
**Passenger car, commercial vehicle,
truck and bus tyres — Methods for
measuring snow grip performance —
Loaded new tyres**

*Pneumatiques pour voitures particulière, véhicules utilitaires,
camions et autobus — Méthodes de mesurage de l'adhérence sur
neige — Pneumatiques neufs en charge*

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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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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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 WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#).

The committee responsible for this document is ISO/TC 31, *Tyres, rims and valves*.

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Passenger car, commercial vehicle, truck and bus tyres — Methods for measuring snow grip performance — Loaded new tyres

1 Scope

This International Standard specifies the method for measuring relative snow grip performance index of a candidate tyre compared to a reference, under loaded conditions for new tyres intended to be used on passenger car, commercial vehicle, truck and bus vehicles on a snow packed surface.

The methods developed here are meant to reduce the variability of the performance measurement. The use of the proper reference tyres is necessary to limit the variability of the testing method procedures.

This International Standard applies to all passenger car, commercial vehicle, truck and bus tyres.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 4000-1, *Passenger car tyres and rims (metric series) — Part 1: Tyres*

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

ASTM F1805, *Standard Test Method for Single Wheel Driving Traction in a Straight Line on Snow- and Ice-Covered Surfaces*

ASTM E1136, *Standard Specification for P195/75R14 Radial Standard Reference Test Tire*

ASTM F2870, *Standard Specification for 315/70R22.5 154/150L Radial Truck Standard Reference Test Tire*

ASTM F2871, *Standard Specification for 245/70R19.5 136/134M Radial Truck Standard Reference Test Tire*

ASTM F2872, *Standard Specification for 225/75R16C 116/114S M+S Radial Light Truck Standard Reference Test Tire*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

passenger car tyre

tyres conforming to ISO 4000-1

3.2

commercial vehicle tyre

tyres conforming to ISO 4209-1 and identified by a load index in single configuration lower or equal to 121 and a speed symbol higher or equal to “N”

3.3

truck and bus tyre

tyres conforming to ISO 4209-1 and identified by

- a) a load index in single configuration higher or equal to 122, or

b) a load index in single configuration lower or equal to 121 and a speed symbol lower or equal to “M”

3.4

test run

single pass of a loaded tyre over a given test surface

3.5

tyre set

group of two or four same tyres

3.6

candidate tyre

T

test *tyre set* (3.5) that is part of an evaluation program

3.7

reference tyre

R

special test *tyre set* (3.5), also known as a Standard Reference Test Tyre (SRTT), that is used as a benchmark in an evaluation program

Note 1 to entry: In order to minimize their variation, these tyres have carefully controlled design features and for this reason, they are produced, controlled and stored in accordance with the following ASTM (ASTM International) standards:

- ASTM E1136, SRTT P195/75R14;
- ASTM F2870, SRTT 315/70 R 22.5 - 154/150 L;
- ASTM F2871, SRTT 245/70 R 19.5 - 136/134 M;
- ASTM F2872, SRTT 225/75 R 16 C - 116/114 S.

3.8

control tyre

C

tyre set (3.5) that is part of an evaluation program

Note 1 to entry: It is an intermediate set of tyres which is used when the candidate tyre and the reference tyre cannot be directly compared on the same vehicle.

3.9

braking test

series of a specified number of ABS-braking *test runs* (3.4) of the same tyre repeated within a short time frame

3.10

mean fully developed deceleration

mfdd

average deceleration calculated on the basis of the measured distance recorded when decelerating a vehicle between two specified speeds

3.11

acceleration test

series of a specified number of traction controlled acceleration *test runs* (3.4) of the same tyre repeated within a short time frame

3.12

acceleration force of a tyre

longitudinal force resulting from acceleration torque application

Note 1 to entry: It is expressed in newtons, N.

3.13**acceleration force coefficient of a tyre****AFC**

ratio of acceleration force to vertical load

3.14**average acceleration****AA**

average acceleration calculated on the basis of the measured distance recorded when accelerating a vehicle between two specified speeds

3.15**Snow Grip Index****SG**

ratio between the performance of the candidate tyre to the performance of the proper standard reference test tyre

3.16**loaded radius**

distance from wheel axis of rotation to supporting surface (ground) at a given load and stated inflation pressure

4 Test methods**4.1 Braking on snow method for passenger car tyres****4.1.1 General**

Snow performance is based on a test method by which the mean fully developed deceleration in a braking test, of a candidate tyre is compared to that of a standard reference test tyre.

The relative performance shall be indicated by a Snow Grip Index (SG).

4.1.2 Test course

The braking tests shall be done on a flat test surface of sufficient length and width, with a maximum 2 % gradient, covered with packed snow.

The snow surface shall be composed of a hard packed snow base at least 3 cm thick and a surface layer of medium packed and prepared snow about 2 cm thick.

The air temperature, measured about one meter above the ground, shall be between $-2\text{ }^{\circ}\text{C}$ and $-15\text{ }^{\circ}\text{C}$; the snow temperature, measured at a depth of about one centimetre, shall be between $-4\text{ }^{\circ}\text{C}$ and $-15\text{ }^{\circ}\text{C}$.

It is recommended to avoid direct sunlight, large variations of sunlight or humidity, as well as wind.

The snow compaction index measured according to ASTM F1805 by using a CTI penetrometer shall be between 75 and 85.

The candidate tyre should be tested in the same slope and snow compaction condition as the reference tyre to avoid any advantage or disadvantage for the candidate tyre.

4.1.3 Vehicle

The test shall be conducted with a standard production vehicle in good running order and equipped with ABS.

The vehicle used shall be such that the loads on each wheel are appropriate to the tyres being tested. Several different tyre set can be tested on the same vehicle.