

# **SLOVENSKI STANDARD**

## **oSIST prEN ISO 16474-3:2019**

**01-november-2019**

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**Barve in laki - Metode izpostavljanja laboratorijskim virom svetlobe - 3. del:  
Fluorescentne UV-svetilke (ISO/DIS 16474-3:2019)**

Paints and varnishes - Methods of exposure to laboratory light sources - Part 3:  
Fluorescent UV lamps (ISO/DIS 16474-3:2019)

Beschichtungsstoffe - Künstliches Bestrahlen oder Bewittern in Geräten - Teil 3: UV-  
Fluoreszenzlampen (ISO/DIS 16474-3:2019)

Peintures et vernis - Méthodes d'exposition à des sources lumineuses de laboratoire -  
Partie 3: Lampes fluorescentes UV (ISO/DIS 16474-3:2019)

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Paints and varnishes

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### Paints and varnishes — Methods of exposure to laboratory light sources —

#### Part 3: Fluorescent UV lamps

*Peintures et vernis — Méthodes d'exposition à des sources lumineuses de laboratoire —  
Partie 3: Lampes fluorescentes UV*

ICS: 87.040

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ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Fax: +41 22 749 09 47  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

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## ISO/DIS 16474-3:2019(E)

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

This second edition cancels and replaces the first edition (ISO 16474-3:2013), which has been technically revised.

The main changes compared to the previous edition are as follows:

- in [7.2](#) the difference between the temperature of a black panel sensor and a black standard sensor has been corrected;
- in [Table 4](#) it has been changed that the black-panel temperature is not controlled during water spray;
- the text has been editorially revised and the normative references have been updated.

A list of all parts in the ISO 16474 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

Coatings of paints, varnishes and similar materials (subsequently referred to simply as coatings) are exposed to laboratory light sources, in order to simulate in the laboratory the ageing processes which occur during natural weathering or behind window glass.

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# Paints and varnishes — Methods of exposure to laboratory light sources —

## Part 3: Fluorescent UV lamps

### 1 Scope

This document specifies methods for exposing coatings to fluorescent UV lamps, heat and water in apparatus designed to reproduce the weathering effects that occur when materials are exposed in actual end-use environments to daylight, or to daylight through window glass.

The coatings are exposed to different types of fluorescent UV lamps under controlled environmental conditions (temperature, humidity and/or water). Different types of fluorescent UV lamp may be used to meet all the requirements for testing different materials.

Specimen preparation and evaluation of the results are covered in other ISO documents for specific materials.

General guidance is given in ISO 16474-1.

NOTE Fluorescent UV lamp exposures for plastics are described in ISO 4892-3.

### 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.

ISO 1514, *Paints and varnishes — Standard panels for testing*

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

ISO 4618, *Paints and varnishes — Terms and definitions*

ISO 9370, *Plastics — Instrumental determination of radiant exposure in weathering tests — General guidance and basic test method*

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

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4618 and the following 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/>

## ISO/DIS 16474-3:2019(E)

### 3.1 radiant exposure

$H$

amount of radiant energy to which a test panel has been exposed

Note 1 to entry: Radiant exposure is given by the equation  $H = \int E \cdot dt$

where

$H$  is the radiant exposure, in joules per square metre;

$E$  is the irradiance, in watts per square metre;

$t$  is the exposure time, in seconds

Note 2 to entry: If the irradiance  $E$  is constant throughout the whole exposure time, the radiant exposure  $H$  is given simply by the product of  $E$  and  $t$ .

## 4 Principle

**4.1** Fluorescent UV lamps, when properly maintained, can be used to simulate the spectral irradiance of daylight in the ultraviolet (UV) region of the spectrum.

**4.2** Specimens are exposed to various levels of UV radiation, heat and moisture (see [4.4](#)) under controlled environmental conditions.

**4.3** The exposure conditions may be varied by selection of:

- a) the type of fluorescent lamp (spectral power distribution);
- b) the irradiance level;
- c) the temperature during the UV exposure;
- d) the relative humidity of the chamber air during the light and dark exposures, when test conditions requiring control of humidity are used;

NOTE Commercial fluorescent UV lamp devices mostly do not provide means of relative humidity control.

- e) the type of wetting (see [4.4](#));
- f) the wetting temperature and cycle;
- g) the timing of the UV/dark cycle.

**4.4** Wetting is usually produced by condensation of water vapour onto the exposed specimen surface or by spraying the test specimens with demineralized/deionized water.

**4.5** The procedure(s) may include measurement of the irradiance and the radiant exposure in the plane of the specimen.

**4.6** It is recommended that a similar material of known performance (a control) be exposed simultaneously with the test specimens to provide a standard for comparative purposes.

**4.7** Intercomparison of results obtained from specimens exposed in different apparatus or to different types of lamp should not be made unless an appropriate statistical relationship has been established between the different types of equipment for the material to be tested.

## 5 Apparatus

### 5.1 Laboratory light source

**5.1.1** Fluorescent UV lamps are fluorescent lamps in which radiant emission in the ultraviolet region of the spectrum, i.e. below 400 nm, makes up at least 80 % of the total light output. There are three types of fluorescent UV lamp used in this document:

- Type 1A (UVA-340) fluorescent UV lamp: These lamps have a radiant emission below 300 nm of less than 1 % of the total light output, have an emission peak at 343 nm, and are more commonly identified as UVA-340 for simulation of daylight from 300 nm to 340 nm (see [Table 1](#), column [A.1](#)). [Figure A.1](#) is a graph of spectral irradiance from 250 nm to 400 nm of a typical type 1A (UVA-340) fluorescent lamp compared to daylight.
- Type 1B (UVA-351) fluorescent UV lamp: These lamps have a radiant emission below 310 nm of less than 1 % of the total light output, have a peak emission at 353 nm, and are more commonly identified as UVA-351 for simulation of the UV portion of daylight behind window glass (see [Table 2](#)). [Figure A.2](#) is a graph of spectral irradiance from 250 nm to 400 nm of a typical type 1B (UVA-351) fluorescent UV lamp compared to daylight filtered by window glass.
- Type 2 (UVB-313) fluorescent UV lamp: These lamps are more commonly identified as UVB-313 and have a radiant emission below 300 nm that is more than 10 % of the total output and a peak emission at 313 nm (see [Table 3](#)). [Figure A.3](#) is a graph of the spectral irradiance from 250 nm to 400 nm of two typical type 2 (UVB-313) fluorescent lamps compared to daylight. Type 2 (UVB-313) lamps may be used only by agreement between the parties concerned. Such agreement shall be stated in the test report.

NOTE 1 Type 2 (UVB-313) lamps have a spectral distribution of radiation which peaks near the 313 nm mercury line and might emit radiation down to  $\lambda = 254$  nm, which can initiate ageing processes that never occur in end-use environments.

NOTE 2 The solar spectral irradiance for a number of different atmospheric conditions is described in CIE No. 85<sup>[2]</sup>. The benchmark daylight used in this document is from CIE No. 85:1989, [Table 4](#).

**5.1.2** Unless otherwise specified, type 1A (UVA-340) fluorescent UV lamps or corresponding type 1A fluorescent UV lamp combinations shall be used to simulate the UV part of daylight (see [Table 4](#), method A). Unless otherwise specified, type 1B (UVA-351) lamps shall be used to simulate the UV part of daylight through window glass (see [Table 4](#), method B).

**5.1.3** Fluorescent lamps age significantly with extended use. If an automatic irradiance control system is not used, follow the apparatus manufacturer's instructions on the procedure necessary to maintain the desired irradiance.