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Termisk skärning – Maskinsäkerhet (ISO 17916:2016)

Safety of thermal cutting machines (ISO 17916:2016)

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EUROPEAN STANDARD

EN ISO 17916

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 2016

ICS 25.160.10

English Version

Safety of thermal cutting machines (ISO 17916:2016)

Sécurité des machines de coupage thermique (ISO
17916:2016)

Sicherheit von Maschinen zum thermischen Trennen
(ISO 17916:2016)

This European Standard was approved by CEN on 27 February 2016.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN ISO 17916:2016) has been prepared by Technical Committee ISO/TC 44 “Welding and allied processes” in collaboration with Technical Committee CEN/TC 121 “Welding and allied processes” 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of an identical text or by endorsement, at the latest by October 2016, and conflicting national standards shall be withdrawn at the latest by October 2016.

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For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

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Endorsement notice

The text of ISO 17916:2016 has been approved by CEN as EN ISO 17916:2016 without any modification.

SS-EN ISO 17916:2017 (E)

Introduction

This International Standard has been created in recognition of the particular hazards that are presented by thermal cutting machines.

This International Standard is a type-C standard as outlined in ISO 12100.

When provisions of a type-C standard are different from those which are stated in type-A or type-B standards, the provisions of the type-C standard will take precedence over the provisions of the other standards for machines that have been designed and built in accordance with the provisions of the type-C standard.

The machinery concerned and the extent to which hazards, hazardous situations, and events are covered are indicated in the Scope of this International Standard.

Hazards associated with thermal cutting machines are well recognized, but the sources of the hazards are frequently unique to a particular thermal cutting system. The number and type(s) of hazard(s) is (are) directly related to the nature of the thermal cutting process and the complexity of the installation. The risks associated with these hazards vary with the type of equipment used, its purpose, and the way in which it is installed, programmed, operated, and maintained.

This International Standard is not applicable to thermal cutting machines that were manufactured prior to its publication date.

Safety of thermal cutting machines

1 Scope

This International Standard specifies the safety requirements and measures for machinery covering design, construction, production, transport, installation, operation, maintenance, and putting out of service.

This International Standard applies to machinery using thermal cutting and or marking processes such as oxy-fuel, plasma arc. This International Standard applies to machinery the basis of which is either designed as open gantry, cantilever machine, or the track of which is incorporated in the cutting table.

This International Standard does not cover design standards for specific tools, e.g. oxy-fuel hose standards, electrical requirements for plasma power supplies. Most tools used on thermal cutting machines have specific design standards.

This International Standard does not cover handheld cutting equipment and cutting equipment which is combined with a constrained tracking system mounted on the work piece.

Risks arising from thermal cutting tools may be covered by related standards.

Risks arising from laser radiation, except those caused by position indicating lasers, are not covered by this International Standard. Those risks are covered by ISO 11553.

Machines that combine thermal processes with other processes (e.g. grinding, drilling, milling, etc.) are only partly covered. Risks arising from these other processes may be covered by related standards.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for 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 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 3821, *Gas welding equipment — Rubber hoses for welding, cutting and allied processes*

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

ISO 5171, *Gas welding equipment — Pressure gauges used in welding, cutting and allied processes*

ISO 5172, *Gas welding equipment — Blowpipes for gas welding, heating and cutting — Specifications and tests*

ISO 5175, *Equipment used in gas welding, cutting and allied processes — Safety devices for fuel gases and oxygen or compressed air — General specifications, requirements and tests*

ISO 7289, *Gas welding equipment — Quick-action couplings with shut-off valves for welding, cutting and allied processes*

ISO 7291, *Gas welding equipment — Pressure regulators for manifold systems used in welding, cutting and allied processes up to 30 MPa (300 bar)*

ISO 8207, *Gas welding equipment — Specification for hose assemblies for equipment for welding, cutting and allied processes*

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

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

ISO 13854, *Safety of machinery - Minimum gaps to avoid crushing of parts of the human body*

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

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

ISO 15012-4¹⁾, *Health and safety in welding and allied processes — Equipment for capture and separation of welding fume — Part 4: General requirements for welding fume separation equipment*

ISO/TR 28821, *Gas welding equipment — Hose connections for equipment for welding, cutting and allied processes — Listing of connections which are either standardised or in common use*

EN 894-1, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — General principles for human interactions with displays and control actuators*

EN 894-3, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Control actuators*

IEC 60204-1:2005, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

IEC 60974-1, *Arc welding equipment — Part 1: Welding power sources*

3 Terms and definitions

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

3.1

thermal cutting

cutting process that uses heat of different sources to melt or oxidize the material and a high speed jet to remove the liquid material

3.2

tool

any component to carry out a working process

Note 1 to entry: Working processes are, for example, cutting or marking.

3.3

aggregate

unit that carries one or more *tools* (3.2) and which is used to position the tools relatively to each other and/or to adjust the bevel angle of the tool(s)

3.4

cutting table

support for the work piece to be cut

3.4.1

dry cutting table

cutting table (3.4) not filled with water

1) To be published.

3.4.2

water table

cutting table (3.4) filled with water

Note 1 to entry: The work piece may be placed under, on, or above the water.

3.5

exhaust unit

unit to exhaust fumes and exhaust gases generated by the cutting process

3.6

exhaust system

system including *cutting table* (3.4), ducting, and *exhaust unit* (3.5)

3.7

marking process

method for applying markings on the surface of the work piece

3.8

movement envelope

area which can be reached by a moveable part of the machine

3.9

oxy-fuel cutting

thermal cutting (3.1) process using an oxygen/fuel gas flame to heat up the material to its ignition temperature and an oxygen jet to oxidize and remove the material

3.10

plasma cutting

thermal cutting (3.1) process using a constricted arc to heat up the material and a high velocity jet of ionized gas to remove the molten material

3.11

positioning laser

laser pointer to indicate the exact position of the machine

3.12

section

segment

partition of the *cutting table* (3.4)

Note 1 to entry: Sections are used to make exhausting more efficient. Flaps in each section allow the exhaust system to open the suction only to the currently active cutting area.

3.13

time weighted average

TWA

quantitative average which is determined from the measurement of a sample, which has been taken over a known time interval, multiplied by the desired time interval expression, and divided by the total time of over which the sample was obtained

Note 1 to entry: For occupational exposure, a working shift of eight hours is commonly used as the averaging time. Values are typically expressed as a concentration of a contaminant in air, or decibels, in the case of noise exposure.

3.14

working area

area where operation of cutting/marketing *tool* (3.2) is intended by design and/or manufacturer's specifications