SLOVENSKI STANDARD
SIST EN 9300-115:2018

01-oktober-2018

Aeronavtika - LOTAR - Dolgotrajno arhiviranje in iskanje digitalne tehnične dokumentacije o izdelkih, kot so podatki o 3D, CAD in PDM - 115. del: Eksplicitna struktura sestavljanja CAD

Aerospace series - LOTAR - LOng Term Archiving and Retrieval of digital technical product documentation such as 3D, CAD and PDM data - Part 115: Explicit CAD assembly structure

Luft- und Raumfahrt - LOTAR - Langzeit-Archivierung und -Bereitstellung digitaler technischer Produktdokumentationen, wie zum Beispiel von 3D-, CAD- und PDM-Daten - Teil 115: Explizite CAD-Baugruppenstrukturen

Élément introductif - LOTAR - Archivage Long Terme et récupération des données techniques produits numériques,telles que CAD 3D et PDM - Partie 115: Structure d'assemblage CAO explicite

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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 115: Explicit CAD assembly structure

Série aérospatiale - LOTAR - Archivage Long Terme et récupération des données techniques produits numériques, telles que CAD 3D et PDM - Partie 115 : Structure d'assemblage CAO explicite

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN 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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EUROPEAN COMMITTEE FOR STANDARDIZATION
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European foreword

This document (EN 9300-115:2018) 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 Standard has received the approval of the National Associations and the Official Services of the member countries of ASD, 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of an identical text or by endorsement, at the latest by January 2019, and conflicting national standards shall be withdrawn at the latest by January 2019.

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.

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Foreword

This standard 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, 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 EN 9300 Geometric Dimensioning & Tolerancing will be referenced in ISO 1101 and ISO 16792, and for NAS 9300 the same information will be referenced in ASME Y14.5M and Y 14.41). The document formatting etc. will follow that of the respective editorial rules of ASD-Stan and AIA.

1 Scope

EN 9300-115 describes the requirements, and particularly the information required, for the long term archiving and retrieval of a mechanical CAD explicit assembly structure. This will allow the retrieval of the assembly structure including the placement information.

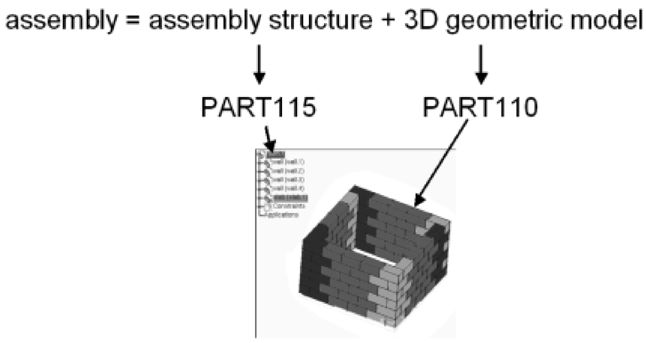

Figure 1 — Assembly structure and geometric model

The CAD assembly structure defines the collection of CAD parts into assemblies, and assemblies into higher level assemblies. An assembly can contain several occurrences of the same part or subassembly.

The assembly structure is a tree, in which the leaf nodes are individual parts, and the non-leaf nodes are assemblies. The parent/child relationship between two nodes records not only that the child is part of a higher assembly, but also the relative position of that child in that assembly.

This standard covers the archiving of the tree structure and the associated positioning information. The geometry of the individual component parts is out of scope.

The assembly structure can be recorded in the same file as the geometry, or can cite the geometry as an external reference.

The assembly structure can be supplied as a single file, or as a set of files, with cross references between files.

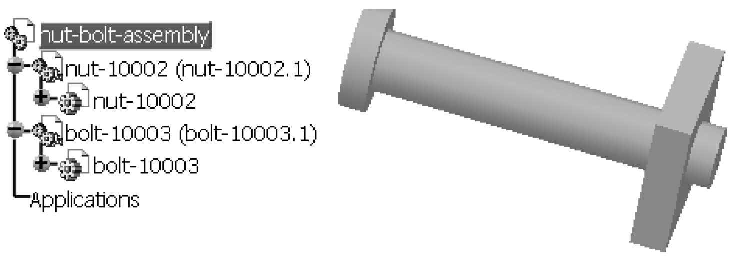

Figure 2 — Example of the scope of the Part 115

NOTE 1 An assembly node may contain geometry that is defined directly in the coordinate system of the assembly rather than through a child node with a corresponding transformation matrix to move the part into the assembly co-ordinate system. Some modeling systems call this a hybrid assembly. This kind of assembly is within the general scope of this part; however no specific verification and validation rules for this geometry are defined.

Out of scope:

— The archiving of the geometric model of the components;

— The management of different occurrences of the same part that have different geometry;

— The management of different occurrences of the same part that have different attributes;

— The archiving of assembly-by-constraint (where, for example, the position of a part is given as "perpendicular to part X", rather than given as a positioning matrix);

— The archiving of the Geometrical Dimensioning and Tolerance (GD&T);

— The archiving of assembly Form Features.

NOTE 2 Product assembly structure may be defined based on the data base management system approach. This case uses other fundamental concepts not covered in this part. See family EN 9300-2xx.

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 10303-44:2000, *Industrial automation systems and integration — Product data representation and exchange — Part 44: Integrated generic resource: Product structure configuration*

PDM and CAX implementor forum documents:

— "Usage Guide for the STEP PDM schema v1.2" Released 4.3 January 2002;

— "Recommended Practices for External References with References to the PDM Schema Usage Guide";

— "Recommended Practices for Geometric Validation Properties";

— "Recommended practices for Assembly Validation Properties".

3 Terms, definitions and abbreviations

For the purposes of this standard, the terms, definitions and abbreviations given in EN 9300-007 shall apply.

4 Applicability

Refer to applicability of EN 9300-001, Clause 4.

5 Business specifications for the long term archiving and retrieval of the explicit CAD assembly structure

5.1 Use cases

The following clauses record the potential use cases for the archiving of an explicit CAD assembly structure. “Annex A: Recommended archiving scenarios” identifies the main archiving scenarios corresponding to these two use cases.

5.1.1 UC1: Full archiving

The term “full archiving” is used where the complete assembly structure is archived as a single unit, and all the assembly structure data are contained in the same Submission Information Package (SIP). The assembly may be contained in one file or in a set of files (see Figure 3: archiving overview of the submission information package).

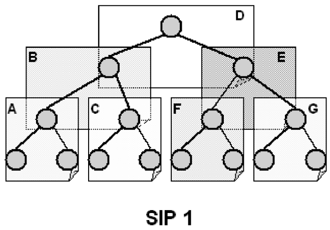

Figure 3 — Archiving overview of the submission information package

5.1.2 UC2: Bottom up and incremental archiving

The assembly structure is archived subset by subset. The assembly structure files are submitted in different submission information packages. For example, in bottom-up archiving, the assembly structure files are submitted from the lower level up to the top level (see Figure 4).

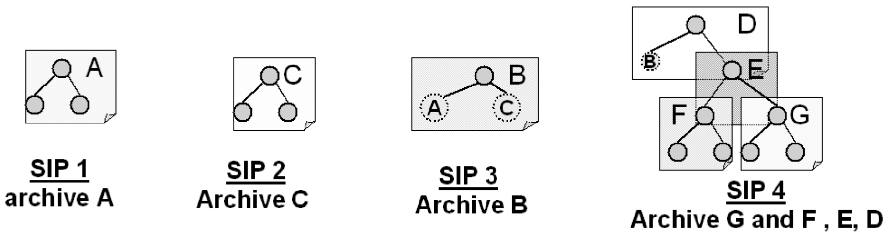

Figure 4 — Bottom up archiving of the assembly structure

6 Essential information for explicit CAD assembly structure

The following list describes the essential information for a CAD assembly structure. The essential information are captured, verified and validated through the core model and the rules. The core model is described in the Clause 7 “Definition of Core Model for an explicit CAD assembly structure” and the rules are described in the Clause 8 “Verification rules of CAD explicit assembly structure” and Clause 9 “Validation rules off an explicit CAD assembly structure”.

6.1 CAD Nodes representing part and assembly

6.1.1 Part identification:

— Part number: Unique Identifier of a part;

— Name: Human readable name of the part (e.g. bolt-CHC-M6);

— Description: Additional human readable information about the part;

— Version (optional): Unique identification of the version (e.g. A001).

6.1.2 Part properties /attributes (optional):

— View / context of definition: e.g. As Designed;

— Systems Unit (mm, …).

6.1.3 Occurrence / Instance identification (optional)

6.2 CAD Assembly structure relationship

6.2.1 Child / parent identification

Identification of the two nodes - the parent and the child (optional: Occurrence/ Instance identification for the parent and the child)

6.2.2 Geometric positioning

Defining the location and orientation of the related geometric component relative to the relating geometric assembly, e.g., Positioning matrix (translation X, Y,Z, Rotation, …)

6.3 References on sub-assembly files or 3D model files

This information is only relevant to leaf nodes representing parts.

— **External part identification:** part number, name, description, version;

— **External file identification:**

  — Name: Unique identifier of the file;

  — Version (optional): Unique identifier of the file version.

— **File properties:**

  — Format: Specification of the file format, e.g., ISO 10303-214;

  — Type: For a geometry file, identification of the type of geometry, e.g. surface model, closed volume, solid model etc.

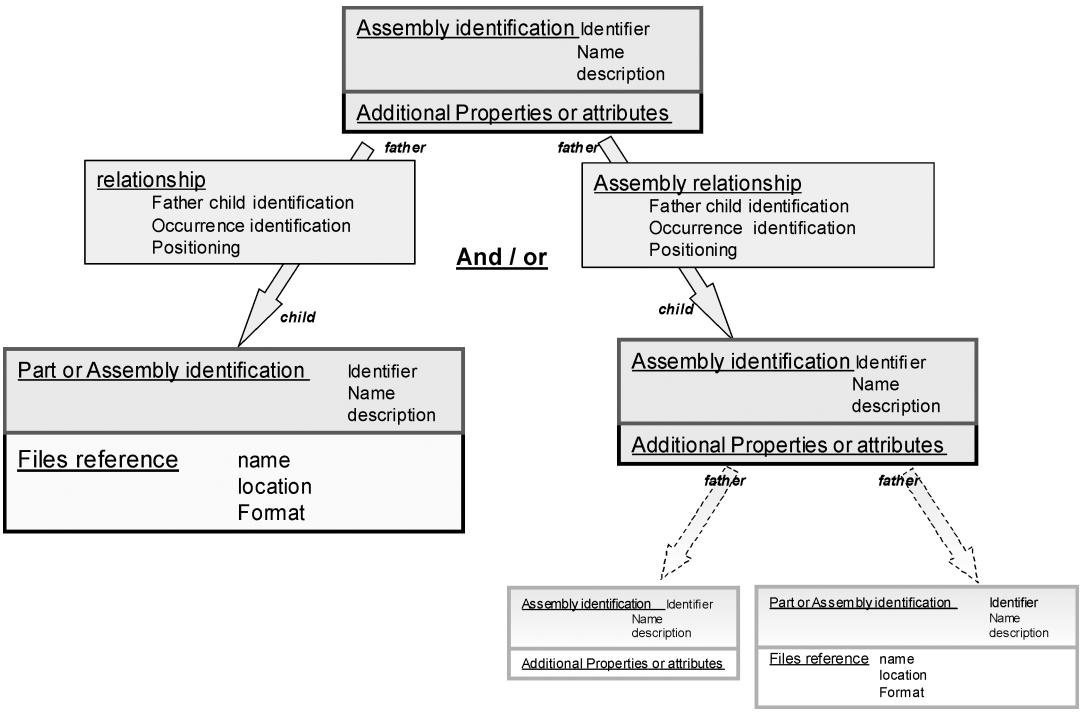

Figure 5 — Main essential objects of the assembly file to be preserved

7 Definition of Core Model for an explicit CAD assembly structure

7.1 Core model STEP AIM level

The core model is based on a subset of the STEP PDM schema v1.2 and the associated usage guide PDM.

The STEP PDM Schema is a core set of entities in STEP that support the concepts for Product Data Management (PDM). The PDM Schema has been established to promote interoperability between STEP APs (AP214 and AP203) in the area of product data management.

The following list identifies which subsets of the “usage Guide for the STEP PDM schema v1.2” are reused for the core model of the part 115.

1 Part Identification

1.1 Part as Product

1.1.1 Product Master Identification

1.1.2 Context Information / Next assembly

1.1.3 Type Classification

2 Specific Part Type Classification

2.1 Classification of parts and managed documents

3 Part Properties

3.1 General Part Properties

3.1.1 Properties Associated with Product Data

3.2 External Part Shape