IEC GUIDE 115

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GUIDE

GUIDE

Application of uncertainty of measurement to conformity assessment activities in the electrotechnical sector

Application de l'incertitude de mesure aux activités d'évaluation de la conformité dans le secteur électrotechnique

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APPLICATION OF UNCERTAINTY OF MEASUREMENT TO CONFORMITY ASSESSMENT ACTIVITIES IN THE ELECTROTECHNICAL SECTOR

FOREWORD

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This second edition of IEC Guide 115 has been prepared, in accordance with ISO/IEC Directives, Part 1, Annex A, by IECEE/CTL. This is a non-mandatory guide in accordance with SMB Decision 136/8.

This second edition cancels and replaces the first edition published in 2007.

The main changes with respect to the previous edition are as follows:

a) editorial alignment to ISO/IEC 17025:2017 without adapting the technical content;
b) references to ISO/IEC 17025:2005 and ISO/IEC 17025:2017 in order to help for the transition to the new edition of ISO/IEC 17025.

The text of this IEC Guide is based on the following documents:

Four months' vote	Report on voting
SMBNC/8/DV	SMBNC/14/RV

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Guide is English.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publication.

INTRODUCTION

This document has been prepared by the IECEE Committee of Testing Laboratories (CTL) to provide guidance on the practical application of the measurement uncertainty requirements of ISO/IEC 17025 to the electrical safety testing conducted within the IECEE CB Scheme.

The IECEE CB Scheme is a multilateral, international agreement, among over 40 countries and some 60 national certification bodies, for the acceptance of test reports on electrical products tested to IEC standards.

The aim of the CTL is, among other tasks, to define a common understanding of the test methodology with regard to the IEC standards as well as to ensure and continually improve the repeatability and reproducibility of test results among the member laboratories.

The practical approach to measurement uncertainty outlined in this document has been adopted for use in the IECEE Schemes, and is also extensively used around the world by testing laboratories engaged in testing electrical products to national safety standards.

This document is of particular interest to the following IEC technical committees, which can decide to make use of it if necessary:

TECHNICAL COMMITTEE 13: ELECTRICAL ENERGY MEASUREMENT AND CONTROL
TECHNICAL COMMITTEE 17: HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR
TECHNICAL COMMITTEE 18: ELECTRICAL INSTALLATIONS OF SHIPS AND OF MOBILE AND FIXED OFFSHORE UNITS
TECHNICAL COMMITTEE 20: ELECTRIC CABLES
TECHNICAL COMMITTEE 21: SECONDARY CELLS AND BATTERIES
TECHNICAL COMMITTEE 22: POWER ELECTRONIC SYSTEMS AND EQUIPMENT
TECHNICAL COMMITTEE 23: ELECTRICAL ACCESSORIES
TECHNICAL COMMITTEE 32: FUSES
TECHNICAL COMMITTEE 33: POWER CAPACITORS AND THEIR APPLICATIONS
TECHNICAL COMMITTEE 34: LIGHTING
TECHNICAL COMMITTEE 35: PRIMARY CELLS AND BATTERIES
TECHNICAL COMMITTEE 38: INSTRUMENT TRANSFORMERS
TECHNICAL COMMITTEE 40: CAPACITORS AND RESISTORS FOR ELECTRONIC EQUIPMENT
TECHNICAL COMMITTEE 47: SEMICONDUCTOR DEVICES
TECHNICAL COMMITTEE 59: PERFORMANCE OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES
TECHNICAL COMMITTEE 61: SAFETY OF HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES
TECHNICAL COMMITTEE 62: ELECTRICAL EQUIPMENT IN MEDICAL PRACTICE
TECHNICAL COMMITTEE 64: ELECTRICAL INSTALLATIONS AND PROTECTION AGAINST ELECTRIC SHOCK
TECHNICAL COMMITTEE 65: INDUSTRIAL-PROCESS MEASUREMENT, CONTROL AND AUTOMATION
TECHNICAL COMMITTEE 66: SAFETY OF MEASURING, CONTROL AND LABORATORY EQUIPMENT
TECHNICAL COMMITTEE 76: OPTICAL RADIATION SAFETY AND LASER EQUIPMENT
TECHNICAL COMMITTEE 77: ELECTROMAGNETIC COMPATIBILITY

TECHNICAL COMMITTEE 78: LIVE WORKING

TECHNICAL COMMITTEE 80: MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS

TECHNICAL COMMITTEE 82: SOLAR PHOTOVOLTAIC ENERGY SYSTEMS

TECHNICAL COMMITTEE 110: ELECTRONIC DISPLAYS

APPLICATION OF UNCERTAINTY OF MEASUREMENT TO CONFORMITY ASSESSMENT ACTIVITIES IN THE ELECTROTECHNICAL SECTOR

1 Scope

This Guide presents a practical approach to the application of uncertainty of measurement to conformity assessment activities in the electrotechnical sector. It is specifically conceived for use in IECEE Schemes as well as by testing laboratories engaged in testing electrical products to national safety standards. It describes the application of uncertainty of measurement principles and provides guidance on making uncertainty of measurement calculations. It also gives some examples relating to uncertainty of measurement calculations for product conformity assessment testing.

2 Normative references

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/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

3 Terms and definitions

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

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

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
coverage factor
number that, when multiplied by the combined standard uncertainty, produces an interval (the expanded uncertainty) about the measurement result that can be expected to encompass a large, specified fraction (e.g. 95 %) of the distribution of values that could be reasonably attributed to the measurand

3.2
combined standard uncertainty
result of the combination of standard uncertainty components

3.3
error of measurement
result of a measurement minus a true value of the measurand

Note 1 to entry: The error of measurement is not precisely quantifiable because the true value lies somewhere unknown within the range of measurement uncertainty.