

TECHNICAL REPORT

Radio frequency identification (RFID) of stationary lead acid cells and monoblocs – Tentative requirements

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**RADIO FREQUENCY IDENTIFICATION (RFID)
OF STATIONARY LEAD ACID CELLS AND MONOBLOCKS –
TENTATIVE REQUIREMENTS**

FOREWORD

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IEC/TR 62540, which is a technical report, has been prepared by IEC technical committee 21: Secondary cells and batteries. It is an informative document destined to lay the groundwork for a possible future IEC/ISO standard. Such a standard would be established by a joint ISO/IEC working group with IEC TC 21 and ISO/IEC JTC1/SC31 acting as the leading technical committees.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
21/685/DTR	21/703/RVC

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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RADIO FREQUENCY IDENTIFICATION (RFID) OF STATIONARY LEAD ACID CELLS AND MONOBLOCS – TENTATIVE REQUIREMENTS

1 Scope

IEC/TR 62540, which is a technical report, applies to all stationary lead-acid cells and monobloc batteries for float charge applications (i.e. permanently connected to a load and to a d.c. power supply), in a static location (i.e. not generally intended to be moved from place to place) and incorporated into stationary equipment or installed in battery rooms for use in telecom, uninterruptible power supply (UPS), utility switching, emergency power or similar applications. These batteries are covered by IEC 60896-11, IEC 60896-21 and IEC 60896-22.

The objective of this technical report is to assist the supplier and user of radio frequency identification devices (RFID) in the understanding of the requirements for performance, durability, data content and structure, the write/read capability of such devices, and to provide guidance so that the RFID tag on the battery will result in meeting the needs of a particular industry application and operational condition.

This technical report does not directly apply to lead-acid cells and batteries used for vehicle engine starting applications (IEC 60095 series), solar photovoltaic applications (IEC 61427), or general purpose applications (IEC 61056 series) but nevertheless can also be the base of standardization activities for these types of lead acid batteries.

2 Terms and definitions

[IEC TR 62540:2009](https://standards.iteh.ai/catalog/standards/sist/4be2e96c-a460-4e39-801e-10a6b0b79a8e/iec-tr-62540-2009)

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For the purposes of this document, the following terms and definitions apply.

2.1

ambient temperature

temperature of the medium in the immediate vicinity of a cell or battery

[IEC 60050-826:2004, 826-10-03, modified]

2.2

ampere-hour

quantity of electricity or a capacity of a battery obtained by integrating the discharge current in ampere with respect to time in hours

NOTE One ampere-hour equals 3 600 coulombs.

2.3

secondary battery

two or more secondary cells connected together and used as a source of electrical energy

[IEC 60050-811:1991, 811-20-02, modified]

2.4

monobloc battery

secondary battery in which the plate packs are fitted in a multi-compartment container

2.5

floating battery

secondary battery whose terminals are permanently connected to a source of constant voltage sufficient to maintain the battery approximately fully charged, intended to supply a circuit, if the normal supply is temporarily interrupted

[IEC 60050-482:2004, 482-05-35, modified]

2.6

battery capacity

quantity of electricity or electrical charge which a fully charged battery can deliver under specified conditions

NOTE The SI unit for electric charge is the coulomb (1 C = 1 A·s) but in practice, battery capacity is expressed in ampere-hours (Ah).

2.7

charge

operation during which a secondary battery receives from an external circuit electrical energy, which is converted into chemical energy

NOTE A charge is defined by its maximum voltage, current and duration.

2.8

cell

assembly of electrodes and electrolyte, which constitutes the basic unit of a secondary battery

[IEC 60050-482:2004, 482-01-01, modified]

2.9

electrochemical cell

electrochemical system capable of storing in chemical form the electric energy received and which can give it back by reconversion, i.e. a secondary cell

[IEC 60050-811:1991, 811-20-01, modified]

2.10

secondary cell

assembly of electrodes and electrolyte which constitutes the basic unit of a secondary battery

2.11

valve-regulated cell

secondary cell which is coded under normal conditions but which has an arrangement, which allows the escape of gas if the internal pressure exceeds a predetermined value

NOTE 1 The cell cannot normally receive the addition of electrolyte.

NOTE 2 Such cells have an immobilized electrolyte to prevent spillage and allow for oxygen recombination on the negative electrode.

2.12

actual capacity

C_a

quantity of electricity delivered by a cell or battery, determined experimentally with a discharge at a specified rate to a specified end-voltage and at a specified temperature

NOTE This value is usually expressed in ampere-hours (Ah).

2.13

nominal capacity

C_n

suitable approximate quantity of electricity used to identify the capacity of a cell or battery

NOTE This value is usually expressed in ampere-hours (Ah).

2.14 rated capacity

C_{rt}

quantity of electricity, declared by the manufacturer, which a cell or battery can deliver under specified conditions after a full charge

NOTE This value is usually expressed in ampere-hours (Ah).

[IEC 60050-482:2004, 482-02-15, modified]

2.15 shipping capacity

C_{sh}

quantity of electricity, declared by the manufacturer, which a cell or battery can deliver, at the time of shipment, under specified conditions of charge

NOTE 1 This value is usually expressed in ampere-hours (Ah).

NOTE 2 In the present technical report this value is assumed to be at least 0,95 C_{rt} .

2.16 durability

ability of an item (battery) to perform a required function under given conditions of use and maintenance, until a limiting state is reached

NOTE A limiting state of an item (battery) may be characterized by the end of the useful life, unsuitability for any economic or technological reasons or other relevant factors.

[IEC 600505-101:1990, 191-02-02]

[IEC TR 62540:2009](#)

2.17 electrolyte

liquid or solid phase containing mobile ions that render the phase electrically conducting

[IEC 60050-482:2004, 482-02-29, modified]

2.18 stationary equipment

either fixed equipment or equipment not provided with a carrying handle and having such a mass that it cannot easily be moved

[IEC 60050-826:2004, 826-6-06, modified]

2.19 failure

termination of the ability of an item (battery) to perform the required function

[IEC 60050-603:1996, 603-05-06]

2.20 lead-acid battery

secondary battery in which the electrodes are made mainly from lead and the electrolyte is a sulphuric acid solution

[IEC 60050-482:2004, 482-05-01, modified]

2.21 design life

expected period of useful life of a battery according to components, design and application

2.22

service life

period of useful life of a battery under specified conditions

[IEC 60050-482:2004, 482-03-46, modified]

2.23

useful life

under given conditions, the time interval beginning at a certain instant of time, and ending when the failure intensity becomes unacceptable or when the item (battery) is considered un-repairable as a result of a fault

[IEC 60050-191:1990, 191-10-06]

2.24

performance

characteristics defining the ability of a battery to achieve its intended functions

[IEC 60050-300:2001, 311-06-11]

2.25

product range

range of products, i.e. cells or monobloc batteries, over which specified design features, materials, manufacturing processes, and quality systems (e.g. ISO 9000) of manufacturing locations are identical.

2.26

accelerated test

test in which the applied stress level is chosen to exceed that stated in the reference conditions in order to shorten the time duration required to observe the stress response of the item (battery), or to magnify the response in a given time duration

NOTE To be valid, an accelerated test shall not alter (or conceal) the basic fault modes and failure mechanisms, or their relative prevalence.

[IEC 60050-191:1990, 191-14-07]

2.27

acceptance test

contractual test to prove to the customer that the item (battery) meets certain conditions of its specification

[IEC 60050-151:2001, 151-16-23]

2.28

commissioning test

tests on an item (battery) carried out on site to prove that it is correctly installed and can operate correctly

[IEV 151-16-24]

2.29

compliance test

test used to show whether or not a characteristic or property of an item (battery) complies with the stated requirements

[IEC 60050-191:1990, 191-14-02]

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2.30

endurance test

test carried out over a time interval to investigate how the properties of an item (battery) are affected by the application of stated stresses and by their duration or repeated application

[IEC 60050-151:2001, 151-16-22]

2.31

laboratory test

compliance test or determination test made under prescribed and controlled conditions, which may or may not simulate field conditions

[IEC 60050-191:1990, 191-14-04]

2.32

life test

test to ascertain the probable life, under specified conditions, of an item (battery)

IEC 60050-151:2001, 151-16-21]

NOTE In stationary lead acid batteries it is customary to assume that for every 10 K rise in service temperature above the reference temperature (20 °C – 25 °C) a halving of the life in a life test is observed (for a test temperature up to 60 °C).

2.33

performance test

test carried out to determine the characteristics of a machine (battery) and to show that the machine (battery) achieves its intended function

2.34

type test

conformity test made on one or more items (batteries) representative of the production

IEC 60050-151:2001, 151-16-16]

2.35

final voltage

U_{final}

specified voltage at which a discharge of a battery is considered finished

[IEC 60050-482:2004, 482-03-30, modified]

NOTE This voltage relates to the demand of the exterior circuit, the discharge rate and temperature.

2.36

float voltage

U_{flo}

constant charge voltage specified by the manufacturer for a floating battery

3 Functional requirements

3.1 Overview

In the framework of this technical report, the following tentative requirements are deemed essential to comprehensively assure the ability of the RFID tags to perform their intended function as a reliable, multiple write and read depository of data concerning battery properties.

These requirements are grouped for data content and data display structure, physical dimensions, performance and durability needs.