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Space engineering - Part 20-08: Photovoltaic assemblies and components

Raumfahrttechnik - Teil 20-08: Fotovoltaische Baugruppen und Komponenten

Ingéniérie spatiale - Partie 20-08: Ensembles et composants photovoltaïque

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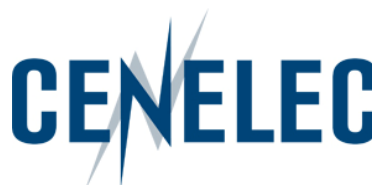
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Foreword

This document (EN 16603-20-08:2014) has been prepared by Technical Committee CEN/CLC/TC 5 "Space", the secretariat of which is held by DIN.

This standard (EN 16603-20-08:2014) originates from ECSS-E-ST-20-08C 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of an identical text or by endorsement, at the latest by February 2015, and conflicting national standards shall be withdrawn at the latest by February 2015.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.

Introduction

The qualification, procurement, storage and delivery of space solar arrays are defined in the dedicated solar array specification, where requirements for the solar array electrical layout, structure and mechanism are specified.

This Standard outlines the requirements for the qualification, procurement, storage and delivery of the main assemblies and components of the space solar array electrical layout: photovoltaic assemblies, solar cell assemblies, bare solar cells, coverglass and protection diodes. This Standard does not outline the requirements for the qualification, procurement, storage and delivery of the solar array subsystem, comprising the solar panels, structural parts and mechanisms.

The general requirements are covered in the main part of this Standard (clauses 5 to 11). Annex A to Annex E specify the contents of the source control drawing of photovoltaic and solar cell assemblies, bare solar cells coverglasses and protection diodes and include the inspection data, physical and electrical characteristics, other ratings and acceptance and qualification specific requirements, which can be different for each space project.

This Standard is divided into five specific subjects, each one corresponding to each assembly or component:

- Clause 5 defines requirements for photovoltaic assemblies,
- Clause 6 for solar cell assemblies,
- Clause 7 for bare solar cells,
- Clause 8 for coverglasses,
- Clause 9 for protection diodes.

Two additional clauses are dedicated to Sun simulators and calibration procedures (clause 10 and capacitance measurement methods (clause 11)).

1

Scope

This Standard specifies the general requirements for the qualification, procurement, storage and delivery of photovoltaic assemblies, solar cell assemblies, bare solar cells, coverglasses and protection diodes suitable for space applications.

This standard does not cover the particular qualification requirements for a specific mission.

This Standard primarily applies to qualification approval for photovoltaic assemblies, solar cell assemblies, bare solar cells, coverglasses and protection diodes, and to the procurement of these items.

This standard is limited to crystalline Silicon and single and multi-junction GaAs solar cells with a thickness of more than 50 μm and does not include thin film solar cell technologies and poly-crystalline solar cells.

This Standard does not cover the concentration technology, and especially the requirements related to the optical components of a concentrator (e.g. reflector and lens) and their verification (e.g. collimated light source).

This Standard does not apply to qualification of the solar array subsystem, solar panels, structure and solar array mechanisms.

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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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 revision 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 more 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 16602-60	ECSS-Q-ST-60	Space product assurance – Electrical, electronic and electromechanical (EEE) components
EN 16602-70-06	ECSS-Q-ST-70-06	Space product assurance – Particle and UV radiation testing for space materials
EN 16602-70-09	ECSS-Q-ST-70-09	Space product assurance – Measurements of thermo-optical properties of thermal control materials
	ISO 15387:2005	Space Systems – Single junction space solar cells – Measurement and calibration procedures
	ISO 14644-1:1999	Cleanrooms and associated controlled environments – Part 1: Classification of air cleanliness
	MIL-E-12397B	Eraser, rubber pumice for testing coated optical elements
	IEC 60749-26:2006	Semiconductor devices – Mechanical and climatic test methods - Part 26: Electrostatic discharge (ESD) sensitivity testing – Human body model (HBM)
	ASTM D1193-99	Standard specification for reagent water
	ESCC 23800 Issue 1	Electrostatic Discharge Sensitivity Test Method
	ESCC 24900 Issue 2	Minimum Requirements for Controlling Environmental Contamination of Components
	DIN 53289	Testing of adhesives for metals; floating roller peel test