SLOVENSKI STANDARD
oSIST prEN 16602-70-80:2021

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Zagotavljanje kakovosti proizvodov v vesoljski tehniki - Zahteve za obdelavo in zagotavljanje kakovosti za fuzijske tehnologije kovinskega prahu za uporabo v vesoljski tehniki

Space product assurance - Processing and quality assurance requirements for metallic powder bed fusion technologies for space applications

Raumfahrtproduktsicherung - Verarbeitungs- und Qualitätssicherungsanforderungen für metallische Pulver-Bett-Fusions-Technologien für Weltraumanwendungen

Assurance produit des projets spatiaux - Exigences de traitement et d'assurance qualité pour les technologies de fusion sur lit de poudre métallique pour applications spatiales

Ta slovenski standard je istoveten z: **prEN 16602-70-80**

ICS:

49.140	Vesoljski sistemi in operacije	Space systems and operations

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Space product assurance - Processing and quality assurance requirements for metallic powder bed fusion technologies for space applications

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This draft European Standard is submitted to CEN members for 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.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 16602-70-80:2021) has been prepared by Technical Committee CEN/CLC/TC 5 “Space”, the secretariat of which is held by DIN (Germany).

This document (prEN 16602-70-80:2021) originates from ECSS-Q-ST-70-80C DIR1.

This document is currently submitted to the Enquiry.

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

Introduction

This Standard specifies the processing and quality assurance requirements for the different types of Powder Bed Additive Manufacturing for Metallic Materials for space flight applications. It can also be used for Additive Manufacturing activities on space related ground equipment and development models for flight hardware. The Standard covers all Powder Bed Additive Manufacturing processes using Laser or Electron Beam as melting source. This includes, but is not limited to:

- Selective Laser Melting (SLM)
- Direct Metal Laser Sintering (DMLS)
- Laser Sintering in Solid Phase (LSSP)
- Laser Beam Melting (LBM)
- Electron Beam Melting (EBM)

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

1 Scope

This Standard defines requirements for processing and quality assurance of powder bed fusion technologies for space applications.

Within this standard a set of phases are specified, each to be followed when defining, verifying and manufacturing parts using metallic powder bed fusion technologies. In addition, requirements for operating and supervision personnel and equipment facilities are described.

This Standard does not aim to prescribe process parameters relevant to the fabrication using metallic powder bed fusion technologies.

Although this standard is developed for powder bed fusion based techniques, its principles can also be used for other metal-based and polymer-based processes. These include Wire Arc Additive Manufacturing (WAAM), Laser Powder Build up Welding (LPBW), Stereolithography (with metals), Binder Jetting, but also Selective Laser Sintering, Stereolithography (with polymers), Fused Deposition Modelling (FDM), and others.

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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 16603-32	ECSS-E-ST-32	Space engineering - Structural general requirements
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 16602-70-15	ECSS-Q-ST-70-15	Space product assurance - Non-destructive testing
EN 16602-70-45	ECSS-Q-ST-70-45	Space product assurance -Mechanical testing of metallic materials
	EN ISO ASTM 52921:2016	Standard terminology for additive manufacturing - Coordinate systems and test methodologies
	DIN 35225:2017	Welding for aerospace applications - Qualification testing of operators for powder bed based laser beam machines for additive manufacturing
	DIN 35224:2018	Welding for aerospace applications - Acceptance inspection of powder bed based laser beam machines for additive manufacturing
	EN2003/009:2007	Aerospace series. Test methods. Titanium and titanium alloys. Determination of surface contamination
	ASTM F3056:2014	Standard Specification for Additive Manufacturing Nickel Alloy (UNS N06625) with Powder Bed Fusion
	ASTM F3302:2018	Standard for Additive Manufacturing – Finished Part Properties – Standard Specification for Titanium Alloys via Powder Bed Fusion

EN reference	Reference in text	Title
	NASA MSFC 3717:2017	MSFC Technical standard specification for control and qualification of laser powder bed fusion metallurgical processes
	NASA MSFC 3716:2017	Standard for additively manufactured spaceflight hardware by laser powder bed fusion in metals
	MMPDS-14:2019	Metallic Materials Properties Development and Standardisation
	ISO 2859-1:1999	Sampling procedures for inspection by attributes, Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection