



ALLIANCE MULTI-STATE COOPERATIVE SOCIETY LIMITED (AMCSL)
TECHNICAL SPECIFICATIONS AND COMPLIANCE
SCHEDULE

12 W White-LED Based Standalone Solar Street Lighting System

Document Particular	Details
Tender Number	AMCSL/GOVEMPSSLI06/2026/OT
Document Status	Final Technical Schedule - To be read with the RFP, BOQ, project-specific Purchase Order and corrigenda
System Type	Standalone off-grid solar street lighting system with LiFePO4 battery
Nominal LED Rating	12 W
Minimum PV Module Rating	75 Wp under Standard Test Conditions (STC)
Minimum Battery Rating	12.8 V, 30 Ah LiFePO4; higher capacity shall be provided where required by the approved sizing calculation

1. Scope and Governing Principle

The scope covers design, engineering, manufacture, supply, packing, transportation, insurance, unloading, storage, civil foundation, erection, installation, testing, commissioning, geo-tagging, documentation, training, warranty and comprehensive maintenance of complete standalone solar street lighting systems at locations specified through written Placement Orders/Purchase Orders issued by AMCSL.

All ratings stated in this Schedule are minimum requirements. The bidder shall provide a fully compatible and safely engineered system. Where a stated minimum component rating is insufficient to achieve the specified duty cycle, autonomy or performance at the project location, the bidder shall provide a higher rating without reducing any other requirement and without additional cost, unless the BOQ expressly provides otherwise.

2. Minimum System Configuration

Sl.	Component / Parameter	Minimum Requirement
1	PV module	Minimum 75 Wp under STC; crystalline-silicon technology; positive power tolerance; suitable for outdoor use.
2	Battery	Minimum 12.8 V, 30 Ah lithium iron phosphate (LiFePO4), with integrated BMS. Final capacity shall satisfy the approved energy-sizing calculation and autonomy requirement.
3	LED luminaire	12 W nominal W-LED luminaire, outdoor road/street-lighting type, with proper optics and diffuser.
4	Total luminous flux	Minimum 1,500 lumens for the complete luminaire.

Sl.	Component / Parameter	Minimum Requirement
5	Efficacy	LED source/chip efficacy: minimum 135 lm/W. Complete luminaire/system efficacy: minimum 125 lm/W, verified by photometric test report.
6	CCT and CRI	Correlated colour temperature: 5,500 K to 6,500 K; CRI: minimum 70.
7	Illumination	At full-output mode: minimum 24 lux measured 4 m vertically below the luminaire. At reduced-output mode: minimum 12 lux at the same point. Illumination shall be uniform and free from objectionable dark bands.
8	Mounting	Pole projection: 5 m above finished ground level; minimum luminaire mounting height: 4.5 m. Pole embedment/foundation shall be as per approved structural design.
9	Enclosure protection	Luminaire optical and control-gear compartments: minimum IP65; IP66 where offered or specifically required. External battery enclosure, if used: minimum IP65.
10	Impact resistance	Luminaire enclosure: minimum IK08.
11	Electronics efficiency	Minimum 90% overall conversion/control efficiency under rated operating conditions.
12	Charge controller	MPPT-type controller, properly matched to PV module and battery, with programmable duty cycle and all specified protections.

3. Operating Performance

- Automatic dusk-to-dawn operation using a reliable ambient-light sensing arrangement. The PV module may be used for ambient sensing where the design is proven and stable.
- Duty cycle: first four hours after dusk at full output (minimum 24 lux), followed by operation at approximately 50% output (minimum 12 lux) until dawn.
- Autonomy: minimum three nights or 36 cumulative operating hours under the specified duty cycle, after full charging and at the declared permissible depth of discharge.
- The bidder shall submit a signed energy-sizing calculation showing solar resource assumptions, module derating, controller and wiring losses, battery usable capacity, depth of discharge, ageing margin and duty-cycle consumption. Merely quoting the minimum component ratings shall not establish compliance.
- Load reconnection shall occur only after the battery has recovered to a safe state of charge; the set points shall be declared by the bidder and protected against unauthorized alteration.

4. PV Module Requirements

Parameter	Requirement
Technology	Crystalline-silicon PV module, minimum 75 Wp under STC, or higher as required by system sizing.
Certification	Conformity to IS 14286 / IEC 61215 and IS/IEC 61730 Part 1 and Part 2, latest applicable editions and amendments.
Efficiency	Minimum module efficiency 14%.
Identification	Permanent nameplate showing manufacturer, model, serial number, rated power, electrical ratings and year/month of manufacture. Serial number shall be unique and traceable.
Junction box and cables	UV-resistant, weatherproof junction box, connectors and solar-grade cables of adequate rating and length.
Domestic-content / listing	BIS registration, ALMM listing or domestic-content compliance shall apply only to the extent mandated by applicable law or expressly required in the RFP/Project Order. The bidder shall submit current documentary evidence wherever applicable.

5. Battery and Battery Management System

Parameter	Requirement
Chemistry and rating	LiFePO ₄ , minimum 12.8 V and 30 Ah. Cells shall be new, matched and of uniform grade. Re-used or second-life cells are prohibited.
BMS protections	Cell balancing; over-charge, over-voltage, under-voltage/deep-discharge, over-current, short-circuit and over-temperature protection; safe cut-off and recovery.
Standards	Conformity to the applicable BIS/IEC safety and performance standards for the offered battery and its intended stationary application, including IS 16046 (Part 2)/IEC 62133-2 or IEC 62619, as applicable. Transport compliance under UN 38.3 shall be submitted where applicable.
Traceability	Permanent label with manufacturer, model, chemistry, rated voltage/capacity, serial/batch number and manufacturing date.
Enclosure	Battery shall be safely housed within the luminaire or in a ventilated, corrosion-resistant, tamper-resistant outdoor enclosure of minimum IP65 with anti-theft locking.

6. LED Luminaire, Optics and Electronics

Parameter	Requirement
Photometry	LM-79 or applicable IS/IEC photometric report for the complete offered luminaire; .ies photometric file shall be submitted.
LED maintenance	LM-80 report for the offered LED package and TM-21 or equivalent lumen-maintenance projection supporting the declared life.
Road-lighting safety	Luminaire shall conform to IS 10322 (Part 5/Section 3) read with IS 10322 (Part 1), or corresponding IEC 60598 requirements, as applicable.
EMC	Radiated/conducted emissions and immunity in accordance with CISPR 15 and IEC 61547 or corresponding adopted Indian Standards, as applicable.
Thermal design	Heat sink and enclosure shall maintain component temperatures within manufacturer limits throughout dusk-to-dawn operation. The bidder shall declare the rated ambient operating range.
Surge protection	Suitable DC-side surge and transient protection, minimum 4 kV unless a higher value is specified for the project location.
Maintainability	Electronics and replaceable parts shall be accessible with standard tools. Wiring shall be properly terminated, polarity-marked and protected against abrasion and moisture ingress.

7. Electrical and Electronic Protections

- No-load protection when the luminaire/load is disconnected while the system is energized.
- Battery over-charge, deep-discharge, reverse-polarity, over-current, short-circuit and over-temperature protection.
- Reverse-current protection from battery to PV module during non-generating periods.
- Correctly rated DC switches, fuses/protective devices, connectors and cables, with safe isolation for maintenance.
- Protection against lightning-induced and switching surges appropriate to site conditions; earthing/bonding shall be provided wherever required by the approved design and applicable electrical safety requirements.

8. Pole, Bracket, Foundation and Mechanical Works

Item	Requirement
Pole	Hot-dip galvanized steel tubular pole conforming to IS 1161 and galvanizing requirements of IS 4736, as applicable. Pole diameter, wall thickness and section shall be stated in the approved drawing.
Structural design	Pole, bracket, module frame and foundation shall be designed for the applicable wind zone and site conditions in accordance with IS 875 (Part 3) and relevant structural standards. The bidder shall submit design calculations/drawings when required.
Height	5 m pole projection above finished ground level; luminaire mounting height not less than 4.5 m. Any 1 m embedment shown in a typical design shall not replace the site-specific foundation design.
Module frame	Corrosion-resistant metallic frame with secure anti-theft fasteners and adjustable orientation for the approved tilt and azimuth.
Foundation	RCC/PCC foundation, excavation, backfilling, curing and restoration complete, based on soil/site conditions and approved drawing. Concrete grade, reinforcement and foundation dimensions shall be stated before execution.
Finish and safety	All exposed edges shall be safe; cable entries sealed; dissimilar-metal corrosion avoided; nuts/bolts protected against loosening and theft.

9. Identification, Documentation and Geo-tagging

- Each system and major component shall have a unique, durable serial number. AMCSL may prescribe QR/asset tags linking the system, component serial numbers and installation record.
- Geo-tagged photographs shall be taken before installation, during foundation/erection and after commissioning, with latitude, longitude, date, location name and asset ID.
- The supplier shall provide approved drawings, bill of materials, component datasheets, test reports, warranty cards, serial-number register, commissioning record and as-built documentation.
- Operation, instruction and maintenance manuals shall be supplied in English and the local language required in the Project Order, covering system description, component ratings, installation, indicators, preventive maintenance, troubleshooting, safety, do's and don'ts, and service contacts.

10. Test Reports and Documentary Compliance

Reports shall be complete, legible and traceable to the offered make and model. A report for a different model, rating or material configuration shall not be accepted unless equivalence is established to AMCSL's satisfaction. Laboratory accreditation shall cover the relevant test at the time of testing.

Component	Minimum Evidence
PV module	IS 14286 / IEC 61215; IS/IEC 61730-1 and 61730-2; current BIS/ALMM evidence where legally applicable.
Complete luminaire	LM-79 / applicable IS photometry; IP; IK; IS 10322 (Part 5/Section 3) with Part 1; CISPR 15; IEC 61547, as applicable.
LED package	LM-80 and TM-21/equivalent lumen-maintenance projection.
Battery	Capacity, safety, cycle/endurance and applicable BIS/IEC conformity evidence for the offered LiFePO4 battery; UN 38.3 where applicable.

Component	Minimum Evidence
System	Energy-sizing calculation, duty-cycle demonstration, protection logic, wiring diagram and functional test report.

AMCSL may require verification from the issuing laboratory, BIS, manufacturer or other competent body. Submission of forged, altered, expired or materially misleading documents shall attract action under the RFP and applicable law.

11. Inspection, Testing and Acceptance

- Approval of drawings, makes, samples or test reports shall not relieve the supplier of contractual responsibility for performance, quality or compatibility.
- AMCSL or its authorized inspection agency may inspect manufacturing facilities and conduct pre-dispatch inspection. Inspection may include documentary verification, visual/dimensional inspection, serial-number verification, functional test, electrical measurements, charging/discharging demonstration, IP/IK evidence and sample photometric verification.
- At site, each installed system shall undergo visual, functional and geo-tag verification. Lux levels and duty-cycle operation shall be checked on a sample or 100% basis as specified in the Project Order/inspection plan.
- Items failing inspection may be rejected. Re-inspection, replacement and associated costs arising from supplier default shall be borne by the supplier, subject to the RFP/Project Order.
- Final acceptance/HOTO shall occur only after successful commissioning, rectification of defects and submission of complete prescribed records. Payment, title and risk shall be governed by the RFP and Project Order.

12. Warranty and Comprehensive Maintenance

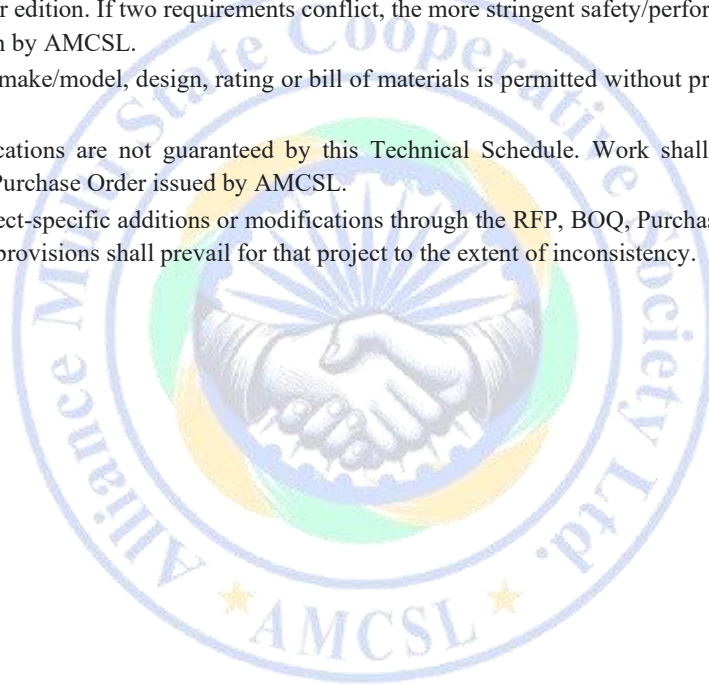
Requirement	Condition
Complete system	Five years from the date of successful commissioning and site-wise acceptance/HOTO, including LED luminaire, battery, electronics, controller, cables, fixtures and workmanship.
PV module	Minimum 25-year performance warranty: not less than 90% of rated output at the end of 10 years and 80% at the end of 25 years, or better manufacturer warranty offered in the bid.
Coverage	Onsite diagnosis, repair, replacement, labour, travel, tools, testing and restoration required to return the system to specified performance, except exclusions expressly stated in the contract.
Service response	Complaint acknowledgement within 48 hours and restoration within 7 calendar days, unless a shorter project-specific SLA is prescribed. If immediate restoration is not feasible, a replacement arrangement shall be made within the period directed by AMCSL.
Records	Helpdesk/contact details, complaint number, attendance, action taken, parts replaced and closure evidence shall be maintained and submitted in the prescribed format.

13. Bidder's Technical Submission

- Duly completed clause-by-clause Compliance Statement in the format at Annexure A.
- Detailed bill of materials with make, model, manufacturer, country of origin, rating and quantity of every major component.
- Component datasheets, type-test reports, certificates, laboratory accreditation evidence and warranty undertakings.
- Energy-sizing calculation; single-line/wiring diagram; general arrangement drawing; pole/module/luminaire/foundation drawings; and installation methodology.
- Deviation statement. Any deviation not expressly disclosed shall be treated as an unconditional confirmation of compliance, subject to verification.

14. General Technical Conditions

- Specifications are minimum and performance-based. Brand-specific or proprietary interpretation is prohibited unless expressly stated with an approved equivalent provision.
- The latest applicable edition and amendments of a cited standard in force on the bid due date shall apply, unless the RFP expressly freezes another edition. If two requirements conflict, the more stringent safety/performance requirement shall apply after written clarification by AMCSL.
- No change of approved make/model, design, rating or bill of materials is permitted without prior written approval. Approval does not waive liability.
- Actual quantity and locations are not guaranteed by this Technical Schedule. Work shall arise only through a written LOA/Placement Order/Purchase Order issued by AMCSL.
- AMCSL may issue project-specific additions or modifications through the RFP, BOQ, Purchase Order or corrigendum. Such written project-specific provisions shall prevail for that project to the extent of inconsistency.



ANNEXURE A

CLAUSE-BY-CLAUSE TECHNICAL COMPLIANCE STATEMENT

Bidder Name: _____

Offered Make/Model: _____

Clause	Requirement Group	Compliance	Offered Particulars / Deviation	Supporting Document & Page
2	Minimum system configuration	Complied / Not Complied		
3	Operating performance and sizing	Complied / Not Complied		
4	PV module	Complied / Not Complied		
5	Battery and BMS	Complied / Not Complied		
6	LED luminaire, optics and electronics	Complied / Not Complied		
7	Electrical protections	Complied / Not Complied		
8	Pole, bracket and foundation	Complied / Not Complied		
9	Identification, documentation and geo-tagging	Complied / Not Complied		
10	Test reports	Complied / Not Complied		
11	Inspection and acceptance	Complied / Not Complied		
12	Warranty and maintenance	Complied / Not Complied		

Bidder's Declaration

We certify that the offered system complies with the Technical Specifications except for deviations expressly disclosed above. All submitted reports and certificates are authentic, valid and applicable to the offered make/model. We accept verification by AMCSL and understand that any material misstatement may lead to rejection, cancellation or other action under the Tender Documents and applicable law.

Authorized Signatory: _____ **Name & Designation:** _____

Date: _____ **Place:** _____ **Company Seal:** _____