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I.S. EN 15830:2012

Rough-terrain variable reach trucks - Visibility - Test methods and verification

I.S. EN 15830:2012

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NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie

W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

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English Version

Rough-terrain variable reach trucks - Visibility - Test methods and verification

Chariots à portée variable tout-terrain - Visibilité - Méthodes d'essai et vérification

Geländegängige Flurförderzeuge mit veränderlicher Reichweite - Sichtverhältnisse - Prüfverfahren und Verifizierung

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN 15830:2012) has been prepared by Technical Committee CEN/TC 150 “Industrial trucks - Safety”, the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2012, and conflicting national standards shall be withdrawn at the latest by November 2012.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This European Standard is a type-C standard as stated in EN ISO 12100.

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

Where there are provisions of this type-C standard which are different from those which are stated in type A or B standards, the provisions of this type-C standard take precedence over the provisions of the other standards, but only for machines that have been designed and built in accordance with the provisions of this type-C standard.

The purpose of this standard is to address the operator's visibility in such a manner that the operator can see around the rough-terrain variable reach truck to enable proper, effective and safe operation that can be quantified in objective engineering terms. This standard includes a test method that uses two lights placed at the location of the operator’s eyes. The masking due to the truck, its components and attachments and a standard test load are determined around the truck, starting at a boundary line 1 m away from the smallest rectangle that encompasses the truck out to the visibility test circle. The radius of the circle is 12 m. 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. Criteria are included in this standard to provide guidance for designers as to the extent of visibility masking that are acceptable.

Due to the operator’s capability and the operation mode of the truck, the test method divides the area around the truck into six sectors: the front (sector A), to the front sides (sectors B and C), to the rear sides (sectors D and E), and to the rear (sector F).

For each of the sectors, the operator has physical characteristics that are considered. Besides the eye spacing of 65 mm (the nominal binocular eye spacing of the 50th percentile operator), additional adjustments (up to the limits specified in Tables 2 and 3) can be made considering that the operator has the capability to turn the head and move the body torso side to side. The eye spacings used are less than the maximum permitted values based on the ergonomics of the operator. This is done to maintain the current state-of-the-art of trucks.

Standard test loads are carried on or suspended from, devices on the truck during the visibility tests. They are intended to be dimensionally representative of typical loads carried by rough-terrain variable reach trucks and are used to determine their masking effects and to define representative boom geometry of the truck in normal uses.

The established visibility performance criteria are based on the physical aspects of the human operators and ground personnel using various representative dimensions and the design of trucks that have provided acceptable visibility. To establish the visibility criteria, a combination of the eye spacings and masking widths are used. Multiple masking in sectors are acceptable where there is adequate spacing between the individual masking. Where the direct visibility is considered inadequate, additional devices for indirect visibility [mirrors or closed circuit television cameras (CCTV)], can be used to achieve acceptable visibility. For the rectangular 1 m boundary (RB) additional devices for indirect visibility (mirrors or CCTV) are preferred. Other aids (see ISO 16001) can be used exceptionally.

1 Scope

This European Standard applies to rough-terrain variable reach trucks (herein-after 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 European Standard specifies a static test method for determining and evaluating the operator's visibility on a rectangular 1 m boundary close around the rough-terrain variable reach truck and on a 12 m visibility test circle. Performance requirements for visibility are specified in this standard.

This European Standard does not apply to rough-terrain variable reach trucks designed to handle freight containers (rough-terrain reach stackers).

It applies to trucks for operation on work sites.

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.

EN 1459:1998+A2:2010, *Safety of industrial trucks—Self-propelled variable reach trucks*

EN 13545:2002, *Pallet superstructures - Pallet collars - Test methods and performance requirements*

EN 13698-2:2003, *Pallet production specification - Part 2: Construction specification for 1000 mm x 1200 mm flat wooden pallets*

EN ISO 3411:2007, *Earth-moving machinery — Physical dimensions of operators and minimum operator space envelope (ISO 3411:2007)*

EN ISO 21898:2005, *Packaging - Flexible intermediate bulk containers (FIBCs) for non-dangerous goods (ISO 21898:2004)*

EN ISO 5353:1998, *Earth-moving machinery, and tractors and machinery for agriculture and forestry — Seat index point* (ISO 5353:1995)

EN ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100:2010)*

ISO 6016:2008, *Earth-moving machinery — Methods of measuring the masses of whole machines, their equipment and components*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010 and EN 1459:1998+A2:2010 and the following apply.

3.1 trucks

3.1.1
variable reach truck
counterbalanced lift truck used for stacking loads with an articulated boom

Note 1 to entry: The boom may be telescopic or not, non-slewing or have a slewing movement of no more than 5° either side of the longitudinal axis of the truck.

3.1.2
rough-terrain variable reach truck
variable reach truck designed for operation on unimproved natural or disturbed terrain or areas

3.1.3
compact truck
truck having a maximum height in normal travel mode of 2 150 mm and:

— a maximum operating mass according to ISO 6016 of 6 000 kg, and/or

— a maximum width in normal travel mode of 1 850 mm

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

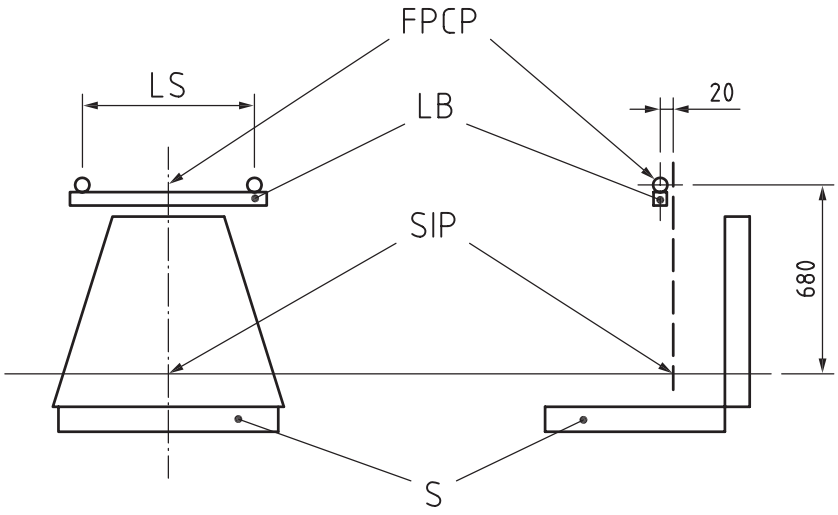
3.1.4
rigid-frame truck
rough terrain variable reach truck having a rigid frame and wheel steering

3.1.5
articulated-frame truck
rough terrain variable reach truck with an articulated frame which accomplishes the steering of the truck

3.2
test surface
area of compacted earth or firm surface that forms the ground reference plane for the visibility measurements, with a gradient of no more than 3 % in any direction

3.3
filament position centre point (FPCP)
centre at the midpoint of the line between the light-bulb filaments, located 680 mm above and 20 mm in front of the seat index point (SIP) as described in ISO 5353 (see Figure 1)

Dimensions in mm



Key

LB light bar
LS light bulb spacing
SIP seat index point
S seat
FPCP filament position centre point

Figure 1 — Light source apparatus

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 filament position centre point. Circle is divided into six visibility sectors (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 machine rectangular boundary (see Figure 4, Figure 5 and Figure 7)

3.4.3
sector of vision A
segment of the visibility test surface 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 filament position centre point with the chord length bisected by the longitudinal plane (see Figure 2)

3.4.4
sectors of vision B and C
segments of the visibility test surface to the front of the truck outside sector A and bounded by the transverse plane through the filament position centre point (see Figure 2)

3.4.5
sectors of vision D and E
segments of the visibility test surface to the rear defined by an angle of 45° to both the right and left sides of the longitudinal plane passing through the filament position centre point (see Figure 2)