SLOVENSKI STANDARD
SIST EN ISO 28881:2013

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Nadomešča:
SIST EN 12957:2002+A1:2009

Obdelovalni stroji - Varnost - Elektroerozijski stroji (EDM) (ISO 28881:2013)

Machine tools - Safety - Electro discharge machines (ISO 28881:2013)

Werkzeugmaschinen - Sicherheit - Funkenerodiermaschinen (ISO 28881:2013)

Machines-outils - Sécurité - Machines d'électro-érosion (ISO 28881:2013)

Ta slovenski standard je istoveten z: EN ISO 28881:2013

ICS:

25.120.40 Elektrokemijski stroji Electrochemical machines

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English Version

Machine tools - Safety - Electro-discharge machines (ISO 28881:2013)

Machines-outils - Sécurité - Machines d'électro-érosion (ISO 28881:2013)

Werkzeugmaschinen - Sicherheit - Funkenerodiermaschinen (ISO 28881:2013)

This European Standard was approved by CEN on 14 March 2013.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (EN ISO 28881:2013) 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of an identical text or by endorsement, at the latest by February 2014, and conflicting national standards shall be withdrawn at the latest by February 2014.

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 12957:2001+A1:2009.

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.

For relationship with EU Directive, 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 28881:2013 has been approved by CEN as EN ISO 28881:2013 without any modification.

Annex ZA
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the New Approach Directive 2006/42/EC on machinery.

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the normative clauses of this standard confers, within the limits of the scope of this standard, a presumption of conformity with the relevant Essential Requirements of that Directive and associated EFTA regulations.

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

INTERNATIONAL STANDARD

ISO 28881

First edition
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Machine tools — Safety — Electro-discharge machines

Machines-outils — Sécurité — Machines d'électro-érosion

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 28881 was prepared by Technical Committee ISO/TC 39, *Machine tools*, Subcommittee SC 10, *Safety*.

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 document 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 are indicated in the Scope of this International Standard. In addition, electro-discharge machining (EDM) equipment and EDM systems are intended to be designed according to the principles of ISO 12100 for hazards which are not dealt with in this International Standard.

When requirements of this type-C standard are different from those which are stated in type-A or -B standards, the requirements of this type-C standard take precedence over the requirements of other standards for machines that have been designed and built according to the requirements of this type-C standard.

This International Standard defines performance level and safety categories of the safety-related parts of the control system for EDM equipment and EDM systems as defined in ISO 13849-1:2006.

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 intended to be provided by the manufacturer to the user.

Machine tools — Safety — Electro-discharge machines

1 Scope

This International Standard specifies safety requirements and/or protective measures, applicable to EDM equipment and EDM systems, such as

— manually controlled EDM die sinking or EDM drilling machines,

— numerically controlled EDM die sinking or EDM drilling machines, and

— numerically controlled EDM wire cutting machines

intended to be adopted by persons undertaking the design, construction, installation and/or supply of such equipment. This International Standard also includes information to be provided by the manufacturer to the user.

This International Standard is not applicable to arc eroding and electro-chemical machining equipment.

This International Standard takes account of the precondition of the intended use as well as the reasonably foreseeable misuse, in normal workshop environments and non-explosive atmospheres, including transportation, installation, setting, maintenance, repair and dismantling for removal or disposal of EDM equipment and EDM systems.

This International Standard is also applicable to auxiliary devices essential for EDM processing.

This International Standard deals with all significant hazards, hazardous situations or hazardous events relevant to EDM equipment and EDM systems, where they are used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer (see Clause 4).

This International Standard is intended to apply to machines manufactured after the date of publication of this International Standard.

2 Normative references

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

ISO 3746, *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, *Hydraulic fluid power — General rules and safety requirements for systems and their components*

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

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

ISO 11202, *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/TR 11688-1, *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, *Safety of machinery — Emergency stop — Principles for design*

ISO 13855, *Safety of machinery — Positioning of safeguards with respect to the approach speeds of parts of the human body*

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

ISO 14118, *Safety of machinery — Prevention of unexpected start-up*

ISO 14122-1, *Safety of machinery — Permanent means of access to machinery — Part 1: Choice of fixed means of access between two levels*

ISO 14122-2, *Safety of machinery – Permanent means of access to machinery — Part 2: Working platforms and walkways*

ISO 14122-3, *Safety of machinery — Permanent means of access to machinery — Part 3: Stairs, stepladders and guard-rails*

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 61000-6-2, *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity for industrial environments*

IEC 61000-6-4, *Electromagnetic compatibility (EMC) — Part 6-4: Generic standards — Emission standard for industrial environments*

IEC 61310-1, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, acoustic and tactile signals*

IEC 61310-2, *Safety of machinery — Indication, marking and actuation — Part 2: Requirements for marking*

IEC 61558-1, *Safety of power transformers, power supplies, reactors and similar products — Part 1: General requirements and tests*

IEC 61800-5-2:2007, *Adjustable speed electrical power drive systems — Part 5-2: Safety requirements — Functional*

EN 2, *Classification of fires*

EN 54-1, *Fire detection and fire alarm systems — Part 1: Introduction*

EN 349, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*

EN 614-1, *Safety of machinery — Ergonomic design principles — Part 1: Terminology and general principles*

EN 614-2, *Safety of machinery — Ergonomic design principles — Part 2: Interactions between the design of machinery and work tasks*

EN 626-1, *Safety of machinery — Reduction of risks to health from hazardous substances emitted by machinery — Part 1: Principles and specifications for machinery manufacturers*

EN 953:2009, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

EN 1037:2008, *Safety of machinery — Prevention of unexpected start-up*

EN 1088, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*

EN 12198-1, *Safety of machinery — Assessment and reduction of risks arising from radiation emitted by machinery — Part 1: General principles*

EN 12198-2, *Safety of machinery — Assessment and reduction of risks arising from radiation emitted by machinery — Part 2: Radiation emission measurement procedures*

EN 12198-3, *Safety of machinery — Assessment and reduction of risks arising from radiation emitted by machinery — Part 3: Reduction of radiation by attenuation or screening*

EN 62226-1, *Exposure to electric or magnetic fields in the low and intermediate frequency range — Methods for calculating the current density and internal electric field induced in the human body — Part 1: General*

EN 62226-2-1, *Exposure to electric or magnetic fields in the low and intermediate frequency range — Methods for calculating the current density and internal electric field induced in the human body— Part 2-1: Exposure to magnetic fields — 2D models*

EN 62226-3-1, *Exposure to electric or magnetic fields in the low and intermediate frequency range — Methods for calculating the current density and internal electric field induced in the human body — Part 3-1: Exposure to electric fields — Analytical and 2D numerical models*

EN 62311, *Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz – 300 GHz)*

CISPR 11, *Industrial, scientific and medical equipment — Radio-frequency disturbance characteristics — Limits and methods of measurement*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100:2010 and ISO 13849-1:2006 and the following apply.

3.1
control circuit
<machine> circuit used for the control, including monitoring, of the machine

Note 1 to entry: For electrical equipment, see IEC 60204-1:2009, 3.8.

3.2
machine control system
system that responds to input signals from parts of machine elements, operators, external control equipment or any combination of these, and generates output signals causing a machine to behave in the intended manner, as specified in ISO 13849-1:2006, 3.1.32

3.3
dielectric fluid
<EDM process> non-conductive medium to improve the discharge effect, evacuate debris and cool the workpiece/electrode

3.4
dielectric fluid container
tank system to keep the dielectric fluid in a condition suitable for EDM

EXAMPLE Filtering and cooling.

3.5
EDM equipment
machine tool that includes all the necessary units for the process of electro-discharge machining

EXAMPLE Generator, control circuits and dielectric fluid container.