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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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Foreword

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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 International Standard.

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] in the Bibliography.