



JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

JIS Z 3420 : 2003

(JWES)

**Specification and approval of
welding procedures for metallic
materials—General rules**

ICS 25.160.10

Reference number : JIS Z 3420 : 2003 (E)

PROTECTED BY COPYRIGHT

Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee according to the proposal of establishing a Japanese Industrial Standard from The Japan Welding Engineering Society (JWES), with a draft of Industrial Standard based on the provision of Article 12 Clause 1 of the Industrial Standardization Law.

This Standard has been made based on **ISO/DIS 15607 : 2000** *Specification and approval of welding procedures for metallic materials—General rules* for the purposes of making it easier to compare this Standard with International Standards; to prepare Japanese Industrial Standard conforming with International Standards; and to propose a draft of an International Standard which is based on Japanese Industrial Standard.

Date of Establishment: 2003-10-20

Date of Public Notice in Official Gazette: 2003-10-20

Investigated by: Japanese Industrial Standards Committee
Standards Board
Technical Committee on Welding

JIS Z 3420 : 2003, First English edition published in 2004-03

Translated and published by: Japanese Standards Association
4-1-24, Akasaka, Minato-ku, Tokyo, 107-8440 JAPAN

In the event of any doubts arising as to the contents,
the original JIS is to be the final authority.

© JSA 2004

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.

Printed in Japan

PROTECTED BY COPYRIGHT

Contents

	Page
Introduction	1
1 Scope	1
2 Normative references	2
3 Definitions	3
4 Welding procedure specification format	5
5 Development and approval of welding procedures	5
5.1 General	5
5.2 Qualification based on welding procedure test	6
5.3 Approval based on approved welding consumables	6
5.4 Approval based on previous welding experience	6
5.5 Approval based on a standard welding procedure	7
5.6 Approval based on a pre-production welding test	7
Annex A (informative) New numbering system of ISO—Details of the standards dealing with specification and approval of welding procedures	8
Annex B (informative) Different phases in welding procedure approval	10
Annex 1 (informative) Comparison table between JIS and corresponding International Standard	11
Annex 2 (informative) Contrast of JIS Z 3420 with other related standards	14

Specification and approval of welding procedures for metallic materials— General rules

Introduction This Japanese Industrial Standard has been prepared based on **ISO/DIS 15607** : 2000 *Specification and approval of welding procedures for metallic materials—General rules* with some modifications of the technical contents.

Portions underlined with dots are the matters in which the contents of original International Standard have been modified. The table of modifications is shown as Annex 1 (informative) with the explanations.

Welding procedure specifications are needed in order to provide a well defined basis for planning of the welding operations and for quality control during welding. Welding is considered a special process in the terminology of standards for quality systems. Standards for quality systems usually require that special processes be carried out in accordance with written procedure specifications.

Preparation of a welding procedure specification provides the necessary basis for, but does not in itself ensure that the welds fulfil the requirements. Some deviations, notably imperfections and distortions, can be evaluated by non-destructive methods on the finished product.

Metallurgical deviations constitute a special problem, however, because non-destructive evaluation of the mechanical properties is impossible at the present level of non-destructive technology, this has resulted in the establishment of a set of rules for qualification of the welding procedure prior to the release of the specification to actual production. This Standard defines these rules.

1 Scope This Standard defines general rules for the specification and approval of welding procedures for metallic materials. This Standard also refers to several other standards as regards detailed rules for specific applications. This Standard is part of a series of standards. Annex A gives details of this series of standard and Annex B gives a flowchart for the use of these standards.

This Standard is applicable to manual, mechanized and automatic welding.

This Standard applies to the case where the approval of welding procedures is required in accordance, for example, with contracts, standards, rules or law. Welding procedures are approved by conforming to one or more welding procedure approval records (WPAR).

The use of a particular method, the approval of welding procedure approval records (WPAR), is often a requirement of an application standard. If there is no requirement, the method of approval shall be agreed between parties concerned.

Remarks : The International Standard corresponding to this Standard is as follows.

In addition, symbols which denote the degree of correspondence in the contents between the relevant International Standard and **JIS** are IDT (identical), MOD (modified), and NEQ (not equivalent) according to **ISO/IEC Guide 21**.

ISO/DIS 15607 : 2000 *Specification and approval of welding procedures for metallic materials—General rules (MOD)*

Information : It is assumed that welding procedure specifications are used in production by competent welders, qualified according to an appropriate standard. Appropriate standard here means a standard agreed between the parties concerned with contract such as Japanese Industrial Standard, International Standard, non-national standard, etc. Their examples are given in Annex 2.

2 Normative references The following standards contain provisions which, through reference in this Standard, constitute provisions of this Standard. If the indication of the year of publication is given to these referred standards, only the edition of indicated year constitutes the provision of this Standard but the revision and amendment made thereafter are not applied. The normative references without the indication of the year of coming into effect apply limiting only to the most recent edition (including amendments).

JIS Z 3001 *Welding terms*

JIS Z 3421-1 *Specification and approval of welding procedures for metallic materials—Welding procedure specification for arc welding*

Remarks : **ISO/DIS 15609-1** : 2000 *Specification and approval of welding procedures for metallic materials—Welding procedure specification—Part 1 : Arc welding* is equivalent to the said standard.

JIS Z 3422-1 *Specification and approval of welding procedures for metallic materials—Welding procedure tests—Part 1 : Arc and gas welding of steels and arc welding of nickel and nickel alloys*

Remarks : **ISO/DIS 15614-1** : 2000 *Specification and approval of welding procedures for metallic materials—Welding procedure tests—Part 1 : Arc and gas welding of steels and arc welding of nickel and nickel alloys* is equivalent to the said standard.

ISO 6520-1 : 1998 *Welding and allied processes—Classification of geometric imperfections in metallic materials—Part 1 : Fusion welding*

ISO 6520-2 : 1998 *Welding and allied processes—Classification of geometric imperfections in metallic materials—Part 2 : Welding with pressure*

ISO/DIS 14555 : 1998 *Welding—Arc stud welding of metallic materials*

ISO/DIS 15609-2 : 2000 *Specification and approval of welding procedures for metallic materials—Welding procedure specification—Part 2 : Gas welding*

ISO/DIS 15609-3 : 2000 *Specification and approval of welding procedures for metallic materials—Welding procedure specification—Part 3 : Electron beam welding*

ISO/DIS 15609-4 : 2000 *Specification and approval of welding procedures for metallic materials—Welding procedure specification—Part 4 : Laser beam welding*

- ISO/DIS 15609-5 : 2000 *Specification and approval of welding procedures for metallic materials—Welding procedure specification—Part 5 : Resistance welding*
- ISO/DIS 15610 : 1999 *Specification and approval of welding procedures for metallic materials—Approval by using approval welding consumables*
- ISO/DIS 15611 : 1999 *Specification and approval of welding procedures for metallic materials—Approval related to previous welding experience*
- ISO/DIS 15612 : 1999 *Specification and approval of welding procedures for metallic materials—Approval by a standard welding procedure for arc welding*
- ISO/DIS 15613 : 1999 *Specification and approval of welding procedures for metallic materials—Approval by a pre-production welding test*
- ISO/DIS 15620 : 1997 *Welding—Friction welding of metallic materials*

3 Definitions For the purposes of this Standard, the definitions given in JIS Z 3001 and the following definitions apply.

- a) **welding procedure** specified course of action to be followed in making a weld, including the welding process(es), reference to parent materials, welding consumables, preparation, preheating (if necessary), method and control of welding and post-weld heat treatment (if relevant), and necessary equipment to be used.
- b) **welding procedure specification** document providing in detail the required variables of the welding procedure to ensure repeatability.
- c) **preliminary welding procedure specification (pWPS)** welding procedure specification which has to be approved and is regarded as proper by manufacturer.
- d) **welding procedure specification (WPS)** welding procedure specification which has been approved by conforming to one or more WPARs.
- e) **work instruction** simplified specification of the welding procedure, suitable for direct application in the workshop.
- f) **welding procedure approval record (WPAR)** record comprising all necessary data needed for application of a preliminary welding procedure specification (pWPS).
- g) **welding procedure test** making and testing of a standardized test piece, as indicated in the pWPS, in order to approve a welding procedure specification.
- h) **pre-production welding test** welding test having the same function as a welding procedure test, but based on a non-standard test piece representative of the production conditions.
- i) **standard welding procedure specification** welding procedure specification which has been approved by a welding procedure test not related to the manufacturer and approved by an examiner or examining body. A standard welding procedure may then be made available to any manufacturer.