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GB/T 21109.1-2022

Replacing GB/T 21109.1-2007

Functional safety of safety instrumented systems in the process industry sector - Part 1: Framework, definitions, system, hardware and application programming requirements

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foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Work Part 1.Structure and Drafting Rules for Standardization Documents"

drafting.

This document is part 1 of GB/T 21109 "Functional Safety of Safety Instrumented Systems in the Process Industry". GB/T 21109 has

The following parts were released.

--- Part 1.Framework, definition, system, hardware and application programming requirements;

--- Part 2.Application Guidelines for GB/T 21109.1;

--- Part 3.Guidelines for determining the required safety integrity level.

This document replaces GB/T 21109.1-2007 "Functional safety of safety instrumented systems in the process industry - Part 1.Framework, definition

Definition, system, hardware and software requirements", compared with GB/T 21109.1-2007, except for structural adjustment and editorial changes, the main technical changes

as follows.

--- Added the management requirements for personnel in functional safety management (see 5.2.2.3);

--- Added requirements for functional safety management system (see 5.2.5.2);

--- Increased the SIS designed and implemented according to the specifications, standards or practices before the publication of this document, and put forward requirements for users

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(see 5.2.5.4);

--- Added new requirements for functional safety assessment, audit and revision (see 5.2.6);

--- Increased safety life cycle structure and planning requirements (see 6.2);

--- Increased application SIS security life cycle requirements (see 6.3);

--- Increased verification requirements (see 7.2);

--- Added requirements for SIS security risk assessment (see 8.2.4);

---Delete "additional requirements for safety integrity level 4", increase risk reduction requirements >10000 or average frequency of dangerous failures

Rate < 10-8/h inspection requirements and protection layer allocation requirements;

--- Added the requirements for the allocation of protection layers when the BPCS is not prepared to comply with this document (see 9.3.4);

--- Increased the relevant requirements of the application security requirements specification (see 10.3.3~10.3.6);

--- Added the safety manual requirements and SIF communication requirements in the SIS design and engineering requirements (see 11.2);

--- Increased the relevant requirements in the case of SIS bypass (see 16.2.3, 16.2.4, 16.2.7, 16.2.11);

--- Added the relevant requirements for SIS spare parts (see 16.2.12);

--- Increased review requirements for hazard and risk analysis, allocation and design of personnel responsible for performing operations and maintenance (see 16.2.13);

---Changed the behavior requirements of SIS in the case of power failure, expanded it to power source (including power supply, air, hydraulic source or pneumatic source)

SIS behavior requirements in case of failure (see 11.2.11, 11.2.11 of the.2007 edition);

--- Changed the system behavior requirements when a fault is detected (see 11.3, 11.3 of the.2007 edition);

--- Changed hardware failure margin requirements (see 11.4, 11.4 of the.2007 edition);

--- Changed the equipment selection requirements (see 11.5, 11.5 of the.2007 edition);

--- Changed the failure probability of SIF, changed it to the quantification of random failure and supplemented the relevant requirements of random failure quantification (see 11.9,

11.9 of the.2007 edition);

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