

FINAL
DRAFT

AMENDMENT

ISO
4254-1.2:2013
FDAM 1

ISO/TC 23/SC 3

Secretariat: DIN

Voting begins on:
2021-04-12

Voting terminates on:
2021-06-07

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

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

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Reference number
ISO 4254-1.2:2013/FDAM 1:2021(E)

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Published in Switzerland

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This document was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 3, *Safety and comfort*, in collaboration with CEN/TC 144, *Tractors and machinery for agriculture and forestry*, in accordance with the agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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Agricultural machinery — Safety —

Part 1: General requirements

AMENDMENT 1

Scope

Add a bullet and NOTE to the third paragraph:

— machine-specific performance levels (PL or AgPL).

NOTE Machine-specific standards can give the required PL or AgPL.

Normative references

Update the reference to ISO 3600 by replacing "1996" with "2015".

Update the reference to ISO 13849-1 by replacing "2006" with "2015".

Update the reference to ISO 13850 by replacing "2006" with "2015".

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Add the following reference:

ISO 9533:2010, *Earth-moving machinery — Machine-mounted audible travel alarms and forward horns — Test methods and performance criteria*

3.3

Modify 3.3 to read:

3.3 three-point contact

system which permits a person to simultaneously use two hands and a foot or two feet and one hand to keep contact with the machine

4.7.1.2

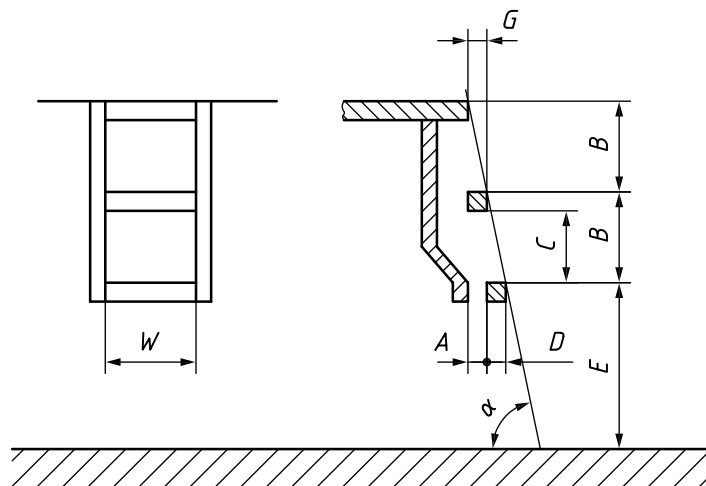
Modify 4.7.1.2.1 to read:

4.7.1.2.1 The height of the first step shall not exceed 550 mm when measured with the specified tyres and with the maximum diameter at specified inflation pressure [see 8.2.3 w)]. The vertical distance between successive steps shall be equal within a tolerance of ± 20 mm. Each step shall have a slip-resistant surface, a lateral stop at each end and be so designed (for example mudguards, perforated steps) that an accumulation of mud and/or snow is minimized under normal work conditions.

A flexible connection(s) between the first and second steps is permitted.

Figure 3

Replace Figure 3 with the following:



Key

- A toe clearance
- B vertical distance between tread surface of successive steps
- C minimum clearance between successive steps
- D tread depth
- E height of the first step
- G horizontal distance between leading edge of successive steps
- W width of step or rung
- α angle of inclination

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Figure 3 — Dimensions of boarding means for operator stations

Table 1

Replace Table 1 with the following:

Table 1 — Dimensions for boarding means for operator stations

Dimensions in millimetres

	Ladders	Steps
α	70° to 90°	20° to 70°
A + D min	150	150
B max	300	300
C min	120	120
D min	50	150
E max	550	550
2B + G max	—	800
W min	300	300

4.8

Replace 4.8.2.1 with the following:

4.8.2.1 A place provided for standing shall have sufficient space for both of the operator's feet with a minimum of 300 mm width, be flat and have a slip-resistant surface. Depending on the machine configuration, it may consist of two separate surfaces and may use machine components. In case of separate surfaces, each surface shall be a minimum of 150 mm width and on the same height level with a tolerance of ± 50 mm. It shall be positioned so the operator can maintain stability while carrying out the service required.

Add a new subclause:

4.8.4 Walkways

Walkways shall be a minimum of 300 mm width. It is allowable for the width to reduce to 250 mm for short distances (e.g. for one step length) to accommodate handrail support members or machine components. The operator shall be able to safely pass along the full length of the walkway.

4.19

Modify the last para by deleting the year of publication so that ISO 13850 becomes an undated reference.

Modify the NOTE to read:

NOTE Requirements for wireless remote control devices that require emergency stop devices of ISO 13850:2015 can be given in relevant machine-specific standards.

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4.20

Replace 4.20 with the following:

Safety-related parts of control systems shall be in accordance with ISO 25119-1 to ISO 25119-4 or ISO 13849-1 and ISO 13849-2.

NOTE Annex E provides guidance for risk assessment and determination of performance levels.

5.1.8.1

Modify 5.1.8.1 to read:

5.1.8.1 To avoid unauthorized activation of the engine starting, means such as the following shall be provided:

- key-operated ignition or starting switch;
- lockable cab;
- lockable cover for the ignition or starting switch;
- security ignition or starting lock;
- lockable battery disconnecting switch.

Information to avoid unauthorized starting shall be provided in the operator's manual [see 8.2.3 f)].

6.4

Add the following NOTE at the end of 6.4.1:

NOTE It is intended to move the specifications of 6.4.1 into another standard in the future (for example ISO 5673-1).

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8.2

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Modify 8.2.3 b) to read

- b) compatibility with the tractor's, for example hitching system, PTO drive shaft, vertical load at hitching point, engine power, stability (see 6.3.1, 6.3.2, 6.4.1), including instructions when replacement of the drive shaft and/or PIC guard are needed these should be clear, concise, and maintain the safety level of the elements that are replaced. When applicable, the information shall include:
- type of connections on the PTO side;
 - type of connections on the PIC side;
 - maximum allowed diameter of the guards for compatibility with the PIC guard;
 - type of allowed locking system(s);
 - type and setting of overload protection device;
 - power and speed to be transmitted;
 - PTO drive shaft length and procedure to adapt the length.

Add the following to 8.2.3:

- z) information on the use of the PTO-drive-shaft for PTO-driven equipment, such as:
- information about the interaction between PTO-drive-shaft guarding and PIC guard;
 - information, if necessary, on how to attach the restraining system;

- the need to and how to use a support for the PTO drive shaft when it is not in use, that is different from the restraining system and which does not cause such damage to the guard that the telescoping of the inner and outer tubes is prevented.

Annex E

Add a new Annex E:

ANNEX E (informative)

Guidance for risk assessment and determination of performance levels for safety-related parts of control systems

E.1 Risk assessment was used to determine the requirements of ISO 4254-1 and the requirements of associated machine specific type-C standards. This annex provides some basic guidance for the use of risk assessment when determining requirements either of related machine specific standards or for hazards not covered by those documents, including the required performance level for safety-related parts of control systems. Additional requirements to deal with hazards not covered by ISO 4254-1 and associated machine specific type-C standards are outside the scope of those standards.

Risk assessment and the allocation of required performance levels are not simple issue and should be carried out by suitably qualified and experienced persons (see E.3). The requirements of ISO 12100 for risk assessment and ISO 13849 (all parts) or ISO 25119 (all parts) for performance levels should be taken into account as they provide a more detailed approach.

The specification and verification of the performance level should cover the whole of the safety-related control system from input sensors to final switching devices (e.g. to stop hazardous motion).

E.2 To achieve optimum results, the machine design accompanying risk assessment and the determination of the required performance level are considered in parallel. This is due to the interdependence of the machine's safety concept (for example inherently safe design, protective measures, etc.) with the determination of the required performance level. Specification of the required performance level without consideration of the machine's limits and architecture is not an appropriate approach.

NOTE The consideration of the machine/system limits, its architecture, functions, etc. is of relevance in both cases – the manufacturer's product development and the standardization process.

All relevant and appropriate aspects should be considered by machine designers when addressing hazardous situations.

EXAMPLE Analysis of hazards related to the opening and closing of the rear door of a trailer with a tipping body can include various aspects such as:

- design related aspects, for example:
 - height of the door above the ground when open and closed;
 - speed of opening and closing;
 - closing force;
 - angle of opening and final position of the door when open;
 - control system (on machine and for interchangeable equipment on the tractor).
- operation related aspects, for example:
 - view to the danger zone by the operator;
 - actuation of controls (for example hold-to-run);

- manual or automatic locking/unlocking of the door;
- capability for complete self-emptying.

E.3 It is recommended that the risk assessment and required performance level determination process is executed by a team with members having different expertise (for example design, manufacturing, application/operation, service, hydraulics, electronics, etc.) and the team for validation of the results has different members.

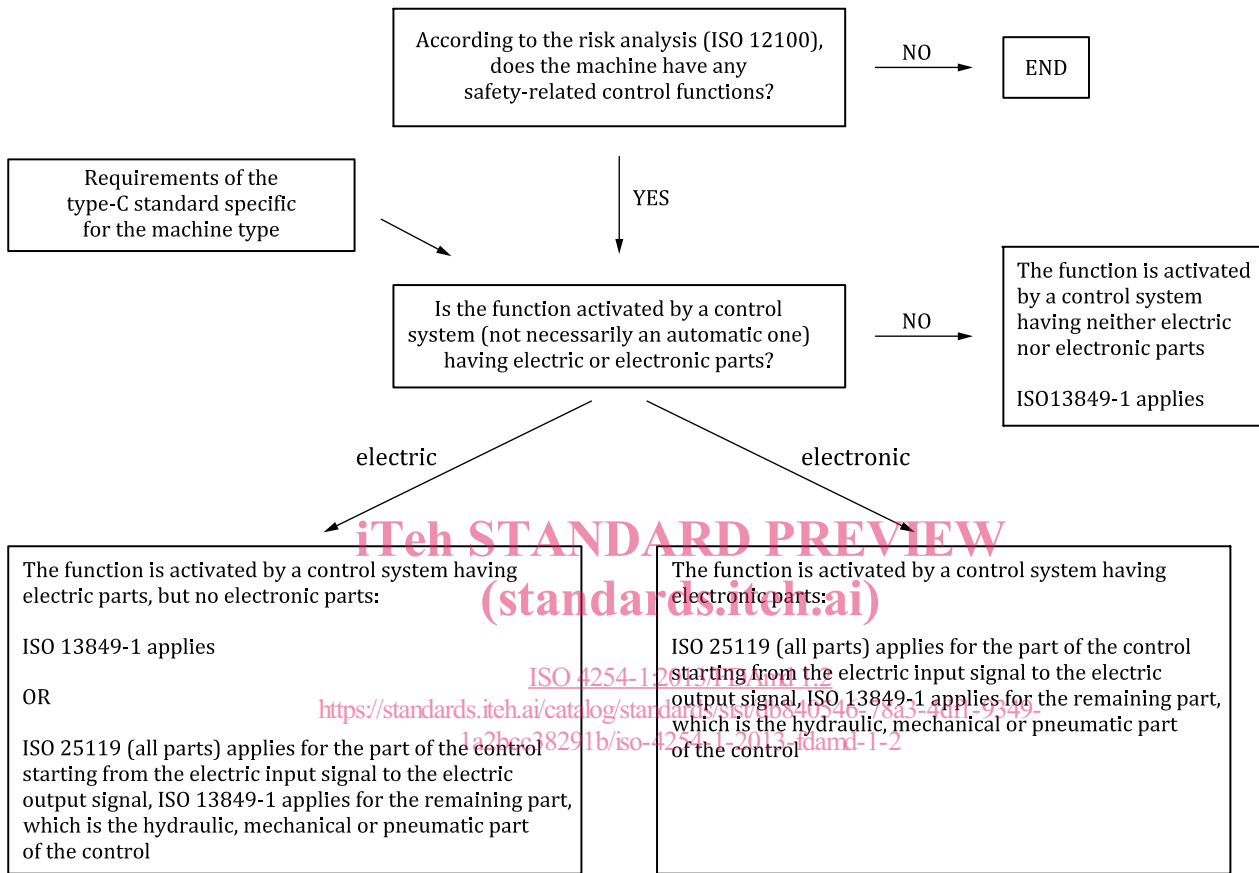


Figure E.1 — Risk reduction process and determination of required performance levels

Bibliography

Add the following references:

[8] ISO 5673-1, *Agricultural tractors and machinery — Power take-off drive shafts and power-input connection — Part 1: General manufacturing and safety requirements*

[9] ISO 14122-2, *Safety of machinery — Permanent means of access to machinery — Part 2: Working platforms and walkways*