

KESKMISED JÕUTRAFOD SAGEDUSELE 50 HZ JA
SEADMETE KÕRGEIMALE PINGELE MITTE ÜLE 36 KV.
OSA 1: ÜLDNÕUDED

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

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 50588-1:2015 sisaldab Euroopa standardi EN 50588-1:2015 ingliskeelset teksti.	This Estonian standard EVS-EN 50588-1:2015 consists of the English text of the European standard EN 50588-1:2015.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 26.06.2015.	Date of Availability of the European standard is 26.06.2015.
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ICS 29.180

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English Version

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

Transformateurs 50 Hz de moyenne puissance, de tension la plus élevée pour le matériel ne dépassant pas 36 kV -
Partie 1: Exigences générales

Mittelleistungstransformatoren 50 Hz, mit einer höchsten Spannung für Betriebsmittel nicht über 36 kV - Teil 1:
Allgemeine Anforderungen

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Foreword

This document (EN 50588-1:2015) has been prepared by CLC/TC 14 "Power transformers".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2016-06-25
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2018-06-25

This document supersedes EN 50464-1:2007 and EN 50541-1:2011.

EN 50588-1:2015 includes the following significant technical changes with respect to EN 50464-1:2007 and EN 50541-1:2011:

- both liquid filled and dry-type transformers are covered in the same document;
- the scope of applicability is extended in terms of rated power;
- new values of no load loss, load loss and sound power level for different values of rated power are specified;
- for transformers having rated power above 3 150 kVA, the concept of Peak Efficiency Index is introduced.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports requirements of Commission Regulation (EC).

For the relationship with requirements of Commission Regulation (EC) see informative Annex ZZ, which is an integral part of this document.

1 Scope

This European Standard covers medium power transformers. 'Medium power transformer' means a power transformer with a highest voltage for equipment higher than 1,1 kV, but not exceeding 36 kV and a rated power equal to or higher than 5 kVA but lower than 40 MVA.

National practices may require the use of highest voltages for equipment up to (but not including) 52 kV, when the rated voltage is less than 36 kV (such as $U_m = 38,5$ kV or $U_m = 40,5$ kV). This is considered to be an unusual case of a large power transformer, where the requirements are those for a medium power transformer with $U_m = 36$ kV.

NOTE 1 'Large power transformer' means a power transformer with a highest voltage for equipment exceeding 36 kV and a rated power equal or higher than 5 kVA, or a rated power equal to or higher than 40 MVA regardless of the highest voltage for equipment. Large power transformers are in the scope of EN 50629.

NOTE 2 Transformers with tap changer (DETC or OLTC) are included in this European Standard even if they have separate tapping winding.

The object of this European Standard is to set up requirements related to electrical characteristics and design of medium power transformers.

The following transformers are excluded from this European Standard:

- instrument transformers, specifically designed to supply measuring instruments, meters, relays and other similar apparatus;
- transformers with low-voltage windings specifically designed for use with rectifiers to provide a DC supply;
- transformers specifically designed to be directly connected to a furnace;
- transformers specifically designed for offshore applications and floating offshore applications;
- transformers specially designed for emergency installations;
- transformers and auto-transformers specifically designed for railway feeding systems;
- earthing or grounding transformers, this is, three-phase transformers intended to provide a neutral point for system grounding purposes;
- traction transformers mounted on rolling stock, this is, transformers connected to an AC or DC contact line, directly or through a converter, used in fixed installations of railway applications;
- starting transformers, specifically designed for starting three-phase induction motors so as to eliminate supply voltage dips;
- testing transformers, specifically designed to be used in a circuit to produce a specific voltage or current for the purpose of testing electrical equipment;
- welding transformers, specifically designed for use in arc welding equipment or resistance welding equipment;
- transformers specifically designed for explosion-proof and underground mining applications;
- transformers specifically designed for deep water (submerged) applications;
- medium Voltage (MV) to Medium Voltage (MV) interface transformers up to 5 MVA;
- large power transformers where it is demonstrated that for a particular application, technically feasible alternatives are not available to meet the minimum efficiency requirements set out by the commission regulation (EU) No 548/2014;
- large power transformers which are like for like replacements in the same physical location/installation for existing large power transformers, where this replacement cannot be achieved without entailing disproportionate costs associated to their transportation and/or installation.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 50180	<i>Bushings above 1 kV up to 52 kV and from 250 A to 3,15 kA for liquid filled transformers — Part 1: General requirements for bushings</i>
EN 50181	<i>Plug-in type bushings above 1 kV up to 52 kV and from 250 A to 2,50 kA for equipment other than liquid filled transformers</i>
EN 50216 (all parts)	<i>Power transformer and reactor fittings</i>
EN 50386	<i>Bushings up to 1 kV and from 250 A to 5 kA, for liquid filled transformers</i>
EN 50387	<i>Busbar bushings up to 1 kV and from 1,25 kA to 5 kA, for liquid filled transformers</i>
EN 50464-4	<i>Three-phase oil-immersed distribution transformers 50 Hz, from 50 kVA to 2 500 kVA with highest voltage for equipment not exceeding 36 kV — Part 4: Requirements and tests concerning pressurised corrugated tanks</i>
EN 60076 (all parts)	<i>Power transformers (IEC 60076, all parts)</i>
EN 60076-19	<i>Power transformers — Part 19: Rules for the determination of uncertainties in the measurement of the losses on power transformers and reactors (IEC/TS 60076-19)</i>
EN 60085	<i>Electrical insulation — Thermal evaluation and designation</i>
EN 60505	<i>Evaluation and qualification of electrical insulation systems (IEC 60505)</i>
EN 61100	<i>Classification of insulating liquids according to fire point and net calorific value (IEC 61100)</i>
IEC/TR 60616	<i>Terminal and tapping markings for power transformers</i>

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 60076-1:2011 and the following apply.

3.1

load factor

k

ratio of actual input current over the rated current of transformer where the actual current and rated current are constant over time

Note 1 to entry: Normally $0 \leq k \leq 1$.

3.2

transmitted apparent power

kS_r

product of the load factor and the rated power