

SLOVENSKI STANDARD
SIST EN 16602-70-30:2015
01-januar-2015

Zagotavljanje varnih proizvodov v vesoljski tehniki - Spajanje z žičnim ovijanjem kontaktov visoko zanesljivih električnih konektorjev

Space product assurance - Wire wrapping of high-reliability electrical connections

Raumfahrtproduktsicherung - Umhüllung von Kabeln für hochzuverlässige elektrische Verbindungen

Assurance produit des projets spatiaux - Enveloppe de fils pour connexion électrique à fiabilité élevée

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Space product assurance - Wire wrapping of high-reliability electrical connections

Assurance produit des projets spatiaux - Enveloppe de fils pour connexion électrique à fiabilité élevée

Raumfahrtproduktsicherung - Umhüllung von Kabeln für hochzuverlässige elektrische Verbindungen

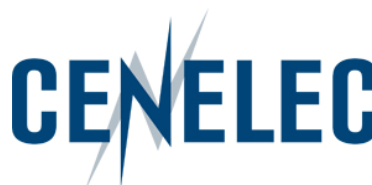
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Foreword

This document (EN 16602-70-30:2014) has been prepared by Technical Committee CEN/CLC/TC 5 "Space", the secretariat of which is held by DIN.

This standard (EN 16602-70-30:2014) originates from ECSS-Q-ST-70-30C.

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of an identical text or by endorsement, at the latest by April 2015, and conflicting national standards shall be withdrawn at the latest by April 2015.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

This Standard specifies requirements for preparing and assembling parts to be joined by wire wrapping, as well as the selection, calibration, use and certification of wire wrapping tools.

The covered wire-wrapped connections are illustrated in Figure 1-1.

This type of connection is similar to “Class A preferred” or “modified” connection detailed in MIL-STD-1130, and NASA NHB 5300.4(3H).

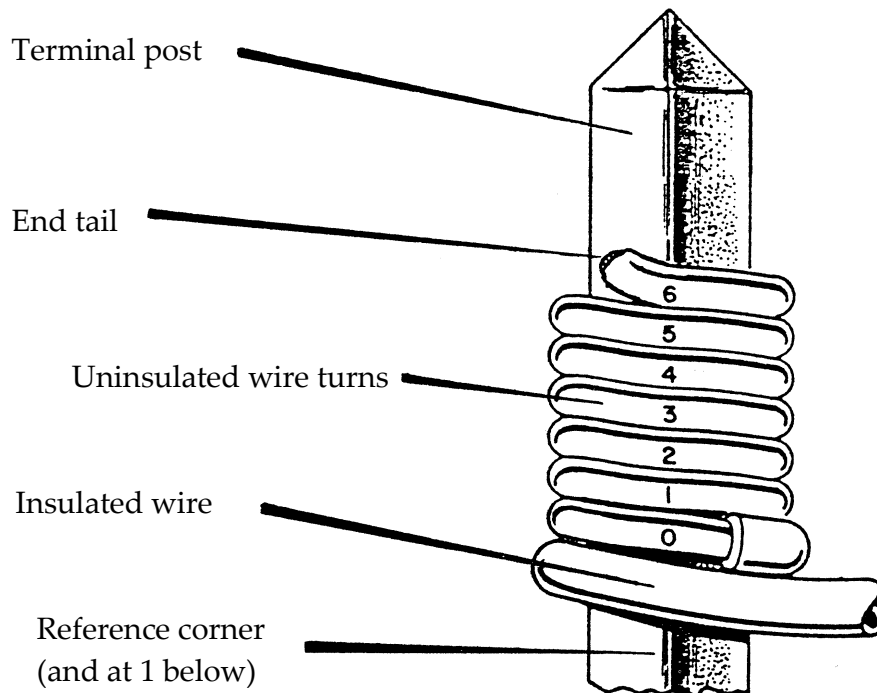
Only previously tested and qualified wire-wrapped connections are covered by this Standard, which includes four wire sizes from 24 AWG to 30 AWG, and three terminal post sizes up to 1,78 mm maximum diagonal. A step-by step procedure is covered in the informative Annex A.

The use of heavier gauge wire and larger terminals is not generally prohibited, but it is considered unlikely that for such dimensions the method of wire-wrapping would be chosen as the electrical interconnection technique. Instead it is assumed that wire larger than 24 AWG will be multi-stranded and terminated by soldering in conformance with ECSS-Q-ST-70-08, or by crimping in conformance with ECSS-Q-ST-70-26.

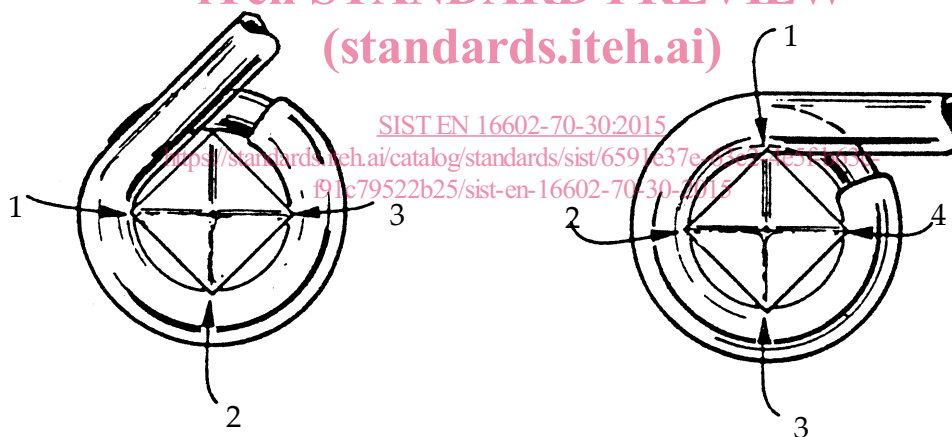
Training and certification requirements for operators and inspectors are defined in clause 5.6.7 and in ECSS-Q-ST-20.

With effect from the date of approval, this Standard announces the adoption of the external document on a restricted basis for use in the European Cooperation for Space Standardization (ECSS) system.

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



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Shows either 3 or 4 corners of contact of insulation minimum $\frac{3}{4}$ turn of insulated wire

Figure 1-1: Single wire-wrapped connection to square terminal and reference corner

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 16602-20	ECSS-Q-ST-20	Space product assurance – Quality assurance
EN 16602-70-02	ECSS-Q-ST-70-02	Space product assurance – Thermal vacuum outgassing test for the screening of space materials
EN 16602-70-38	ECSS-Q-ST-70-38	Space product assurance – High-reliability soldering for surface-mount and mixed technology
	ESSCC Generic specification 3903	Solid wires, electrical 350V, for wire wrapping

Terms, definitions and abbreviated terms

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 from ECSS-Q-ST-70-38 the following term:

process identification document (PID)

NOTE The content of the PID is specified in ECSS-Q-ST-70-38.

3.2 Terms specific to the present standard

3.2.1 a turn of wire

a wrap consisting of one complete single helical ring of wire wrapped 360 degrees around the terminal post touching all four corners of the post.

NOTE For the purpose of counting turns, the number of times the wrapped wire passes and intercepts the reference edge of the terminal post after the first intercept of uninsulated wire and terminal post, constitutes the number of turns of uninsulated wire in the connection.

3.2.2 end tail

end of the last turn of wire on the terminal post which can extend in a tangential direction instead of resting against the post

3.2.3 gas-tight area

contact area between the terminal post and wire which excludes gas fumes

3.2.4 reference corner

corner of the terminal post at which the first turn of uninsulated wire contacts, and from which the number of turns of the wrapped wire are counted.

3.2.5 terminal post

post of square or rectangular section onto which the interconnection wire is wrapped.

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3.2.6 wire-wrapped connection

connection consisting of a helix of continuous, solid, non-insulated wire tightly wrapped around the terminal post to produce a mechanically and electrically stable connection.

NOTE 1 The number of turns required will depend on the gauge of wire used.

NOTE 2 All completed wraps have an additional minimum of 3/4 turn of the insulated wire that is in contact with at least three corners of the terminal post (see Figure 1-1).

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
ETFE	ethylene-tetrafluorethylene (Tefzel)
NCR	nonconformance report
PFA	perfluoroalkoxy
PID	process identification document
PTFE	polytetrafluorethylene
PVDF	polyvinylidene fluoride (Kynar)
QA	quality assurance
RFA	request for approval
RH	relative humidity

4 Principles

The production of wire-wrapped connections is a relatively simple yet precision method of fusion. Its use for high reliability space conditions affords high skills of operators and inspectors as well as tooling and environmental controls to produce continued high level quality. The following principles are laid down in this Standard:

- Each tool is certified for each wire to post configuration; regular calibration is mandatory.
- All material, including wire and post, requires approval and rigorous inspection.
- A well-defined and documented process control document (PID) to ensure consistency of production over extended periods.
- Operators and inspectors need experience and regular training and certification.
- Frequent inline inspection and testing of wire-wraps validate continued quality levels for the intended high reliability application.

Formal Quality Assurance and documentation will substantiate the achieved level of compliance to the requirements within this Standard.

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