



SLOVENSKI STANDARD

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SIST EN 1853:1999+A1:2010

Kmetijski stroji - Prikolice s prekucnim kesonom - Varnost

Agricultural machinery - Trailers with tipping body - Safety

Landmaschinen - Anhänger mit Kippaufbauten - Sicherheit

Matériel agricole - Remorques à benne basculante - Sécurité

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ICS:

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English Version

Agricultural machinery - Trailers - Safety

Matériel agricole - Remorques - Sécurité

Landmaschinen - Anhänger - Sicherheit

This European Standard was approved by CEN on 12 June 2017.

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

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EN 1853:2017 (E)**European foreword**

This document (EN 1853:2017) has been prepared by Technical Committee CEN/TC 144 “Tractors and machinery for agriculture and forestry”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by April 2018, and conflicting national standards shall be withdrawn at the latest by April 2018.

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

This document supersedes EN 1853:1999+A1:2009.

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.

Significant technical changes between this document and the previous edition (EN 1853:1999+A1:2009) are:

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- addition of hook-lift trailers to the scope;
 - addition of requirements for hook-lift trailers;
 - addition of requirements for rear doors;
 - addition of requirements for high-tip trailers;
 - addition of requirements for conveyors;
 - addition of an Annex regarding “Verification of stability by calculation”;
 - update of Normative references.

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

Introduction

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

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

- machine manufacturers (small, medium and large enterprises);
- health and safety bodies (regulators, accident prevention organizations, market surveillance etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

- machine users/employers (small, medium and large enterprises);
- machine users/employees (e.g. trade unions, organizations for people with special needs);
- service providers, e.g. for maintenance (small, medium and large enterprises);
- consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

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 type-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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1 Scope

This European Standard specifies safety requirements and their verification for the design and construction of trailers with a tipping body, balanced or semi-mounted, used in agriculture, as defined in 3.1. It includes also hook-lift trailers and trailers with conveyor device as defined in 3.9.

This European Standard does not deal with trailers equipped with pick-up devices and/or rear spreading devices.

Trailers with a load push/push-off device, slats or alternating moving floor may be removed from this standard, provided a new work item on loader wagons and forage transport wagons (prEN ISO 4254-17) is accepted.

This European Standard does not give Required Performance Levels for the identified safety functions.

This European Standard, taken together with EN ISO 4254-1, deals with the significant hazards, hazardous situations and events relevant to agricultural trailers, when they are used as intended and under the conditions of misuse which are reasonably foreseeable by the manufacturer (see Table A.1), excepting the hazards arising from:

- hazards related to conveying devices other than those defined in 3.9.1 and 3.9.2, for example load push/push-off device;
- hazards related to the environment and road safety;
- hazards related to braking.

In addition, it specifies the type of information on safe working practices to be provided by the manufacturer.

This document is not applicable to trailers which are manufactured before the date of its publication as EN.

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 349:1993+A1:2008, *Safety of machinery - Minimum gaps to avoid crushing of parts of the human body*

EN ISO 4254-1:2015, *Agricultural machinery - Safety - Part 1: General requirements (ISO 4254-1:2013)*

EN ISO 5353:1995, *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)*

EN ISO 13857:2008, *Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2008)*

ISO 5676:1983, *Tractors and machinery for agriculture and forestry — Hydraulic coupling — Braking circuit*

ISO 15817:2012, *Earth-moving machinery — Safety requirements for remote operator control systems*

ISO 16028:1999, *Hydraulic fluid power — Flush-face type, quick-action couplings for use at pressures of 20 MPa (200 bar) to 31,5 MPa (315 bar) — Specifications*

3 Terms and definitions

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

3.1

trailer

trailed agricultural vehicle fitted with wheels or endless tracks, intended mainly to carry loads and designed to be towed by an agricultural tractor or a self-propelled machine

[SOURCE: ISO 12934:2013, 3.6 modified]

3.1.1

balanced load carrying trailer

(drawbar) trailer with at least two axles, at least one of which is steerable and a drawbar towing device that allows vertical movement so that vertical forces cannot be transferred to the towing vehicle

Note 1 to entry: See Figure 1.

[Source: ISO 12934:2013, 3.6.1 modified]

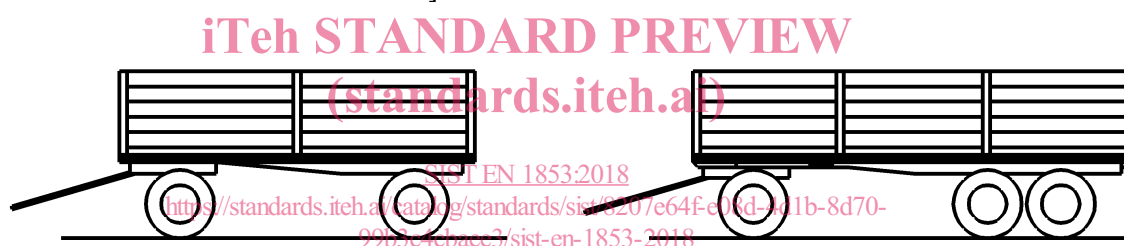


Figure 1 — Examples of balanced trailer

3.1.2

semi-mounted trailer

trailer from which part of vertical load is transferred to the towing vehicle

Note 1 to entry: See Figure 2.



Figure 2 — Examples of semi-mounted trailer

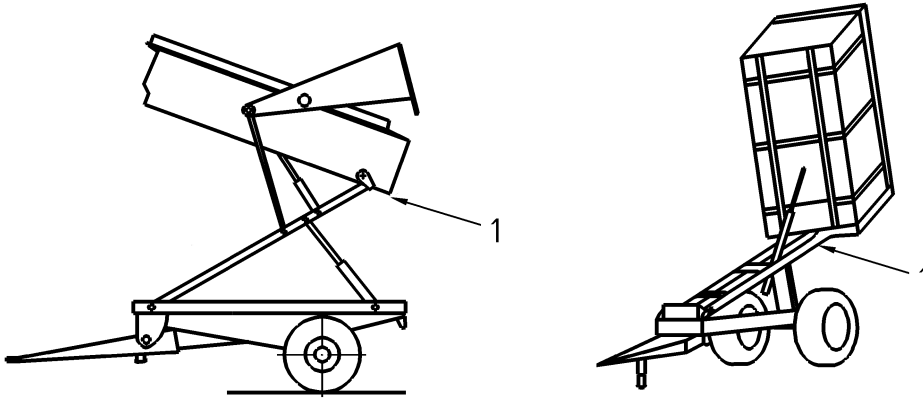
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3.1.3

high-tip trailer

trailer equipped with a system to raise the tipping axis

Note 1 to entry: See Figure 3.

**Key**

1 tipping axis

Figure 3 — Examples of high-tip trailer
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3.1.4

hook-lift trailer

trailer including a hook-lift system for picking up, transporting, tipping and exchanging of roll off loading platforms, e.g. containers, dump bodies, frames

Note 1 to entry: See Figure 4.

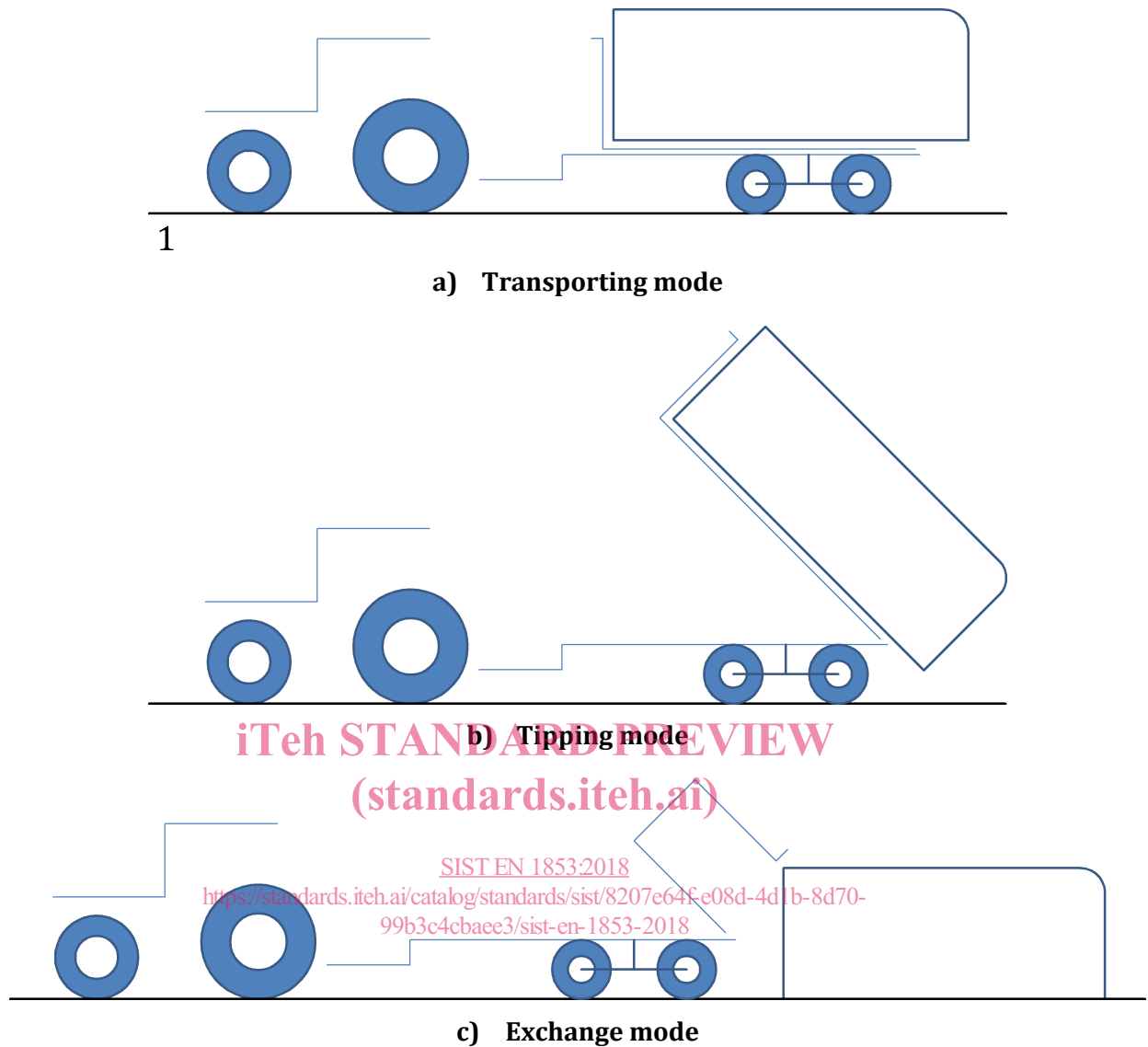


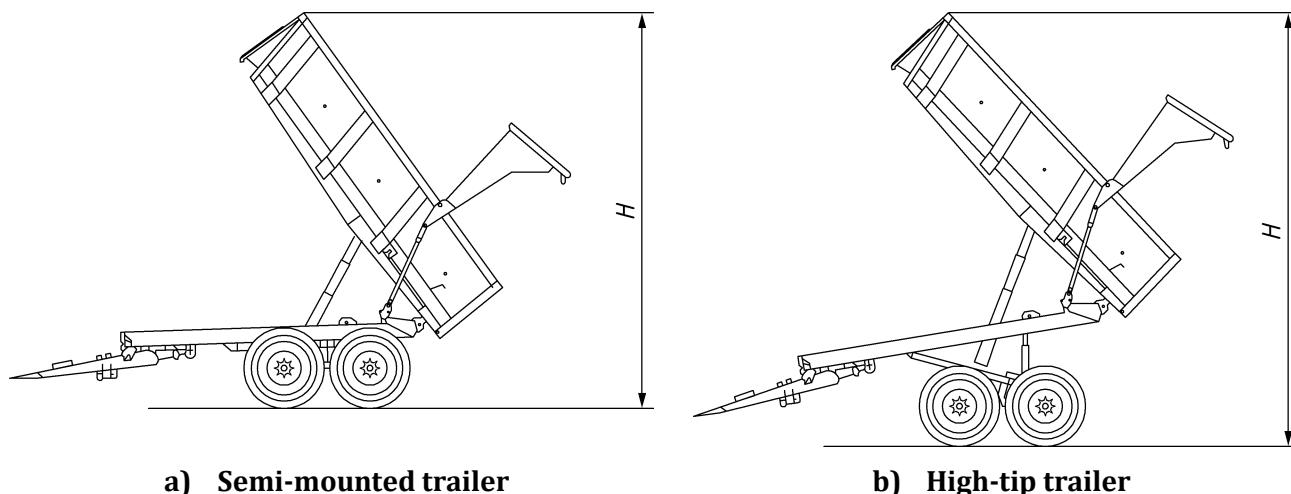
Figure 4 — Example of hook-lift trailer

3.4

height in the highest tipping position

vertical distance between ground plane and the highest part of the raised load body when in maximum tipping position

Note 1 to entry: See Figure 5.

**Key**

H height in the highest tipping position

Figure 5 — Height in the highest tipping position

3.5
sideboard
fixed or movable wall that constitutes a load retaining side of the body and which may be hinged on the platform of the trailer

3.6
load body
volume consisting of a platform with a front wall, two sideboards and a rear wall or discharge gate to contain the load for its transport and discharging

[SOURCE: EN 690:2013, 3.2 modified]

3.7
tipping
action that allows the load carried in the trailer to be discharged by tilting the body

Note 1 to entry: The tipping can be lateral or to the rear.

3.9
conveyor device
device able to convey/move/carry the material in the load body, that are of different types such as scraper floor, conveyor belt, load push/push-off device or alternating moving floor

Note 1 to entry: A combination of these devices is possible.

[SOURCE: EN 690:2013, 3.3 modified]

3.9.1
scraper floor
conveyor device made by two or more dragging chains and by a number of slats

[SOURCE: EN 690:2013, 3.3.1]

3.9.2**conveyor belt**

conveyor device made by belt

[SOURCE: EN 690:2013, 3.3.2]

3.9.3**load push/push-off device**

conveyor device formed by a moveable wall for pushing the material in the load body towards the discharge opening

[SOURCE: EN 690:2013, 3.3.3 modified]

3.9.4**alternating moving floor**

conveyor device made by alternating moving slats

3.10**blocking device for axle suspension and bogie axle**

system for eliminating free movement of axle suspension or bogie articulation

4 Safety requirements and/or protective/risk reduction measures**4.1 General**

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Trailers shall comply with the safety requirements and/or protective measures of this clause.

In addition, the machine shall be designed according to the principles of EN ISO 12100 for relevant but not significant hazards which are not dealt with by this document.

Unless otherwise specified in this standard, the trailer shall comply with the requirements of EN ISO 4254-1:2015 and with EN ISO 13857:2008, Table 1, Table 3 and Table 4 as appropriate, unless a specific reference is made, for access to trapping and shearing points.

4.2 Stability**4.2.1 Stability and immobilisation of the detached trailer****4.2.1.1 Stability**

Trailers when detached shall comply with the stability requirements given in EN ISO 4254-1:2015, 6.2.1.1.

Verification: this requirement shall be checked by calculation or by the following test:

The trailer shall stand, loaded with its maximum permissible load, and with any steerable axles in the most unfavourable angle on a firm surface with a slope of 8,5°. The trailer shall be positioned on the slope in the most unfavourable orientation. The parking brake or chocks shall be engaged.

During the test, all supports (i.e. wheels, supporting devices) shall remain on the test surface.

4.2.1.2 Ground pressure

When the trailer is parked on a horizontal surface, containing a uniform load equal to the maximum permissible load declared by the manufacturer, any supporting devices other than wheels shall comply with EN ISO 4254-1:2015, 6.2.1.2.

Verification: by calculation or measurement.

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4.2.1.3 Immobilisation

4.2.1.3.1 General

The design shall ensure that the detached trailer does not move (e.g. by the provision of chocks or with the parking brake applied).

Trailers with the sum of the technically permissible masses per axle of at least 750 kg shall be provided with a parking brake.

The parking brake system with which the trailer is equipped shall be capable of holding the laden detached trailer stationary on a 18 % up and down gradient.

Verification: this requirement shall be checked by standing the trailer, loaded with its maximum permissible load, and with any steerable axles in the most unfavourable angle on a firm surface with a slope of 18 %. This test shall be carried out with the trailer positioned on the slope in the up and down gradient.

During the test, the trailer shall not move.

4.2.1.3.2 Chocks

If chocks are required to prevent any movement of the detached trailer, a device shall be provided on the trailer for their storage when not in use.

This device shall be designed to secure the chocks so they cannot detach from the trailer unintentionally or move freely when the trailer is in motion.

The wheel chocks need to be safe to operate and be easily accessible from outside the contour of the machine. Hooks or chains shall not be used as a device for storage/fixation. The device should preferably be at the front or in close proximity to the wheels.

Verification: by design check and visual inspection.

4.2.2 Stability in the raised position when tipping

Trailers shall be so designed that they remain stable when loaded and raised to the highest position achievable for tipping.

Verification: by tests described in Annex B or by calculation described in Annex C for rear tipping trailers.

The lateral tipping angle shall be limited by design to ensure the stability of lateral tipping trailers on firm ground with a slope of 5°.

Verification: by functional test or design check.

4.2.3 Minimum load on the drawbar hitch

The vertical downward load on the drawbar of semi-mounted trailers, measured at the hitch point shall be positive and at least 3 % of the weight of the empty trailer with the trailer in lowered position and it shall be at least 500 N in all tipping positions, with:

- the trailer on a horizontal firm surface;
- the trailer body empty;
- the trailer equipped with its relevant load compensation devices, as specified by the manufacturer.

This vertical downward load can be achieved, for example, by using counterweights, outriggers positioned to compensate the load, by positioning of the axle or bogie or by a blocking device for axle suspension and bogie axle (see 4.2.4) in case of suspended bogies.

Verification: by measurement.

4.2.4 Blocking device for axle suspension and bogie axle

If fitted on a trailer, the blocking device for axle suspension and bogie axle (see 3.10) shall act automatically.

4.2.5 Stability during travelling

During travelling, the trailer shall remain stable.

Verification: by calculation or test with the trailer fully laden and a minimum static tipping angle of 23°.

NOTE Verification method by calculation is still under investigation for consideration at the next revision or amendment of this standard.

4.3 Boarding means

4.3.1 Exterior boarding means in conformity with EN ISO 4254-1:2015, 4.8.3 shall be provided on a trailer with sideboards.

When dismountable sideboards are not in place and the platform is higher than 1 m from the ground, similar boarding means shall be provided. One or more handholds shall be provided on top of the boarding means and located/positioned such that three-point contact is possible during ascending.

4.3.2 Trailers with sideboards higher than 900 mm measured from the trailer platform shall be fitted with an interior boarding means in conformity with EN ISO 4254-1:2015, 4.8.3. This boarding means shall be on the same sideboard and opposite to the exterior one.

The boarding means should preferably be placed on the left side of the front of the trailer relative to the direction of motion.

To avoid trapping risk under the ladder when the tipping body is being lowered, the lowest part of the ladder shall not exceed the lowest part of the load body or a minimum gap shall be provided according to EN 349.

4.3.3 The requirements of 4.3.1 and 4.3.2 apply also to sideboard extensions and coverings offered by the manufacturer.

4.3.4 Trailers with roll-up tarpaulin that cannot be operated from the ground shall be equipped with boarding means and a platform according to EN ISO 4254-1.

The width of the platform shall be such that a safe operation of the roll-up tarpaulin from the platform is possible. The minimum horizontal distances from the load body shall be (see Figure 6):

- 400 mm to the foot guard;
- 450 mm to the intermediate rail; and
- 500 mm to the handrail.

The width of the access opening shall be at least 400 mm and maximum 600 mm.