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Rubber, vulcanized or thermoplastic — Determination of abrasion resistance using the Improved Lambourn test machine

*Caoutchouc vulcanisé ou thermoplastique — Détermination de
la résistance à l'abrasion à l'aide d'une machine de Lambourn
perfectionnée*



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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

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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 procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 2, *Testing and analysis*.

This second edition cancels and replaces the first edition (ISO 23337:2007), which has been technically revised to include a calibration schedule as [Annex B](#).

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Introduction

Various types of laboratory test equipment for determining the wear resistance of rubber compounds have been developed, depending on the products to which rubber compounds have been applied in the past. One such piece of equipment, called the "Improved Lambourn" abrasion test machine, is briefly introduced with other types in ISO 23794[2] and the test method for using it is described in detail in this document.

The main features of the Improved Lambourn machine are as follows:

- a) The slip rate is adjustable by virtue of the fact that the abrasive wheel and test piece are driven separately. A servo-mechanism is used for driving both the abrasive wheel and the test piece to ensure accurate speed control. In older types of equipment, both the abrasive wheel and the test piece were driven by the same drive system, with the speeds of rotation controlled by braking systems, which could result in an inaccurately controlled slip rate.
- b) A controlled feed of carborundum grit to the nip between the rubber test piece and the abrasive wheel ensures that abraded particles are prevented from adhering to the surface of the test piece or abrasive wheel, which is important in obtaining reproducible test results.

A previous wear study for rubber compounds using the Improved Lambourn machine showed that, at higher slip rates, wear resistance decreased in the order: butadiene rubber (BR) base compound, natural rubber (NR) base, styrene-butadiene rubber (SBR) base. However, at low slip rates, the order was reversed. This is interesting since the tread compound in truck and bus tyres generally uses NR or a blend of NR and BR base compound, while SBR base compound is used in car tyres. More details can be found in Reference [3].