

PÕLLU- JA METSATÖÖ TRAKTORID JA MASINAD.
KÄITUSVÕLLIDE KARDANID JA -KAITSED. OHUTUS

Tractors and machinery for agriculture and forestry -
Power take-off (PTO) drive shafts and their guards -
Safety

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 12965:2019 sisaldab Euroopa standardi EN 12965:2019 ingliskeelset teksti.	This Estonian standard EVS-EN 12965:2019 consists of the English text of the European standard EN 12965:2019.
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English Version

Tractors and machinery for agriculture and forestry - Power take-off (PTO) drive shafts and their guards - Safety

Tracteurs et matériels agricoles et forestiers - Arbres
de transmission à cardans de prise de force et leurs
protecteurs - Sécurité

Traktoren und Maschinen für die Land- und
Forstwirtschaft - Gelenkwellen und ihre
Schutzeinrichtungen - Sicherheit

This European Standard was approved by CEN on 16 September 2019.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 12965:2019) has been prepared by Technical Committee CEN/TC 144 “Tractors and machinery for agriculture and forestry”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2020, and conflicting national standards shall be withdrawn at the latest by December 2020.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12965:2003+A2:2009.

The main changes compared to the previous edition are as follows:

- precision of the general requirements;
- addition of PTO type 4;
- precision of the requirements for the restraining system;
- addition and precision of the requirements for service and maintenance;
- addition of requirements for the locking system;
- addition of an entanglement test;
- addition of new pictogram required to highlight compatibility of guarding systems of PTO drive shaft with tractor and machinery.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This document is a type C standard as defined in EN ISO 12100:2010.

The machinery concerned and the extent to which hazards, hazardous situations and events are covered are indicated in the scope of this document.

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.

Hazards that are common to agricultural machines (self-propelled, mounted, semi-mounted and trailed) are dealt with in EN ISO 4254-1:2015. EN 12965 provides requirements for power take-off (PTO) drive shafts in addition to those of EN ISO 4254-1.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

- machine manufacturers (small, medium and large enterprises);
- health and safety bodies (regulators, accident prevention organizations, market surveillance, etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

- machine users/employers (small, medium and large enterprises);
- machine users/employees (e.g. trade unions, organizations for people with special needs);
- service providers, e.g. for maintenance (small, medium and large enterprises);
- consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

1 Scope

This document specifies safety requirements and their verification for the design and construction of power take-off (PTO) drive shafts and their guards linking a tractor or self-propelled machinery to the first fixed bearing of recipient machinery. It describes methods for the elimination or reduction of risks that need specific requirements including such risks arising from misuse, reasonably foreseeable by the manufacturer. It is applicable only to those PTO drive shafts and guards mechanically linked to the shaft by at least two bearings. When used with compatible guards for power take-off (PTO) of the tractor (master shield) or self-propelled machine and the power input connection (PIC) of the power receiving machine, the requirements for power take-off drive shafts are complete.

NOTE 1 Fully enclosing PIC guard cones alone provide full protection.

NOTE 2 ISO 500-1 and ISO 500-2 give requirements for the guarding of tractor power take-offs (PTO) and ISO 4254-1 gives requirements for power input connections (PIC) of power receiving machinery that are compatible with the guarding required by this document.

In addition, it specifies the type of information on safe working practices to be provided by the manufacturer.

This document does not deal with:

- the guards totally covering, but not mechanically linked to, the PTO drive shaft;
- the mechanical characteristics of PTO drive shafts, overrun devices and torque limiters;
- general hazards which are dealt with in EN ISO 4254-1:2015 (see introduction).

Environmental aspects have not been considered in this document.

This document is not applicable to PTO drive shafts and their guards that are manufactured before the date of publication of this document by CEN.

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 this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 15811:2014, *Agricultural machinery — Fixed guards and interlocked guards with or without guard locking for moving transmission parts (ISO/TS 28923:2012 modified)*

EN ISO 4254-1:2015, *Agricultural machinery — Safety — Part 1: General requirements (ISO 4254-1:2013)*

EN ISO 5674:2009, *Tractors and machinery for agriculture and forestry — Guards for power take-off (PTO) drive-shafts — Strength and wear tests and acceptance criteria (ISO 5674:2004, corrected version 2005-07-01)*

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

EN ISO 13857:2008, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2008)*

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

ISO 1140:2012, *Fibre ropes — Polyamide — 3-, 4-, 8- and 12-strand ropes*

ISO 500-3:2014, *Agricultural tractors — Rear-mounted power take-off types 1, 2, 3 and 4 — Part 3: Main PTO dimensions and spline dimensions, location of PTO*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1
power take-off (PTO) drive shaft
assembly consisting of two joints, telescopic members and a guard which is mechanically linked to the shaft by at least two bearings used to transmit rotational power from the PTO of a tractor or self-propelled machine to the PIC of an implement

Note 1 to entry: See Figure 1 - only shown as an example.

3.2
restraining system
part of the PTO drive shaft guard which prevents rotation of the guard when the PTO drive shaft rotates

Note 1 to entry: See Figure 1, key 28 - only shown as an example.

3.3
universal joint
mechanical device which can transmit torque and/or rotational motion

Note 1 to entry: See Figure 1, key 12 - only shown as an example.

3.4
wide-angle universal joint
mechanical device which can transmit torque and/or rotational motion at a constant velocity at fixed or varying angles, generally equal or higher than 50°

Note 1 to entry: See Figure 1, key 16 - only shown as an example.

3.5
overrun device
device that permits the transmission of motion only in one direction (from the tractor towards the recipient machinery)

Note 1 to entry: It is normally used with recipient machine having high value inertia.

3.6
torque limiter
device that cuts or limits the transmission of motion between tractor and recipient machinery, when the torque reaches a prefixed value