



SLOVENSKI STANDARD
oSIST prEN 1643:2020

01-oktober-2020

**Varnostne in nadzorne naprave za gorilnike in aparate na plin in/ali tekoča goriva -
Sistemi za preskušanje samodejnih zapornih ventilov**

Safety and control devices for burners and appliances burning gaseous and/or liquid
fuels - Valve proving systems for automatic shut-off valves

Sicherheits- und Regeleinrichtungen für Brenner und Brennstoffgeräte für gasförmige
und/oder flüssige Brennstoffe - Ventilüberwachungssysteme für automatische
Absperrventile

(standards.iteh.ai)

Équipements auxiliaires pour brûleurs et appareils utilisant des combustibles gazeux ou
liquides - Systèmes de contrôle d'étanchéité pour robinets automatiques de
sectionnement

Ta slovenski standard je istoveten z: prEN 1643

ICS:

| | | |
|-----------|--|-----------------------------------|
| 23.060.40 | Tlačni regulatorji | Pressure regulators |
| 27.060.01 | Gorilniki in grelniki vode na splošno | Burners and boilers in general |

oSIST prEN 1643:2020

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN 1643:2020](#)

<https://standards.iteh.ai/catalog/standards/sist/02250174-6886-4137-9cf8-b5c05a8399/osist-pren-1643-2020>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 1643

August 2020

ICS 23.060.40

Will supersede EN 1643:2014

English Version

Safety and control devices for gas burners and gas burning appliances - Valve proving systems for automatic shut-off valves

Dispositifs de commande et de sécurité pour brûleurs à gaz et appareils à gaz - Systèmes de contrôle d'étanchéité pour robinets automatiques de sectionnement

Sicherheits-, Regel- und Steuereinrichtungen für Gasbrenner und Gasgeräte - Ventilüberwachungssysteme für automatische Absperrventile

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 58.

If this draft becomes a European Standard, CEN 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 CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

| 1 | Contents | Page |
|----|--|------|
| 2 | European foreword | 5 |
| 3 | Introduction | 6 |
| 4 | 1 Scope | 7 |
| 5 | 2 Normative references | 7 |
| 6 | 3 Terms and definitions | 8 |
| 7 | 4 Classification | 10 |
| 8 | 4.1 Classes of control | 10 |
| 9 | 4.2 Groups of control | 10 |
| 10 | 4.3 Classes of control functions | 10 |
| 11 | 4.4 Types of DC supplied controls | 10 |
| 12 | 5 Test conditions and uncertainty of measurements | 10 |
| 13 | 5.1 Test conditions | 10 |
| 14 | 5.2 Uncertainty of measurements | 10 |
| 15 | 6 Design and construction | 10 |
| 16 | 6.1 General | 10 |
| 17 | 6.2 Mechanical parts of the control | 11 |
| 18 | 6.3 Materials | 11 |
| 19 | 6.4 Gas connections | 11 |
| 20 | 6.5 Electrical parts of the control | 11 |
| 21 | 6.5.1 General | 11 |
| 22 | 6.5.2 Switching elements | 11 |
| 23 | 6.5.3 Electrical components | 12 |
| 24 | 6.6 Protection against internal faults for the purpose of functional safety | 12 |
| 25 | 6.6.1 Design and construction requirements | 12 |
| 26 | 6.6.2 Class A | 12 |
| 27 | 6.6.3 Class B | 12 |
| 28 | 6.6.4 Class C | 12 |
| 29 | 6.6.5 Circuit and construction evaluation | 14 |
| 30 | 6.101 Additional constructional requirements for VPS | 14 |
| 31 | 6.101.1 Signal for indication | 14 |
| 32 | 6.101.2 VPS setting | 14 |
| 33 | 7 Performance | 15 |
| 34 | 7.1 General | 15 |
| 35 | 7.2 Leak-tightness | 15 |
| 36 | 7.2.1 Requirements | 15 |
| 37 | 7.2.2 Tests | 17 |
| 38 | 7.3 Torsion and bending | 17 |
| 39 | 7.4 Rated flow rate | 17 |
| 40 | 7.5 Durability | 17 |
| 41 | 7.6 Performance tests for electronic controls | 17 |
| 42 | 7.7 Long-term performance for electronic controls | 17 |
| 43 | 7.7.1 General | 17 |
| 44 | 7.7.2 Stress test | 17 |

| | | | |
|----|------------------------------|--|-----------|
| 45 | 7.7.3 | Long term performance tests | 18 |
| 46 | 7.8 | Data exchange | 18 |
| 47 | 7.101 | Functional requirements | 18 |
| 48 | 7.101.1 | General | 18 |
| 49 | 7.101.2 | Programme sequence | 18 |
| 50 | 7.101.3 | Timing | 18 |
| 51 | 7.101.4 | Testing of the programme sequence and timing | 19 |
| 52 | 7.101.5 | Detection limit | 19 |
| 53 | 7.101.6 | Self-checking | 19 |
| 54 | 7.101.7 | Lock-out and reset device | 19 |
| 55 | 8 | Electrical requirements | 20 |
| 56 | 8.1 | General | 20 |
| 57 | 8.2 | Protection by enclosure | 20 |
| 58 | 9 | Electromagnetic compability (EMC) | 20 |
| 59 | 9.1 | Protection against environmental influences | 20 |
| 60 | 9.2 | Supply voltage variations below 85 % of rated voltage | 21 |
| 61 | 9.3 | Voltage dips and interruptions | 21 |
| 62 | 9.4 | Supply frequency variations | 21 |
| 63 | 9.5 | Surge immunity tests | 22 |
| 64 | 9.6 | Electrical fast transient/burst | 22 |
| 65 | 9.7 | Immunity to conducted disturbances induced by radio frequency fields | 22 |
| 66 | 9.8 | Immunity to radiated disturbances induced by radio frequency fields | 23 |
| 67 | 9.9 | Electrostatic discharge tests | 23 |
| 68 | 9.10 | Power frequency magnetic field immunity tests | 23 |
| 69 | 9.11 | Harmonics and interharmonics including mains signalling at a. c. power port, low frequency immunity tests | 23 |
| 70 | | | |
| 71 | 10 | Marking, instructions | 23 |
| 72 | 10.1 | Marking | 23 |
| 73 | 10.2 | Instructions | 24 |
| 74 | 10.3 | Warning Notice | 24 |
| 75 | Annex A (informative) | Abbreviations and Symbols | 25 |
| 76 | Annex B (informative) | Leak-tightness tests for gas controls – volumetric method | 26 |
| 77 | Annex C (informative) | Leak-tightness tests for gas controls – pressure loss method | 27 |
| 78 | Annex D (normative) | Calculation of pressure loss into leakage rate | 28 |
| 79 | Annex E (normative) | Electrical/electronic component fault modes | 29 |
| 80 | Annex F (normative) | Additional requirements for safety accessories and pressure accessories as defined in EU Directive 2014/68/EU | 31 |
| 81 | | | |
| 82 | Annex G (normative) | Materials for pressurized parts | 32 |
| 83 | Annex H (informative) | Additional materials for pressurized parts | 33 |
| 84 | Annex I (normative) | Requirements for controls used in DC supplied burners and appliances burning gaseous or liquide fuels | 34 |
| 85 | | | |
| 86 | Annex J (normative) | Method for the determination of a Safety Integrity Level (SIL) | 36 |
| 87 | Annex K (normative) | Method for the determination of a Performance Level (PL) | 37 |
| 88 | Annex L (informative) | Relationship between Safety Integrity Level (SIL) and Performance Level (PL) | 38 |
| 89 | | | |

prEN 1643:2020 (E)

| | | |
|-----|--|-----------|
| 90 | Annex M (normative) Reset functions | 39 |
| 91 | Annex N (informative) Guidance document on Environmental Aspects | 40 |
| 92 | Annex O (normative) Seals of elastomer, cork and synthetic fibre mixtures | 41 |
| 93 | Annex AA (informative) Application Guidance | 42 |
| 94 | Annex ZA (informative) Relationship between this European Standard and the essential | |
| 95 | requirements of EU Directive 2009/142/EC aimed to be covered | 43 |
| 96 | Annex ZB (informative) Relationship between this European Standard and the essential | |
| 97 | requirements of Regulation (EU) 2016/426 aimed to be covered | 44 |
| 98 | Annex ZC (informative) Relationship between this European Standard and the Essential | |
| 99 | Safety Requirements of EU Directive 2014/68/EU aimed to be covered | 47 |
| 100 | Bibliography | 48 |
| 101 | | |

iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN 1643:2020](https://standards.iteh.ai/catalog/standards/sist/02250174-6886-4137-9cf8-f35c05a8399/osist-pren-1643-2020)

<https://standards.iteh.ai/catalog/standards/sist/02250174-6886-4137-9cf8-f35c05a8399/osist-pren-1643-2020>

102 **European foreword**

103 This document (prEN 1643:2020) has been prepared by Technical Committee CEN/TC 58 “Safety and
104 control devices for burners and appliances burning gaseous or liquid fuels”, the secretariat of which is
105 held by BSI.

106 This document is currently submitted to the CEN Enquiry

107 This document will supersede EN 1643:2014.

108 This document has been prepared under a mandate given to CEN by the European Commission and the
109 European Free Trade Association, and supports essential requirements of Regulation (EU) 2016/426.

110 For relationship with EU Regulation, see informative Annexes ZA, ZB and ZC, which are an integral part
111 of this document.

112 Note that the following provides details of significant technical changes between this document and the
113 previous edition:

114 a) Alignment with EN 13611:2019;

115 b) Update on the requirements from ISO 23551-4:2018;

116 c) Annex ZB has been added with respect to Regulation (EU) 2016/426 on appliances burning gaseous
117 fuels (GAR).

iTeh STANDARD PREVIEW
(standards.iteh.ai)
oSIST prEN 1643:2020
<https://standards.iteh.ai/catalog/standards/sist/02250174-6886-4137-9cf8-f35c05a8399/osist-pren-1643-2020>

118 **Introduction**

119 This document refers to clauses of EN 13611:2019 or adapts it by stating “with the following
120 modification”, “with the following addition”, “is replaced by the following” or “is not applicable” in the
121 corresponding clause. This document adds clauses or subclauses to the structure of EN 13611:2019
122 which are particular to this document, i.e. subclauses or annexes which are additional to those in
123 EN 13611 are numbered starting from 101 or are designated as Annex AA, Annex BB, Annex CC etc. It
124 should be noted that these clauses and subclauses are not indicated as an addition. If by reference to
125 EN 13611 the term “control” is given, this term should be read as valve-proving systems.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN 1643:2020](https://standards.iteh.ai/catalog/standards/sist/02250174-6886-4137-9cf8-3f5c05a8399/osist-pren-1643-2020)

[https://standards.iteh.ai/catalog/standards/sist/02250174-6886-4137-9cf8-
3f5c05a8399/osist-pren-1643-2020](https://standards.iteh.ai/catalog/standards/sist/02250174-6886-4137-9cf8-3f5c05a8399/osist-pren-1643-2020)

126 1 Scope

127 EN 13611:2019, Clause 1 is replaced by following:

128 This document specifies safety, constructional and performance requirements of valve-proving systems,
129 hereafter referred to as VPS, intended for use with gas burners and gas-burning appliances. It also
130 describes the test procedures for checking compliance with these requirements and provides
131 information necessary for the purchaser and user.

132 This document applies to all types of VPS which are used for the automatic detection of leakage in a gas
133 burner section having at least two valves designed in accordance with EN 161 and which give a signal if
134 the leakage of one of the valves exceeds the detection limit.

135 This document applies to VPS for fuel gases with a maximum working pressure up to and including
136 500 kPa.

137 This document does not apply to VPSs for use in explosive atmospheres.

138 This document is applicable to AC and DC supplied VPS (for VPS supplied by stand-alone battery
139 system, battery systems for mobile applications or systems which are intended to be connected to DC
140 supply networks VPS see Annex I).

141 Provisions for production control are not part of this document.

142 2 Normative references

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

146 EN 161, *Automatic shut-off valves for gas burners and gas appliances*
[https://standards.iteh.ai/catalog/standards/sist/02250174-6886-4137-9cf8-](https://standards.iteh.ai/catalog/standards/sist/02250174-6886-4137-9cf8-2f5c05a8399/osist-pr-en-1643-2020)

147 EN 1854, *Pressure sensing devices for gas burners and gas burning appliances*

148 EN 13611:2019, *Safety and control devices for burners and appliances burning gaseous and/or liquid*
149 *fuels - General requirements*

150 EN 60730-1:2016,¹ *Automatic electrical controls — Part 1: General requirements (IEC 60730-1:2013,*
151 *modified + COR1:2014)*

152 EN 60730-2-5:2015,² *Automatic electrical controls — Part 2-5: Particular requirements for automatic*
153 *electrical burner control systems (IEC 60730-2-5:2013, modified)*

154 EN 60947-5-1:2017, *Low-voltage switchgear and controlgear - Part 5-1: Control circuit devices and*
155 *switching elements - Electromechanical control circuit devices*
156 *(IEC 60947-5-1:2016+IEC 60947-5-1:2016/COR1:2016)*

157 EN 61810-1:2015,³ *Electromechanical elementary relays — Part 1: General requirements*
158 *(IEC 61810-1:2015)*

¹ As amended by EN 60730-1:2016/A1:2019.

² As amended by EN 60730-2-5:2015/A1:2019.

³ As impacted by EN 61810-1:2015/AC:2017

prEN 1643:2020 (E)

159 **3 Terms and definitions**

160 For the purposes of this document, the terms and definitions given in EN 13611:2019 and the following
 161 apply.

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

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

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

165 **3.101**166 **valve proving system**

167 VPS

168 system to check the effective closure of automatic shut-off valves by detecting leakage, that often
 169 consists of a programming unit, a measuring device, valves and other functional assemblies

170 **3.102**171 **VPS programming unit**

172 unit which follows a predetermined sequence of valve proving actions

173 **3.103**174 **detecting device**

175 device for direct or inferential detection of leakage

176 EXAMPLE Leakage is detected by measuring flow or pressure.

177 **3.104**178 **VPS operational time**

179 time taken by the VPS to perform its entire cycle of operation

180 **3.105**181 **detection limit**

182 maximum amount of leakage that can occur before the VPS is required to give a signal

183 Note 1 to entry: See Figure 1.

184 **3.106**185 **detection setting**

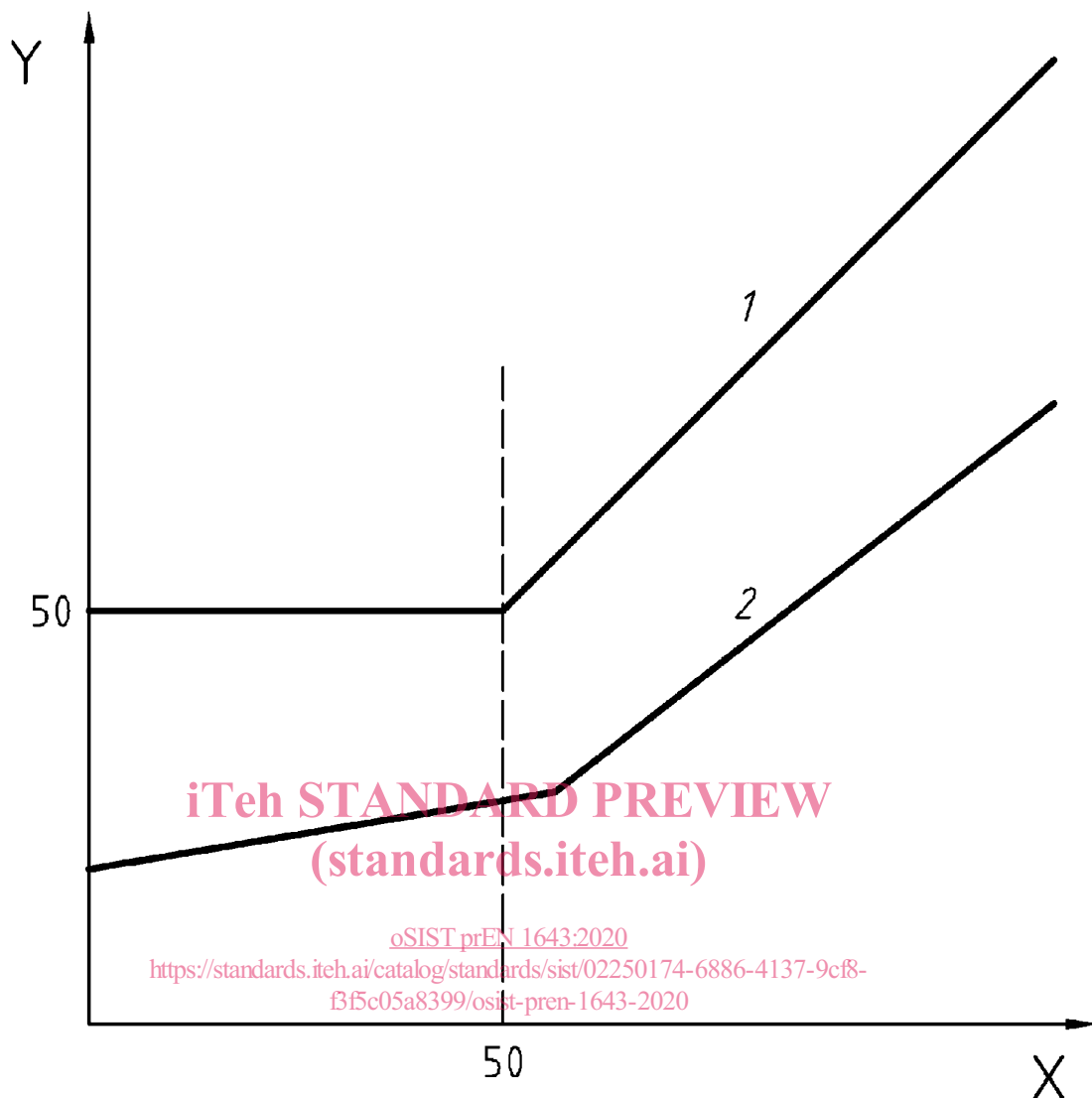
186 actual leakage rate at which the VPS gives a signal

187 Note 1 to entry: See Figure 1.

iTeh STANDARD PREVIEW
 (standards.iteh.ai)

oSIST prEN 1643:2020

perform its entire cycle of operation
 2250174-6886-4137-9c18-
 f35c05a8399/osist-pren-1643-2020



188

189 **Key**

- X burner heat, gas flow, expressed in m^3/h
 Y detected leakage rate, expressed in dm^3/h
 1 detection limit, see 3.105
 2 detection setting, see 3.106

190

Figure 1 — Illustration of detection limit and detection setting191 **3.107**192 **leakage testing time**

193 time in which the VPS monitors a gas valve for leakage

194 **3.108**195 **safety shutdown**

196 process which is effected immediately following the detection of a leakage exceeding the detection limit,
 197 or detection of an internal fault, disabling energisation of the ignition and of the automatic shut-off
 198 valves

prEN 1643:2020 (E)

199 **3.109**
 200 **volatile lock-out**
 201 safety shutdown condition of the system where a restart can only be accomplished by either the manual
 202 reset of the system, or an interruption of the main power and its subsequent restoration

203 **3.110**
 204 **non-volatile lock-out**
 205 safety shutdown condition of the system, where a restart can only be accomplished by the manual reset
 206 of the system and by no other means

207 4 Classification**208 4.1 Classes of control**

209 EN 13611:2019, 4.1 is not applicable.

210 4.2 Groups of control

211 Shall be according to EN 13611:2019, 4.2.

212 4.3 Classes of control functions

213 Shall be according to EN 13611:2019, 4.3 with the following addition:

214 The valve proving system for automatic shut-off valves is a Class C control function.

215 4.4 Types of DC supplied controls

216 Shall be according to EN 13611:2019, 4.4

217 5 Test conditions and uncertainty of measurements**218 5.1 Test conditions**

219 Shall be according to EN 13611:2019, 5.1. with following addition:

220 All tests are performed in the order written in this document (i.e. EN 1643) except for that of 6.6 and
 221 7.7.

222 5.2 Uncertainty of measurements

223 Shall be according to EN 13611:2019, 5.2.

224 6 Design and construction**225 6.1 General**

226 EN 13611:2019, 6.1, applies, with the following addition.

227 The VPS shall be designed such that changes in critical circuit component values (such as those affecting
 228 timing or sequence) within the worst case tolerances of the components specification, including the
 229 long-term stability, shall result in the system continuing to function in accordance with this document.
 230 Compliance shall be checked by worst-case analysis.

231 The construction of any additional functions included in the VPS for which no provisions exist in this
 232 document shall be such that they do not degrade the safe and correct operation.

233 Where components are used to complete the VPS, these components shall comply with the relevant
 234 harmonized European controls Standard. Valves (e.g. for pressurizing and relieving the test section)
 235 integrated into the VPS functional sequence shall comply with EN 161 Class A, if not otherwise specified
 236 by a relevant appliance standard, and pressure-sensing devices, with EN 1854.

237 **6.2 Mechanical parts of the control**

238 Shall be according to EN 13611:2019, 6.2.

239 **6.3 Materials**

240 Shall be according to EN 13611:2019, 6.3.

241 **6.4 Gas connections**

242 Shall be according to EN 13611:2019, 6.4.

243 **6.5 Electrical parts of the control**

244 **6.5.1 General**

245 Shall be according to EN 13611:2019, 6.5.1 with the following addition:

246 The construction of any additional functions included in the valve proving system, programming unit or
 247 flame detector device for which no provisions exist in this document, shall be such that they do not
 248 degrade the safe and correct operation of the valve proving system.

249 **6.5.2 Switching elements**

250 **6.5.2.1 Requirements**

251 Shall be according to EN 13611:2019, 6.5.2.1 with the following addition:

252 Measures shall be taken to protect against failure of two (or more) switching elements, due to a
 253 common cause, by an external short circuit that would prevent the valve proving system from
 254 performing a safety shutdown.

255 Acceptable methods are current limitation, overcurrent protection device or internal fault detecting
 256 functions.

257 The suitability of measures to maintain the capability to interrupt the energization of the shut-off valve
 258 terminals by means of at least one switching element or a non-replaceable overcurrent protection
 259 device has been interrupted shall be verified by the following test.

260 **6.5.2.2 Tests of protecting measures against failure of switching elements**

261 Shall be according to EN 13611:2019, 6.5.2.1 with the following modifications:

262 For the purpose of this clause, the terms “safety related output terminals” or “output terminals” are
 263 replaced by “shut-off valve terminals”.

264 Delete in the brackets of the first paragraph the words “contacts of”.

265 Add the following NOTE:

266 NOTE A switching element means semiconductors as well as electro-mechanic switching elements.

267 Add to the end of the 2nd paragraph the following text:

268 If the valve circuit of the burner control system is always supplied by an integrated power supply, the
 269 test shall be applied with this integrated power supply under worst-case conditions for the highest
 270 short circuit current.

prEN 1643:2020 (E)271 **6.5.3 Electrical components**272 **6.5.3.1 Performance of electrical components**

273 Shall be according to EN 13611:2019, 6.5.3.1.

274 **6.5.3.2 Tests**

275 Shall be according to EN 13611:2019, 6.5.3.2.

276 **6.5.3.3 Sensing element**

277 Shall be according to EN 13611:2019, 6.5.3.3.

278 **6.5.3.4 Gas controls employing electrical components in the gas circuit**

279 Shall be according to EN 13611:2019, 6.5.3.4.

280 **6.6 Protection against internal faults for the purpose of functional safety**281 **6.6.1 Design and construction requirements**282 **6.6.1.1 Fault avoidance and fault tolerance**

283 Shall be according to EN 13611:2019, 6.6.1.1.

284 **6.6.1.2 Lock-out function**

285 Shall be according to EN 13611:2019, 6.6.1.2.

286 **6.6.1.3 Reset device**

287 Shall be according to EN 13611:2019, 6.6.1.3.

288 Remark to WG12: It would have been better if 3611 would have put the reset device requirements of
 289 6.6.1.3 completely into Annex M – remove 6.6.1.3.

290 **6.6.1.4 Design documentation**

291 Shall be according to EN 13611:2019, 6.6.1.4.

292 **6.6.2 Class A**

293 EN 13611:2019, 6.6.2 is not applicable.

294 **6.6.3 Class B**

295 EN 13611:2019, 6.6.3 is not applicable.

296 **6.6.4 Class C**297 **6.6.4.1 Design and construction requirements**

298 Shall be according to EN 13611:2019, 6.6.4.1 with the following modification:

299 Replace the second and third paragraph by the following:

300 At least the following states are defined as unsafe states:

- 301 a) if during burner shutdown, the gas flow through a valve or by-passing valve is higher than the
 302 detection limit value of that valve except for the function of the VPS;
- 303 b) if a test for leakage is outside the limits defined in 3.105 or 3.106;

304 c) overriding the VPS sequence control of the safety shut-off valves by the burner control system,
305 except for the normal function of the VPS;

306 d) preventing the VPS from going to a defined fault response.

307 VPS or safety-related (hardware) parts of the VPS that are not powered during the stand-by and the
308 running state of the appliance shall execute all relevant internal tests during powering-up of the VPS.
309 Once the VPS is operational, the required internal test to detect the first faults leading to one of the
310 unsafe states as mentioned in above shall be executed every 3 s.

311 For this type of VPS, the second fault shall only be considered to occur when a start-up sequence has
312 been performed between the first and the second fault.

313 VPS that are powered during stand-by or running state of the appliance shall comply with the following:

314 — reaction time to detect the first faults leading to one of the unsafe states as mentioned in above
315 are ≤ 3 s;

316 — reaction time to detect second independent fault ≤ 24 h.

317 Software shall conform to software Class C of EN 60730-2-5:

318 The VPS shall be fail-safe. Systems which meet the requirements of this clause and, if applicable, 6.6.1.1
319 are considered to be inherently fail-safe.

320 The circuitry and the construction of the system shall be such that they meet the requirements of 7.101
321 and shall be appraised according to the requirements to 6.6.4.2, 6.6.4.3 and 6.6.4.4 and under the test
322 conditions and criteria of 6.6.5. (standards.iteh.ai)

323 Components shall be dimensioned on the basis of the worst-case conditions which can arise in the
324 system, as stated within the design documentation. 643:2020

325 **6.6.4.2 First fault** <https://standards.iteh.ai/catalog/standards/sist/02250174-6886-4137-9cf8-b3f5c05a8399/osist-pren-1643-2020>

326 EN 13611:2019, 6.6.4.2 is replaced by the following:

327 Any first fault (see Annex E) in any one component or any one fault together with any other fault arising
328 from that first fault shall result in either:

329 a) the VPS becoming inoperative with all valve terminals de-energised;

330 b) the system proceeding to safety shutdown within 3 s followed by a non-volatile or volatile lock-out.
331 The lock-out may be executed by the VPS, or by another control within the appliance preventing the
332 burner start up. During subsequent reset action, the VPS shall not operate any valves or the
333 pressurizing pump belonging to the valve. Subsequent reset from the lock-out condition under the
334 same fault condition results in the VPS returning to the volatile or non-volatile lock-out condition;
335 continue with fault assessment during lock-out or safety shutdown according to 6.6.4.4.3;

336 c) the VPS continuing to operate, the fault being identified during the next start-up sequence, the
337 result being a) or b);

338 d) the VPS remaining operational in accordance with all other requirements of this document
339 (see 7.101).

340 For VPS designed for use on non-permanent operating appliances list item c) is applicable whereas list
341 item c) is not applicable for VPS designed for use on permanent operating appliances.