



SLOVENSKI STANDARD
SIST EN 4473:2010
01-december-2010

Aeronavtika - Premazi, pigmentirani z aluminijem, za vezne elemente - Tehnična specifikacija

Aerospace series - Aluminium pigmented coatings for fasteners - Technical specification

Luft- und Raumfahrt - Aluminium pigmentierte Beschichtungen für Fixierungen - Technische Lieferbedingungen

Série aérospatiale - Revêtements aluminés pour fixations - Spécification technique

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 4473:2010](https://standards.iteh.ai/catalog/standards/sist/d59b4b35-4c31-43d7-bf9f-452c17d9b43f/sist-en-4473-2010)

Ta slovenski standard je istoveten z: EN 4473:2010

ICS:

49.025.20	Aluminij	Aluminium
49.030.01	Vezni elementi na splošno	Fasteners in general
49.040	Prevleke in z njimi povezani postopki, ki se uporabljajo v letalski in vesoljski industriji	Coatings and related processes used in aerospace industry

SIST EN 4473:2010

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 4473:2010

<https://standards.iteh.ai/catalog/standards/sist/d59b4b35-4c31-43d7-bf9f-432e17d9b43f/sist-en-4473-2010>

EUROPEAN STANDARD

EN 4473

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2010

ICS 49.040

English Version

Aerospace series - Aluminium pigmented coatings for fasteners - Technical specification

Série aérospatiale - Revêtements aluminés pour
fixations - Spécification technique

Luft- und Raumfahrt - Aluminium pigmentierte
Beschichtungen für Fixierungen - Technische
Lieferbedingungen

This European Standard was approved by CEN on 5 May 2010.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

[SIST EN 4473:2010](https://standards.iteh.ai/catalog/standards/sist/d59b4b35-4c31-43d7-bf9f-432e17d9b43f/sist-en-4473-2010)

<https://standards.iteh.ai/catalog/standards/sist/d59b4b35-4c31-43d7-bf9f-432e17d9b43f/sist-en-4473-2010>



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword.....	3
1 Scope	4
2 Normative references	4
3 Terms and definitions	5
4 Technical specifications	6
4.1 Product	6
4.2 Product composition	6
4.3 Product application	6
5 Quality assurance	6
5.1 Qualification	6
5.2 Acceptance	6
6 Requirements	6
Annex A (normative) Test coupons for paint adhesion test.....	12
Annex B (normative) Test specimen for ohmic resistance measurement.....	13
Annex C (normative) Lightning current simulation and swept lightning	14
C.1 Lightning current simulation	14
C.2 Test specimens distribution	14
C.3 Swept lightning (on countersunk head fastener)	14
C.3.1 Current waveforms	14
C.3.2 Test method.....	15
C.3.3 Specimens	15
C.4 Lightning current transfer condition (on protruding head fastener).....	15
C.4.1 Current waveforms	15
C.4.2 Test method.....	16

Foreword

This document (EN 4473:2010) 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 March 2011, and conflicting national standards shall be withdrawn at the latest by March 2011.

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.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

ITEH STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 4473:2010

<https://standards.iteh.ai/catalog/standards/sist/d59b4b35-4c31-43d7-bf9f-432e17d9b43f/sist-en-4473-2010>

EN 4473:2010 (E)**1 Scope**

This European Standard defines the qualification test conditions for aluminium pigmented coatings applicable to fasteners in titanium, titanium alloys, nickel base alloys and corrosion resisting steels. The aluminium pigmented coatings are not applicable to fasteners in non-corrosion resistant steels.

Temperature class: 315 °C ¹⁾

Type I : Coating with chromate and a cetyl alcohol lubricant.

Type II : Coating without chromate and an cetyl alcohol lubricant.

Type III : Coating with chromate, no additional lubricant.

Type IV : Coating without chromate, no additional lubricant.

2 Normative references

The following referenced documents are indispensable for the application 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 2409, *Paints and varnishes — Cross-cut test*

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

EN ISO 2812-1, *Paints and varnishes — Determination of resistance to liquids — Part 1: Immersion in liquids other than water (ISO 2812-1:2007)*

EN 4474, *Aerospace series — Aluminium pigmented coatings — Coating methods*

EN 6117, *Specification for bolts with cetyl alcohol* ²⁾

EN 9133, *Aerospace series — Quality management systems — Qualification Procedure for Aerospace Standards Parts*

TR 4676, *Aluminium pigmented coatings — List of commercial products* ³⁾

NASM 1312-5, *Fastener Test Methods; Method 5: Stress durability* ⁴⁾

NASM 1312-12, *Fasteners Test Methods, Method 12: Thickness of metallic coatings* ⁴⁾

MIL-A-8625, *Anodic coatings for aluminium and aluminium alloys* ⁵⁾

1) Maximum operating temperature.

2) Published as ASD Prestandard at the date of publication of this standard.

3) Published as ASD Technical Report at the date of publication of this standard.

4) Published by: Aerospace Industries Association, 1000 Wilson Boulevard, Suite 1700, Arlington, VA 22209-3928, USA.

5) Published by: Department of Defense (DOD), the Pentagon, Washington, D.C. 20301 USA.

3 Terms and definitions

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

3.1

production lot

product quantity of known composition (aluminium pigmented resin) prepared as one mixing using the same equipment

3.2

seam

open surface defect

3.3

blister

local convexity caused by a sub-surface inclusion of gas or liquid

3.4

nodule

localized buildup or unmixed solid particles

3.5

pit

void, hole in the surface as caused, for example, by corrosion

3.6

porosity

fine holes or pores within the coating

3.7

functional surfaces

functional surfaces are defined as surfaces in contact with mating structure and threaded portion such as

- screws: under head bearing surface, shank, lead-in radius and thread surface if applicable;
- nuts: bearing surfaces, thread surface;
- spherical washers: bearing surfaces;
- swaged collars: all surfaces.

3.8

generic part

family of similar parts such as:

- screws;
- nuts and threaded collars;
- lockbolts;
- swaged collars;
- solid rivets;
- blind bolts;
- bushes;
- spherical washers.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 4473:2010

<https://standards.iteh.ai/catalog/standards/sist/d59b4b35-4c31-43d7-bf9f-432c17d9b431/sist-en-4473-2010>

EN 4473:2010 (E)**4 Technical specifications****4.1 Product**

TR 4676 gives the list of aluminium pigmented coating commercial products.

Product to be applied shall conform to environmental, work safety and public health European regulations.

4.2 Product composition

The preparation method and product composition shall be defined by the manufacturer. The latter must peremptorily notify its users of any change subsequent to qualification.

The product shall not contain chemical compounds as listed below : lead, graphite, type II and IV shall not contain hexavalent chromate.

4.3 Product application

Product must be applied in accordance with EN 4474. The resin curing temperature must be lower than the last ageing treatment of the material to be coated by at least 10 °C. Product may be applied in several coats but shall only have one curing (polymerization), pre heating (flash-off) is acceptable for each coat.

5 Quality assurance

iTeh STANDARD PREVIEW
(standards.iteh.ai)

5.1 Qualification

EN 9133

All coating qualification tests shall be done on fasteners and according to Table 1.

For fastener qualification only 6.1 to 6.3 apply.

5.2 Acceptance

Acceptance is done through fasteners lots for appearance, thickness and adhesion. Sampling 3 per generic part or coating application process and test method in accordance with 6.1 (Appearance), 6.2 (Thickness) and 6.3 (Adhesion).

6 Requirements

See Table 1.

All the tests are to be carried out after application according to EN 4474.

When cetyl alcohol is added to type III or IV, they shall be qualified according to type I or II.

Table 1

Section	Characteristic	Requirement	Inspection and test method	Sampling for qualification
6.1	Appearance	The coating shall be smooth, uniform color, and shall be free of pinholes, porosity, blisters, nodules, pits, or other harmful imperfections.	Visual examination	10 per generic part
6.2	Thickness	<p><u>External threaded fasteners:</u> The coating thickness shall be between 5 µm and 13 µm on all functional surfaces as defined in 3.7.</p> <p><u>Internal threaded fasteners:</u> The coating thickness shall be between 5 µm and 20 µm on all functional surfaces as defined in 3.7.</p>	<p>Determination of coating thickness shall be made by any of the methods specified in NASM 1312-12.</p> <p>In case of conflict the micrographic examination shall be chosen.</p>	10 per generic part or coating application process
6.3	Adhesion	<p>The coating must remain continuously bonded to the basis material.</p> <p>Class 0</p>	<p>ISO 2409</p> <p>If fastener geometry does not allow ISO 2409 adhesion test, the coating must be cut through to the base material on the largest plain surface of the part. Press the tape firmly to the cut on the plain surface of the fastener and remove the tape in one abrupt motion perpendicular to the fastener surface.</p> <p>Any evidence of coating separation when examined at approximately 4X is cause for rejection.</p>	5 per generic part, material type or coating application process
6.4	Heat resistance	<p>The coating must remain continuously bonded to the basis material.</p> <p>No powder shall be detected by visual inspection.</p> <p>Class 0</p>	<p>Expose the coated test part to 315 °C for 4 h. Air cool and carry out the adhesion test (see 6.3).</p> <p>ISO 2409.</p>	4 screws

continued