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**Agricultural machinery — Safety —**  
**Part 8:**  
**Solid fertilizer distributors**

*Matériel agricole — Sécurité*

*Partie 8: Distributeurs d'engrais solides*

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ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva, Switzerland  
Tel. +41 22 749 01 11  
Fax +41 22 749 09 47  
copyright@iso.org  
www.iso.org

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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](http://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](http://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 on 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 the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

ISO 4254-8 was prepared by the European Committee for Standardization (CEN) in collaboration with ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 3, *Safety and comfort*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 4254-8:2009), which has been technically revised and includes the following changes:

- revision of the edition 2009 under the Vienna Agreement (whole document);
- alignment with ISO 4254-1:2003 (whole document);
- addition of terms and definitions ([3.5](#), [3.6](#));
- improved differentiation concerning the access for loading with and without load ([4.5](#));
- additional requirements concerning the removal of spreading devices ([4.8](#));
- addition of noise reduction requirements ([4.10](#));
- alignment of the list of significant hazards ([Annex A](#)).

A list of all the parts in the ISO 4254 series can be found on the ISO website.

## Introduction

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 and events are covered are indicated in the scope of this document. These hazards are specific to solid fertilizer distributors.

Significant hazards that are common to all the agricultural machines (self-propelled, mounted, semi-mounted and trailed) are dealt with in ISO 4254-1.

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

When provisions of this type-C standard are different from those which are stated in type-A or type-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.

The structure of safety standards in the field of machinery is as follows.

- Type-A standards (basis standards) give basic concepts, principles for design, and general aspects that can be applied to machinery.
- Type-B standards (generic safety standards) deal with one or more safety aspects or one or more types of safeguards that can be used across a wide range of machinery:
  - Type-B1 standards on particular safety aspects (e.g. safety distances, surface temperature, noise);
  - Type-B2 standards on safeguards (e.g. two-hands controls, interlocking devices, pressure sensitive devices, guards).
- Type-C standards (machinery safety standards) deal with detailed safety requirements for a particular machine or group of machines.

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# Agricultural machinery — Safety —

## Part 8: Solid fertilizer distributors

### 1 Scope

This document, intended to be used together with ISO 4254-1, specifies the safety requirements and their verification for the design and construction of mounted, semi-mounted, trailed or self-propelled fertilizer distributors for solid fertilizer application in agriculture and to be used by one operator only, e.g. full width solid fertilizer distributors, solid fertilizer broadcasters, distributors with oscillating tube and line-distributors, as well as solid fertilizer distributors driven by an auxiliary engine. In addition, it specifies the type of information on safe working practices (including residual risks) to be provided by the manufacturer.

This document deals with all the significant hazards (as listed in [Annex A](#)), hazardous situations and events relevant to solid fertilizer distributors, when they are used as intended and under the conditions foreseeable by the manufacturer (see [Clause 4](#)), excepting the hazards arising from:

- inadequate lighting of working area;
- inadequate visibility from drivers/operators position;
- inadequate seating;
- travelling functions (drive, braking etc.);
- rolling over;
- equipment for loading fertilizer into the machine;
- an auxiliary engine;
- moving parts for power transmission except for strength requirements for guards.

This document is neither applicable to maintenance or repairs carried out by professional service personnel nor to environmental hazards (except noise).

This document is not applicable to the following:

- combined seed and fertilizer drills which create a soil trench and deposit fertilizer in said trench;
- machines for distributing granulated pesticides;
- pedestrian controlled distributors;
- knapsack distributors.

This document is not applicable to solid fertilizer distributors which are manufactured before the date of its publication.

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

ISO/TR 11688-1, *Acoustics — Recommended practice for the design of low-noise machinery and equipment — Part 1: Planning*

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

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

ISO 14120:2015, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

## 3 Terms and definitions

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

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

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

- 3.1  
solid fertilizer distributor**  
machine which spreads fertilizer on the soil surface or in crop but not incorporated into the soil
- 3.2  
full width solid fertilizer distributor**  
*solid fertilizer distributor* (3.1) which spreads fertilizer over the whole surface and has a working width which is approximately the same as the machine width
- 3.3  
solid fertilizer broadcaster**  
*solid fertilizer distributor* (3.1) which propels fertilizer over the whole surface and has a working width which is essentially wider than the machine width
- 3.4  
solid fertilizer line-distributor**  
*solid fertilizer distributor* (3.1) which spreads fertilizer in bands separated by bands without fertilizer and which has a working width which is roughly the same as the machine width
- 3.5  
access with load**  
mounting the machine and carrying, for example, a bag in order to fill the hopper with material
- Note 1 to entry: Access with load normally does not allow three point contact.
- 3.6  
access without load**  
mounting the machine without carrying material as additional equipment is used for filling the hopper, for example, filling auger
- Note 1 to entry: Access without load normally allows three point contact.

## 4 Safety requirements, risk reduction and protective measures

### 4.1 General

Machinery shall comply with the safety requirements, risk reduction and protective measures of this clause. Unless otherwise specified in this document, the machine shall comply with the requirements of ISO 4254-1.

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

### 4.2 Stability when parked and for manual handling

#### 4.2.1 General

The machine shall be designed to be stable as specified in ISO 4254-1:2013, 6.2.1. This shall be verified according to [Clause 5](#). See also [6.1](#) a), b) and c).

#### 4.2.2 Mounted machines fitted with rollers for manual handling when dismantled

Machines equipped with transport rollers for manual handling shall be designed so that they cannot overturn. This shall be verified according to [Clause 5](#).

#### 4.2.3 Machines with adjustable supporting devices

When the machine is fitted with adjustable supporting devices, it shall be possible for the operator to adjust these supporting devices without going beneath the machine.

This shall be verified by inspection.

### 4.3 Distributing components

#### 4.3.1 Swivelling and movable distributing components

To limit the risk associated with overhead power lines, ISO 4254-1:2013, 8.2.3 p) and 8.3.4 shall be applied.

See also [6.1](#) d), e) and f).

This shall be verified by inspection.

#### 4.3.2 Spreading plates and oscillating tubes

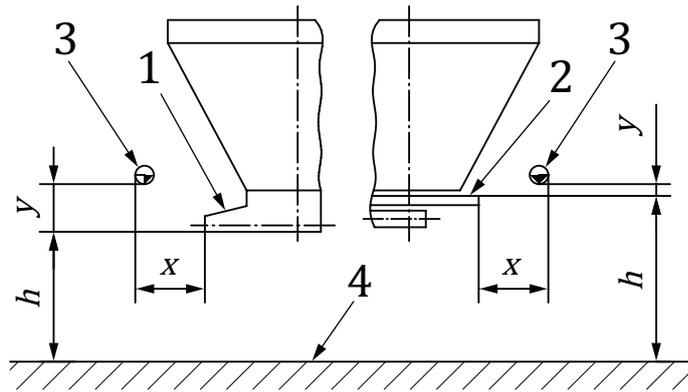
##### 4.3.2.1 Protection against unintentional contact with distributing components

Machines shall be designed or guarded in such a way that any unintentional contact with the distributing components at the front, at the rear and at the sides is avoided (e.g. a barrier or a part of the machine). This shall not apply to solid fertilizer distributors with ground-wheel-driven distributing components.

This shall be verified by inspection. See also [6.1](#) g), h), i), j), k) and l).

**4.3.2.1.1** For machines where the maximum working height ( $h$ ) is less than 1 500 mm from the ground, guarding shall be provided which is continuous over the front, rear and both sides in accordance with the following:

- a) a barrier located above the distributing components so that the dimensions given in [Figure 1](#) and [Table 1](#), respectively, or



**Key**

- 1 distributing component (oscillating distributor)
- 2 distributing component (rotary distributor)
- 3 barrier
- 4 ground
- h* maximum working height
- x* horizontal distance between the tip of distributing components and the barrier
- y* vertical distance between the tip of distributing components and the barrier

NOTE *h*, as shown, is only given here as an example.

**Figure 1 — Guarding by the use of a barrier for machines where the working height is less than 1 500 mm (without horizontal overlap)**

**Table 1 — Distance between the tip of distributing components and the barrier (without horizontal overlap)**

Horizontal distance mm	Vertical distance mm
$100 \leq x < 200$	$y \leq 200$
$x \geq 200$	$y \leq 300$

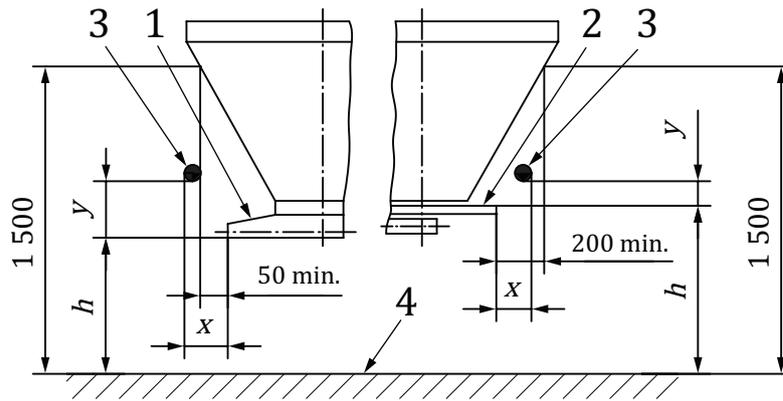
b) when a horizontal overlap between the side of the hopper or structural framework of the machine, at a height of 1 500 mm, and the path of motion of the tip of the distributing components (see [Figure 2](#)) of:

- 200 mm minimum in the case of rotary distributors, or
- 50 mm minimum in the case of oscillating distributors.

Then, a barrier located above the distributing components so that the dimensions given in [Figure 2](#) and [Table 2](#) are respected.

In the case where the barrier is located up to 100 mm inside the external contour of the hopper, then this barrier shall withstand a vertical and a horizontal load of 600 N.

Dimensions in millimetres



**Key**

- 1 distributing component (oscillating distributor)
- 2 distributing component (rotary distributor)
- 3 barrier
- 4 ground
- h* maximum working height
- x* horizontal distance between the tip of distributing components and the barrier
- y* vertical distance between the tip of distributing components and the barrier

NOTE *h*, as shown, is only given here as an example.

**Figure 2 — Guarding by the use of a barrier for machines where the working height is less than 1 500 mm (with horizontal overlap)**

**Table 2 — Distance between the tip of distributing components and the barrier (with horizontal overlap)**

Horizontal distance mm	Vertical distance mm
$50 \leq x < 100$ mm	$y \leq 100$ mm
$x \geq 100$ mm	$y \leq 150$ mm

In both cases a) and b), the dimension ( $h + y$ ) shall not exceed 1 500 mm.

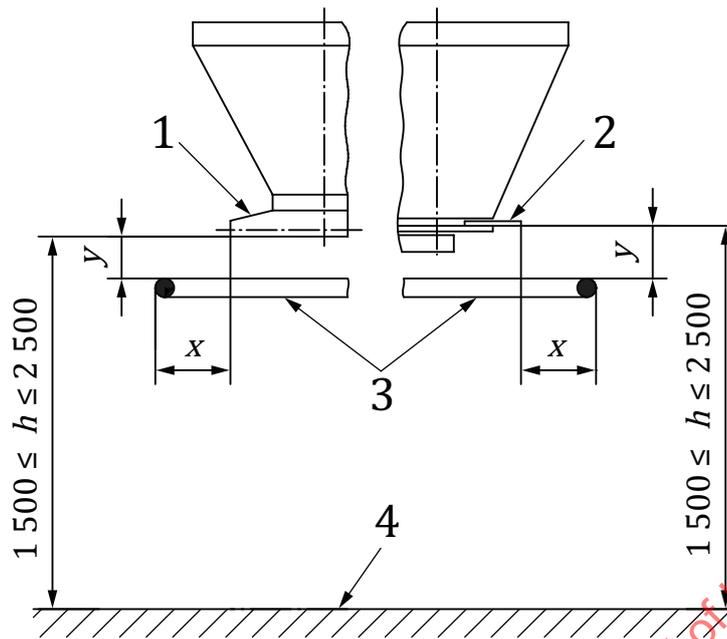
This shall be verified by measurement, test in accordance with ISO 4254-1, Annex C and inspection. See also 6.1 m).

**4.3.2.1.2** For machines where the minimum working heights, *h*, are more than 1 500 mm from the ground, guarding shall be achieved by a barrier located below the distributing components which is continuous over the front, the rear and both sides compliant with the dimensions given in Figure 3 and Table 1.

This shall be verified by measurement and inspection.

**4.3.2.1.3** For machines where the working heights (*h*) according to the operator's manual can be more or less than 1 500 mm from the ground, the dimensions and requirements given in 4.3.2.1.1 and 4.3.2.1.2 apply.

This shall be verified by measurement and inspection. See also 6.1 m).



**Key**

- 1 distributing component (oscillating distributor)
- 2 distributing component (rotary distributor)
- 3 barrier
- 4 ground
- h* minimum working height
- x* horizontal distance between the tip of distributing components and the barrier (see [Table 1](#))
- y* vertical distance between the tip of distributing components and the barrier (see [Table 1](#))

NOTE *h* is the value calculated from the ground to the distributing components taken on the lower level of the plate or the axis of the oscillating tube.

**Figure 3 — Guarding for machines where the working height is more than 1 500 mm**

**4.3.2.2 Protection against ejection of parts of machine**

Parts of distributing components of solid fertilizer broadcasters, such as blades, shall be reliably fixed, for example, by one or more fixing bolts with a safety lock-nut.

This shall be verified by inspection.

NOTE A test method on the strength of this device is planned for future development.

**4.4 Feeding components guarding**

For machines of which feeding components and agitators are not ground-wheel-driven and in case the feeding components and agitators show an entanglement or drawn-in hazard, the hopper shall be fitted with either of the following:

- fixed guard (according to ISO 12100:2010, 6.3.3.2.2, and ISO 14120); or
- movable guard which remains attached to the machine when opened (for example, by means of hinges) and automatically locks in the closed position without the use of a tool and needing a tool to be opened; or

- combination of fixed and movable guards. In case a grid is used as a guard, the grid apertures and location shall comply with the safety distances given in ISO 13857:2008, Tables 3 and 6 when in the closed position; or
- the opening or removal of the guard (grid) shall cause the drive of the feeding components and agitators to stop; or
- the feeding components and agitators shall not move when the machine is at a standstill (travel speed 0 km/h).

For specific operations (e.g. calibration of the flow rate, emptying of residues, cleaning), starting the feeding components and agitators shall be possible only if additional safety measures are applied (e.g. limitation of speed, hold-to-run control).

These requirements shall be verified by inspection and measurement. See also 6.1 n) and o).

When in the closed position, this guard (grid) shall meet the strength requirement for the vertical load as specified in ISO 4254-1:2013, 4.10.

The distributing conveyors and flow control regulators and their driving systems, which are not ground-wheel-driven, shall be guarded against any contact, except for the feeding zone of distributing components or when feeding components and agitators shall not move when the machine is at a standstill (travel speed 0 km/h).

The accessible parts of the ground-wheel-driven distributing conveyors and of the flow control regulators shall be guarded on the top and at the sides, except for the feeding zone of distributing components.

This shall be verified by inspection.

## 4.5 Loading

### 4.5.1 Operator access to loading locations without load

The access to the loading locations around the hopper shall comply with ISO 4254-1:2013, 4.8.

### 4.5.2 Operator access to manual loading location with load

The approach to the loading location shall be freely accessible so that the operator does not need to climb over or on to machine components in order to reach the boarding means.

A platform for manual loading shall be provided when the top edge of the hopper is more than 1 250 mm above ground level. If a platform is provided, the vertical height of which above the ground exceeds 300 mm, a boarding means with an inclination from the horizontal of less than 70° shall be provided (see [Figure 4](#)).

The vertical distance between the lowest step and the ground shall not exceed 300 mm and shall be freely accessible. The steps shall have at least a depth of 200 mm and at least a width of 300 mm (see [Figure 4](#)).

The boarding means to a platform located more than 1 200 mm above the ground shall be fitted with at least one handrail or handholds suitably located.

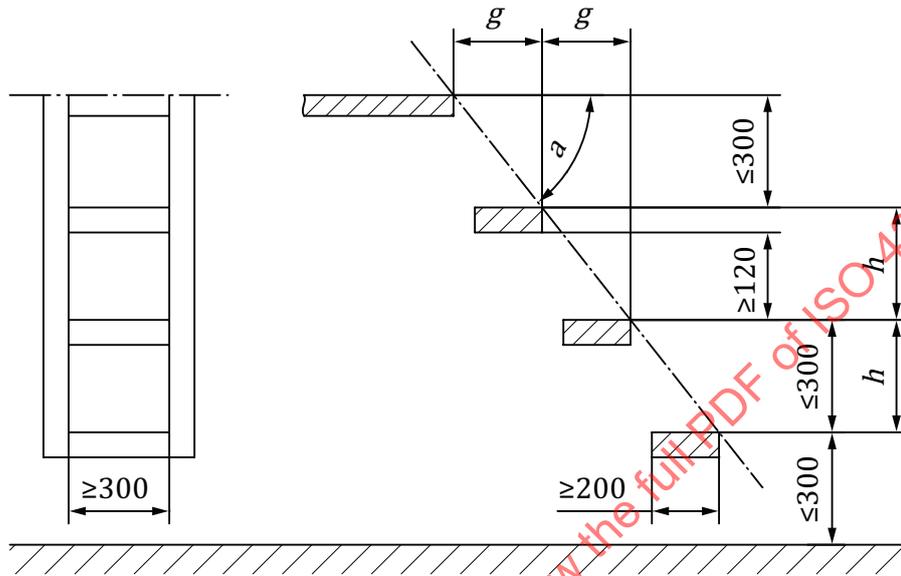
The lower end of the handrail/handhold shall be located at a maximum horizontal distance of 400 mm from the edge of the first step.

If a loading platform is provided, this platform shall meet the following requirements:

- the minimum width of the platform shall be 600 mm and the minimum depth from back to front shall be 300 mm;

- the distance between the edge of the hopper or the edge of the opened cover and the vertical plane through the edge of the platform shall be 200 mm maximum (see Figure 5);
- a handrail or handholds shall be provided, located either between the hopper and the platform or on the outside of the platform. The handrail or handholds may be integral parts of the hopper, provided the handrail or handholds are suitably designed;
- platforms and steps, if provided, shall meet the requirements of ISO 4254-1.

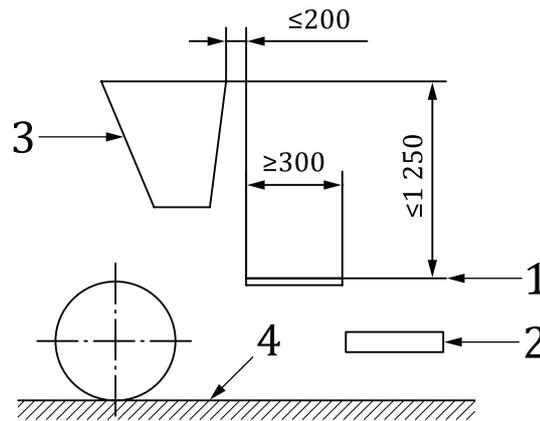
Dimensions in millimetres



**Key**

- $\alpha$  angle of inclination
- $h$  going (height between two successive steps)
- $g$  rise (depth between two successive steps)

**Figure 4 — Dimensions of boarding means for loading location when a platform is provided**

**Key**

- 1 platform
- 2 step
- 3 hopper
- 4 ground

**Figure 5 — Loading location**

This shall be verified by measurement and inspection. See also 6.1 p).

**4.5.3 Other boarding means**

Other boarding means, if available, shall meet the requirements of ISO 4254-1:2013, 4.8.

This shall be verified by measurement and inspection.

**4.6 Checking of the hopper contents**

In order to enable the operator to check the content of the hopper, e.g. the residual volume, and if the distance of the upper edge of the hopper in the loading position is more than 1 600 mm from the ground:

- a) boarding means complying with ISO 4254-1:2013, 4.8.3 shall be provided whereby the vertical distance between the upper edge of the hopper and the upper step shall be neither less than 1 200 mm nor more than 1 600 mm; or
- b) an inspection window in the hopper wall; or
- c) other measures shall be provided enabling a risk-less check of the hopper content for the operator, e.g. by using a level indicator, a video camera, etc.

A safety sign shall be provided warning against entering the hopper.

This shall be verified by measurement and inspection. See also 6.1 q).

**4.7 Protection against ejection of fertilizer**

Solid fertilizer distributors shall be designed so that there is no ejection of fertilizer towards the operator on a 2 m width in a vertical plane, perpendicular to the driving direction of the machine and going through the lower hitching points or towing point. For self-propelled machines the vertical plane shall be at the rear side of the driver station.

This shall be verified by measurement and inspection.

#### 4.8 Removal of the spreading device

Removable spreading devices with a mass equal to or greater than 40 kg shall be fitted with clearly identified hooking points, which enable the use of lifting equipment.

Information regarding the procedure for removal of the spreading device shall be provided in the operator's manual.

This shall be verified by inspection. See also [6.1 i](#)).

#### 4.9 Flow rate calibration system

When a solid fertilizer distributor is supplied with a flow rate calibration system, it shall be possible for the operator to use it without going beneath the machine during the calibration test, intended to check the application rate, and while the fertilizer is falling or the machine is working.

This shall be verified by inspection.

#### 4.10 Hitching and clearance zone

For mounted machines, a sufficient clearance between the fertilizer distributor and the tractor shall be ensured for the connection of the driving elements (e.g. transmission), if provided, and control elements (e.g. electric/hydraulic remote control). That shall be achieved by:

- a clearance zone between the lower hitching points and the outer contour of the machine of minimum 200 mm as shown in [Figure 6](#) at least on one side, so that it is possible to connect the driving or steering elements after having coupled the fertilizer distributor;
- design of the driving or control elements so that their connection is possible before coupling the fertilizer distributor in a compatible clearance zone according to [Figure 6](#).

This shall be verified by measurement and inspection. See also [6.1 r](#)).

Dimensions in millimetres

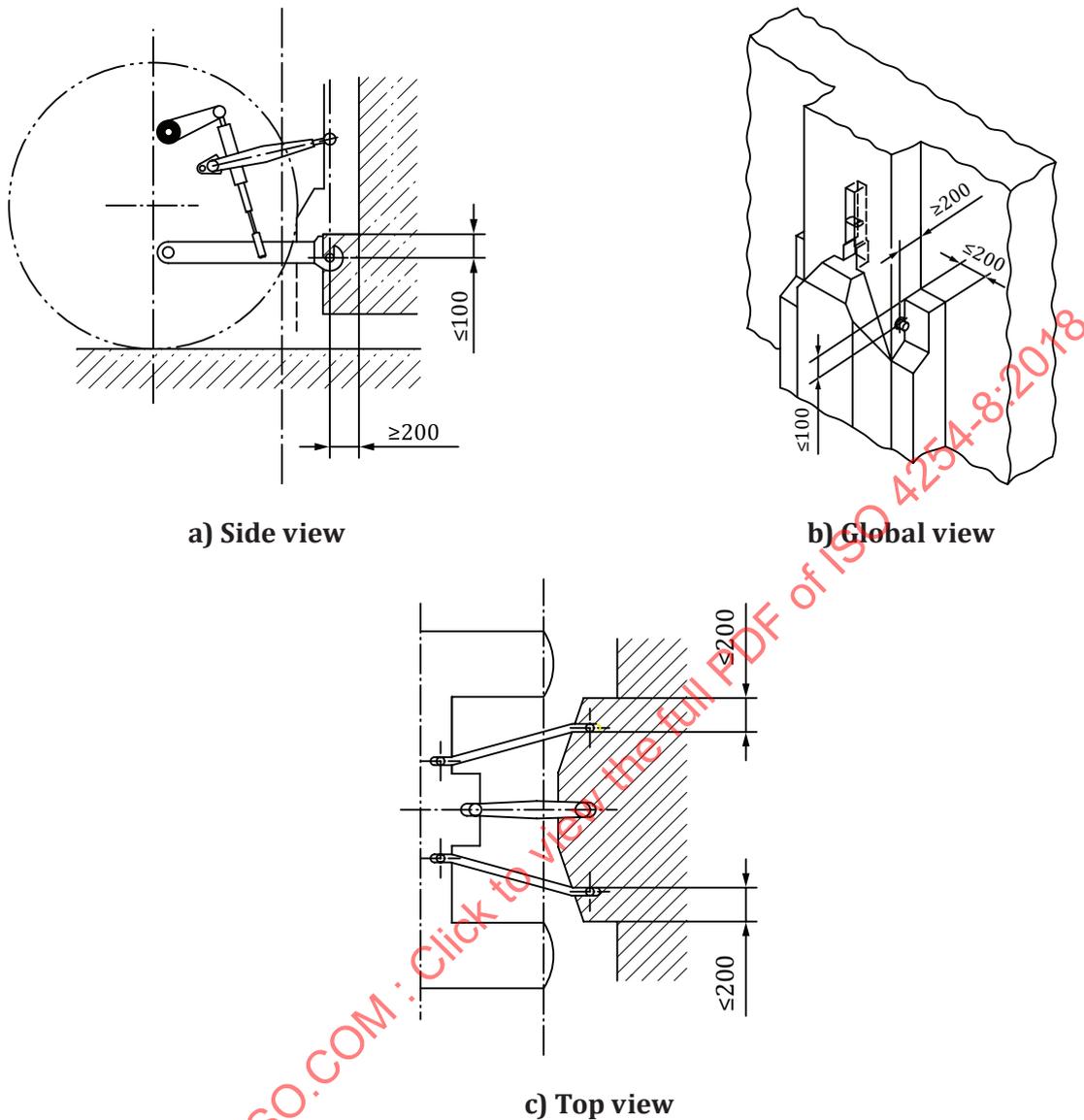


Figure 6 — Clearance zone

## 4.11 Noise

### 4.11.1 Noise reduction as a safety requirement

#### 4.11.1.1 Reduction at source by design and by protective measures

The machine shall comply with ISO 4254-1:2013, 4.3. The main sources causing noise are spreading devices and vibrating surfaces.

Machines shall be designed and constructed taking into account the available information and technical measures to control noise at source at the design stage, as described in ISO/TR 11688-1.

## 5 Verification of the safety requirements, risk reduction, and protective measures

Verification of the requirements given in [Clause 4](#) shall be made by means of inspection, calculation, or testing as appropriate and as indicated in [Clause 4](#) and [Table 3](#).

The means of verification for the requirements given in ISO 4254-1 shall be as specified in that part of ISO 4254.

**Table 3 — Additional means of verification of safety requirements and/or protective measures given in this document**

Subclause	Verification of	Visual inspection	Test performance checking	Measurement	Procedure/reference
<a href="#">4.2.1</a>	Stability (general)	X			Verification according to ISO 4254-1:2013, 6.2.1, with the basic hoppers half full to capacity of test material with a volumetric mass 1 t/m <sup>3</sup> .
<a href="#">4.2.2</a>	Stability (mounted machines fitted with rollers)	X	X		Place the machine fitted with rollers for manual handling on a horizontal and even plane. Then, push the machine in each direction so that it rolls, at a speed of 1 m/s against a fixed rectangular obstacle 50 mm high and located at a right angle to the direction of movement of the machine.  The machine shall not tip over.

## 6 Information for use

### 6.1 Operator's manual

In addition to ISO 4254-1, the following information shall be included in the operator's manual, as applicable:

- the fact that the load imposed by mounted distributors can influence tractor manoeuvrability and stability (see ISO 4254-1:2013, Annex D for stability calculations) and provide information to allow safe storage when dismantled (see [4.2](#));
- that it is recommended that the distributor is parked on a horizontal, solid surface with the hoppers empty (see [4.2](#));
- in case of ATV (all-terrain vehicle) the need to refer to the ATV operator's manual in particular for stability and maximum loads;
- the risk of unintentional contact with overhead power lines where this is possible during application operations, for example, due to uneven ground or use of swivelling and movable components, requires a risk assessment to be completed before any working operation commences in the area to be operated by the machine (see [4.3](#));
- that unfolding and folding of foldable components from and into the transport position shall be performed only in areas without overhead power lines (see [4.3](#));
- the need to check that the unlocking procedure does not cause the swivelling and movable components to fall down in an uncontrolled way (especially important with new machines) (see [4.3](#));

- g) that the engine is stopped during maintenance (see 4.3);
- h) that the operator shall avoid wearing loosely fitting clothes which could become entangled with moving parts (see 4.3);
- i) the hazards involved during removal and refitting of the spreading device and the instructions to be followed for its handling (see 4.3);
- j) the need to use a PTO drive shaft equipped with a guard in good condition (see 4.3);
- k) that all persons not concerned with the machine shall be kept away (see 4.3);
- l) that persons shall not approach the machine, ride on it or enter the hopper when the spreading device is running;
- m) the different working heights for which the machine is intended (see 4.3);
- n) the conditions of use to prevent blockages occurring (e.g. in the hopper) and the hazards related to clearing blockages (see 4.4);
- o) the procedures to be followed for calibration and loading (see 4.4);
- p) the need to follow advice concerning manual handling of heavy loads or the need to follow correct procedures for sack handling and lifting (see 4.5);
- q) precautions to take when mounting and dismounting extensions on the hopper (see 4.6);
- r) instructions concerning the use of automatic and semi-automatic hitching, when provided (see 4.10).

## 6.2 Safety and instructional signs

The following warnings shall be affixed on the machine drawing the attention to:

- hazards caused by moving parts (distributing components);
- hazards caused by ejection of materials;
- hazards of falling off when climbing on protective structures that are not designed for boarding purposes;
- that it is hazardous to board the machine while it is moving; this warning is to be affixed near means of access, if any.