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Industrial trucks — Lorry-mounted trucks —

Part 2: Safe use requirements

Chariots de manutention — Chariots embarqués sur porteur routier —

Partie 2: Exigences pour l'utilisation en toute sécurité

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Foreword

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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 of the voluntary nature of standards, 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 www.iso.org/iso/foreword.html.

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

A list of all parts in the ISO 20297 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Lorry-mounted trucks are known by a variety of terms, including for example "vehicle-mounted trucks", "piggyback trucks".

Lorry-mounted trucks can also be equipped with a variety of attachments.

Industrial trucks — Lorry-mounted trucks —

Part 2:
Safe use requirements

1 Scope

This document specifies requirements for the application, inspection, training, maintenance, repair and safe operation (hereafter referred to collectively as the 'safe use') of industrial and rough-terrain lorry-mounted trucks (hereafter referred to as 'trucks') which have design features that allow them to be mounted for transport on a carrier vehicle.

This document is intended to achieve the following:

— the prevention of personal injuries, property damage and accidents;

— the establishment of criteria for inspection, maintenance and operation;

— the establishment of operator training requirements.

NOTE National or local requirements can apply.

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 5057, *Industrial trucks — Inspection and repair of fork arms in service on fork-lift trucks*

ISO 20297-1:2017, *Industrial trucks — Lorry-mounted trucks — Part 1: Safety requirements and verification*

ISO 23676, *Rough-terrain trucks — Operator training — Content and methods*

3 Terms and definitions

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

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

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

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

3.1
authorized person
person approved or assigned to perform a specific task or tasks at a specific location or locations at a worksite

[SOURCE: ISO 11525-1:2020, 3.1]

3.2
user
person or entity responsible for assigning an *operator* (3.3) to operate a truck and specifying the tasks to be performed

[SOURCE: ISO 11525-1:2020, 3.2]

3.3
operator
person who controls the *operation* (3.8) of the truck

[SOURCE: ISO 11525-1:2020, 3.3]

3.4
competent person
person who has acquired, through training, qualification, experience or a combination of these, the knowledge and skill enabling that person to correctly perform the required tasks

[SOURCE: ISO 11525-1:2020, 3.4]

3.5
responsible entity
person or entity with responsibility for the design, specification, procurement, fabrication, manufacture, assembly, provision of information and testing of a truck

[SOURCE: ISO 11525-1:2020, 3.5]

3.6
maintenance
act of upkeep, including inspection, lubrication, cleaning, adjustment and scheduled parts replacement

[SOURCE: ISO 11525-1:2020, 3.6]

3.7
modification
change to the truck that affects its *operation* (3.8), *stability* (3.9), *actual capacity* (3.17) or safety

[SOURCE: ISO 11525-1:2020, 3.7, modified — The term "capacity" has been replaced by "actual capacity".]

3.8
operation
performance of functions of a truck within the scope of its specifications and in accordance with the manufacturer's instructions and work rules

[SOURCE: ISO 11525-1:2020, 3.8]

3.9
stability
ability of the truck to withstand conditions that would cause it to overturn

Note 1 to entry: Conditions that can affect stability include ground and floor conditions, gradient, speed, loading (trucks equipped with attachments behave as partially loaded trucks even when operated without a load on the attachment), dynamic and static forces, and incorrect tyre inflation and incorrect tyre type.

[SOURCE: ISO 11525-1:2020, 3.9, modified — "and incorrect tyre type" has been added to the end of Note 1 to entry.]

3.10
lorry-mounted truck
wheeled, operator-controlled truck with a powered driving mechanism, designed either to carry, stack or tier in racks any kind of load, and capable of self-loading to, and self-unloading from, a *carrier vehicle* (3.14) using its load-lifting means

[SOURCE: ISO 20297-1:2017, 3.1, modified — The term "vehicle" has been replaced by "truck" and Note 1 to entry has been removed.]

3.11
industrial lorry-mounted truck
lorry-mounted truck (3.10) designed for *operation* (3.8) under normal operating conditions on substantially firm, smooth, level, prepared and consolidated surfaces

[SOURCE: ISO 20297-1:2017, 3.1.1, modified — Note 1 to entry has been removed.]

3.12
rough-terrain lorry-mounted truck
lorry-mounted truck (3.10) designed for *operation* (3.8) under normal operating conditions on unimproved natural terrain as well as the disturbed terrain of work sites

[SOURCE: ISO 20297-1:2017, 3.1.2, modified — Note 1 to entry has been removed.]

3.13
normal operating position
position specified by the manufacturer in which the *operator* (3.3) is able to control the truck *operations* (3.8), including load-handling functions

[SOURCE: ISO 20297-1:2017, 3.13]

3.14
carrier vehicle
lorry or trailer that is suitable for transporting a *lorry-mounted truck* (3.10) by the fitting of a suitable *mounting kit* (3.15)

[SOURCE: ISO 20297-1:2017, 3.15]

3.15
mounting kit
structure designed to fit a *lorry-mounted truck* (3.10) to a *carrier vehicle* (3.14)

[SOURCE: ISO 20297-1:2017, 3.16]

3.16
rated capacity
maximum load that an attachment is permitted by its manufacturer to handle in normal *operation* (3.8) under specified conditions

[SOURCE: ISO 20297-1:2017, 3.3, modified — Domain "<attachment>" and Note 1 to entry have been removed.]

3.17
actual capacity
maximum load at a specified load centre distance, established by the manufacturer based on component strength and truck *stability* (3.9), that the truck can carry, lift and stack to a specified lift height and reach, in normal *operation* (3.8)

[SOURCE: ISO 20297-1:2017, 3.4, modified — Notes to entry have been removed.]

4 General requirements

4.1 Principles

4.1.1 This document shall be supplemented by good management practices, safety controls and the application of sound principles of safety, training, inspection, maintenance, application selection and operation. All data available regarding the parameters of intended use and the expected environment shall be considered. Those with direct control over the application and operation of the truck shall be responsible for ensuring good safety practices.

NOTE Different operating conditions can require additional safety precautions, training and special safe operating procedures.

4.1.2 The operation of any truck is subject to certain hazards that can be protected against only by the exercise of care and common sense. It is essential to have competent persons trained in the intended use, safe operation, maintenance and service of the truck and any attachment(s).

4.1.3 The user shall ensure that the operator understands that safe operation of the truck is also the operator's responsibility.

4.1.4 The user shall take reasonable measures to ensure that the operator's mental or physical condition will not impair their ability to operate the truck.

4.1.5 In addition to specific training, application selection and operation of the truck, the user shall take the following characteristics for trucks into consideration:

— these trucks are primarily designed for handling supported loads on forks;

— other attachments can be fitted.

4.1.6 The user shall take reasonable measures (for example, spot checks) to ensure that the safe use requirements are being applied during operation.

4.2 Operator's manual(s)

4.2.1 The user shall ensure that the operator's manual(s) and any additional safety manuals provided by the manufacturer of the truck and mounting kit manufacturer (if available), are always available to the operator and maintenance personnel.

4.2.2 The user, the operator, or both shall refer to the responsible entity if doubt arises on either the use of the truck or the interpretation of the operator's manual.

4.3 Modifications or alterations

4.3.1 Except as provided for below, no modifications or alterations to a truck that can affect its actual capacity, stability or safe operation shall be made without the prior written approval of the original truck manufacturer or its successor.

4.3.2 If the truck manufacturer is no longer in business and there is no successor, modifications or alterations to the truck shall be carried out by a competent person under the following conditions:

a) the design, testing and implementation of the modification or alteration is made in accordance with ISO 20297-1:2017;

b) a permanent record is kept of the design, tests and implementation of the modification or alteration;

c) appropriate changes are made to the information plate(s), documents, certificates, labels, tags and operator's manual(s);

d) a permanent and readily visible label is affixed to the truck stating the manner in which the truck has been modified or altered, together with the date of the modification or alteration, and the name of the person or organization responsible for the design, testing and implementation of the modifications.

4.3.3 Upon completion of any approved modification or alteration and prior to truck operation, the user shall ensure that the appropriate changes have been made to information plate(s), documents, certificates, labels, tags and operator's manual(s) and any training, if required.

4.4 Manufacturer's bulletins

The user shall conform to the applicable bulletins as directed by the responsible entity.

4.5 Operator qualifications and training

4.5.1 Users shall only allow competent and authorized persons to operate a truck and are responsible for ensuring that the operator has been trained in accordance with ISO 23676.

4.5.2 The user shall ensure that the operator has read and is familiar with the operator's manual(s) and any other safety information provided by the manufacturer and user on the particular truck being operated, the application and environment in which the truck is to be used, and any attachments used.

4.5.3 The user shall ensure that the operator is familiar with worksite rules and layout, working conditions, handling of loads found at the workplace and local emergency procedures.

4.6 Inspection and maintenance

4.6.1 General

4.6.1.1 The inspection and maintenance of trucks shall be performed in accordance with the manufacturer's and user's recommendations. This includes:

a) a planned system for scheduled inspection, lubrication, maintenance and adjustment;

b) verification that only competent and authorized persons are permitted to maintain, repair, rebuild, adjust, and inspect trucks, in accordance with the manufacturer's recommendations.

4.6.1.2 The user shall ensure that inspections and maintenance operations are conducted in an authorized area where safe clearances exist.

4.6.1.3 The user shall ensure that appropriate personal protective equipment is available for use by the authorized person.

4.6.2 Preparation for inspection or repair

In preparation for, and prior to, starting inspection or repair of a truck the authorized person shall:

— park the truck on a firm level surface;

— set the direction control in neutral, apply the parking brake, switch off the engine or power system and remove the device (for example, key, key pad, magnetic card) that prevents starting without use of such device;

— apply means to ensure the truck remains stationary (for example, wheel chocks, setting of park brake);

— implement manufacturer-approved methods/devices as outlined in the operator's manual(s) to prevent unintentional movement of the truck/components before working on or around it;

— eliminate the possibility of unintentional fluid escape before any part of that system is disconnected;

— disconnect the battery before working on the electrical system, as directed by the manufacturer;

— eliminate the possibility of unintentional stored energy release, (for example, from the accumulator or hydraulic system).

4.6.3 Performance checks

4.6.3.1 Prior to conducting the performance checks, the user shall ensure that the operator has performed the pre-operation inspection as per the manufacturer's instructions and that a record has been kept of the check.

4.6.3.2 The user shall ensure that performance checks are conducted in an authorized area where safe clearances exist.

4.6.3.3 Before starting the performance check, the operator shall:

a) check that no persons are placed at risk;

b) be in the normal operating position using the operator restraint (for example, seat belt);

c) apply service and parking brakes;

d) disengage the clutch, if the truck is so equipped;

e) place directional control(s) in neutral; and

f) start the engine or power system.

4.6.3.4 The operator shall check that all control systems (for example, load-handling means, steering, brakes) and safety devices are functioning in accordance with the manufacturer's instructions.

4.6.3.5 Before exiting the truck, the operator shall:

a) stop the truck;

b) fully lower the load-handling means and place the fork tips on the ground to minimize the potential for tripping;

c) place directional control(s) in neutral;

d) apply the parking brake;

e) shut down the engine or power system; and

f) remove the device necessary for starting the truck (for example, key, key pad, magnetic card).

4.6.4 Inspection and maintenance precautions

The user shall ensure that the following precautions are taken when inspection and maintenance is performed.

— Fire hazards shall be avoided, and fire protection equipment shall be present in the work area.

— An open flame shall not be used to check fluid levels or for leakage of fuel, battery electrolyte or other flammable liquids.

— Open containers of fuel or flammable cleaning fluids for cleaning parts shall not be used.

— The work area shall be properly ventilated, including engine exhaust fumes.

— The work area shall be kept clean and dry.

— Repairs or adjustments (for example, welding of structures) shall not be made unless specifically authorized to do so in accordance with 4.3.

— When refuelling, smoking in the area shall not be permitted, the engine shall be stopped, and the operator shall not be in the truck.

— Spillage of oil or fuel shall be cleaned up appropriately.

— Oil and fuel tank caps shall be replaced before restarting the engine.

— Other potential hazards associated with the inspection and maintenance of the truck not addressed in this document or the operator's manual shall be avoided.

— The user shall be aware of national and local environmental regulations for managing waste oils, filters or any other source of environmental pollution.

— Appropriate personal protective equipment shall be worn.

4.6.5 Inspection and maintenance requirements

The user shall ensure that:

a) brakes, steering mechanisms, control mechanisms, warning devices, guards and safety devices, lift and tilt mechanisms, axle stops, stabilizers and frame members are carefully inspected and maintained in a safe operating condition;

b) if the truck and components are designed and approved for hazardous area operation, that they receive special attention from a competent person so that the maintenance performed achieves the original, approved safe operating conditions;

c) fuel systems are inspected for leaks, damage and deterioration;

d) hydraulic systems are inspected and maintained in conformance with the manufacturer's recommendations, and that hydraulic cylinders, valves and other hydraulic system components are checked to ensure that creep or leakage has not developed to the extent that it would create a hazard or exceed the values defined in ISO 20297-1:2017, 4.12.3;

e) all lighting devices, including the connection to the vehicle carrier, are operating properly;

f) truck safety, load charts, operation and maintenance information plates, tags and labels are maintained in a legible condition;

g) the truck is kept in a clean condition to minimize fire hazards and facilitate detection of loose or damaged parts;

h) replacement parts, including tyres, are approved by the truck manufacturer;

i) if any repairs that could affect the safe use of the truck are necessary, action is taken to prevent the use of the truck until repairs have been completed;

j) industry safety practices are followed when fitting or removing tyres from rims, pneumatic tyres are completely deflated prior to their removal from rims and a safety cage or restraining device is used while inflating tyres;

k) approved load-handling attachments are inspected, repaired or replaced in accordance with manufacturer's instructions;

l) forks are inspected, repaired or replaced in accordance with ISO 5057;

m) all fluids (for example, mechanism lubricant, hydraulic oils, brake fluid) have been checked and are at appropriate levels; and

n) records, including the name of the person responsible and date of the periodical inspection, and maintenance are kept.

NOTE Local regulations can also apply.

4.7 Hazardous environments

4.7.1 The user shall ensure that the truck selected is appropriate for the environment in which it is intended to be used.

4.7.2 To operate in the proximity of overhead electric lines, the user shall inform the operator about the minimum safe distance and all the necessary precautions to be taken.

NOTE Specific national or local regulations can apply for operation in potentially explosive atmospheres or underground.

4.8 Refuelling

4.8.1 When refuelling, the operator shall follow the instructions provided by the manufacturer in the operator's manual.

4.8.2 Trucks shall be refuelled in an area specified by the user. This area shall be ventilated to minimize the accumulation of flammable gases.

4.8.3 Care shall be taken to ensure that no fuel is spilled.

4.8.4 The engine shall not be restarted until the fuel-filling equipment has been removed from the truck, the filler cap has been replaced on the tank and any spilled fuel or additives disposed of.

4.9 Elevating personnel (use of personnel work platforms)

The truck shall not be used to elevate personnel, nor shall it be fitted with provisions to elevate personnel, for example, a personnel work platform, also known as a PWP.

5 Operating safety rules and precautions

5.1 Operator's responsibility for safety

5.1.1 Before operating any truck, the operator shall have read and be familiar with the operator's manual(s) and any additional safety documents provided by the truck and mounting kit manufacturers and user for the particular truck being operated.

5.1.2 The operator shall develop safe working practices and shall be aware of hazardous conditions, utilizing all means, including those provided by the user, to protect themselves, other personnel, the truck, the load and the local environment.

5.1.3 The operator shall understand the operation, identification and functions of all controls and instruments before operating the truck.

5.1.4 The operator shall understand the load charts affixed to the truck before operating it. This shall include any attachments that are used as well as when the truck is on stabilizers/outriggers or tyres.

5.1.5 The operator shall know the mass and the load centre distance of the load before approaching the load.

5.1.6 The operator shall look for any overhead obstructions (for example, overhead power cables) and maintain a safe distance from them.

5.2 Visual inspection and functional tests

5.2.1 Before use each day or at the beginning of each shift, the operator shall ensure that the truck is subjected to a visual inspection and functional tests, including:

— operating and emergency controls;

— safety devices;

— seat assembly and seatbelt;

— lights (if so equipped);

— lighting devices and connections to the carrier vehicle;

— the mounting kit;

— brakes;

— lift and tilt systems, load-handling means, chains, cables and limit switches;

— personal protective equipment (PPE);

— fork arms and the attachment means;

— air, hydraulic and fuel systems;

— cables and wiring;

— loose, damaged or missing parts;

— tyres and wheels;

— instructions, warnings and control markings;

— operator's manual(s);

— structural components, such as stabilizing devices;

— any attachments other than forks to be used;

— load charts are visible and legible;

— hydraulic oil and other fluids level;

— optional equipment, (for example, remote control); and

— other items specified by the manufacturer.

5.2.2 If the truck is found to be in need of repair or is unsafe in any way, or if it contributes to an unsafe condition, the operator shall immediately report the matter to the user's designated authority. The truck shall not be operated until it has been restored to a safe operating condition.

5.2.3 The operator shall report the results of the visual inspection and functional tests to the user.

5.3 General operating instructions

5.3.1 When dismounting the truck from the carrier vehicle

The operator shall:

a) ensure that the supporting surface for the truck is stable and clear of obstacles;

b) ensure that all electrical connections between the carrier vehicle and truck have been disconnected;

c) for trucks where dismounting is carried out from the normal operating position:

   1) access the truck's operator's station maintaining three points of contact, i.e. one hand and two feet or two hands and one foot,

   2) be in the normal operating position using the operator restraint, for example, seat belt,

   3) ensure that the parking brake is applied,

   4) ensure that all load-handling and directional controls are in the neutral position;

d) start the engine or activate the power source;

e) dismount the truck from the carrier vehicle according to the truck manufacturer's instructions.

5.3.2 When operating the truck once it has been dismounted

The operator shall:

a) if not already in the normal operating position, access the truck's operator's station maintaining three points of contact, i.e. one hand and two feet or two hands and one foot;

b) be in the normal operating position using the operator restraint system, for example, seat belt;

c) ensure that the parking brake is applied;

d) ensure that all load-handling and directional controls are in the neutral position;

e) start the engine or activate the power source;

f) not start or operate the truck, or any of its functions or attachments, from any place other than the normal operating position;

g) never put any part of the body, including hands and feet:

   1) outside the operator's compartment except when entering and exiting,

   2) into the load-handling structure,

   3) between the load-handling structure, the stabilizers and the truck,

   4) within the reach mechanism, or attachments of the truck;

h) understand the limitations of the truck, and always operate the truck in a safe manner;

i) not drive a truck directly up to anyone;

j) safeguard pedestrians at all times, and exercise particular care during reversing and other operations where pedestrians can potentially step into the path of travel of the truck;

k) not allow anyone to stand or pass under the elevated load handling structure of the truck, whether empty or loaded;

l) not permit passengers to ride on trucks unless a designated passenger seat has been provided by the manufacturer. If the passenger seat is occupied, the operator shall operate the truck in a manner that ensures the safety of the passenger, who shall:

   1) remain seated with seat belt fastened at all times except when entering and exiting,

   2) keep all parts of their bodies, including hands and feet, inside the passenger compartment,

   3) keep clear of, and make no contact with, the operating controls of the truck, and

   4) not exit the truck until is properly shut down;

m) check clearance carefully before driving under obstructions, for example, electrical lines, bridges;

n) check for underground utility services before using ground-engaging attachments;

o) take reasonable steps to minimize the environmental impact of using the truck;

p) take into account the effects of weather, (for example, wind, rain, snow), on the safe operation of the truck;

q) before leaving the normal operating position:

   1) bring the truck (see 5.4) to a complete stop,

   2) place directional control in neutral,

   3) apply the parking brake,

   4) fully retract and lower the load-handling means and position forks or other attachments flat on the ground,

   5) in addition, when leaving the truck unattended (see NOTE), stop the engine or other power source and remove the device necessary for starting the truck (for example, key, key pad, magnetic card);

   NOTE A truck is unattended when the operator is 7,6 m or more from the normal operating position or whenever the normal operating position is not in the operator's view.

r) maintain a safe distance from the edge of ramps, platforms and other working surfaces;

s) in areas classified as potentially hazardous, use only trucks approved for use in those areas;

t) report all accidents involving personnel, building structures and equipment to the supervisor or as directed;

u) not block access to fire exits, stairways or fire equipment or park closer than 1,8 m to a railway line and maintain safe distances from drop-offs (for example, excavations, ditches);

v) maintain the appropriate minimum safe distance from energized power lines.

5.3.3 If the truck is found to be in a condition that is unsafe in any way, this shall be reported immediately to the user. The truck shall not be operated until it has been restored to safe operating condition.