BS ISO 4529:2023

BSI Standards Publication

Industrial furnaces and associated processing equipment — Secondary steelmaking — Machinery and equipment for treatment of liquid steel

National foreword

This British Standard is the UK implementation of ISO 4529:2023. It supersedes BS EN 14677:2008, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee RHE/13, Liquid fuel firing.

A list of organizations represented on this committee can be obtained on request to its committee manager.

Contractual and legal considerations

This publication has been prepared in good faith, however no representation, warranty, assurance or undertaking (express or implied) is or will be made, and no responsibility or liability is or will be accepted by BSI in relation to the adequacy, accuracy, completeness or reasonableness of this publication. All and any such responsibility and liability is expressly disclaimed to the full extent permitted by the law.

This publication is provided as is, and is to be used at the recipient's own risk.

The recipient is advised to consider seeking professional guidance with respect to its use of this publication.

This publication is not intended to constitute a contract. Users are responsible for its correct application.

Published by BSI Standards Limited 2023

ISBN 978 0 539 20556 5

ICS 25.180.01; 77.180

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 August 2023.

Amendments/corrigenda issued since publication

Date	Text affected

BS ISO 4529:2023

INTERNATIONAL STANDARD

ISO 4529

First edition
2023-03

Industrial furnaces and associated processing equipment — Secondary steelmaking — Machinery and equipment for treatment of liquid steel

Fours industriels et équipements associés — Sidérurgie secondaire — Machines et équipements pour le traitement de l'acier liquide

Reference number
ISO 4529:2023(E)

COPYRIGHT PROTECTED DOCUMENT

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

Published in Switzerland

Contents

Page

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 244, *Industrial furnaces and associated processing equipment*.

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 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);

— consumers (in case of machinery intended for use by consumers).

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.

INTERNATIONAL STANDARD ISO 4529:2023(E)

Industrial furnaces and associated processing equipment — Secondary steelmaking — Machinery and equipment for treatment of liquid steel

1 Scope

This document:

— specifies the general safety requirements for secondary steelmaking machinery and equipment (SSME) as defined in 3.1 to treat liquid steel;

— deals with all significant hazards, hazardous situations and events pertinent to SSME, when used as intended and under conditions foreseen by the manufacturer, but also includes foreseeable misuse, faults and malfunctions;

— specifies the requirements to ensure the safety of persons which are to be met during the design, pre-assembly, transport, sites assembly, commissioning, operation, maintenance, decommissioning and dismantling/ disassembling of the equipment;

— assumes that SSMEs are operated and maintained by adequately trained and competent personnel. Manual intervention for setting, adjustment and maintenance is accepted as part of the normal use of the equipment.

This document applies to SSME involved in the treatment process of liquid steel under vacuum or atmospheric pressure and covers:

— LF, ladle furnace,

— VD, vacuum degassing,

— VOD, vacuum oxygen decarburization,

— RH (OB), Ruhrstahl Heraeus (oxygen blowing),

— process related interfaces/interactions (e.g. according to design, controls) to:

  a) process media,

  b) primary and secondary gas cleaning plant,

  c) material handling systems,

  d) transfer cars for steel ladle, and

  e) crane and ladle.

NOTE 1 Due to the variety of secondary metallurgical processes, there are other variants (e.g. VODC – vacuum oxygen decarburization converter, CAS, CAS - OB) in addition to the main processes discussed in this document. Most countries require that applicable safety requirements, specific to this equipment be implemented.

This document does not cover safety requirements for the following equipment:

— cranes;

— transfer cars, e.g. ladle transfer cars, tank cars, maintenance cars;

— fork lift trucks or other transporting equipment;

— ladles;

— equipment for relining and preheating in the relining area;

— burners according to ISO 13577-2 (the burner lances for RH vessels are covered by ISO 13577-2 except for maximum main burner ignition time, see 5.2.26.2);

— cleaning and treatment of dust and fume exhaust systems;

— process media (e.g. air separation, boiler house, steam generation system);

— material handling systems.

NOTE 2 Significant hazards and hazardous situations due to transporting/positioning of heavy components, e.g. by cranes (e.g. ladles, vessels, covers) are considered in this document (see 5.2.3).

This document is not applicable to SSMEs and associated equipment manufactured before the date of its publication.

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 3864-1, *Graphical symbols — Safety colours and safety signs — Part 1: Design principles for safety signs and safety markings*

ISO 3864-3, *Graphical symbols — Safety colours and safety signs — Part 3: Design principles for graphical symbols for use in safety signs*

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

ISO 7000, *Graphical symbols for use on equipment — Registered symbols*

ISO 7731, *Ergonomics — Danger signals for public and work areas — Auditory danger signals*

ISO 8995-1, *Lighting of work places — Part 1: Indoor*

ISO 11064-1, *Ergonomic design of control centres — Part 1: Principles for the design of control centres*

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 11428, *Ergonomics — Visual danger signals — General requirements, design and testing*

ISO 11429, *Ergonomics — System of auditory and visual danger and information signals*

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

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

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

ISO 13850:2015, *Safety of machinery — Emergency stop function— Principles for design*