FINAL
DRAFT

INTERNATIONAL STANDARD

ISO/FDIS 23741

ISO/TC **61**/SC **6**

Secretariat: DIN

Voting begins on:
2020-12-24

Voting terminates on:
2021-02-18

Plastics — Determination of spray water delivery during spray cycles when using a xenon arc weathering test apparatus

Reference number
ISO/FDIS 23741:2020(E)

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

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).

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).

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.

This document was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 6, *Ageing, chemical and environmental resistance*.

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.

Plastics — Determination of spray water delivery during spray cycles when using a xenon arc weathering test apparatus

1 Scope

This document specifies general procedures to determine the quantity of water sprayed on specimens during a spray cycle in a xenon arc weathering test apparatus.

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 4892-1, *Plastics — Methods of exposure to laboratory light sources — Part 1: General guidance*

ISO 4892-2, *Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon-arc lamps*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Principle

Water delivery during accelerated weathering testing is important because materials in most outdoor environments experience long times of wetness. In order to quantify water delivery, a set of collecting devices is placed on a specimen tray or mounted to a specimen rack of a xenon arc weathering test apparatus. The instrument is set to a spray cycle and after a specified time, the collected amount of water is determined.

The quantity of water delivered to specimens is not necessarily the same as water absorbed by specimens. Other factors such as temperature, time of wetness, and specimen affinity for water can affect total water absorption, but delivery of sufficient water is a necessary prerequisite for adequate absorption.

5 Apparatus

5.1 The xenon arc weathering test apparatus shall conform to the requirements of ISO 4892-1 and ISO 4892-2.

5.2 The collecting devices shall be made of inert, water-resistant material and contain an opening that leads to a reservoir.

5.2.1 The construction of the collecting device shall be such that the opening is in the same plane and orientation as the specimens.

5.2.2 The area of the opening of the collecting device is preferably between 40 cm^2 and 140 cm^2 and the volume of the reservoir is preferably large enough to contain water collected during a five-minute spray period.

5.2.3 In order to prevent artificially high water collection values, the collecting devices shall be designed to only allow water delivery from the front, lamp-facing side of the collecting devices. Water spray and water run-off from other specimen areas shall be prevented from being collected.

NOTE In practice, specimen mounting configurations in both flat-array and rotating-rack instruments can result in water run-off from specimens that can affect other specimens. Collections can differ from the actual amount delivered to a specimen surface.

5.3 A mass balance shall be able to measure water collection values to the nearest 0,1 g. More precise balances are also permitted.

6 Procedure

6.1 Determine the opening area of each collecting device to the nearest 0,5 cm^2 and the mass of each dry collecting device to the nearest 0,1 g.

6.2 Place a minimum of 3 collecting devices on the tray of a flat array instrument (e.g. top-left, centre, and bottom-right) or mount at least one collecting device per tier on a rotating rack instrument. Preferred positions to test are given in ISO 105-B02:2014, Figure B.1 and Figure B.2; examples are provided in Annex A.

6.3 Randomization of collecting device position, and performance of repeat collections, are recommended in order to improve statistical validity.

6.4 Run a five minutes test in a xenon arc weathering test apparatus using dark and water spray conditions. Chamber air and black panel thermometer temperatures shall be set to ambient conditions or uncontrolled.

6.5 After 5 min, remove the collecting devices from the weathering test apparatus, taking care not to spill any of the collected water. Immediately dry any excess water from the outer surface of each collecting device and then weigh each collecting device (along with collected water).

6.6 Determine the mass of collected water to the nearest 0,1 g by subtracting the mass of the completely dried collecting device from the measurement in 6.5.

7 Calculation

7.1 Calculation of water delivery amount

Calculate the amount of the collected water by using Formula (1):

$$R_{H2O} = m_{H2O} / A_{cd} \times t_e \quad (1)$$

where

R_{H2O} is the amount of the collected water, expressed in gram per minute and square centimetre;

m_{H2O} is the mass of the collected water, expressed in gram;

A_{cd} is the opening of the collecting device, expressed in square centimetre;

t_e is the time elapsed, expressed in minutes.

If collected water overflows the collection reservoir, report the collected amount as a minimum in 8 d).

7.2 Calculation of water delivery uniformity

7.2.1 Calculate the uniformity of collected water by first determining the average water collection from all collection devices.

7.2.2 If water delivery amount at any collection device differs by >10 % from the average water delivery, it is recommended in the interest of reducing variability in test results that specimens be periodically repositioned during the exposure period of standards that include water spray step(s) to ensure that each specimen receives a similar amount of water. Any repositioning schedule shall be agreed upon by all interested parties.

8 Test report

The test report shall contain at least the following information:

a) all information necessary for identification of the collecting device, including the area of the opening;

b) a reference to this document, i.e. ISO 23741:2021;

c) the type of xenon arc weathering test apparatus used (e.g. model - flat array instrument or rotating rack, etc.) and the duration of the test;

d) the quantity of collected spray water, expressed in gram per minute and square centimetre;

e) any deviations from the procedure;

f) any unusual features observed;

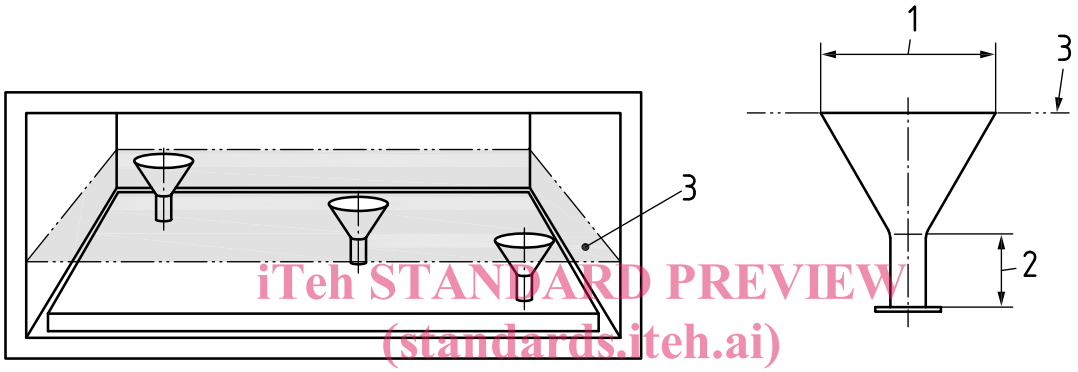
g) the date of the test.

Annex A
(informative)

Examples of water collection device configurations

A.1 An example of water collection devices for a flat-array xenon arc weathering test apparatus is shown in Figure A.1.

The specimen tray in a flat array apparatus may be removed to meet the requirement in 5.2.1 that the water collection device opening is located in the specimen plane. This can affect the air flow inside the apparatus, which can in turn affect the distribution of water spray.



Key

1 collection area
2 reservoir
3 specimen plane

Figure A.1 — Funnel arrangement in a flat-array xenon arc weathering test apparatus for quantification of water delivery

A.2 An example of a water collection device for a rotating rack xenon arc weathering test apparatus is shown in Figure A.2.

Figure A.2 — Water collection reservoir in a rotating rack xenon arc weathering test apparatus for quantification of water delivery

A.3 This water collection approach only quantifies the approximate amount of water delivered to the front face of the specimen. In practice, different specimen mounting configurations can result in water run-off that can affect other specimens in both flat-array and rotating-rack instruments.