

Second edition
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Road vehicles — Ergonomic aspects of transport information and control systems — Occlusion method to assess visual demand due to the use of in-vehicle systems

Véhicules routiers — Aspects ergonomiques des systèmes d'information et de contrôle du transport — Méthode par occlusion pour évaluer la distraction visuelle due à l'utilisation des systèmes embarqués



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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.

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This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 39, *Ergonomics*.

This second edition cancels and replaces the first edition (ISO 16673:2007), which has been technically revised.

The main changes compared to the previous edition are as follows:

- the accessibility has been changed from “unrestrained driver” to “buckled driver” in [3.1](#);
- the following paragraph has been added in [4.1](#): “Written instructions should not be visible to the participants during task performance or they should be visible to the participants during the whole task performance, i.e. also during occluded intervals”;
- [Annex B](#) has been added.

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Introduction

A wide range of information and communication devices and advanced driver assistance systems are being introduced into motor vehicles. These include navigation aids, emergency messaging systems and wireless communication including email and internet access, which are all accessible to the driver of a motor vehicle. Many of these features have associated visual information that can potentially both inform and distract. To help ensure that the use of such devices and features that are meant to be used by the driver while driving do not result in excessive visual demand, a consistent, verifiable and repeatable method to determine the visual demand imposed by such in-vehicle systems is needed.

Developing precise mathematical predictions of the risk of a crash due to driver distraction from using a particular driver interface is difficult. However, it can be reasonably stated that if drivers are not looking at the road (e.g. looking inside the vehicle to operate a control or read a display), then the probability of a crash is increased^[5].

This document is not intended to preclude direct measurement of eye glances as a method to assess visual demand. Direct measurement of eye glances is always desirable. However, direct measurements of eyes-off-the-road times, i.e. glance time measurements, are typically difficult and very costly to measure. The occlusion method estimates visual demand, including resumability, of a task using a means for intermittent viewing of the in-vehicle system. Evaluation by occlusion identifies driver interfaces that are likely to take the driver's eyes away from the road for excessively long durations. Additional data collected without occlusion can be combined with occlusion data to calculate *R*, a measure believed to identify whether or not tasks can be easily resumed after the driver interrupts the task to look back at the road. This procedure does not require extensive resources and can be applied if a functioning prototype of the driver interface exists.