

INTERNATIONAL STANDARD



**Railway applications – Rolling stock – Batteries for auxiliary power supply systems –
Part 2: Nickel Cadmium (NiCd) batteries**

IEC 62973-2:2020

<https://standards.iteh.ai/catalog/standards/sist/959601c2-cc39-49ab-9c8e-3da7bf5468f0/iec-62973-2-2020>



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

RAILWAY APPLICATIONS – ROLLING STOCK – BATTERIES FOR AUXILIARY POWER SUPPLY SYSTEMS –

Part 2: Nickel Cadmium (NiCd) batteries

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International Standard IEC 62973-2 has been prepared by IEC technical committee 9: Electrical equipment and systems for railways.

The text of this International Standard is based on the following documents:

| FDIS | Report on voting |
|-------------|------------------|
| 9/2585/FDIS | 9/2594/RVD |

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

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

A list of all parts in the IEC 62973 series, published under the general title *Railway applications – Rolling stock – Batteries for auxiliary power supply systems*, can be found on the IEC website.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
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INTRODUCTION

This document considers the requirements for vented or partial recombination Nickel Cadmium (NiCd) batteries following IEC 62973-1:2018.

In this document the interface with a LVPS or charger is specified and the LVPS or charger itself is out of scope.

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RAILWAY APPLICATIONS – ROLLING STOCK – BATTERIES FOR AUXILIARY POWER SUPPLY SYSTEMS –

Part 2: Nickel Cadmium (NiCd) batteries

1 Scope

This part of IEC 62973 applies to NiCd rechargeable batteries for auxiliary power supply systems used on railway vehicles. It is an extension of IEC 62973-1:2018 which specifies common requirements for all battery technologies of other parts of IEC 62973. Unless otherwise specified, the requirements of IEC 62973-1:2018 apply.

Battery systems described in this document are used in conjunction with charging systems onboard rolling stock, as described in IEC 62973-1:2018. Charging systems (e.g. LVPS, converters, etc.) are excluded from the scope of this document.

This document also specifies the design, operation parameters, safety recommendations, routine and type tests, as well as marking and designation.

This document is used in addition to IEC 60623:2017 or IEC 62259:2003 for NiCd Cells.

Specific requirements on subcomponents within the battery systems are covered in this document, e.g. temperature measurement components.

When there is an existing IEC standard specifying additional test conditions and requirements for NiCd batteries used in specific railway applications and which conflicts with this document, the latter takes precedence.

The main objective of this document is to achieve standardization of the electrical interfaces by considering NiCd battery parameters to allow for calculating the NiCd battery capacity required for a specific load profile.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60051 (all parts), *Direct acting indicating analogue electrical measuring instruments and their accessories*

IEC 60077-1, *Railway applications – Electric equipment for rolling stock – Part 1: General service conditions and general rules*

IEC 60623:2017, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Vented nickel-cadmium prismatic rechargeable single cells*

IEC 61373:2010, *Railway applications – Rolling stock equipment – Shock and vibration test*

IEC 62259:2003, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Nickel cadmium prismatic secondary single cells with partial gas recombination*

IEC 62485-2:2010, *Safety requirements for secondary batteries and battery installations – Part 2: Stationary batteries*

IEC 62973-1:2018, *Railway applications Rolling stock – Batteries for auxiliary power supply systems – Part 1: General requirements*

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

NOTE All typical battery related descriptions are defined in IEC 60050-482.

3.1.1

battery crate

container with frame walls for holding several cells or batteries

Note 1 to entry: Refer to 4.1 and Clause 5.

[SOURCE: IEC 60050-482:2004/AMD1:2016, 482-05-10, modified – Note 1 to entry has been added.]

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3.1.2

battery tray

container with a base and walls for holding several cells or batteries

Note 1 to entry: Refer to 4.1 and Clause 5.

[SOURCE: IEC 60050-482:2004/AMD1:2016, 482-02-35, modified – Note 1 to entry has been added.]

3.1.3

cell

basic functional unit of NiCd battery, consisting of an assembly of electrodes, electrolyte, container, terminals and usually separators, that is a source of electric energy obtained by direct conversion of chemical energy

[SOURCE: IEC 60050-482:2004/AMD1:2016, 482-01-01, modified – Note has been deleted and the specific use “of NiCd battery” has been added.]

3.1.4

monobloc battery

battery with multiple separate but electrically connected cell compartments each of which is designed to house an assembly of electrodes, electrolyte, terminals or interconnections and possible separators

Note 1 to entry: The cells in a monobloc battery can be connected in series or in parallel.

[SOURCE: IEC 60050-482:2004, 482-02-17]

3.1.5

nickel cadmium battery

secondary battery with an alkaline electrolyte, a positive electrode containing nickel oxide and a negative electrode of cadmium

[SOURCE: IEC 60050-482:2004/AMD1:2016, 482-05-02, modified – A synonym has been removed.]

3.1.6

rated capacity, <for railway NiCd cell>

C_n

capacity value of a battery determined under IEC 60623:2017 specified conditions and declared by the battery manufacturer

3.1.7

state of charge

SOC

remaining capacity to be discharged, normally expressed as a percentage of the full battery rated capacity as expressed in relevant standards

Note 1 to entry: Practical definitions of SOC are dependent upon chosen technologies.

3.1.8

depth of discharge

DOD

capacity removed from a battery during discharge in relation to its full rated capacity expressed as a percentage

Note 1 to entry: It is the complement of SOC.

Note 2 to entry: As one increases, the other decreases by the same amount.
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3.1.9

ageing factor, <for railway NiCd cell>

quantitative factor expressing the degradation in the ability of the battery, due to usage, to deliver electrical energy under specified operating conditions such as, but not limited to, operating ambient temperature, cycling considering depth of discharge (DOD), and maintenance practices

3.1.10

nickel cadmium battery information system

electronic system collecting and analyzing battery data to provide additional information, i.e. information not necessary for battery operation

Note 1 to entry: Additional information can be information about e.g. condition-based maintenance.

3.1.11

battery system

battery

system that includes battery tray(s), battery crate(s), monobloc(s), electrical components and/or equipment and associated electromechanical components and connections

3.1.12

end user

organization which operates the battery system

Note 1 to entry: The end user is normally an organization which operates the vehicle equipped with the battery system, unless the responsibility is delegated to a main contractor or consultant.