TECHNICAL SPECIFICATION

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Agricultural machinery — Guards for moving parts of power transmission — Guard opening with tool

Matériel agricole — Protecteurs pour éléments mobiles de transmission de puissance — Protecteur à ouverture avec outil

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Foreword

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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.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

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An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised or withdrawn. If the ISO/PAS or ISO/TS is confirmed or revised, it is reviewed again after a further three years, at which time it should preferably either be transformed into an International Standard or withdrawn.

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/TS 28923 was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 3, *Safety and comfort*.

This second edition of ISO/TS 28923 cancels and replaces the first edition (ISO/TS 28923:2007), which has been technically revised.

Introduction

This Technical Specification 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.

Agricultural machinery — Guards for moving parts of power transmission — Guard opening with tool

1 Scope

This Technical Specification specifies the safety requirements and their verification for the design and construction of fixed guards to be opened by the use of a tool and interlocking movable guards for moving parts of the power transmission on self-propelled ride-on machines and mounted, semi-mounted or trailed machines used in agriculture. In addition, it specifies the type of information on safe working practices (including residual risks) to be provided by the manufacturer.

It deals with the significant hazards (as listed in Annex A), hazardous situations and events relevant for fixed guards to be opened by the use of a tool and interlocking movable guards of moving parts of power transmission used as intended and under the conditions foreseen by the manufacturer (see Clauses 4 and 5).

It is not applicable to guards of moving parts of the power transmission of

— agricultural and forestry tractors,

— aircraft and air cushion vehicles used in agriculture,

— lawn and garden equipment, or

— guards for PTO drive shafts between agricultural and forestry tractors and mounted or towed implements.

2 Normative references

The following 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 4254-1:—[1)], *Agricultural machinery — Safety — Part 1: General requirements*

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 danger zones being reached by the upper and lower limbs*

3 Terms and definitions

For the purpose of this document, the terms and definitions specified in ISO 12100:2010 and ISO 4254-1:— apply.

4 General

The exact choice of a guard for a particular machine shall be made on the basis of the risk assessment for that machine.

Selection of appropriate measures shall take into consideration the strategies for risk reduction specified in ISO 12100:2010, Clause 5, and shall consider both normal operation and service operations as specified in the operator's manual.

1) To be published. (Revision of ISO 4254-1:2008)

In selecting an appropriate guard for a particular type of machinery or hazard zone, it shall be borne in mind that a fixed guard as specified in 5.2.1 is simple and shall be used where access of an operator to the hazard zone is not or infrequently required during normal operation (operation without malfunction) of the machinery.

In case of frequent access, this inevitably leads to the fixed guard not being replaced. This requires the use of an alternative protective measure (movable interlocking guard, sensitive protective equipment).

When evaluating the frequency of access, it should also be considered that difficult operating conditions could increase the need for access.

5 Requirements

5.1 General

The design of guards shall take into consideration the risks to the operator and other persons as well as the proper function of the machine and the generation of other hazards such as drainage, debris accumulation, blockages or malfunctions.

Guards shall be designed in such a way that normal operation and service of the machine can be readily carried out.

Guards can be formed of a rigid mesh or grille. The size of the opening permitted depends on the distance between the guard and the hazard/hazardous area (see ISO 13857:2008, Table 1, 3, 4 or 6).

The strength of the guards shall comply with ISO 4254-1:—.

5.2 Additional requirements for fixed guards

5.2.1 Fixed guards shall be securely held in place:

— by permanent fasteners (e.g. by welding, riveting, one-way screws); or

— by means of fasteners such as screws and nuts which require common tools for opening or removal. The fixing system shall remain attached to the guard or to the machine when the guards are removed. Where possible, the guards shall be incapable of remaining in place without their fixings; or

— by means of hinges and a locking system, which can only be opened by using a tool (in order to make opening an intentional action), and which can be automatically closed without the use of a tool.

5.2.2 In the case of fixed guards which can be opened or removed in order to provide access to hazardous power transmission parts which continue to rotate or move after the power supply is disengaged, the following requirements apply:

— a safety sign in the immediate vicinity of the hazardous parts; and

— a visible (while in the hazard area) or audible indication, starting from the moment that the power supply is disengaged until the hazardous parts stop rotating or moving. It is not required that the indicator be triggered as long as the machine is in ground motion/travelling.

5.3 Additional requirements for interlocking movable guards

Interlocking movable guards shall

— as far as possible, remain attached to the machine when open, and

— be designed and constructed in such a way that they can be adjusted only by means of an intentional action.

Interlocking movable guards shall have an interlocking device which

— prevents the start of the hazardous transmission parts when the guard is open, and

— gives a command to disengage the power transmission when the guard is opened.

If the run-down time of the power transmission parts exceeds the time needed for an average operator to reach them, a locking device shall be provided which

— locks the guard when closed, and

— keeps the guard locked until the hazardous movement has stopped.

6 Verification of safety requirements or protective measures

See Table 1.

Table 1 — List of safety requirements and/or protective measures and their verification

Clause	Verification		
	Inspection	Measurement	Test with reference
5	X	—	Shall be verified by carrying out normal operation and service of the machine as specified in the operator's manual.

7 Information for use

7.1 Operator's manual

The manual shall include warnings about the significant residual risks and how these are to be controlled, as well as any training requirements (see 5.2).

7.2 Safety signs

A safety sign shall be provided on access doors or guards to indicate the rotation of parts, if applicable (see 5.2.2).