SLOVENSKI STANDARD
oSIST prEN 9102:2022

01-september-2022

Aeronavtika - Sistem vodenja kakovosti - Zahteve za prvi pregled vzorcev

Aerospace series - Quality systems - First Article Inspection Requirement

Luft- und Raumfahrt - Qualitätsmanagementsysteme - Anforderungen an die Erstmusterprüfung

Série aérospatiale - Systèmes qualité - Exigences pour la revue premier article

Ta slovenski standard je istoveten z: **prEN 9102**

ICS:

03.120.10	Vodenje in zagotavljanje kakovosti	Quality management and quality assurance
49.020	Letala in vesoljska vozila na splošno	Aircraft and space vehicles in general

oSIST prEN 9102:2022 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 9102

June 2022

ICS

Will supersede EN 9102:2015

English Version

Aerospace series - Quality systems - First Article Inspection Requirement

Série aérospatiale - Systèmes qualité - Exigences pour la revue premier article

Luft- und Raumfahrt - Qualitätsmanagementsysteme - Anforderungen an die Erstmusterprüfung

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee ASD-STAN.

If this draft becomes a European Standard, CEN 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 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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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.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Ref. No. prEN 9102:2022 E

Contents

Page

European foreword

This document (prEN 9102:2022) 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, prior to its presentation to CEN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 9102:2015.

This document was revised to emphasize and enhance the First Article Inspection (FAI) planning, evaluation, and re-accomplishment activities; aligning requirements to EN 9100. Additional changes to the document requirements, definitions, and associated notes were incorporated in response to stakeholder needs.

Introduction

To assure customer satisfaction, the aviation, space, and defence industry organizations must produce and continually improve safe, reliable products that meet or exceed customer and regulatory requirements. The globalization of the industry and the resulting diversity of regional/national requirements and expectations have complicated this objective. End-product organizations face the challenge of assuring the quality and integration of products purchased from suppliers throughout the world and at all levels of the supply chain. Industry suppliers face the challenge of delivering products to multiple customers having varying quality requirements and expectations.

The aviation, space, and defence industry established the International Aerospace Quality Group (IAQG) for the purpose of achieving significant improvements in quality, delivery, safety, and reductions in cost throughout the value stream. This organization includes representation from companies in the Americas, Asia/Pacific, and Europe.

This document standardizes FAI process requirements to the greatest extent possible. While primarily developed for the aviation, space, and defence industry, this document can also be used in other industry sectors where a standardized FAI process is needed.

1 Scope

1.1 General

This document establishes the requirements for performing and documenting FAI. It is emphasized that the requirements specified in this document are complementary (not alternative) to customer and applicable statutory and regulatory requirements.

If there is a conflict between the requirements of this document, and customer or applicable statutory/regulatory requirements, the latter takes precedence.

In this document, the following verbal forms are used:

- "shall" indicates a requirement;
- "should" indicates a recommendation;
- "may" indicates a permission;
- "can" indicates a possibility or a capability.

Information marked as "NOTE" is for guidance in understanding or clarifying the associated requirement.

1.2 Purpose

The primary purpose of FAI is to verify and validate product realization processes capable of producing characteristics that meet engineering and design requirements. A FAI is not a product acceptance document. A well-planned and executed FAI by a multi-disciplinary team (e.g., members from responsible functions) provides objective evidence the manufacturer's processes can produce compliant product, having effectively understood and incorporated the associated requirements.

NOTE While interrelated, FAI and product acceptance are separate activities. FAI focus is verification of production processes via assessment of product. FAI and supporting documentation do not provide assurance regarding conformance for product acceptance purposes; neither does the lack of a FAI necessarily imply that the product is nonconforming to engineering and design requirements.

FAI will:

- provide confidence that the product realization processes are capable of producing conforming product;
- demonstrate that the manufacturers and processors of the product have an understanding of the associated requirements;
- provide objective evidence of process capability;
- mitigate risk associated with production startup and/or process changes;
- provide assurance of product conformance at the start of production and after changes, as outlined in this document.

A FAI is intended to:

- reduce future escapes, risks, and total costs;
- help ensure product safety;
- improve quality, delivery, and customer satisfaction;

- reduce costs and production delays associated with product nonconformances;
- identify product realization processes not capable of producing conforming product, and initiate and/or validate associated corrective actions.

1.3 Application

This document applies to organizations and sub-tiers responsible for product realization processes that produce the design characteristics of the product. The organization shall flow down the requirements of this document to suppliers who produce design characteristics.

This document applies to external suppliers performing special processes. A Certificate of Conformity (CoC) provided by processors attests to satisfying the specification requirements of the applicable design authority. External suppliers providing special processes can satisfy this document's requirements by either:

- documenting the design characteristics and associated results on a FAI;
- documenting the design characteristics and associated results on a customer-defined detailed CoC.

This document applies to assemblies, sub-assemblies, and detail parts including castings, forgings, and modifications to document catalogue or Commercial-Off-the-Shelf (COTS) items. Each of these items requires a stand-alone FAI.

Unless contractually required, this document does not apply to:

- development and prototype parts that are not considered as part of the first production run;
- procured standard catalogue items, COTS, or deliverable software. These items shall be documented in the index of part numbers in an assembly First Article Inspection Report (FAIR).

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 9100, *Quality Management Systems - Requirements for Aviation, Space and Defence Organizations*[1)]

EN 9103, *Aerospace series - Quality management systems - Variation management of key characteristics*

3 Terms and definitions

Definitions for general terms can be found in the IAQG International Dictionary[1)].An acronym log for this standard is presented in Annex A.

ISO and IEC maintain terminological 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/

[1)] As developed under the auspice of the International Aerospace Quality Group (IAQG) and published by various standards bodies [e.g., AeroSpace and Defence Industries Association of Europe - Standardization (ASD-STAN), SAE International, European Committee for Standardization (CEN), Japanese Standards Association (JSA)/Society of Japanese Aerospace Companies (SJAC), Brazilian Association for Technical Norms (ABNT)].

[1)] Located on the IAQG website: https://iaqg.org/tools/dictionary/.

3.1
assembly
product that is produced by joining two or more detail parts, COTS, standard catalogue items, or sub-assemblies into one item

3.2
attribute data
result from a characteristic or property that is appraised only as to whether it does or does not conform to a given requirement

Note 1 to entry: For example, “go/no-go”, “accept/reject”, “pass/fail”.

3.3
ballooned design characteristic
clear and uniquely identified design characteristic indicated on a ballooned document

Note 1 to entry: The number may be circled or highlighted for easy visual identification.

3.4
ballooned document
aid used in FAI to identify all the design characteristics, including all documents [e.g., drawings, purchase order, Digital Product Definition (DPD)]; typically sequentially numbering the design characteristics and putting a circle around or highlighting the numbered design characteristics

3.5
baseline part number
number referring to a previous FAI part number or approved configuration, including revision level, to which a partial FAI is performed

Note 1 to entry: An example of an approved configuration could be a part produced, prior to the requirements of this document, that had already been produced and verified as conforming product.

3.6
capability
ability of an organization, system, or process to produce a product that will fulfil the associated design characteristics defined for that product; used to objectively measure whether the process is or is not meeting the requirements

3.7
Commercial-Off-the-Shelf (COTS) item
commercially available item intended by design to be procured and utilized without modification (e.g., common electronic components)

Note 1 to entry: Any item or assembly meeting all of the following requirements:

a) defined by industry, manufacturer, military, or recognized specifications or standards;

b) without design modification, specifically for a customer;

c) customarily used by the public or industries; and

d) offered for sale to the public, though catalogues, price list, brochures, stores, or websites.

3.8
deliverable software
embedded or loadable airborne, spaceborne, or ground support software or firmware components which are part of an aircraft type design, weapon system, missile, or spacecraft

3.9
design characteristic
dimensional, visual, functional, mechanical, and material features or properties, which describe and constitute the design of the product

Note 1 to entry: These characteristics can be measured, inspected, tested, or verified to determine conformance to the design requirements as specified on the parts list, purchasing document, drawing, or DPD, to which the product is to be produced:

- dimensional design characteristics include in-process locating features (e.g. additive manufacturing, target-machined or forged/cast dimensions on forgings and castings, weld/braze joint preparation necessary for acceptance of finished joint);
- material design characteristics include processing output variable (e.g. plating or coating thickness/runout, material hardness/conductivity). These provide assurance of intended characteristics that could not be otherwise defined.

3.10
designed tooling
product specific tooling [e.g. check fixtures, Coordinate Measurement Machine (CMM) program] specifically made to validate the design characteristics of a product

3.11
detail part
article/part produced to engineering definition that does not include assembly processes (i.e. processes that join two or more parts together)

Note 1 to entry: Detail parts may include processing, finishes, and/or special processes.

3.12
Digital Product Definition (DPD)
digital data file(s) that disclose, directly or by reference, the physical or functional requirements, including data files that disclose the design or acceptance criteria of a product

Note 1 to entry: Examples of DPD include the following:

- digital data file(s) and fully dimensioned two-dimensional (2D) drawing sheets;
- three-dimensional (3D) data model, and simplified or reduced content 2D drawing sheets;
- 3D data model with design characteristics displayed as text;
- any other data files containing design characteristics that define a product in its entirety.

3.13
First Article Inspection (FAI)
planned, complete, independent, and documented inspection and verification process to ensure that prescribed production processes have produced an item conforming to engineering drawings, DPD, planning, purchase order, engineering specifications, and/or other applicable design documents

Note 1 to entry: The intent of independent as referenced above is to mitigate the effect of measurement error. This includes ensuring the person that verifies the characteristic for the first article not be the same person that generated the characteristic. Self-inspection (i.e. operator self-verification) is not considered independent. The equipment used to verify the characteristic should be different from the equipment used to produce the characteristic.

3.14
First Article Inspection Report (FAIR)
comprised of the forms identified in Annex B, all ballooned design characteristics, and the supporting documentation determined by FAI planning for a part number, sub-assembly, or assembly

3.15
first production run
initial group of one or more parts that are the result of a planned process designed to be used for future production of these same parts

3.16
Modified Commercial-Off-the-Shelf (COTS)/standard catalogue items
COTS item that has a change made to it from its originally purchased configuration

Note 1 to entry: Once modified, these items are categorized as detail parts for the purpose of assembly.

3.17
multiple characteristics
identical characteristics that occur at more than one location (e.g. “4 places”), but are identified by a single set of drawing or DPD requirements (e.g. rivet hole size, dovetail slots, corner radii, chemical milling pocket thickness)

3.18
product
any intended output resulting from the product realization process, which in the context of this document includes finished detail parts, sub-assemblies, assemblies, forgings, and castings

3.19
qualified tooling
universal (not part specific) calibrated monitoring and measuring equipment (e.g. go/no go gauges, thread gauges, radius gauges) used to validate product design characteristics using attribute data

3.20
reference characteristic
characteristic (including reference and basic dimensions) that are used for “information only” or to show relationship; these are dimensions without tolerances and refer to other dimensions on the drawing or in the DPD

3.21
special processes
any processes for production and service provision where the resulting output cannot be verified by subsequent monitoring or measurement and, as a consequence, deficiencies become apparent only after the product is in use or the service has been delivered