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Replacing GB/T 34590.3-2017

Road Vehicles - Functional Safety - Part 3: Concept Phase

道路车辆 功能安全 第3部分：概念阶段

(ISO 26262-3:2018, MOD)

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Table of Contents

Foreword.....	3
Introduction.....	8
1 Scope.....	12
2 Normative references.....	13
3 Terms and definitions.....	13
4 Requirements	14
4.1 Purpose.....	14
4.2 General requirements	14
4.3 Interpretations of tables.....	14
4.4 ASIL-dependent requirements and recommendations	15
4.5 Adaptation for motorcycles.....	15
4.6 Adaptation for goods vehicles, buses, special vehicles, and trailers.....	16
5 Item definition	16
5.1 Objectives	16
5.2 General rules.....	16
5.3 Inputs to this chapter.....	16
5.4 Requirements and recommendations	16
5.5 Work products.....	18
6 Hazard analysis and risk assessment	18
6.1 Objectives	18
6.2 General rules.....	18
6.3 Inputs to this chapter.....	18
6.4 Requirements and recommendations	19
6.5 Work products.....	27
7 Functional safety concept	27
7.1 Objectives	27
7.2 General rules.....	27
7.3 Inputs to this chapter.....	28
7.4 Requirements and recommendations	28
7.5 Work products.....	32
Appendix A (Informative) Overview of and workflow of concept phase	34
Appendix B (Informative) Hazard analysis and risk assessment.....	36
References.....	49

Foreword

This document was drafted in accordance with the rules provided in GB/T 1.1-2020 *Directives for Standardization - Part 1: Rules for the Structure and Drafting of Standardizing Documents*.

This document is Part 3 of GB/T 34590 *Road Vehicles - Functional Safety*. GB/T 34590 has issued the following parts:

- Part 1: Vocabulary;
- Part 2: Management of Functional Safety;
- Part 3: Concept Phase;
- Part 4: Product Development at the System Level;
- Part 5: Product Development at the Hardware Level;
- Part 6: Product Development at the Software Level;
- Part 7: Production, Operation, Service and Decommissioning;
- Part 8: Supporting Processes;
- Part 9: Automotive Safety Integrity Level (ASIL)-oriented and Safety-oriented Analyses;
- Part 10: Guideline;
- Part 11: Guidelines on Applications to Semiconductors;
- Part 12: Adaptation for Motorcycles.

This document serves as a replacement for GB/T 34590.3-2017 *Road Vehicles - Functional Safety - Part 3: Concept phase*. In comparison with GB/T 34590.3-2017, apart from structural adjustments and editorial modifications, the main technical changes are as follows:

- The scope of application of the standard is revised from “mass-produced passenger cars” to “mass-produced road vehicles other than mopeds” (see Chapter 1; see Chapter 1 of the 2017 edition);
- The adaptation requirements for motorcycles are added (see 4.5);
- The adaptation requirements for goods vehicles, buses, special vehicles, and trailers are added (see 4.6);

- The objectives of the definition of related items are changed (see 5.1; see 5.1 of the 2017 edition);
- The content of the requirements of related items that shall be given is changed (see 5.4.1; see 5.4.1 of the 2017 edition);
- The content that shall be considered when defining the boundaries of related items, their interfaces, and the assumptions of their interactions with other related items and elements is changed (see 5.4.2; see 5.4.2 of the 2017 edition);
- The content of the safety life cycle initiation is deleted (see Chapter 6 of the 2017 edition);
- The requirements for supporting information for hazard analysis and risk assessment are changed (see 6.3.2; see 7.3.2 of the 2017 edition);
- The requirements for describing the operational situations where hazardous events occur are changed (see 6.4.2.1; see 7.4.2.1 of the 2017 edition);
- The requirements for determining hazards during hazard identification are changed (see 6.4.2.2; see 7.4.2.2.1 of the 2017 edition);
- The requirements for dealing with hazards beyond the scope of GB/T 34590 are changed (see 6.4.2.4; see 7.4.2.2.5 of the 2017 edition);
- The requirements for factors that shall be considered in the severity classification are added (see 6.4.3.3);
- The severity class analysis requirements for hazards limited to object damage and not involving personal injury are changed (see 6.4.3.4; see 7.4.3.3 of the 2017 edition);
- The requirements for estimating the controllability of hazardous events are changed (see 6.4.3.8; see 7.4.3.7 of the 2017 edition);
- The availability assessment requirements for hazards that do not affect the safe operation of the vehicle are changed (see 6.4.3.9; see 7.4.3.8 of the 2017 edition);
- The requirements for QM level are changed (see 6.4.3.10, 6.4.3.11, and Table 4; see 7.4.4.1 and Table 4 of the 2017 edition);
- The requirements for determining safety objectives are changed (see 6.4.4.1; see 7.4.4.3 of the 2017 edition);
- The requirement that the assumptions used or derived from it shall be identified in the process of hazard identification and risk assessment are added (see 6.4.4.4);

- The difference management requirements for T&B vehicle hazard analysis and risk assessment are added (see 6.4.5);
- The requirements for verification of hazard analysis and risk assessment are changed (see 6.4.6.1; see 7.4.5 of the 2017 edition);
- The work products of hazard analysis and risk assessment are changed (see 6.5; see 7.5 of the 2017 edition);
- The objectives of the functional safety concept are changed (see 7.1; see 8.1 of the 2017 edition);
- The general requirements of the functional safety concept are changed (see 7.2; see 8.2 of the 2017 edition);
- The supporting information of the functional safety concept is changed (see 7.3.2; see 8.3.2 of the 2017 edition);
- The content of the derivation of functional safety requirements is changed (see 7.4.2.1; see 8.4.2.1 of the 2017 edition);
- The requirements for strategies that the functional safety requirements shall specify are added (see 7.4.2.3);
- The requirements for making assumptions about the necessary actions of the driver or other personnel are changed (see 7.4.2.7; see 8.4.2.6 of the 2017 edition);
- The requirements for the allocation of functional safety requirements are changed (see 7.4.2.8; see 8.4.3.1 of the 2017 edition);
- The requirements when the functional safety concept relies on external measures are changed (see 7.4.2.10; see 8.4.3.3 of the 2017 edition);
- The requirements for safety validation criteria are changed (see 7.4.3; see 8.4.4 of the 2017 edition).

This document is modified in relation to ISO 26262-3:2018 *Road Vehicles - Functional safety - Part 3: Concept phase*.

The technical differences between this document and ISO 26262-3:2018, and the causes for these differences are as follows:

- ISO 26262-1 is replaced by the normatively quoted GB/T 34590.1 to adapt to the technical conditions of China;
- The description of T&B vehicles is changed from “trucks, buses, trailers, and semi-trailers” to “goods vehicles, buses, special vehicles, and trailers” (see 4.6),

so that the vehicle types are consistent with that specified in GB/T 3730.1-2022 *Terms and Definitions of Motor Vehicles, Trailers and Combination Vehicle - Part 1: Types*.

This document also makes the following editorial modifications:

- The clause numbers “6.4.6.1”, “7.4.3.1” and “7.4.4.1” are deleted, because there is only one sub-clause in 6.4.6, 7.4.3, and 7.4.4;
- ISO 26262-5:2018 is replaced by the informatively quoted GB/T 34590.5-2022;
- ISO 26262-7:2018 is replaced by the informatively quoted GB/T 34590.7-2022;
- ISO 26262-12:2018 is replaced by the informatively quoted GB/T 34590.12-2022;
- An example of the road type “city road” is added under E4 level in Table B.2 of Appendix B.

Please be noted that certain content of this document may involve patents. The institution issuing this document does not undertake the responsibility of identifying these patents.

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Road Vehicles - Functional Safety - Part 3: Concept Phase

1 Scope

This document specifies the requirements for the concept phase for automotive applications, including the following:

- item definition;
- hazard analysis and risk assessment; and
- functional safety concept.

This document is intended to be applied to safety-related systems that include one or more electrical and/or electronic (E/E) systems and that are installed in series production road vehicles, excluding mopeds.

This document does not address unique E/E systems in special vehicles such as E/E systems designed for drivers with disabilities.

NOTE: Other dedicated application-specific safety standards can complement this document or vice versa.

Systems and their components released for production, or systems and their components already under development prior to the publication date of this document, are exempted from the scope of this edition. This document addresses alterations to existing systems and their components released for production prior to the publication of this document by tailoring the safety lifecycle depending on the alteration. This document addresses integration of existing systems not developed according to this document and systems developed according to this document by tailoring the safety lifecycle according to this document.

This document addresses possible hazards caused by malfunctioning behaviour of safety-related E/E systems, including interaction of these systems. It does not address hazards related to electric shock, fire, smoke, heat, radiation, toxicity, flammability, reactivity, corrosion, release of energy and similar hazards, unless directly caused by malfunctioning behaviour of safety-related E/E systems.

This document describes a framework for functional safety to assist the development of safety-related E/E systems. This framework is intended to be used to integrate functional safety activities into a company-specific development framework. Some requirements have a clear technical focus to implement functional safety into a product; others address the development process and can therefore be seen as process requirements in order to demonstrate the capability of an organization with respect to

NOTE 1: In general, each hazard will have a variety of potential causes related to the item's implementation, but these causes do not need to be considered in the hazard analysis and risk assessment for the analysis of the malfunctioning behaviour.

NOTE 2: Only hazards associated with malfunctioning behaviour of the item are considered; every other system (external measure) is presumed to be functioning correctly provided it is sufficiently independent.

6.4.2.4 If there are hazards identified in this chapter that are outside of the scope of GB/T 34590 (see Chapter 1), then these hazards shall be addressed according to organization specific procedures.

NOTE: As these hazards are outside the scope of GB/T 34590, this document does not provide guidance for ASIL compliance of these hazards. Such hazards are classified according to the procedures of the applicable safety discipline.

6.4.2.5 Relevant hazardous events shall be determined.

6.4.2.6 The consequences of hazardous events shall be identified.

NOTE: If malfunctioning behaviour induces the loss of several functions of the item, then the situation analysis and hazard identification consider the combined effects.

EXAMPLE 1: Loss of the functionality of a braking system (ESC) can lead to the simultaneous unavailability of driver assistance functions.

EXAMPLE 2: Failure of the vehicle's electrical power supply system can lead to a simultaneous loss of a number of functions including "engine torque", "power assisted steering" and "forward illumination".

6.4.2.7 It shall be ensured that the chosen level of detail of the list of operational situations does not lead to an inappropriate lowering of the ASIL.

NOTE: A very detailed list of operational situations (see 6.4.2.1) for one hazard, with regard to the vehicle state, road conditions and environmental conditions, can lead to a fine granularity of situations for the classification of hazardous events. This can make it easier to rate controllability and severity. However, a larger number of different operational situations can lead to a consequential reduction of the respective classes of exposure, and thus to an inappropriate lowering of the ASIL. This can be avoided by aggregating similar situations.

6.4.3 Classification of hazardous events

6.4.3.1 All hazardous events identified in 6.4.2 shall be classified, except those that are outside the scope of GB/T 34590.

NOTE: If classification of a given hazard with respect to severity (S), probability of exposure (E) or controllability (C) is difficult to make, it is classified conservatively, i.e. whenever there is a reasonable doubt, a higher S, E or C classification is chosen.

6.4.3.2 The severity of potential harm shall be estimated based on a defined rationale

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