

This is a preview of "ISO/TR 17671-6:2005". Click [here](#) to purchase the full version from the ANSI store.

First edition
2005-02-15

Welding — Recommendations for welding of metallic materials —

Part 6: Laser beam welding

*Soudage — Recommandations pour le soudage des matériaux
métalliques —*

Partie 6: Soudage par faisceau laser



Reference number
ISO/TR 17671-6:2005(E)

© ISO 2005

This is a preview of "ISO/TR 17671-6:2005". [Click here to purchase the full version from the ANSI store.](#)

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

© ISO 2005

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

This is a preview of "ISO/TR 17671-6:2005". [Click here to purchase the full version from the ANSI store.](#)

Contents

Page

Foreword.....	v
Introduction	vi
1 Scope.....	1
2 Normative references	1
3 Terms and definitions	3
4 Health and safety and protection of the environment.....	3
5 Quality requirements	3
6 Equipment.....	4
6.1 General	4
6.2 Provisions for acceptance testing	4
6.3 Provisions for maintenance and calibration	4
7 Qualification of welding personnel	4
8 Welding procedure specification	5
9 Welding procedure test	5
10 Consumables.....	5
10.1 Filler metals	5
10.2 Gases.....	5
11 Design	6
11.1 Overall design of structure or product	6
11.2 Joint design	6
11.3 Joint preparation.....	6
12 Laser beam welding.....	7
12.1 Characteristics	7
12.2 Advantages and limitations	9
12.3 Assembling and fixtures	10
12.4 Process control	10
12.5 Inspection and testing.....	10
12.6 Imperfections.....	10
Annex A (informative) Equipment.....	11
A.1 Description of laser process.....	11
A.2 Laser beam sources	12
A.3 Guiding, shaping and focussing the beam	14
A.4 Devices used to create a relative movement between the laser beam and the work piece.....	18
A.5 Fixtures used to hold the work piece.....	18
A.6 Cooling system	19
A.7 Control systems	19
Annex B (informative) Laser beam properties.....	20
Annex C (informative) Information about weldability of metallic materials	22
C.1 General	22
C.2 Steels and iron alloys	22
C.3 Nickel alloys	24
C.4 Aluminium and magnesium alloys.....	24
C.5 Copper and its alloys.....	24
C.6 Refractory and reactive materials	24

This is a preview of "ISO/TR 17671-6:2005". [Click here to purchase the full version from the ANSI store.](#)

C.7	Titanium and its alloys.....	25
C.8	Dissimilar metals.....	25
C.9	Non-metals.....	25
Annex D (informative) Information about causes of weld imperfections and their prevention.....		26
Annex E (informative) Beam control and monitoring.....		28
E.1	General.....	28
E.2	Focal point.....	28
E.3	Beam alignment and pilot beam coincidence.....	28
E.4	Beam power.....	29
E.5	Beam power distribution.....	29
E.6	Nozzle alignment.....	29
E.7	Pulsed beam power data.....	30
E.8	Manipulators, guides, etc.....	30
Annex F (informative) Laser beam processing.....		31
F.1	Laser beam cutting.....	31
F.2	Laser beam drilling.....	33
F.3	Laser beam surface treatment.....	33
F.4	Laser beam cladding.....	34
F.5	Laser beam marking and engraving.....	35
Bibliography.....		36

This is a preview of "ISO/TR 17671-6:2005". [Click here to purchase the full version from the ANSI store.](#)

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

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.

ISO/TR 17671-6 was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 10, *Unification of requirements in the field of metal welding*.

ISO/TR 17671 consists of the following parts, under the general title *Welding — Recommendations for welding of metallic materials*:

- *Part 1: General guidance for arc welding*
- *Part 2: Arc welding of ferritic steels*
- *Part 3: Arc welding of stainless steels*
- *Part 4: Arc welding of aluminium and aluminium alloys*
- *Part 5: Welding of clad steels*
- *Part 6: Laser beam welding*
- *Part 7: Electron beam welding*

This is a preview of "ISO/TR 17671-6:2005". [Click here to purchase the full version from the ANSI store.](#)

Introduction

ISO/TR 17671 has been issued in several parts in order that it can be extended to cover the different types of metallic material that are produced in accordance with all International Standards for weldable metallic materials.

When ISO/TR 17671 is referenced for contractual purposes, the ordering authority or contracting parties should state the need for compliance with the relevant parts of ISO/TR 17671 and such of the annexes as are appropriate.

This part of ISO/TR 17671 gives general guidance for the satisfactory production and control of welding and associated processes and details of some of the possible detrimental phenomena that can occur, with advice on methods by which they can be avoided. It is generally applicable to laser beam processing of metallic materials and also to some extent for non-metallic materials. It is appropriate regardless of the type of fabrication involved, although the relevant product standard, structural code or design specification can have additional requirements. Permissible design stresses, methods of testing and inspection levels are not included because they depend on the service conditions of fabrication. These details should be obtained from the relevant application standard or established by agreement between the contracting parties.

It has been assumed in the drafting of this part of ISO/TR 17671 that the execution of its provisions is entrusted to appropriately qualified, experienced and trained personnel.

Requests for official interpretations of any aspect of this part of ISO/TR 17671 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.