

INTERNATIONAL STANDARD

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Road vehicles — Sensitivity to lateral wind —

Part 1:

Open-loop test method using wind generator
input

Véhicules routiers — Sensibilité au vent latéral —

Partie 1: Méthode en boucle ouverte avec génération de vent



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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.

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.

International Standard ISO 12021-1 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 9, *Vehicle dynamics and road-holding ability*.

ISO 12021 will consist of the following parts, under the general title *Road vehicles — Sensitivity to lateral wind*:

- *Part 1: Open-loop test method using wind generator input*
- *Part 2: Semi open-loop test method using natural wind input*

Annexes A and B form an integral part of this part of ISO 12021.

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Introduction

The dynamic behaviour of road vehicles is a most important part of active vehicle safety. Any given vehicle, together with its driver and the prevailing environment, forms a unique closed-loop system. The task of evaluating dynamic behaviour is therefore very difficult because of the significant interaction of the driver, vehicle and road elements, each of which is in itself complex. A complete and accurate description of the behaviour of the road vehicle must necessarily involve information obtained from a number of tests of different types.

The results of the test described in this part of ISO 12021 quantify only a small part of the whole handling field. Hence, the results of a test can be considered significant only for a correspondingly small part of the overall dynamic behaviour.

Moreover, insufficient knowledge is available concerning the relationship between accident risk and the dynamic characteristics evaluated by the test described in this part of ISO 12021. A substantial amount of effort is necessary to acquire sufficient and reliable data on the correlation between accident risk and the characteristics of vehicle dynamics in general and the results of this test in particular.

Therefore, it is not possible to use this method and test results for regulation purposes at present. The best that can be expected is that the sensitivity to lateral wind test is used as one among many other mostly transient tests, which together cover the field of vehicle dynamic behaviour.

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Road vehicles — Sensitivity to lateral wind —

Part 1:

Open-loop test method using wind generator input

1 Scope

This part of ISO 12021 specifies an open-loop test method to determine the sensitivity to lateral wind of a vehicle by means of a wind generator. It applies to passenger cars as defined in ISO 3833, passenger car-trailer combinations and light trucks. Its applicability to motorcycles is yet to be investigated.

The test conditions specified in this test method are not representative of real driving conditions but are useful to obtain measures of vehicle dynamic response to lateral wind.

NOTE 1 The test conditions in this test method do not simulate natural wind conditions. However, the wind velocity proposed here is representative of fairly severe wind conditions occurring naturally.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 12021. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 12021 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1176:1990, *Road vehicles — Masses — Vocabulary and codes*.

ISO 3833:1977, *Road vehicles — Types — Terms and definitions*.

ISO 8855:1991, *Road vehicles — Vehicle dynamics and road-holding ability — Vocabulary*.

3 Principle

The purpose of this test method is to determine vehicle sensitivity to lateral wind by which the vehicle motion is disturbed.

This method requires the measurement of vehicle behaviour under a lateral wind condition. The vehicle behaviour can be characterized by several measures.

In this test method the vehicle is initially driven along a straight path and its response to a crosswind input of a wind generator is then measured. The steering-wheel is held fixed during most of the test.

Two methods for finding the lateral deviation are proposed

- a direct method by means of direct measurement or with a dye-trail left on the road surface, and
- an indirect method by means of a computation from on-board-measured vehicle motions.

4 Reference system

The variables of motion used to describe the effect of lateral wind on course holding and directional behaviour of the vehicle relate to the intermediate axis system (X , Y , Z) as defined in ISO 8855.

5 Variables

The following variables corresponding to the terms and definitions of ISO 8855 shall be measured:

- yaw velocity, $\dot{\psi}$;
- lateral acceleration, a_Y ;
- steering-wheel angle, δ_H ;