

SLOVENSKI STANDARD
oSIST prEN ISO 14982-2:2021
01-julij-2021

Kmetijski in gozdarski stroji - Elektromagnetna združljivost - 2. del: Dodatne zahteve glede EMC za funkcionalno varnost (ISO/DIS 14982-2:2021)

Agricultural and forestry machinery - Electromagnetic compatibility - Part 2: Additional EMC requirements for functional safety (ISO/DIS 14982-2:2021)

Land- und forstwirtschaftliche Maschinen - Elektromagnetische Verträglichkeit - Teil 2: EMV Anforderungen für funktionale Sicherheit (ISO/DIS 14982-2:2021)

Machines agricoles et forestières - Compatibilité électromagnétique - Partie 2: Exigences CEM supplémentaires relatives à la sécurité fonctionnelle (ISO/DIS 14982-2:2021)

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ICS:

33.100.01	Elektromagnetna združljivost na splošno	Electromagnetic compatibility in general
65.060.01	Kmetijski stroji in oprema na splošno	Agricultural machines and equipment in general

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Agricultural and forestry machinery — Electromagnetic compatibility —

Part 2: Additional EMC requirements for functional safety

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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 documents 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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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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.

ISO 14982-2 was prepared by Technical Committee ISO/TC 23, Tractors and machinery for agriculture and forestry, Subcommittee SC 2, Working group 10.

This first edition of ISO 14982-2:2021, together with ISO 14982-1:2021, cancels and replaces ISO 14982:1998, of which it constitutes a technical revision and contains the following changes:

- the provisions have been brought up to date with technological change;
- normative references have been updated to the latest editions.

A list of all parts in the ISO 14982 series can be found on the ISO website.

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Introduction

This document is a type-C standard as stated in ISO 12100:2010.

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

- machine manufacturers;
- health and safety bodies (regulators, accident prevention organisations, 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;
- machine users/employees (e.g. trade unions, organizations for people with special needs);
- service providers, e.g. for maintenance;
- 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.

The machinery concerned and the extent to which hazards, hazardous situations or hazardous 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.

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ISO/DIS 14982-1:2021 (E)

Agricultural and forestry machinery — Electromagnetic compatibility — Part 2: Additional EMC requirements for functional safety

1 Scope

This International Standard specifies test methods and acceptance criteria for evaluating the electromagnetic compatibility of tractors, and all kinds of mobile (including hand-held) agricultural machinery, forestry machinery, landscaping and gardening machinery [referred to hereafter as machine(s)] as supplied by the machine manufacturer. It is applicable to machines and electrical/electronic sub-assemblies (ESA's) which are manufactured after the date of publication of this International Standard.

It specifies additional EMC requirements under aspect of functional safety for machinery, ESA and separate ESAs.

This International Standard is only relevant for functions of machine control system failures which when risk assessed to ISO 25119 (or the equivalent when other electronic functional safety standards are used), are greater than or equal to AgPLr b (or the equivalent).

Machinery utilizing systems not complying ISO 25119 (or the equivalent), need not test to this part of ISO 14982. Electrical and electronic components or separate ESAs intended to be used in the applicable machinery control functions are also dealt with by this International Standard.

The following electromagnetic disturbance phenomena are evaluated:

- radiated electromagnetic field by off-board sources with various field strength and frequency;
- radiated electromagnetic field by portable transmitters (antenna inside/outside) with various field strength and frequency;
- electrical field (wire conducted electrical fields);
- electrostatic discharge.

This International Standard is not applicable to machines directly supplied with low voltage current from public electrical mains.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 10605: 2008, Road vehicles — Electrical disturbance from electrostatic discharge

ISO 11451-1: 2015, Road vehicles — Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy — Part 1: General principles and terminology

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ISO 11451-2: 2015, Road vehicles — Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy — Part 2: Off-vehicle radiation sources

ISO 11451-3: 2015, Road vehicles — Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy — Part 3: On-board transmitter simulation

ISO 11451-4: 2013, Road vehicles — Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy — Part 4: Bulk current injection (BCI)

ISO 11452-1: 2015, Road vehicles — Electrical disturbances by narrowband radiated electromagnetic energy — Component test methods — Part 1: General and definitions

ISO 11452-2: 2019, Road vehicles — Electrical disturbances by narrowband radiated electromagnetic energy — Component test methods — Part 2: Absorber-lined chamber

ISO 11452-3: 2016, Road vehicles — Component test methods for electrical disturbances from narrowband radiated electromagnetic energy — Part 3: Transverse Electromagnetic (TEM) Cell

ISO 11452-4: 2011, Road vehicles — Component test methods for electrical disturbances from narrowband radiated electromagnetic energy — Part 4: Harness excitation methods

ISO 11452-5: 2002, Road vehicles — Electrical disturbances by narrowband radiated electromagnetic energy — Component test methods — Part 5: Stripline

ISO 11452-9: 2012, Road vehicles — Component test methods for electrical disturbances from narrowband radiated electromagnetic energy — Part 9: Portable transmitters

ISO 13849-2:2012, Safety of machinery — Safety-related parts of control systems — Part 2: Validation

ISO 14982-1: 2021, Agricultural and forestry machinery — Electromagnetic compatibility — Part 1: General EMC requirements <https://standards.iteh.ai/catalog/standards/sist/4f74e39f-805a-411b-8e71-870141b947a9/osist-pr-en-iso-14982-2-2021>

ISO 25119-1: 2018, Tractors and machinery for agriculture and forestry — Safety-related parts of control systems — Part 1: General principles for design and development

ISO 25119-2: 2019, Tractors and machinery for agriculture and forestry — Safety-related parts of control systems — Part 2: Concept phase

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

3 Terms, definitions and abbreviated terms

For the purposes of this document, the terms, definitions and abbreviated terms given in, ISO 14982-1:2021 apply.

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

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

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4 General principles

The functional safety of machinery and systems is sufficiently described in other standards, however, the effects of EMC related to functional safety are not considered.

The EMC requirement defined in this document shall be evaluated in terms of their effect on the functional safety of the machine in order to represent to totality of all significant technically and known such phenomena.

The performance parameters linked to these EMC phenomena thereby represent the current generally known implemented technical performance measure (magnitude).

The user of this International Standard shall test to the levels in Clause 5 to all functions with a greater than or equal to AgPLr b as defined in ISO 25119-2 (or equivalent) to verify that the machine shall either maintain the function as intended by the manufacturer or to perform a changeover into the "safe state" as implied in ISO 25119-1 (or equivalent).

If analysis or simulation is used as an alternative to testing in accordance with Clause 5, data proving that the machine changes to one of the defined states mentioned above should be included in the test report or compliance statement of this ISO standard.

For ESA testing it is required to determine the machine level behavior of immunity failures for the device under test, e.g. a corrupted signal from a controller can cause a loss of braking or steering.

Note - Safety related functions require compliance to ISO 14982-1 and ISO 14982-2.

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5 EMC phenomena

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5.1 General

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With the increasing use of electronic devices in areas where agricultural and forestry machinery operates, there is a need to ensure that the machinery is provided with adequate immunity to electromagnetic disturbances.

The electrical and high frequency disturbances as described in this document refer to electromagnetic effects caused due to technical appliances (man-made effects). These effects generally can be considered as singular ones and additionally located and restricted to defined narrow areas.

While these effects on machinery cannot be considered as being general, their consequences on machinery still need to be considered. They might be generated within a large frequency range with different electrical characteristics or by conduction or radiation, and then imparted to other electrical/electronic devices and systems by conduction or radiation. Narrowband, and sometimes broadband, signals generated by sources of interference inside or outside the machinery can also be coupled in electrical/electronic systems and influence the normal function of electrical/electronic devices. These strong electromagnetic disturbances can cause systematic or "common cause" faults.

Electrostatic discharges are relevant to the machinery because control elements can be positioned outside the operator station where potential differences could emerge at contact points. Conducted transients in power supply wiring must be considered because the machinery can contain open systems, in which several devices or components can be combined to complement machine functionality.