



SLOVENSKI STANDARD

SIST EN 12525:2000

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Kmetijski stroji - Sprednji nakladalnik - Varnost

Agricultural machinery - Front loaders - Safety

Landmaschinen - Frontlader - Sicherheit

Matériel agricole - Chargeurs frontaux - Sécurité

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EUROPEAN STANDARD
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English version

Agricultural machinery - Front loaders - Safety

Matériel agricole - Chargeurs frontaux - Sécurité

Landmaschinen - Frontlader - Sicherheit

This European Standard was approved by CEN on 22 November 1999.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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

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Foreword

This European Standard 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of an identical text or by endorsement, at the latest by July 2000, and conflicting national standards shall be withdrawn at the latest by July 2000.

This European Standard 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 standard.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Annex A is normative and contains the "List of hazards". Annexes B, C and D are informative.

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Introduction

The extent to which hazards are covered is indicated in the scope of this standard.

1 Scope

This standard specifies safety requirements and their verification for the design and construction of front loaders designed to be mounted on agricultural and forestry wheeled tractors (as defined in the Directive 74/150/EEC).

Hazards related to mounting the lifting arms to the frame mounted on the tractor, and also hazards related to devices for mounting attachments to the arm are covered.

Hazards related to mounting the frame to the tractor (carried out by the dealer of the loader and/or of the tractor), the mounted attachments and hazards due to loss of mechanical strength of the structure are excluded.

Hazards related to operations and/or attachments requiring the presence of any person near to the front loader whilst moving are also excluded.

Hazards related to the transport of passengers are not covered.

This standard describes methods and requirements for the elimination or reduction of risks which need specific requirements to front loaders. In addition, it specifies the type of information on safe working practices to be provided by the manufacturer.

The list of significant hazards dealt with in this standard is given in annex A. Annex A also indicates the hazards which have not been dealt with.

This standard applies primarily to machines which are manufactured after the date of issue of the standard.

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 292-1:1991, *Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology.*

[SIST EN 12525:2000](#)

EN 292-2:1991, *Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles and specifications.*

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EN 292-2:1991/A1: 1995, *Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles and specifications.*

EN 982, *Safety of machinery - Safety requirements for fluid power systems and their components – Hydraulics.*

ISO 8935, *Tractors for agriculture and forestry – Mountings and apertures for external equipment controls.*

ISO 10448:1994, *Agricultural tractors – Hydraulic pressure for implements.*

ISO 11684:1995, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment- Safety signs and hazard pictorials - General principles.*

3 Definitions

For the purpose of this standard, the definitions given in EN 292-1: 1991 and EN 292-2: 1991 apply together with the following:

3.1

front loader

detachable unit consisting of lifting arms and fastening devices designed to be mounted on a frame on the front of a tractor and equipped with devices for mounting various allowable attachments

NOTE: See figure 1.

3.2

allowable attachment

working attachment, approved by the front loader manufacturer for mounting and operating with specified front loaders (and tractors)

3.3

supporting device

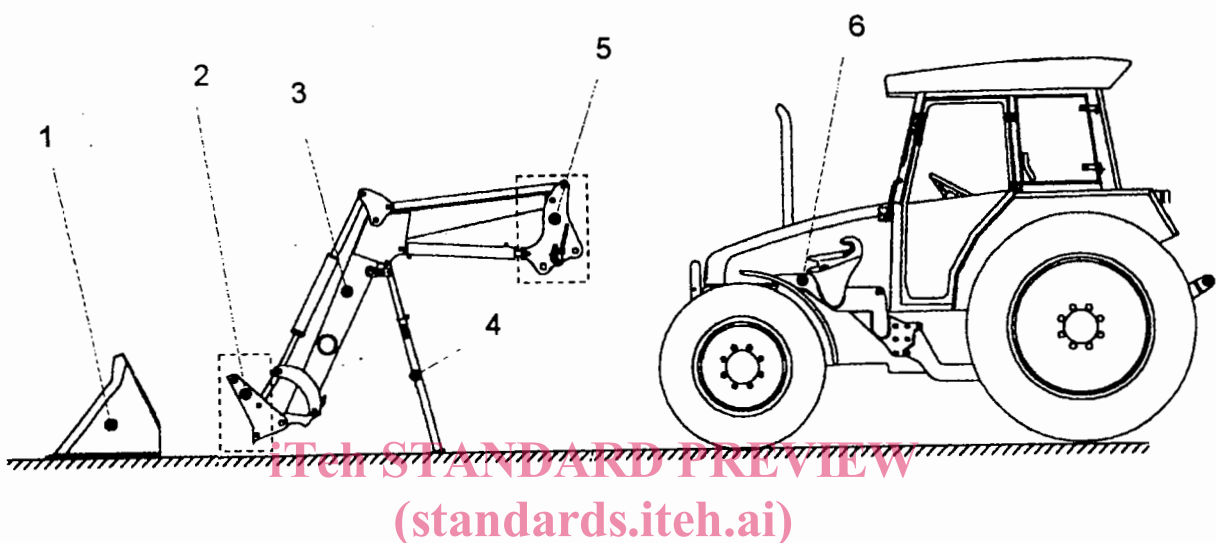
device for supporting the lifting arms in a stable position when it is dismounted from the tractor

NOTE: For example, for storage, see figure 1.

3.4

manual controls of the front loader

control equipment supplied with the front loader to enable the loader and attachments to be operated from the driving position of the tractor



Key

- | | |
|-------------------------------------|---|
| 1 - attachment | https://standards.iteh.ai/catalog/standards/sist/60e9d261-de3b-404a-8393-330e7d871d71/sist-en-12525-2000 |
| 2 - device for mounting attachments | |
| 3 - lifting arm | |
| 4 - supporting devices | |
| 5 - fastening devices | |
| 6 - frame mounted on the tractor | |

Figure 1 — Front loader

4 Safety requirements and/or measures

Front loaders shall comply as appropriate with EN 292 for hazards which are not dealt with and especially with annex A of EN 292-2: 1991/A1: 1995 when EN 292 does not give precise requirements.

4.1 Mounting of the front loader on a tractor

4.1.1 Intended use

The front loader manufacturer shall state which tractors are suitable for the mounting and use with the front loader taking into account the specific technical characteristics of the tractor and the intended use of the combined unit.

4.1.2 Stability of the combined tractor/front loader

The stability of the combined tractor/front loader is dependent on the range and capacity of the attachment, the arrangement of the front loader on the tractor together with the type of tractor. Improvements in stability can be achieved by fitting a counterweight or ballasting the rear wheels and observing limits to driving and operating conditions.

For further guidance see Annex B.

4.1.3 Frame for mounting the front loader on a tractor

The front loader manufacturer shall design the mounting frame and its fastening elements so that the maximum loads expected in accordance with the intended usage are transferred safely to the structure of the tractor.

4.2 Dismounting and storing of the lifting arms

4.2.1 Supporting devices

Devices shall be provided to support the dismantled lifting arms when stored on the ground. They shall:

- be so designed that the strength of the structure is able to hold the weight of the lifting arms and of the heaviest allowable attachment under the conditions specified in 4.2.2;
- have a supporting surface area which exerts a ground pressure of not more than 400 kPa. This requirement shall be met with any allowable attachment in the lowered position;
- have a locking device to prevent inadvertent lowering and creation of drawing-in or trapping hazards at the supporting devices themselves;
- be available at any time when dismantling the lifting arms. They shall be attached to the lifting arms or stored separately from the front loader somewhere on the vehicle.

The supporting devices shall be so designed that they can be fastened and have their height adjusted by the operator standing beside the lifting arms or sitting on the seat of the tractor.

4.2.2 Stability

When the lifting arms are standing dismantled on horizontal, hard ground in a position recommended in the instruction book, they shall be capable of resisting a force of 400 N applied in any direction, without tilting.

4.3 Mounting of attachments on the lifting arms

4.3.1 Intended use

The front loader manufacturer shall specify the type and capacity of the allowable attachments that can be fitted and safely operated.

4.3.2 Device for mounting attachments

The device shall be so designed that mounting and dismantling of an attachment can be done by the driver alone.

4.3.3 Device for locking attachments

The device for locking attachments shall have a positive engagement and retention system to secure the attachment onto the lifting arms so that the attachment is held securely under any operating conditions (see Annex C for an example).

It shall not be possible for an attachment to become unintentionally disengaged by use or by failure of the securing system. This requirement can be met by use of a locking valve in the hydraulic system, for example.

4.4 Hydraulic circuit

4.4.1 Hydraulic power and pressures

The hydraulic circuit and its components shall be designed according to EN 982.

The system shall be so designed that it can transmit the full hydraulic power of the tractor or have the power limited by a pressure control valve supplied with the front loader.

Hoses, pipes and all connections shall withstand - without bursting - a pressure at least equal to four times the setting pressure of the hydraulic circuit of the tractor or of the front loader when fitted with a separate pressure control valve.

If the setting pressure of the hydraulic circuit is not known, then the pressure requirements of ISO 10448: 1994 shall be used.

4.4.2 Pressure hoses near operator's seat

Unprotected pressure hoses having a pressure of more than 5 MPa (50 bar) shall be located at a distance of more than 1 m from the operator in his normal driving position. Hoses shall be protected in such a way that, in the case of failure, the operator cannot be reached by liquid at a temperature of more than 50 °C.

4.4.3 Connections

Connections shall be designed so that either incorrect coupling is not physically possible or they shall be marked so that they are clearly identified.

4.5 Manual controls

4.5.1 Design and arrangement

An example of mounting apertures for external equipment controls is given in ISO 8935.

Control movements of the lifting arms and of the attachments shall be of the hold-to-run type as specified in 3.23.3 of EN 292-1: 1991, except the float position control which may be held in its position by a detent (see Annex D for an example).

The controls shall be designed and arranged so that they are:

- accessible and recognizable;
- marked on or near the control according to figures 2 or 3.

NOTE: Control symbols where not specified as above should conform to EN ISO 3767- 2.

Unintentional operation of the loader controls shall be prevented by:

- positively isolating the controls from the hydraulic supply so they cannot be used; or
- locking of the controls so they cannot be operated; or
- the arrangement and design of the controls (e.g. by recessing fingertip controls).

If the internal controls of the tractor can be used to operate the loader, then all the necessary information about this shall be provided.

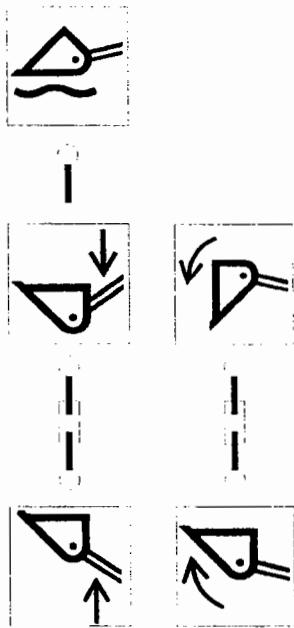
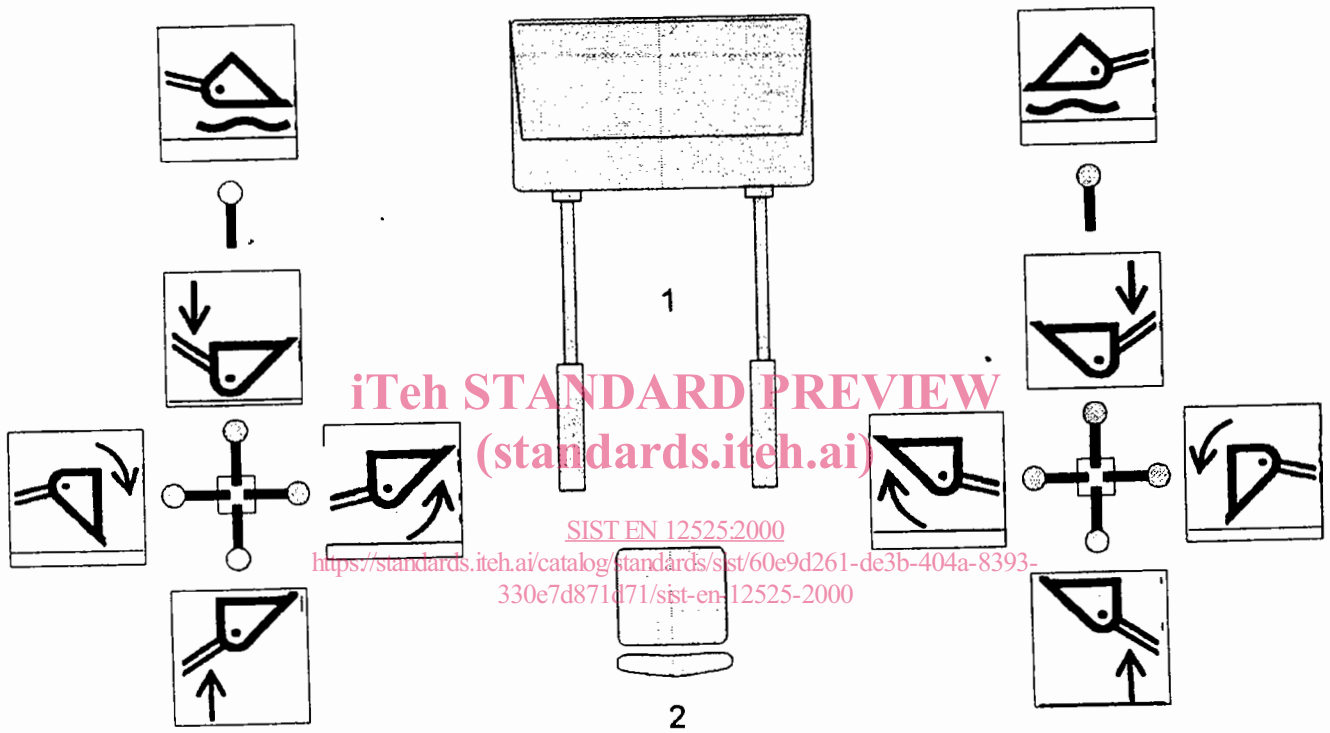


Figure 2 — Layout and marking two-lever control or one change-over lever control



Key
1 - lifting arms
2 - seat

Figure 3 — Layout and marking single-lever control, left and right position

4.6 Service and maintenance operations

It shall be possible to prevent inadvertent lowering of the raised lifting arms.

Mechanical supports or other hydraulic locking devices shall be provided in order to enable maintenance and service operations to be carried out by the operator under raised parts of the lifting arms.

It shall be possible to operate the hydraulic locking or mechanical supporting devices without the operator having to stand in, or reach into, the moving range of the lifting arms and attachment. When the supports are manually operated, their position and functioning have to be indicated on the front loader.

The hydraulic locking devices shall be positioned on the hydraulic cylinder or in the lines leading to the hydraulic cylinder.

Mechanical supports shall withstand at least 1,5 times the force generated by the lifting arms including the heaviest attachment.

Mounting and dismounting of the lifting arms on the tractor and of allowable attachments on the lifting arms shall be designed to be accomplished by only one person alone.

Lifting points shall be provided on the lifting arms and shall be clearly marked and located at the point of balance.

NOTE: Lifting points may either be a hook or a ring attached to the arm, a cut-out in the arm, or a suitable place to fix a rope.

5 Verification of safety requirements and/or measures

Dimensions, where given, shall be verified by measurements. Controls shall be verified by a function test and positional measurements; guards by functional test.

6 Information for the assembler

Comprehensive instructions and information on all aspects of assembling the front loader to the tractor shall be provided.

In particular, the following points shall be emphasised:

- information on tractors for which the front loader is designed;
- information about the arrangement and mounting of the frame to be fixed on a specific tractor;
- the location and marking of the lifting points to lift the lifting arms;
- the maximum allowable pressure of the hydraulic system, and the maximum lifting capacity of the front loader;
- the meaning of symbols and the effect of control movements shall be explained;
- how the manual controls shall be attached to the tractor when the front loader is mounted;
- possible changes of tractor stability during operation with the front loader and guidance about ballasting;
- that the roll-over-protection-structure (ROPS) provides only partial protection from a load falling onto the driving position and additional protection can only be achieved by the use of attachments which are designed to prevent the load falling onto the driving position of the tractor.

NOTE: Attention should be drawn to any national legal traffic regulations which can affect the operation of tractors fitted with front loaders.