



1. SCOPE

The testing and certification of valve regulated sealed lead-acid (VRSLA) batteries by CSIRO is provided as a service to assist suppliers and maintainers of fire detection, alarm and warning system Control and Indicating Equipment (FDCIE) and Emergency Warning and Intercom Systems (EWCIE) to identify and source suitable VRSLA batteries as secondary (standby) power supplies.

With the publication of Australian Standard AS/NZS 62368.1:2018, which applies to this category of life safety equipment as referenced by national electrical safety regulations (Telecommunications (Customer Equipment Safety) Technical Standard 2018), the specified requirements of CSIRO (ActivFire) TS-001 Technical Specification have been superseded and replaced by this CSIRO TS-015 Technical Specification.

2. REFERENCED DOCUMENTS

The documents referenced by this technical specification are detailed in Table 1.

Table 1. List of documents referenced by this technical specification.

AS/NZS 62368.1:2018	Audio/video, information and communication technology equipment, Part 1: Safety requirements (IEC 62368-1:2014 (ED. 2.0) MOD)
IEC 60896-21:2004	Stationary lead-acid batteries - Part 21: Valve regulated types - Methods of test
IEC 60896-22:2004	Stationary lead-acid batteries - Part 22: Valve regulated types - Requirements
AS ISO/IEC 17025:2018	General requirements for the competence of testing and calibration laboratories
F2018L01725	Telecommunications (Customer Equipment Safety) Technical Standard 2018 (Telecommunications Act 1997)

3. VERIFICATION PROCEDURE

Documentation, submitted as evidence of conformity with IEC 60896, shall be a relevant selection of records and reports from recognised testing agencies in accordance with suitable and relevant protocols, standards or specifications.

The following activities, as detailed in Table 2, are required for the purposes of verifying conformance of VRSLA batteries.

Table 2. Activities required for the purposes of verifying conformance with the specified requirements of this technical specification.

Activity	Description	Support Documentation Required
1 ⁽ⁱ⁾	Verification that battery tests have been conducted and/or fire extinguishing performance has been established in accordance with suitable Standard(s)	Completed IEC 60896-22 Annex B form Test report(s) from a laboratory accredited to IEC 60896-21 within the ILAC recognition framework.
2	Verification that product designations (variants, series/models) of the tested batteries, are selected from and correlate with the designations of batteries included in the full schedule/tabulation of batteries submitted for purposes of certification.	Manufacturer's Declaration stating which product designations (variants, series/models) tested and designated in an IEC 60896-21 test report correlate with the product designations (variants, series/models) in the full schedule/tabulation of batteries submitted for purposes of certification.
3	Review of design and installation manual(s)	Manufacturer's Declaration and engineering justification/confirmation correlating the design of the tested batteries with the full schedule/tabulation of batteries submitted for purposes of certification. (ref. Section 5.1). Product datasheets of VRSLA battery series and/or datasheets of each VRSLA battery product designations (variants, series/models).
4	Review of component quality assurance program	ISO 9001 certificates of battery manufacturer.
5	Identification of battery series limitations	-
6	Prescription of ongoing constancy of conformity activities required for certification.	-

Notes:

- i. For the purposes of Activity 1, evidence for conformity may be provided through validated external test reports from recognised external agencies and/or laboratories. The clauses relevant to VRSLA batteries intended to be used with FDCIE/EWCIE are detailed in Section 4 of this technical specification.

4. EVALUATION SCHEDULE

Table 3 provides the required evaluation schedule of a battery series to IEC 60896, indicating the applicable clauses for which evidence of conformity is required to be provided. The schedule is drawn from IEC 60896-22 (Section 5 and Annex A), with mandatory and optional tests nominated as appropriate for the performance and durability characteristics of batteries intended for use with FDCIE/EWCIE.

Table 3. Evaluation schedule required to demonstrate conformity. All requirements are mandatory unless noted as optional.

IEC 60896-21 Clause	Title	Conformity information required (Note 1)	Comments
Product safe operation in-service			
6.1	Gas emission (at float voltage and at 2,40 Vpc)	Data	Nil
6.2	High current tolerance	Pass	Nil
6.3	Short circuit current and d.c. internal resistance	Data	Nil
6.4	Internal ignition from external spark sources	Pass	Nil
6.5	Protection against ground short propensity	Pass	Nil
6.6	Content and durability of required markings	Pass	Nil
6.7	Material identification	Pass	Nil
6.8	Valve operation	Pass	Nil
6.9	Flammability rating of materials	Data	Nil
6.10	Intercell connector performance	Data	Nil
Product performance in-service			
6.11	Discharge capacity	Data for C ₁₀ , C ₈ , C ₃ , C and C _{0.25} .	Data for C ₂₀ may be optionally supplied as it is a common specification used for determining required battery capacity of FDCIE/EWCIE systems.
6.12	Charge retention during storage	Pass	Optional requirement
6.13	Float service with daily discharges	Value	Optional requirement
6.14	Recharge behaviour	Pass	Nil
Product durability in-service			
6.15	Service life at an operating temperature of 40°C	Value	Optional requirement. If this value is not provided then a nominal operating temperature not exceeding 40°C will be indicated with a statement that the service life for operation at 40°C is not specified.
6.16	Impact of a stress temperature of 55°C or 60°C	Value	Optional requirement
6.17	Abusive over-discharge	Value	Optional requirement
6.18	Thermal runaway sensitivity	Pass or Data	Nil
6.19	Low temperature sensitivity	Value	Optional requirement. If this value is not provided then an operating temperature limitation will be stated to ensure the prevention of electrolyte freezing.
6.20	Dimensional stability at elevated internal pressure and temperature	Data	Nil
6.21	Stability against mechanical abuse of units during installation	Pass	Nil

Normative notes:

Note 1: Evidence will be verified from external test report(s).

5. REQUIREMENTS FOR VALIDATION OF PRODUCT VARIANTS (MODEL RANGE)

5.1. Capacity range

All or part of the full schedule/tabulation of VRSLA battery variants (model range) in a series of designated batteries, submitted for purposes of certification, will be validated based upon the capacity (in Ah) of the variants/models tested and detailed in the submitted IEC 60896-22 report(s). The principles applied to establish the validated variants (model range) are specified in Table 4.

Table 4. Principles for establishing the extent of variants (model range) in a series, validated for purposes of certification, from the full schedule/tabulation of batteries submitted.

$C_{n, \text{tested}}$ is the nominal capacity (in Ah) of variant (model) tested in accordance with IEC 60896-21.

Series Extent	Capacity (Ah)	Note
Minimum	$C_{n, \text{tested}} \div 12.5$	Rounded to 0.1 Ah, down to 4 Ah. Smaller capacity variants (models) are unlikely to be useful for the purposes of standby power supplies to FDCIE/EWCIE.
Maximum	$C_{n, \text{tested}} \times 12.5$	Rounded to 1 Ah, up to 300 Ah. Larger capacity variants (models) require separate application to establish special considerations that may include additional test evidence.

For example, if the nominal capacity of the battery variant (model) tested to IEC 60896-21 was 65 Ah, then the extent of the certified series may include variants (models) which span, at most, nominal capacities of between 5.2 and 300 Ah. Alternatively, if a variant (model) with a capacity of 7 Ah was tested, then certified range may include variants (models) which span, at most, nominal capacities of between 4 and 88 Ah.

5.2. Physical properties (mass)

The mass of each battery variant (model), validated for purposes of certification, must be detailed in the associated product literature (e.g. Datasheet(s)) such that it may be physically verified.

6. SUITABILITY OF EXTERNAL EVIDENCE

6.1. Physical testing and reports

Assessment of the suitability of external agencies (laboratory) evidence shall be conducted in accordance with the CSIRO Recognition Framework, which requires that, at least, external test evidence (i.e. reports) are produced by a laboratory accredited under the ILAC recognition framework.

Evidence of conformity, in the form of endorsed test reports written in English, are required to be submitted in full. Where test reports were originally produced in a language other than English, suitable translations may be supplied in addition. Submitted external test reports must provide sufficient detail to describe the product being evaluated in full and in detail and establish that an evaluation schedule was designed and applied to each component submitted to the external agency.

6.2. Certificates of Conformity

Certificates, such as those published by a Conformity Assessment Body, *do not* provide direct and sufficient detail for the purposes of evaluation for conformity in accordance with this technical specification.

7. REPORTING

The evidence of conformity to the relevant clauses of the referenced documents, details product designations and documentation reviewed, product limitations and any requirements for a constancy of conformity program, are to be detailed in a Technical Verification of Conformity report.

8. REVISION HISTORY

Issue date: 7 November 2022

Issuing Authorities: Team Leader, CSIRO Fire Systems Laboratory, and
Executive Officer, CSIRO Verification Services - ActivFire Scheme