

Aerospace — Bolts, with MJ threads, in titanium alloys, strength class 1 100 MPa — Procurement specification

ICS 49.030.20

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National foreword

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The UK participation in its preparation was entrusted by Technical Committee ACE/12, Aerospace fasteners and fastening systems, to Subcommittee ACE/12/1, Aerospace fasteners and fastening systems (International), which has the responsibility to:

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- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the ISO title page, pages ii to iv, pages 1 to 22 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

This British Standard, having been prepared under the direction of the Engineering Sector Committee, was published under the authority of the Standards Committee and comes into effect on 15 January 1999

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Contents

	Page
National foreword	Inside front cover
Foreword	iii
Text of ISO 9152	1

INTERNATIONAL STANDARD

**ISO
9152**

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Aerospace — Bolts, with MJ threads, in titanium alloys, strength class 1 100 MPa — Procurement specification

*Aéronautique et espace — Vis à filetage MJ, en alliages de titane, classe
de résistance 1 100 MPa — Spécification d'approvisionnement*



Contents

	Page
Foreword	iii
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Quality assurance	2
4.1 General	2
4.1.1 Approval of manufacturers	2
4.1.2 Qualification of bolts	2
4.1.3 Acceptance of bolts	2
4.2 Qualification inspection conditions	2
4.3 Acceptance inspection conditions	3
4.4 Use of “Statistical process control (SPC)”	3
5 Requirements	3
Annex A (informative) Cross sectional areas and formulae for tensile and tension fatigue loads	21
Annex B (informative) Cross sectional areas and formulae for double shear loads	21
Figure 1 — Distortion in head to shank fillet area	17
Figure 2 — Head to shank grain flow	17
Figure 3 — Metallurgical test pieces	18
Figure 4 — Grain flow in threads	18
Figure 5 — Not permissible laps, seams and surface irregularities in threads	19
Figure 6 — Permissible laps and seams in threads	19
Figure 7 — Permissible surface irregularities in threads	20
Figure 8 — Thread discontinuities	20
Table 1 — Requirements and test methods	4
Table 2 — Summary of inspections for qualification and allocation of bolt samples	10
Table 3 — Classification of defects	11
Table 4 — Sampling plans for visual inspections and dimensional characteristics	12
Table 5 — Minimum loads for tensile and double shear tests	13
Table 6 — Sampling plans for the inspection of mechanical and metallurgical characteristics	13
Table 7 — Variable sampling for tensile and shear tests	14
Table 8 — Tension fatigue test loads	15
Table 9 — Recess wrenching torque	15
Table 10 — Discontinuities	16
Table 11 — Thread discontinuities	16
Table A.1	21
Table B.1	21

Descriptors: Aircraft industry, fasteners, MJ threads, titanium alloys, bolts, procurements, specifications, characteristics, mechanical properties, tests, mechanical tests, quality assurance, qualification.

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 9152 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 4, *Aerospace fastener systems*.

Annex A and Annex B of this International Standard are for information only.

1 Scope

This International Standard specifies the characteristics and quality assurance requirements for MJ threads bolts made in titanium alloy, of strength class 1 100 MPa, for aerospace construction.

It is applicable whenever it is referenced in a definition document.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 2859-1:1989, *Sampling procedures for inspection by attributes — Part 1: Sampling plans indexed by acceptable quality level (AQL) for lot-by-lot inspection*.

ISO 3452:1984, *Non-destructive testing — Penetrant inspection — General principles*.

ISO 4288:1996, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Rules and procedures for the assessment of surface texture*.

ISO 5855-2:1988, *Aerospace — MJ threads — Part 2: Limit dimensions for bolts and nuts*.

ISO 6892:1998, *Metallic materials — Tensile testing at ambient temperature*.

ISO 7870:1993, *Control charts — General guide and introduction*.

ISO 7961:1994, *Aerospace — Bolts — Test methods*.

ISO 7966:1993, *Acceptance control charts*.

ISO 8258:1991, *Shewhart control charts*.

ISO 9002:1994, *Quality systems — Model for quality assurance in production, installation and servicing*.

ISO/TR 13425:1995, *Guide for the selection of statistical methods in standardization and specification*.

3 Terms and definitions

For the purposes of this International Standard, the following terms and definitions apply.

3.1

production batch

quantity of finished bolts, manufactured using the same process, from a single material cast (single heat of alloy), having the same number of definition document, same thread and diameter code, heat treated together to the same specified conditions and produced as one continuous run

3.2

inspection lot

quantity of bolts from a single production batch having the same number of definition document

3.3

definition document

document specifying directly or indirectly all the requirements for bolts

NOTE The definition document may be an International Standard, an in-house standard or a drawing.

3.4

crack

rupture in the material which may extend in any direction and which may be intercrystalline or transcrystalline in character

3.5

seam

open surface defect

3.6

lap

surface defect caused by folding over metal fins or sharp corners and then rolling or forging them into the surface

3.7

crevice

hollow area at thread crest

3.8

inclusions

non-metallic particles originating from the material manufacturing process

NOTE These particles may be isolated or arranged in strings.

3.9

microstructural shearing shear banding

V- or U-shaped rippled grain structure immediately below the thread root, or chevron-shaped rippled grain structure within the thread crest

3.10 sampling plan

plan according to which one or more samples are taken in order to obtain information and to reach a decision, if possible

NOTE In this International Standard, each sampling plan defines the number of bolts to be inspected as a function of the size of the batch and the acceptance number [number of defective items acceptable (Ac)]¹⁾.

3.11 simple random sampling

sampling of n items from a population of N items in such a way that all possible combinations of n items have the same probability of being chosen

3.12 critical defect

defect that, according to judgement and experience, is likely to result in hazardous or unsafe conditions for individuals using, maintaining, or depending upon the considered product (bolt), or that is likely to prevent performance of the function of a major end item

3.13 major defect

defect, other than critical, that is likely to result in a failure or to reduce materially the usability of the considered product (bolt) for its intended purpose

3.14 minor defect

defect that is not likely to reduce materially the usability of the considered product (bolt) for its intended purpose, or that represents a departure from established specification having little bearing on the effective use or operation of this product

3.15 limiting quality LQ

(sampling plan) quality level which corresponds to a specified and relatively low probability of acceptance

NOTE 1 It is the limiting lot quality characteristic that the consumer is willing to accept with a low probability that a lot of this quality would occur.

NOTE 2 For the purposes of this International Standard, the limiting quality quoted in Table 8 corresponds to a probability of acceptance of 10 %.

3.16 acceptable quality level AQL

maximum percent defective (or the maximum number of defects per hundred units) that, for purposes of sampling inspection, can be considered satisfactory as a process average

NOTE Variant: quality level which in a sampling plan corresponds to a specified but relatively high probability of acceptance.

4 Quality assurance

4.1 General

4.1.1 Approval of manufacturers

The manufacturer shall conform to the quality assurance and approval procedures defined by ISO 9002. The purpose of these procedures is to ensure that a manufacturer has a quality system and the capability for continuous production of bolts complying with the specified quality requirements.

Quality documentation, as specified in ISO 9002, for parts produced in accordance with this International Standard, shall be maintained for a minimum period of 10 years.

The approval of the manufacturer shall be granted by the Certification Authorities, or their appointed representative, who may be the prime contractor.

4.1.2 Qualification of bolts

The purpose of inspections²⁾ is to verify that the design and manufacturing conditions of a bolt enable it to satisfy the requirements of this International Standard.

The qualification shall be granted by the Certification Authorities in the purchaser's country, or their appointed representative, who may be the prime contractor.

4.1.3 Acceptance of bolts

The purpose of inspections is to verify, as simply as possible, using a method which is inexpensive, with the uncertainty inherent in statistical sampling, that the bolts satisfy the requirements of this International Standard.

They shall be carried out by the manufacturer, or under his responsibility.

The manufacturer is responsible for the quality of the bolts manufactured.

4.2 Qualification inspection conditions

Unless otherwise specified, the inspection shall be carried out on:

- each type and diameter of bolt;
- 25 bolts selected from a single inspection lot by simple random sampling.

¹⁾ Supplementary information taken from ISO 2859-1.

²⁾ In order to simplify the text the term "inspections" used in this International Standard also refers to "inspections and tests".