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Agricultural machinery - Safety - Part 19: Livestock feed and bedding machines (ISO/DIS 4254-19:2026)

Matériel agricole - Sécurité - Partie 19: Machines pour l'alimentation et la litière du bétail (ISO/DIS 4254-19:2026)

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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 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 23, Tractors and machinery for agriculture and forestry, Subcommittee SC 3, Safety and comfort.

A list of all parts in the ISO 4254 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 is a type-C standard as stated in ISO 12100:2010.

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 organisations, 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.

NOTE Examples of machine and components, illustrating the terms and definitions in Clause 3, are given in Annex B.

Agricultural machinery — Safety —

Part 19: Livestock feed and bedding machines

1 Scope

This document, used together with ISO 4254-1, specifies the safety requirements and their verification for the design and construction of livestock feed and bedding machines that can perform a combination of two or more of the following processes: loading, mixing, chopping and distributing materials. In addition, it specifies the type of information on safe working practices to be provided by the manufacturer.

NOTE Livestock feed and bedding machines (for example feed mixers, bale processors, silage block cutters) can be stationary, mounted, semi-mounted, interchangeable towed or self-propelled.

Examples of machines and components covered by this document are shown in Annex B.

When requirements of this document are different from those which are stated in ISO 4254-1, the requirements of this document take precedence over the requirements of ISO 4254-1 for machines that have been designed and built according to the requirements of this document.

This document is not applicable to:

— machines which pick up or transport crop material directly from the field;

— loading cranes;

— automated, semi-autonomous and autonomous functions (for example, those covered by ISO 3991)

— the integrity of safety-related parts of control systems in relation to the specification of performance levels;

— environmental hazards (excluding noise), road safety and hazards associated with moving transmission parts;

— hazards associated with maintenance or repairs carried out by professional service personnel.

This document deals with the significant hazards, hazardous situations and events relevant to machines for loading, mixing and/or chopping and distributing silage and/or other feedstuffs, when they are used as intended and under the conditions foreseen by the manufacturer as listed in Annex A, except for the hazards arising from:

— failure of the control circuit;

— inadequate seating;

— inadequate lighting;

— travelling of machinery related to road safety;

— break-up of parts rotating at high speed;

This document is not applicable to machines manufactured before the date of publication of this document.

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 3600:2022, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Operator's manuals — Content and format*

ISO 4254-1:2013, *Agricultural machinery — Safety — Part 1: General requirements*

ISO 5353:1995, *Earth-moving machinery, and tractors and machinery for agriculture and forestry — Seat index point*

ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 13851:2019, *Safety of machinery — Two-hand control devices — Principles for design and selection*

ISO 13857:2019, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs*

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

ISO 16001:2017, *Earth-moving machinery — Object detection systems and visibility aids — Performance requirements and tests*

IEC 60204-1:2016, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements*

3 Terms and definitions

For the purposes of this document, the following terms and definitions given in ISO 12100:2010, ISO 4254-1:2013 and the following apply.

ISO and IEC maintain terminological 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
Livestock feed and bedding machines

3.1.1
feed mixer
machine with a chamber and powered mixing/chopping device(s) for blending of feed stocks and supplements, and a means for dispensing the blended material

Note 1 to entry: The mixing/chopping devices can consist of, but are not limited to, rotating augers, rotors (for example paddles, ribbons, bars, knives), or a combination of augers and rotors.

3.1.2
bale processor
machine or device with an open-top chamber and powered chopping elements intended to chop baled materials and distribute the processed material used for livestock feed or bedding

3.1.3
silage block cutter
device with cutting edge(s) that is used to cut a block of material from the remaining material and transport the material for processing or distribution while maintaining the material density and form

3.2
Processes

3.2.1
mixing
operation to blend two or more different materials to create a mixture

3.2.2
chopping
operation to break up or reduce the size of the constituent elements of a mass of material

3.2.3
cutting
operation to sever a portion of material from the remaining material

3.3
Loading device
element or set of elements attached to the machine where material is loaded into the machine

Note 1 to entry: Loading arms/forks on bale processors are not considered to be part of this definition.

3.3.1
loading door
moveable portion of the chamber that opens for loading of the machine and closes during the processing of material

3.3.2
loading conveyor
powered mechanism that continually moves material into the chamber

3.4
cutting/loading device
element or set of elements attached to the machine that, alone or in combination, perform the processes of a cutting device and a loading device

3.5
mixing/chopping device
element or set of elements that performs the mixing and/or chopping process(es) on the material in the chamber

3.6
cutting device
element or set of elements attached to the machine that performs the cutting process

3.7
distribution device
element or set of elements, attached to the machine, which moves the material from the chamber to a desired location

3.8
unloading door
moveable portion of the chamber that opens to unload material

3.9
moving floor
powered conveyor for moving the material within the chamber or on the loading door

3.10
workstation
position on the machine, other than the operator's station, from which control of at least some machine operations is possible

3.11
operator station
position of the operator during machine operations including transport

3.12
mineral hopper
a device for introduction of animal dietary supplement into the feed mixer

3.13
counter-knife (knives)
element(s) located close to the mixing and chopping device which restraints the feed material while it is cut, shredded, impacted, and reduced

[SOURCE: ISO 7448:2024, 3.3.7 (modified)]

4 Safety requirements and/or protective risk reduction measures

4.1 General

4.1.1 Machinery shall comply with the safety requirements or protective risk reduction measures of clause 4 of this document. In addition, the machine shall be designed according to the principles of relevant clauses of ISO 12100:2010 for hazards relevant but not significant, which are not dealt with by this document.

4.1.2 Unless otherwise specified in this document, machinery shall comply with the requirements of ISO 4254-1:2013 and with ISO 13857:2019, Table 1, Table 3, Table 4 and Table 6 as appropriate.

4.2 Controls

4.2.1 Controls located on the workstation or in the operator station

4.2.1.1 Controls shall be designed so that the operator can reach them where intended, for example by means of an adjustable position.

4.2.1.2 It shall not be possible for the operator to reach unguarded moving working elements while actuating the control.

4.2.1.3 It shall not be possible to reach the manual controls from inside the mixing/chopping chamber(s).

4.2.1.4 Stop controls shall have priority over all other controls.

4.2.1.5 Workstation controls shall be hold-to-run, except the following:

— controls for the mineral hopper;

— controls for the distribution device;

— controls to activate the automatic work cycle of the counter-knives, only for machines with a vertical mixing/chopping device.

4.2.1.6 It shall be possible to deactivate the workstation controls to limit control of the machine to the operator station only.

4.2.1.7 Two-hand controls shall comply with ISO 13851:2019.

4.2.2 Remote controls

4.2.2.1 Remote controls and their electrical components shall comply with ISO 15817:2012 or IEC 60204-1.

4.2.2.2 The remote control shall:

— if wired or wireless, have a unique assignment of the remote control to the receiver to prevent operation by other than the assigned remote controls; and

— be constructed in such a way as to prevent unintentional operation of the control devices that could trigger dangerous movements (for example by means of protective collars or recessed buttons).

4.2.3 Emergency stop

An emergency stop control according to ISO 4254-1:2013, 4.19 shall be installed on self-propelled machines.

4.2.4 Safety and reliability of control systems

Safety and reliability of control systems shall conform with ISO 4254-1:2013, 4.20.

4.3 Visibility of work areas of cutting, loading and cutting/loading devices

4.3.1 Operator's eye position

For the purpose of assessing visibility, the position of the operator's eye is defined as shown in Figure 1 and Figure 3. A lateral displacement of the eye of the operator is allowed within ±300 mm from the centre position.

4.3.2 For work area at front of the machine

4.3.2.1 The operator shall have visibility of the work area at the front of the machine from the operator station and/or the workstation assessed from the eyepoint defined in 4.3.1.

4.3.2.2 The width of the work area is the entire width of any cutting, loading, and cutting/loading devices, including any entrapment zones.

4.3.2.3 The height of the work area extends from the highest working position of any cutting, loading, and cutting/loading devices to a height of 1 m or less from the ground when the machine is in its loading position (see Figure 1).

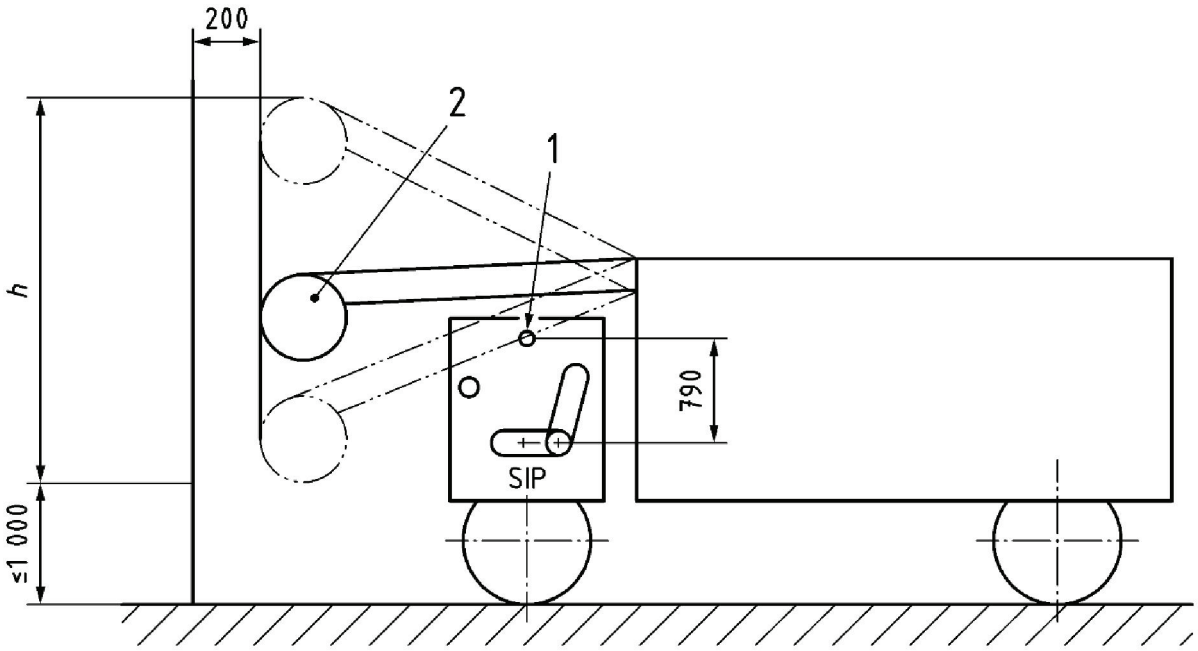
4.3.2.4 The location of the work area is 200 mm measured from the edge of any cutting, loading, and cutting/loading devices (see Figure 1).

4.3.2.5 When direct visibility is not achievable, the indirect visibility shall be provided by fitting machines with devices such as mirrors, closed circuit television (CCTV) or other adequate system (see ISO 16001:2017). Mirrors shall be used in a direct manner. Using one mirror to view another is not allowed.

4.3.2.6 Verification shall be by measurement.

4.3.2.7 Verification is achieved with the tools in the raised position. The position of the operator's eye is 790 mm above the seat index point (SIP) as defined in ISO 5353:1995 (Figure 1).

Dimensions in millimetres



Key

1	eye position
2	cutting/loading device
h	visibility height range

Figure 1 — Checking of the direct visibility of a self-propelled machine

4.3.3 For work area at rear of the machine

4.3.3.1 The operator shall have visibility of the work area at the rear of the machine from the operator station and/or the workstation assessed from the eyepoint defined in 4.3.1.

4.3.3.2 The width of the work area is the entire width of any cutting, loading, and cutting/loading devices, including any entrapment zones [see d_2 of Figure 2b) and 2d)].

4.3.3.3 The height of the work area extends from the highest working position of any cutting, loading, and cutting/loading devices to a height of 1,5 m or less from the ground when the machine is in its loading position.

4.3.3.4 The location of the work area is 200 mm to the rear of:

— the edge of any cutting, loading, and cutting/loading devices,

— the machine when the loading door is closed.

4.3.3.5 When direct visibility is not achievable, the indirect visibility shall be provided by fitting machines with devices such as mirrors, closed circuit television (CCTV) or other adequate system (see ISO 16001:2017). Mirrors shall be used in a direct manner. Using one mirror to view another is not allowed.

4.3.4 For work areas at sides of machine

4.3.4.1 The operator shall have visibility of the work area at the side of the machine from the operator station and/or the workstation assessed from the eyepoint defined in 4.3.1.

4.3.4.2 The width of the work area is 200 mm measured from the sides of any cutting, loading, and cutting/loading devices of the machine [see Figures 2b) and 2d)].

4.3.4.3 The height of the work area extends from the highest working position of any cutting, loading, and cutting/loading devices to a height of 1,5 m or less from the ground when the machine is in its loading position.

4.3.4.4 The location of the work area is 200 mm to the rear of:

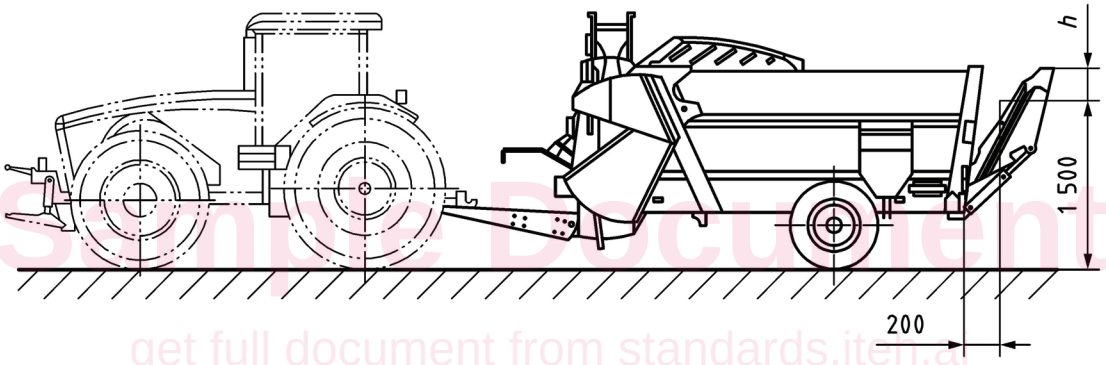
— the edge of any cutting, loading, and cutting/loading devices; or

— the machine when the loading door is closed.

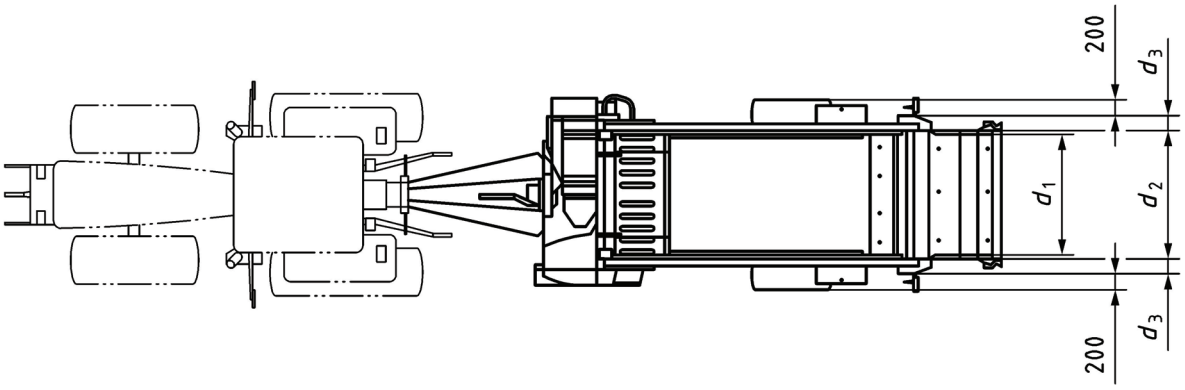
4.3.4.5 When direct visibility is not achievable, the indirect visibility shall be provided by fitting machines with devices such as mirrors, closed circuit television (CCTV) or other adequate system (see ISO 16001:2017). Mirrors shall be used in a direct manner. Using one mirror to view another is not allowed.

4.3.4.6 Verification shall be by measurement on an empty machine.

Dimension in millimetres



a) Checking of the visibility for trailed machines with loading door - side view



b) Checking of the visibility for trailed machines with loading door – top view