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Aircraft ground support equipment — Specific requirements —

Part 11: Container/Pallet dollies and loose load trailers

Matériel au sol pour aéronefs — Exigences particulières —

Partie 11: Remorques porte-conteneur/porte-palette et pour charges en vrac

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Foreword

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This document was prepared by the European Committee for Standardization (CEN) (as EN 12312-11:2005) and drafted in accordance with its editorial rules. It was assigned to Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 9, *Air cargo and ground equipment* and adopted under the "fast-track procedure".

A list of all parts in the ISO 32312 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

This document specifies health and safety requirements, as well as some functional and performance requirements for container/pallet dollies and loose load trailers intended for moving unit load devices (ULD), loose freight, mail and baggage on an airport.

The minimum essential criteria are considered to be of primary importance in providing safe, serviceable, economical and practical container/pallet dollies and loose load trailers. Deviations from the recommended criteria should occur only after careful consideration, extensive testing, risk assessment and thorough service evaluation have shown alternative methods or conditions to be satisfactory.

This document is a type C standard as stated in both parts of ISO 12100.

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

When provisions of this type C standard 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, for machines that have been designed and built according to the provisions of this type C standard.

Aircraft ground support equipment — Specific requirements —

Part 11: Container/Pallet dollies and loose load trailers

1 Scope

This document specifies the technical requirements to minimise the hazards listed in Clause 4 which can arise during the commissioning, operation and maintenance of container/pallet dollies and loose load trailers when carried out in accordance with the specifications given by the manufacturer or his authorised representative. It also takes into account some performance requirements recognised as essential by authorities, aircraft and ground support equipment (GSE) manufacturers as well as airlines and handling agencies.

This document applies to container/pallet dollies using ball-mat, inverted cargo castors, or rollers and loose load trailers intended to be used for the transportation of baggage and cargo on airports (examples, see Annex A).

This document does not apply to trailers of similar design as used on public roads, e.g., truck type trailers.

This document does not establish requirements for noise and vibration.

Noise and vibration are dealt with respectively in EN 1915-4 and EN 1915-3.

This document is not applicable to container/pallet dollies and loose load trailers which are manufactured before the date of publication by ISO of this document.

NOTE Certain measurements have been given in imperial units (in parentheses), following the metric measurements, since the containers/pallets to be handled are based mainly on the imperial system.

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.

EN 1050:1996, *Safety of machinery — Principles for risk assessment*

EN 1915-1:2001, *Aircraft ground support equipment — General requirements — Part 1: Basic safety requirements*

EN 1915-2+A1, *Aircraft ground support equipment — General requirements — Part 2: Stability and strength requirements, calculations and test methods*

ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology (ISO 12100-1:2003)*

ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles (ISO 12100-2:2003)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100-1:2003, ISO 12100-2:2003 and EN 1915-1:2001 and the following 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
dolly
trailer designed for the transportation of containers or palletized loads

3.2
loose load trailer
trailer capable of transporting loose loads

EXAMPLE Baggage, parcels, mail bags.

3.3
container overhang
part of a container contoured beyond the base to match the design of an aircraft

3.4
overrun brake
brake operated by inertia to slow down a trailer in addition to the braking power of the towing vehicle

3.5
auto reverse brake
brake that releases automatically when the trailer is reversed

3.6
end towing
towing of a dolly from the shorter edge

3.7
side towing
towing of a dolly from the longer edge

3.8
end transfer (end loading)
loading/unloading of the ULD in line with the direction of travel of the trailer/dolly

3.9
side transfer (side loading)
loading/unloading of the ULD at 90° to the direction of travel of the dolly

3.10
roller
uni-directional transfer unit

3.11
inverted castor
omni-directional transfer unit

3.12
ball transfer unit
omni-directional transfer unit using ball modules

3.13
guide
fixed or retractable device used to maintain the desired direction of movement of ULDs

3.14
lead-on roller
special roller, positioned close to the edge of the platform to ease transfer of loads and absorb initial impact

3.15
lead-in flare
tapered end of guides to facilitate the easy transfer of ULDs

3.16
stop
fixed or retractable device capable of preventing horizontal movement of ULDs

3.17
lock
fixed or retractable device capable of preventing horizontal and vertical movement of ULDs

3.18
protective cover
fixed or flexible sheet to protect the load

3.19
cover stowage box
device to store flexible protective covers when not in use

4 List of hazards

The list of risks and hazards (see Annex B) is based on EN 1050:1996 and contains the hazards and hazardous situations, as far as they are dealt with in this document, identified by risk assessment as significant for container/pallet dollies and loose load trailers and which require action to eliminate or reduce risks.

5 Safety requirements and/or measures

5.1 General requirements

5.1.1 Container/pallet dollies and loose load trailers shall conform to the relevant requirements of EN 1915-1:2001, unless otherwise specified in this document. They shall also conform to the specific requirements of this document.

5.1.2 Stability and strength calculations shall be carried out in accordance with EN 1915-2+A1.

5.1.3 Container/pallet dollies and loose load trailers shall be designed to be towed in trains, e.g., by having a drawbar at one end and a towing coupling at the other.

5.1.4 When dollies/trailers are towed in trains, the design shall be such as to avoid any contact between adjacent dollies/trailers and ULDs intended to be carried when dollies/trailers are at 90° to each other.

5.1.5 Control device actuators, e.g., handles, foot pedals, shall be accessible and positioned so that they can be operated whilst wearing protective clothing, e.g., cold weather protection, safety shoes. Handles shall be designed to be operated by gloved hands.

5.1.6 In the case where it is not possible to identify clearly the crushing, shearing and falling points in this document, the manufacturer shall carry out a specific risk assessment. The manufacturer shall also carry out a specific risk assessment for the interface with other machines.

NOTE This risk assessment is part of the general risk assessment.

5.2 Structure

5.2.1 The support structure stiffness shall be such that the requirements of Annex C, in respect of the support area, are satisfied taking into account the dimensions and masses of the payloads given in Annex D.

5.2.2 The structure of the trailer/dolly shall include no projections or corners that could cause injury, e.g., corners shall be chamfered to a minimum radius of 3 mm unless smooth corners are provided by the intrinsic design of the standard material profiles used in its construction.

5.3 Platform

5.3.1 On loose load trailers, drainage shall be provided to avoid accumulation of water on the platform.

5.3.2 On loose load trailers, the loading platform shall be designed to ease loading and assist with load stability, e.g. the loading platform may be sloped towards the centre.

5.3.3 The platform of dollies shall be designed to keep the efforts needed for manual movements of ULDs within acceptable limits.

5.3.4 All parts of the platform structure of dollies, including retractable components, shall be at least 13 mm (0,5 in) below the top of the conveying surface.

5.3.5 To absorb the initial impact load and to ease the transfer of ULDs, one or a combination of the following shall be used:

— lead-on rollers with the maximum possible diameter commensurate with design (see Annex C);

— a maximum distance of 100 mm between centre line of first roller and outer edge of platform;

— any parts extending beyond the first rollers shall be ramped down to a minimum of 15° to the horizontal;

— any parts extending beyond the first rollers shall be mounted 15 mm below the horizontal centre line of the first rollers.

5.3.6 Guides on dollies shall be smooth and continuous. Where practicable, a lead-in flare shall be provided to guide ULDs into position and minimize impact loads.

5.3.7 Turntables fitted to platform dollies shall be capable of being positively locked in the transport and loading/unloading positions.

5.4 Load securing points

Dollies and loose load trailers shall be designed so that loads are secured. This may be achieved on dollies e.g., by using locks and stops, and on loose load trailers by using fully enclosed bodies. If this is not feasible, load securing points shall be provided to enable the load to be secured in all directions with load restraint devices.

Stops shall have a minimum height of not less than 50 mm (2 in) above the conveying surface. Stops shall be retractable to permit loading/unloading. The maximum height shall take into account the types of containers to be handled.

NOTE For majority of containers and pallets a maximum height of 100 mm (4 in) is required to avoid damage to overhanging loads or sloping undersides of some containers. For certain lower deck containers, the maximum height becomes 54 mm.

5.5 Steering

Trailers or dollies of the same model shall be designed in such a way that, when towed in a train, they are capable of following the direction provided by the towing vehicle, i.e. by following a straight line in a train, maintaining straight line stability and maintaining the line of a curve when rounding a corner.

5.6 Manoeuvring

When under manual control, the hand forces needed to move the steering device of a fully laden trailer or dolly shall not exceed 300 N. Handles fitted to the structure itself, or the drawbar, shall be designed so as not to cause injury to the operator, e.g., by crushing, squeezing or trapping. This shall be achieved by avoidance of sharp edges or corners and the use of smooth material profiles.

5.7 Wheel assemblies

The design or selection of the rims and tyres shall take into account:

— maximum speed;

— maximum load;

— heat generation as caused by e.g. route, distance and environment;

— intended local environment.

5.8 Overrun brakes

Where overrun brakes are installed, they shall be able to stop trailers/dollies in a straight line, when towed in a train.

NOTE 1 For requirements for overrun brakes see 98/12/EC.

NOTE 2 The user should agree with the supplier which type of tow tractors to be used with the trailers/dollies and whether or not overrun brakes are required.

5.9 Coupling and drawbars

5.9.1 The rated capacity of couplings and drawbars shall take into account the loads imposed by the maximum number of dollies/trailers in a train, in front or behind.

5.9.2 Towing couplings and drawbars shall be compatible with the towing points on the tow tractors for which they are intended. (see Annex E).

NOTE Towing couplings should ensure that the towbars remain as horizontal as possible during operation.

5.10 Options

Optional equipment shall conform to the relevant requirements of this document and EN 1915-1:2001. Such optional equipment may include:

— axle suspension;

— destination board/placard holder;

— protective cover for the load;

— cover stowage box attached to the forward wall;

— stowage facility for removable attachments.

6 Information for use

6.1 Marking

Permanent marking of data shall consist of metal plates fixed with rivets or welded to the structure.

6.2 Safety marking

Parts protruding into work and passage areas beyond the contour during intended use shall have safety markings.

6.3 Instructions

6.3.1 Operating and maintenance instructions shall be supplied with each trailer or dolly. They shall generally meet the requirements in 6.2 of EN 1915-1:2001. In addition, the operating and maintenance instructions shall contain, depending on type and design of the trailer/dolly, information about:

— minimum turning radius;

— towing capacity of rear tow bar hitch in worst-case scenario;

— maximum speed;

— payload;

— the type of ULDs to be carried;

— information about load transferring and positioning;

— routine checks to be carried out by the operator;

— minimum training programme for the operator;

— information about optional equipment;

— information about the measures to be taken in case of emergency situations or breakdown;

— safety requirements for maintenance resulting from the specific design of, e.g., removal of jammed or loose parts;

— additional information for transporting damaged ULDs, e.g., bend, distorted.

6.3.2 Operating instructions shall include the following information with regard to towing in a train:

— a laden trailer shall not be towed behind an unladen trailer;

— the heaviest dolly/trailer shall be towed nearest to the towing vehicle;

— the widest dolly/trailer shall be towed nearest to the towing vehicle. If, at the same time, it is not the heaviest dolly/trailer in the train, it shall be towed in a different train;

— within the same train, trailers with overrun brakes shall not be mixed with trailers without overrun brakes;

— the maximum number of trailers/dollies permitted in a train.

7 Verification of requirements

The verification of requirements shall be carried out generally in accordance with Clause 7 of EN 1915-1:2001.

The following shall be verified by functional tests, and measurement (as appropriate):

— load test (see 5.2.1);

— operation of stops and locks (see 5.4);

— steering and manoeuvring (see 5.5 and 5.6);

— brakes (see 5.8).

Annex A
(informative)

Typical designs of dollies and trailers

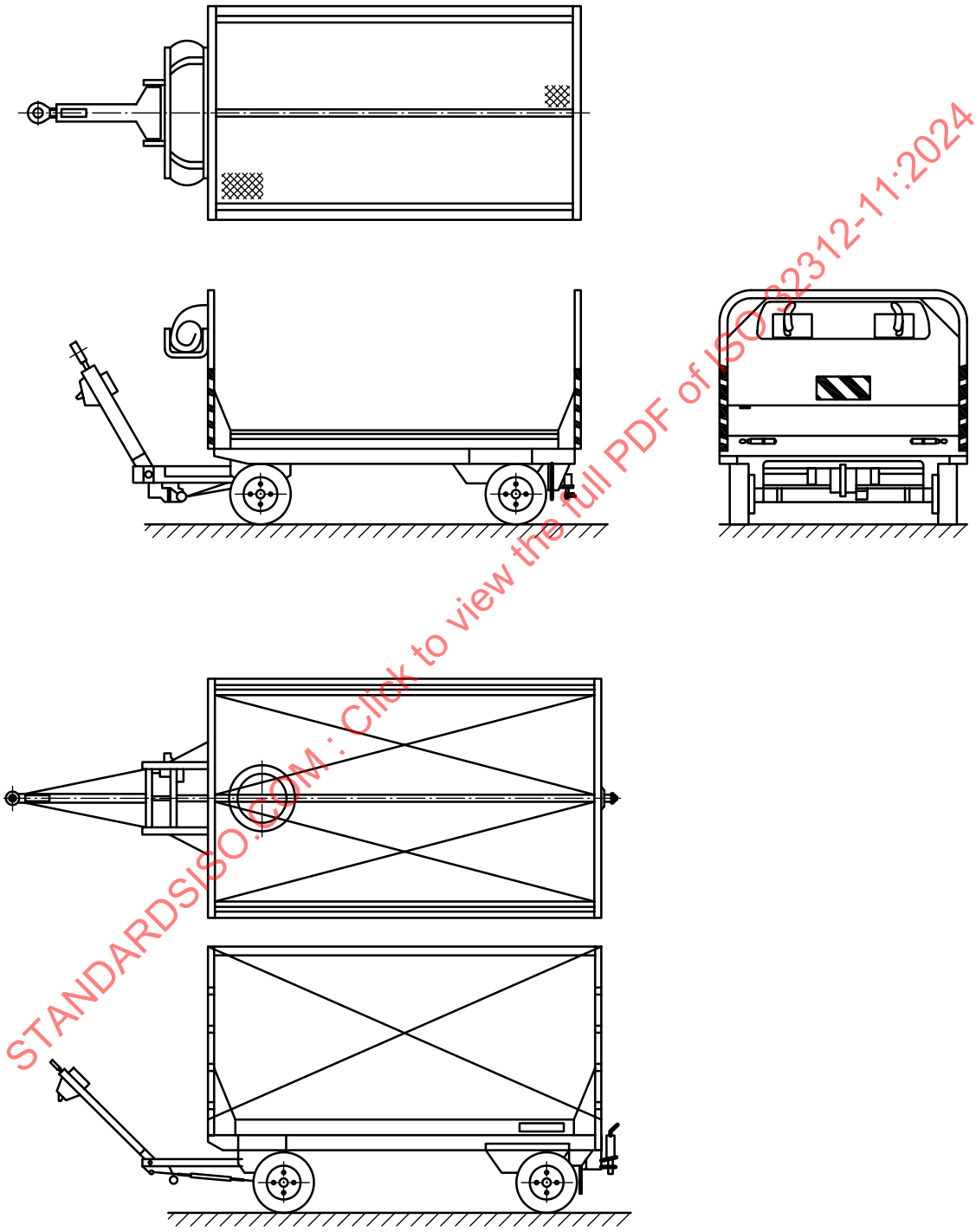

Figure A.1 — Baggage trailer

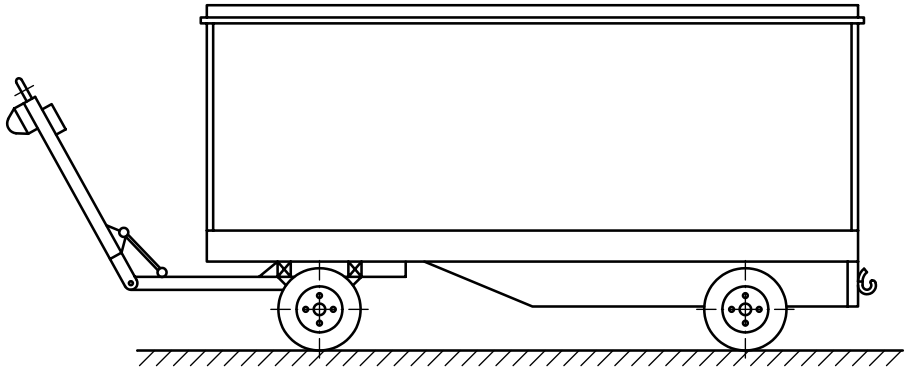

Figure A.2 — Heavy duty trailer for loose loads

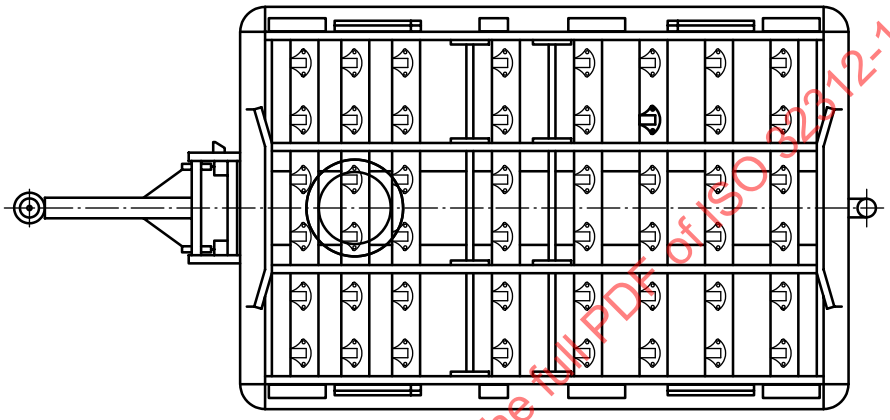

Figure A.3 — Container/pallet dolly, end towing, side transfer

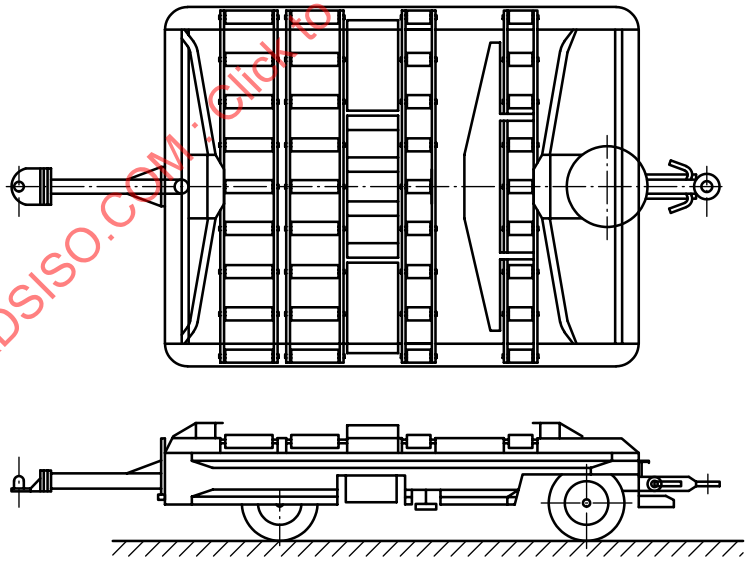

Figure A.4 — Container dolly, fixed platform, side transfer

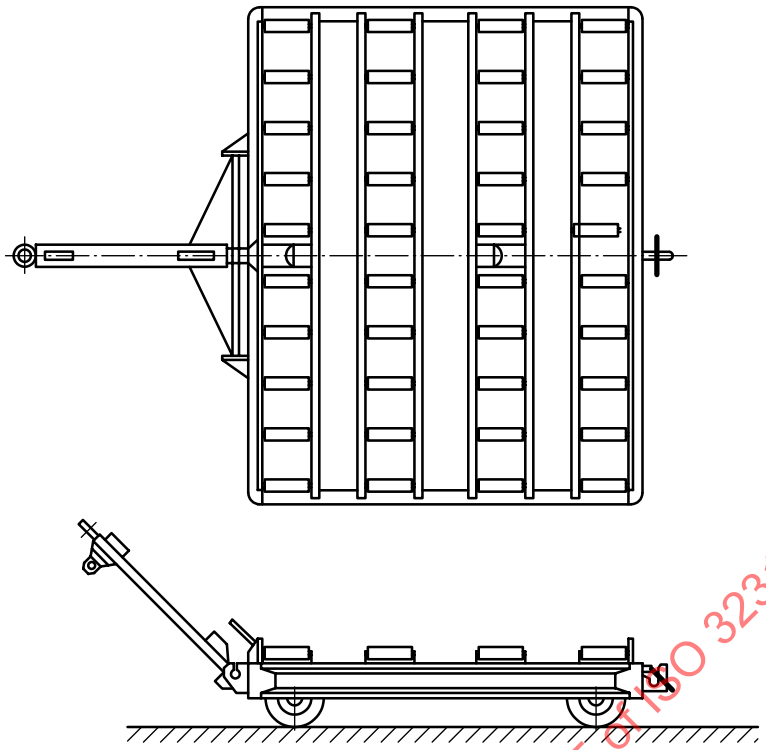

Figure A.5 — Container/pallet dolly, side towing, side transfer

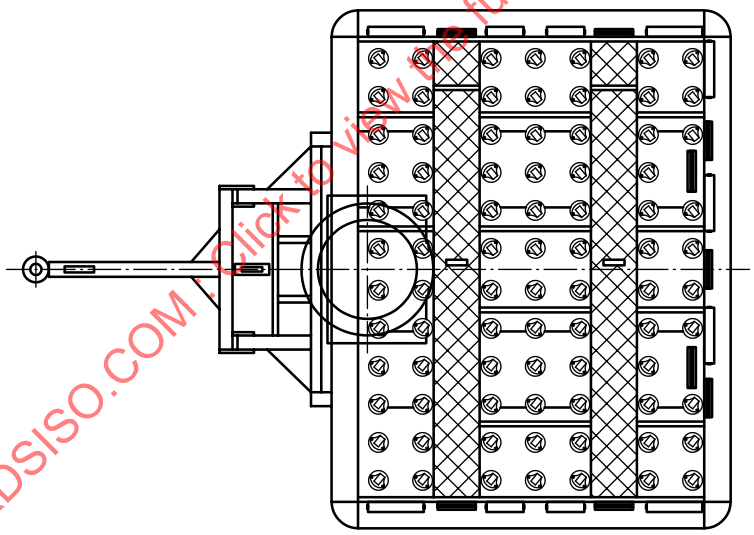

Figure A.6 — Container/pallet dolly, side towing, side/end transfer

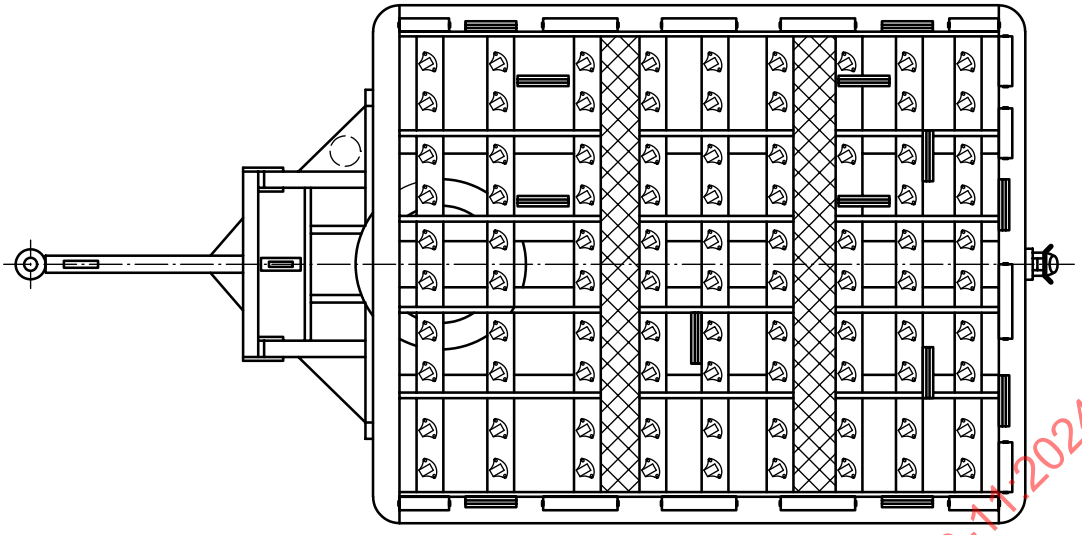

Figure A.7 — Container/pallet dolly, end towing side/end transfer

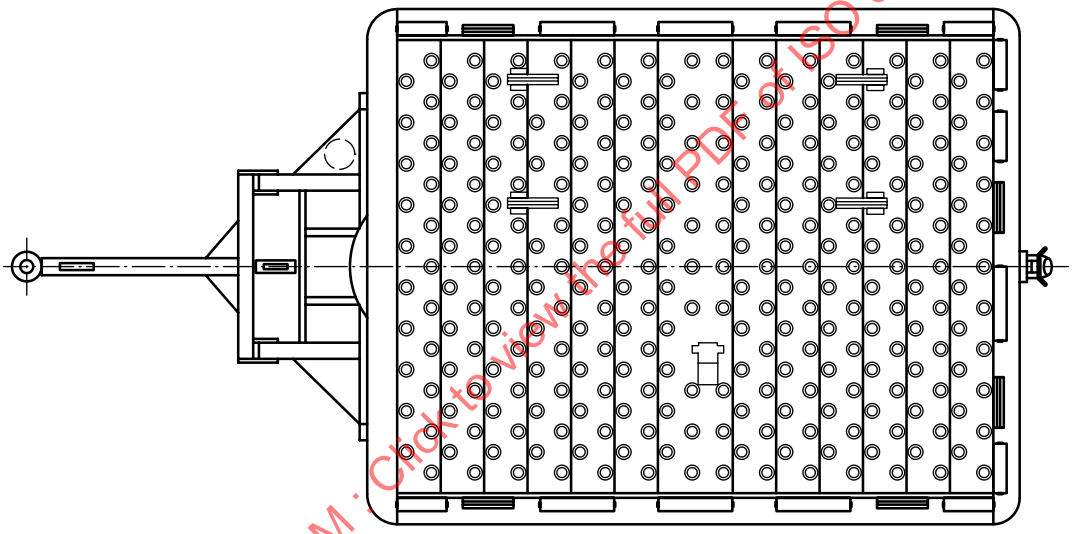

Figure A.8 — Container/pallet dolly, end towing side, ball transfer unit

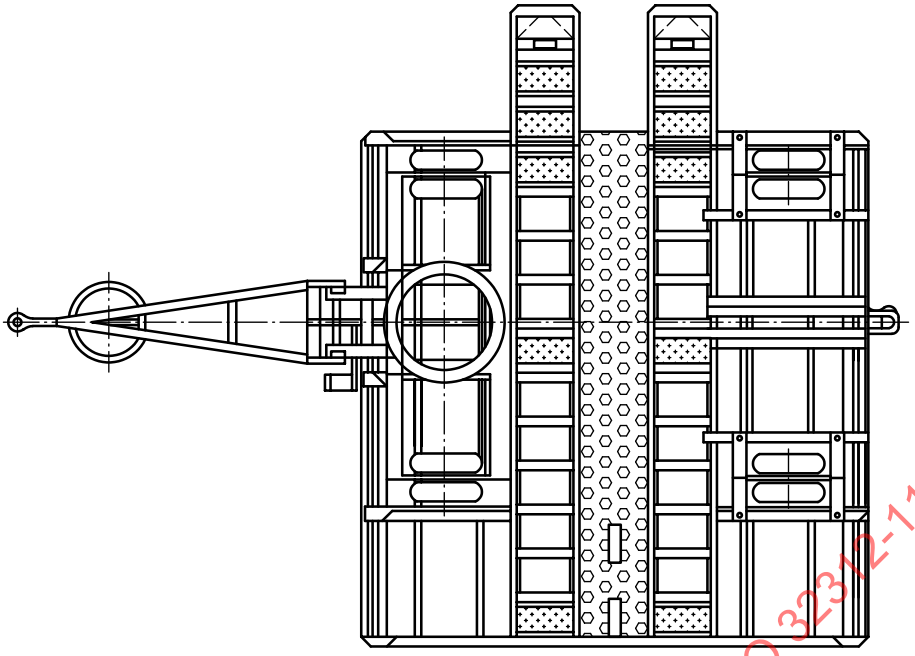

Figure A.9 — Other GSE interface points

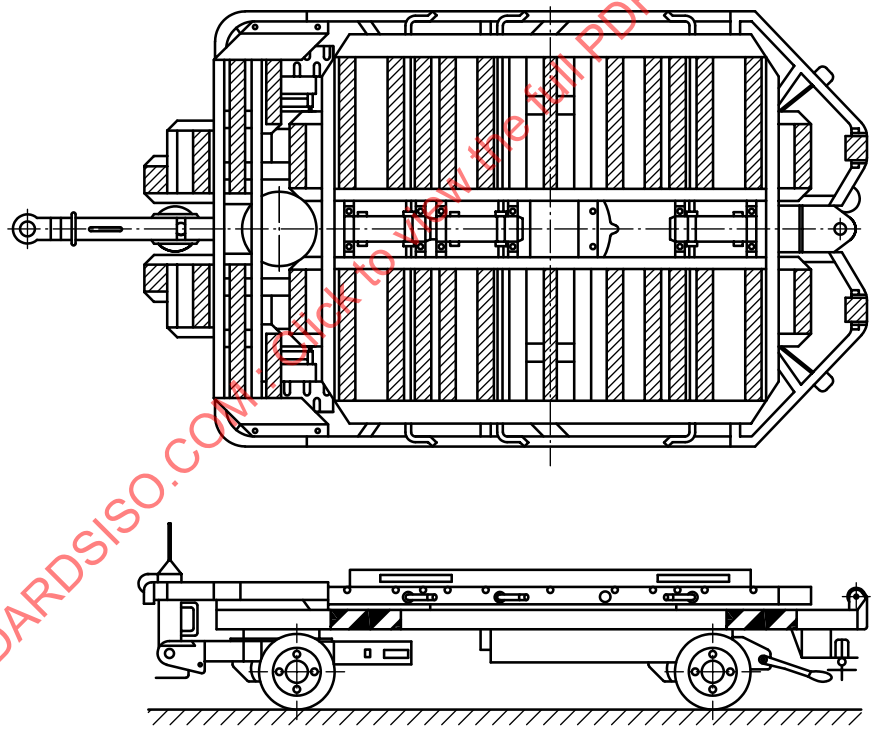

Figure A.10 — Container/pallet dolly with turntable and side/end interface

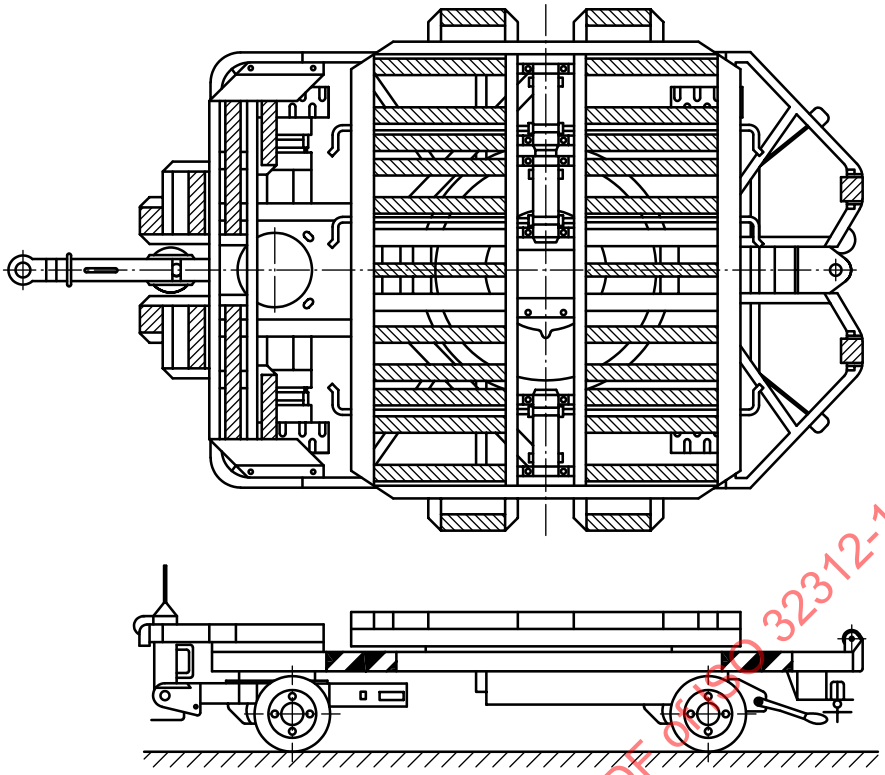

Figure A.11 — Container/pallet dolly with turntable and side/end interface (deck rotated 90°)

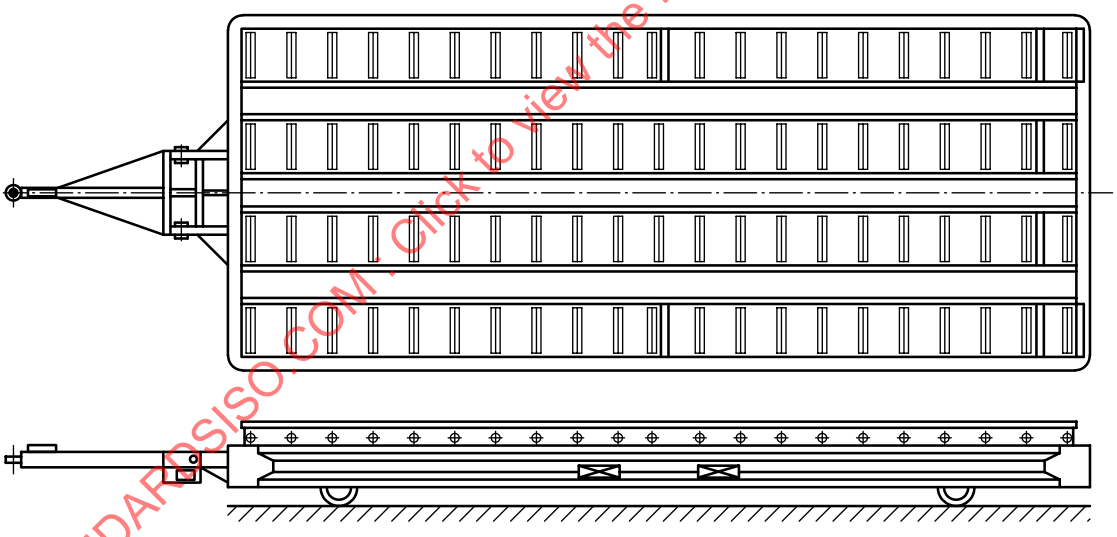

Figure A.12 — Dolly for 20 ft ULDs

Annex B
(normative)

List of hazards in addition to those of EN 1915-1:2001

Table B.1 — List of hazards

Number corresponding to EN 1050:1996	Hazard	Risk area	Hazardous situation	Reference in this document
1.1 1.2	Crushing Shearing	Chassis Platform	Crushing or shearing between trailers/ dollies or other ground support equipment during positioning	5.1.3, 5.5, 5.6
			Crushing or shearing due to inadequate stability or strength	5.1.2, 5.2.1
			Crushing or shearing due to unintentional movement of the load	5.4
			Crushing or shearing during loading/ unloading	5.1.6
			Crushing or shearing when handling load securing devices	5.4
		Couplings Drawbars	Crushing or shearing during coupling	5.1.3, 5.1.4, 5.9
1.6 1.7 1.8	Impact Stabbing Friction Abrasion	Chassis Platform	Impact or stabbing by protruding parts or sharp corners and edges	5.2.2, 5.6
			Friction or abrasion by rough surface	5.2.2, 5.3.6
8.1	Unhealthy postures Excessive effort	Platform Steering	Excessive effort due to inadequate design of platforms or steering	5.3.2, 5.3.3, 5.3.4, 5.3.5, 5.3.6, 5.6
8.7	Design or location of manual controls	Manual controls	Inadequate design or location of manual controls	5.1.5
18	Loss of stability/ overturning of machinery	Wheels	Loss of stability due to inadequate tyres	5.7
			Loss of stability due to inadequate overrun brakes	5.8
26	Insufficient instructions	Information for use	Missing data	6.1
			Missing safety markings	6.2
			Missing or inadequate instructions	6.3

Annex C
(informative)

Conveying surface minimum design requirements for compatibility with aircraft ULD bases

Table C.1 — Roller platform for single direction conveyance

Roller dimensions	Minimum diameter	50 mm (2 in)
	Minimum bearing length	100 mm (4 in)
	Minimum radius at roller edges	3 mm (0,125 in)
Roller distances	Maximum lateral distance between roller ends	405 mm (16 in)
	Maximum distance between centre lines of rollers with a diameter of	
	up to 100 mm	254 mm (10 in)
	between 100 mm and 150 mm	305 mm (12 in)
	150 mm and above	380 mm (15 in)
Roller mounting	Maximum unit load device overhang (distance between roller edge and guide)	150 mm (6 in)
	Maximum height difference between any two adjacent rollers	3 mm (0,125 in)
	Maximum height difference between rollers in any 1 524 mm × 1 524 mm (60 in × 60 in) area	6 mm (0,25 in)
Support area	Minimum cumulative length of any number or rollers on a common axis as support of the corresponding unit load device dimension (staggered pattern of rollers shall provide equivalent support)	50 %

Table C.2 — Roller platform with multi direction conveyance

Inverted castors	Castor lay-out and dimensions	Minimum diameter	75 mm (3 in)
		Minimum width	25 mm (1 in)
		Minimum radius at castor wheel edge	3 mm (0,125 in)
	Castor distance	Maximum allowable spacing for inverted castors throughout the area traversed by the unit load device measured in two directions 90° apart	
		castor wheel diameter	
		up to 100 mm	254 mm (10 in)
		100 mm and above	305 mm (12 in)
	Castor mounting	Maximum height difference between any two adjacent castors	3 mm (0,125 in)
		Maximum height difference between castors in any 1 524 mm × 1 524 mm (60 in × 60 in) area	6 mm (0,25 in)

Table C.2 *(continued)*

Ball transfer units	Ball dimensions	Minimum ball diameter	25 mm (1 in)
	Ball transfer distances	Maximum allowable spacing throughout the area traversed by the unit load device, except for those areas supported by other means, measured in two directions 90° apart	
		Ball diameter:	
		up to 30 mm	127 mm (5 in)
		between 30 mm and 60 mm	180 mm (7 in)
		60 mm and above	305 mm (12 in)
	Ball mounting	Maximum height difference between any two adjacent ball transfer units	3 mm (0,125 in)
		Maximum height difference between ball transfer units in any 1 524 mm × 1 524 mm (60 in × 60 in) area	6 mm (0,25 in)