



IECEE OPERATIONAL DOCUMENT

**IEC System of Conformity Assessment Schemes for Electrotechnical Equipment
and Components (IECEE System)**

Committee of Testing Laboratories (CTL)

Instrument Accuracy Limits





THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2019 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester.

If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

Useful links:

IEC publications search - www.iec.ch/searchpub

The advanced search enables you to find IEC publications by a variety of criteria (reference number, text, technical committee,...).

It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available on-line and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary (IEV) on-line.

Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

CONTENTS

FOREWORD.....	3
Background	4
1 Purpose.....	4
2 Scope.....	4
3 Normative References	4
4 Responsibility of the laboratory.....	4
5 Requirements	4

FOREWORD

Document Owner

CTL

History of changes

Date	Brief summary of changes
2016-06-01	N/A, as first edition
2019-03	3 year review, update to new OD document format

Effective date	Next maintenance due date
2019-06-30	2022-06-01

Background

The CTL decided in 2016 to convert the CTL Decision Sheet (DSH) 251 into the IECEE Operational Document (OD) structure. Editorial adjustments have been made where necessary.

1 Purpose

1.1 The purpose of this document is to provide default instrument accuracies for measurement ranges.

2 Scope

2.1 This Operational Document provides default instrument accuracy requirements where the test standard does not provide criteria.

3 Normative References

The following publication contains provisions which, through reference in this text, constitute modification or additions of this Operational Document.

ISO/IEC17025:2017	General requirements for the competence of testing and calibration laboratories
-------------------	---

4 Responsibility of the laboratory

4.1 The Laboratory shall assure instruments meet required accuracy.

5 Requirements

5.1 The default instrument accuracy requirements given below shall be applied when the standard does not provide criteria:

Instrument Accuracy Limits

<u>Parameter</u>	<u>Range</u>	<u>Instrument accuracy of Range</u>
Voltage		
≤ 1000 V	≤ 1 kHz	± 1,5%
	> 1kHz ≤ 5 kHz	± 2%
	> 5 kHz ≤ 20 kHz	± 3%
	> 20 kHz	± 5%
> 1000 V	dc ≤ 20 kHz	± 3%
	> 20 kHz	± 5%
Current		
≤ 5 A	dc ≤ 60 Hz	± 1,5%
	> 60 Hz ≤ 5 kHz	± 2,5%
	> 5 kHz ≤ 20 kHz	± 3,5%
	> 20 kHz	± 5%
> 5 A	dc ≤ 5 kHz	± 2,5%
	>5 kHz ≤ 20 kHz	± 3,5%
	> 20 kHz	± 5%
Leakage (Touch) current ¹		
	50 Hz ≤ 60 Hz	± 3,5%
	> 60 Hz ≤ 5 kHz	± 5%
	> 5 kHz ≤ 100 kHz	± 10%
	> 100 kHz ≤ 1 MHz	under consideration
Power (50/60 Hz)		
	≤ 3 kW	± 3%
	> 3 kW	± 5%
Power Factor		
	50 ≤ 60 Hz	± 0,05
Frequency		
	≤ 10 kHz	± 0,2%
Resistance		
	1 mΩ ≤ 100 mΩ	± 5%
	>1 MΩ ≤ 1 TΩ	± 5%
	> 1 TΩ	± 10%
	for all other cases	± 3%
Temperature ^{2, 3}		
	≥ -35°C < 100° C	± 2°C
	100° C ≤ 500° C	± 3%
	< -35°C	± 3°C

Instrument Accuracy Limits

<u>Parameter</u>	<u>Range</u>	<u>Instrument accuracy of Range</u>
<i>Time</i>	10 ms ≤ 200 ms	± 5%
	>200 ms ≤ 1 s	± 10 ms
	> 1 s	± 1%
<i>Linear dimensions</i>	≤ 1 mm	± 0,05 mm
	> 1 mm ≤ 25 mm	± 0,1 mm
	> 25 mm	± 0,5%
<i>Mass</i>	> 10 g ≤ 100 g	± 1%
	> 100 g ≤ 5 kg	± 2%
	> 5 kg	± 5%
<i>Force</i>	for all values	± 6%
<i>Mechanical energy</i>	for all values	± 10%
<i>Torque</i>	for all values	± 10%
<i>Angles</i>	for all values	± 1 degree
<i>Relative humidity</i>	30% ≤ 95% RH	± 6 %RH
<i>Barometric air pressure</i>	for all values	± 10 kPa
<i>Gas & fluid pressure</i>	for static measurement	± 5%

¹ The stated tolerances apply to the total tolerance of the leakage (touch) current circuit and metering instrument. Refer to IECEE CTL OD 5013 "Leakage (Touch) Current Measurement Instruments".

² Thermocouple not included in the Instrument accuracy of measuring range. Thermocouples type "K", "T" and "J", premium grade, are recommended. Switching power supplies present an electrically noisy environment for test instrumentation. When measuring temperatures on and within switching power supplies, thermocouples are in the immediate vicinity or in intimate contact with component sources of the electrical noise. Type J thermocouples are made of material that is magnetic. Type K thermocouples are made of material that is slightly magnetic. Type T thermocouples are made of nonmagnetic materials. As a result Type T thermocouples are affected less by the high frequency magnetic fields present and give more accurate results.

³ Not for measurements related to relative humidity.

**INTERNATIONAL
ELECTROTECHNICAL
COMMISSION**

3, rue de Varembé
PO Box 131
CH-1211 Geneva 20
Switzerland

Tel: + 41 22 919 02 11
info@iec.ch
www.iec.ch

**IEC SYSTEM OF CONFORMITY ASSESSMENT
SCHEMES FOR ELECTROTECHNICAL
EQUIPMENT AND COMPONENTS (IECEE)**

IECEE Secretariat c/o IEC
3, rue de Varembé
PO Box 131
CH-1211 Geneva 20
Switzerland

Tel: + 41 22 919 02 11
secretariat@iecee.org
www.iecee.org