BS ISO 19237:2017

BSI Standards Publication

Intelligent transport systems — Pedestrian detection and collision mitigation systems (PDCMS) — Performance requirements and test procedures

Documents
Document Sharing Hub

Full document details: BS ISO 19237:2017

National foreword

This British Standard is the UK implementation of ISO 19237:2017.

The UK participation in its preparation was entrusted to Technical Committee EPL/278, Intelligent transport systems.

A list of organizations represented on this committee 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 87180 1

ICS 43.040.80; 03.220.01; 35.240.60

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

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 December 2017.

Amendments/corrigenda issued since publication

Date	Text affected

Documents
Document Sharing Hub

Full document details: BS ISO 19237:2017

INTERNATIONAL STANDARD

ISO 19237

First edition
2017-12

Intelligent transport systems — Pedestrian detection and collision mitigation systems (PDCMS) — Performance requirements and test procedures

Systèmes intelligents de transport — Systèmes de détection des piétons et de prévention des collisions (PDCMS) — Exigences de performance et modes opératoires d'essai

Reference number
ISO 19237:2017(E)

Documents
Document Sharing Hub

© ISO 2017

Full document details: BS ISO 19237:2017

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: BS ISO 19237:2017

Contents

Page

Foreword ... **iv**
Introduction ... **v**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **2**
4 Symbols and abbreviated terms ... **3**
5 Requirements ... **4**
5.1 Minimum enabling capabilities ... 4
5.2 Operating model — State transition diagram ... 4
5.2.1 State functional descriptions ... 4
5.3 Performance requirements ... 6
5.3.1 General ... 6
5.3.2 Operating speed ... 6
5.3.3 Countermeasure requirements ... 7
5.3.4 Driver controls and human interface ... 8
5.4 Types of PDCMS ... 8
6 Test procedures ... **8**
6.1 General requirements ... 8
6.1.1 Pedestrian test target specification ... 8
6.1.2 Driving surface ... 8
6.1.3 Ambient air temperature ... 8
6.1.4 Horizontal visibility ... 8
6.1.5 Vehicle pre-conditioning ... 9
6.1.6 Vehicle mass ... 9
6.2 Test requirements for Type 1 systems ... 9
6.2.1 Ambient illumination ... 9
6.2.2 Test procedures ... 9
6.2.3 Pass criteria ... 9
6.3 Test requirements for Type 2 systems ... 11
6.3.1 Ambient illumination ... 11
6.3.2 Test setup ... 11
6.3.3 Illuminance measurement methods ... 12
6.3.4 Illuminance values ... 13
6.3.5 Test procedures ... 13
6.3.6 Pass criteria ... 14
Annex A (informative) ... **15**

© ISO 2017 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS ISO 19237:2017

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

This document was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*.

© ISO 2017 – All rights reserved
Documents
Document Sharing Hub
Full document details: BS ISO 19237:2017

Introduction

The fatality and severe injury rates of traffic accidents involving pedestrians are significantly high, resulting in the loss of many lives.

Pedestrian Detection and Collision Mitigation Systems (PDCMS) reduce the severity of pedestrian collisions that cannot be avoided, and may reduce the likelihood of fatality. By a collision warning (CW) and automatically activating EB, PDCMS assist in slowing a vehicle when a collision is likely.

Functional elements of PDCMS are shown in Figure 1.

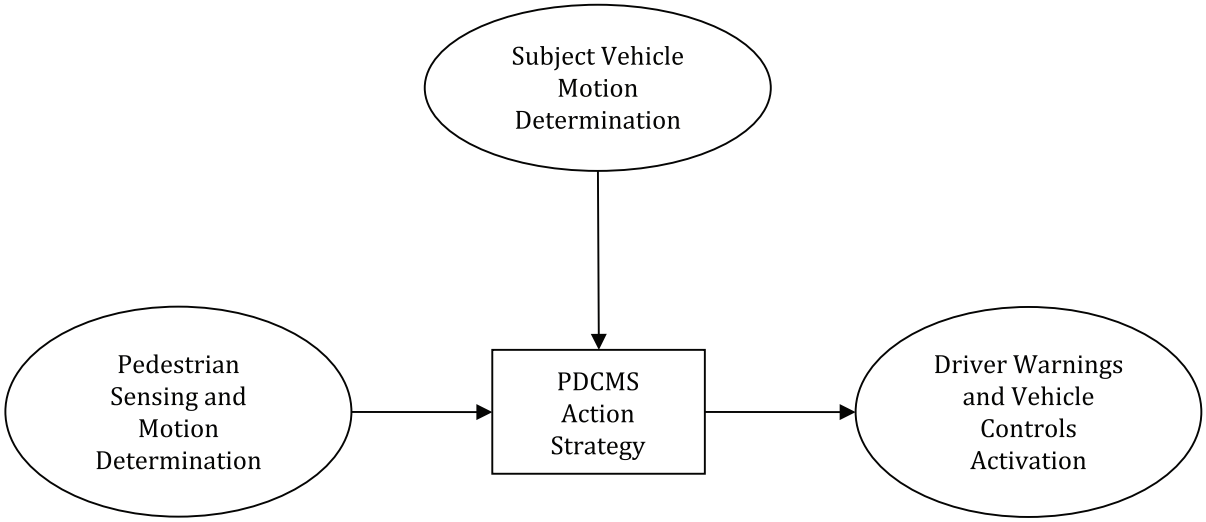

Figure 1 — Pedestrian Detection and Collision Mitigation Systems (PDCMS) functional elements

System designers and other users of this document may apply it to stand-alone PDCMS or to the integration of the PDCMS functions into other driving assistance and support systems.

© ISO 2017 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS ISO 19237:2017

Intelligent transport systems — Pedestrian detection and collision mitigation systems (PDCMS) — Performance requirements and test procedures

1 Scope

This document specifies the concept of operation, minimum functionality, system requirements, system interfaces, and test procedures for Pedestrian Detection and Collision Mitigation Systems (PDCMS). It specifies the behaviours that are required for PDCMS, and the system test criteria necessary to verify that a given implementation meets the requirements of this document. Implementation choices are left to system designers wherever possible.

PDCMS reduce the severity of pedestrian collisions that cannot be avoided, and may reduce the likelihood of fatality and severity of injury. PDCMS require information about range to pedestrians, motion of pedestrians, motion of the subject vehicle (SV), driver commands and driver actions. PDCMS detect pedestrians ahead of time, determine if detected pedestrians represent a hazardous condition, and warn the driver if a hazard exists. PDCMS estimate if the driver has an adequate opportunity to respond to the hazard. If there is inadequate time available for the driver to respond, and if appropriate criteria are met, PDCMS determine that a collision is imminent. Based upon this assessment, PDCMS will activate CWs and vehicle brakes to mitigate collision severity. This document, while not a collision avoidance standard, does not preclude a manufacturer from implementing collision avoidance with PDCMS.

Systems that include other countermeasures such as evasive steering are not within the scope of this document.

Responsibility for the safe operation of the vehicle remains with the driver.

This document applies to light duty passenger vehicles (see 3.6). It does not apply to other vehicle categories such as heavy vehicles or motorcycles. PDCMS are not intended for off-road use.

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 1176, *Road vehicles — Masses — Vocabulary and codes*

ISO 19206-2, *Road vehicles — Test devices for target vehicles, vulnerable road users and other objects, for assessment of active safety functions — Part 2: Requirements for pedestrian targets*[1)]

ISO 19476:2014, *Characterization of the performance of illuminance meter and luminance meter*

United Nations Economic and Social Council World Forum for Harmonization of Vehicle Regulations. (WP.29) TRANS/WP.29/78/Rev.2

United Nations Economic and Social Council World Forum for Harmonization of Vehicle Regulations. (WP.29) TRANS/WP.29/1045

No FMVSS 105; Hydraulic and electric brake systems

1) To be published.

© ISO 2017 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS ISO 19237:2017

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
collision warning
CW
warning system that alerts the driver of a potential collision with a pedestrian in the forward path of the subject vehicle

3.2
driver override
driver initiated suppression of an EB or CW countermeasure

3.3
emergency braking
EB
PDCMS countermeasure that responds to the detection of an imminent pedestrian collision by automatically activating braking to quickly reduce the relative velocity

3.4
heavy vehicle
any single vehicle or combination of vehicles defined as Category 1-2 or Category 2 in the United Nations Economic and Social Council World Forum for Harmonization of Vehicle Regulations (WP.29) TRANS/WP.29/1045

3.5
impact position
lateral contact position from the SV point of view or expected lateral contact position at the front of the SV when the SV collides with a pedestrian or when a collision is expected

3.6
light duty passenger vehicle
vehicle according to category M1 (≦8 passenger seats except driver seat) in the United Nations Economic and Social Council World Forum for Harmonization of Vehicle Regulations (WP.29) TRANS/WP.29/78/Rev.2.

3.7
minimum PDCMS speed reduction
minimum speed reduction achieved PDCMS shall achieve

3.8
minimum velocity
$V_{\min}$
minimum SV speed for which PDCMS shall be capable of activating a countermeasure

3.9
pedestrian
human being on the road or near the road

3.10
pedestrian collision
collision between the SV and a pedestrian

© ISO 2017 – All rights reserved
Documents
Document Sharing Hub
Full document details: BS ISO 19237:2017