
**Industrial furnaces and associated
processing equipment — Safety
requirements for steel converter and
associated equipment**

*Fours industriels et équipements associés — Prescriptions de sécurité
pour les convertisseurs et équipements associés*

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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 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.

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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 and events are covered are indicated in the scope of this document.

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 standards, for machines that have been designed and built according to the provisions of this type C standard.

Where for clarity an example of a preventive measure is given in this document, this should not have been considered as the only possible solution. Any other solution leading to the same risk reduction is permissible if an equivalent level of safety is achieved.

This document assumes that

- the steel converter is operated and maintained by adequately trained personnel (see 3.13 and 7.5);
- manual intervention for setting, adjustment and maintenance is accepted as part of the intended use of the steel converter;
- the steel converter is used with adequate workplace lighting conforming to e.g. ISO 8995-1.

This document assumes that the input materials do not contain the following hazardous components:

- radioactive scrap;
- explosives;
- entrapped water/ice;
- closed containers;
- oversized scrap which can lead to water leakage due to collision with lances (see 7.3.5).

The charging should be done to avoid/minimize risk of explosion.

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 organizations, 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.

Industrial furnaces and associated processing equipment — Safety requirements for steel converter and associated equipment

1 Scope

This document applies for new steel converter and its associated equipment (hereinafter referred to as converter plant) used in the process of carbon or stainless steel making as defined in [3.1](#) and illustrated in [Annex B](#).

This document deals with significant hazards, hazardous situations and events relevant to the converter plant. It covers the intended use and foreseeable misuse.

This document specifies the safety requirements to be met during design, pre-assembly, transport, site-assembly, commissioning, operation, maintenance (as described in [Clause 5](#)) and decommissioning/dis-assembly of the equipment.

Assembly does not include erection because national regulations, e.g. national civil engineering laws and regulations or occupational health and safety regulations contain such information.

This document applies to:

Steel converter and its associated equipment (see [Annex B, Figure B.1](#) for the oxygen steelmaking process

- from charging hot metal/liquid steel and scrap;
- via oxygen refining and stirring;
- temperature measurement and sampling equipment;
- up to tapping including slag retaining device;
- cooling systems;
- maintenance devices (e.g. relining device, tap hole repair device, device for cleaning the converter mouth);
- process related interfaces/interactions (e.g. according to design, controls) to
 - process media,
 - primary and secondary gas cleaning plant,
 - material feeding systems and ladle alloying systems,
 - transfer cars for steel ladle and slag pot, and
 - charging/tapping equipment, e.g. crane, scrap chute, ladles and slag pots.

This document does not cover safety requirements for:

- usage of process media other than oxygen, nitrogen, argon and compressed air;
- primary and secondary gas cleaning plants;
- measuring devices with radioactive sources;
- material feeding systems and ladle alloying systems;