

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Lithium-ion batteries and charging systems – Safety

Batteries lithium-ion et systèmes de charge – Sécurité



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CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	6
2 Normative references	7
3 Terms and definitions	9
4 Void.....	13
5 General conditions for the tests	13
6 Void.....	15
7 Void.....	15
8 Marking and instructions.....	15
9 Protection against electric shock	20
10 Void.....	20
11 Void.....	20
12 Heating.....	20
13 Resistance to heat and fire	21
14 Void.....	23
15 Void.....	23
16 Void.....	23
17 Void.....	23
18 Abnormal operation	23
19 Mechanical hazards.....	28
20 Mechanical strength	28
21 Construction	29
22 Internal wiring.....	32
23 Components	33
24 Supply connection and external flexible cords	34
25 Void.....	35
26 Void.....	35
27 Screws and connections	35
28 Creepage distances, clearances and distances through insulation.....	35
Bibliography.....	37
Figure 1 – Test fingernail	31
Figure 2 – Measurement of clearances	36
Table 1 – Minimum creepage distances and clearances between parts of different potential.....	35

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**LITHIUM-ION BATTERIES AND CHARGING SYSTEMS –
SAFETY**
FOREWORD

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

Draft	Report on voting
116/579/FDIS	116/588/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/standardsdev/publications.

In this document, the following print types are used:

- requirements: in roman type;
- *test specification: in italic type;*
- notes: in smaller roman type.
- words in **bold** in the text are defined in Clause 3. When a definition concerns an adjective, the adjective and the associated noun are also in bold.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under 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
- amended.

INTRODUCTION

This document contains a subset of requirements from IEC 62841-1:2014 that are applicable for **battery charging systems**. The **battery charging system** includes the **battery(ies)** and its related charging circuitry. In many cases, the same **battery charging system** is utilized for a wide variety of end products. Therefore, the purpose of this document is to provide a means for evaluating a **battery charging system** for electric motor-operated hand-held tools, transportable tools and lawn and garden machinery. This evaluation can then be utilized over a wide range of **products** covered by IEC 62841 (all parts), without having to re-evaluate the **battery charging system** for each case where the **battery charging system** is utilized in or with a **product**.

NOTE This document is structured in a way that other Technical Committees could reference this document in end **product** standards. For example, **products** outside of the scope of IEC 62841 (all parts) often use the same **battery charging systems** as in products covered by IEC 62841 (all parts).

This document has been structured so that the clause and subclause numbers are aligned, as far as practical, with both the main body and Annex K of IEC 62841-1:2014.

The following is a list of subclauses in IEC 62841-1:2014 that do not need to be repeated for **battery charging systems** evaluated to this document during **product** evaluations:

- 8.2, 8.6, 8.12, 8.14, 8.14.1, 20.2, 21.3, 21.22, 21.23, 21.24, 22.1, 22.4, 22.5, 23.1.4, 23.1.5, 23.1.7, 23.1.8, 23.4, 27.2;
- K.8.3, K.8.14.1.1, K.8.14.2, K.9.1, K.9.3, K.9.5, K.12.201, K.13.2, K.13.2.201, K.18.1, K.18.201, K.18.202, K.19.202, K.20.1, K.20.3.1, K.20.3.2, K.21.202, K.21.203, K.22.2, K.23.201, K.23.202, K.28.1.

Subclause K.13.1 of IEC 62841-1:2014 may or may not need to be repeated for **battery charging systems** evaluated to this document, depending on the temperature used for the test of 13.1 of this document and the temperature required by K.13.1 of IEC 62841-1:2014.

LITHIUM-ION BATTERIES AND CHARGING SYSTEMS – SAFETY

1 Scope

This document applies to the safety of lithium-ion **batteries** and **charging systems** for use in rechargeable **battery**-powered motor-operated or magnetically driven

- hand-held tools (IEC 62841-2),
- transportable tools (IEC 62841-3), and
- lawn and garden machinery (IEC 62841-4).

The above listed categories are hereinafter referred to as "**products**".

NOTE 1 This document is structured in a way that other Technical Committees could reference this document in end **product** standards. For example, **products** outside of the scope of IEC 62841 (all parts) often use the same **battery charging systems** as in products covered by IEC 62841 (all parts).

The maximum nominal voltage assigned by the manufacturer for **battery** packs is 75 V DC.

Electric shock hazard is considered to exist only between parts of opposite polarity, except for cases where **batteries** are charged by a non-isolated **charger**.

Battery packs covered under this document intended to be charged by a non-isolated **charger** are evaluated by this document and to the requirements for protection against electric shock specified in IEC 62841-1:2014. When evaluating a **battery** pack for protection against electric shock, **creepage distances**, **clearances** and distances through insulation, the **battery** pack is fitted to the intended **charger**.

Since **battery** packs covered under this document are submitted to different use patterns (such as rough use, high charging and discharging currents), their safety can be evaluated only by this document or by IEC 62841-1:2014 and not by using other standards for **battery** packs, such as IEC 62133-2:2017, unless otherwise indicated in this document. All relevant aspects related to the safety of **batteries** are addressed in this document, such that the requirements of IEC 62133-2:2017 need not be separately applied.

For **integral batteries**, this document only applies to the **integral battery** when in combination with the **product**.

When evaluating the risk of **fire** associated with **batteries**, consideration has been given to the fact that these **batteries** are unattended energy sources and have been evaluated as such in this document. Requirements in other documents regarding the risk of **fire** due to the charging of these **batteries** are therefore considered to be fulfilled.

The following is considered within the context of these requirements.

- These requirements address the risk of **fire** or **explosion** of these **batteries** and not any possible hazards associated with toxicity nor potential hazards associated with transportation or disposal.

NOTE 2 IEC 62281:2019 covers the safety aspects of lithium-ion **batteries** during transport.

- **Batteries** and **charging systems** covered by these requirements are not intended to be serviced by the end user.
- This document is intended to provide an evaluation of the combination of a **battery(ies)** and its corresponding **charging system(s)**.