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(JPIF/JSA)

**Plastics—Methods of exposure to
laboratory light sources—Part 3:
Fluorescent UV lamps**

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4-1-24, Akasaka, Minato-ku, Tokyo, 107-8440 JAPAN

In the event of any doubts arising as to the contents,
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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by the Japan Plastics Industry Federation (JPIF)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS K 7350-3:1996** is replaced with this Standard.

This **JIS** document is protected by the Copyright Law.

Attention is drawn to the possibility that some parts of this Standard may conflict with a patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have technical properties. The relevant Minister and the Japanese Industrial Standards Committee are not responsible for identifying the patent right, application for a patent after opening to the public, utility model right or application for registration of utility model after opening to the public which have the said technical properties.

JIS K 7350 consists of the following 4 parts under the general title “*Plastics—Methods of exposure to laboratory light sources*”:

Part 1: General guidance

Part 2: Xenon-arc lamps

Part 3: Fluorescent UV lamps

Part 4: Open-flame carbon-arc lamps

Plastics—Methods of exposure to laboratory light sources— Part 3: Fluorescent UV lamps

Introduction

This Japanese Industrial Standard has been prepared based on the second edition of **ISO 4892-3** published in 2006 with some modifications of the technical contents.

The portions given sidelines or dotted underlines are the matters in which the contents of the original International Standard have been modified. A list of modifications with the explanations is given in Annex JA.

Warning

Persons using this Standard should be familiar with normal laboratory practice. This Standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices.

1 Scope

This Standard specifies methods for exposing specimens to fluorescent UV radiation, 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 specimens are exposed to fluorescent UV lamps under controlled environmental conditions (temperature, humidity and/or water). Specimen preparation and evaluation of the results are covered in relevant standards for specific materials.

General guidance is given in **JIS K 7350-1**.

NOTE 1 Fluorescent UV lamp exposures for paints, varnishes and other coatings are described in **JIS K 5600-7-8**.

NOTE 2 The International Standard corresponding to this Standard is as follows.

ISO 4892-3:2006 *Plastics—Methods of exposure to laboratory light sources—Part 3: Fluorescent UV lamps* (MOD)

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21**.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. For the standards with the indication of year, only the edition of the indicated year shall be applied but not any revisions made thereafter (including amendments). For those with no indication of year, the most recent edition (including amendments) shall be applied.

*JIS K 7350-1 : 1995 Plastics—Methods of exposure to laboratory light sources Part 1:
General guidance*

NOTE : **JIS K 7350-1 : 1995** corresponds to **ISO 4892-1 : 1994** *Plastics—Methods of exposure to laboratory light sources—Part 1: General guidance* and does not correspond to **ISO 4892-1 : 1999** which is referred to in the corresponding International Standard of this Standard. However, there is no technical deviation.

JIS K 7362 Plastics—Determination of changes in colour and variations in properties after exposure to daylight under glass, natural weathering or laboratory light sources

NOTE : Corresponding International Standard: **ISO 4582** *Plastics—Determination of changes in colour and variations in properties after exposure to daylight under glass, natural weathering or laboratory light sources* (MOD)

3 Principle

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

3.2 Specimens are exposed to various levels of UV radiation, heat and moisture (see **3.4**) under controlled environmental conditions.

3.3 The exposure conditions may be varied by selection of:

- a) The type of fluorescent lamp.
- b) The irradiance level.
- c) The temperature during the light 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 devices usually do not provide means of relative humidity control.

- e) The type of wetting (see **3.4**).
- f) The wetting temperature and cycle.
- g) The timing of the light/dark cycle.

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

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

3.6 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.

3.7 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.

4 Apparatus

4.1 Laboratory light source

4.1.1 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 Standard.

— **Type 1A (UVA-340) fluorescent UV lamp:**

These lamps have a radiant emission below 300 nm of less than 2 % 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, A1). Figure A.1 of Annex A is a graph of spectral irradiance from 250 nm to 400 nm of a typical type 1A (UVA-340) fluorescent lamp compared to daylight. If specified and agreed upon by all parties, a combination of fluorescent UVA lamps may also be used (see table 1, A2). When combinations of lamps with different spectral emissions are used, provision shall be made to ensure the uniformity of the spectral irradiance at the surface of the specimens, e.g. by continuous repositioning of the specimens around the lamp array.

— **Type 1B (UVA-351) fluorescent UV lamp:**

These lamps have a radiant emission below 300 nm of less than 2 % 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 of Annex A 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 of Annex A 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 may 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**. The benchmark daylight used in this Standard is from table 4 in **CIE No. 85**.

4.1.2 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).

4.1.3 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.

4.1.4 For irradiance uniformity, periodic repositioning shall be performed when irradiances at all positions within the exposure area are less than 90 % of the peak irradiance. In the case of repositioning, the radiant exposure shall be uniform.