BS EN 9102:2024

BSI Standards Publication

Aerospace series — Quality systems — First article inspection requirements

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National foreword

This British Standard is the UK implementation of EN 9102:2024. It supersedes BS EN 9102:2015, which is withdrawn.

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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Luft- und Raumfahrt - Qualitätsmanagementsysteme - Anforderungen an die Erstmusterprüfung

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Full document details: BS EN 9102:2024

Contents

Page

European foreword 3

Introduction 4

1 Scope 5
1.1 General 5
1.2 Purpose 5
1.3 Application 6
1.4 Convention 6

2 Normative references 7

3 Terms and definitions 7

4 Requirements 10
4.1 First article inspection planning 10
4.2 Part requirements 11
4.3 Digital product definition requirements 11
4.4 Evaluation activities 12
4.5 Nonconformance handling 12
4.6 Partial or re-accomplishment of first article inspection 13
4.7 Documentation 14
4.8 Retained documented information 15

Annex A (informative) **Acronym log** 16

Annex B (normative) **EN 9102 forms and supporting form instructions** 17

B.1 General 17

B.2 Form 1: Part number accountability 18

B.3 Form 2: Product accountability — materials, special processes and functional testing 22

B.4 Form 3: Characteristic accountability, verification and compatibility evaluation 25

Bibliography 28

Documents
Document Sharing Hub

Full document details: BS EN 9102:2024

European foreword

This document (EN 9102:2024) has been prepared by 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 document shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2024, and conflicting national standards shall be withdrawn at the latest by September 2024.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.

This document supersedes EN 9102:2015.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this document: 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.

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Introduction

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.

To ensure 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.

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1 Scope

1.1 General

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

1.2 Purpose

The primary purpose of FAI is to verify and validate product realization processes are capable of producing characteristics that meet engineering and design requirements. 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 A FAI is not a product acceptance document. While interrelated, FAI and product acceptance are separate activities. The focus of FAI 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 product is nonconforming to engineering and design requirements.

FAI will:

— provide confidence, through objective evidence, the product realization processes are capable of producing conforming product;

— demonstrate the manufacturers and processors of the product have an understanding of the associated requirements;

— provide assurance of product conformance at the start of production and after changes, as outlined in this document.

A FAI is intended to:

— mitigate risks associated with production startup and process changes;

— reduce future escapes;

— 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 characteristics and initiate and/or validate associated corrective actions.

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Full document details: BS EN 9102:2024

1.3 Application

This document applies to organizations and their suppliers 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 also applies to suppliers performing special process(es). A certificate of conformance (CoC) provided by processors attests to satisfying the requirements. External suppliers providing special process(es) can satisfy this document's requirements by either:

— documenting the design characteristics and associated results on a first article inspection report (FAIR); or

— documenting the design characteristics and associated results on a detailed CoC.

This document applies to assemblies, sub-assemblies, and detail parts including castings, forgings, and modifications to standard catalogue or commercial-off-the-shelf (COTS) items. Each of these items have a separate 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 item, COTS, or deliverable software. When these items are included in an assembly, they shall be documented in the index of part numbers in an assembly FAIR.

1.4 Convention

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].

[1] Notes to entry used in definitions, however, are considered normative and will provide additional information that supplements the terminological data such as statements, instructions, recommendations, or requirements relating to the use of a term.

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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.

ISO 9000,[2] *Quality management systems — Fundamentals and vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 9000, the IAQG Internal Dictionary[3] and the following apply.

An acronym log for this document 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/

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

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

Note 1 to entry: the unique identifier 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
part number from the previous FAI or approved configuration, including revision level, to which a partial FAI is performed

Note 1 to entry: an example of an approved configuration is a part produced and verified as conforming product prior to the requirements of this document.

[2] Published by: ISO International Organization for Standardization http://www.iso.ch/.
[3] Located on the IAQG website: https://iaqg.org/tools/dictionary/.

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3.6
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.

3.7
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

3.8
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.

3.9
designed tooling
product specific tooling [e.g. check fixtures, coordinate measurement machine (CMM) program] specifically made to validate the design characteristics of a product

3.10
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.

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