

Industrial communication networks - Profiles - Part
3-13: Functional safety fieldbuses - Additional
specifications for CPF 13

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 61784-3-13:2017 sisaldab Euroopa standardi EN 61784-3-13:2017 ingliskeelset teksti.	This Estonian standard EVS-EN 61784-3-13:2017 consists of the English text of the European standard EN 61784-3-13:2017.
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English Version

**Industrial communication networks - Profiles - Part 3-13:
Functional safety fieldbuses - Additional specifications for CPF
13
(IEC 61784-3-13:2016)**

Réseaux de communication industriels - Profils - Partie 3-13: Bus de terrain de sécurité fonctionnelle - Spécifications complémentaires pour CPF 13
(IEC 61784-3-13:2016)

Industrielle Kommunikationsnetze - Profile - Teil 3-13: Funktional sichere Übertragung bei Feldbussen - Zusätzliche Festlegungen für die Kommunikationsprofilfamilie 13
(IEC 61784-3-13:2016)

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European foreword

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This document supersedes EN 61784-3-13:2010.

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Endorsement notice

The text of the International Standard IEC 61784-3-13:2016 was approved by CENELEC as a European Standard without any modification.

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

IEC 60204-1	NOTE Harmonized as EN 60204-1
IEC 61000-6-7	NOTE Harmonized as EN 61000-6-7
IEC 61131-2	NOTE Harmonized as EN 61131-2
IEC 61131-6	NOTE Harmonized as EN 61131-6
IEC 61158 (all parts)	NOTE Harmonized as EN 61158 (all parts)
IEC 61326-3-1	NOTE Harmonized as EN 61326-3-1
IEC 61326-3-2	NOTE Harmonized as EN 61326-3-2
IEC 61496 (all parts)	NOTE Harmonized as EN 61496 (all parts)
IEC 61508-1:2010	NOTE Harmonized as EN 61508-1:2010 (not modified).
IEC 61508-4:2010	NOTE Harmonized as EN 61508-4:2010 (not modified).
IEC 61508-5:2010	NOTE Harmonized as EN 61508-5:2010 (not modified).
IEC 61511 (all parts)	NOTE Harmonized as EN 61511 (all parts)
IEC 61784-1	NOTE Harmonized as EN 61784-1
IEC 61784-5 (all parts)	NOTE Harmonized as EN 61784-5 (all parts)
IEC 61800-5-2	NOTE Harmonized as EN 61800-5-2
IEC 62061	NOTE Harmonized as EN 62061
IEC 62443 (all parts)	NOTE Harmonized as prEN 62443 (all parts)
IEC/TR 62685	NOTE Harmonized as CLC/TR 62685
ISO 10218-1	NOTE Harmonized as EN ISO 10218-1
ISO 12100	NOTE Harmonized as EN ISO 12100
ISO 13849-1	NOTE Harmonized as EN ISO 13849-1
ISO 13849-2	NOTE Harmonized as EN ISO 13849-2

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 When 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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61131-3	-	Programmable controllers - Part 3: Programming languages	EN 61131-3	-
IEC 61158-3-13	-	Industrial communication networks - Fieldbus specifications - Part 3-13: Data link layer service definition - Type 13 elements	EN 61158-3-13	-
IEC 61158-4-13	-	Industrial communication networks - Fieldbus specifications - Part 4-13: Data-link layer protocol specification - Type 13 elements	EN 61158-4-13	-
IEC 61158-5-13	-	Industrial communication networks - Fieldbus specifications - Part 5-13: Application layer service definition - Type 13 elements	EN 61158-5-13	-
IEC 61158-6-13	-	Industrial communication networks - Fieldbus specifications - Part 6-13: Application layer protocol specification - Type 13 elements	EN 61158-6-13	-
IEC 61508	series	Functional safety of electrical/electronic/programmable electronic safety-related systems -- Part 1: General requirements	EN 61508	series
IEC 61784-2	-	Industrial communication networks - Profiles - Part 2: Additional fieldbus profiles for real-time networks based on ISO/IEC 8802-3	EN 61784-2	-
IEC 61784-3	-	Industrial communication networks - Profiles - Part 3: Functional safety fieldbuses - General rules and profile definitions	EN 61784-3	-
IEC 61784-5-13	-	Industrial communication networks - Profiles -- Part 5-13: Installation of fieldbuses - Installation profiles for CPF 13	EN 61784-5-13	-
IEC 61918	-	Industrial communication networks - Installation of communication networks in industrial premises	EN 61918	-
ISO/IEC 19501	-	Information technology - Open Distributed Processing - Unified Modeling Language (UML) Version 1.4.2	-	-

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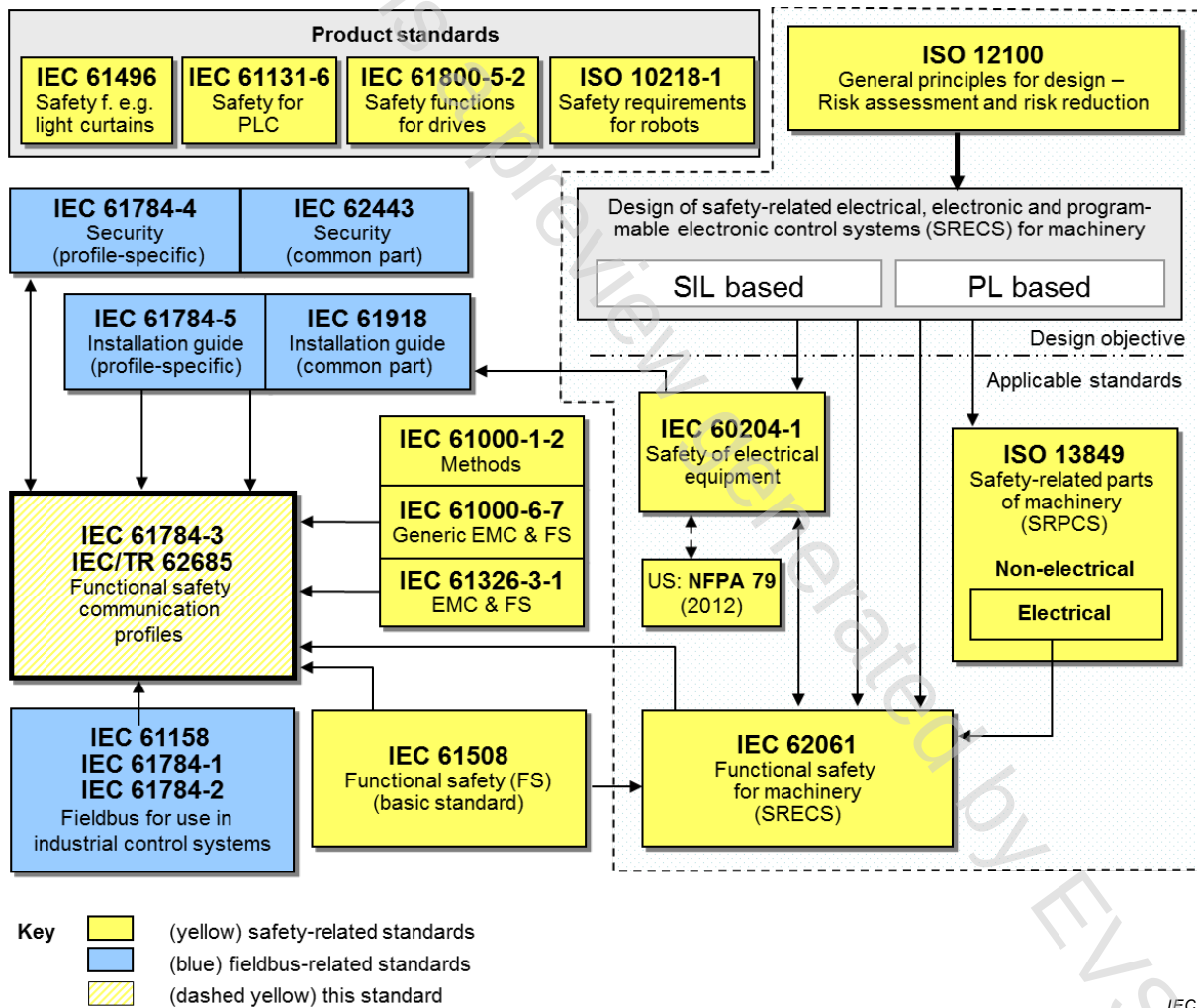
0 Introduction

0.1 General

The IEC 61158 fieldbus standard together with its companion standards IEC 61784-1 and IEC 61784-2 defines a set of communication protocols that enable distributed control of automation applications. Fieldbus technology is now considered well accepted and well proven. Thus fieldbus enhancements continue to emerge, addressing applications for areas such as real time, safety-related and security-related applications.

This standard explains the relevant principles for functional safety communications with reference to IEC 61508 series and specifies several safety communication layers (profiles and corresponding protocols) based on the communication profiles and protocol layers of IEC 61784-1, IEC 61784-2 and the IEC 61158 series. It does not cover electrical safety and intrinsic safety aspects.

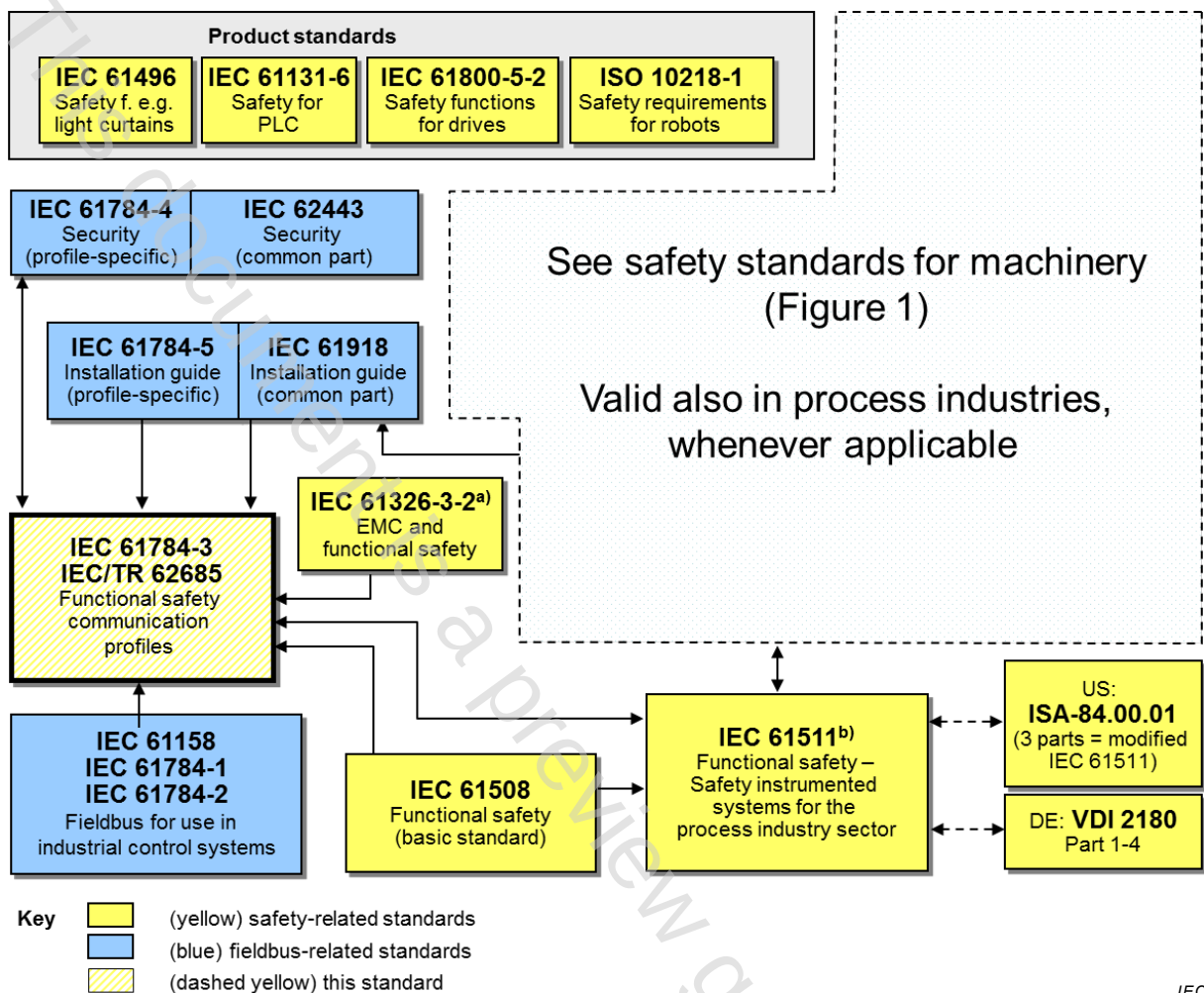
Figure 1 shows the relationships between this standard and relevant safety and fieldbus standards in a machinery environment.



NOTE Subclauses 6.7.6.4 (high complexity) and 6.7.8.1.6 (low complexity) of IEC 62061 specify the relationship between PL (Category) and SIL.

Figure 1 – Relationships of IEC 61784-3 with other standards (machinery)

Figure 2 shows the relationships between this standard and relevant safety and fieldbus standards in a process environment.



^a For specified electromagnetic environments; otherwise IEC 61326-3-1 or IEC 61000-6-7.

^b EN ratified.

Figure 2 – Relationships of IEC 61784-3 with other standards (process)

Safety communication layers which are implemented as parts of safety-related systems according to IEC 61508 series provide the necessary confidence in the transportation of messages (information) between two or more participants on a fieldbus in a safety-related system, or sufficient confidence of safe behaviour in the event of fieldbus errors or failures.

Safety communication layers specified in this standard do this in such a way that a fieldbus can be used for applications requiring functional safety up to the Safety Integrity Level (SIL) specified by its corresponding functional safety communication profile.

The resulting SIL claim of a system depends on the implementation of the selected functional safety communication profile (FSCP) within this system – implementation of a functional safety communication profile in a standard device is not sufficient to qualify it as a safety device.

This standard describes:

- basic principles for implementing the requirements of IEC 61508 series for safety-related data communications, including possible transmission faults, remedial measures and considerations affecting data integrity;
- functional safety communication profiles for several communication profile families in IEC 61784-1 and IEC 61784-2, including safety layer extensions to the communication service and protocols sections of the IEC 61158 series.

0.2 Patent declaration

The International Electrotechnical Commission (IEC) draws attention to the fact that it is claimed that compliance with this document may involve the use of patents concerning the functional safety communication profiles for family 13 as follows, where the [xx] notation indicates the holder of the patent rights:

AT 504739	[BR]	Anordnung und ein Verfahren zur sicheren Datenkommunikation über ein nicht sicheres Netzwerk
DE 102005032877.6	[BR]	Verfahren zur Zeitsynchronisation von Teilnehmern eines Netzwerkes
DE 102004055685.7	[BR]	Verfahren zur Abgrenzung eines sicheren Netzwerkes
DE 102004055684.9	[BR]	Verfahren zur Absicherung des Datentransfers in einem sicheren Netzwerk mit CRC's variabler Länge
EP 08150038.1	[BR]	Anordnung und ein Verfahren zur sicheren Datenkommunikation über ein nicht sicheres Netzwerk

IEC takes no position concerning the evidence, validity and scope of these patent rights.

The holder of these patent rights has assured the IEC that he/she is willing to negotiate licences either free of charge or under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of these patent rights is registered with IEC.

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Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights other than those identified above. IEC shall not be held responsible for identifying any or all such patent rights.

ISO (www.iso.org/patents) and IEC (<http://patents.iec.ch>) maintain on-line data bases of patents relevant to their standards. Users are encouraged to consult the data bases for the most up to date information concerning patents.

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INDUSTRIAL COMMUNICATION NETWORKS – PROFILES –

Part 3-13: Functional safety fieldbuses – Additional specifications for CPF 13

1 Scope

This part of the IEC 61784-3 series specifies a safety communication layer (services and protocol) based on CPF 13 of IEC 61784-2 and IEC 61158 Type 13. It identifies the principles for functional safety communications defined in IEC 61784-3 that are relevant for this safety communication layer. This safety communication layer is intended for implementation in safety devices only.

NOTE 1 It does not cover electrical safety and intrinsic safety aspects. Electrical safety relates to hazards such as electrical shock. Intrinsic safety relates to hazards associated with potentially explosive atmospheres.

This part¹ defines mechanisms for the transmission of safety-relevant messages among participants within a distributed network using fieldbus technology in accordance with the requirements of IEC 61508 series² for functional safety. These mechanisms may be used in various industrial applications such as process control, manufacturing automation and machinery.

This part provides guidelines for both developers and assessors of compliant devices and systems.

NOTE 2 The resulting SIL claim of a system depends on the implementation of the selected functional safety communication profile within this system – implementation of a functional safety communication profile according to this part in a standard device is not sufficient to qualify it as a safety device.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 61131-3, *Programmable controllers – Part 3: Programming languages*

IEC 61158-3-13, *Industrial communication networks – Fieldbus specifications – Part 3-13: Data-link layer service definition – Type 13 elements*

IEC 61158-4-13, *Industrial communication networks – Fieldbus specifications – Part 4-13: Data-link layer protocol specification – Type 13 elements*

IEC 61158-5-13, *Industrial communication networks – Fieldbus specifications – Part 5-13: Application layer service definition – Type 13 elements*

IEC 61158-6-13, *Industrial communication networks – Fieldbus specifications – Part 6-13: Application layer protocol specification – Type 13 elements*

¹ In the following pages of this standard, “this part” will be used for “this part of the IEC 61784-3 series”.

² In the following pages of this standard, “IEC 61508” will be used for “IEC 61508 series”.