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Heavy commercial vehicles and buses — Definitions of properties for the determination of suspension kinematic and compliance characteristics

Véhicules utilitaires lourds et autobus — Définitions des propriétés pour la détermination des caractéristiques cinématiques et de conformité des suspensions

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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*.

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Introduction

The dynamic behaviour of a road vehicle is a very important aspect of active vehicle safety. Any given vehicle, together with its driver and the prevailing environment, constitutes a closed-loop system that is unique. The task of evaluating the dynamic behaviour is therefore, very difficult since the significant interaction of these driver-vehicle-environment elements are each complex in themselves. A complete and accurate description of the behaviour of the road vehicle shall necessarily involve information obtained from a number of different tests.

Static properties of the vehicle and its systems can have an important impact on the vehicle dynamic behaviour and a driver's or automation's ability to generate the desired motion. Test conditions have a strong influence on test results. Therefore, only vehicle dynamic and static properties obtained under virtually identical test conditions are comparable to one another.

Since this test method quantifies only one small part of the complete vehicle handling characteristics, the results of these tests can only be considered significant for a correspondingly small part of the overall dynamic behaviour.

Moreover, insufficient knowledge is available concerning the relationship between overall vehicle dynamic properties and accident avoidance. A substantial amount of work is necessary to acquire sufficient and reliable data on the correlation between accident avoidance and vehicle dynamic properties in general and the results of these tests in particular. Consequently, it is important for any application of this test method for regulation purposes the proven correlation between test results and accident statistics.

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Heavy commercial vehicles and buses — Definitions of properties for the determination of suspension kinematic and compliance characteristics

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1 Scope

This document applies to heavy vehicles—that is, to commercial vehicles and buses as defined in ISO 3833—that are covered by the categories M3, N2, N3, O3, and O4 of ECE and EC vehicle regulations. These categories pertain to trucks and trailers with maximum weights above 3,5 tonnes and to buses with maximum weights above 5 tonnes.

Vehicle suspension kinematic and compliance (K&C) properties that impact vehicle stability and dynamic behaviour are described in this document and common methods of measurement are outlined. These methods are applicable to heavy vehicles. The measurements are performed on a single unit and typically one or two axles at a time.

This document will define or reference the key suspension kinematic and compliance parameters necessary for characterizing and simulating vehicle suspension performance. These parameters also provide system-level descriptions of quasi-static behaviour that can be cascaded into subsystem and component performance targets. The suspension variables required for determining suspension characterization of one vehicle end, i.e. for a single axle or for multiple axles inter-related through suspension configuration (for example, walking-beam), are provided. Metrics pertaining to the chassis connection between the front and rear suspensions are not included. Some typical methods of measurement will be discussed, however detail on how the measurements are executed is not within the scope of 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 8855, *Road vehicles — Vehicle dynamics and road-holding ability — Vocabulary*

ISO 15037-2, *Road vehicles — Vehicle dynamics test methods — Part 2: General conditions for heavy vehicles and buses*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 8855, ISO 15037-2 and the following apply.

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

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

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

3.1
side view swing centre
point in a plane parallel to the X_V-Z_V plane that intersects the wheel centre and locates the instantaneous centre of rotation of the wheel centre resulting from a displacement in the Z_V direction

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