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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



21A/907/CD

COMMITTEE DRAFT (CD)

PROJECT NUMBER: IEC 60622 ED4	
DATE OF CIRCULATION: 2024-10-25	CLOSING DATE FOR COMMENTS: 2024-12-20
SUPERSEDES DOCUMENTS: 21A/896/RR	

IEC SC 21A : SECONDARY CELLS AND BATTERIES CONTAINING ALKALINE OR OTHER NON-ACID ELECTROLYTES	
SECRETARIAT: France	SECRETARY: Mr Jean-Marie Bodet
OF INTEREST TO THE FOLLOWING COMMITTEES:	HORIZONTAL FUNCTION(S):
ASPECTS CONCERNED:	

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TITLE: Secondary cells and batteries containing alkaline or other non-acid electrolytes - Sealed nickel-cadmium prismatic rechargeable cells and batteries for use in industrial applications.
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CONTENTS

CONTENTS	1
FOREWORD	5
1 Scope	7
2 Normative references	7
3 Terms and definitions	7
3.1 sealed cell	8
3.2 monobloc battery	8
3.3 battery crate	8
3.4 battery tray	8
3.5 ageing factor	8
3.6 battery module	8
3.7 battery system	8
3.8 nickel cadmium battery information system	9
3.9 end user	9
3.10 system integrator	9
3.11 manufacturer	9
3.13 nominal voltage	9
3.14 discharge voltage closed circuit voltage	9
3.15 rated capacity	9
3.16 CCCV charge	10
4 Parameter measurement tolerances	10
5 Designation and marking	10
5.1 Cell designation (mandatory)	10
5.2 Cell designation (optional)	11
5.3 Cell termination	11
5.4 Battery designation	11
5.4.1 Battery structure formulation	11
5.4.2 Definitions of components of a battery system	12
5.4.3 Classes of usage of battery system	14
5.5 Marking	15
5.6 Safety recommendations	15
6 Dimensions	15
7 Electrical tests	18
7.1 General	18
7.2 Charging procedure for test purposes	18
7.2.1 General	18
7.2.2 Charge procedure based on constant current	18
7.2.3 Charge procedure based on constant voltage at a given current	18
7.2.4 Rapid charge current	18
7.3 Discharge performances	19
7.3.1 General	19
7.3.2 Discharge performance at 20 °C	19
7.3.3 Discharge performance at +5 °C	20
7.3.4 Discharge performance at –18 °C	20
7.3.5 Discharge performance at low temperature	21

7.3.6	Discharge performance at high temperature	21
7.3.7	High rate current test	22
7.3.8	Measurement of the internal DC resistance	23
7.3.9	Pulse Power Calculation	25
7.3.10	Constant power measurement test	26
7.4	Charge retention	26
7.5	Endurance	27
7.5.1	Test conditions	27
7.5.2	Endurance in cycles	27
7.5.3	Final test at the end of endurance in cycles	28
7.5.4	Permanent charge endurance	28
7.6	Charge acceptance at constant voltage	29
7.7	Vent plug operation	29
7.8	Electrolyte retention test	29
7.9	Storage	29
7.9.1	Test method	29
7.9.2	Acceptance criteria	29
7.10	Safety device operation	29
7.10.1	General	29
7.10.2	Test method	30
7.10.3	Acceptance criteria	30
7.11	Gas leakage test	30
7.11.1	General	30
7.11.2	Test method	30
7.11.3	Acceptance criterion	30
8	Mechanical tests	30
9	Physical appearance	30
10	Requirements at battery level	30
10.1	General requirements	30
10.2	Environmental conditions	30
10.3	Operating voltage range of the battery system	31
10.4	Optional additional components to battery system	32
10.4.1	General	32
10.4.2	Battery information system	32
10.4.3	Battery heater	32
10.4.4	Thermostat or cut-off switch	33
10.4.5	Mounting racks	33
11	Performance requirement for the battery system	33
11.1	Design energy and power calculation methodology	33
11.1.1	General	33
11.1.2	Requirements for battery capacity sizing	34
11.1.3	Deep discharge of batteries	35
11.1.4	Documentation	36
11.2	End of life performance	36
12	Conditions for approval and acceptance	36
12.1	Type approval	36
12.2	Batch acceptance	37
Annex A (normative)	CCCV charge methodology	39

Annex B (normative) NiCd load profile verification documentation	42
B.1 General.....	42
B.2 General methodology	42
B.3 Battery sizing documentation	43
B.4 Operational verification (load profile test)	43
B.5 Test report	44
Annex C (informative) Battery Structure Information	45
C.1 General.....	45
Annex D (informative) Declaration of cell model range representative of the testing	47
D.1 Electrical performance declaration	47
Bibliography.....	48
 Figure 1 – Definition of cell(s), monobloc battery, crate, tray, and box, example of mobile application	12
Figure 2. Definition of cell(s), crate/block/module, Battery, Cabinet, example of stationary application for Telecom.....	13
Figure 3. Definition of cell(s), crate/block/module, Battery, rack, example of stationary application	14
Figure 4– Example of a sealed prismatic cell in steel container with two terminals and four lugs	16
Figure 5: Pulsed Discharge graph showing the voltage behavior under a Current pulse	24
Figure 6 – Example of a NiCd cell discharge curve at various constant discharge currents based on percentage of capacity	32
Figure A. 1 – Overview of charging characteristic of Ni-Cd.....	41
 Table 1 – Dimensions for unjacketed sealed nickel-cadmium prismatic cells.....	17
Table 2 – Dimensions for sealed nickel-cadmium prismatic cells in plastic containers	17
Table 3 – Measurement tolerances in millimetres (valid for widths and lengths)	18
Table 4 – Maximum values for rapid charge current R	19
Table 5 – Discharge performance at 20 °C.....	19
Table 6 – Discharge performance at +5 °C.....	20
Table 7 – Discharge performance at –18 °C.....	20
Table 8 – Discharge performance at low temperature	21
Table 9 – Discharge performance at high temperature	22
Table 10 – High currents values.....	23
Table 11 – Discharge currents for measurement of internal resistance	24
Table 12 – Endurance in cycles	27
Table 13 – Parameters and responsibility for battery capacity sizing	35
Table 14 – Sequence of tests for type approval	37
Table 15 – Recommended test sequence for batch acceptance	38
Table A.1 – Ni-Cd batteries charging characteristics	40

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SECONDARY CELLS AND BATTERIES CONTAINING
ALKALINE OR OTHER NON-ACID ELECTROLYTES –
SEALED NICKEL-CADMIUM PRISMATIC RECHARGEABLE CELLS AND
BATTERIES FOR USE IN INDUSTRIAL APPLICATIONS**

FOREWORD

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International Standard IEC 60622 has been prepared by subcommittee 21A: Secondary cells and batteries containing alkaline or other non-acid electrolytes, of IEC technical committee 21: Secondary cells and batteries.

This edition cancels and replaces the edition published in 2002 and constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- optional characterization of cells designed for performances at very low and/or very high temperature;
- optional characterization of cells tested with CCCV charge;
- optional characterization of cells designed for rapid charge;
- optional characterization of cells designed for high cycling.

56 The text of this standard is based on the following documents:

FDIS	Report on voting
XXX	YYY

57
58 Full information on the voting for the approval of this standard can be found in the report on
59 voting indicated in the above table.

60 This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

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

- 64 • reconfirmed,
- 65 • withdrawn,
- 66 • replaced by a revised edition, or
- 67 • amended.

68

69

SECONDARY CELLS AND BATTERIES CONTAINING ALKALINE OR OTHER NON-ACID ELECTROLYTES – SEALED NICKEL-CADMIUM PRISMATIC RECHARGEABLE CELLS AND BATTERIES FOR USE IN INDUSTRIAL APPLICATIONS

1 Scope

IEC 60622 specifies marking, designation, dimensions, tests and requirements for sealed nickel-cadmium prismatic secondary single cells.

NOTE In this context, "prismatic" refers to cells having rectangular sides and base.

When there exists an IEC standard specifying test conditions and requirements for cells used in special applications and which is in conflict with this document, the former takes precedence.

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 60050-486, *International Electrotechnical Vocabulary – Chapter 486: Secondary cells and batteries*

IEC 60050-482:2004, *International Electrotechnical Vocabulary – Part 482 Primary and Secondary cells and batteries*

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

IEC 60410, *Sampling plans and procedures for inspection by attributes*

IEC 60417, *Graphical symbols for use on equipment* (available from: <http://www.graphical-symbols.info/equipment>)

IEC 60485, *Digital electronic d.c. voltmeters and d.c. electronic analogue-to-digital converters*

IEC 61438, *Possible safety and health hazards in the use of alkaline secondary cells and batteries – Guide to equipment manufacturers and users.*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-482 and the following 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>

3.1 sealed cell

cell which remains closed and does not release either gas or liquid when operated within the limits of charge and temperature specified by the manufacturer. The cell is equipped with a safety device to prevent dangerously high internal pressure. The cell does not require addition to the electrolyte and is designed to operate during its life in its original sealed state.

Note 1 to entry: The opening may be fitted with a venting system.

3.2 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.

Note 2 to entry: See 5.4.2

[SOURCE: IEC 60050-482:2004, 482-02-17, modified – Note 2 to entry has been added.]

3.3 battery crate

container with frame walls for holding several cells or batteries.

Note 1 to entry: See 5.4.2.

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

3.4 battery tray

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

Note 1 to entry: See 5.4.2.

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

3.5 ageing factor

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

3.6 battery module

group of cells connected together either in a series and/or parallel configuration without protective devices (e.g. fuse or temperature sensor)

3.7 battery system

system that also includes battery tray(s), battery crate(s), monobloc(s), battery module(s), electronic components and/or equipment and associated electromechanical connections. Any component necessary to obtain the safety and durability of the battery system is included (e.g. BTMS).

Note 1 to entry: See 10.4.1

Note 2 to entry: The battery system manufacturer can be the end user or the equipment manufacturer, in case they install e.g. heating/cooling systems, ventilation common to the global equipment but needed for the battery,

3.8 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.

3.9 end user

organization which operates the battery system

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

3.10 system integrator

organization which has the technical responsibility of the complete battery system and charging system

Note 1 to entry: The system integrator can be the end user or the equipment manufacturer, or none of them.

3.11 manufacturer

organization which has the technical responsibility for its scope of supply

Note 1 to entry: The manufacturer can be the equipment manufacturer or the system integrator of a battery system, a cell manufacturer, etc. If necessary to explicitly distinguish, "equipment manufacturer", "battery system manufacturer" or "cell manufacturer" is expressed.

**3.12 cumulated requested service
CRS**

total amount of service requested by the buyer or the end user, expressed in duration (months or years) or delivered energy in kWh, under e.g representative ambient and operating conditions as expressed

Note 1 to entry: Refer to 10

3.13 nominal voltage

suitable approximate value of the voltage used to designate or identify a cell or a battery

Note 1 to entry: The nominal voltage of a sealed nickel-cadmium rechargeable single cell is 1,2 V.

Note 2 to entry: The nominal voltage of a battery of n series connected cells is equal to n times the nominal voltage of a single cell.

[SOURCE: IEC 60050-482:2004, 482-03-31, modified – Replacement of the words "a battery or an electrochemical system" by "or a battery" and addition of Notes 1 and 2 to entry.]

**3.14 discharge voltage
closed circuit voltage**

DEPRECATED: on load voltage

<cell or battery> voltage between the terminals of a cell or battery when being discharged

[SOURCE: IEC 60050-482:2004, 482-03-28]

3.15 rated capacity

capacity value of a cell or battery determined under specified conditions and declared by the manufacturer

Note 1 to entry: The rated capacity is the quantity of electricity C_5 Ah (ampere-hours) declared by the manufacturer which a single cell can deliver during a 5 h period when charging, storing and discharging under the conditions specified in 7.3.2.

189 [SOURCE: IEC 60050-482:2004, 482-03-15, modified – Addition of the words "a cell or" in the
190 definition, and of Note 1 to entry.]

191 **3.16 CCCV charge**

192 method of charge consisting in a charge at Constant Current followed by a charge at Constant
193 Voltage

194 **4 Parameter measurement tolerances**

195 The overall accuracy of controlled or measured values, relative to the specified or actual
196 values, shall be within these tolerances:

- 197 a) ± 1 % for voltage;
- 198 b) ± 1 % for current;
- 199 c) ± 2 °C for temperature;
- 200 d) $\pm 0,1$ % for time;
- 201 e) ± 1 % for capacity.

202 These tolerances comprise the combined accuracy of the measuring instruments, the
203 measurement techniques used, and all other sources of error in the test procedure.

204 The details of the instrumentation used shall be provided in any report of results.

205 **5 Designation and marking**

206 **5.1 Cell designation (mandatory)**

207 Sealed nickel-cadmium prismatic secondary single cells shall be designated by the letter "KC"
208 followed by a letter L, M, H or X which signifies:

- 209 – low rate of discharge (L);
- 210 – medium rate of discharge (M);
- 211 – high rate of discharge (H);
- 212 – very high rate of discharge (X).

213 NOTE 1 These types of cells are typically but not exclusively used for the following discharge rates:

- 214 – L up to $0,5 I_t$ A;
- 215 – M up to $3,5 I_t$ A;
- 216 – H up to $7,0 I_t$ A;
- 217 – X up to and above $7,0 I_t$ A.

218 NOTE 2 These currents are expressed as multiples of I_t A, where I_t A = C_5 Ah/1 h (see IEC 61434).

219 NOTE 3 In case the cells have internal separations but a common electrolyte, they are still considered as a single
220 cell

221

222 This group of three letters shall be followed by a group of figures indicative of the rated
223 capacity of the cell in ampere-hours. Cells that have been tested at 20 °C and 5 °C but not
224 at –18 °C shall carry an additional marking of T5: for example: KCH 185 or KCH 185 T5.

225 As an option, cells in cases of plastic material shall be designated by the letter "P" after the
226 figures (for example: KCH 185 P), or in case of steel cells with a letter "S".

5.2 Cell designation (optional)

The additional marking shall be added to the mandatory marking. When the marking would exceed the available space on the cell, this information may be omitted on the cell but shall be provided in the documentation corresponding to the cell and in the type test report, or in a shared IT system accessible to the end-user based on information on the cell label (e.g. data matrix).

If there is no mention concerning the marking for temperature, the cells shall have been tested at: -18°C , 5°C and 20°C . Cells tested at other temperatures shall carry an additional marking of T followed by tested temperatures. In case the cell is characterized with both low and high temperature, they shall be indicated in increasing order with a solidus separating them: for example: KCH 185 P T-35/+45.

Cells tested with CCCV charges shall carry the marking of CCCV: for example, KCH 185 P CCCV.

Cells tested at rapid charge shall carry the marking R and the value of the tested rapid charge current, expressed in multiple of I_t A: for example, KCH 185 P R1.

High grade cycling cells shall carry an additional marking C followed by the number of cycles: for example, KCH 185 P C1500.

Cells having been tested with multiple types of tests shall carry the marking for the various tests performed: for example KCH 185 P T-35/+45 CCCV R1 C1500.

5.3 Cell termination

This document does not specify cell termination.

5.4 Battery designation

5.4.1 Battery structure formulation

Modules, battery packs and battery systems are preferably designated as described below.

In case of batteries where there are cells in series with crates or modules with different number of same capacity cells, the detailed information is not necessary in the designation, it is a constructive information already provided in the drawing.

Cells Designation as per 5.1 or 5.2 followed by the battery structure formulation:

a) it describes the number of cells in the minimum constitutive(s) entity(ies) and on the right side of the number, it describes their connection mode in series (S) or in parallel (P).

See Annex C (informative)

Battery Structure Information

b) in the event that the minimum constitutive entities are connected in series or in parallel, it describes the number of minimum constitutive entities, and on the right side of the number, it describes their connection mode in series (S) or in parallel (P).

See Annex C (informative) including some examples.

The battery designation should include the breakdown structure of the battery. The descriptive path followed to formulate the battery is from the smallest entity to the largest one:

EXAMPLE 1 "KCM130(80S)" would designate a prismatic sealed nickel-cadmium battery. Its rated capacity is 130 Ah with 80 cells. It is designed for a medium discharge rate.

EXAMPLE 2 "KCH100((2P)84S)" would designate a prismatic sealed nickel-cadmium battery system. Its rated capacity is 100 Ah. It is designed for a high discharge rate.

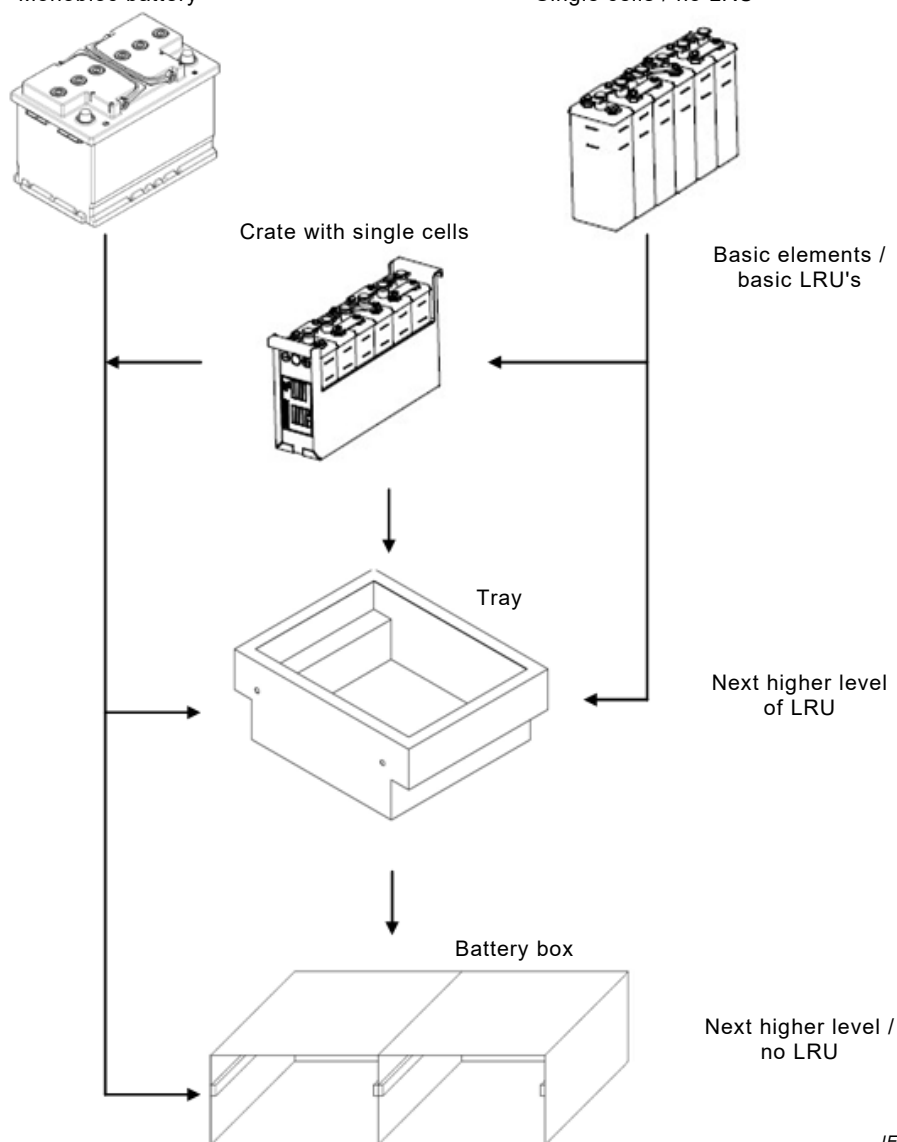
5.4.2 Definitions of components of a battery system

In order to clarify the definitions, this chapter presents practical examples

See Figure 1 (images are examples) for the case of mobile applications.

Monobloc battery

Single cells / no LRU

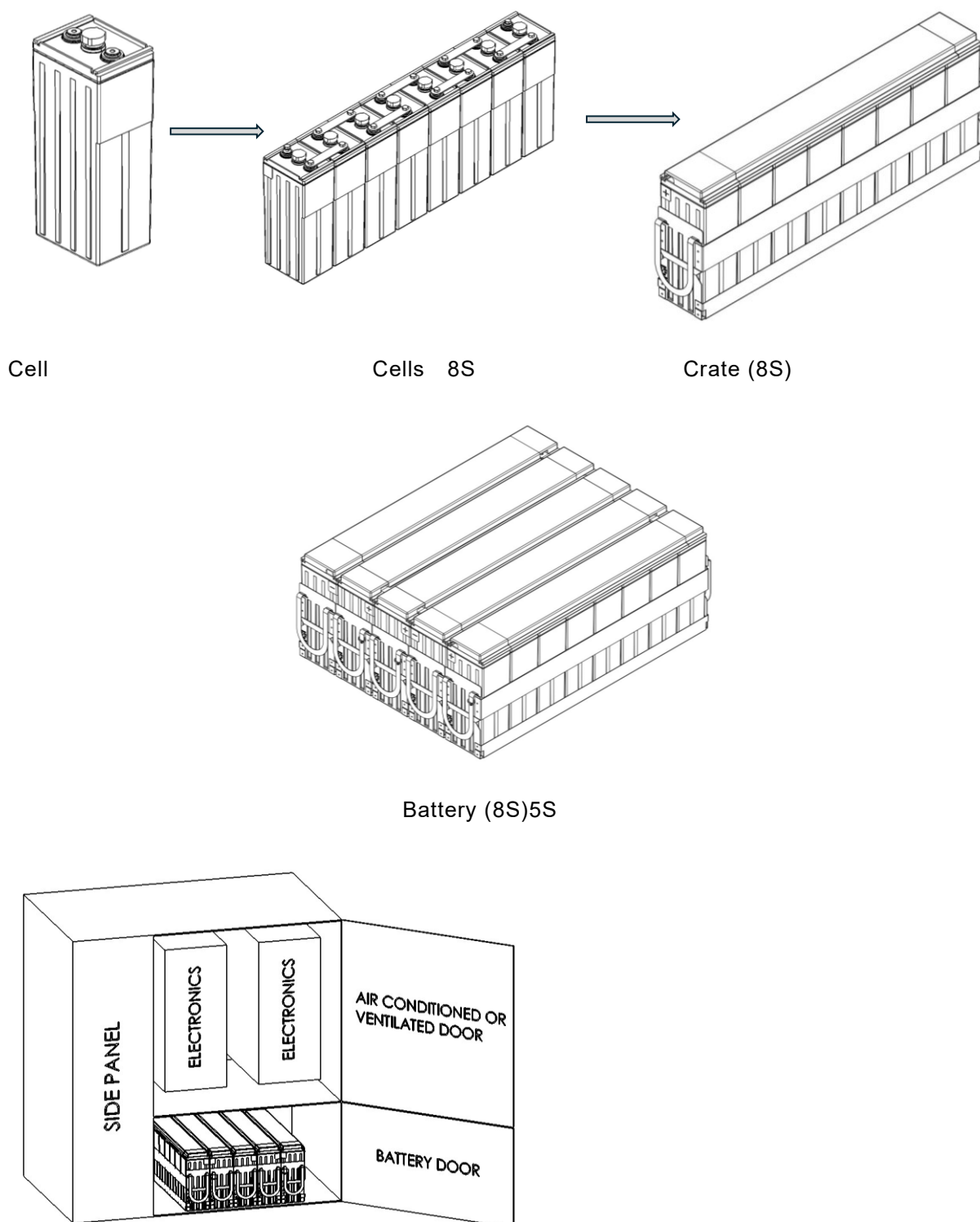


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Figure 1 – Definition of cell(s), monobloc battery, crate, tray, and box, example of mobile application

Some batteries may not include all of the above components, e.g. single cells may be installed in a tray without crates. Some battery technologies may include further components (e.g. module) in the parts of this standard series if necessary.

For the case of stationary applications, see Figure 5 and Figure 3 - schematics as examples, with reference to Annex C provided.



Battery (8S)5S in a Cabinet

Figure 2. Definition of cell(s), crate/block/module, Battery, Cabinet, example of