

SOUTH WESTERN RAILWAYS

Annexure _B

ELECTRICAL (GS) BRANCH

MYSURU DIVISION

TENDER DOCUMENT

Name of the work: Chikjajur - Construction of new AC loco trip shed at Chikjajur (JRU).

Electrical (GS) Scope of Work:

- Excavation of cable trench for cable laying.
- Laying of LTUG cables & HDPE pipes.
- Platform surface/concrete cutting for excavation of cable trench.
- Excavation of cable trench below the Rail track/road crossing.
- Supply and fixing of GI pipe.
- Wiring for circuit / sub main / point wiring.
- Supply and provision of modular 6 A / 16 /20 A switches and sockets.
- Supply, fixing, testing and commissioning of BLDC ventilating fans.
- Freight, fixing, testing and commissioning of LED light fittings/street lights/BLDC Ceiling fans.
- Design Fabrication supply, fixing testing and commissioning of L.T control panel / distribution boards.
- Provision of LT earthing arrangements.
- Supply, installation, testing and commissioning of 62.5 KVA Diesel Generating set.

Definition for similar nature of work:

SN	Name of the work description / Activity	Definition of Similar Nature of Work
1	<p>LT works (low and medium voltage to 650 volts) Such as</p> <ul style="list-style-type: none"> i) Wiring works in service buildings quarters, Stations, Hospitals. ii) RA lighting. iii) Cat Walk lighting. iv) Waist level lighting works. v) Lighting arrangements of portals. vi) Tunnel lighting. vii) Pre-Cooling arrangements for AC coaches. viii) Battery charging works. ix) Cable trays. x) Bus bar trunking system works. xi) Lighting Arrangements in circulating areas Yards, colonies, streetlights. xii) Facade lighting. xiii) Supply and erection of High mast lighting. xiv) Glow signage boards with any type of lighting system for indoor/outdoor applications with control and protection arrangements. xv) LED lighting of service buildings xvi) LED lighting for stations. xvii) LED lighting in yards. xviii) Earthing arrangements. xix) Maintenance contracts of any LT asset in. <ul style="list-style-type: none"> a. Quarters. b. Service buildings. c. Stations xx) Cable laying xxi) Erection of overhead lines. i) LT power line crossings 	<p>Works of wiring/cabling or installation and commissioning of electrical items (other than on coaches) such as lights, fans, pumps, charging arrangements. earthing etc, with or without supply of items / equipment's for 230volts 1phase or 415V, 3phase system or higher voltages.</p>

➤ **Executive in charge:**

- Senior Divisional Electrical Engineer/General/Mysore (Sr.DEE/G/MYS).

➤ **Locations for Execution of work: At Chikkajajur (JRU) Railway station premises.**

- The contractor has to make his own arrangements for transportation of men & materials at site. Contractor is advised to visit the sites to have information about the scope of the work to be executed before submitting the offer.

SPECIAL CONDITIONS

1. GENERAL REQUIREMENTS:

- The work to be governed by this contract shall cover designing, manufacturing, transporting till site, safe custody at site, insurance, erection, and commissioning of equipment's as detailed in the scope of Work of tender documents. All the materials and workmanship shall strictly conform to the provision of this specification primarily and to the related Indian Standard Specification and code of practice mentioned in the specifications.
- All the materials brought to site for use on this work shall be new of the best quality of approved makes/manufacture as per list of approved makes of equipment's/materials enclosed as Schedule and conforming to the relevant BIS specifications.
- All the cable routes, locations of relevant items of work shall be first shown in drawing and marked at site and approval of the Engineer-in-charge obtained for the same before starting the work. Such drawings shall be based on the drawings issued and further based on the changes made at site by the Engineer-in-charge through instructions to the site representative of the contractor.
- The rates quoted for the relevant items of work shall include the cost of materials and equipment's, their accessories, fixing labour, together with the cost of providing the necessary tools and tackles etc., so as to ensure that the work carried out forms a complete installation to the satisfaction of the Engineer-in-charge.
- Any deviation from the specifications shall be clearly brought out in the offer along with the reasons for such deviations. If, no such deviations are brought out in the offer, it will be deemed that the tenderer has fully understood the requirements of the tender and no extra cost will be paid under any circumstances for carrying out the works under this tender in accordance with the interpretations of the Engineer- in-charge.
- The rates quoted shall also include the cost of any civil works connected with the relevant items of works.
- The rates quoted shall also provide for handing over the necessary completion drawings together with the test results of commissioning tests carried out by the contractor, in accordance with BIS before the installation is handed over to the Railways.
- The contractor is bound by the opinion of the Engineer-in-charge in accepting whether the work is carried out in accordance with the provisions of these

specifications or not and shall take steps to rectify or replace such parts of the materials and installations as in the opinion of the Engineer-in-charge which are unsatisfactory in relation to this specifications.

2. STANDARDS FOR EQUIPMENTS AND WORKMANSHIP:

- The materials and equipment's to be supplied and installed under this contract shall conform to the requirements of these specifications.
- In further support of what is contained in this specifications, the materials and equipment's as well as workmanship shall satisfy the requirements.
- All the materials and equipment's shall conform to the Standards not less than those stipulated under the current Indian Standard Specifications.
- For such of the materials and methods of construction for which BIS have not been published, British Standards shall be followed subject to the approval of the Engineer- in-charge.
- In addition to the above, the equipment and workmanship shall satisfy the requirements of the following:-
 - Method of construction approved by the Electrical Inspectorate.
 - Indian Electricity Acts and Rules.
 - Fire Insurance Regulations.
 - I.E.E. wiring regulations.
 - Instructions of the Engineer-in-charge based on the site conditions and revised requirements, if any.

3. CONTRACTOR'S ELECTRICAL LICENCE:

The work shall be carried out only by a Tenderer/Contractor holding a **valid Class-I or above Electrical license** only issued by any state Government for carrying out the installation work of the voltage classes involved, under the direct supervision of the persons holding valid certificates of competency for the same voltage classes issued or recognized by the State Government. The tenderer should furnish with his tender offer the particulars of the license held by him. The successful tenderer shall furnish the names and particulars of certificates of competency of the supervisors and workmen to be engaged for carrying out this work.

NOTE:

- All safety precautions are to be ensured by the contractor while execution of work and no work has to be carried without the permission of Engineer in charge. Also, the execution of work should not infringe the train moving dimension as per permanent way manual nor affect the train traffic in any way. Contractor shall request for line/ power block wherever required through engineer in charge for carrying out the works. The Railway will arrange for necessary Line/Power block for

execution of the work at specified timings as per request of the contractor.

- **After receipt of LOA / Agreement, any correspondence related to contract work, contractor has to make “through designated Supervisor in charge of the work only”.**
- **Any correspondence with combination of 02 or more tenders in single letter head is not acceptable and advised to made separate correspondence for each tender/Agreement work separately.**

Inspection:

- a. The inspection of schedule item costing **5 Lakhs and above** shall be done by RDSO/ RITES/ Any other agency at manufacturer's premises before dispatch of material.
- b. The inspection of material shall include type test, routine test, stage test and acceptance test whichever applicable.
- c. The inspection procedure shall be approved by Railway. No materials shall be dispatched from the manufacturer's factory or assembling unit prior to inspection and/or without approval of Railway.
- d. For the inspections at out stations, the contractor shall give at least two weeks' notice to the engineer to enable him to arrange necessary inspection. All the cost for the inspection shall be borne by the contractor.**
- e. If any material found, notwithstanding any approval, the material non-conformance to technical specification, specified performance & reliability and quality standard shall be rejected during inspections.
- f. The rejected material shall be marked with “rejection mark” for identification. The contractor shall take immediate action to replace the rejected material. All the cost regarding replacement shall be borne by the contractor.
- g. The rejected material shall be lying at the risk & account of the contractor. Railway shall also be entitled to recover from the contractor the handling and ground rent/demurrage and any other charges for the period the rejected stores are not removed within justifiable period. Railway shall also have the right to dispose of such stores, as deemed fit, at the contractor's risk and account if contractor failed to remove the rejected material.
- h. The decision of the Engineer with regards the inspection & rejection shall be final and binding on the contractor.

Inspection of Works:

- a) The inspection of works shall be done by Engineer/ Engineer's Representative at site

during execution of work. The inspection of works shall include stage inspections, inspection for testing & commissioning etc. The inspection procedure/ inspection forms shall be approved by Railway.

- b) Not withstanding any approval, the work non-conformance to the technical specification, specified performance, reliability and quality standard shall be rejected during inspections. The contractor shall take immediate action to correct the non-conformity in the work. All the cost regarding this shall be borne by the contractor.
- c) The contractor has to arrange the Road Vehicle whenever required to the use of the Railway Officials for inspection of works as per site requirement. No separate payment will be made for this.

PRICE AND PAYMENT

The terms and conditions of payments for the various items of work to be executed under this contract shall be as follows:

➤ **PRICES:**

Prices shall be quoted as per details shown in Schedule of work. The prices quoted shall be firm and not subject to variations for any reasons whatsoever. The prices quoted shall be NET including all taxes and duties etc.

➤ **PAYMENT:**

The contractor shall be entitled to be paid from time to time by way of **"On Account Payment"** for such item of work carried out at site provided such scheduled work completed in all respects to the satisfaction of the Engineer in charge of the Work.

The bills for payment will be processed after submission of the followings.

Check list for submission of document for claiming CC bills for payment:

- a. Engineer-in-Charge of the works has to obtain Material Approval from competent authority on request of contractor duly mentioning make & model and same has to be submitted along with warranty certificate & measuring book in original to this office bill preparing section, before processing of CC bill.
- b. All electrical points to be provided during wiring as per existing guidelines of Railway board. If any additional points to be required as per site condition prior approval of competent authority is required.
- c. CC bill shall be prepared after submission of Inspection/test certificates, warranty if any.

- d. **Before supply of schedule item costing Rs.5 lakhs or above RDSO/RITES inspection should be conducted as per extant rules/guidelines. Inspection certificate should be submitted to this office in original along with test certificates duly obtaining of approval from competent authority.**
- e. **For the inspections at out stations, the contractor shall give at least two weeks' notice to the engineer to enable him to arrange necessary inspection. All the cost for the inspection shall be borne by the contractor.**
- f. **As per RB Ltr No C-22011/1/2021-DIR-TELE Date: 24.05.2024 and HQ/SWR Letter No: SG/SWR/OFC/Cut Damage E3:4, Dated: 14/08/2024, implementation of mobile application "Call Before U Dig (CBuD)" is made available for all concerned supervisors (SSE's & JE's) over Indian Railways to co-ordinate for excavation/digging activities and for safeguarding underground cables during work.**
- **Penalty to be levied for damages to the Railway Cables during work execution as per the "Joint Procedure Order" of Railway Board Ltr No. 2021/Tele/5(2)/3-Part(1)(3425647) Dt: 12.06.2023 and Sr.DSTE/MYS Ltr No.Y/SG.209/JPO Dt: 30.03.2024 (Attached).**

Cable Damaged	Penalty per Location
Only Quad cable or Signaling cable	₹ 1.0 lakh
Only OFC	₹ 1.25 lakh
Both OFC & Quad	₹ 1.5 lakh
Electrical Cable	₹ 1.0 lakh

- **DEDUCTION OF INCOME TAX AT SOURCE:** In terms of new section 194-C inserted by the Finance Act, 1972 in the Income tax Act, 1961 the Railway shall at the time of arranging payments to the contractor and/or subcontractor (in the case of subcontractor only when the Railway is responsible for payment of consideration to him under the contract) for carrying out any work (including supply of labour for carrying out any work) under the contract, be entitled to deduct income tax at source on income comprised in the sum of such payments. The deductions towards Income tax to be made at source from the payments, due to non-residents shall continue to be governed by section 195 of the Income tax act 1961.
- **GST CLAUSE:** During submission of offer, the contractor has to quote the rate inclusive of GST. The contractor has to produce the invoice while submitting the running bill.

(i) Tenders will examine the various provisions of the central goods and service 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 (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 And shall submit GSTIN along with other details required under CGST/IGST/UTGST/SGST Act 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 At the railway shall deduct the applicable GST from his/their bills under reverse charge mechanism (RCM) and deposit the same to the concerned authority.

NOTE : Materials to be supplied by Railways if any, shall be collected by the contractor from SSE/E/W/MYS stores on free of cost & transported to site on his own cost duly giving a requisition letter to Supervisor in Charge of the work.

- **Rates for Items of Works:** However, if rates of existing GST or cess on GST for Works Contract is increased or any new tax /cess on Works Contract is imposed by Statute after the date of opening of tender but within the original date of completion/date of completion extended under clause 17 & 17A and the Contractor thereupon properly pays such taxes/cess, the Contractor shall be reimbursed the amount so paid.

Further, if rates of existing GST or cess on GST for Works Contract is decreased or any tax/cess on Works Contract is decreased / removed by Statute after the date of opening of tender, the reduction in tax amount shall be recovered from Contractor's bills/Security Deposit or any other dues of Contractor with the Government of India.

➤ **RECOVERY OF CONSERVANCY CHARGES:**

As per the Railway Board's instruction, the conservancy charges to be recovered from the contractor bills as per the prescribed rates as mentioned below:

	DESCRIPTION	Average No. of labourer/ Work-man employed per day.	Conservancy Cess charges to be recovered ed (Per Month)

	Railway contractors :		
A	Engg. Works contractors (Engg. Electrical, Mechanical, Signal, etc.,)	01 to 05 06 to 10 11 to 25	Rs. 159/- Rs. 312/- Rs. 785/-
B	General Goods handling contractors including contracts awarded by	26 to 50 51 to 100 101 to 200	Rs. 1143/- Rs.
C	Stores deptt. Coal handling ash pit cleaning	201 to 300 301 to 750	1534/- Rs.
D	contractors. Rly. Siding used by the	751 to 1500 1501 to 3000	1926/- Rs.
E	contractors. Contractor supplying water to engines.	3001 and above	2318/- Rs.2676/- Rs.5382/- Rs.10768/ - Rs.21508/ -

Check List For Upload/Submission for the contract work:

A	List of uploads/submission for participating in the tender (Whichever is applicable for this tender work).
	a) Up to 50 Lakhs:
1	Minimum class - I electrical license.
2	GSTIN.
3	Annexure (V) as per tender document.
	b) Above 50 Lakhs:
1	Minimum class - I electrical license.
2	Annexure (V) as per tender document.
3	GSTIN.
4	Annexure (VI) (B).
5	Financial eligibility criteria - "The tenderer must have minimum average annual contractual turnover of V/N or 'V' whichever is less; where V= Advertised value of the tender in crores of Rupees, N= Number of years prescribed for completion of work for which bids have been invited. The average annual contractual turnover shall be calculated as an average of "total contractual payments" in the previous three financial years, as per the audited balance sheet. However, in case balance sheet of the previous year is yet to be prepared/ audited, the audited balance sheet of the fourth previous year shall be considered for calculating average annual contractual turnover. The tenderers shall submit requisite information as per Annexure-VIB, along with copies of Audited Balance

	Sheets duly certified by the Chartered Accountant /Certificate from Chartered Accountant duly supported by Audited Balance Sheet. "
6	Technical eligibility criteria - "The tenderer must have successfully completed or substantially completed any one of the following categories of work(s) during last 07 (seven) years, ending last day of month previous to the one in which tender is invited: (i) Three similar works each costing not less than the amount equal to 30% of advertised value of the tender, or (ii) Two similar works each costing not less than the amount equal to 40% of advertised value of the tender, or (iii) One similar work costing not less than the amount equal to 60% of advertised value of the tender."
B	During work Execution and after completion of the work: The following items to be ensured and certified by concern SSE electrical in charge as per the HQ/SWR Ltr No. SWR/EL/P-General Policy part 2 (E-file 124476) Dt: 15.04.2024. (Whichever is applicable for this tender work).
1	Every cable/Electrical wire 6 sq. mm or above is to be provided with cable Tags/identifications.
2	The cable Tags/identification at the end connection is to be provided so that they are identified easily behind the lug/terminals.
3	At the beginning and end of cable / exposed portion (BIS: 12949:1990), the cable Tagging/identification will be provided at 3 per 10 metres. The remaining portion cable marker is to be provided at 10-meter intervals.
4	Cable Tags /identification can be PVC ferrule type, printed PVC sticker type protected by transparent self-adhesive tapes, or legibly handwritten paper protected by transparent self-adhesive tapes etc.
5	The cable numbering/coding is to be indicated in the wiring diagram/cable route diagram and the same number code is to be printed on the cable Tags/identifications.
6	Wiring Diagram/cable route diagrams are an essential part and are to be approved by Sr.DEE/G before commencement of work.
7	Cable Tags / Identifiers are different than Cable Route Marker/Indicator. These markers are provided while laying/drawing cable on cable body itself.
C	Uploads/submission while processing the CC bills (Whichever is applicable for this tender work).
1	Test reports/inspection certificates.
2	Drawing approval to be obtained before installation of meter boxes & Distribution boards
3	Material approval for all used items in tender by competent authority.
4	LED light fixtures test reports & warranty certificates (for item costing Rs.5 Lakh & above.).
5	DBR, DBI & PO copy of indented/ supplied items if any.
6	Work completion certificate from Engineer in charge of the work.
7	Consignee/RDSO/RITES inspection certificates for item costing Rs.5 Lakh & above.

8	Technical staff details with supervisor's Degree/Diploma certificates.
9	Proforma for self-certification of local content.

SPECIAL CONDITIONS OF CONTRACT

Conditions covering the contract:

The special conditions of contract contained herein shall supplement to the "General conditions of contract". In the event of any conflict or inconsistency between them, the special conditions of contract contained herewith shall prevail. The technical specifications of contract as incorporated in this contract document and drawings supplied with Tender will form the basis for executing the work. The standard general conditions of the contract for Civil Engineering works of South Western Railway amended up to date will form part of the contract agreement and for all purposes be treated as if the same have been incorporated herein. The contractor can obtain copy of standard General conditions of contract for Civil Engineering works from the Office of Divisional Railway Manager, South Western Railway, Mysuru –570 021 on payment of Rs.40/- plus tax as liable. If there are varying or conflicting provisions in the documents forming part of the contract, the Railway Engineer shall be the deciding authority with regard to the intentions of the provisions and his decision shall be final and binding on the contractor. If the contractor is not satisfied with the decisions of the Engineer at site in respect of the rates for the execution of items of works not included in the accepted schedule of rates of the contract, he may appeal to the Principal Chief Electrical Engineer within 30 days of getting the decision of the Engineer, supported by the analysis of the rates claimed. The Principal Chief Electrical Engineer's decision after hearing both the parties in the matter is final and binding on the contractor and the Railways.

1. Safety Provision of carrying out works:

- i) The contractor shall take all precautionary measures in order to ensure protection of his own personnel moving about or working on the Railway premises and shall have to conform to the rules and regulations of the South Western Railway.
- ii) The works must be carried out carefully in such a way that they do not hinder the railways operation except as agreed to by the Railways.
- iii) The contractors' employees and workers shall not for any reason operate any appliances of Railway installations concerning the safety of train movements, but they should notify to the appropriate railway staff whenever necessary, who will then take necessary steps.
- iv) The Contractor shall abide by the Indian Electricity Act and the Indian Electricity Rules as amended from time to time.
- v) If at any time, the Indian Railways find the safety arrangements inadequate

or insufficient, the contractor shall take immediate corrective action as directed by Railway representative at site.

vi) Necessary personal safety equipment's as considered adequate by the Engineer in charge shall be kept available for the use of the persons employed at the site and maintained in a condition suitable for immediate use and the contractor should take adequate steps to ensure proper use of equipment's by those concerned.

vii) No Electrical apparatus which is liable to be source of danger, shall remain electrically charged.

2. Steps to be taken to avoid damages to Railway Installations:

The contractor shall see that no damages are caused to Railway installations-signaling and transmission, Electrical Cables, wires, station installations, communication lines, electric devices, trains of any kind fencing as well as any rolling stock and in general to all railway installations and equipment's. If any damage is caused to or suffer or any rolling stock and in general to all Railway installations and equipment's or any Railway property or by the consequences of the acts of unlawful omission of the contractor, its employees and workmen or other person connected with it, necessary repairs or replacements shall be effected by the Railways at the risk and cost of the contractor. The expenses shall be recovered from the money due and payable to the contractor or by other appropriate processes.

3. GUARANTEE:

The contractor shall guarantee satisfactory working of the installation erected by him for a period of 01 (one) year beginning from date of issue of completion certificates. During this period, the contractor shall keep all materials, tools and other requisite equipment readily available and shall carryout at his own expense all modification, additions or substitutions that may be considered necessary for satisfactory working of the contracted work or equipment's. Final decision in respect of unsatisfactory working of the contract work or equipment's or faulty use of designs or workmanship etc., shall rest with the Senior Divisional Electrical Engineer, South Western Railway, Mysuru and the same shall be binding on the contractor. During the aforesaid period of Guarantee, the Contractor shall be liable at his own cost for all repairs or replacements of any parts that may be found defective in the contract work or equipment's irrespective of whether any defect arising as a result of faulty design, materials, workmanship, installation or otherwise. Such defective parts if are not repairable at site are to be promptly removed by the contractor for repairs if so required by them and such defective parts should be replaced by them by new ones at their own expenses. In case minor repairs are carried out by the Railway at site, the cost of such repairs plus departmental charges shall be borne by the contractor.

4. NIGHT WORK:

The Contractor shall not carry out any work between sun-set and sun-rise without the previous permission of the Engineer. However, if the Engineer is satisfied that the work is not likely to be completed in time except by resorting to night work, he may order the same without confirming any right on the Contractor for claiming any extra payment for the same.

5. ATTENDING TO DEFECTS:

The contractor shall rectify defects that may arise in the work executed for a period of 01 (one) year after completion of the work (warranty period), such defects being due to bad workmanship on the part of the contractor. Should any dispute arise as to the correctness of the defect pointed out, the engineer's decision in this regard is final and binding.

6. INSURANCE:

The contractor shall take out and keep in force a policy or policies of insurance against all liabilities of the contractor or the railway at common law or under any statute in respect of accident to persons who shall be employed by the contractor, in or about the site or the contractor's Office for the purpose of carrying out the contract works on the site. The contractor shall take about and keep in force a policy or policies of insurance against all recognized risks to their office accommodation and storage for which he is liable. Such insurance shall be in all respects be subject to the approval of the Railway.

7. INSTRUCTIONS:

All the work should be carried out in the presence of authorized Railway representative. All leads lifts and labour charges are to be borne by the contractor. No pass facility will be made available to the contractor/his representative or for his laborers.

8. WARRANTY:

- The contractor shall warrant that everything to be executed under this contract shall be new and free from all defects and faults in materials, design, workmanship and manufacture and shall be of the highest grade and consistent with the established and accepted standards for work of the type contracted for and in full conformity with technical specifications, drawings and other contract stipulations.

- This warranty shall survive inspection of, payment for an acceptance of the work/material but shall expire **01 (One) year** from the date of acceptance of the completed work by the Railway or **a period of 01 year beginning from date of issue of completion certificates** whichever is earlier in case of the whole work of Supply and provision all schedule items/equipment's for the warranty will be 01 year in respect whole works.
- Any approval or acceptance by the Railway at any stage of the work contracted for, shall not, in any way, limit the contractor's liability under this warranty.
- The contractor's liability in respect of any complaint defect or claim shall limited to the execution, installation and erection of replacement parts free of any charges, or the repair of defective parts only to the extent that such replacement or repairs are attributable to or arise from faulty workmanship or design or material in the manufacture of the equipment/stores and/or negligence in any manner and also in the event of failure of the equipment to perform as intended.
- The contractor shall, if a required, replace, repair, execute and/or install the goods or such portion thereof as is rejected by the Railway, the contractor shall pay to the Railway the value thereof and such other expenditure and damage as may arise by reason of the breach of the conditions herein specified.
- All replacement and repairs that the Railway shall call upon the contractor to deliver or perform under this warranty shall be delivered and performed by the contractor within a period of 21 (Twenty one) days promptly from the date of receipt of advice to that effect from the Engineer. In case where such replacement, repair, execution and/or installation takes place during the warranty period, the provision of this warranty clause shall apply to that portion to replace or renew until the expiration of **01 (one) year** from the date of such replacement, repair, execution and/or installation. This extended period shall hereinafter be referred to as "EXTENDED WARRANTY PERIOD".
- If any defect were not remedied satisfactorily within the above mentioned 21 days, the Railway may proceed to do the work at the contractor's risk and cost and also without prejudice to any other rights of the Railway under this contract.
- If the contractor so desire, the replaced parts can be taken over by him or his representative for disposal as he deems fit within a period of 3 (Three) months from the date of replacement of goods/parts. At the expiry of this period, no claim, whatsoever shall lie on the Railway.
- Moreover, the Railway may, at its discretion recover the ground rent for the goods/parts which have been rejected during the warranty period for the

Specified period of 3 (Three) month, if the rejected materials are not taken over within that period 3 (Three) months, by the contractor or his representative.

- The warranty herein contained shall not apply to any material which shall have been repaired or altered by the Railway or on its behalf in any way without the consent of the contractor so as to affect its strength, performance or reliability or to any defects to any part due to misuse, negligence or accident and to items of normal wear and tear to be specifically mentioned by the contractor in his offer and got accepted by the Railway. The decision of the Railway in regard to contractor's liability and the money if any payable, under this warranty shall be final and conclusive.

TECHNICAL SPECIFICATIONS

(To be considered whichever is applicable)

<https://cpwd.gov.in/publication/internal2013.pdf>

➤ **Earthing Arrangements: (as per drawing No. Y/E.61/GL/MYS/11)**

The earthing arrangements shall be provided as per the enclosed drawing with the following:

- a. GI wire of size 6 SWG used from earth electrode.
- b. Earth wires shall be protected against mechanical damage.
- c. There shall be no joints in the earth wire and shall be rigidly connected to the electrode.
- d. The combined earth resistance should not exceed 2 ohms.
- e. The earthing schedule includes supply of all materials, digging of pits providing masonry.
- f. Plinth with cement around the pit painted with black paint all round. All civil works in this connection shall be done by the contractor.
- g. Combined and individual earth values with date has to paint on earth pit.
- h. The earth electrode shall be of 50 mm "C" class GI pipe.
- i. The earth pit can be constructed either by brick masonry or RCC.

(Note: Entire earthing arrangement work including electrode and brick/RCC masonry works should be within earth/ground level only, accordingly Earthing drawing should be read).

➤ **Excavation of cable trench:**

Excavation of cable trench 450 mm wide and 1000 mm deep in all kinds of soil and refilling of the cable trench (after laying of power cable inside HDPE pipe) by excavated soil, free from unwanted materials, ramming,

consolidating and bringing the surface to its original finish.

➤ **Trench for cable underneath the track/road:**

Cables shall be drawn through HDPE pipe. Trench to accommodate HDPE pipe shall be of suitable width and excavated at 1.0 M below the formation level. No sand cushioning and spreading of bricks are required. But once the HDPE pipes of suitable size are laid in the trench, it should be made to its original formation level by filling it up with excavated earth by watering and ramming process and resetting the ballast of track to its original level. Similarly wherever road has been dug for laying the cable the same should be filled, rammed and asphalted and brought to original condition.

The cable raising above ground shall be taken through GI pipe neatly clamped and open end of GI pipe has to be sealed with bitumen compound. The cable has to be laid along the route as per instruction of Supervisor-in-charge.

➤ **Specification for FRLSH / EB FR HR multi stranded PVC insulated & unsheathed copper cables:**

The FRLSH / EB FR HR Multi stranded round flexible copper cable conforming to IS: 694-1990 or its latest editions with bright annealed based copper conductor as per IS: 8130 of 1976 or its latest editions, working voltage 650/ 1100 volts with ISI marked of following size: 1.5 sq.mm, 2.5 sq.mm, 4 sq.mm, 6 sq.mm.

➤ **Specification for multi core PVC insulated flexible copper conductor cables for voltage grade 650/ 1100 volts:**

Multi Core PVC insulated multi stranded PVC insulated and FR PVC round sheathed flexible copper cable of industrial grade conforming to IS: 694-1990 or its latest editions with bright annealed based copper conductor as per IS: 8130 of 1976 or its latest editions, working voltage 1100 volts.

➤ **Specification for single core PVC insulated flexible copper conductor cables for voltage grade 650/ 1100 volts:**

Single Core PVC insulated multi stranded flexible copper cable conforming to IS: 694-1990 or its latest editions with bright annealed based copper conductor as per IS: 8130 of 1976 or its latest editions, working voltage 650/ 1100 volts with ISI marked.

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➤ **Specification for laying of LTUG cables:**

The laying of LTUG Cable includes un-coiling of cable from cable drum, Laying the cable in the trench free from twists, bends, Peeling of Insulation, Dressing at Terminal Ends, Provision of Cable glands, Crimping with suitable shoe, Connection at both ends & Earthing of Armour at both ends.

➤ **General guidelines for PVC conduit wiring:**

- a) Drilling holes in the walls should be done very carefully without causing damage to supporting wall and structure of building. Minor damages caused if any to the plastering on the wall should be repaired by the contractor.
- b) Wall crossings should be through PVC pipe of 25/20 mm dia (2 mm wall thickness).
- c) Looping of neutral is not permitted; a separate neutral wire is to be drawn from the neutral strip connector in Sub circuit board to each point.
- d) The wiring shall conform to latest IS specification (IS-732) and NEC Code for internal wiring in buildings. No joint is permitted in wiring.
- e) The pipes should be fixed on to the walls in exactly horizontal or vertical fashion as required as per site condition and there should not be gap left between the consecutive lengths. The pipes should be fairly tight to facilitate easy removal and replacement of the same for maintenance wherever required.
- f) The Junction Boxes, straight through joints, bends etc., should be provided where ever necessary.
- g) The wires taken inside the pipe shall not be cramped and wires should be easy to pull out at the time of maintenance/checking.

Specifications for BLDC ceiling fan: As per Dy.CEE/G/SWR letter No: SWR/EL/P/S-Description change (E.File: 150666), Dated: 09.09.2025 or latest.

- Energy Efficient Brushless DC Motor (BLDC) Ceiling fan
- Sweep 1200 mm, BEE Rating 5 Star,
- Rated Power: 28 Watts Maximum,
- Operating Voltage: 140 – 290 V single-phase AC,
- Frequency: 48 – 52 Hz, Minimum
- Air Delivery: 210 M3/ Min.,
- Harmonic Distortion: 5 % Max,
- Speed Control: IR Remote.
- Blade thickness: 1.1 MM, Blade material Aluminium,
- Bearing: Double Ball Bearings,
- Down Rod Size (without shackle): 300 mm or as required at site,
- Shank & Shackle Thickness: 2mm (Minimum),
- Canopy: 2 Nos,

- Colour: Standard white
- Warranty: 5 Years.
- Report: The firm has to submit type test report from Government accredited test labs like NABL/CPRI
- Performance test for Air Delivery: as per IS: 374/2019 or latest
- Conforming to: (a) IS 374/2019 or latest, (b) IS 302 (Part 2/Sec 80) for safety requirements.

➤ **Specifications for LTUG XLPE cable:**

- Conformity of the specification for XLPE cable: as per IS:7098 (Part 1): 1988 latest
- Nominal Area of Conductor (in Sq mm):all sizes as per **Annexure - A**
- Number of core (in Nos): 4
- Material of conductor: Aluminium
- Insulation: XLPE
- Colour of XLPE insulation: Red, Yellow, Blue, Black
- Type of cable: Armoured cable
- Material of armouring: Galvanized steel formed wire
- Type of armouring: Single strip.

➤ **Specifications for DG set (62.5 KVA):**

Scope: This specification covers Supply, Installation, Testing and Commissioning of Diesel Generating set of capacity 50 KVA to 750 KVA, 3 phase, 50 Hz. AC at 1500 RPM complete with control panel, associated accessories, tools etc.

Nominal ratings of DG Sets: DG Sets are normally available in following standard capacities:

(Ratings in KVA)

50	62.5	75	82.5	110	125	140	200	225	250	320	350	380	415
450	500	550	600	625	700	750							

Capacity output of DG Set should be specified in tender in terms of "Prime Power Rating at 0.85 load factor" as per Clause 13.3.2 of ISO-8528 (Part-1), titled 'Reciprocating internal combustion engine driven alternating current generating sets: Part-1: Application, ratings and performance'. However, depending upon the particular application & use, 'Continuous' or 'Standby' rating can be specified.

SN	Item	Details
1	Power Generator installation configurations as defined in CPWD General Specifications for Electrical works - Part VII(DG Set)	Fixed (Power Generators are permanently installed)"
2	Nominal Rated Capacity (kVA)	To be specified by Consignee
3	ENGINE	
	The engine shall conform to IS: 10000/ ISO 3046/ BS: 649/ BS 5514 amended up to date.	
3.1	Rated Engine Power (kWm)	110% of the required powered at STP(Standard Temperature Pressure).i.e. equal to {(Nominal Rated Capacity (KVA) of power generator + any Auxiliary power Consumption by the Power generator)} x Power factor(0.8) / Alternator efficiency
3.2	Type of Engine cooling	Liquid Cooled
3.3	Type of governor	Electronic
3.4	Number of cylinders (nos)	To be specified by Consignee
3.5	No of Strokes (nos)	4
3.6	Rated RPM of Engine(RPM)	1500
3.7	Fuel	High Speed Diesel (HSD)
3.8	Overload capacity	Engine is capable of delivering an output of 10% in excess of rated KVA for a period of one hour in any period of 12 hours continuous running
3.9	Specific Fuel Consumption (gm/kWh)	200 to 265
3.10	Starting voltage (volt)	As per clause 9.2
3.11	Salient Features of Engine	Turbo Charged Engine, Direct Injection Fuel System
4	GOVERNING CLASS	
4.1	Class of governor	Capacity of DG set up to and including 200 KVA above 200 KVA Class of governor A2 or A1 or A0 A1 or A0
5	ALTERNATOR	
5.1	Alternator Voltage Rating Conformity to Indian Standard (for Alternator) Generally conforming to IS:13364 (Part-2) latest (Above 20 KVA)	415 Volt
5.2	Rating of AC Generator(KVA)	To be specified by Consignee

Scope: This specification covers Supply, Installation, Testing and Commissioning of Diesel Generating set of capacity 50 KVA to 750 KVA, 3 phase, 50 Hz. AC at 1500 RPM complete with control panel, associated accessories, tools etc.

Nominal ratings of DG Sets: DG Sets are normally available in following standard capacities:

(Ratings in KVA)

50	62.5	75	82.5	110	125	140	200	225	250	320	350	380	415
450	500	550	600	625	700	750							

Capacity output of DG Set should be specified in tender in terms of "Prime Power Rating at 0.85 load factor" as per Clause 13.3.2 of ISO-8528 (Part-1), titled 'Reciprocating internal combustion engine driven alternating current generating sets: Part-1: Application, ratings and performance'. However, depending upon the particular application & use, 'Continuous' or 'Standby' rating can be specified.

SN	Item	Details
1	Power Generator installation configurations as defined in CPWD General Specifications for Electrical works - Part VII(DG Set)	Fixed (Power Generators are permanently installed)"
2	Nominal Rated Capacity (kVA)	To be specified by Consignee
3	ENGINE	
	The engine shall conform to IS: 10000/ ISO 3046/ BS: 649/ BS 5514 amended up to date.	
3.1	Rated Engine Power (kWm)	110% of the required powered at STP(Standard Temperature Pressure)i.e. equal to {(Nominal Rated Capacity (KVA) of power generator + any Auxiliary power Consumption by the Power generator)} x Power factor(0.8) / Alternator efficiency
3.2	Type of Engine cooling	Liquid Cooled
3.3	Type of governor	Electronic
3.4	Number of cylinders (nos)	To be specified by Consignee
3.5	No of Strokes (nos)	4
3.6	Rated RPM of Engine(RPM)	1500
3.7	Fuel	High Speed Diesel (HSD)
3.8	Overload capacity	Engine is capable of delivering an output of 10% in excess of rated KVA for a period of one hour in any period of 12 hours continuous running
3.9	Specific Fuel Consumption (gm/kWh)	200 to 265
3.10	Starting voltage (volt)	As per clause 9.2
3.11	Salient Features of Engine	Turbo Charged Engine, Direct Injection Fuel System
4	GOVERNING CLASS	
4.1	Class of governor	Capacity of DG set up to and including 200 KVA above 200 KVA
		Class of governor A2 or A1 or A0 A1 or A0
5	ALTERNATOR	
5.1	Alternator Voltage Rating Conformity to Indian Standard (for Alternator) Generally conforming to IS:13364 (Part-2) latest (Above 20 KVA)	415 Volt
5.2	Rating of AC Generator(KVA)	To be specified by Consignee

5.3	Power Factor of AC generator	0.8 (minimum)																					
5.4	Efficiency at rated Power factor at full Load	<table> <tr> <th>SN</th><th>Rating</th><th>Efficiency (minimum)</th></tr> <tr> <td>(i)</td><td>50 KVA to 62.5 KVA</td><td>86%</td></tr> <tr> <td>(ii)</td><td>Above 62.5 KVA & upto 250 KVA</td><td>90%</td></tr> <tr> <td>(iii)</td><td>Above 250 KVA</td><td>93.5%</td></tr> </table>	SN	Rating	Efficiency (minimum)	(i)	50 KVA to 62.5 KVA	86%	(ii)	Above 62.5 KVA & upto 250 KVA	90%	(iii)	Above 250 KVA	93.5%									
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(i)	50 KVA to 62.5 KVA	86%																					
(ii)	Above 62.5 KVA & upto 250 KVA	90%																					
(iii)	Above 250 KVA	93.5%																					
5.5	Type of alternator	Brushless																					
5.6	Voltage Regulation Grade	VG 3																					
5.7	Alternator IP Rating	IP 23 or higher																					
5.8	Class of Insulation	H																					
6	CONTROL PANEL																						
6.1	Control Panel	AMF Control Panel																					
6.2	Control Panel Location	Outside the Canopy																					
6.3	IP Rating of Control Panel	IP 53 or higher																					
6.4	Display meters in the control panel (with appropriate rating and accuracy class) – inclusive in the scope of supply	Multifunctional Digital display meter (displaying Voltage, Current, Frequency, Power Factor)																					
6.5	Other devices in the control panel (with appropriate rating) -inclusive in the scope of supply	All equipments for meeting all functional, operational requirement (e.g. switches and cutout, Contactor, Battery charger)																					
6.6	Displayed parameters/Features	Engine Speed, Lube oil pressure, Coolant/cylinder head Temperature, Engine running hours, Engine battery voltage, Engine Running status, Generator Voltage (Ph-Ph), Generator Voltage (Ph-N), Generator Current (R, Y, B), Generator apparent Power (kVA), Generator active Power (kW), Power factor, Frequency, Fuel level, Event log, Control supply Voltage.																					
6.7	Indicators	Low Lube oil pressure, High water / coolant / cylinder head temperature, Low fuel level, Over speed																					
6.8	Audio Alarm	Low Lube oil pressure, High water / coolant / cylinder head temperature, Low fuel level, Over speed																					
7	ACOUSTIC ENCLOSURE																						
7.1	Acoustic Enclosure (inclusive in the scope of supply)	Yes, Power Generator supplied with Acoustic Enclosure																					
7.2	Sheet Thickness (mm)	1.6 (minimum)																					
7.3	Thickness of insulation (mm)	100 (minimum)																					
7.4	Density of insulation (kg/cubic m)	64 (minimum)																					
7.5	Noise level at 1 meter (dB)	75 (max) or latest as per clause 11.7																					
8	Fuel Tank																						
8.1	Fuel Tank Capacity	<table> <tr> <th>SN</th><th>Capacity of DG set</th><th>Minimum Fuel Tank Capacity</th></tr> <tr> <td>(i)</td><td>50 to 62.5 KVA</td><td>120 Litres</td></tr> <tr> <td>(ii)</td><td>Above 62.5 KVA to 125 KVA</td><td>225 Litres</td></tr> <tr> <td>(iii)</td><td>Above 125 KVA to 200 KVA</td><td>285 Litres</td></tr> <tr> <td>(iv)</td><td>Above 200 KVA to 380 KVA</td><td>500 Litres</td></tr> <tr> <td>(v)</td><td>Above 380 KVA to 500 KVA</td><td>700 Litres</td></tr> <tr> <td>(vi)</td><td>Above 500 KVA to 750 KVA</td><td>900 Litres</td></tr> </table>	SN	Capacity of DG set	Minimum Fuel Tank Capacity	(i)	50 to 62.5 KVA	120 Litres	(ii)	Above 62.5 KVA to 125 KVA	225 Litres	(iii)	Above 125 KVA to 200 KVA	285 Litres	(iv)	Above 200 KVA to 380 KVA	500 Litres	(v)	Above 380 KVA to 500 KVA	700 Litres	(vi)	Above 500 KVA to 750 KVA	900 Litres
SN	Capacity of DG set	Minimum Fuel Tank Capacity																					
(i)	50 to 62.5 KVA	120 Litres																					
(ii)	Above 62.5 KVA to 125 KVA	225 Litres																					
(iii)	Above 125 KVA to 200 KVA	285 Litres																					
(iv)	Above 200 KVA to 380 KVA	500 Litres																					
(v)	Above 380 KVA to 500 KVA	700 Litres																					
(vi)	Above 500 KVA to 750 KVA	900 Litres																					
8.2	Number of Fuel tank	1																					
8.3	Fuel Tank Sheet Material Thickness (mm)	2 (minimum)																					
8.4	Fuel Tank Fabricated Material	M.S Sheet																					

BATTERY					
9.1	Battery Type & Specification	"Low Maintenance free to IS: 14257 for high cranking performance"			
9.2	Battery capacity (Ah) & Electrical System (V)	SN	Capacity of DG set	Battery capacity (Ah)	Electrical System (volt)
		(i)	50 to 62.5 KVA	120	12
		(ii)	Above 62.5 KVA upto 82.5 KVA	150	12
		(iii)	Above 82.5 KVA upto 125 KVA	180	12
		(iv)	Above 125 KVA upto 500 KVA	180	12/24
		(v)	Above 500 KVA	360	24
9.3	No of batteries	1 or 2			
10	Salient Features of Power Generator	Glass window on Acoustic Enclosure in front of the Control Panel, Emergency Stop outside the Acoustic Enclosure			
11	General Technical Requirements (GTR) / Commissioning				
11.1	General Technical Requirements (GTR) /Commissioning (Part-1)	Power Generator shall be complete with Diesel Engine, Alternator and AMF Control Panel along with Acoustic Enclosure. Diesel engine and alternator shall be closely coupled or provided with flexible coupling and mounted on a base plate / M.S. frame of robust in construction			
11.2	General Technical Requirements (GTR) /Commissioning (Part-2)	Anti-Vibration mountings shall be provided for complete Power Generator in case of flexible coupling. In case of direct coupling Anti-Vibration mountings shall be provided for the Engine as well as the alternator.			
11.3	General Technical Requirements (GTR) /Commissioning (Part-3)	Power Generator should have protection against under voltage, over voltage, under frequency, over frequency, low battery voltage, over current, earth-fault, short circuit, phase sequence change etc.			
11.4	General Technical Requirements (GTR) /Commissioning (Part-4)	Automatic Mains Failure (AMF) control panel, where applicable, shall be able to start up the Power Generator and transfer the load on to the Power Generator on mains failure without requiring any human intervention. Similarly on restoration of mains supply, it shall be able to transfer the load to mains supply and switch off the Power Generator automatically.			
11.5	General Technical Requirements (GTR) /Commissioning (Part-5)	Control Panel (Manual / AMF), where applicable, shall be equipped with suitable Voltmeter, Ammeter, Frequency meter, power factor meter (these items can be alternatively supplied in one multifunctional digital display meter), battery charger, indicators, various switches and cutout / MCB / MCCB / Contactor / Circuit breaker for the DG output of appropriate rating and accuracy class as per trade practice for better utility.			
11.6	General Technical Requirements (GTR) /Commissioning (Part-6)	Acoustic Enclosure shall be made of Pre-treated and Powder coated CRCA Sheet. The sheet shall be Pre-treated and Powder coated with weather-proof paint. The Acoustic Enclosure shall be vermin proof. The enclosure shall accommodate the (daily service) fuel tank of the Power Generator to make the system compact.			
11.7	General Technical Requirements (GTR) /Commissioning (Part-7)	Power Generators shall meet the requirements of Environmental (Protection) Rules 1986 as laid down by Min. of Environment & Forests read with GSR 371 (E) dated 17.5.2002, GSR 520(E) dated 1.7.2003, No.448 (E) dated 12.07.2004, GSR 771(E) dated 11.12.2013 GSR 232(E) dated 31.03.2014, Gazette Notification No.167 dated 31.03.2014 and Gazette Notification No. 578 dated 11.11.2014 in respect of noise and emission norms. The latest amendments to above GSRs shall be applicable as and when amended by Ministry of Environment and Forest.			
11.8	General Technical Requirements	Standard set of tools consisting of a set of 3 spanners, one screw driver, one standard plier and one nose plier of appropriate size shall be provided			

	/Commissioning (Part-8)	along with each Power Generator.
11.9	General Technical Requirements (GTR) /Commissioning (Part-9)	Supply of Fuel tank of suitable capacity as mentioned in clause 8.1 is inclusive in the scope of supply. Fuel Tank shall be complete with fuel piping (between fuel tank and diesel engine), valves, level indications and all standard accessories. MS pipes, heavy class of suitable dia conforming to IS 1239 (Part-1) - latest shall be used for fuel piping.
11.10	General Technical Requirements (GTR) /Commissioning (Part-10)	Buyer's Responsibilities: i) Mains ACB for AMF operation shall be provided by the buyer for DG set of rating above 600 KVA. For DG set of other ratings seller shall provide mains and DG contactor/breaker, ii) Exhaust piping, extra civil work, distribution board shall be provided by the buyer. iii) Consumables such as filters, lube oil at the time of servicing during warranty period shall be provided by the buyer. iv) Obtaining necessary approvals, if any, is the responsibility of the buyer.
12	SCOPE OF INSTALLATION	
12.1	Installation	with installation - inclusive in the scope of supply
12.2	Scope of installation for Diesel Generating Set when offered by the vendor - inclusive in the scope of supply (Part-1)	a) Installation of Power Generator when offered by the vendor is inclusive in the scope of supply and shall be done by the seller. The installation work of Power Generator and its constituent parts shall be generally conforming to CPWD General Specification for Electrical Works, Part - VII - latest. b) Foundation shall be constructed by the seller. Foundation shall be of PCC type with the ratio of 4:2:1. The length and breadth of the foundation shall be 300 mm more from the respective length and breadth of the Power Generator. The height of the foundation shall be 400 mm, i.e., 200 mm below and 200 mm above the ground level. All the materials /labor required for foundation work shall be supplied by the seller.
12.3	Scope of installation for Diesel Generating Set when offered by the vendor - inclusive in the scope of supply (Part-2)	Supply, laying and termination of interconnecting power and control cable shall be done by the seller. The cable supplied shall be ISI marked heavy duty PVC insulated, armoured cable, with PVC outer Sheath of Type ST-2 (FR Grade, Category C1), with aluminium conductor having insulation of PVC compound type -C, suitable for rated voltage up to and including 1100 volts. and conforming to IS: 1554 (Part-1) latest. For 3-Phase Power Generators, 3.5 core or higher core cables shall be used. Total length of the cable supplied by the seller shall be within 30 meters for each Power Generator with manual control panel and within 60 metres for each Power Generator with AMF control panel.
12.4	Scope of installation for Diesel Generating Set when offered by the vendor - inclusive in the scope of supply (Part-3)	The current rating of the cables shall be as indicated below: 3.5C, 35 Sq mm for Three Phase, 50 KVA 3.5C, 70 Sq mm for Three Phase, 62.5 & 75 KVA 3.5C, 95 Sq mm for Three Phase, 82.5 KVA 3.5C, 120 Sq mm for Three Phase, 110 KVA 3.5C, 185 Sq mm for Three Phase, 125 KVA 3.5C, 300 Sq mm for Three Phase, 140 KVA 3.5C, 2 Run of 120 Sq mm for Three Phase, 180 KVA 3.5C, 2 Run of 150 Sq mm for Three Phase, 200 KVA 3.5C, 2 Run of 185 Sq mm for Three Phase, 225 KVA 3.5C, 2 Run of 240 Sq mm for Three Phase, 250 & 275 KVA 3.5C, 3 Run of 185 Sq mm for Three Phase, 320 KVA 3.5C, 3 Run of 240 Sq mm for Three Phase, 350, 380 & 415 KVA 3.5C, 4 Run of 240 Sq mm for Three Phase, 450, 500, 550, 600, 700 & 750 KVA
12.5	Scope of installation for	i) Construction of suitable earthing station and necessary connections shall be done by the seller. All the materials / labour required for construction of

	Diesel Generating Set when offered by the vendor - inclusive in the scope of supply (Part-4)	earthing station shall be supplied by the seller. The total number of earthing pits/ stations shall be 4, i.e., 2 for neutral and 2 for body-earthing. Copper plate earthing (Neutral Grounding) shall be provided for DG Sets of capacity 500 KVA or above, whereas G.I. plate earthing (Neutral Grounding) shall be provided for DG Sets below 500 KVA capacity. The body earthing shall generally be of G.I. The consignee should choose installation site in such a way that the earthing stations can be made within 10 meters of the Power Generator. Earthing station shall be typically constructed as per prevalent standard practices and shall be generally conforming to CPWD General specification for Electrical Works, Part - VII & Part - I - latest. ii) Installation of Fuel Tank including foundation / stand shall be done by the seller. iii) The warranty is applicable up to specified value of month/hours whichever occurs first.
13	WARRANTY/SERVICES	
13.1	Warranty on Complete power generator/DG Set	24 Months
13.2	Warranty in running hours	5000 hour
13.3	Number of preventive maintenance visits offered in an year during warranty period (Supply of all consumables is the buyer's responsibility)	2
13.4	Response Time to attend he complaint during Warranty	7 days
13.5	Time Duration for Repairing /Replace the defect during Warranty	30 days
14	TEST REPORTS	
14.1	Type of lab which carried out Test of Complete Product to prove the conformity of product as per specification	Certificates required as per CPCB
14.2	Test report Available for (Test/approval)	Type Approval Certificate for the specified rating of the Power Generator from any of the designated agency authorized by CPCB, COP Certificate for engine, Type test report for Alternator as per IS:13364 (Part-1) latest / IS:13364 (Part-2) latest to prove conformity to the specifications.

Following details are to be specified by Consignee:

- (i) **SN 2:-** Nominal Rated Capacity (KVA)
(ii) **SN 3.4:-** Number of cylinders (nos.)

Nominal Rated Capacity (KVA)	Number of cylinders (nos.)
50 kva upto 125 kva	4 or 6 (minimum)
Above 125 kva upto 380 kva	6 or 8 (minimum)
Above 380 kva upto 750 kva	6 or 8 or 10 or 12 (minimum)

- (iii) **SN 5.2:-** Rating of AC Generator (KVA)

Specifications:

GENERAL REQUIREMENTS:

- Any deviation from the specifications shall be clearly brought out in the offer along with the reasons for such deviations. If, no such deviations are brought out in the offer, it will be deemed that the tenderer has fully understood the requirements of the tender and no extra cost will be paid under any circumstances for carrying out the works under this tender in accordance with the interpretations of the Engineer-in-charge.
- The work to be governed by this contract shall cover designing, manufacturing, transporting till site, safe custody at site, insurance, erection, testing and commissioning of electrical items/fittings as detailed in the scope of Work of tender documents. All the materials and workmanship shall strictly conform to the provision of this specification primarily and to the related Indian Standard Specification and code of practice mentioned in the specifications.
- All the materials brought to site for use on this work shall be new of the best quality of approved makes/manufacture as per list of approved makes of equipment's/materials and conforming to the relevant BIS specifications.
- The rates quoted for the relevant items of work shall include the cost of materials and equipment's, their accessories, fixing labour, together with the cost of providing the necessary tools and tackles etc., so as to ensure that the work carried out forms a complete installation to the satisfaction of the Engineer-in-charge.
- The rates quoted shall also include the cost of any civil works with the relevant items of works.
- The rates quoted shall also provide for handing over the necessary completion drawings together with the test results of commissioning tests carried out by the contractor, in accordance with BIS before the installation is handed over to the Railways.
- The contractor is bound by the opinion of the Engineer-in-charge in accepting whether the work is carried out in accordance with the provisions of these specifications or not and shall take steps to rectify or replace such parts of the materials and installations as in the opinion of the Engineer-in-charge which are unsatisfactory in relation to this specifications.

STANDARDS FOR EQUIPMENTS AND WORKMANSHIP:

- The materials and equipment's to be supplied and installed under this contract shall conform to the requirements of these specifications.

- In further support of what is contained in this specifications, the materials and equipment's as well as workmanship shall satisfy the requirements.
- All the materials and equipment's shall conform to the Standards not less than those stipulated under the current Indian Standard Specifications.
- For such of the materials and methods of construction for which BIS have not been published, British Standards shall be followed subject to the approval of the Engineer-in-charge.
- In addition to the above, the equipment and workmanship shall satisfy all the statutory requirements concerned and the requirements of the Railway standards as per the Instructions of the Engineer-in-charge based on the site conditions and revised requirements, if any.

**PROVISIONAL LIST OF APPROVED MAKES
OF ELECTRICAL EQUIPMENTS & COMPONENTS**

The following makes of materials and equipment's shall be used in the work with approval of competent authority. In the event of non-availability of certain items, the approval of the competent authority must be obtained in writing prior to using any substitute make.

Sl.	Name of the item	Makes / Brands / Suppliers
01	MCCBs, MCBs, COS, ACBs, DBs, RCCB, RCBO, SPD's, Fuse/Fuse links, timers & other switchgears.	Legrand, ABB, Indo Asian, Schneider, Havells, L & T, C & S, Siemens, HPL, Mitshubishi
02	All type of LED fittings	Philips, Crompton, Bajaj, Wipro, Havells, Polycab, GM, Halonix, Yamini, Surya, K-lite./Kesslec/ Transrail/Lightman/Bega/Iguzzini
03	LED's	LUMILEDS, Samsung, NICHIA, OSRAM, CREE, Avago
04	FRLSH / E-Beam FR HR Copper wires multi stranded single/multi core PVC insulated un armoured of all sizes.	Polycab, V-Guard, Fincab, Havells, GM, KEI, HPL, SBEE, Nakoda, Torrent, Sudhakar, Finolex, Benlo
05	PVC conduit pipe / casing capping of all sizes.	Sudhakar, Godavari, Astral, GM, Polycab, Sun, National, Modi, precision, universal, VIP

06	Modular box, plate, sockets, switches, etc, GI boxes, modular holder, ceiling roses.	Indo Asian, GM, HPL, Havells, Legrand, L&T, C&S, Anchor roma, Great White, Rider, Bentec/Benlo, Kany, Kolors.
07	BLDC fans with remote/regulator of all types.	Gorilla (Atombarg), Crompton, Bajaj, Havells, Usha, Orient, Polycab, GM, Super fan, Halonix. Almonard.
08	Split AC/ Cassette AC	Blue star, O-General, Hitachi, DAIKIN, Carrier, Toshiba, Voltas, Mitsubishi, LLYOD.
09	HDPE pipes of all sizes.	Nagarjuna, Godavari, Narmada, Sudhakar, Mngalam, Ganga kaveri,
10	HTUG / LTUG XLPE power cables of all ratings.	Polycab, Havells, Toreent, Finecab, Gloster, Nakoda, KEI, SBEE.
11	Termination Kits	Recham, Densen, M-Seal
12	'B' & 'C' class GI pipes, GI plates of all sizes	Jindal, Tata, Oswal, Surya Roshni, APL Apollo, and Hi-Tech Pipes
13	Junction box / Pole mounted junction Boxes, Distribution boxes, Feeder pillar boxes.	Lagrand, Indo Asian, Havells, C&S, L&T, Cape, Sintex, kakatiya
14	Exhaust/Ventilating fan	Indo Asian, Almonard, Bajaj, Crompton, Havells, Usha, Atomberg, Halonix
15	Solar water heating system	Solar idea, Aditya solar, Aar pee technology, Honeywel, Supreeme Andromeda
16	Electric Geyser	Bajaj, CGL, V-Guard, Crompton, Havells
17	Water cooler	M/s. Usha / Blue star / Voltas, Honybee
18	Energy efficient motors / Pump sets	CGL, KSB, Kirloskar, Grundfos, Havells, Shakti, Suguna, V-Guard, KMP.
19	DOL starters with protection system	Schneider Siemens, L&T, Gelco, Gokul, C&S
20	VFDs	ABB, Schneider, Siemens, Danfoss,
21	High mast/Octagonal Pole	CG, Philips, Bajaj, Valmont, Utkarsh, Transrail
22	Computers (Power analyser)	Dell, HP, Lenovo, Acer, and Apple
23	Printers	HP, Cannon, Epson
24	Bolard LED lighting	Havells, Bajaj, CG, Wipro, Philips/ Transrail.
25	Occupancy Sensors	Legrand, L&T, Schneider, Havells
26	Air Circulator	Crompton, Bajaj, Havells, Usha, Orient, Almonard
27	On-line UPS, Inverters	Power One, Delta, Fronius, Uniline, ABB, V-Guard, APC, Hitachi, I-Ball, Microtek, Misthubi

28	RMU & VCB	Lucy, ABB, Siemens, Schneider, CGL
29	Industrial plug socket	Legrand, Havells, L&T, C&S, Cyclo
30	Pit line LED/catwalk LED Lights	Yamini, S2 light, OSSE or reputed make
31	2KVA, 24V DC and 48V AC Power supply unit	Yamini, S2 light, OSSE or reputed make
32	Batteries	EXIDE, Amaron, Luminous, QUANTA
33	Refrigerators	LG, Samsung, Whirlpool, Godreg, Voltas,
34	Decorative pole/ Decorative Bollards	KLITE, KESSLEC, LIGHTMAN, BEGA, IGUZZINI, Bajaj, Philips, CG, Havells, Wipro, Transrail.
35	Façade lights	Bajaj BA WW, CW series, Phillips, Wipro, Polycab, K-lite, Transrail.
36	DMX Controller System	Nicolaudie, Pharos, Osram ECUE, Philips, Transrail.
37	DMX Splitter cum Booster	Pioneer, Briteq, Swisson or equivalent, Transrail.
38	Signage Boards	Yamini, S2 or equivalent
39	LED Name Boards	Yamini, S2 or equivalent
40	Cablofill cable Trays	Legrand, Eaton, Panduit or equivalent
41	DG Set	Kirlosker, Cummins, Honda, Bajaj, Mahindra
42	Hand dryer	Euronics, Dolphy or similar
43	Solar Panels	Sri savitr solar Pvt Ltd, Aksaya Solar power India pvt Ltd, Sirius Solar energy system pvt Ltd, TATA or MNRE approved makes/ ISO 9001:2008 certification.
44	Multi-function meters (MFM)	L&T, C&S, ABB, Siemens, Selec controls, Schneider, Rishab, HPL, Elmeasure, Mecro instruments
45	Submersible pumps, Mono block pumps	Kirlosker, CRI, CG, Texmo, KMP DECCAN, Karvel pumpset.
46	IFDs	L&T, KL itech, Efftronics or similar
47	CTs, PTs	L&T, KL itech, Electrohms, Efftronics or similar
48	Level sensors	Pulsar, Kaifeng Instruments, Efftronics or similar

49	Meter Boxes	Sintex, Hensel
50	Ceiling Rose (Flush type, surface mounting)	Rider, Kany, Kolors, Havells, Anchor, RR Kabel
51	Selector switch	L&T, Salzer, Kaycee, C&S
52	Current transformer	Powermat, Newtek, sresta, kappa
53	Indication Lamps	Powermat, L&T, ABB, Schneider, C&S
54	Air conditioners	LLOYD, LG, Hitachi, Samsung, Blue star, Voltas, Daikin, Panasonic, Godrej, Carrier, Haier
55	Voltage stabilizers	V-guard, Servomax, Microtek
56	Battery chargers	Yamini, Cyco,
57	Bus bar Trunking	C&S, Schinder, Legnrad, L&T
58	Transformers / CSS	ABB, Vision Vidhyut Engineers, Vijay Electric Co, Transgear power systems, Banavathy power systems, Arrivaa power systems and as per latest approved list of ESCOM.
59	FRP type cable Trays	Sintex or any ISI certified
60	FRP Ladders	Sintex or any ISI certified
61	SMC Chequered plates, insulation plates, Safety & Flooring plates	Sintex or any ISI certified
62	FRP fencing	Sintex, Fibrograts, Aeron Composite, , Falcons, KK-FRP or any ISI certified

NOTE:

1. **Contractor may not need to get the material makes approval from the Executive Engineer in charge, if they used from the above list of makes in the contract work.**
2. **But, list of materials and makes to be used in the contract work should be submitted to the Executive Engineer in charge for kind information through the concern Engineer In charge (i.e., SSE/Electrical), before processing the CC bill and the same to be uploaded in the IRWCMS / MB during the CC bill.**
3. **Further, all other materials/makes to be used for the contract work should be of reputed make, ISI certified and best available in the market. In this case contractor should get the material makes approval from the Executive Engineer in charge, before executing the same.**
4. The firm whose products have been certified by Indian Standard Institute and provided with ISI make on their product only to be used for the work ISI

approved certificates should be submitted for such materials.

5. The products of some reputed firms given in the above list can be used in spite of non-awarding of ISI Certificate on them.
6. Acceptance of materials is subject to suitability at site and as approved by the Engineer-in-charge.
7. For all the above mentioned items, one sample may be submitted to Engineer-In –Charge & One set for Approving Authority.
8. These sample should be submitted well in advance, as a whole lot, before the commencement of work.
9. Material approval should be obtained only after issue of LOA and before execution at site.
10. For all other materials covered in the tender, the contractor shall indicate the make proposed to be used and copies of certificates of ISI approval for such materials should be submitted, if available.
11. The samples should be submitted in carton box, duly making necessary identifications on the carton box for having submitted by him.
12. Acceptance of materials is subject to the inspection of Engineer-in-charge of the work.
13. Manufacture's Test Reports/Test Certificates should be submitted to this office for all major plants, equipment and machineries as required by the Engineer in-charge along with the delivery challans before making the final measurement.

➤ **Materials to be supplied by railways:**

- LTUG cable 4 x 120 Sqmm – 500 Mtr
- LTUG cable 4 x 25 Sqmm – 500 Mtr
- HDPE pipe 110 mm dia – 1000 Mtr
- HDPE pipe 50 mm dia – 500 Mtr
- UPS 2 KVA - 4 Nos

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➤ **Materials to be supplied by the contractor:**

Detailed item-wise schedule mentioned in Price Schedule - A.

Procurement of materials to be done as per schedule in consultation with engineer in charge of work only.

Executive in charge: Sr.DEE/G/Mysuru.

Stores depot where materials are to be collected if any: SSE/E/Works/MYS.

Note: Necessary assistance will be extended to the contractor for issue of Railway, material, lifting machinery including FS letter for transporting the Rly items. The contractor should depute his Supervisor in-charge of the work, & sufficient labour along with request letter. The contractor has to make his own arrangements for transportation of collected materials to site.

PROFORMA FOR SELF-CERTIFICATION OF LOCAL CONTENT

I/We (*Name of the bidder*) represented byon the behalf of tenderer hereby certify that the local content, as defined by Public Procurement (Preference to Make in India), Order 2017-Revision dated 19.07.2024 of Department of Promotion of Industry and Internal Trade, Ministry of Commerce and Industry, Govt. of India is (*percentage of local content*).

This qualifies me as a "Class-I local supplier"/"Class-II local supplier" (*please tick whichever is applicable*).

(Note: *For qualification as "Class-I local supplier" the minimum local content should be 50% and for "Class-II local supplier the minimum local content should be 20%*).

Details of the locations at which local value addition is made are as follows:

1. (location name)
2. (location name)
3. (location name)
4. (location name)
5. (location name)

Place:

Date:

Signature of Tenderer with seal

List of rough sketch/drawing supplied by Railways: (If Applicable)

SN	Description	Drawing Reference No
1.	Specification LED light fittings (indoor/outdoor)	SWR/LED light fittings (indoor/outdoor)/001-2016 Dt: 18.04.2016
2.	Earthing Arrangements	Y/E.61/ GL/MYS/11, Dt: 12.06.2006
3.	Tubular Lamp post 6 Mtr long	Y/E.GL/04/55.LC, Dt: 22.09.2004
4.	Specifications for Smart Energy Meters	SWR/EL/T-488/Smart Energy Meters, Dt: 07.01.2019

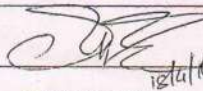
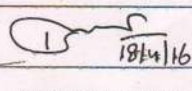
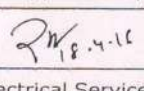
1) Specifications for LED Light fittings:

दक्षिण पश्चिम रेलवे
SOUTH WESTERN RAILWAY
SPECIFICATION FOR LED TYPE (INDOOR/ OUTDOOR) LIGHT FITTINGS

Page 1 of 2	Effective from 18.04.2016	Specification No.: SWR/LED LIGHT FITTING (Indoor /Outdoor) / 001-2016
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1. General requirements of LED Type (INDOOR/ OUTDOOR) Light Fitting

1	LED Make	NICHIA / OSRAM / SEOUL / PHILIPS LUMILEDS / CREE / LEDNIUM / AVAGO
2	Type of LED	High power, SMD (Surface Mounting Device) LED
3	Lumen Output/Efficiency	> 100 Lumens/Watt
4	Lumen Output at fitting level /Efficiency	> 75 Lumens/Watt
5	LED Life	>50,000 burning hours.
6	Depreciation	30% max. After 50,000 burning hours.
7	Color Rendering Index (CRI)	> 75
8	Nominal Voltage	220 V AC
9	Input Operating Voltage	105-295 V AC
10	Power Factor	> 0.9
11	Protections	
	i. Surge protection	1.5 kV for 50 micro seconds
	ii. Over voltage protection	300 V AC for 2 minutes
	iii. High voltage protection	1.72 Kv AC for 1 minute
	iv. Insulation Resistance	Minimum 2 mega ohms with 500 V megger
12	Driver type	Constant Current driver with short circuit protection
13	Driver components	Industrial grade only
14	THD	< 20%
15	Efficiency of Driver Electronic	Efficiency of driver >85%
16	Construction of Housing	Pressure die cast aluminium or CRCA or Extruded aluminium
17	Finishing	Powder coated / anodised
18	Lamp Cover	Toughened glass of min. 0.8 mm thickness of sufficient strength or high transmittance efficiency (min.90%) Acrylic diffuser as per need of fitting.
19	Secondary optics	Polycarbonate reflector / polycarbonate lence
20	Mounting	Indoor : Suitable for Surface / Recessed / Hung Type Outdoor: Suitable for Existing Pole etc.
21	Ingress protection	IP 20 - Indoor IP 65 - Outdoor

Prepared By:	Checked By:	Approved By:
		
JE/Drg/SWR	DY.CEE/HQ/SWR	Chief Electrical Services Engineer South Western Railway, Hubli

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✓ Drg. U/s

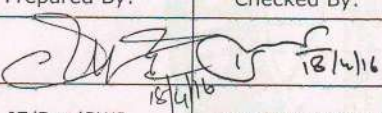
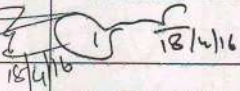
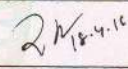
Page 2 of 2	Effective from 18.04.2016	Specification No.: SWR/LED LIGHT FITTING (Indoor /Outdoor) / 001-2016
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2. NOTE

- 1 Supplied LED Luminaires shall confirm to BIS:16107 or IEC:62722 and LEDs to BIS: 16103 or IEC: 62717
- 2 LED Luminaires shall also confirm to LM-79 (For quoted fitting) and LM-80 for LEDs used
- 3 Firms have to submit LM80 & LM 79 test certificate from National/International accredited Laboratory and OEM certificate for compliance of BIS/IEC along with offer.
- 4 Firms have to submit warranty certificate for 5 (five) years along with supply.

3. Following informations are to be mentioned by consignee in indent description.

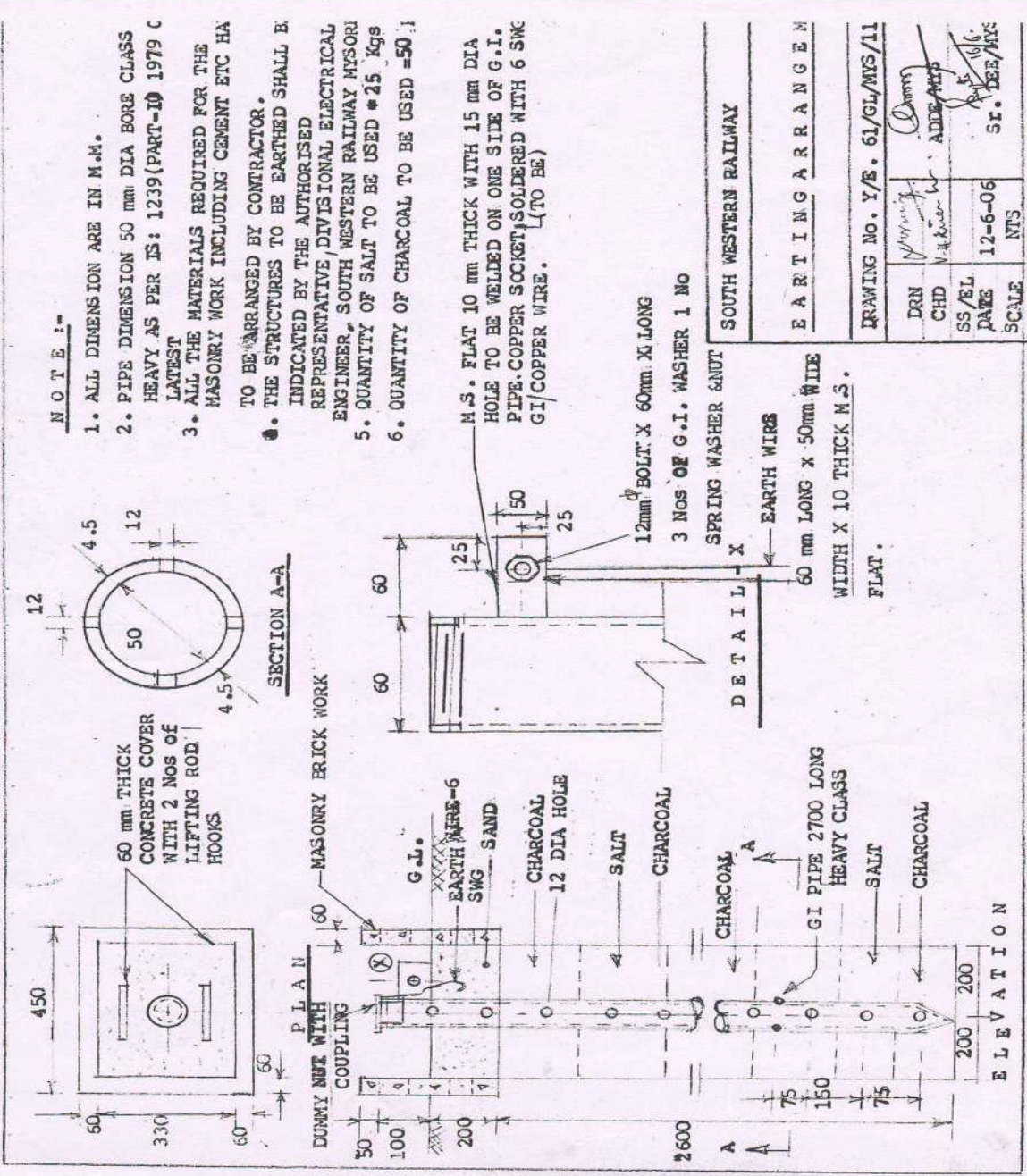
- i) Type of luminaire ; Like Street light , Flood light, Focus light, Retrofit (for retrofit type luminaire, this specification may be referred wherever applicable)
- ii) Total wattage of LED luminaire
- iii) Arrangement of LED :Single LED / Multi LED
- iv) Dimentions if required.
- v) Indoor / Outdoor
- vi) Mounting type : i.e. Indoor : Suitable for Surface / Recessed /Hung Type
Outdoor : Suitable for Existing Pole etc.

Prepared By:	Checked By:	Approved By:
		
JE/Drg/SWR	DY.CEE/HQ/SWR	Chief Electrical Services Engineer South Western Railway, Hubli

This Specification supersede earlier General specification for LED Luminaires No.SWR/Spec/LED
Dt.12.06.2015

SOUTH WESTERN RAILWAY

2)



SOUTH WESTERN RAILWAY



4.Specifications for Smart Energy Meters:

TECHNICAL SPECIFICATIONS FOR WHOLE CURRENT A.C. SINGLE PHASE TWO WIRE SMART ENERGY METER OF ACCURACY CLASS 1.0 WITH BI-DIRECTIONAL COMMUNICATION FACILITY SUITABLE FOR ADVANCED METERING INFRASTRUCTURE (AMI)

1. SCOPE

The specification covers the design, manufacturing, testing, supply and delivery of AC whole current 3 phase 4 wires Smart Energy Meter with bidirectional communication facility. The meter shall be suitable for Advanced Metering Infrastructure (AMI). The meter shall communicate with Head End System (HES) and bridging platform as per the requirement of the utility.

2. GENERAL STANDARDS APPLICABLE FOR METERS

Unless otherwise specified elsewhere in this specification, the performance and testing of the meters shall comply to the following standards with latest amendments thereof:

S. No.	Standard No.	Title
1	IS 13779 with latest amendments or IEC 62052-11/IEC 62053-21/IEC 62053-23	AC Static Watt-hour Meter class 1 & 2 Electricity metering equipment (a.c.) – General requirements, tests and test conditions – Part11: Metering equipment
2	IS 16444 with latest amendments	A.C. Static Direct connected Watt-Hour smart Meters Class 1 and 2-Specification
3	IS 15884 with latest amendments or IEC 62055-31	Alternating Current Direct Connected Static Prepayment Meters for Active Energy (Class 1 and 2)- Specification Electricity Metering- Prepayment systems
4	IS 15959 Part 1 & Part 2 with latest amendments or IEC62056-21/ IEC62056-61/ IEC62056-53/ IEC62056-46/ IEC62056-42	Data Exchange for Electricity Meter Reading, Tariff and Load Control-Companion Standards Electricity Metering-Data exchange for meter reading, Tariff and Load Control-Part 21: direct local data exchange.

3. COMMUNICATION

Meter shall have ability to communicate with HES and bridging platform mentioned in IS16444 in a secure manner, as per the site conditions and as per design requirement of AMI Implementing agency. For GPRS/3G/4G based meter, the meter shall accommodate SIM card of any service provider. In case of Plug in type communication module, the meter shall log communication module removal /non responsive event with snapshot.

3.1 Remote Load control facility

4. Basic Functions of Advanced Metering Infrastructure [AMI]

The AMI system shall help utility to manage their resource and business process efficiently. AMI system shall support the following minimum functionalities:

- (a) Remote Meter data reading at configurable intervals(push/pull)

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Location: New Delhi

- (b) Time of day (TOD)/TOU metering
- (c) Pre paid functionality with wireless token transfer
- (d) Alarm/Event detection, notification and reporting
- (e) Remote Load Limiter and connection/ disconnection at defined/on demand conditions
- (f) Remote firmware upgrade
- (g) Integration with other existing systems like IVRS, Billing & collection software, GIS mapping, consumer indexing, new connections & disconnection, analysis software, Outage Management System etc.
- (h) Security features to prevent unauthorized access to the AMI including Smart meter & meter data etc. and to ensure authentication of all AMI elements by third party.

The System should accurately maintain system time synchronization across all devices to ensure accuracy of data. The communication network shall preferably be able to support multiple applications.

AC whole current Single Phase Two Wire Smart Energy Meter Specifications:

SN	Parameter	Specification
1	Meter Type	AC whole current Single Phase Two wire Smart Energy Meter with bidirectional communication facility.
2	Accuracy	Class 1.0 Active Energy Class 2.0 Reactive Energy
3	Rated voltage V_{ref}	0.7 to 1.2 V_{ref}
4	Frequency	50Hz ($\pm 5.0\%$)
5	Measuring current	5-80A
6	Starting current	0.004 I_b
7	Initial Startup of meter	The meter shall be fully functional within 5s after the rated voltage is applied to meter terminals.
8	Running with no load	When the voltage is applied with no current flowing in the current circuit, the test output of the meter shall not produce more than one output pulse count.
9	Pulse constant	1000imp/kWh, 1000imp/kvarh
10	Power consumption	Current Circuit: ≤ 4 VA Voltage circuit: ≤ 2 W

SN	Parameter	Specification
11	Operating temperature	-20°C ~ +75°C
12	Storage temperature	-45°C ~ +85°C
13	tolerable humidity	90% RH
14	Instantaneous Parameters	Date Real Time Voltage(V) Current (A) Active Power(kW) Reactive Power(kvar) Apparent Power(kVA) Cumulative kWh Cumulative kVAh Cumulative kVRh Power factor Frequency(Hz)
15	LED	Active pulse LED Alarm LED Credit status LED: [for prepaid] (Double color, red and green)
16	Backlit	Should last for 30 Secs when display button is pressed.
17	Backup battery	Battery should be replaceable & backup should be about one year in case of power failure.
18	Relay Operation	Load switching capability: The smart meter shall be provided with switching elements, integral with the meter enclosure, to control the flow of electricity to the load at the instance of connect/disconnect commands as per functional needs of the system. One load switch o in phase shall be provided. The switches are to be rated to carry maximum current continuously under normal operating conditions and to withstand the switching transients during make and break operations.
19	Pre-Payment Function	Standard Transfer Specification [STS]
20	Terminal Box	[As per IS 13779 – 1999 with latest amendments shall apply OR IEC 62052-11/IEC 62053-21/IEC 62053-23]
21	Enclosure protection	IP 54
22	Seal	1. Meter seal. 2. Terminal cover seal 3. Modem & Battery seal

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SN	Parameter	Specification
23	Meter material	Meter should be housed in safe, high grade, unbreakable, fire resistant, UV stabilized, virgin Polycarbonate casing of projection mounting type with sealing arrangement. It should not change in shape, colour, size, and dimensions when subjected to 200 hrs on UV test as per ASTM D 53. It should withstand 650 deg. C. glow wire test and heat deflection test as per ISO 75. For testing of changing colour 72 hrs on UV test is applicable. As per IS 16444/IS 13779
24	Communication	Communication with HES with inbuilt - GSM / GPRS communication module.
25	Tests	As per clause 12 of IS 13779 – 1999
26	Guarantee	Manufacturer Shall undertake a guarantee to replace meter up to a period of 60 months from the date of supply. The meter which are found defective/inoperative within the guarantee period, these defective/inoperative meters shall be replaced within one month of receipt of report for such defective/inoperative meters

**** END OF THE BOOKLET ****