



BSI Standards Publication

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

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Part 121: Semantic representation of CAD 3D Explicit Geometry  
with Product and Manufacturing Information

# National foreword

This British Standard is the UK implementation of EN 9300-121:2023.

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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English Version

**Aerospace series - LOTAR - Long Term Archiving and  
Retrieval of digital technical product documentation such  
as 3D CAD and PDM data - Part 121: Semantic  
representation of CAD 3D Explicit Geometry with Product  
and Manufacturing Information**

Série aéronautique - LOTAR - Archivage long terme et  
récupération des données techniques produits  
numériques telles que CAO, 3D et PDM - Partie 121 :  
Représentation sémantique de la géométrie CAO 3D  
explicite avec données de produit et de fabrication

Luft- und Raumfahrt - LOTAR - Langzeit-Archivierung  
und -Bereitstellung digitaler technischer  
Produktdokumentationen, wie zum Beispiel von 3D-,  
CAD- und PDM-Daten - Teil 121: Semantische  
Darstellung von eindeutiger 3D-CAD-Geometrie mit  
Produkt- und Fertigungsinformationen

This European Standard was approved by CEN on 22 December 2019.

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COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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## Contents

Page

|                                                                                      |    |
|--------------------------------------------------------------------------------------|----|
| European foreword .....                                                              | 3  |
| Introduction .....                                                                   | 4  |
| 1 Scope.....                                                                         | 5  |
| 1.1 In scope.....                                                                    | 5  |
| 1.2 Out of scope.....                                                                | 5  |
| 2 Normative references.....                                                          | 5  |
| 3 Terms, definitions and abbreviations .....                                         | 6  |
| 4 Applicability.....                                                                 | 9  |
| 5 Business specifications for the long term archiving and retrieval of CAD PMI ..... | 10 |
| 5.1 General.....                                                                     | 10 |
| 5.2 Description of use cases for retrieval of 3D PMI entities .....                  | 11 |
| 6 Essential Information of Product and Manufacturing Information (PMI) .....         | 11 |
| 6.1 Dimensional tolerancing.....                                                     | 12 |
| 6.2 Geometric tolerances .....                                                       | 12 |
| 6.3 Associativity between the shape and PMI.....                                     | 13 |
| 6.4 Other PMI related data.....                                                      | 13 |
| 7 Definition of Core Model for Product and Manufacturing Information (PMI).....      | 13 |
| 8 Verification rules for Product and Manufacturing Information .....                 | 14 |
| 8.1 General.....                                                                     | 14 |
| 8.2 Level of Verification .....                                                      | 15 |
| 9 Validation rules of Product and Manufacturing Information .....                    | 15 |
| 9.1 General.....                                                                     | 15 |
| 9.2 Levels of Validation .....                                                       | 16 |
| 9.3 Comparison of the PMI Validation Properties (PMIVP).....                         | 16 |
| 9.4 Results of the Validation .....                                                  | 16 |
| 9.4.1 At the ingest process (qualify) .....                                          | 16 |
| 9.4.2 At the retrieval process (comparison) .....                                    | 17 |

## European foreword

This document (EN 9300-121:2023) 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.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

## 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 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 NAS 9300-xxx. The content in the EN 9300 and NAS 9300 documents will be the same. The differences will be noted in the reference documentation (i.e. for EN9300 Geometric Dimensioning & Tolerancing will be referenced in ISO 1101 and ISO 16792, and for NAS 9300 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.

This document specifies the requirements for the long term digital preservation of the Semantic Representation 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, without loss, with respect to the geometry produced by the original CAD system, following the principles laid down in EN 9300-003 “Fundamentals and Concepts”.

The requirements of EN 9300-110 concerning the preservation of the 3D explicit shape shall apply within this Part.

The term “semantic representation” is specified in Clause 3 “Terms, definitions and abbreviations”.

# 1 Scope

## 1.1 In scope

This document is applicable to:

- machine-interpretable PMI “Semantic Representation” (Refer to Clause 3 for definition);
- the association of the above with 3D geometric shapes;
- the possible association of the above with Presentation of 3D Product and Manufacturing Information (PMI), and 3D annotations as specified in EN 9300-120.

In EN 9300-121, the technology used to preserve this 3D information is based on semantic representation. The main use cases are Certification, Product Liability and Design re-use.

For the purpose of this document, the semantic definition is at the level that supports associative “Cross-highlighting” for the purpose of human readability.

## 1.2 Out of scope

This document is applicable to:

- PMI presentation (specified in EN 9300-120);
- User defined attributes that are assigned to 3D geometric entities or at the part level. The archiving of the UDA is specified in EN 9300-120.
- How to preserve additional information:
  - property rights;
  - form features;
  - CAD Assemblies.
- The semantics of special Notes outside the scope of PMI: ITAR/EAR, proprietary, and title block information, etc.

# 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 10303-203, *Industrial automation systems and integration — Product data representation and exchange — Part 203: Application protocol: Configuration controlled 3D design of mechanical parts and assemblies*<sup>1</sup>

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<sup>1</sup> Document is withdrawn.