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Road vehicles — Test method for the quantification of on-centre handling —

Part 2: Transition test

Véhicules routiers — Méthode d'essai pour la quantification du centrage —

Partie 2: Essai de la transition



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Contents

Page

Foreword ... **iv**

Introduction ... **v**

1 Scope ... **1**

2 Normative references ... **1**

3 Terms, definitions and symbols ... **1**

4 Principle ... **2**

5 Variables ... **2**
5.1 Reference system ... 2
5.2 Variables to be measured ... 2

6 Measuring equipment ... **3**
6.1 Description ... 3
6.2 Transducer installations ... 3
6.3 Data processing ... 3

7 Test conditions ... **3**
7.1 General ... 3
7.2 Test track ... 4
7.3 Wind velocity ... 4
7.4 Test vehicle ... 4
7.4.1 General data ... 4
7.4.2 Tyres ... 4
7.4.3 Operating components ... 4
7.4.4 Loading conditions of the vehicle ... 5

8 Test procedure ... **5**
8.1 Warm-up ... 5
8.2 Initial driving condition ... 5
8.3 Transition test procedure ... 5

9 Data evaluation and presentation of results ... **6**
9.1 General ... 6
9.2 Time histories ... 6
9.3 Characteristic values ... 6
9.3.1 Presentation of results ... 6
9.3.2 Steering-wheel torque versus steering-wheel angle (M_H vs. δ_H) ... 9
9.3.3 Yaw velocity versus steering-wheel angle ($d\psi / dt$ vs. δ_H) ... 9
9.3.4 Yaw velocity versus steering-wheel torque ($d\psi / dt$ vs. M_H) ... 9
9.3.5 Lateral acceleration versus steering-wheel angle (a_y vs. δ_H) ... 9
9.3.6 Lateral acceleration versus steering-wheel torque (a_y vs. M_H) ... 9

Annex A (informative) **Characteristic values** ... **10**

Bibliography ... **15**

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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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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 WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 22, *Road vehicles*, Subcommittee SC 33, *Vehicle dynamics and chassis components*.

This second edition cancels and replaces the first edition (ISO 13674-2:2006), which has been technically revised.

ISO 13674 consists of the following parts, under the general title *Road vehicles — Test method for the quantification of on-centre handling*:

— *Part 1: Weave test*

— *Part 2: Transition test*

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Introduction

The main purpose of this part of ISO 13674 is to provide repeatable and discriminatory test results.

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 must necessarily involve information obtained from a number of different tests.

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, any application of this test method for regulation purposes will require proven correlation between test results and accident statistics.

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Road vehicles — Test method for the quantification of on-centre handling —

Part 2: Transition test

1 Scope

This part of ISO 13674 specifies a test schedule that addresses a particular aspect of the transition test, the on-centre handling characteristics of a vehicle. It is applicable to passenger cars in accordance with ISO 3833 and to light trucks, N1 category.

NOTE The manoeuvre specified in this test method is not representative of real driving conditions, but is useful for obtaining measures of vehicle on-centre handling behaviour in response to a specific type of steering input under closely controlled test conditions. Other aspects of on-centre handling are addressed in the companion ISO 13674-1.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 2416, *Passenger cars — Mass distribution*

ISO 3833, *Road vehicles — Types — Terms and definitions*

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

ISO 15037-1:2006, *Road vehicles — Vehicle dynamics test methods — Part 1: General conditions for passenger cars*

3 Terms, definitions and symbols

For the purposes of this document, the terms, definitions and symbols given in ISO 1176, ISO 2416, ISO 3833, ISO 8855 and the following apply.

3.1
on-centre handling
description of the steering "feel" and steering precision of a vehicle during nominally straight-line driving and in negotiating large radius bends at high speeds but low lateral accelerations

3.2
ordinate threshold
value of a parameter plotted as the ordinate on a graph and defined as the minimum threshold of human perception

3.3
abscissa deadband
horizontal separation between the pair of straight-line fits at ordinate threshold values

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3.4
gradient
ratio of change in the ordinate with respect to a unit change in the abscissa, for a straight-line fit to a pair of recorded variables plotted one against the other on Cartesian coordinates

4 Principle

On-centre handling represents that part of the straight-line directional stability characteristics of the vehicle existing at low lateral acceleration levels, typically no greater than 1 m/s^2. On-centre handling is concerned primarily with features that directly influence the driver's steering input, such as steering system and tyre characteristics. Thus, test schedules for the evaluation of on-centre handling behaviour seek to minimize other factors that influence the wider aspects of straight-line directional stability, such as disturbance inputs due to ambient winds and road irregularities.

This part of ISO 13674 defines test schedules that involve driving the vehicle in a nominally straight line at a constant forward speed. During the tests, driver inputs and vehicle responses are measured and recorded. From the recorded signals, characteristic values are calculated.

5 Variables

5.1 Reference system

The variables of motion used to describe vehicle behaviour in a test-specific driving situation shall be related to the intermediate axis system (X, Y, Z) (see ISO 8855).

The location of the origin of the vehicle axis system (X_V, Y_V, Z_V) is the reference point and therefore should be independent of the loading condition. The origin is therefore fixed in the longitudinal plane of symmetry at half-wheelbase and at the same height above ground as the centre of gravity of the vehicle at complete vehicle kerb mass (see ISO 1176).

5.2 Variables to be measured

When using this test method, the following variables shall be measured:

— steering-wheel angle, δ_H;

— steering-wheel torque, M_H;

— yaw velocity, $d\psi / dt$;

— longitudinal velocity, v_x;

— lateral acceleration, a_y (see the NOTE to 6.2).

The following variables should be measured:

— steering-wheel angular velocity, $d\delta_H / dt$;

— roll angle, ψ.

The variables are defined in ISO 8855.

In order to acquire a deeper understanding of the vehicle behaviour, it may be desirable to determine motions of various components within the steering system, especially for vehicles with more than one steering axle.

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