

TÖÖPINGID. OHUTUS. TREIPINGID

Machine tools - Safety - Turning machines (ISO 23125:2015, Corrected version 2016-03-15)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 23125:2015 sisaldab Euroopa standardi EN ISO 23125:2015 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 23125:2015 consists of the English text of the European standard EN ISO 23125:2015.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 14.01.2015.	Date of Availability of the European standard is 14.01.2015.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 25.080.01

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:
Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

EUROPEAN STANDARD

EN ISO 23125

NORME EUROPÉENNE

EUROPÄISCHE NORM

January 2015

ICS 25.080.01

Supersedes EN ISO 23125:2010

English Version

Machine tools - Safety - Turning machines (ISO 23125:2015, Corrected version 2016-03-15)

Machines-outils - Sécurité - Machines de tournage (ISO 23125:2015, Version corrigée 2016-03-15)

Werkzeugmaschinen - Sicherheit - Drehmaschinen (ISO 23125:2015, korrigierte Fassung 2016-03-15)

This European Standard was approved by CEN on 25 September 2014.

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, 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: Avenue Marnix 17, B-1000 Brussels

European foreword

This document (EN ISO 23125:2015) has been prepared by Technical Committee ISO/TC 39 “Machine tools” in collaboration with Technical Committee CEN/TC 143 “Machine tools - Safety” the secretariat of which is held by SNV.

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 July 2015, and conflicting national standards shall be withdrawn at the latest by July 2015.

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

This document supersedes EN ISO 23125:2010.

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 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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 23125:2015, Corrected version 2016-03-15 has been approved by CEN as EN ISO 23125:2015 without any modification.

Contents

	Page
Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	4
3.1 General terms.....	4
3.2 Terms related to parts of turning machines.....	5
3.3 Terms related to modes of operation — Mandatory and optional modes of operation for turning machines.....	7
3.4 Terms related to sizes and groups of turning machines defined.....	8
3.5 Terms related to maximum permissible spindle speeds and axes feeds.....	13
4 List of significant hazards	14
4.1 General.....	14
4.2 Main hazard zones.....	15
4.3 Significant hazards and hazardous situations covered by this International Standard.....	15
5 Safety requirements and/or protective measures	19
5.1 General requirements.....	19
5.1.1 Overview.....	19
5.1.2 Required characteristics for guards for all machine groups.....	19
5.2 Specific requirements resulting from mechanical hazards identified in Clause 4	20
5.2.1 Group 1 machines.....	20
5.2.2 Groups 2, 3 and 4 machines.....	21
5.2.3 Workpiece clamping conditions.....	24
5.2.4 Modes of machine operation.....	25
5.2.5 Optional or additional equipment for turning machines.....	29
5.3 Specific requirements resulting from electrical hazards.....	32
5.4 Specific requirements resulting from noise hazards.....	32
5.5 Specific requirements resulting from radiation hazards.....	32
5.6 Specific requirements resulting from material or substance hazards.....	33
5.7 Specific requirements resulting from neglect of ergonomic principles hazards.....	34
5.8 Specific requirements resulting from unexpected start-up, over-run or over- speed hazards.....	35
5.9 Specific requirements resulting from variation in rotational speed of tool hazards.....	37
5.10 Specific requirements resulting from failure of the power supply hazards.....	37
5.11 Specific requirements resulting from failure of the control circuit hazards.....	38
5.12 Specific requirements resulting from errors of fitting hazards.....	39
5.13 Specific requirements resulting from ejected fluids or objects hazards.....	39
5.13.1 General requirements.....	39
5.13.2 Guards for large vertical Group 3 machines (NC turning machines and turning centres).....	40
5.13.3 Guards for large horizontal Group 3 machines (NC turning machines and turning centres).....	41
5.14 Specific requirements resulting from loss of stability hazards.....	41
5.15 Specific requirements resulting from slips, trips and fall of persons hazards.....	41
5.16 Verification of the safety requirements and/or protective measures.....	41
6 Information for use	44
6.1 Marking.....	44
6.2 Instruction for use.....	44
6.2.1 General.....	44
6.2.2 Tooling.....	46
6.2.3 Workpiece clamping.....	46
6.2.4 Machine functions accessible from the NC panel.....	47

6.2.5	Restart.....	47
6.2.6	Noise.....	47
6.2.7	Ancillary handling devices	48
6.2.8	Residual risks to be addressed by the machinery user	48
6.2.9	Installation instructions for the turning machine.....	49
6.2.10	Cleaning instruction for the machine.....	49
Annex A (normative) Impact test method for guards on turning machines		50
Annex B (informative) Test equipment for impact test and examples of materials.....		55
Annex C (informative) Calculation of direct impact energy		58
Annex D (informative) Example of checklist for safety functions.....		60
Annex E (informative) Examples of exhaust and extinguishing systems.....		62
Annex F (informative) Example of the determination of performance level for interlocked guard		66
Bibliography		71

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. 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. 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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 39, *machine tools*, Subcommittee SC 10, *Safety*.

This second edition cancels and replaces the first edition (ISO 23125:2010), of which it constitutes a minor revision. It also incorporates the Amendment ISO 23125:2010/Amd. 1:2012.

The International Standards produced by ISO/TC 39/SC 10 in collaboration with CEN/TC 143 are particular to machine tools and complement the relevant A and B standards on the subject of general safety (see Introduction to ISO 12100 for a description of type-A, -B and -C standards).

This International Standard 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).

This corrected version of ISO 23125:2015 incorporates the following corrections: in 5.3 a) 2), normative references to IEC 60204-1 have been substituted for those to IEC 60529 in two instances, and the year of publication of IEC 60529 corrected from 2003 to 2013 in the remaining reference to that standard.

Introduction

This International Standard has been prepared to be a Harmonized Standard to provide one means of conforming to the Essential Safety Requirements of the Machinery Directive of the European Union and associated EFTA regulations.

This International Standard is a type-C standard as defined in ISO 12100:2010.

The machinery concerned and the extent to which hazards, hazardous situations and events are covered is indicated in the Scope of this International Standard. In addition, turning machines shall comply as appropriate with ISO 12100:2010 for hazards which are not covered by this International Standard.

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 International Standards for machines that have been designed and built in accordance with the provisions of this type-C standard.

This International Standard makes reference to the “safety categories” in EN 954-1:1996 as resistance to faults and their subsequent behaviour in the fault condition together with the “performance level” defined in ISO 13849-1:2006 in terms of probability of dangerous failure per hour. It is the decision of the user of this International Standard to apply “safety categories” or “performance levels”.

The requirements of this International Standard concern designers, manufacturers, suppliers and importers of machines described in the Scope.

This International Standard also includes a list of informative items to be provided by the manufacturer to the user.

The requirements for a new mode of operation, Mode 3 “manual intervention machining mode” will be discussed in the future.

Machine tools — Safety — Turning machines

1 Scope

This International Standard specifies the requirements and/or measures to eliminate the hazards or reduce the risks in the following groups of turning machines and turning centres, which are designed primarily to shape metal by cutting.

- **Group 1:** Manually controlled turning machines without numerical control.
- **Group 2:** Manually controlled turning machines with limited numerically controlled capability.
- **Group 3:** Numerically controlled turning machines and turning centres.
- **Group 4:** Single- or multi-spindle automatic turning machines.

NOTE 1 For detailed information on the machine groups, see the definitions in [3.4](#) and mandatory and optional modes of operation in [3.3](#).

NOTE 2 Requirements in this International Standard are, in general, applicable to all groups of turning machines. If requirements are applicable to some special group(s) of turning machines only, then the special group(s) of turning machine(s) is/are specified.

NOTE 3 Hazards arising from other metalworking processes (e.g. grinding and laser processing) are covered by other International Standards (see Bibliography).

This International Standard covers the significant hazards listed in [Clause 4](#) and applies to ancillary devices (e.g. for workpieces, tools and work clamping devices, handling devices and chip handling equipment), which are integral to the machine.

This International Standard also applies to machines which are integrated into an automatic production line or turning cell inasmuch as the hazards and risks arising are comparable to those of machines working separately.

This International Standard also includes a minimum list of safety-relevant information which the manufacturer has to provide to the user. See also ISO 12100:2010, Figure 2, which illustrates the interaction of manufacturer's and user's responsibility for the operational safety.

The user's responsibility to identify specific hazards (e.g. fire and explosion) and reduce the associated risks can be critical (e.g. whether the central extraction system is working correctly).

Where additional processes (milling, grinding, etc.) are involved, this International Standard can be taken as a basis for safety requirements; for specific information see the Bibliography.

This International Standard applies to machines that are manufactured after the date of issue of this International Standard.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable to its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 230-5:2000, *Test code for machine tools — Part 5: Determination of the noise emission*

ISO 447:1984, *Machine tools — Direction of operation of controls*

ISO 702 (all parts), *Machine tools — Connecting dimensions of spindle noses and work holding chucks*

ISO 841:2001, *Industrial automation systems and integration — Numerical control of machines — Coordinate system and motion nomenclature*

ISO 3744:2010, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for an essentially free field over a reflecting plane*

ISO 3746:2010, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Survey method using an enveloping measurement surface over a reflecting plane*

ISO 4413:2010, *Hydraulic fluid power — General rules and safety requirements for systems and their components*

ISO 4414:2010, *Pneumatic fluid power — General rules and safety requirements for systems and their components*

ISO 4871:1996, *Acoustics — Declaration and verification of noise emission values of machinery and equipment*

ISO 6385:2004, *Ergonomic principles in the design of work systems*

ISO 8525:2008, *Airborne noise emitted by machine tools — Operating conditions for metal-cutting machines*

ISO 9241 (all parts), *Ergonomics of human-system interaction*

ISO 9355-1, *Ergonomic requirements for the design of displays and control actuators — Part 1: Human interactions with displays and control actuators*

ISO 9355-2, *Ergonomic requirements for the design of displays and control actuators — Part 2: Displays*

ISO 9355-3, *Ergonomic requirements for the design of displays and control actuators — Part 3: Control actuators*

ISO 10218-2:2011, *Robots and robotic devices — Safety requirements for industrial robots — Part 2: Robot systems and integration*

ISO 11161:2007+Amd.1:2010, *Safety of machinery — Integrated manufacturing systems — Basic requirements*

ISO 11202:2010, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions applying approximate environmental corrections*

ISO 11204:2010, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions applying accurate environmental corrections*

ISO 11228 (all parts), *Ergonomics — Manual handling*

ISO/TR 11688-1:1995, *Acoustics — Recommended practice for the design of low-noise machinery and equipment — Part 1: Planning*

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

ISO 13849-1:2006, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*

ISO 13849-2:2003, *Safety of machinery — Safety-related parts of control systems — Part 2: Validation*

ISO 13850:2006, *Safety of machinery — Emergency stop — Principles for design*

ISO 13851:2002, *Safety of machinery — Two-hand control devices — Functional aspects and design principles*

- ISO 13854:1996, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*
- ISO 13855:2010, *Safety of machinery — Positioning of safeguards with respect to the approach speeds of parts of the human body*
- ISO 13856-2:2005, *Safety of machinery — Pressure-sensitive protective devices — Part 2: General principles for the design and testing of pressure-sensitive edges and pressure-sensitive bars*
- ISO 13856-3:2013, *Safety of machinery — Pressure-sensitive protective devices — Part 3: General principles for design and testing of pressure-sensitive bumpers, plates, wires and similar devices*
- ISO 13857:2008, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs*
- ISO 14118:2000, *Safety of machinery — Prevention of unexpected start-up*
- ISO 14119:2013, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*
- ISO 14120:2002, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*
- ISO 14122-1:2001, *Safety of machinery — Permanent means of access to machinery — Part 1: Choice of fixed means of access between two levels*
- ISO 14122-2:2001, *Safety of machinery — Permanent means of access to machinery — Part 2: Working platforms and walkways*
- ISO 14122-3:2001, *Safety of machinery — Permanent means of access to machinery — Part 3: Stairs, stepladders and guard-rails*
- ISO 14122-4:2004, *Safety of machinery — Permanent means of access to machinery — Part 4: Fixed ladders*
- ISO 14159:2002, *Safety of machinery — Hygiene requirements for the design of machinery*
- ISO 15534-1:2000, *Ergonomic design for the safety of machinery — Part 1: Principles for determining the dimensions required for openings for whole-body access into machinery*
- ISO 15534-2:2000, *Ergonomic design for the safety of machinery — Part 2: Principles for determining the dimensions required for access openings*
- ISO 16156:2004, *Machine-tools safety — Safety requirements for the design and construction of work holding chucks*
- IEC 60204-1:2009, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*
- IEC 60529, *Degrees of protection provided by enclosures (IP Code)*
- IEC 60825-1:2007, *Safety of laser products — Part 1: Equipment classification and requirements*
- IEC 61000-6-2:2005, *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity for industrial environments*
- IEC 61000-6-4:2011, *Electromagnetic compatibility (EMC) — Part 6-4: Generic standards — Emission standard for industrial environments*
- IEC 61800-5-2:2007, *Adjustable speed electrical power drive systems — Part 5-2: Safety requirements — Functional*
- EN 954-1:1996, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*
- EN 1837:1999+A1:2009, *Safety of machinery — Integral lighting of machines*