
Agricultural machinery — Safety —
Part 7:
Combine harvesters, forage harvesters
and cotton harvesters

Matériel agricole — Sécurité —

Partie 7: Moissonneuses-batteuses, récolteuses-hacheuses-chargeuses de fourrage et récolteuses de coton

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ISO 4254-7:2008

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 4254-7 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 7, *Equipment for harvesting and conservation*.

This second edition cancels and replaces the first edition (ISO 4254-7:1995), which has been technically revised.

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

- *Part 1: General requirements*
- *Part 3: Tractors¹⁾*
- *Part 5: Power-driven soil working equipment*
- *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*
- *Part 11: Pick-up balers*
- *Part 12: Rotary disc and drum mowers and flail mowers*

Part 4, *Forestry winches*, was cancelled and replaced by ISO 19472, *Machinery for forestry — Winches — Dimensions, performance and safety*.

1) Under the general title *Tractors and machinery for agriculture and forestry — Technical means for ensuring safety*. To be cancelled and replaced by ISO 26322 (all parts), *Tractors and machinery for agriculture and forestry — Safety*.

Introduction

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

- a) Type-A standards (basic standards) give basic concepts, principles for design, and general aspects that can be applied to machinery.
- b) Type-B standards (generic safety standards) deal with one or more safety aspect(s) or one or more type(s) 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-hand controls, interlocking devices, pressure sensitive devices, guards);
- c) Type-C standards (machinery safety standards) deal with detailed safety requirements for a particular machine or group of machines.

This part of ISO 4254 is a type-C standard as stated in ISO 12100-1.

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 machinery concerned and the extent to which hazards, hazardous situations and events are covered are indicated in the scope of this part of ISO 4254. These hazards are specific to combine harvesters, forage harvesters and cotton harvesters.

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

Agricultural machinery — Safety —

Part 7:

Combine harvesters, forage harvesters and cotton harvesters

1 Scope

This part of ISO 4254, intended to be used together with ISO 4254-1, specifies the safety requirements and their verification for the design and construction of combine harvesters, forage harvesters and cotton harvesters. It describes methods for the elimination or reduction of hazards arising from the intended use of these machines by one person (the operator) in the course of normal operation and service. In addition, it specifies the type of information on safe working practices to be provided by the manufacturer.

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

This part of ISO 4254, taken together with ISO 4254-1, deals with all the significant hazards (as listed in Table 1), hazardous situations and events relevant to combine harvesters, forage harvesters and cotton harvesters, when they are used as intended and under the conditions foreseen by the manufacturer (see Clause 4). It is not applicable to hazards arising from the presence of persons other than the operator, cleaning of the grain tank, and hazards related to vibrations and moving parts for power transmission, except for strength requirements for guards and barriers. In respect of braking and steering, it is applicable only to the ergonomic aspects (e.g. location of brake pedal and steering wheel); no other aspects related to braking and steering are covered. In the case of trailed harvesters, it is applicable only to hazards related to the working process.

NOTE Specific requirements related to road traffic regulations are not taken into account in this part of ISO 4254.

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

2 Normative references

The following referenced documents are indispensable for the application 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 3600:1996, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Operator's manuals — Content and presentation*

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

ISO 3767-2, *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 4254-7:2008(E)

ISO 3776-2:2007, *Tractors and machinery for agriculture — Seat belts — Part 2: Anchorage strength requirements*

ISO 4253:1993, *Agricultural tractors — Operator's seating accommodation — Dimensions*

ISO 4254-1:2008, *Agricultural machinery — Safety — Part 1: General requirements*

ISO 5131:1996, *Acoustics — Tractors and machinery for agriculture and forestry — Measurement of noise at the operator's position — Survey method*

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

ISO 5687:1999, *Equipment for harvesting — Combine harvesters – Determination and designation of grain tank capacity and unloading device performance*

ISO 9533:1989, *Earth-moving machinery — Machine-mounted forward and reverse audible warning alarm — Sound test method*

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

ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology*

ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles*

ISO 15077:2008, *Tractors and self-propelled machinery for agriculture — Operator controls — Actuating forces, displacement, location and method of operation*

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3 Terms and definitions

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

3.1 instructional seat

integral or separate seat to allow a trainer or trainee to be seated

3.2 guidance system

automatic system to control machine steering during the harvesting operation

3.3 combine harvester

mobile grain-harvesting machine for cutting, stripping or picking up crops, threshing, separating, cleaning and conveying grain into a grain tank and depositing harvest residue onto the ground

3.4 clean grain and returns handling systems

systems for conveying of clean grain and returns within the machine by augers and/or elevators to the grain tank or threshing/re-threshing system

3.5**forage harvester**

mobile agricultural machine used to harvest or gather the crop, cut the crop into short parallel lengths and deliver the chopped crop into containers or separate vehicles

NOTE ISO 8909-1 gives detailed definitions of terms related to forage harvesters.

3.6**cotton harvester**

mobile cotton seed harvesting machine for cleaning as required, handling and conveying seed cotton into a basket and depositing harvest residue onto the ground

3.7**cotton harvesting unit**

portion of cotton harvester comprising the mechanism for gathering and stripping or picking seed, cotton from a cotton plant

3.8**compacting device**

elements for compacting the harvested material on a mobile cotton harvester

3.9**basket**

container used to receive, hold, compact and unload harvested cotton crop material

3.10**cleaner**

device for separating trash from harvested cotton material on a mobile cotton harvester

3.11**header**

portion of the combine/forage harvester or cotton harvester comprising the mechanism for gathering, cutting, stripping or picking up the crop

3.12**operator's work station**

location on the machine that encompasses the driver's position

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4 List of significant hazards

Table 1 gives the significant hazard(s), the significant hazardous situation(s) and event(s) covered by this part of ISO 4254 that have been identified by risk assessment as being significant for this type of machine, and which require specific action by the designer or manufacturer to eliminate or to reduce the risk.

Attention is drawn to the necessity to verify that the safety requirements specified in this part of ISO 4254 apply to each significant hazard presented by a given machine and to validate that the risk assessment is complete.

Table 1 — List of significant hazards associated with combine harvesters, forage harvesters and cotton harvesters

No. ^a	Hazard	Hazardous situation and event	Clause/subclause of ISO 4254-1:2008	Clause/subclause of this part of ISO 4254
A.1	Mechanical hazard			
A.1.1	Crushing hazard	Clearance to adjacent parts when actuating controls	4.4.3; 5.1.3.1; 5.1.3.3; 5.1.8; 6.1	5.2.1.3; 5.2.2; 5.2.3; 5.3.3, 7.2.5
		Movement of boarding means	4.5.1.1.2; 4.5.1.2.5; 4.5.2.3; 4.5	5.3.5; 5.3.7.3; 5.4
		Design of platforms	4.5.2.2	5.3.7.2
		Working tools	4.7	5.1.2
		Service points, service and maintenance operations, use of supports	4.8; 4.14.1	5.9.4
		Movement of folding elements	4.14.3; 4.14.5; 4.14.6	5.5
		Shearing and pinching points at the operator's work station	5.1.4	5.3.4
		Construction of jack-up points, moving the machine, tie down and jacking operations	5.2	5.9.5
		Lack of stability	6.2	5.1.2
		Mounting of machines	6.2.2; 6.2.3; 6.3	5.6
		Cutting mechanism, feed augers, reel	—	6.3
		Grain tank augers and grain handling systems	—	6.4.1; 6.4.2; 6.4.3; 6.4.4; 6.4.5.1; 6.4.6
		Maize harvesting attachment	—	6.5
		Rear straw chopper, straw spreader, chaff spreader	—	6.6.2; 6.6.3; 6.6.4
		Emptying of stone trap	—	6.7
		Infeed mechanism	—	7.2
		Inspection points, Inspection of drum and fingers	—	8.1.2.1.2
		Basket lowering	—	8.2.1
		Compactor auger operation	—	8.2.2

Table 1 (continued)

No. ^a	Hazard	Hazardous situation and event	Clause/subclause of ISO 4254-1:2008	Clause/subclause of this part of ISO 4254
A.1.2	Shearing hazard	Clearance to adjacent parts when actuating controls	4.4.3; 5.1.3.1; 5.1.3.3; 5.1.8; 6.1	5.2.1.3; 5.2.2; 5.2.3; 5.3.3, 7.2.5
		Movement of boarding means	4.5.1.1.2; 4.5.1.2.5; 4.5.2.3; 4.6	5.3.5; 5.3.7.3; 5.4
		Design of platforms	4.5.2.2	5.3.7.2
		Working tools	4.7	5.1.2
		Service points, service and maintenance operations, use of supports	4.8; 4.14.1	5.9.4
		Movement of folding elements	4.14.3; 4.14.5; 4.14.6	5.5
		Shearing and pinching points at the operator's work station	5.1.4	5.3.4
		Construction of jack-up points, moving the machine, tie down and jacking operations	5.2	5.9.5
		Lack of stability	6.2	5.1.2
		Mounting of machines	6.2.2; 6.2.3; 6.3	5.6
		Cutting mechanism, feed augers, reel	—	6.3
		Grain tank augers and grain handling systems	—	6.4.1; 6.4.2; 6.4.3; 6.4.4; 6.4.5.1; 6.4.6
		Maize harvesting attachment	—	6.5
		Rear straw chopper, straw spreader, chaff spreader	—	6.6.2; 6.6.3; 6.6.4
		Emptying of stone trap	—	6.7
		Infeed mechanism	—	7.2
		Operation of knife sharpening device	—	7.5.1, 7.5.2
		Inspection points, inspection of drum and fingers	—	8.1.2.1.2
Basket lowering	—	8.2.1		
Compactor auger operation	—	8.2.2		

Table 1 (continued)

No. ^a	Hazard	Hazardous situation and event	Clause/subclause of ISO 4254-1:2008	Clause/subclause of this part of ISO 4254
A.1.3	Cutting or severing hazard	Working tools	4.7	5.1.2
		Cutting mechanism, feed augers, reel	—	6.3
		Grain tank augers and grain handling systems	—	6.4.1; 6.4.2; 6.4.3; 6.4.4; 6.4.5.1; 6.4.6
		Maize harvesting attachment	—	6.5
		Rear straw chopper, straw spreader, chaff spreader	—	6.6.2; 6.6.3; 6.6.4
		Storage of sickle bars	—	6.7
		Infeed mechanism	—	7.2
		Operation of knife sharpening device	—	7.5.1, 7.5.2
		Inspection points, inspection of drum and fingers	—	8.1.2.1.2
		Basket lowering	—	8.2.1
		Compactor auger operation	—	8.2.2
A.1.4	Entanglement hazard	Working tools	4.7	5.1.2
		Starting/stopping the engine with engaged drive(s)	5.1.8	5.2.3
		Cutting mechanism, feed augers, reel	—	6.3
		Grain tank augers and grain handling systems	—	6.4.1; 6.4.2; 6.4.3; 6.4.4; 6.4.5.1; 6.4.6
		Maize harvesting attachment	—	6.5
		Infeed mechanism	—	7.2
		Inspection points, inspection of drum and fingers	—	8.1.2.1.2
		Basket lowering	—	8.2.1
		Compactor auger operation	—	8.2.2

Table 1 (continued)

No. ^a	Hazard	Hazardous situation and event	Clause/subclause of ISO 4254-1:2008	Clause/subclause of this part of ISO 4254
A.1.5	Drawing-in or trapping hazard	Working tools	4.7	5.1.2
		Starting/stopping the engine with engaged drive(s)	5.1.8	5.2.3
		Cutting mechanism, feed augers, reel	—	6.3
		Grain tank augers and grain handling systems	—	6.4.1; 6.4.2; 6.4.3; 6.4.4; 6.4.5.1; 6.4.6
		Maize harvesting attachment	—	6.5
		Infeed mechanism	—	7.2
		Inspection points, inspection of drum and fingers	—	8.1.2.1.2
		Basket lowering	—	8.2.1
		Compactor auger operation	—	8.2.2
A.1.6	Impact hazard	Movement of boarding means	4.5.1.2.5	5.3.5
		Movement of folding elements	4.14.5; 4.14.6	5.5
		Design of steering system	5.1.3.2	5.1.2
		Operator's seat, adjustment of suspension system	—	5.3.1.4
		Movement of cabin doors	—	5.3.12.2.1
		Interchangeable and detachable harvesting devices	—	5.6.1
		Maize picker head (covers)	—	6.5.1.1
A.1.7	Stabbing or puncture hazard	Working tools	4.7	5.1.2
A.1.8	Friction or abrasion hazard	Actuation of controls	4.4.3; 5.1.3.2	5.2.1.3; 5.2.2; 5.2.3; 5.3.3, 7.2.5
		Electrical equipment, location of cables	4.9.1	5.16.1
		Location of boarding means	4.5.1.1.2	5.3.5
A.1.9	High-pressure fluid injection or ejection hazard	Hydraulic components and fittings (e.g. rupture)	4.10; 6.5	5.15

Table 1 (continued)

No. ^a	Hazard	Hazardous situation and event	Clause/subclause of ISO 4254-1:2008	Clause/subclause of this part of ISO 4254
A.2	Electrical hazards			
A.2.1	Contact of persons with live parts (direct contact)	Non-insulated electrical equipment	4.9; 5.3, 6.5	5.9.2; 5.13.2; 5.16
A.2.2	Contact of persons with parts which have become live under faulty conditions (indirect contact)	Electrical equipment	4.9.1	5.13.2; 5.16
A.2.3	Approach to live parts under high voltage	Contact with overhead power lines	8.1.3, 8.2.1	5.11; 10.1.2; 10.2.3.2
A.2.4	Thermal radiation or other phenomena such as the projection of molten particles and chemical effects from short circuits, overloads, etc.	Failure of electrical equipment	4.9.2	5.1.2
		Failure of battery	5.3.1	5.9.2
A.3	Thermal hazards			
A.3.1	Burns, scalds and other injuries by possible contact of persons with objects or materials with an extreme high or low temperature, by flames or explosions and also by the radiation of heat sources	Hydraulic system, operating fluids (e.g. fuel, hydraulic oil, engine coolant)	4.12	5.9.3; 10.1.2
		Cabin material (in case of fire)	5.1.6	5.10.3
		Hot surfaces (e.g. of engine and associated parts)	5.5	5.8; 10.1.2
A.4	Hazards generated by noise			
A.4.1	Hearing loss (deafness), other physiological disorders (e.g. loss of balance, loss of awareness), accidents due to interference with speech communication and acoustic warning signals	Working of the machine	4.2; 8.1.3	5.14

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Table 1 (continued)

No. ^a	Hazard	Hazardous situation and event	Clause/subclause of ISO 4254-1:2008	Clause/subclause of this part of ISO 4254
A.5	Hazards generated by materials and substances			
A.5.1	Hazards resulting from contact with or inhalation of harmful fluids, gases, mists, fumes and dusts	Contact with operating fluids (fuel tank, hydraulic systems, engine cooling system)	4.10; 4.12; 5.4; 8.1.3	5.9.3; 5.15; 10.1.2
		Cabin material (in case of fire)	5.1.6	5.10.3
		Battery	5.3.1	5.9.2
		Exhaust system	5.6	5.1.2
		Ventilation system	—	5.3.12.5
A.5.2	Fire or explosion hazard	Cabin material	5.1.6	5.10.3
A.6	Hazards generated by neglecting ergonomic principles in machinery design			
A.6.1	Unhealthy postures or excessive efforts	Location and design of controls	4.4; 8.1.3	5.2.1; 10.1.2; 10.2.2
		Location and design of boarding means	4.5.1; 4.6; 8.1.3	5.3.5; 5.3.6; 5.4
		Service and maintenance operations	4.14.2; 4.14.4	5.1.2
		Design of folding elements	4.14.5	5.5.3
		Design of operator's work station	5.1.1; 5.1.2.1; 5.1.3	5.3.8; 5.3.12.4
		Interchangeable and detachable harvesting devices	—	5.6
		Location of greasing points	—	5.9.6.1
A.6.2	Inadequate consideration of hand-arm or foot-leg anatomy	Location of controls	4.4	5.2.1; 5.3.3; 5.12.2; 5.13.3; 6.4.5.2; 7.2.5; 8.1.2.1; 8.2.2.1
		Design of boarding means	4.5; 4.6	5.3.5; 5.3.6; 5.3.7; 5.3.8; 5.4
		Design of operator's work station	5.1	5.3.1; 5.3.2; 5.3.4; 5.3.7; 5.3.8; 5.3.11; 5.3.12.2; 5.3.12.3; 5.3.12.4
A.6.3	Not using, wrong or neglected use of personal protective equipment	Missing or insufficient information about the use of personal protective equipment in the operator's manual	8.1.3	10.1.4.2
A.6.4	Missing or insufficient local lighting	Operation of the machine, service and maintenance operations	5.1.7.3	5.3.11.1
A.6.5	Mental overload and under load, stress	Multifunction controls	4.4	5.2
		Provisions for installing working lights	5.1.7	5.3.11.1