

AWS D11.2/D11.2M:2025
An American National Standard



Guide for Welding Iron Castings



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Guide for Welding Iron Castings

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Prepared by the
American Welding Society (AWS) D11 Committee on Welding Iron Castings

Under the Direction of the
AWS Technical Activities Committee

Approved by the
AWS Board of Directors

Abstract

This standard presents briefly the history and metallurgy of cast iron and the welding processes applicable to it. A weldability test for cast irons is described in detail and instructions given for its application in specific cases. Provision is made for qualification of welding procedures and welders when necessary; quality control practice is also included.



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This standard is subject to revision at any time by the AWS D11 Committee on Welding Iron Castings. It must be reviewed every five years, and if not revised, it must be either reaffirmed or withdrawn. Comments (recommendations, additions, or deletions) and any pertinent data that may be of use in improving this standard are requested and should be addressed to AWS Headquarters. Such comments will receive careful consideration by the AWS D11 Committee on Welding Iron Castings and the author of the comments will be informed of the Committee's response to the comments. Guests are invited to attend all meetings of the AWS D11 Committee on Welding Iron Castings to express their comments verbally. Procedures for appeal of an adverse decision concerning all such comments are provided in the Rules of Operation of the Technical Activities Committee. A copy of these Rules can be obtained from the American Welding Society, 8669 NW 36 St, # 130, Miami, FL 33166.

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Foreword

This foreword is not a part of this standard but is included for informational purposes only.

This publication is a revision of the first edition published in 1989.

This guide was prepared by the AWS D11 Committee on Welding Iron Castings as a service to the industry. Sufficient data have been gathered and organized to yield an authoritative source of sound technical practices for joining iron castings. The description of iron castings, together with factors to be considered in joining them, is presented here as clearly and concisely as possible. It is the committee's hope that this guide will lead to better quality and performance.

These recommendations represent the best of current practice in the opinion of the committee. At the present state of the art, all recommendations may not be applicable to all products and situations. Selection of pertinent requirements should be the result of rational decisions and not lack of knowledge on the part of those who are welding iron castings.

A vertical line in the margin or underlined text in clauses, tables, or figures indicates an editorial or technical change from the previous edition.

Comments and suggestions for the improvement of this standard are welcome. They should be sent to the Secretary, AWS D11 Committee on Welding Iron Castings, American Welding Society, 8669 NW 36 St, # 130, Miami, FL 33166.

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Dedication

The AWS D11 Committee on Welding Iron Castings dedicates this edition of D11.2/D11.2M, *Guide for Welding Iron Castings*, to the memory of Edward G. Yevick for his significant contribution to welding.

A life member of AWS and a recipient of the Samuel Wylie Miller Award for outstanding effort and contributions to welding, Mr. Yevick worked in the welding industry for 53 years. Positions he held at AWS throughout his career include:

- Chair of the Pittsburgh Section, 1980/81.
- Chair of the D11 Committee on Welding Iron Castings
- Chair of D14H Subcommittee on Surfacing of Industrial Rolls and Equipment
- Mr Yevick also served three terms on the AWS Technical Activities Committee (TAC)

Additionally, Mr Yevick was a member of AWS B2, C5, and D14 Committees and Subcommittees and contributed to the development of several of their standards. In addition to his contributions to welding he was also a member of the American Society for Non-Destructive Testing for over 50 years.

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Guide for Welding Iron Castings

1. General Requirements

1.1 Scope. The term *cast iron* encompasses a family of ferrous alloys with a variety of metallurgical, mechanical, and physical properties. The chemical composition and welding requirements of the metals vary within the family. This document discusses the relative weldability of various types of cast irons and the filler metals and processes used to weld them. It recommends the steps for qualification of welding procedures, welding operators and welders, and requirements for the quality of welds. The terms *welding procedure*, *welding operator*, and *welder*, are used as defined in the latest edition of AWS A3.0M/A3.0, *Standard Welding Terms and Definitions, Including Terms for Adhesive Bonding, Brazing, Soldering, Thermal Cutting, and Thermal Spraying*.

Although this guide is not written with mandatory requirements, mandatory language, such as the use of “shall”, will be found in those portions of the document where failure to follow the instructions or procedures could produce inferior, misleading or unsafe results.

1.2 Units of Measure. This standard makes use of both U.S. Customary Units and the International System of Units (SI). The latter are shown within brackets ([]) or in appropriate columns in tables and figures. The measurements may not be exact equivalents; therefore, each system must be used independently.

1.3 Safety. Safety and health issues and concerns are beyond the scope of this standard; some safety and health information is provided, but such issues are not fully addressed herein.

Safety and health information is available from the following sources:

American Welding Society:

- (1) ANSI Z49.1, *Safety in Welding, Cutting, and Allied Processes*
- (2) AWS Safety and Health Fact Sheets
- (3) Other safety and health information on the AWS website

Material or Equipment Manufacturers:

- (1) Safety Data Sheets supplied by materials manufacturers
- (2) Operating Manuals supplied by equipment manufacturers

Applicable Regulatory Agencies

Work performed in accordance with this standard may involve the use of materials that have been deemed hazardous, and may involve operations or equipment that may cause injury or death. This standard does not purport to address all safety and health risks that may be encountered. The user of this standard should establish an appropriate safety program to address such risks as well as to meet applicable regulatory requirements. ANSI Z49.1 should be considered when developing the safety program.

1.4 History

1.4.1 Types of Iron. Although iron has been used in various forms for over two thousand years, iron castings in the form used today evolved in Europe in the 15th and 16th centuries. The microstructure of medieval castings basically was gray iron with areas of white iron and nonmetallic inclusions. Refinements in foundry practices and melt control resulted in a more uniform structure.