



SLOVENSKI STANDARD
oSIST prEN IEC 61558-2-12:2023
01-januar-2023

**Varnost transformatorjev, dušilk, napajalnikov in kombinacij teh elementov - 2-12.
del: Posebne zahteve in preskusi za transformatorje s konstantno napetostjo in
napajalnike s konstantno napetostjo**

Safety of transformers, reactors, power supply units and combination thereof - Part 2-12:
Particular requirements and tests for constant voltage transformers and power supply
units for constant voltage

STANDARD PREVIEW
(standards.iteh.ai)

Sécurité des transformateurs, bobines d'inductance, blocs d'alimentation et des
combinaisons de ces éléments - Partie 2-12: Exigences particulières et essais pour les
transformateurs à tension constante et les blocs d'alimentation pour tension constante

Ta slovenski standard je istoveten z: prEN IEC 61558-2-12:2022

ICS:

29.180 Transformatorji. Dušilke Transformers. Reactors

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TITLE:

Safety of transformers, reactors, power supply units and combination thereof - Part 2-12: Particular requirements and tests for constant voltage transformers and power supply units for constant voltage

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SAFETY OF TRANSFORMERS, REACTORS,
POWER SUPPLY UNITS AND COMBINATIONS THEREOF –****Part 2-12: Particular requirements and tests for constant voltage
transformers and power supply units for constant voltage**

FOREWORD

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International standard IEC 61558-2-12 has been prepared by IEC technical committee 96: Transformers, reactors, power supply units and combinations thereof.

This third edition cancels and replaces the second edition published in 2011. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) Adjustment of structure and references in accordance with IEC 61558-1:2017;
- b) Description of constructions moved to IEC 61558-1:2017
- c) New symbol for power supply unit with linearly regulated output voltage.

92 The text of this International Standard is based on the following documents:

Draft	Report on voting
96/XXX/FDIS	96/XXX/RVD

93 Full information on the voting for its approval can be found in the report on voting indicated in
94 the above table.

95 The language used for the development of this International Standard is English.

96 This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in
97 accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available
98 at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are
99 described in greater detail at www.iec.ch/standardsdev/publications.

100 It has the status of a group safety publication in accordance with IEC Guide 104.

101 This International Standard is to be used in conjunction with IEC 61558-1:2017.

102 This document supplements or modifies the corresponding clauses in IEC 61558-1:2017, so as
103 to convert that publication into the IEC standard: *Particular requirements and tests for constant*
104 *voltage transformers and power supply units for constant voltage*.

105 A list of all parts in the IEC 61558 series published under the general title *Safety of*
106 *transformers, reactors, power supply units and combinations thereof*, can be found on the
107 IEC website.

108 Future standards in this series will carry the new general title as cited above. Titles of existing
109 standards in this series will be updated at the time of the next edition.

110 Where this document states "*addition*", "*modification*" or "*replacement*", the relevant text of
111 IEC 61558-1:2017 is to be adopted accordingly.

112 In this document, the following print types are used:

113 – requirements proper: in roman type;

114 – *test specifications: in italic type;*

115 – explanatory matter: in smaller roman type:

116 In the text of this document, the words in **bold** are defined in Clause 3.

117 Subclauses, notes, figures and tables additional to those in IEC 61558-1:2017 are numbered
118 starting from 101; supplementary annexes are entitled AA, BB, etc.

119 The committee has decided that the contents of this document will remain unchanged until the
120 stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to
121 the specific document. At this date, the document will be

- 122 • reconfirmed,
- 123 • withdrawn,
- 124 • replaced by a revised edition, or
- 125 • amended.

126

127

INTRODUCTION

128 IEC TC 96 has a group safety function in accordance with IEC Guide 104 for transformers other
129 than those intended to supply distribution networks, in particular transformers and power supply
130 units intended to allow the application of protective measures against electric shock as defined
131 by TC 64, but in certain cases including the limitation of voltage and horizontal safety function
132 for SELV, in accordance with IEC 60364-4-41.

133 The group safety function (GSF) is used because of responsibility for safety extra-low voltage
134 (SELV) in accordance with IEC 61140:2016, 5.2.6 and IEC 60364-4-41:2005, 414.3.1 or control
135 circuits in accordance with IEC 60204-1:2016, 7.2.4.

136 The group safety function is used for each part of IEC 61558-2 because different standards of
137 the IEC 61558 series can be combined in one construction but in certain cases with no limitation
138 of rated output power.

139 For example an auto-transformer in accordance with IEC 61558-2-13 can be designed with a
140 separate SELV-circuit in accordance with the particular requirements for IEC 61558-2-6 relating
141 to the general requirements of IEC 61558-1.

142

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<https://standards.iteh.ai/catalog/standards/sist/0294c3b2-c8e4-4706-accc-5a7c772b62a2/osist-pren-iec-61558-2-12-2023>

143 **SAFETY OF TRANSFORMERS, REACTORS,**
144 **POWER SUPPLY UNITS AND COMBINATIONS THEREOF –**
145

146 **Part 2-12: Particular requirements and tests for constant voltage**
147 **transformers and power supply units for constant voltage**
148
149

150 **1 Scope**

151 *Replacement*

152 This part of IEC 61558 deals with the safety of **constant voltage transformers** for general
153 applications and **power supply units for constant voltage** for general applications. **Constant**
154 **voltage transformers** incorporating **electronic circuits** are also covered by this document.

155 NOTE 1 Safety includes electrical, thermal and mechanical aspects.

156 Unless otherwise specified, from here onward, the term **transformer** covers **constant voltage**
157 **transformers** for general applications and **power supply units for constant voltage** for
158 general applications.

159 This document is applicable to **stationary** or **portable** single-phase or polyphase, air-cooled
160 (natural or forced) **independent** or **associated dry-type**:

- 161 – **constant voltage auto-transformers;**
- 162 – **constant voltage separating transformers;**
- 163 – **constant voltage isolating transformers;**
- 164 – **constant voltage safety isolating transformers.**

165 The windings can be encapsulated or non-encapsulated.

166 For **power supply units** (linear) this document is applicable. For **switch mode power supply**
167 **units** IEC 61558-2-16 is applicable together with this document. Where two requirements are
168 in conflict, the most severe take precedence.

169 The **rated supply voltage** does not exceed 1 000 V AC. The **rated supply frequency** does not
170 exceed 500 Hz, the **internal operating resonant frequency** does not exceed 30 kHz and the
171 **internal operating frequency** does not exceed 100 MHz.

172 The **rated output** does not exceed:

- 173 – 40 kVA for single-phase **constant voltage auto-transformers;**
- 174 – 200 kVA for polyphase **constant voltage auto-transformers;**
- 175 – 25 kVA for single-phase **constant voltage separating transformers** and **constant**
176 **voltage isolating transformers;**
- 177 – 40 kVA for polyphase **constant voltage separating transformers** and **constant**
178 **voltage isolating transformers;**
- 179 – 10 kVA for single-phase **constant voltage safety isolating transformers;**
- 180 – 16 kVA for polyphase **constant voltage safety isolating transformers.**

181 This document is applicable to **transformers** without limitation of the **rated output**, subject to
182 an agreement between the purchaser and the manufacturer.

183 NOTE 2 **Transformers** intended to supply distribution networks are not included in the scope.

184 Where applicable to **constant voltage auto-transformers**

- 185 – the **no-load output voltage** or the **rated output voltage** does not exceed 1 000 V AC
186 or 1 415 V ripple-free DC, and for **independent constant voltage auto-transformers**
187 the **no-load output voltage** and the **rated output voltage** exceed 50 V AC or 120 V
188 ripple-free DC;
- 189 – **constant voltage auto-transformers** covered by this document are used only in
190 applications where no **insulation** between circuits is required by the installation rules
191 or by the end product standard.

192 Where applicable to **constant voltage separating transformers**

- 193 – the **no-load output voltage** or the **rated output voltage** does not exceed 1 000 V AC
194 or 1 415 V ripple-free DC, and for **independent constant voltage separating**
195 **transformers** the **no-load output voltage** and the **rated output voltage** exceeds 50 V
196 AC or 120 V ripple-free DC;
- 197 – **constant voltage separating transformers** covered by this document are used only in
198 applications where **double** or **reinforced insulation** between circuits is not required by
199 the installation rules or by the end product standard.

200 Where applicable to **constant voltage isolating transformers**

- 201 – the **no-load output voltage** or the **rated output voltage** does exceed 50 V AC or 120 V
202 ripple-free DC and where applicable, does not exceed 500 V AC or 708 V ripple-free
203 DC. The **no-load output voltage** and the **rated output voltage** can be up to 1 000 V
204 AC or 1 415 V ripple-free DC for special applications.
- 205 – **constant voltage isolating transformers** covered by this document are used only in
206 applications where **double** or **reinforced insulation** between circuits is required by the
207 installation rules or by the end product standard.

208 Where applicable to **constant voltage safety isolating transformers**

- 209 – the **no-load output voltage** or the **rated output voltage** does not exceed 50 V AC or
210 120 V ripple-free DC;
- 211 – **constant voltage safety isolating transformers** covered by this document are used
212 only in applications where **double** or **reinforced insulation** between circuits is required
213 by the installation rules or by the end product standard.

214 This document is not applicable to external circuits and their components intended to be
215 connected to the input terminals and output terminals of the **transformers**.

216 Attention is drawn to the following if necessary:

- 217 – for **transformers** intended to be used in vehicles, on board ships, and aircraft, additional
218 requirements (from other applicable standards, national rules, etc.);
- 219 – measures to protect the **enclosure** and the components inside the enclosure against
220 external influences such as fungus, vermin, termites, solar-radiation, and icing;
- 221 – the different conditions for transportation, storage, and operation of the **transformers**;
- 222 – additional requirements in accordance with other appropriate standards and national
223 rules may be applicable to **transformers** intended for use in special environments.

224 Future technological development of **transformers** may necessitate a need to increase the
225 upper limit of the frequencies. Until then this document may be used as a guidance document.

226 This group safety publication focusing on safety guidance is primarily intended to be used as a
227 product safety standard for the products mentioned in the scope, but is also intended to be used
228 by technical committees in the preparation of publications for products similar to those
229 mentioned in the scope of this group safety publication, in accordance with the principles laid
230 down in IEC Guide 104 and ISO/IEC Guide 51.

231 One of the responsibilities of a technical committee is, wherever applicable, to make use of
232 basic safety publications and/or group safety publications in the preparation of its publications.

233

234 **2 Normative references**

235 This clause of IEC 61558-1 is applicable except as follows:

236 *Addition*

237 IEC 61558-1:2017, *Safety of transformers, reactors, power supply units and combinations*
238 *thereof – Part 1: General requirements and tests*

239 IEC 61558-2-16:2021, *Safety of transformers, reactors, power supply units and combinations*
240 *thereof – Part 16: Particular requirements and tests for switch mode power supply units and*
241 *transformers for switch mode power supply units for general applications*

242

243 **3 Terms and definitions**

244 For the purposes of this document, the terms and definitions given in IEC 61558-1 apply, except
245 as follows:

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

- 248 • IEC Electropedia: available at <http://www.electropedia.org/>
- 249 • ISO Online browsing platform: available at <http://www.iso.org/obp>

250 *Addition*

251 **3.1.101**

252 **constant voltage transformer**

253 **transformer** intended to limit the influence of the input voltage variations

254 NOTE 1 This type of **transformer** can also limit the influence of transients

255 **3.5.101**

256 **regulation tolerance**

257 deviation in per cent of the **rated output voltage** when the **constant voltage transformer** is
258 supplied within the **rated supply voltage** variation

259 **3.5.102**

260 **internal operating resonant frequency**

261 frequency produced within a **constant voltage transformer**

262

263 4 General requirements

264 This clause of IEC 61558-1 is applicable.

265

266 5 General notes on tests

267 This clause of IEC 61558-1 is applicable.

268

269 6 Ratings

270 This clause of IEC 61558-1 is applicable except as follows:

271 *Addition*

272 **6.101** The **rated output voltage** shall not exceed:

- 273 – 1 000 V AC or 1 415 V ripple-free DC for **constant voltage auto-transformers** and
- 274 **constant voltage separating transformers**;
- 275 – 250 V AC for single-phase **portable constant voltage isolating transformers**;
- 276 – 400 V AC for polyphase **portable constant voltage isolating transformers**, and
- 277 – 500 V AC or 708 V ripple-free DC for **constant voltage isolating transformers**. For
- 278 **constant voltage isolating transformers**, the **rated output voltage** may be up to
- 279 1 000 V AC or 1 415 V ripple-free DC to be in accordance with the national wiring rules
- 280 or for a special purpose;
- 281 – 50 V AC or 120 V ripple-free DC for **constant voltage safety isolating transformers**;

282 The **rated output voltage** shall exceed:

- 283 – 50 V AC or 120 V ripple-free DC for **independent constant voltage auto-**
- 284 **transformers, constant voltage separating transformers** and **constant voltage**
- 285 **isolating transformers**.

286 **6.102** The **rated output** shall not exceed:

- 287 – 40 kVA for single-phase **constant voltage auto-transformers**,
- 288 – 200 kVA for polyphase **constant voltage auto-transformers**,
- 289 – 25 kVA for single-phase **constant voltage separating** and **isolating transformers**,
- 290 – 40 kVA for polyphase **constant voltage separating** and **isolating transformers**,
- 291 – 10 kVA for single-phase **constant voltage safety isolating transformers**,
- 292 – 16 kVA for polyphase **constant voltage safety isolating transformers**,

293 except for **constant voltage transformers** subject to an agreement between the purchaser and

294 the manufacturer.

295 **6.103** The **rated supply frequency** shall not exceed 500 Hz

296 **6.104** The rated value of the output **regulation tolerance** shall be given at the **rated supply**

297 **voltage** range, the **rated output**, and the power factor of 1.

298 **6.105** For **independent transformers** the input voltage variation shall not be less than 10 %.

299 **6.106** The **internal operating resonant frequency** shall not exceed 30 kHz.

300 **6.107** The **internal operating frequency** shall not exceed 100 MHz.