



SLOVENSKI STANDARD
SIST EN ISO 14505-3:2006

01-oktober-2006

9f[cbca]Ulc d`c hbY[Uc_c`UË JfYXbchYb`Ylc d`c hbY[Uc_c`Uj `j cn]` \ `È' "XY.
JfYXbchYb`Ylc d`c hbY[Ui [cXUg dca c `c`dfYg_i gb] `cgYV`fIGC`%() \$)!'.&\$ \$* Ł

Ergonomics of the thermal environment - Evaluation of the thermal environment in vehicles - Part 3: Evaluation of thermal comfort using human subjects (ISO 14505-3:2006)

iTeh STANDARD PREVIEW

Ergonomie der thermischen Umgebungen - Bewertung der thermischen Umgebungen in Fahrzeugen - Teil 3: Bewertung der thermischen Behaglichkeit durch Versuchspersonen (ISO 14505-3:2006)

[SIST EN ISO 14505-3:2006](https://standards.iteh.ai/catalog/standards/sist/11d0a1ad-bc18-4800-b742-ecc86a27d8ed/sist-en-iso-14505-3-2006)

<https://standards.iteh.ai/catalog/standards/sist/11d0a1ad-bc18-4800-b742-ecc86a27d8ed/sist-en-iso-14505-3-2006>

Ergonomie des ambiances thermiques - Évaluation des ambiances thermiques dans les véhicules - Partie 3: Évaluation du confort thermique en ayant recours a des sujets humains (ISO 14505-3:2006)

Ta slovenski standard je istoveten z: EN ISO 14505-3:2006

ICS:

13.180	Ergonomija	Ergonomics
43.020	Cestna vozila na splošno	Road vehicles in general

SIST EN ISO 14505-3:2006 en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN ISO 14505-3:2006](https://standards.iteh.ai/catalog/standards/sist/11d0a1ad-bc18-4800-b742-ecc86a27d8ed/sist-en-iso-14505-3-2006)

<https://standards.iteh.ai/catalog/standards/sist/11d0a1ad-bc18-4800-b742-ecc86a27d8ed/sist-en-iso-14505-3-2006>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 14505-3

June 2006

ICS 13.180; 43.020

English Version

**Ergonomics of the thermal environment - Evaluation of the
thermal environment in vehicles - Part 3: Evaluation of thermal
comfort using human subjects (ISO 14505-3:2006)**

Ergonomie des ambiances thermiques - Évaluation des
ambiances thermiques dans les véhicules - Partie 3:
Évaluation du confort thermique en ayant recours à des
sujets humains (ISO 14505-3:2006)

Ergonomie der thermischen Umgebung - Bewertung der
thermischen Umgebungen in Fahrzeugen - Teil 3:
Bewertung der thermischen Behaglichkeit durch
Versuchspersonen (ISO 14505-3:2006)

This European Standard was approved by CEN on 12 May 2006.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

EN ISO 14505-3:2006 (E)**Foreword**

This document (EN ISO 14505-3:2006) has been prepared by Technical Committee ISO/TC 159 "Ergonomics" in collaboration with Technical Committee CEN/TC 122 "Ergonomics", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2006, and conflicting national standards shall be withdrawn at the latest by December 2006.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Endorsement notice

The text of ISO 14505-3:2006 has been approved by CEN as EN ISO 14505-3:2006 without any modifications.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN ISO 14505-3:2006](https://standards.iteh.ai/catalog/standards/sist/11d0a1ad-bc18-4800-b742-ecc86a27d8ed/sist-en-iso-14505-3-2006)

<https://standards.iteh.ai/catalog/standards/sist/11d0a1ad-bc18-4800-b742-ecc86a27d8ed/sist-en-iso-14505-3-2006>

INTERNATIONAL
STANDARD

ISO
14505-3

First edition
2006-06-01

**Ergonomics of the thermal
environment — Evaluation of thermal
environments in vehicles —**

**Part 3:
Evaluation of thermal comfort using
human subjects**

iTeh STANDARD PREVIEW
(standards.iteh.ai)

*Ergonomie des ambiances thermiques — Évaluation des ambiances
thermiques dans les véhicules —*

*Partie 3: Évaluation du confort thermique en ayant recours à des sujets
humains*

<https://standards.iteh.ai/catalog/standards/sist/11d0a1ad-bc18-4800-b742-ecc86a27d8ed/sist-en-iso-14505-3-2006>



Reference number
ISO 14505-3:2006(E)

© ISO 2006

ISO 14505-3:2006(E)**PDF disclaimer**

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN ISO 14505-3:2006](https://standards.iteh.ai/catalog/standards/sist/11d0a1ad-bc18-4800-b742-ecc86a27d8ed/sist-en-iso-14505-3-2006)

<https://standards.iteh.ai/catalog/standards/sist/11d0a1ad-bc18-4800-b742-ecc86a27d8ed/sist-en-iso-14505-3-2006>

© ISO 2006

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword.....	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms, and definitions.....	2
4 Assessment of vehicle environments using human subjects	2
5 Principles of assessment.....	3
5.1 Subjective methods	3
5.2 Objective methods	3
5.3 Behavioural methods	3
5.4 Assessment of thermal comfort	3
6 Design of human subject trials	4
6.1 Aim of trial	4
6.2 Selection of human subjects	4
6.3 Measurement of subject responses	4
6.4 Selection of operating conditions.....	6
6.5 Analysis and interpretation of results	7
7 Test method for assessing thermal comfort in vehicle	7
Annex A (normative) Test method for assessment of vehicle thermal comfort.....	8
Annex B (informative) Example of single-sheet subjective questionnaire	10
Annex C (informative) Practical example of vehicle thermal comfort assessment using test method	11
Annex D (informative) Practical example of assessment of thermal comfort properties of vehicle glazing.....	13
Annex E (informative) Practical example of assessment of thermal comfort properties of vehicle seats	15
Bibliography	17

ISO 14505-3:2006(E)

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 14505-3 was prepared by Technical Committee ISO/TC 159, *Ergonomics*, Subcommittee SC 5, *Ergonomics of the physical environment*.

ISO 14505 consists of the following parts, under the general title *Ergonomics of the thermal environment — Evaluation of the thermal environment in vehicles*:

- *Part 1: Principles and methods for assessment of thermal stress*
- *Part 2: Determination of equivalent temperature*
- *Part 3: Evaluation of thermal comfort using human subjects*

Introduction

Direct methods for the assessment of thermal environments (hot, moderate, cold) in vehicles involve measurements of the responses of human subjects. There are three types: subjective methods, objective methods, and behavioural methods. *Subjective methods* quantify the responses of people to an environment using subjective scales. *Objective methods* are those which quantify the physical, physiological or mental condition of a person by the use of instrumentation or measures of an output such as performance measures. *Behavioural methods* quantify or represent human behaviour in response to an environment. Each of these methods has been developed according to basic principles and the most appropriate form of the method and combination of methods used in concert for the assessment of thermal environments in vehicles will depend upon the context and vehicle environment of interest. This part of ISO 14505 provides both principles and application of methods for the assessment of thermal comfort in vehicle environments using human subjects. The most appropriate methods for evaluating thermal comfort in vehicles are subjective. The principles for the construction of subjective assessment scales are given in ISO 10551 and are used in the development of the test method specified in this part of ISO 14505. Physiological measurements on human subjects are described in ISO 9886 and are beyond the scope of this part of ISO 14505.

This part of ISO 14505 complements standards concerned with the ergonomics of thermal environments and in particular can be used together with thermal indices that are valid for use in vehicle environments.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN ISO 14505-3:2006](https://standards.iteh.ai/catalog/standards/sist/11d0a1ad-bc18-4800-b742-ecc86a27d8ed/sist-en-iso-14505-3-2006)

<https://standards.iteh.ai/catalog/standards/sist/11d0a1ad-bc18-4800-b742-ecc86a27d8ed/sist-en-iso-14505-3-2006>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN ISO 14505-3:2006

<https://standards.iteh.ai/catalog/standards/sist/11d0a1ad-bc18-4800-b742-ecc86a27d8ed/sist-en-iso-14505-3-2006>

Ergonomics of the thermal environment — Evaluation of thermal environments in vehicles —

Part 3: Evaluation of thermal comfort using human subjects

1 Scope

This part of ISO 14505 gives guidelines and specifies a standard test method for the assessment, using human subjects, of thermal comfort in vehicles. It is not restricted to any particular vehicle but provides the general principles that allow assessment and evaluation. The method can be used to determine a measure of the performance of a vehicle for conditions of interest, in terms of whether it provides thermal comfort to people or not. This can be used in vehicle development and evaluation.

This part of ISO 14505 is applicable to all types of vehicles, including cars, buses, trucks, off-road vehicles, trains, aircraft, ships, submarines, and to the cabins of cranes and similar spaces. It applies where people are enclosed in a vehicle and when they are exposed to outside conditions. For those exposed to outside conditions, such as riders of bicycles or motorcycles, drivers of open sports cars and operators of fork lift trucks without cabins, vehicle speed and weather conditions can dominate responses. The principles of assessment, however, will still apply.

This part of ISO 14505 applies to both passengers and operators of vehicles where its application does not interfere with the safe operation of the vehicle.

It presents the principles of the assessment and evaluation of thermal comfort, including the use of test methods and trials. It also presents subjective methods that can be used in assessment.

This part of ISO 14505 is a basic ergonomics standard which can contribute to the development of standards concerned with specific vehicles and products.

2 Normative references

The following referenced documents are indispensable for the application 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 12894, *Ergonomics of the thermal environment — Medical supervision of individuals exposed to extreme hot or cold environments*

ISO 13731, *Ergonomics of the thermal environment — Vocabulary and symbols*