



**SLOVENSKI STANDARD**  
**SIST EN 4592:2009**  
**01-julij-2009**

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5 YfcbUj h\_U!`6 Ufj Y]b`U\_]!`DfYg\_i gbY'a YrcXY'nUi [ chUj `Ub^Y'cXVc'bcgh  
]bZUfXY Y[ UgYj Ub^U

Aerospace series - Paints and varnishes - Test method for determination of infrared reflectance

Luft- und Raumfahrt - Beschichtungsstoffe - Prüfverfahren zur Messung der Infrarotemission

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Série aérospatiale - Peintures et vernis - Méthode d'essai pour réflectance infrarouge

[SIST EN 4592:2009](https://standards.iteh.ai/catalog/standards/sist/4f198b6b-00a5-4781-91ec-c5dd46910776/sist-en-4592-2009)

Ta slovenski standard je istoveten z: **EN 4592:2006**

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**ICS:**

49.040	Preveleke 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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**SIST EN 4592:2009**

**en,de**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 4592**

October 2006

ICS 49.040

English Version

## Aerospace series - Paints and varnishes - Test method for determination of infrared reflectance

Série aérospatiale - Peintures et vernis - Méthode d'essai  
pour réflectance infrarouge

Luft- und Raumfahrt - Anstrichstoffe - Prüfmethode zur  
Messung der Infrarotremission

This European Standard was approved by CEN on 21 July 2006.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, 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 4592:2009

<https://standards.iteh.ai/catalog/standards/sist/4f198b6b-00a5-4781-91ec-c3dd46910776/sist-en-4592-2009>



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**Contents**

Page

Foreword.....	3
1 <b>Scope</b> .....	4
2 <b>Normative references</b> .....	4
3 <b>Terms and definitions</b> .....	4
4 <b>Principle</b> .....	4
5 <b>Apparatus</b> .....	4
6 <b>Specimen</b> .....	5
7 <b>Procedure</b> .....	5
8 <b>Designation</b> .....	6
9 <b>Test report</b> .....	6

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## Foreword

This document (EN 4592:2006) 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 April 2007, and conflicting national standards shall be withdrawn at the latest by April 2007.

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, 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 4592:2006 (E)

### 1 Scope

This standard specifies the method of test for determining the infrared reflectance of paints and varnishes.

The test procedure determines the amount of energy reflected by the material in the range of wavelengths between 700 nanometres and 2 400 nanometres with respect to that of a standard reflectance material.

The procedure is applicable to products intended for use in aerospace applications.

### 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 1513, *Paints and varnishes — Examination and preparation of samples for testing.*

ISO 2808, *Paints and varnishes — Determination of film thickness.*

ISO 3270, *Paints and varnishes and their raw materials — Temperatures and humidities for conditioning and testing.*

ISO 15528, *Paints, varnishes and raw materials for paints and varnishes — Sampling.*

### 3 Terms and definitions

For the purposes of this standard, the following definitions apply.  
<https://standards.iteh.ai/catalog/standards/sist/4f198b6b-00a5-4781-91ec-c3dd46910776/sist-en-4592-2009>

#### 3.1

##### **infrared reflectance**

the proportion of the energy reflected by a specimen in relation to a defined standard material

### 4 Principle

The reflectance of a specimen comprising a coated test panel is measured against that of reflectance standard in the 700 nm to 2 400 nm wavelength range.

### 5 Apparatus

A recording spectrophotometer fitted with an integrating sphere which will meet the following requirements unless otherwise specified or agreed (see Table 1).

Table 1

Measurement range	700 nm to 2 400 nm minimum
Wavelength accuracy	$\pm 5$ nm
Measurement accuracy	(700 nm to 2 100 nm) $\pm 2$ % (2 100 nm to 2 400 nm) $\pm 8$ %
Bandpass	4 nm at 700 nm rising to a maximum of 14 nm at 2 400 nm
Integrating sphere geometry (reference conditions in case of dispute)	$(10 \pm 2)^\circ$ /diffuse specular component included

A reference material of known reflectance in the range 700 nm to 2 400 nm.

## 6 Specimen

Take a representative sample of the product to be tested or of each component in the case of a multi-coat system as described in ISO 15528.

Examine and prepare the sample for testing as described in ISO 1513.

The test panel shall be of a size suitable for the performance of the tests identified by this and the product standard.

Coat the test panel with the test product as specified by the product standard.

Dry/cure the coating for the time and under the conditions specified in the product standard.

The coating thickness, when determined using one of the non destructive procedures specified in ISO 2808 shall comply with the requirements of the product standard.

Condition the test panels in accordance with ISO 3270 for a minimum of 16 hours and a maximum of 72 hours prior to testing.

## 7 Procedure

### 7.1 Operation

Operate the spectrophotometer in accordance with the manufacturer's recommendations for environmental conditions, method of operation and calibration if different from that below.

### 7.2 Calibration

Place the reflectance standard over the reference port of the integrating sphere. Block the sample beam before it enters the integrating sphere using a suitable device and obtain a 0 % baseline in the specified wavelength range. Note that with some spectrophotometers it may be possible to calibrate the baseline so that no correction is necessary to the sample spectrum.

Remove the sample port blocking device and place reflectance standards over both the reference and sample ports and obtain the 100 % baseline in the specified wavelength range.

If the absolute reflectance spectrum is required, correct the spectrum to 100 % using the correction factors for the reflectance standard used.

**EN 4592:2006 (E)****7.3 Measurement**

Replace the sample port reflectance standard with the test panel and record the sample reflectance spectrum over the specified wavelength range. If the absolute reflectance spectrum is required, correct the spectrum using the correction factors for the reflectance standard used.

If specified, compare the recorded spectrum with that of the comparison spectrum.

**8 Designation**

EXAMPLE

Description block	Identity block
DETERMINATION OF INFRARED REFLECTANCE	<u>EN4592</u>
Number of the standard _____	

**9 Test report****9.1 Basic information**

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The test report shall contain at least the following information:

- a) all details necessary to identify the product tested; [EN 4592:2009](https://standards.iteh.ai/catalog/standards/sist/4f198b6b-00a5-4781-91ec-c3dd46910776/sist-en-4592-2009)
- b) reference to this test standard; <https://standards.iteh.ai/catalog/standards/sist/4f198b6b-00a5-4781-91ec-c3dd46910776/sist-en-4592-2009>
- c) reference to the product standard;
- d) items of supplementary information (9.2);
- e) results of the test work in terms of the stated requirements;
- f) any deviation from the test method specified;
- g) date(s) of the test;
- h) name of operator.