
**Agricultural machinery — Safety —
Part 1:
General requirements**

*Matériel agricole — Sécurité —
Partie 1: Exigences générales*

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Published in Switzerland

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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. 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. 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.

The committee responsible for this document is ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 3, *Safety and comfort*.

This fifth edition of ISO 4254-1 cancels and replaces the fourth edition (ISO 4254-1:2008), which has been technically revised. In particular, requirements relating to the following have been introduced:

- vibrations; [ISO 4254-1:2013](https://standards.iteh.ai/catalog/standards/sist/004df688-6e13-440b-9ce5-bc9cbcd709c0/iso-4254-1-2013)
- protection of moving parts; <https://standards.iteh.ai/catalog/standards/sist/004df688-6e13-440b-9ce5-bc9cbcd709c0/iso-4254-1-2013>
- operation of machine parts;
- operating fluids;
- foldable barriers;
- PTO drive shaft guard clearance;
- emergency stop controls;
- safety related parts of control systems;
- roll-over and tip-over hazards.

ISO 4254 consists of the following parts, under the general title *Agricultural machinery — Safety*:

- *Part 1: General requirements*
- *Part 5: Power-driven soil-working machines*
- *Part 6: Sprayers and liquid fertilizer distributors*
- *Part 7: Combine harvesters, forage harvesters and cotton harvesters*
- *Part 8: Solid fertilizer distributors*
- *Part 9: Seed drills*
- *Part 10: Rotary tedders and rakes*

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- *Part 11: Pick-up balers*
- *Part 12: Rotary disc and drum mowers and flail mowers*
- *Part 13: Large rotary mowers*

ISO 4254-2, *Anhydrous ammonia applicators*, has been withdrawn.

ISO 4254-3, *Tractors*, has been cancelled and replaced by ISO 26322 (all parts), *Tractors for agriculture and forestry — Safety*.

ISO 4254-4, *Tractors and machinery for agriculture and forestry — Technical means for providing safety — Part 4: Forestry winches*, has been cancelled and replaced by ISO 19472, *Machinery for forestry — Winches — Dimensions, performance and safety*.

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Introduction

This document is a type-C standard as stated in 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 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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Agricultural machinery — Safety —

Part 1: General requirements

1 Scope

This part of ISO 4254 specifies the safety requirements and the means of their verification for the design and construction of self-propelled ride-on machines, mounted, semi-mounted and trailed machines used in agriculture in order to deal with the hazards which are typical for most of the machines. In addition, it specifies the type of information on safe working practices including information about residual risks to be provided by the manufacturer.

This document deals with significant hazards, hazardous situations and events, as listed in [Annex A](#), relevant to this agricultural machinery when used as intended and under the conditions of misuse foreseeable by the manufacturer during normal operation and service.

This part of ISO 4254 is not applicable to

- agricultural or forestry tractors,
- aircraft and air-cushion vehicles used in agriculture,
- lawn and garden equipment,
- machine-specific components or functions (e.g. working tools and/or processes).

This part of ISO 4254 is not applicable to hazards related to periodic service, machine conversion and repairs intended to be carried out by professional service personnel, environmental hazards, road safety (e.g. steering, braking), or to the power take-off (PTO) drive shaft; neither is it applicable to guards of moving parts for power transmission except for strength requirements for guards and barriers.

This part of ISO 4254 is not applicable to machines which are manufactured before the date of its publication.

Not all of the hazards dealt with by this part of ISO 4254 are necessarily present on a particular machine. A risk assessment should be carried out by the manufacturer to determine the hazards that are applicable and any hazards in addition to those dealt with by this part or a relevant machine-specific part. The requirements of a machine-specific part of ISO 4254 take precedence over the requirements of this part.

2 Normative references

The following referenced 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.

ISO 3600:1996, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Operator's manuals — Content and presentation*

ISO 3744:2010, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for an essentially free field over a reflecting plane*

ISO 3767-1:1998, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Symbols for operator controls and other displays — Part 1: Common symbols*

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- ISO 3767-2:2008, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Symbols for operator controls and other displays — Part 2: Symbols for agricultural tractors and machinery*
- ISO 3776-1:2006, *Tractors and machinery for agriculture — Seat belts — Part 1: Anchorage location requirements*
- ISO 3776-2:2013, *Tractors and machinery for agriculture — Seat belts — Part 2: Anchorage strength requirements*
- ISO 3776-3:2009, *Tractors and machinery for agriculture — Seat belts — Part 3: Requirements for assemblies*
- ISO 3795:1989, *Road vehicles, and tractors and machinery for agriculture and forestry — Determination of burning behaviour of interior materials*
- ISO 4253:1993, *Agricultural tractors — Operator's seating accommodation — Dimensions*
- ISO 4413:2010, *Hydraulic fluid power — General rules and safety requirements for systems and their components*
- ISO 4414:2010, *Pneumatic fluid power — General rules and safety requirements for systems and their components*
- ISO 5008:2002, *Agricultural wheeled tractors and field machinery — Measurement of whole-body vibration of the operator*
- ISO 5353:1995, *Earth-moving machinery, and tractors and machinery for agriculture and forestry — Seat index point*
- ISO 10975:2009, *Tractors and machinery for agriculture — Auto-guidance systems for operator-controlled tractors and self-propelled machines — Safety requirements*
- ISO 11201:2010, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions in an essentially free field over a reflecting plane with negligible environmental corrections*
- ISO 11204:2010, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions applying accurate environmental corrections*
- ISO 11684:1995, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Safety signs and hazard pictorials — General principles*
- ISO/TR 11688-1:1995, *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 13849-1:2006, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*
- ISO 13849-2:2012, *Safety of machinery — Safety-related parts of control systems — Part 2: Validation*
- ISO 13850:2006, *Safety of machinery — Emergency stop — Principles for design*
- ISO 13857:2008, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs*
- ISO 14982:1998, *Agricultural and forestry machinery — Electromagnetic compatibility — Test methods and acceptance criteria*
- ISO 15077:2008, *Tractors and self-propelled machinery for agriculture — Operator controls — Actuating forces, displacement, location and method of operation*
- ISO 16231-1:2013, *Self-propelled agricultural machinery — Assessment of stability — Part 1: Principles*
- ISO 25119-1:2010, *Tractors and machinery for agriculture and forestry — Safety-related parts of control systems — Part 1: General principles for design and development*

ISO 25119-2:2010, *Tractors and machinery for agriculture and forestry — Safety-related parts of control systems — Part 2: Concept phase*

ISO 25119-3:2010, *Tractors and machinery for agriculture and forestry — Safety-related parts of control systems — Part 3: Series development, hardware and software*

ISO 25119-4:2010, *Tractors and machinery for agriculture and forestry — Safety-related parts of control systems — Part 4: Production, operation, modification and supporting processes*

3 Terms and definitions

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

3.1

normal operation

use of the machine for the purpose intended by the manufacturer by an operator familiar with the machine characteristics and complying with the information for operation, and safe practices, as specified by the manufacturer in the operator's manual and by signs on the machine

Note 1 to entry: Normal operation includes the preparation and storage of the machine, such as

- mounting and dismounting,
- swinging components into work position and vice versa,
- adding or removing ballast and picking up and setting down attachments,
- filling substances and materials that are needed and consumed during the use of the machine (such as twine spools, seed, fertilizers, water and plant protection products),
- the adjustment and setting of the machine, or the combination tractor-machine for the specific condition of the field and/or the crop, and
- clearing of blockages in the crop flow or clearing accumulation of debris.

3.2

service

activities to be done as required and/or at regular intervals by an operator familiar with the machine characteristics and complying with the information for service and safe practices, as specified by the manufacturer in the operator's manual and by signs on the machine, in order to maintain the proper function of the machine

Note 1 to entry: Service includes activities such as fuelling, cleaning, washing, topping up fluid levels, greasing, adjusting (e.g. belts and chains) and the replacement of consumable articles such as light bulbs and fast-wearing parts (e.g. cutting elements).

3.3

three-point contact support

system which permits a person to simultaneously use two hands and a foot or two feet and one hand when boarding, or dismounting from, a machine

3.4

inadvertent contact

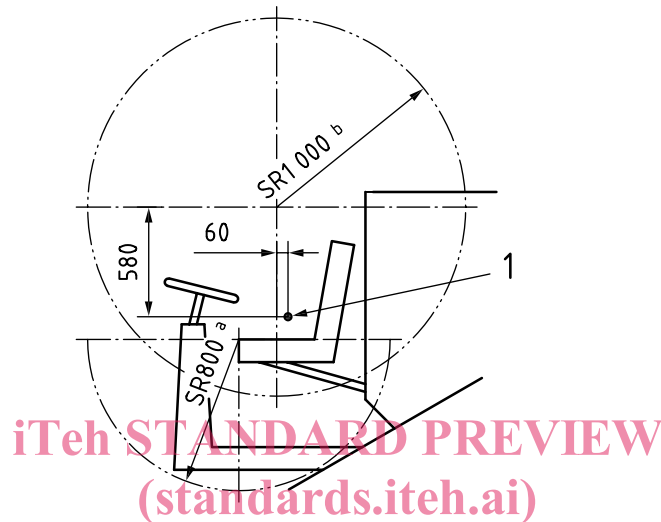
unplanned exposure of a person to a hazard resulting from the person's action during normal operation and service of the machine

3.5 hand and foot reach

3.5.1 hand and foot reach

<machine without cab> reach defined for hands by a sphere of 1 000 mm radius, centred on the seat centreline, 60 mm in front of and 580 mm above the seat index point (SIP) as defined in ISO 5353 and for feet by a hemisphere of 800 mm radius, centred on the seat centreline at the front edge of the cushion and extending downwards, with the seat in its central position See [Figure 1](#).

Dimensions in millimetres



Key

- 1 SIP (seat index point)
- a Hemisphere radius (feet).
- b Sphere radius (hands).

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Figure 1 — Hand and foot reach

3.5.2 hand and foot reach

<machine with cab> reach defined for hands by those portions, lying within the cab, of a sphere of 1 000 mm radius, centred on the seat centreline, 60 mm in front of and 580 mm above the seat index point (SIP) as defined in ISO 5353, and for feet by those portions, lying within the cab, of a hemisphere of 800 mm radius centred on the seat centreline at the front edge of the cushion and extending downwards, with the seat in its central position

3.6 normal access

access for operators for process control and adjusting, during normal operation or service, according to the intended use of the machine

3.7 automatic mode

machine function that consists of either repetitive work cycles or a single work cycle that, once initiated by the intentional actuation of a control by the operator or by the machine itself, either repeats a cycle or comes to stop at the completion of a cycle without operator intervention as a part of normal machine operation

3.8 work cycle

series of machine-functional events that recur in succession and that either lead back to the starting point (e.g. a bale knotter system) or come to a predetermined stopping point (e.g. folding or unfolding of an implement wing)

3.9 stationary operation

application of the machine while the machine is not travelling in any direction as the equipment performs its function

4 Safety requirements and/or measures applicable to all machines

4.1 Fundamental principles, design guidance

4.1.1 The machinery shall comply with the safety requirements and/or protective measures of [Clauses 4](#) and [5](#) or [6](#). In addition, the machinery shall be designed according to the principles of ISO 12100:2010 for relevant but not significant hazards, which are not dealt with by this document.

Not all of the hazards dealt with by this part of ISO 4254 are necessarily present on a particular machine. A risk assessment should be carried out by the manufacturer to determine the hazards that are applicable and any hazards in addition to those dealt with by this part or a relevant machine-specific part. The manufacturer is responsible for the specification and provision of safety measures to deal with additional hazards. The requirements of a machine-specific part of ISO 4254 take precedence over the requirements of this part.

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4.1.2 Unless otherwise specified in this part of ISO 4254, safety distances shall comply with the requirements given in ISO 13857:2008, [Table 1.3](#), [4.2](#) or [6](#), as appropriate.

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4.1.3 Functional components which need to be exposed for proper function, drainage or cleaning shall be guarded without causing other hazards, for example risk of fire due to the accumulation of organic material during the intended use, and without interfering with the proper function, drainage or cleaning.

4.2 Protection from moving parts involved in the work

Within the intended use and reasonably foreseeable misuse of the machine, if guards cannot be used to prevent inadvertent contact with moving parts involved in the machine's work process, then other appropriate measures to prevent inadvertent contact shall be provided.

During the risk assessment process selection of such appropriate measures shall take into consideration the strategies for risk reduction specified in ISO 12100:2010, and shall consider both normal operation and service operations as specified in the operator's manual.

An example of an appropriate measure is safety distance guarding through the use of a barrier.

4.3 Noise

4.3.1 The technical information given in ISO/TR 11688-1 shall be used as means to design low-noise machinery.

NOTE 1 ISO/TR 11688-2 (see [Reference 3](#)) also gives useful information on noise-generation mechanisms in machinery.

NOTE 2 Noise generation can vary considerably between machinery types. Noise reduction measures are therefore dealt with in product-specific standards.

4.3.2 Noise emission values, if required to be declared, shall be determined in accordance with [Annex B](#).