INTERNATIONAL STANDARD

ISO 19447

First edition
2021-09

Passenger car tyres — Method for measuring ice grip performance — Loaded new tyres

Pneumatiques pour voitures particulières — Méthode de mesurage de l'adhérence sur glace — Pneumatiques neufs en charge

Reference number
ISO 19447:2021(E)

© ISO 2021



COPYRIGHT PROTECTED DOCUMENT

© ISO 2021

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword ..... **iv**

Introduction ..... **v**

1 Scope **1**

2 Normative references **1**

3 Terms and definitions **1**

4 Test methods **3**

4.1 Braking on ice method for passenger car tyres 3

4.1.1 General 3

4.1.2 Test course 3

4.2 Vehicle 3

4.3 Standard reference test tyre 3

4.4 Tyre preparation 4

4.4.1 General 4

4.4.2 Stud protrusion measurement procedure 4

4.4.3 Tyre load and inflation pressure 5

4.4.4 Instrumentation 6

4.4.5 Testing order and braking test cycles 7

4.4.6 Test procedure 7

4.4.7 Data evaluation and presentation of results 8

4.4.8 Ice grip performance comparison between a candidate tyre and a reference tyre using a control tyre 10

Annex A (informative) **Example of a possible test report of ice grip index for a passenger car tyre** **12**

Annex B (informative) **Example of a test conditions calculation to perform an ice grip evaluation test** **17**

Bibliography **21**

© ISO 2021 – All rights reserved

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).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

© ISO 2021 – All rights reserved

Introduction

The method for measuring ice grip performance described in this document is meant to reduce the variability of the performance measurement. The use of the proper reference tyres limits the variability of the testing method procedures.

© ISO 2021 – All rights reserved

Passenger car tyres — Method for measuring ice grip performance — Loaded new tyres

1 Scope

This document specifies the method for measuring the relative ice grip performance index of a candidate tyre compared with a reference tyre under loaded conditions for new tyres intended to be used for passenger cars on surfaces made of ice.

This document applies to all passenger car tyres, except for T-type temporary-spare 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 4000-1, *Passenger car tyres and rims — Part 1: Tyres (metric series)*

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

ASTM F2493, *Standard Specification for P225/60R16 97S Radial Standard Reference Test Tire*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4000-1 and ISO 4223-1 and the following apply.

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

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

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

3.1
test tyre
candidate tyre (3.3), *reference tyre* (3.4) or *control tyre* (3.5)

3.2
test run
single pass of a loaded tyre over a given test surface

3.3
candidate tyre
T
test tyre (3.1) that is part of an evaluation programme

3.4
reference tyre
SRTT
R
special *test tyre* (3.1) that is used as a benchmark in an evaluation programme

Note 1 to entry: The reference tyre is defined in ASTM F2493.

© ISO 2021 – All rights reserved

Note 2 to entry: Reference tyres have carefully controlled design features to minimize variation and shall be stored in accordance with ASTM F2493.

Note 3 to entry: The reference tyre shall not be older than 30 months starting from the production week.

3.5
control tyre
C
intermediate *test tyre* (3.1) that is used when the *candidate tyre* (3.3) and the *reference tyre* (3.4) cannot be directly compared on the same vehicle

Note 1 to entry: The control tyre shall pass the ice grip index threshold defined in 4.4.7.5.

3.6
braking test
series of a specified number of *test runs* (3.2) of the same *test tyre* (3.1) repeated within a short time frame

3.7
braking test cycle
series of *braking tests* (3.6) that consist of an initial braking test of the *reference tyre* (3.4) or the *control tyre* (3.5), of up to two braking tests of *candidate tyres* (3.3), control tyres or both, and a final braking test of the same reference tyre or control tyre

3.8
non-consecutive braking test cycle
braking test cycles (3.7) performed at least after minimum refreshing (or new preparation) of the ice surface, or on a different test lane, or on a different day

3.9
mean fully developed deceleration
d_{m}
average deceleration calculated on the basis of the measured distance recorded when decelerating a vehicle between two specified speeds

3.10
ice grip index
G_{I}
ratio between the *mean fully developed deceleration* (3.9) of a *test tyre* (3.1) and that of the *reference tyre* (3.4) or that of the *control tyre* (3.5)

3.11
reference load
Q_{ref}
theoretical load capacity of a tyre at the test inflation pressure

Note 1 to entry: It is expressed in kilograms.

Note 2 to entry: It may exceed the maximum load-carrying capacity of the test tyre as indicated by its load index

3.12
load-on-tyre rate
R_{LoT}
actual tyre load on test vehicle divided by *reference load* (3.11)

Note 1 to entry: It is expressed as a percentage of the reference load.

3.13
tyre set
set of four tyres

© ISO 2021 – All rights reserved