
**Rough-terrain trucks — Safety
requirements and verification —**

**Part 2:
Slewing trucks**

*Chariots tout-terrain — Exigences de sécurité et vérifications —
Partie 2: Chariots rotatifs*

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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).

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 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 110, *Industrial trucks*, Subcommittee SC 4, *Rough-terrain trucks*.

ISO 10896 consists of the following parts, under the general title *Rough-terrain trucks — Safety requirements and verification*:

- *Part 1: Variable-reach trucks*
- *Part 2: Slewing trucks*
- *Part 4: Additional requirements for variable-reach trucks handling freely suspended loads*
- *Part 5: Interface between rough-terrain truck and integrated personnel work platform*
- *Part 6: Tilting operator's cabs*

The following part is under preparation:

- *Part 7: Longitudinal load moment systems*

Lorry-mounted trucks are to form the subject of a specific series, ISO 20297.

Introduction

Variable-reach trucks are known by a variety of terms, including “telehandlers” and “multi-purpose handlers”.

The variable-reach rough-terrain trucks covered by this part of ISO 10896 are designed to transport loads to and place them on elevated work areas and can be driven on unimproved or disturbed terrain.

They can also be equipped with a variety of attachments (e.g. mowers, sweepers).

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Rough-terrain trucks — Safety requirements and verification —

Part 2: Slewing trucks

1 Scope

This part of ISO 10896 specifies general safety requirements for slewing variable-reach rough-terrain trucks (hereafter known as “trucks”), consisting of a lower chassis with a slewing upper structure equipped with a telescopic lifting means (pivoted boom), on which a load handling device (e.g., carriage and fork arms) is typically fitted. Fork arms and other integrated attachments are considered to be parts of the truck.

Other standards, in addition to the relevant provisions of this part of ISO 10896, can apply to the attachments.

This part of ISO 10896 is not applicable to the following:

- a) variable-reach rough terrain trucks covered by ISO 10896-1 (non-slewing);
- b) industrial variable-reach trucks covered by ISO 3691-2;
- c) mobile cranes;
- d) machines designed primarily for earth-moving, such as loaders, even if their buckets are replaced by fork arms (see ISO 20474);
- e) trucks designed primarily with variable-length load suspension elements (e.g. chain, ropes) from which the load may swing freely in all directions;

NOTE Additional requirements for trucks intended for freely swinging load applications, their lifting devices and attachments, and personnel/work platform applications on trucks, are being developed by ISO/TC 110/SC4.

- f) trucks designed primarily for container handling.

The significant hazards covered by this part of ISO 10896 are listed in [Annex A](#). This part of ISO 10896 does not address hazards that can occur

- during manufacture,
- when handling suspended loads, which may swing freely,
- when lifting personnel,
- when using trucks on public roads,
- when operating in potentially explosive atmospheres, or
- with a battery, LPG or hybrid as the primary power source.

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 2328, *Fork-lift trucks — Hook-on type fork arms and fork arm carriages — Mounting dimensions*

ISO 2330, *Fork-lift trucks — Fork arms — Technical characteristics and testing*

ISO 2867:2011, *Earth-moving machinery — Access systems*

ISO 3449, *Earth-moving machinery — Falling-object protective structures — Laboratory tests and performance requirements*

ISO 3457, *Earth-moving machinery — Guards — Definitions and requirements*

ISO 3471:2008, *Earth-moving machinery — Roll-over protective structures — Laboratory tests and performance requirements*

ISO 3795, *Road vehicles, and tractors and machinery for agriculture and forestry — Determination of burning behaviour of interior materials*

ISO 4413, *Hydraulic fluid power — General rules and safety requirements for systems and their components*

ISO 5053¹⁾, *Powered industrial trucks — Terminology*

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

ISO 6292, *Powered industrial trucks and tractors — Brake performance and component strength*

ISO 6682, *Earth-moving machinery — Zones of comfort and reach for controls*

ISO 6683, *Earth-moving machinery — Seat belts and seat belt anchorages — Performance requirements and tests*

ISO 7000²⁾, *Graphical symbols for use on equipment — Registered symbols*

ISO 7096:2000, *Earth-moving machinery — Laboratory evaluation of operator seat vibration*

ISO 9244, *Earth-moving machinery — Machinery safety labels — General principles*

ISO 9533, *Earth-moving machinery — Machine-mounted audible travel alarms and forward horns — Test methods and performance criteria*

ISO 10263-3, *Earth-moving machinery — Operator enclosure environment — Part 3: Pressurization test method*

ISO 10263-4, *Earth-moving machinery — Operator enclosure environment — Part 4: Heating, ventilating and air conditioning (HVAC) test method and performance*

ISO 11112:1995+A1:2001, *Earth-moving machinery — Operator's seat — Dimensions and requirements.*

ISO 12508, *Earth-moving machinery — Operator station and maintenance areas — Bluntness of edges*

ISO 13284, *Fork-lift trucks — Fork-arm extensions and telescopic fork arms — Technical characteristics and strength requirements*

1) Withdrawn and replaced by ISO 5053-1.

2) The database on Graphical Symbols for Use on Equipment contains the complete set of graphical symbols included in IEC 60417 and ISO 7000: <http://www.graphical-symbols.info/>.

ISO 13732-1, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 1: Hot surfaces*

ISO 13849-1, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*

ISO 13850, *Safety of machinery — Emergency stop — Principles for design*

ISO 13857, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs*

ISO 15817, *Earth-moving machinery — Safety requirements for remote operator control*

ISO 15870, *Powered industrial trucks — Safety signs and hazard pictorials — General principles*

ISO 16528-1, *Boilers and pressure vessels — Part 1: Performance requirements*

ISO 16528-2, *Boilers and pressure vessels — Part 2: Procedures for fulfilling the requirements of ISO 16528-1*

ISO 21507, *Earth-moving machinery — Performance requirements for non-metallic fuel tanks*

ISO 22915-10, *Industrial trucks — Verification of stability — Part 10: Additional stability test for trucks operating in the special condition of stacking with load laterally displaced by powered devices*

ISO 22915-20, *Industrial trucks — Verification of stability — Part 20: Additional stability test for trucks operating in the special condition of offset load, offset by utilization*

ISO 22915-24, *Industrial trucks — Verification of stability — Part 24: Slewing variable-reach rough-terrain trucks*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

3 Terms and definitions

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

3.1

rough-terrain truck

truck designed for operation on unimproved natural terrain as well as the disturbed terrain of work sites

3.2

slewing variable-reach truck

variable reach truck with an upper structure which can rotate around a vertical axis of the chassis in a circular motion greater than 5° either side of the longitudinal axis of the truck

3.3

actual capacity

maximum load, established by the manufacturer based on component strength and truck stability, that the truck can carry, lift, and stack to a specified height, at a specified load centre distance and reach, in normal operating conditions

Note 1 to entry: The actual capacity depends on the configuration of the truck in terms of such variables as the following:

- lift height;
- reach of the boom (measured from the centre of slewing of the rotating upper structure);
- slewing position;
- actual load centre;
- load handling device (fork arms or attachment fitted);

— stabilizing devices.

Note 2 to entry: This actual capacity defines the load handling ability of the particular truck as equipped. Additional actual capacity ratings with removable attachments may also be established where permitted by the appropriate stability test or by calculation verified by empirical data.

3.4 reach

d
normal distance between the axis of rotation of the upper structure and the vertical plane including *G* perpendicular to the longitudinal axis of the upper structure

Note 1 to entry: See [Figure 1](#).

Note 2 to entry: The centre-of-gravity of the load (*G*) is defined in [Table 1](#).

3.5 rated capacity

Q_1
<truck> maximum load permitted by the manufacturer at the standard load centre distance that the truck is capable of lifting and transporting on *fork arms* (3.13) in normal conditions with the boom fully retracted

Note 1 to entry: See [Figure 1](#).

3.6 rated capacity

<attachment> maximum load that the attachment is permitted by its manufacturer to handle in normal operation under specified conditions

Note 1 to entry: The rated capacity of the attachment can be associated with the load centre distance. See [Table 1](#).

3.7 lift height

H
height from the ground to the upper face of the fork arms or underside of the load, whichever is the lower

3.8 standard load centre distance

D
distance from the centre of gravity of the load, horizontally rearwards to the front of the fork shanks and vertically downwards to the upper faces of the *fork arms* (3.13)

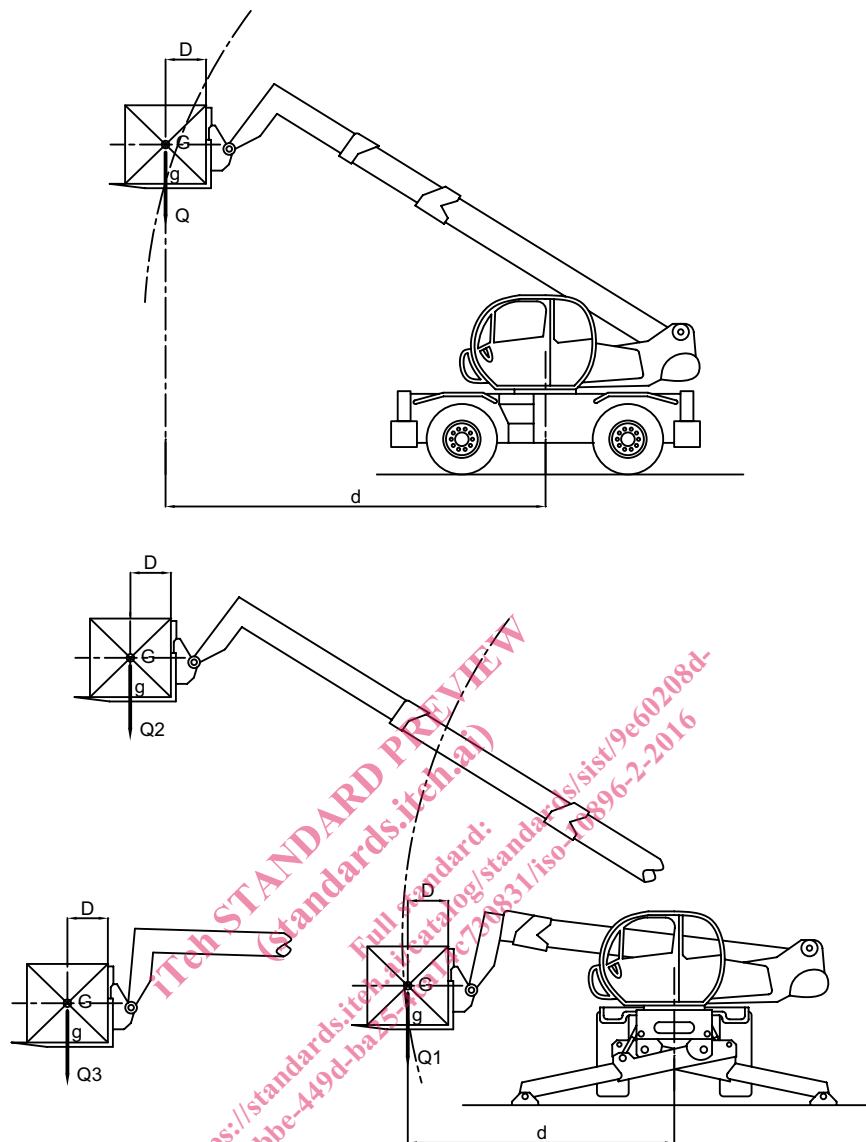
Note 1 to entry: See [Figure 1](#).

Note 2 to entry: [Table 1](#) gives standard load centre distances in relation to their rated capacities.

3.9 effective thickness

ET
horizontal shift in the standard load centre that may occur when removable attachments are added to a truck

Note 1 to entry: Effective thickness is also known as lost load (LL) or lost load centre (LLC).

**Key**

- d reach
- D standard load centre distance
- G centre of gravity of the load
- g vertical projection of the centre-of-gravity (G) of the load onto the plane of the top surface of the fork arms
- Q_1 rated capacity
- Q_2 actual capacity at maximum height
- Q_3 actual capacity at maximum reach

Figure 1 — Parameters for the designation of the actual capacity of the truck with fork arms