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Motorcycles — Consideration for use cases of ISO 26262-12 MSIL classification

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National foreword

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Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 38, *Motorcycles and mopeds*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

0.1 General

The ISO 26262 series 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. The ISO 26262 series does not address unique E/E systems in special vehicles such as E/E systems designed for drivers with disabilities.

ISO 26262-12:2018 is the standard to address the sector-specific needs of E/E systems within series production motorcycles. The motorcycle industry recognizes the need to use appropriate safety-related techniques to avoid unreasonable risk resulting from random or systematic faults of E/E systems.

Motorcycle safety integrity level (MSIL) is the output of hazard analysis and risk assessment (HARA). This is then apportioned between the risk-reduction mechanisms and measures assigned to E/E systems using automotive safety integrity level (ASIL) and the risk reduction taken care of by external measures and/or other technologies. Specifically in the motorcycle industry, a greater proportion of the overall risk reduction is generally apportioned to external measures (for example, riding rules, training/qualification of riders, personal protective equipment, e.g. helmets and infrastructure features).

The worldwide established level of technology ("state-of-the-art") in the motorcycle industry suggests that ASIL requirements are not appropriate for motorcycles. This is addressed through the alignment between MSIL and ASIL. It is acknowledged that product development processes and technical solutions within the motorcycle industry are inhomogeneous with those of the automobile industry; therefore, the difference between MSIL and ASIL has been made to accommodate worldwide capability.

0.2 Objectives

Publicly-available research documents and references relating to the functional safety of motorcycles are fewer in number than those for passenger cars. The purpose of this document is to contribute to the functional safety of motorcycles by internationally collecting and providing examples for motorcycle HARA. This document provides an overview of the principles behind HARA using simplified examples to the concepts.

A prerequisite for HARA is the item definition, which is not the subject of this document. It also does not cover the safety goals of the item. This document takes examples of some items on motorcycles, but is also not exhaustive in terms of their function.

This document presents examples of potential accident scenarios and risk assessments, from the behaviour of an item when it fails and the hazard at vehicle level to its potential accident scenarios. Several methods have been published for each of these, and the aim is to provide a side-by-side comparison to assist in the implementation of HARA.

0.3 Points to note

In using this document, please note the following.

The hazard analysis results and MSIL described in this document is just a collection and does not specify the MSIL of a specific item. Although some examples are given in this document, they are the result of several approaches and do not specify the MSIL for a particular item. The same applies even if only one example is given for an item. Also, the information presented in this document is neither exhaustive nor complete. However, introducing some cases (i.e. analytical approaches and results) will help shape the image for applying the ISO 26262 series.

This document has taken as faithfully as possible the descriptions from published documents. Although there are formatting differences from the original text for the purpose of side-by-side comparison, severity(S), exposure(E), controllability(C) and MSIL described have not been altered or harmonised in any way. The information contained in this document is only part of the published material, and it is

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recommended to consult the original when referring to it in implementation. The use of these methods is neither mandatory nor recommended and is to be used at the user's own responsibility.

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TECHNICAL REPORT **ISO/TR 5340:2023**

Motorcycles — Consideration for use cases of ISO 26262-12 MSIL classification

1 Scope

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

NOTE The series production motorcycle is the vehicle that is intended to be used for public roads and is not a prototype.

This document covers HARA for one or more E/E systems installed in motorcycles. The approach of HARA defined in ISO 26262-12:2018, Clause 8 is applied to them in a motorcycle environment.

The intended user of this document is a functional-safety analyst complying with requirements in ISO 26262-12:2018. Therefore, this document does not intend to provide further necessary knowledge or guidelines in related fields including, but not limited to, item-specific knowledge, user and road profiling, medicine, statistics, accident research and human factors. Instead, it is intended to be related to the field of functional safety with the focus on the HARA examples only. It is the responsibility of the functional-safety analyst to achieve detailed knowledge about the item under investigation and the target application environment.

In this document, the values shown are for reference only. Any new HARA can use the latest relevant data and analyses. The values shown in this document were derived based on some, but not all segments of information expected within an item description, and thus are not considered as an item definition. The ISO 26262 series requires that a HARA be based on a specific item definition. This document is not to be constructed to suggest that conducting a HARA without a specific item definition is acceptable. The scope of the ISO 26262 series is limited to functional safety which is one aspect of the overall system safety assessment in safety risk management.

As for any risk assessment method, the methods mentioned in this document have inherent limitations. The HARA describes a simplified model of the real world, which is neither complete nor fully accurate. Although each assessment is based on available or applicable data as well as on expert judgment, the interpretation of such data can vary among analyses. For these reasons, the user of this document can bear in mind these limitations and judge the applicability of this document in any particular case.

2 Normative reference

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 26262-1, *Road vehicles — Functional safety — Part 1: Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 26262-1 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

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