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Industrial furnaces and associated processing equipment — Safety —

Part 1: General requirements

Fours industriels et équipements associés — Sécurité —

Partie 1: Exigences générales

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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).

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 World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/TC 244, *Industrial furnaces and associated processing equipment.*

This second edition cancels and replaces the first edition (ISO 13577-1:2012), which has been technically revised. The following changes have been made:

— reconfiguration of the scope (no technical change);

— elimination of the requirements related to the implosion hazard;

— reconfiguration of the requirements related to electrical safety as the following:

  — the referenced safety requirements for electrical equipment of industrial furnaces and associated processing equipment (TPE) are integrated to IEC 60204-1 (referencing IEC 60519 series was eliminated);

  — referencing ISO 13577-4 for the requirements of protective systems (safety related control systems) was introduced;

  — independent subclause for the electroheat installations where electrical energy is directly used as the heating energy was established;

  — associated changes were made in Table 1 in regards to the changes in 4.3;

— change of title of regional Annex E from "Requirements specific to Japan" to "Information specific to Japan" and modification of its content;

— addition of regional Annex H specific to Canada;

— other editorial changes.

A list of all parts in the ISO 13577 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.

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 -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.

Industrial furnaces and associated processing equipment (TPE) generally consists of the following components:

— processing chambers (e.g. steel construction with lining or without lining);

— heating systems;

— protective system;

— control and instrumentation system/operator-control level.

This document gives additional requirements for TPE in certain countries or regions. When applying the requirements specific to a country or region, which are given in the relevant annexes, it is essential that a level of safety be ensured that is at least equivalent to that provided for by the requirements of the main body of this document.

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Industrial furnaces and associated processing equipment — Safety —

Part 1: General requirements

1 Scope

This document specifies the general safety requirements common to industrial furnaces and associated processing equipment (TPE).

This document deals with the significant hazards, hazardous situations or hazardous events relevant to TPE, as listed in Annex A, when TPE is used as intended and also under conditions of misuse that are reasonably foreseeable by the manufacturer.

Annex B provides a list of common industrial furnaces and associated processing equipment.

This document specifies the requirements intended to be met by the manufacturer to ensure the safety of persons and property during commissioning, start-up, operation, shut-down, maintenance periods and dismantling, as well as in the event of foreseeable faults or malfunctions that can occur in the equipment.

These general safety requirements apply to all TPE, unless an exception is given in other parts of ISO 13577 dealing with specific equipment. The provisions of other parts of ISO 13577 that directly apply to specific types of TPE take precedence over the provisions of this document.

This document is not applicable to blast furnaces, converters (in steel plants), boilers or equipment not covered under ISO 12100.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

ISO 13577-2:2014, *Industrial furnaces and associated processing equipment — Safety — Part 2: Combustion and fuel handling systems*

ISO 13577-3[1)], *Industrial furnaces and associated processing equipment — Safety — Part 3: Generation and use of protective and reactive atmosphere gases*

ISO 13577-4, *Industrial furnaces and associated processing equipment — Safety — Part 4: Protective systems*

ISO 13732-1, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 1: Hot surfaces*

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

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

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ISO 14119, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*

ISO 14120, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

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 60079-0, *Explosive atmospheres — Part 0: Equipment — General requirements*

IEC 60204-1:2009, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements*

IEC 60519 (all parts), *Safety in electroheat installations*

IEC 60825-1, *Safety of laser products — Part 1: Equipment classification and requirements*

IEC 62598, *Nuclear instrumentation — Constructional requirements and classification of radiometric gauges*

EN 1547, *Industrial thermoprocessing equipment — Noise test code for industrial thermoprocessing equipment including its ancillary handling equipment*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12100 and ISO 13574 apply.

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

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

4 Safety requirements and/or protective measures

4.1 General

4.1.1 Requirements

The TPE shall comply with the safety requirements and/or protective measures described in Clause 4 and shall be verified in accordance with Clause 5. In addition, the TPE shall be designed in accordance with the principles of ISO 12100 for relevant hazards, but not significant hazards, which are dealt with by this document.

Anticipated significant hazards are listed in Table A.1.

For ease of reference, Table A.1 also indicates the corresponding preventive measures and should be used in conjunction with Clauses 4, 5 and 6.

Where particular requirements of the other parts of ISO 13577 apply, they shall supplement or modify these general safety requirements.

For regional requirements, see Annexes E, F, G, H and I.

4.1.2 General design and construction requirements

The manufacturer shall maintain evidence that all safety requirements of the design have been fulfilled.

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