
Welding — Friction welding of metallic materials

Soudage — Soudage par friction des matériaux métalliques

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

ISO 15620:2019

<https://standards.iteh.ai/catalog/standards/iso/3439ba89-9b23-40c8-99dd-43387e3332d5/iso-15620-2019>



iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

ISO 15620:2019

<https://standards.iteh.ai/catalog/standards/iso/3439ba89-9b23-40c8-99dd-43387e3332d5/iso-15620-2019>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2019

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Welding knowledge	3
4.1 Process	3
4.1.1 General	3
4.1.2 Direct drive rotational friction welding	4
4.1.3 Stored energy (inertia) friction welding	6
4.1.4 Further processes	8
4.1.5 Friction welding arrangements	8
4.2 Materials and material combinations	8
4.3 Friction welding machines	9
4.3.1 General	9
4.3.2 Features	10
5 Quality requirements	10
5.1 General	10
5.2 Pre-welding requirements	10
5.2.1 Condition of raw materials	10
5.2.2 Preparation of the components to be welded	11
5.2.3 Component holding	11
5.3 Post-welding treatment	11
5.4 Quality assurance	11
6 Welding procedure specification (WPS)	12
6.1 General	12
6.2 Information related to the manufacturer	12
6.3 Information related to the material	13
6.4 Welding parameters	13
6.5 Joint	13
6.6 Optional devices	13
7 Welding procedure approval	13
7.1 Principles	13
7.2 Welding procedure tests	14
7.2.1 Application	14
7.2.2 Preliminary welding procedure specification (pWPS)	14
7.2.3 Number of test weldments	14
7.2.4 Specification for test specimens	14
7.2.5 Test procedures	16
7.2.6 Acceptance criteria	18
7.3 Welding procedure approval record (WPQR)	18
7.4 Previous experience	18
7.5 Circumstances mandating requalification	18
7.6 Machine-specific nature of a WPS	19
7.7 Requalification procedure requirements	19
8 Welding personnel	19
8.1 Friction welding machine operator	19
8.2 Friction welding machine setter	19
8.3 Welding coordination personnel (supervisor)	19
Annex A (informative) Relationship of welding parameters	20

Annex B (informative) Additional processes based on friction	22
Annex C (informative) Material combinations weldable by friction welding	25
Annex D (informative) Guidelines for quality assurance	27
Annex E (informative) Examination and test	28
Annex F (informative) Manufacturer's friction welding procedure specification (WPS)	30
Annex G (informative) Characteristics of friction welded components	32
Annex H (informative) Welding procedure approval record form (WPQR) Welding procedure approval — Test certificate	37
Bibliography	40

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[ISO 15620:2019](https://standards.iteh.ai/catalog/standards/iso/3439ba89-9b23-40c8-99dd-43387e3332d5/iso-15620-2019)

<https://standards.iteh.ai/catalog/standards/iso/3439ba89-9b23-40c8-99dd-43387e3332d5/iso-15620-2019>

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 10, *Quality management in the field of welding*.

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 10 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 15620:2000), which has been technically revised.

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

- Clause 2 has been updated;
- in Clause 3, terms not used in the text have been deleted;
- in [Annex B](#) of 4 processes based on friction have been added;
- the recommended test to perform on test weld has been clarified (addition of [Table 4](#)).

Introduction

Friction welding is a method for making welds in the solid phase in which one component is moved relative to and in pressure contact with the mating component to produce heat at the faying surfaces, the weld being completed by the application of a force during or after the cessation of relative motion. There are several forms of supplying energy and various forms of relative movements.

The generation of friction heating results in a comparatively low joining temperature at the interface. This is largely the reason why friction welding is suitable for materials and material combinations which are otherwise difficult to weld. The weld region is generally narrow and normally has a refined microstructure.

While the friction welding process deals primarily with components of circular cross-section it does not preclude the joining of other component shapes.

iTeh Standards
(<https://standards.itih.ai>)
Document Preview

[ISO 15620:2019](https://standards.itih.ai/catalog/standards/iso/3439ba89-9b23-40c8-99dd-43387e3332d5/iso-15620-2019)

<https://standards.itih.ai/catalog/standards/iso/3439ba89-9b23-40c8-99dd-43387e3332d5/iso-15620-2019>