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Technical product documentation (TPD) - Classification of requirements - Part 2: Classification based on severity and susceptibility (ISO/DIS 24096-2:2023)

Technische Produktdokumentation(TPD) - Klassifizierung von Anforderungen - Teil2: Klassifizierung nach Schweregrad und Empfindlichkeit (ISO/DIS 24096-2:2023)

Documentation technique de produits (TPD) - Classification des exigences - Partie 2: Classification en fonction de la gravité et de la susceptibilité (ISO/DIS 24096-2:2023)

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Technical product documentation (TPD) — Classification of requirements —

Part 2:
Classification based on severity and susceptibility

Documentation technique de produits (TPD) — Classification des exigences —

Partie 2: Classification en fonction de la gravité et de la probabilité

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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 10, *Technical product documentation*, Subcommittee SC 6, *Mechanical engineering documentation*.

A list of all parts in the ISO 24096 series can be found on the ISO website.

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.

Introduction

This document addresses classification of requirements. It is a framework for building a system to enable classification of requirements and indication of the classification in the technical product documentation (TPD) to support communication of the consequences of deviation from requirements.

This document has been elaborated mainly to be implemented within industry, e.g. the automotive and aerospace industries. However, it could also be used in other engineering fields.

Classification of requirements is a tool by which subsequent parties and stakeholders can be informed of the severity of consequences of non-conformity of requirements. This facilitates guiding of production and quality assurance resources, for instance the work of purchasing, production planning, control and revision. The classification system relies on an underpinning of procedures, regulatory framework and contractual agreements for implementation and follow-up as present in all modern industry.

There are quite a few examples of industrial stakeholders which deploys their own or partially self-developed system and methodology for classification of requirements. There has not been any ISO document that pragmatically describes “what is” and “how to create” a classification system. With these documents, the identified gap will be bridged. There is a great need within ISO, and external ISO, to describe how to introduce and work with a classification system in an industrial and design context.

Knowledge of the consequences of non-conformity with requirements and actions taken to resolve the source of the deviation from given requirements will have a positive effect on the product quality, user safety and economy of the product The production and inspection resources can then be used where they are most needed.

Annex A gives examples of classification with severity and susceptibility.

Annex B gives guidance on susceptibility.

Technical product documentation (TPD) — Classification of requirements —

Part 2: Classification based on severity and susceptibility

1 Scope

This document describes a method for classification of requirements based on severity and susceptibility. This classification method needs a system in line with the framework described in ISO 24096-1 to form a complete system.

This document

— indicates the needed elements for a consistent evaluation of the severity over time, and supports a company business model and its brand image;

— gives background to why more than severity is useful as a base for classification;

— adds susceptibility as a viable parameter along with severity;

— describes the methodology for classification requirements using severity and susceptibility.

2 Normative references

The following documents 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 8015:2011, *Geometrical product specifications (GPS) — Fundamentals — Concepts, principles and rules*

ISO 10209, *Technical product documentation — Vocabulary — Terms relating to technical drawings, product definition and related documentation*

ISO 24096-1, *Technical product documentation (TPD) – Classification of requirements – Part 1: Framework*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 8015:2011, ISO 10209 and ISO 24096-1, and the following apply.

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

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

— IEC Electropedia: available at https://www.electropedia.org/

3.1
susceptibility
degree to which a function is affected by non-conformity of a requirement

3.2
severity list
normative assessments of severity within each company or organization

4 Basic rules

A classification needs to encompass more than the severity of a potential consequence, since equating classification with severity could lead to an overload of classification markings in the TPD. In this document, susceptibility to deviation is used in addition to severity to balance classification, see clause 5 and Annex A.

All requirements in the product documentation shall be fulfilled compliant with ISO 8015:2011, 4.3.

In the same way as risk is evaluated by combining severity and probability, classification in this document is evaluated by combining severity and susceptibility, see Figure 1.

Severity is the gravity of possible consequence of non-conformity.

Susceptibility is the degree of leverage on the effect a deviation from a requirement has, i.e., a high susceptibility vs. a low would be that the same deviation would give a large or a negligible effect on the function respectively, Figure 1, Figure A.3 and Figure A.5.

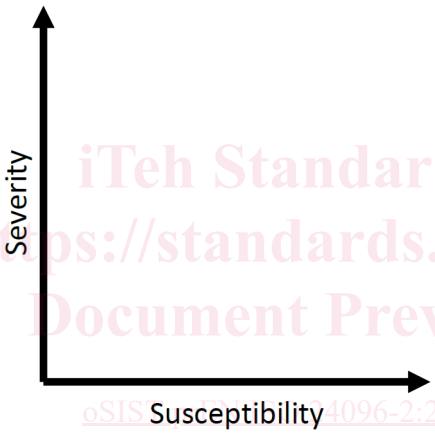

Figure 1 — Example of a template diagram for classification evaluation

Severity of non-conformity with a requirement and susceptibility to deviation are mandatory parameters in a classification system to be assessed in classification of requirement.

Due to the existence of a variety of solutions addressing this problem, this document is a framework document. Referencing this framework document in the technical product documentation (TPD) makes the supplier aware of the fact that a classification system for the consequences of non-conformity has been used, and that the classification system used has been developed following certain rules and ideas laid out in this document. The details of the classification itself and the symbology to indicate the classes, however, are not given in the framework document but in an additional document which shall be referenced in the TPD. In this way it is possible to use any of the already existing explicit solutions or develop a new one, maybe by modifying existing ones.

5 Classification with severity and susceptibility

5.1 General

Classification with severity and susceptibility is made in three main steps. Severity and susceptibility are treated as separate parameters which together determine the final classification of requirements.

The three steps are described in 5.1.1 to 5.1.3 and aspects of them are described in detail in 5.2 to 5.4.

5.1.1 Evaluation of the severity

By starting with severity, a screening is achieved. First, it reduces the relevant number of components that may have requirements worthy of classification higher than baseline. Second, it reduces the number of requirements on which the susceptibility needs to be evaluated. Evaluation and grading of the severity should use a severity list for consistency.

In the first step, step 1, the evaluation of severity can consist of answering three questions:

1.1 What are the functions of the design solution?

— Describe, in detail, what it shall do. List all functions.

1.2 What are the effects on the product and for the customer in case of a function deviation?

— List the effects of function deviation. Remember to include all side effects.

1.3 What type of severity heading should each of the effect be associated with?

— Match each effect to its relevant severity rating. The highest recommended rating is found in the severity list.

This is a bottom-up approach to determine severity, see Annex A for two applied examples.

When the severity is determined with a top-down analysis, it modifies the analysis to a degree. If the top-down analysis is performed correctly, it identifies the maximum severity for the analysed component. The classification should still not continue directly at step 2 since different deviations can give different severity and be linked to different requirements.

5.1.2 Evaluation of the susceptibility

In the second step, step 2, evaluation of susceptibility consists of answering two questions:

2.1 Which requirements affect the function at a deviation (most)?

— List (the most influential) requirements to affect the function.

2.2 How closely outside the requirements will the function start to deteriorate?

— Evaluate the susceptibility of each listed requirement.

5.1.3 Weighing severity and susceptibility together

In the third step, step 3, the results from step 1 and step 2 are combined. The combination of severity and susceptibility will yield the classification for each requirement. A simple diagram as given in Figure 2 can be used.