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English Version

**Functional safety - Safety instrumented systems for the process  
industry sector - Part 4: Explanation and rationale for changes in  
IEC 61511-1 from Edition 1 to Edition 2  
(IEC/TR 61511-4:2020)**

Sécurité fonctionnelle - Systèmes instrumentés de sécurité  
pour le secteur des industries de transformation - Partie 4 :  
Explication et justifications relatives aux modifications  
apportées entre l'Edition 1 et l'Edition 2 de l'IEC 61511-1  
(IEC/TR 61511-4:2020)

Funktionale Sicherheit - PLT-Sicherheitseinrichtungen für  
die Prozessindustrie - Teil 4: Erläuterung und Gründe der  
Änderungen in der IEC 61511-1 von Edition 1 zu Edition 2  
(IEC/TR 61511-4:2020)

This Technical Report was approved by CENELEC on 2020-09-14.

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European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

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## European foreword

The text of document (65A/911/DTR), future edition 1 of IEC/TR 61511-4, prepared by SC 65A "System aspects" of IEC/TC 65 "Industrial-process measurement, control and automation" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as CLC IEC/TR 61511-4:2020.

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## 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.cenelec.eu](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-192	-	International electrotechnical vocabulary - Part 192:- Dependability		-
IEC 61508-4	2010	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 4: Definitions and abbreviations (see <a href="http://www.iec.ch/functionalsafety">http://www.iec.ch/functionalsafety</a> )	EN 61508-4	2010
IEC 61511-1	2016	Functional safety - Safety instrumented systems for the process industry sector - Part 1: Framework, definitions, system, hardware and application programming requirements	EN 61511-1	2017
+ A1	2017		+ A1	2017
ISO/IEC Guide 51	2014	Safety aspects - Guidelines for their inclusion in standards		-

# TECHNICAL REPORT

**Functional safety – Safety instrumented systems for the process industry sector –  
Part 4: Explanation and rationale for changes in IEC 61511-1 from Edition 1 to  
Edition 2**



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#### IEC Glossary - [std.iec.ch/glossary](http://std.iec.ch/glossary)

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

# TECHNICAL REPORT

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**Functional safety – Safety instrumented systems for the process industry sector –  
Part 4: Explanation and rationale for changes in IEC 61511-1 from Edition 1 to Edition 2**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**FUNCTIONAL SAFETY – SAFETY INSTRUMENTED SYSTEMS  
FOR THE PROCESS INDUSTRY SECTOR –****Part 4: Explanation and rationale for changes in IEC 61511-1  
from Edition 1 to Edition 2**

## FOREWORD

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IEC TR 61511-4, which is a Technical Report, has been prepared by subcommittee 65A: Systems aspects, of IEC technical committee 65: Industrial-process measurement, control and automation.

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

Draft TR	Report on voting
65A/911/DTR	65A/920A/RVDTR

Full information on the voting for the approval of this Technical Report 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 61511 series, published under the general title *Functional safety – Safety instrumented systems for the process industry sector*, 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.

## INTRODUCTION

IEC 61511 (all parts) addresses safety instrumented systems (SIS) for the process industry sector. It is written to use terminology that is familiar within this sector and to define practical implementation requirements based on the sector-independent clauses presented in the IEC 61508 basic safety standard. IEC 61511-1 is recognized as a good engineering practice in many countries and a regulatory requirement in an increasing number of countries.

Nevertheless, standards evolve with the application experience in the affected sector. The second edition of IEC 61511-1 was edited based on a decade of international process sector experience in applying the requirements of the first edition of IEC 61511-1:2003. The changes from Edition 1 to Edition 2 were initiated by comments from National Committees representing a broad spectrum of users of the standard worldwide.

In Edition 1:2003 (Ed. 1)<sup>1</sup>, the requirements addressing the avoidance and control of systematic errors that occur during design, engineering, operation, maintenance and modification were adapted primarily to support independent safety functions up to a SIL 3 performance target. In contrast, Edition 2:2016 (Ed. 2) needed to address a prevailing trend of sharing automation systems across multiple safety functions.

Ed. 2 also needed to address the common misinterpretations of the Ed. 1 requirements that became evident to the IEC 61511 maintenance team (MT 61511) over the intervening years. For example, Ed. 2 reinforced the necessity to design for functional safety management rather than a narrow focus on a calculation and to manage the actual performance of the SIS over time.

IEC TR 61511-4 was created to provide a brief introduction of the above issues to a general audience, with the more detailed content remaining in the main parts of the IEC 61511 series. IEC TR 61511-4 describes the underlying rationale of the primary clauses in IEC 61511-1, clarifies some common application misconceptions, provides a listing of the main differences between the first and second editions of IEC 61511-1, and gives a brief explanation of the typical process sector approaches to the application of each primary clause.

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<sup>1</sup> For ease of reading, "Ed. 1" and "Ed. 2" will be used in this document.