
**Road vehicles — Test method to
evaluate the performance of lane-
keeping assistance systems**

*Véhicules routiers — Méthode d'essai pour évaluer la performance
des systèmes d'aide au maintien de la trajectoire*



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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).

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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 22, *Road vehicles*, Subcommittee SC 33, *Vehicle dynamics and chassis components*.

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.

Introduction

The main function of a lane keeping assistance system (LKAS) is to support the driver in keeping the vehicle within the current lane. LKAS acquires information on the position of the vehicle within the lane and, when required, sends commands to actuators to influence the lateral movement of the vehicle, and in turn provides status information to the driver.

This document is intended to assess the complete performance of an LKAS fitted in a road vehicle:

- the capacity to keep the vehicle within the current lane during other situations not described in this test method (more complex scenarios, other weather conditions);
- the capacity to avoid undesired lane change.

Road vehicles — Test method to evaluate the performance of lane-keeping assistance systems

1 Scope

This document specifies test methods and performance metrics to evaluate the behaviour of a vehicle equipped with lane keeping assistance system (LKAS, see 3.2).

For this purpose, variables relevant to vehicle dynamics as well as controllability of a vehicle with LKAS and their measurement methods are defined.

A system requiring a driver intervention is excluded from the scope. This document applies to the vehicles of M1 category.

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 8855, *Road vehicles — Vehicle dynamics and road-holding ability — Vocabulary*

ISO 15037-1:2019, *Road vehicles — Vehicle dynamics test methods — Part 1: General conditions for passenger cars*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 8855, ISO 15037-1 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

distance to line crossing

DTLC

remaining lateral distance (perpendicular to the line) between the inner side of the lane marking and most outer edge of the tyre, before the *vehicle under test (VUT)* (3.5) crosses the line, assuming that the VUT would continue to travel with the same lateral velocity towards the lane marking

3.2

lane keeping assistance system

LKAS

heading correction system that is applied automatically by the vehicle in response to the detection of the vehicle that is about to drift beyond a delineated edge line of the current travel lane

Note 1 to entry: There are two kinds of LKAS: lane centring LKAS where steering intervention is constantly occurring to keep the vehicle running along the centreline of lane and lane departure prevention LKAS where steering intervention only occurs when the vehicle is imminent to cross the lane boundary. Different performance metrics can be applied for each system.

3.3 peak braking coefficient PBC

measure of tyre to road surface friction based on the maximum deceleration of a rolling tyre

Note 1 to entry: Measured by using the American Society for Testing and Materials (ASTM) E1136-10 (2010) standard reference test tyre, in accordance with ASTM Method E 1337-90 (1996), at a speed of 64,4 km/h, without water delivery.

Note 2 to entry: Alternatively, the method as specified in UNECE R13-H.

3.4 time to line crossing T_{TLC}

remaining time before the *vehicle under test (VUT)* (3.5) crosses the line, assuming that the VUT continues to travel with the same lateral velocity towards the lane marking

3.5 vehicle under test VUT

vehicle tested according to this document with a lane keeping assistance system

3.6 vehicle width

widest point of the vehicle ignoring the rear-view mirrors, side marker lamps, tyre pressure indicators, direction indicator lamps, position lamps, flexible mudguards and the deflected part of the tyre sidewalls immediately above the point of contact with the ground

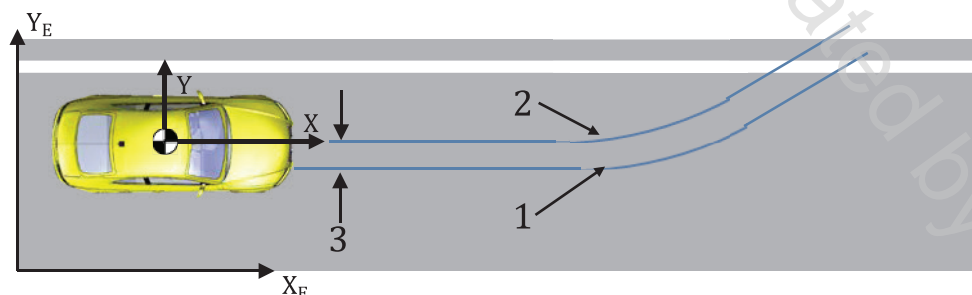
4 Variables

4.1 Coordinate systems

The road fixed reference system X_E - Y_E - Z_E , as shown in [Figure 1](#), is fixed to the lane, and the vehicle fixed reference system X - Y - Z is fixed to the centre of gravity (CG) of VUT.

4.2 Lateral deviation from path (Y_{VUT} error)

The lateral deviation from path is determined as the lateral distance between the centre of the front of the VUT when measured in parallel to the intended path as shown in [Figure 1](#). This measure applies during both the straight-line approach and the curve that establishes the lane departure.



Key

- 1 intended path
- 2 actual path
- 3 lateral deviation from path

Figure 1 — Definition of lateral deviation from path