

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 3: Determination of the power rating of a transformer loaded with non-sinusoidal currents

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EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 50464-3:2007 sisaldab Euroopa standardi EN 50464-3:2007 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 19.06.2007 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 50464-3:2007 consists of the English text of the European standard EN 50464-3:2007.</p> <p>This document is endorsed on 19.06.2007 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p>Käsitlusala:</p> <p>This European Standard gives to the user guidance to determine the loadability of an oil-immersed distribution transformer, as defined in and covered by EN 50464-1, in the case of load current with harmonic factors exceeding the maximum values allowed.</p>	<p>Scope:</p> <p>This European Standard gives to the user guidance to determine the loadability of an oil-immersed distribution transformer, as defined in and covered by EN 50464-1, in the case of load current with harmonic factors exceeding the maximum values allowed.</p>
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ICS 29.180

Võtmesõnad: buildings, energy supply system, equipment, load currents, management, mathematical calculations, measurement, oil bath transformers, oil-immersed transformers, oils, performance, power supplies, three-phase current, three-phase transformers, transformers, voltage

**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 3: Determination of the power rating of a transformer
loaded with non-sinusoidal currents**

Transformateurs triphasés de distribution
immergés dans l'huile,
50 Hz, de 50 kVA à 2 500 kVA,
de tension la plus élevée
pour le matériel ne dépassant pas 36 kV -
Partie 3: Détermination
de la caractéristique de puissance
d'un transformateur avec des courants
de charge non sinusoïdaux

Ölgefüllte
Drehstrom-Verteilungstransformatoren
50 Hz, 50 kVA bis 2 500 kVA,
mit einer höchsten Spannung
für Betriebsmittel bis 36 kV -
Teil 3: Bestimmung
der Bemessungsleistung
eines Transformators bei
nichtsinusförmigen Lastströmen

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of the Harmonization Document HD 428.4 S1:1994, prepared by the Technical Committee CENELEC TC 14, Power transformers, was submitted to the formal vote for conversion into a European Standard and was approved by CENELEC as EN 50464-3 on 2007-02-01.

The following date was fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2008-02-01

The EN 50464 series consists of the following parts, under the general title “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 1	General requirements
Part 2-1	Distribution transformers with cable boxes on the high-voltage and/or low-voltage side – General requirements
Part 2-2	Distribution transformers with cable boxes on the high-voltage and/or low-voltage side – Cable boxes type 1 for use on distribution transformers meeting the requirements of EN 50464-2-1
Part 2-3	Distribution transformers with cable boxes on the high-voltage and/or low-voltage side – Cable boxes type 2 for use on distribution transformers meeting the requirements of EN 50464-2-1
Part 3	Determination of the power rating of a transformer loaded with non-sinusoidal currents
Part 4	Requirements and tests concerning pressurised corrugated tanks

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1 Scope

This European Standard gives to the user guidance to determine the loadability of an oil-immersed distribution transformer, as defined in and covered by EN 50464-1, in the case of load current with harmonic factors exceeding the maximum values allowed.

NOTE In general this document is also applicable to dry-type distribution transformers as defined in and covered by HD 538.

2 Normative references

For the purposes of this document, the normative references of EN 50464-1 apply.

3 Application

For normal electrical energy distribution, the allowable total harmonic factor ¹⁾ and even harmonic factor of the load current are assumed to be limited to 5 % and 1 % respectively.

For electrical distribution with higher harmonic factors, it has to be taken into account that the load loss increases and, by consequence, the temperature rises in the transformer exceed those corresponding to sinusoidal currents having the same r.m.s. value.

NOTE If the transformer is intended for converter operation or the harmonic factor is higher than 5%, the matter shall be discussed between purchaser and manufacturer.

4 Equivalent power rating

The equivalent power rating is related to sinusoidal current which causes the same losses as those occurring with the non-sinusoidal current imposed.

The equivalent power rating is equal to the power based on the r.m.s. value of the non-sinusoidal current multiplied by the factor K .

The rated power of the transformer to be used shall be equal to or higher than the equivalent power rating.

In case a transformer in service is subsequently loaded with harmonic currents, a derating factor $1/K$ shall be applied to the rated power.

1) The harmonic factor H , in percentage, is defined by:

$$H\% = 100 \left[\sum_{n=2}^{n=N} \left(\frac{I_n}{I_1} \right)^2 \right]^{\frac{1}{2}}$$