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Responsible committee: ACE/12 Aerospace fasteners and fastening systems

Interested committees:

Title: Draft BS EN 3833 Aerospace series - Bolts, MJ threads, in heat resisting nickel base alloy NI-PH2601 (Inconel 718), passivated - Classification: 1 550 MPa (at ambient temperature)/650 °C - Technical specification

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- iii) requires additional national guidance or information

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Introduction

This draft standard is based on European discussions in which the UK has taken an active part. Your comments on this draft are welcome and will assist in the preparation of the consequent British Standard. Comment is particularly welcome on national, legislative or similar deviations that may be necessary.

Even if this draft standard is not approved by the UK, if it receives the necessary support in Europe, the UK will be obliged to publish the official English Language text unchanged as a British Standard and to withdraw any conflicting standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with reasons) or positive vote on this draft.

Submission of Comments

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- All comments submitted should be presented as given in the example below. Further information on submitting comments and how to obtain a blank electronic version of a comment form are available from the BSI website at:
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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	(7)
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/ Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

ICS:

Supersedes edition P 2 of November 2004
and will supersede EN 3833:2004

Descriptors: Aircraft industry, fastener, MJ-threads, nickel alloy, surface treatment, bolt, procurement, specification, characteristic, mechanical properties, test, mechanical test, quality assurance, qualification

ENGLISH VERSION

Aerospace series — Bolts, MJ threads, in heat resisting nickel base alloy NI-PH2601 (Inconel 718), passivated — Classification: 1 550 MPa (at ambient temperature) / 650 °C — Technical specification

**Luft- und Raumfahrt — Schrauben,
MJ-Gewinde, aus hochwarmfester
Nickelbasislegierung NI-PH2601
(Inconel 718), passiviert — Klasse: 1
550 MPa (bei Raumtemperatur) /
650 °C — Technische
Lieferbedingungen**

**Série aérospatiale — Vis à filetage
MJ, en alliage résistant à chaud à
base de nickel NI-PH2601 (Inconel
718), passivées — Classification : 1
550 MPa (à température ambiante) /
650 °C — Spécification technique**

This "Aerospace Series" Prestandard has been drawn up under the responsibility of ASD-STAN (The Aerospace and Defence Industries Association of Europe- Standardization). It is published on green paper for the needs of the European Aerospace and Defence Industry. It has been technically approved by the experts of the concerned Domain following member comments.

Subsequent to the publication of this Prestandard, the technical content shall not be changed to an extent that interchangeability is affected, physically or functionally, without re-identification of the standard.

After examination and review by users and formal agreement of ASD-STAN it will be submitted as a draft European Standard to CEN (European Committee for Standardization) for formal vote.

Edition approved for publication

Comments should be sent within six months
after the date of publication to
ASD-STAN

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Foreword

This standard was reviewed by the Domain Technical Coordinator of ASD-STAN's Mechanical Domain.

After inquiries and votes carried out in accordance with the rules of ASD-STAN defined in ASD-STAN's General Process Manual, this standard has received approval for Publication.

1 Scope

This standard specifies the characteristics, qualification and acceptance requirements for bolts with MJ threads in NI-PH2601, passivated, for aerospace applications.

Classification: 1 550 MPa ¹⁾ /650 °C ²⁾

It is applicable whenever referenced.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 3452-1, *Non-destructive testing — Penetrant testing — Part 1: General principles*

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

EN ISO 6508-1, *Metallic materials — Rockwell hardness test — Part 1: Test method (scales A, B, C, D, E, F, G, H, K, N, T)*

EN ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature*

EN ISO 6892-2, *Metallic materials — Tensile testing — Part 2: Method of test at elevated temperature*

EN ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests*

ISO 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

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

ISO 7961, *Aerospace — Bolts — Test methods*

ASTM E112-13, *Standard Test Methods for Determining Average Grain Size* ³⁾.

¹⁾ Minimum tensile strength of the material at ambient temperature

²⁾ Maximum test temperature of the parts

³⁾ Published by: ASTM National (US) American Society for Testing and Materials. <http://www.astm.org>

3 Terms and definitions

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

3.1

batch

quantity of finished parts, of the same type and same diameter, produced from the same material obtained from the same melt, manufactured in the course of the same production cycle, following the same manufacturing route and having undergone all the relevant heat treatments and surface treatments

3.2

inspection lot

quantity of parts from a single production batch with the same part number which completely defines the part

3.3 Surface discontinuities

3.3.1

crack

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

3.3.2

seam

open surface defect

3.3.3

lap

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

3.3.4

inclusions

non-metallic particles originating from the material manufacturing process

Note 1 to entry: These particles may be isolated or arranged in strings.

3.4

test temperature

ambient temperature unless otherwise specified

3.5

simple random sampling

the taking 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

3.6

critical defect

a 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, or that is likely to prevent performance of the function of a major end item

3.7

major defect

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

3.8

minor defect

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

3.9

sampling plan

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

3.10

Limiting Quality

LQ₁₀

in a sampling plan, the quality limit which corresponds to a specified 10 % probability of acceptance

3.11

Acceptance Quality Limit

AQL

a quality limit which in a sampling plan corresponds to a specified but relatively high probability of acceptance

Note 1 to entry: It is the maximum per cent defective (or the maximum number of defects per hundred units) that, for purposes of sampling inspection can be considered satisfactory as a process average.

3.12

finished bolt

a bolt ready for use, inclusive of any possible treatments and/or surface coatings, as specified in the product standard or definition document

3.13

definition document

document specifying all the requirements for finished bolts

4 Quality assurance

4.1 Qualification

The product qualification shall be performed to the process as defined in e. g. EN 9133 to achieve a qualification approval from the controlling Certification Authority (CA).

Qualification inspections and tests (requirements, methods, numbers of bolts) are specified in Table 1. They shall be carried out on:

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

The test programme may possibly be reduced, or the qualification of a bolt be granted without inspection or testing. Any such decision shall be based on the results obtained on similar types and diameters of bolts provided that the design and manufacturing conditions are identical.

Table 2 indicates the allocation of bolt samples for the inspections and tests.

4.2 Acceptance

4.2.1 Purpose

The purpose of acceptance inspections and tests is to check, as simply as possible, by a method representative of actual use conditions, with the uncertainty inherent to statistical sampling, that the bolts constituting the batch satisfy the requirements of this standard.

4.2.2 Conditions

Acceptance inspections and tests (requirements, methods, numbers of bolts) are specified in Table 1; they shall be carried out on each batch. Bolts from the batch to be tested shall be selected by simple random sampling.

Each bolt may be submitted to several inspections or tests.

If a more stringent inspection is deemed necessary, all or part of the qualification inspections and tests may be performed during the acceptance inspection and testing. In this case, the number of bolts submitted to these inspections and tests is the same as that submitted for qualification inspection and tests.

4.2.3 Responsibility

Acceptance inspections and tests shall be carried out by the manufacturer, or under his responsibility.

4.2.4 Inspection and test report

A test report showing actual numerical values shall be provided if specified in the purchase order.

5 Requirements

See Table 1.

Table 1 — Technical requirements and test methods (1 of 6)

Clause	Characteristic	Requirement	Inspection and test method	Q/A ^a	Sample size
5.1	Material	In accordance with the product standard or definition document	Chemical analysis or certificate of compliance issued by the manufacturer of the semi-finished product	Q	
				A	
5.2	Dimensions, tolerances and tolerances of form and position	In accordance with the product standard or definition document	Standard gauging	Q	25
				A	Tables 3 and 4
5.3	Manufacturing				
5.3.1	Forging	The head of the bolts shall be formed by hot or cold forging. If hot forged, the forging temperature shall be between 1 040 °C and 1 080 °C and they shall be air cooled. The equipment shall ensure a uniform temperature throughout the batch.	The method of forging shall be indicated. The equipment shall be approved.	Q	
5.3.2	Heat treatment	The heat treatment medium or atmosphere shall not cause any surface contamination except as permitted by 5.5.6. Any scale not removed by subsequent machining shall be removed by abrasive blasting with an appropriate equipment. The headed blanks shall be precipitation heat treated at (720 ± 5) °C, held at temperature for 8 h ± 15 min, furnace cooled at (55 ± 5) °C per hour to (620 ± 5) °C, held at 620 °C for 8 h ± 15 min, followed by air cooling or faster. Instead of the 55 °C per hour cooling rate to 620 °C, parts may be furnace cooled at any rate provided the time at 620 °C is adjusted to give a total precipitation time of 18 h min.	Calibration of the heat treatment equipment shall be confirmed. Visual examination Examination of the heat treatment specification	Q	