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Truck and bus tyres — Method for measuring relative wet grip performance — Loaded new tyres

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Foreword

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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 document 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 of the voluntary nature of standards, 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 www.iso.org/iso/foreword.html.

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

This third edition cancels and replaces the second edition (ISO 15222:2021), which has been technically revised.

The main changes are as follows:

— addition of new reference tyres in Clauses 5.4, 6.7.4, 7.8.3, and Annex A;

— revision of the track characterization method in Clause 5.1.

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Truck and bus tyres — Method for measuring relative wet grip performance — Loaded new tyres

1 Scope

This document specifies the method for measuring the relative wet grip braking performance index to a reference under loaded conditions for new tyres for use on commercial vehicles on a wet-paved surface.

NOTE The methods developed in this document are intended to reduce variability. A reference tyre is used to limit the variability of the testing method procedures.

This document applies to all commercial vehicle, truck and bus tyres.

This document does not apply to:

— tyres fitted with additional devices to improve traction properties (e.g. studded tyres);

— professional off-road 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.

ASTM E965-15, *Standard Test Method for Measuring Pavement Macrotexture Depth Using a Volumetric Technique*

ISO 4209-1, *Truck and bus tyres and rims (metric series) — Part 1: Tyres*

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

ISO 23671, *Passenger car tyres — Method for measuring relative wet grip performance — Loaded new 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
test run
single pass of a loaded tyre over a given test surface

3.2
candidate tyre
T
test tyre that is part of an evaluation programme

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3.3
reference tyre
R
standard reference test tyre (3.19) that is used as a benchmark in an evaluation programme

Note 1 to entry: These tyres usually have carefully controlled design features to minimize variation.

3.4
control tyre
C
intermediate tyre that is used when the *candidate tyre* (3.2) and the *reference tyre* (3.3) cannot be directly compared on the same vehicle

3.5
braking force
longitudinal force between a tyre and the road resulting from braking torque application

Note 1 to entry: It is expressed in newtons.

3.6
braking force coefficient
BFC
<vehicle method> ratio between the average deceleration in a *test run* (3.1) and the acceleration gravity (9,81 $m \cdot s^{-2}$)

3.7
dynamic tyre braking force coefficient
$\mu(t)$
<trailer or tyre test vehicle method> ratio between the *braking force* (3.5) and the *vertical load* (3.10) acquired in real time

3.8
peak braking force coefficient
μ_{peak}
<trailer or tyre test vehicle method> maximum value of the *dynamic tyre braking force coefficient* (3.7) that occurs prior to the *lockup of a wheel* (3.9) as the braking torque is progressively increased

3.9
lockup of a wheel
condition of a wheel in which its rotational velocity about the wheel spin axis is zero and it is prevented from rotating in the presence of applied wheel torque

3.10
vertical load
normal force (Z-direction) of a tyre exerted on the road resulting from the mass supported by the tyre

Note 1 to entry: It is expressed in newtons.

3.11
trailer
tyre test vehicle
special purpose tyre evaluation vehicle which has instruments to measure the vertical and longitudinal forces on one tyre during braking

3.12
hitch height
coupling height
height when measured perpendicularly from the centre of the articulation point of the trailer towing coupling or hitch to the ground, when the towing vehicle and trailer are coupled together

Note 1 to entry: The vehicle and trailer shall be standing on level pavement surface in their test mode complete with the appropriate tyre(s) to be used in the particular test.

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3.13
braking test
series of a specified number of *test runs* (3.1) of the same tyre repeated within a short time frame

3.14
braking test cycle
series of *braking test* (3.13) that consist of an initial braking test of the *reference tyre* (3.3) set, of up to three braking tests of either *candidate tyre* (3.2) sets or *control tyre* (3.4) sets, or both, and a final braking test of the same reference *tyre set* (3.17) or *tyre set* (3.18)

3.15
vehicle method
method for testing a tyre mounted on a commercially available vehicle

3.16
trailer or tyre test vehicle method
method for testing a tyre mounted on a trailer towed by a vehicle, or mounted on a special tyre test vehicle

3.17
tyre set
<vehicle method> four or six tyres depending on the test vehicle

3.18
tyre set
<trailer or a tyre test vehicle method> one or two tyres

3.19
SRTT
standard reference test tyre
tyre that is produced, controlled and stored under specific conditions, in order to be used as a reference tyre for testing

Note 1 to entry: These tyres usually have carefully controlled design features to minimize variation. The requirements for SRTTs are given in ASTM international standards as indicated in *SRTT16C* (3.19.1) to *SRTT22.5 siped* (3.19.6) .

3.19.1
SRTT16C
standard reference test tyre (3.19) as defined in ASTM F2872 [1]

Note 1 to entry: It has the designation 225/75R16C 116/114S.

3.19.2
SRTT19.5
standard reference test tyre (3.19) as defined in ASTM F2871 [2]

Note 1 to entry: It has the designation 245/70R19.5 136/134M.

3.19.3
SRTT22.5
standard reference test tyre (3.19) as defined in ASTM F2870 [3]

Note 1 to entry: It has the designation 315/70R22.5 154/150L.

3.19.4
SRTT16
standard reference test tyre (3.19) as defined in ASTM F2493 [4]

Note 1 to entry: It has the designation P225/60R16 97S.

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3.19.5
SRTT19.5 siped
standard reference test tyre (3.19) as defined in ASTM F3678 [5]

Note 1 to entry: It has the designation 245/70R19.5 136/134M SW.

3.19.6
SRTT22.5 siped
standard reference test tyre (3.19) as defined in ASTM F3677 [6]

Note 1 to entry: It has the designation 315/70R22.5 154/150L SW.

3.20
class of tyre
type of tyres intended to be used on similar vehicles

[SOURCE: ISO 20908 [7], 3.1]

3.20.1
class C2 tyre
commercial vehicle tyres with the load index (LI) in single formation lower than or equal to 121 and speed category symbol greater than or equal to "N"

Note 1 to entry: Speed symbol “N” is defined in ISO 4209-1 [8].

3.20.2
class C3 tyre
commercial vehicle tyres with the load index (LI) in single formation less than or equal to 121 and speed symbol "M" and below, or such tyres with the LI in single formation 122 and higher

Note 1 to entry: Speed symbol “M” is defined in the ISO 4209-1 [8].

4 Methods for measuring wet grip

The relative wet grip braking performance of a loaded new tyre for commercial vehicles travelling straight ahead on a wet, paved surface can be measured by one of the following methods:

— a vehicle method consisting of testing a tyre set mounted on a standard vehicle;

— a test method using a trailer or a tyre test vehicle equipped with a test tyre set.

5 General test conditions

5.1 Track characteristics

5.1.1 General

The surface shall be a dense asphalt surface with a uniform gradient of not more than 2 %. The surface shall not deviate by more than 6 mm when tested with a 3 m straight edge.

The test surface shall have a pavement of uniform age, composition and wear. The test surface shall be free of loose material or foreign deposits.

The maximum chipping size shall be from 8 mm to 13 mm.

The macro texture depth (MTD) of the area of the track to be used for the wet grip test shall be measured as specified in ASTM E965-15, and shall be (0,7 ± 0,3) mm.

The surface friction value for the wetted track shall be established by either of the following methods:

a) method specified in 5.1.2;

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