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Rough-terrain trucks — Visibility test methods and their verification —

Part 1: Variable-reach trucks

Chariots tout-terrain — Méthodes d'essai de la visibilité et leur vérification —

Partie 1: Chariots à portée variable

Reference number
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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

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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).

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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 World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 110, *Industrial trucks*, Subcommittee SC 4, *Rough-terrain trucks*.

This corrected version of ISO 18063-1:2016 incorporates the following corrections:

— the illustration of a load has been removed from Figure 3;

— the second and third title elements have been combined into a single element, *Visibility test methods and their verification*;

— the listing of normative reference ISO 5053-1 has been transferred from the Bibliography to Clause 2.

— hyperlinked references to terminological databases have been added in Clause 3.

A list of all parts in the ISO 18063 series can be found on the ISO website.

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Introduction

This document is a type-C standard as stated in ISO 12100.

The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the Scope of this document.

When requirements of this type-C standard are different from those which are stated in type-A or -B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

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Rough-terrain trucks — Visibility test methods and their verification —

Part 1: Variable-reach trucks

1 Scope

This document applies to rough-terrain variable-reach trucks (hereinafter referred to as 'trucks') that have a specific seated operator's position on the left-hand side of the boom or centre position (excluding operator position on the right side of the boom).

This document specifies a static test method for determining and evaluating the operator's visibility on a rectangular 1 m boundary around the rough-terrain variable-reach truck and on a 12 m radius visibility test circle. Performance requirements for visibility are specified in this document.

This document does not apply to

— trucks designed to handle freight containers (reach stackers),

— articulated telescopic wheel loaders,

— slewing trucks, or

— lorry mounted trucks.

NOTE The method used does not capture all of the aspects of the operator's visibility, but provides information to assist in determining the acceptability of visibility from the truck.

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 5053-1, *Industrial trucks — Terminology and classification — Part 1: Types of industrial trucks*

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

ISO 12100, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 10896-1, ISO 5053-1 and ISO 12100 and the following apply.

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

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

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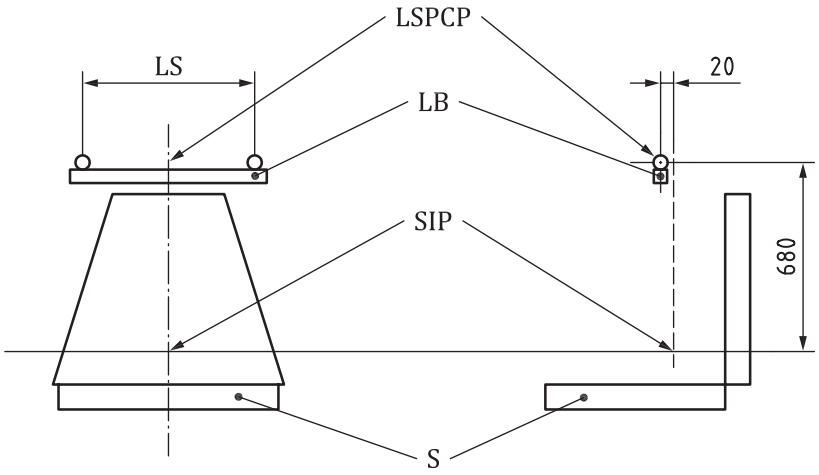
3.1
test surface
area of compacted earth or firm surface that forms the ground reference plane for the visibility measurements, with a gradient of (0 ± 2) %

3.2
light source position centre point
LSPCP
mid-point of the line between light sources, at 65 mm, 205 mm or 405 mm light source spacing, located 680 mm above and 20 mm in front of the seat index point (SIP)

Note 1 to entry: The seat index point is defined in ISO 5353, 3.1.

Note 2 to entry: See Figure 1.

Dimensions in millimetres



Key

LB	light bar
LS	light source spacing (see Annex A)
SIP	seat index point
S	seat
LSPCP	light source position centre point

Figure 1 — Light source apparatus

3.3
test truck boundary
TTB
smallest rectangular boundary that can be placed around the vertical projection of the truck

Note 1 to entry: Truck dimensions do not include equipment such as working lights, mirrors, etc.

Note 2 to entry: See Figure 4.

3.4 Visibility-test locations

3.4.1
visibility test circle
VTC
circle with 12 m radius located on the ground reference plane with its centre vertically below the *light source position centre point* (3.2), which is divided into six sectors of vision

Note 1 to entry: For the six sectors of vision, see 3.4.3 to 3.4.6.

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Note 2 to entry: See Figure 2.

3.4.2
rectangular 1 m boundary
RB
line on the ground reference plane located at 1 m distance from the outside *test truck boundary* (3.3)

Note 1 to entry: See Figure 3 and Figure 4.

3.4.3
sector of vision A
segment of the *visibility test circle* (3.4.1) to the front of the truck, defined by a 9,5 m chord length for the 12 m radius that is perpendicular to the longitudinal plane passing through the *light source position centre point* (3.2) with the chord length bisected by the longitudinal plane

Note 1 to entry: See Figure 2.

3.4.4
sectors of vision B and C
segments of the *visibility test circle* (3.4.1) to the front of the truck outside *sector of vision A* (3.4.3) and bounded by the transverse plane through the *light source position centre point* (3.2)

Note 1 to entry: See Figure 2.

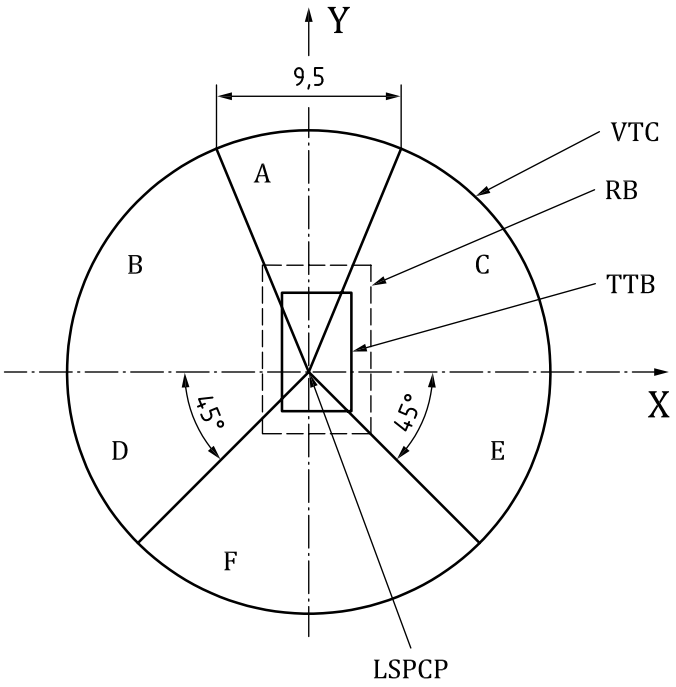
3.4.5
sectors of vision D and E
segments of the *visibility test circle* (3.4.1) to the rear defined by an angle of 45° to both the right and left sides of the longitudinal plane passing through the *light source position centre point* (3.2)

Note 1 to entry: See Figure 2.

3.4.6
sector of vision F
segment of the *visibility test circle* (3.4.1) to the rear between *sectors of vision D and E* (3.4.5)

Note 1 to entry: See Figure 2.

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Key

VTC	visibility test circle
LSPCP	light source position centre point
RB	rectangular 1 m boundary
TTB	test truck boundary
X	perpendicular to forward direction of the truck
Y	forward direction of the truck
A, B, C, D, E, F	sectors of vision

Figure 2 — Visibility test boundary

3.5
masking
shadow on the 12 m *visibility test circle* (3.4.1) or on the *rectangular 1 m boundary* (3.4.2) created because parts of the base truck and/or its equipment block the light rays from the light sources

3.6
light source apparatus
test unit with at least two light sources that have adjustable light spacing, 360° rotatable, with its rotation point at the *light source position centre point* (3.2) to simulate the range of eye positions for an operator

Note 1 to entry: See Figure 1.

3.7
light source spacing
distance between the vertical centre axis of the considered light sources

3.8
light bar
rigid support on which the light sources are fixed and aligned

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3.9
visibility performance criteria
criteria intended to minimize risk to persons in the vicinity of the truck during truck operation

Note 1 to entry: These visibility performance criteria are specified as maximum allowed *maskings* (3.5) at the 12 m *visibility test circle* (3.4.1) or at the *rectangular 1 m boundary* (3.4.2).

3.10 Direct and indirect visibility

3.10.1
direct visibility
visibility by direct line of sight as determined by the light from the light source

3.10.2
indirect visibility
visibility with the aid of mirrors or other visual aids, such as closed circuit TV (CCTV)

Note 1 to entry: For more information, see Annex B.

3.11
derivative truck
truck modified or fitted with equipment and/or attachments which can affect visibility

3.12
vertical test object
object used to evaluate the *maskings* (3.5) on the *rectangular 1 m boundary* (3.4.2), considered to be two-dimensional, without depth

4 Test apparatus

4.1 Light source apparatus

The light source apparatus is capable of positioning a light bar horizontally with two light sources (halogen light bulbs, laser, LEDs or equivalent). Each light source shall be horizontally movable on the light bar from 32,5 mm up to 202,5 mm on each side of the light source position centre point. It shall be possible to rotate the light bar through 360° around the light source position centre point. The light source position centre point shall be located 680 mm above and 20 mm in front of the seat index point (SIP) as described in ISO 5353. See Figure 1.

4.2 Vertical test object

The vertical test object shall be 1,5 m high, 100 mm wide and be maintained substantially perpendicular to the test surface throughout the tests.

4.3 Observation mirror

To determine the maskings on the visibility test circle or the rectangular 1 m boundary, a hand-held mirror can be used to detect the line-of-sight between the light source and the ground reference plane or vertical test object. The observation mirror shall have a maximum size of 100 mm × 150 mm.

5 Truck test configuration

5.1 Equipment of the truck

The truck shall be equipped with standard fork arms and equipment according to the manufacturer's standard specification.

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