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**Agricultural tractors — Requirements,  
test procedures and acceptance  
criteria for the operator's field of  
vision —**

**Part 2:  
Field of vision to the side and to the  
rear**

*Tracteurs agricoles — Exigences, modes opératoires d'essai et critères  
d'acceptation relatifs au champ de visibilité du conducteur —*

*Partie 2: Champ de visibilité latéral et vers l'arrière*



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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](http://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](http://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 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 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 4, *Tractors*.

This first edition of ISO 5721-2, together with ISO 5721-1, cancels and replaces the second edition of ISO 5721 (ISO 5721:1989), which has been technically revised.

ISO 5721 consists of the following parts, under the general title *Agricultural tractors — Requirements, test procedures and acceptance criteria for the operator's field of vision*:

- *Part 1: Field of vision to the front*
- *Part 2: Field of vision to the side and to the rear*

# Agricultural tractors — Requirements, test procedures and acceptance criteria for the operator's field of vision —

## Part 2: Field of vision to the side and to the rear

### 1 Scope

This part of ISO 5721 specifies the requirements, test procedures, and acceptance criteria for the field of vision to the side and the rear of the operator of agricultural tractors.

### 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 5006:2006, *Earth-moving machinery — Operator's field of view — Test method and performance criteria*

ISO 5721-1:2013, *Agricultural tractors — Requirements, test procedures and acceptance criteria for the operator's field of vision — Part 1: Field of vision to the front*

UNECE R 46, *Uniform provisions concerning the approval of devices for indirect vision and of motor vehicles with regard to the installation of these devices (including amendment 1)*

### 3 Terms and definitions

For the purpose of this document, the terms and definitions of ISO 5721-1 apply.

### 4 General provisions for testing

#### 4.1 General

The fields of vision as described in 5.1 shall be viewed either directly from the operator's seat or by means for the indirect view. In this last case, the lateral and rear visibility shall be checked for a single setting.

#### 4.2 Measurement accuracy

See 4.1 of ISO 5721-1:2013.

#### 4.3 Eye position

See 4.2 of ISO 5721-1:2013.

## 5 Requirements, test procedures, and acceptance criteria

### 5.1 Requirements

#### 5.1.1 General

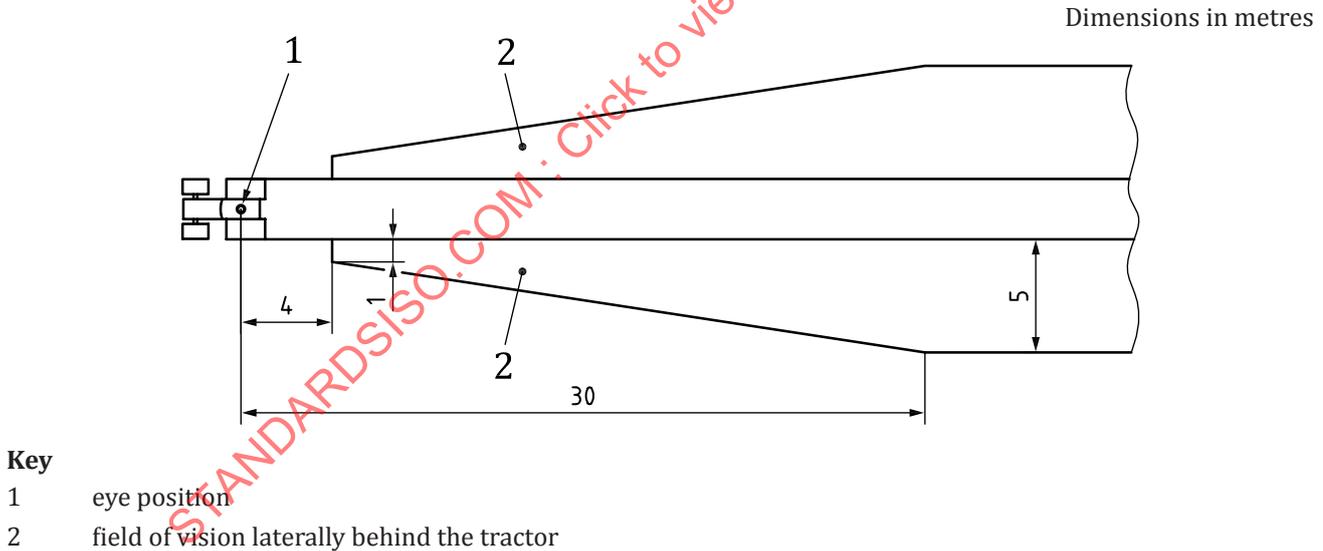
The tractor shall be constructed and equipped in such a way that, in road traffic and in farm use, the operator has an adequate field of vision, under all the usual conditions pertaining to highway use and to work undertaken in fields and at track width appropriate for the overall width of single tires not to exceed 2,55 m.

Mirrors and other means for indirect view shall be attached in such a way that their movements and vibrations do not cause noticeable change of the measured field of view so as to minimize possibility of misinterpretation of the view by the operator. This requirement shall be fulfilled with speeds up to 80 % of the maximum design speed.

#### 5.1.2 Field of vision laterally behind the vehicle

The field of vision shall be such that the operator can see on both sides at least a 5 m wide, flat, horizontal portion at a height of 1 m above the road, which is bounded by a plane parallel to the median longitudinal vertical plane of the vehicle and passing through the outermost point of the vehicle and which extends from 30 m behind the operator's eye position to the horizon.

In addition, the portion 1 m above the road shall be visible to the operator over a width of 1 m, which is bounded by a plane parallel to the median longitudinal vertical plane and passing through the outermost point of the vehicle starting from a point 4 m behind the vertical plane passing through the operator's eye position (see [Figure 1](#)).



**Figure 1 — Field of vision laterally behind the vehicle**

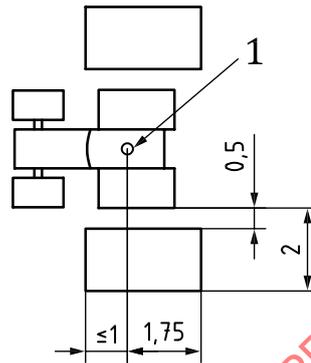
#### 5.1.3 Field of vision beside the vehicle

The field of vision shall be such that the operator can see at least a flat horizontal portion at a height of 1 m above the road, which is bounded by (see [Figure 2](#)):

- the plane parallel to the median longitudinal vertical plane of the vehicle which passes 0,5 m from the outermost point of the width of the vehicle,

- the plane parallel to the median longitudinal vertical plane of the vehicle which passes 2 m from the outermost point of the width of the vehicle,
- to the rear, the plane parallel to the vertical plane passing through the operator's eye position and situated at a distance of 1,75 m behind that plane, and
- to the front, the plane parallel to the vertical plane passing through the operator's eye position and situated at a distance of 1 m in front of that plane. If the vertical transverse plane passing through the forwardmost point of the tractor chassis or grill screen is less than 1 m in front of the vertical plane passing through the operator's eye position, the field of vision shall be limited to that plane.

Dimensions in metres

**Key**

1 eye position

**Figure 2 — Field of vision beside the vehicle in 1 m height above the ground****5.1.4 Equivalent requirements**

The requirements of ISO 5006:2006 for the evaluation of the indirect view of earth-moving machines are considered equivalent.

The technical requirements of the UNECE Regulation No. 46 revision 4 including amendment 1 are considered equivalent.

**5.2 Test procedures****5.2.1 Evaluation, whether additional means for indirect view beside the vehicle are necessary**

The tractor shall be placed on a horizontal surface. On a horizontal support level with the reference point, there shall be mounted two point sources of light, 65 mm apart and symmetrically located with respect to the reference point. The support shall be rotatable at its centre point about a vertical axis passing through the reference point. For the purpose of measuring the masking effects, the support shall be so aligned that when simultaneous or alternate switching on of both sources of light, the silhouette (deepest shadow) is determined as the masking effect at 1 m height within the specified fields of vision. Shifting of the eye position shall be permissible around 170 mm to both sides. For the verification, e.g. a mirror at 1 m height shall be carried across the entire specified field of vision. The mirror shall be oriented to the light sources such that these can be detected.

**5.2.2 Determination of the field of vision**

The field of vision shall be determined by placing powerful light sources at the eye position and measuring the light reflected.

For closed-circuit television systems (CCTV), the test procedures of the UNECE Regulation No. 46 revision 4 including amendment 1 apply.

### 5.2.3 Equivalent test procedures

Other equivalent test procedures are permitted.

The test procedures according to ISO 5006:2006 for the evaluation of the indirect view of earth-moving machines are considered equivalent.

The test procedures according to the UNECE Regulation No. 46 revision 4 including amendment 1 are considered equivalent.

## 5.3 Acceptance criteria

### 5.3.1 Direct view

When testing according to [5.2.1](#), no deepest shadow (umbra) shall remain as the masking effect at 1 m height within the specified fields of vision.

The specified field of vision according to [5.1.3](#) shall be deemed to be sufficient if masking effects caused by obstructions cover not more than 10 % of the specified field of vision on each side of the vehicle and a test specimen of  $\varnothing$  300 mm does not entirely disappear in one masking within the whole specified field of vision.

If these criteria are not met, means for indirect view are necessary.

### 5.3.2 Indirect view

In the specified fields of vision, obstruction due to the bodywork and some of its components, such as other mirrors, door handles, outline marker lights, direction indicators, etc., as well as reflective-surface cleaning components, shall not be taken into account if they are responsible for a total obstruction of less than 10 % of the specified field of vision.

Obstructions of the specified fields of vision according to [5.1.3](#) shall not be permitted.