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(JPIF/JSA)

**Plastics—Methods of exposure to
laboratory light sources—
Part 4: Open-flame carbon-arc
lamps**

ICS 83.080.01

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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 7350-4** : 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 sources

Part 3: Fluorescent UV lamps

Part 4: Open-flame carbon-arc lamps

Plastics—Methods of exposure to laboratory light sources— Part 4: Open-flame carbon-arc lamps

Introduction

This Japanese Industrial Standard has been prepared based on the second edition of **ISO 4892-4** published in 2004 and Technical Corrigendum 1 (2005) with some modifications of the technical contents. The Technical Corrigendum has been edited and incorporated without modifications.

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

The open-flame carbon-arc lamps are also referred to as “sunshine carbon-arc lamps”.

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 and to ensure compliance with any national regulatory conditions.

1 Scope

This Standard specifies methods for exposing specimens to open-flame carbon-arc lamps in presence of moisture to reproduce the weathering effects that occur when materials are exposed in actual end-use environments in daylight or daylight filtered through window glass.

Specimen preparation and evaluation of the results are covered in other **JIS** standards for specific materials.

General guidance related to the test is given in **JIS K 7350-1**.

NOTE : The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO 4892-4:2004 *Plastics—Methods of exposure to laboratory light sources—Part 4: Open-flame carbon-arc lamps* and Technical Corrigendum 1 (2005) (MOD)

The symbols which denote the degree of correspondence in the contents between **JIS** and the corresponding International Standard 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 standards with the indication of year, the edition of the indicated year shall be applied and not any revisions (including amendments) made thereafter, and for those without, the most recent edition of the standard (including amendments) shall be applied.

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

NOTE : Though **JIS K 7350-1 : 1995** corresponds to **ISO 4892-1 : 1994** *Plastics—Methods of exposure to laboratory light sources—Part 1: General guidance*, and not to the most recent edition, **ISO 4892-1 : 1999** which is cited in the International Standard corresponding to this Standard, this difference does not cause any 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)

ASTM G152 Standard Practice for Operating Open Flame Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials

3 Principle

3.1 Specimens of the materials to be tested are exposed to glass-filtered open-flame carbon-arc light, to heat and to moisture continuously or in repetitive cycles.

3.2 The exposure conditions may be varied by selection of:

- a) the light filter;
- b) the type of exposure to moisture/humidity;
- c) the length of exposure to light and moisture/humidity;
- d) the temperature of the exposure;
- e) the relative lengths of the light and dark periods.

The effect of moisture is usually produced by controlling the humidity of the air or by spraying the test specimens with demineralized/deionized water or by condensation of water vapour onto the surfaces of the specimens.

3.3 The procedure may include measurements of the irradiance and radiant exposure at the surface of the specimens.

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

3.5 Intercomparison of results obtained from specimens exposed in different apparatus should not be made unless an appropriate statistical relationship has been established between the devices for the particular material tested.

4 Apparatus

4.1 Laboratory light source

4.1.1 General

Open-flame carbon-arc light sources typically use three or four pairs of carbon rods which contain a mixture of rare-earth metal salts and have a surface coating of a metal such as copper. An electric current is passed between the carbon rods which burn, giving off ultraviolet, visible and infrared radiation. The pairs of carbon rods are burned in sequence, with one pair burning at any one time. Use the carbon rods recommended by the manufacturer of the apparatus. See Annex JA for detailed specification of light source. The radiation reaching the specimens passes through glass filters. Three types of glass filter are used in practice. Tables 1 and 2 show the typical relative spectral power distribution for open-flame carbon-arc lamps with daylight (type 1) and window-glass (type 2) filters, respectively. When extended-UV filters (type 3) are used, the relative spectral power distribution shall meet the requirements of table 3.

Figure 1 shows the typical spectral irradiance between 250 nm to 800 nm for open-flame carbon-arc lamps with type 1, type 2 and type 3 filters, and the reference spectral irradiance of daylight specified in table 4 of **CIE No. 85**:1989.

Figure 2 shows, for information, the typical spectral irradiance between 250 nm to 320 nm for open-flame carbon-arc lamps with type 1, type 2 and type 3 filters, and the reference spectral irradiance of daylight specified in table 4 of **CIE No. 85**:1989.

Figure 2 clearly shows the difference of the rise in the short wavelength area among the three filters.

The manufacturer of the apparatus shall show that the spectral irradiance of the open-flame carbon-arc lamp with the respective filters satisfies the given requirements. The confirmation that the requirements and requests are met shall be made in accordance with the procedure given in **ASTM G152**.

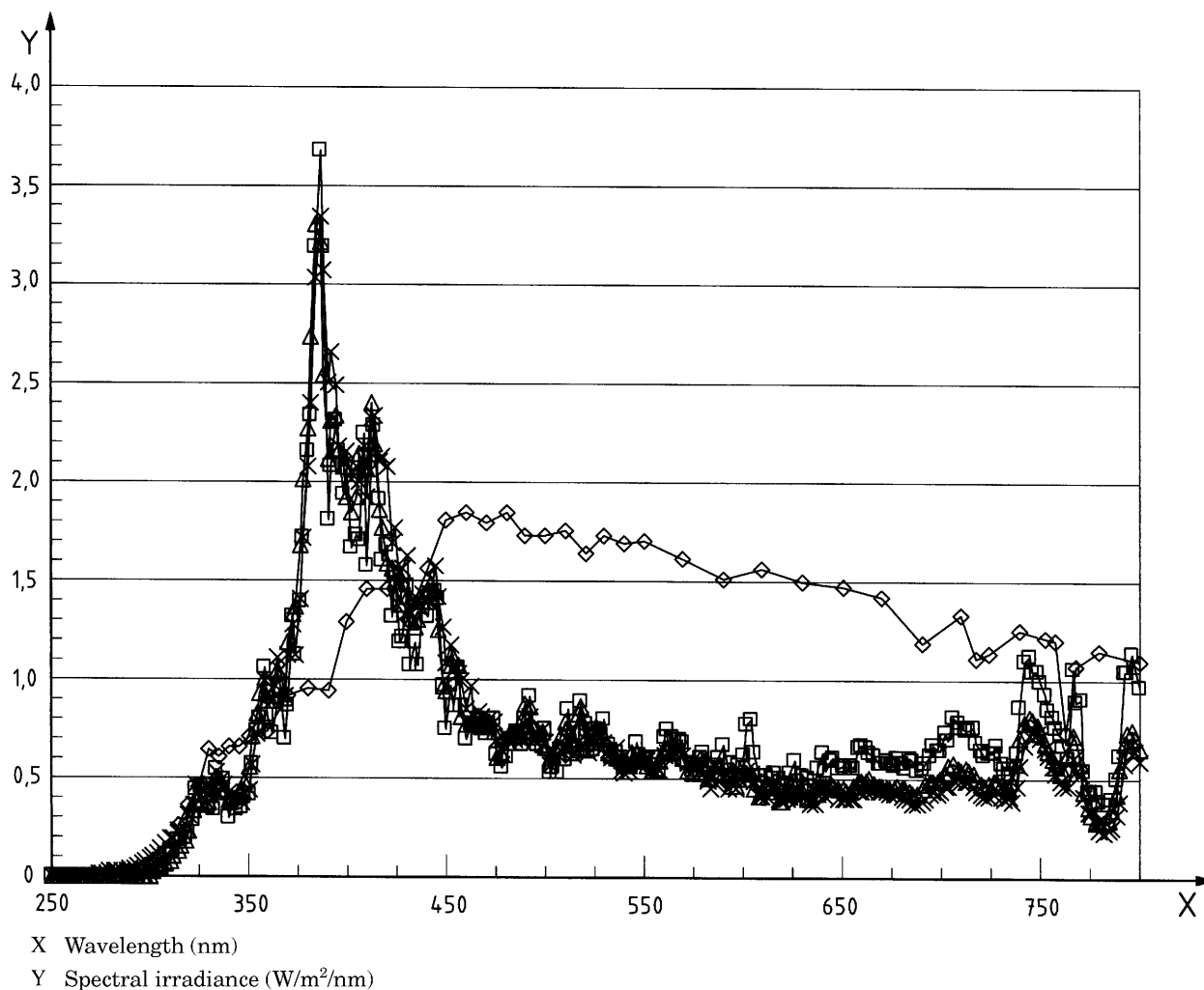


Figure 1 Reference spectral irradiance of daylight specified in table 4 of CIE No. 85:1989 (◇) and typical spectral irradiance for open-flame carbon-arc lamps with type 1 (□), type 2 (△) and type 3 (×) filters