
Varnostne zahteve za električno opremo za meritve, nadzor in laboratorijsko uporabo - 2-034. del: Posebne zahteve za merilno opremo za izolacijsko upornost in preskusno opremo za električno trdnost

Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-034: Particular requirements for measurement equipment for insulation resistance and test equipment for electric strength

Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte - Teil 2-034: Besondere Anforderungen für Prüf- und Messgeräte zur Isolationswiderstandsmessung und Prüfausrüstung für die Spannungsfestigkeit

Exigences de sécurité pour appareils électriques de mesure, de régulation et de laboratoire - Partie 2-034: Exigences particulières applicables aux appareils de mesure de la résistance d'isolement et aux appareils d'essai de rigidité diélectrique

034-2022

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71.040.10	Kemijski laboratoriji. Laboratorijska oprema	Chemical laboratories. Laboratory equipment

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66/756/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

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IEC TC 66 : SAFETY OF MEASURING, CONTROL AND LABORATORY EQUIPMENT	
SECRETARIAT: United Kingdom	SECRETARY: Mr David Hyde
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 78, TC 85	PROPOSED HORIZONTAL STANDARD: <input checked="" 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	
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TITLE:

Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-034: Particular requirements for measurement equipment for insulation resistance and test equipment for electric strength

PROPOSED STABILITY DATE: 2025

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60 INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 2-034: Particular requirements for measurement equipment for insulation resistance and test equipment for electric strength

FOREWORD

- 70 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all
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72 operation on all questions concerning standardization in the electrical and electronic fields. To this end and in
73 addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports,
74 Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation
75 is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may
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96 arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 97 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is
98 indispensable for the correct application of this publication.
- 99 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent
100 rights. IEC shall not be held responsible for identifying any or all such patent rights.

101 International Standard IEC 61010-2-034 has been prepared by IEC technical committee 66:
102 Safety of measuring, control and laboratory equipment.

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

104 This second edition cancels and replaces the first edition published in 2017. This edition
105 constitutes a technical revision.

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

FDIS	Report on voting
66/xxx/FDIS	66/xxx/RVD

107

108 Full information on the voting for the approval of this International Standard can be found in the
109 report on voting indicated in the above table.

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

111 A list of all parts of the IEC 61010 series, under the general title *Safety requirements for electrical*
112 *equipment for measurement, control, and laboratory use*, can be found on the IEC website.

113 This Part 2-034 is to be used in conjunction with IEC 61010-1:2010/AMD1:2016. It was
114 established on the basis of the third edition (2010) of IEC 61010-1, including its amendment 1
115 (2016) and its corrigendum 1 (2019).

116 This Part 2-034 supplements or modifies the corresponding clauses in IEC 61010-1 so as to
117 convert that publication into the IEC standard: *Particular requirements for measurement*
118 *equipment for insulation resistance and test equipment for electric strength*.

119 Where a particular subclause of Part 1 is not mentioned in this Part 2-034, that subclause applies
120 as far as is reasonable. Where this part states “addition”, “modification”, “replacement”, or
121 “deletion” the relevant requirement, test specification or note in Part 1 should be adapted
122 accordingly.

123 In this standard:

124 a) the following print types are used:

- 125 – requirements: in roman type;
- 126 – NOTES: in small roman type;
- 127 – *conformity and tests: in italic type*;
- 128 – terms used throughout this standard which have been defined in Clause 3: SMALL ROMAN
129 CAPITALS;

130 b) subclauses, figures, tables and notes which are additional to those in Part 1 are numbered
131 starting from 101. Additional annexes are lettered starting from AA and additional list items
132 are lettered from aa).

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

- 136 • reconfirmed,
- 137 • withdrawn,
- 138 • replaced by a revised edition, or
- 139 • amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

140

141

CHANGES TO PREVIOUS EDITION

142 This edition includes numerous editorial changes and the following significant technical changes
143 with respect to the previous edition.

- 144 a) 1.2.1: requirements for protection against HAZARDS which could occur from reading a voltage
145 have been added to the scope.
- 146 b) Clause 2: all normative references have been dated; new normative references have been
147 added.
- 148 c) 4.3.2.5: requirements for power supply have been modified.
- 149 d) 4.3.2.6: requirements for inputs/outputs have been modified.
- 150 e) 5.1.5.101.2: minimum RATINGS for voltage of measuring TERMINALS are required.
- 151 f) 5.4.2: new information about RATINGS in documentation have been added.
- 152 g) 5.4.4: new instructions for operation have been added.
- 153 h) 5.101.1: HAZARD indicators shall be functional in NORMAL CONDITION and in SINGLE FAULT
154 CONDITION.
- 155 i) 6.6.101.1: insulating material of group I may be allowed for determination of CREEPAGE
156 DISTANCES of measuring circuit TERMINALS.
- 157 j) 6.6.101.2: CLEARANCES and CREEPAGE DISTANCES above 1 000 V a.c. and 1 500 V d.c. for
158 measuring circuit TERMINALS in Unmated position have been defined.
- 159 k) 6.6.101.3: requirements for measuring circuit TERMINALS in partially-mated position have
160 been specified.
- 161 l) 6.6.101.4: requirements for measuring circuit TERMINALS in mated position have been
162 specified.
- 163 m) 6.102 replaces 6.9.103 and has been rephrased.
- 164 n) A new 9.101 to consider the protection of measuring circuits against the spread of fire and
165 arc flash has been added. Table 102 has been replaced by Table K.101.
- 166 o) 9.101.2 is a relocation of 101.3.
- 167 p) 9.101.3 is a relocation of 101.4 It has been extended to MEASUREMENT CATEGORY II and refers
168 to IEC 61000-4-5 for tests.
- 169 q) 9.101.4 is a relocation of 16.1.102.
- 170 r) 9.101.5 is a relocation of K.103 for induced current and has numerous changes.
- 171 s) 14.101 has been removed. Consequently, 14.102 becomes 14.101.
- 172 t) 101.3 and 101.4 having been moved to 9.101.2 and 9.101.3, 101.5 becomes 101.3 with more
173 protections against HAZARD occurring from reading a voltage value.
- 174 u) K.2.1: another method for determination of CLEARANCES of secondary circuits is proposed.
- 175 v) K.3.101 is a relocation of 6.9.104.
- 176 w) Clause K.102 is a relocation with clarifications of Clause K.103.
- 177 x) Table K.103 and Table K.104 replace Table K.102, Table K.103 and Table K.104.
- 178 y) K.101.4 has been reviewed. Tables and tests for solid insulation have been modified. Table
179 K.105 replaces Table K.9.
- 180 z) Table K.106 has been replaced by Table K.101.
- 181 aa) Clause K.4 has been completely redrafted and propose now a method to determine U_t for
182 circuits which reduce TRANSIENT OVERVOLTAGES.

183

184

INTRODUCTION

185 IEC 61010-1 specifies the safety requirements that are generally applicable to all equipment
186 within its scope. For certain types of equipment, the requirements of IEC 61010-1 and its
187 amendment will be supplemented or modified by the special requirements of one, or more than
188 one, Part 2 which are read in conjunction with the Part 1 requirements.

189 This Part 2-034 specifies the safety requirements for measurement equipment for insulation
190 resistance and test equipment for electric strength which are connected to units, lines or circuits
191 for test or measurement purposes.

192 Part 2-030 specifies the safety requirements for equipment with testing or measuring circuits
193 which are connected for test or measurement purposes to devices or circuits outside the
194 measurement equipment itself.

195 Part 2-032 specifies the safety requirements for HAND-HELD and hand-manipulated current
196 sensors for measuring, detecting or injecting current, or indicating current waveforms on circuits
197 without physically opening the current path of the circuit being measured.

198 Part 2-033 specifies the safety requirements for hand-held multimeters for domestic and
199 professional use, capable of measuring MAINS voltage, intended to measure voltage and other
200 electrical quantities such as resistance or current.

201 All requirements of Part 2-030 have been included into Part 2-034. Equipment within the scopes
202 of both Part 2-030 and Part 2-034 are considered to be covered by the requirements of this
203 Part 2-034.

204 However, for equipment within the scope of Part 2-032, Part 2-033 and Part 2-034, these
205 standards are read in conjunction.

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

209 **Part 2-034: Particular requirements for measurement equipment**
 210 **for insulation resistance and test equipment for electric strength**
 211
 212
 213
 214

215 **1 Scope and object**

216 This clause of Part 1 is applicable except as follows:

217 **1.1.1 Equipment included in scope**

218 *Replace the existing text with the following:*

219 This group safety publication is primarily intended to be used as a product safety standard for
 220 the products mentioned in the scope, but shall also be used by technical committees in the
 221 preparation of their publications for products similar to those mentioned in the scope of this
 222 standard, in accordance with the principles laid down in IEC Guide 104 and ISO/IEC Guide 51.

223 This part of IEC 61010 specifies safety requirements to equipment for measuring insulation
 224 resistance and to equipment for testing electric strength which have an output voltage exceeding
 225 50 V a.c. or 120 V d.c.

226 This document also applies to combined measuring equipment which has an insulation resistance
 227 measurement function or an electric strength test measurement function.

228 **1.1.2 Equipment excluded from scope**

229 *Add the following new items to the list:*

230 aa) IEC 61557-8, *Electrical safety in low voltage distribution systems up to 1 000 V a.c. and*
 231 *1 500 V d.c. – Equipment for testing, measuring or monitoring of protective measures –*
 232 *Part 8: Insulation monitoring devices for IT systems;*

233 bb) IEC 61557-9, *Electrical safety in low voltage distribution systems up to 1 000 V a.c. and*
 234 *1 500 V d.c. – Equipment for testing, measuring or monitoring of protective measures –*
 235 *Part 9: Equipment for insulation fault location in IT systems.*

236 **1.2.1 Aspects included in scope**

237 *Replace the third paragraph with the following new paragraph:*

238 Requirements for protection against HAZARDS arising from NORMAL USE, REASONABLY FORESEEABLE
 239 MISUSE and ergonomic factors are specified in Clause 16 and Clause 101.

240 **2 Normative references**

241 This clause of Part 1 is applicable except as follows:

242 *Replace the following existing normative references:*

243 IEC 60364-4-44:2007, *Low-voltage electrical installations – Part 4-44: Protection for safety –*
 244 *Protection against voltage disturbances and electromagnetic disturbances IEC 60364-4-*
 245 *44:2007/AMD1:2015*

- 246 IEC 61010-031, *Safety requirements for electrical equipment for measurement, control and*
 247 *laboratory use – Part 031: Safety requirements for hand-held probe assemblies for electrical*
 248 *measurement and test*
- 249 IEC 61180 (all parts), *High-voltage test techniques for low-voltage equipment*
- 250 IEC 61180-1, *High-voltage test techniques for low-voltage equipment – Part 1: Definitions, test*
 251 *and procedure requirements*
- 252 IEC 61180-2, *High-voltage test techniques for low-voltage equipment – Part 2: Test equipment*
- 253 IEC 61672-1, *Electroacoustics – Sound level meters – Part 1: Specifications*
- 254 IEC 61672-2, *Electroacoustics – Sound level meters – Part 2: Pattern evaluation tests*
- 255 *with the following new normative references:*
- 256 IEC 60364-4-44:2007/AMD1:2015/AMD2:2018, *Low-voltage electrical installations – Part 4-44:*
 257 *Protection for safety – Protection against voltage disturbances and electromagnetic disturbances*
- 258 IEC 61010-031:2023¹, *Safety requirements for electrical equipment for measurement, control*
 259 *and laboratory use – Part 031: Safety requirements for hand-held and hand-manipulated probe*
 260 *assemblies for electrical test and measurement*
- 261 IEC 61180:2016, *High-voltage test techniques for low-voltage equipment – Definitions, test and*
 262 *procedure requirements, test equipment*
- 263 NOTE IEC 61180:2016 replaces everywhere IEC 61180, IEC 61180-1 and IEC 61180-2 are referenced in Part 1.
- 264 IEC 61672-1:2013, *Electroacoustics – Sound level meters – Part 1: Specifications*
- 265 IEC 61672-2:2013/AMD1:2017, *Electroacoustics – Sound level meters – Part 2: Pattern*
 266 *evaluation tests*
- 267 *Add the following new normative references:*
- 268 IEC 60479-1:2018, *Effects of current on human beings and livestock - Part 1: General aspects*
- 269 IEC 60479-2:2019, *Effects of current on human beings and livestock - Part 2: Special aspects*
- 270 IEC 60664-1:2020, *Insulation coordination for equipment within low-voltage supply systems -*
 271 *Part 1: Principles, requirements and tests*
- 272 IEC 61000-4-5:2014/AMD1:2017, *Electromagnetic compatibility (EMC) - Part 4-5: Testing and*
 273 *measurement techniques - Surge immunity test*
- 274 IEC 61010-2-032:2019, *Safety requirements for electrical equipment for measurement, control,*
 275 *and laboratory use – Part 2-032: Particular requirements for hand-held and hand-manipulated*
 276 *current sensors for electrical test and measurement*

¹ Under preparation. Stage at the time of publication: IEC 61010-031/Ed.3/CDV.

277 **3 Terms and definitions**

278 This clause of Part 1 is applicable except as follows:

279 **3.5 Safety terms**

280 *Replace the definition of 3.5.4 with the following new definition:*

281 **3.5.4**

282 **MAINS**

283 electricity supply system

284 *Add the following new term and definition:*

285 **3.5.101**

286 **MEASUREMENT CATEGORY**

287 classification of testing and measuring circuits according to the type of MAINS to which they are
288 intended to be connected

289 Note 1 to entry: MEASUREMENT CATEGORIES take into account OVERVOLTAGE CATEGORIES, short-circuit current levels,
290 the location where the test or measurement is to be made and some forms of energy limitation or transient protection
291 included in the building installation (see Annex AA for more information).

292 **4 Tests**

293 This clause of Part 1 is applicable except as follows:

294 **4.3.2.5 MAINS supply**

295 *Replace the existing title and text with:* [https://standards.iteh.ai/catalog/standards/sist/af517a3b-](https://standards.iteh.ai/catalog/standards/sist/af517a3b-b1a-4dda-bdd4-448cf3e6a585/osist-pren-iec-61010-2-034-2022)

296 **4.3.2.5 Power supply** [b1a-4dda-bdd4-448cf3e6a585/osist-pren-iec-61010-2-034-2022](https://standards.iteh.ai/catalog/standards/sist/af517a3b-b1a-4dda-bdd4-448cf3e6a585/osist-pren-iec-61010-2-034-2022)

297 The following requirements apply:

- 298 a) the MAINS supply voltage shall be between 90 % and 110 % of any RATED supply voltage for
299 which the equipment can be set or, if the equipment is RATED for a greater fluctuation, at any
300 supply voltage within the fluctuation range;
- 301 b) the MAINS frequency shall be any RATED frequency;
- 302 c) equipment for both a.c. and d.c. shall be connected to an a.c. or d.c. supply;
- 303 d) equipment powered by single-phase a.c. MAINS supply shall be connected both with normal
304 and reverse polarity;
- 305 e) if the means of connection permit reversal, battery-operated and d.c. equipment shall be
306 connected with both reverse and normal polarity.

307 **4.3.2.6 Input and output voltages**

308 *Replace the existing title and text with:*

309 **4.3.2.6 Input and output voltages or currents**

310 Input and output voltages or currents, including floating voltages but excluding the MAINS supply
311 voltage, shall be set to any voltage or current within their RATED range, in normal and reverse
312 polarity if possible.

313 *Add the following new subclause:*

314 **4.4.2.15 Surge protective devices**

315 Surge protective devices shall be short-circuited and open-circuited.

316 **5 Marking and documentation**

317 *Replace the existing title with:*

318 **5 Marking, documentation and HAZARD indicator**

319 This clause of Part 1 is applicable except as follows:

320 **5.1.5 TERMINALS, connections and operating devices**

321 *Add the following new subclause:*

322 **5.1.5.101 Measuring circuit TERMINALS**

323 **5.1.5.101.1 General**

324 Some measuring circuit TERMINALS for the equipment within the scope of this standard also serve
325 as output TERMINALS.

326 Except as permitted in 5.1.5.101.5:

- 327 a) the value of the RATED voltage to earth of measuring circuit TERMINALS shall be marked, and
328 b) the value of the RATED voltage of the RATED current, as applicable, of each pair or set of
329 measuring circuit TERMINALS that are intended to be used together shall be marked, and
330 c) the pertinent MEASUREMENT CATEGORY for each individual pair, or set of measuring circuit
331 TERMINALS, or symbol 14 of Table 1 shall be marked as specified in 5.1.5.101.2 and
332 5.1.5.101.3, if applicable.

333 Measuring circuit TERMINALS are usually arranged in pairs or sets. Each pair or set of TERMINALS
334 may have a RATED voltage or a RATED current, or both, within that set, and each individual
335 TERMINAL may have a RATED voltage to earth. For some equipment, the RATED voltage between
336 TERMINALS may be different from the RATED voltage to earth. Markings shall be clear to avoid
337 misunderstanding.

338 Symbol 14 of Table 1 shall be marked if current measuring TERMINALS are not intended for
339 connection to current transformers without internal protection (see 101.2).

340 Markings shall be placed adjacent to the TERMINALS. However, if there is insufficient space (as in
341 multi-input equipment), the marking may be on the RATING plate or scale plate, or the TERMINAL
342 may be marked with symbol 14 of Table 1.

343 For any set of measuring circuit TERMINALS, symbol 14 of Table 1 does not need to be marked
344 more than once, if it is close to the TERMINALS.

345 *Conformity is checked by inspection and, if applicable, as specified in 5.1.5.101.2, 5.1.5.101.3*
346 *and 5.1.5.101.4, taking the exceptions in 5.1.5.101.5 into account.*

347 **5.1.5.101.2 Measuring circuit TERMINALS RATED for MEASUREMENT CATEGORIES**

348 The relevant MEASUREMENT CATEGORY shall be marked for TERMINALS of measuring circuits RATED
349 for MEASUREMENT CATEGORIES. The MEASUREMENT CATEGORY markings shall be "CAT II", "CAT III"
350 or "CAT IV" as applicable.

351 The RATED voltage of the TERMINALS of a measuring circuit intended for MAINS voltage
352 measurements shall be equal to or higher than their RATED a.c. line-to-neutral or d.c. voltage.

353 NOTE CLEARANCES are specified for a nominal a.c. r.m.s. line-to-neutral or d.c. voltage of MAINS being measured (see
354 Table K.102 and Annex I). Neutral is considered to be earthed.

355 Marking those TERMINALS with more than one type of MEASUREMENT CATEGORY and its RATED
356 voltage is permissible.

357 *Conformity is checked by inspection.*

358 **5.1.5.101.3 Measuring circuit TERMINALS RATED for connection to voltages above the** 359 **levels of 6.3.1**

360 Symbol 14 of Table 1 shall be marked for measuring circuit TERMINALS RATED for connection to
361 voltages above the levels of 6.3.1, but that are not RATED for MEASUREMENT CATEGORIES (see also
362 5.4.1 bb)).

363 *Conformity is checked by inspection.*

364 **5.1.5.101.4 HAZARDOUS LIVE output TERMINALS**

365 Output TERMINALS of measurement equipment for insulation resistance and test equipment for
366 electric strength which can be HAZARDOUS LIVE shall be marked with symbol 12 of Table 1 in close
367 proximity to those TERMINALS.

368 *Conformity is checked by inspection.*

369 **5.1.5.101.5 Measuring circuit TERMINALS which are permanently connected, dedicated or** 370 **for non-HAZARDOUS LIVE voltages**

371 Measuring circuit TERMINALS do not need to be marked if:

- 372 a) they are intended to be permanently connected and not ACCESSIBLE (see 5.4.3 aa) and bb)),
373 or
374 b) they are dedicated only for connection to specific TERMINALS of other equipment, or
375 c) it is obvious from other indications that the RATED voltage does not exceed the levels of 6.3.1.

376 NOTE Examples of acceptable indications that the inputs are intended to do not exceed the levels of 6.3.1
377 include:

- 378 – the full scale deflection marking of a single-range indicating voltmeter or ammeter or maximum marking of a
379 multi-range multimeter;
380 – the maximum range marking of a voltage selector switch;
381 – a marked voltage or power RATING expressed in dB, mW or W, where the equivalent value, as explained in
382 the documentation, does not exceed 30 V a.c.

383 *Conformity is checked by inspection.*

384 **5.4.1 GENERAL**

385 *Add the following two new items to the list and a new paragraph at the end of the list:*

- 386 aa) information about each relevant MEASUREMENT CATEGORY if the measuring circuit is RATED
387 for MEASUREMENT CATEGORIES (see 5.1.5.101.2);
388 bb) for measuring circuits that are not RATED for MEASUREMENT CATEGORIES, but that could be
389 misused by connection to such circuits, a warning not to use the equipment for
390 measurements on MAINS, and a detailed RATING including TRANSIENT OVERVOLTAGES (see
391 AA.2.4 for more information).

392 Some equipment may have multiple MEASUREMENT CATEGORY RATINGS for the same measuring
 393 circuit. For such equipment, the documentation shall clearly identify the MEASUREMENT
 394 CATEGORIES where the equipment is intended to be used and where it shall not be used.

395 **5.4.2 Equipment RATINGS**

396 *Add the following three new items to the list:*

- 397 aa) the output voltage or voltage range, frequency and current RATING;
- 398 bb) for insulation resistance measurement equipment, the RATED line or unit capacitance as
 399 required by 6.102;
- 400 cc) for insulation resistance measurement equipment intended for use in power station or
 401 substation, the RATED induced current.

402 **5.4.3 Equipment installation**

403 *Add the following two new items to the list:*

- 404 aa) for measuring circuit TERMINALS intended for permanent connection and that are RATED for
 405 MEASUREMENT CATEGORIES, information regarding the MEASUREMENT CATEGORY, RATED
 406 voltages or RATED currents as applicable (see 5.1.5.101.2);
- 407 bb) for measuring circuit TERMINALS intended for permanent connection and that are not RATED
 408 for MEASUREMENT CATEGORIES, information regarding the RATED voltages, RATED currents,
 409 and RATED TRANSIENT OVERVOLTAGES as applicable (see 5.1.5.101.5).

410 **5.4.4 Equipment operation**

411 *Add the following three new items to the list:*

- 412 aa) instructions for a daily or routine check to ensure the correct functionality of the equipment
 413 before use when one HAZARD indicator has been considered to be sufficient (see 5.101.1);
- 414 bb) when performing an a.c. voltage test, instructions to warn the OPERATOR that a hazardous
 415 residual voltage can be present after the interruption of the test if the capacitance value of
 416 the line or unit under test exceeds the maximum RATED line or unit capacitance value (see
 417 6.102.3);
- 418 cc) when an automatic operation to energise the equipment outputs is provided, a warning to
 419 keep distance from the unit under test.

420 *Add the following new subclause:*

421 **5.101 HAZARD indicator**

422 **5.101.1 General**

423 At least one of the following HAZARD indicators shall be provided and functional in NORMAL
 424 CONDITION and in SINGLE FAULT CONDITION of the indicator. One indicator is considered to be
 425 sufficient if the manufacturer's instructions or markings require a daily or routine check to ensure
 426 the correct functionality of the equipment before use.

427 a) Indicator light

428 Where an indicator light is provided, it shall illuminate or flash when there are HAZARDOUS
 429 LIVE voltages present on the TERMINALS. It may start illuminating or flashing at any point the
 430 output is activated.

431 The indicator light shall be red in colour.

432 If the indicator light flashes, the frequency shall be 50 cycles per minute to 300 cycles per
 433 minute. The duty cycle shall be at least 40 %.

434 *Conformity is checked by inspection and measurement.*

435 b) Variable visible indicator