SLOVENSKI STANDARD
oSIST prEN IEC 60352-2:2023

01-september-2023

Nespajkani spoji - 2. del: Nespajkani stisnjeni spoji - Splošne zahteve, preskusne metode in praktični napotki

Solderless connections - Part 2: Crimped connections - General requirements, test methods and practical guidance

Lötfreie Verbindungen - Teil 2: Crimpverbindungen - Allgemeine Anforderungen, Prüfverfahren und Anwendungshinweise

Connexions sans soudure - Partie 2: Connexions serties - Exigences générales, méthodes d\'essai et guide pratique

Ta slovenski standard je istoveten z: **prEN IEC 60352-2:2023**

ICS:

29.120.20	Spojni elementi	Connecting devices

oSIST prEN IEC 60352-2:2023 **en**

48B/3053/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER:	
IEC 60352-2 ED3	
DATE OF CIRCULATION:	CLOSING DATE FOR VOTING:
2023-08-04	**2023-09-29**
SUPERSEDES DOCUMENTS:	
48B/2986/CDV, 48B/3020/RVC	

IEC SC 48B : ELECTRICAL CONNECTORS	
SECRETARIAT:	SECRETARY:
United States of America	Mr Jeffrey Toran
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: ☐
	Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY

☒ SUBMITTED FOR CENELEC PARALLEL VOTING

Attention IEC-CENELEC parallel voting

The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting.

The CENELEC members are invited to vote through the CENELEC online voting system.

☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Recipients of this document are invited to submit, with their comments, notification of any relevant "In Some Countries" clauses to be included should this proposal proceed. Recipients are reminded that the CDV stage is the final stage for submitting ISC clauses. (SEE AC/22/2007 OR NEW GUIDANCE DOC).

TITLE:

Solderless connections - Part 2: Crimped connections - General requirements, test methods and practical guidance

PROPOSED STABILITY DATE: 2025

NOTE FROM TC/SC OFFICERS:

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

SOLDERLESS CONNECTIONS –

Part 2: Crimped connections – General requirements, test methods and practical guidance

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 60352-2 has been prepared by subcommittee 48B: Electrical connectors, of IEC technical committee 48: Electrical connectors and mechanical structures for electrical and electronic equipment. It is an International Standard.

This third edition cancels and replaces the second edition published in 2006 and Amendment 1:2013. This edition constitutes a technical revision.

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

a) the “”former Clauses 6 through 15 have been moved into a new informative Annex A titled “Practical guidance”;
b) several definitions have been added (wire, cable, crimping, crimped connection, crimp contact, terminal, terminal end, pre-insulated terminal end, termination, connecting device, splice, insulation support, insulation grip, pre-insulated crimped connection, crimping tool, locator, positioner, full cycle crimp mechanism, crimp anvil, crimp indenter, crimp height, crimp inspection hole, crimp barrel wire range, nominal cross-sectional area, geometric (actual) cross-sectional area, stranded conductor, crimp funnel, foreign object damage (FOD), crimp depth, manufacturer, user);

c) a three-level classification by end-product level has been introduced in Clause 4 Workmanship, based on the expected level of reliability of the end-use application for which the crimped connections under subject are suitable, similar to what was done in 4.3 of IEC 61191-1:2018 for soldered electrical and electronic assemblies;

d) for better clarification, former subclause 4.5 Crimped connections, now renumbered and renamed 5.5 Prerequisites for crimped connections, has been split in several third level subclauses with assigned title;

e) allowable strand damage has been introduced with reference to the classification in three levels by end-use application, for the production of test specimens;

f) based on industry experience, in 5.3.1 the minimum copper content of a copper alloy suitable for making crimp barrels has been lowered to 57 % from original 60 %;

g) the elongation at break of annealed copper suitable for conductors to be crimped has been increased to 15 % from original 10 %;

h) the cross-sectional area of conductors for testing purposes is allowed to be the nominal (commercial) one, instead of the geometric (actual) one for wires with nominal cross-sectional area larger than 2,5 mm^2 (see 5.4.3), the geometric (actual) one being the reference in case of dispute on test results;

i) consideration about wire insulation concentricity has been added in 5.4.5;

j) former subclause 5.2.1 General examination is now renumbered and renamed as 7.1 General examination of crimp barrels and wires (examination of parts as called later) and a new subclause 7.2 Examination of crimp dimensions has been added, to cover examination of dimensions after crimping, with several new third level subclauses: 7.2.1 Crimp height C_h, crimp width C_w and measurable crimp width C_{wm}, 7.2.2 Contact deformation after crimping, 7.2.3 Visual examination of insulation distance and conductor overhang, 7.2.4 Visual examination of splice crimped connections, 7.2.5 Visual examination of crimped connections on closed (machined crimp barrels, 7.2.6 Visual examination of crimped connections on B-crimp open crimp barrels, 7.2.7 Visual examination of crimped connections with open crimp barrel with insulation grip;

k) the pull-out force (tensile strength) requirements covering safety requirements of crimped connections in Edition 2 Table 1 have been kept, here renumbered Table 5; interpolated values for most used cross-sectional areas 0,34 mm^2 and 0,37 mm^2 have been added. Reference to IEC 61210 as source for these safety values has been removed, as partially inaccurate. Optional specification of higher pull-out force requirements, based on classification by end-use product as specified in 5.1, and more representative of what can be achieved based on the type of crimp barrel, the form of the crimping, the material and plating of barrel and wire, has been introduced in A.7.3;

l) a microsection test (optional) has been added in 7.3.2;

m) a vibration test (optional) has been added in 7.3.7;

n) a current-carrying capacity test (optional) has been added in 7.4.3;

o) an alternative current loading, cyclic test method added in 7.5.5;

p) a flowing mixed gas corrosion test (optional) has been added in 7.6.2;

q) crimping at low temperature (former subclause 5.4.2.5) has been completed in 7.5.6 by re-entering the test method already present in Edition 1 subclause 11.4.5;

r) types of test specimens have been expanded: a new type A specimen is added, type B is former type A, type C is former type B, type D is former type C, type E is former type D modified with addition of reference wires, type F is former type E, and new specimen types G and H were added to perform tests on splices;

s) normative references, as well as Bibliography have been updated and expanded as required;

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

Draft	Report on voting
48B/XX/FDIS	48B/XX/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 60352 series, published under the general title *Solderless connections*, can be found on the IEC website.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The "colour inside" logo on the cover page of this document 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.

INTRODUCTION

This document includes requirements and relevant tests as well as practical guidance in Annex A for crimped connections.

Two test schedules are provided:

– the basic test schedule which applies to solderless crimped connections which conform to all of the prerequisites of Clause 5. It is derived from experience with successful applications of such connections;

– the full test schedule which applies to solderless crimped connections which do not fully conform to all prerequisites of Clause 5, for example which are made with solid wires, using materials or finishes not included in Clause 5.

This philosophy permits cost- and time-effective performance verification using a limited basic test schedule for established crimped connections and an expanded full test schedule for connections requiring more extensive performance validation.

A detail product specification or the manufacturer's specification for crimped connections or associated cable assemblies or both, as well as for crimp contacts, terminal ends or splices, can include additional tests to verify enhanced performance and/or conformance with specified product classes. It can also reference this document with test severities and acceptance criteria other than those provided by either one of the two test schedules, as well as foresee an intermediate test schedule. The requirements of the detail product specification or the manufacturer's specification prevail.

The suitability of the crimped connection implies that the specified requirements and tests apply to all factors involved in producing a suitable crimped connection, namely:

– the crimp barrel, which can be part of a crimp contact or terminal end, the contact deemed to be used in a single-pole or multipole connector;

– the wire (or range of wires) for which the termination is suitable;

– the tools required to produce that type of solderless connection.

The practical guidance in Annex A serves as a guideline for the required workmanship. Attention is drawn to the fact that some industries (e.g. automotive, aerospace, nuclear, military) can have specific workmanship standards and/or quality requirements, which are outside the scope of this document.

IEC Guide 109 advocates the need to minimize the impact of a product on the natural environment throughout the product life cycle.

It is understood that some of the materials permitted in this document can have a negative environmental impact.

As technological advances lead to acceptable alternatives for these materials, they will be eliminated from future editions of IEC 60352-2.