Australian Standard®

Outdoor weathering of plastics in the Australian environment

Part 2: Guide for design purposes

This Australian Standard was prepared by Committee PL/10, Methods of Testing Plastics. It was approved on behalf of the Council of Standards Australia on 3 April 1989 and published on 18 August 1989.

The following interests are represented on Committee PL/10:

Bureau of Meteorology
CSIRO, Division of Building, Construction and Engineering
Plastics Institute of Australia
Society of Automotive Engineers
Telecom Australia

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PREFACE

This Standard was prepared by the Standards Australia Committee for Methods of Testing Plastics under the direction of the Plastics Standards Board to supersede AS 1745.2—1975.

This Standard is technically equivalent to the previous edition, but the opportunity has been taken to clarify recommended procedures. In this edition 'hours of sunshine' has been replaced by the more precise concept of 'global radiation' as a measure of solar radiation accumulated during outdoor exposure.

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STANDARDS AUSTRALIA

Australian Standard

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1 SCOPE. This Standard sets out the recommended method of accumulating, presenting and using data on the outdoor weathering of plastics taking into account the methods of production, fabrication and installation of the test specimens. The Standard will assist in the selection of suitable plastics materials for the manufacture of commercial products for outdoor use in the Australian environment.

2 REFERENCED DOCUMENTS. The following documents are referred to in this Standard:

AS
1745 Outdoor weathering of plastics in the Australian environment
1745.1 Part 1: Commercial products

BS
4618 Recommendations for the presentation of plastics design data
Part 1: Mechanical properties

3 DEFINITIONS. For the purpose of this Standard, the definitions given in AS 1745.1 and those below apply.

3.1 Unit manufacturing process—a stage in the process of changing a raw material or an intermediate component into a finished or part-finished product.

3.2 Grade (of a plastics material)—the specific material used in the unit manufacturing process. A grade contains a specific polymer or polymer mixtures and various additives, e.g. plasticizers, colorants. Each grade is regarded as a unique material since any change in composition of the material may affect weathering performance.

NOTE: It is possible to obtain identical colours that have differing weathering characteristics with different pigments.

3.3 Global radiation.

3.3.1 *Mean daily global radiation*—the mean daily solar irradiation per unit area incident on a horizontal plane at the earth's surface over a stated number of complete years.

NOTE: The units are megajoules per square metre.

3.3.2 *Total global radiation*—the product of the mean daily global radiation and the number of days duration of exposure.

NOTE: The units are megajoules per square metre.

3.4 Total exposure period—the total period of exposure at the exposure site.

NOTE: This period is recorded in months or days.

3.5 Failure—the point at which the condition of the article is no longer acceptable for continued use.

4 GUIDELINES FOR THE PREPARATION OF DATA SHEETS.

4.1 General. When a new plastics grade has been developed, the eventual market should be critically reviewed, and the unit manufacturing processes likely to be used to produce commercial products from that grade should be established. A list of possible applications and the associated unit production processes used in the manufacture of commercial articles may be drawn up, and a series of suitable tests developed. (See Clause 4.2.)

The result of this review will indicate the data that should be provided in data sheet form for that grade. Where the grade is intended for 'general' application, the exclusion of unlikely applications or unit manufacturing processes could be of assistance in drawing up the list.

Where the grade has been developed for a specific application, the task is much simpler. For example, with an electrical grade for an outdoor switchboard, the minimum data required would relate to changes in the following properties as a result of outdoor exposure:

(a) Electrical and mechanical properties.

(b) Dimensional stability.

(c) Appearance and colour.

(d) Moisture resistance.

Specimens produced by the unit manufacturing process to be used to make the switchboard should be provided to obtain the data.

4.2 Guidelines for the selection of suitable tests.

4.2.1 *Performance tests for material having general application.* Tests should be applicable to the material grade and correspond to expected modes of degradation and the selected general performance requirements for the application.

BS 4618 provides useful guidelines for the selection of such tests. The methods used in BS 4618 for characterizing the grades should be used, except that AS 1745.1 should be used in preference to BS 4618: Section 4.2.

At least one test from each of the following categories should be carried out, on exposed and unexposed specimens, to determine changes as a result of outdoor exposure:

(a) Mechanical properties.

(b) Appearance.

(c) Dimensions.

(d) Electrical properties.

(e) Biological resistance.