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Močnostni transformatorji - Dodatne evropske zahteve - 3-1. del: Veliki močnostni transformator - Splošne zahteve

Power transformers - Additional European requirements: Part 3-1 Large power transformer - General requirements

Transformateurs de puissance - Exigences européennes supplémentaires: Partie 3-1 : Transformateurs de grande puissance

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English Version

Power transformers - Additional European requirements: Part 3-1 Large power transformer - General requirements

Transformateurs de puissance - Exigences européennes supplémentaires: Partie 3-1 : Transformateurs de grande puissance

To be completed

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European Committee for Electrotechnical Standardization
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Europäisches Komitee für Elektrotechnische Normung

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European foreword

This document (EN 50708-3-1:2020) 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)	2020-11-22
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This document supersedes EN 50629:2015 and all of its amendments and corrigenda (if any).

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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.

Introduction

For the purpose of this document, the requirements of the general EN 50708-1-1:2020 apply.

This document contains particular requirements for specific transformers or transformer applications, which are based on the requirements of the general EN 50708-1-1:2020.

This document should be considered in conjunction with the requirements of the general parts.

The particular requirements of the different subparts of EN 50708 supplement, modify or replace certain requirements of the general parts of EN 50708-1 and/or EN 50708-1-X being valid at the time of publication of this document. The absence of references to the exclusion of a part or a clause of a general part means that the corresponding clauses of the general part are applicable (undated reference).

Requirements of other -X parts with X greater than 1 being eventually relevant for cases covered by this document also apply. This document could therefore also supplement, modify or replace certain of these requirements valid at the time of publication of this document.

The main clause numbering of each part follows the pattern and corresponding references of EN 50708-1-1:2020. The numbers following the particular number of this document are those of the corresponding parts, or clauses of the other parts of the EN 50708 series, valid at the time of publication of this document, as indicated in the normative references of this document (dated reference).

In the case where new or amended general parts with modified numbering were published after the subpart was issued, the clause numbers referring to a general part in subparts might no longer align with the latest edition of the general part. Dated references should be observed.

1 Scope

The scope of this document is to define performance requirements of Large Power Transformers in compliance with EN 50708-1-1:2020.

NOTE This document covers the transformers under Commission Regulation (EU) No 548/2014 of 21 May 2014 and its amendment No 2019/1783 of 1 October 2019, gives additional specific guidance for single phase transformers, autotransformers, multi winding transformers and for transformers with OD and OF cooling systems, necessary for the correct application of energy efficiency requirements to these categories of transformers.

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.

EN 50708-1-1:2020, *Power transformers - Additional European requirements: Part 1-1: Common part - General requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 50708-1-1:2020 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

4 Service condition

The additional requirements for service condition are given in EN 50708-1-1:2020.

5 Rating and general requirements

5.1 Energy performance requirements

5.1.1 General

For Large power transformers the energy performance requirement consist of a minimum value of Peak Efficiency Index which is the maximum value of the Efficiency Index.

The Peak Efficiency Index is to be calculate in accordance with EN 50708-1-1:2020.

The tables in this clause indicate the minimum energy performances for TIER1 and TIER2.

TIER1 has been applied since 1 July 2015 for the values of losses following Commission Regulation (EU) No 548/2014 of 21 May 2014 and its amendment No 2019/1783 of 1 October 2019.

TIER2 shall be applied from 1 July 2021 for the values of losses following Commission Regulation (EU) No 548/2014 of 21 May 2014 and its amendment No 2019/1783 of 1 October 2019.

5.1.2 Minimum PEI values

Liquid immersed and dry type large power transformers shall have Minimum Peak Efficiency Index values according to Table 1, Table 2 and Table 3 respectively.

For rated powers different from the ones reported in Table 1, Table 2 and Table 3, the corresponding PEI value shall be obtained by linear interpolation from the two adjacent values.

The PEI requirements apply to transformers and auto-transformers.

For auto-transformers the reference power for PEI values is the rated power.

Three phase or single phase transformers shall be evaluated against the rated power of the individual transformer.

Table 1 — Values of minimum Peak Efficiency Index for liquid immersed large power transformers

S_r (MVA)	Minimum Peak Efficiency Index (%)	
	Tier 1	Tier 2
≤ 0,025	97,742	98,251
0,05	98,584	98,891
0,1	98,867	99,093
0,16	99,012	99,191
0,25	99,112	99,283
0,315	99,154	99,320
0,4	99,209	99,369
0,5	99,247	99,398
0,63	99,295	99,437
0,8	99,343	99,473
1	99,360	99,484
1,25	99,418	99,487
1,6	99,424	99,494
2	99,426	99,502
2,5	99,441	99,514
3,15	99,444	99,518
4	99,465	99,532
5	99,483	99,548
6,3	99,510	99,571
8	99,535	99,593
10	99,560	99,615
12,5	99,588	99,640
16	99,615	99,663
20	99,639	99,684
25	99,657	99,700
31,5	99,671	99,712
40	99,684	99,724
50	99,696	99,734
63	99,709	99,745
80	99,723	99,758
100	99,737	99,770
125	99,737	99,780
160	99,737	99,790
≥ 200	99,737	99,797

Table 2 — Values of minimum Peak Efficiency Index for dry-type large power transformers with Um ≤ 36 kV

S_r (MVA)	Minimum Peak Efficiency Index (%)	
	Tier 1	Tier 2
3,15 < S_r ≤ 4	99,348	99,382
5	99,354	99,387
6,3	99,356	99,389
8	99,357	99,390
≥ 10	99,357	99,390

Table 3 — Values of minimum Peak Efficiency Index for dry-type large power transformers with U_m > 36 kV

S_r (MVA)	Minimum Peak Efficiency Index (%)	
	Tier 1	Tier 2
≤ 0,05	96,174	96,590
0,1	97,514	97,790
0,16	97,792	98,016
0,25	98,155	98,345
0,4	98,334	98,570
0,63	98,494	98,619
0,8	98,677	98,745
1	98,775	98,837
1,25	98,832	98,892
1,6	98,903	98,960
2	98,942	98,996
2,5	98,933	99,045
3,15	99,048	99,097
4	99,158	99,225
5	99,200	99,265
6,3	99,242	99,303
8	99,298	99,356
10	99,330	99,385
12,5	99,370	99,422
16	99,416	99,464
20	99,468	99,513
25	99,521	99,564
31,5	99,551	99,592
40	99,567	99,607
50	99,585	99,623
≥ 63	99,590	99,626