

SLOVENSKI STANDARD

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Nadomešča:

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Zagotavljanje kakovosti proizvodov v vesoljski tehniki - Stiskalno spajanje kontaktov visoko zanesljivih električnih konektorjev

Space product assurance - Crimping of high-reliability electrical connections

Raumfahrtproduktsicherung - Falten von hochzuverlässigen elektrischen Verbindungen

Assurance produit des projets spatiaux - Serrissage de connections électriques hautes fiabilités

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49.140	Vesoljski sistemi in operacije	Space systems and operations

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EUROPEAN STANDARD

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Space product assurance - Crimping of high-reliability electrical connections

Assurance produit des projets spatiaux - Sertissage de
connections électriques haute fiabilité

Raumfahrtproduktsicherung - Falten von
hochzuverlässigen elektrischen Verbindungen

This European Standard was approved by CEN on 9 November 2018.

CEN and CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN and 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 CEN and CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN and CENELEC members are the national standards bodies and national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



CEN-CENELEC Management Centre:
Rue de la Science 23, B-1040 Brussels

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European Foreword

This document (EN 16602-70-26:2019) has been prepared by Technical Committee CEN-CENELEC/TC 5 "Space", the secretariat of which is held by DIN.

This standard (EN 16602-70-26:2019) originates from ECSS-Q-ST-70-26C Rev.1.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2019, and conflicting national standards shall be withdrawn at the latest by September 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN16602-70-26:2014.

The main changes with respect to EN16602-70-26:2014 are listed below:

- Implementation of ECSS Change requests
- Several Figures replaced by new Figures
- Clause 3 "Terms, definitions and abbreviated terms" updated
- Nomenclature added as clause 3.4
- Titles of clauses 5.1.2.3, 5.2, 5.2.4, 5.2.5, 5.3, 5.3.2, 5.4.3.2, 5.4.3.3 changed
- Several changes in the Clause 5.3 "Requirements for crimp configuration qualification"
- Several changes in clause 5.4 "Test methods"
- Clause 5.5.2 "Personnel training and certification" updated
- Clause 5.5.4 "Visual inspection" updated
- Several changes in clause 5.5.5 "Shift performance inspection and test for harness manufacturing"
- Clause 5.5.9 "Special crimping activities at spacecraft level, modifications and repairs" added
- All Figures from Issue C replaced
- Annex A "Crimp configurations and tools" updated
- Annex B "Examples of typical ultimate axial strength" added

This document has been prepared under a standardization request given to CEN by the European Commission and the European Free Trade Association.

This document has been developed to cover specifically space systems and has therefore precedence over any EN covering the same scope but with a wider domain of applicability (e.g. : aerospace).

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According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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1

Scope

This Standard specifies:

- Requirements for the following crimping wire connections intended for high reliability electrical connections for use on spacecraft and associated equipment operating under high vacuum, thermal cycling and launch vibration:
 - removable contacts, single wire
 - removable contacts, multiple wires
 - coaxial contacts, ferrules
 - lugs and splices.

NOTE These are the most commonly used crimping wire connections and are represented in Figure 1-1.

- The general conditions to be met for the approval of connections other than the above mentioned ones.

NOTE Additional forms of crimps, not covered in this standard, are listed (not exhaustively) in the informative Annex A.

- Product assurance provisions for both the specific and the generic connections mentioned above.
- Training and certification requirements for operators and inspectors (clause 5.5.2), additional to those specified in ECSS-Q-ST-20.

This standard may be tailored for the specific characteristics and constraints of a space project, in conformance with ECSS-S-ST-00.

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Figure 1-1: Example of interconnections described in this Standard

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Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this ECSS Standard. For dated references, subsequent amendments to, or revisions of any of these publications do not apply. However, parties to agreements based on this ECSS Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references the latest edition of the publication referred to applies.

EN reference	Reference in text	Title
EN 16601-00-01	ECSS-S-ST-00-01	ECSS system - Glossary of terms
EN 16602-10-09	ECSS-Q-ST-10-09	Space product assurance - Nonconformance control system
EN 16602-20	ECSS-Q-ST-20	Space product assurance - Quality assurance
EN 16602-60	ECSS-Q-ST-60	Space product assurance - Electrical, electronic and electromechanical (EEE) components
EN 16602-60-05	ECSS-Q-ST-60-05	Space product assurance – General requirements for hybrids
EN 16602-70	ECSS-Q-ST-70	Space product assurance - Materials, mechanical parts and processes
EN 16602-70-08	ECSS-Q-ST-70-08	Space product assurance - Manual soldering of high-reliability electrical connections
EN 16602-70-38	ECSS-Q-ST-70-38	Space product assurance - High-reliability soldering for surface-mount and mixed technology
EN 16602-70-71	ECSS-Q-ST-70-71	Space product assurance - Data for selection of space materials and processes
	SAE-AS-22520, 24 October 2011	Crimping tools, , wire termination, General specification for
	SAE-AS-7928B 10 March 2011	Terminals, lugs, splices, conductor, crimp style, copper, general specification for
	ISO 7500-1:2004	Metallic materials - Verification of static uniaxial testing machines - Part 1: tension/compression testing machines - Verification and calibration of the force-measuring system

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EN reference	Reference in text	Title
	ESCC 3901, Issue 2 May 2013	ESCC generic specification No. 3901 Wires and cables, electrical, 600V, low frequency

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3

Terms, definitions and abbreviated terms

3.1 Terms defined in other standards

- a. For the purpose of this Standard, the terms and definitions from ECSS-S-ST-00-01 apply, in particular for the following terms:
 1. acceptance
 2. analysis
 3. batch
 4. component
 5. conformance
 6. contaminant
- b. For the purpose of this Standard, the terms and definitions from ECSS-Q-ST-60-05 apply, in particular for the following terms:
 1. process identification document (PID)
- c. For the purpose of this Standard, the terms and definitions from ECSS-Q-ST-70-08 apply, in particular for the following terms:
 1. electrical connection

3.2 Terms specific to the present standard

3.2.1 adjustable indenter tool

crimping ratcheting tool which has an adjustable part (setting variable) that indents or compresses the conductor barrel or ferrule

3.2.2 crimping configuration

combination of crimping tool, crimp item and number and type of wires defined by the procurement specification

NOTE 1 Example of crimp item include lug, splice and contact, ferrule.

NOTE 2 Type of wires include material, size, finish and batch if not ESCC qualified wire.

NOTE 3 Crimping tool based on the combination of tool reference, setting and locator (when necessary).

3.2.3 crimping tool

mechanical ratcheting tool used for permanently attaching a wire connection device to a conductor by pressure deformation or by reshaping the barrel around the conductor to establish good electrical and mechanical contact

3.2.4 ferrule

short metal tube used to make crimp connections to the outer conductor of shielded or coaxial cables

3.2.5 intrinsic wire strength

tensile strength of a wire used in a crimped assembly, determined by a specific pull test

3.2.6 lug

metallic tube with drilled flange projection for fixing to a connection point

3.2.7 splice

metallic tube for joining two or more conductors to each other

3.2.8 terminal

metallic device that is used to make an electrical connection

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3.3 Abbreviated terms

For the purpose of this Standard, the abbreviated terms from ECSS-S-ST-00-01 and the following apply:

Abbreviation	Meaning
AWG	American wire gauge
DRD	document requirement definition
IPA	iso-propyl alcohol
KIP	key inspection point
MIP	mandatory inspection point
NCR	nonconformance report
PID	process identification document
QA	quality assurance
RFA	request for approval
RFW	request for waiver
RH	relative humidity

3.4 Nomenclature

The following nomenclature applies throughout this document:

- a. The word “shall” is used in this Standard to express requirements. All the requirements are expressed with the word “shall”.
- b. The word “should” is used in this Standard to express recommendations. All the recommendations are expressed with the word “should”.

NOTE It is expected that, during tailoring, recommendations in this document are either converted into requirements or tailored out.

- c. The words “may” and “need not” are used in this Standard to express positive and negative permissions, respectively. All the positive permissions are expressed with the word “may”. All the negative permissions are expressed with the words “need not”.
- d. The word “can” is used in this Standard to express capabilities or possibilities, and therefore, if not accompanied by one of the previous words, it implies descriptive text.

NOTE In ECSS “may” and “can” have completely different meanings: “may” is normative (permission), and “can” is descriptive.

- e. The present and past tenses are used in this Standard to express statements of fact, and therefore they imply descriptive text.

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