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GB/T 16855.2-2015

**Safety of machinery -- Safety-related parts of control systems --
Part 2: Validation
(English Translation)**

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Foreword

GB/T 16855 Safety of Machinery - Safety-Related Parts of Control Systems consists of the following two parts.

--- Part 1.General Principles for Design.

--- Part 2.Validation.

This Part is Part 2 of GB/T 16855.

This Part was drafted as per the rules specified in GB/T 1.1-2009.

This Part replaced GB/T 16855.2-2007 Safety of Machinery - Safety-Related Parts of Control Systems - Part 2.Validation. Compared with GB/T 16855.2-2007, this Part has the major technical changes as follows besides the editorial modifications.

--- Add the validation applicable to the performance level in the Scope (see Clause

1 of this Edition; Clause 1 of 2007 Edition);

--- Add the validation of the safety requirements and specifications of the safety function (see Clause 7 of this Edition);

--- Add the performance level and its related parameters (MTTFd, DCavg and CCF), and the validation of safety-related software (see Clause 9 of this Edition, Clause

1 of 2007 Edition);

--- Add confirmation of technical documents and usage information (see Clause 12 of this Edition);

--- Add the failure characteristics validation and diagnostic measure examples (see Appendix E of this Edition).

This Part uses translation method to equivalently adopt ISO 13849-2:2012 Safety of Machinery - Safety-Related Parts of Control Systems - Part 2.Validation (English Version).

This Part was proposed by and under the jurisdiction of National Technical Committee for Standardization of Machinery Safety (SAC/TC 208).

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--- GB/T 16855.2-2007.

1 Scope

This Part specifies the procedures and conditions to be followed for the validation by analysis and testing of.

2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) is applicable to this document.

GB/T 15706-2012 Safety of Machinery - General Principles for Design - Risk Assessment and Risk Reduction (ISO 12100.2010, IDT)

3 Terms and Definitions

For the purpose of this document, the terms and definitions given in GB/T 15706-2012 and GB/T 16855.1-2008 apply.

4 Validation Process

The validation plan shall identify and describe the requirements for carrying out the validation process for the specified safety functions, their categories and performance levels.

If necessary, a specific product-related fault list shall be generated as a reference document for the validation process of the safety-related part(s). The list can be based on the appropriate generic list(s) found in the annexes.

5 Validation by Analysis

The selection of an analysis technique depends upon the particular object. Two basic techniques exist, as follows.

6 Validation by Testing

The accuracy of measurements during the validation by testing shall be appropriate for the test carried out. In general, these measurement accuracies shall be within 5°C for temperature measurements and 5% for the following.

Unless otherwise specified, the tests shall be made on a single production sample of the safety-related part being tested.

7 Validation of Safety Requirements Specification for Safety Functions

Prior to the validation of the design of the SRP/CS, or the combination of SRP/CS providing the safety function, the requirements specification for the safety function shall be verified to ensure consistency and completeness for its intended use.

8 Validation of Safety Functions

The validation of safety functions shall demonstrate that the SRP/CS, or combination of SRP/CSs, provides the safety function(s) in accordance with their specified characteristics.

9 Validation of Performance Levels and Categories

Where the safety function is implemented by two or more safety-related parts, validation of the combination - by analysis and, if necessary, by testing - shall be undertaken to establish that the combination achieves the performance level specified in the design.

10 Validation of Environmental Requirements

The performance specified in the design of the SRP/CS shall be validated with respect to the environmental conditions specified for the control system.