STANDARDS AUSTRALIA

**RECONFIRMATION**

**OF**
**AS 1683.4–1992**
**Methods of test for elastomers**
**Method 4: Rubber, vulcanized–**
**Determination of density**

# RECONFIRMATION NOTICE

Major stakeholders of this publication have reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

Certain documents referenced in the publication may have been amended since the original date of publication. Users are advised to ensure that they are using the latest versions of such documents as appropriate, unless advised otherwise in this Reconfirmation Notice.

Approved for reconfirmation in accordance with Standards Australia procedures for reconfirmation on 29 August 2018.

NOTES

Australian Standard®

# Methods of test for elastomers

# Method 4: Rubber, vulcanized—Determination of density

## PREFACE

This Standard was prepared by the Standards Australia Committee on Analysis and Testing of Elastomers under the direction of the Multitechnics Standards Policy Board, to supersede AS 1683.4 — 1974, *Methods of test for elastomers, Method 4: Density of vulcanized rubber*. It is identical with and has been reproduced from ISO 2781:1988, Rubber, vulcanized — Determination of density.

For purposes of this Australian Standard, the ISO text should be modified as follows:

(a) *Terminology* The words 'Australian Standard' should replace the words 'International Standard' wherever they appear.

(b) *Decimal marker* Substitute a full point for a comma as a decimal marker.

## CONTENTS

## 1 Scope

This International Standard specifies two methods of test for the determination of the density of solid vulcanized rubber.

Such determinations are of importance in the control of the quality of a rubber compound and in the calculation of the mass of rubber required to produce a given volume of vulcanizate.

This International Standard does not cover the determination of the relative density of rubber, which is the ratio of the mass of a given volume of the rubber to the mass of an equal volume of pure water at a given temperature.

In this International Standard the determination is made by observation of gravitational forces under different conditions but, for convenience, these forces are expressed in mass units.

## 2 Definition

For the purposes of this International Standard, the following definition applies.

**density:** The mass of unit volume of the rubber at a stated temperature. It is expressed in megagrams per cubic metre ($Mg/m^3$).

## 3 Principle

Two methods, A and B, are given.

In method A the masses of the test piece in air and in water are determined using an analytical balance equipped with a pan straddle. The mass when immersed in water is less than that in air by the mass of water displaced, the volume of water displaced being equal to that of the test piece.

Method B is intended to be used only when it is necessary to cut up the test piece into small pieces to eliminate air spaces, as in the case of narrow bore tubing and electric cable insulation. Measurements are made using a balance and a density bottle.

## 4 Apparatus

Ordinary laboratory apparatus and

**4.1 Analytical balance,** accurate to 1 mg.

**4.2 Balance pan straddle,** of convenient size to support the beaker and permit determination of the mass of the test piece in water (for method A).

**4.3 Beaker,** 250 $cm^3$ capacity (or smaller if necessitated by the design of the balance) (for method A).

**4.4 Density bottle** (for method B).

## 5 Test piece

**5.1** The test piece shall consist of a piece of the rubber with smooth surfaces, free from crevices and dust, and having a mass of at least 2,5 g. For method B the shape of the test piece shall be such as to permit cutting into suitable pieces (see 9.3).

**5.2** A minimum of two tests shall be made.

## 6 Time-interval between vulcanization and testing

Unless otherwise specified for technical reasons, the following requirements for time-intervals shall be observed.

**6.1** For all test purposes, the minimum time between vulcanization and testing shall be 16 h.

**6.2** For non-product tests, the maximum time between vulcanization and testing shall be 4 weeks and for evaluations intended to be comparable, the tests, as far as possible, shall be carried out after the same time-interval.

**6.3** For product tests, whenever possible, the time between vulcanization and testing shall not exceed 3 months. In other cases, tests shall be made within 2 months of the date of receipt by the customer of the product.

## 7 Conditioning of test pieces

**7.1** Samples and test pieces shall be protected from direct sunlight during the interval between vulcanization and testing.

**7.2** Samples, after such preparation as is necessary, shall be conditioned at a standard temperature (that is 23 °C ± 2 °C or 27 °C ± 2 °C) for at least 3 h before the test pieces are cut. These test pieces may be tested immediately but, if not, they shall be kept at the standard temperature until tested. If the preparation involves buffing, the interval between buffing and testing shall not exceed 72 h.

## 8 Temperature of test

The test shall normally be carried out at a standard temperature (23 °C ± 2 °C or 27 °C ± 2 °C), the same temperature being used throughout one test or series of tests intended to be comparable.

## 9 Procedure

### 9.1 Preparation of sample

If fabric is attached to, or embedded in, the samples, it shall be removed before cutting the test pieces. The method of removal shall preferably avoid the use of a swelling liquid, but, if necessary, a suitable non-toxic liquid of low boiling point may be used to wet the contacting surfaces. Care shall be taken to avoid stretching the rubber during the separation from the fabric, and the liquid, if used, shall be allowed to evaporate completely from the rubber surfaces after separation. Cloth-marked surfaces shall be made smooth by buffing.