BRITISH STANDARD AUTOMOBILE SERIES

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ISO 8767:1992

# Tyres and wheels —

## Part 1: Tyres —

## Section 1: Car tyres —

## Subsection 1.3 Method of measuring rolling resistance

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# Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Automobile Standards Policy Committee (AUE/-) to Technical Committee AUE/4, upon which the following bodies were represented:

Agricultural Engineers' Association
Automobile Association
British Industrial Truck Association
British Pressure Gauge Manufacturers' Association
British Rubber Manufacturers' Association
Bus and Coach Council
Department of Transport
Freight Transport Association
Institute of Road Transport Engineers (Inc)
Motor Cycle Industry's Association of Great Britain Ltd.
Motor Industry Research Association
National Tyre Distributors' Association
Retread Manufacturers' Association
Road Haulage Association Ltd.
Society of Motor Manufacturers and Traders Ltd.

This British Standard, having been prepared under the direction of the Automobile Standards Policy Committee, was published under the authority of the Standards Board and comes into effect on 15 January 1993

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# National foreword

This Subsection of this Part of BS AU 50 has been prepared under the direction of the Automobile Standards Policy Committee and is identical with ISO 8767:1992 *Passenger car tyres — Methods of measuring rolling resistance,* published by the International Organization for Standardization (ISO). Other Parts of this standard are as follows:

— *Part 2: Wheels and rims;*

— *Part 3: Valves;*

— *Part 4: Rim profiles and dimensions.*

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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**Summary of pages**

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 8 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.



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## 1 Scope

This International Standard specifies methods for measuring rolling resistance, under controlled laboratory conditions, for new pneumatic tyres designed primarily for use on passenger cars. The relationship between values obtained and the fuel economy of the vehicle is undetermined, and such values are not intended to be used to indicate levels of performance or quality.

This International Standard applies to all passenger car tyres.

It enables comparisons to be made between the rolling resistance of new tyres when they are free-rolling straight ahead, in a position perpendicular to the drum outer surface, and in steady-state conditions.

In measuring tyre rolling resistance, it is necessary to measure small forces in the presence of much larger forces. It is, therefore, essential that equipment and instrumentation of appropriate accuracy be used.

## 2 Definitions

For the purposes of this International Standard, the following definitions apply.

**2.1**
**rolling resistance:** $F_r$

loss of energy (or energy consumed) per unit of distance

NOTE 1 The SI unit conventionally used for the rolling resistance is the newton metre per metre (N m/m). This is equivalent to the drag force in newtons (N).

**2.2**
**rolling resistance coefficient:** $C_r$

ratio of the rolling resistance, in newtons, to the load on the tyre, in newtons. This quantity is dimensionless and is derived as follows:

$$C_r = \frac{\text{rolling resistance}}{\text{test load}}$$

**2.3**
**capped inflation**

process of inflating the tyre and allowing the inflation pressure to build up, as the tyre is warmed up while running

**2.4**
**regulated inflation**

process of inflating the tyre to the required pressure independent of its temperature, and maintaining this inflation pressure while the tyre runs under load. This is most commonly done by using a regulated pressure source attached to the tyre through a rotating union (See Annex B.)

**2.5**
**parasitic loss**

loss of energy (or energy consumed) per unit distance excluding tyre losses, and attributable to aerodynamic loss, bearing friction and other sources of systematic loss which may be inherent in the measurement

**2.6**
**skim reading**

type of parasitic loss measurement, in which the tyre is kept rolling, without slip page, while reducing the tyre load to a level at which energy loss within the tyre itself is virtually zero

**2.7**
**machine reading**

type of parasitic loss measurement, involving losses of the test machine, exclusive of losses in the rotating spindle which carries the tyre and rim

**2.8**
**moment of inertia**

(see Annex C)

## 3 Test methods

The following alternative measurement methods are given in this International Standard. The choice of an individual method is left to the tester. For each method, the test measurements shall be converted to a rolling resistance force acting at the tyre/drum interface.

a) Force method: the reaction force at the tyre spindle.

b) Torque method: the torque input to the test drum.

c) Power method: the power input to the test drum.

d) Deceleration method: the deceleration of the test drum and tyre assembly.

## 4 Test equipment

### 4.1 Drum specifications

#### 4.1.1 *Diameter*

The test dynamometer shall have a cylindrical flywheel (drum) with a diameter of between 1,5 m and 3 m inclusive. It should be noted that the results are different; see **8.3** for drum diameter correction for comparisons, if necessary.

#### 4.1.2 *Surface*

The surface of the drum shall be smooth steel or textured and shall be kept clean. For the textured drum surface, see **B.4**.

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