



SLOVENSKI STANDARD

SIST EN 4170:2008

01-september-2008

5 YfcbUj H_U! '6 Ufj Y]b`U_]! 'A YhcXUa Yf Yb`UcXdcfbcgH]`dfch]`fUhc_Ua ``df]
W_] bYa `]ndcgHj`Ub1 `b]n_]`hYa dYfUi f]

Aerospace series - Paints and varnishes - Test method for measurement of resistance to cold crack temperature cycle

Luft- und Raumfahrt - Anstrichstoffe - Beständigkeit gegen thermische Kreisläufe
(standards.iteh.ai)

Série aérospatiale - Peintures et vernis - Méthode de test pour mesurer la résistance aux cycles de basse température

<https://standards.iteh.ai/catalog/standards/sist/a0485a70-652e-46cd-bfca-6486f9508dd0/sist-en-4170-2008>

Ta slovenski standard je istoveten z: EN 4170:2007

ICS:

49.040	Prevleke in z njimi povezani postopki, ki se uporabljajo v letalski in vesoljski industriji	Coatings and related processes used in aerospace industry
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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 4170

July 2007

ICS 49.040

English Version

**Aerospace series - Paints and varnishes - Test method for
measurement of resistance to cold crack temperature cycle**

Série aéronautique - Peintures et vernis - Méthode de test
pour mesurer la résistance aux cycles de basse
température

Luft- und Raumfahrt - Anstrichstoffe - Beständigkeit gegen
thermische Kreisläufe

This European Standard was approved by CEN on 13 April 2007.

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, 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.

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COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN 4170:2007) 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 January 2008, and conflicting national standards shall be withdrawn at the latest by January 2008.

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, 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.

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EN 4170:2007 (E)**1 Scope**

This standard describes a procedure of ageing to assess the resistance of a coated panel (metallic or organic substrate) to a temperature cycle (cold, hot, hot and wet) for aerospace purposes.

This test deals with the assessment of the capability of the paint to support modification of internal stresses without any crack formation, peeling or other defects due to modification of the mechanical properties of the paint system.

2 Principle

The principle of the method is to create, using a temperature cycle (see 5.2), a periodic fatigue of the paint applied on a given substrate (fatigue of the interfaces or the paint itself). Generally failures occurring are:

- loss of adhesion;
- cracks if the energy due to internal stress development is greater than the cohesive strength of the paint;
- loss of flexibility, gloss;
- blistering.

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3 Apparatus

Climatic chamber: capable of reproducing the temperature cycle define in 5.2 or other required cycle.

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4 Specimen

The panels for the determination of the properties after the ageing process are selected and treated according to the material specification. The tests are indicated in the material specification.

Paint system is applied according to the manufacturers instructions (viscosity, overcoating time).

5 Procedure**5.1 General**

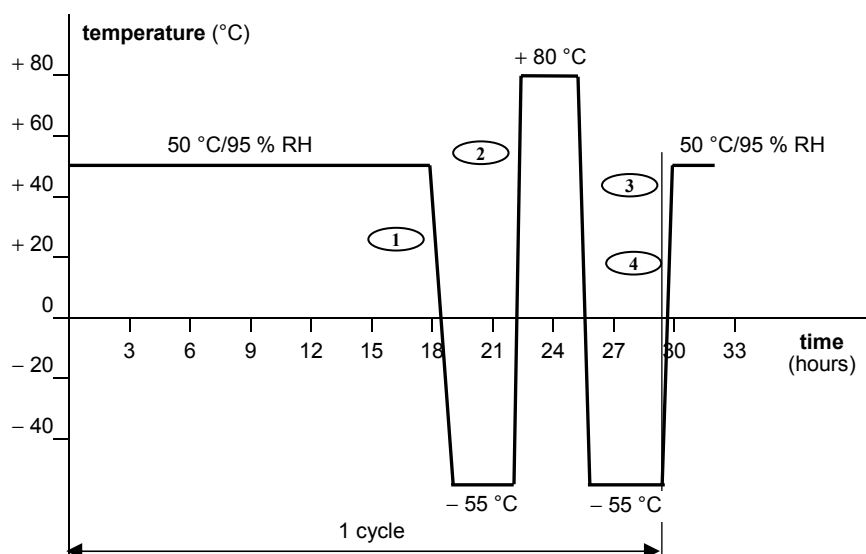
After the drying period defined in the material standard:

- If required gloss and colour are measured using relevant test method;
- The test panels are exposed vertically in the climatic chamber. A distance of 2 cm should separate successive panels.

Unless otherwise the duration of the test is defined by the number of cycles: 30.

5.2 Cold crack cycle

See Figure 1.



Key

○ = rate: 1 and 4: (2 < R < 3) °C/min
2 and 3: 10 °C/min

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Figure 1

SIST EN 4170:2008

All temperatures are given with an accuracy of $\pm 1^\circ\text{C}$.

All relative humidity are given with an accuracy of $\pm 10\%$ RH.

The thermal cycle is described hereafter:

- panels are exposed for 18 hours in a $(50 \pm 1)^\circ\text{C}/(90 \pm 10)\%$ RH atmosphere,
- at a rate of 2-30 °C/min, the atmosphere is cooled to -55°C ,
- the temperature is controlled for 2 hours at $(-55 \pm 1)^\circ\text{C}$,
- the ambience is quickly heated up to $(80 \pm 1)^\circ\text{C}$ at 10 °C/min,
- the temperature is controlled for 2 hours at $(80 \pm 1)^\circ\text{C}$,
- at a rate of 10 °C/min, the atmosphere is cooled to -55°C ,
- the temperature is controlled for 2 hours at $(-55 \pm 1)^\circ\text{C}$,
- the atmosphere is heated up to $(50 \pm 1)^\circ\text{C}$ and $(90 \pm 10)\%$ at a rate of 2 °C/min to 3 °C/min.

EN 4170:2007 (E)**6 Results**

Requirements and test methods are defined in the material specification. The evaluation of the results and test procedures are described in the relevant test methods.

7 Designation

EXAMPLE

Description block	Identity block
RESISTANCE TO THERMAL CYCLES	EN4170
Number of the standard _____	

8 Test report

- a) designation;
- b) date;
- c) thermal cycle;
- d) paint system;
- e) batch numbers;
- f) reference;
- g) application device;
- h) drying time and temperature, relative humidity;
- i) overcoating time;
- j) thickness of the dry film;
- k) thickness of the different layers;
- l) results;
- m) results and requirements;
- n) gloss;
- o) colour;
- p) defects.

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