BS ISO 4254-13:2023

BSI Standards Publication

Agricultural machinery — Safety

Part 13: Large rotary mowers

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National foreword

This British Standard is the UK implementation of ISO 4254-13:2023.

The UK participation in its preparation was entrusted to Technical Committee AGE/32, Agricultural implements and trailers.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Part 13: Large rotary mowers

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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 document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document 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 4254-13:2012), which has been technically revised.

The main changes are as follows:

— additional information has been added to the Scope regarding applicability;

— the Normative references have been updated;

— in Clause 3:

  — some terms and definitions have been modified, added or removed;

  — former Figure 1 has been removed and subsequent figures have been renumbered;

— blade test and performance requirements have been moved to ISO 5718-2;

— in Clause 4, subclauses 4.8, 4.9, 4.10 and 4.11 have been revised to reflect the strength and performance requirements in the standards concerned;

— in Clause 5:

  — title has been revised;

  — Figure 2 (former Figure 3) has been modified;

  — Figure 3 (former Figure 4) has been modified;

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- 5.2.2.3 has been added to indicate a test condition;
- 5.3.1.4 has been modified to indicate new requirements for test equipment;
- 5.4.1.4 has been added to indicate new requirements for test equipment;
- 5.4.5 test acceptance criteria has been modified;
- 5.5.4 test acceptance criteria has been modified;
- subclause 5.7 and succeeding subclauses have been removed;
- subclause 5.8 and succeeding subclauses, including Table 1 and Figure 12, have been removed;
- 5.6.2.6 has been modified to correct an error in the sand particle size requirements for test equipment;

— the Bibliography has been updated.

A list of all parts of ISO 4254 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

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

— type-A standards (basis safety standards) giving basic concepts, principle for design, and general aspects that can be applied to machinery;

— type-B standards (generic safety standards) dealing with one safety aspect or one type of safeguards that can be used across a wide range of machinery;

  — type-B1 standards on particular safety aspects (for example, safety distances, surface temperature, noise);

  — type-B2 standards on safeguards (for example, two-hands controls, interlocking devices, pressure sensitive devices, guards);

— type-C standards (machinery safety standards) dealing with detailed safety requirements for a particular machine or group of machines.

This Standard is a type C standard as stated in ISO 12100.

When provisions of this type C standard are different from those which are stated in type A or 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 document.

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

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Agricultural machinery — Safety —

Part 13: Large rotary mowers

1 Scope

This document, when used together with ISO 4254-1, specifies the safety requirements and their verification for the design and construction of towed, semi-mounted, or mounted large rotary mowers with single or multiple cutting elements which have a cutting element tip circle of 1 000 mm or greater for any single cutting-element assembly, mounted on a propelling tractor or machine, intended for agricultural mowing equipment and designed for shredding crop residue, grass and small brush by impact. It describes methods for the elimination or reduction of hazards arising from the intended use and reasonably foreseeable misuse 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.

NOTE 1 When used outside of agriculture, additional requirements not specified in this document can be applicable.

This document is not applicable to:

— rotary disc mowers, rotary drum mowers, and flail mowers designed for forage crop harvesting as covered by ISO 4254-12;

— arm-type large rotary mowers;

— pedestrian-controlled motor mowers;

— lawn mowers covered by the ISO 5395 series.

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

This document is also not applicable to environmental hazards, road safety, electromagnetic compatibility, vibration and hazards related to moving parts for power transmission. It is also not applicable to hazards related to maintenance or repairs to be carried out by professional service personnel.

This document, taken together with ISO 4254-1, deals with all the significant hazards, hazardous situations and events relevant to large rotary mowers used as intended and under the conditions foreseen by the manufacturer. (A list of significant hazards is provided in Annex A.)

NOTE 2 Example illustrations of two mowers (a rigid-deck large rotary mower and a trail-type multi-section, foldable-wing large rotary mower) dealt with in this document are shown in Annex C, C.1.

NOTE 3 Example illustrations of mowers not dealt with in this document are shown in Annex C, C.2.

NOTE 4 ISO 14982 specifies test methods and acceptance criteria for evaluating the electromagnetic compatibility of all kinds of mobile agricultural machinery.

This document is not applicable to large rotary mowers which are manufactured before the date of publication.

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2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 730, *Agricultural wheeled tractors — Rear-mounted three-point linkage — Categories 1N, 1, 2N, 2, 3N, 3, 4N and 4*

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

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

ISO 5718-2, *Harvesting equipment – Requirements for cutting elements – Part 2: Blades for large rotary mowers (under development)*

ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 13857:2019, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/.

3.1 Rotary mowers

3.1.1
large rotary mower
mower, which may include mulching, with single or multiple cutting-element assemblies which have a *cutting-element tip circle* (3.2.4) of 1 000 mm or greater powered by a propelling machine in which one or more functional components rotate(s) about a vertical axis to cut or shear crop residue, grass and small brush by impact

3.1.1.1
rigid-deck large rotary mower
large rotary mower (3.1.1) with single or multiple cutting-element assemblies on a common rigid deck

3.1.1.2
multi-section, foldable-wing large rotary mower
large rotary mower (3.1.1) with multiple cutting-element assemblies and with a single wing or multiple wings that are capable of following the terrain

Note 1 to entry: The wings are foldable for transport and to clear obstacles, but are intended to operate only with all sections in close proximity to the ground surface when mowing.

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3.2 Cutting elements

3.2.1
cutting element
mower tool designed to cut or shear crop residue, grass and small brush by impact

Note 1 to entry: This can include mulching.

Note 2 to entry: Blades are common cutting-elements used on large rotary mowers.

3.2.2
cutting-element holder
rotating part of the mower to which the *cutting element* (3.2.1) is fastened

3.2.3
cutting-element assembly
rotating group of parts including *cutting element(s)* (3.2.1), *cutting-element holder* (3.2.2), cutting-element fasteners

3.2.4
cutting-element tip circle
maximum cutting diameter of the *cutting-element assembly* (3.2.3)

3.2.5
cutting-element enclosure
housing for the cutting-element assembly including the top deck, side deck, rigid or flexible guards designed to minimize thrown objects or inadvertent blade contact

3.3 Thrown-object testing

3.3.1
projectile impact
rupture of the front layer but not the back layer of the *target material* (3.3.3) by a *test projectile* (3.3.4)

3.3.2
projectile hit
rupture of all layers of the *target material* (3.3.3) by a *test projectile* (3.3.4)

3.3.3
target material
material used for the thrown-object test

Note 1 to entry: See Annex D

3.3.4
test projectile
common steel nail or steel wire with the approximate dimensions shown in Figure 1

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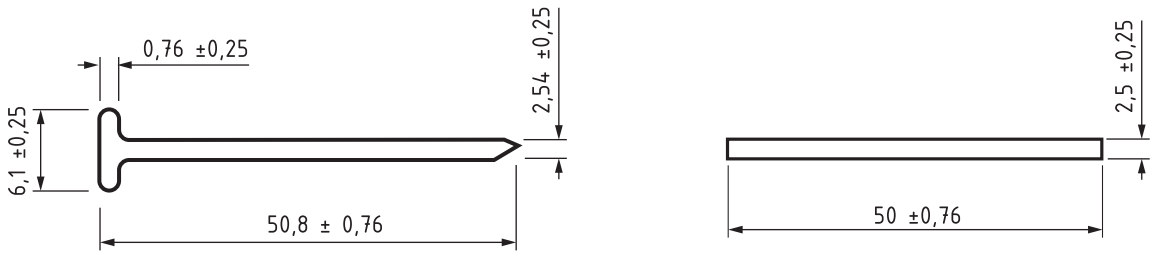
Note 1 to entry: The wire projectile should be capable of bending 180° with no cracks or breaks.

Dimensions in millimetres



a) Criteria for nail projectile **b) Criteria for wire projectile**

Figure 1 — Test projectile

3.3.5
target wall
arrangement of target material and supports

Note 1 to entry: See the cross-section in Figure 8 with configuration shown in Figures 6 and 7.

3.3.6
operator zone
space on the *target wall* (3.3.5) representing the area in which operator is seated on the propelling machine with hands on the steering controls and feet on controls or areas provided for foot placement while operating the mower

Note 1 to entry: For examples of target configurations, see Figures 6 and 7.

4 Safety requirements and/or protective/risk reduction measures

4.1 General

4.1.1 Machinery shall be in accordance with the safety requirements and/or protective/risk reduction measures of Clauses 4 and 5. Machinery shall meet the test requirements and acceptance criteria as specified in 5.3, 5.4 and 5.5. In addition, the machine shall be designed in accordance with the principles of ISO 12100 for relevant but not significant hazards which are not dealt with by this document.

4.1.2 Unless otherwise specified in this document, the machine shall be in accordance with the requirements of ISO 4254-1 and with ISO 13857:2019, Tables 1, 3, 4 and 6.

4.1.3 The maximum tip speed for cutting elements shall not exceed 96,5 m/s.

4.2 Protection against thrown objects

The mower shall be designed to minimize thrown objects so that tests defined in 5.6 are satisfied.

Protective devices, for example, protective skirts, chains or rubber strips may be used.

4.3 Protection against inadvertent contact with the cutting elements

4.3.1 The mower shall be designed or guarded in such a way that any inadvertent contact with the cutting elements at the sides and on the top is prevented when the mower is operated according to the manufacturer's instructions in the operator's manual.

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