International Standard

ISO 15614-9

First edition
2025-11

Specification and qualification of welding procedures for metallic materials — Welding procedure test —

Part 9: Underwater hyperbaric wet welding

Descriptif et qualification d'un mode opératoire de soudage pour les matériaux métalliques — Épreuve de qualification d'un mode opératoire de soudage —

Partie 9: Soudage hyperbare en pleine eau

Reference number
ISO 15614-9:2025(en)

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Published in Switzerland

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Foreword

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This document was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 15, *Underwater welding*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 121, *Welding and allied processes*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

A list of all parts in the ISO 15614 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. Official interpretations of ISO/TC 44 documents, where they exist, are available from this page: https://committee.iso.org/sites/tc44/home/interpretation.html.

Introduction

The primary purpose of welding procedure qualification is to demonstrate that the joining process proposed for construction, including preliminary and subsequent treatment, is capable of producing joints having the necessary mechanical properties and conforming to the non-destructive testing (NDT) requirements for the intended application.

Before a particular welding procedure is used in production, the manufacturer should determine and document the suitability of the welding procedure specification (WPS) to produce a weld of the required quality.

In this document, the term "welding procedure specification" comprises all the activities which influence the welding result, such as preparation, welding parameters, and post treatment.

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1 Scope

This document specifies how a preliminary welding procedure specification (pWPS) is qualified by welding procedure tests.

This document is applicable to production welding and repair welding.

This document is applicable to fusion welding of steels covered by groups 1, 2, 3 and 8 in accordance with ISO 15608 in a hyperbaric wet environment.

This document is applicable to the following welding processes, in accordance with ISO 4063:2023, applicable in hyperbaric wet environments:

— 111 manual metal arc welding (metal arc welding with covered electrode);

— 114 self-shielded tubular-cored arc welding.

The principles of this document can be applied to other steel groups and fusion welding processes not listed.

This document specifies three weld quality levels, A, B, and Z in order to permit application to a wide range of weldments. Each weld quality level defines a set of criteria for weldment properties that are established during qualification.

This document does not address the selection of the weld quality level to meet the requirements of a particular application.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 148-1, *Metallic materials — Charpy pendulum impact test — Part 1: Test method*

ISO 4136, *Destructive tests on welds in metallic materials — Transverse tensile test*

ISO 5173, *Destructive tests on welds in metallic materials — Bend tests*

ISO 5178, *Destructive tests on welds in metallic materials — Longitudinal tensile test on weld metal in fusion welded joints*

ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature*

ISO 6947:2019, *Welding and allied processes — Welding positions*

ISO 9015-1, *Destructive tests on welds in metallic materials — Hardness testing — Part 1: Hardness test on arc welded joints*