BS EN 2434-002:2010

BSI Standards Publication

Aerospace series — Paints and varnishes — Two component cold curing polyurethane finish

Part 002: High chemical resistance

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National foreword

This British Standard is the UK implementation of EN 2434-002:2010.

The UK participation in its preparation was entrusted to Technical Committee ACE/65/-/3, Paints for Aerospace Purposes.

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

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Série aérospatiale - Peintures et vernis - Peinture de finition polyuréthane, à deux composants polymérisant à température ambiante - Partie 002: Tenue chimiques aux fluides

Luft- und Raumfahrt - Beschichtungsstoffe - Zweikomponenten- Polyurethan-Decklack, kalthärtend - Teil 002: Hohe Beständigkeit gegen Chemikalien

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Foreword

This document (EN 2434-002:2010) 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of an identical text or by endorsement, at the latest by March 2011, and conflicting national standards shall be withdrawn at the latest by March 2011.

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Introduction

This European Standard is part of a series of EN non-metallic materials standards for aerospace applications.

The general organisation of this series is described in EN 4385.

This European Standard is a level 3 document as defined in EN 4385.

Definition of subcase numbering in Table 2 to Table 5 is given in EN 7000-9.

1 Scope

This European Standard specifies the requirements for a two component polyurethane finish to be applied over a primer for interior and exterior aerospace applications, where maximum resistance to normal operational fluids is required.

The properties specified in this European Standard are obtained on defined aluminium alloy test pieces prepared in accordance with EN 3837 Procedure A and EN 23270 and painted with primer to EN 2435-002. The ability of the material to be used for a specific application (e.g. alternative substrate, alternative primer, specific drying conditions etc.) shall be determined by supplementary tests to confirm that the requirements of this standard are met.

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.

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

EN 2379, *Aerospace series — Fluids for assessment of non-metallic materials* [1)]

EN 2435-002, *Aerospace series — Paints and varnishes — Corrosion resistant chromated two component cold curing primer — Part 002: High corrosion resistance*

EN 3837, *Aerospace series — Paints and varnishes — Nature and method for surface preparation of test pieces in aluminium alloys* [1)]

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

EN 4385, *Aerospace series — Non-metallic materials — General organisation of standardisation — Links between types of standards* [1)]

EN 7000-9, *Aerospace series — Non-metallic materials — Rules for the drafting and presentation of material standards — Part 9: Paints and varnishes* [1)]

EN ISO 1513, *Paints and varnishes — Examination and preparation of samples for testing (ISO 1513:1992)*

[1)] Published as ASD-STAN Prestandard at the date of publication of this standard

EN ISO 3696, *Water for analytical laboratory use — Specification and test methods (ISO 3696:1987)*

3 Terms and definitions

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

3.1
Gloss finish
≥ 80 units measured at 60° according to EN 3840 test 27

4 Classification

Not applicable.

5 Batch release and qualification testing

5.1 Batch release testing

For batch acceptance the tests marked with an * in Table 1 to Table 5 shall be performed.

5.2 Qualification tests

For product qualification, all tests mentioned in this European Standard, in the Table 1 to Table 5, shall be performed.

Table 1 – General Requirements

1.001	Material description	Two component cold curing polyurethane coating
1.002	Formulation	Base – a base containing an hydroxyl functional resin, solvents and pigments. Activator – a polyisocyanate activator solution Thinner – if required
1.003	Form and method of production	These components shall be mixed in simple whole number proportions, by volume or by weight, in accordance with the manufacturer's instructions.
1.004	Technical specification	See EN 3840
1.009	Application and use	Dry film thickness of (50 ± 5) µm
1.010	Storage stability	See EN 3840
1.011	Shelf life	See EN 3840
1.013	Processing conditions	ISO 3270 for 7 d before testing unless otherwise specified. Finish is applied to the primer following drying of the primer for 4 h to 16 h.
1.093	Quality assurance	See EN 3840
1.094	Designation	Polyurethane Finish EN 2434-02
1.095	Packaging	See EN 3840
1.096	Identification marking	See EN 3840
1.097	Flash point	See EN 3840
1.098	Health and safety	See EN 3840

Table 2 – Physical and chemical characteristics

2.014	Condition			
		1	EN ISO 1513	
		6	As received in original container	
	*	7	Shall be free from extraneous matter and show no skinning, gelling, hard settlement or other defect which will prevent satisfactory application to produce a defect free film.	
2.011	Application properties and finish			
		1	None	
		3	EN 3837 – A_2	2024-T3 clad
		4	**EN 3837 Process A**	EN 2334 Pickle
		5	EN 2435-02 primer + finish to this standard	
	*	7	**Paint film shall show an opaque even finish, free from runs, sags, wrinkling, pinholing or other defect.**	
2.034	Sedimentation rating		EN 3840	
		1	Test 5	
		6	base + activator + thinner	
		7	ml	V = ≤ 30 after 4 h
2.012	Pot life		EN 3840	
		1	Test 20 followed by Test 8 [a] or Test 9 [a]	
		6	base + activator + thinner	
	*	7	s or Pa s	≤ 2 x initial value after 4 h
2.035	Fineness of grind		EN 3840	
		1	Test 10	
		6	base + activator	
	*	7	µm	Gloss finish ≤ 15, other gloss levels ≤ 30

(continued)

Table 2 – Physical and chemical characteristics *(concluded)*

2.029	Viscosity		EN 3840			
		1	Test 8 [1] or Test 9 [1]			
		6	base + activator + thinner			
		7	s or Pa s	± 10 % [1, 2]		
2.027	Non volatile matter		EN 3840			
		1	Test 1			
		7		base	activator	
			%	± 2 [2, 3]	± 2 [2, 3]	
2.027	Volatile organic compound (VOC) content		EN 3840			
		1	Test 49			
		6	base + activator + thinner			
		7	g/l	≤ reference value [2, 3]		
2.057	Density		EN 3840			
		1	Test 3			
		6	base			
	*	7	g/cm^3	± 2 [2, 3, 5]		
2.057	Density hydrometer		EN 3840			
		1	Test 4			
		6	activator + thinner			
		7		activator	thinner	
	*		g/cm^3	± 2 [2, 3]	± 2 [2, 3]	
2.036	Flash point		EN 3840			
		1	Test 7			
		7		base	activator	thinner
			°C	≥ reference value [3]	≥ reference value [3]	≥ reference value [3]
2.041	Surface dry time		EN 3840			
		1	Test 21			
		3	EN 3837 – A_2		2024-T3 clad	
		4	**EN 3837 Process A**		EN 2334 Pickle	
		5	EN 2435-02 primer + finish to this standard			
		6	EN 23270			
		7	h	≤ 1 [4]		
2.041	Drying time print-free		EN 3840			
		1	Test 22			
		3	EN 3837 – A_2		2024-T3 clad	
		4	EN 3837 Process A		EN 2334 Pickle	
		5	EN 2435-02 primer + finish to this standard			
		6	EN 23270			
		7	h	≤ 6		
2.041	Through dry time		**EN 3840**			
		1	Test 23			
		3	EN 3837 – A_2		2024-T3 clad	
		4	**EN 3837 Process A**		EN 2334 Pickle	
		5	EN 2435-02 primer + finish to this standard			
		6	EN 23270			
	*	7	h	≤ 16		
2.999	Notes	[1] Test 8 shall be used for non-thixotropic paints and test 9 for thixotropic paints. [2] The deviation is that compared to the reference value. [3] The reference value is that established during qualification. [4] Unless otherwise specified. [5] Test could also be used for activator and thinner if required.				

Table 3 – Physico – Chemical characteristics

3.084 or 3.053	Colour		EN 3840	
		1	Test 30	
		3	EN 3837 – A_2	2024-T3 clad
		4	**EN 3837 Process A**	EN 2334 Pickle
		5	EN 2435-02 primer + finish to this standard	
		6	EN 23270	
	*	7	ΔE	shall match the colour specified
3.088 or 3.083	Gloss 60°		EN 3840	
		1	**Test 27**	
		3	EN 3837 – A_2	2024-T3 clad
		4	**EN 3837 Process A**	EN 2334 Pickle
		5	EN 2435-02 primer + finish to this standard	
		6	EN 23270	
	*	7	Gloss units	shall match the gloss specified

Table 4 – Mechanical characteristics

4.082	Adhesion		EN 3840	
		1	Test 24	
		3	EN 3837 – A_2	2024-T3 clad
		4	**EN 3837 Process A**	EN 2334 Pickle
		5	EN 2435-02 primer + finish to this standard	
		6	EN 23270	
		7	Classification ≤ 1	
4.076	Scratch resistance		**EN 3840**	
		1	Test 29	
		3	EN 3837 – A_2	2024-T3 clad
		4	**EN 3837 Process A**	EN 2334 Pickle
		5	EN 2435-02 primer + finish to this standard	
		6	EN 23270	
	*	7	≥ 1 500 g primer not exposed	
4.082	Slow deformation		EN 3840	
		1	Test 46	
		3	EN 3837 – A_2	2024-T3 clad
		4	**EN 3837 Process A**	EN 2334 Pickle
		5	EN 2435-02 primer + finish to this standard	
		6	EN 23270	
	*	7	≥ 2,5 mm no detachment or cracking	

Table 5 – Environmental characteristics

5.100	Resistance to fluids – [a]		EN 3840	
		1	Test 35	
		3	EN 3837 – A_2	2024-T3 clad
		4	**EN 3837 Process A**	EN 2334 Pickle
		5	**EN 2435-02 primer + finish to this standard, panel scribed to substrate immediately before testing.**	
		6	A	tri-n-butyl phosphate to EN 2379 G2 for 1 000 h (EN 23270) [1]
			B	tri-n-butyl phosphate to EN 2379 G2 for 1 000 h at (70 ± 2) °C [1]
		7	No blistering, softening, lifting or other film defect Test 29 ≥ 1 200 g primer not exposed	
5.101	Water behaviour		EN 3840	
		1	Test 34	
		3	EN 3837 – A_2	2024-T3 clad
		4	**EN 3837 Process A**	EN 2334 Pickle
		5	EN 2435-02 primer + finish to this standard, panel scribed to substrate immediately before testing.	
		6	water to EN ISO 3696 Grade 2 for 168 h at (40 ± 2) °C	
		7	No blistering, softening, lifting or other film defect Test 24 Classification ≤ 1 Test 29 ≥ 1 500 g primer not exposed	
5.106	Artificial weathering		EN 3840	
		1	Test 40	
		3	EN 3837 – A_2	2024-T3 clad
		4	**EN 3837 Process A**	EN 2334 Pickle
		5	EN 2435-02 primer + finish to this standard	
		6	UVB 313, 4 h light/4 h humidity/total 500 h	
		7	Test 27 ≤ 20 % reduction from initial value. Test 30 Δ E ≤ 2 units	
5.999	Notes	[1]	Additional fluids shall be subject of agreement between the manufacturer and the user.	

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