Technical Report

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Welding — Best practices for specification and measurement of ferrite in stainless steel weld metal

Soudage — Bonnes pratiques pour la spécification et le mesurage de la ferrite dans le métal fondu des aciers inoxydables

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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

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Foreword

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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 document 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).

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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 IIW, *International Institute of Welding*, Commission II, *Arc welding and Filler Metals*, in collaboration with ISO/TC 44, *Welding and allied processes*, Subcommittee SC 3,*Welding consumables*.

This second edition cancels and replaces the first edition (ISO/TR 22824:2003), which has been technically revised.

The main changes are as follows:

— the metallurgical phenomenon of ferrite has been addressed;

— methods of ferrite measurement have been addressed;

— best practice for reasonable and effective specifications for ferrite has addressed;

— best practice for dealing with outliers in ferrite measurement has been addressed;

— the list of references has been expanded.

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.

Official interpretations of ISO/TC 44 documents, where they exist, are available from this page: https://committee.iso.org/sites/tc44/home/interpretation.html.

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Introduction

This document was prepared by the International Institute of Welding, Commission II, through its Subcommission II-C, Arc Welding and Filler Metals, in cooperation with Commission IX through its Subcommission IX-H, Welding of Stainless Steels and Nickel Base Alloys, on behalf of ISO/TC 44/SC 3. It constitutes the considered judgement of the experts on measurement and specification of ferrite in nominally austenitic and duplex ferritic-austenitic stainless steel weld metals.

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Welding — Best practices for specification and measurement of ferrite in stainless steel weld metal

1 Scope

This document describes best practices, based on the experience of experts, for setting appropriate requirements, in specifications and other standards and contract documents, on ferrite content of nominally austenitic or duplex ferritic-austenitic stainless steel weld metals. It also describes a best practice on measurement and measurement reproducibility, and deals with outliers in measurement. It considers ferrite in the weld heat-affected zone of duplex stainless steel. It does not consider specification or measurement of ferrite in ferritic stainless steels nor in martensitic stainless steels.

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
stainless steel
any member of a diverse family of alloys containing at least 10,5 % chromium (the minimum chromium content which provides for rust free service in ordinary ambient air free of salt), and often but not always containing substantial nickel, in which the iron content exceeds that of any other element when all other elements are taken at the specification minima for the alloy

3.2
austenite
face-centred cubic crystal structure of iron base alloys that is not ferro-magnetic at ambient temperatures

3.3
duplex ferritic-austenitic stainless steel
stainless steel base metal or weld metal consisting of a microstructure of approximately equal parts *ferrite* (3.4) and *austenite* (3.2)

Note 1 to entry: The ranges of the two phases can be quite broad – often shortened to duplex stainless steel.

3.4
ferrite
body-centred cubic crystal structure of iron base alloys that is ferro-magnetic at ambient temperatures

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