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Welding for aerospace applications — Qualification test for welders and welding operators — Fusion welding of metallic components

Soudage pour applications aérospatiales — Épreuve de qualification pour soudeurs et opérateurs — Soudage par fusion des composants métalliques

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 ISO/TC 44, *Welding and allied processes*, Subcommittee SC 14, *Welding and brazing in aerospace*.

Any feedback, question or request for official interpretation related to any aspect of this document should be directed to the Secretariat of ISO/TC 44/SC 14 via your national standards body. A complete listing of these bodies can be found at www.iso.org/members.html. Official interpretations, where they exist, are available from this page: https://committee.iso.org/sites/tc44/home/interpretation.html.

This second edition cancels and replaces the first edition (ISO 24394:2008). It also incorporates the Amendment ISO 24394:2008/Amd 1:2012. The main changes compared to the previous edition are:

— the terms welding equipment operator and automatic welding have been introduced as 3.4 and 3.12;

— old subclause 4.1.3 has been moved to 4.1;

— requirements in 4.4 have been refined;

— Tables 1 to 4 have been created to present the ranges of qualification for welding positions for every test piece;

— in 4.5, material group F has been introduced;

— the header of 4.6 has been changed and new subclause 4.6.3 has been created;

— in 4.6.1 and 4.6.2, the qualification of thickness ranges has been clarified;

— requirements in 5.1 have been changed;

— a bullet list has been added to 6.1.1;

— in 6.2, a new requirement has been introduced that the theory test shall be documented;

— references to EN 462 series for radiographic images have been deleted;

— Clause 9 has been reworded to clearly state that only the features created by welding shall be assessed for TP6;

— Clause 10 has been changed so that if a welder/welding operator needs vision correction, it shall be noted on the test certificate;

— in Tables A.1 to A.4, new material group F has been included;

— the document has been editorially revised.

Introduction

A welder or welding operator qualification test properly passed in accordance with this document demonstrates that the welder or welding operator concerned has been proved to possess the minimum degree of skill and knowledge required for the fusion welding of aerospace hardware.

Welding for aerospace applications — Qualification test for welders and welding operators — Fusion welding of metallic components

1 Scope

This document specifies requirements for the qualification of welders and welding operators for the fusion welding of metallic materials for aerospace applications.

NOTE Success in the test is an essential precondition for the qualification of welders (3.2) and welding operators (3.3) in new production and repair work in aerospace. However, welding equipment operators (3.4) do not need to be qualified according to this document.

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 4063, *Welding and allied processes — Nomenclature of processes and reference numbers*

ISO 6520-1:2007, *Welding and allied processes — Classification of geometric imperfections in metallic materials — Part 1: Fusion welding*

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

ISO 9606-2, *Qualification test of welders — Fusion welding — Part 2: Aluminium and aluminium alloys*

ISO 14731, *Welding coordination — Tasks and responsibilities*

ISO 18490, *Non-destructive testing — Evaluation of vision acuity of NDT personnel*

EN 4179, *Aerospace series — Qualification and approval of personnel for non-destructive testing*

SAE AMS 2694C, *In-Process Welding of Castings*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6520-1, ISO 9606-2, ISO 14731 and the following 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
parent material form
type of the semi-finished product

Note 1 to entry: Semi-finished products are sheets/plates, tubes and castings.