

Passenger cars — Test track for a severe lane-change manoeuvre —

Part 1: Double-lane change

ICS 43.020

National foreword

This British Standard reproduces verbatim ISO 3888-1:1999 and implements it as the UK national standard.

The UK participation in its preparation was entrusted to Technical Committee AUE/15, Safety related to vehicles, which has the responsibility to:

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- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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Summary of pages

This document comprises a front cover, an inside front cover, the ISO title page, pages ii and iii, a blank page, pages 1 to 5 and a back cover.

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INTERNATIONAL STANDARD

ISO
3888-1

First edition
1999-10-01

Passenger cars — Test track for a severe lane-change manoeuvre —

Part 1: Double lane-change

*Voitures particulières — Piste d'essai de déboîtement latéral brusque —
Partie 1: Double déboîtement*



Reference number
ISO 3888-1:1999(E)

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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 3888-1 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 9, *Vehicle dynamics and road-holding ability*.

It cancels and replaces ISO/TR 3888:1975. Due to the subjective nature of the test, only the dimensions for a severe double lane-change track have been retained from ISO/TR 3888 for this part of ISO 3888. This should result in more comparable measurements when used for investigations on vehicle dynamics. The principle and examples of tests on severe lane-change manoeuvres specified in ISO/TR 3888 have been included in ISO 3888-1 for information (see annex A).

ISO 3888 consists of the following parts, under the general title, *Road vehicles — Test procedure for a severe lane-change manoeuvre*:

$\frac{3}{4}$ *Part 1: Double lane-change*

$\frac{3}{4}$ *Part 2: Obstacle avoidance*

Annex A of this part of ISO 3888 is for information only.

Introduction

The severe lane-change manoeuvre is a well-known test method which is generally used for subjective evaluation of vehicle dynamics.

The severe lane-change manoeuvre test method was previously described in a Technical Report (ISO/TR), and until now has not been dealt with in an International Standard. The reason for this was that the driver has a great influence on test results. The test method itself has now been placed in an informative annex, permitting the specification for the test track to be published as an International Standard. No closed-loop test has so far been specified in an International Standard for the purpose of investigating vehicle dynamics.

Since test performed on the severe lane-change track quantifies only a small part of complete handling characteristics, the results obtained on this test track can only be considered significant for a correspondingly small aspect of overall vehicle-dynamics behaviour. Therefore, it is not possible to use this part of ISO 3888 and test results for regulation purposes.

Passenger cars — Test track for a severe lane-change manoeuvre —

Part 1: Double lane-change

1 Scope

This part of ISO 3888 specifies the dimensions of the test track for a closed-loop test method to subjectively determine a double lane-change which is one part of the vehicle dynamics and road-holding ability of passenger cars. It is applicable to passenger cars as defined in ISO 3833. It is also applicable to light commercial vehicles up to a gross vehicle mass of 3,5 t.

2 Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this part of ISO 3888. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 3888 are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

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

3 Term and definition

For the purposes of this part of ISO 3888 the following term and definition apply.

3.1

vehicle width

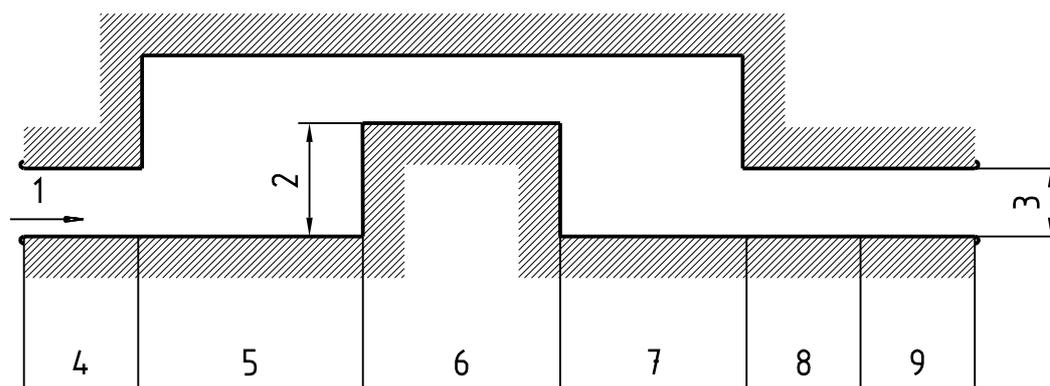
overall width of the vehicle without rear view mirrors

4 Specifications

4.1 Dimensions of the double lane-change track

Track dimensions for a double lane-change are represented in Figure 1 and specified in Table 1. The vehicle to be tested is driven through this track.

The lengths of track sections are fixed. The widths are a function of vehicle width. The total length of the track shall be 125 m.



Key

| | | | | | |
|---|-------------------|---|-----------|---|-----------|
| 1 | Driving direction | 4 | Section 1 | 7 | Section 4 |
| 2 | Lane offset | 5 | Section 2 | 8 | Section 5 |
| 3 | Width | 6 | Section 3 | 9 | Section 6 |

Figure 1 — Double lane-change track and designation of sections

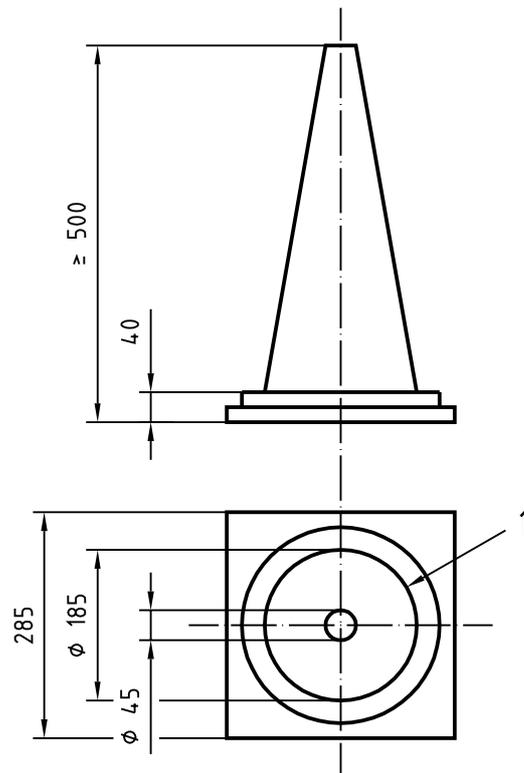
Table 1 — Dimensions of the double lane-change track

Dimensions in metres

| Section | Length | Lane offset | Width |
|---------|--------|-------------|--|
| 1 | 15 | — | $1,1 \times \text{vehicle width} + 0,25$ |
| 2 | 30 | — | — |
| 3 | 25 | 3,5 | $1,2 \times \text{vehicle width} + 0,25$ |
| 4 | 25 | — | — |
| 5 | 15 | — | $1,3 \times \text{vehicle width} + 0,25$ |
| 6 | 15 | — | $1,3 \times \text{vehicle width} + 0,25$ |

4.2 Marking of the double lane-change track

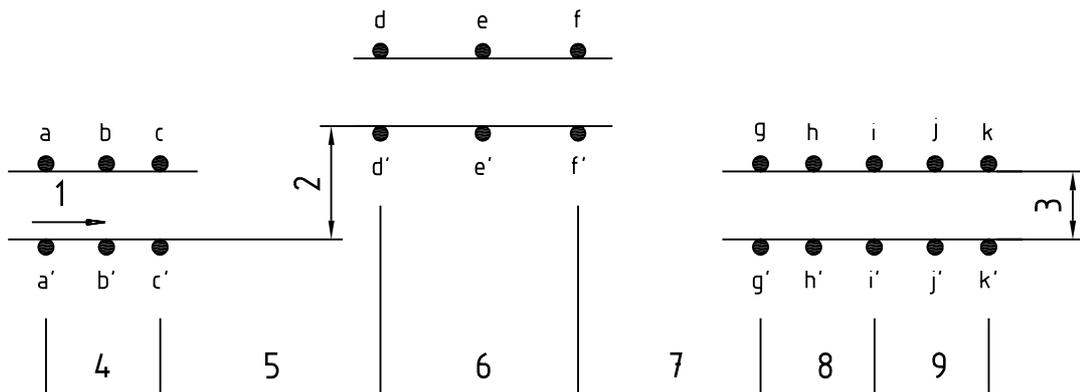
The double lane-change track shall be marked with cones of minimum height 500 mm; suitable cones are depicted in Figure 2. The cones shall be placed at points specified by Figure 3, and the track limits shall be tangential to the base circles of the cones.



Key

- 1 Base circle of cone

Figure 2 — Cone used for marking double lane-change track



Key

- | | | |
|---------------------|-------------|-------------|
| 1 Driving direction | 4 Section 1 | 7 Section 4 |
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Figure 3 — Placing of cones for marking the double lane-change track

Annex A (informative)

Test method

A.1 Severe double lane-change manoeuvre

A.1.1 Principle

The severe double lane-change manoeuvre is a dynamic process consisting of rapidly driving a vehicle from its initial lane to another lane parallel to the initial lane, and returning to the initial lane, without exceeding lane boundaries.

A.1.2 Use as an evaluation method for certain aspects of road-holding ability

The basic idea in the choice of the severe lane-change manoeuvre in the year 1970 was to create a test method for transient road-holding ability with which the closed control loop could be tested in a situation encountered in traffic.

Originally the proposed test seemed to be suitable for this purpose since the driver was not only to observe the given lanes but also to select the vehicle path within the track limits.

This process, which could be described as a type of anticipatory control, is of great importance for the behaviour of the system "driver-vehicle-environment" in actual driving situations. Here, the task is nearly always to select a proper course and to keep on it with certain accuracy given the situation.

A.1.3 Problems

In trying to keep the test method as simple as possible, the passing time through the course was first proposed as the sole evaluation criterion. Numerous comparative tests in different countries led to the conclusion that this criterion was insufficient. For this reason, numerous measurements were subsequently made in which the vehicle input values and the relevant responses of the vehicle, together with the subjective evaluation by the drivers, were covered by different criteria.

The evaluation of all tests gave in detail the following results and demonstrated the following problems:

- ¾ although the test was developed for testing lateral dynamics, it was found that the longitudinal dynamics (usability of the engine power) had a strong influence, which explained a considerable amount of scatter in the data and thus reflected on the results;
- ¾ the elimination of longitudinal dynamics did not lead to the desired result in the correlation between individual measured values and subjective evaluation criteria;
- ¾ the different paths followed in different tests also brought about a considerable amount of scatter in the data and thus the results.

A.1.4 Consequences

For the reasons given in A.1.2 to A.1.3, this International Standard defines only the dimensions of the test track for subjective evaluation of vehicle dynamics.

A.2 Example of tests

A.2.1 General

Only skilled drivers shall be allowed to perform the test. A passage is faultless when none of the cones positioned as specified in 4.2 have been displaced.

The measuring distance, for instance to evaluate the average speed, starts at the beginning of section 1 and finishes at the end of section 5.

The gear or selector position engaged during the test shall be stated in the test report.

A.2.2 Test 1

The recommended speed of entry into section 1 is (80 ± 3) km/h. Higher or lower speeds may be used. The speed of entry shall be mentioned in the test report.

Over the test course the throttle position shall be held as steady as possible.

Further constraints, such as steer strategy used, may be applied.

The speed of exit from section 5 shall be stated in the test report.

Some typical uses of this test are:

- ¾ to evaluate, with respect to time, the steer input or motion parameters;
- ¾ to evaluate driver-control strategies;
- ¾ to subjectively evaluate the vehicle.

A.2.3 Test 2

The speed of entry into section 1 shall be the maximum possible speed to complete the test course.

Two alternative throttle positions can be considered:

- ¾ over the test course the throttle position shall be held as steady as possible; if necessary, the throttle position suitable for this test condition can be determined by preliminary tests;
- ¾ any throttle position can be used during the test.

The alternative chosen shall be stated in the test report.

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