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Assignment of safety integrity requirements – Basic rationale

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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ASSIGNMENT OF SAFETY INTEGRITY REQUIREMENTS – BASIC RATIONALE

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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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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.

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*