



Understanding the new ISO 13849-1 for machinery testing

The amount of electronic systems and software in modern machines and devices has been increasing in recent years. These systems have also taken over safety functions to some extent and must be developed and checked in accordance with current safety standards. We will perform all necessary tests and support you already in the phase of product development if desired.

The well-known ISO 12100 describes a 3 step risk reduction method and a testing and certification procedure. For the risk reduction, manufacturer must consider an update. A new edition of ISO 13849-1 has been published in April

2023 and is applicable at the second step of the method. The concept that the [Safety Requirements Specification \(SRS\)](#) shall document details of each safety function to be performed was already present in the 2015 edition of ISO 13849-1, but in the new version is made explicit (new chapter 5.2 added, together with Annex M).

A [further clarification](#) was made regarding the inappropriate use of a Category to describe an SRP/CS. Instead, a safety system should be defined by its PFHD, Performance Level (or SIL if IEC 62061 is employed), without any reference to a Category or Architecture.

Software clause is updated: a V-model of software safety lifecycle similar to ISO 13849-1:2015 is introduced, that foresees more information on inputs and outputs of each activity. A simplified V-model for software is possible if pre-assessed safety-related hardware and software modules are used in combination with LVL (Limited Variability Language).

Components with embedded software may be used under conditions related to the achieved PL (performance level), category and CCF requirements. New annex N is introduced for the **avoidance of systematic failure** in software design. Furthermore, a new informative Annex L provides four routes to fulfil **EMI requirements**.

SECURITY MEASURES

With the convergence of the operational technology (OT) and information technology (IT) environments, **security** is increasingly becoming an important factor that can affect safety and safety functions. ISO 13849-1 does not provide security measures. Such measures are included in the new edition of IEC 62061. The edition of the standard also calls for security risk assessments in order to identify the threats and vulnerabilities of the safety-related control system. Although artificial intelligence (AI) can be used for SRP/CS, ISO 13849-1 does not address additional specific requirements necessary for AI technology.

An important change with respect to the 2015 edition, is the fact the **Validation process** was moved from ISO 13849-2 to ISO 13849-1, but not the annexes. It is better detailed and it is carried out by analysis and test according to a validation plan. The validation process should be carried out by a person who is independent from the one who designed of the SRP/CS.

A functional safety plan should provide measures for preventing incorrect specification, implementation or modification issues (new informative clause G.5). Activities that are necessary for the achievement of the required functional

safety of the SRP/CS shall be documented in a functional safety plan (6.1.7). This makes the **management of functional safety** indirectly normative.

Finally, in the **Information for Use** section (13), a new distinction has been made between the information required for the integrator to properly integrate the SRP/CS and the information needed by the user to ensure the correct usage of the SRP/CS.

WE SUPPORT THE IMPLEMENTATION

- Support during the definition of the necessary safety or performance levels
- Determination or checking of safety or performance levels achieved
- Perform functional safety assessments with documental analysis and by testing safety functions under normal conditions and with fault insertion tests. The purpose is to certify the product in accordance with state-of-the-art functional safety standards (ex. ISO 13849-1)
- Testing of devices with software and embedded systems under the low voltage directive
- In-house training courses on the subject of functional safety



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