

Cable management systems — Cable ties for electrical installations

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National foreword

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Cable management systems – Cable ties for electrical installations



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CABLE MANAGEMENT SYSTEMS – CABLE TIES FOR ELECTRICAL INSTALLATIONS

1 Scope

This International Standard specifies requirements for metallic, non-metallic and composite cable ties and their associated fixing devices used for the management and support of wiring systems in electrical installations.

Cable ties and associated fixing devices may also be suitable for other applications and where so used, regard should be taken of any additional requirements.

This standard does not contain requirements that evaluate any electrical insulation properties of the cable tie or mechanical protection of the cables provided by the cable tie.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60068-2-6:1995, *Environmental Testing – Part 2: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-52:1996, *Environmental testing – Part 2: Tests – Test Kb: Salt mist, cyclic (sodium, chloride solution)*

IEC 60695-11-5:2004, *Fire hazard testing – Part 11-5: Test flames – Needle flame test method – Apparatus, confirmatory test arrangement and guidance*

IEC 60216-4-1, *Electrical insulating materials – Thermal endurance properties – Part 4-1: Ageing ovens – Single-chamber ovens*

ISO 4892-2:1994, *Plastics – Methods of exposure to laboratory light sources – Part 2: Xenon-arc lamps¹⁾*

ISO 4892-4:1994, *Plastics – Methods of exposure to laboratory light sources – Part 4: Open-flame carbon-arc lamps²⁾*

ISO 6988:1985, *Metallic and other non organic coatings – Sulphur dioxide test with general condensation of moisture*

¹⁾ This publication has been withdrawn and replaced by a 2006 edition.

²⁾ This publication has been withdrawn and replaced by a 2004 edition.

3 Terms and definitions

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

3.1

cable tie

band or length of material, employing a locking device, used for bundling or tying groups of cables together, securing and/or supporting the cables

NOTE Type 1 and Type 2 cable ties are classified in 6.2.1 and 6.2.2.

3.2

fixing device

component (such as a block or bracket) specifically designed to secure the cable tie to a mounting surface

NOTE A cable tie and the fixing device may be manufactured as an integrated component.

3.3

metallic component

component which consists of metal only

3.4

non-metallic component

component which consists of non-metallic material only

3.5

composite component

component comprising both metallic and non-metallic materials

3.6

environmental influence

effect of corrosive or polluting substances or solar radiation etc.

3.7

loop tensile strength

reference mechanical characteristic of a cable tie with its locking mechanism engaged

3.8

locking device

feature of a cable tie for fixing it in a closed position

4 General requirements

A cable tie and a fixing device shall withstand the stresses likely to occur during recommended installation practice and perform under the conditions of classifications in Clause 6 as declared by the manufacturer.

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

5 General notes on tests

5.1 Tests according to this standard are type tests. Unless otherwise specified, tests are carried out with the cable ties and their associated fixing devices, where available, installed as in normal use according to the manufacturer's instructions.

NOTE For guidance in determining product types and sample sets, a family of cable ties or fixing devices having material, construction characteristics, and classifications according to Clause 6, in common, are considered of the same product type. Examples for consideration are material colours, or variable lengths of a cable tie of otherwise like construction.

The sample sets selected for testing from each product type should represent the extremes of the range (example: shortest and longest), and the minimum performance level obtained for either extreme should be determined to be representative of the entire range.

Consideration should be given to minor construction variations that can be determined by inspection to have no affect on performance, when determining product types.

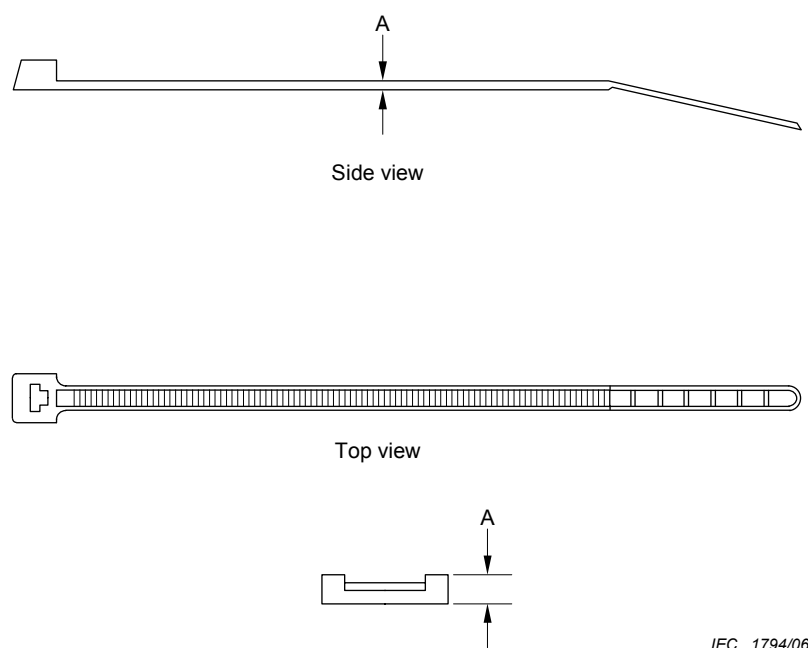
5.2 Unless otherwise specified, tests on non-metallic and composite components shall commence when the samples have been removed from their packaging and then stabilised at a temperature of $(23 \pm 5)^{\circ}\text{C}$ and at a relative humidity of $(50 \pm 5)\%$, for a period as indicated in Table 1.

NOTE This stabilisation intends to achieve equilibrium of moisture content for all samples before and after further conditioning and testing. Stabilisation time may be reduced if the product's moisture equilibrium is validated by a calibrated moisture analyzer device. Stabilisation time determined by this method may be different for as-received samples and following each required further conditioning.

Table 1 – Stabilisation time for samples

Reference thickness (RT) of the device mm	Stabilization time days
$RT \leq 1,2$	7 ± 1
$1,2 < RT \leq 1,4$	$21 \begin{smallmatrix} 0 \\ -7 \end{smallmatrix}$
$1,4 < RT$	$35 \begin{smallmatrix} 0 \\ -7 \end{smallmatrix}$

The reference thickness of a cable tie is measured at the midpoint of the strap. The reference thickness of a fixing device shall be the smallest cross section in the area that interfaces with the cable tie or as declared by the manufacturer. See Figure 1.

**Key**

A Reference thickness of cable tie

Figure 1 – Reference thickness for cable ties

5.3 Unless otherwise specified, the tests shall be carried out at an ambient temperature of $(23 \pm 5) ^\circ\text{C}$ and with a relative humidity of between 40 % and 60 %.

5.4 Unless otherwise specified, three new samples are submitted to the tests and the requirements are satisfied if all the tests are met. If only one of the samples does not satisfy a test due to an assembly or manufacturing fault, that test and any preceding one which may have influenced the results of the test shall be repeated and also the tests which follow shall be made in the required sequence on another full set of samples, all of which shall comply with the requirements.

NOTE The applicant, when submitting the first set of samples, may also submit an additional set of samples which may be necessary should one sample fail. The test station will then without further request test the additional set of samples and will reject only if a further failure occurs.

If the additional set of samples is not submitted at the same time, a failure of one sample will entail a rejection.

5.5 When toxic or hazardous processes are used, due regard shall be taken of the safety of persons within the test area.

5.6 Unless otherwise specified, the cross-head speed of a tensile machine used during the tests shall be $(25 \pm 2,5) \text{ mm/min}$.

5.7 Where required for heat ageing, a full draft circulating-air oven as specified in IEC 60216-4-1 shall be used. A portion of the air shall be allowed to re-circulate and a substantial amount of air shall be admitted continuously to maintain the normal air content surrounding the samples. The oven shall be adjusted to achieve more than 5 complete fresh-air changes per hour.

5.8 A fixing device that is integral to a cable tie shall comply with the requirements for both the fixing device and the cable tie.

5.9 Unless otherwise specified, when conducting the tests on cable ties in Clause 9, the samples shall be installed according to the manufacturer's instructions on a steel or aluminium mandrel which has a diameter A:

- equal to (20 ± 2) mm for cable ties with a maximum declared diameter of 38 mm or less; or
- equal to (38 ± 2) mm for cable ties with a maximum declared diameter greater than 38 mm.

The width B of the mandrel shall be at least 5 mm greater than the maximum width of the cable tie as shown in Figure 2.

If the cable tie is too short to meet the diameter of the test mandrel, then a test mandrel that has the maximum diameter as declared by the manufacturer shall be used.

If the minimum diameter of the cable tie is greater than the diameter of the test mandrel, then a test mandrel that has the minimum diameter as declared by the manufacturer shall be used.

For the loop tensile strength tests, the mandrel shall be split in two equal parts and the cable ties positioned as shown in Figure 2.

The excess end (tail) of the cable tie is permitted to be cut off after assembly, except in the tests where marking is required for the purpose of measurement (see 9.6).