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Appliance couplers for household and similar general purposes - Part 1: General requirements

Gerätesteckvorrichtungen für den Hausgebrauch und ähnliche allgemeine Zwecke –Teil 1: Allgemeine Anforderungen

Connecteurs pour usages domestiques et usages généraux analogues - Partie 1: Exigences générales

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ICS:

29.120.30 Vtiči, vtičnice, spojke Plugs, socket-outlets, couplers

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23G/447/CDV

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IEC SC 23G : APPLIANCE COUPLERS	
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OF INTEREST TO THE FOLLOWING COMMITTEES: SC 34D, SC 48B, TC 61, TC 108	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	
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TITLE:

Appliance couplers for household and similar general purposes - Part 1: General requirements

PROPOSED STABILITY DATE: 2020

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**APPLIANCE COUPLERS FOR HOUSEHOLD
AND SIMILAR GENERAL PURPOSES –****Part 1: General requirements****FOREWORD**

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244

245 International Standard IEC 60320-1 has been prepared by subcommittee 23G: Appliance
246 couplers, of IEC technical committee 23: Electrical accessories.

247 This fourth edition constitutes a technical revision.

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

250 a) Introduction of necessary tolerances throughout the standard

251 b) The heating test from edition 2 is reintroduced in clause 18.2

252 c) Temperature rise added for plug connectors in clause 21

253 d) Change for better readability in 23.3

254 e) Updated lateral pull test in 23.6 for connectors/plug connectors with separate front parts

255 f) Revision of clause 24.1 for ball pressure test

256 g) Clause 27 for glow wire test is updated

257 h) Revision of Annex C for test sequences

258 i) Additional Annex E for additional tests and requirements for appliance couplers intended
259 to be used in ambient temperatures above +35 °C

260

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

262 A list of all the parts in the IEC 60320 series, under the general title *Appliance couplers for*
263 *household and similar general purposes*, can be found on the IEC website.

264 Part 1 is to be used in conjunction with the following parts of the IEC 60320 series, if
265 applicable.

266 IEC 60320-2-1, *Appliance couplers for household and similar general purposes – Part 2-1:*
267 *Sewing machine couplers*

268 IEC 60320-2-3, *Appliance coupler for household and similar general purposes – Part 2-3:*
269 *Appliance coupler with a degree of protection higher than IPX0*

270 IEC 60320-2-4, *Appliance couplers for household and similar general purposes – Part 2-4:*
271 *Couplers dependent on appliance weight for engagement*

272 IEC 60320-3, *Appliance couplers for household and similar general purposes – Part 3:*
273 *Standard sheets and gauges*

274 NOTE If these standards are referring to another edition of IEC 60320-1, that edition is applicable.

275 The committee has decided that the contents of the base publication and its amendment will
276 remain unchanged until the stability date indicated on the IEC web site under
277 "http://webstore.iec.ch" in the data related to the specific publication. At this date, the
278 publication will be

- 279 • reconfirmed,
- 280 • withdrawn,
- 281 • replaced by a revised edition, or
- 282 • amended.

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284

APPLIANCE COUPLERS FOR HOUSEHOLD AND SIMILAR GENERAL PURPOSES –

Part 1: General requirements

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1 Scope

293 This part of IEC 60320 sets the general requirements for appliance couplers for two poles and
294 two poles with earth contact and for the connection of electrical devices for household and
295 similar onto the mains supply.

296 This part of IEC 60320 is also valid for appliance inlets/appliance outlets integrated or
297 incorporated in appliances.

298 The rated voltage does not exceed 250 V (a.c.) and the rated current does not exceed 16 A.

299 Appliance couplers complying with this part of IEC 60320 are suitable for normal use at
300 ambient temperatures not normally exceeding +40 °C, but their average over a period of 24 h
301 does not exceed +35 °C, with a lower limit of the ambient air temperature of –5 °C.

302 Annex E provides test requirements for derating the operating current of an accessory when
303 used in ambient temperatures above +35 °C up to +90 °C.

304 Appliance couplers are not suitable for

- 305 – use in place of plug and socket-outlet systems according to IEC 60884-1.
- 306 – use in place of devices for connecting luminaires (DCLs) according to IEC 61995 or
- 307 luminaire supporting couplers (LSCs).

308 NOTE Requirements for d.c. are under consideration.

2 Normative references

310 The following documents, in whole or in part, are normatively referenced in this document and
311 are indispensable for its application. For dated references, only the edition cited applies. For
312 undated references, the latest edition of the referenced document (including any
313 amendments) applies.

314 IEC 60068-2-31, *Environmental testing – Part 2-31: Tests – Test Ec: Rough handling shocks,*
315 *primarily for equipment-type specimens*

316 IEC 60068-2-60, *Environmental testing – Part 2-60: Tests – Test Ke: Flowing mixed gas*
317 *corrosion test*

318 IEC 60068-2-75, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

319 IEC 60112, *Method for the determination of the proof and the comparative tracking indices of*
320 *solid insulating materials*

321 IEC 60227 (all parts), *Polyvinyl chloride insulated cables of rated voltages up to and including*
322 *450/750 V*

323 IEC 60245 (all parts), *Rubber insulated cables – Rated voltages up to and including*
324 *450/750 V*

325 IEC 60320 (all parts), *Appliance couplers for household and similar general purposes*

- 326 IEC 60320-3:2014, *Appliance couplers for household and similar general purposes – Part 3:*
327 *Standard sheets and gauges*
- 328 IEC 60417, *Graphical symbols for use on equipment* (available from: [http://www.graphical-](http://www.graphical-symbols.info/equipment)
329 [symbols.info/equipment](http://www.graphical-symbols.info/equipment))
- 330 IEC 60664-1:2020, *Insulation coordination for equipment within low voltage systems – Part 1:*
331 *Principles, requirements and tests*
- 332 IEC 60695-2-11:2014, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods –*
333 *Glow-wire flammability test method for end-products (GWEPT)*
- 334 IEC 60695-10-2:2014, *Fire hazard testing – Part 10-2: Abnormal heat – Ball pressure test*
335 *method*
- 336 IEC 60730-2-11:2019, *Automatic electrical controls for household and similar use – Part 2-11:*
337 *Particular requirements for energy regulators*
- 338 IEC 60999-1:1999, *Connecting devices – Electrical copper conductors – Safety requirements*
339 *for screw-type and screwless-type clamping units – Part 1: General requirements and*
340 *particular requirements for clamping units for conductors from 0,2 mm² up to 35 mm²*
341 *(included)*
- 342 IEC 61032:1997, *Protection of persons and equipment by enclosures – Probes for verification*
- 343 IEC 61058 (all parts), *Switches for appliances*

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344 3 Terms and definitions (standards.iteh.ai)

345 For the purposes of this document, the following terms and definitions apply.

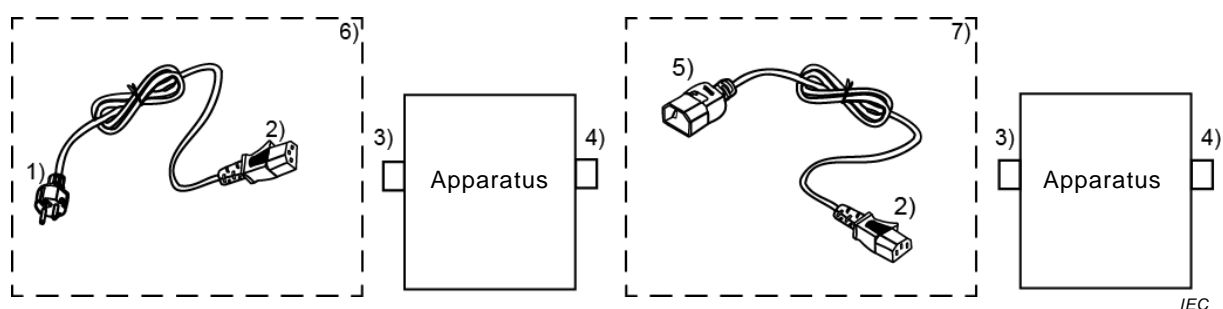
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346 3.1

347 appliance coupler

348 means enabling the connection and disconnection of an appliance or equipment to the supply

349 SEE: Figure 1.



350

1 Plug

2 Connector (see 3.1.1)

3 Appliance inlet (see 3.1.2)

4 Appliance outlet (see 3.2.2)

5 Plug connector (see 3.2.1)

6 Cord set (see 3.5)

7 Interconnection cord set (see 3.6)

351

352 **Figure 1 – Intended use of appliance couplers**

353 3.1.1

354 connector

355 part of the appliance coupler integral with, or intended to be attached to, one cord connected
356 to the supply

357 SEE: Figure 1.

358 [SOURCE: IEC 60050-442:1998, 442-07-02]

359 3.1.2

360 appliance inlet

361 part of the appliance coupler integrated as a part of an appliance or incorporated as a
362 separate part in the appliance or equipment or intended to be fixed to it

363 SEE: Figure 1.

364 3.2

365 interconnection coupler

366 appliance coupler enabling the connection and disconnection of an appliance or equipment to
367 a cord leading to another appliance or equipment

368 SEE: Figure 1.

369 Note 1 to entry: An interconnection coupler is a type of appliance coupler.

370 3.2.1

371 plug connector

372 part of the interconnection coupler integral with or intended to be attached to one cord

373 SEE: Figure 1.

374 [SOURCE: IEC 60050-442:1998, 442-07-09]

375 3.2.2

376 appliance outlet

377 part of the interconnection coupler which is the part integrated or incorporated in the
378 appliance or equipment or intended to be fixed to it and from which the supply is obtained

379 SEE: Figure 1. <https://standards.iteh.ai/catalog/standards/sist/c6f597ab-2c56-4e9c-9b10-683edd6666e5/osist-pren-iec-60320-1-2020>

380 [SOURCE: IEC 60050-442:1998, 442-07-08]

381 3.3

382 rewirable accessory

383 accessory so constructed that a cable or cord can be replaced

384 3.4

385 non-rewirable accessory

386 accessory so constructed that it forms a complete unit with flexible supply cable or cord after
387 connection and assembly by the manufacturer of the accessory

388 3.5

389 cord set

390 assembly consisting of one cable or cord fitted with one non-rewirable plug and one non-
391 rewirable connector, intended for the connection of an electrical appliance or equipment to the
392 electrical supply

393 SEE: Figure 1.

394 3.6

395 interconnection cord set

396 assembly consisting of one cable or cord fitted with one non-rewirable plug connector and one
397 non-rewirable connector, intended for the interconnection between two electrical appliances

398 SEE: Figure 1

399 [SOURCE: IEC 60050-442:1998, 442-07-06, modified – “a” has been changed to “one” in two
400 places and a reference to Figure 1 has been added.]

- 401 **3.7**
402 **integrated appliance coupler**
403 appliance coupler which is formed by the housing or enclosure of the appliance or equipment
404 and cannot be tested separately
- 405 **3.8**
406 **incorporated appliance coupler**
407 appliance coupler built in or fixed to an appliance or equipment, but that can be tested
408 separately
- 409 **3.9**
410 **base of a pin**
411 part of the pin where it protrudes from the engagement face
- 412 **3.10**
413 **retaining device**
414 mechanical provision/arrangement which holds a connector in proper engagement with a
415 corresponding appliance inlet and prevents its unintentional withdrawal
- 416 **3.11**
417 **rated voltage**
418 voltage assigned by the manufacturer for a specified operating condition of an accessory
- 419 [SOURCE: IEC 60050-442:1998, 442-01-03]
- 420 **3.12**
421 **rated current**
422 current assigned by the manufacturer for a specified operating condition of an accessory
423 [SOURCE: IEC 60050-442:1998, 442-01-02]
- 424 **3.13**
425 **terminal**
426 part of an accessory to which a conductor is attached, providing a re-usable connection
427 [SOURCE: IEC 60050-442:1998, 442-06-05]
- 428 **3.14**
429 **termination**
430 part of an accessory to which a conductor is permanently attached
431 [SOURCE: IEC 60050-442:1998, 442-06-06]
- 432 **3.15**
433 **thread-cutting screw**
434 screw having an interrupted thread which, by screwing in, makes a thread by removing
435 material from the cavity
436 [SOURCE: IEC 60050-442:1998, 442-06-03]
- 437 **3.16**
438 **type test**
439 test of one or more devices made to a certain design to show that the design meets certain
440 requirements
441 [SOURCE: IEC 60050-811:1991, 811-10-04]
- 442 **3.17**
443 **routine test**
444 test to which each individual device is subjected during and/or after manufacture to ascertain
445 whether it complies with certain criteria

446 [SOURCE: IEC 60050-811:1991, 811-10-05]

447 **4 General requirements**

448 Appliance couplers shall be so designed and constructed that in normal use their performance
449 is reliable and without danger to the user or the surroundings.

450 Non-standardized appliance couplers shall comply with all safety requirements of this
451 standard and shall be tested together with its counterpart.

452 Compliance is checked by carrying out all the tests specified.

453 Appliance couplers according to this standard are not intended to be used in portable
454 accessories covered by IEC TC 23.

455 **5 General notes on tests**

456 **5.1 General**

457 Tests shall be made to prove compliance with the requirements laid down in this standard,
458 where applicable.

459 Tests are as follows:

- 460 – Type tests shall be made on representative samples of each accessory.
- 461 – Routine tests shall be conducted by the manufacturer and made on each accessory.
- 462 – Unless otherwise specified, the tests are carried out in the order of the clauses.
- 463 – Unless otherwise specified, appliance couplers are tested with their counterparts,
464 complying with this standard.
- 465 – Appliance inlets and appliance outlets integrated or incorporated in an appliance or
466 equipment are tested under the conditions of use of the equipment, the number of test
467 samples then being the same as the number of test samples of equipment required
468 according to the relevant standard for the equipment.
- 469 – Appliance couplers are considered to comply with this standard if there is not more than
470 one failure of one test sample in one of the tests. If one test sample fails in a test, that test
471 and those preceding which may have influenced the result of that test are repeated on
472 another set of test samples, all of which shall then comply with the repeated tests.

473 Subclauses 5.2 to 5.3 are applicable to type tests. For number of samples and test
474 sequences, see Annex C.

475 **5.2 Test samples**

476 Unless otherwise specified, the test samples are tested as delivered and under normal
477 conditions assembled and installed as in normal use according to the manufacturer's
478 instructions at an ambient temperature of $20\text{ °C} \pm 5\text{ °C}$; they are tested with a.c. at 50 Hz or
479 60 Hz. Tests shall not commence earlier than 168 h after manufacture.

480 Non-rewirable connectors/plug connectors, other than those forming part of a cord set, shall
481 be submitted with a cord at least 1 m long.

482 **5.3 Failures**

483 In general, only the test which caused the failure need be repeated unless

- 484 a) a failure occurs to one of the three test samples when tested in accordance with Clauses
485 19, 20 or 21, in which case the tests are repeated from Clause 16 onwards; or
- 486 b) a failure occurs to one of the three test samples when tested in accordance with Clauses
487 22 or 23 (except 22.3), in which case the tests are repeated from Clause 18 onwards.

488 The applicant may submit, together with the first set of test samples, the additional set which
489 may be wanted should one test sample fail. The testing station will then, without further
490 request, test the additional test samples and will only reject if a further failure occurs. If the
491 additional set of test samples is not submitted at the same time, a failure of one test sample
492 will entail a rejection.

493 **5.4 Routine tests**

494 Routine tests are specified in Annex B.

495 **6 Standard ratings**

496 **6.1** The maximum permitted rated voltage is 250 V.

497 **6.2** The maximum permitted rated current is 16 A.

498 Preferred rated currents for appliance couplers are 0,2 A, 2,5 A, 6 A, 10 A and 16 A.

499 NOTE For details of standard type ratings refer to IEC 60320-3.

500 **7 Classification of appliance couplers**

501 **7.1** According to maximum pin temperature at the base of the pins of the corresponding
502 appliance inlet or the socket contacts of the corresponding appliance outlet:

- 503 a) appliance couplers for cold conditions, pin temperature not exceeding 70 °C;
504 b) appliance couplers for hot conditions, pin temperature not exceeding 120 °C;
505 c) appliance couplers for very hot conditions, pin temperature not exceeding 155 °C.

506 NOTE Appliance couplers for hot conditions can also be used under cold conditions; appliance couplers for very
507 hot conditions can also be used under cold or hot conditions.

508 **7.2** According to the type of equipment to be connected:

- 509 a) appliance couplers for class I equipment;
510 b) appliance couplers for class II equipment.

511 NOTE 1 For a description of the classes, see IEC 61140.

512 NOTE 2 Appliance couplers for 0,2 A are intended only for the connection of small hand-held class II equipment,
513 if allowed by the relevant standard for the equipment.

514 **7.3** Connectors/plug connectors according to the method of connecting the cord:

- 515 a) rewirable;
516 b) non-rewirable.

517 **7.4** According to the ambient temperature

- 518 a) Appliance couplers for ambient temperatures up to +35 °C
519 b) Appliance couplers for ambient temperatures up to +90 °C. This classification also
520 requires a classification according to 7.1 b) or 7.1 c).

521 **8 Marking**

522 **8.1 General**

523 Appliance couplers shall be marked with:

- 524 – name, trade mark or identification mark of the manufacturer or responsible vendor;
525 – type reference.

526 NOTE The type reference can be a catalogue number.