

Physical testing of rubber —

Part A60: Curemetering —

Section 60.1 Guide to the use of curemeters

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee PRI/22, Physical testing of rubber, upon which the following bodies were represented:

- British Railways Board
- British Rubber Manufacturers' Association
- GAMBICA (BEAMA Ltd.)
- Institution of Mechanical Engineers
- Institution of Water and Environmental Management
- Malaysian Rubber Producers' Research Association
- Ministry of Defence
- RAPRA Technology Ltd.
- SATRA Footwear Technology Centre
- Co-opted member

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Foreword

This British Standard has been prepared by Technical Committee PRI/22.

The preparation of this guide was undertaken because the use of curemeters to provide the initial quality assurance of process and compound parameters for rubber based materials has grown significantly over the past few years. At the same time the number of types of curemeter has also increased. It was therefore felt that a guide which brought together the various uses and types may serve to support future standardization in this field.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 12, 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.

1 Scope

This British Standard gives guidance on the determination of vulcanization characteristics of rubber compound by means of curemeters.

2 Normative references

This British Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are made at the appropriate places in the text and the cited publications are listed on the inside back cover. For dated references, only the edition cited applies; any subsequent amendments to, or revisions of the cited publications apply to this British Standard only when incorporated in the reference by amendment or revision. For undated references, the latest edition of the cited publication applies.

3 Definitions

For the purposes of this British Standard the following definitions apply.

3.1

curemeter

instrument designed to determine the increase in stiffness of a vulcanizable rubber compound during heating. The instrument is used for determining the appropriate time for vulcanization or for assessing the tendency to premature vulcanization

3.2

oscillating disc curemeter (ODC)

a curemeter consisting of a bi-conical disc oscillated within a temperature controlled die cavity containing the test piece

3.3

rotorless curemeter (RCM)

a curemeter consisting of two dies forming a temperature controlled cavity, one of which is moved relative to the other to apply a stress or strain to the test piece

types of rotorless curemeter are listed in clause 5.1 and illustrated in Figure 3, Figure 4 and Figure 5

3.4

optimum cure

condition of vulcanization to achieve an acceptable compromise between a number of desired properties or the optimum value of a selected property

3.5

reverting cure

a type of vulcanization during which the modulus proceeds to a maximum and then decreases during an additional period at the vulcanization temperature

NOTE Peak cure is a synonym for reverting cure (the preferred term).

3.6

plateau cure

a type of vulcanization during which the modulus proceeds to a maximum and then remains essentially constant for a substantial period at the vulcanization temperature

3.7

marching modulus cure

a type of vulcanization during which the modulus does not reach a maximum value but continues to rise slowly, after a rapid rise, at the vulcanization temperature

3.8

scorch

premature vulcanization of a rubber compound

3.9

vulcanization characteristics

characteristics which may be taken from a vulcanization curve [see Figure 1 a)]. These are explained in clause 4

3.10

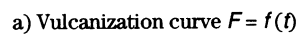
force, torque, stiffness

force and torque have their accepted scientific meaning. Stiffness is used as a general term for modulus or resistance to stress

4 Vulcanization characteristics

4.1 General

The properties of a rubber compound change during the course of vulcanization and the vulcanization characteristics can be determined by measuring properties as a function of time and temperature. Vulcanization characteristics are most commonly determined using instruments known as curemeters in which a cyclic stress or strain is applied to a test piece and the associated strain or force required is measured. Normally the test is carried out at a predetermined constant temperature and the measure of stiffness recorded continuously as a function of time.



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Figure 1 — Typical vulcanization curve and method of evaluation