PD ISO/TS 13471-1:2017

BSI Standards Publication

Acoustics — Temperature influence on tyre/road noise measurement

Part 1: Correction for temperature when testing with the CPX method

Documents
Document Sharing Hub

Full document details: PD ISO/TS 13471-1:2017

National foreword

This Published Document is the UK implementation of ISO/TS 13471-1:2017.

The UK participation in its preparation was entrusted by Technical Committee EH/1, Acoustics, to Subcommittee EH/1/2, Transport noise.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2017
Published by BSI Standards Limited 2017

ISBN 978 0 580 94680 6

ICS 17.140.30; 43.020

Compliance with a British Standard cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 May 2017.

Amendments/corrigenda issued since publication

Date	Text affected

Documents
Document Sharing Hub

Full document details: PD ISO/TS 13471-1:2017

TECHNICAL SPECIFICATION

ISO/TS 13471-1

First edition
2017-03-15

Acoustics — Temperature influence on tyre/road noise measurement —

Part : Correction for temperature when testing with the CPX method

Acoustique — Effet de la température sur les essais de bruit pneu/route —

Partie : Mode opératoire de correction sur les essais avec la méthode CPX

Reference number
ISO/TS 13471-1:2017(E)

AVA Documents
Document Sharing Hub
© ISO 2017

Full document details: PD ISO/TS 13471-1:2017

COPYRIGHT PROTECTED DOCUMENT

© ISO 2017, Published in Switzerland

All rights reserved. Unless otherwise specified, 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
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

© ISO 2017 – All rights reserved

Documents
Document Sharing Hub

Full document details: PD ISO/TS 13471-1:2017

Contents

Page

Foreword ... **iv**
Introduction ... **v**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **1**
3.1 Acoustics ... 1
3.2 Tyres and road surfaces ... 2
3.3 Temperatures ... 2
4 Principles of the correction procedures ... **3**
5 Temperature measurement equipment ... **4**
6 Measurement methods ... **4**
6.1 General ... 4
6.2 Measurement of air temperature ... 5
6.3 Measurement of road surface temperature (optional) ... 5
6.4 Measurement of tyre temperature (optional) ... 5
7 Temperature range ... **5**
7.1 General ... 5
7.2 Temperature range within which the correction procedure is valid ... 5
8 Temperature correction procedure ... **6**
8.1 Correction to CPX levels, L_{CPX} ... 6
8.2 Temperature coefficient ... 6
8.3 Spectral correction ... 8
9 Measurement uncertainty assessment according to ISO/IEC Guide 98-3 ... **8**
9.1 General ... 8
9.2 Potential uncertainties ... 8
9.3 Uncertainty estimation of temperature correction ... 9
9.4 Sources of uncertainty ... 9
9.4.1 Temperature coefficients, γ_t ... 9
9.4.2 Road surface category, δ ... 9
9.4.3 Temperature measurements, T ... 9
9.5 Estimation of uncertainties ... 10
10 Test report ... **10**
Annex A (informative) **Discrete temperature coefficient** ... **12**
Annex B (informative) **Information about road surface types** ... **13**
Annex C (informative) **Selection of temperature for normalization** ... **15**
Bibliography ... **16**

© ISO 2017 – All rights reserved

Documents
Document Sharing Hub
Full document details: PD ISO/TS 13471-1:2017

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 on 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 43 *Acoustics*, Subcommittee SC 1 *Noise*.

A list of all the parts in the ISO/TS 13471 series can be found on the ISO website.

© ISO 2017 – All rights reserved
Documents
Document Sharing Hub
Full document details: PD ISO/TS 13471-1:2017

Introduction

Air, tyre and road surface temperatures affect noise emission from the tyre/road interaction, as measured by means of, for example, the close-proximity (CPX) method specified in ISO 11819-2. This method allows the user to make measurements within a wide air temperature range (5 °C to 35 °C) which means that temperature influence on the results may be substantial.

In the CPX method, one or two reference tyres may be used, as specified in ISO/TS 11819-3; consequently, the temperature corrections need to be valid for these reference tyres. Tyre properties like rubber hysteresis and tread rubber hardness are affected by temperature, but the latter may also affect road surface properties. Temperature effects on noise, therefore, depend on both the tyre and the road surface, the temperatures of which are affected by ambient air temperature. To make it more complicated, the temperature probably has different effects on different noise generation mechanisms. Ideally, and whenever possible, temperature corrections shall be tailored to the tested tyre/road combination.

The approach to the temperature correction in this document is semi-generic, which means that under certain conditions a correction to noise for temperature is made common to a group of tyres or a group of road surfaces. This document makes a distinction to the two reference tyres and to a few major road pavement categories.

© ISO 2017 – All rights reserved

Documents
Document Sharing Hub
Full document details: PD ISO/TS 13471-1:2017

This page deliberately left blank

Documents
Document Sharing Hub

Full document details: PD ISO/TS 13471-1:2017

Acoustics — Temperature influence on tyre/road noise measurement —

Part : Correction for temperature when testing with the CPX method

1 Scope

This document specifies procedures for determining the effect of temperature on tyre/road noise emission. Temperatures considered are tyre, road and ambient air temperatures.

The noise emission for which this document is applicable is measured by means of ISO 11819-2, or similar methods such as the on-board sound intensity (OBSI) method specified in Reference [1]. Measurement results obtained at a certain temperature, which may vary over a wide range, are normalized to a designated reference temperature (20 °C) using a correction procedure specified in this document.

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 11819-2, *Acoustics — Measurement of the influence of road surfaces on traffic noise — Part 2: The close-proximity method*

ISO/TS 11819-3, *Acoustics — Measurement of the influence of road surfaces on traffic noise — Part 3: Reference tyres*

ISO/IEC Guide 98-3, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

3 Terms and definitions

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

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

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

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

3.1 Acoustics

3.1.1
tyre/road noise
noise generated by the tyre/road interaction

© ISO 2017 – All rights reserved

Documents
Document Sharing Hub

Full document details: PD ISO/TS 13471-1:2017