SLOVENSKI STANDARD
oSIST prEN 16602-70-15:2018

01-september-2018

Zagotavljanje kakovosti proizvodov v vesoljski tehniki - Neporušitveni pregled

Space product assurance - Non-destructive inspection

Zerstörungsfreie Prüfung oder zerstörungsfreie Inspektion

Ta slovenski standard je istoveten z: **prEN 16602-70-15**

ICS:

19.100	Neporušitveno preskušanje	Non-destructive testing
49.140	Vesoljski sistemi in operacije	Space systems and operations

oSIST prEN 16602-70-15:2018 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 16602-70-15

June 2018

ICS 19.100; 49.140

English version

Space product assurance - Non-destructive inspection

Zerstörungsfreie Prüfung oder zerstörungsfreie Inspektion

This draft European Standard is submitted to CEN members for parallel enquiry. It has been drawn up by the Technical Committee CEN/CLC/JTC 5.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN and CENELEC 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.

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

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European Foreword

This document (prEN 16602-70-15:2018) has been prepared by Technical Committee CEN/CLC/TC 5 “Space”, the secretariat of which is held by DIN (Germany).

This document (prEN 16602-70-15:2018) originates from ECSS-Q-ST-70-15C DIR1.

This document is currently submitted to the CEN ENQUIRY.

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

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

Introduction

Non-destructive Inspection (NDI) covers a wide range of processes used in quality control. The generic term NDI covers several sub processes such as Dye Penetrant Inspection, Radiography, Ultrasonic and Eddy Current. The processes are applied at the discretion of the design authority depending on the criticality of the part or component and inherent risk of the manufacturing process to create detrimental flaws. It is expected that every component used in spaceflight is subjected to some level of NDI in accordance with the present standard, which complements the ECSS-Q-ST-70-39C "Welding of metallic materials for flight hardware".

The lack of NDI control throughout the supply chain has been evident in all space projects across the Europe. As no standard was in place at that time this has resulted in inconsistency in the rationale and application for NDI selection. NDI is generally applied for quality control to ensure that components are free of defects and discontinuities. For some components the NDI methods used form the basis of the fracture and fatigue verification and thus the assurance of design margins. The level of NDI is expected to be decided based on the manufacturing processes applied and the criticality of the part or component and the impact if that part fails in service.

1 Scope

This standard specifies NDI requirements for flight parts, components and structures used for space missions. It covers the NDI methods and stipulates the certification levels for personnel. The qualification of such processes are also specified for non-standard NDI techniques or where complex components are concerned. This standard also identifies the best practice across the large range of international and national standards.

Visual inspection included in this standard is not intended to include incoming inspection of, for example, raw materials, damage during transport, storage and handling and parts procurement verification.

The minimum requirements for NDI documentation are specified in the DRDs of the Annexes.

This standard does not cover the acceptance criteria of components, structures and parts submitted to this examination; it is expected that these criteria are identified on specific program application documentation.

This Standard does not apply to EEE components.

This standard may be tailored for the specific characteristic and constrains 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 16601-40	ECSS-M-ST-40	Space management - Configuration and information management
EN 16602-10	ECSS-Q-ST-10	Space product assurance - Product assurance management
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 16602-70-39	ECSS-Q-ST-70-39	Space product assurance -Welding of metallic materials for flight hardware
EN 16603-32	ECSS-E-ST-32	Space engineering – Structural general requirements
EN 16603-32-01	ECSS-E-ST-32-01	Space engineering – Fracture control
	EN 4179:2017	Aerospace series – Qualification and approval of personnel for non-destructive testing
	EN 12668-1:2010	Non-destructive testing. Characterization and verification of ultrasonic examination equipment. Instruments
	EN 13068-3:2001	Non-destructive testing - Radioscopic testing - Part 3: general principles or radioscopic testing of metallic materials by x- and gamma rays
	EN 1779:1999	Non-destructive testing - Leak testing - Criteria for method and technique selection
	EN ISO 3452-1:2013	Non-destructive testing — Penetrant testing — Part 1: General principles

EN reference	Reference in text	Title
	EN ISO 3452-2:2013	Non-destructive testing -- Penetrant testing -- Part 2: Testing of penetrant materials
	EN ISO 3452-3:2013	Non-destructive testing — Penetrant testing — Part 3: Reference test blocks
	EN ISO 5579:2013	Non-destructive testing -- Radiographic testing of metallic materials using film and X- or gamma rays -- Basic rules
	EN ISO 9712:2012	Non-destructive testing -- Qualification and certification of NDT personnel
	EN ISO 9934-1:2016	Non-destructive testing -- Magnetic particle testing -- Part 1: General principles
	EN ISO 9934-2:2015	Non-destructive testing -- Magnetic particle testing -- Part 2: Detection media
	EN ISO 9934-3:2014	Non-destructive testing -- Magnetic particle testing -- Part 3: Equipment
	EN ISO 15548-1:2013	Non-destructive testing — Equipment for eddy current examination — Part 1: Instrument characteristics and verification
	EN ISO 15548-2:2013	Non-destructive testing — Equipment for eddy current examination — Part 2: Probe characteristics and verification
	EN ISO 15548-3:2008	Non-destructive testing — Equipment for eddy current examination — Part 3: System characteristics and verification
	EN ISO 15549:2008	Non-destructive testing — Eddy current testing — General principles
	EN ISO 15708-2:2017	Non-destructive testing – Radiation methods for computed tomography-Part2: Principles, equipment and samples
	EN ISO 16810:2012	Non-destructive testing — Ultrasonic testing — General principles
	EN ISO 17635:2016	Non-destructive testing of welds — General rules for metallic materials
	EN ISO 17636-1:2013	Non-destructive testing of welds — Radiographic testing — Part 1: X- and gamma-ray techniques with film
	EN ISO 17636-2:2013	Non-destructive testing of welds — Radiographic testing — Part 2: X- and gamma-ray techniques with digital detectors
	EN ISO 17640:2017	Non-destructive testing of welds – Ultrasonic testing – Techniques, testing levels and assessment
	EN 13018:2016	Non-destructive testing - Visual testing - General principles
	AMS-STD-2154:2005	Process for Ultrasonic Inspection of Wrought Metals

EN reference	Reference in text	Title
	ASTM E 127:2015	Standard Practice for Fabrication and Control of Aluminium Alloy Ultrasonic Standard Reference Blocks
	ASTM E 137:2016	Standard practice for evaluation of mass spectrometers for quantitative analysis from a batch inlet
	ASTM E 164:2013	Standard Practice for Contact Ultrasonic Testing of Weldments
	ASTM E 426:2016	Standard Practice for Electromagnetic (Eddy Current) Examination of Seamless and Welded Tubular Products, Titanium, Austenitic Stainless Steel and Similar Alloys
	ASTM E 428-08(2013)	Standard Practice for Fabrication and Control of Metal, Other than Aluminum, Reference Blocks Used in Ultrasonic Testing
	ASTM B 594:2013	Standard Practice for Ultrasonic Inspection of Aluminium-Alloy Wrought Products
	ASTM E 1254:2008	Standard guide for storage of radiographs and unexposed industrial radiographic films
	ASTM E 1417/1417M-11:2016	Standard Practice for Liquid Penetrant Testing
	ASTM E 1441:2011	Standard Guide for Computed Tomography (CT) Imaging
	ASTM E 1444/E1444M-:2011	Standard Practice for Magnetic Particle Testing
	ASTM E 1734:2016	Standard Practice for Radioscopic Examination of Castings
	ASTM E1742/E1742M:2012-	Standard Practice for Radiographic Examination
	ASTM E1814 - :2014	Standard Practice for Computed Tomographic (CT) Examination of Castings
	ASTM E 2375:2013	Standard Practice for Ultrasonic Testing of Wrought Products
	ASTM E 2445:2014	Standard Practice for Performance Evaluation and Long-Term Stability of Computed Radiography Systems
	ASTM E 2698:2010	Standard Practice for Radiological Examination Using Digital Detector Arrays
	IR99: 1999	Ionizing Radiation Regulations 1999
	NAS 410:2014	NAS Certification and Qualification of Non Destructive Test Personnel
	SAE-ARP-4402:2013	Eddy Current Inspection of Open Fastener Holes in Aluminium Aircraft Structure