

Methods of testing vulcanized rubber —

Part A53: Methods for exposure to natural weathering, for use in determining resistance to weathering

[ISO title: Rubber, vulcanized — Resistance to weathering —
Part 2: Methods of exposure to natural weathering]

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Rubber Standards Committee (RUM/-) to Technical Committee RUM/36, upon which the following bodies were represented:

- British Railways Board
- British Rubber Manufacturers' Association
- ERA Technology Ltd.
- GAMBICA (BEAMA Ltd.)
- Institution of Mechanical Engineers
- Institution of Water Engineers and Scientists
- Malaysian Rubber Producers' Research Association
- Ministry of Defence
- National College of Rubber Technology
- Rapra Technology
- SATRA Footwear Technology Centre

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National foreword

This Part of BS 903 has been prepared under the direction of the Rubber Standards Committee. It is identical with ISO 4665-2:1985 “*Rubber, vulcanized — Resistance to weathering — Part 2: Methods of exposure to natural weathering*”, published by the International Organization for Standardization (ISO).

Terminology and conventions. The text of the International Standard has been approved as suitable for publication as a British Standard without deviation. Some terminology and certain conventions are not identical with those used in British Standards; attention is drawn especially to the following.

The comma has been used as a decimal marker. In British Standards it is current practice to use a full point on the baseline as the decimal marker.

Wherever the words “part of ISO 4665” appear, referring to this Part of this standard, they should be read as “Part of BS 903”.

Cross-references

International Standard	Corresponding British Standard
	BS 1006:1978 <i>Methods of test for colour fastness of textiles and leather</i>
ISO 105-A02:1984	Section A02 <i>Grey scale for assessing change in colour</i> (Technically equivalent)
ISO 105-B01:1984	Section B01 <i>Blue wool standards</i> (Technically equivalent)
ISO 471:1983	BS 903 <i>Methods of testing vulcanized rubbers</i> Part A35:1985 <i>Temperatures, humidities and times for conditioning and testing of test pieces</i> (Identical)
ISO 1431-1:1980	Part A43:1982 <i>Determination of resistance to ozone cracking</i> (static strain test) (Identical)
ISO 1826:1981	Part A19:1986 <i>Heat resistance and accelerated ageing test</i> (National Appendix A is technically equivalent)
ISO 4661:1986	Part A36:1988 <i>Preparation of test pieces</i> (Identical)
ISO 4665-1:1985	Part A55:1988 <i>Method for assessment of changes in properties after exposure to natural weathering or artificial light, for use in determining resistance to weathering</i> (Identical)

Additional information. In UK practice the standard laboratory temperature is $23 \pm 2\text{ }^{\circ}\text{C}$ (see 5.3).

Although Annex C is expressed as not forming an integral part of the standard, attention is drawn to the fact that the test report (see clause 10) requires a description of the class and type of climate. It is recommended, for the purposes of description, that one of the classifications in Annex C is employed, together with the climatic conditions detailed in 9.3.2.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 10, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

0 Introduction

Weathering tests of the type specified in this part of ISO 4665 are needed to evaluate the performance of materials intended for outdoor use. The results of such tests should be regarded only as an indication of the effect of weathering. Results obtained at one time may not be strictly comparable with those obtained at another, although, in general, samples exposed for any period of several years and examined at the same time of year will show comparable behaviour. Even in long-term tests, the results may be affected by the season in which the tests are started.

The results of short-term exposure tests can give an indication of the relative outdoor performance but should not be used to predict the absolute long-term performance of a material. The results of tests carried out for less than 12 months will depend on the particular season of the year in which they are commenced.

It should be noted that the method of exposure is usually designed to expose the material to the most severe effects associated with any particular climate. It should therefore be borne in mind that the severity of exposure in actual use is, in most cases, likely to be less than that specified in this part of ISO 4665, and allowance should be made accordingly when interpreting the results. For example vertical exposure is considerably less severe in its effect on rubbers, particularly in tropical regions, where the sun is at a high angle when it is most powerful, and also because rain-water drains more rapidly from test pieces.

In the northern hemisphere, north-facing surfaces are likely to be less severely degraded than south-facing ones because they are less exposed to solar radiation, but the fact that they may remain wet for longer periods may be of significance for materials that are affected by moisture.

1 Scope and field of application

This part of ISO 4665 specifies methods of exposing vulcanized rubbers to natural weathering in order to assess changes produced after specified stages of such exposure.

It includes procedures designed for estimating the resistance of rubber to ozone cracking under atmospheric conditions of exposure.

NOTE For the method of determination of changes in properties after exposure, see ISO 4665-1.

2 References

ISO 105, *Textiles — Tests for colour fastness*.

ISO 105-A02, *Grey scale for assessing change in colour*.

ISO 105-B01, *Colour fastness to light: Daylight*.

ISO 471, *Rubber — Standard temperatures, humidities and times for the conditioning and testing of test pieces*.

ISO 1431-1, *Rubber, vulcanized — Resistance to ozone cracking — Part 1: Static strain test*.

ISO 1826, *Rubber, vulcanized — Time-interval between vulcanization and testing — Specification*.

ISO 4661, *Rubber — Preparation of test pieces*.

ISO 4665-1, *Rubber, vulcanized — Resistance to weathering — Part 1: Assessment of changes in properties after exposure to natural weathering or artificial light*.

3 Principle

Exposure outdoors to natural daylight of test pieces, or if required sheets and other shapes from which test pieces can later be cut. After a given exposure stage, removal for the determination of changes in colour, appearance or mechanical properties. The exposure stage may be a given interval of time or expressed in terms of a given solar radiation dosage. The latter is preferred whenever the main objective of the exposure is to determine resistance to light ageing since it minimizes the effect of variations in the quality and intensity of solar radiation with climate, location and time.

Unless otherwise specified, test pieces for the determination of change in colour and change in mechanical properties are exposed in an unstrained state. If required they may be exposed under window glass. Test pieces for the determination of ozone resistance are exposed under one or more tensile strains and are examined for cracking at certain intervals. Ozone resistance is expressed according to the procedures given in ISO 1431-1.

Climatic conditions and variations during the test are monitored and reported with other conditions of exposure.

4 Apparatus

4.1 *Exposure equipment*, consisting essentially of a test rack on to which test pieces may be mounted directly or in suitable holders.

The rack, holders and other fixtures shall be made from inert materials that will not affect the test results. Wood, non-corrosive aluminium alloy, stainless steel or ceramics have been found suitable. Materials having thermal properties which differ from these may give different results.