

SLOVENSKI STANDARD
oSIST prEN IEC 61010-2-201:2020
01-november-2020

Varnostne zahteve za električno opremo za meritve, nadzor in laboratorijsko uporabo - 2-201. del: Posebne zahteve za opremo za nadzor in upravljanje

Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-201: Particular requirements for control equipment

Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte - Teil 2-201: Besondere Anforderungen für Steuer- und Regelgeräte

Exigences de sécurité pour appareils électriques de mesure, de régulation et de laboratoire - Partie 2-201: Exigences particulières pour les équipements de commande

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Ta slovenski standard je istoveten z: prEN IEC 61010-2-201:2020

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71.040.10	Kemijski laboratoriji. Laboratorijska oprema	Chemical laboratories. Laboratory equipment

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SECRETARIAT: France	SECRETARY: Mr Rudy BELLIARDI
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 66	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 <input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING	
<p>Attention IEC-CENELEC parallel voting</p> <p>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.</p> <p>The CENELEC members are invited to vote through the CENELEC online voting system.</p>	

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TITLE:

Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-201: Particular requirements for control equipment

PROPOSED STABILITY DATE: 2026

NOTE FROM TC/SC OFFICERS:

1 CONTENTS

2	CONTENTS	2
3	FOREWORD	4
4	INTRODUCTION	7
5	1 Scope and object	8
6	2 Normative references	9
7	3 Terms and definitions	10
8	4 Tests	12
9	5 Marking and documentation	13
10	6 Protection against electric shock	15
11	7 Protection against mechanical HAZARDS	30
12	8 Resistance to mechanical stresses	31
13	9 Protection against the spread of fire	32
14	10 Equipment temperature limits and resistance to heat	37
15	11 Protection against HAZARDS from fluids and solid foreign objects	44
16	12 Protection against radiation, including laser sources, and against sonic and	
17	ultrasonic pressure	44
18	13 Protection against liberated gases and substances, explosion and implosion	44
19	14 Components and subassemblies	44
20	15 Protection by interlocks	48
21	16 HAZARDS resulting from application of EN IEC 61010-2-201:2020	48
22	17 RISK assessment	49
23	Annexes	50
24	Annex E (informative) Guideline for reduction of POLLUTION DEGREES	51
25	Annex F (normative) ROUTINE TESTS	53
26	Annex L (informative) Index of defined terms	55
27	Annex AA (informative) General approach to safety for control equipment	56
28	Annex BB (informative) System drawing of isolation boundaries	58
29	Annex CC (informative) Historical techniques for secondary circuits	69
30	Annex DD (normative) Flammability test for magnesium alloy fire ENCLOSURES or	
31	flame barriers (see 9.3.2)	73
32	Annex EE (informative) Information/documentation and correlation to its uses	74
33	Annex FF (informative) Measurement of CLEARANCES and CREEPAGE DISTANCES	76
34	Bibliography	79
35		
36	Figure 101 – Typical INTERFACE/PORT/TERMINAL diagram of control equipment	18
37	Figure 102 – Examples of insulation between separate circuits and between circuits	
38	and ACCESSIBLE conductive parts	23
39	Figure 103 – Mechanical HAZARDS, with regard to PANEL MOUNTED EQUIPMENT	30
40	Figure 104 – Spread of fire HAZARDS, with regard to PANEL MOUNTED EQUIPMENT	34
41	Figure 105 – General temperature test environment	39
42	Figure 106 – Vented equipment	41
43	Figure 107 – Non-vented equipment	42

44	Figure 108 – PANEL MOUNTED EQUIPMENT extending through the wall of the end location	
45	ENCLOSURE	43
46	Figure AA.1 – Control equipment access and safety concerns	56
47	Figure BB.1 – Typical system ENCLOSURE layout	58
48	Figure BB.2 – Simplified system schematic.....	60
49	Figure BB.3 – HAZARD situation of the control equipment.....	61
50	Figure BB.4 – Application of the standard to the control equipment safety drawing	62
51	Figure BB.5 – Application of 6.7.1.5 items a) and b) to the control equipment safety	
52	drawing.....	62
53	Figure BB.6 – Application of 6.7.1.5 items a), b), c) and d) to the control equipment	
54	safety drawing	63
55	Figure BB.7 – REINFORCED INSULATION.....	63
56	Figure BB.8 – BASIC INSULATION.....	64
57	Figure BB.9 – REINFORCED INSULATION, BASIC INSULATION and impedance	65
58	Figure BB.10 – REINFORCED INSULATION from external power supplies	66
59	Figure BB.11 – BASIC INSULATION from external power supplies	67
60	Figure EE.1 – Information/documentation for component products	74
61	Figure EE.2 – Information/documentation accumulation and segregation tree for an	
62	example installation	75
63	Figure FF.1 – The path a component mounted to a PWB (side view).....	77
64	Figure FF.2 – The path a component mounted to a PWB (side view).....	77
65		
66	Table 101 – INTERFACES, PORTS AND TERMINALS considered as OPERATOR ACCESSIBLE	
67	for OPEN and ENCLOSED EQUIPMENT	17
68	Table 4 – CLEARANCE and CREEPAGE DISTANCES for MAINS CIRCUITS of OVERVOLTAGE	
69	CATEGORY II up to 300 V.....	26
70	Table 5 – Test voltages for solid insulation between MAINS and between MAINS and	
71	secondary circuits OVERVOLTAGE CATEGORY II up to 300 V	27
72	Table 6 – CLEARANCES and test voltages for secondary circuits derived from MAINS	
73	CIRCUITS of OVERVOLTAGE CATEGORY II up to 300 V	28
74	Table 19 – Surface temperature limits, under NORMAL CONDITION.....	38
75	Table E.1 – Environmental situations	51
76	Table E.2 – Reduction of POLLUTION DEGREES (PD)	52
77	Table CC.1 – Limits of output current and output power for inherently limited power	
78	sources.....	71
79	Table CC.2 – Limits of output current, output power and RATINGS for over-current	
80	protective devices for non-inherently limited power sources.....	72
81	Table FF.1 – Dimensions of X	76
82		
83		

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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**SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT
FOR MEASUREMENT, CONTROL, AND LABORATORY USE –**

89

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Part 2-201: Particular requirements for control equipment

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FOREWORD

- 93 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising
94 all national electrotechnical committees (IEC National Committees). The object of IEC is to promote
95 international co-operation on all questions concerning standardization in the electrical and electronic fields. To
96 this end and in addition to other activities, IEC publishes International Standards, Technical Specifications,
97 Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC
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121 expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC
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- 123 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is
124 indispensable for the correct application of this publication.
- 125 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of
126 patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

127 International Standard IEC 61010-2-201 has been prepared by IEC technical committee 65:
128 Industrial-process measurement, control and automation.

129 The text of this standard is based on the following documents:

CD	Report on voting
IEC 61010-2-201 Ed3.0	65/xxx/RVC

130

131 Full information on the voting for the approval of this standard can be found in the report on
132 voting indicated in the above table.

133 This third edition cancels and replaces the second edition published in 2017. This edition
134 constitutes a technical revision.

135 This third edition includes the following significant technical changes with respect to the
136 previous edition;

- 137 a) 1.1.1 The related equipment of the standard have been clarified
- 138 b) 4.3.2.101 The Optical fiber module has been deleted.
- 139 c) 5.4.3 Equipment installation has been clarified.
- 140 d) 6.7.1.1 Revision of the figure of insulation between separate circuits has been included.
- 141 e) 6.7.101 The sub-clause of insulation for FIELD WIRING TERMINALS of OVERVOLTAGE
142 CATEGORY II with a nominal voltage up to 1 000 V has been deleted.
- 143 f) 6.7.1.101 A new sub-clause of insulation for SELV/PELV circuits has been included.
- 144 g) 6.8.3 Specification of voltage tester has been added.
- 145 h) 6.9.3 Additional exception of color coding has been included.
- 146 i) 6.9.101 A new sub-clause of wiring for secondary circuits e.g. SELV/PELV has been
147 included.
- 148 j) 8.2.2.101 Additional requirements of Glass displays have been included.
- 149 k) 8.3 A subclause of Drop test has been removed.
- 150 l) 9.3.2 Additional requirements for material of connectors and insulating material has been
151 included.
- 152 m) The particular requirements for nonmetallic material has been clarified.
- 153 n) 11 The particular requirements for Protection against HAZARDS from fluid and solid
154 foreign objects has been removed.
- 155 o) 12.4 Additional subclause of (Microwave radiation) has been included.
- 156 p) 14.102 The description of Switching devices has been clarified.

157 This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

158 This Part 2-201 is to be used in conjunction with third edition of IEC 61010-1 (2010), including
159 its amendment 1 (2016).

160 This Part 2-201 supplements or modifies the corresponding clauses in IEC 61010-1 so as to
161 convert that publication into the IEC standard: *Particular requirements for control equipment*.

162 Where a particular subclause of Part 1 is not mentioned in this part 2, that subclause applies
163 as far as is reasonable. Where this part states “addition”, “modification”, “replacement”, or
164 “deletion”, the relevant requirement, test specification or NOTE in Part 1 should be adapted
165 accordingly.

166 In this standard, the following print types are used:

- 167 – requirements and definitions: in roman type;
- 168 – NOTE in smaller roman type;
- 169 – *conformity and tests: in italic type;*
- 170 – terms used throughout this standard which have been defined in Clause 3: SMALL ROMAN
171 CAPITALS.

172 A list of all parts in the IEC 61010 series, published under the general title “*Safety*
173 *requirements for electrical equipment for measurement, control and laboratory use*”, can be
174 found on the IEC website.

175 The committee has decided that the contents of this publication will remain unchanged until
176 the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data
177 related to the specific publication. At this date, the publication will be

- 178 • reconfirmed,
179 • withdrawn,
180 • replaced by a revised edition, or
181 • amended.

182

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185

INTRODUCTION

186 IEC 61010-2-2xx documents are a series of standards on safety of industrial-process
187 measurement, control and automation equipment.

188 This part specifies the complete safety related requirements and related tests for control
189 equipment (e.g. programmable controller (PLC), the components of distributed control
190 systems (DCS), I/O devices, human machine interface (HMI)).

191 Safety terms of general use are defined in IEC 61010-1. More specific terms are defined in
192 each part of IEC 61010.

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SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE –

Part 2-201: Particular requirements for control equipment

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202 **1 Scope and object**

203 *This clause of Part 1 is applicable, except as follows.*

204 **1.1.1 Equipment included in scope**

205 *Replacement:*

206 This part of IEC 61010 specifies safety requirements and related verification tests for control
207 equipment and/or their associated peripherals.

208 Some equipment examples are:

- 209 • programmable logic controller (PLC);
- 210 • programmable automation controller (PAC);
- 211 • distributed control systems (DCS);
- 212 • industrial PC (computers) and panel PC;
- 213 • programming and debugging tools (PADTs);
- 214 • displays and human-machine interfaces (HMI);
- 215 • any product performing the function of control equipment and/or their associated
216 peripherals;
- 217 • positioners; and
- 218 • control equipment which have as their intended use the command and control of
219 machines, automated manufacturing and industrial processes, e.g. discrete and
220 continuous control.

221 Components of the above named equipment and in the scope of this standard are e.g.:

- 222 • (auxiliary) stand-alone power supplies;
- 223 • peripherals such as digital and analogue I/O,
- 224 • remote-I/O;
- 225 • industrial network equipment, embedded or standalone (e.g. switches, routers, wireless
226 base station).

227 Control equipment and their associated peripherals are intended to be used in an industrial
228 environment and may be provided as OPEN or ENCLOSED EQUIPMENT.

229 NOTE 1 Control equipment intended also for use in other environments or for other purposes (example: for use in
230 building installations to control light or other electrical installations, or for use on cars, trains or ships) can have
231 additional conformity requirements defined by the safety standard(s) for these applications. These requirements
232 can involve as example: insulation, spacings and power restrictions.

233 NOTE 2 Computing devices and similar equipment within the scope of IEC 60950 (planned to be replaced by
234 IEC 62368) and conforming to its requirements are considered to be suitable for use with control equipment within
235 the scope of this standard. However, some of the requirements of IEC 60950 for resistance to moisture and liquids
236 are less stringent than those in IEC 61010-1:2010, 5.4.4 second paragraph.

237 Control equipment covered in this standard is typically intended for use in OVERVOLTAGE
238 CATEGORY II (IEC 60664-1) in low-voltage installations, where the RATED equipment supply
239 voltage does not exceed AC 1 000 V r.m.s. (50/60 Hz), or DC 1 000 V.

240 Where control equipment is intended for installation to supply systems with overvoltage
241 category III or IV, additional requirements are identified in Annex K.

242 The requirements of ISO/IEC Guide 51 and IEC Guide 104, as they relate to this part of
243 IEC 61010, are incorporated herein.

244 **1.1.2 Equipment excluded from scope**

245 *Replacement:*

246 This standard does not deal with aspects of the overall automated system, e.g. a complete
247 assembly line. Control equipment (e.g. DCS and PLC), their application program and their
248 associated peripherals are considered as components (components in this context are items
249 which perform no useful function by themselves) of an overall automated system.

250 Since control equipment (e.g. DCS and PLC) are component devices, safety considerations
251 for the overall automated system including installation and application are beyond the scope
252 of this standard. Refer to IEC 60364 series of standards or applicable national/local
253 regulations for electrical installation and guidelines.

254 **1.2.1 Aspects included in scope**

255 *Replace first sentence:*

256 The purpose of the requirements of this standard is to ensure that all HAZARDS to the
257 OPERATOR, SERVICE PERSONNEL and the surrounding area are reduced to a tolerable level.

258 NOTE By using the terms "OPERATOR" and "SERVICE PERSONNEL" this standard considers the perception of
259 HAZARDS depending on training and skills. Annex AA gives a general approach in this regard.

260 **1.2.2 Aspects excluded from scope**

261 *Replacement:*

262 This standard does not cover:

- 263 a) reliability, functionality, performance, or other properties of the control equipment not
264 related to safety;
- 265 b) mechanical or climatic requirements for operation, transport or storage;
- 266 c) EMC requirements (see e.g. IEC 61326 or IEC 61131-2);
- 267 d) protective measures for explosive atmospheres (see e.g. IEC 60079 series);
- 268 e) functional safety (see e.g. IEC 61508, IEC 61131-6).

269 **2 Normative references**

270 This clause of Part 1 is applicable, except as follows.

271 *Addition:*

272 IEC 60384-14, *Fixed capacitors for use in electronic equipment – Part 14: Sectional*
273 *specification: Fixed capacitors for electromagnetic interference suppression and connection to*
274 *the supply mains*

- 275 IEC 60664-1, *Insulation coordination for equipment within low-voltage systems – Part 1:*
276 *Principles, requirements and tests*
- 277 IEC 60695-2-11, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods –*
278 *Glow-wire flammability test method for end-products (GWEPT)*
- 279 IEC 60695-11-3, *Fire hazard testing – Part 11-3: Test flames – 500 W flames – Apparatus and*
280 *confirmational test methods*
- 281 IEC 60947-5-1, *Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices*
282 *and switching elements – Electromechanical control circuit devices*
- 283 IEC 61010-1:2010, *Safety requirements for electrical equipment for measurement, control,*
284 *and laboratory use – Part 1: General requirements*
- 285 IEC 61010-2-030, *Safety requirements for electrical equipment for measurement, control, and*
286 *laboratory use – Part 2-030: Particular requirements for testing and measuring circuits*
- 287 IEC 61051-2, *Varistors for use in electronic equipment – Part 2: Sectional specification for*
288 *surge suppression varistors*
- 289 IEC 61643-21, *Low voltage surge protective devices – Part 21: Surge protective devices*
290 *connected to telecommunications and signalling networks – Performance requirements and*
291 *testing methods*
- 292 IEC 61643-311, *Components for low-voltage surge protective devices – Part 311:*
293 *Performance requirements and test circuits for gas discharge tubes (GDT)*
- 294 IEC 61643-321, *Components for low-voltage surge protective devices – Part 321:*
295 *Specifications for avalanche breakdown diode (ABD)*
- 296 IEC 61643-331, *Components for low-voltage surge protective devices – Part 331:*
297 *Specification for metal oxide varistors (MOV)*
- 298 IEC 61810-1, *Electromechanical elementary relays - Part 1: General and safety requirements*

299 **3 Terms and definitions**

300 This clause of Part 1 is applicable, except as follows.

301 **3.1.3**

302 **PORTABLE EQUIPMENT**

303 *Modification:*

304 equipment intended to be carried by hand and not fixed during NORMAL USE

305 **3.2.3**

306 **PROTECTIVE CONDUCTOR TERMINAL**

307 *Modification:*

308 In this part “PROTECTIVE CONDUCTOR TERMINAL” is replaced by “PROTECTIVE EARTH TERMINAL”.

309 Note 1to entry: PROTECTIVE EARTH TERMINAL is most familiar to industrial users, manufacturers, etc. Therefore
310 since this part is targeted towards industrial use, the most familiar term is utilized.

311 *Add the following terms and definitions:*

312 **3.2.4**313 **ENCLOSURE**314 *Replacement:*

315 housing affording the type and degree of protection suitable for the intended application

316 [SOURCE: IEC 60050-195:1998, 195-02-35]

317 **3.101**318 **AMBIENT TEMPERATURE**

319 temperature, determined under prescribed conditions, of the air surrounding the equipment

320 **3.102**321 **ENCLOSED EQUIPMENT**

322 equipment which includes an ENCLOSURE, having safety capability, or combination of an
 323 ENCLOSURE, having safety capability, and installation provisions enclosing on all sides, with
 324 the possible exception of its mounting surface, to prevent personnel from accidentally
 325 touching HAZARDOUS LIVE, hot or moving parts contained therein and meeting requirements of
 326 mechanical strength, flammability, and stability (where applicable)

327 Note 1 to entry: An example is HAND-HELD EQUIPMENT.

328 Note 2 to entry: This definition is related to IEC 60050-441:2000, 441-12-02.

329 **3.103**330 **FIELD WIRING**

331 wiring of the control equipment, which is not installed in the control equipment manufacturer's
 332 facility

333 Note to entry: An example of FIELD WIRING is mains supply wiring. <https://standards.iteh.ai/catalog/standards/sist/277a2178-b79c-4011-bc86-e38f1899be84/osist-pren-iec-61010-2-201-2020>334 **3.104**335 **INTERFACE**

336 shared boundary between one control equipment and another control equipment, or between
 337 parts of a control equipment, through which information or electrical energy is conveyed

338 [SOURCE: IEC 61131-2:2017]

339 **3.105**340 **MODULAR EQUIPMENT**

341 equipment consisting of different modules such as a Rack, CPU, different I/O-modules,
 342 network modules etc.

343 Note to entry: MODULAR EQUIPMENT can:

- 344 a) be OPEN EQUIPMENT or ENCLOSED EQUIPMENT;
- 345 b) consist of modules that cannot operate alone or of a basic module that is operational alone and can be
 346 enhanced in functions by additional modules;
- 347 c) vary in size and functionality depending on the combination and the number of modules;
- 348 d) be combined with operational equipment or enhanced in function by the addition of modules by the customer.

349 **3.106**350 **OPEN EQUIPMENT**

351 equipment which does not protect personnel from accidentally touching HAZARDOUS LIVE or
 352 moving parts contained therein nor meet requirements of mechanical strength, flammability
 353 and stability (where applicable)

354 Note to entry: See Annex AA.

3.107**PANEL MOUNTED EQUIPMENT**

equipment where a portion of the equipment may form part of the ENCLOSURE

Note to entry: See Figure 103.

3.108**PORT(S)**

access to a device or network where electromagnetic energy or signals may be supplied or received or where the device or network variables may be observed or measured

Note to entry: Most commonly used with respect to EMC.

3.109**PROTECTIVE EXTRA-LOW VOLTAGE CIRCUIT****PELV CIRCUIT**

protective earth referenced electrical circuit in which the voltage cannot exceed the following:

NORMAL CONDITION and SINGLE FAULT CONDITION: The AC voltage levels are 30 V r.m.s., 42,4 V peak and the DC voltage level is 60 V. For equipment intended for use in WET LOCATIONS, the AC voltage levels are 16 V r.m.s., 22,6 V peak and the DC voltage level is 35 V.

Transients are not considered in PELV circuits.

[SOURCE: IEC 60050-826-12-32:2004, modified – clarified and more fully described]

3.110**SAFETY EXTRA-LOW VOLTAGE CIRCUIT****SELV CIRCUIT**

non-protective earth referenced electrical circuit in which the voltage cannot exceed the following:

NORMAL CONDITION and SINGLE FAULT CONDITION: The AC voltage levels are 30 V r.m.s., 42,4 V peak and the DC voltage level is 60 V. For equipment intended for use in WET LOCATIONS, the AC voltage levels are 16 V r.m.s., 22,6 V peak and the DC voltage level is 35 V.

Transients are not considered in SELV circuits.

[SOURCE: IEC 60050-826-12-31:2004, modified – clarified and more fully described]

3.111**SERVICE PERSONNEL**

person, which is installing, changing or repairing the control equipment, with the appropriate technical training, experience and awareness of HAZARDS and of measures to minimize danger to themselves, other persons or to the control equipment, in an industrial environment

Note 1 to entry: SERVICE PERSONNEL are persons having the appropriate technical training and experiences necessary to be aware of HAZARDS – e.g. electrical HAZARDS, temperature HAZARDS, fire HAZARDS – to which they are exposed in performing a task and of measures to minimize danger to themselves or to other persons or to the control equipment, in an industrial environment.

Note 2 to entry: SERVICE PERSONNEL change or repair the control equipment e.g. hardware configuration or installing software updates provided by the manufacturer.

4 Tests

This clause of Part 1 is applicable, except as follows.

396 4.1 General

397 *Add the following 3 paragraphs of requirements after the last (3rd) paragraph of requirements.*

398 The product is verified to this standard in a test configuration, defined by the manufacturer,
399 which represents the least favourable configuration. See 4.3.

400 It is likely or possible that there are different test configurations which yield least favourable
401 test conditions. For example there may be a least favourable configuration for temperature
402 test, and a different least favourable test configuration for voltage test. If this is the case then
403 the appropriate least favourable test configuration(s) shall be used with regard to 4.3.2 and
404 4.4.

405 These least favourable test configurations and test conditions shall be practical and useful for
406 the intended applications.

407 *Add the following conformity statement at the end of the list of conformity statements:*

408 *Conformity verification: The selected test configuration(s) and test conditions shall be*
409 *documented with the rationale in the test report.*

410 4.4.1 General

411 *Add the following after 4.4.1 a):*

412 *NOTE A fault condition can include open or short circuit of components, as well as disabling/bridging one*
413 *means/layer of protection.*

414 4.4.4.3 Spread of fire

415 *Add to the conformity statement:*

416 *Optionally, for OPEN EQUIPMENT;*

417 *The equipment may be placed inside a wire mesh cage covered with cheesecloth. The wire*
418 *mesh cage shall be maximum 1.5 times the size (length, width, height) of the device or*
419 *representative system including the device, to simulate the intended enclosure during the*
420 *single fault condition testing. See clause 10.4.1.101 for representative system methodology.*

421 *The wire mesh cage shall be of metal screen with a mesh 25 mm X 25 mm, +/- 5 mm, center*
422 *to center with a wire diameter of 0.8 mm, +/- 0.3 mm.*

423 *NOTE The wire mesh used is commonly known as chicken wire, 25 mm hexagonal mesh weave made of 0.81*
424 *gauge wire.*

425 *Cheesecloth is a bleached cotton cloth of approximately 40 g/m2 containing no flame*
426 *retardants.*

427 *NOTE 1 Cheesecloth is a coarse, loosely woven cotton gauze, originally used for wrapping cheese.*

428 *NOTE 2 Panel mounted equipment may combine the two methods.*

429 5 Marking and documentation

430 This clause of Part 1 is applicable, except as follows.

431 5.1.5.2 TERMINALS

432 *Modification:*