



# SLOVENSKI STANDARD

## SIST EN 2756:2010

01-april-2010

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### Aeronavtika - Žarnice - Preskusne metode

Aerospace series - Lamps, incandescent - Test methods

Luft- und Raumfahrt - Glühlampen - Prüfverfahren

Série aérospatiale - Lampes à incandescence - Méthodes d'essais

Ta slovenski standard je istoveten z: **EN 2756:2010**

[SIST EN 2756:2010](https://standards.iteh.ai/catalog/standards/sist/00db79c9-62fd-4209-81fc-3af3a07784d1/sist-en-2756-2010)

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#### **ICS:**

49.060	Letalska in vesoljska električna oprema in sistemi	Aerospace electric equipment and systems
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**SIST EN 2756:2010**

**en**

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ICS 49.060

English Version

## Aerospace series - Lamps, incandescent - Test methods

Série aérospatiale - Lampes à incandescence - Méthodes  
d'essais

Luft- und Raumfahrt - Glühlampen - Prüfverfahren

This European Standard was approved by CEN on 26 September 2009.

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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.

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## Foreword

This document (EN 2756:2010) 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of an identical text or by endorsement, at the latest by August 2010, and conflicting national standards shall be withdrawn at the latest by August 2010.

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.

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**EN 2756:2010 (E)****1 Scope**

This standard specifies the test methods for incandescent lamps used for aerospace applications.

It concerns lamps used for lighting and/or for interior or exterior signalling.

**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 2240-001:2009, *Aerospace series — Lamps, incandescent — Part 001: Technical specification*

EN 2240-002, *Aerospace series — Lamps, incandescent — Part 002: Main characteristics*

ISO 2678, *Environmental tests for aircraft equipment — Insulation resistance and high voltage tests for electrical equipment*

ISO 7137, *Aircraft — Environmental conditions and test procedures for airborne equipment*

IEC 60061-3, *Lamp caps and holders together with gauges for the control of interchangeability and safety — Part 3: Gauges*

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**3 Tests**

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**3.1 Test conditions** <https://standards.iteh.ai/catalog/standards/sist/00db79c9-62fd-4209-81fc-3af3a07784d1/sist-en-2756-2010>

Unless otherwise specified, the tests shall be carried out under the following conditions:

- ambient temperature: 15 °C to 35 °C;
- atmospheric pressure: 84 kPa to 107 kPa;
- relative humidity < 85 %.

Prior to all tests, the lamps shall be placed in these conditions for 1 h. The atmosphere of the environment shall not undergo any significant variations during a series of tests. (See ISO 7137.)

NOTE Each lamp subjected to tests shall be the object of individual monitoring.

**3.2 Visual examination****3.2.1 External appearance**

The lamps shall not present any defect capable of having an adverse effect on their installation or correct functioning; they shall conform with the characteristics specified in the product standards.

The bulb shall have a regular shape and shall not exhibit any defect which may adversely affect utilization.

The form and position of the filament shall conform with the indications given in EN 2240-002.

### 3.2.2 Quality of marking

The marking of lamps shall be legible and remain so after all the tests. It shall contain the indications specified in EN 2240-001.

### 3.3 Mass and dimensions

The mass should not exceed the values defined in the product standards by more than 10 %. The dimensions shall conform with the indications given in the product standards.

The dimensional interchangeability of the lamps shall be checked in individual cases by means of the gauge defined by IEC 60061-3 or by means of the gauge defined in the product standard.

### 3.4 Electrical and photometric tests

#### 3.4.1 General

Before the electrical and photometric tests, the lamps shall be stabilized by energizing them at nominal voltage.

For the qualification tests, this stabilization shall be effected by energizing them at nominal voltage for 10 h.

NOTE For the photometric tests, the ambient temperature to which the lamps is subjected shall not exceed the values specified at 3.1.

#### 3.4.2 Homogeneity of filament

When the lamp is energized at 50 % of nominal voltage, the filament shall appear homogenous and exhibit a uniform brightness except in the vicinity of points of contact with the support(s) and at the leadwires, where account shall be taken of the cooling effect.

#### 3.4.3 Luminous flux at nominal voltage

The lamp shall be placed in a correctly calibrated integrating photometer (e.g.: Ulbricht sphere) where it is supplied with direct current at stabilized nominal voltage; the tolerance under test voltage shall be fixed at:

- $\pm 0,1$  % for a test voltage  $> 6$  V;
- $\pm 0,2$  % for a test voltage  $\leq 6$  V.

When thermal equilibrium has been reached, the intensity of the electric current and the luminous flux are measured.

The power consumed shall be equal to the nominal value to within  $\pm 10$  %.

The luminous flux recorded shall be equal to the nominal values specified in the product standards, taking account of the tolerances ( $\pm 25$  %,  $\pm 15$  %,  $\pm 10$  %) appropriate to the category of lamp.

#### 3.4.4 Luminous flux at reduced voltage

This test concerns the lamps for use at reduced voltage.

The lamp shall first be subjected to tests specified in 3.4.3.

The lamp shall then be energized with direct current at reduced stabilized voltage as specified in the product standard applying the same tolerance as under 3.4.3.

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When thermal equilibrium is reached, the electric intensity and the luminous flux are measured.

The luminous flux measured shall be equal to the value imposed in the product standard to within  $\pm 25\%$ .

**3.4.5 Colour temperature of the filament**

This test shall apply to clear glass lamps (colourless glass) under nominal conditions of use when the colour temperature is mentioned in the product standards.

The lamp to be measured shall be energized at nominal voltage for a period of time which is sufficient to allow thermal equilibrium to be reached. Then the colour temperature shall be measured, recording at the same time the intensity of the current passing through the lamp.

The following measuring methods may be used:

- interpolation method based on the ratio of the red/blue luminous flux and by reference to the known colour temperature of three gauge lamps energized under specified conditions (the colour temperatures of these gauges lamps shall encompass the value specified for the lamps examined);
- Ulbricht sphere with a two-colour pyrometer;
- Ulbricht sphere with a coloured measuring head and measuring device;
- pyrometer with incandescent filament.

Requirement: the colour temperature should conform with the nominal value mentioned in the product standards. The measured value shall be only for information if not otherwise specified.

NOTE In the event of discrepancy between the results obtained by means of these different methods, the method of interpolation based on the ratio of the red/blue luminous flux and by reference to the gauge lamps shall be taken as the reference method.

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**3.4.6 Voltage strength and insulation resistance**

**3.4.6.1** Measurements to be undertaken on lamps in which the filament shall be supplied by a free wire or on bi-pin lamps

After mechanical destruction of the filament, the following tests shall be carried out:

a) voltage strength test in accordance with ISO 2678.

An alternating voltage is applied between the two power leads under the following conditions:

- 1) alternating current 500 V r.m.s, 50 Hz to 60 Hz;
- 2) method of application: progressive;
- 3) duration of application: 1 min.

Requirements:

- 4) there shall be no breakdown;
- 5) the value of the leakage current shall not exceed 0,5 mA (r.m.s.);

b) insulation resistance in accordance with ISO 2678.

A test voltage of 50 V d.c. to 100 V d.c. is applied between the two power leads.



The resistance is measured after 1 min of application.

Requirement:

— insulation resistance  $\geq 100 \text{ M}\Omega$ .

#### 3.4.6.2 Measurements to be undertaken on lamps equipped with a single-contact cap

After mechanical destruction of the filament, the tests set out in 3.4.6.1, a) and b) shall be carried out, applying the test voltages between the contact and the outer casing of the cap.

#### 3.4.6.3 Measurements to be undertaken on lamps the filament of which shall be supplied by two contacts insulated from the outer casing of the cap

#### 3.4.6.4 Measurements to be undertaken between the outer casing of the cap and one of the contacts (or the two contacts joined together)

##### a) voltage strength test in accordance with ISO 2678.

An alternating voltage shall be applied between the two power leads under the following conditions:

- 1) alternating voltage 500 V r.m.s, 50 Hz to 60 Hz;
- 2) method of application: progressive;
- 3) duration of application: 1 min.

Requirements:

- 4) there shall be no breakdown, nor flashover;
- 5) the value of the leakage current shall not exceed 0,5 mA (r.m.s.);

##### b) insulation resistance in accordance with ISO 2678.

A test voltage of 50 V d.c. to 100 V d.c. shall be applied between the outer casing of the cap and one of the contacts.

The resistance is measured after 1 min of application.

Requirement:

— insulation resistance  $\geq 100 \text{ M}\Omega$ .

#### 3.4.6.5 Measurements to be undertaken between the two contacts

After mechanical destruction of the filament, the tests set out in 3.4.6.2, a) and b) shall be carried out, applying the test voltages between the two contacts.

### 3.4.7 Life

#### 3.4.7.1 General

The life to be taken into account shall be the value specified in the product standard.

Two types of tests are applied to verify the life of the lamps.