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**Earth-moving machinery — Field of  
vision of surveillance and rear-view  
mirrors —**

**Part 1:  
Test methods**

**iTeh STANDARD PREVIEW**

*Engins de terrassement — Champ de visibilité des rétroviseurs et des  
miroirs de surveillance —*

*(standards.iteh.ai)*

*Partie 1: Méthodes d'essai*

*ISO 14401-1:2004*

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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.

ISO 14401-1 was prepared by Technical Committee ISO/TC 127, *Earth-moving machinery*, Subcommittee SC 1, *Test methods relating to machine performance*.

ISO 14401 consists of the following parts, under the general title *Earth-moving machinery — Field of vision of surveillance and rear-view mirrors*:

— *Part 1: Test methods*

[ISO 14401-1:2004](#)

— *Part 2: Performance criteria*

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# Earth-moving machinery — Field of vision of surveillance and rear-view mirrors —

## Part 1: Test methods

### 1 Scope

This part of ISO 14401 specifies two test methods for determining the field of vision provided by surveillance and rear-view mirrors for seated operators of earth moving machinery. It is applicable to self-propelled wheeled and track-type earth-moving machinery as defined in ISO 6165, used on and off public roads.

NOTE Additional national regulations may apply for machines travelling on public roads.

### 2 Normative references

The following referenced documents are indispensable for the application 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 5006-1:1991, *Earth-moving machinery — Operator's field of view — Part 1: Test method*

ISO 5353, *Earth-moving machinery, and tractors and machinery for agriculture and forestry — Seat index point*

ISO 6016, *Earth-moving machinery — Methods of measuring the masses of whole machines, their equipment and components*

ISO 6165, *Earth-moving machinery — Basic types — Vocabulary*

ISO 14401-2:2004, *Earth-moving machinery — Field of vision of surveillance and rear-view mirrors — Part 2: Performance criteria*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

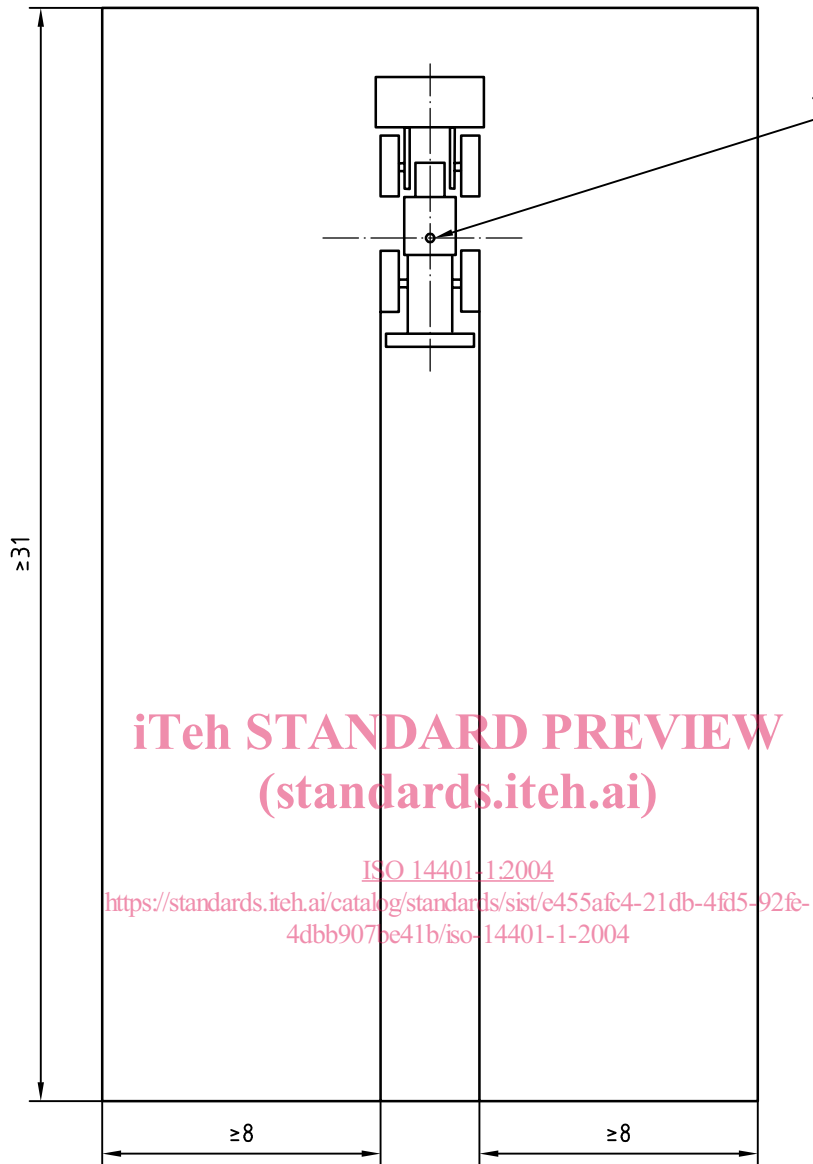
#### 3.1

##### **filament position centre point**

(eye position) point located 660 mm above and 20 mm in front of the seat index point

See ISO 5006-1:1991, Figure 1.

NOTE For a definition of the seat index point, see ISO 5353.



**Key**

1 filament position centre point

**Figure 1 — Test surface and machine positioning**

**3.2  
field of vision**

area which can be seen from the operator's position through the surveillance and rear-view mirrors

**3.3  
rear-view mirror**

device which provides indirect field of vision to the rear and to the side of the machine

**3.3.1  
interior rear-view mirror**

mirror(s) located in the operator station (enclosure or canopy)

**3.3.2****exterior rear-view mirror**

mirror(s) located outside the operator station (enclosure or canopy)

**3.4****surveillance mirror**

mirror(s) located inside or outside of the operator station (enclosure or canopy) which provide a field of view to a specific area

**4 Test apparatus**

**4.1 Light source**, consisting of one halogen bulb (or equivalent) mounted with the filament vertical. A fixture shall locate the light source at the filament position centre point.

**4.2 Test surface**, which shall be an area of compacted earth or a paved surface having a gradient of no more than 3 % in any direction.

**4.3 Hand-held test mirror**, used to view the light source reflection from the surveillance and rear-view mirror(s) at the field of vision.

**5 Machine configuration**

**5.1** The machine shall be in accordance with the manufacturer's specifications.

**5.2** All machine openings, such as doors and windows, shall be closed.

**5.3** The machine shall be set up in accordance with ISO 5006-1:1991, Annex A. For the boom position of excavators, see ISO 14401-2:2004, Table A.1, Footnotes c and d.

**5.4** The mirrors shall be adjusted to provide the required field of vision as specified in ISO 14401-2.

**6 Measurement procedure****6.1 Light source method**

**6.1.1** Locate the machine on the test surface as shown in Figure 1.

**6.1.2** Locate the light source as specified in 4.1. A light source movement of up to 150 mm to the front is allowed for excavators, if the direct view between the light source and the mirror(s) is obstructed (e.g. by the boom of an excavator) when the machine is set-up as specified in 5.3.

**6.1.3** The light source reflection from the mirror(s) fitted onto the machine defines the field of vision of the mirror(s). A hand-held test mirror can be used to recognize the light source reflection at the field of vision measuring locations specified in ISO 14401-2:2004, Clause 4. The reflection in the hand-held test mirror shall be measured as close as possible at the ground level or other specific locations and at the lower edge of the hand-held test mirror.

**6.1.4** To determine the field of vision, follow the procedure a) to d), below.

- a) After location of the machine (6.1.1) and the light source (6.1.2) mark the minimum requirements for the field of vision in accordance with ISO 14401-2:2004, Clause 4 and Annex A (measuring locations).
- b) Adjust the mirror(s) so that measuring locations close to the machine can be verified at the hand-held mirror.

- c) Measure afterwards all measuring locations as specified for that specific class of field of vision.
- d) Measure the limits which can be seen in the hand-held mirror, mark them, and measure the actual dimensions.

NOTE The test can be carried out in a dark environment where the outer and inner border-lines of the field of vision at the ground level can be directly determined.

## 6.2 Calculation and computer simulation procedure

The measurement procedure described in 6.1 may be simulated using mathematical techniques to calculate the field of vision.

A validation test according to 6.1 shall be made after the first simulation to confirm the result of the computer simulation.

## 7 Test report

The test report shall include the following information:

- manufacturer;
- model;
- operating mass (see ISO 6016);
- operator station description;
- mirror types, sizes, radius of curvature and locations;
- field of vision (diagram or drawing of the measured field of vision).

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