not acceptable to \_\_\_\_\_ Railway. Should the tenderer fail to observe or comply with the foregoing stipulation, the amount deposited or Bank guarantee bond submitted as Bid Security for the due performance of the above stipulation, shall be forfeited to the Railway.

**6.0 - Contractor shall ensure all precautions during digging work close to Rly signaling, telecom electrical cables etc. Penalties to be imposed for damages to any cable as per Railway board letter no. 2021/Tele/5(2)/3-Part(1)/(3425647) dtd 12.06.2023**

## 7.0 GENERAL CONDITION OF CONTRACT:

Unless otherwise stated in the tender papers, contract shall be governed by “**Indian Railways Standard General Conditions of Contract, April 2022**”, along with the amendments, if any, issued by the Government of India, Ministry of Railways (Railway Board) from time to time. In case of any contradiction with the regulations laid down here under, GCC April 2022 with latest orders, modification and amendments will prevail, copy of which may be downloaded from the website:

[https://indianrailways.gov.in/railwayboard/uploads/directorate/civil\\_engg/pdf/2022/GCC\\_April-2022\\_2022\\_CE-I\\_CT\\_GCC-2022\\_POLICY\\_27\\_04\\_22.pdf](https://indianrailways.gov.in/railwayboard/uploads/directorate/civil_engg/pdf/2022/GCC_April-2022_2022_CE-I_CT_GCC-2022_POLICY_27_04_22.pdf)  
and [https://indianrailways.gov.in/railwayboard/view\\_section.jsp?id=0,1,304,366,526](https://indianrailways.gov.in/railwayboard/view_section.jsp?id=0,1,304,366,526)

For block working in Bhusawal Division, rules/procedure stipulated in PDSR (Power Distribution & Subsidiary Rules) and G&SR (General & Subsidiary Rules) as applicable for Bhusawal Division shall be followed. Successful tenderer shall ensure himself & his staff for getting acquaintance of these rules. The complete tender document should be read in conjunction with GCC April 2022 and all forthcoming amendments.

## 8.0 ADDRESSES:

Relevant addresses for specified purposes in connection with the tender are given below:

### 8.1 For Contract execution –

**Senior Divisional Electrical Engineer,  
(General Service) Bhusawal,**  
DRM office Bldg., 1<sup>st</sup> floor,  
Central Railway, Bhusawal-425201.

# **CHAPTER-I**

## **INSTRUCTIONS TO TENDERERS**

**&**

## **SPECIAL CONDITIONS OF CONTRACT**



## CHAPTER-I

### INSTRUCTIONS TO TENDERERS & SPECIAL CONDITIONS OF CONTRACT

The special conditions of contract shall supplement and to be read together with the General Conditions of Contract, April 2022 of the Indian Railway and the extant orders along with the amendments, if any, issued by the Government of India, Ministry of Railways (Railway Board) from time to time.

#### **1.0 Care in submission of Tenders: -**

Before submitting a tender, the tenderer will be deemed to have satisfied himself by actual inspection of the site and locality of the works, that all conditions liable to be encountered during the execution of the works are taken into account and that the rates he enters in the tender forms are adequate and all-inclusive to accord with the provisions in Clause-37 of the Standard General Conditions of Contract for the completion of works to the entire satisfaction of the Engineer.

#### **2.0. Documents to be Submitted Along with Tender**

(i) The tenderer shall clearly specify whether the tender is submitted on his own (Proprietary Firm) or on behalf of a Partnership Firm / Company / Joint Venture (JV) / Registered Society / Registered Trust / Hindu Undivided Family (HUF) / Limited Liability Partnership (LLP) etc. The tenderer(s) shall enclose the attested copies of the constitution of their concern, and copy of PAN Card along with their tender. Tender Documents in such cases are to be signed by such persons as may be legally competent to sign them on behalf of the firm, company, association, trust or society, as the case may be. **In case a tenderer is participating as Sole Proprietor in a tender, it is mandatory for him to submit an undertaking on suitable stamp paper to this effect clearly mentioning PAN number also along with tender document at the time of submission of tender.**

(ii) Following documents shall be submitted by the tenderer:

##### **(a) Sole Proprietorship Firm:**

(i) All documents in terms of Para 10 of the Tender Form (Second Sheet) of GCC April 2022

##### **(b) HUF:**

(i) A copy of notarized affidavit on Stamp Paper declaring that he who is submitting the tender on behalf of HUF is in the position of 'Karta' of Hindu Undivided Family (HUF) and he has the authority, power and consent given by other members to act on behalf of HUF.

(ii) All other documents in terms of Para 10 of the Tender Form (Second Sheet) of GCC April 2021

##### **(c) Partnership Firm:**

(i) All documents as mentioned in para 18 of the Tender Form (Second Sheet) of GCC April 2022

(d) **Joint Venture (JV):** All documents as mentioned in para 17 of the Tender Form (Second Sheet) of GCC April 2022

##### **(e) Company registered under Companies Act 2013:**

(i) The copies of MOA (Memorandum of Association) / AOA (Articles of Association) of the company

- (ii) A copy of Certificate of Incorporation
  - (iii) A copy of Authorization/Power of Attorney issued by the Company (backed by the resolution of Board of Directors) in favour of the individual to sign the tender on behalf of the company and create liability against the company.
  - (iv) All other documents in terms Para 10 of the Tender Form (Second Sheet) of GCC April 2022
- (f) **LLP (Limited Liability Partnership):**
- (i) A copy of LLP Agreement
  - (ii) A copy of Certificate of Incorporation
  - (iii) A copy of Power of Attorney/Authorization issued by the LLP in favour of the individual to sign the tender on behalf of the LLP and create liability against the LLP.
  - (iv) An undertaking by all partners of the LLP that they are not blacklisted or debarred by Railways or any other Ministry / Department of the Govt. of India from participation in tenders / contracts as on the date of submission of bids, either in their individual capacity or in any firm/LLP or JV in which they were / are partners/members. Concealment / wrong information in regard to above shall make the contract liable for determination under Clause 62 of the Standard General Conditions of Contract.
  - (v) All other documents in terms of Para 10 of the Tender Form (Second Sheet) of GCC April 2022
- (g) **Registered Society & Registered Trust:**
- (i) A copy of Certificate of Registration
  - (ii) A copy of Memorandum of Association of Society/Trust Deed
  - (iii) A copy of Power of Attorney in favour of the individual to sign the tender documents and create liability against the Society/Trust.
  - (iv) A copy of Rules & Regulations of the Society
  - (v) All other documents in terms of Para 10 of the Tender Form (Second Sheet) of GCC April 2022
- (iii) If it is NOT mentioned in the submitted tender that tender is being submitted on behalf of a Sole Proprietorship firm / Partnership firm / Joint Venture / Registered Company etc., then the tender shall be treated as having been submitted by the individual who has signed the tender.
- (iv) After opening of the tender, any document pertaining to the constitution of Sole Proprietorship Firm / Partnership Firm / Registered Company/ Registered Trust / Registered Society / HUF/LLP etc. shall be neither asked nor considered, if submitted. Further, no suo moto cognizance of any document available in public domain (i.e., on internet etc.) or in Railway's record/office files etc. will be taken for consideration of the tender, if no such mention is available in tender offer submitted.
- (v) A tender from JV shall be considered only where permissible as per the tender conditions.
- (vi) The Railway will not be bound by any change of power of attorney or in the composition of the firm made subsequent to the submission of tender. Railway may, however, recognize such power of attorney and changes after obtaining proper legal advice, the cost of which will be chargeable to the Contractor.

**2.1 Note :-** The tenderer whether sole proprietor / a company or a partnership firm / joint venture (JV) / registered society / registered trust / HUF / LLP etc if they want to act through agent or individual partner(s), should submit along with the tender, a copy of power of attorney duly stamped and authenticated by a Notary Public or by Magistrate in favour of the specific person whether he/they be partner(s) of the firm or any other person, specifically authorizing him/them to sign the tender, submit the tender and further to deal with the Tender/ Contract up to the stage of signing the agreement except in case where such specific person is authorized for above purposes through a

provision made in the partnership deed / Memorandum of Understanding / Article of Association / Board resolution, failing which tender shall be summarily rejected.

A separate power of attorney duly stamped and authenticated by a Notary Public or by Magistrate in favour of the specific person whether he/they be partner(s) of the firm or any other person, shall be submitted after award of work, specifically authorizing him/them to deal with all other contractual activities subsequent to signing of agreement, if required.

Note: A Power of Attorney executed and issued overseas, the document will also have to be legalized by the Indian Embassy and notarized in the jurisdiction where the Power of Attorney is being issued. However, the Power of Attorney provided by Bidders from countries that have signed the Hague Legislation Convention 1961 are not required to be legalized by the Indian Embassy if it carries a conforming Apostille certificate.

### **3.0. Employment/Partnership etc. of Retired Railway Employees:**

- (a) Should a tenderer
- i) be a retired Engineer of the gazetted rank or any other gazetted officer working before his retirement, whether in the executive or administrative capacity or whether holding a pensionable post or not, in the Engineering or any other department of any of the railways owned and administered by the President of India for the time being, OR
  - ii) being partnership firm / joint venture (JV) / registered society / registered trust etc have as one of its partners / members a retired Engineer of the gazetted rank or any other gazetted officer working before his retirement, OR
  - iii) being an incorporated company have any such retired Engineer of the gazetted rank or any other gazetted officer working before his retirement as one of its directors

AND

in case where such Engineer or officer had not retired from government service at least 1 year prior to the date of submission of the tender

THEN

the tenderer will give full information as to the date of retirement of such Engineer or gazetted officer from the said service and as to whether permission for taking such contract, or if the Contractor be a partnership firm or an incorporated company, to become a partner or director as the case may be, has been obtained by the tenderer or the Engineer or officer, as the case may be from the President of India or any officer, duly authorized by him in this behalf, shall be clearly stated in writing at the time of submitting the tender.

- b) In case, upon successful award of contract, should a tenderer depute for execution of the works under or to deal matters related with this contract, any retired Engineer of gazette rank or retired gazetted officer working before his retirement in the Engineering or any other department of any of the railways owned and administered by the President of India for the time being, and now in his employment, then the tenderer will ensure that retired Engineer or retired gazetted officer had retired from government service at least 1 year prior to the date of his employment with tenderer and in case he had retired from service within a year then he possesses the requisite permission from the President of India or any officer, duly authorized by him in this behalf, to get associated with the tenderer.
- c) Should a tenderer or Contractor being an individual, have member(s) of his family or in the case of partnership firm/ company / joint venture (JV) / registered society / registered trust etc. one or more of his partner(s)/shareholder(s) or member(s) of the family of

partner(s)/shareholder(s) having share of more than 1% in the tendering entity employed in gazetted capacity in the Engineering or any other department of the railway, then the tenderer at the time of submission of tender, will inform the authority inviting tenders the details of such persons.

**Note:** - If information as required as per 3.0. a), b), c) above has not been furnished, contract is liable to be dealt in accordance with provision of clause 62 of Standard General Condition of contract.

#### **4.0. Participation of Partnership Firms in works tenders:**

4.1 The Partnership Firms participating in the tender should be legally valid under the provisions of the Indian Partnership Act.

4.2 The partnership firm should have been in existence or should have been formed prior to submission of tender. Partnership firm should have either been registered with the Registrar or the partnership deed should have been notarized as per the Indian Partnership Act, prior to submission of tender.

4.3 Separate identity / name should be given to the partnership firm. The partnership firm should have PAN / TAN number in its own name and PAN / TAN number in the name of any of the constituent partners shall not be considered. The valid constituents of the firm shall be called partners.

4.4 Once the tender has been submitted, the constitution of the firm shall not normally be allowed to be modified / altered / terminated during the validity of the tender as well as the currency of the contract except when modification becomes inevitable due to succession laws etc., in which case prior permission should be taken from Railway and in any case the minimum eligibility criteria should not get vitiated. The re-constitution of firm in such cases should be followed by a notary certified Supplementary Deed. The approval for change of constitution of the firm, in any case, shall be at the sole discretion of the Railways and the tenderer shall have no claims what-so-ever. Any change in the constitution of Partnership firm after submission of tender shall be with the consent of all partners and with the signatures of all partners as that in the Partnership Deed. Failure to observe this requirement shall render the offer invalid and full Bid Security shall be forfeited.

If any Partner/s withdraws from the firm after submission of the tender and before the award of the contract, the offer shall be rejected and Bid Security of the tenderer will be forfeited. If any new partner joins the firm after submission of tender but prior to award of contract, his / her credentials shall not qualify for consideration towards eligibility criteria either individually or in proportion to his share in the previous firm. In case the tenderer fails to inform Railway beforehand about any such changes / modification in the constitution which is inevitable due to succession laws etc. and the contract is awarded to such firm, then it will be considered a breach of the contract conditions liable for determination of the contract under Clause 62 of the Standard General Conditions of Contract.

4.5 A partner of the firm shall not be permitted to participate either in his individual capacity or as a partner of any other firm in the same tender.

4.6 The tender form shall be submitted only in the name of partnership firm. The Bid Security shall be submitted by partnership firm. The Bid Security submitted in the name of any individual partner or in the name of authorized partner (s) shall not be considered.

4.7 On issue of Letter of Acceptance (LOA) to the partnership firm, all the guarantees like Performance Guarantee, Guarantee for various Advances to the Contractor shall be submitted only in the name of the partnership firm and no splitting of guarantees among the partners shall be acceptable.

4.8 On issue of Letter of Acceptance (LOA), contract agreement with partnership firm shall be executed in the name of the firm only and not in the name of any individual partner.

4.9 In case the Letter of Acceptance (LOA) is issued to a partnership firm, the following undertakings shall be furnished by all the partners through a notarized affidavit, before signing of contract agreement.

(a) Joint and several liabilities:

The partners of the firm to which the Letter of Acceptance (LOA) is issued, shall be jointly and severally liable to the Railway for execution of the contract in accordance with General and Special Conditions of the Contract. The partners shall also be liable jointly and severally for the loss, damages caused to the Railway during the course of execution of the contract or due to non-execution of the contract or part thereof.

(b) Duration of the partnership deed and partnership firm agreement:

The partnership deed/partnership firm agreement shall normally not be modified/altered/terminated during the currency of contract and the maintenance period after the work is completed as contemplated in the conditions of the contract. Any change carried out by partners in the constitution of the firm without permission of Railway, shall constitute a breach of the contract, liable for determination of the contract under Clause 62 of the Standard General Conditions of Contract.

(c) Governing laws: The partnership firm agreement shall in all respect be governed by and interpreted in accordance with the Indian laws.

(d) No partner of the firm shall have the right to assign or transfer the interest right or liability in the contract without the written consent of the other partner/s and that of the Railway.

4.10 The tenderer shall clearly specify that the tender is submitted on behalf of a partnership firm. The following documents shall be submitted by the partnership firm, with the tender:

- (i) A notarized copy of the Partnership Deed or a copy of the Partnership deed registered with the Registrar.
- (ii) A notarized or registered copy of Power of Attorney in favour of the individual to tender for the work, sign the agreement etc. and create liability against the firm.
- (iii) An undertaking by all partners of the partnership firm that they are not blacklisted or debarred by Railways or any other Ministry / Department of the Govt. of India from participation in tenders / contracts as on the date of submission of bids, either in their individual capacity or in any firm/LLP in which they were / are partners/members. Any Concealment / wrong information in regard to above shall make the bid ineligible or the contract shall be determined under Clause 62 of the Standard General Conditions of Contract.
- (iv) All other documents in terms of explanatory notes in clause 10 (i.e. Eligibility Criteria) of GCC, April-2022.

4.11 **Evaluation of eligibility of a partnership firm:**

- (i) Technical and financial eligibility of the firm shall be adjudged based on satisfactory fulfillment of the eligibility criteria laid down in Clause 10 (i.e. Eligibility Criteria) of GCC, April-2022.

## **5.0 TENDERER SPECIAL CONDITIONS:**

The tenderer should normally not stipulate any special conditions while submitting his tender. In such an eventuality, Central Railway reserves the right to summarily reject such tenders without assigning any reasons whatsoever. The tenderer should normally submit his tender in full conformity with the tender conditions of Central Railway, Bhusawal. If any particulars are furnished by the tenderer in response to specific tender conditions, by which such particulars are required to be furnished at the tender stage, this shall not be treated as special conditions for the purpose of this para.

## **6.0 PRICE VARIATION CLAUSE (PVC) : As per GCC along with latest amendments.**

## **7.0 DEFECTIVE EQUIPMENTS TO BE CHANGED :**

Not with standing completion of work in partial or full use of any equipment, if the completed equipment or any portion thereof before it finally taken over at the end of the guarantee period be found to be or to have become defective in course of usage by the Railway due to faulty material, design or workmanship, or otherwise fails to fulfill the requirement of the contract and/or its purpose, the purchaser shall normally give the contractor prompt notice setting forth the particulars of each defects or failure and the contractor shall forthwith make the defects good or modify or replace the equipment, as may be directed by the purchaser's Engineer, at his own cost in all respects to make comply satisfactorily with the said requirements. Should the contractor fail to do within a reasonable time the service of the said notice upon him or should time not permit of service of such notice, the purchaser may repair or reject and replace the whole or part of such defective equipment as the case may be, at the cost of the contractor. The contractor's full liability under this clause shall be satisfied by the payment to the purchaser of the extra total cost, if any, of such replacement delivered and erected as provided for in the original contract, such extra cost being the ascertained difference between the price paid by the purchaser under the provisions above mentioned for such replacement and the contractor's price for the plant so replaced, plus the sum, if any, paid by the purchaser to the contractor in respect of such defective equipment. Should the purchaser not so replace the rejected equipment within a reasonable time, the contractor's liability under this clause shall be satisfied by the repayment by the contractor of all money paid by the purchaser to him in respect of such rejected equipment. Rejected/defective materials shall be returned to the contractor to the extent possible.

## **8.0 FINAL ACCEPTANCE:**

The final acceptance of the entire equipment installed on the site shall take effect from the date of expiry of the period of guarantee. After expiry of the period of guarantee for each section, a certificate of final acceptance shall be issued by the Purchaser and the last of such certificate will be called the last and final acceptance certificate. The contract shall not be considered as completed until the issue of final acceptance certificate by the Purchaser. The Purchaser shall not be liable to the Contractor for any matter arising out of or in connection with the contract or execution of the work unless the Contractor shall have made a claim in writing in respect thereof before the issue of final acceptance certificate under this clause.

Notwithstanding the issue of final acceptance certificate, the Contractor and the Purchaser (subject to sub-clause as above) shall remain liable for fulfillment of any obligation incurred under the provision of the contract prior to the issue of final acceptance certificate which remains unperformed at the time such certificate is issued and for determining the nature and extent of such obligation the contract shall be deemed to remain in force between the parties hereto.

## 9.0 ISSUE OF IDENTITY CARDS TO CONTRACTOR'S LABOURS:

Following certificates/documents should be issued to each contract labourers nominated to work in the railway premises by the contractor, indicating Contract No, Name of the person, place of work etc.

1. Identity Card,
2. Character certificate issued by Police Department,
3. Certificate for technical competency.

If these are not issued to contract Labour, he / they will not be permitted to work in the Railway premises. The list of the labour should be submitted to this office for records.

## 10.0 ISSUE OF MATERIALS TO THE CONTRACTOR:

Contractors have to submit a Bank Guarantee for an amount equal to the cost of material paid to them and to be handed over to them for erection. The cost of material paid to them and handed over to them and under their possession at any time shall not exceed the value of the B.G. already submitted.

## 11.0 STANDING INDEMNITY BOND:

Cost of all the materials for which 'On Account' payments have been made to the contractor against the Contract and materials handed over to the contractor by the purchaser for the purpose of execution of the said Contract, until such time the materials are duly erected or otherwise handed over to the purchaser shall be covered by the standing indemnity bond(see FormNo.16).

## 12.0 INSPECTION :

All the material, required for this work shall be subject to inspection to ensure that the work is done in accordance with specification, drawings and is of the best quality suitable for the purpose. Following inspection schedule shall be followed.

- a) **Inspection of material :-**
- i) **At Firm's premises:-** Material having value above Rs.5 lakhs shall be inspected by RITES. Inspection of other materials shall be done by Railway's representative. Firm will submit manufactures original test certificate.
- ii) **After Receipt of material:-** Inspection of other item shall be done at depot / site by Railway Engineer's representative. Contractor shall produce all the test reports, material documents, etc. during inspection.
- iii) All the defects / discrepancies, if any, pointed out during inspection should be attended by the contractor immediately.
- b) **Stage Inspections:-** Stage inspections shall be carried out by Railway Engineer's representative from time to time during execution of the work at site. All the shortcomings noticed during stage inspection shall be attended by the contractor.
- c) **Final Inspections:-** After completion of work, contractor shall offer it for final inspection and testing. All the shortcomings noticed during final inspection shall be attended by the contractor, immediately and a joint inspection shall be carried out by Railway Engineer's Representative and by Contractor Representative after completion of the entire work and a joint inspection report shall be made. The joint inspection report shall be signed by the contractors representative, Railway's authorized Engineer for that work and shall be enclosed along with the final bill with details of works carried out in individual location. Any defect / shortcomings noticed shall be attended by the contractor immediately.

## 13.0 MATERIALS/EQUIPMENTS:

All materials used in the work shall be of the best quality and of the class most suited for the purpose specified. All the standard fittings, equipments, motor, gear box, breaks, governors, control panel, cables and other accessories required for this work shall be as per RDSO / RCF / ICF approved make conforming to relevant IS specifications against each schedule item. If any material does not appear in the RDSO / RCF / ICF approved list then make of material should approved by Sr.DEE(G) Bhusawal /Railway representative before supply.

All the equipments, materials, fittings and components will be subject to quality control program of being part of the quality assurance program of the contractor. All the major equipments / material shall be inspected as per inspection clause para 12.0.

#### **14.0 WARRANTY/GUARANTEE :-**

After successful completion of entire work and the same has been taken over by Railway, it shall be guaranteed for 12 months. During this period if any defects arise the same shall be made good by the contractor free of cost. LED fittings shall be guaranteed for 5 years.

#### **15.0 RELEASED MATERIAL:-**

The released materials should be returned by the contractor to Railways and acknowledged. The released materials should be transported to respective depot with the tenderers men and vehicle as per instruction of Railway's Engineer.

#### **16.0 ELECTRICAL CONTRACTORS LICENSE:**

**The contractor shall submit self-attested copy of valid Electrical Contractor License as per Clause No. 45 IE Rule 1956 along with the offer. The offer will be summarily rejected in absence of valid Electrical Contractor License.**

#### **17.0 OTHER SPECIAL CONDITIONS:-**

- 17.1 Tenderers should submit their offer with credentials regarding working capacity and financial capabilities.
- 17.2 Tenderers should submit the list of personnel / organization on hand and proposed to be engaged for the tendered work. Similarly list of Plant & Machinery available on hand and proposed to be inducted and hired for the tendered work.
- 17.3 Contractors found using un-approved materials shall be, on the spot, stopped from executing further work and suitable action taken to terminate the contract. Particular note of this should be taken and it shall be strictly ensured that only quality work is done.
- 17.4 All completed work shall be jointly recorded by contractors with Railways in 'Measurement Books' which will be available with Rly's engineer No work, other than those recorded in M.B, will be recognized.
- 17.5 Bills shall be submitted in Rly's bill form only. All released materials shall be handed over to Railways at the depot of Senior Section Engineer (EM)'s. Contractors should keep a proper account of the released materials handed over, with proper acknowledgement from Railway's engineer and submit the same along with the bills.(NA)
- 17.6 During the process of work the contractor shall arrange to keep electric supply available to avoid any inconvenience to the occupant and the temporary wiring shall be safe and shall not pose any hazard to any points. It shall be contractor's responsibility to ensure the safety of his man and also materials and occupants from any hazard of electricity during the process of wiring. (NA)
- 17.7 During the process of work the contractors shall arrange to keep the material away from the LC gate to avoid any inconvenience of the traffic on gate.
- 17.8 The switchboard shall be of seasoned teak wood/ PVC confirming IS.
- 17.9 Code of practice for electrical wiring installation shall be followed as per IS-732 – 1989 with latest amendment.



- 17.10 PVC insulated wires for working voltages up to and including 1100 Volt shall be as per IS-694 – 1990 with latest amendment.
- 17.11 PVC insulated (heavy duty)/XLPE electric cables for working voltages up to and including 1100 Volt shall be as per IS-1554 – (Part – I) – 1988 with latest amendment.

**18.0 OTHER SPECIAL CONDITION OF THE WORK**

The Contractor shall maintain a register showing names and addresses of the person so engaged along with photographs of each person and shall produce the same for inspection on demand by Welfare Officer or such other person so authorized by the owner. The Contractor shall not use or allow to be authorized to be used train or any part thereof for dwelling purpose and shall not allow any outsiders to loiter in or around the train without valid authority.

- 18.1 The contractor shall be required to employ/engage only that number of employees/workers as may be specifically authorized by Railway Administration from time to time and shall maintain complete records of such employees/workers with regard to their names, address qualifications, experience and other required details. The Railway shall have absolute right to test, interview or otherwise assess or determine skills, knowledge, proficiency, capability, etc. so as to ensure that such employees/workers are competent, qualified or otherwise suitable for efficient working. Workers rejected on this account by the Railways shall not be employed/ engaged by the contractor on the work covered by this contract.
- 18.2 The contractor is liable to pay provident fund contribution. Leave salary, medical benefits to his employees and to observe statutory working hours. The contractor is responsible for the proper maintenance of registers, records and accounts so far as compliance with any statutory provisions/obligations is concerned. The contractor to keep proper records pertaining to payment of wages, etc. and also for depositing the provident fund contributions with the authorities concerned. The contractor is liable to defend, indemnify and hold harmless to the Railway from any liability or penalty which may be imposed by the Central, State or local authorities by reason of any violation by the contractor or such laws regulations and also from all claims, suits or proceedings that may be brought against the management arising under or incidental to or by reason of the work provided/assigned under the contract brought by the employees of the contractor, third party or by the Central or State Government authorities.
- 18.3 The contractor will make aware his employees that the contract employee are employee of contractor and the employee are not entitled for any regularization in Railway Service. If such situation arises in future contractor is liable to defend indemnify & hold harmless to the Railway Administration from any such liability.
- 18.4 The contractor shall follow all labour Law, rules, regulation pertaining to labour, whether mentioned or not.
- 18.5 (i)** Contractor is to abide by the provisions of Payment of Wages act & Minimum Wages act in terms of clause 54 and 55 of Indian Railways General Condition of Contract. In order to ensure the same, an application has been developed and hosted on website ‘[www.shramikkalyan.indianrailways.gov.in](http://www.shramikkalyan.indianrailways.gov.in)’. Contractor shall register his firm/company etc. and upload requisite details of labour and their payment in this portal. These details shall be available in public domain. The Registration/ updation of Portal shall be done as under:
  - (a) Contractor shall apply for onetime registration of his company/firm etc. in the **Shramikkalyan portal** with requisite details subsequent to issue of Letter of Acceptance.

Engineer shall approve the contractor's registration in the portal within 7 days of receipt of such request.

- (b) Contractor once approved by any Engineer, can create password with login ID (PAN No.) for subsequent use of portal for all LOAs issued in his favour.
- (c) The contractor once registered on the portal, shall provide details of his Letter of Acceptances (LOA) / Contract Agreements on **shramikkalyan portal** within 15 days of issue of any LoA for approval of concerned engineer. Engineer shall update (if required) and approve the details of LOA filled by contractor within 7 days of receipt of such request.
- (d) After approval of LOA by Engineer, contractor shall fill the salient details of contract labours engaged in the contract and ensure updating of each wage payment to them on **shramikkalyan portal** on monthly basis.
- (e) It shall be mandatory upon the contractor to ensure correct and prompt uploading of all salient details of engaged contractual labour & payments made thereof after each wage period.
- (ii) While processing payment of any 'On Account bill' or 'Final bill' or release of 'Advances' or 'Performance Guarantee / Security deposit', contractor shall submit a certificate to the Engineer or Engineer's representatives that "I have uploaded the correct details of contract labours engaged in connection with this contract and payments made to them during the wage period in Railway's Shramikkalyan portal at '[www.shramikkalyan.indianrailways.gov.in](http://www.shramikkalyan.indianrailways.gov.in)' till \_\_\_\_Month, \_\_\_\_Year."

**18.6** The payment to the contract labours should be made through Bank / EFT only.

**19.0** The registration of contractors working under Railway departments with ESIC is mandatory.

**20.0** Special Condition for employment of staff by the contractor for works contract as per HQ's Policy L.no. L.253.AC.AMC/Policy Dated-15.01.2010

#### **Employment of staff-**

- (a) The contract is liable for cancellation if either the contractor himself or any of his employee is found to be a person of Gazetted rank of Engineering Department which includes Civil, Mechanical, Signal & Telecommunication Department of Railways whether pensionable or non-pensionable who after retirement has sought engagement as contractor for or in connection with the execution of public works whether on Railway, P.W.D. or Defence Forces or as an employee of such contractor within 2 years of his retirement without obtaining the permission of the President of India before taking up such engagement or employment.
- (b) The contractor shall employ the following technical staff during the execution of the work.
  - i) At least one Graduate Electrical/ Electronics Engineer when the cost of the work to be executed is Rs. 50 lakhs and above.
  - ii) At least one qualified Electrical /Electronics diploma holder when the cost of the work to be executed is more than Rs. 10 lakhs, but less than Rs. 50 Lakhs.
- (c) Technical staff should be available at site whenever required by the Engineer –in-charge to take instructions. In case the desired level of technical staff fails to take instructions of the Engineer –in-charge, contractor shall liable to pay a reasonable amount to the Railways not exceeding a sum of Rs. 5000/- (Rupees five thousand only) for each calendar month or part thereof for default in case of Graduate Engineer and Rs. 2500/- (Rupees two thousand five hundred only) for each calendar month or part thereof for default in case of Diploma holder.

- (d) The decision of the Engineer-in-charge as to the period for which required technical staff was not employed by the contractor and as to the reasonableness of the amount to be deducted from the contractor, shall be final & binding on the contractor.
- (e) The contract is liable to be terminated in case of persistent failure to engage suitable technical staff by the contractor.

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## **CHAPTER – II**

### **PRICES AND PAYMENT**

## CHAPTER – II

### PRICES AND PAYMENT

#### 1. SCOPE :-

This chapter deals with prices to be paid for the various items of work and other amount payable in accordance with accepted schedule of prices and conditions of payment herein mentioned.

#### 2. SCHEDULE OF PRICES :-

The unit rates given against various items of work in tender papers are the schedule of rates. The tenderers are required to quote **rates above /at par/ below as specified** against schedule of rates while quoting the summary of prices. The actual payment to be made against any item of Schedule of rates shall be derived after loading the Schedule of rates prices with the tenderer's quoted percentage. The prices so obtained shall be the unit prices for the various items of work given in Schedule of rates.

#### 3. INCIDENTAL CHARGES :-

The unit prices are including of loss, wastage, incidental charges for transportation, loading, unloading and handling of materials. It also include commissioning for arranging dispatch by rail, completing all necessary formalities in this respect, arranging payment of wages collection of railway receipt all insurance premier banker's charges etc.

#### 4. OTHER PRICE PAYMENT :-

No adjustment in unit price on account of price fluctuation will be permitted on any account.

#### 5. PAYMENT TERMS :-

##### (i) On A/c. payment for supply

(a) Payment to the extent of **70 %** towards cost of supply of materials will be made on receipt of the materials only either at site or at purchasers depot of the following tender schedule items as tabulated below :

<b>Sch. A</b>	<b>2 to 6, 10, 15, 16, 18, 20, 21, 30, 31, 35, 38 to 40</b>
<b>Sch. B</b>	<b>2 to 4, 6, 7, 11, 16, 17, 20, 21, 32, 33, 35, 41, 44</b>

Received material shall be duly supported by Suppliers delivery challan and inspection certificates of Engineers representative. Engineers representative shall make proper account of material received.

(b) The following schedule items whose supply & erection rates are combined, payment to the extent of **60%** towards cost of supply of material shall be made subject to conditions as mentioned above:

<b>Sch. A</b>	<b>-</b>
<b>Sch. B</b>	<b>37</b>

Further balance payment will be released after erection & satisfactory completion of each item and quantity as certified and measurements recorded in measurement book by engineer's representative.

(c) Firm will submit manufacturers original test certificate and material purchase proof from OEM or his authorized agents.

**(ii) Issue of materials to the contractor for erection.**

The material for which payment has been released will be issued by Railway to the contractor for execution of work as per site requirement and as per the discretion of 'Engineer'

**(iii) Progress on account payment for Supply & erection**

The contractor shall be paid payment to the extent of **30%** of supply & 100% of erection for such item as given above in **i)(a)** on satisfactory completion of each item and quantity as certified and measurements recorded in measurement book by engineer's representative.

**(iv)** 100% progressive payment for following schedule items of tender schedule shall be made after successful completion of same :

<b>Sch. A</b>	<b>1, 7 to 9, 11 to 14, 17, 19, 22 to 29, 32 to 34, 36, 37</b>
<b>Sch. B</b>	<b>1, 5, 8 to 10, 12 to 15, 18, 19, 22 to 31, 34, 36, 38 to 40, 42, 43 , 45, 46</b>

**(v) Final payment:** - Final Bill of supply & erection shall be paid after successful completion of entire work as per terms, condition and scope of work of contract and provisional acceptance of the work.

**(vi)** Joint inspection report with engineer's representative and provisional acceptance certificate by engineer shall be submitted by contractor.

**The payment shall be made against**

- i) Certificate by the Railway representative that the work has been done in accordance with the provision of the contract agreement and all the material replaced by the contractor during the maintenance period has been of good quality and as per specification.
- ii) All the schedule as mentioned in the tender has been successfully carried out.
- iii) The statement of recovery if any.
- iv) Valid security deposit furnished in advance at the time of signing of agreement. All the above payments shall be subject to observance of all formalities viz. Signing of agreement, furnishing S.D., verification of power of attorney, MB formalities, bill in Railways standard form etc.

***Note: Following particulars to be furnished by firm***

**i) PAN NO. ii) FULL ADDRESS iii) GST REGISTRATION**

**6. FINAL PAYMENT :-**

On completion of entire work in all respect and on submission of joint inspection report and PROVISIONAL ACCEPTANCE CERTIFICATE, the contractor shall receive the final payment for remaining works.

**7. REFUND OF SECURITY DEPOSIT:-**

The security deposit will be refunded on submission of Final Completion Certificate after successful completion of the contract and after expiry of the guarantee obligation.

**8. TAXES :-**

**The contractor should have GST registration number.**

(i) Tenderers will examine the various provisions of The Central Goods and Services Tax Act, 2017(CGST)/ Integrated Goods and Services Tax Act, 2017(IGST)/ Union Territory Goods and Services Tax Act, 2017(UTGST)/ respective state's State Goods and Services Tax Act (SGST) also, as notified by Central/ State Govt. & as amended from time to time and applicable taxes before bidding. Tenderers will ensure that full benefit of Input Tax Credit (ITC) likely to be availed by them is duly considered while quoting rates.

(ii) The successful Tenderer who is liable to be registered under CGST/IGST/UTGST/SGST Act shall submit GSTIN along with other details required under CGST/IGST/UTGST/SGST Act to Railway immediately after the award of contract, without which no payment shall be released to the contractor. The contractor shall be responsible for deposition of applicable GST to the concerned authority.

(iii) In case the successful tenderer is not liable to be registered under CGST/IGST/UTGST/SGST Act, the Railway shall deduct the applicable GST from his/their bills under reverse charge mechanism (RCM) and deposit the same to the concerned authority. **(Authority –Railway Board's Letter No.2017/CE-I/CT/4/GST Dated 23/06/2017.)**

**9. PENALTY :-**

- 1) As per relevant clause of GCC April 2022.
- 2) A suitable token penalty shall be imposed if any deficiency in workmanship or quality of work is noticed during inspection by competent authority.

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## **CHAPTER-III**

### **TECHNICAL SPECIFICATION**



Central Railway

Electrical (G) Branch

Bhusawal Division

**E-Tender no.BSL-L-W-T-55-2026**

**This tender calls for the work of Electrification work in connection with following : Sch. A - Development of Track machine siding at Kuram station. ; Sch. B - Development of Track machine siding at Murtizapur station.**

**1.Schedule item no. A-1, B-1**

**Supply, erection, testing and commissioning of Point wiring for light, fan, exhaust fan in PVC casing capping with 2x2.5 sq. mm. FRLS multistranded PVC copper wire alongwith all accessories, running earth etc.**

**SYSTEM OF POINT WIRING**

Point wiring shall be carried out with 2x2.5 sqmm FRLS Copper conductor in ISI Mark PVC Casing-capping / PVC Conduit pipe( If required as per site condition) on the walls/ ceilings along with running earth conductor of 2.5 sq.mm. FRLS Copper wire.

The point wiring of light, fan, plug socket of 5 amp. capacity shall be carried out with single core Flame Retardant Low Smoke PVC multi stranded copper wire of size 2.5 sq mm confirming to IS 694/1990. In addition to this the wire shall also confirm FRLS (Flame retardant Low Smoke) properties as per ASTM-D 2863 and IEC 60754-1 and of 1100 volts grade inside PVC casing/capping/ PVC conduit as specified in schedule. Point wiring shall include all accessories like bend, elbow, tee, junction box etc. with necessary fixing materials/hardware etc. complete with all respect. No joints are allowed in the wiring. The neutral connection in the board should be done with proper connectors.

**TECHNICAL SPECIFICATION FOR WIRING****1.System of Interior wiring.**

The wiring (unless otherwise specified) shall be carried out in single core, multi-stranded PVC insulated copper wire conforming to IS-694/1990 with latest amendments and of the 1100 volts grade in rigid heavy-duty non-metallic flame retarding (PVC) casing/capping.

The PVC insulated wire shall be FRLS (Fire Retardant Low Smoke) with latest amendment. The wiring shall be done on the distribution system with main and branch distribution boards at convenient centers and without isolated fuses. All conductors shall be run, as far as possible along the walls and ceiling, so as to be easily accessible to and capable of being thoroughly inspected. Runs as marked out will be inspected and cables shall not be fixed until the lay-out is approved by Sr.DEE(G)BSL or his authorized representative whose decision is final and binding on the contractor. The internal wiring shall be conforming to code of practice for electrical wiring as per IS-732 – 1989 with latest amendment.

The cables shall be run on rigid heavy duty non-metallic fire retarding (PVC) casing/capping with corresponding accessories. The conduit shall conform to IS-2509 and accessories to IS-3419 with latest amendments. The PVC casing/capping and accessories shall be ivory white with fire retardant as per clause of BS-4678 Part-IV-82.

In case where surface wiring with PVC conduit is specified the conduits shall be fixed to walls using spacer's etc. not more than 600 mm apart. Bends or diversions shall be done by employing normal bends, inspection bends, inspection boxes, elbows or similar fittings. Conduit joints shall be by means of plain or screwed couplers. For long run of straight conduit inspection type coupler shall be provided at intervals.

## 2.PVC Junction box.

All ceiling roses, lamp holder etc. shall be fixed on rigid PVC square junction box conforming to relevant IS, specification of stardust color Precision makes with Brass inserts.

Switch board – All electrical switchboard shall be of PVC fire retardant board of standard size.

## 3.Plugging walls or ceilings.

Plugs for ordinary walls or ceiling shall be of PVC of appropriate size. They shall be cemented into the walls or ceilings to within line of the surface and remainder being finished according to the nature of surface used with plaster or lime putty. Where owing to irregular coursings or other reasons, the plugging of the wall or ceiling present difficulties, the casing shall be attached to the walls or ceiling in a manner approved by the Sr.DEE(G)BSL.

Plugs for fixing square box for ceiling rose or single switch shall be sufficiently large to take two screws so as to prevent box from turning while in use.

## 4.Passing through floors and walls.

This shall be done strictly in accordance with code of practice for wiring installation as per IS-732 / 1989 with latest amendments.

## 5.White washing.

Walls cut or defaced during wiring will have to be made good and adequately white washed, distempered/painted as the case may be.

## 6.Wires and cables.

All conductors shall be standard Alum./copper and in accordance relevant IS specifications. The wiring shall conform to the IEE, wiring rules (Latest) and no conductors shall have a cross section of less than 2.5 sq.mm, unless otherwise specified.

Each coil of wire and cables proposed to be used must be accompanied by the makers test certificates stating that the 'Class' and giving the results of insulation tests.

## 7.Main and sub-distribution boards.

The fuses/switch board/ meter board must be the swing back type provided with suitable hinged unglazed cover permitting of inspection at back and having ample room behind the boards for the convenience and neat arrangement of the conductors and to take a small amount of slack necessary to enable cut out to be readily connected up. The board must be made of seasoned teak wood, impregnated with varnish and with a good finish and constructed with all joints dove tailed and provided with a back of the same materials or PVC Board. Meter should be provided on teakwood board of appropriate size.

Placement of fuses – Fuses shall not be placed in ceiling roses or in any position other than the distribution boards or the sub-distribution boards which shall be located as approved by the Sr.DEE(G)BSL. No fuses shall be placed in the neutral conductor of a main, sub-main or sub-circuits.

Adequate space, clear of other fittings and to the satisfaction of the Sr.DEE(G)BSL or his representative shall be provided on each main distribution board for the installation of KWH Meters. Adequate size conduit casing/capping leading to the main board will be provided for the incoming mains.

Similarly adequate space shall be provided on the switchboards controlling fan light, plug for the installation of fan regulators.

Bus bar contacts and other live metal parts shall be suitably protected as to render it impossible for anyone to make accidental contact with them while replacing fuses. A strip of teak wood easily removable shall be provided in front of the neutral bus bar so as to avoid contact with it while fuses are being attended to.

## 8.Main and sub-distribution boards – Earthing.

Continuous running earth shall be provided by the contractor as given below:-

The continuity of earth wire shall be maintained throughout without any joints. This shall be in conformity with IEE Rules No. 32 & IS-3043 (latest) section 2 clauses 12 to 13.7.

1.	Main earth pit/pole to main meter board or distribution board	25mm x 3mm GI Strip
2	Meter board/distribution board to main switch inside quarters.	2.5 sq.mm. PVC copper stranded Green colour wire.
3	Main switch insides quarters to wall plug fan, fan regulators & any other metallic/ accessories.	2.5 sq.mm. PVC copper stranded Green colour wire.

The fuses shall be mounted as follows.

The distribution boards shall be fixed at such a height as to be within easy reach of a person standing on the floor. The installation of main and distribution boards shall be as per IS-732 Clause 4.3.

The cost of point wiring includes the cost of sub-main circuits unless otherwise specified, which shall not be less than 4 sq.mm and No sub-main circuit shall contain more than 10 (Ten) light/fan/5A, plug points. Wherever No. of points exceeds more than 10. The contractor shall draw separate sub-main circuit for each 10 points or part thereof.

The contractor shall observe all colour code in wiring viz. Red, Yellow, Blue for phases, Black for neutral and Green for earthing.

On completion of wiring of each quarters, contractor shall do routine tests as per IS. Free of cost and result of same shall be submitted along with bill duly certified by Railway's representative.

#### 9.Joints.

All joints in conductors shall be made by mechanical connections in suitable joint boxes, jointing of aluminum conductors shall be in accordance with IS-732 appended 'C' Clause C-6. Joint boxes shall be as per approved make by Sr.DEE(G)Bhusawal or his representative at site.

#### 10.Switches.

All switches, controlling points must be placed on 'Phase' wires. All switches shall be of Modular / Piano type (as per site requirement) 5/10 Amps capacity unless otherwise specified and conforming to relevant IS specifications of approved make and shall be provided with quick make and break movement and shall have substantial plain Bakelite cover. The switches shall be mounted at height of 2-4 feet from ground level unless otherwise approved. The switches shall generally comply with the relevant I.S. specification. The switches shall be of Original Approved make only.

#### 11.Plugs and sockets.

Plugs shall be of a front entry pattern with hand shield. The shrouds of sockets and the grips of plugs shall be molded Bakelite and the bases of sockets shall be of vitreous porcelain or Bakelite. All sockets shall be complete with plugs of standard dimensions and shall be interchangeable. Each plug point shall be controlled by a switch on the supply side. The socket shall be 5-Pin Universal design 5 Amp unless otherwise specified with separate controlling switch and original.

#### 12.Lamp holders, shades etc.

Bakelite lamp holders with necessary accessories shall be robust and of approved make. Lamp holders for use of brackets and the like shall be in accordance with IS-1258 (latest) and as per Clause 5.5 of I.S-732 / 1989 (latest).

#### 13.Mountings.

All fittings such as switches, plugs etc mounted on board shall be adequate spaced with a uniform margin to the satisfaction of the Sr.DEE(G)BSL and only brass fixing screws/Nut bolts of approved sizes shall be used. The mounting heights from the floor shall be a generally as follows :- Switches, distribution boards etc. 1.5 mtrs., Lights –2.5 Mtrs.

#### 14.Flexible wires and pendants.

Unless otherwise specified and except in PVC pipe pendants, flexible wire with PVC insulated and PVC sheathed copper conductors bearing ISI mark with a minimum of size of 24/0.2 mm or the nearest equivalent shall be used. This will be subject to approval by the Sr.DEE(G)BSL.

Suitable service tapings in all quarters at positions decided by the Sr.DEE(G)BSL or his authorized representative will be provided by the Railway.

#### 15.Special clauses for the internal wiring.

The work shall comprise supply of all necessary materials, installations, testing and putting into operational lights, plugs etc. as per schedule, which is subject to slight variations at the time of execution of the work.

The system of wiring for lighting and fan point shall be PVC insulated cable on rigid PVC casing/capping.

The contractor shall on completion of the work but before the installation is taken over by the Railway, supply drawings as under :

- a) Wiring – diagram sub-mains mains with particulars of size of cables and wires used.
- b) Main and branch distribution boards.

#### 16.Special Clauses for the internal wiring.

Conformity with Electricity Act, 2003. The installation shall be in conformity with the requirements of the Electricity Act, 2003 as amended up to the date and Indian Electricity Rules, framed, there under and also the relevant regulations of the electric supply authority concerned, and IS-732 of 1989 with latest amendments.

#### 17.Materials.

All materials fittings, appliances, used in electrical installations shall conform to Indian Standard Specification and of approved make.

#### 18.Workmanship.

Good workmanship is an essential requirement for compliance with the Rules in the code. The work shall be carried out under the direct supervision of a person holding a certificate of competency issued by the State Government for the type of work involved.

- a. Position of lamp, fans and fittings, branch wires and not be shown, but the fittings etc. connected to each circuit must be clearly indicated by numbers on the fuse carrier of distribution board.
- b. Any alternations in the position of fittings or modifications of the existing lay out of the schedule of suit local conditions as indicated by the representative of the Sr.DEE(G)BSL shall also be carried out while the work is in progress.

Before taking the work in hand a specimen of each of the materials and fittings proposed to be used as per schedule shall be submitted to the Sr.DEE(G)BSL for his approval. The letter of approval of materials by Sr.DEE(G)BSL shall be submitted along with final bill.

#### 19.Metal casing

All metal casings of metallic coverings containing or protecting any electric supply line or apparatus shall be connected with earth by the contractor shall be jointed and connected across all junction boxes and other openings as to make a good mechanical and electrical connection throughout the whole length.

#### 20. PVC Conduit Pipe

PVC conduit pipe shall be of suitable size as per IS : 9537 having ISI mark with requisite accessories.

**NOTE:**

- i. All wall plugs mentioned under clause page 6 shall be of Universal pin type, the earth pin being connected to the continuous running earth.
- ii. All fan even if supplied by the Railways shall be connected to the continuous running earth conductor.
- iii. Continuous running earth through 2.5 sq.mm. copper PVC conductor PVC wire green colour from the main board to the various wall plugs, fan points, regulator etc.
- iv. All existing FT fittings, fans, incandescent light fittings and other equipment shall be connected to ceiling rose/power point with 2 core twisted PVC insulated copper conductor of size not less than 1.0 sq.mm.

**2.Schedule item no. A-8, B-9**

**Supply, erection, testing & commissioning of 5 A 5 Pin universal plug socket complete with switch, wiring and earth connection, to be provided in Existing light/fan board.**

Supplying and erecting shockproof 5 amps 3/5 pin socket outlet with flush type erected on Provided board for light and fan duly connected with earth terminals and supply system. The socket outlet shall be 5- pin universal design 5A capacity. The socket outlet shall confirm to IS 1293 of 1988 with latest amendments. Socket shall be of front entry pattern with hand shield shall be of 5 pin type & unbreakable to be connected with 2 x2.5 sq.mm. FRLS copper wire. Each socket outlet shall be controlled by a piano type switch preferably located immediately adjacent thereto. Switch controlling the socket outlet shall be connected to the phase wire i.e. on live side of the line.

**3.Schedule item no. A-9, B-10**

**Supply, erection, testing and commissioning of 15 A 6 pin universal plug socket with switch alongwith independent point wiring in PVC casing capping with 2x4 sq. mm. FRLS multistranded PVC copper wire alongwith all accessories, running earth etc.**

The socket outlet shall be 3-pin universal design 15 amp capacity with piano type switch, fuse, indicator. The socket outlet shall confirm to IS 1293 of 1988 with latest amends & ISI mark. Each socket outlets shall be controlled by a separate Point Wiring With 2x4 sqmm FRLS PVC Copper wire from nearest Sub distribution board. Piano type Switch controlling the socket outlet shall be on phase side of the line. Each 15 Amp. 3 pin socket and switch will be fixed on separate switch board and running earthing of 2.5 sq.mm. copper conductor with green colour PVC insulated to metallic part.

**MCB-** MCB shall be 'C' Class, of 10 kA breaking capacity and conforming to IS 8828 –78 with latest amendments. MCB shall be with ON/OFF indication, IP 65 degree protection, showing mid trip position in case of overload or short circuit conditions. MCB shall be having bi-connect terminals, load-line reversibility and with energy limitation class –III features.

**4.Schedule item no. A-13, B-14**

**Supply, erection, testing and commissioning of teakwood / PVC Main Board with electronic KWH meter 5-30 A cap.230 V, 50 HZ single phase duly wired with FRLS multistranded PVC copper wire with MCB, cutout, neon indication and earth connection etc.**

The teakwood/PVC board of size 12"x10" of good strength shall be supplied by contractor. Teakwood/PVC board shall be properly varnished. All required accessories like Electronic KWH meter 5-30 amps as per requirement, DP MCB, cut out 2 nos. with HRC fuse, neon indication and earth connection shall be supplied and erected on main board by contractor including wiring etc. in an approved manner.

All connections between meter board, MCB, Cutout shall be done with 10 sq.mm. FRLS copper wire as per IS 694 as per specified colour coding.

KWH meter shall be provided on main board along with switchgear with adequate spacing to ensure easy maintenance as per the instructions of Sr.DEE(G) or his authorized representative. Make and Sample of the KWH meter and MCB shall be got approved from Sr.DEE/G. Sample of teakwood/PVC board shall be approved from Sr.DEE/G. Meter before commissioning shall be deposited with the office of SSE/ incharge for the calibration and giving Rlys. Serial numbers. Adequate space shall be kept available on meter board for provision of ELCB/RCCB/RCBO.

**The meter board shall be supplied with following items**

**SPECIFICATION OF ELECTRONIC TYPE KWH METER**

**A. Electrical -**

**Current rating- 5-30 amps**

**Voltage rating-**

Rated voltage- 240 V AC

Operating voltage-140 V to 300 V AC,

Frequency- 50 Hz

Class of accuracy- 1

Meter constant-1600/3200(impulses/kwh)

Starting current-0.4 % of basic current

Resolution kWh -1, 1/10,

**Power consumption-** less than 1 W

**Output Device-Pulsating red colour LED provided for metrology indication**

Indication - LED provided for temper indication.(Reverse & earth)

Dielectric test- 2 KV, 50 HZ for 1 minute.

Protection level- IP 51

**B. Mechanical-**

Register- Stepper motor counter, impulse counter,

Temp. range-  $-10^{\circ}$  to  $60^{\circ}$  C

Humidity- upto 95% RH non condensing.

Sealing- 2 No. meter cover sealing screws and 1 terminal cover sealing screws.

Terminal- Brass /Tin plated brass.

**C. Tamper proof features :**

- Internal and external potential links.
- Immunity to passage of direct current.
- Capable of withstanding line to line momentary faults.
- Register accurately in current reversal. i.e. interchange of load and supply lines.
- In case of single phase, meter registers accurately when earth is used as a return path partially or fully, even when phase and neutral connection are reversed.
- Ultrasonically welded window pane in sheet steel case.
- Extended terminal cover ensuring total encapsulation of the cable termination.

**D. Salient features.**

- Accuracy class 1
  - Negligible effect of influence quantities such as frequency, voltage and temperature variation on the accuracy.
  - Low power consumption.
  - Factory calibrated. No modification of calibration possible at site by whatsoever means
  - Low starting current for low loads.
  - DC Immune - The meter does not saturate on passage of direct current and thus meets the requirement of affects of DC component in AC supply.
- The work of erection of Main Board shall be done in an approved manner as per the site condition and the instructions of field engineer.

**5.Schedule item no. B-15**

**Supply, Erection, Testing and Commissioning of DP-MCB 6-32A C-Series in provided distribution board.**

**MCB:-** Miniature circuit breaker 'C' Class, of 10 kA breaking cap. for outgoing supply. MCB as per IS 8828-1976 or latest.

MCB shall be 'C' Class, of 10 kA breaking capacity and conforming to IS 8828 –78 with latest amendments. MCB shall be with ON/OFF indication, IP 20 degree protection, showing mid trip position in case of overload or short circuit conditions. MCB shall be having bi-connect terminals, load-line reversibility and with energy limitation class –III features.

**6.Schedule item no. A-12, B-12**

**Supply, erection, testing & commissioning of submain from switch board to single phase DP switch / DP one circuit meter comprising of submain with 2x4 sq.mm. PVC insulated FRLS 1.1KV multistranded wire & one running earth of 2.5 sq.mm. copper conducting PVC insulation green colour of 1.1 KV grade on rigid PVC casing capping with all accessories.**

Supply, erection, testing and commissioning of Submain with 2x4 sq mm 1100V grade PVC FRLS copper wire. The wiring for submains shall consist of two wires of single core 4 sq.mm. PVC insulated multi-stranded FRLS copper wire of 1.1 KV grade on rigid PVC casing capping/ PVC Conduit pipe ( If required as per site condition) along with running earthing with one wire of 2.5 sq.mm. wire insulated with green colour PVC. For measurement purpose each meter of submain shall comprise of 2 wires of 4 sq.mm. of 1 mtr. length each and one earthing wire of 2.5 sq.mm of 1 mtr. length along with associated accessories like PVC casing –capping/ PVC conduit etc. The sub-mains shall be run inside the PVC casing capping /PVC conduit of suitable size as per site condition as per standard practice specified above as per the instructions of field Engineer. The item sub main shall be measured only for length upto switch board in room If more than one switch board is provided in a room or adjacent room and total no. of points is upto 10, then interconnection between switch boards as per schedule item of point wiring shall be done as stated in specification for point wiring.

**7.Schedule item no. A-11, B-13**

**Supply, erection, testing & commissioning of Submain with 2x6 sqmm FRLS copper wire inside PVC Casing capping with running earth etc complete. (1 m length of submain consists one cktmtr including all accessories & 2 wire of 6 sqmm with one wire of 2.5 sqmm for earth conn).**

The wiring for sub-mains shall consist of two wires of single core 6 sq.mm. PVC insulated multistranded FRLS copper wire of 1.1 KV ISI mark and confirming to IS-694/1990 or latest grade on rigid PVC casing capping/ PVC conduit along with running earthing with one wire of 2.5 sq.mm. wire insulated with green colour PVC. For measurement purpose each meter of submain shall comprise of 2 wires of 6 sq.mm. of 1 mtr. length each and one earthing wire of 2.5 sq.mm of 1 mtr. Length along with associated accessories like PVC casing–capping/ PVC conduit etc. The sub-mains shall be run inside the PVC casing capping /PVC conduit of suitable size as per site condition as per standard practice specified above as per the instructions of field Engineer. The item submain shall be measured only for length upto switch board in room. If more than one switch board is provided in a room or adjacent room and total no. of points is upto 10, then interconnection between switch boards as per schedule item of point wiring shall be as stated in specification for point wiring.

**8.Schedule item no. A-5**

**Supply, erection, testing and commissioning of BLDC Super efficient electrical Ceiling Fan 1400 mm sweep (56") 260-280 RPM, Services value 7.7 input voltage 140-285 V. Power consumption 26 W to 30 W. Air delivery 270 CMM or more, 3 blades with double ball bearing with regulator of electronic step type and down rod 300-600 mm as per requirement, canopies, shackle.**

Supply, erection, testing and commissioning of Ceiling fan 1400 mm sweep BLDC with Down rod and other accessories with regulator of electronic step type.

**TECHNICAL SPECIFICATION FOR BLDC CEILING FAN, INPUT VOLTAGE SINGLE PHASE 230 VOLT AC 50 HZ FOR GENERAL SERVICES APPLICATIONS.**

**1.0 SCOPE:**

This specification defines the requirement of Design, Manufacture, Supply, Testing & inspection of Ceiling Fan & Electronic fan Regulator for various applications at Platforms, services buildings & Railway Quarters for General services over Central Railway. This specification supersedes earlier CR specification no PCEE / CR / 2019 / 1400 MM BLDC FAN dtd 10.01.2019 & Rev 1 dtd 05.02.19.

**2.0 Reference Standards:**

The following documents given below are for reference to the manufacturer for design, manufacture, performance, safety, environmental & other type test requirements. In the event of conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall prevail.

**IS/IEC:**

SN	Specification no.	Description
1	IS:374- 2019 Fourth revision with latest amendment	Electric Ceiling Fan
2	IS: 302.2.80-2017	Safety Requirements
3	IS: 12360-1988, Reaffirmed 2020	Rated Voltage
4	IS: 648-2006 IS: 649-1997 IS: 3024-2006	Stampings
5	IS: 1271- 1985	Insulating Materials
6	IS: 1248- 2003	Routine & Acceptance Tests
7	IS: 4905-1968	Scale of Sampling
8	IS: 11037-2019	Electronic Fan Regulator
9	IS:737 - 2008	Fan Blade
10	IS: 13730 -1993	Copper winding wire
11	IS:13778 - 2011	Test Method of Copper winding wire

**3.0 SCOPE FOR SUPPLY OF ITEMS:**

- Supply of 1400/1200 mm Sweep Ceiling Fan BEE 05 star with ISI Marked confirming to IS 374/2019 Fourth revision with latest amendment.



- Fan regulator: ISI marked electronic fan regulator in four/five steps or stepless upto 100 watt.

#### 4.0 GENERAL TECHNICAL REQUIREMENTS:-

- 4.1 The fan regulator shall be electronic type and should be able to with stand long periods of overload without getting damaged.
- 4.2 The ceiling fans 1200mm & 1400mm sweep shall be BEE 05 star with ISI Marked.
- 4.3 The tolerance limit in technical parameters if not given shall be as per reference of Indian Standard.
- 4.4 The Public Procurement (Preference to make in India), 'Order-2017' shall be applicable for procurement.
- 5.0 Supply ceiling Fan 'ISI' marked and latest highest BEE star ratings confirming to IS: 374/2019 Fourth revision with latest amendment.

#### 5.1 1400 mm Sweep ceiling fan:

SN	Item	Description
1	Type of motor	Brushless DC
2	Sweep size in mm	1400 mm
3	BEE star rating	5 star
4	Minimum air delivery (Cubic m/min)	250
5	Service value (air delivery cu. Meter/min/watt)	Not less than 7.5
6	Power factor	Not less than 0.90
7	Power consumption	Not more than 35 watts.
8	Safety wire set	1.6 mm strand wire, 2 U clamp, 1 L clamp.
9	Rated voltage & frequency	230 V Single phase AC , 50 Hz
7	Working Voltage	140-285 V
8	Standard color	Ivory/ white or based on site requirement
9	Regulator	Fixed speed.
10	No. of blades	03
11	Blade thickness	Minimum 1.1 mm
12	Blade material	Aluminum
13	Winding material	Enameled copper
14	Bearing	Double ball bearing
15	Length of down rod without shackle	300 mm or greater
16	Shank	Thickness : 1.6 mm (Minimum) Material: CRC (cold Rolled Coiled) sheet
17	Shackle	Thickness : 2.0 mm (Minimum) Material: CRC (cold Rolled Coiled) sheet
18	Total Harmonic distortion (THD)	Less than 15%
19	Canopy	02 Nos
20	ISI mark	IS:374 :2019 Fourth revision with latest amendment
21	Noise level	Less than or equal 55 dB at 1 meter below fan

22	Surge protection capacity	2 KV
23	Warranty	The fan shall be with warranty of 05 years

**Note:** Sr.DEE/G will decide the requirement of "Remote BLDC fans". Preferably BLDC fans with regulator will be procured.

## 5.2 'ISI' marked Electronic Fan Regulator in Four/Five steps or stepless upto 100 watt.

SN	Item	Description
5.3.1	Fan regulator upto 100 watt	ISI marked Electronic Fan Regulator as per IS: 11037-2019.
5.3.2	Types & make of Fan Regulator	Make: Anchor, SSK, Philips, CONA, Havells, Legrand, Crabtree, & Schneider or similar.  The Fan Regulator shall be Switch/Socket Type low inductive cell of metalized polyester film coated with flame retardant grade epoxy powder.  The regulator shall be suitable for surface/concealed mounting complete with Knob & screws.
5.3.3	Input Voltage	Single Phase 230 volt AC, 50Hz
5.3.4	Material Grade	Poly Carbonate
5.3.5	Life Test Conditions	a) a) Endurance Test: Loaded at 1.1 times of rated voltage at 70 deg. C for 500 hours b) Switching Test; >20,000 cycles of 4 step/5step switch type fan regulator c) Lot to Lot testing: loaded at 450 volt AC at ambient temperature for 2 hours
5.3.6	Noise level	No appreciable noise/ disturbance on radio/television when operated outside a radius of 2 mtr. From the regulator

6.0 Warranty: The fan shall be with warranty of 05 years.

7.0 **Identification:** Each fan shall be indelibly marked firm name, month & year of manufacture, warranty period, serial number, rated voltage, wattage, size of fan & type of fan on ceiling fan.

## 8.0 **Inspection:**

The Inspection by M/s. RITES or TPI at manufacturers works, facility for carrying out acceptance tests as per IS/IEC specification shall be made available by the manufacturer to inspecting authority at manufactures cost.

## 9.0 **TESTS:**

The ceiling fan shall be tested with the applicable IS/IEC reference standards given In Para 2.0 of this specification.

## **TYPES OF TESTS:**

### **9.1.1 Types Tests:**

Inspecting Agency M/s RITES or third party will verify the documents available with the firm for type tests mentioned in Para 9.1.4 carried out from Govt. Laboratory/National/International Accredited Laboratory to ensure the confirmation with the requirement of specification. However, only BIS-approved laboratories are permitted.

### **9.1.2 Acceptance tests:**

These tests shall be carried out by an Inspecting Agency at the manufacturer works on sample taken from a lot for the purpose of acceptance of material.

### **9.1.3 Routine Tests:**

These tests shall be performed by the manufacturer on each item and the records shall be shown to the Inspecting Agency during the inspection of lot offered for acceptance tests.

## **9.1.4 TESTS SCHEME**

<b>9.1.4 (a) For Fan</b>					
<b>SN</b>	<b>Description of test</b>	<b>Reference Para of the IS specification</b>	<b>Type test</b>	<b>Acceptance test</b>	<b>Routine test</b>
1	Safety requirements	Clause 9 (IS: 374:2019)	Y	-	-
2	Performance requirements	Clause 15 (IS: 374:2019)	Y	-	-
3	Speed and power factor	Clause 14.4 & 14.5 (IS: 374:2019)	Y	Y	-
4	Speed regulators	Clause 10 (IS: 374:2019)	Y	Y	-
5	Starting	Clause 11 (IS: 374:2019)	Y	Y	-
6	Interchangeability	Clause 12 (IS: 374:2019)	Y	-	-
7	Silent operation	Clause 13 (IS: 374:2019)	Y	-	-
8	Power input	10 of IS: 302 (part 2/sec 80) (IS: 374:2019)	Y	Y	-
9	Test for harmonic distortion	Clause 17 (IS: 374:2019)	Y	-	-
10	Endurance test	Clause 16 (IS: 374:2019)	Y	-	-
11	Leakage current at operating temperature	13 of IS 302 (part 2/sec 80)	-	Y	-
12	Earthing connection	27 of IS 302 (part 2/sec 80)	-	Y	-
13	Earth continuity test	A-1 of IS 302-1	-	-	Y
14	Electric strength test	A-2 of IS 302-1	-	-	Y
15	Functional test	A-3 of IS 302-1	-	-	Y
	Simple running test	-	-	-	Y

16	(checking fan is operating or not)				
9.1 4 (b) . For Regulator					
SN	Description of test	Reference Para of the IS specification	Type test	Acceptance test	Routine test
1	Temperature-rise	Clause 9.5.1 (IS: 11037-2019)	Y	-	-
2	Leakage current	Clause 9.5.2 (IS: 11037-2019)	Y	Y	-
3	High voltage	Clause 9.5.3 (IS: 11037-2019)	Y	Y	-
4	Insulation resistance	Clause 9.5.4 (IS: 11037-2019)	Y	Y	-
5	Earthing connection	Clause 9.5.5 (IS: 11037-2019)	Y	Y	Y
6	Protection against electric shock	Clause 9.5.6 (IS: 11037-2019)	Y	Y	-
7	Voltage drop Performance	Clause 7.7 (IS: 11037-2019)	Y	-	-
8	Performance	Clause 8 (IS: 11037-2019)	Y	Y	-
9	Moisture resistance	Clause 9.5.7 (IS: 11037-2019)	Y	Y	-
10	Mechanical strength	Clause 9.5.8 (IS: 11037-2019)	Y	-	-
11	Creepage distances and clearances	Clause 9.5.9 (IS: 11037-2019)	Y	-	-
12	Electrical endurance test	Clause 9.5.10 (IS: 11037-2019)	Y	Y	-
13	Environmental tests	Clause 9.5.11 (IS: 11037-2019)	Y	-	-
14	Resistance to abnormal heat and to fire	Clause 9.5.12 (IS: 11037-2019)	Y	-	-
15	Resistance to rusting	Clause 9.5.13 (IS: 11037-2019)	Y	-	-
16	Checking of dimensions	Clause 9.5.14 (IS: 11037-2019)	Y	-	-
17	Flash rate	Clause 9.5.3.4 (IS: 11037-2019)	-	-	Y
18	Insulation resistance	Clause 9.5.4.2 (IS: 11037-2019)	-	-	Y

**Note :** Safety Wire Set 1.6 mm Strand Wire, 2 U Clamp, 1 L Clamp required to be provided with fan.

**9.Schedule item no. B-6**

**Supply, erection, testing & commissioning of Ceiling Fan of Energy Efficient (BLDC) of 1200 mm sweep, 28 watts, motor shall be Inverter driven, controlled by microprocessor with BEE 5 star rated, having input power of 28 W, Power Factor 0.98, Air Delivery 230 Cu.Mtr/Min, Speed 385 RPM, number of aluminium blade 3, with remote control / regulator of electronic step type to use in 230 V, 50 Hz. AC supply with 5 years replacement warranty along with valid test certificate.**

Supply, erection, testing and commissioning of Ceiling fan 1200 mm sweep BLDC with Down rod and other accessories with regulator of electronic step type.

**TECHNICAL SPECIFICATION FOR BLDC CEILING FAN, INPUT VOLTAGE SINGLE PHASE 230 VOLT AC 50 HZ FOR GENERAL SERVICES APPLICATIONS.**

**3.0 SCOPE:**

This specification defines the requirement of Design, Manufacture, Supply, Testing & inspection of Ceiling Fan & Electronic fan Regulator for various applications at Platforms, services buildings & Railway Quarters for General services over Central Railway. This specification supersedes earlier CR specification no PCEE / CR / 2019 / 1400 MM BLDC FAN dtd 10.01.2019 & Rev 1 dtd 05.02.19.

**4.0 Reference Standards:**

The following documents given below are for reference to the manufacturer for design, manufacture, performance, safety, environmental & other type test requirements. In the event of conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall prevail.

**IS/IEC:**

SN	Specification no.	Description
1	IS:374- 2019 Fourth revision with latest amendment	Electric Ceiling Fan
2	IS: 302.2.80-2017	Safety Requirements
3	IS: 12360-1988, Reaffirmed 2020	Rated Voltage
4	IS: 648-2006 IS: 649-1997 IS: 3024-2006	Stampings
5	IS: 1271- 1985	Insulating Materials
6	IS: 1248- 2003	Routine & Acceptance Tests
7	IS: 4905-1968	Scale of Sampling
8	IS: 11037-2019	Electronic Fan Regulator
9	IS:737 - 2008	Fan Blade
10	IS: 13730 -1993	Copper winding wire
11	IS:13778 - 2011	Test Method of Copper winding wire

**3.0 SCOPE FOR SUPPLY OF ITEMS:**

- Supply of 1400/1200 mm Sweep Ceiling Fan BEE 05 star with ISI Marked confirming to IS

374/2019 Fourth revision with latest amendment.

- Fan regulator: ISI marked electronic fan regulator in four/five steps or stepless upto 100 watt.

#### 4.5 GENERAL TECHNICAL REQUIREMENTS:-

4.6 The fan regulator shall be electronic type and should be able to with stand long periods of overload without getting damaged.

4.7 The ceiling fans 1200mm & 1400mm sweep shall be BEE 05 star with ISI Marked.

4.8 The tolerance limit in technical parameters if not given shall be as per reference of Indian Standard.

4.9 The Public Procurement (Preference to make in India), 'Order-2017' shall be applicable for procurement.

5.3 Supply ceiling Fan 'ISI' marked and latest highest BEE star ratings confirming to IS: 374/2019 Fourth revision with latest amendment.

#### 5.4 1200 mm Sweep ceiling fan:

SN	Item	Description
1	Type of motor	Brushless DC
2	Sweep size in mm	1200 mm
3	BEE star rating	5 star
4	Minimum air delivery (Cubic m/min)	250
5	Service value (air delivery cu. Meter/min/watt)	Not less than 7.5
6	Power factor	Not less than 0.90
7	Power consumption	Not more than 28 watts.
8	Safety wire set	1.6 mm strand wire, 2 U clamp, 1 L clamp.
9	Rated voltage & frequency	230 V Single phase AC , 50 Hz
7	Working Voltage	140-285 V
8	Standard color	Ivory/ white or based on site requirement
9	Regulator	Fixed speed.
10	No. of blades	03
11	Blade thickness	Minimum 1.1 mm
12	Blade material	Aluminum
13	Winding material	Enameled copper
14	Bearing	Double ball bearing
15	Length of down rod without shackle	300 mm or greater
16	Shank	Thickness : 1.6 mm (Minimum) Material: CRC (cold Rolled Coiled) sheet
17	Shackle	Thickness : 2.0 mm (Minimum) Material: CRC (cold Rolled Coiled) sheet
18	Total Harmonic distortion (THD)	Less than 15%
19	Canopy	02 Nos
20	ISI mark	IS:374 :2019 Fourth revision with latest amendment
21	Noise level	Less than or equal 55 dB at 1 meter below fan

22	Surge protection capacity	2 KV
23	Warranty	The fan shall be with warranty of 05 years

5.5 'ISI' marked Electronic Fan Regulator in Four/Five steps or stepless upto 100 watt.

SN	Item	Description
5.3.1	Fan regulator upto 100 watt	ISI marked Electronic Fan Regulator as per IS: 11037-2019.
5.3.2	Types of Fan Regulator	The Fan Regulator shall be Switch/Socket Type low inductive cell of metalized polyester film coated with flame retardant grade epoxy powder.  The regulator shall be suitable for surface/concealed mounting complete with Knob & screws.
5.3.3	Input Voltage	Single Phase 230 volt AC, 50Hz
5.3.4	Material Grade	Poly Carbonate
5.3.5	Life Test Conditions	d) a) Endurance Test: Loaded at 1.1 times of rated voltage at 70 deg. C for 500 hours e) Switching Test; >20,000 cycles of 4 step/5step switch type fan regulator f) Lot to Lot testing: loaded at 450 volt AC at ambient temperature for 2 hours
5.3.6	Noise level	No appreciable noise/ disturbance on radio/television when operated outside a radius of 2 mtr. From the regulator

9.0 **Warranty:** The fan shall be with warranty of 05 years.

10.0 **Identification:** Each fan shall be indelibly marked firm name, month & year of manufacture, warranty period, serial number, rated voltage, wattage, size of fan & type of fan on ceiling fan.

#### 11.0 Inspection:

The Inspection facility for carrying out acceptance tests as per IS/IEC specification shall be made available by the manufacturer to inspecting authority at manufactures cost.

#### 9.1 TESTS:

The ceiling fan shall be tested with the applicable IS/IEC reference standards given In Para 2.0 of this specification.

#### TYPES OF TESTS:

##### 9.1.1 Types Tests:

Inspecting authority will verify the documents available with the firm for type tests mentioned in Para 9.1.4 carried out from Govt. Laboratory/National/International Accredited Laboratory to ensure the confirmation with the requirement of specification. However, only BIS-approved laboratories are permitted.

### 9.1.2 Acceptance tests:

These tests shall be carried out by an Inspecting Agency at the manufacturer works on sample taken from a lot for the purpose of acceptance of material.

### 9.1.3 Routine Tests:

These tests shall be performed by the manufacturer on each item and the records shall be shown to the Inspecting Agency during the inspection of lot offered for acceptance tests.

#### 9.1.4 TESTS SCHEME

<b>9.1.4 (a) For Fan</b>					
<b>SN</b>	<b>Description of test</b>	<b>Reference Para of the IS specification</b>	<b>Type test</b>	<b>Acceptance test</b>	<b>Routine test</b>
1	Safety requirements	Clause 9 (IS: 374:2019)	Y	-	-
2	Performance requirements	Clause 15 (IS: 374:2019)	Y	-	-
3	Speed and power factor	Clause 14.4 & 14.5 (IS: 374:2019)	Y	Y	-
4	Speed regulators	Clause 10 (IS: 374:2019)	Y	Y	-
5	Starting	Clause 11 (IS: 374:2019)	Y	Y	-
6	Interchangeability	Clause 12 (IS: 374:2019)	Y	-	-
7	Silent operation	Clause 13 (IS: 374:2019)	Y	-	-
8	Power input	10 of IS: 302 (part 2/sec 80) (IS: 374:2019)	Y	Y	-
9	Test for harmonic distortion	Clause 17 (IS: 374:2019)	Y	-	-
10	Endurance test	Clause 16 (IS: 374:2019)	Y	-	-
11	Leakage current at operating temperature	13 of IS 302 (part 2/sec 80)	-	Y	-
12	Earthing connection	27 of IS 302 (part 2/sec 80)	-	Y	-
13	Earth continuity test	A-1 of IS 302-1	-	-	Y
14	Electric strength test	A-2 of IS 302-1	-	-	Y
15	Functional test	A-3 of IS 302-1	-	-	Y
16	Simple running test (checking fan is operating or not)	-	-	-	Y



9.2 4 (b) . For Regulator					
SN	Description of test	Reference Para of the IS specification	Type test	Acceptance test	Routine test
1	Temperature-rise	Clause 9.5.1 (IS: 11037-2019)	Y	-	-
2	Leakage current	Clause 9.5.2 (IS: 11037-2019)	Y	Y	-
3	High voltage	Clause 9.5.3 (IS: 11037-2019)	Y	Y	-
4	Insulation resistance	Clause 9.5.4 (IS: 11037-2019)	Y	Y	-
5	Earthing connection	Clause 9.5.5 (IS: 11037-2019)	Y	Y	Y
6	Protection against electric shock	Clause 9.5.6 (IS: 11037-2019)	Y	Y	-
7	Voltage drop Performance	Clause 7.7 (IS: 11037-2019)	Y	-	-
8	Performance	Clause 8 (IS: 11037-2019)	Y	Y	-
9	Moisture resistance	Clause 9.5.7 (IS: 11037-2019)	Y	Y	-
10	Mechanical strength	Clause 9.5.8 (IS: 11037-2019)	Y	-	-
11	Creepage distances and clearances	Clause 9.5.9 (IS: 11037-2019)	Y	-	-
12	Electrical endurance test	Clause 9.5.10 (IS: 11037-2019)	Y	Y	-
13	Environmental tests	Clause 9.5.11 (IS: 11037-2019)	Y	-	-
14	Resistance to abnormal heat and to fire	Clause 9.5.12 (IS: 11037-2019)	Y	-	-
15	Resistance to rusting	Clause 9.5.13 (IS: 11037-2019)	Y	-	-
16	Checking of dimensions	Clause 9.5.14 (IS: 11037-2019)	Y	-	-
17	Flash rate	Clause 9.5.3.4 (IS: 11037-2019)	-	-	Y
18	Insulation resistance	Clause 9.5.4.2 (IS: 11037-2019)	-	-	Y

**Note :** Safety Wire Set 1.6 mm Strand Wire, 2 U Clamp, 1 L Clamp required to be provided with fan.

**10.Schedule item no. A-6, B-7**

**Supply, erection, testing & commissioning of Heavy Duty single phase Exhaust Fan of 380 mm size sweep, 1440 RPM duly wired with 3 core flexible copper wire and fixing arrangement, hardware etc. complete.**

Supply erection, testing and commission of single phase Exhaust fan of 380 mm sweep heavy duty ISI mark and fixing arrangement, Hardware etc 1440 RPM duly wired with 3 core flexible copper wire with flexible pipe shall be erected on position with necessary material and fixing arrangements. The mounting frame shall be passed with steel bracket which will connect the frame and fan motor assembly. Rubber mountings shall be provided between mounting fan and mounting brackets.

The work shall be done in approved manner as per the instructions of field Engineer.

**11.Schedule item no. B-34**

**Supply, installation, testing & commissioning of single phase RCBO of 32A capacity, 30mA sensitivity with Metal enclosure.**

The price shall cover the cost of work includes supply, installation, testing & commissioning of single phase RCBO of 32A capacity, 30mA sensitivity with metal enclosure of suitable size as per site requirement.

Compact single phase RCBO of 32Amp, sensitivity 30mA with overload, short circuit and earth leakage protection. The RCBO shall be of make as per list enclosed. ISI marked and as per IS 12640 (Part 2) IEC 61009 – 1.

**RCBO –**

RCBO shall have conformance to IS 12640-2 / IEC 61009-1.

RCBO shall be of breaking capacity of 10kA.

RCBO shall not be line load biased.

RCBO shall have minimum electric life of 10,000 electric operations.

Single Phase RCBO of 6A-40A to be in 2 Modules size with a breaking capacity of 10kA.

The RCBO shall have separate indications for short circuit fault and earth leakage fault.

The RCBO shall trip on leakage fault of AC waveform consisting of pulsating DC along with transients and harmonics.

The RCBO shall have pollution degree 3.

The RCBO shall have rated impulse withstand of 6 kV.

The RCBO shall have IP20.

The RCBO shall have a test button to check health of RCBO by creating artificial fault.

The RCBO shall be suitable for isolation.

The RCBO shall have bi-connect terminals for both bus bar and cable termination.

The RCBO, up to 63A, shall have cable termination capacity of 35 sq mm for rigid cable & 25 sq mm for flexible.

The RCBO shall have safety shutter to avoid any wrong insertion of cable.

The RCBO shall have operating temperature -5 °C to +60 °C.

The RCBO shall have a provision for padlock to prevent unauthorized access.

The RCBO shall have provision for mounting of accessories – Auxiliary Contact, Trip Alarm Contact, UV, OV, Shunt Release.

The RCBO shall have DIN clip on both the sides for easy removal of an RCBO from the DIN rail.

**12.Schedule item no. A-10, B-11**

**SETC of Lighting Circuit Board, Double Door Powder coated with locking arrangement consisting 63 A TPN MCCB I/C and 18 Nos x 6 A SPN MCB and 6 Nos x 20 A SPN MCB for O/G complete.(All MCCB are Microprocessor Based)**

**Supply, erection, testing & commissioning of Three Phase Lighting Circuit Board, Double Door Powder coated with locking arrangement consisting 63 A 4P MCCB as I/C and 18 Nos x 6 A SPN MCB and 6 Nos x 20A SPN MCB as O/G complete.**

The price shall cover cost of supply, loading, transportation and unloading of material at site, erection testing and commissioning of single phase/ 3 phase distribution board as above. The DB shall be double metallic door type with earthing terminal, bus bars, neutral link, etc. housed in 16 SWG CRCA sheet enclosure powder coated type with all accessories with IP 65 **protection**. The minimum breaking capacity of MCB shall be 10 KA.

**MCB DB-** MCB Distribution board consisting with various capacity of MCB's as in schedule. MCB shall be 'C' Class, of 10 kA breaking capacity and conforming to IS 8828 –78 with latest amendments. MCB shall be with ON/OFF indication, IP 65-degree protection, showing mid trip position in case of overload or short circuit conditions. MCB shall be having bi-connect terminals, load-line reversibility and with energy limitation class –III features.

Distribution board shall be made of high quality CRCA steel sheet with surface finish powder coated mat finish broken white distribution board double door & neutral link with box type terminal tin plated Electrolyte grade copper bus bar & phase link tin plated brass earthing link and wire set for internal wiring. DB shall be with IP 65 protection. It shall be provided with cements skill protection and side locking DIN bar interchangeable door.

**RCBO –**

RCBO shall have conformance to IS 12640-2 / IEC 61009-1.

RCBO shall be of breaking capacity of 10kA.

RCBO shall not be line load biased.

RCBO shall have minimum electric life of 10,000 electric operations.

Single Phase RCBO of 6A-40A to be in 2 Modules size with a breaking capacity of 10kA.

The RCBO shall have separate indications for short circuit fault and earth leakage fault.

The RCBO shall trip on leakage fault of AC waveform consisting of pulsating DC along with transients and harmonics.

The RCBO shall have pollution degree 3.

The RCBO shall have rated impulse withstand of 6 kV.

The RCBO shall have IP20.

The RCBO shall have a test button to check health of RCBO by creating artificial fault.

The RCBO shall be suitable for isolation.

The RCBO shall have bi-connect terminals for both bus bar and cable termination.

The RCBO, up to 63A, shall have cable termination capacity of 35 sq mm for rigid cable & 25 sq mm for flexible.

The RCBO shall have safety shutter to avoid any wrong insertion of cable.

The RCBO shall have operating temperature -5 °C to +60 °C.

The RCBO shall have a provision for padlock to prevent unauthorized access.

The RCBO shall have provision for mounting of accessories – Auxiliary Contact, Trip Alarm Contact, UV, OV, Shunt Release.

The RCBO shall have DIN clip on both the sides for easy removal of an RCBO from the DIN rail.

**13.Schedule item no. A-28, B-30****Supply & erection of cast iron cable marker.**

The cost includes supply erection, testing and commissioning of Cable marker shall consist of M. S. angle of size 35x35x6mm welded with 8mm thick rounded shape Cast Iron plate of 120mm dia, with Raised embossed 2 mm Lettering C.R. CABLE 11KV. M.S. angle shall be welded with cast iron plate 8mm thick of 120 mm dia. MS flat shall be welded at bottom. Item shall be hot dip galvanized in an approved manner.

**14.Schedule item no. A-39, A-40, B-33**

**SETC of LT Panel consisting 2 x250 A 4 P MCCB as I/C and 2x100 A 4 Pole MCCB, 4 x63 A MCCB, DP MCB 2x32 A and SPN MCB 4 x 32 A O/G with multi-function meter and complete associated (ALL MCCB are Microprocesor Based)**

**SETC of LT Panel consisting 1x 100 A 4 P MCCB as I/C and 2 x 63 A 4 Pole MCCB O/G with multi-function meter and complete associated (ALL MCCB are Microprocesor Based)**

**Supply, erection, testing & commissioning of LT Panel Outdoor type with double door power coated consisting 1x125 A 4 P MCCB incomer, 3 x 63 A 4P MCCB, 2 x 32 A 4 Pole MCB, 4 x 32 DP MCB as outgoing with 3Ph KWH meter with copper busbar & indication lamps and other complete associated accessories. All MCCB are Microprocessor Based.**

This specification covers design, manufacture supply, erection, testing and commissioning of cubicle type sheet steel floor mounting, LT panel board for distribution of power.

**SYSTEM PARTICULARS:-**

<b>RATED VOLTAGE</b>	<b>440 VOLT 3 PHASE 4 WIRE</b>
<b>RATED FREQUENCY</b>	<b>50 HZ.</b>
<b>MAX. AMBIENT TEMPERATURE</b>	<b>55° C</b>
<b>IP rating</b>	<b>54 or above</b>

**CONSTRUCTIONAL FEATURES-** The design shall be totally enclosed completely dust tight and vermin proof, neoprene gaskets shall be used between all adjacent units and beneath all covers to render the joints effectively dust proof, Powder coated inside & outside. Sheet steel work shall be of high quality. All openings and out cuts in the doors shall be free from, burrs. Weld runs shall be ground smooth. All sheet surfaces shall be free from dents and hammer marks. A base channel of 50 mm x 50 mm fabricated out of 3 mm thick hot rolled sheet steel galvanized shall be provided to prevent corrosion of the sheet steel cubicles and facilitate cleaning of floors. All switches shall be operatable from front. The compartment of the outgoing switch fuse unit shall be provided with properly interlocking arrangement.

**FABRICATION-**The Control Panel shall be fabricated with CRCA steel sheet 1.6 mm and shall be with front and back opening with locking arrangement. The LT panel shall be floor mounting type comprising or following items suitably on ½ ft. height foundation or Iron angle frame.

**BUSBAR-** Busbar chamber with 4 nos busbars and supported on ceramic / epoxy insulators of 500V cap. as per respective panel. The busbars shall be separated at a distance of 3" minimum and covered with coloured insulated heat shrinkable sleeve /epoxy coating of the red, yellow, blue colour indicating the phases and black for indicating the neutral. Busbar shall be of high conductivity of uniform cross section. Busbar shall be housed in separate bus bar chamber. Capacity of

Main/Branch. The connectors between horizontal and vertical bus bar shall be short and neat. Connections shall be fully enclosed, so as to leave no access to live parts and shall present neat appearance.

**Note** – Busbar shall be of copper only and as per IS 8623-1 (1993). The current carrying capacity shall not be less than **1.25 Amp /1 sqmm** for copper Busbar.

**SWITCH FUSE UNITS :-** Air-Brake, Heavy Duty SFU switch with HRC fuses for incoming and outgoing supply shall be provided Switch fuse unit shall be confirming to IS 13947 pt-3 1993 or latest and HRC fuse confirming to IS 13703 – PT-1&2 -1993 or latest. All SFU should be 4 pole. The panel board shall be provided with following Items:-

**CHANGE OVER SWITCH-** 4 pole, 415 volt onload changeover switch as per IS 13947 (Pt-I&III).

**MCCB-**4 pole Molded case circuit breakers with breaking capacity 35 kA as per requirement & IS/IEC 60947-2, IEC 60947-2 & EN 60947-2.

**Note – (1)All incoming and outgoing MCCB should be 4 pole microprocessor based with adjustable short circuit, overload, ground fault (LSIG) and earth leakage protection (ELR with CBCT for each MCCB required).**

**(2) Electrical interlocking between MCCB to be done.**

**(3) Busbar shall be of copper only.**

**(4) Busbar size should be same for phase and neutral.**

**(5) Indicating lamp LED type required for outgoing and incoming supply**

**MCB:-** Miniature circuit breaker ‘C’ Class of 10 kA breaking cap. for outgoing supply. MCB as per IS 8828-1976 or latest.

**Contactor :-** 4 Pole power contactor, AC1 Rating 440 Volt AC 50 Hz. Conform to IS /IEC 60947-4-1

**MCB DB-** MCB Distribution board consisting with various capacity of MCB's as in schedule. MCB shall be ‘C’ Class, of 10 kA breaking capacity and conforming to IS 8828 –78 with latest amendments. MCB shall be with ON/OFF indication, IP 65 degree protection, showing mid trip position in case of overload or short circuit conditions. MCB shall be having bi-connect terminals, load-line reversibility and with energy limitation class –III features.

It shall be provided with cements skill protection and side locking DIN bar interchangeable door.

**ACB-** ACB shall be microprocessor based EDO type having breaking capacity 50 kA with following features.

- 4 pole conforming to IS/IEC- 60947 (Part 1 & 2)
- High short time withstand capacity.  $I_{cu}=I_{cs}=I_{cw}$  for 1 sec total selectivity.
- High mechanical and electrical operating life.
- Advanced micro-processor based protection release with LSING protection & type of fault indication.
- 50% and 200% neutral protection solution
- RoHS compliant.
- Inbuilt Electrical and Mechanical Anti-Pumping prevent multiple breaker closures due to persistent closing command
- CE marking.
- Arc-chute interlocking prevents the closure of breaker if arc-chute is missing or not properly installed.
- Smart-racking shutter interlock ensures breaker is switched off before racking out the breaker.

- Conforms to Glow wire Testing.
- ACB Release should provide overload / Short Circuit/Instantaneous/Ground fault & Neutral current protection IS/IEC 60947-2 & IEC 60947-2.
- Electrical Interlocking between ACB/Switchgears to be done.
- ACB release should give last 10 fault history.

**Bus Coupler** - It shall be similar to incomer switchgears and should be electrically and mechanically interlocked.

**Protection** - over load protection (phase wise) short circuit protection, reverse power over / under voltage & current, under / over frequency, earth fault protection with type of fault indication.

**ELCB/ RCCB**- It shall be 2 pole RCCB 16/25/40/63 A, electromagnetic type with 30 mA sensitivity with earth leakage trip indication complete as per specification with Metal enclosure It shall be Conforming to IS 12640-1/2000. It shall be erected in an approved manner as per site condition and instructions of field supervisor.

Residual Current Circuit Breakers: - The RCCB shall have conformance to IS 12640-1 / IEC 61008-1

- The RCCB shall be truly current operated and shall operate on Core Balance Current Transformer (CBCT) mechanism
- The RCCB shall have advanced neutral mechanism
- The RCCB shall have pollution degree 3
- The RCCB shall have minimum electric life of 10,000 electric operations
- The RCCB shall have terminal capacity of 35 sq. mm up to 63A, 50 sq. mm up to 100A
- The RCCB shall have IP20
- The RCCB shall have operating temperature -5 °C to +60 °C.
- The RCCB shall have a test button to check health of RCCB by creating artificial fault
- The RCCB shall have rated impulse withstand up to 6 kV
- The RCCB shall have no line load bias.
- The RCCB shall have bi-connect terminals for both bus bar and cable termination
- The RCCB shall give an indication for leakage fault when tripping
- The RCCB shall have rated conditional short circuit current of 10kA
- The RCCB shall have rated residual making and breaking capacity of 1kA
- The RCCB shall have flag indication for Earth Leakage Faults - The RCCB shall have a provision for padlock to prevent unauthorized access
- The RCCB shall have provision for mounting of accessories – Auxiliary Contact, Trip Alarm Contact, UV, OV, Shunt Release
- The RCCB shall be suitable for isolation
- The RCCB shall have safety shutter to avoid any wrong insertion of cable
- The RCCB shall have DIN clip on both the sides for easy removal of an RCCB from the DIN rail.

#### **RCBO –**

RCBO shall have conformance to IS 12640-2 / IEC 61009-1.

RCBO shall be of breaking capacity of 10kA.

RCBO shall not be line load biased.

RCBO shall have minimum electric life of 10,000 electric operations.

Single Phase RCBO of 6A-40A to be in 2 Modules size with a breaking capacity of 10kA.

The RCBO shall have separate indications for short circuit fault and earth leakage fault.

The RCBO shall trip on leakage fault of AC waveform consisting of pulsating DC along with transients and harmonics.

The RCBO shall have pollution degree 3.

The RCBO shall have rated impulse withstand of 6 kV.

The RCBO shall have IP20.

The RCBO shall have a test button to check health of RCBO by creating artificial fault.

The RCBO shall be suitable for isolation.

The RCBO shall have bi-connect terminals for both bus bar and cable termination.

The RCBO, up to 63A, shall have cable termination capacity of 35 sq mm for rigid cable & 25 sq mm for flexible.

The RCBO shall have safety shutter to avoid any wrong insertion of cable.

The RCBO shall have operating temperature -5 °C to +60 °C.

The RCBO shall have a provision for padlock to prevent unauthorized access.

The RCBO shall have provision for mounting of accessories – Auxiliary Contact, Trip Alarm Contact, UV, OV, Shunt Release.

The RCBO shall have DIN clip on both the sides for easy removal of an RCBO from the DIN rail.

**ELECTRONIC KWH METER:-** Electronic KWH meter, 3 phase, 4 wire, CT operated with unbalanced load and reverse protection for AC 415 Volt, 50 Hz supply This shall comply with IS 13779 Pt. I of 1972 and following features –

Instantaneous start, low power consumption, Meter shall record correct energy with same accuracy under reverse current connection. LED indication for current reversal tampering shall be provided. Phase available indication to be provided.

**AMMETER-** Digital type Ammeter 3 1/2 Digit LED display CT operated cap. as per panel requirement with necessary wiring and fixing accessories with selector switch.

**VOLTMETER:** Digital type Voltmeter 3 1/2 Digit LED display 0-750 volts with necessary wiring and fixing accessories with selector switch.

**INDICATING LAMPS :-** LED type for outgoing and incoming supply separately.

**WIRING -**The internal control wiring of panel shall be done by FRLS 2.5 sqmm copper wire as per IS 694 as per ratings of connected switchgear in an approved manner. The internal connections shall be easily accessible during inspection and maintenance of the panel board. Sufficient space shall be provided for cable entering hole and cable gland plate at the bottom.

**CABLE ENTRY:** Provision of suitable cable entry through brass glands to connect the equipment to incoming and outgoing cables shall be made. The cable entry to terminal of transformer shall be provided with suitable glands to avoid mechanical damage to the cable insulation. The cable shall be easily accessible.

**Distribution board** -Distribution board shall be made of high quality CRCA steel sheet with surface finish power coated mat finish broken white distribution board double door & neutral link with box type terminal tin plated Electrolyte grade copper bus bar & phase link tin plated brass earthing link and wire set for internal wiring DB shall be with IP 65 protection.

### 1)SCOPE:

The specification covers design, manufacture, testing and commissioning of fabricated lighting / power distribution boards. (Readymade DB to be supplied & installed as per the preferred makes of material & Schedule of Quantity.)

### 2)STANDARDS:

The design, manufacture and testing of lighting/power distribution board shall comply with the latest issue of following standards :

IS – 61439	:	Low-voltage switchgear and control gear assemblies - part 3 distribution boards intended to be operated by ordinary persons ( dbo )
IS - 60529	:	Degree of protection provided by enclosure for low voltage switchgear.
IS 60947	:	LV switchgear
IS 12640	:	Residual current operated circuit- breakers without integral overcurrent protection (RCCB) / with integral overcurrent protection (RCBO) for household and similar uses
IS 14614	:	Residual current-operated protective devices RCDs for household and similar use electromagnetic compatibility
IS 60898	:	Electrical accessories-circuit-breakers for overcurrent protection(MCB) for household and similar installations

**ERECTION-** The panel board shall be installed on cement concrete foundation and cement mortar ratio of 1:2:4 or fabricated stand of Iron angle frame as per site condition & requirement. Height of cement concrete foundation / angle frame shall be 1 feet.(1/2 ft below ground level and ½ ft above ground level). Fabricated Iron angle frame shall be of 40mm x 40mm x 4 mm size angle. In Outdoor type panel board top sheet shall be provided such as to protect the panel board from entering the rainy water as per the instructions of field Engineer. Panel board shall be charged with existing power supply arrangement. The work shall be carried out under the supervision of field Engineer.

**Successful tenderer shall submit the General Arrangement Drawing of panel board and get it approved by Sr. DEE(G)BSL before execution of the work at site.**

**15.Schedule item no. A-2, B-2**

**Supply, erection, testing & commissioning of energy efficient 1x18 W indoor fitting LED batten with extruded aluminium housing with integrated LED Driver/Tube complete and associated accessories complete.**

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of energy efficient 1x18W LED batton, Extruded aluminium housing fitted with engg. Plastic end caps. Opal diffuser provides smooth light distribution. LED populated on PCB comprising of LED's connected in series parallel. Luminaire color temperature: White (WH) : 6500K. Driver: Constant current output driver, operating range 150–275V AC supply voltages. Ingress protection: IP20, Luminaire efficacy required minimum guaranteed **120 Lumen/watt**, PF >= 0.95, THD <10%, CCT 6500, CRI ≥ 70. LED fittings shall be guaranteed for 5 years.

**16.Schedule item no. A-16, B-17**

**Supply, erection, testing & commissioning of LED street Light Roadway fittings in aluminium PDC housing, toughened glass cover with IP66 protection, Wattage 45 watts, input voltage-240 volts ac, 50Hz. Complete.**

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of energy efficient LED street light luminaries 45 W in Epoxy powder coated pressure die-cast aluminum housing with weatherproof gasket for lamp and control gear accessories. Toughen Glass front cover fixed with SS screws. LED specification – High power LED chip with secondary lenses for proper light distribution with color temperature 5700K ±300K LED. Luminaries is wired with inbuilt driver with open/short circuit and surge protection inbuilt 5kV and external 10 kV Input voltage range: 100–300 V AC. Side entry mounting for 25-33 mm OD pipe bracket. Degree of protection: IP66, CRI ≥ 70, Driver efficiency>85% P.F. >= 0.95, THD< 15%,



Luminaries efficacy required minimum guaranteed **110 Lumen/watt**. LED and driver compartment should be separated. LED fittings shall be guaranteed for 5 years.

**17.Schedule item no. A-3, B-3**

**Supply, erection, testing & commissioning of Bulkhead fitting with 10 W LED light with heat resistant glass cover and MS galvanised wire guard complete in toilet/bath.**

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of indoor Luminaire Bulk head fitting with 10 watt LED Light with heat resistant glass cover and MS Galvanised wire guard complete with energy efficient 1x10 W LED, multipurpose application made from extruded aluminum housing and polycarbonate diffuser. Luminaire color temperature: White (WH) : 5700K. IP20, Luminaire efficacy required minimum guaranteed **100 Lumen/watt** PF $\geq$  0.95, THD <15%, CCT 5700, CRI  $\geq$  70. LED fittings shall be guaranteed for 5 years.

**18.Schedule item no. A-4, B-4**

**Supply, erection, testing & commissioning of 2Ft 1x9 watt LED tube with accessories complete.**

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of 2 FT 1x9 watt LED tube fitting with accessories complete, Polycarbonate co-extrusion tube for LED light housing with engg-plastic end caps. Opal diffuser provides smooth light distribution. LED populated on PCB comprising of LED's connected in series parallel. Luminaire color temperature: White (WH) : 5700K. IP20, Luminaire efficacy required minimum guaranteed **125 Lumen/watt** PF  $\geq$  0.95, THD <15%, CCT 6500, CRI = 80. LED fittings shall be guaranteed for 5 years.

**19.Schedule item no. A-17, B-18**

**SETC of 70%-30% Lighting panel consisting of the following items: one no. of 3-pole power contactor MNX 70 (Make : L&T, BCH, Siemens), one no. of electronic timer 120 DT(Make : L&T, BCH, Siemens), one no .of 3 pole MCB63 A, two nos. of terminal 4-way (Make : Indigenous ), one no. of auto / manual switch (Make : Indigenous), one no. of push to on switch (Make: Indigenous), one no of MS box with powder coated paint size-500mm x 350mm x 150mm (make : Indigenous), one no. of plug type relay 2CO-230V (Make : PLA, LA, L&T), with fixing material and fixing charge per panel.**

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of 70%-30% Lighting panel consisting of the following items: one no. of 3-pole power contactor MNX 70 (Make : L&T, BCH, Siemens), one no. of electronic timer 120 DT(Make : L&T, BCH, Siemens), one no .of 3 pole MCB63 A, two nos. of terminal 4-way (Make : Indigenous ), one no. of auto / manual switch (Make : Indigenous), one no. of push to on switch (Make: Indigenous), one no of MS box with powder coated paint size-500mm x 350mm x 150mm (make : Indigenous), one no. of plug type relay 2CO-230V (Make : PLA, LA, L&T), with fixing material and fixing charge per panel. LED fittings shall be guaranteed for 5 years.

**20.Schedule item no. A-20 to A-25, B-20 to B-25, B-29**

**Supply of 4 core 16 sqmm armoured LT XLPE Cable.**

**Supply of LT XLPE Armoured 4 Core 50 Sq mm Aluminium cable as per relevant IS.**

**Trenching & refilling of LT/HT/ Various sizes of PVC / XLPE cables- Along the Road (Size - 900mm x 300mm)**

**Digging of cable trench 300/450 mm x 1000 mm in RCC/PCC/hard soil & refilling as per specification and requirement at the site.**

**Transportation, Laying, Installation, terminating, testing and commissioning of LT/HT cable of sizes 10 sqmm to 400 sqmm in existing trench, pipe or on structure.**

**Erection, testing and commissioning of cables other than trench i.e.Wall/Truss including clamp, GI wire and hardware**

**Supply and laying of RCC Hume Pipe of size 6"(150mm) dia 2 mtr. Length.**

### **LT XLPE Copper Cable**

Cable shall be cross linked polyethylene and XLPE insulated PVC outer sheathed cable with copper conductor suitable for rated voltage at 1100 V grade and confirming to IS : 7098 Part -1 1988 with amendment number 1, 2 & 3 Reaffirmed 2005 or latest.

Armouring – Galvanised steel strip armoured

Shape of conductor -stranded

No. of core – 4 core / 2 core (as per schedule item description)

BIS marked,

Material of conductor – Copper EC grade.

Cable to be supplied on wooden drums confirming to IS : 10418/82 with latest amendments.

In addition to marking requirement as per relevant specification, sequential marking for length, size of the cable, type of the cable & drum No., shall be embossed /printed on the cable.

### **LT XLPE Aluminium Cable –**

Cable shall be cross linked polyethylene (XLPE) insulated PVC outer sheathed cable with alluminium conductor suitable for rated voltage at 1100 V grade and confirming to IS : 7098 Part -1 1988 with amendment number 1, 2 & 3 Reaffirmed 2005 or latest.

Armouring – Galvanised steel strip armoured

Shape of conductor -stranded

No. of core – 4 core / 2 core (as per schedule item description)

BIS marked,

Material of conductor – Aluminium EC grade.

Cable to be supplied on wooden drums confirming to IS : 10418/82 with latest amendments.

In addition to marking requirement as per relevant specification, sequential marking for length, size of the cable, type of the cable & drum No., shall be embossed/printed on of the cable.

## **1. SPECIFICATION OF CABLES**

### **1.1 L.T CABLE**

Cross linked polyethylene insulated PVC sheathed conductor cable with common covering over cores, provided other by extended inner sheath of thermo plastic vulcanized or invulcanized rubber galvanized single trip armorng suitable for 1100 volts grade conforming to IS 157098 (Pt-I) of 1988 with latest amendments size of cable should be as per requirement shown in plan & scope of work.

### **1.2 ARMORING**

Armoring of cable should be conform to ISS: 3975/79

### **1.3 INSULATION**

The insulation of cable should conform to IS 7098 - Pt. -I –1988 table I.

### **1.4 ALUMINUM CONDUCTOR**

The Aluminum conductor should comply with 8130-1984

### **1.5 CABLE**

It should be ISI marked and should be of the make specified in attached approved list of Materials.

### **LAYING OF LT / HT CABLE -**

(A) The cable laying shall conform to IS 1255/1983 or latest. The cable shall be laid by digging a trench in the ground and laying cables on a bedding of minimum 75mm riddled soil or fine sand at the bottom of the trench and covering it with additional riddled soil or sand of minimum 75 mm. The width of the trench should be at-least 300mm(12") and make the surface as original/earlier.

(B) Cable should be covered with best quality of tiles, bricks or slabs continuously on entire length of cable. Layer of bricks/ tiles / slabs shall be ensured to protect the cable from damages. After that it shall be refilled properly upto the ground surface keeping a crown of 150mm (6") above the ground level.(FOR LT CABLE)

(C) The cable shall be covered with RCC Warning Cover of size 450mm X175mmX 37mm (18"X7"X1.5") completely. After that it shall be refilled properly upto the ground surface keeping a crown of 150mm(6") above the ground level.(FOR HT CABLE)

(D) Cable marker should be provided at a spacing of 50 Mtrs. On straight runs one marker at 50 Mtr shall be provided and ends of track or road crossing or as per instructions of railways engineer at every turning of cable. (FOR HT CABLE)

(E) While terminating the cable on the wall, it shall be fixed with the help of "J" hooks and secured properly on walls. Size of hook shall depend on size and weight of the cable.

(F) Where cable has to be taken on pole the suitable size of clamp, nut Bolt shall be used. The cable shall go through GI pipe of suitable size.

(G) The laying of RCC pipe /GI pipe /PVC pipe is also the part of cable laying cost under track /Road/ on pole. However supply of RCC hume pipe /GI pipe/PVC pipe shall be covered separately in schedule or supplied by Rly. at SSE's depot.

(H) Wherever cables are to be taken through pipe on existing steel structures / walls, the pipe shall be supported on steel structures with suitable and proper clamps made from 50 X 6 mm thick GI flat, fixed to the structures with, 16 mm dia GI bolt, nut and plain, spring washer.

(I) **MINIMUM PERMISSIBLE BENDING RADII** –The cable should not be bent to sharp radius. Wherever possible larger radii should be used. Minimum recommended Bending Radii are given as follows-

VOLTAGE RATING	PVC & XLPE CABLE	
KV	Single core	Multi core
Upto 1.1	15 D	12 D
Above 1.1 to 11	15 D	15 D
Above 11	20 D	15 D

Note D' is outer diameter of cable. Special precaution should be taken so as not to damage the cable. At joints and terminations bending radius for the individual cores should be above 12 times the diameter over the insulation.

(J) **DEPTH :-** The desired minimum depth of laying from ground surface to the top of cables is as follows-

i) Cable up to 11 KV rating =0.9 mtr

ii) 22 KV to 33 KV rating =1.05 mtr

iii) Cables at road crossing =1.00 mtr

iv) Cables at railway level crossing (measured

From bottom of sleepers to the top of pipe) =1.00 mtr

Supply and laying of RCC Hume Pipe of size 6"(150mm) dia of 2 mtr. Length for each pipe of standard thickness as per IS 451 Type – NP-2 in provided depth below ground /Road/Track to enclose the cable and necessary back filling.

Note : LT XLPE cable to be terminated by suitable termination kit of reputed make.

**TESTING OF CABLE-**

- i. After laying the XLPE cable and making the cable end termination, it shall be tested by the contractor with high pressure testing equipment as per relevant IS specification in the presence of Railway representative. High pressure testing set shall be arranged by the contractor at site.
  - ii. Insulation resistance reading of the cable shall be taken before the contractor is allowed to lay the cable or allowed to carry out cable end termination work.
  - iii. Insulation resistance (IR) values of cable shall be taken in the presence of Railway representative before and after the high pressure testing. Tenderer shall ensure the IR value does not reduce appreciably after carrying out the cable laying, making cable end termination and high pressure testing
  - iv. The test results jointly be signed by the contractor and SrDEE(G)'s authorized representative.
- Laying erection, testing and commissioning of LT 1100V grade PVC armoured aluminium conductor cable of various size as per specification.
- Laying/Erection, testing and commissioning of XLPE armored cable with continuous GI Earth wire, Glands/lugs etc. on wall /trusses/pole/pipe etc as per the instruction of field engineer.

**Clearances**

The desired minimum clearances are as follows -

Power cable to control cable - 200 mm  
 Power cable to communication cable - 300 mm  
 Power cable to gas / water main - 300 mm

Power to power cable - Clearance not necessary: however, larger the clearance, better would be current carrying capacity.

**CABLE LAYING (HT & LT) SHOWN**

SEPARATE Date of test

Voltage of megger used

Location from

to Size in sq

mm Total

length

Megger value at the time of issue

Megger value during laying & before covering

Signature of contractor

**High voltage testing before commissioning HT/LT cable and overhead lines work**

Cable works

i) Wherever high voltage test was conduct ----- Yes / No

ii) If conducted, system of supply -----

Test H/V applied -----KV for ----- minutes.

Result of test ----- (Satisfactory / Unsatisfactory)

iii) If not conducted

Voltage of megger used -- - - - -

Result of megger used -----

Result of megger testing -----

Between R & Y

Y & B

B & R

-do- R & N

Y &amp; N

B &amp; N

-do- R &amp; E

Y &amp; E

B &amp; E

N &amp; E

Signature of contractor's

Cable jointing No of joint Location

Type of jointing

Size of cable I

II

Clause Nos

Voltage of megger used I

II

i) Insulation resistance before jointing

Cable I a) Between R &amp; Y

Y &amp; B

B &amp; R

b) -do- R &amp; N

Y &amp; N

B &amp; N

c) -do- R &amp; E

Y &amp; E

N &amp; E

Cable II a) Between R &amp; Y

Y &amp; B

B &amp; R

b) -do- R &amp; N

Y &amp; N

B &amp; N

c) -do- R &amp; E

Y &amp; E

N &amp; E

ii) Insulation resistance of jointed cable

a) Between R &amp; Y

Y &amp; B

B &amp; R

b) -do- R &amp; N

Y &amp; N

B &amp; N

c) -do- R &amp; E

Y &amp; E

N &amp; E

Signature of contractor

**IS for Cables**

1	IS : 7098 (Part-I)	Cross linked polyethylene insulated PVC sheathed cable for working voltage and including 1100 Volts.
2	IS : 1554 (Part-I)	PVC insulated (heavy duty) electric cables for working voltage upto and including 1100V.
3	IS : 3961 (Part-II)	Recommended current ratings for cables.
4	IS : 3975	Mild steel wires, strips and tapes for armouring of cables
5	IS : 4905	Methods for random sampling
6	IS : 5831	PVC insulation and sheath of electrical cables.
7	IS : 8130	Conductors for insulated electrical cables and flexible cords
8	IS : 10418	Specification for drums for electric cables.
9	IS : 10810	Method of tests for cables.
10	ASTM-D-2843	Standard test method for density of smoke from the burning or decomposition of plastics.
11	ASTM-D-2863	Standard method for measuring the minimum oxygen concentration to support E3 candle like construction plastics.
12	IEC-754 (Part-I)	Test on gases evolved during combustion of electric cables.
13	SS:424-1475	Flammability testing of cables.

**Technical parameters-**

1	Power system details	415 V +/-10%, 3 phase, 4 wire solidly earthed.
2	Frequency	50 Hz.
3	Size of cable, conductor & quantity	As per S.O.Q.
4	Core identification	Colour scheme as per IS 1554 (part I) /88 or latest
5	Conductor	Stranded circular/sector shape core Aluminium/Copper conductor
6	Rated voltage	1100 Volts
7	Insulation	XLPE
8	Maximum conductor temperature at rated current.	90°C
9	Maximum conductor temperature during short circuit under hot condition	250°C
10	Inner sheath	Extruded PVC inner sheath
11	Filler material	If used, shall be compatible with other materials of cable construction

12	Armouring	Single layer galvanized steel round wire/ flat strip armoured.
13	Overall serving (outer sheath)	Anti rodent and anti termite extruded black FRLS grade PVC sheath (Type ST-2)
14	Embossing on the cable	Cable shall be embossed / printed on the outer sheath at every 1 m. length as under :1.1 kV, PVCA/XLPE, conductor material, No. of core and size of cable, sequential marking for the metered length of cable, make and year of manufacturing

#### **21.Schedule item no. A-19, B-19**

**Supply, erection, testing & commissioning of 2x4 sqmm FR Stranded/solid copper PVC insulated wire laid inside of pole for connecting the luminaries.**

Supply, erection, testing and commissioning of 2 x 4 sq mm 1100V grade PVC FR copper wire. The wiring shall consist of two wires of single core 4 sq.mm. PVC insulated multi-stranded FR copper wire of 1.1 KV grade on rigid PVC casing capping/ PVC conduit.

The wire shall be run inside the PVC casing capping /PVC conduit of suitable size as per site condition as per standard practice specified above as per the instructions of field Engineer. The wire shall be measured only for length upto fitting.

#### **22.Schedule item no. A-26, B-26**

**Supply & laying of GI pipe Class B, ISI marked under road /Clamping with erecting pole or wall as per technical specification & drawing for passing cable.**

Supply & laying of GI pipe Class B, ISI marked under road /Clamping with erecting pole or wall as per technical specification & drawing for passing cable of dia 50-63mm.

This item shall be in conformity to IS 5613/Pt.I Sec. 1 & 2/1985 (Latest Version). GI pipe shall conform to IS 1239/Pt.I/1990 and fittings shall conform to IS 1239/Pt.II/1992(Latest Version).

#### **23.Schedule item no. A-27, B-27**

**Supply, installation, testing & commissioning of HDPE Pipe 110 mm Nominal Dia as per IS-4984-1995.**

Supply, installation, testing & commissioning of HDPE Pipe 110 mm nominal dia & laying of HDPE (High Density Poly Ethylene polymers) pipe of Material Grade- PE 63 grade, IS 4984 Resistance to chemicals- Exceptional resistance to all external and internal corrosion. Resistant to electrolytic corrosion. Specified base density- 940 to 958kg/mtr<sup>3</sup>, Size-Supply of HDPE pipe outer diameter 63 mm, wall thick Min.3.0 mm & Max 3.5 mm.

Indian Standards - IS-4984, IS 14151, IS 14333, IS 14930 (part2), IS 14885, IS 16098 (part2).

#### **24.Schedule item no. B-28**

**Supply and laying of RCC half round pipe 150 mm ID & 1 mtr length.**

The contractor shall supply half Round RCC pipe of 150mm inner dia. and 1 Mtr in length as per given description. The internal surface shall have a smooth finish without any bulge or projections to avoid damage to the cable.

Internal dia.	External dia.	Thickness	Approx. Weight	Approx. Steel Weight
150mm	184 mm	25 mm	14.5 kg	240 gm

Laying of Pipe - Half round pipes shall be laid above cables for mechanical protection on laid cables in the existing trench. After doing this the trench can be filled up with soil available thereby.

If any damage done, contractor will make good the same on his own cost. The cost of damage will be decided by Railway.

**Note** - Inspection will be carried out as per inspection clause.

#### **25 Schedule item no. A-29, B-31**

**Supply & Erection of RCC Warning Cover and refilling the cable trench in an approved manner.**

The price shall cover supply, erection testing commissioning of **RCC Warning Cover and refilling the cable trench** of size 450mm X175mmX 37mm (18"X7"X1.5") completely. After that it shall be refilled properly upto the ground surface keeping a crown of 150mm (6") above the ground level.

#### **26. Schedule item no. A-30, B-32**

**Supply, erection, testing & commissioning of maintenance free earth as per RDSO specification no. RDSO/PE/SPEC/ PS/0109-008(REV '0') with improved earthing enhancing compound and exothermic welding as per specifications attached.**

The maintenance free earthing arrangement shall be done in accordance with RDSO specification no. RDSO/ PE/ SPEC/ PS/ 0109-2008 (REV'0'). For transformers, substation earthing, LT line equipment (**40 kA**), The IR value shall be less than 1 ohm., in normal soil resistivity upto 50 ohm-mtr, single electrode type earth system.

The earthing system includes earth electrode, installation of earth electrode in suitable pit size, construction of earth pit with cover for the installation, connection of earth electrode with equipotential earth bus and connection of equipment to equipotential earth bus. The work shall be done in an approved manner as per site conditions as per the instructions of field Engineer.

**Concentric pipe earth electrode : (Current capacity 40 kA)**

**Primary conductor -**

MS pipe with 40 mm diameter, class B, ISI mark as per IS-1239, length 3000 mm.

**Secondary conductor -**

MS pipe with 80 mm diameter, class B, ISI mark as per IS-1239, Length 3000 mm.

**Current carrying capacity :** The design of the electrode should be such as to have current carrying capacity in 40 kA (for 1 second).

S.N.	Current Capacity	Primary Conductor diameter	Electrode dimensions (dia. X length)
1	40 kA	40 mm	80 mm x 3000 mm

#### **Dimensions and Nominal Mass of Steel Tubes — Medium (as per IS 1239)**

Nominal Bore	Outside Diameter		Thickness	Mass of Tube
(mm)	Maximum (mm)	Minimum (mm)	(mm)	Plain End (kg/m)
40	48.8	47.9	3.2	3.56
80	89.5	88.0	4.0	8.36



### Conductive mixture

- 1) For hermetically filling inside the cavity i.e. between secondary conductor and primary conductor, crystalline compound is to be injected in the electrode assembly. It is a combination of high conductivity metal alloys, copper and aluminium powder, conductive carbon/cement and bonding material etc. mixed in different portion. The mixture is forced (pressurized) filled inside the earth electrode in the paste form and after solidification of the same, the end caps are welded. The metal alloys shall help in conducting the current and conductive carbon gives anti corrosive property. Bonding material should provide strength to the mixture. Resistivity of the mixture shall be less than 0.2 ohm-meter. Resistivity shall be tested by making a 20 cm cube of the material and checking resistance across the opposite face of the cube.
- 2) Complete electrode shall be molecularly bonded by 99.99% pure, high conductivity copper on outer surface with copper coating thickness 300 micron or more.
- 3) Its surface shall be clean and free from any visible oxide layer or foreign material.
- 4) Copper bus bar of size 250 mm x 50 mm x 6 mm having electrical conductivity of 101% IACS, minimum 99.9% copper content shall preferably be exothermically welded to earth electrode or connected with the help of two number stainless steel nut bolts of appropriate size having 4 holes of 12 mm dia. (2 on each side) for connecting earthing conductor.

### Minimum quantity of earth enhancement material to be supplies :

For 5'x5'x10' earth pit – min 75 kgs per pit

For 300 mm bore type earth pit – min 50 kgs per pit

The earth enhancement material shall be supplied in sealed, moisture proof bags. These bags shall be marked with manufacturers name or trade name, quantity, batch no & date of manufacture.

**Warranty : 05 year against earth electrode for copper plating. If found faded or corrosive whole earthing is to be replaced by tenderer.**

***Note :** Earthing Pit Box should be supplied & erected by contractor. Also necessary cementing work to be done by contractor to make site as original.*

### R.C.C. earth pit box

R.C.C. earth pit box of size 450 X 450 X 50mm including cover of size 450 X 450 X 4.5mm along with white wash. The work shall be done in an approved manner as per the instructions of field supervisor.

### PVC Large Earth Pit

PVC Large Earth Pit Cover (10 inches) At Top (Dia) -252 mm At Bottom (Dia) – 334 mm Height – 260 mm (IS-3043).

### Special Features -

- A durable round valve box ideal for commercial and residential installation.
- Round Valve box extra support for strong load
- Twist lock design cover
- UV Resistant
- Pipe cutouts for quick and easy installation
- Damper proof

➤ **Every individual earth shall be allotted a serial number. Following information shall be suitably written with white or yellow paint.**

- a) Earth No. \_\_\_\_\_
- b) Individual earth resistance \_\_\_\_\_ ohms
- c) Overall earth resistance \_\_\_\_\_ ohms

d) Date of test

**Test report of earthing system (To be connected by earth Tester)**

i) Individual Earth Resistance

Earth Electrode No 1 \_\_\_\_\_ ohm

Earth Electrode No 2 \_\_\_\_\_ ohms

Earth Electrode No 3 \_\_\_\_\_ ohms

ii) Overall Earth Resistance:

a) HT earth electrode \_\_\_\_\_ ohms

b) LT earth electrode \_\_\_\_\_ ohms

c) Neutral earth electrode \_\_\_\_\_ ohms

Note: Before energization of installation earthing system will have to be checked by contractor in presence of Sr. DEE/G/BSL's authorized representative/Site in charge and test report be submitted to Sr. DEE/G/BSL for his approval on above prescribed Performa.

Signature of Tenderer

**27.Schedule item no. B-36**

**Supplying and erecting metal clad changeover switch 2 pole, 240 V, 32A erected on provided angle iron/GI frame and duly connected with suitable wire leads complete as per specification.**

The price shall cover cost of supply, loading, transportation and unloading to site, erection, testing and commissioning of metal clad changeover switch 2 pole, 240 V, 32A erected on provided angle iron/GI frame and duly connected with suitable wire leads complete as per specification.

IS 13947-5-2 (2004): Low-Voltage Switchgear and Control gear.

**28.Schedule item no. A-15, B-16**

**SETC of Steel Tubular Swaged pole 8 mtr. Long with Junction Box, Single/Double arm as per site requirement, internal wiring and all accessories with foundation complete.**

**TUBULAR POLE** - GI tubular pole shall be 139.7 x 114.3 x 88.9 mm dia with 4.5 x 3.65 x 3.25mm thickness respectively. The pole should be hot dipped galvanized after fabrication internally & externally, the thickness of galvanizing should be 65 Microns as per IS 2629. The pole shall be provided with MS base plate of 30x30x0.6 cms thick at the bottom welded, suitable pole cap erected with set screws or welded. The pole shall be ISI approved make, IS -2713-1 to 3 (1980) or latest.

**Erection of pole-** The pole with MS base plate shall be erected in cement concrete foundation and plinth. The top opening of the pole shall be closed so that the rain water should not enter inside the pole. Pole shall be erected by the contractor duly painted with two coats of red oxide paint and one coat of bituminous paint for the length to be embedded in the ground and plinth.

**EXCAVATION AND CASTING OF FOUNDATION FOR ERECTION OF POLE :-**

The pole shall be buried 1.5 mtrs. deep in ground with cement concrete foundation including excavation for the poles with 600 mm x 600 mm x 1500 mm deep in 1:3:6 cement concrete (20 x 25 stone metal ) and 450 mm height x 450 mm dia. plinth duly plastered and with necessary curing and finishing in an approved manner above ground level. The muffing in cement concrete of ratio 1:2:4 shall be provided. A crown of 100 mm shall be provided on the muffing and plastering with fine finish in an approved manner.

**JUNCTION BOX**-The junction box should be water tight made of FRP of size 12"x 8"x4" with electrically insulated body shock proof, connector leads and control equipped with 2 nos.16 amps cutout and rewirable fuse. The box should be of front door opening with rubber gasket to make it water tight. The junction box shall be vermin proof having rubber bushes at cable entry. The junction box shall be mounted on pole/ wall etc at the height of 1.50 mtrs or as per site condition by providing MS clamps of suitable size. Colour of junction box shall be got approved before erection. The junction box shall be erected in an approved manner as per the site condition and instructions of field supervisor.

**29.Schedule item no. B-35**

**Supply, erection, testing & commissioning of Online UPS with isolation transformer suitable for single phase AC input & single phase AC output, floor mounted type rating of UPS 5 KVA indicative back-up time 120 minutes complete with Battery and stand.**

General		
1	Rating in KVA (KVA)	5 KVA – 5.5 KVA
2	Technology	IGBT-PWM with inbuilt isolation transformer
3	Input Power	single phase 160V - 260V sinewave,50Hz
4	Output power	Single phase 230V +/-1% sinewave 50 Hz
5	Backup time (Minutes)	120
6	Minimum AH (total)	≥ 1600
7	Warranty for UPS (Years)	1 Years
8	Movable trolley for Batteries	With trolley / rack
9	Warranty for battery	3 Years
10	Degree of Protection	IP21
11	Cabling 5 meters for input and out put	Yes
12	Installation and Commissioning	Yes
CONSTRUCTIONAL		
1	Minimum thickness of M. S. Sheet Enclosure duly painted (mm)	1.2
2	Type of Battery	SMF-VRLA conforming to JISC:8702(Pt.I,II&III)
FUNCTIONAL		

1	Maximum overshoot and Under shoot of output rated voltage	4
2	Voltage Regulation from no load to full load (%)	$< / = 3\%$
3	20% Overload limit for minimum 10 minutes	Yes
4	Overall Efficiency (%)	$\geq 90\%$
5	Total Harmonic Distortion(THD) (%)	Maximum 3%
6	50% Overload limit for minimum 1 minutes	Yes
<b>PROTECTION</b>		
1	Protection for under voltage at battery terminal at 10.5V per 12 V battery.	Yes
2	Protection of Over voltage, Short Circuit & over load at UPS output terminal	Yes
<b>METERING AND INDICATIONS</b>		
1	Digital Metering in UPS for AC Input Voltage, Output AC Voltage, Current, Frequency, Battery Voltage and Current	Yes
2	Indicators for mains presence, Battery charging and discharging, Output Over Load, Low Battery Voltage	Yes

**Note : - Necessary Certificate shall be submitted.**

**30.Schedule item no. B-37**

**Supplying, erecting, testing and commissioning of minimum three & above star rated 3 phase, 415 V, 50 Hz, submersible pump set of 14.92kW/20 HP suitable for erection on open well, pump having delivery head from 60 to 36 m and discharge from 1425 to 825 litres per minute & 80 mm suction/65 mm delivery dia. as per specification**

**Technical Specification for Openwell submersible pump-**

**OPEN WELL TYPE SUBMERSIBLE PUMP** - Electrically operated open well type Submersible Pump set direct coupled to wet type submersible squirrel cage induction type Electric motor ,Speed 2900/3000 RPMdesigned for continuous operation under water ,of compact design and sturdy

construction, vibration free and noiseless operation. The pump shall be constructed with casing of high grade cast iron of sufficient strength, hardness and long lasting. The pump shall be provided with electro-dynamically balanced impellers of high grade bronze conforming to ISS 318(latest). Pump shaft shall be of stainless steel, water lubricated bearing complete with sturdy brass strainer on the pump suction side, thrust bearing assembly pressure equalizing device etc. The pump shall be ISI marked, conform to IS 14220/1994 or latest.

**WET TYPE MOTOR** Electrical wet type motor suitable for operation on A.C.415 V +/-5% ,3 phase 50 Hz supply Copper wound with class 'F' insulation ISI marked, conforming to IS 9283/1995 or latest suitable for above pump. Pump model shall be got approved by Sr.DEE(G)BSL before execution of the work. Contractor will have to supply copy of the required maintenance manual for the subject pump set provided by them characteristic curve to be approved. The erection of the pump shall be done in an approved manner as per site conditions as per the instructions of field Engineer.

1	Impeller	CAST IRON
2	Delivery Casing	CAST IRON
3	Motor Body	CAST IRON
4	Pump Shaft	S.S
5	Sealing	OIL SEAL

**Note :** The prior approval of Sr.DEE(G)/BSL or his authorized representative shall be taken before supply of Pump. While taking approval characteristic curve of pump shall be submitted.

**31.Schedule item no. A-31**

**Supply, erection, testing and commissioning of Borewell Submersible pump set alongwith wet type squirrel cage induction motor Head 50-140 meters, discharge 250-50 LPM, Max. Efficiency at Duty point (66 LPM at 110 meter head) 5 HP/3.7 kW 10 stages, 2" outlet ISI mark, with all accessories as per specifications.**

**BEE 5 or more star rated Borewell Submersible pump set:-**

**Technical Specification for borewell submersible pump :**

**BOREWELL TYPE SUBMERSIBLE PUMP :-** Submersible pump Set comprising of multistage Vertical type submersible pump directly coupled to wet type water submersible squirrel cage induction type Electrical motor Speed 2900/3000 RPM designed for continuous operation under water, of compact design and sturdy construction, vibration free and noise less operation. The pump shall be constructed with casing of high grade cast iron of sufficient strength, hardness and long lasting. The pump shall be provided with electro-dynamically balanced impellers of stainless steel. Pump shaft of stainless steel, water lubricated bearing complete with sturdy brass strainer on the pump suction side, Non-return valve at the discharge outlet, thrust bearing assembly pressure equalizing device etc. The pump shall be ISI marked, conform to IS 8034/2002 or (latest).

**WET TYPE MOTOR -** Electrical wet type motor suitable for operation on A.C.415 V +/-5% ,3 phase 50 Hz supply **Copper wound** with Design For Continuous Working - motor designs with Rotor made from 99.9% EC grade Copper, "S1" duty motors with "F" class insulation make them suitable for continuous working without any adverse effect on the pump life, ISI marked, conforming to IS 9283/1995 or latest suitable for above pump. Pump model shall be got approved by Sr. DEE(G)BSL before execution of the work. The erection of the pump shall be done in an approved manner as per site conditions as per the instructions of field Engineer. Contractor will have to supply copy of the required maintenance manual for the subject pump set provided by them along with characteristic curve. International standard NEMA coupling with lesser transmission losses, lesser wear and tear and efficient hydraulics design performances last longer. Longer Life And Minimal

Maintenance Cost - Inexpensive on cost of maintenance, motors are prefilled with oil having better lubrication and heat transfer properties, which reduces friction and ensures substantial savings from maintenance costs. Higher Efficiencies and Lower Power Consumption. Inefficacious on health, all the motors are prefilled with non-toxic, non-hazardous purified paraffin oil, which has no fear of health hazard.

Motor Body	SS-202
Pump Shaft	SS 410
Sealing	MECH. SEAL
Warranty	24-month warranty

**32.Schedule item no. A-33, B-39**

**Supply, erection, testing and commissioning of Heavy duty Sluice Valve 50 mm dia as per IS specification.**

Supply, erection, testing and commissioning of 50 mm dia, Sluice valve as per site condition of Cast iron double flanged with gun metal faced and gun metal nut, manganese forged/bronze spindle cast iron hand wheel to suit the delivery outlet of the pump. It shall comply to IS 780 of 1984 or latest.

**33.Schedule item no. A-34, B-40**

**Supply, erection, testing and commissioning of Heavy duty Non Return Valve 50 mm dia as per IS specification.**

Supply, erection, testing and commissioning of 50 mm dia Non-Return Valve as per site condition of Cast Iron double flanged with gun metal faced seating and flap, removable cast iron inspection cover to suit the delivery outlet of the pump together with bypass arrangement with suitable cock for priming the pump. It shall conforming to IS 5312 or latest.

**34.Schedule item no. A-35, B-41**

**Supply and erecting ISI mark "C" Class (Heavy Duty) G.I. pipe of 50 mm dia with coupling/accessories.**

Supply, erection, testing and commissioning of GI Pipe 50 mm dia 'C' Class (3 Mtr in length each) threaded at both ends with Heavy Duty Couplings fixed at one end, the heavy duty coupling should be of 75 mm long fully threaded as per I.S.1239. Erection of GI pipe shall be done in an approved manner as per the instructions of site Engineer.

**35.Schedule item no. A-36, B-42**

**Supply, erection, testing and commissioning of GI C- class Bend 50 mm dia**

Supply & erection of 50 mm dia GI Bend 'C' class as per instruction of field supervisor. GI Bend shall be with ISI mark and Hot dip galvanized.

**36.Schedule item no. A-37, B-43**

**Supply, erection, testing and commissioning of M.S. supporting clamps for 50 mm dia G.I. pipe**

Supply, erection, testing and commissioning of Heavy Duty M.S. Supporting clamps made from 50x6 mm MS flat for erection of GI pipe along with GI nut bolts, washer etc. as per instruction of field Engineer and shall be Hot dip galvanized.

**37.Schedule item no. A-38, B-44**

**Supply, erection, testing and commissioning of Flat Flexible Copper cable, 3 core, X 6 sq.mm. for submersible pump & starter connection.**

Supply, erection, testing and commissioning of water proof PVC insulated and sheathed flat flexible 1100 V grade Copper Cable conforming to IS: 694/1990 for the motor supply connected

through a water tight sealing device and suitably clamped at fixed intervals with column pipe assembly.

### **38.Schedule item no. B-45**

**Supply, erection, testing & commissioning of Pump guard Current operated type Should have protection against dry run, single phase, over load, over voltage, under voltage, reverse phase protection etc. for pump up to 20 HP three phase suitable to operate in 415 volts 50 Hz AC supply.**

#### **Supply Voltage**

System 100-120/220-240/380-440V AC  $\pm 20\%$ , 48-63 Hz

Auxiliary 100-120/220-240VAC $\pm 20\%$ , 24V DC+10%-15%

#### **Output Relay Contact**

Output Relay Contact - 2 CO

#### **Trip Setting**

Phase to phase unbalance - 50% of Motor Current (Fixed)

Under current (Dryrunning) - 40% to 80% of set current

Overload - As per inverse time characteristics

#### **Trip Time Delay**

On phase failure - 4 Sec  $\pm 1\%$  Sec (Fixed)

For overloading - As per Inverse Time Characteristics 2/5/10 Sec. (Selectable)

#### **Resetting**

Resetting - Auto / Manual

**Note:** 1) Wherever not specified Contact Rating: 5A @ 230 V AC (resistive)

2) Pump guard Current operated type Should have protection against dry run, single phase, over load, over voltage, under voltage, reverse phase protection etc.

### **39.Schedule Item No. B-38**

**Supplying & erecting automatic control panel for 3 Ph, 415 volt, A.c.Submersible/ centrifugal pump set upto 20 HP consisting of Star Delta starter having relay range 13-21 Amp, S.P.P., Combined ammeter/ voltmeter, phase indicating lamp enclosed in CRCA powder coated Vibration proof enclosure with IP 54 protection. Control Panel should offer single phasing, phase reversal, phase imbalance etc.**

The control gear of the pump motor shall be housed in a **M.S fabricated sheet metal Box fro 16 SWG CRCA MS Sheet** with hinged doors and locking arrangement conforming to IP54 with gasket and canopy suitable for outdoor installation, floor mounting type of suitable size comprising of following switch-gear and following accessories:-

S.N.	Item	Specification
1	<b>STAR DELTA STARTER</b>	<b>1 no.-</b> Air-brake triple pole push button operated STAR DELTA STARTER sheet steel enclosure with over load release and no volt release. This starter shall comply with IS 8544(Latest)
2	<b>Relays</b>	<b>1 no.-</b> Bi-metallic overload relay with auto/manual overload trip-reset facilities. 1 no.-Auto-reset type under voltage relay suitable for 3 Phase low voltage protection for voltage below 360 V AC.
3	<b>TPN SWITCH with HRC fuses</b>	<b>1 no.</b> Air-break heavy duty TPN. SFU shall be confirming to IS 13947 Part-III 1993 and HRC fuse confirming to IS 13703-1993 or latest.
4	<b>Ammeter</b>	<b>1 no.,</b> Digital type Ammeter 3 1/2 Digit LED display CT operated calibrated for 0-100 amps with necessary wiring and fixing

		accessories
5	Voltmeter	1 no., Digital type Voltmeter 3 1/2 Digit LED display 0-750 volts with necessary wiring and fixing accessories.
6	Electronic KWH meter	1 no. Electronic KWH meter, 3 phase, 4 wire, 5-40A suitable for unbalanced load and reverse protection for AC 415 Volt, 50 Hz supply. This shall comply with IS-13779 Pt. I of 1972 and following features - Instantaneous start, Low power consumption, saving more than 30%, Meter shall record correct energy with same accuracy under reverse current connection, LED indication for current reversal tampering shall be provided, Phase available indication to be provided.
7	Indicating lamps	3 nos. Main RYB indicating lamp with internal wiring. 3 nos. ON-OFF and overload trip indication with internal wiring.
8	Internal wiring & connections	ONE SET incoming and outgoing terminal connector supported on non-hygroscopic synthetic resin bounded supports. Internal control wiring and power wiring should be separately run. Earthing terminal shall be provided on the side of the panel. The electrical inter connector should be carried out by PVC coated flexible copper wire using crimped type socket terminal with wire no. identification mark for POWER WIRING.
9	Pump guard a. phase to phase unbalance b. Under current (dry running) c. Overload d. UV/ OV	1 no. for Protection of pump-motor set against the faults, like single phasing, dry running under load and over voltage negative phase sequence unbalance supply and over loading. Single phasing preventer current sensing type suitable for 3phase, 440 volt, AC supply. (Prodless pump guard shall be installed.) All these components should be properly housed in a sheet metal panel with fixing arrangements.
10	Painting	The panel board shall be powder coated.

The control Gear shall comply with IE Rules. The enclosure should be suitable for outdoor installation. This system should be able to operate on 415V + 5 %, 50 HZ, AC supply. All these components should be properly housed in a sheet metal panel with fixing arrangements

The internal wiring of panel shall be done by copper wire of adequate size and capacity in an approved manner.

**CABLE ENTRY:** Provision of suitable cable entry through glands to connect the equipment to incoming and outgoing cables shall be made. The cable entry to terminal of motor shall be provided with suitable glands to avoid mechanical damage to the cable insulation. The cable shall be easily accessible to motor terminals. In case of conduit entry for external connection, provision shall be made on starter metallic housing/control panel to anchor the cables mechanically to avoid mechanical damage.

#### **40. Schedule Item No. A-32**

**Supply, erection, testing & commissioning of Supply and erecting Automatic Control Panel for 3 ph, 415 volt, A.C. Submersible/ centrifugal pump set up to 7.5 HP. Consisting of DOL starter having relay range 9-18 Amps. SPP Combined Ammeter, Voltmeter, phase Indicating lamps enclosed in CRCA powder coated vibration proof enclosure with IP 54 protection. Control panel should offer single phasing phase reversal phase imbalancing etc.**

The control gear of the pump motor shall be housed in a **M.S fabricated sheet metal Box from 16 SWG CRCA MS Sheet** with hinged doors and locking arrangement conforming to IP54



with gasket and canopy suitable for outdoor installation, floor mounting type of suitable size comprising of following switch-gear and following accessories:-

S.N.	Item	Specification
1	<b>DOL STARTER</b>	<b>1 no.-</b> Air-break triple pole push button operated DOL Starter sheet steel enclosure with over load release and no volt release . This starter shall comply with IS 8544 (Latest)
2	<b>Relays</b>	<b>1 no.-</b> Bi-metallic overload relay with auto/manual overload trip-reset facilities. 1 no.-Auto-reset type under voltage relay suitable for 3 Phase low voltage protection for voltage below 360 V AC.
3	<b>TPN SWITCH with HRC fuses</b>	<b>1 no.</b> Air-break heavy duty TPN. SFU shall be confirming to IS 13947 Part-III 1993 and HRC fuse confirming to IS 13703-1993 or latest.
4	<b>Ammeter</b>	<b>1 no.,</b> Digital type Ammeter 3 1/2 Digit LED display CT operated calibrated for 0-100 amps with necessary wiring and fixing accessories
5	<b>Voltmeter</b>	<b>1 no.,</b> Digital type Voltmeter 3 1/2 Digit LED display 0-750 volts with necessary wiring and fixing accessories.
6	<b>Electronic KWH meter</b>	<b>1 no.</b> Electronic KWH meter, 3 phase ,4 wire, 5-40A suitable for unbalanced load and reverse protection for AC 415 Volt ,50 Hz supply. This shall comply with IS-13779 Pt. I of 1972 and following features - Instantaneous start, Low power consumption, saving more than 30%, Meter shall record correct energy with same accuracy under reverse current connection, LED indication for current reversal tampering shall be provided, Phase available indication to be provided.
7	<b>Indicating lamps</b>	3 nos. Main RYB indicating lamp with internal wiring. 3 nos. ON-OFF and overload trip indication with internal wiring.
8	<b>Internal wiring &amp; connections</b>	ONE SET incoming and outgoing terminal connector supported on non-hygroscopic synthetic resin bounded supports. Internal control wiring and power wiring should be separately run. Earthing terminal shall be provided on the side of the panel. The electrical inter connector should be carried out by PVC coated flexible copper wire using crimped type socket terminal with wire no. identification mark for POWER WIRING.
9	<b>Pump guard e. phase to phase unbalance f. Under current (dry running) g. Overload h. UV/ OV</b>	1 no. for Protection of pump-motor set against the faults, like single phasing , dry running under load and over voltage negative phase sequence unbalance supply and over loading. Single phasing preventer current sensing type suitable for 3phase, 440 volt, AC supply. (Prodless pump guard shall be installed . ) All these components should be properly housed in a sheet metal panel with fixing arrangements.
10	<b>Painting</b>	The panel board shall be powder coated .

The control Gear shall comply with IE Rules. The enclosure should be suitable for outdoor installation. This system should be able to operate on 415V + 5 %, 50 HZ , AC supply. All these components should be properly housed in a sheet metal panel with fixing arrangements

The internal wiring of panel shall be done by copper wire of adequate size and capacity in an approved manner.

**CABLE ENTRY:** Provision of suitable cable entry through glands to connect the equipment to incoming and outgoing cables shall be made. The cable entry to terminal of motor shall be provided

with suitable glands to avoid mechanical damage to the cable insulation. The cable shall be easily accessible to motor terminals. In case of conduit entry for external connection, provision shall be made on starter metallic housing/control panel to anchor the cables mechanically to avoid mechanical damage.

**41.Schedule item no. B-5**

**Supply of Aluminium telescopic ladder, heavy duty with holding rubber, foldable with equal steps, 12 Feet height with push button type system ladder**

The price shall cover Supply of Aluminium telescopic ladder, heavy duty with holding rubber, foldable with equal steps, 12 to 13 feet height with push button type system ladder as per relevant IS 61620.

**42.Schedule item no. A-7, B-8**

**Supply, erection, testing & commissioning of Industrial type metallic plug sockets 20A with 20 A MCB DP with 3x4 sqmm PVC insulated and sheathed copper conductor complete.**

Supply, erection, testing and commissioning of Industrial type plug socket metallic 20 amp with DP MCB of rated current 20 Amp., 10 kA breaking capacity, 'C' series shall be provided inside the suitable size of MS sheet enclosure along with plug socket. Iron clad Plug socket with 3 pin top shall be mounted on teak wood board. The wiring for the industrial plug socket shall be done with PVC insulated 3x4 sq. mm. FRLS copper wire as per IS 694/1990 or latest from nearest sub distribution board. The work shall be carried out under the supervision of field engineer.

**43.Schedule item no. A-14**

**Supplying, erecting & marking DPMCB 6A to 32A, C-series with rated short - circuit breaking capacity (Icn) 10kA in provided distribution board as per specification no. SW-SWR/MCB**

Supply, erection, testing and commissioning of DP MCB of rated current 6A to 32 Amp., 10 kA breaking capacity, 'C' series and conforming to IS 8828 –78 with latest amendments. MCB shall be with ON/OFF indication, IP 65 degree protection, showing mid trip position in case of overload or short circuit conditions. MCB shall be having bi-connect terminals, load-line reversibility and with energy limitation class –III features. MCB shall be provided inside the suitable size of MS sheet enclosure along with plug socket. The work shall be carried out under the supervision of field engineer.

**44.Schedule item no. A-18**

**Provision of outdoor type Pre-cooling point with 1x4 pole 100 A MCCB 415 V, 63 A metal Clad Male & Female inter-locked industrial type 5 pin type plug and socket in 14 SWG CRCA sheet hot dipped galvanized enclosure mounted on angle stand complete.**

**SPECIFICATION FOR PRECOOLING POINT:-**

The pre-cooling plugs shall be complete with stand having enclosure made from 14 SWG CRCA steel sheet, hot dip galvanized, with 02 Nos. 40 x 6 mm thick steel flat for fixing on the stand. The Pre-cooling Plug shall consist of following: -

100 A four Pole, 10 kA Breaking Capacity, MCCB – 01 No. 63 Amp 3 Phase, 415 V, AC, 5 Pin metal clad, male and female interlocked industrial type socket with spring actuated self-closing dust cover – 01 No. 40 mm dia. Epoxy bus insulators.

Internal connections with 16 sq. mm., 1100 V graded, PVC insulated stranded copper conductors up to terminal with duly crimped lugs. The connections of incoming and outgoing cables are covered under separate items, 02 holes (01 dummied) on each side are to be made, before galvanization, for cable entry. The stand shall be grouted with cement concrete as shown in drawing.

The PC plugs will have to be aligned and erected in between two track, at the approximate spacing of 22 Mtrs, in relation of Engine Stop point. The erection work is to be carried out as per the directives of Railway Representative.

**Note – All incoming and outgoing MCCB should be 4 pole microprocessor based with adjustable short circuit, overload, ground fault (LSIG) and earth leakage protection (ELR with CBCT for each MCCB required).**

**45.Schedule item no. B-46**

**SETC of Standalone sensor 360 degree PIR occupancy sensors recessed single load sensing technology, angle of detection: 360 degree, detection distance: 3 to 20M, Power consumption: 0.5W, installation height: 2.2 to 6M, detection motion speed :0.6 to 1.5m/s, load :incandescent Lamp Max 1000W, AC Halogen lamp, Power source 220- 240V AC, frequency: 50/60Hz, type of installation: ceiling(Flush).**

SETC of Standalone sensor 360 degree PIR occupancy sensors recessed single load sensing technology, angle of detection: 360 degree, detection distance: 3 to 20M, Power consumption: 0.5W, installation height: 2.2 to 6M, detection motion speed :0.6 to 1.5m/s, load :incandescent Lamp Max 1000W, AC Halogen lamp, Power source 220- 240V AC, frequency: 50/60Hz, type of installation: ceiling(Flush).

### **GENERAL CONDITIONS FOR SUPPLY AND ERECTION**

1. The work is to be done as per tender technical specification. In case of any doubt etc. the details as given in tender technical specifications will prevail.
2. All the supply and erection work shall be done in accordance with relevant IS.
3. Contractor shall supply the material duly inspected by Railway representative or agency as per inspection clause mentioned below.
4. Any kind of testing required to confirm suitability of material either at manufacturers premises or at Rly. Stores before material is accepted by consignee shall be the responsibility of contractor. All testing charges shall be borne by the contractor.
5. Due care has been taken while framing technical specification, however if any deviation from prevailing standard norms is noticed at the time of execution the same shall be rectified and made good by the contractor. Contractor shall also bring such things if ever noticed by them to the knowledge of this office and to field Engineer.
6. Site survey shall be carried out by the contractor and Rly. Representative on award of LOA and before starting the work. Targeted Action Plan with material delivery schedule based on above survey shall be prepared by the contractor. One copy of the same shall be submitted to Engineer for monitoring the progress.
7. All material to be used for work shall be duly supported with test/inspection reports shall be deposited with SSE in charge of execution for ensuing quality before fitment. Only after clearance and satisfaction of quality the material shall be taken to site for erection and commissioning. Contractor shall therefore supply material in bulk lots to avoid repetitions of inspections/ testing.
8. **INSPECTION and TESTING:-**
  - (i) The stores material shall be inspected by Railway Representative nominated by Sr.DEE (G) BSL. All the inspection and testing charges shall be borne by the contractor. The contractor shall submit details of the material being offered before inspection schedule date at manufactures premises/ consignee premises. Where RITES or any third party is nominated as inspection agency, the inspection fee charged to the agency shall be borne by Contractor.
  - (ii) Material having value above Rs.5 lakhs shall be inspected by RITES. Inspection of other materials shall be done by Railway's representative.
9. **Successful bidder/tenderer shall survey the site and submit action plan within 15 days immediately after issuing of LOA to this office.**
10. All released material to be deposited to concern field In-charge office/depot.
11. There may be minor variation in rating / other parameters from make to make. The variation in positive side and beneficial to Railway is acceptable. However, prior approval of Sr.DEE(G)BSL shall be required before delivery of material to Railways.
12. In case, any contradiction in schedule of rate and specification; final decision of Railway authority will be final as per railway requirement.
13. LED fittings shall be guaranteed for 5 years

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## **CHAPTER –IV**

### **SCHEDULE OF QUANTITIES**

**AND**

**RATES**

CENTRAL RAILWAY

ELECT (G) BRANCH

BHUSAWAL DIVISION

TENDER No. BSL-L-W-T-55-2026

**Schedule of work, rates and quantities for the work of Electrification work in connection with following : Sch. A - Development of Track machine siding at Kuram station. ; Sch. B - Development of Track machine siding at Murtizapur station.**

<b>Sch. A - Development of Track machine siding at KUM station</b>									
<b>A</b>	<b>S N</b>	<b>Description</b>	<b>QTY.</b>	<b>Unit</b>	<b>Sup. Rate</b>	<b>Erec. Rate</b>	<b>Total cost of sup.</b>	<b>Total cost of erec.</b>	<b>Grand Total</b>
A	1	Supply, erection, testing and commissioning of Point wiring for light, fan, exhaust fan in PVC casing capping with 2x2.5 sq. mm. FRLS multistranded PVC copper wire alongwith all accessories, running earth etc.	40	Nos	349	108	13960	4320	18280
A	2	Supply, erection, testing & commissioning of energy efficient 1x18 W indoor fitting LED batten with extruded aluminium housing with integrated LED Driver/Tube complete and associated accessories complete.	20	Nos	288	73	5760	1460	7220
A	3	Supply, erection, testing & commissioning of Bulkhead fitting with 10 W LED light with heat resistant glass cover and MS galvanised wire guard complete in toilet/bath.	5	Nos	825	82	4125	410	4535
A	4	Supply, erection, testing & commissioning of 2Ft 1x9 watt LED tube with accessories complete.	5	Nos	403	40	2015	200	2215
A	5	Supply, erection, testing & commissioning of BLDC Super Efficient Electrical Ceiling Fan 1400 MM sweep (56')260-280 RPM, Services value 7.7 Input voltage 140-285 V. Power Consumption 26 W to 30 W. Air delivery 270 CMM or more, 3 Blades with double ball bearing regulator of electronic step type and down rod 300-600 MM as per requirement canopies shackle.	10	Nos	2831	136	28310	1360	29670
A	6	Supply, erection, testing & commissioning of Heavy Duty single phase Exhaust Fan of 380 mm size sweep,1440 RPM duly wired with 3 core flexible copper wire and fixing arrangement, hardware etc. complete.	5	Nos	3939	198	19695	990	20685
A	7	Supply, erection, testing & commissioning of Industrial type metallic plug sockets 20A with 20 A MCB DP with 3x4 sqmm PVC insulated and sheathed copper	2	Nos	831	133	1662	266	1928

		conductor complete.							
A	8	Supply, erection, testing & commissioning of 5 A 5 Pin universal plug socket complete with switch, wiring and earth connection, to be provided in Existing light/fan board.	5	Nos	53	45	265	225	490
A	9	Supply, erection, testing and commissioning of 15 A 6 pin universal plug socket with switch alongwith independent point wiring in PVC casing capping with 2x4 sq. mm. FRLS multistranded PVC copper wire alongwith all accessories, running earth etc.	5	Nos	339	54	1695	270	1965
A	10	SETC of Lighting Circuit Board, Double Door Powder coated with locking arrangement consisting 63 A TPN MCCB I/C and 18 Nos x 6 A SPN MCB and 6 Nos x 20 A SPN MCB for O/G complete.(All MCCB are Microprocessor Based)	1	Nos	15458	1333	15458	1333	16791
A	11	S.E T.C. of Submain with 2x6 sqmm FRLS copper wire inside PVC Casing caping with running earth etc complete. (1 m length of submain consists one cktmtr including all accessories & 2 wire of 6 sqmm with one wire of 2.5 sqmm for earth conn).	50	Ckt Mtrs.	143	18	7150	900	8050
A	12	Supply, erection, testing & commissioning of submain from switch board to single phase DP switch / DP one circuit meter comprising of 2x4 sq.mm. PVC insulated FRLS 1.1KV multistranded wire & one running earth of 2.5 sq.mm. copper conducting PVC insulation green colour of 1.1 KV grade on rigid PVC casing caping with all accessories.	100	Ckt Mtrs.	116	18	11600	1800	13400
A	13	Supply, erection, testing and commissioning of teakwood /PVC Main Board with electronic KWH meter 5-30 A cap.230 V,50 hz. Single phase duly wired with FRLS multistranded PVC copper wire with MCB,cutout, neon indication & earth connection etc.	1	Nos	1610	115	1610	115	1725
A	14	Supplying, erecting & marking DPMCB 6A to 32A, C-series with rated short - circuit breaking capacity (Icn) 10kA in provided distribution board as perspecification no. SW-SWR/MCB	4	Nos	631	0	2524	0	2524
A	15	Supply, erection, testing & commissioning of Steel Tubular Swaged pole 8 mtr. Long with	15	Nos	9128	215	136920	3225	140145

		Junction Box and all accessories with foundation complete.							
A	16	Supply, erection, testing & commissioning of LED street Light Roadway fittings in aluminium PDC housing, toughened glass cover with IP66 protection, Wattage-45 watts, input voltage-240 volts ac, 50Hz. Complete.	20	Nos	3636	60	72720	1200	73920
A	17	Supply, erection, testing & commissioning of 70%-30% Lighting panel consisting of the following items: One No. of 3-pole power contactor MNX 70 (Make : L&T, BCH, Siemens), One No. of Electronic timer 120 DT( Make : L&T, BCH, Siemens), One no. of 3 pole MCB 63 A, Two nos. of terminal 4-way ( Make : Indigenous ), One No. of Auto / Manual switch (Make : Indigenous), One No. of push to on switch ( Make: Indigenous ) ,One no. of MS BOX with powder coated paint size500mm x 350mm x150mm(make : Indigenous), One no. of plug type relay 2CO-230V ( Make : PLA, LA, L&T ) with fixing material and fixing charge per panel.	1	Nos	18571	0	18571	0	18571
A	18	Provision of outdoor type Pre-cooling point with 1x4 pole 100 A MCCB 415 V,63 A metal Clad Male & Female inter-locked industrial type 5 pin type plug and socket in 14 SWG CRCA sheet hot dipped galvanised enclosure mounted on angle stand complete.	10	Nos	7782	469	77820	4690	82510
A	19	Supply, erection, testing & commissioning of 2x4 sqmm FR Stranded/solid copper PVC insulated wire laid inside of pole for connecting the luminaries.	150	Nos	62	10	9300	1500	10800
A	20	Supply of LT XLPE Armoured 4 Core 50 Sq mm Aluminium cable as per relevant IS.	900	Mtr.	467	0	420300	0	420300
A	21	Supply of 4 core 16 sqmm armoured XLPE Cable	900	Mtr.	158	0	142200	0	142200
A	22	Trenching & refilling of LT/HT/ Various sizes of PVC / XLPE cables- <b>Along the Road</b> (Size - 900mm x 300mm)	1600	Mtr.	0	177	0	283200	283200
A	23	Digging of cable trench 300/450 mm x 1000 mm in <b>RCC/PCC/hard soil &amp; refilling</b> as per specification and requirement at the site.	100	Mtr.	0	315	0	31500	31500
A	24	<b>Transportation, Laying,</b>	1700	Mtr.	0	26	0	44200	44200



		<b>Installation, terminating, testing and commissioning</b> of LT/HT cable of sizes 10 sqmm to 300 sqmm in existing trench, pipe or on structure.						
A	25	Erection, testing and commissioning of cables other than trench i.e. Wall/Truss including clamp, GI wire and hardware	100	Mtr.	0	58	0	5800
A	26	Supply & laying of <b>GI pipe Class B</b> , ISI marked under road /Clamping with erecting pole or wall as per technical specification & drawing for passing cable.	10	Mtr.	173	0	1730	0
A	27	Supply, installation, testing & commissioning of <b>HDPE Pipe</b> 110 mm Nominal Dia as per IS-4984-1995.	15	Mtr.	428	0	6420	0
A	28	Supply & Erection of <b>cast iron cable</b> marker.	34	Nos	209	94	7106	3196
A	29	Supply & Erection of <b>RCC Warning Cover</b> and refilling the cable trench in an approved manner.	25	Nos	280	125	7000	3125
A	30	Supply, erection, testing & commissioning of maintenance free earth as per RDSO specification no. RDSO/PE/SPEC/ PS/0109-008(REV '0') with improved earthing enhancing compound and exothermic welding	4	Nos	11098	1752	44392	7008
A	31	Supply, erection, testing and commissioning of Borewell Submersible pump set alongwith wet type squirrel cage induction motor Head 50-140 meters, discharge 250-50 LPM, Max. Efficiency at Duty point ( 66 LPM at 110 meter head ) 5 HP/3.7 kW 10 stages, 2" outlet ISI mark, with all accessories as per specifications.	1	Nos	38524	3502	38524	3502
A	32	Supply, erection, testing & commissioning of Supply and erecting Automatic Control Panel for 3 ph, 415 volt, A.C. Submersible/ centrifugal pump set up to 7.5 HP. Consisting of DOL starter having relay range 9-18 Amps. SPP Combined Ammeter, Voltmeter, phase Indicating lamps enclosed in CRCA powder coated vibration proof encloser with IP 54 protection. Control panel should offer single phasing phase reversal phase imbalancing etc.	1	Nos	7398	314	7398	314

A	33	Supply, erection, testing & commissioning of Heavy duty Sluice Valve 50 mm dia. as per IS specification.	1	Nos	4463	96	4463	96	4559
A	34	Supply, erection, testing & commissioning of Heavy duty Non Return Valve 50 mm dia. as per IS specification.	1	Nos	4040	96	4040	96	4136
A	35	Supply and erecting ISI mark " C " Class ( Heavy Duty ) GI pipe of 50 mm dia. with coupling/accessories.	150	Mtr.	757	87	113550	13050	126600
A	36	Supply, erection, testing & commissioning of GI C- class Bend 50mm dia.	2	Nos	589	47	1178	94	1272
A	37	Supply, erection, testing & commissioning of M.S. supporting clamps for 50 mm dia GI pipe	4	Nos	188	62	752	248	1000
A	38	Supply, erection, testing & commissioning of Flat Flexible Copper cable, 3 core X 6 sq.mm. for submersible pump & starter connection.	200	Mtr.	184	7	36800	1400	38200
A	39	SETC of LT Panel consisting 2 x250 A 4 P MCCB as I/C and 2x100 A 4 Pole MCCB, 4 x63 A MCCB, DP MCB 2x32 A and SPN MCB 4 x 32 A O/G with multi-function meter and complete associated <b>(ALL MCCB are Microprocesor Based)</b>	1	No	136174	10142	136174	10142	146316
A	40	SETC of LT Panel consisting 1x 100 A 4 P MCCB as I/C and 2 x 63 A 4 Pole MCCB O/G with multi-function meter and complete associated <b>(ALL MCCB are Microprocesor Based)</b>	1	No	50875	1333	50875	1333	52208
A		<b>Total Sch. A</b>							<b>1886630</b>
B	<b>Sch. B - Development of Track machine siding at MZR station</b>								
B	S N	Description	QTY.	Unit	Sup. Rate	Erec. Rate	Total cost of sup.	Total cost of erec.	Grand Total
B	1	Supply, erection, testing and commissioning of Point wiring for light, fan, exhaust fan in PVC casing capping with 2x2.5 sq. mm. FRLS multistranded PVC copper wire alongwith all accessories, running earth etc.	40	Nos	368	113	14720	4520	19240
B	2	Supply, erection, testing & commissioning of energy efficient 1x18 W indoor fitting LED batten with extruded aluminium housing with integrated LED Driver/Tube complete and associated accessories complete.	25	Nos	449	113	11225	2825	14050
B	3	Supply, erection, testing & commissioning of Bulkhead fitting with 10 W LED light with heat resistant glass cover and MS	5	Nos	825	82	4125	410	4535

		galvanised wire guard complete.							
<b>B</b>	4	Supply, erection, testing & commissioning of 2Ft 1x9 watt LED tube with accessories complete.	5	Nos	403	40	2015	200	2215
<b>B</b>	5	Supply of Aluminium telescopic ladder, heavy duty with holding rubber, foldable with equal steps, 12 Feet height with push button type system ladder	2	Nos	6200	0	12400	0	12400
<b>B</b>	6	Supply, erection, testing & commissioning of Ceiling Fan of Energy Efficient (BLDC) of 1200 mm sweep, 28 watts, motor shall be Inverter driven, controlled by microprocessor with BEE 5 star rated, having input power of 28 W, Power Factor 0.98, Air Delivery 230 Cu.Mtr/Min, Speed 385 RPM, number of aluminium blade 3, with remote control / regulator of electronic step type to use in 230 V, 50 Hz. AC supply with 5 years replacement warranty along with valid test certificate.	10	Nos	2175	108	21750	1080	22830
<b>B</b>	7	Supply, erection, testing & commissioning of Heavy Duty single phase Exhaust Fan of 380 mm size sweep, 1440 RPM duly wired with 3 core flexible copper wire and fixing arrangement, hardware etc. complete.	5	Nos	3242	162	16210	810	17020
<b>B</b>	8	Supply, erection, testing & commissioning of Industrial type metallic plug sockets 20A with 20 A MCB DP with 3x4 sqmm PVC insulated and sheathed copper conductor complete.	2	Nos	870	205	1740	410	2150
<b>B</b>	9	Supply, erection, testing & commissioning of 5 A 5 Pin universal plug socket complete with switch, wiring and earth connection, to be provided in Existing light/fan board.	5	Nos	68	56	340	280	620
<b>B</b>	10	Supply, erection, testing and commissioning of 15 A 6 pin universal plug socket with switch alongwith independent point wiring in PVC casing capping with 2x4 sq. mm. FRLS multistranded PVC copper wire alongwith all accessories, running earth etc.	5	Nos	350	56	1750	280	2030
<b>B</b>	11	Supply, erection, testing & commissioning of Three Phase Lighting Circuit Board, Double Door Powder coated with locking arrangement consisting 63 A 4P MCCB as I/C and 18 Nos x 6 A SPN MCB and 6 Nos x 20A SPN MCB as	1	Nos	14222	1727	14222	1727	15949

		O/G complete.							
<b>B</b>	12	Supply, erection, testing & commissioning of submain from switch board to single phase DP switch / DP one circuit meter comprising of 2x4 sq.mm. PVC insulated FRLS 1.1KV multistranded wire & one running earth of 2.5 sq.mm. copper conducting PVC insulation green colour of 1.1 KV grade on rigid PVC casing capping with all accessories.	100	Ckt Mtrs	128	20	12800	2000	14800
<b>B</b>	13	S.E T.C. of Submain with 2x6 sqmm FRLS copper wire inside PVC Casing capping with running earth etc complete. (1 m length of submain consists one cktmtr including all accessories & 2 wire of 6 sqmm with one wire of 2.5 sqmm for earth conn).	50	Ckt Mtrs	138	18	6900	900	7800
<b>B</b>	14	Supply, erection, testing and commissioning of teakwood /PVC Main Board with electronic KWH meter 5-30 A cap.230 V,50 hz. Single phase duly wired with FRLS multistranded PVC copper wire with MCB,cutout, neon indication & earth connection etc.	1	Nos	1643	117	1643	117	1760
<b>B</b>	15	Supply, erection, testing & commissioning of DP-MCB 6-32A in provided energy meter board as above.	4	Nos	471	35	1884	140	2024
<b>B</b>	16	Supply, erection, testing & commissioning of Steel Tubular Swaged pole 8 mtr. Long with Junction Box and all accessories with foundation complete.	10	Nos	9128	215	91280	2150	93430
<b>B</b>	17	Supply, erection, testing & commissioning of LED street Light Roadway fittings in aluminium PDC housing, toughened glass cover with IP66 protection, Wattage-45 watts, input voltage-240 volts ac, 50Hz. Complete.	20	Nos	3833	384	76660	7680	84340
<b>B</b>	18	Supply, erection, testing & commissioning of 70%-30% Lighting panel consisting of the following items: One No. of 3-pole power contactor MNX 70 (Make : L&T, BCH, Siemens), One No. of Electronic timer 120 DT( Make : L&T, BCH, Siemens), One no. of 3 pole MCB 63 A, Two nos. of terminal 4-way ( Make : Indigenous ), One No. of Auto / Manual switch (Make : Indigenous), One No. of push to on switch ( Make: Indigenous ), One no. of MS BOX with powder coated paint size500mm	1	Nos	18571	0	18571	0	18571

		x 350mm x150mm(make : Indigenous), One no. of plug type relay 2CO-230V ( Make : PLA, LA, L&T ) with fixing material and fixing charge per panel.							
<b>B</b>	19	Supply, erection, testing & commissioning of 2x4 sqmm FR Stranded/solid copper PVC insulated wire laid inside of pole for connecting the luminaries.	150	Mtrs.	62	10	9300	1500	10800
<b>B</b>	20	Supply of LT XLPE Armoured 4 Core 50 Sq mm Aluminium cable as per relevant IS.	900	Mtrs.	467	0	420300	0	420300
<b>B</b>	21	Supply of 4 core 16 sqmm armoured XLPE Cable.	900	Mtrs.	126	0	113400	0	113400
<b>B</b>	22	Trenching & refilling of LT/HT/ Various sizes of PVC / XLPE cables- Along the Road (Size - 900mm x 300mm)	1600	Mtr.	0	177	0	283200	283200
<b>B</b>	23	Digging of cable trench 300/450 mm x 1000 mm in RCC/PCC/hard soil & refilling as per specification and requirement at the site.	100	Mtr.	0	315	0	31500	31500
<b>B</b>	24	Transportation, Laying, Installation, terminating, testing and commissioning of LT/HT cable of sizes 10 sqmm to 300 sqmm in existing trench, pipe or on structure.	1700	Mtr.	0	26	0	44200	44200
<b>B</b>	25	Erection,testing and commissioning of cables other than trench i.e.Wall/Truss including clamp, GI wire and hardware	100	Mtr.	0	58	0	5800	5800
<b>B</b>	26	Supply & laying of GI pipe Class B, ISI marked under road /Clamping with erecting pole or wall as per technical specification & drawing for passing cable.	10	Mtr.	173	0	1730	0	1730
<b>B</b>	27	Supply,installation, testing & commissioning of HDPE Pipe 110 mm Nominal Dia as per IS-4984-1995.	15	Mtr.	428	0	6420	0	6420
<b>B</b>	28	Supply and laying of RCC half round pipe 150 mm ID & 1 mtr length.	1600	Mtr.	72	11	115200	17600	132800
<b>B</b>	29	Supply and laying of RCC Hume Pipe of size 6"(150mm) dia 2 mtr. Length.	9	Nos.	526	79	4734	711	5445
<b>B</b>	30	Supply & Erection of cast iron cable marker.	34	Nos	209	94	7106	3196	10302
<b>B</b>	31	Supply & Erection of RCC Warning Cover and refilling the cable trench in an approved manner.	30	Nos	280	125	8400	3750	12150
<b>B</b>	32	Supply, erection, testing & commissioning of maintenance free earth as per RDSO specification no. RDSO/PE/SPEC/ PS/0109-008(REV '0') with improved earthing enhancing compound and exothermic welding	4	Nos	11520	1819	46080	7276	53356
<b>B</b>	33	Supply, erection, testing &	1	Nos	91207	10142	91207	10142	101349

		commissioning of LT Panel Outdoor type with double door power coated consisting 1x125 A 4 P MCCB incomer, 3 x 63 A 4P MCCB, 2 x 32 A 4 Pole MCB, 4 x 32 DP MCB as outgoing with 3Ph KWH meter with copper busbar & indication lamps and other complete associated accessories. All MCCB are Microprocessor Based.							
B	34	Supply, installation, testing & commissioning of single phase RCBO of 32A capacity, 30mA sensitivity with Metal enclosure.	5	Nos	3062	0	15310	0	15310
B	35	Supply, erection, testing & commissioning of Online UPS with isolation transformer suitable for single phase AC input & single phase AC output,floor mounted type rating of UPS 5.0 KVA indicative back-up time 120 minutes complete with Battery and stand.	2	Nos	171430	8572	342860	17144	360004
B	36	Supplying and erecting metal clad changeover switch 2 pole, 240 V, 32A erected on provided angle iron/GI frame and duly connected with suitable wire leads complete as per specification	1	Nos	1677	0	1677	0	1677
B	37	Supplying, erecting, testing and commissioning of minimum three & above star rated 3 phase, 415 V, 50 Hz, submersible pump set of 14.92kW/20 HP suitable for erection on open well, pump having delivery head from 60 to 36 m and discharge from 1425 to 825 litres per minute & 80 mm suction/65 mm delivery dia. as per specification	2	Nos	92171	0	184342	0	184342
B	38	Supplying & erecting automatic control panel for 3 Ph, 415 volt, A.c.Submersible/ centrifugal pump set upto 20 HP consisting of Star Delta starter having relay range 13-21 Amp, S.P.P., Combined ammeter/ voltmeter, phase indicating lamp enclosed in CRCA powder coated Vibration proof encloser with IP 54 protection. Control Panel should offer single phasing, phase reversal, phase inbalance etc.	1	Nos	12740	481	12740	481	13221
B	39	Supply, erection, testing & commissioning of Heavy duty Sluice Valve 50 mm dia. as per IS specification.	2	Nos	4463	96	8926	192	9118
B	40	Supply, erection, testing & commissioning of Heavy duty Non Return Valve 50 mm dia. as per IS specification.	2	Nos	4040	96	8080	192	8272

<b>B</b>	41	Supply and erecting ISI mark " C " Class ( Heavy Duty ) GI pipe of 50 mm dia. with coupling/accessories.	300	Mtrs.	757	87	227100	26100	253200
<b>B</b>	42	Supply, erection, testing & commissioning of GI C- class Bend 50mm dia.	4	Nos	589	47	2356	188	2544
<b>B</b>	43	Supply, erection, testing & commissioning of M.S. supporting clamps for 50 mm dia GI pipe	8	Nos	188	62	1504	496	2000
<b>B</b>	44	Supply, erection, testing & commissioning of Flat Flexible Copper cable, 3 core X 6 sq.mm. for submersible pump & starter connection.	400	Mtrs.	184	7	73600	2800	76400
<b>B</b>	45	Supply, erection, testing & commissioning of Pump guard Current operated type Should have protection against dry run, single phase, over load, reverse phase protection etc. for pump up to 20 HP three phase suitable to operate in 415 volts 50 HZ AC supply.	2	Nos	2402	0	4804	0	4804
<b>B</b>	46	Standalone sensor 360 degree PIR occupancy sensors recessed single load sensing technology, angle of detection: 360 degree, detection distance: 3 to 20M, Power consumption: 0.5W, installation height: 2.2 to 6M, detection motion speed :0.6 to 1.5m/s, load :incandescent Lamp Max 1000W, AC Halogen lamp, Power source 220-240V AC, frequency: 50/60Hz, type of installation: ceiling(Flush).	5	Nos	1319	132	6595	660	7255
<b>B</b>		<b>Total Sch. B</b>							<b>2506663</b>
		<b>Grand Total Sch. A+B</b>							<b>4393293</b>

S= Supply, E= Erection/laying, T= Testing, & C= Commissioning, Nos.= numbers, D-Dismantling.

- 1) The tender schedule shall be read in conjunction with scope of work and technical specification of the work for various items included therein
- 2) Tenderer / should Quote his / their own single & common percentage rates in offer sheet i.e. above /At Par / below the estimated rates of Railways schedule.
- 3) I/We agreed to execute the above work at -----% (In figure) -----  
(in words) above /At Par / below of the Railways schedule of rates.

**NOTE:-**

- (i) The above rates are inclusive all taxes and duties including GST.
- (ii) The tenderer shall quote the all-inclusive rates i.e. Labour, Material, tools / repair maintenance including **GST and income tax** etc. No additional payment shall be paid by railway other than accepted offer.

**Signature**  
**Address and seal of Contractor**

**Sr DEE(G)Bhusawal**

## The List of Makes to be used in works.

## Annexure-I

SN	Item description	Accepted Makes
1	Switch, Socket, industrial socket, Batton/Angle holder Ceiling rose, SDB	Lauritz Knudsen (L&T), Havells, Legrand, Cona, Crabtree, C&S, Press Fit, Anchor, Benlo
2	Time Switches / Astronomical timer	Lauritz Knudsen (L&T), Siemens, Legrand, Havells, GE
3	DP Switch	Lauritz Knudsen (L&T), Havells, Legrand Siemens, GE, ABB, Cona, Crabtree, HPL
4	MCB /RCCB/RCBO/PRCD	Havells, Lauritz Knudsen (L&T), Legrand, Siemens, ABB, Schneider, Benlo
5	SFU /ACB / VCB / MCCB / ATS	Lauritz Knudsen (L&T), Siemens, Legrand, ABB, Schneider, Hager, Havells, Benlo
6	FRMUE/ EFS/ RMU/ Indoor compact switchgear / VCB Panel	ABB, L&T, Schneider, GE, Siemens
7	Switchgear for AMF/APFC panel	Lauritz Knudsen (L&T), Legrand, GE, Siemens, ABB, Hager, Schneider, Havells.
8	Thyrister, Contactors, Reactors	Lauritz Knudsen (L&T), Legrand, GE, Siemens, ABB, Hager, Schneider, Havells.
9	LT Panels (IEC 61439)	Siemens, ABB, Schneider, Lauritz Knudsen (L&T), Havells, Legrand
10	Ray roll plug socket	Legrand, Anchor, GE, Havells and Standard
11	Luminaries fittings/ Facade lighting	Philips, Havells, Jaquar, Wipro, Bajaj, Panasonic, Surya, Orient, Crompton
12	Sensor based Luminaries fittings	Philips, GE, Havells, Wipro, Bajaj, Tata Power.
13	PIR sensors	L&T, Philips, Legrand, Crompton, Havells, Jaquar, Wipro, Bajaj, Orient, Atomberg
14	LED	NICHIA / CREE / OSRAM / SEOUL / PHILIPS /LUMILEDS / Samsung
15	LED Pit Light	Philips, GE, Havells, Syska, Jaquar, Wipro, LED 4 India, Shakti.
16	LED indicators for panel.	Lauritz Knudsen (L&T), Siemens, ABB, Schneider.
17	Solar Standalone street light	Philips, Havells, Exide, Surya, Bajaj, Wipro, Jain Irrigation
18	Torch Light (1.5 -3 Kms range)	Nei, Ascentech, kinnav, Havells, Eveready, GE, Jaquar, Wipro, Yashika
19	High Masts, Flag mast, Poles	Bajaj, Utkarsh, Valmont, Havells, Wipro
20	FRP cable looping boxes	Sintex, Ercon, Bravo, National
21	Junction Boxes	Hensel, Cape Electric, National, Sintex.
22	Cable- HT, UG/Aerial Bunched Cable	Havells, Polycab, RR Kabel, KEI, Finolex
23	Cable/wire- LT, PVC/XLPE, UG/ Aerial Bunched Cable/ flexible, armoured/ unarmoured, domestic cables/wires.	Havells, Polycab, RR Kabel, KEI, Finolex, Vishal
24	Cable/Bus Duct, Bus trunking	Schneider Electric India Ltd. Legrand, Lauritz Knudsen (L&T), ABB, EAE
25	Cable joint and termination kit	M-seal, Dowells, Kaycee, Jainson, Cabseal, 3M, Mahindra & Mahindra.
26	BLDC Ceiling Fan / Pedestal fan / Exhaust Fan, Electronic Fan Regulator	Havells, Orient, Usha, Atomberg, Crompton, Bajaj
27	Wall Bracket fan/Air Circulator	Bajaj, Havells, Usha, Crompton, Orient, Almonard.
28	Casing Capping / PVC conduit	Prestoplast, Precision, Modi, Press Fit
29	Multi-Function meter & Electrical measuring instruments	Lauritz Knudsen (L&T), Siemens, Secure, ABB, Schneider, Set & De, trinity, MECO
30	Insulation resistance meter, Anemometer, Digital Multifunction (Loop Impedance Meter) Tester	Megger, Fluke, Stanlay, Testo
31	Earth tester	Meco, Nippen, Stanlay, Testo
32	Digital Clamp on Meter (Tong Tester).	Meco, Stanlay, Fluke, Testo
33	BDV Testing Kit	Stanley, Motwane
34	Digital lux meter	Fluke / Stanley / meco /Rishabh
35	Digital clamp on earth tester	Motwane, kusum-meco, Megger, Fluke, Stanlay
36	Digital Vernier caliper, Digital screw gauge	Baker, Freemans, Insize, MITUTOYO, TESA
37	Cable Fault Locator	Megger, Stanlay, Kusum-meco, Radiodetection, Fluke
38	Surge Suppressor	Legrand, Rider, Costain, Havells, Schneider, ABB, GE
39	Pumps (Make of Motor for Pump shall be acceptable as per OEM of the Pump)	Kirloskar, Crompton, KSB Pumps, Deccan, Jyoti, Wilo, Flowmore, Goodwin. Mather Platt, CRI, Worthington.
40	Pump Guard	Minilec, Lauritz Knudsen (L&T), Crompton, Siemens, C&S
41	Motor Starter	Lauritz Knudsen (L&T), Kirloskar, Schneider, GE, Siemens, CG, BCH, C&S
42	VFD Drive / Soft Starter	ABB, Siemens, Lauritz Knudsen (L&T), Schneider.
43	Valves all types & Butterfly	C&R / Audco / Castel / Leader / Honeywell / Kirloskar
44	GI Pipes	Tata, Zenith, Jindal, Bansal, Surya Prakash, Swastik, Apollo
45	PVC Pipe/ Column Pipe	Finolex, Supreme, Astral, Ashirvad, Prince, Apollo
46	HDPE Pipe	Supreme, Utkarsh, Jain Pipes, CRI Pipes
47	Polyolefin Cable channel	Finolex, Supreme, Astral, Ashirvad, Prince, Apollo
48	M.S. Pipes	Jindal / Tata / Zenith / GST / Malhotra
49	TMC Pipe	IT Combo, Palak, Sagar, Mahavir
50	UPS Battery	AMARARAJA, EXIDE, CBS, PANASONIC, HITACHI, HBL, OKAYA, Microtek
51	UPS/ Inverter	Numeric Power Systems Ltd, APC, Schneider, Legrand, Emerson (Siemens), Luminous Power Technologies Pvt. Ltd. Luminous, Su-Kam, Microtek, Uniline
52	Standard Lead Acid Battery	Amararaja, Exide, Okaya, HBL



53	Geysers, Water Heater	Bajaj, Havells, Crompton Greaves, Jaquar, Racold, Morphy Richards
54	Flex for Glow Sign Board	LG 3m penaflex
55	Vinyl for Glow Sign Board	LG 3m penaflex
56	Cement	Ultratech, ACC, Ambuja, JK, Birla
57	Paints	Asian, Nerolac, Dulux, Shalimar, Berger
58	Sleeve Insulation	The Supreme Industries Ltd. / K Flex / Armaflex / A Flex
59	GI sheet	Jindal / Sail / Essar / Tata / Zenith
60	Fly Catcher Fitting	Fly, Kill lite, PCI, Avro, Orchids
61	Window AC / Split AC / AC Plant/ Cassette AC	Blue Star, Voltas, LG, Fedders Lloyd, Hitachi, Samsung, Daikin, O' General, Mitsubishi, Panasonic, Carrier, Godrej, IFB
62	VRF/VRV Units & Ductable split unit inverter type	Blue star / Samsung / Hitachi / Mistubishi / Daikin / O General/ Voltas, Panasonic/ LG
63	Duct Insulation	The Supreme Industries Ltd. / K Flex / Armaflex / A Flex
64	Air diffuser / Grill	Cosmos / Dynacraft / Carrier
65	Volume Control Damper	Cosmos / Dynacraft / Carrier
66	Ventilation Fans	Carrier / Systemair / Kruger / Nicotra/ Almonard
67	AC Compressor	Emersion Copeland/ Kirloskar/ Bluestar/ Carrier/ Daikin/ Tecumseh
68	AC Condenser	Blue Star / Carrier / Hitachi / Daikin
69	Motors	CG, Bharat Bijlee, ABB, Siemens, Kirloskar
70	AHU / IDU	Neutech / Blue Star / Ethos / Voltas / Systemair / Flaktwood / VTS / Trane / York / Blue star / Samsung / Hitachi / Mistubishi / Daikin / O General/ Voltas, Panasonic/ LG
71	Cooling Tower	Paharpur / National / Perfect / Omkar / Choksi Group
72	Chiller line Insulating	Thermoshell / Beardsell Ltd./ Armaflax / Superlone / Century / ECOFLACK
73	Package unit	Blue Star / Hitachi / Daikin / Carrier / Voltas
74	Water Cooler	USHA, Blue Star, Voltas, Sidwal
75	Refrigerator	LG, Voltas, Whirlpool, Haier, Godrej, Samsung, Panasonic
76	Diesel Generating Set	Kirloskar Oil Engines Limited, Mahindra, Cummins, GCL, Ashok Leyland.
77	APFC RELAY / Power capacitor	EPCOS, SELEC, L&T, Schneider, Havells, C&S
78	Transformers	ABB, Siemens, BHEL, GEC, Bharat Bijlee, Crompton, Schneider/ Areva, transdelta, Highvolt, Fairdeal, Tesla, Kirloskar, Power star, Transformer & Rectifier.
78	Oil filtration plant	Spera, CEE DEE, CBS, Minimac, Kristorr
79	Voltage stabilizer	Melcon, servokon, V-guard, Microtek, Jindal, Servomax, Power control systems, GE, Apex
80	IFD	ABB, Motorola, Siemens, JAISuS, Honeywell, L&T
81	ULT	Endress & Hauser, Siemens, Honeywell, Pepperl & Fuchs, Nivelco, Rosemount
82	AB switch	Kiran/ Pactil / ABB
83	Hammer Drill machine	Bosch, Stanley, Dewalt, Hilti
84	Hydraulic crimping tools	Bosch, Stanley, Dowel
85	Thermal image camera	Bosch, TIPL, Fluke, Meco, Testo
86	Electric air blower	Bosch, Dewalt
87	Tools & Plant, Chain Pipe Wrenches	Taparia, Tata, Freemans, Fluke, Bosch, Stanley
88	Furniture's, Almirah, BOOK SHELF	Godrej or equivalent.
89	Binoculars	Nikon, ZEISS, Canon, Celestron
90	Day light pipe	Skyshade/ E- VIEW Global/ SKY PIPE/ EGO LIGHT/ EKOOL PLUS
91	Earthing pit Box cover	Sintex, True power, National
92	Ball Bearing	SKF / NBC / FAG
93	Capacitors for fan	Tibcon / Epcos / Syscap / Jimcap / Keltron / Havells
94	Solar Panel	Tata, Waaree, Havells, ABB, Adani, Vikram
95	Solar inverter	Tata, Waaree, Havells, ABB, Adani, Sungrow, Solis, Microtek
96	Solar water heater	V-Guard, Jain Irrigation, Sudarshan, Havells, Racold, Green sense
97	Computer	HP, Dell
98	Printer	HP, Brother
99	Air Cooler /Industrial Cooler	Symphony, Breezeair, Greencon, Arctic
100	Storage Tank	Sintex, Plasto
101	Telescopic Ladder	Corvids, Gorilla
102	Voltage stabilizer for AC	V-guard, IFB, Microtek.
103	BESS	Su-vastika, Lotus, Waaree, Tata, Exide, Amararaja, Panasonic, Schneider, Cummins
104	Portable Generator(Petrol/Kerosene)	Honda, Birla

**Note** – i) Only ISI / BIS marked items shall be accepted. If ISI / BIS marked materials are not available in market then prior approval shall be taken from Sr. DEE(G)BSL before supply.

ii) The above makes are acceptable subject to fulfillment of technical specification requirement.

## Indian Standard codes/IEC List

## Annexure-II

<i>S.No</i>	<i>Standard</i>	<i>Title</i>	<i>Reaffirm Date</i>	<i>Amdt.</i>
(1)	IEC 61439	The standards for low voltage switchgear and control gear assemblies		
(2)	IS 732:1989	Code of practice for electrical wiring installations (third revision)	March 2010	
(3)	IS 4648:1968	Guide for electrical layout in residential buildings	August 2012	
(4)	IS 8061:1976	Code of practice for design, installation and maintenance of service lines upto and including 650 V	March 2011	
(5)	IS 8884:1978	Code of practice for the installation of electric bells and call systems	August 2012	
(6)	IS 5578:1984/ IEC 60391 (1972)	Guide for marking of insulated conductors (first revision)	March 2011	
(7)	IS 1353:1985/ IEC 60445 (1973)	Guide for uniform system of marking and identification of conductors and apparatus terminals	July 2012	
(8)	IS 3234:1991/ IEC 60909: 1988	Guide for short circuit current calculations in three-phase ac systems (superseding IS 5728)	August 2012	
(9)	IS 7752 (Part 1):1975	Guide for improvement of power factor in consumer installation: Part 1 Low and medium supply voltages	March 2011	
(10)	IS 3646 (Part 1):1992	Code of practice for interior illumination: Part 1 General requirements and recommendations for working interiors (first revision)	March 2008	
(11)	IS 3646 (Part 2):1966	Code of practice for interior illumination: Part 2 Schedule of illumination and glare index	March 2008	
(12)	IS 3646 (Part 3):1968	Code of practice for interior illumination: Part 3 Calculation of coefficients of utilization by the BZ method	March 2008	
(13)	IS 4347:1967	Code of practice for hospital lighting	May 2010	
(14)	IS 6665:1972	Code of practice for industrial lighting	May 2010	
(15)	IS 2672:1966	Code of practice for library lighting	May 2010	
(16)	IS 10118 (Part 1):1982	Code of practice for selection, installation and maintenance of switchgear and controlgear : Part 1 General	March 2011	
(17)	IS 10118 (Part 2):1982	Code of practice for selection, installation and maintenance of Switchgear and controlgear : Part 2 Selection	March 2011	
(18)	IS 10118 (Part 3):1982	Code of practice for selection, installation and maintenance of switchgear and controlgear : Part 3 Installation	March 2011	
(19)	IS 10118 (Part 4):1982	Code of practice for selection, installation and maintenance of switchgear and controlgear : Part 4 Maintenance	March 2011	
(20)	IS 4146:1983	Application guide for voltage transformers (first revision)	September 2011	
(21)	IS 4201:1983	Application guide for current transformers (first revision)	September 2011	
(22)	IS 5547:1983	Application guide for capacitor voltage transformers (first revision)	September 2011	
(23)	IS 2309:1989	Code of practice for protection of buildings and allied structures against lightning (second revision)	March 2010	1

(24)	IS 3043:1987	Code of practice for earthing	March 2011	2
(25)	IS 5216 (Part 1):1982	Recommendations on safety procedures and practices in electrical work: Part 1 General (first revision)	March 2010	
(26)	IS 5216 (Part 2):1982	Recommendations on safety procedures and practices in electrical work: Part 2 Life saving techniques (first revision)	March 2010	
<b>ELECTRIC FANS</b>				
(1)	IS 555:1979	Electric table type fans and regulators (third revision)	July 2010	2
(2)	IS 1169:1967	Electric pedestal type fans and regulators (first revision)	Mar 2009	6
(3)	IS 374:1979	Electric ceiling type fans and regulators (third revision)	September 2010	6
(4)	IS 2997:1964	Air circulator type electric fans and regulators	July 2010	8
(5)	IEC: 60665 (1981) IS 2312:1967	Propeller type ac ventilating fans (first revision) Draft Standard issued in wide circulation	July 2010	8
(6)	IS 3588:1987	Electric axial flow fans (first revision)	August 2009	1
(7)	IS 3963:1987	Roof extractor units (first revision)	August 2009	3
(8)	IS 4283:1981	Hot air fans (first revision)	August 2009	3
(9)	IS 6272:1987	Industrial cooling fans (man coolers) (first revision)	August 2009	2
(10)	IS 4894:1987	Centrifugal fans (first revision)	August 2009	3
(11)	IS 11037:1984	Electronic type fan regulators	August 2010	3
(12)	IS 12155:1987	General and safety requirements for fans and regulators for household and similar purposes		
<b>LOW VOLTAGE SWITCH GEAR AND CONTROL GEAR</b>				
(1)	IS 4237:1982	General requirements for switchgear and controlgear for voltages not exceeding 1000 volts ac or 1200 volts dc (first revision) [superseded by IS 13947 (Part 1):1993]		
(2)	IS 6875 (Part 1):1973	Control switches (switching devices for control and auxiliary circuits including contactor relays) for voltages upto and including 1000 V ac & 1200 V dc: Part 1 General requirements [superseded by IS 13947 (Part 5/Section 1)]		
(3)	IS 6875 (Part 2):1973	Control switches (switching devices for control and auxiliary circuits including contactor relays) for voltages upto and including 1000 V ac and 1200 V dc: Part 2 Push- buttons and related control switches [Superseded by IS 13947 (Part 5/Section1)]		
(4)	IS 6875 (Part 3):1980	Control switches (switching devices for control and auxiliary circuits including contactor relays) for voltages upto and including 1000 V ac and 1200 V dc : Part 3 Rotary control switches [superseded by IS 13947 (Part 5/ Section 1)]		
(5)	IS 10027:2000	Composite units of air-break switches and rewirable type fuses for voltages not exceeding 650 volt ac - Specification (first revision)	March 2010	
(6)	IS 4064 (Part 1):1978	Air-break switches, air break disconnectors, air-break switch disconnectors and fuse-combination units for voltages not exceeding 1000 V ac or 1200 V dc: Part 1 General requirements (revised) [superseded by IS 13947 (Part 3): 1993]		
(7)	IS 2675:1983	Enclosed Distribution Fuse Boards and Cut Outs for voltages not exceeding 1000 V A.C. or 1200 V D.C.	March 2011	
(8)	IS 8828:1996	Circuit-breakers for over current protection for		

		household and similar installations (second revision)		
(9)	IS 13032:1991	Miniature circuit breaker boards for voltage upto and including 1 000 Volt ac	March 2011	1
(10)	IS 12640 (Part 1):2008	Residual current operated circuit-breakers for household and similar uses : Part 1 circuit-breakers without integral over current protection (RCCBs) (First Revision)		
(11)	IS 12640 (Part 2):2008	Residual current operated circuit-breakers for household and similar uses: Part 2 circuit breakers with integral over current protection (RCBOs) (First Revision)		
(12)	IS 2959:1985	Contactors for voltages not exceeding 1000 V ac or 1200 V dc (first revision) [superseded by IS 13947 (Part 4/ Section 1)]		
(13)	IS 12021:1987	Specification for control transformers for switchgear and controlgear for voltages not exceeding 1000 Volt AC	March 2010	2
(14)	IS 5039:1983	Distribution pillars for voltages not exceeding 1000 volts (first revision)	March 2011	2
(15)	IS 8623 (Part 1): 1993/ IEC 60439-1 (1985)	Specification for low voltage switchgear and controlgear assemblies: Part 1 Requirements for type-tested and partially type tested assemblies (first revision).	March 2008	2
(16)	IS 8623 (Part 2):1993/ IEC 60439-2 (1987)	Specification for low voltage switchgear and controlgear assemblies: Part 2 Particular requirements for busbar trunking systems (busways)-(first revision)	March 2008	2
(17)	IS 8544 (Part 1):1977	Motor starters for voltages not exceeding 1000 V: Part Direction line ac starters [superseded by IS 13947 (Part 4/Section 1): 1993]		2
(18)	IS 8544 (Part 2):1977	Motor starters for voltages not exceeding 1000 V : Part 2 Star-delta starters [superseded by IS 13947 (Part 4/ Section 1): 1993]		
(19)	IS 8544 (Part 3/ Sec 1): 1979	Motor starters for voltages not exceeding 1000 V : Part 3 Rheostatic motor starters, Section 1 General requirements [superseded by IS 13947 (Part 4/Section 1): 1993]		
(20)	IS 8544 (Part 4):1979	Motor starters for voltages not exceeding 1000 V: Part 4 Reduced voltage ac starters: two step auto-transformer starters [superseded by IS 13947 (Part 4/Section 1): 1993]		
<b>POWER CABLE</b>				
(1)	IS 94:1990/ IEC 60227-1 to 5 (1979)	PVC Insulated cables for working voltages upto and including 1100 V	February 2010	5
(2)	IS 694: 2010	Polyvinyl chloride insulated sheathed and unsheathed cables with rigid and flexible conductor for rated voltages upto and including 450/750 V : Part 1 General requirements (fourth revision)		1
(3)	IS 1554 (Part 1): 1988/ IEC 60502 (1983)	PVC insulated (heavy duty) electric cables: Part 2 For working voltages upto and including 1100 V (Third revision)		
(4)	IS 3961 (Part 1):	Recommended current ratings for cables: Part 1 Paper insulated lead sheathed cables	November 2011	

	1967			
(5)	IS 4288:1988	PVC insulated (heavy duty) electric cables with solid aluminium conductors for voltages upto and including 1100 V (second revision) (withdrawn)		
(6)	IS 4289 (Part 1): 1984/ IEC 60245-5	Flexible cables for lifts and other flexible connections: Part 1 Elastomer insulated cables (first revision)		
<b>ELECTRIC WIRING ACCESSORIES</b>				
(1)	IS 9537 (Part 1): 1980/ IEC 60614-1 (1978)	Conduits for electrical installations: Part 1 General Requirements	November 2010	(1)
(2)	IS 9537 (Part 2): 1981	Conduits for electrical installations: Part 2 Rigid steel conduits (superseding IS:1653)	May 2012	(2)
(3)	IS 3480:1966	Flexible steel conduits for electrical wiring	May 2012	(1)
(4)	IS 2667:1988	Fittings for rigid steel conduits for electrical wiring (first revision) [Superseded by IS 14768 (Part 2): 2003]	February 2008	
(5)	IS 3837:1976	Accessories for rigid steel conduits for electrical wiring (first revision)	May 2012	(1)
(6)	IS 9537 (Part 4):1983	Conduits for electrical installations: Part 4 Pliable self-recovering conduits of insulating materials	May 2012	
(7)	IS 9537 (Part 5): 2000/ IEC 60614-2-3 (1990)	Conduits for a electrical installations: Part 5 Pliable conduits of insulating material [Superseding IS 6946]	June 2010	
(8)	IS 3419:1989	Fittings for rigid non-metallic conduits (second revision)	May 2012	
(9)	IS 14772:2000/ IEC 60670-1 (1989)	Enclosures for accessories for household and similar fixed electrical installations [Superseding IS 5133 (Part 1 and 2)]	May 2010	
(10)	IS 2412:1975	Link clips for electrical wiring (first revision)	May 2012	(2)
(11)	IS 371:1999	Ceiling roses (third revision)	March 2010	(4)
(12)	IS 3854:1997/ IEC 60669-1 (1998)	Switches for domestic and similar purposes (second revision)	July 2012	(6)
(13)	IS 4615:1968	Switch-socket outlets (non-interlocking type) (Withdrawn)		
(14)	IS 4160:2005/ IEC 60884-2-6 (1997)	Interlocking switch socket outlets - Specification (first revision)	June 2010	
(15)	IS 1293:2005/ IEC 60884-1 (2002)	Plugs and socket outlets of rated voltage upto and including 250 volts and rated current upto and including 16 amperes - Specification (third revision)	June 2010	(5)
<b>ELECTRICAL LAMPS AND THEIR AUXILIARIES</b>				
(1)	IS 418:2004/ IEC 60064 (1993)	Tungsten filament lamps for domestic and similar general lighting purposes (fourth revision)	March 2009	(4)
(2)	IS 2418 (Part 1): 1977/ IEC 81 (1974)	Tubular fluorescent lamps for general lighting service: Part 1 Requirements and tests (first revision)	December 2010	(8)
(3)	IS 9900 (Part 1):1981 / IEC 188 (1974)	High pressure mercury vapour lamps: Part 1 Requirements and test [Superseding IS 2183 and IS 7023]	October 2012	(4)

(4)	IS 9974 (Part 1): 1981/ IEC 662 (1980)	High pressure sodium vapour lamps : Part 1 General requirements and tests	October 2012	(4)
(5)	IS 1258:2005/ IEC 61184 (1997)	Bayonet lamp holders (fourth revision)	June 2010	(3)
(6)	IS 3323:1980/ IEC 60400 (1972)	Bi-pin lamp holders for tubular fluorescent lamps (first revision)	October 2012	(1)
(7)	IS 3324:1982/ IEC 400 (1972)	Holders for starters for tubular fluorescent lamps (first revision)	June 2008	
(8)	IS 2215:2006/ IEC 60155 (1993)	Starters for fluorescent lamps (third revision)	Jun 2010	
(9)	IS 1534 (Part 1):1977 / IEC 82 (1973)	Ballasts for fluorescent lamps: Part 1 For switch start circuits (second revision)	July 2011	(5)
(10)	IS 1569:1976/ IEC 566	Capacitors for use in tubular fluorescent	July 2011	(1)
(11)	IS 6616:1982/ IEC 262 (1969)	Ballasts for high pressure mercury vapour Lamps (first revision)	July 2011	(1)
<b>LIGHT FITTINGS AND LUMINAIRES</b>				
(1)	IS 1913 (Part 1):1978	General and safety requirements for luminaires: Part 1 Tubular fluorescent lamps (second revision)		
(2)	*IS 10322 (Part1) :1982 / IEC 598 - 1(1979)	Luminaires: Part 1 General requirements	May 2010	
(3)	IS 10322 (Part 2):1982 / IEC 598 - 1(1979)	Luminaires: Part 2 Constructional Requirements	May 2010	
(4)	IS 10322 (Part 5/ Sec. 2):2012	Luminaires: Part 5 Particular requirements, Sec 2 Recessed luminaires (First Revision)	March 2012	
(5)	IS 10322 (Part 5/ Sec. 3):2012/ IEC 60598-2-3 (1979)	Luminaires: Part 5 Particular requirements, Sec 3 Luminaires for road and street lighting (First revision)	March 2012	
(6)	IS 10322 (Part 5/ Sec 4):1987/ IEC 60598-2-4 (1979)	Luminaires: Part 5 Particular requirements, Section 4 Portable general purpose	May 2010	1
(7)	IS 10322 (Part 5/ Sec 5):1987/ IEC 60598-2-5	Luminaires: Part 5 Particular requirements, Section 5 Flood lights [superseding IS 1947]	May 2010	(1)
(8)	IS 3287:1965	Industrial lighting fittings with plastic reflectors		
(9)	IS 1777:1978	Industrial luminaires with metal reflectors (first revision)		
(10)	IS 2206 (Part 1):1984	Flameproof electric lighting fittings: Part 1 Well-glass and bulkhead types (first revision)		
(11)	IS 3528:1966	Waterproof electric lighting fittings	May 2010	

(12)	IS 3553:1966	Watertight electric lighting fittings	May 2010	
(13)	IS 8030:1976/ IEC 162 (1972)	Luminaires for hospitals	March 2008	
(14)	IS 7537:1974	Road traffic signals	March 2008	
(15)	IS 9583:1981/ IEC 598-2-22 (1980)	Emergency lighting units	March 2008	
<b>ELECTRICAL APPLIANCES</b>				
(1)	IS 302 (Part 1): 2008/ IEC 60335-1 (2006)	Safety of household and similar electrical appliances: Part 1 General requirements (sixth revision)		(1)
(2)	IS 2268:1994	Electric call bells and buzzers for indoor use (second revision)	March 2009	
(3)	IS 3412:1994	Electric water boilers (second revision)	March 2009	
<b>ELECTRICAL INSTRUMENTS</b>				
(1)	IS 6236:1971/ IEC 60258 (1968)	Direct recording electrical measuring Instruments	January 2010	
(2)	IS 1248 (Part 1): 2003/ IEC 600 51-1 (1997)	Direct acting indicating analogue electrical measuring instruments and their accessories: Part 1 General requirements (fourth revision)	Sep 2008	
(3)	IS 1248 (Part 2): 2003/ IEC 600 51-2 (1984)	Direct acting indicating analogue electrical measuring instruments and their accessories: Part 2 Ammeters and voltmeters (third revision)	Aug 2008	
(4)	IS 1248 (Part 3): 2003/ IEC 600 51-3 (1984)	Direct acting indicating analogue electrical measuring instruments and their accessories: Part 3 Wattmeters and varmeters (third revision)	Aug 2012	
(5)	IS 1248 (Part 4): 2003/ IEC 600 51-4 (1984)	Direct acting indicating analogue electrical measuring instruments and their accessories: Part 4 Frequency meters (third revision)	Aug 2008	
(6)	IS 1248 (Part 5): 2003/ IEC 600 51-5 (1984)	Direct acting indicating analogue electrical measuring instruments and their accessories: Part 5 Phase meters, power factor meters and synchroscope (third revision)	Aug 2008	
(7)	IS 722 (Part 1):1998	AC electricity meters : General requirement and tests		
(8)	IS 722 (Part 2):1977	AC electricity meters: Part 2 Single-phase whole-current watt-hour meters, Class 2 (first revision)		
(9)	IS 722 (Part 3):1988	AC electricity meters: Part 3 Three-phase whole current and transformer operated and single-phase transformer operated watt-hour meters, class 2 (second revision)		
(10)	IS 722 (Part 5):1980	AC electricity meters: Part 5 Volt-ampere hour meters for restricted power factor range, class 3.5 (first revision)		
(11)	IS 722 (Part 7/Sec 1): 1987	AC electricity meters: Part 7 Volt-ampere hour meters for full power factor range, Section 1 General requirements (first revision)		
(12)	IS 722 (Part 8):1972	AC electricity meters: Part 8 Single-phase 2-wire whole current watt-hour meter (class 1.0)		



(13)	IS 722 (Part 9):1972	AC electricity meters: Part 9 Three-phase whole current and transformer operated watt-hour meters and single- phase two-wire transformer operated watt-hour meters (class 1.0)		
(14)	IS 8530: 1977 IEC 60211:1966	Maximum demand indicators (class 1)		
(15)	*IS 2992:1987	Insulation resistance testers, hand operated (magneto generator type) (second revision)	Jan 2010	
<b>INSTRUMENT TRANSFORMERS</b>				
(1)	IS 2705 (Part 1): 1992/ IEC 60185 (1966)	Current transformers: Part 1 General requirements (second revision)	Aug 2012	(1)
(2)	IS 2705 (Part 2): 1992/ IEC 60185 (1966)	Current transformers: Part 2 Measuring current transformers (second revision)	Aug 2012	
(3)	IS 2705 (Part 3): 1992/ IEC 60185 (1966)	Current transformers: Part 3 Protective current transformers (second revision)	Aug 2012	
(4)	IS 2705 (Part 4): 1992/ IEC 60185 (1966)	Current transformers: Part 4 Protective current transformers for special purpose applications (second revision)	Aug 2012	
(5)	IS 6949:1973	Summation current transformers	Sep 2011	
<b>FUSES</b>				
(1)	IS 9224 (Part 1):1979	Low voltage fuses: Part 1 General requirements [superseded by IS 13703 (Part 1):1993]		
(2)	IS 9224 (Part 2):1979	Low voltage fuses: Part 2 Supplementary requirements for fuses for industrial applications (superseding IS 2208) [superseded by IS 13703 (part 2/Section 1):1993]		
(3)	IS 2086:1993	Carriers and bases used in rewirable type electric fuses for voltages upto 650 V (third revision) [Superseding IS 8724]	Mar 2009	(1)
(4)	IS 9926:1981	Fuse wires used in rewirable type electric fuses upto 650 volts	Mar 2011	
(5)	IS 8187:1976/ IEC 269-3 (1973)	D-type fuses		
<b>MISCELLANEOUS</b>				
(1)	IS 2551:1982	Danger notice plates (first revision)	Mar 2010	
(2)	IS 2448 (Part 1):1963	Adhesive insulating tapes for electrical purposes: Part 1 Tapes with cotton textile substrates	Oct 2010	(5)
<b>ELECTROTECHNICAL VOCABULARY</b>				
(1)	IS 1885 (Part 1):1961	Electrotechnical vocabulary: Part 1 Fundamental Definitions	Jul 2012	(2)
(2)	IS 1885 (Part 9):1992/ IEC 60050 (446):1983	Electrotechnical Vocabulary: Part 9 Electrical relays (second revision)	Jul 2012	
(3)	IS 1885 (Part 11):1966	Electrotechnical vocabulary: Part 11 Electrical Measurements	Jul 2012	
(4)	IS 1885	Electrotechnical vocabulary: Part 16 Lighting, Section	Jul 2012	



	(Part 16/ Sec 1):1968	1 General aspects		
(5)	IS 1885 (Part 16/ Sec. 2):1968	Electrotechnical vocabulary: Part 16 Lighting, Section 2 General illumination, lighting fittings and lighting for traffic and signaling	Jul 2012	
(6)	IS 1885 (Part 16/ Sec. 3):1967	Electrotechnical vocabulary: Part 16 Lighting, Section 3 Lamps and auxiliary apparatus	Jul 2012	
(7)	IS 1885 (Part 17):1979	Electrotechnical vocabulary: Part 17 Switchgear and control gear (first revision)	Jul 2012	
(8)	IS 1885 (Part 32):1993/ IEC 60050 (461):1984	Electrotechnical Vocabulary: Part 32 Electric cables (first revision)	Mar 2009	
<b>SAFETY</b>				
(1)	IS 4770:1991	Rubber Gloves for electrical purposes		
(2)	IS 5424:1969	Rubber mats for electrical purpose (Superseded by IS 15652:2006)	April 2011	(2)

## **CHAPTER- V**

### **FORMS FOR TENDER ETC.**

**Proforma A****LIST OF WORKS COMPLETED IN LAST THREE FINANCIAL YEARS**

SN	Description of work	Organization for whom executed	Approximate value of contract at the time of award.	Date of award	Date of scheduled completion of work	Actual completion	Final value of contract

Signature of the Contractor.

**Proforma B****LIST OF WORKS ON HAND**

SN	Description of work	Contract value	Approximate value of balanced work yet to be done	Date of award

Signature of the Contractor

**FORM 14****उपबंद**

सविंदा करार सं.....तारीख.....यह करार आनुचछेद एक पक्षकार के रूप में.....रेल प्रशासन के माध्यम से कार्यरत भारत के राष्ट्रपति, जिनहे ईस्मे आगे "रेल" कहा गया है, तथा दूसरे पक्षकार के रूप में मेसर्स..... जिनहे इसमें आगे ठेकेदार कहा गया है, के बीच आज तारीख.....को किया गया ।।

ठेकेदारों को इसमें उपापबद्ध अनुसूची में उपवर्णित.....कार्य के निष्पादन के लिए ता.....की मुद्रित/अग्रिम संशोधन पर्ची सं.....संशोधित कार्य पुस्तिका भाग III में और ता..... की मुद्रित/अग्रिम संशोधन पर्ची सं.....तक संशोधित सवाछता संबंधी कार्य पुस्तिका में अंतर्विष्ट मध्य रेल के विनिर्देशों तथा तारीख..... की मुद्रित/अग्रिम संशोधन पर्ची सं ..... तक संशोधित मध्य रेल की दर अनुसूची, भाग I तथा विशेष विनिर्देशों, यदि कोई हो, पर और इससे उपापबद्ध रेखाचित्र के अनुरोध कार्य करो का करार किया है और उक्त का निष्पादन ऐसा कार्य है, जिससे जाता हितबद्ध है।

अब यह विलेख इस बात का साक्षी है की, रेलों द्वारा किए जो वाले संदायों के प्रतिफलस्वरूप, ठेकेदार उक्त अनुसूची में उपवर्णित उक्ता कार्य का सम्यक रूप से निष्पादन करेंगे और उक्ता कार्य मध्य रेल के समाधानप्रद रूप में बहुत तत्परता, सावधानी और सही ढंग से कुशलता से करेंगे तथा तारीख.....को या इससे पहले उक्ता विनिर्देशों और उक्ता रेखाचित्रों तथा सविन्दा की उक्ता शर्तों के अनुसार पूरा करेंगे और उक्ता कार्यों के पूरा होने की प्रामाणिक तारीख से.....कलेंडर मास अवधि के लिए उनका अनुरक्षण करेंगे तथा उसमें उल्लेखित सभी शर्त (जिनहे इस सविन्दा का भाग समझा और मान जाएंगा मानें वे इसमें पूर्णहता उपवर्णित की गई है) को मानेंगे, पूरा करेंगे उनका निर्वाह करेंगे और रेल इसके दुवारा करार करती है की, यदि ठेकेदार उक्ता कार्य का पूर्वोक्त रीति से सम्यक रूप से निष्पादन करेगा उक्ता निर्बंधनों और शर्तों का पाला और विवाह करेगा तो रेल उक्ता कार्यों के अंतिम रूप से पूरा हो जाने पर ठेकेदार को उक्ता कार्यों के संबंध में इससे उपबद्ध अनुसूची में विनिर्दिष्ट दरो पर देय रक्कम का संदाय करेंगी या कराएंगी ।

ठेकेदार.....	पदनाम.....
पता.....	भारत के राष्ट्रपति के लिए
तारीख.....	तारीख.....
ठेकेदार के हस्ताक्षर, साक्षियों के हस्ताक्षर तथा पते	साक्षी
1.....	1.....
2.....	2.....

### **MANDATE FORM FOR EFT/NEFT**

**1. Particulars of the Party.**

- i) Name:- \_\_\_\_\_
- ii) Address:- \_\_\_\_\_
- iii) Phone No.:- \_\_\_\_\_ Mobile No. \_\_\_\_\_  
Fax No:- \_\_\_\_\_
- iv) Income Tax PAN No. \_\_\_\_\_
- v) E Mail ID \_\_\_\_\_

**2. Particulars of Bank Account**

- i) City :- \_\_\_\_\_
- ii) Bank Name: \_\_\_\_\_
- iii) Branch: \_\_\_\_\_
- iv) Bank Address:- \_\_\_\_\_
- v) Bank Tel. No. \_\_\_\_\_ FAX no. \_\_\_\_\_
- vi) Bank MICR Code(9 Digit) \_\_\_\_\_
- vii) Bank IFS Code: \_\_\_\_\_
- viii) Bank Account No. \_\_\_\_\_  
(Please enclose a canceled blank cheque)
- ix) Account type :- (Saving/Current/Cash Credit) \_\_\_\_\_

**3. Certified that the particulars furnished with reference to Bank Account are correct and the bank guarantees to honor all EFT/NEFT advices/reports as per RBI Regulations.**

\_\_\_\_\_  
Bank Seal Signature of the authorized official of the bank

**4. DECLARATION BY THE PARTY**

- i. I hereby declare that the particulars given in this mandate form are correct and complete. If the transaction is delayed or not effected at all for reasons of incomplete or incorrect information, the User institution i.e. FA & CAO/Central Railway Mumbai will not be held responsible.

Date \_\_\_\_\_  
Signature of the party with stamp

**FORM-15**  
**(On Stamp Paper of Requisite Value)**  
**GUARANTEE BOND FOR SECURITY DEPOSIT**

**(TO BE USED BY APPROVED SCHEDULE BANKS/NATIONALISED BANKS)**

1. In consideration of the President of India " hereinafter called "the Government" having agreed to exempt.....(hereinafter called "the said Contractor (s)" from the demand, under the terms and conditions of an Agreement dated.....made between.... and..... for (hereinafter called "the said Agreement") of security deposit for the due fulfillment by the said Contractor (s) of the terms and conditions contented in the said Agreement, on production of a Bank guarantee for Rs.....(Rupees.....only). We,..... (indicate the name of Bank) hereinafter referred to as "the Bank" at the request of..... (Contractor(s) do hereby undertake to pay to the Government an amount not exceeding Rs..... against any loss or damage caused to or suffered or would be caused to or suffered by the Government by reason of any breach by the said Contractor (s) of any of the terms or conditions contained in the said Agreement.
2. We..... (indicate the name of Bank) do hereby undertake to Pay the amount due and payable under this guarantee without any demur, merely on a demand from the Government stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Government by reason of breach by the said Contractor(s) of any of the terms or conditions contained in the said Agreement or by reason of the Contractor (s) failure to perform the said Agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding.....
3. We undertake to pay to the Government any money so demanded notwithstanding any dispute or disputes raised by the Contractor (s)/ supplier (s) in any suit for proceeding pending before any court or Tribunal relating thereto our liability under this present contract being absolute and unequivocal.

The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the Contractor (s)/supplier (s) shall have no claim against us for making such payment.

4. We..... (indicate the name of Bank) further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Government under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till..... office / Department Ministry of.....certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said contractor (s) and accordingly discharges this guarantee. Unless a Demand or claim under this guarantee is made on us in writing on or before the..... (b) we shall be discharged from all liability under this guarantee thereafter.
5. We..... (indicate the name of Bank) further agree with the Government that the Government shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said Contractor (s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said Contractor (s) and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor (s) or for any forbearance, act or omission on the part of the Government or any indulgence by the

Government to the said Contractor (s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor (s)/ Supplier (s).

7. We..... (indicate the name of Bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Government in writing.

Dated : the..... day of.....20

for.....

(indicate the name of Bank)

.....  
(a) The guarantee shall be valid for a period of two months after the expiry of the guarantee period of the equipment.





**FORM-16****STANDING INDEMNITY BOND FOR 'ON ACCOUNT' PAYMENTS****(On paper of requisite stamp value)**

We, M/s..... hereby undertake that we hold at our stores Depot/s at..... for and on behalf of the President of India acting in the premises through the General Manager or his successor of Central Railway (hereinafter referred to as "The Purchaser") all materials for which 'On Account' payments have been made to us against the Contract for supply and erection of (Name of work) \*.on the section/s of Central Railway also referred to as Group/s..... vide letter of Acceptance of Tender No..... dated..... and materials handed over to us by the purchaser for the purpose of execution of the said Contract, until such time the materials are duly erected or otherwise handed over to him.

We shall be entirely responsible for the safe custody and protection of the said materials against all risk till they are duly delivered as erected equipment to the purchaser or as he may direct otherwise and shall indemnify the purchaser against any loss damage or deterioration whatsoever in respect of the said materials while in our possession and against disposal of surplus materials. The said materials shall at all times be open to inspection by any officer authorized by the General Manager incharge of Railway Electrification (whose address will be intimated in due course).

Should any loss, damage or deterioration of materials occur or surplus materials disposed off and refund becomes due, the Purchaser shall be entitled to recover from us the full cost as per prices included in Schedule 3 to the Contract (as applicable) and in respect of other materials as indicated in part I, Chapter- IV, section 1 and also compensation for such loss or damage if any long with the amount to be refunded without prejudice to any other remedies available to him by deduction from any sum due or any sum which at any time hereafter becomes due to us under the said or any other Contract.

Dated this day..... day of..... 20

for and on behalf of

M/s.....(Contractor)

Signature of witness

Name of witness in Block Letters

Address.

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\* Strike out whichever is not applicable

**FORM-19**  
**(On Stamp Paper of Requisite Value)**  
**GUARANTEE BOND AGAINST "ON ACCOUNT" PAYMENTS**

**(TO BE USED BY APPROVED SCHEDULE BANKS/NATIONALISED BANKS)**

1. In consideration of the President of India " hereinafter called "the Government") having agreed to exempt.....(hereinafter called "the said Contractor (s)") from the demand, under the terms and conditions of an Agreement dated.....made between.... and..... for (hereinafter called "the said Agreement") of "On- Account" Payments for the due fulfillment by the said Contractor (s) of the terms and conditions contented in the said Agreement, on production of a Bank guarantee for Rs.....(Rupees.....only).

We,..... (indicate the name of Bank) hereinafter referred to as "the Bank" at the request of..... (Contractor(s) do hereby undertake to pay to the Government an amount not exceeding Rs..... against any loss or damage caused to or suffered or would be caused to or suffered by the Government by reason of any breach by the said Contractor (s) of any of the terms or conditions contained in the said Agreement.

2. We..... do hereby undertake to Pay (indicate the name of the Bank) the amount due and payable under this guarantee without any demur, merely on a demand from the Government stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Government by reason of breach by the said Contractor (s) of any of the terms or conditions contained in the said Agreement or by reason of the Contractor (s) failure to perform the said Agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding.....
3. We undertake to pay to the Government any money so demanded notwithstanding any dispute or disputes raised by the Contractor (s)/ supplier (s) in any suit for proceeding pending before any court or Tribunal relating thereto our liability under this present contract being absolute and unequivocal.

The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the Contractor (s)/supplier(s) shall have no claim against us for making such payment.

4. We..... (indicate the name of Bank) further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Government under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till..... office/ Department Ministry of.....certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said contractor (s) and accordingly discharges this guarantee. Unless a Demand or claim under this guarantee is made on us in writing on or before the..... (b) we shall be discharged from all liability under this guarantee thereafter.
5. We..... (indicate the name of Bank) further agree with the Government that the Government shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said Contractor (s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said Contractor (s) and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such

variation, or extension being granted to the said Contractor (s) or for any forbearance, act or omission on the part of the Government or any indulgence by the Government to the said Contractor (s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor (s)/ Supplier (s).
7. We..... (indicate the name of Bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Government in writing.

Dated : the..... day of..... 20

for.....

(indicate the name of Bank)

1. The guarantee shall be valid for a period of two months after the completion of installation and testing to the satisfaction of Engineer-in-Charge.



**FORM-21****(On Stamp Paper of Requisite Value)****GUARANTEE BOND AGAINST PROVISIONAL ACCEPTANCE PAYMENTS****(TO BE USED BY APPROVED SCHEDULE BANKS/NATIONALISED BANKS)**

1. In consideration of the President of India " hereinafter called "the Government" having agreed to exempt.....(hereinafter called "the said Contractor (s)" from the demand, under the terms and conditions of an Agreement dated.....made between.... and..... for (hereinafter called "the said Agreement") of Provisional Acceptance Payments for the due fulfillment by the said Contractor (s) of the terms and conditions contented in the said Agreement, on production of a Bank guarantee for Rs.....(Rupees.....only). We,..... hereinafter referred to as "the Bank" (indicate the name of Bank) at the request of..... (Contractor(s) do hereby undertake to pay to the Government an amount not exceeding Rs..... against any loss or damage caused to or suffered or would be caused to or suffered by the Government by reason of any breach by the said Contractor (s) of any of the terms or conditions contained in the said Agreement.
2. We..... (indicate the name of the Bank) do hereby undertake to Pay the amount due and payable under this guarantee without any demur, merely on a demand from the Government stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Government by reason of breach by the said Contractor (s) of any of the terms or conditions contained in the said Agreement or by reason of the Contractor (s) failure to perform the said Agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding.....
3. We undertake to pay to the Government any money so demanded notwithstanding any dispute or disputes raised by the Contractor (s), supplier (s) in any suit for proceeding pending before any court or Tribunal relating thereto our liability under this present contract being absolute and unequivocal.  
The payment so made by us under this bond shall be a valid discharge of our liability for payment thereunder and the Contractor (s)/supplier (s) shall have no claim against us for making such payment.
4. We..... (indicate the name of the Bank) further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Government under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till..... office/Department Ministry of.....certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said contractor (s) and accordingly discharges this guarantee. Unless a Demand or claim under this guarantee is made on us in writing on or before the..... (b) we shall be discharged from all liability under this guarantee thereafter.
5. We..... (indicate the name of the Bank) further agree with the Government that the Government shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said Contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said Contractor (s) and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation or extension being granted to the said Contractor (s) or for any forbearance, act or omission on the part of the Government or any indulgence by the Government to the said Contractor (s) or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision, have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor (s)/ Supplier (s).

7. We..... (indicate the name of the Bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Government in writing.

Dated: the..... day of..... 20

for.....

(indicate the name of Bank)

---

(a) The guarantee shall be valid for a period of two months after the completion of work.

## ANNEXURE 'A'

## DECLARATION FORMAT

As per GCC April 2022, Clause No.16 Employment / Partnership etc. of Retired Railway Employees.

Clause	CONDITIONS	WRITE YES/NO WHICH IS APPLICABLE
16 (a)	(i) Should a tenderer be a retired Engineer of the gazetted rank or any other gazetted officer working before his retirement, whether in the executive or administrative capacity or whether holding a pensionable post or not, in the Engineering or any other department of any of the railways owned and administered by the President of India for the time being,	YES/NO In case where such Engineer or officer had not retired from government service at least 1 year prior to the date of submission of the Tender.
	OR (ii) Should a tenderer being partnership firm / joint venture (JV) / registered society / registered trust etc. have as one of its partners a retired Engineer of the gazetted rank or any other gazetted officer working before his retirement,	THEN The tenderer will give full information as to the date of retirement of such Engineer or gazetted officer from the said service and as to whether permission for taking such contract, or if the Contractor be a partnership firm or an incorporated company, to become a partner or director as the case may be, has been obtained by the tenderer or the Engineer or officer, as the case may be from the President of India or any officer, duly authorized by him in this behalf, shall be clearly stated in writing at the time of submitting the tender.
	OR (iii) Should a tenderer being an incorporated company have any such retired Engineer of the gazetted rank or any other gazetted officer working before his retirement as one of its directors	
16 (b)	In case, upon successful award of contract, should a tenderer depute for execution of the works under or to deal matters related with this contract, any retired Engineer of gazette rank or retired gazetted officer working before his retirement in the Engineering or any other department of any of the railways owned and administered by the President of India for the time being, and now in his employment.	YES/NO If yes then the tenderer will ensure that retired Engineer or retired gazetted officer had retired from government service at least 1 year prior to the date of his employment with tenderer and in case he had retired from service within a year then he possesses the requisite permission from the President of India or any officer, duly authorized by him in this behalf, to get associated with the tenderer.
16 (c)	Should a tenderer or Contractor being an individual, have member(s) of his family or in the case of partnership firm/ company / joint venture (JV) / registered society / registered trust etc. one or more of his partner(s) / shareholder(s) or member(s) of the family of partner(s)/shareholder(s)having share of more than 1% in the tendering entity employed in gazetted capacity in the Engineering or any other department of the railway	YES/NO If yes then the tenderer at the time of submission of tender, will inform the Authority inviting tenders the details of such persons.
Note: - If information as required as per 16. a), b), c) above has not been furnished; contract is liable to be dealt in accordance with provision of clause 62 of Standard General Condition of contract.		

Date:  
Place:

Signature  
(Name of contractor/firm)

**Annexure-B****SAMPLE FORMAT OF COMPLETION CERTIFICATE**

<b>SN</b>	<b>Name of Item</b>	<b>Description</b>
1	LOA No. and date	
2	Name of the work	
3	Contract Agreement No. and date	
4	Name of the contractor	
5	Original Agreement Value	
6	Revised Agreement Value, if any	
7	Date of commencement of work	
8	Date of completion of work as per original / revised agreement	
9	Date of actual completion	
10	Cumulative payment made to the contractor up to the Last paid bill	
11	Total Penalty Imposed (If No penalty, please specified as NIL)	
12	Performance of the contractor	

This certificate submitted by the tenderer should be signed by competent authority of the concerned department.

**Annexure –VIA**

Para 5 of the Instructions to Tenderers

**(Bid Security)**

**Bank Guarantee Bond from any scheduled commercial bank of India**  
*(On non-judicial stamp paper, which should be in the name of the Executing Bank).*

**Name of the Bank: -----**

President of India,

Acting through .....,

..... Railway,

Beneficiary: ..... Railway

Date:.....

**Bank Guarantee Bond No.:****Date:-----**

In consideration of the President of India acting through----- (***Designation & address of Contract Signing Authority***), ..... Railway, ....., .... (hereinafter called "The Railway") having invited the bid for \_\_\_\_\_ through Notice inviting tender (NIT) No. \_\_\_\_\_, We have been informed that [***Insert name of the Bidder***]..... (***hereinafter called "the Bidder"***) intends to submit its bid (hereinafter called "the Bid")

WHEREAS, the Bidder is required to furnish Bid Security for the sum of [***Insert required Value of Bid Security***], in the form of Bank Guarantee, according to conditions of Bid.

**AND**

WHEREAS,.....[***Insert Name of the Bank***], with its Branch.....[***Insert Address***] having its Headquarters office at..... [***Insert Address***], hereinafter called the **Bank**, acting through.....[***Insert Name and Designation of the authorised persons of the Bank***], have, at the request of the Bidder, agreed to give guarantee for Bid Security as hereinafter contained, in favour of the Railway:

1. KNOW ALL MEN that by these present that I/We the undersigned [***Insert name(s) of authorized representatives of the Bank***], being fully authorized to sign and incur obligations for and on behalf of the Bank, confirm that the Bank, hereby, unconditionally and irrevocably guarantee to pay to the Railway full amount in the sum of [***Insert required Value of Bid Security***] as above stated.
2. The Bank undertakes to immediately pay on presentation of demand by the Railway any amount up to and including aforementioned full amount without any demur, reservation or recourse. Any such demand made by the Railway on the Bank shall be final, conclusive and binding, absolute and unequivocal on the Bank notwithstanding any disputes raised/ pending before any Court, Tribunal, Arbitration or any Authority or any threatened litigation by the Bidder or Bank.
3. The Bank shall pay the amount as demanded immediately on presentation of the demand by Railway without any reference to the Bidder and without the Railway being required to show grounds or give reasons for its demand of the amount so demanded.
4. The guarantee hereinbefore shall not be affected by any change in the constitution of the Bank or in the constitution of the Bidder.
5. The Bank agrees that no change, addition, modifications to the terms of the Bid document or to any documents, which have been or may be made between the Railway and the Bidder, will in any way absolve the Bank from the liability under this guarantee; and the Bank, hereby, waives any requirement for notice of any such change, addition or modification made by Railway at any time.
6. This guarantee will remain valid and effective from.....[***insert date of issue***]till .....[***insert date, which should be minimum 90 days beyond the expiry of validity of Bid***]. Any demand in respect of this Guarantee should reach the Bank within the validity period of Bid Security.



7. The Bank Guarantee is unconditional and irrevocable.
8. The expressions Bank and Railway herein before used shall include their respective successors and assigns.
9. The Bank hereby undertakes not to revoke the guarantee during its currency, except with the previous consent in writing of the Railway. This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No.758.
10. The Bank hereby confirms that it is on the SFMS (Structured Financial Messaging System) and shall invariably send the advice of this Bank Guarantee to the following bank details –

IFSC CODE	SBIN00RAIL
IFSC TYPE	BRANCH
BANK NAME	STATE BANK OF INDIA
BRANCH NAME	RAIL
CITY NAME	NAVI MUMBAI
ADDRESS	SECTOR-11, CBD BELAPUR, NAVI MUMBAI
DISTRICT	NAVI MUMBAI
STATE	MAHARASHTRA
BG ENABLED	YES

11. The Guarantee shall be valid in addition to and without prejudice to any other security Guarantee(s) of Bidder in favour of the Railway. The Bank, under this Guarantee, shall be deemed as Principal Debtor of the Railway.

Date .....

Place.....

.....

Bank's Seal and authorized signature(s)

*[Name in Block letters]* .....

*[Designation with Code No.]*.....

*[P/Attorney]* No.

Witness:

1 Signature, Name & Address & Seal

2 Signature, Name& address & Seal

Bank's Seal

*[P/Attorney]*No.

**Note: All italicized text is for guidance on how to prepare this bank guarantee and shall be deleted from the final document.**

**ANNEXURE-V(A)**

Reference -Para 6.1 of ITT

(This certificate is to be given by attorney/authorized signatory/each member of Partnership firm/Joint Venture (JV)/ Hindu Undivided Family (HUF)/ Limited Liability Partnership (LLP) etc.)

I/We.....(Name), attorney/authorized signatory of the .....(constituent firm / constituent partner) and member/partner of the .....(tendering firm) hereby solemnly affirm and state as under:

1. I/we certify that.....(Constituent firm/constituent partner) is/are not blacklisted or debarred by Railways or any other Ministry/ Department of Govt. of India from participation in tender on the date of submission of bids, either in individual capacity or as a HUF/ member of the partnership firm LLP/JV/Society/Trust.
2. I/We have read the clause regarding restriction on procurement from a bidder of a country which shares a land border with India and certify that I am/We are not from such a country or, if from such a country, have been registered with the competent Authority. I/We hereby certify that I/we fulfil all the requirements in this regard and am/are eligible to be considered (evidence of valid registration by the competent authority is enclosed),

SEAL AND SIGNATURE  
OF THE CONSTITUENT FIRM/CONSTITUENT PARTNER

Place :

Dated :

-----End of the document---