SLOVENSKI STANDARD
oSIST prEN IEC 62933-5-2:2024

01-maj-2024

Električne naprave za shranjevanje energije (EES) - 5-2. del: Varnostne zahteve za sisteme EES, integrirane v omrežje - Elektrokemični sistemi

Electrical energy storage (EES) systems - Part 5-2: Safety requirements for grid-integrated EES systems - Electrochemical-based systems

Elektrische Energiespeichersysteme (EES-Systeme) - Teil 5-2: Sicherheitsanforderungen an netzintegrierte EES-Systeme - Elektrochemische Systeme

Systèmes de stockage de l'énergie électrique (EES) - Partie 5-2: Exigences de sécurité pour les systèmes EES intégrés dans un réseau - Systèmes électrochimiques

Ta slovenski standard je istoveten z: **prEN IEC 62933-5-2:2024**

ICS:

27.010	Prenos energije in toplote na splošno	Energy and heat transfer engineering in general

oSIST prEN IEC 62933-5-2:2024 **en**

120/353/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 62933-5-2 ED2**	
DATE OF CIRCULATION: **2024-03-15**	CLOSING DATE FOR VOTING: **2024-06-07**
SUPERSEDES DOCUMENTS: **120/326/CD, 120/348/CC**	

IEC TC 120 : ELECTRICAL ENERGY STORAGE (EES) SYSTEMS

SECRETARIAT: Japan	SECRETARY: Mr Masatake SAKUMA
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 8,TC 21,SC 21A,TC 22,SC 22E,TC 57,TC 64,TC 69,TC 82,TC 88,TC 105,CISPR	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☒ SAFETY

☒ SUBMITTED FOR CENELEC PARALLEL VOTING	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

Attention IEC-CENELEC parallel voting

The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting.

The CENELEC members are invited to vote through the CENELEC online voting system.

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Recipients of this document are invited to submit, with their comments, notification of any relevant "In Some Countries" clauses to be included should this proposal proceed. Recipients are reminded that the CDV stage is the final stage for submitting ISC clauses. (SEE AC/22/2007 OR NEW GUIDANCE DOC).

TITLE:

Electrical energy storage (EES) systems - Part 5-2: Safety requirements for grid-integrated EES systems - Electrochemical-based systems

PROPOSED STABILITY DATE: 2029

NOTE FROM TC/SC OFFICERS:

This CDV reflects the observations made in 120/348/CC.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTRICAL ENERGY STORAGE (EES) SYSTEMS

Part 5-2: Safety requirements for grid-integrated EES systems – Electrochemical-based systems

FOREWORD

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International Standard IEC 62933-5-2 has been prepared by IEC technical committee 120: Electrical Energy Storage (EES) Systems.

This International Standard is to be used in conjunction with IEC 62933-5-1(Future):20xx.

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

FDIS	Report on voting
120/XX/FDIS	120/XX/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 62933 series, published under the general title *Electrical energy storage (EES) 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
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

All the electrical energy storage systems (EESS) follow the general safety requirements as described in IEC 62933-5-1(Future), which is based on a system approach. IEC 62933-5-2 follows the same structure as IEC 62933-5-1(Future) and provides additional requirements for battery energy storage systems (BESS). The additional requirements are provided for the following reasons:

BESS can be integrated into a significant range of electrical grids.

The level of safety requirements awareness can vary between utilities, system integrators, operators and end-users.

Although the safety of individual subsystems is generally covered by international standards at ISO and IEC levels, the safety matters that arise due the combination of electrochemical accumulation subsystems and any electrical subsystems are not always considered. BESS are complex at the systems level due to the variety of potential battery options and configurations, including the combination of subsystems (e.g. control systems for electrochemical accumulation subsystems, electrochemical accumulation subsystems, power conversion subsystems and auxiliary subsystems). Compliance with standards and related material produced specifically for the safety of subsystems cannot be sufficient to reach an acceptable level of safety for the overall system.

BESS can have additional safety hazards, due, for example, to the presence of chemicals, the emission of toxic gases, chemicals spilt around the electrochemical accumulation subsystems and to events critical for safety from electrochemical accumulation subsystems that cause safety issues for the entire BESS. They can cause loss of power at any part of the systems and buildings that can result in additional threats to safety. From a systems perspective, these individual hazards can have a system wide impact.

ELECTRICAL ENERGY STORAGE (EES) SYSTEMS

Part 5-2: Safety requirements for grid integrated EES systems – Electrochemical based systems

1 Scope

This part of IEC 62933 primarily describes safety aspects for people and, where appropriate, safety matters related to the surroundings and living beings for grid-connected energy storage systems where an electrochemical storage subsystem is used.

This safety standard is applicable to the entire life cycle of BESS (from design to end of service life management).

This document provides further safety provisions that arise due to the use of an electrochemical storage subsystem (e.g. battery system) in EES systems that are beyond the general safety considerations described in IEC 62933-5-1(Future).

This document specifies the safety requirements of an “electrochemical” energy storage system as a "system" to reduce the risk of harm or damage caused by the hazards of an electrochemical energy storage system due to interactions between the subsystems as presently understood.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitute 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.

ISO/IEC 31010, Risk management — Risk assessment techniques

IEC 60068-2-52, *Environmental testing – Part 2-52: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)*

IEC 60079-7:2015, *Explosive atmospheres – Part 7: Equipment protection by increased safety "e"*
IEC 60079-7:2015/AMD1:*2017*

IEC 60079-13, *Explosive atmospheres – Part 13: Equipment protection by pressurized room "p" and artificially ventilated room "v"*

IEC 60079-29 (all parts), *Explosive atmospheres – Gas detectors*

IEC 60364-4-44*, Low-voltage electrical installations – Part 4-44: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances*

IEC 60364-6:2016, *Low voltage electrical installations – Part 6:* Verification

IEC 60529*, Degrees of protection provided by enclosures (IP Code)*

IEC 60664-1:2020, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60812, *Failure modes and effects analysis (FMEA and FMECA)*

IEC 61000-1-2*, Electromagnetic compatibility (EMC) – Part 1-2: General – Methodology for the achievement of functional safety of electrical and electronic systems including equipment with regard to electromagnetic phenomena*

IEC 61000-6-7, *Electromagnetic compatibility (EMC) – Part 6-7: Generic standards – Immunity requirements for equipment intended to perform functions in a safety-related system (functional safety) in industrial locations*

IEC 61025, *Fault tree analysis (FTA)*

IEC 61660-1, *Short-circuit currents in d.c. auxiliary installations in power plants and substations – Part 1: Calculation of short-circuit currents*

IEC 61660-2, *Short-circuit currents in d.c. auxiliary installations in power plants and substations – Part 2: Calculation of effects*

IEC 61882, *Hazard and operability studies (HAZOP studies) – Application guide*

IEC 61936-1:2010, *Power installations exceeding 1 kV a.c. – Part 1: Common* rules
IEC 61936-1:2010/AMD1:2014

IEC 62305-2*, Protection against lightning – Part 2: Risk management*

IEC 62368-1, *Audio/video, information and communication technology equipment - Part 1: Safety requirements*

IEC 62477-1:2022, *Safety requirements for power electronic converter systems and equipment – Part 1: General*

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

IEC 62619:2022, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for secondary lithium cells and batteries, for use in industrial applications*

IEC 62933-1, *Electrical energy storage (EES) systems – Part 1: Vocabulary*

IEC 62933-5-1: (Future), *Electrical Energy Storage (EES) systems – Part 5-1: Safety considerations for grid integrated EES systems – General specification*

IEC 62933-5-3, *Electrical energy storage (EES) systems Part 5-3: Safety requirements for electrochemical based EES systems considering initially non-anticipated modifications - partial replacement, changing application, relocation and loading reused battery -*

ISO/IEC Guide 51:2014, *Safety aspects – Guidelines for their inclusion in standards*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62933-1 and IEC 62933-5-1(Future) 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

NOTE Where differences in definitions appearing in IEC 62933-1 and IEC 62933-5-1(Future) exist, the definition given in IEC 62933-1 prevail, unless otherwise specified here.

3.1
type test
conformity test made on one or more items representative of the production

[SOURCE: IEC 60050-151:2001, 151-16-16]

3.2
routine test
conformity test made on each individual item during or after manufacture

[SOURCE: IEC 60050-151:2001, 151-16-17]

3.3
battery management system
BMS
electronic system associated with a battery which has functions to controlling current in case of overcharge, overcurrent, over discharge, and overheating and which monitors and/or manages its state, calculates secondary data, reports that data and/or controls its environment to influence the battery's safety, performance and/or service life

[SOURCE:IEC 62619:2022,3.12,]

[SOURCE: IEC 60050-617:2009, 617-04-01, modified – the original definition has been particularized for the EES system and notes to entry have been added.]

3.4

system integrator
the manufacturer who integrates the individual subsystem and completes functions properly as a single system.

4 Basic guidelines for safety of BESS

4.1 General

An assessment and reduction of risk associated with the BESS as manufactured and as intended to be installed shall be conducted according to the sequence shown in Figure 1.

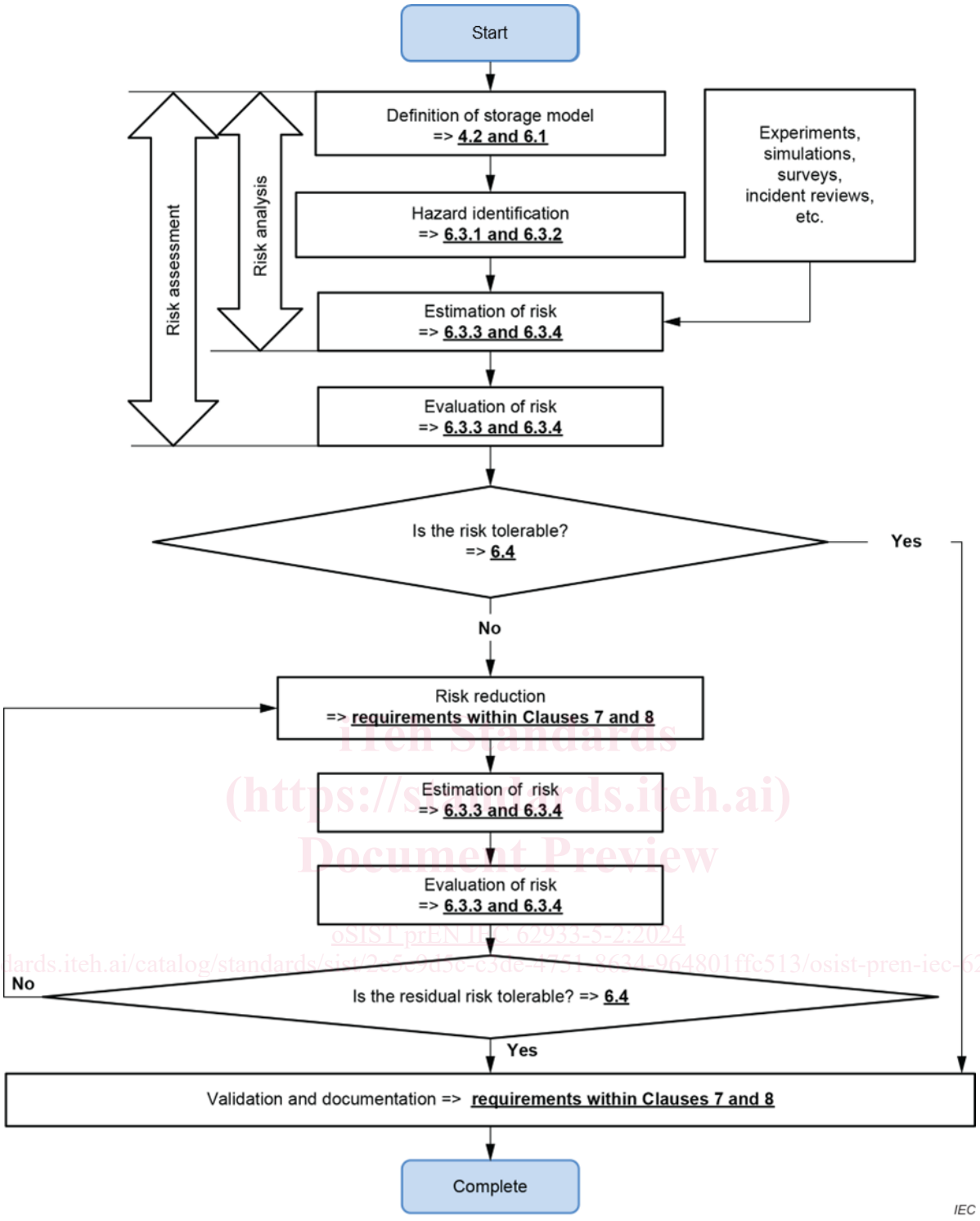

Figure 1 – General description for risk assessment and reduction of BESS

Risks can depend on many factors including location, chemistry and the size/scale (e.g. power) of the BESS and need to be assessed accordingly. The location of BESS can range from single domestic situations, commercial and industrial applications to utility scale systems; and risks need to be assessed accordingly. Selection of chemistry for the electrochemical accumulation subsystem of the BESS can depend on the environment, performance characteristics and any associated costs and benefits.

As described in ISO/IEC Guide 51, risk reduction measures taken during design are “inherently safe design”, “guards and protective devices”, and “information for end users”. Additional measures at the use phase (life cycle safety management) are also described in ISO/IEC Guide 51.