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BSI Standards Publication

Assessment of power quality — Characteristics of electricity supplied by public networks

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National foreword

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A list of organizations represented on this committee can be obtained on request to its secretary.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ASSESSMENT OF POWER QUALITY – CHARACTERISTICS OF ELECTRICITY SUPPLIED BY PUBLIC NETWORKS

FOREWORD

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Technical Specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 62749, which is a technical specification, has been prepared by IEC technical committee 8: System aspects of electrical energy supply.

The text of this Technical Specification is based on the following documents:

Draft TS	Report on voting
8/1512/DTS	8/1524/RVDTS

Full information on the voting for the approval of this Technical Specification 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.

This second edition cancels and replaces the first edition published in 2015. This edition constitutes a technical revision.

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

a) minimum number of remaining data for weekly analysis,
b) improvement of the compatibility between EN 50160 and IEC TS 62749,
c) further explanation of the conception of daily sliding window,
d) further explanation of the aggregation method used for events,
e) further explanation of the relation between Power Quality and EMC,
f) addition of a new definition of mains communicating system (MCS),
g) addition of a new Annex G: Other phenomena,
h) transfer of the main content of IEC TR 62510 to IEC TS 62749.

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

- transformed into an International standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

The description of electricity is of fundamental importance within electricity supply systems. In the past, its characteristics depended less on its generation than on the way in which it was transported by networks and being used by the equipment of the multiple users. Faults or other events such as short-circuit and lightning strikes occurring within users' installations or public networks also disturb or degrade it.

Nowadays, Smart Grid construction and massive deployment of renewable energy sources increase the complexity of power quality management. For more information about power quality issues related to distributed generation and micro-grids, refer to Annex D.

NOTE For more information about role of stakeholders for power quality management, see Annex H.

There is a need for a common set of power quality (PQ) indices and measurement methods in order to allow different system operators to measure and report power quality in a consistent manner.

Regarding the limits or levels of power quality, the situation differs. Historically, the electrical systems in different countries/regions have been designed in different ways to cater for national/regional variations like different geographic, climatic or commercial conditions, etc. It is thus essential that any set of internationally agreed power quality limits or levels also recognize these differences, which depends namely on the system configuration, the transfer characteristics between the different voltage levels (attenuation or amplification), the actual disturbance levels on the system, etc.

Also, the quality of power is not absolute. Optimizing power quality should be carried out in a cost-effective manner to balance network user power quality requirements and willingness to pay for it with power quality supply costs.

Therefore, some of the objectives recommended hereafter allow for a range of values, or options, while still ensuring the coordination of disturbance levels between different parts of the system or voltage levels.

Then, the requirements to be applied can be expressed by the association of the IEC Power Quality framework from the normative part of this document and profiles. Examples of profiles are given in Annex A.

ASSESSMENT OF POWER QUALITY – CHARACTERISTICS OF ELECTRICITY SUPPLIED BY PUBLIC NETWORKS

1 Scope

This Technical Specification specifies the expected characteristics of electricity at the point of supply of public low, medium and high voltage, 50 Hz or 60 Hz, networks, as well as power quality assessment methods.

NOTE 1 The boundaries between the various voltage levels can be different for different countries/regions. In the context of this TS, the following terms for system voltage are used:

- low voltage (LV) refers to $U_N \leq 1$ kV;
- medium voltage (MV) refers to 1 kV < $U_N \leq 35$ kV;
- high voltage (HV) refers to 35 kV < $U_N \leq 230$ kV.

NOTE 2 Because of existing network structures, in some countries/regions, the boundary between medium and high voltage can be different.

This document applies to the phenomena listed in Table 1.

Table 1 – Classification of electromagnetic phenomena addressed by power quality indices

Continuous phenomena	Discontinuous phenomena – Events	Other phenomena
FREQUENCY DEVIATION	SUPPLY INTERRUPTION	MAINS COMMUNICATING VOLTAGES
SUPPLY VOLTAGE DEVIATION	VOLTAGE DIP	
VOLTAGE UNBALANCE	VOLTAGE SWELL	
HARMONIC VOLTAGE	TRANSIENT OVERVOLTAGE	
INTERHARMONIC VOLTAGE	RAPID VOLTAGE CHANGE	
FLICKER (VOLTAGE FLUCTUATION)		

NOTE 3 Specification of related measurement methods can be found in IEC 61000-4-30.

NOTE 4 Specification of the performance of related measuring instruments can be found in IEC 62586.

While power quality is related to EMC in a number of ways, especially because compliance with power quality requirements depends on the control of cumulative effect of electromagnetic emissions from all/multiple equipment and/or installations, this document is not an EMC publication (see also Annex F).

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 60038, *IEC standard voltages*