



**SLOVENSKI STANDARD**  
**oSIST prEN 50708-2-3:2020**

**01-oktober-2020**

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**Močnostni transformatorji - Dodatne evropske zahteve - 2-3. del: Srednji močnostni transformatorj - Pribor**

Power transformers - Additional European requirements - Part 2-3: Medium power transformer - Accessories

**iTeh STANDARD PREVIEW**

Transformateurs de puissance - Exigences européennes supplémentaires - Partie 2-3 : Transformateurs de moyenne puissance - Accessoires

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**ICS:**

29.180      Transformatorji. Dušilke      Transformers. Reactors

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
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**DRAFT**  
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ICS

English Version

## Power transformers - Additional European requirements - Part 2-3: Medium power transformer - Accessories

Transformateurs de puissance - Exigences européennes supplémentaires - Partie 2-3 : Transformateurs de moyenne puissance - Accessoires

To be completed

This draft European Standard is submitted to CENELEC members for enquiry.  
Deadline for CENELEC: 2020-10-30.

It has been drawn up by CLC/TC 14.

If this draft becomes a European Standard, CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CENELEC in three official versions (English, French, German).  
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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

1	<b>Contents</b>	
2	European foreword .....	4
3	Introduction .....	5
4	1 Scope .....	6
5	2 Normative references .....	6
6	3 Terms and definitions .....	6
7	4 Service conditions .....	8
8	5 Electrical characteristics .....	8
9	6 Design requirements .....	8
10	6.1 Liquid immersed transformers .....	8
11	6.1.1 Type of liquid preservation system and degree of sealing .....	8
12	6.1.2 Terminals .....	8
13	6.1.3 Terminal markings .....	8
14	6.1.4 Distance between bushings .....	8
15	6.1.5 Rollers .....	9
16	6.2 Dry-type transformers .....	9
17	6.2.1 Terminals .....	9
18	6.2.2 Terminal markings .....	10
19	6.2.3 Rollers .....	10
20	6.2.4 Enclosure .....	10
21	7 Accessories .....	10
22	7.1 Liquid immersed transformers .....	10
23	7.2 Dry-type transformers .....	11
24	8 Cable box for Liquid immersed transformers .....	11
25	8.1 Transformers with cable boxes on the high-voltage and/or low-voltage	
26	side .....	11
27	8.1.1 General consideration .....	11
28	8.1.2 Provision for cable box Type 1 connections .....	11
29	8.1.3 Provision for cable box Type 2 .....	11
30	8.1.4 Transformer requirements .....	12
31	8.1.5 Distance between bushings .....	13
32	8.1.6 Tests .....	13
33	8.2 Transformers with cable boxes on the high-voltage and/or low-voltage side	
34	- Cable boxes type 1 .....	18
35	8.2.1 General consideration .....	18
36	8.2.2 Electrical requirements and clearances .....	18
37	8.2.3 Design considerations .....	20
38	8.2.4 Tests .....	21
39	8.2.5 Earthing of cable boxes .....	21
40	8.3 Transformers with cable boxes on the high-voltage and/or low-voltage side	
41	-Cable boxes type 2 .....	21
42	8.3.1 General consideration .....	21
43	8.3.2 High-voltage connections .....	22
44	8.3.3 Low-voltage connections .....	23
45	8.3.4 Design considerations .....	24

46	8.3.5 Tests.....	25
47		

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**prEN 50708-2-3:2020 (E)**

48 **European foreword**

49 This document (prEN 50708-2-3:2020) has been prepared by CLC/TC 14 “Power transformers”.

50 This document is currently submitted to the Enquiry.

51 The following dates are proposed:

- latest date by which the existence of this document has to be announced at national level (doa) dor + 6 months
- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) dor + 12 months
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) dor + 36 months (to be confirmed or modified when voting)

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## 52 Introduction

53 This document defines the rules for the assessment of energy performance to ensure the product  
54 conformity to the Commission Regulation (EU) No 548/2014 of 21 May 2014 and its amendment No  
55 2019/1783 of 1 October 2019.

56 Regulation leads to have a minimum level of energy performances of power transformers.

57 NOTE In this document, the term Regulation refers to the Commission Regulation (EU) No 548/2014 of 21  
58 May 2014 and its amendment No 2019/1783 of 1 October 2019.

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

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

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

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

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

71 The main clause numbering of each part follows the pattern and corresponding references of  
72 EN 50708-1-1:2020. The numbers following the particular number of this document are those of the  
73 corresponding parts, or clauses of the other parts of the EN 50708 series, valid at the time of  
74 publication of this document. (standards.iteh.ai)

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

<https://standards.iteh.ai/catalog/standards/sist/f7dd3b26a84b/osist-pren-50708-2-3-2020>

**prEN 50708-2-3:2020 (E)****78 1 Scope**

79 This document describes lists of typical accessories used for liquid and dry type Medium Power  
80 Transformers ( $\leq 3150\text{kVA}$ ). It defines the interface between the transformer's terminals, including  
81 cable boxes, and the power grid.

**82 2 Normative references**

83 The following documents are referred to in the text in such a way that some or all of their content  
84 constitutes requirements of this document. For dated references, only the edition cited applies. For  
85 undated references, the latest edition of the referenced document (including any amendments)  
86 applies.

87 EN 50180, *Bushings above 1 kV up to 36 kV and from 250 A to 3,15 kA for liquid filled transformers*

88 EN 50216-4, *Power transformer and reactor fittings - Part 4: Basic accessories (earthing terminal,  
89 drain and filling devices, thermometer pocket, wheel assembly)*

90 EN 50336, *Bushings for transformers and reactor cable boxes not exceeding 36 kV*

91 EN 50386, *Bushings up to 1 kV and from 250 A to 5 kA, for liquid filled transformers*

92 EN 50387, *Busbar bushings up to 1 kV and from 1,25 kA to 5 kA, for liquid filled transformers*

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

95 EN 50708-2-1, *Power transformers - Additional European requirements: Part 2-1 Medium power  
96 transformer - General requirements*

97 EN 50708-3-1, *Power transformers - Additional European requirements: Part 3-1 Large power  
98 transformer - General requirements*

99 EN 60076-1, *Power transformers - Part 1: General (IEC 60076-1)*

100 EN 60076-3, *Power transformers - Part 3: Insulation levels, dielectric tests and external clearances in  
101 air (IEC 60076-3)*

102 EN IEC 60076-11, *Power transformers - Part 11: Dry-type transformers (IEC 60076-11)*

103 EN IEC 60076-22-7, *Power transformers - Part 22-7: Power transformer and reactor fittings -  
104 Accessories and fittings (IEC 60076-22-7)*

105 EN 60529, *Degrees of protection provided by enclosures (IP Code) (IEC 60529)*

106 EN 62444:2013, *Cable glands for electrical installations (IEC 62444:2010)*

107 IEC/TR 60616, *Terminal and tapping markings for power transformers*

**108 3 Terms and definitions**

109 For the purposes of this document, the terms and definitions given in the EN 50708 series, EN 50336  
110 and the following apply.

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

112 — ISO Online browsing platform: available at <https://www.iso.org/obp>

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



- 114 **3.1**  
 115 **transformers with cable boxes, side mounted**  
 116 transformer with electrical characteristics in the scope of this document, with facings on the  
 117 transformer tank side for provision of cable boxes Type 1
- 118 Note 1 to entry: These facings shall be on opposite sides of the transformer (as Figure 1).
- 119 **3.2**  
 120 **transformers with cable boxes or similar, cover mounted**  
 121 transformer with electrical characteristics in the scope of this document, with terminations mounted  
 122 on the tank cover
- 123 Note 1 to entry: The terminations exit in such a way as to provide for cables on opposite sides of the  
 124 transformer. The type of termination can be either cable box Type 1 or cable box Type 2 (as per Figures 3 or 4).
- 125 **3.3**  
 126 **unit substation transformer, side mounted**  
 127 transformer with electrical characteristics in the scope of this document, having facings on the  
 128 transformer tank side for provision of HV switchgear and LV equipment
- 129 Note 1 to entry: These facings shall be on the same side of the transformer (as per Figure 2).
- 130 **3.4**  
 131 **unit substation transformer, cover mounted**  
 132 transformer with electrical characteristics in the scope of this document, with terminations mounted  
 133 on the tank cover and enclosed in a flange box
- 134 Note 1 to entry: Figure 5 shows a typical arrangement.
- 135 **3.5**  
 136 **cable boxes, Type 1**  
 137 metallic box designed for receiving and protecting the ends of HV or LV cables so that the cable  
 138 dielectric can be effectively sealed against moisture damage, mechanical protection and against  
 139 accidental contacts
- 140 Note 1 to entry: A minimum protection of IP54 is required. These boxes are not specified in this section. A  
 141 higher protection, IP65, could be necessary to satisfy termination requirements.
- 142 **3.6**  
 143 **cable boxes, Type 2**  
 144 metallic or non-metallic enclosure designed to prevent accidental contact with live parts but without  
 145 mechanical protection of the ends of HV or LV cables
- 146 Note 1 to entry: The enclosure can be common to HV and LV terminations or be independent for HV and LV. A  
 147 protection between IP33 and IP55 is required and is subject to agreement between manufacturer and purchaser.
- 148 **3.7**  
 149 **flange box**  
 150 enclosure designed to provide flanges for mounting ancillary equipment on opposite sides of the  
 151 transformer as per Figures 5 and 6
- 152 Note 1 to entry: The box is mounted on the cover of the transformer.
- 153 **3.8**  
 154 **fully insulated cable box**  
 155 metallic cable box where those parts of the termination and bushing within the enclosure including  
 156 live metal parts and cable cores are insulated by oil or compound and allowance made for thermal  
 157 expansion
- 158 Note 1 to entry: The box is suitably sealed to contain the oil or compound and allows for their expansion due to  
 159 temperature changes.

**prEN 50708-2-3:2020 (E)**

160 **3.9**  
 161 **air insulated cable box**  
 162 metallic cable box designed to protect the ends of the cables and bushings, providing a weatherproof  
 163 enclosure with a minimum rating of IP54

164 **3.10**  
 165 **shrouded cable box**  
 166 air filled cable box within the cable cores are terminated as in 3.9 with additional local insulation  
 167 enhancement, e.g. phase barrier, bushing protection or taping

168 Note 1 to entry: Enhancement can be achieved using insulated phase barriers.

**169 4 Service conditions**

170 EN 60076-1 applies.

**171 5 Electrical characteristics**

172 These shall comply with EN 50708-2-1.

**173 6 Design requirements****174 6.1 Liquid immersed transformers****175 6.1.1 Type of liquid preservation system and degree of sealing**

176 The type of liquid preservation system and the degree of sealing shall be indicated in the enquiry and  
 177 order.

**178 6.1.2 Terminals**

179 The terminations to be used can be of the following types:

- 180 a) open type bushings;
- 181 b) plug-in type bushings;
- 182 c) LV busbars;
- 183 d) cable boxes.

184 The requirements of the different types of terminations are described in the following standards:  
 185 EN 50180, EN 50386, EN 50387 and EN 50336.

**186 6.1.3 Terminal markings**

187 Terminal markings shall be in accordance with IEC/TR 60616 unless otherwise specified.

**188 6.1.4 Distance between bushings****189 6.1.4.1 Distances between high-voltage liquid to air bushings**

190 The bushings clearance shall meet the requirements of Table 1.

191

Table 1 — Clearance and creepage distances

Rated voltage	Type of enclosure	Clearance between live metal of different phases	Clearance between live metal and earth	Creepage over insulator
kV		mm	mm	mm
12	Fully insulated/shrouded	45	32	*
12	Air clearance	127	76	127
17,5	Fully insulated/shrouded	75	60	
17,5	Air clearance	165	102	153
24	Fully insulated/shrouded	100	75	
24	Air clearance	242	140	203
36	Fully insulated/shrouded	125	100	
36	Air clearance	356	222	305

192 NOTE The clearances in Table 1 are not those of EN 60076-3 and are reduced because these clearances  
193 are used only in the box and not considered the polluted area and atmospheric area.

#### 194 6.1.4.2 Preferred distance between centres of low-voltage bushings

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195 For open type bushing, the distance between bushing can be defined as below:

- 196 — for currents up to 250 A 70 mm;  
197 — for currents above 250 A and up to 2 000 A 150 mm;  
198 — for currents above 2 000 A 165 mm.

199 Distances between centres are indicated in EN 50336 for LV cable box connexions made through  
200 mono block bushing.

#### 201 6.1.5 Rollers

202 When rollers are fitted, they shall comply with EN 50216-4.

203 For larger rated power this should be specified at the enquiry stage.

## 204 6.2 Dry-type transformers

### 205 6.2.1 Terminals

206 HV and LV terminals could be located on the upper side or middle part or lower side.

207 For easy understanding HV connecting leads side are fixed and used as reference side.

208 LV terminals could be on the same or on the opposite side referred to the HV leads.

209 Tapping could be on the same side or on the opposite side referred to the HV leads; preferred side is  
210 on the same HV side.

211 At the enquiry stage the exact positions of HV leads/terminals, LV leads/terminals and tapping shall  
212 be stated.

213 If in respect of leads with special dimensions and/or precise-exact dimensions and locations are  
214 needed, this needed information shall be given at the enquiry stage and agreed between  
215 manufacturer and purchaser.