BS EN 9300-120:2023

BSI Standards Publication

Aerospace series — LOTAR — LOng Term Archiving and Retrieval of digital technical product documentation such as 3D CAD and PDM data

Part 120: CAD 3D explicit geometry with graphic product and manufacturing information

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National foreword

This British Standard is the UK implementation of EN 9300-120:2023.

The UK participation in its preparation was entrusted to Technical Committee ACE/1, International and European Aerospace Policy and Processes.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Aerospace series - LOTAR - LOng Term Archiving and Retrieval of digital technical product documentation such as 3D CAD and PDM data - Part 120: CAD 3D explicit geometry with graphic product and manufacturing information

Série aérospatiale - LOTAR - Archivage long terme et récupération des données techniques produits numériques, telles que CAD 3D et PDM - Partie 120: CAO 3D explicite et informations graphiques 3D pour la fabrication du produit

Série aérospatiale - LOTAR - Archivage long terme et récupération des données techniques produits numériques telles que CAO, 3D et PDM - Partie 120 : Géométrie CAO 3D explicite avec données graphiques de produit et de fabrication

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European foreword

This document (EN 9300-120:2023) has been prepared by the Aerospace and Defence Industries Association of Europe - Standardization (ASD-STAN).

After enquiries and votes carried out in accordance with the rules of this Association, this document has received the approval of the National Associations and the Official Services of the member countries of ASD-STAN, prior to its presentation to CEN.

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of an identical text or by endorsement, at the latest by May 2024, and conflicting national standards shall be withdrawn at the latest by May 2024.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

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Introduction

This document was prepared jointly by AIA, ASD-STAN, PDES, Inc., and the prostep ivip Association. The prostep ivip Association is an international non-profit association in Europe. For establishing leadership in IT-based engineering it offers a moderated platform to its nearly 200 members from leading industries, system vendors and research institutions. Its product and process data standardization activities at European and worldwide levels are well known and accepted. The prostep ivip Association sees this standard and the related parts as a milestone of product data technology.

PDES, Inc. is an international non-profit association in USA. The mission of PDES, Inc. is to accelerate the development and implementation of the ISO 10303 series, enabling enterprise integration and PLM interoperability for member companies. PDES, Inc. gathers members from leading manufacturers, national government agencies, PLM vendors and research organizations. PDES, Inc. supports this standard as an industry resource to sustain the interoperability of digital product information, ensuring and maintaining authentic longevity throughout their product lifecycle.

Readers of this standard should note that all standards undergo periodic revisions and that any reference made herein to any other standard implies its latest edition, unless otherwise stated. The Standards will be published under two different standards organizations using different prefixes. ASD-STAN will publish the standard under the number EN 9300–xxx. AIA will publish the standard under the number NAS9300–xxx. The content in the EN 9300 and NAS9300 documents will be the same. The differences will be noted in the reference documentation (i.e. for EN 9300 Geometric Dimensioning & Tolerancing will be referenced in ISO 1101 and ISO 16792, and for NAS9300 the same information will be referenced in ASME Y14.5 and Y 14.41). The document formatting etc., will follow that of the respective editorial rules of ASD-STAN and AIA.

The requirements of EN 9300-110 “CAD mechanical 3D explicit geometry information” about the preservation of the 3D explicit shape shall apply within this document.

This document specifies the requirements for the long term digital preservation of the presentation of Product and Manufacturing Information (PMI) with their possible links to the 3D explicit shape and geometry of single CAD parts. The goal is to preserve this 3D information with respect to the geometry and related PMI produced by the original CAD system, following the principles laid down in EN 9300-003 “Fundamentals and Concepts”.

The meaning of terms “Presentation” and “Representation”, specified in the EN 9300-100 “Common concepts for Long term archiving and retrieval of CAD 3D mechanical information” is required to understand this EN 9300 document.

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1 Scope

1.1 In scope

This document is applicable to:

— the Presentation of 3D geometrical dimension and tolerance, and 3D annotation attributes;

— their possible semantic links with 3D Geometric shape;

— User Defined Attributes: that are assigned to 3D geometric entities or at the part level.

For the purpose of this document, the semantic definition is at the level that supports associative "Cross-highlighting", to illustrate the portion of the geometry to which a PMI element applies.

In this version, the technology used to preserve this 3D information is based on polyline and tessellated presentation. Polyline presentation is a conversion to lines and curves of all 3D annotations by the STEP interfaces of the CAD system, including validation properties. Tessellated presentation is a conversion to tessellated curves and tessellated faces. The main use cases are the Certification and Product Liability of static information, however, re-use is also possible after the deletion of previous PMI and creation of new PMI (refer to clause 3 for definition).

1.2 Out of scope

This document does not apply to:

— machine-interpretable PMI "Representation";

— how to preserve additional information:

  — property rights;

  — form features;

  — machining features;

— CAD Assemblies.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 9300 (all parts), *Aerospace series — LOTAR — Long Term Archiving and Retrieval of digital technical product documentation such as 3D, CAD and PDM data*

ISO 10303-42, *Industrial automation systems and integration — Product data representation and exchange — Part 42: Integrated generic resources: Geometric and topological representation*

ISO 10303-101, *Industrial automation systems and integration — Product data representation and exchange — Part 101: Integrated application resources: Draughting*

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ISO 10303-203, *Industrial automation systems and integration — Product data representation and exchange — Part 203: Application protocol: Configuration controlled 3D design of mechanical parts and assemblies*[1]

ISO 10303-214, *Industrial automation systems and integration — Product data representation and exchange — Part 214 — Application protocol: Core data for automotive mechanical design processes*[1]

ISO 10303-242, *Industrial automation systems and integration — Product data representation and exchange — Part 242: Application protocol: Managed model-based 3D engineering*

ISO 10303-514, *Industrial automation systems and integration — Product data representation and exchange — Part 514: Application interpreted construct: Advanced boundary representation*

ISO 10303-519, *Industrial automation systems and integration — Product data representation and exchange — Part 519: Application interpreted construct: Geometric tolerances*

ISO 1101, *Geometrical product specifications (GPS) — Geometrical tolerancing — Tolerances of form, orientation, location and run-out*

ISO 16792, *Technical product documentation — Digital product definition data practices*

ASME Y14.41, *Digital Product Definition Data Practices*

CAx-IF Recommended Practices for the Representation and Presentation of Product Manufacturing Information (PMI) (AP242)

CAx-IF Recommended Practices for PMI Polyline Presentation (AP203/AP214)

CAx-IF STEP Recommended Practices for User Defined Attributes

3 Terms, definitions and abbreviations

For the purposes of this document, the terms and definitions given in EN 9300-007, EN 9300-100 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

Figure 1 illustrates the terms introduced in this document:

[1] Document is withdrawn.

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