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Standard**

**ISO 21763**

**Guidelines for smart manufacturing  
in the iron and steel industry**

*Lignes directrices pour la fabrication intelligente dans l'industrie  
sidérurgique*

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CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

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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](http://www.iso.org/directives)).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at [www.iso.org/patents](http://www.iso.org/patents). ISO shall not be held responsible for identifying any or all such patent rights.

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](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 17, *Steel*.

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](http://www.iso.org/members.html).

## Introduction

Smart manufacturing technologies have been playing increasingly pivotal roles across diverse industrial sectors and daily life. In 2021, ISO released the "White Paper on Smart Manufacturing Standardization", which defines smart manufacturing as the 4th industrial revolution. This foundational document delineates strategic pathways for deploying smart technologies across multifarious industrial domains, while establishing forward-looking standardization frameworks to guide technological convergence and innovation trajectories over the next decade.

The iron and steel industry is one of the most critical industrial sectors. With the rapid development of global smart manufacturing technologies, how new smart manufacturing technologies can be applied to the iron and steel industry to improve production efficiency, enhance product quality, reduce production costs, and ensure employee safety has become a topic of common concern.

Enhancers and enablers, as outlined in the ISO Smart Manufacturing Coordinating Committee (SMCC) "The White Papers on Smart Manufacturing", are the basic requirements for achieving smart manufacturing in the iron and steel industry. During production, using advanced algorithms, smart equipment, smart systems, and other smart manufacturing technologies can be effective to reduce production costs, stable product quality, worker's safety, and the climate actions, which are important for every iron and steel enterprise. While numerous iron and steel enterprises have initiated strategic adoption of smart manufacturing systems, the operational frameworks for integrating these technologies into metallurgical processes remain underdeveloped. Therefore, it is useful to provide guidelines for the application of smart manufacturing technologies, which gives the outlines and common requirements for their implementation in the iron and steel industry.

This document aims to support the promotion of smart manufacturing to upgrade steel plants and to guide the development of the iron and steel industry by improving work environments, worker safety, and well-being, as well as reducing carbon footprints. As a result, it contributes, directly or indirectly, to the UN Sustainable Development Goals".

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# Guidelines for smart manufacturing in the iron and steel industry

## 1 Scope

This document specifies guidelines for smart manufacturing technologies applicable to smart plants in the iron and steel industry, together with the basic requirements for these technologies as defined in the application guidelines.

This document covers three dimensions related to the steel production process:

- smart production process design,
- smart equipment, and
- smart production.

This document provides an overview of the potential applications of smart manufacturing technology in these scenarios, as well as the specific technical requirements it needs to meet.

This document provides reference guidelines for the iron and steel industry to formulate smart factory upgrading plans to improve productivity and product quality. It is intended for use by iron and steel manufacturing enterprises, smart manufacturing technology vendors, and relevant public sector organizations, and is applicable to steel plants regardless of manufacturing process route, equipment configuration, plant size, geographic location, or product type.

This document is not intended to be used for any form of evaluation or grading of steel plants or companies.

## 2 Normative references

There are no normative references in this document.

## 3 Terms and definitions

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

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

### 3.1

#### **smart manufacturing**

manufacturing that improves its performance aspects with integrated and smart use of processes and resources in cyber, physical and human spheres to create and deliver products and services, which also collaborates with other domains within enterprises' value chains

[SOURCE: ISO/TR 22100-4:2018, 3.16]