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**Instruments and software used for measurements in high-voltage and
high-current tests –
Part 1: Requirements for instruments for impulse tests**

**Appareils et logiciels utilisés pour les mesurages pendant les essais à tension
et courant élevés –
Partie 1: Exigences pour les appareils utilisés pour les essais de choc**



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**INSTRUMENTS AND SOFTWARE USED FOR MEASUREMENTS
IN HIGH-VOLTAGE AND HIGH-CURRENT TESTS –****Part 1: Requirements for instruments for impulse tests**

FOREWORD

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International Standard IEC 61083-1 has been prepared by IEC technical committee 42: High-voltage and high-current test techniques.

This third edition cancels and replaces the second edition published in 2001. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) Requirements for static integral non-linearity and static differential non-linearity have been removed.
- b) Requirement for impulse scale factor non-linearity has been added.
- c) Uncertainty requirements for impulse calibrators have been revised.
- d) Requirements for peak voltmeter have been revised.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
42/386/FDIS	42/388/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all the parts in the IEC 61083, under the general title *Instruments and software used for measurements in high-voltage and high-current tests*, can be found on the IEC website.

Future standards in this series will carry the new general title as cited above.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://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- withdrawn,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

The electric power industry requires standardized tools to provide confidence in high-voltage and high-current testing results, and to prove equivalence between tests performed in different test facilities.

Analogue capture of test data has today been largely replaced by digital capture with recording instruments based on sampling technology. This part of IEC 61083 specifies requirements for the performance of digital recorders used for high-voltage and high-current impulse tests.

Since the last revision of this standard, significant improvements have been made in many aspects of digitising instruments used for high-voltage and high-current tests. In particular, digitising resolutions have improved several folds since the last revision, with 12-bit to 14-bit being typical resolutions for impulse measurement digitisers. Furthermore, the improvement of A/D converters has led to a situation where other aspects of the instruments, such as linearity of front-end amplifiers and performance of immunity to interference, have replaced performance of A/D converters as the main concern of measurement accuracy and instrument reliability.

The requirements in this edition of the standard have been revised to reflect these technological changes. For example, the number of type tests aimed for evaluating the performance of A/D converters has been reduced, and new requirements for the linearity of complete system (A/D converter and analogue components) have been added.

During preparation of the second edition of this standard in 2021, the need to keep analogue oscilloscopes and peak voltmeters was thoroughly discussed. Requirements for analogue oscilloscopes have now been removed, and only essential requirements for peak voltmeters have been kept.

INSTRUMENTS AND SOFTWARE USED FOR MEASUREMENTS IN HIGH-VOLTAGE AND HIGH-CURRENT TESTS –

Part 1: Requirements for instruments for impulse tests

1 Scope

This part of IEC 61083 is applicable to digital recorders, including digital oscilloscopes, used for measurements during tests with high impulse voltages and high impulse currents. It specifies the measuring characteristics and calibrations required to meet the measuring uncertainties and procedures specified in IEC 60060-2 and IEC 62475.

This document

- defines the terms specifically related to digital recorders;
- specifies the necessary requirements for such instruments to ensure their compliance with the requirements for high-voltage and high-current impulse tests;
- establishes the tests and procedures necessary to demonstrate their compliance;
- covers digital recorders that permit access to raw data from permanent or temporary storage;
- covers peak meters used for measuring the extreme value of lightning impulses, the peak value of switching or current impulses.

It has the status of a horizontal standard in accordance with IEC Guide 108.

This horizontal standard is primarily intended for use by technical committees in the preparation of standards in accordance with the principles laid down in IEC Guide 108. One of the responsibilities of a technical committee is, wherever applicable, to make use of horizontal standards in the preparation of its publications. The contents of this horizontal standard will not apply unless specifically referred to or included in the relevant publications.

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.

IEC 60060-1, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60060-2:2010, *High-voltage test techniques – Part 2: Measuring systems*

IEC 62475, *High-current test techniques – Definitions and requirements for test currents and measuring systems*

ISO/IEC Guide 98-3:2008, *Uncertainty of measurement – Part 3: Guide to the expression of uncertainty in measurements (GUM:1995)*

3 Terms and definitions

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