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Role of measurement uncertainty in conformity assessment

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foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Work Part 1.Structure and Drafting Rules for Standardization Documents"

drafting.

This document is modified to adopt ISO /IEC Guide 98-4.2012 "Uncertainty of Measurement - Part 4.Uncertainty of Measurement in Conformity Assessment

The role of ", the file type is adjusted from the ISO guide to the national standard of our country.

Compared with ISO /IEC Guide 98-4.2012, this document has made the following structural adjustments.

--- Deleted the suspension paragraph of Chapter 4 and the article number of A.4.1.1 in ISO /IEC Guide 98-4.2012;

---Changed the order of appendices, Appendix A corresponds to Appendix C in ISO /IEC Guide 98-4.2012, and Appendix C corresponds to ISO /IEC Guide

Appendix A of 98-4.2012.

The following editorial changes have been made to this document.

---Changed the name of the standard to "The Role of Measurement Uncertainty in Conformity Assessment" to coordinate with existing standardization documents;

--- Deleted JCGM102.2011 in the chapter on normative references, the document is only in the introduction of ISO /IEC Guide 98-4.2012 and

It is cited in the informative appendix, but not cited in this document;

--- ISO 3650 was replaced by GB/T 6093 (see introduction), and ISO /IEC 17025 was replaced by GB/T 27025-2019.

2005 (see introduction, source of term 3.3.12), replaced JCGM100.2008 (GUM) with GB/T 27418-2017 (see

Chapter 3 Introduction, 4.1, 6.3.2.4, B.1.1, C.4.2.2, C.4.4.3), replace JCGM101 with GB/T 27419-2018.

2008 (see Chapter 3 Guidance, 6.3.2.3 and 7.2.3), replaced JCGM200.2012 with ISO /IEC Guide99.2007

(See the introduction in Chapter 3), the cited technical content is consistent, which is convenient for the application of this document;

--- Deleted the informative appendix ZZ in ISO /IEC Guide 98-4.2012, which has nothing to do with my country's technical conditions and applications.

Introduction

Conformity assessment (see 3.3.1), broadly speaking, refers to the determination, directly or indirectly, whether a product, process, system, person or organization meets the requirements of relevant

any activity performed as required by standards and regulations (see 3.3.3). GB/T 27000-2006 "Conformity Assessment Vocabulary and General Principles" gives

General terms and definitions related to conformity assessment, including accreditation of conformity assessment bodies and the use of conformity assessment in facilitating trade.

In certain types of conformity assessment (sometimes called inspection, see 3.3.2), the determination of whether a product fulfills specified requirements relies on measuring the

Primary source of information. ISO 10576-1.2003 [22] provides an inclusive interval for the results of a measurement of a quantity (see 3.2.1)

(see 3.2.7, called "uncertainty interval" in ISO 10576-1.2003) is compared with the tolerance interval (see 3.3.5) to check compliance with

Guidance on setting limit values. This document extends this approach to include explicit risk considerations and formulate judgments based on measurements (see 3.2.5).

A general procedure for determining compliance, recognizing the central role of probability distributions (see 3.1.1) in the expression of uncertainty and incomplete information.

GB/T 27418-2017 "Assessment and Expression of Uncertainty in Measurement", GB/T 27419-2018 "Assessment and Expression of Uncertainty in Measurement"

Supplementary Document 1.Distribution Propagation Based on Monte Carlo Method" and

JCGM103[3] provide an understanding of the technical issue of measurement uncertainty assessment

solution. This document assumes that the quantity of interest, the measurand (see 3.2.4), is measured and that the measurement results are expressed in a manner consistent with

The principles stated in GB/T 27418-2017.In particular, it is assumed that all identified significant systematic effects have been corrected for.

In conformity assessment, measurement results are used to determine whether the article of interest conforms to specified requirements. Items of interest can be based on

The gauge block calibrated according to GB/T 27025-2019 [23] or tested according to GB/T 6093 [24] can also be a sample of industrial wastewater. Meet the requirements

The usual form is one or two tolerance limits (see 3.3.4) to define the allowable value interval of the measurable property of the item, called the tolerance interval

(see 3.3.5). Examples of these attributes include gauge block length, voltmeter reading error, and mass concentration of mercury in a wastewater sample. if testable

If the true value of the quantity attribute is within the allowable interval, it is called conformity, otherwise it does not conform.

Note. The term "tolerance interval" used in conformity assessment has a different meaning from the "tolerance interval" used in statistics.

In general, determining whether an item is qualified depends on multiple measured attributes, and there may be one or more attributes associated with each attribute.

allowable range. Given the measurement results, there may be more than one possible conclusion considering each attribute. For example, after measuring a certain value, the human

We may decide to accept the item, reject the item, take another measurement, etc. Items discussed in this document have a single scalar attribute

The specified requirements are given by one or two tolerance limits, and the judgment result is a binary conclusion, that is, there are only two possible states of the item (qualified and unqualified).

case) and two possible corresponding decisions (accept or reject). The concepts presented in this paper can be extended to more general decision problems.

In the evaluation of measured data, the probability density function (see 3.1.3) or a numerical approximation of such a function is usually used to express and transfer the measurand.

Information about energy value. This knowledge is usually summarized as best estimates (considered as measured quantities, see 3.2.6), and their associated measured

degree of certainty, or the inclusion interval that includes the value of the measurand with a specified probability of inclusion (see 3.2.8). Therefore, the evaluation based on the information after carrying out the measurement is

Compliance with specified requirements is a matter of probability.

In typical measurement activities, the underlying truth value of the measurand of interest is unknown. For example, the length of a steel gauge block cannot be directly observed, but can be

Observe the micrometer reading where the anvil is in contact with the end of the gauge block. This indication is obtained by means of measurements including influencing quantities such as thermal expansion and micrometer calibration.

The gauge model conveys information about the length of the gauge block. Accept/reject decisions in conformity assessment are based on observable data from which the measurand

Possible values of potential truth values [37].

Due to the uncertainty of measurement, judging whether an item meets the specified requirements based on the measured value of the property of the item usually has the risk of misjudgment. this

There are generally two kinds of misjudgments. the accepted qualified items may actually be unqualified, and the rejected unqualified items may actually be acceptable.

grid.

By defining an acceptance interval (see 3.3.9) that allows the measured value of the measurand to be measured, it is possible to balance false acceptance/rejection with respect to measurement uncertainty

risk and minimize the cost of misjudgment. This document addresses the issue of calculating the probability density function (PDF) of the measurand, tolerance limits, and acceptance limits.

Calculation of pass probability (see 3.3.7) and two kinds of technical problems of misjudgment probability.

The specific acceptance interval and its relationship with the corresponding allowable interval are shown in Figure 1.

It is stipulated that the true value of the measurable property (measurand) of the item lies within the allowable interval defined by (TL,TU). If the measured value of the attribute lies within the acceptance limits (see 3.3.8)