



SLOVENSKI STANDARD
oSIST prEN IEC 61558-2-9:2023
01-marec-2023

**Varnost transformatorjev, dušilk, napajalnikov in podobnih proizvodov - 2-9. del:
Posebne zahteve in preskusi za transformatorje in napajalnike za ročne svetilke
razreda III**

Safety of transformers, reactors, power supply units and combinations thereof - Part 2-9:
Particular requirements and tests for transformers and power supply units for class III
handlamps

*iTeh STANDARD PREVIEW
(standards.iteh.ai)*

Sécurité des transformateurs, bobines d'inductance, blocs d'alimentation et des
combinaisons de ces éléments - Partie 2-9: Règles particulières et essais pour les
transformateurs et blocs d'alimentation pour lampes baladeuses de classe III

Ta slovenski standard je istoveten z: prEN IEC 61558-2-9:2023

ICS:

29.180 Transformatorji. Dušilke Transformers. Reactors

oSIST prEN IEC 61558-2-9:2023 en



96/566/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER:
IEC 61558-2-9 ED3

DATE OF CIRCULATION:
2023-01-13

CLOSING DATE FOR VOTING:
2023-04-07

SUPERSEDES DOCUMENTS:
96/560/RR

IEC TC 96 : TRANSFORMERS, REACTORS, POWER SUPPLY UNITS, AND COMBINATIONS THEREOF	
SECRETARIAT: Germany	SECRETARY: Mr Wolfgang Reichelt
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: <input type="checkbox"/> EMC <input type="checkbox"/> ENVIRONMENT <input type="checkbox"/> QUALITY ASSURANCE <input checked="" type="checkbox"/> SAFETY	
<input checked="" type="checkbox"/> SUBMITTED FOR CENELEC PARALLEL VOTING Attention IEC-CENELEC parallel voting The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	<input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

Safety of transformers, reactors, power supply units and combinations thereof - Part 2-9: Particular requirements and tests for transformers and power supply units for class III handlamps

PROPOSED STABILITY DATE: 2025

NOTE FROM TC/SC OFFICERS:

Copyright © 2022 International Electrotechnical Commission, IEC. All rights reserved. It is permitted to download this electronic file, to make a copy and to print out the content for the sole purpose of preparing National Committee positions. You may not copy or "mirror" the file or printed version of the document, or any part of it, for any other purpose without permission in writing from IEC.

CONTENTS

1		
2		
3	FOREWORD.....	3
4	INTRODUCTION.....	5
5	1 Scope.....	6
6	2 Normative references	7
7	3 Terms and definitions	7
8	4 General requirements	7
9	5 General notes on tests.....	7
10	6 Ratings.....	8
11	7 Classification.....	8
12	8 Marking and other information.....	9
13	9 Protection against electric shock.....	10
14	10 Change of input voltage setting.....	10
15	11 Output voltage and output current under load	10
16	12 No-load output voltage.....	10
17	13 Short-circuit voltage.....	11
18	14 Heating	11
19	15 Short-circuit and overload protection	11
20	16 Mechanical strength.....	11
21	17 Protection against harmful ingress of dust, solid objects and moisture	11
22	18 Insulation resistance, dielectric strength and leakage current.....	11
23	19 Construction	11
24	20 Components.....	13
25	21 Internal wiring.....	14
26	22 Supply connection and other external flexible cables or cords.....	14
27	23 Terminals for external conductors	14
28	24 Provisions for protective earthing	14
29	25 Screws and connections	14
30	26 Creepage distances, clearances and distances through insulation	14
31	27 Resistance to heat, fire and tracking	14
32	28 Resistance to rusting	14
33	Annexes	15
34	Bibliography	16
35		
36	Table 101 – Symbols indicating the kind of transformer	9
37	Table 102 – Output voltage ratio	11
38		
39		

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SAFETY OF TRANSFORMERS, REACTORS,
POWER SUPPLY UNITS AND COMBINATIONS THEREOF –****Part 2-9: Particular requirements and tests for transformers and
power supply units for class III handlamps**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International standard IEC 61558-2-9 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 2010. 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) new symbol for power supply unit with linearly regulated output voltage.
- c) document is not only valid for transformers for tungsten filament handlamps

94 The text of this document is based on the following documents:

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

95
96 Full information on the voting for its approval can be found in the report on voting indicated in
97 the above table.

98 The language used for the development of this document is English.

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

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

104 This document is to be used in conjunction with IEC 61558-1:2017.

105 This document supplements or modifies the corresponding clauses in IEC 61558-1:2017, so as
106 to convert that publication into the IEC standard: *Particular requirements and tests for*
107 *transformers and power supply units for class III handlamps*.

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

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

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

114 In this document, the following print types are used: [c-61558-2-9-2023](https://standards.iec.ch/catalog/standards/sist/17edb9cb-dee1-4cfb-aeaf-c-61558-2-9-2023)

115 – requirements proper: in roman type;

116 – *test specifications*: in italic type;

117 – explanatory matter: in smaller roman type.

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

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

121 The committee has decided that the contents of this document will remain unchanged until the
122 stability date indicated on the IEC website under www.webstore.iec.ch in the data related to the
123 specific document. At this date, the document will be

- 124 • reconfirmed,
- 125 • withdrawn,
- 126 • replaced by a revised edition, or
- 127 • amended.

128

129

INTRODUCTION

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

135 The group safety function (GSF) is used because of responsibility for example for safety extra-
136 low voltage (SELV) in accordance with IEC 61140:2016, 5.2.6 and IEC 60364-4-41:2005,
137 414.3.1 or control circuits in accordance with IEC 60204-1:2016, 7.2.4.

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

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

144

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN IEC 61558-2-9:2023](https://standards.iteh.ai/catalog/standards/sist/17edb9cb-dee1-4cfb-aeaf-571f6e0634d0/osist-pren-iec-61558-2-9-2023)

<https://standards.iteh.ai/catalog/standards/sist/17edb9cb-dee1-4cfb-aeaf-571f6e0634d0/osist-pren-iec-61558-2-9-2023>

145 **SAFETY OF TRANSFORMERS, REACTORS,**
146 **POWER SUPPLY UNITS AND COMBINATIONS THEREOF –**
147

148 **Part 2-9: Particular requirements and tests for transformers and**
149 **power supply units for class III handlamps**
150
151

152 **1 Scope**

153 *Replacement*

154 This part of IEC 61558 deals with the safety of **transformers for class III handlamps** and
155 **power supply units incorporating transformers for class III handlamps**. **Transformers**
156 incorporating **electronic circuits** are also covered by this document.

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

158 Unless otherwise specified, from here onward, the term **transformer** covers **transformers for**
159 **class III handlamps** and **power supply units incorporating transformers for class III**
160 **handlamps**.

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

164 This document is applicable to **stationary** or **portable**, single-phase, air-cooled (natural or
165 forced) **independent** or **associated dry-type transformers**. The windings can be encapsulated
166 or non-encapsulated.

167 The **rated supply voltage** does not exceed 1 000 V AC and the **rated supply frequency** and
168 the **internal operating frequencies** do not exceed 500 Hz.

169 **Transformers** have the following additional characteristics:

- 170 – **the no-load output voltage** and the **rated output voltage** do not exceed 50 V AC or 120 V
171 ripple-free DC;
- 172 – there is only a small difference between the **no-load output voltage** and the **rated output**
173 **voltage**.

174 The **rated output** does not exceed 10 kVA.

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

177 NOTE 3 **Transformers** covered by this document are only used in applications where **double** or **reinforced**
178 **insulation** between circuits is required by the installation rules or by the end product standard.

179 Attention is drawn to the following, if necessary:

- 180 – for **transformers** intended to be used in vehicles, on board ships, and aircraft, additional
181 requirements (from other applicable standards, national rules, etc.);
- 182 – measures to protect the **enclosure** and the components inside the enclosure against
183 external influences such as fungus, vermin, termites, solar-radiation, and icing;
- 184 – the different conditions for transportation, storage, and operation of the **transformers**;
- 185 – additional requirements in accordance with other appropriate standards and national
186 rules can be applicable to **transformers** intended for use in special environments.

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

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

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

196

197 **2 Normative references**

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

199 *Addition*

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

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

205

206 **3 Terms and definitions**

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

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

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

213 *Addition*

214 **3.1.101**

215 **transformer for class III handlamps**

216 associated **safety isolating transformer** intended to supply one or more class III handlamps

217 **3.1.102**

218 **power supply unit incorporating transformer for class III handlamps**

219 **power supply unit** where an associated **safety isolating transformer** is used intended to
220 supply one or more **class III handlamps**

221

222 **4 General requirements**

223 This clause of IEC 61558-1 is applicable.

224

225 **5 General notes on tests**

226 This clause of IEC 61558-1 is applicable.

227

228 **6 Ratings**

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

230 *Addition*

231 **6.101** The **rated output voltage** shall not exceed 50 V AC or 120 V ripple-free DC.

232 For **independent transformers**, this **output voltage** limitation applies even when **output**
233 **windings**, not intended for interconnection, are connected in series.

234 **6.102** The **rated output** shall not exceed 10 kVA.

235 **6.103** The **rated supply frequency** and the **internal operating frequencies** shall not
236 exceed 500 Hz.

237 **6.104** The **rated supply voltage** shall not exceed 1 000 V AC.

238 *Compliance with the requirements of 6.101 to 6.104 is checked by inspection of the marking.*

239

240 **7 Classification**

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

242

243 **7.2**

244 *Replacement*

245 According to short-circuit characteristic or protection against abnormal use:

- 246 – **inherently short-circuit proof transformers;**
- 247 – **non-inherently short-circuit proof transformers.**

248

249 **7.3**

250 *Replacement*

251 According to their degree of protection ensured by the **enclosure**

- 252 – **portable transformers** shall have a degree of protection of at least IP24.

253

254 **7.5**

255 *Replacement*

256 According to their **duty-type**:

- 257 – **continuous operation**

258

259