

BS ISO 26262-1:2011



BSI Standards Publication

Road vehicles — Functional safety

Part 1: Vocabulary

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National foreword

This British Standard is the UK implementation of ISO 26262-1:2011.

The UK participation in its preparation was entrusted to Technical Committee AUE/16, Electrical and electronic equipment.

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

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Road vehicles — Functional safety — Part 1: Vocabulary

*Véhicules routiers — Sécurité fonctionnelle —
Partie 1: Vocabulaire*



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Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 26262-1 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 3, *Electrical and electronic equipment*.

ISO 26262 consists of the following parts, under the general title *Road vehicles — Functional safety*:

- *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 and operation*
- *Part 8: Supporting processes*
- *Part 9: Automotive Safety Integrity Level (ASIL)-oriented and safety-oriented analyses*
- *Part 10: Guideline on ISO 26262*

Introduction

ISO 26262 is the adaptation of IEC 61508 to comply with needs specific to the application sector of electrical and/or electronic (E/E) systems within road vehicles.

This adaptation applies to all activities during the safety lifecycle of safety-related systems comprised of electrical, electronic and software components.

Safety is one of the key issues of future automobile development. New functionalities not only in areas such as driver assistance, propulsion, in vehicle dynamics control and active and passive safety systems increasingly touch the domain of system safety engineering. Development and integration of these functionalities will strengthen the need for safe system development processes and the need to provide evidence that all reasonable system safety objectives are satisfied.

With the trend of increasing technological complexity, software content and mechatronic implementation, there are increasing risks from systematic failures and random hardware failures. ISO 26262 includes guidance to avoid these risks by providing appropriate requirements and processes.

System safety is achieved through a number of safety measures, which are implemented in a variety of technologies (e.g. mechanical, hydraulic, pneumatic, electrical, electronic, programmable electronic) and applied at the various levels of the development process. Although ISO 26262 is concerned with functional safety of E/E systems, it provides a framework within which safety-related systems based on other technologies can be considered. ISO 26262:

- a) provides an automotive safety lifecycle (management, development, production, operation, service, decommissioning) and supports tailoring the necessary activities during these lifecycle phases;
- b) provides an automotive-specific risk-based approach to determine integrity levels [Automotive Safety Integrity Levels (ASIL)];
- c) uses ASILs to specify applicable requirements of ISO 26262 so as to avoid unreasonable residual risk;
- d) provides requirements for validation and confirmation measures to ensure a sufficient and acceptable level of safety being achieved;
- e) provides requirements for relations with suppliers.

Functional safety is influenced by the development process (including such activities as requirements specification, design, implementation, integration, verification, validation and configuration), the production and service processes and by the management processes.

Safety issues are intertwined with common function-oriented and quality-oriented development activities and work products. ISO 26262 addresses the safety-related aspects of development activities and work products.

Figure 1 shows the overall structure of this edition of ISO 26262. ISO 26262 is based upon a V-model as a reference process model for the different phases of product development. Within the figure:

- the shaded “V”s represent the interconnection between ISO 26262-3, ISO 26262-4, ISO 26262-5, ISO 26262-6 and ISO 26262-7;
- the specific clauses are indicated in the following manner: “m-n”, where “m” represents the number of the particular part and “n” indicates the number of the clause within that part.

EXAMPLE “2-6” represents Clause 6 of ISO 26262-2.

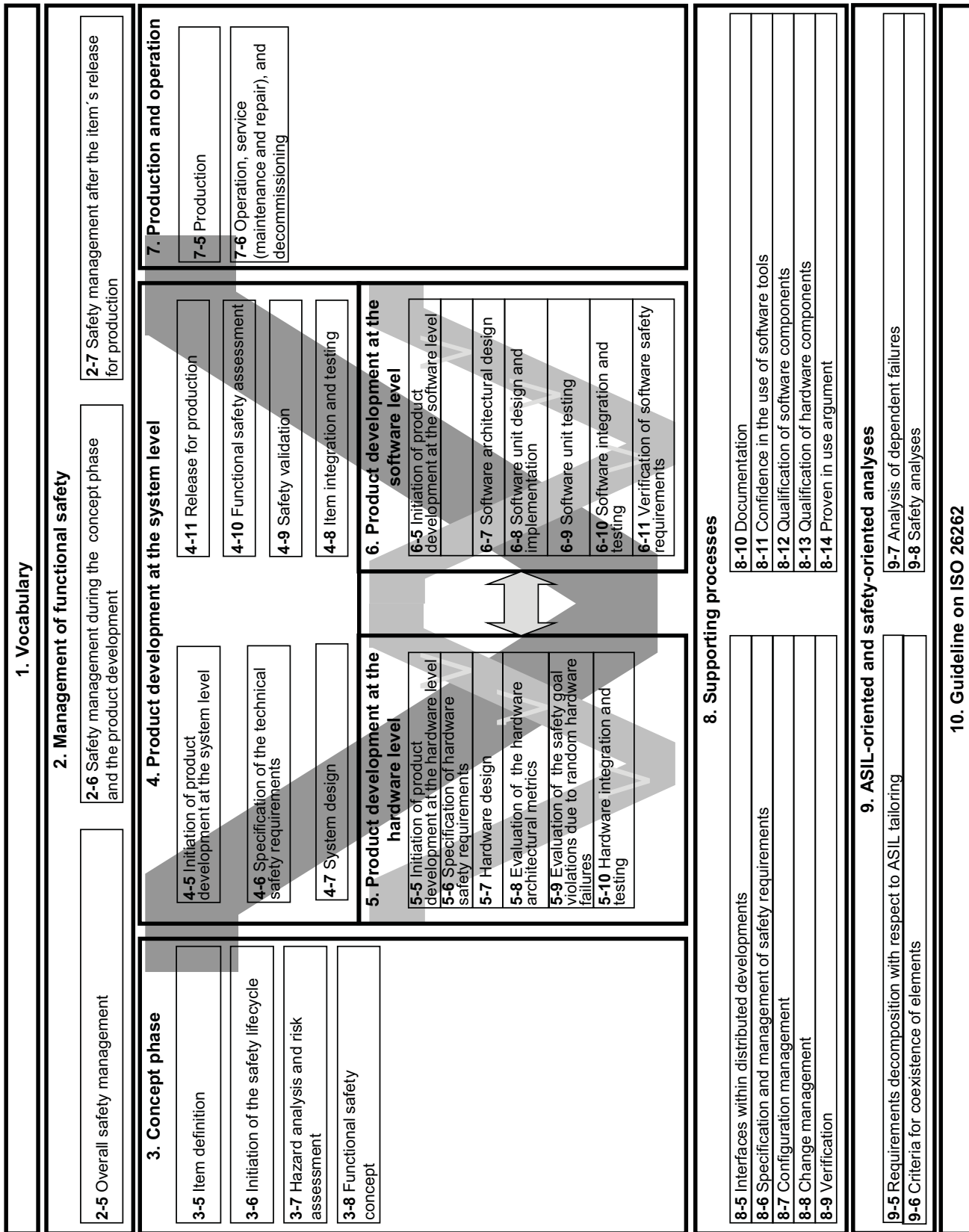


Figure 1 — Overview of ISO 26262

Road vehicles — Functional safety —

Part 1: Vocabulary

Scope

ISO 26262 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 passenger cars with a maximum gross vehicle mass up to 3 500 kg. ISO 26262 does not address unique E/E systems in special purpose vehicles such as vehicles designed for drivers with disabilities.

Systems and their components released for production, or systems and their components already under development prior to the publication date of ISO 26262, are exempted from the scope. For further development or alterations based on systems and their components released for production prior to the publication of ISO 26262, only the modifications will be developed in accordance with ISO 26262.

ISO 26262 addresses possible hazards caused by malfunctioning behaviour of E/E safety-related 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 E/E safety-related systems.

ISO 26262 does not address the nominal performance of E/E systems, even if dedicated functional performance standards exist for these systems (e.g. active and passive safety systems, brake systems, Adaptive Cruise Control).

This part of ISO 26262 specifies the terms, definitions and abbreviated terms for application in all parts of ISO 26262.

1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

1.1

allocation

assignment of a requirement to an architectural **element** (1.32)

NOTE Intent is not to divide an atomic requirement into multiple requirements. Tracing of an atomic **system** (1.129) level requirement to multiple lower level atomic requirements is allowed.

1.2

anomaly

condition that deviates from expectations, based, for example, on requirements, specifications, design documents, user documents, standards, or on experience

NOTE Anomalies can be discovered, among other times, during the **review** (1.98), **testing** (1.134), analysis, compilation, or use of **components** (1.15) or applicable documentation.

1.3 **architecture**

representation of the structure of the **item** (1.69) or functions or **systems** (1.129) or **elements** (1.32) that allows identification of building blocks, their boundaries and interfaces, and includes the **allocation** (1.1) of functions to hardware and software elements

1.4 **assessment**

examination of a characteristic of an **item** (1.69) or **element** (1.32)

NOTE A level of **independence** (1.61) of the party or parties performing the assessment is associated with each assessment.

1.5 **audit**

examination of an implemented process

1.6 **Automotive Safety Integrity Level ASIL**

one of four levels to specify the **item's** (1.69) or **element's** (1.32) necessary requirements of ISO 26262 and **safety measures** (1.110) to apply for avoiding an unreasonable **residual risk** (1.97), with D representing the most stringent and A the least stringent level

1.7 **ASIL decomposition**

apportioning of safety requirements redundantly to sufficiently independent **elements** (1.32), with the objective of reducing the **ASIL** (1.6) of the redundant safety requirements that are allocated to the corresponding elements

1.8 **availability**

capability of a product to be in a state to execute the function required under given conditions, at a certain time or in a given period, supposing the required external resources are available

1.9 **baseline**

version of a set of one or more work products, **items** (1.69) or **elements** (1.32) that is under configuration management and used as a basis for further development through the change management process

NOTE See ISO 26262-8:2011, Clause 8.

1.10 **branch coverage**

percentage of branches of the control flow that have been executed

NOTE 1 100 % branch coverage implies 100 % **statement coverage** (1.127).

NOTE 2 An if-statement always has two branches - condition true and condition false - independent of the existence of an else-clause.

1.11 **calibration data**

data that will be applied after the software build in the development process

EXAMPLE Parameters (e.g. value for low idle speed, engine characteristic diagrams); vehicle specific parameters (adaptation values) (e.g. limit stop for throttle valve); variant coding (e.g. country code, left-hand/right-hand steering).

NOTE Calibration data cannot contain executable or interpretable code.

1.12 candidate

item (1.69) or **element** (1.32) whose definition and conditions of use are identical to, or have a very high degree of commonality with, an item or element that is already released and in operation

NOTE This definition applies where candidate is used in the context of a **proven in use argument** (1.90).

1.13 cascading failure

failure (1.39) of an **element** (1.32) of an **item** (1.69) causing another element or elements of the same item to fail

NOTE Cascading failures are **dependent failures** (1.22) that are not **common cause failures** (1.14). See Figure 2, Failure A.



Figure 2 — Cascading failure

1.14 common cause failure CCF

failure (1.39) of two or more **elements** (1.32) of an **item** (1.69) resulting from a single specific event or root cause

NOTE Common cause failures are **dependent failures** (1.22) that are not **cascading failures** (1.13). See Figure 3.

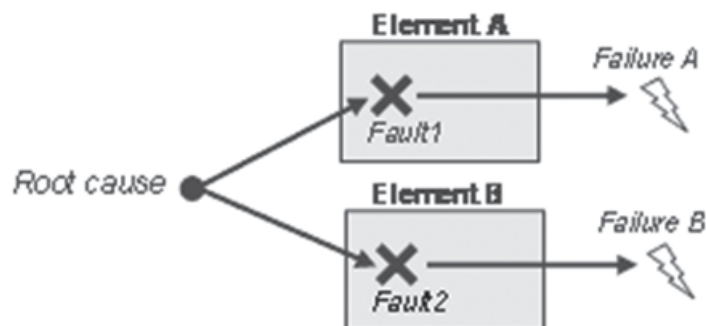


Figure 3 — Common cause failure

1.15 component

non-**system** (1.129) level **element** (1.32) that is logically and technically separable and is comprised of more than one **hardware part** (1.55) or of one or more **software units** (1.125)

NOTE A component is a part of a system.

1.16 configuration data

data that is assigned during software build and that controls the software build process

EXAMPLE Pre-processor instructions; software build scripts (e.g. XML configuration files).