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Small craft — Lithium-ion batteries

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Foreword

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This document was prepared by Technical Committee ISO/TC 188, *Small craft*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Small craft — Lithium-ion batteries

1 Scope

This document provides requirements and recommendations for the selection and installation of lithium-ion batteries for boats. It applies to lithium-ion batteries and to battery systems with a capacity greater than 600 Wh, installed on small craft for providing power for general electrical loads and/or to electric propulsion systems. It is primarily intended for manufacturers and battery installers.

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 terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
ampere interrupt capacity
AIC
maximum current a circuit breaker or fuse is rated to safely interrupt at a specific voltage

3.2
battery
collection of *cells* (3.7) wired in series (or series/parallel) and constituting a single physical unit

3.3
battery bank
set of *batteries* (3.2) electrically connected (parallel/series) to increase capacity and or voltage

3.4
battery capacity
C
capacity of the *battery* (3.2), expressed in ampere-hours (Ah) at a nominal voltage or in watt hours (Wh), from the manufacturer's specified fully charged to discharged voltage levels

Note 1 to entry: Ah capacity rating at a given discharge rate or time.

3.5
battery management system
BMS
system designed to protect a lithium-ion *battery* (3.2) from potentially damaging events, such as overcharging or overdischarging and high and low temperatures

3.6
battery system
battery (3.2) or batteries and all ancillary components

3.7
cell
fundamental building block that is inside a lithium-ion *battery* (3.2) where electrical energy is derived from the insertion/extraction reactions of lithium ions or oxidation/reduction reaction of lithium between the negative electrode and the positive electrode

3.8
C rating
measure of *battery* (3.2) charge and discharge rating expressed as a function of the rated Ah capacity of the battery

Note 1 to entry: A 100 Ah battery charged or discharged at 100 A is a 1C rate.

3.9
contactor
protection relay/switch controlled by the *battery management system* (3.5) for *battery* (3.2) protection

3.10
high voltage cutout
HVC
battery management system's (3.5) response to a *high voltage event* (3.11) that protects the *battery* (3.2) from overcharging

3.11
high voltage event
HVE
condition where a *cell* (3.7) has been charged to a voltage above the manufacturer's cell maximum voltage limit

3.12
low voltage cutout
LVC
battery management system's (3.5) response to a *low voltage event* (3.13) that protects the *battery* (3.2) from overdischarging

3.13
low voltage event
LVE
condition where a *cell* (3.7) has been discharged beyond the cell manufacturer's cell low voltage limit

3.14
main contactor
in the case of a multiple *contactor* (3.9) system [*high voltage event* (3.11), *low voltage event* (3.13), plus the main], device intended to be the last one to open, or closest to the *battery* (3.2), and, in case of a single contactor system, device intended to serve as *high voltage cutout* (3.10)/*low voltage cutout* (3.12)/ main protection

3.15
overcharging
charging a *cell* (3.7) above the cell manufacturer's upper cell voltage limit, which may result in damage to the cell

3.16
safe operating limits
SOL
set of voltage, temperature and other parameters, within which the *battery* (3.2) is intended to be operated and which, if exceeded, initiates a *battery management system* (3.5) response to correct the problem or to shut the battery down