INTERNATIONAL STANDARD

ISO 25239-4

Second edition
2020-06

Friction stir welding — Aluminium —

Part 4: Specification and qualification of welding procedures

Soudage par friction-malaxage — Aluminium —

Partie 4: Descriptif et qualification des modes opératoires de soudage

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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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This second edition cancels and replaces the first edition (ISO 25239-4:2011), which has been technically revised.

The main changes compared to the previous edition are as follows:

— alternative process control methods (e.g. temperature control) have been included;

— the wording of the paragraph on thermal management and heat treatments has been improved;

— the definition for the extraction of test specimens has been modified for all test pieces and the figures have been revised accordingly;

— the requirement for testing transverse test specimens with as welded surfaces has been deleted;

— in Table 3, a new requirement on the minimum joint efficiency has been added for heat treatable alloys below 5 mm;

— the pWPS is now to be qualified in accordance with the defined acceptance levels included in ISO 25239-5;

— acceptance levels have been included in the WPQR form in Annex D.

A list of all parts in the ISO 25239 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.

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Introduction

Welding processes are widely used in the fabrication of engineered structures. During the second half of the twentieth century, fusion welding processes, wherein fusion is obtained by the melting of parent material and usually a filler metal, dominated the welding of large structures. In 1991, Wayne Thomas at TWI invented friction stir welding (FSW), which is carried out entirely in the solid phase (no melting).

The increasing use of FSW has created the need for this document in order to ensure that welding is carried out in the most effective way and that appropriate control is exercised over all aspects of the operation. This document focuses on the FSW of aluminium because, at the time of publication, the majority of commercial applications for FSW involved aluminium. Examples include railway carriages, consumer products, food processing equipment, aerospace structures, and marine vessels.

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