SLOVENSKI STANDARD
SIST EN 12965:2020+A1:2025

01-maj-2025

Traktorji ter kmetijski in gozdarski stroji - Priključne gredi in njihova zaščita - Varnost (vključno z dopolnilom A1)

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

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

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

Ta slovenski standard je istoveten z: **EN 12965:2019+A1:2025**

ICS:

65.060.01	Kmetijski stroji in oprema na splošno	Agricultural machines and equipment in general

SIST EN 12965:2020+A1:2025 **en,fr,de**

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 12965:2019+A1

March 2025

ICS 65.060.01

Supersedes EN 12965:2019

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 and includes Amendment 1 approved by CEN on 29 December 2024.

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

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European foreword

This document (EN 12965:2019+A1:2025) 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of an identical text or by endorsement, at the latest by September 2025, and conflicting national standards shall be withdrawn at the latest by September 2025.

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 A1 EN 12965:2019 A1

The main changes [in EN 12965:2019] compared to the previous edition [EN 12965:2003+A2:2009] 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.

The following technical modifications have been made [in EN 12965:2019 for EN 12965:2019+A1:2025]:

— Modification to subclause 4.1;

— Modification to subclause 4.2.1;

— Modification to subclause 4.2.2.

These modifications require that also on PIC side, the guard covers the transmission to the ends of the inner jaws in the case of simple universal joints and at least to the centre of the outer joint or joints in the case of wide-angle universal joints.

This document includes Amendment 1 approved by CEN on 29 December 2024.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 A1.

This document has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

For the relationship with EU Legislation, see informative Annex ZA, which is an integral part of this document.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

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, Türkiye 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)*

〚A1〛 EN ISO 1140:2021, *Fibre ropes — Polyamide — 3-, 4-, 8- and 12-strand ropes (ISO 1140:2021)* 〚/A1〛

〚A1〛 EN ISO 4254-1:2015[1] 〚/A1〛, *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)*

[1] As impacted by EN ISO 4254-1:2015/A1:2021.

[A1] EN ISO 13857:2019, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2019)* [A1]

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*

[A1] ISO 11684:2023, *Tractors, machinery for agriculture and forestry, powered lawn and garden equipment — Safety labels — General principles* [A1]

3 Terms and definitions

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

ISO and IEC maintain terminology 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
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.

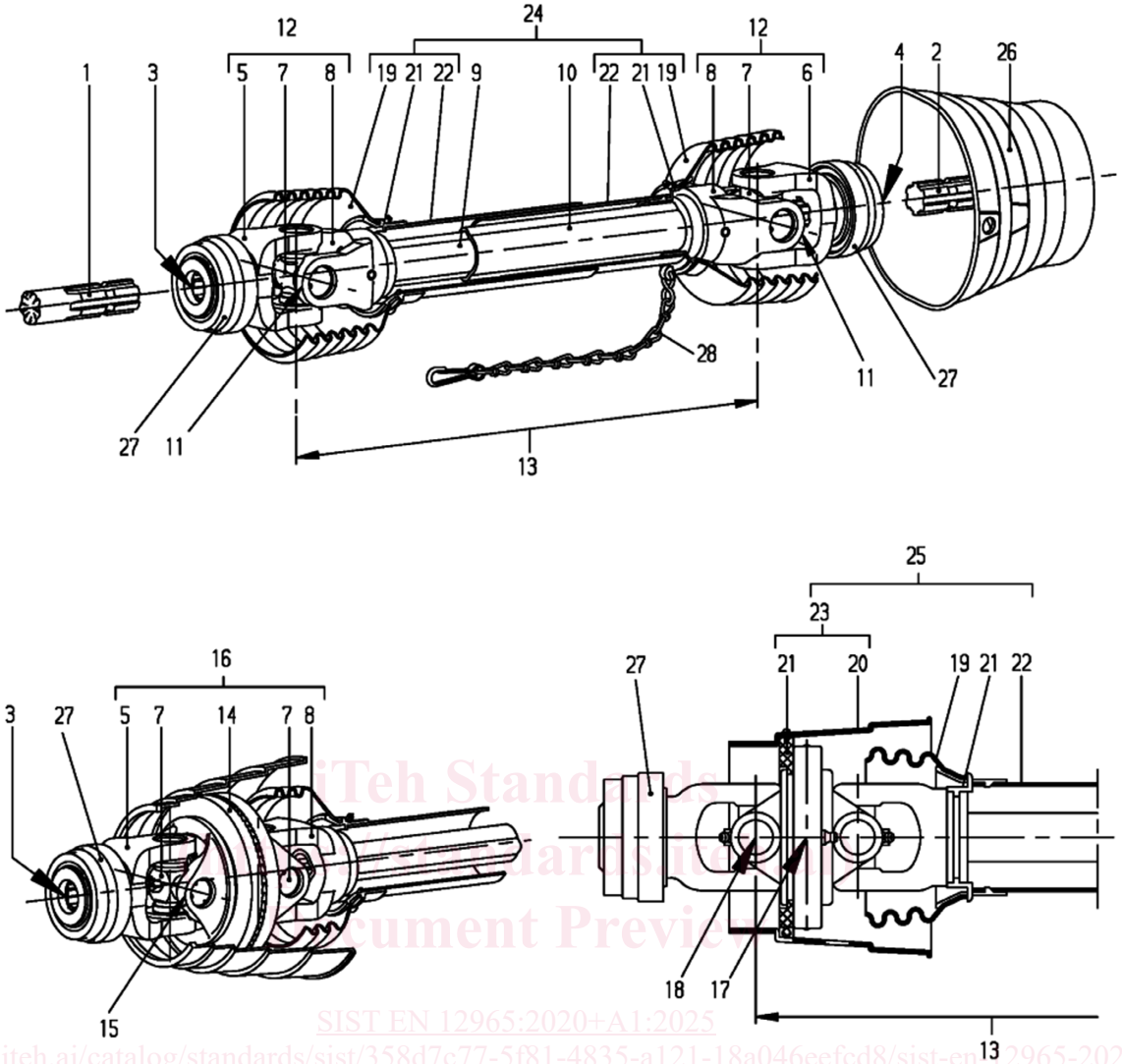
3.4
wide-angle universal joint
mechanical device which can transmit torque and/or rotational motion at a constant velocity at fixed or varying angles, generally equal or higher than 50°

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



Key

1	power take off shaft (PTO)	15	end of double yoke of outer joint
2	power-input connection (PIC)	16	wide-angle universal joint
3	PTO yoke bore	17	centre of articulation of wide-angle universal joint
4	PIC yoke bore	18	centre of outer joint
5	PTO yoke	19	guard cone
6	PIC yoke	20	wide angle guard cone
7	journal cross-assembly	21	guard bearing
8	inner yoke	22	guard tube
9	inner telescopic member	23	separate guard of wide angle universal joint
10	outer telescopic member	24	PTO drive shaft guard
11	end of inner yoke of universal joint	25	PTO drive shaft guard (in case of wide-angle PTO drive shaft)
12	universal joint	26	PIC guard
13	PTO drive shaft, closed and extended length	27	locking system
14	double yoke	28	restraining system (as an example)

Figure 1 — Example of PTO drive shaft and guard

3.7
locking system
device on the PTO yoke and PIC yoke which allows locking of the PTO drive shaft mechanically to the tractor's PTO and to the PIC of the recipient machinery

Note 1 to entry: See Figure 1, key 27 - only shown as an example.

3.8
guard cone
guard of the inner yokes of the PTO drive shaft, integrally fixed to the guard tubes of the inner and outer telescopic members of the PTO drive shaft

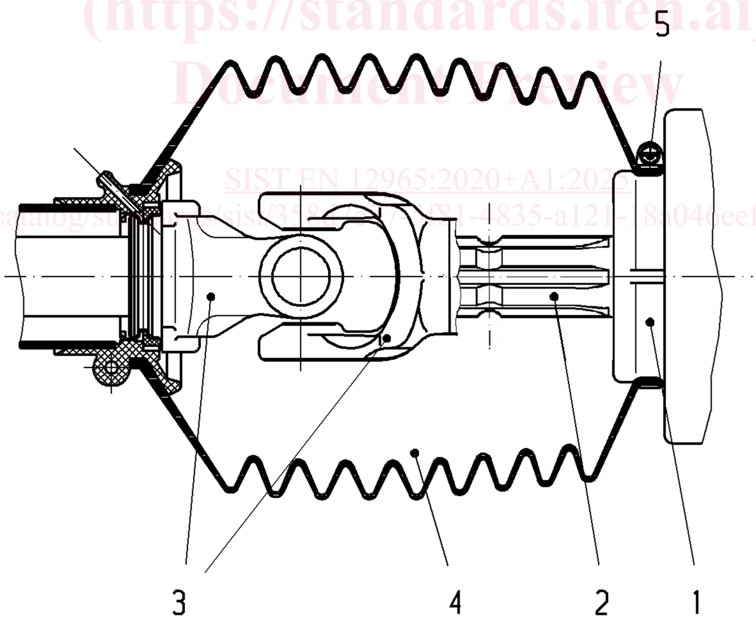
Note 1 to entry: See Figure 1, key 19 - only shown as an example.

3.9
wide-angle guard cone
guard of the wide-angle universal joint of the PTO drive shaft

Note 1 to entry: See Figure 1, key 20 – only shown as an example.

3.10
fully enclosed guard cone
guard on PIC side of the PTO drive shaft covering the universal or wide-angle universal joint, including its locking system and the PIC of the recipient machinery, and which also includes other devices, if any (e.g. torque limiter, overrun device)

Note 1 to entry: See Figure 2, key 4 – only shown as an example.



Key

1 implement
2 PIC
3 universal joint
4 fully enclosed guard cone
5 clamping device on implement

Figure 2 — Example of fully enclosed guard cone