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# TECHNICAL REPORT

## Household and similar electrical appliances – Method of measuring performance – Assessment of repeatability, reproducibility and uncertainty

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# HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – METHOD OF MEASURING PERFORMANCE – ASSESSMENT OF REPEATABILITY, REPRODUCIBILITY AND UNCERTAINTY

## FOREWORD

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IEC 63250 has been prepared IEC technical committee 59: Performance of household and similar electrical appliances. It is a Technical Report.

The text of this Technical Report is based on the following documents

| Draft | Report on voting |
|---|---|
| 59/752/DTR | 59/765/RVDTR |

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 Technical Report is English.

Words **in bold** in the text are defined in Clause 3.

This document was drafted in accordance with 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/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

# INTRODUCTION

To encourage the efficient use of energy and other resources, national governments and regional authorities have issued regulations that mandate the provision of information to consumers regarding the energy and water consumption of household appliances and associated performance characteristics.

Therefore, methods for measuring performance characteristics must be of sufficient **accuracy** to provide confidence to governments, consumers and manufacturers.

The **accuracy** of a test method is expressed in terms of **bias** and **precision**. **Precision**, when evaluating test methods, is expressed in terms of two measurement concepts: **repeatability** (intra-laboratory variability) and **reproducibility** (inter-laboratory variability). Therefore, standard procedures are required for determining the **repeatability** and the **reproducibility** of test methods. The determination of levels of **repeatability** and **reproducibility** is frequently done by carrying out **round robin tests** (RRT). The **repeatability** of a test method must be sufficiently accurate for comparative testing. The **reproducibility** of a test method must be sufficiently accurate for the determination of values that are declared, and for checking these declared values. Other ways to assess the uncertainty are possible.

Uncertainty reporting is essential to ensure measured data are interpreted correctly. Especially when data of measurements are to be compared between laboratories or when normative requirements are set up, it is necessary to know the uncertainty with which data can be measured.

In conformity assessment using a binary decision rule, a property of an item is measured, and the item is accepted as conforming if the measured value of the property lies within a defined acceptance interval. A measured value outside the acceptance interval leads to rejection of the item as non-conforming.

The objective of this technical report is to give guidelines for household and similar electrical appliances within TC 59, but it can also be used for assessing other types of appliances outside the technical committee 59 and its subcommittees' environment.

It is intended to collate and summarise the information needed for assessing the **repeatability**, **reproducibility** and uncertainty of measurements of performance of household and similar electrical appliances present in previous IEC publications[1].

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[1] IEC TR 61923, IEC TR 62617 and IEC TR 62970

# HOUSEHOLD AND SIMILAR ELECTRICAL APPLIANCES – METHOD OF MEASURING PERFORMANCE – ASSESSMENT OF REPEATABILITY, REPRODUCIBILITY AND UNCERTAINTY

## 1 Scope

This Technical Report deals with the determination of **repeatability** and **reproducibility** of test methods used for assessing the performance characteristics of household and similar electrical appliances. It also provides guidance for carrying out **round robin tests** (RRT).

It also specifies the uncertainty reporting of measurements of household and similar electrical appliances.

It describes methods to estimate the uncertainty of a measured result and to predict the range of measured values when the same appliance is measured in another laboratory applying the same measurement method.

It does not cover the development of measurement methods. It also does not deal with:

– the production variability of the appliance;

– how closely the measurement method reflects the normal use of appliances in households.

NOTE 1 Although this technical report does not cover the development of test methods, it can be taken into consideration for this purpose.

NOTE 2 For the purpose of this technical report production variability includes the variation of the individual appliances of the same type and model manufactured on the same production line.

NOTE 3 For noise standardisation, some deviating definitions are used (see. IEC 60704-3:2019).

## 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 5725-2:2019, *Accuracy (trueness and precision) of measurement methods and results – Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method*

ISO 80000-1:2009, *Quantities and units – Part 1: General*