IEC/IEEE 60076-16

Edition 2.0 2018-09

INTERNATIONAL STANDARD

Power transformers –
Part 16: Transformers for wind turbine applications

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 27.180; 29.180

ISBN 978-2-8322-5807-1

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOREWORD

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International Standard IEC/IEEE 60076-16 has been prepared by IEC technical committee 14: Power transformers, in cooperation with Performance Characteristics Subcommittee of the IEEE Power and Energy Society [1], under the IEC/IEEE Dual Logo Agreement between IEC and IEEE.

This second edition of IEC/IEEE 60076-16 cancels and replaces IEC 60076-16:2011, and constitutes a technical revision.

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

1) relationship between transformer rated power and the output current from the associated generator is introduced;
2) thermal correction of the effective cooling medium has been introduced;
3) testing regime has been strengthened to ensure transformers are suitable for the harsh electrical environment to which they are subjected.

This publication is published as an IEC/IEEE Dual Logo standard.

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

FDIS	Report on voting
14/959/FDIS	14/965/RVD

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

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

A list of all parts in the IEC/IEEE 60076 series, published under the general title *Power transformers*, can be found on the IEC website.

The IEC Technical Committee and IEEE Technical Committee have 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

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- withdrawn,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

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

1 A list of IEEE participants can be found at the following URL: https://standards.ieee.org/project/60076-16.html

POWER TRANSFORMERS –

Part 16: Transformers for wind turbine applications

1 Scope

This part of IEC 60076 applies to dry-type and liquid-immersed transformers for wind turbine step-up applications having a winding with highest voltage for equipment up to and including 72,5 kV. This document applies to the transformer used to connect the wind turbine generator to the wind farm power collection system or adjacent distribution network and not the transformer used to connect several wind turbines to a distribution or transmission network.

Transformers covered by this document comply with the relevant requirements prescribed in the IEC 60076 standards or IEEE C57 standards.

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.

2.1 IEC references

IEC 60076-1, *Power transformers – Part 1: General*

IEC 60076-2, *Power transformers – Part 2: Temperature rise for liquid-immersed transformers*

IEC 60076-3, *Power transformers – Part 3: Insulation levels, dielectric tests and external clearances in air*

IEC 60076-5, *Power transformers – Part 5: Ability to withstand short circuit*

IEC 60076-7, *Power transformers – Part 7: Loading guide for mineral-oil-immersed power transformers*

IEC 60076-11, *Power transformers – Part 11: Dry-type transformers*

IEC 60076-12, *Power transformers – Part 12: Loading guide for dry-type power transformers*

IEC 60076-14, *Power transformers – Part 14: Liquid-immersed power transformers using high-temperature insulating materials*

IEC 61378-1, *Converter transformers – Part 1: Transformers for industrial applications*

2.2 IEEE references

IEEE Std C57.12.00™, *IEEE Standard for General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers*

IEEE Std C57.12.01™, *IEEE Standard for General Requirements for Dry-Type Distribution and Power Transformers*

IEEE Std C57.12.80™, *IEEE Standard Terminology for Power and Distribution Transformers*

IEEE Std C57.91™, *IEEE Guide for Loading Mineral-Oil-Immersed Transformers and Step-Voltage Regulators*

IEEE Std C57.96™, *IEEE Guide for Loading Dry-Type Distribution and Power Transformers*

IEEE Std C57.110™, *IEEE Recommended Practice for Establishing Liquid-Filled and Dry-Type Power and Distribution Transformer Capability When Supplying Nonsinusoidal Load Currents*

IEEE Std C57.154™, *IEEE Standard for the Design, Testing, and Application of Liquid-Immersed Distribution, Power, and Regulating Transformers Using High-Temperature Insulation Systems and Operating at Elevated Temperatures*

ANSI C84.1, *Electric Power Systems and Equipment – Voltage Ratings (60 Hz)*

2.3 ISO references

ISO 12944 (all parts), *Paints and varnishes – Corrosion protection of steel structures by protective paint systems*

ISO 12944-4, *Paints and varnishes – Corrosion protection of steel structures by protective paint systems – Part 4: Types of surface and surface preparation*

2.4 CENELEC references

EN 50588-1:2015, *Medium power transformers 50 Hz, with highest voltage for equipment not exceeding 36 kV – Part 1: General requirements*