BS EN 4689:2021

BSI Standards Publication

Aerospace series — Paints and varnishes — Two-components room temperature curing polyurethane finish — High flexibility and chemical agent resistance for military application

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National foreword

This British Standard is the UK implementation of EN 4689:2021. It supersedes BS EN 4689:2012, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee ACE/65, Non-metallic materials for aerospace purposes.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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English Version

Aerospace series - Paints and varnishes - Two-components room temperature curing polyurethane finish - High flexibility and chemical agent resistance for military application

Série aérospatiale - Peintures et vernis - Peinture de finition polyuréthane à deux composants polymérisant à température ambiante - Haute flexibilité et résistance aux substances chimiques pour applications militaires

Luft- und Raumfahrt - Beschichtungsstoffe - Zweikomponenten Polyurethan- Decklack, raumtemperaturhärtend - Hohe Elastizität und Beständigkeit gegen Chemikalien für militärische Anwendun

This European Standard was approved by CEN on 2 November 2020.

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European foreword

This document (EN 4689:2021) 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 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2021, and conflicting national standards shall be withdrawn at the latest by July 2021.

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 4689:2012.

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, Turkey and the United Kingdom.

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1 Scope

This document specifies the requirements for a two-components flexible polyurethane topcoat to be applied over EN 4687 and/or EN 4688 primers mainly for exterior aerospace applications.

The primer and the finish tested to this document will be from the same manufacturer applied in accordance with (i.a.w.) their instructions/Table 1.

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 2101, *Aerospace series — Chromic acid anodizing of aluminium and wrought aluminium alloys*

EN 2334, *Aerospace series — Chromic-sulphuric acid pickle of aluminium and aluminium alloys*

EN 2437, *Aerospace series — Chromate conversion coatings (yellow) for aluminium and aluminium alloys*

EN 3837, *Aerospace series — Paints and varnishes — Nature and method for surface preparation of test pieces in aluminium alloys*

EN 3840, *Aerospace series — Paints and varnishes — Technical specification*

EN 3847, *Aerospace series — Paints and varnishes — Determination of sedimentation rating*

EN 4160, *Aerospace series — Paints and varnishes — Determination of the effect of thermal exposure*

EN 4687, *Aerospace series — Paints and varnishes — Chromate free (non corrosion inhibiting) two-components room temperature curing primer — Chromate free primer for military application*

EN 4688, *Aerospace series — Paints and varnishes — Corrosion resistant chromated two-components room temperature curing epoxy primer — High corrosion resistance for military application*

EN 4704, *Aerospace series — Tartaric-Sulphuric-Acid anodizing of aluminium and aluminium wrought alloys for corrosion protection and paint pre-treatment (TSA)*

EN 6042, *Aerospace series — Organic compounds — Test method — Analysis by infrared spectroscopy* [1)]

EN ISO 1513, *Paints and varnishes — Examination and preparation of test samples*

EN ISO 1518-1, *Paints and varnishes — Determination of scratch resistance — Part 1: Constant-loading method*

EN ISO 1519, *Paints and varnishes — Bend test (cylindrical mandrel)*

EN ISO 1520, *Paints and varnishes — Cupping test*

EN ISO 1524, *Paints, varnishes and printing inks — Determination of fineness of grind*

EN ISO 2409, *Paints and varnishes — Cross-cut test*

EN ISO 2431, *Paints and varnishes — Determination of flow time by use of flow cups*

EN ISO 2811-1, *Paints and varnishes — Determination of density — Part 1: Pycnometer method*

[1)] Published as ASD-STAN Standard at the date of publication of this document by AeroSpace and Defence industries Association of Europe — Standardization (ASD-STAN), http://www.asd-stan.org/

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EN ISO 2811-2, *Paints and varnishes — Determination of density — Part 2: Immersed body (plummet) method*

EN ISO 2811-3, *Paints and varnishes — Determination of density — Part 3: Oscillation method*

EN ISO 2811-4, *Paints and varnishes — Determination of density — Part 4: Pressure cup method*

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

EN ISO 2812-2, *Paints and varnishes — Determination of resistance to liquids — Part 2: Water immersion method*

EN ISO 2813, *Paints and varnishes — Determination of gloss value at 20°, 60° and 85°*

EN ISO 3251, *Paints, varnishes and plastics — Determination of non-volatile-matter content*

EN ISO 3675, *Crude petroleum and liquid petroleum products — Laboratory determination of density — Hydrometer method*

EN ISO 3679, *Determination of flash no-flash and flash point — Rapid equilibrium closed cup method*

EN ISO 4628-2, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 2: Assessment of degree of blistering*

EN ISO 4628-8, *Paints and varnishes — Evaluation of degradation of coatings — Designation of quantity and size of defects, and of intensity of uniform changes in appearance — Part 8: Assessment of degree of delamination and corrosion around a scribe or other artificial defect*

EN ISO 6270-1, *Paints and varnishes — Determination of resistance to humidity — Part 1: Condensation (single-sided exposure)*

EN ISO 9117-1, *Paints and varnishes — Drying tests — Part 1: Determination of through-dry state and through-dry time*

EN ISO 9117-3, *Paints and varnishes — Drying tests — Part 3: Surface-drying test using ballotini*

EN ISO 9117-6, *Paints and varnishes — Drying tests — Part 6: Print-free test*

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

EN ISO 9514, *Paints and varnishes — Determination of the pot life of multicomponent coating systems — Preparation and conditioning of samples and guidelines for testing*

EN ISO 11664- *, *Colorimetry*

EN ISO 11890-1, *Paints and varnishes — Determination of volatile organic compound (VOC) content — Part 1: Difference method*

EN ISO 11909, *Binders for paints and varnishes — Polyisocyanate resins — General methods of test*

EN ISO 16474-1, *Paints and varnishes — Methods of exposure to laboratory light sources — Part 1: General guidance*

EN ISO 16474-3, *Paints and varnishes — Methods of exposure to laboratory light sources — Part 3: Fluorescent UV lamps*

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* And all its parts quoted in this document.

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MIL-PRF-5606H, *Performance specification: Hydraulic fluid, petroleum base; aircraft, missile, and ordnance. (NATO H-515)* [2)]

MIL-PRF-6081D, *Performance specification: Lubricating oil, jet engine. (NATO O-133)* [2)]

MIL-PRF-23699F, *Performance specification: Lubricating oil, aircraft turbine engine, synthetic base, NATO code number O-156* [2)]

MIL-DTL-83133G, *Detail specification: Turbine fuel, aviation, kerosene type, JP-8 (NATO F-34), NATO F-35, and JP-8+100 (NATO F-37)* [2)]

AMS 1526B, *Cleaner for aircraft exterior surfaces water-miscible, pressure- spraying type* [3)]

AMS 1527B, *Cleaner for aircraft exterior surfaces water-miscible, foam-on, pressure-spraying* [3)]

AMS 1533A, *Cleaner for exterior aircraft surfaces gel-type, solvent-base* [3)]

DEF STAN 68-10 Issue 5, *Corrosion Preventive, Water Displacing NATO Code: C-634 Joint Service Designation: PX-24*

BS 1595-1:1986, *Propan-2-ol (isopropyl alcohol) for industrial use — Part 1: Specification for propan-2-ol (isopropyl alcohol)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 3840 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at http://www.iso.org/obp
- IEC Electropedia: available at http://www.electropedia.org/

4 Surface pretreatments

In accordance with EN 3837, the surface pretreatments applicable to aluminium alloy test panels are the following:

EN 3837 — Procedure A:	Sulfochromic pickling in accordance with EN 2334
EN 3837 — Procedure B:	Chromate acid anodizing in accordance with EN 2101
EN 3837 — Procedure C:	Chromate conversion coating in accordance with EN 2437
EN 3837 — Procedure D:	Tartaric-Sulphuric-Acid anodizing in accordance with EN 4704

[2)] Published by: DoD National (US) MIL. Department of Defense http://www.defenselink.mil/.

[3)] Published by: SAE International (US) Society of Automotive Engineers http://www.sae.org/.

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