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**Tractors and machinery for agriculture and  
forestry — Technical means for ensuring  
safety —**

iTeh **STANDARD PREVIEW**

**Part 7:**

**(Combine harvesters), forage and cotton  
harvesters**

[ISO 4254-7:1995](https://standards.iso.org/iso/4254-7:1995)

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*Tracteurs et matériels agricoles et forestiers — Dispositifs techniques  
permettant d'assurer la sécurité —*

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



Reference number  
ISO 4254-7:1995(E)

## 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.

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.

International Standard ISO 4254-7 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 3, *Safety and comfort of the operator*, and Subcommittee SC 7, *Equipment for harvesting and conservation*.

ISO 4254 consists of the following parts, under the general title *Tractors and machinery for agriculture and forestry — Technical means for ensuring safety*:

- Part 1: *General*
- Part 2: *Anhydrous ammonia applicators*
- Part 3: *Tractors*
- Part 4: *Forestry winches*
- Part 5: *Power-driven soil-working equipment*
- Part 6: *Equipment for crop protection*
- Part 7: *Combine harvesters, forage and cotton harvesters*
- Part 9: *Equipment for sowing, planting and distributing fertilizers*

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# Tractors and machinery for agriculture and forestry — Technical means for ensuring safety —

## Part 7:

### Combine harvesters, forage and cotton harvesters

#### 1 Scope

This part of ISO 4254 specifies technical means for ensuring the safety of operators and others involved in the course of normal running, maintenance and the use of combine harvesters and self-propelled forage and cotton harvesters. These are additional to the requirements of ISO 4254-1. It also provides guidelines regarding the prevention of accidents arising from the use of combine harvesters, and self-propelled forage and cotton harvesters.

#### 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 4254. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 4254 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3767-1:1991, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Symbols for operator controls and other displays — Part 1: Common symbols.*

ISO 3767-2:1991, *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 4254-1:1989, *Tractors and machinery for agriculture and forestry — Technical means for ensuring safety — Part 1: General.*

ISO 6689-1:—<sup>1)</sup>, *Equipment for harvesting — Combines and functional components — Part 1: Vocabulary.*

ISO 8909-1:1994, *Forage harvesters — Part 1: Vocabulary.*

#### 3 Definitions

For the purposes of this part of ISO 4254, the definitions given in ISO 6689-1 and ISO 8909-1 apply.

#### 4 Technical means

##### 4.1 Operator's workplace

###### 4.1.1 Internal clearance dimensions

Minimum clearance dimensions inside the cab shall conform to figure 1. Dimensions in figure 1 shall apply with the seat at the maximum height, mid-suspension and in the middle position horizontally.

1) To be published. (Revision of ISO 6689:1981)

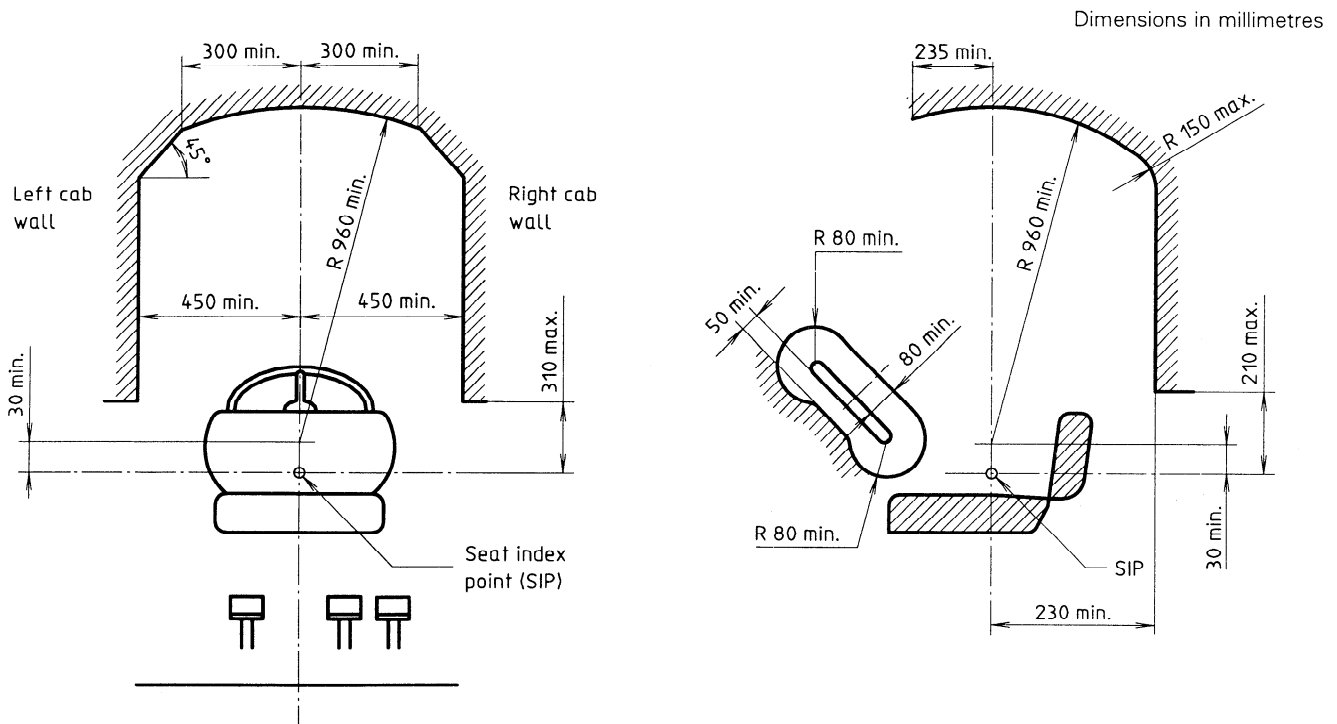


Figure 1 — Cab minimum internal clearance dimensions

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#### 4.1.2 Seat dimensions and arrangement

The seat shall give a comfortable sitting position and allow the operator to change position. Dimensions shall be in accordance with figure 2.

It shall be possible to adjust the seat manually without tools by a minimum of  $\pm 30$  mm vertically and a minimum of  $\pm 50$  mm horizontally (fore and aft). The aim shall be to achieve the greatest possible adjustment range:  $\pm 75$  mm is recommended. The vertical adjustment shall be independent of the horizontal adjustment.

#### 4.1.3 Steering-wheel

The steering-wheel shall be comfortably positioned and the position may be adjustable. It is preferred that the centre of the steering-wheel is on the longitudinal centreline of the seat. In any case however, the maximum offset shall not exceed 50 mm. Clearance between fixed parts and the steering-wheel shall be in accordance with figure 1.

#### 4.1.4 Operator controls

The operator controls and their different positions shall be identified with clear and permanent symbols in accordance with ISO 3767-1 and ISO 3767-2, or corresponding text in the language(s) of the user(s).

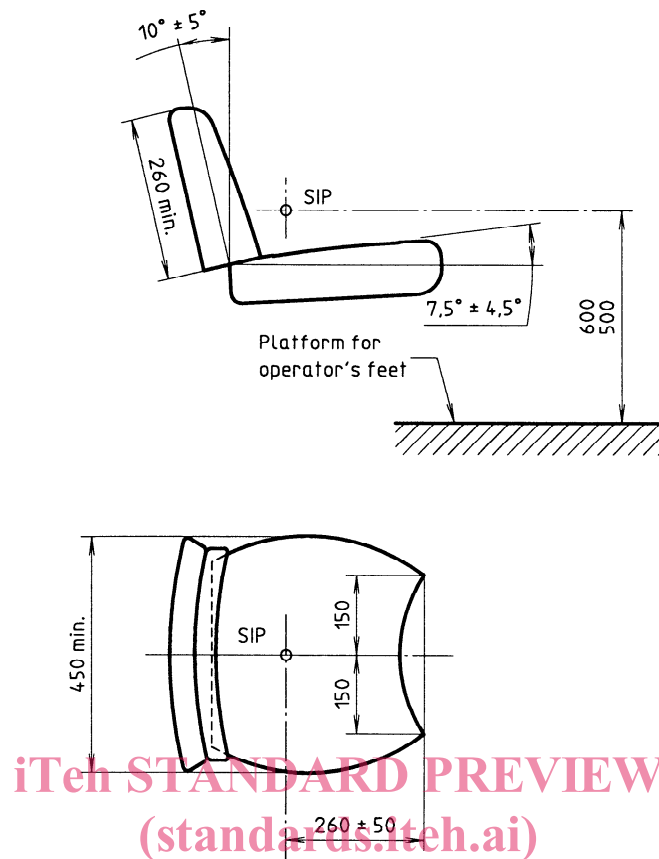
For controls which require an operating force of more than 50 N, a minimum clearance of 50 mm shall be maintained.

For controls which require an operating force of less than 50 N, a minimum clearance of 25 mm shall be maintained; fingertip operation controls are excluded from this requirement, providing there is no risk of inadvertent operation of adjacent controls.

#### 4.1.5 Shearing and pinching points

No shearing or pinching points shall be permitted within reach of the operator's hands or feet when he is seated.

Dimensions in millimetres



ISO 4254-7:1995  
**Figure 2 — Operator's seating accommodation**  
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No hazard is deemed to exist between the seat backrest and adjoining components behind it if the adjoining components have a smooth surface and the seat backrest itself has no sharp edges in the interface zone.

#### 4.1.6 Access to operator's workplace

Cab openings shall conform with the dimensions in figure 3. The dimensions in figure 3 relate to

- the minimum size of aperture which shall be achieved both in the door framework and in the "door open" position;
- where the operator foot platform and related door sill are higher than 550 mm and 650 mm respectively above the ground so that additional access steps are required.

There shall be a clear unimpeded path (min. 250 mm width) to the operator's seat into which no controls

impinge, to enable foot placing step by step. This shall apply to all positions of the controls except those used as operator presence controls.

Inadvertent restraint by protrusions, controls, steps or handles catching or holding the operator or his clothes should be minimized.

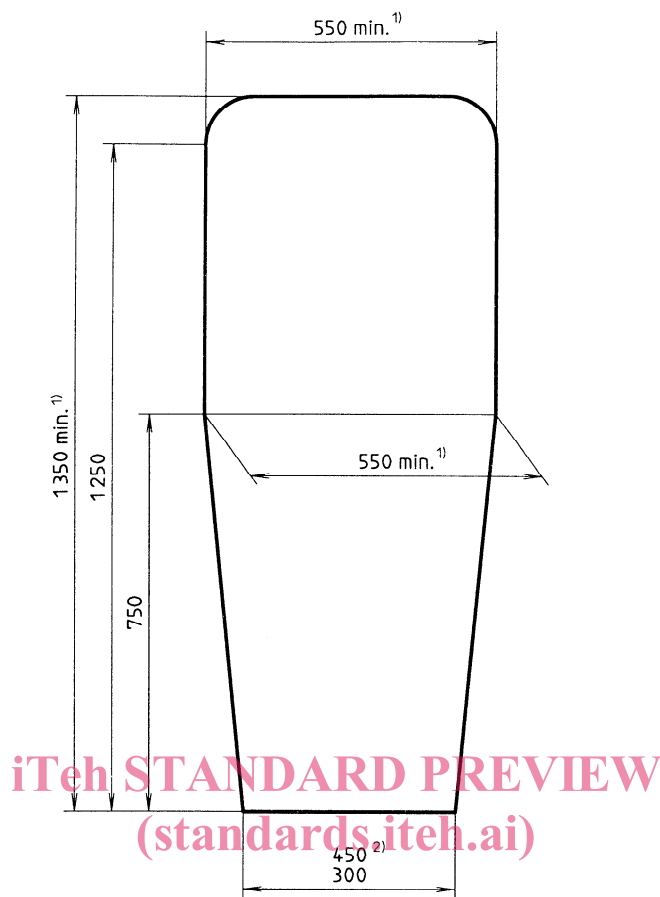
For safe manoeuvring of the machine, as a minimum, two adequately large rearview mirrors shall be provided, one on each side.

If there is a cab, it shall have a means of holding the door open. Closed cabs shall have fan-assisted ventilation with an adequate filter.

#### 4.1.7 Emergency exits from cabs

There shall be at least two exits, on different sides of the cab. (The front, rear and roof may also be considered as sides for this purpose.) The exit shall be designed to be easily opened, normally without tools, from inside the cab.

Dimensions in millimetres



- 1) For direct-entry cabs without access steps, the minimum overall access height of 1 350 mm may be reduced to 1 300 mm min., and 550 mm min. widths may be reduced to 450 mm min.
- 2) Recommended value: 450 mm.

**Figure 3 — Dimensions for main door and access facilities**

The cross-sectional dimensions of emergency exits shall be large enough to enclose an ellipse with principal axes of 640 mm and 440 mm.

#### 4.1.8 Steps to operator's platform/seat

**4.1.8.1** In addition to the requirements of ISO 4254-1:1989, subclause 10.1, the following shall apply.

- Steps shall be designed to prevent the build-up of a layer of mud.
- In special cases (rice harvesting, track-running gear, slope compensation) the dimension from the ground to the tread surface of the lowest step may be 700 mm.

- A stair inclination is recommended so that the outer edge of the next step down is visible when dismounting from the machine.
- Upward or downward movement of the steps shall not create a shearing, pinching or shock situation for the operator or bystander.

**4.1.8.2** Handrails or handholds on both sides of the access steps shall be provided. These shall be so designed that the operator can maintain three-point contact at all times. The handrail/handhold cross-section shall be between 25 mm and 35 mm. The lower end of the handrail/handhold shall be located not higher than 1 600 mm from the ground and a minimum clearance of 50 mm shall be provided for hand clearance behind the handrail/handhold. A handrail/handhold grab shall be provided at a height of 1 000 mm above the upper step of any stairway or ladder. The handhold shall be at least 150 mm long.

## 4.2 Other steps, ladders and platforms

**4.2.1** Steps, ladders and access ways for service and maintenance areas shall conform with the requirements in 4.1.8. In special cases (height restrictions), handrails or handholds may be less than 1 000 mm high but not less than 650 mm.

Service platforms shall have guard-rails 1 000 mm high to prevent personnel falling from the machine. In special cases (height restrictions), guard-rails/handholds may be less than 1 000 mm high but not less than 650 mm.

**4.2.2** Appropriate handholds shall be provided. Step-type tread surfaces are not regarded as appropriate handholds.

## 4.3 Header, feed auger and reel

In the operator's manual and at relevant positions on the machine, attention shall be drawn to functional related shearing locations at gathering and/or cutting devices (e.g. header, reel, cutter-bar, pick-up device, auger stripper).

A clearance of 25 mm shall exist between the uppermost part of the reel and adjacent stationary parts.

The header drive disengagement system shall be designed to prevent accidental re-engagement.

A feeder reverser is recommended.

## 4.4 Grain tank and augers

### 4.4.1 Grain tank

A suitable warning note and safety sign shall be included in the operator's manual and on the machine respectively, indicating that entering the grain tank when the machine is running is strictly forbidden.

The grain tank shall be designed to minimize the bridging of grain.

Steps and handholds outside the grain tank shall be provided for safe inspection.

Means to take a sample safely shall be provided.

### 4.4.2 Distributor and levelling augers, unloading augers

Augers shall be guarded to prevent unintentional

contact. The cover of the grain tank is not considered to be a safety device unless the operation of the augers is prevented by an interlock device when the cover is open.

Guarding requirements may also be fulfilled if the augers are fitted with screening which

- prevents unintentional contact from the operating position or from other standing locations on the machine (see ISO 4254-1 for safety distances);
- is securely mounted and, if it can be pushed or swung open, takes up its protective position during operation;
- may have maximum openings of 80 mm × 80 mm, provided the apertures are spaced at least 100 mm from the auger circumference within the direct reach zone and at least 50 mm in the remaining reach zone (see figure 4).

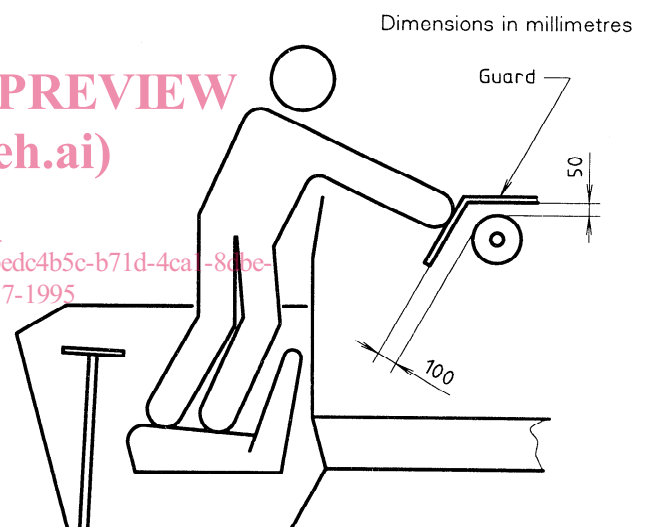


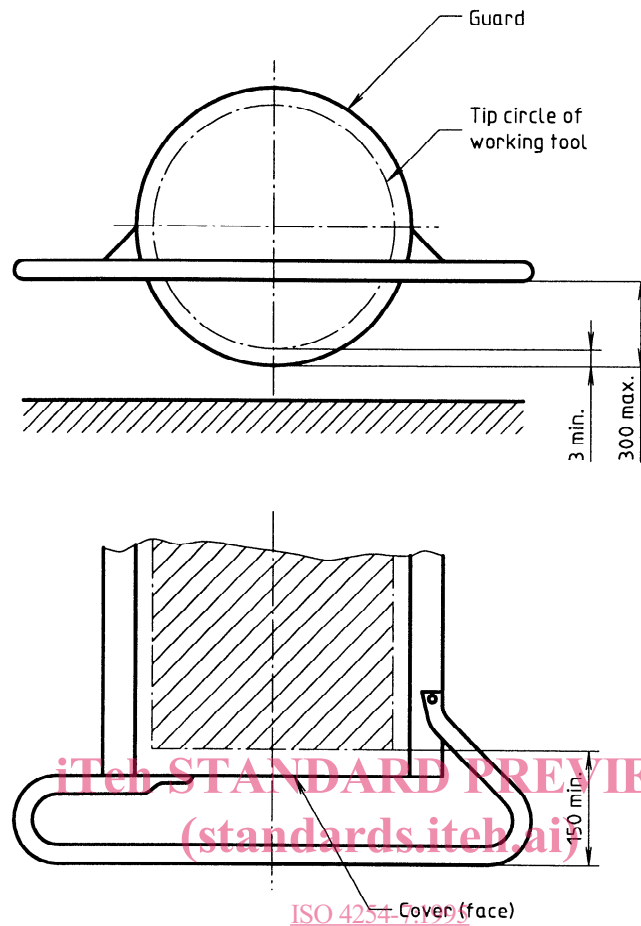
Figure 4 — Guarding of augers

## 4.5 Maize picker head

**4.5.1** Attention shall be drawn in the operator's manual, supported by a suitable safety sign on the machine, to crushing and shearing points arising on gathering devices or picking rollers within the picking area (working tools) due to the operating conditions. The requirements of 4.3 apply to the transverse auger conveyor.



Dimensions in millimetres



ISO 4254-7:1995

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NOTE — Figure 5 applies to choppers rotating about a horizontal axis.

**Figure 5 — Safety distance of underbody chopper**

**4.5.2** The safety distance between the underbody rotating working tool(s) (e.g. chopper) and the outer edge of the maize picker head or of the guard-rail shall be 150 mm minimum for a maximum height of 300 mm. The cover shall be closed and extended by at least 3 mm to cover the tip circle of the working tools (see figure 5).

#### 4.6 Vertical sickle bars

When vertical sickle bars are fitted, hydraulic or electrical motor-driver power transmissions to these extra attached sickle bars for rape or canola harvesting shall be disengaged when disengaging the operating header.

#### 4.7 Mounted straw chopper

The power transmission to the straw chopper shall be so arranged that the chopper is disengaged when disengaging the threshing mechanism.

An all-round safety distance of at least 850 mm to the tip circle of the blades shall be observed. If the lower edge of the guard is located lower than 1 100 mm above the ground level, the safety distance of 850 mm may be reduced to 550 mm.

A warning decal "Do not stay behind chopper" or an equivalent safety sign shall be fixed to the machine. The operator's manual shall draw attention to this hazard.



## 4.8 Service and maintenance

### 4.8.1 Separating and cleaning mechanism

Particular care shall be taken to provide adequate clearances, protection and/or shielding where unexpected movement of these mechanisms during servicing and maintenance gives rise to potential crushing or shearing actions. If a special tool is required to accomplish manual turning of the threshing mechanism, it shall be provided with the machine and its use covered in the operator's manual.

### 4.8.2 Drainage points

Engine and hydraulic oil drainage points shall be arranged at a low level above the ground.

It is recommended that similar attention is given to the changing of other operating liquids.

### 4.8.3 Header hold-up

A mechanical device shall be provided to hold the header in its raised position and its use shall be

covered in the operator's manual. The hydraulic control shall not allow the header to drop when the engine is stopped.

NOTE 1 A mechanical device includes an automatic stopping device acting directly on a hydraulic cylinder.

## 4.9 Battery location

Batteries shall be located so they may be easily maintained and serviced, preferably from the ground. The electrical, non-earth terminals of batteries shall be protected to prevent unintentional contact and shorting to earth.

## 4.10 Fire extinguishers

Fire extinguishers shall be made available. Their use shall be covered in the operator's manual and protection of the operator shall be the first consideration.

Recommended mounting locations for fire extinguishers shall be shown in the operator's manual.

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