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Connecting devices - Flat quick-connect terminations for electrical copper  
conductors - Safety requirements (IEC 61210:1993)

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English version

Connecting devices  
Flat quick-connect terminations for electrical copper  
conductors  
Safety requirements

(IEC 1210 : 1993, modified)

Dispositifs de connexion

Bornes plates à connexion rapide pour  
conducteurs électriques en cuivre

Prescriptions de sécurité  
(CEI 1210 : 1993, modifiée)

Verbindungsmaterial

Flachsteckverbindungen für elektrische  
Kupferleiter

Sicherheitsanforderungen  
(IEC 1210 : 1993, modifiziert)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

## CENELEC

European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B-1050 Brussels

## Foreword

The text of the International Standard IEC 1210 : 1993, prepared by SC 23F, Connecting devices, of IEC TC 23, Electrical accessories, together with common modifications prepared by Reporting Secretariat SR 23F, was submitted to the formal vote and was approved by CENELEC as EN 61210 on 1994-12-06.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1995-12-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1995-12-01

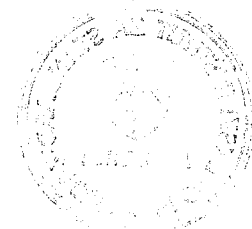
For products which have complied with the relevant national standard before 1995-12-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 2000-12-01.

Annexes designated 'normative' are part of the body of the standard. Annexes designated 'informative' are given for information only. In this standard, annex ZA is normative and annex A is informative. Annex ZA has been added by CENELEC.

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## CONNECTING DEVICES – FLAT QUICK-CONNECT TERMINATIONS FOR ELECTRICAL COPPER CONDUCTORS – SAFETY REQUIREMENTS

### 1 Scope

This International Standard applies to flat quick-connect terminations consisting of a male tab of size 2,8, 4,8, 6,3 or 9,5 mm and a mating female connector for use as either an incorporated or an integrated part of an equipment or of a component, or as a separate entity, for connecting electrical copper conductors according to the manufacturer's instructions.

Said electrical copper conductors may be flexible or rigid stranded, having a cross-sectional area up to and including 6 mm<sup>2</sup> or rigid solid having a cross-sectional area up to and including 2,5 mm<sup>2</sup>.

The rated voltage by which electrical energy is utilized, shall not exceed 1 000 V a.c. with a frequency up to and including 1 000 Hz, and 500 V d.c. and having the temperature limits applicable to materials used within this standard.

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Requirements for insulated male tabs and female connectors are under consideration.

#### NOTES

- 1 This standard, where applicable, may be used for conductors made of material other than copper, but not including aluminium.
- 2 For reasons of safety, it is recommended that flat quick-connect terminations beyond the scope of this standard should not be interchangeable with those of this standard.
- 3 This standard does not apply to female connectors with positive locking means.
- 4 The flat quick-connect terminations covered by this standard are not intended to be disconnected by pulling the cable.

This standard does not apply to flat quick-connect terminations for data and signal circuits.

### 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 68-1: 1988, *Environmental testing – Part 1: General and guidance*

IEC 760: 1989, *Flat, quick-connect terminations*

ISO 1456: 1988, *Metallic coatings – Electrodeposited coatings of nickel plus chromium and of copper plus nickel plus chromium*

ISO 2081: 1986, *Metallic coatings – Electroplated coatings of zinc on iron or steel*

ISO 2093: 1986, *Electroplated coatings of tin – Specification and test methods*

### 3 Definitions

For the purpose of this International Standard the following definitions apply:

**3.1 flat quick-connect termination:** Electrical connection consisting of a male tab and a female connector which can be inserted and withdrawn with or without the use of a tool.

**3.2 male tab:** That portion of a quick-connect termination which receives the female connector.

**3.3 male test tab:** Male tab manufactured to close tolerances with specific material without coating for the purpose of conducting mechanical tests on female connectors taken from the production line.

**NOTE** In most cases a male tab from the production line (with or without coating) may be also suitable.

**3.4 female connector:** That portion of a quick-connect termination which is pushed onto the male tab.

**3.5 detent:** Dimple (depression) or hole in the male tab which engages a raised portion on the female connector to provide a latch for the mating parts.

**3.6 maximum permissible temperature (maximum service temperature):** Highest temperature which the quick-connect termination is allowed to attain in normal use as a result of ambient temperature, induced heat and heat caused by the connector itself.

### 4 General

Flat quick-connect terminations shall be so designed and constructed that in normal use their performance is reliable and without danger to the user or surroundings.

*Compliance is checked by carrying out all tests specified.*

### 5 General requirements for tests

**5.1 Tests according to this standard are type tests.**

5.2 Unless otherwise specified, the samples are tested as delivered and connected as for normal use, at an ambient temperature of  $(20 \pm 5)$  °C.

In case of doubt, (for example between test laboratories, or between manufacturer and test laboratory) IEC 68-1 applies.

5.3 If samples are not delivered with conductors already assembled, the conductors shall be connected to the associated parts in accordance with the manufacturer's instructions and using an appropriate tool.

5.4 The tests are carried out on each set in the sequence as specified in table 1, according to the most onerous combination of the tab and the female connector as declared and documented in item 5 of 7.2.

Table 1 – Test sequences and sets of samples

Sets	Number of new samples per set		Clauses and subclauses	Test sequence
	Tabs	Female connectors		
A	12 (6 double ended tabs)	24	8.2 9.3 9.4 9.5	Measurement of dimensions Temperature-rise test Electrical overload test Elevated temperature test
B	10 (male test tabs)	10	8.2 9.1 9.6	Measurement of dimensions Insertion and withdrawal force Tensile strength test for crimped connections
C (in-line tabs)	10		8.2 9.6	Measurement of dimensions Tensile strength test for crimped connections
D (integral tabs and female connectors)	12	12	8.2 9.2	Measurement of dimensions Mechanical overload force
E (integral female connectors)	12 (male test tabs)	12	8.2 9.1 9.2	Measurement of dimensions Insertion/withdrawal force Mechanical overload force

Set A These tests have to confirm the electrical performance of the female connectors.

Set B These tests have to confirm the mechanical performance of the female connectors.

Set B + C The Tensile Strength Test has to confirm the lack of undue heat emission by the crimp connection of the tabs.

Set D + E These tests only apply to devices with incorporated and integrated tabs or female connectors. The tests have to confirm the dimensional and mechanical requirements of tabs and female connectors forming part of a device.

The necessary further requirements (i.e. the admissible max. temperatures, nominal current) have to be specified in the device standard.



## 6 Main characteristics

6.1 Flat quick-connect terminations are classified into groups according to the nominal width of the male tabs.

This standard covers the following groups:

- 2,8 mm series;
- 4,8 mm series;
- 6,3 mm series;
- 9,5 mm series.

The male tab and female connector dimensions shall be as indicated in tables 10-1 and 10-2 and in figures 1, 2, 3, 4 and 5.

NOTE - The shapes of the various parts may deviate from those given in the figures, provided that the specified dimensions are not influenced and the test requirements are complied with, for example: corrugated tabs, folded tabs, etc.

6.2 The preferred conductor cross-sectional areas shall be: 0,5, 0,75, 1,0, 1,5, 2,5, 4,0 and 6,0 mm<sup>2</sup>.

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6.3 Preferred relationship between the cross-sectional area of the connected conductors and the nominal width of male tabs are given in table 3.

Table 3 – Relationships between conductors and tabs

Cross-sectional area mm <sup>2</sup>	Nominal width of male tabs	
	mm	
0,5	2,8/4,8/6,3	
0,75	2,8/4,8/6,3	
1,0	2,8/4,8/6,3	
1,5	4,8/6,3	
2,5	4,8/6,3	
4,0	6,3/9,5	
6,0	6,3/9,5	

## 7 Marking and Information

The manufacturer of male tabs and/or female connectors supplied separately and the manufacturer of the component with integral tabs and/or female connectors shall provide adequate information to ensure that the flat quick-connect termination can be applied in the intended manner and that the testing authority can perform the relevant tests in accordance with this standard.

7.1 This information shall be provided in the following ways, as detailed in 7.2:

- by marking (Ma)

The information shall be provided by marking clearly and indelibly on the male tab and on the female connector.

NOTE - In the case of integral tabs (e.g. in switches for appliances) the marking can be positioned on the switch itself.

- by documentation (Do)

The information shall be provided by a separate document, which may consist of a leaflet, label or a specification sheet, supplied with the smallest package unit or separately supplied. The content of the document shall be available to the end user or to the component or equipment manufacturer and to the testing authority as appropriate, in any suitable format. The format in which this information is presented is not within the scope of this standard.

- by declaration (De)

This information shall be provided to the testing authority for the purpose of testing and in a manner agreed between the testing authority and the manufacturer.

In the case of a male tab or female connector which is an integral part of the equipment or of a component, the information is obtained by measurement or inspection (see note 1).

7.2 The minimum information required is to be supplied by the methods indicated in 7.1.

- a) Manufacturer's name or trade mark ..... Ma
- b) Type reference ..... Do (see note 2)
- c) Nominal series ..... Do (see note 2)
- d) Maximum permissible temperature if higher than 85 °C ..... Do
- e) The most onerous combination of the tab and the female connector ..... Do, De
- f) Type and size(s) of conductor(s) for which that part of the termination  
is suitable ..... Do

**Warning**

The insulation of the cable and of the contact-carrying plastic parts shall be compatible with the declared maximum permissible temperature.

- g) The recommended method of attaching the conductor to the termination  
(i.e. tool, stripping length, any special preparation, etc.) ..... Do
- h) The material(s) and type of plating ..... De

NOTES

1 The information for integrated tabs or female connectors may be given together with the equipment or component.

2 For this information an appropriate code may be used.

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**8 Constructional requirements**

8.1 Male tabs and female connectors shall be of a metal having mechanical strength, electrical conductivity and resistance to corrosion adequate for their intended use.

*Compliance is checked by inspection, by the tests of 9.1 to 9.6 and, if necessary, by chemical analysis.*

Examples of suitable metals, when used within the permissible temperature range and under standard atmospheric conditions are:

- copper (for tabs only);
- an alloy containing at least 58 % copper for parts made from rolled sheet (in cold condition) or at least 50 % copper for other parts;
- stainless steel containing at least 13 % chromium and not more than 0,09 % carbon, for tabs only;
- steel provided with an electroplated coating of zinc (for earthing conductors only), according to ISO Standard 2081;
- steel provided with an electroplated coating of nickel, according to ISO Standard 1456;
- steel provided with an electroplated coating of tin, according to ISO Standard 2093.

NOTE - The choice of material and coating is left to the relevant product committees who should consider the pollution conditions occurring in the equipment or component where the flat quick-connect termination is mounted.