

SVENSK STANDARD

SS-ISO 19206-4:2020

Vägfordon – Surrogatmål för utvärdering av aktiva säkerhetsfunktioner hos fordon –
Del 4: Krav för cyklistmål (ISO 19206-4:2020, IDT)

Road vehicles — Test devices for target vehicles, vulnerable road users and other objects, for assessment of active safety functions —

Part 4: Requirements for bicyclist targets (ISO 19206-4:2020, IDT)



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Institutet för
Standarder

Language: engelska/English

Edition: 1

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Den internationella standarden ISO 19206-4:2020 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av ISO 19206-4:2020.

The International Standard ISO 19206-4:2020 has the status of a Swedish Standard. This document contains the official English version of ISO 19206-4:2020.

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Ett krav är ett uttryck i ett dokumentets innehåll som anger objektivet verifierbara kriterier som ska uppfyllas och från vilka ingen avvikelse tillåts om efterlevnad av dokumentet ska kunna åberopas. Krav uttrycks med hjälpverbet ska (eller ska inte för förbud).

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En förklaring är ett uttryck i ett dokumentets innehåll som förmedlar information. En förklaring kan uttrycka tillåtelse, möjlighet eller förmåga. Tillåtelse uttrycks med hjälpverbet får (eller motsatsen behöver inte). Möjlighet och förmåga uttrycks med hjälpverbet kan (eller motsatsen kan inte).

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These instructions cover the main principles for the use of provisions and external constraints in standardization deliverables.

Requirement

A requirement is an expression, in the content of a document, that conveys objectively verifiable criteria to be fulfilled, and from which no deviation is permitted if conformance with the document is to be claimed. Requirements are expressed by the auxiliary shall (or shall not for prohibition).

Recommendation

A recommendation is an expression, in the content of a document, that conveys a suggested possible choice or course of action deemed to be particularly suitable, without necessarily mentioning or excluding others. Recommendations are expressed by the auxiliary should (or should not for dissuasion).

Instruction

An instruction is expressed in the imperative mood and is used in order to convey an action to be performed. It can be subordinated to another provision, such as a requirement or a recommendation. It can also be used independently and is then to be regarded as a requirement.

Statement

A statement is an expression, in the content of a document, that conveys information. A statement can express permission, possibility or capability. Permission is expressed by the auxiliary may (its opposite being need not). Possibility and capability are expressed by the auxiliary can (its opposite being cannot).

Contents

Page

Foreword	vii
Introduction	viii
1 Scope.....	1
2 Normative references	1
3 Terms and definitions.....	1
4 Abbreviated terms	2
5 Bicyclist target specifications	2
5.1 Bicyclist target size	2
5.2 Dimensions of the BT rider	3
5.3 Safety considerations	3
5.4 Repairability and robustness.....	3
5.5 Environmental conditions	3
5.6 Postures and articulation	3
5.6.1 General.....	3
5.6.2 Static posture	3
6 Bicyclist target response to sensing technologies.....	4
6.1 General.....	4
6.2 Optical requirements	4
6.2.1 General.....	4
6.2.2 Reference measurements	4
6.2.3 Colours and clothing.....	4
6.3 Radar requirements.....	5
6.3.1 General.....	5
6.3.2 Reference measurements	5
6.3.3 Radar cross section measurement of BT.....	5
6.3.4 Micro-Doppler effect for rotating wheels and pedalling of the BT	6
6.4 Thermal requirements for far IR vision systems	7
6.4.1 General.....	7
6.4.2 Reference measurements	7
6.4.3 Thermal characteristics.....	7
6.5 Calibration and verification.....	8
7 Motion and positioning during test for BT including target carrier system	8
7.1 General requirements.....	8
7.2 Longitudinal positioning	9
7.2.1 Speed range for operation.....	9
7.2.2 Accelerations.....	9
7.3 Lateral positioning	9
7.3.1 General.....	9
7.3.2 Heading angle	9
7.3.3 Lateral position	9
7.4 Vertical positioning.....	9
7.4.1 General.....	9
7.4.2 Pitch angle.....	9
7.4.3 Vertical motions.....	9
Annex A (normative) Adult and child bicyclist target dimensions and postures	10
Annex B (normative) Sensor-specific recognition properties	18
Annex C (normative) Bicyclist target measurements and measurement equipment.....	25
Annex D (normative) Bicyclist target articulation properties	30
Annex E (informative) Verification of bicyclist target properties.....	31

SS-ISO 19206-4:2020 (E)

Annex F (informative) Field verification of target properties.....	41
Annex G (informative) Example interface between target carrier and BT bicycle.....	43
Bibliography	46

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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*.

A list of all parts in the ISO 19206 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

ADAS (Advanced Driver Assistance Systems) and active safety systems are designed to support decision-making for the driver, extend the driver's awareness of the traffic situation with advanced warnings, improve the behaviour of the vehicle, and even take over vehicle control in an emergency situation. The goal is to completely avoid an accident or at least reduce the severity of an accident.

The surrogate target is an essential component in the evaluation of ADAS/active safety functions and different levels of automated driving systems, in all situations where a collision with the target may occur.

The characteristics of targets need to be trustworthy and a vehicle target needs to be recognized as a real vehicle by the various sensing technologies.

This document addresses the specification of bicyclist test targets. The bicyclist targets specified are representative of adult and child sizes.

A bicyclist test target needs to represent the characteristics of the rider and bicycle yet provide safety for the subject vehicle and test operators in the event that contact is made between the tested vehicle and the bicyclist target. Crashworthiness and durability requirements for the bicyclist target require that the material and construction of the bicyclist target are adapted to fit the purposes.

Test cases usually address both stationary and moving targets and, as such, the physical construction of the target may accommodate a target carrier system capable of mimicking realistic motions. This document includes requirements on the target carrier system as applicable.

Targets described in the ISO 19206 series can be used for system development or applied in conjunction with existing standards, or standards under development, for assessment of ADAS and active safety functions of vehicles.

Road vehicles — Test devices for target vehicles, vulnerable road users and other objects, for assessment of active safety functions —

Part 4: Requirements for bicyclist targets

1 Scope

This document specifies the properties and performance requirements of a bicyclist target (BT) that represents a human bicyclist in terms of shape, movement, reflection properties, etc. for testing purposes. The BT is used to assess the system detection and activation performance of active safety systems.

This document establishes the detection requirements for a BT in terms of sensing technologies commonly in use at the time of publication of this document, and where possible, anticipated future sensing technologies. It also establishes methodologies to verify the target response properties to these sensors, as well as some performance requirements for the target carrier.

The BT according to this document is also representative for electrically assisted pedal bicycles (pedal electric cycle, pedelec).

This document does not address the test procedures in terms of speeds, positions, or timing of events. Performance criteria for the active safety system being tested are also not addressed.

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 8608, *Mechanical vibration — Road surface profiles — Reporting of measured data*

3 Terms and definitions

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

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

subject vehicle

SV

vehicle with active safety system to be tested

3.2

bicyclist target

BT

test device representing a bicyclist on a bicycle used to test active safety systems

SS-ISO 19206-4:2020 (E)

3.2.1

BT bicycle

part of the *bicyclist target* (3.2) consisting of the bicycle only

3.2.2

BT rider

part of the *bicyclist target* (3.2) consisting of the rider only

3.3

target carrier

mechanical or electro-mechanical system used to move the target according to a test protocol

Note 1 to entry: Target carrier can be self-contained within, or supporting the target structure or external devices connected with cables, beams, or similar structures. It can also be a self-propelled carrier.

Note 2 to entry: Target structure fixation is included in the target carrier. A commonly used fixation interface is shown in [Annex G](#).

3.4

measurement equipment

equipment used to record the position of the *bicyclist target* (3.2) relative to the *subject vehicle* (3.1) to ensure that the test protocol is followed within prescribed tolerances and record data documenting the function of the active safety system and allowing its performance to be assessed

4 Abbreviated terms

BT	bicyclist target
CCD	charge-coupled device
CMOS	complementary metal oxide semiconductor
FIR	far infrared
LIDAR	light detection and ranging
NIR	near infrared
PMD	photonic mixer device
RCS	radar cross section
SV	subject vehicle

5 Bicyclist target specifications

5.1 Bicyclist target size

The bicyclist targets specified in this document are representative for adult and child sizes. References for subsequent requirements are based on sample measurements of different demographics and compiled into categories. The following human bicyclist sizes are relevant for this document:

- adult: 50-percentile male;
- child: 6-7 year old.

5.2 Dimensions of the BT rider

[Annex A](#), [Tables A.1](#) and [A.2](#) provide the information for a 50-percentile male adult and a 6-7 year old child.

5.3 Safety considerations

Drivers of the subject vehicle shall not be exposed to any substantial risk of personal injury resulting from impact of the BT by the SV. The BT and its components should not cause more than cosmetic damage to the subject vehicle when struck at a relative velocity of 60 km/h. The conditions specified by the test procedure application shall be taken into consideration.

NOTE Test procedures for specific applications typically indicate what measures are taken to reduce the risk of injury and vehicle damage. These measures can include instructions to disable subject vehicle systems such as supplementary occupant restraints, seatbelt pre-tensioners, vulnerable user protection systems, etc.

5.4 Repairability and robustness

The BT should be easily reassembled or repaired after contacts up to a relative speed of 60 km/h. Field repairs should be possible with hand tools. After repair, the target body and/or target carrier system shall be verified according to [6.5](#).

NOTE The repairability requirement does not apply to disposable targets.

After a collision, the correctness of the BT posture and dimension shall be verified before start of a new test.

5.5 Environmental conditions

The BT shall fulfil all requirements in a temperature range of -5 °C to +40 °C. The BT shall not deteriorate under storage temperatures in the range of -20 °C to +80 °C when properly stored.

NOTE The specified temperature range recognises that there can be substantial technical challenges achieving a cost-effective target fulfilling the requirements at lower temperatures than -5 °C.

5.6 Postures and articulation

5.6.1 General

The BT described in this document represents an average human bicyclist (adult and child versions) on an average utility bicycle ([Figure 1](#)) in relation to the vulnerable road users (VRU) detection sensors used in vehicles. The requirements relate, unless not specified otherwise, to the BT including a target carrier.

The BT shall be a full 3D representation of a human bicyclist with bicycle and shall have rotating wheels (synchronized to speed) or other means of producing the 3D visual and micro-Doppler effects as described in [6.3.4](#) and [Annex D](#).

BT rider postures can be of static (non-peddalling type) or articulated (pedalling type). Both variants are recognised according to this document.

5.6.2 Static posture

The torso angles shall be implemented according to [Table A.1](#) and [Table A.2](#) (10° and 30°). Optional torso angles may be implemented using a range of 0° to 50°.