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# Welding consumables — International Institute of Welding (IIW) position statement on the use of trace element analyses in welding consumable specifications

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# National foreword

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# Welding consumables — International Institute of Welding (IIW) position statement on the use of trace element analyses in welding consumable specifications

*Produits consommables pour le soudage — Position de l'Institut international de la soudure (IIW) sur l'utilisation d'analyses d'éléments-trace lors de la spécification de consommables*

Reference number
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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 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).

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For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by the International Institute of Welding.

Requests for official interpretations of any aspect of this document should be directed to the ISO Central Secretariat, who will forward them to the IIW Secretariat for an official response.

# Introduction

This document is the result of study and deliberations of the International Institute of Welding.

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**TECHNICAL REPORT** **ISO 22281:2018(E)**

# Welding consumables — International Institute of Welding (IIW) position statement on the use of trace element analyses in welding consumable specifications

## 1 Scope

This document, based on round robin tests for chemical analysis conducted within IIW, considers interlaboratory reproducibility of measurement of trace element concentrations in steel and weld metals, and offers guidance in respect to application of accept/reject criteria in welding filler metal procurement as can be applied using, for example, ISO 14344 or API RP 934-A.

## 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 terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

**3.1**
**trace element**
chemical element, generally considered to have an undesirable effect but unavoidably present in steel at concentrations significantly below 1 % by weight, whose concentration is normally determined in parts per million (ppm)

**3.2**
**Bruscato Factor**
weighted sum of concentrations of P, Sb, Sn and As, each element expressed in parts per million in steel and corresponding weld metal, as follows:

$$Bruscato\ Factor = \frac{10\mathrm{P} + 5\mathrm{Sb} + 4\mathrm{Sn} + \mathrm{As}}{100}$$

**3.3**
**Reheat Cracking Composition Factor**
*K*f
weighted sum of concentrations of Pb, Bi and Sb, each element expressed in parts per million in steel and corresponding weld metal, as follows:

$$K\mathrm{f} = \mathrm{Pb} + \mathrm{Bi} + 0{,}03\mathrm{Sb}$$

## 4 Background

Recognizing that disputes have arisen between consumable suppliers and consumable users concerning acceptability of lots of welding consumables based on trace element measurements and calculation of various accept/reject criteria such as the Bruscato Factor or the Reheat Cracking Composition