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Functional safety of electrical/electronic/ programmable electronic safety-related systems

Part 3-1: Software requirements — Reuse of pre-existing software elements to implement all or part of a safety function

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National foreword

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A list of organizations represented on this committee can be obtained on request to its secretary.

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Part 3-1: Software requirements – Reuse of pre-existing software elements to implement all or part of a safety function

FOREWORD

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Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 61508-3-1, which is a technical specification, has been prepared by subcommittee 65A: System aspects, of IEC technical committee 65: Industrial-process measurement, control and automation.

The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
65A/780/DTS	65A/802/RVC

Full information on the voting for the approval of this technical specification can be found in the report on voting indicated in the above table.

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

A list of all parts in the IEC 61508 series, published under the general title *Functional safety of electrical/electronic/programmable electronic safety-related systems*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- transformed into an International standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

The requirements set out in this technical specification deal with the reuse of software elements when they are intended to form part of a safety function.

In many fields of automation, software elements are used today in support of safety functions. Such applications will certainly be further developed and extended. Software engineers, however, do not always wish to write the software for these applications from scratch, but will in many cases use already existing software and integrate it with the new application which might be slightly different from the one for which the software was originally specified.

In IEC 61508-3:2010, a requirement is given in 7.4.2.12. It offers three routes to the achievement of the necessary integrity for the pre-existing software element. The requirements to comply with the second route, Route 2_s, are defined in IEC 61508-2:2010, 7.4.10.

This entails that IEC 61508-3:2010 –dealing solely with software –refers to requirements in IEC 61508-2:2010 which concerns complete systems including hardware but excluding software (see IEC 61508-2:2010, 1.1 enumeration “e“).

This technical specification defines the requirements for software elements explicitly, because IEC 61508-2:2010 excludes software, and is intended to replace the text of the second bullet (“route 2_s”) of a), 7.4.2.12 in IEC 61508-3:2010 in a future revision of IEC 61508-3.

FUNCTIONAL SAFETY OF ELECTRICAL/ELECTRONIC/PROGRAMMABLE ELECTRONIC SAFETY-RELATED SYSTEMS –

Part 3-1: Software requirements – Reuse of pre-existing software elements to implement all or part of a safety function

1 Scope

This Technical Specification presents requirements by the application of which pre-existing software elements may be claimed to be proven-in-use for all or a part of safety function(s) of SIL1 or SIL 2.

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.

IEC 61508-3:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems – Part 3: Software requirements*

3 Terms and definitions

No terms and definitions are listed in this document.

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

4 Requirements

4.1 Notes 1 to 4 below apply to the entire Clause 4 (4.2 to 4.9).

NOTE 1 Any documentation required by a clause in this document could either be available with the pre-existing software or could be included as part of the documentation of the safety related function.

NOTE 2 A reused software function in this document means a function specified on the level of the requirements specification (see IEC 61508-3:2010, 7.2). A reused software function does not refer to a programming language construct.

NOTE 3 Conditions are set for the data on the history of the pre-existing software in 4.2 b) and c). The fulfilment of these conditions does not entail that the software is deterministic: hidden internal states of the software can affect its execution even when the required combination as specified in 4.2 b) and c) is exactly the same. The use of pre-existing software is thus restricted by 4.7.

NOTE 4 In some cases (e.g. input data are analogue data or a clock signal) the demonstration of proven-in-use for software could be difficult.

4.2 An element shall only be regarded as proven-in-use when:

a) its description:
   1) exists and is available;
   2) fulfils the requirements of IEC 61508-3:2010, 7.2;
   3) describes the previous use,