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**Industrial communication networks – Profiles –
Part 3: Functional safety fieldbuses – General rules and profile definitions**

**Réseaux de communication industriels – Profils –
Partie 3: Bus de terrain de sécurité fonctionnelle – Règles générales et
définitions de profils**

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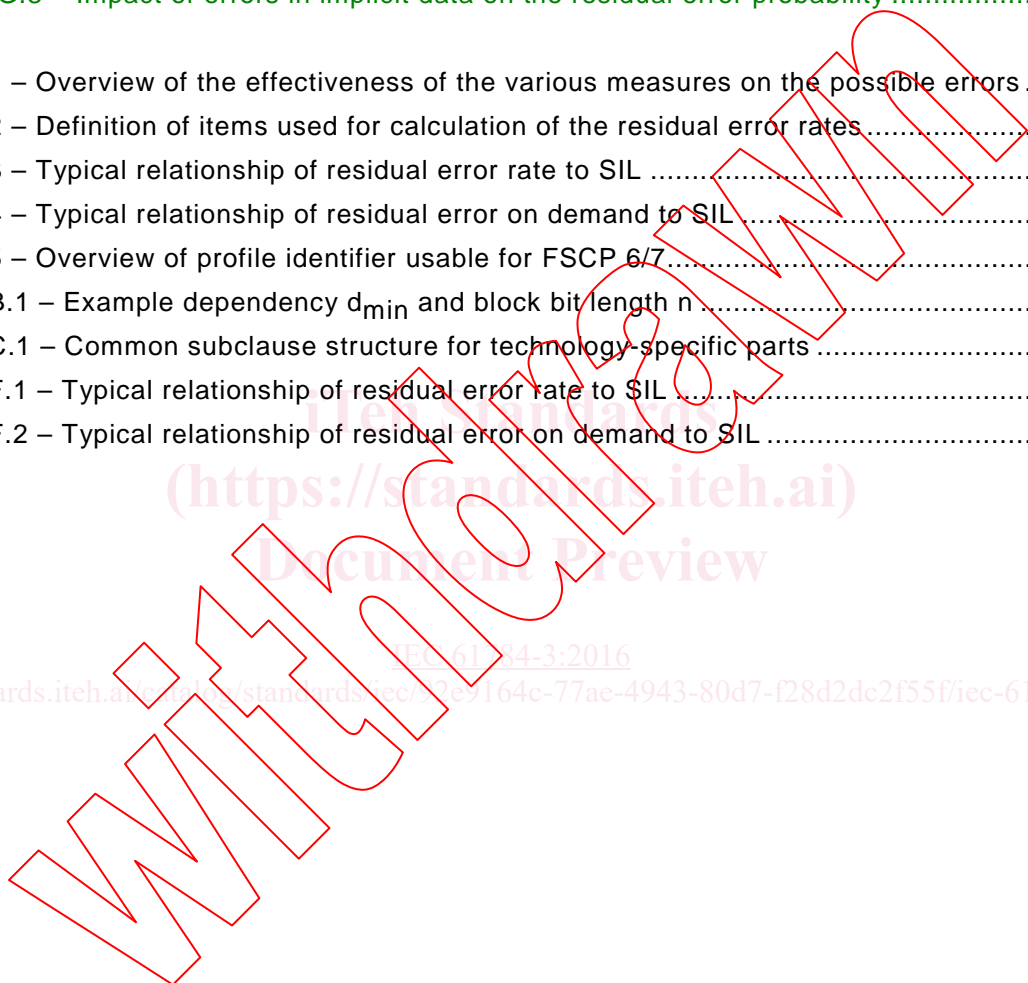
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Table F.2 – Typical relationship of residual error on demand to SIL 75

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INDUSTRIAL COMMUNICATION NETWORKS – PROFILES –

Part 3: Functional safety fieldbuses – General rules and profile definitions

FOREWORD

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This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 61784-3 edition 3.1 contains the third edition (2016-05) [documents 65C/840/FDIS and 65C/848/RVD] and its amendment 1 (2017-08) [documents 65C/879/FDIS and 65C/886/RVD].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

International Standard IEC 61784-3 has been prepared by subcommittee 65C: Industrial networks, of IEC technical committee 65: Industrial-process measurement, control and automation.

This third edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- clarifications and additional explanations for requirements, updated references;
- deletion of technical overviews of profiles (Clauses 6 to 13), and associated dedicated subclauses for terms, definitions, symbols and abbreviations;
- addition of profiles for Communication Profile Families 8, 17 and 18 (Clauses 10, 14, 15);
- clarifications of models in Annex A;
- Annex B changed from informative to normative;
- addition of a new informative Annex E describing models for explicit and implicit FSCP mechanisms;
- addition of a new informative Annex F introducing an extended model for estimation of the total residual error rate;
- updates in parts for CPF 1, CPF 2, CPF 3, CPF 8, CPF 13 (details provided in the parts);
- addition of a new part for CPF 17.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 61784-3 series, published under the general title *Industrial communication networks – Profiles – Functional safety fieldbuses*, can be found on the IEC website.

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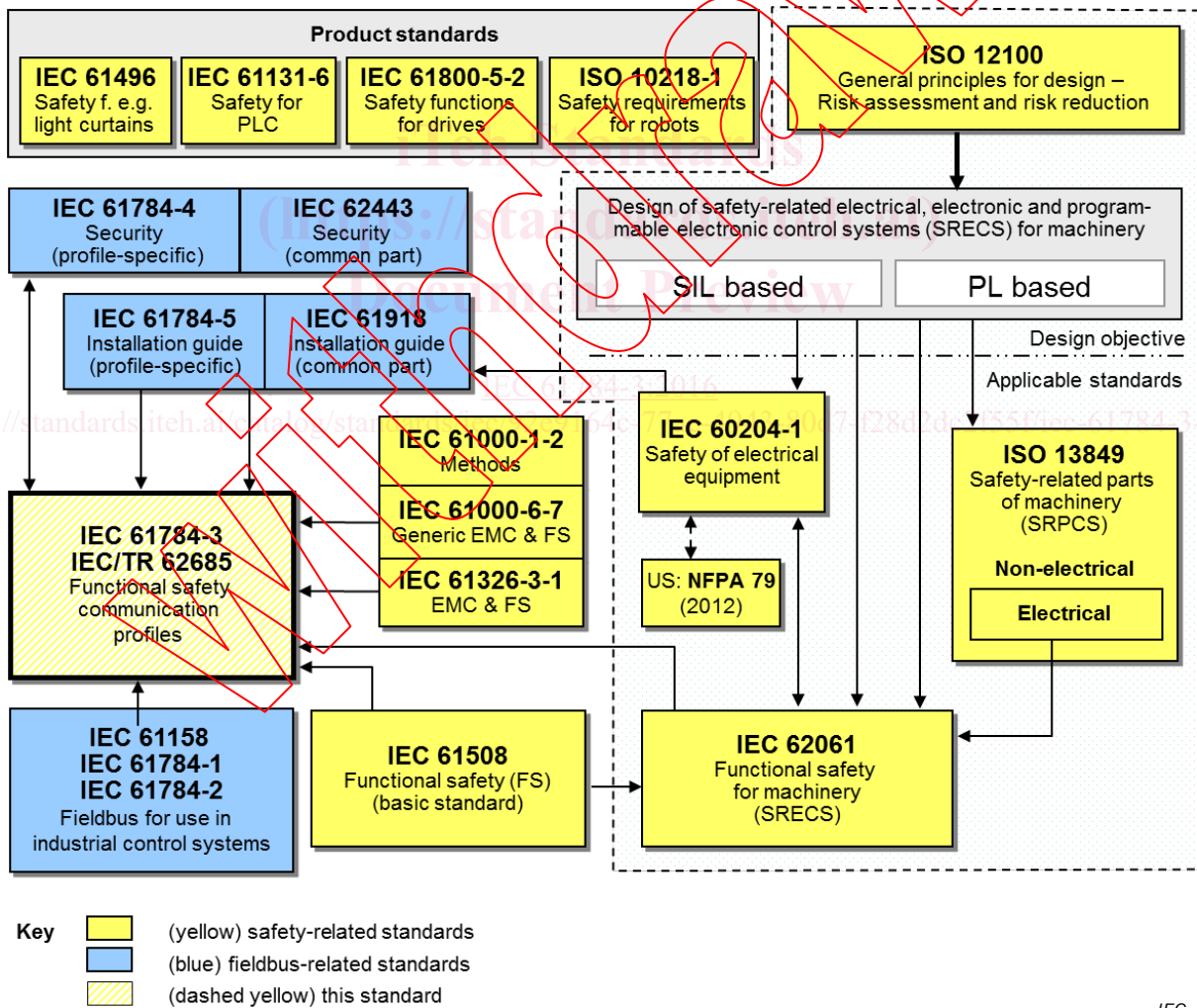
0 Introduction

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.

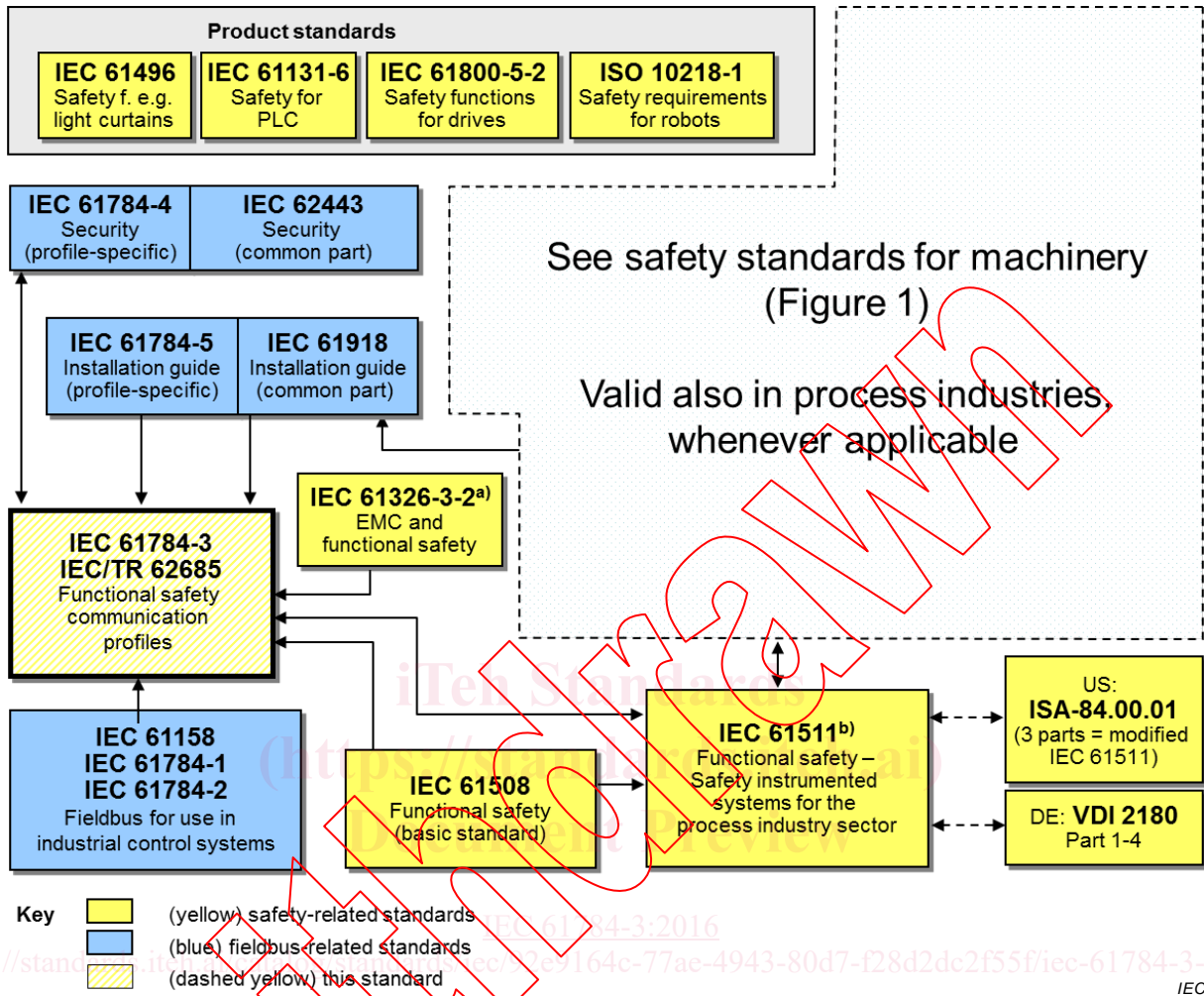
Figure 1 shows the relationships between this standard and relevant safety and fieldbus standards in a machinery environment.



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.