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Hand crimping tools - Tools for the crimp termination of electric cables and wires for low frequency and radio frequency applications - Part 2-3: Particular requirements for contacts of electrical connectors

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Handcrimpwerkzeuge - Werkzeuge für den Crimpanschluß von elektrischen Leitungen und Drähten für Niederfrequenz- und für Hochfrequenzanwendungen -- Teil 2-3: Spezielle Anforderungen für Kontakte von elektrischen Steckverbindern

Outils de sertissage manuels - Outils pour sertir les câbles et fils électriques basse fréquence et radio-fréquence -- Partie 2-3: Contacts des connecteurs électriques

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English version

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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

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Foreword

This European Standard was prepared by the British Electrotechnical Committee.

The text of the draft was submitted to the Unique Acceptance Procedure (UAP) in November 1992 and was approved by CENELEC as EN 50109-3-1 on 1993-09-22.
It was later renumbered EN 50109-2-3.

NOTE: Finland has no obligation to implement this European Standard.

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) 1995-12-15
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1995-12-15

For products which have complied with the relevant national standard before 1995-12-15, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 2000-12-15.

Contents

Introduction

Part 1 of this European Standard provides general requirements and tests for hand crimping tools for the termination of electrical cables and wires for low frequency and radio frequency applications.

Part 2 of the Standard covers hand crimping tools for radio frequency crimped type connectors such as those listed in radio frequency connector detail specifications based on CECC 22 000 and is subdivided as follows:

Part 2-1 covers hand crimping tools with fixed dies, sizes A to E, V and W.

Part 2-2 covers hand crimping tools with removable and interchangeable dies, sizes A to G, Q to T, V and W.

Part 2-3 covers hand crimping tools for contacts of electrical connectors.

Part 2-4 covers hand crimping tools for centre contacts of RF connectors, series SMZ.

Part 2-5 covers hand crimping tools for the termination of twin-ax cable for databus applications.

1 Scope

Part 2-3 of this European Standard specifies detail requirements for hand crimping tools incorporating a system of multiple indentors for use with removable male and female contacts of electrical connectors and similar components.

Two sizes of tool are covered, as follows:

- a tool for contacts with crimp barrel size 12 to 20 inclusive (tool reference EN 50109-2-3-100), see clause 5;

- a tool for contacts with crimp barrel size 20 and smaller (tool reference EN 50109-2-3-300), see clause 5.

It includes requirements for crimped joints made with the tools.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to, or revisions of, any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

EN 50109-1	1994	Hand crimping tools - Tools for the termination of electrical cables and wires for low frequency and radio frequency applications - Part 1: General requirements and tests
ISO 468		Assessment of surface texture: Methods and instrumentation
ISO 4287/1		Glossary of surface roughness terms: Surface and its parameters
ISO 6507		Method for Vickers hardness test and for verification of Vickers hardness testing machines
CECC 22 000		Generic Specification: Radio frequency coaxial connectors (Parts I, II and III)
CECC 75 400		Specification for removable contacts of assessed quality for electrical connectors
AECMA Standard 2G 210		Specification for PTFE insulated wires (with silver plated copper conductors)

3 Definitions

For the purpose of this Part 2-3, the definitions given in Part 1 apply.

4 Requirements

4.1 General

Crimping tools shall comply with the requirements of clause 4 of Part 1.

4.2 Indentor operation

The design of the crimping tool shall be such that all indentors travel with uniform and simultaneous movement when the tool is operated through distances typical of those shown in figures A.1 or A.4, as appropriate.

NOTE: Dimensions of indentors and gauges are given in figures A.2 or A.5, as appropriate.

4.3 Crimping operation

Positioners or turrets shall be provided for the proper holding and location of the contacts during the crimping operation during which, except for elongation, there shall be no movement of the contact.

NOTE: Typical turrets and positioners shown in figures A.3 and A.6, as appropriate, are described in annex B.

4.4 Outline dimensions

The tool designated EN 50109-2-3-100 shall have the outline dimensions shown in figure A.1. The tool designated EN 50109-2-3-300 shall have the outline dimensions shown in figure A.4.

4.5 Mass

The maximum mass of the tool designated EN 50109-2-3-100 without positioner or turret shall be 0,7 kg. The maximum mass of the tool designated EN 50109-2-3-300 without positioner shall be 0,45 kg.

4.6 Operating force (crimping cycle)

When the tool is tested as described in 6.7 of Part 1 using the largest combination of contact and wire for which the tool is designed, the force applied shall be not greater than 400 N for the tool designated EN 50109-2-3-100 or 200 N for the tool designated EN 50109-2-3-300 when applied to the handles at a point 30 mm to 35 mm from their ends.

4.7 Overload force

When tested as described in 6.8 of Part 1 except for the magnitude of the applied force, the tool shall comply with the requirements of that clause. The force shall be applied to the handles at a point 30 mm to 35 mm from their ends and shall increase at a rate of not more than 25 N/s until it reaches 670 N, this maximum force being maintained for 30 s.

4.8 Indentors

The dimensions, and arrangement of the indentors shall be in accordance with figures A.2 and A.5 when tested using the gauges given in those figures. When visually examined, without the aid of magnification, the surface texture of the indentors shall be smooth and free from cracks.

4.9 Marking

Data plates shall be permanently affixed to turrets and positioners and the information on them shall be legible. Positioners and turrets shall be marked in accordance with 5.1 of Part 1. When colour codes are used to indicate the contact size for test contacts, the colours used for each size of positioner shall be in accordance with annex C.

4.10 Crimped joints

4.10.1 General

The tool shall be designed such that it will produce crimped joints complying with the requirements given in 4.10.2 to 4.10.5, when tested as described in annex D.

4.10.2 General examination

There shall be no evidence of cracks in the material of the crimp barrel or its plated surface finish when examined with a magnification of × 10.

4.10.3 Deformation of crimp barrel

The out-of-roundness of the barrel after crimping shall not exceed the maximum diameter before crimping by more than the following:

Crimp barrel size 20 and larger:	0,15 mm
Smaller crimp barrel sizes:	0,05 mm

4.10.4 Run-out (axial concentricity)

The run-out of crimped contacts shall not exceed 0,31 mm total indicator reading (TIR) for sizes 12 and 16 contacts and 0,28 mm TIR for size 20 and smaller.

NOTE: This includes a tolerance for the manufacture of the contact.

4.10.5 Tensile strength

The pull-off load for crimped joints made with solid or stranded copper and high strength copper alloy conductors of the sizes and characteristics given in table 1 shall be not less than the relevant minimum value given in that table.

Table 1: Requirements for tensile strength of crimped joints

Conductor size number	Number/nominal diameter of strands mm	Minimum tensile pull-off load N
28	7/0,125	12,5
26	19/0,10	25
24	19/0,12	40
24	19/0,118 (see note)	53
23	1/0,60	53
22	19/0,15	50
20	19/0,20	85
18	19/0,25	140
16	19/0,30	170
14	37/0,25	250
12	37/0,315	450
NOTE: High strength copper alloy only		

4.11 Gauging

When the space between opposing closed indentors is tested using the relevant GO gauge from figure A.2 or A.5, as appropriate, the gauge shall pass cleanly through. The appropriate NOT GO gauge from the appropriate figure shall not pass through the space between the closed indentors. The gauges used shall be made from hardened and tempered tool steel.

4.12 Mechanical endurance

When tested as described in 6.9 of Part 1 under the conditions specified in annex E, the tool shall:

- form test joints after 50 000, 100 000, 150 000 and 200 000 cycles that shall comply with 4.10.2 to 4.10.5;

- comply, after 200 000 cycles, with the requirements of 6.9 of Part 1.

4.13 Corrosive atmosphere (salt mist)

When tested as described in 6.10 of Part 1, the tool shall comply with the requirements of that subclause.

4.14 Low temperature crimping

When tested as described in 6.11 of Part 1, the tool shall comply with the requirements of that subclause.

5 Classification and designation

5.1 Tools

The tools shall be designated by individual references which shall consist of three elements as follows:

- the number of this European Standard followed by a hyphen, i.e. EN 50109-;

- the number of this Part followed by a hyphen, i.e. 2-3-;

- the number of the tool, i.e. 100 or 300.

EXAMPLE: Reference EN 50109-2-3-100 designates the tool shown in figure A.1. Reference EN 50109-2-3-300 designates the tool shown in figure A.4.

5.2 Positioners and turrets

Positioners and turrets shall be designated by individual references which shall consist of three elements as follows:

- the number of this European Standard followed by a hyphen, i.e. EN 50109-;

- the number of this Part of followed by a hyphen, i.e. 2-3-;

- for turrets: A three digit number consisting of the numeral one followed by two digits;

- for positioners: A three digit number consisting of the numeral three followed by two digits.

EXAMPLE: Reference EN 50109-2-3-104 designates a turret, as described in B.1. Reference EN 50109-2-3-307 designates a positioner, as described in B.2.

NOTE: Reference numbers refer to individual tools, or turrets or positioners, and not to assemblies of tools with either turrets or positioners.

6 Test and acceptance requirements

With the following exceptions, type testing and production testing of tools shall be in accordance with clauses 6 and 7 of Part 1:

- the modified test methods given in annexes D and E of this Part 2-3 shall be used;

- for the purposes of type testing, the methods of test described in annex D for crimped joints shall be carried out after the overload force test of 6.8 of Part 1, using crimped joints made with the crimping tools under test.

7 User information

User information in accordance with 5.3 of Part 1 shall be provided.

NOTE: Details of user control gauge tools are given in tables E.2 and E.3 and figure E.1.