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Motorcycle tyres rolling resistance measurement methods — Single point test

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Foreword

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This document was prepared by Technical Committee ISO/TC 31, *Tyres, rims and valves*.

This second edition of ISO 18164 cancels and replaces ISO 18164:2005 and ISO 28580:2018, which have been technically revised.

The main change is as follows:

— the measuring methods for passenger car, truck and bus tyres, and the optional test methods of the former Annex B have been removed.

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Motorcycle tyres rolling resistance measurement methods — Single point test

1 Scope

This document specifies methods for measuring rolling resistance, under controlled laboratory conditions, for new pneumatic tyres designed primarily for use on motorcycles. 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 document applies to motorcycle tyres.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 4223-1, *Definitions of some terms used in the tyre industry — Part 1: Pneumatic tyres*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4223-1 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
rolling resistance
F_r
loss of energy (or energy consumed) per unit of distance travelled

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

3.2
rolling resistance coefficient
C_r
ratio of the rolling resistance to the load on the tyre

Note 1 to entry: Rolling resistance is measured in newtons (N).

Note 2 to entry: Load on the tyre is measured in kilonewtons (kN).

Note 3 to entry: Although this quantity is dimensionless, it is conventionally expressed in N/kN.

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3.4
parasitic loss
loss of energy (or energy consumed) per unit distance excluding internal tyre losses, and attributable to aerodynamic loss of the different rotating elements of the test equipment, bearing friction and other sources of systematic loss which can be inherent in the measurement

Note 1 to entry: Depending on the method used, the aerodynamic loss of the tyre is possibly or possibly not included in the parasitic loss.

3.5
skim test reading
type of parasitic loss measurement, in which the tyre is kept rolling, without slippage, while reducing the tyre load to a level at which energy loss within the tyre itself is virtually zero

3.6
machine reading
type of parasitic loss measurement, involving losses of the test machine, exclusive of losses in the rotating spindle bearing, which carries the tyre and rim, and aerodynamic losses

3.7
moment of inertia
ratio of the torque applied to the tyre to the annular acceleration on the tyre

Note 1 to entry: See Annex A.

4 Test methods

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

a) Force method: the reaction force measured at the tyre spindle. This measured value also includes the bearing losses of the tyre spindle and the aerodynamic losses of the tyre and the wheel.

b) Torque method: the torque input measured at the test drum (see NOTE).

c) Power method: the measurement of the power input to the test drum (see NOTE).

d) Deceleration method: the measurement of deceleration of the test drum and tyre assembly (see NOTE).

NOTE This measured value also includes the bearing and aerodynamic losses of the wheel, the tyre and the drum, losses that are also to be considered.

5 Test equipment

5.1 Drum specifications

5.1.1 Diameter

The test dynamometer shall have a cylindrical flywheel (drum) with a diameter of at least 1,5 m (reference drum diameter: 1,7 m).

The results are different for different diameters; see 9.3 for drum diameter correction for comparisons, if necessary.

NOTE Historically, the measurement of the fore and aft (longitudinal) force on a flat surface machine has been shown to be quite difficult since this force is very small relative to other forces being measured. If a flat surface machine is used, care must be taken to correlate the data with the reference drum diameter in order to assure accurate results.

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