



**SLOVENSKI STANDARD**  
**SIST EN 16602-70-26:2015**  
**01-januar-2015**

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

Space product assurance - Crimping of high-reliability electrical connections

Raumfahrtproduktsicherung - Quetschen von hochzuverlässigen elektrischen Verbindungen

Assurance produit des projets spatiaux - Sertissage des connexions électriques à fiabilité élevée

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**ICS:**

49.060	Letalska in vesoljska električna oprema in sistemi	Aerospace electric equipment and systems
49.140	Vesoljski sistemi in operacije	Space systems and operations

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**en**

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EUROPEAN STANDARD

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NORME EUROPÉENNE

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English version

## Space product assurance - Crimping of high-reliability electrical connections

Assurance produit des projets spatiaux - Sertissage des connexions électriques à fiabilité élevée

Raumfahrtproduktsicherung - Quetschen von hochzuverlässigen elektrischen Verbindungen

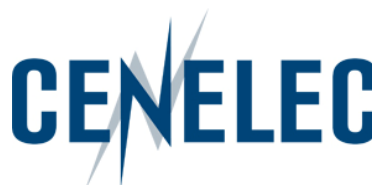
This European Standard was approved by CEN on 11 April 2014.

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CEN-CENELEC Management Centre:  
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## Foreword

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This document (EN 16602-70-26:2014) has been prepared by Technical Committee CEN/CLC/TC 5 "Space", the secretariat of which is held by DIN.

This standard (EN 16602-70-26:2014) originates from ECSS-Q-ST-70-26C.

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of an identical text or by endorsement, at the latest by April 2015, and conflicting national standards shall be withdrawn at the latest by April 2015.

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 has been prepared under a mandate 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).

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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

# 1

## Scope

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This Standard specifies:

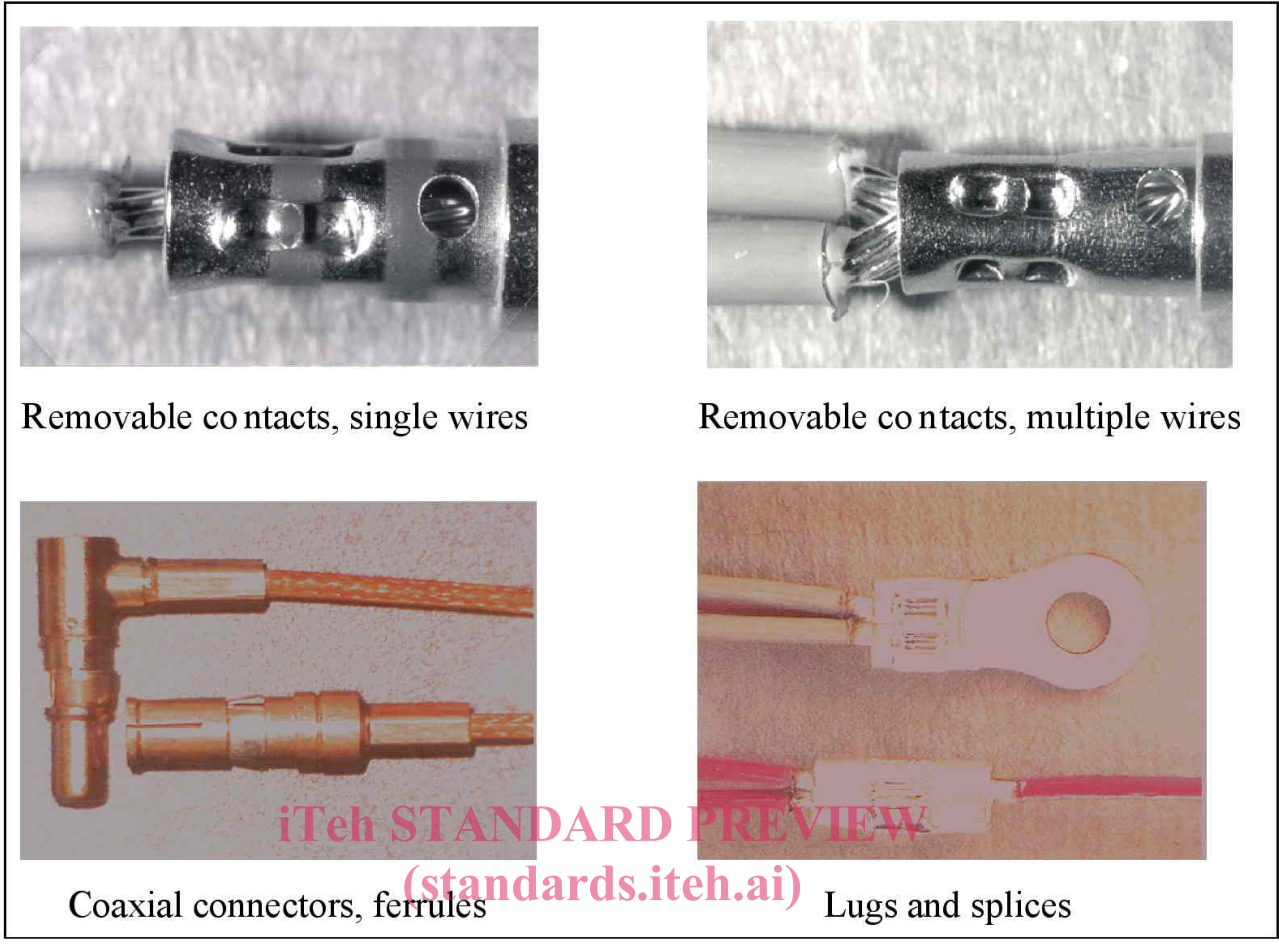
- Requirements for the following crimping wire terminations intended for high reliability electrical connections for use on customer spacecraft and associated equipment operating under high vacuum, thermal cycling and launch vibration:
  - removable contacts, single wires
  - removable contacts, multiple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

NOTE These are the most common used crimping wire termination and are represented in Figure 1-1.
- The general conditions to be met for the approval of terminations 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 terminations 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.





Removable contacts, single wires

Removable contacts, multiple wires

Coaxial connectors, ferrules

Lugs and splices

**Figure 1-1: Specific interconnections in this Standard**

## 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 16602-70	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
	MIL-DTL-22520G	Crimping tools, terminal hard, wire termination, general specification for
	NASA-STD-8739.4/CHG3 09/05/2006	Crimping, Interconnection cables, harnesses and wiring
	SAE-AS-7928A 02/01/2008	Terminals, lugs, splices, conductor, crimp style, copper, general specification for
	SAE-AS-81824 08/01/1998	Splices, electric, permanent, crimp style, copper, insulated, environment resistant

## Terms, definitions and abbreviated terms

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### 3.1 Terms defined in other standards

For the purpose of this Standard, the terms and definitions from ECSS-S-ST-00-01 and ECSS-Q-ST-70-38 apply, in particular for the following terms:

**electrical connections**

**process identification document (PID)**

NOTE The DRD for the PID is given in ECSS-Q-ST-70-38.

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### 3.2 Terms specific to the present standard

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**3.2.1 adjustable indenter tool**

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

**3.2.2 crimping tool**

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

**3.2.3 ferrule**

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

**3.2.4 lug**

metallic tube with drilled flange projection for fixing to threaded terminal

**3.2.5 splice**

device for joining two or more conductors to each other

**3.2.6 terminal**

metallic device that is used for making electrical connections

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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:

<b>Abbreviation</b>	<b>Meaning</b>
<b>AWG</b>	American wire gauge
<b>QA</b>	quality assurance
<b>PID</b>	process identification document
<b>RFA</b>	request for approval
<b>RH</b>	relative humidity

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## 4 Principles

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This Standard is structured such that the necessary level of quality is achieved and consistently maintained, and high reliability of the end product assured. The following principles are covered:

- Preparatory conditions determine the availability of facilities, tools and equipment, along with obligatory hazard and health precautions.
- Specific interconnections, as identified in the Scope above, are then covered in detail including
  - Material selection, and
  - Process identification and documentation.
- New crimp configurations beyond those identified above.
- Test methods and acceptance criteria for both specific and generic types of interconnections are specified.
- Quality assurance measures for both the operator and the inspector are prescribed
  - Training and certification of personnel,
  - Workmanship standards and acceptance criteria,
  - Inspection criteria and sequence,
  - Calibration of tools and equipment,
  - Records from material intake through delivery of the end product, including the handling of deviations by RFA or NCR.

It is important to perform the work taking into account health and safety regulations, and in particular the national standards on this subject.