

INTERNATIONAL STANDARD

ISO
9606-1

First edition
1994-08-15

Approval testing of welders — Fusion welding —

Part 1: Steels

*Qualification des soudeurs — Soudage par fusion —
Partie 1: Aciers*



Reference number
ISO 9606-1:1994(E)

Contents

	Page
1 Scope	1
2 Normative references	1
3 Definitions	2
4 Symbols and abbreviations	2
4.1 General	2
4.2 Test piece	2
4.3 Consumable (including auxiliaries, e.g. shielding gas, flux) ...	3
4.4 Miscellaneous	3
5 Essential variables for approval testing	3
5.1 General	3
5.2 Welding processes	3
5.3 Joint types (butt and fillet welds)	3
5.4 Material groups	3
5.5 Filler metal, shielding gas and flux	4
5.6 Dimensions	4
5.7 Welding positions	5
6 Range of approval for the welder	5
6.1 General	5
6.2 Welding process	5
6.3 Joint types	5
6.4 Material groups	8
6.5 Covered electrodes	8
6.6 Shielding gas and flux	8
6.7 Dimensions	8
6.8 Welding positions	8

© ISO 1994

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 the publisher.

International Organization for Standardization
Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

7	Examination and testing	11
7.1	Supervision	11
7.2	Shape and dimensions of test pieces	11
7.3	Welding conditions	11
7.4	Test methods	11
7.5	Test piece and test specimens	14
8	Acceptance requirements for test pieces	16
9	Re-tests	17
9.1	General	17
9.2	Additional test specimens	17
10	Period of validity	17
10.1	Initial approval	17
10.2	Prolongation	18
11	Certification	18
12	Designation	18
Annexes		
A	Comparison of steel groups	20
B	Welder approval test certificate	21
C	Manufacturer's welding procedure specification (WPS) [see ISO 9956-2]	23
D	Job knowledge	25

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.

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.

International Standard ISO 9606-1 was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 11, *Approval requirements for welding and allied processes personnel*.

ISO 9606 consists of the following parts, under the general title *Approval testing of welders — Fusion welding*:

- Part 1: Steels
- Part 2: Aluminium and aluminium alloys
- Part 3: Nickel and nickel alloys
- Part 4: Magnesium and magnesium alloys
- Part 5: Titanium and titanium alloys

Annex A forms an integral part of this part of ISO 9606. Annexes B, C and D are for information only.

Introduction

This part of ISO 9606 covers the principles to be observed in the approval testing of welder performance for the fusion welding of steels.

The quality of work involved in welding depends on the skill of the welder to a high degree. The ability of the welder to follow verbal or written instructions and testing of his skill are therefore important factors in ensuring the quality of the welded product.

Testing of skill in accordance with this part of ISO 9606 depends on welding methods in which uniform rules and test conditions are complied with, and standard test pieces are used.

This part of ISO 9606 applies to processes where the skill of the welder has a significant influence on weld quality.

This part of ISO 9606 is intended to provide the basis for the mutual recognition by examining bodies for approval relating to welders' competence in the various fields of application. It is intended that tests be carried out in accordance with this part of ISO 9606 unless more severe tests are specified by the relevant application standard.

The test weld may be used to approve a welding procedure and a welder provided that all the relevant requirements, e.g. test piece dimensions, are satisfied (see ISO 9956).

The welder's skill and job knowledge continue to be approved only if the welder is working with reasonable continuity on welding work within the extent of approval.

However, this part of ISO 9606 does not invalidate previous welder approvals made to former national standards or specifications, providing the intent of the technical requirements is satisfied and the previous approvals are relevant to the application and production work on which they are to be employed.

Also, where additional tests have to be carried out to make the approval technically equivalent it is only necessary to do the additional tests on a test piece made in accordance with this part of ISO 9606. Consideration of previous approvals to former national standards or specifications should be at the time of the enquiry/contract stage and agreed between the contracting parties.

This document is a preview generated by EVS

This page intentionally left blank

Approval testing of welders — Fusion welding —

Part 1: Steels

1 Scope

This part of ISO 9606 specifies requirements, ranges of approval, test conditions, acceptance requirements and certification for the approval testing of welder performance for the welding of steels. The recommended format for the certificate of approval testing is given in annex B.

During the approval test, the welder is required to show adequate practical experience and job knowledge (test nonmandatory) of the welding processes, materials and safety requirements for which he is to be approved; information on these aspects is given in annex D.

This part of ISO 9606 is applicable when the welder's approval testing is required by the purchaser, by inspection authorities or by other organizations.

This part of ISO 9606 applies to the approval testing of welders for the fusion welding of steels.

The welding processes referred to in this part of ISO 9606 include those fusion welding processes which are designated as manual or partly mechanized welding. It does not cover fully mechanized and fully automatic processes (see 5.2).

This part of ISO 9606 covers approval testing of welders for work on semifinished and finished products made from wrought, forged or cast material types listed in 5.4.

This part of ISO 9606 does not cover the issue of the certificate of approval testing which is under the sole responsibility of the examiner or test body.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 9606. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 9606 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 857:1990, *Welding, brazing and soldering processes — Vocabulary*.

ISO 1106-1:1984, *Recommended practice for radiographic examination of fusion welded joints — Part 1: Fusion welded butt joints in steel plates up to 50 mm thick*.

ISO 1106-2:1985, *Recommended practice for radiographic examination of fusion welded joints — Part 2: Fusion welded butt joints in steel plates thicker than 50 mm and up to and including 200 mm in thickness*.

ISO 1106-3:1984, *Recommended practice for radiographic examination of fusion welded joints — Part 3: Fusion welded circumferential joints in steel pipes of up to 50 mm wall thickness*.

ISO 2560:—¹⁾, *Specification for carbon-manganese steel electrodes for shielded metal arc welding.*

ISO 3452:1984, *Non-destructive testing — Penetrant inspection — General principles.*

ISO 3580:1975, *Covered electrodes for manual arc welding of creep-resisting steels — Code of symbols for identification.*

ISO 3581:1976, *Covered electrodes for manual arc welding of stainless and other similar high alloy steels — Code of symbols for identification.*

ISO 4063:1990, *Welding, brazing, soldering and braze welding of metals — Nomenclature of processes and reference numbers for symbolic representation on drawings.*

ISO 5173:—²⁾, *Welding — Welded butt joints in metallic materials — Bend tests.*

ISO 5817:1992, *Arc-welded joints in steel — Guidance on quality levels for imperfections.*

ISO 6520:1982, *Classification of imperfections in metallic fusion welds, with explanations.*

ISO 6947:1990, *Welds — Working positions — Definitions of angles of slope and rotation.*

ISO 9956-2:—³⁾, *Specification and approval of welding procedures for metallic materials — Part 2: Welding procedure specification for arc welding.*

ISO 9956-3:—³⁾, *Specification and approval of welding procedures for metallic materials — Part 3: Welding procedure tests for the arc welding of steels.*

3 Definitions

For the purposes of this part of ISO 9606, the following definitions apply.

3.1 welder: Person who performs the welding.

NOTE 1 Collective term used for both manual welders and welding operators. It does not cover operators for fully mechanized and fully automatic welding processes.

3.1.1 manual welder: Welder who holds and manipulates the electrode holder, welding gun, torch or blowpipe by hand.

3.1.2 welding operator: Welder who operates welding equipment with partly mechanized relative movement between the electrode holder, welding gun, torch or blowpipe and the workpiece.

3.2 examiner or test body: Person or organization appointed by the contracting parties to verify compliance with this part of ISO 9606.

3.3 welding procedure specification (WPS): Document providing in detail the required variables for a specific application to assure repeatability.

3.4 range of approval: Extent of approval for an essential variable.

3.5 test piece: Welded assembly which is used in the approval test.

3.6 test specimen: Part or portion cut from the test piece in order to perform a specified destructive test.

3.7 test: Series of operations which will include the making of a welded test piece and subsequent non-destructive and/or destructive testing reporting of results.

4 Symbols and abbreviations

4.1 General

Where the full wording is not used, the following symbols and abbreviations shall be used when completing the test certificate (see annex B).

4.2 Test piece

<i>a</i>	nominal throat thickness
BW	butt weld
<i>D</i>	outside diameter of pipe
FW	fillet weld
P	plate
<i>t</i>	plate or pipe wall thickness
T	pipe
<i>z</i>	leg length of fillet weld

1) To be published. (Revision of ISO 2560:1973)

2) To be published. (Revision of ISO 5173:1981)

3) To be published.