
Cast irons —

**Part 1:
Materials and properties for design**

Fontes —

Partie 1: Matériaux et propriétés pour la conception



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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 25, *Cast irons and pig irons*.

This second edition cancels and replaces the first edition (ISO/TR 10809-1:2009), which has been technically revised.

The main changes are as follows:

- [Clauses 4](#) to [10](#) have been reordered in line with microstructural similarities between cast iron types;
- the Bibliography has been updated.

A list of all parts in the ISO 10809 series can be found on the ISO website.

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

Worldwide cast-iron production is in excess of 74 million metric tonnes per annum.^[13] It is manufactured in a wide range of alloys and has applications in all sectors of world production and manufacture. Its use spans many industries, including automotive, oil, mining, etc.

The purpose of this document is to assist the designer and engineer in understanding the family of cast iron materials and to be able to utilize them with a more complete knowledge of their potential, among the wide range of other engineering materials and fabrication methods now available. A considerable amount of the data provided are metallurgical, but it is usually the metallurgical aspects of the cast irons that create misunderstandings when these materials are specified. Metallurgy is not one of the scientific disciplines commonly taught to engineering students, so the material properties of cast irons are not often well understood. Thus, such students often have a lack of knowledge regarding the fundamentals underpinning the material properties of cast irons.

Cast irons —

Part 1: Materials and properties for design

1 Scope

This document provides information about cast iron materials so that users and designers are in a better position to understand cast iron as a design material in its own right and to correctly specify cast iron for suitable applications.

This document suggests what can be achieved, and what is not achievable when cast irons are specified as well as the reasons why. It is not designed to be a textbook of cast iron metallurgy. It is intended to help people to choose the correct material for the right reasons and to also help to obviate the specification or expectation of unrealistic additional requirements, which are unlikely to be met and which can be detrimental to the intended application.

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

alloying

addition of elements such as copper, nickel and molybdenum to enhance hardenability

3.2

annealing

heat treatment (3.17) that breaks down *iron carbide* (3.21) and *pearlite* (3.26) to produce *ferrite* (3.12)

3.3

ausferrite

cast iron matrix microstructure, produced by a controlled thermal process, which consists of predominantly acicular *ferrite* (3.12) and high carbon *austenite* (3.5)