

INTERNATIONAL STANDARD

NORME INTERNATIONALE

General guidance on reuse and repurposing of secondary cells and batteries

Recommandations générales relatives à la réutilisation et à la réaffectation des accumulateurs et des batteries d'accumulateurs

IEC 63338:2024

<https://standards.iteh.ai/catalog/standards/iec/c141727d-92a8-46af-bd20-57c8cc409d8b/iec-63338-2024>



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CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	9
2 Normative references	9
3 Terms and definitions	9
4 General considerations.....	15
5 Consideration of safety risks associated with reuse and repurposing	16
5.1 General.....	16
5.2 Lithium ion systems	17
5.2.1 Lithium ion cells.....	17
5.2.2 Lithium ion battery systems	17
5.3 Nickel systems.....	18
5.3.1 Nickel-metal hydride cells	18
5.3.2 Nickel-metal hydride cells and battery systems	19
6 Considerations for reused or repurposed battery systems.....	19
6.1 General.....	19
6.2 Determining suitability for reuse or repurposing (based on battery lifetime traceability data)	20
6.2.1 General	20
6.2.2 Battery lifetime traceability data.....	21
6.3 Safety evaluation of reused or repurposed batteries	21
6.4 Reused or repurposed cell and battery operating region	21
7 Coordination of reuse or repurposing with the original manufacturer.....	22
7.1 General.....	22
7.2 Warning notice on reuse or repurposing applicability.....	22
7.2.1 General	22
7.2.2 Originally intended reuse or repurposing (according to the original manufacturer).....	22
7.2.3 Warning notice requesting the original manufacturer's approval for reuse or repurposing	22
7.2.4 Absence of warning notice.....	22
8 Recommendations for reuse or repurposed application manufacturers.....	23
8.1 Removal of original cell or battery label and markings.....	23
8.2 Affixation of label or marking specifying reuse or repurposing	23
8.3 Prerequisites for reuse or repurposed application manufacturers	23
9 Environmental options if reuse or repurposing is not possible.....	23
Annex A (informative) Guidance checklist.....	24
Annex B (informative) Reuse and repurposing: relevant reference information	25
B.1 General.....	25
B.2 IEC 63330-1	25
B.3 IEC 62933-4-4	25
B.4 IEC 62933-5-3	26
B.5 UL 1974.....	26
B.6 SAE J2997 (Under development)	26
B.7 EN 45554.....	26

B.8 National Renewable Energy Laboratory (of the U.S. Department of Energy Office of Energy Efficiency & Renewable Energy) TP-5400-63332 26

B.9 European Commission JRC Technical Report 2018-08-28 27

B.10 Ecodesign preparatory Study for Batteries 2020-03-10 27

Annex C (informative) Examples of common terms for reuse and repurposing 28

Bibliography..... 29

Figure 1 – Scope of this document..... 9

Figure 2 – Battery system configuration example 18

Figure 3 – Example of protection device installation..... 19

Table 1 – Standards on reuse and repurposing of batteries and battery energy storage systems (BESS)..... 7

Table A.1 – Checklist of recommendations before reuse or repurposing of relevant secondary cells and batteries..... 24

Table B.1 – Reuse and repurposing: relevant reference information..... 25

Table C.1 – Examples of common terms for reuse and repurposing 28

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GENERAL GUIDANCE ON REUSE AND REPURPOSING OF SECONDARY CELLS AND BATTERIES

FOREWORD

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IEC 63338 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. It is an International Standard.

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

Draft	Report on voting
21A/885/FDIS	21A/899/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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INTRODUCTION

Based on the principles of life cycle thinking (LCT) and environmentally conscious design (ECD), secondary battery reuse and repurposing are a means to reduce raw material consumption. However, there are potential safety risks to consider before reusing or repurposing a battery. These should be thoroughly addressed before considering any kind of reuse or repurposing operations. Further, it is essential that all reused or repurposed batteries or sub-units of batteries comply with all safety, transport and product testing at the same level as new battery products (except tests requiring destructive sampling).

The primary purpose of this document is to provide basic guidance on the environmental aspects of reuse and repurposing of relevant cells and batteries; basic guidance on safety risks for the reuse and repurposing of relevant cells and batteries; basic guidance on original manufacturer warning notice on the applicability of a product for reuse or repurposing; and useful information regarding reuse and repurposing and relevant cell and battery regulations and standards to interested parties.

Additionally, various regions and countries are currently developing requirements and regulations for the reuse and repurposing of secondary cells and batteries, especially those used for the propulsion of electric road vehicles, after being extracted at their end of life. These differing requirements and regulations could lead to technical or safety issues in the use of these batteries. Thus, this document can assist nations and regions in setting up secondary battery reuse and repurposing regulations.

The expected users of this document are the following: original manufacturers (including cell and battery or application), qualified reuse and repurposed application manufacturers (e.g. with approval in writing from the original manufacturer to reuse or repurpose); national, regional, and local authorities that establish secondary battery reuse and repurposing regulations; and national, regional, and local authorities that revise secondary battery reuse and repurposing regulations.

However, other stakeholders are not precluded from using this document.

National and regional standards and voluntary stewardship programs are given priority over the matters covered in this document.

Table 1 contains an overview of different standards on reuse and repurposing of batteries and Battery Energy Storage Systems (BESS) developed by IEC/TC 21 Secondary cells and batteries and IEC/TC 120 Electrical Energy Storage (EES) systems. The purpose of Table 1 is to inform users of these standards about the existence of the other standards listed in the table and give a concise overview of the outline of those standards. It also identifies areas of possible overlap and informs users in these cases which of the standards takes precedence.

Table 1 – Standards on reuse and repurposing of batteries and battery energy storage systems (BESS)

		IEC 63338		IEC 63330-1		IEC 62933-4-4		IEC 62933-5-3	
Title		General guidance on reuse and repurposing of secondary cells and batteries		Repurposing of secondary batteries – Part 1: General requirements		Electrical energy storage (EES) systems – Part 4-4: Environmental requirements for battery-based energy storage systems (BESS) with reused batteries		Electrical energy storage (EES) systems – Part 5-3: Safety requirements for grid-integrated EES systems – Performing unplanned modification of electrochemical based system	
Scope		Secondary lithium ion and Ni-MH		Repurposing of secondary batteries and systems (excluding redox flow/Ni-MH/Pb batteries)		BESS using reused batteries		Energy storage systems	
		Battery	System	Battery	System	Battery	System	Battery	System
Requirements	General			No overlap: Clause 4 Clause 5 Clause 6					
	Environment					Support: Annex A (info)	No overlap: Clause 4 Clause 5 Clause 6 Clause 7 Annex B (info)		
	Safety			Priority: Clause 4 Clause 5 Clause 6	Support: Clause 6 (ESS) No overlap: Clause 6 (other)			Support: Annex A (Info)	No overlap: Clause 5 Clause 6 Clause 7 Clause 8 Priority: Clause 9
	Assessment			Priority: Clause 5	Support: Clause 6 (ESS) No overlap: Clause 6 (other)				

		IEC 63338	IEC 63330-1		IEC 62933-4-4		IEC 62933-5-3	
Guidance	General	No overlap: Clause 4						
	Environment	No overlap: Clause 9						
	Safety	Priority: Clause 5 Clause 6 No overlap: Clause 7 Clause 8						

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GENERAL GUIDANCE ON REUSE AND REPURPOSING OF SECONDARY CELLS AND BATTERIES

1 Scope

This document applies to the reuse and repurposing of secondary lithium ion and nickel-metal hydride cells and batteries after extraction from the application for which they were first placed on the market (hereafter "relevant cells and batteries").

This document does not permit reuse or repurposing of single cells or cell assemblies if battery lifetime traceability data are not recorded. See Clause 4. Swappable batteries such as those used in e-scooters are removed and installed by the user (such as for charging) without conducting a safety assessment (such as battery lifetime traceability data assessment) as part of intended use, which is not considered reuse or repurposing. This document does not cover system component reuse and repurposing. The original manufacturer can be contacted to confirm suitability of components for reuse and repurposing.

Figure 1 illustrates the scope of this document in the product life stage.

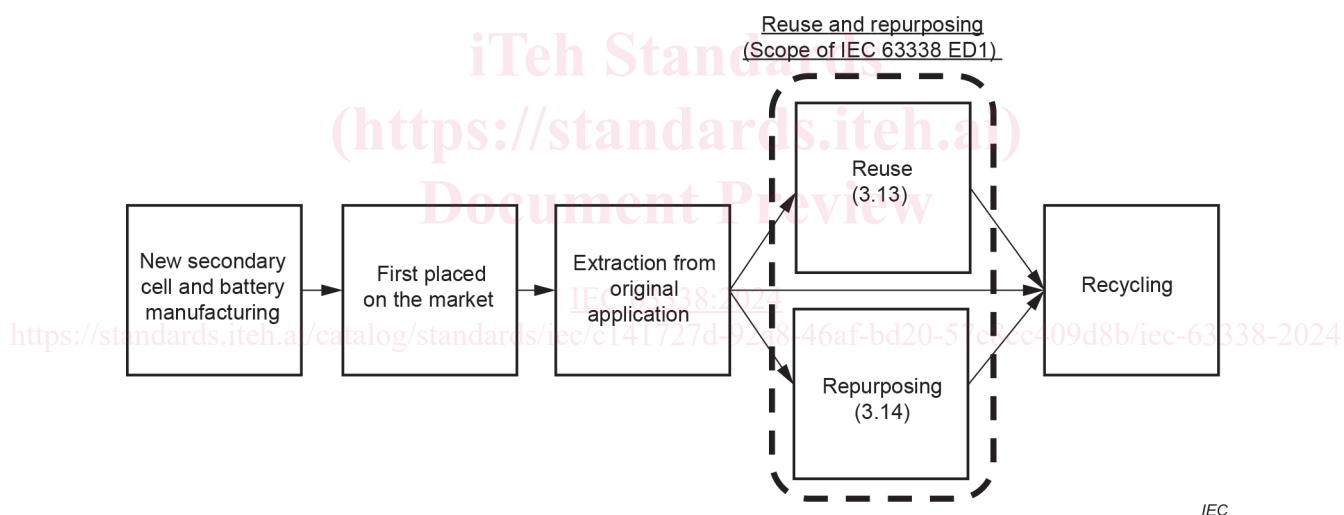


Figure 1 – Scope of this document

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

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

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

3.1

product

goods or service

[SOURCE: IEC 63218:2021, 3.1, modified – "any" has been deleted from the definition.]

3.2

electric road vehicle

electric vehicle with only a traction battery as power source for vehicle propulsion (battery electric vehicle) or vehicle with both a rechargeable energy storage system and a fuelled power source for propulsion (hybrid electric vehicle)

[SOURCE: IEC 62660-1:2018, 3.1 and IEC 62660-1:2018, 3.2, modified – The terminological entries have been merged and the terms have been replaced with "electric road vehicle".]

3.3

waste battery

cells or batteries which the holder discards or intends or is required to discard

Note 1 to entry: Assessment of used batteries for possibility to repurpose is included in IEC 63330 ED1

[SOURCE: IEC 63218:2021, 3.2 modified – "cells or" added to the definition.]

3.4

environment

surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans and their interrelationships

Note 1 to entry: Surroundings in this context extend from within an organization to the global system.

[SOURCE: IEC 63218:2021, 3.3]

3.5

environmental aspect

element of an organization's activities or products that interacts or can interact with the environment

Note 1 to entry: An environmental aspect can cause (an) environmental impact(s). A significant environmental aspect is one that has or can have one or more significant environmental impact(s).

Note 2 to entry: Significant environmental aspects are determined by the organization applying one or more criteria.

Note 3 to entry: Activities of the organization are those related to the design and development.

[SOURCE: IEC 60050-901:2013, 901-07-02, modified – "interacts or" added to the definition, and note to entry replaced with three new notes to entry.]

3.6

environmental impact

change to the environment, whether adverse or beneficial, wholly or partly resulting from a product environmental aspect

[SOURCE: IEC 60050-904:2014, 904-01-03, modified – "environmental aspects" replaced with "a product environmental aspect".]

3.7 environmentally conscious design ECD

systematic approach which takes into account environmental aspects in the design and development process with the aim to reduce adverse environmental impacts

[SOURCE: IEC 60050-904:2014, 904-01-13]

3.8 life cycle

consecutive and interlinked stages of a product system, from raw material acquisition or generation from natural resources to the final disposal

[SOURCE: IEC 60050-901:2013, 901-07-12]

3.9 life cycle thinking LCT

consideration of all relevant environmental aspects during the entire life cycle of products

[SOURCE: IEC 60050-901:2013, 901-07-14]

3.10 life cycle assessment LCA

compilation and evaluation of the inputs, outputs and the potential environment impacts of a product system throughout its life-cycle

[SOURCE: IEC 60050-901:2013, 901-07-13]

3.11 end of life EOL

life cycle stage of a product starting when it is finally removed from its intended use-phase

[SOURCE: IEC 60050-901:2013, 901-07-15]

3.12 recycling

processing of waste materials for the original purpose or for other purposes, excluding energy recovery

[SOURCE: IEC 60050-901:2013, 901-07-10, modified – note to entry omitted.]

3.13 reuse

operations by which secondary batteries are used again in the same application as when first placed on the market

Note 1 to entry: See Annex C for alternative common terms.

Note 2 to entry: When reuse of secondary batteries is as originally intended from the design stage, this is considered "originally intended reuse". When reuse of secondary batteries is not originally intended from the design stage, this is considered "originally unintended reuse".

Note 3 to entry: An example of reuse is when a battery is extracted from an electric vehicle (EV), its battery lifetime traceability data is assessed, its battery management system (BMS) operating region is narrowed, and it is used again in another less demanding EV.

3.14 repurposing

operation by which secondary batteries are used again in a different application to when first placed on the market

Note 1 to entry: See Annex C for alternative common terms.

Note 2 to entry: When repurposing of secondary batteries is as originally intended from the design stage, this is considered "originally intended repurposing". When repurposing of secondary batteries is not originally intended from the design stage, this is considered "originally unintended repurposing".

Note 3 to entry: An example of repurposing is when a battery is extracted from an EV, its battery lifetime traceability data is assessed, its BMS operating region is narrowed, and it is used again in another less demanding application such as an energy backup system for telecom equipment.

3.15 reuse or repurposed application

application in which a cell or battery or battery system is used after undergoing reuse or repurposing operations

3.16 secondary cell

basic manufactured unit providing a source of electrical energy by direct conversion of chemical energy, that consists of electrodes, separators, electrolyte, container and terminals, and that is designed to be charged electrically

[SOURCE: IEC 62133-1:2017, 3.7]

3.17 secondary battery

assembly of secondary cell(s) which may include associated safety and control circuits and case, ready for use as a source of electrical energy characterized by its voltage, size, terminal arrangement, capacity and rate capability

Note 1 to entry: The term "secondary battery" includes single cell batteries.

[SOURCE: IEC 63218:2021, 3.20]

3.18 battery system battery

system which comprises one or more cells, modules or battery packs

Note 1 to entry: The battery system has a battery management system to cut off in case of overcharge, overcurrent, overdischarge, and overheating.

Note 2 to entry: Overdischarge cut-off is not mandatory if there is an agreement between the battery manufacturer and the customer.

Note 3 to entry: The battery system may have cooling or heating units. More than one battery system may constitute a larger battery system. The battery system is sometimes also referred to as a battery.

[SOURCE: IEC 62619:2022, 3.11, modified – The wording "and has a battery management system capable of controlling current in case of overcharge, overcurrent, overdischarge, and overheating" omitted from the definition and Note 1 to entry added (existing notes renumbered).]