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**Plastics — Methods of exposure to solar  
radiation —**

**Part 3:  
Intensified weathering using  
concentrated solar radiation**

**iTeh STANDARD PREVIEW**  
*Plastiques — Méthodes d'exposition au rayonnement solaire —*  
*(standards.iteh.ai) Partie 3: Exposition intensifiée par rayonnement solaire concentré*

ISO 877-3:2009

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## 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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

ISO 877-3 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 6, *Ageing, chemical and environmental resistance*.

Together with the other parts (see below), it cancels and replaces ISO 877:1994, which has been technically revised.

ISO 877 consists of the following parts, under the general title *Plastics — Methods of exposure to solar radiation*:

- *Part 1: General guidance*
- *Part 2: Direct weathering and exposure behind window glass*
- *Part 3: Intensified weathering using concentrated solar radiation*

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## Introduction

The International Organization for Standardization (ISO) draws attention to the fact that it is claimed that compliance with this document may involve the use of American patents US 6659638 B1, US 7318672 B2 and US 4807247 concerning the temperature control discussed in Subclause 6.3. ISO takes no position concerning the evidence, validity and scope of these patent rights.

The holder of these patent rights has assured ISO that he is willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of these patent rights is registered with ISO. Information may be obtained from:

Atlas Material Testing Technology LLC  
Intellectual Property  
45601 North 47th Avenue  
Phoenix, Arizona 85087, USA

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights other than those identified above. ISO shall not be held responsible for identifying any or all such patent rights.

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# Plastics — Methods of exposure to solar radiation —

## Part 3: Intensified weathering using concentrated solar radiation

### 1 Scope

This part of ISO 877 specifies a method for exposing plastics to concentrated solar radiation using reflecting concentrators to accelerate the weathering processes. The purpose is to assess property changes produced after specified stages of such exposures. General guidance concerning the scope of ISO 877 is given in ISO 877-1:2009, Clause 1. The reflecting concentrators used in these exposures are sometimes referred to as “Fresnel reflectors” because in cross-section the array of mirrors used to concentrate the solar radiation resembles the cross-section of a Fresnel lens.

For additional information about solar concentrating exposures, including a partial list of standards in which they are specified, refer to the Bibliography.

### 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.

ISO 877-1:2009, *Plastics — Methods of exposure to solar radiation — Part 1: General guidance*

ISO 4582, *Plastics — Determination of changes in colour and variations in properties after exposure to daylight under glass, natural weathering or laboratory light sources*

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

ASTM G 90, *Standard Practice for Performing Accelerated Outdoor Weathering of Nonmetallic Materials Using Concentrated Natural Sunlight*

ASTM G 179, *Standard Specification for Metal Black Panel and White Panel Temperature Devices for Natural Weathering Tests*

### 3 Principle

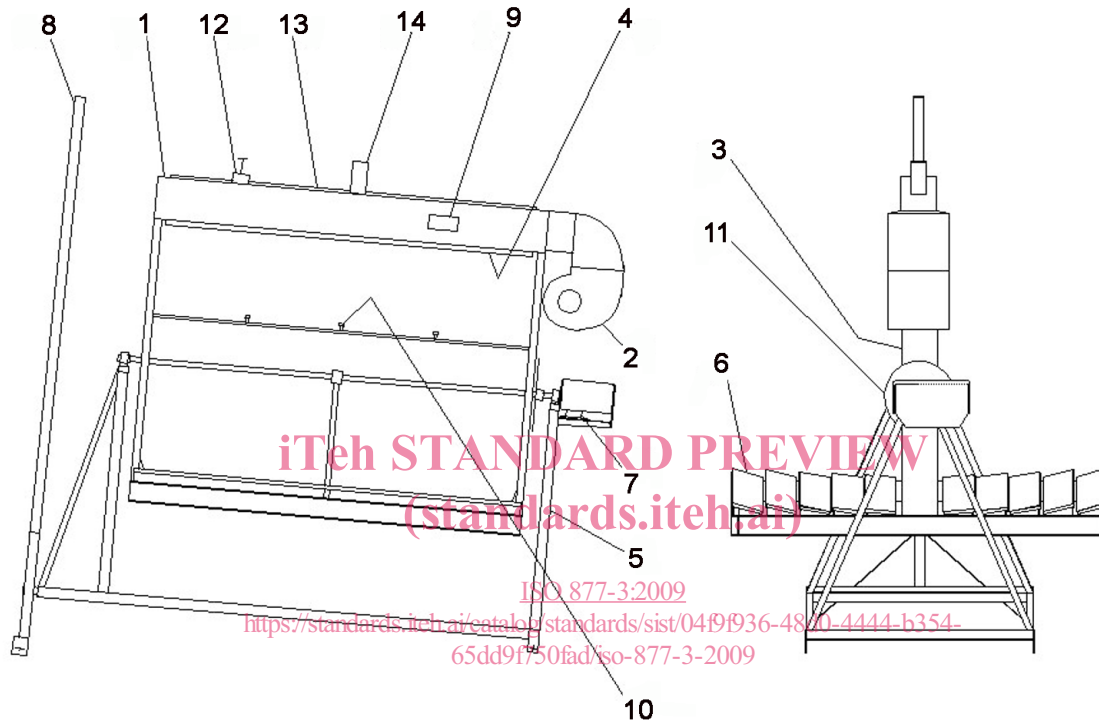
This part of ISO 877 describes a method for performing accelerated weathering on plastics using intensified solar radiation. General guidance is given in ISO 877-1:2009, Clause 4.

## 4 Apparatus

### 4.1 General requirements

Refer to ISO 877-1:2009, Subclause 5.1, for general requirements.

All requirements for the solar concentrating device, operation of the device and measurement of the solar radiation within the specimen exposure area shall be in accordance with ASTM G 90. See Figures 1 and 2 for schematic diagrams of the two types of test apparatus.

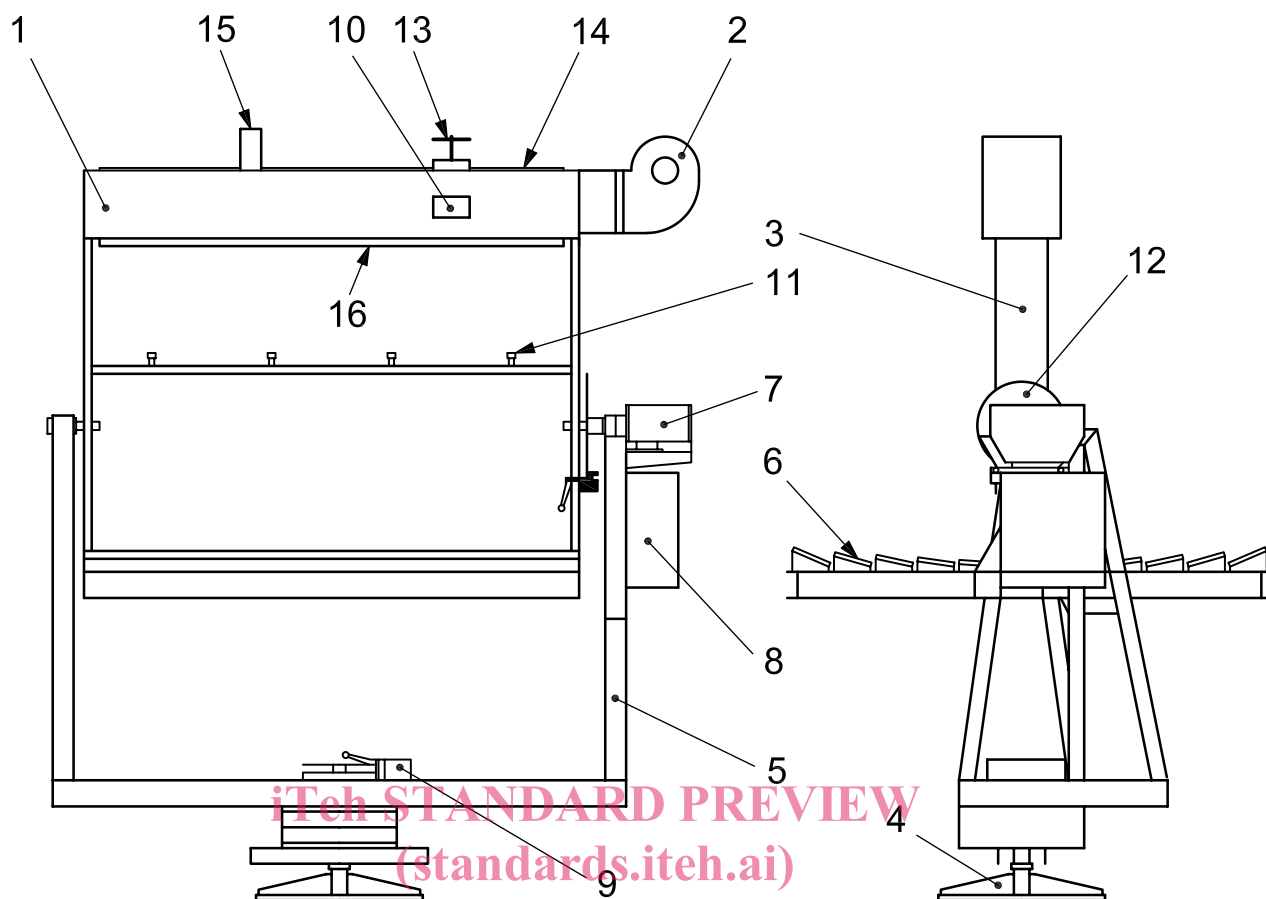


#### Key

1	air plenum	6	mirror	11	clutch disc for elevation drive
2	air blower	7	gear box	12	solar cells with shadow hat
3	rotor assembly	8	mast for manual elevation adjustment	13	specimen protection door
4	air deflector	9	air flow switch	14	door release mechanism
5	A-frame assembly	10	water spray nozzles		

**Figure 1 — Schematic diagram of test apparatus with single-axis tracking and manual elevation adjustment**



**Key**

1	air plenum	7	gear box for elevation drive	12	clutch disc for elevation drive
2	air blower	8	control box	13	solar cells with shadow hat
3	rotor assembly	9	gear box for azimuth drive	14	specimen protection door
4	turntable assembly	10	air flow switch	15	door release mechanism
5	A-frame assembly	11	water spray nozzle	16	air deflector
6	mirror				

**Figure 2 — Schematic diagram of test apparatus with dual-axis tracking**

#### 4.2 Apparatus for measurement of climatic factors

Refer to ISO 877-1:2009, Subclause 5.2.

#### 5 Test specimens

Refer to ISO 877-1:2009, Clause 6.

**NOTE** When irregularly shaped specimens are used, air flow and specimen cooling may be adversely affected. In addition, irradiance will not be uniform on all surfaces of a shaped specimen.