SLOVENSKI STANDARD
SIST EN ISO 19014-1:2018

01-november-2018

Stroji za zemeljska dela - Funkcijska varnost - 1. del: Metodologija ugotavljanja delov krmilnega sistema, ki so povezani z varnostjo in zahtevanimi lastnostmi (ISO 19014-1:2018, popravljena različica 2019-02)

Earth-moving machinery - Functional safety - Part 1: Methodology to determine safety-related parts of the control system and performance requirements (ISO 19014-1:2018, Corrected version 2019-02)

Erdbaumaschinen - Funktionale Sicherheit - Teil 1: Methodik zur Bestimmung sicherheitsbezogener Teile der Steuerung und deren Leistungsanforderungen (ISO 19014-1:2018, korrigierte Fassung 2017-02))

Engins de terrassement - Sécurité fonctionnelle - Partie 1: Méthodologie pour la détermination des parties relatives à la sécurité des systèmes de commande et les exigences de performance (ISO 19014-1:2018, Version corrigée 2019-02)

Ta slovenski standard je istoveten z: **EN ISO 19014-1:2018**

ICS:

53.100	Stroji za zemeljska dela	Earth-moving machinery

SIST EN ISO 19014-1:2018 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 19014-1

August 2018

ICS 53.100

English Version

Earth-moving machinery - Functional safety - Part 1: Methodology to determine safety-related parts of the control system and performance requirements (ISO 19014-1:2018, Corrected version 2019-02)

Engins de terrassement - Sécurité fonctionnelle - Partie 1: Méthodologie pour la détermination des parties relatives à la sécurité des systèmes de commande et les exigences de performance (ISO 19014-1:2018, Version corrigée 2019-02)

Erdbaumaschinen - Funktionale Sicherheit - Teil 1: Methodik zur Bestimmung sicherheitsbezogener Teile der Steuerung und deren Leistungsanforderungen (ISO 19014-1:2018)

This European Standard was approved by CEN on 23 May 2018.

This European Standard was corrected and reissued by the CEN-CENELEC Management Centre on 06 February 2019.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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

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

Contents

Page

European foreword **3**

European foreword

This document (EN ISO 19014-1:2018) has been prepared by Technical Committee ISO/TC 127 "Earth-moving machinery" in collaboration with Technical Committee CEN/TC 151 “Construction equipment and building material machines - Safety” the secretariat of which is held by DIN.

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 February 2019, and conflicting national standards shall be withdrawn at the latest by February 2019.

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.

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

Endorsement notice

The text of ISO 19014-1:2018, Corrected version 2019-02 has been approved by CEN as EN ISO 19014-1:2018 without any modification.

INTERNATIONAL STANDARD

ISO 19014-1

First edition
2018-06

Corrected version
2019-02

Earth-moving machinery — Functional safety —

Part 1: Methodology to determine safety-related parts of the control system and performance requirements

Engins de terrassement — Sécurité fonctionnelle —
Partie 1: Méthodologie pour la détermination des parties relatives à la sécurité des systèmes de commande et les exigences de performance

Reference number
ISO 19014-1:2018(E)

COPYRIGHT PROTECTED DOCUMENT

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword ..... **iv**

Introduction ..... **v**

1 Scope **1**

2 Normative references **1**

3 Terms and definitions **1**

4 Method to determine MPLr for SRP/CS of earth moving machinery **5**
4.1 General 5
4.2 Machine Control System Safety Analysis (MCSSA) method 5

5 Requirements for immediate action warning indicators **6**
5.1 General 6

6 Performance level determination procedures **6**
6.1 General 6
6.2 Participants in the risk assessment 6
6.3 Assessment and classification of a potential harm 6
6.4 Assessment of exposure in the situation observed 7
6.5 Assessment of a possibility to avoid harm 7
6.6 Determining the required MPL 9

Annex A (informative) **Process flow chart for machinery risk assessment** **11**

Annex B (informative) **Table of warning/operation indicators** **13**

Annex C (informative) **Example of MCSSA Process** **14**

Annex D (informative) **List of possible safety control systems (SCS) of earth moving machines** **18**

Bibliography **20**

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).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 127, *Earth-moving machinery*, Subcommittee SC 2, *Safety, ergonomics and general requirements*.

This first edition of ISO 19014-1, together with ISO 19014-2, ISO 19014-3, ISO 19014-4 and ISO/TS 19014-5, cancels and replaces ISO 15998 and ISO/TS 15998-2, which have been technically revised.

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

— method for determination of performance levels and machine control system safety analysis,

— additional requirements for mobile machines,

— environmental test requirements for components of safety controls systems, and

— requirements for software validation and verification of machine performance levels.

This corrected version of ISO 19014-1:2018 incorporates the following corrections:

— in 4.2 c) 2), 4.2 d) 1), 6.1 and Annex C, the cross-references to the steps defined in 4.2 have been corrected.

A list of all parts in the ISO 19014-series can be found on the ISO website. At the time of publication of this document, Part 2, *Design and evaluation of safety-related machine control systems*, Part 4, *Design and evaluation of software and transmission for safety related parts of the control system*, and Part 5, *Tables of performance levels*, are under development.

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.

Introduction

This document addresses systems of all energy types used for functional safety in earth-moving machinery.

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

Type-A standards (basis standards) give basic concepts, principles for design and general aspects that can be applied to machinery.

Type-B standards (generic safety standards) deal with one or more safety aspects, or one or more types of safeguards that can be used across a wide range of machinery:

— type-B1 standards on particular safety aspects (e.g. safety distances, surface temperature, noise);

— type-B2 standards on safeguards (e.g. two-hands controls, interlocking devices, pressure sensitive devices, guards).

Type-C standards (machinery safety standards) deal with detailed safety requirements for a particular machine or group of machines.

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

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 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 (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);

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.