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Dodelitev zahtev celovite varnosti - Osnovni princip (IEC/TR 63161:2022)

Assignment of safety integrity requirements - Basic rationale (IEC/TR 63161:2022)

Zuordnung der Sicherheitsintegritäts-Anforderungen - Grundlegende Begründungen (IEC/TR 63161:2022)

Attribution des exigences en matière d'intégrité de la sécurité - Justification fondamentale (IEC/TR 63161:2022)

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Zuordnung der Sicherheitsintegritäts-Anforderungen -
Grundlegende Begründungen
(IEC/TR 63161:2022)

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
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CLC IEC/TR 63161:2024 (E)**European foreword**

This document (CLC IEC/TR 63161:2024) consists of the text of IEC/TR 63161:2022 prepared by IEC/TC 44 "Safety of machinery - Electrotechnical aspects".

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The text of the International Technical Report IEC/TR 63161:2022 was approved by CENELEC as a European Technical Report without any modification.

In the official version, for Bibliography, the following notes have to be added for the standard indicated:

IEC 61508-1	NOTE	Approved as EN 61508-1
IEC 61508-4:2010	NOTE	Approved as EN 61508-4:2010 (not modified)
IEC 61508-5:2010	NOTE	Approved as EN 61508-5:2010 (not modified)
IEC 61511-1:2016	NOTE	Approved as EN 61511-1:2017 (not modified)
IEC 62061:2021	NOTE	Approved as EN IEC 62061:2021 (not modified)
ISO 13849 (series)	NOTE	Approved as EN ISO 13849 (series)

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cencenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
ISO 12100	2010	Safety of machinery – General principles for design – Risk assessment and risk reduction	EN ISO 12100	2010

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ASSIGNMENT OF SAFETY INTEGRITY REQUIREMENTS – BASIC RATIONALE

FOREWORD

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IEC TR 63161 has been prepared by IEC technical committee 44: Safety of machinery – Electrotechnical aspects. It is a Technical Report.

The text of this Technical Report is based on the following documents:

Draft	Report on voting
44/935A/DTR	44/954/RVDTR

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 Technical Report 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.

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

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- withdrawn,
- replaced by a revised edition, or
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INTRODUCTION

This document describes an example basic logical rationale for assigning a safety integrity requirement to a safety related control function in a risk based approach. The parameters for the assignment are explained. It is described how these parameters can relate to the risk assessment according to ISO 12100 and to the safety integrity requirement.

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ASSIGNMENT OF SAFETY INTEGRITY REQUIREMENTS – BASIC RATIONALE

1 Scope

This document can be used where a risk assessment according to ISO 12100 has been conducted for a machine or process plant and where a safety related control function has been selected for implementation as a protective measure against specified hazards. This document describes an example basic logical rationale to assign a safety integrity requirement to the selected function.

The description is generic and as far as reasonably possible independent from any specific tool or method that can be used for assignment of a safety integrity requirement. The requirement can be expressed as a safety integrity level (SIL), or performance level (PL).

An example basic rationale is described that is embodied by such methods and tools, as far as they follow a risk based quantitative approach.

Conversely, the logic described in this document can be used as a reference for assessing specific methods or tools for safety integrity assignment. This can clarify how far the respective tool/method is following a risk based quantitative approach, and where deviations from that approach are imposed by other considerations. In real applications, the quantitative risk based approach can be modified or overridden by other considerations in many cases and for good reasons. It is not within the scope of this document to discuss or evaluate such reasons. Usually the reasons for deviations from a given tool or method from a quantitative logic are provided, so that this can be discussed in the proper frame.

Examples for such analyses are provided for common assignment tools in the format of risk graphs and risk matrices.

This document can be used for safety related control functions in all modes of application: continuous mode, high demand mode and low demand mode of application.

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.

ISO 12100:2010, *Safety of machinery – General principles for design – Risk assessment and risk reduction*

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:

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

3.1 probability

real number in the interval 0 to 1 attached to a random event and expressing quantitatively how likely the occurrence of that event is

Note 1 to entry: See 5.2.2 for more information.

[SOURCE: IEC 60050-103:2009, 103-08-02, modified – Notes 1 and 2 to entry have been removed and replaced with a new Note 1 to entry.]

3.2 event rate

frequency with the dimension of time^{-1} , typically given in the units h^{-1} or year^{-1} , attached to a random event and expressing quantitatively how frequently this event is expected to occur

Note 1 to entry: See 5.2.3 for more information.

3.3 tolerable risk

level of risk that is accepted in a given context based on the current values of society

Note 1 to entry: For the purposes of ISO/IEC Guide 51:2014, the terms "acceptable risk" and "tolerable risk" are considered to be synonymous.

[SOURCE: ISO/IEC Guide 51:2014, 3.15]

3.4 tolerable risk limit

risk which is accepted in the context of a given hazard of machinery or process equipment and which is quantified as an event rate for the occurrence of harm with a specified level of severity as a consequence of the hazard

Note 1 to entry: See 5.9.5 for more information.

Note 2 to entry: The harm with the specified level of severity is a necessary attribute of a tolerable risk limit, however it is not expressed in the limit itself.

Note 3 to entry: This definition adds the element of quantification to the general definition of "tolerable risk", which is not necessarily implied in the term "tolerable risk" without the modifier "limit".

3.5 hazardous event

event that can cause harm

Note 1 to entry: See 4.3.2 for more information.

[SOURCE: ISO 12100:2010, 3.9, modified – The note to entry has been removed and replaced by a new one.]

3.6 hazardous situation

circumstance in which a person is exposed to at least one hazard

Note 1 to entry: According to ISO 12100:2010, 3.10.

Note 2 to entry: See 4.3.2 for more information.

[SOURCE: ISO 12100:2010, 3.10, modified – The note to entry has been removed and replaced by two new ones.]