

TECHNICAL REPORT

ISO
TR 9474

First edition
1993-08-15

Rubber and rubber products — Determination of accuracy and bias of chemical test methods

*Caoutchouc et produits en caoutchouc — Détermination de la justesse
et du biais des méthodes d'essai chimiques*



Reference number
ISO/TR 9474:1993(E)

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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.

The main task of technical committees is to prepare International Standards, but in exceptional circumstances a technical committee may propose the publication of a Technical Report of one of the following types:

- type 1, when the required support cannot be obtained for the publication of an International Standard, despite repeated efforts;
- type 2, when the subject is still under technical development or where for any other reason there is the future but not immediate possibility of an agreement on an International Standard;
- type 3, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example).

Technical Reports of types 1 and 2 are subject to review within three years of publication, to decide whether they can be transformed into International Standards. Technical Reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

ISO/TR 9474, which is a Technical Report of type 3, was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*.

The reasons which led to the decision to publish this document in the form of a type 3 Technical Report are explained in the introduction.

Introduction

Evaluation of test methods and the quality control monitoring of equipment and operating procedures is carried out by evaluating the precision of the test methods. In chemical test procedures it is essential that a careful assessment of both accuracy and precision is made. In physical and technological test procedures, on the other hand it is frequently only possible to assess the precision of the measurements.

ISO/TR 9272 addresses the assessment of precision which is important for both physical and chemical test methods. The present document addresses both accuracy and bias, vitally important for chemical analyses and also other tests where a 'true' or reference value can be established within ISO/TC45.

This document has been published as a Technical Report to make it more readily available to all who require it for background information in the determination of accuracy and bias in ISO/TC45 chemical test methods.

Rubber and rubber products — Determination of accuracy and bias of chemical test methods

1. Scope

This Technical Report presents guidelines for evaluating the accuracy and bias of ISO/TC45 test method results. These guidelines are additional to those in ISO 5725 and ISO/TR 9272, and give the format for expressing accuracy and bias.

This Technical Report is devoted to test method accuracy assessment and is limited to test method standards that

- have test results expressed in terms of a quantitative continuous variable
- have test results which are quantifiable in absolute terms

The accuracy and bias expression as determined by interlaboratory tests, enable the following to be assessed:

- a) the adequacy of the test method submitted to interlaboratory testing, where adequacy refers to the accuracy of the method and low values fixed bias, B_F and relative bias, B_R ;
- b) operator bias;
- c) sample bias.

2. References

ISO 5725 - Precision of test methods - Determination of repeatability and reproducibility by interlaboratory tests.

ISO/TR 9272 - Rubber and rubber products - Determination of precision for test method standards.

ISO Standards Handbook 3:1989, Statistical methods. (This handbook contains the following International Standards: ISO 2602, ISO 2854, ISO 2859-1, ISO 2859-2, ISO 3207, ISO 3301, ISO 3494, ISO 3534, ISO 3534-3, ISO 3951, ISO 5725.)

3. Definitions

For the purposes of this Technical report, the following definitions apply.

Note 1 -

Definitions of repeatability and reproducibility are given in ISO 5725, with clarification in ISO/TR 9272. Precision is defined in ISO 3534. It is a testing or measurement concept that expresses the ability to generate test results that agree with each other. The type of agreement is normally measured inversely by the standard deviation, high precision corresponding to a low (small) standard deviation. High precision may exist simultaneously with a large bias or poor accuracy.