



JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

JIS G 0901 : 2023

(JISF)

**Classification of structural rolled steel
plate and wide flat for building by
ultrasonic test**

ICS 77.040.20 ; 77.140.50

Reference number : JIS G 0901 : 2023 (E)

PROTECTED BY COPYRIGHT

G 0901 : 2023

Date of Establishment: 1983-03-01

Date of Revision: 2023-05-22

Date of Public Notice in Official Gazette: 2023-05-22

Developed by: The Japan Iron and Steel Federation

Investigated by: The Japan Iron and Steel Federation, Standardization
Center

JIS G 0901 : 2023, First English edition published in 2023-09

Translated and published by: Japanese Standards Association
Mita MT Building, 3-13-12, Mita, Minato-ku, Tokyo, 108-0073 JAPAN

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

© JSA 2023

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	1
3 Terms and definitions	2
4 Flaw detection method	3
5 Inspection engineer	3
6 Flaw detection apparatus	3
6.1 Composition of flaw detection apparatus	3
6.2 Flaw detector	3
6.3 Probes	5
6.4 Functions and devices available for automated testing apparatus	6
6.5 Testing block	6
7 Procedure of flaw detection	6
7.1 Type of flaw detection	6
7.2 Timing of flaw detection	6
7.3 Test surface	7
7.4 Coupling medium	7
7.5 Scanning procedure	7
7.6 Flaw detecting position (scanning position and area)	7
8 Working sensitivity and probe specification	8
8.1 General	8
8.2 Working sensitivity, probe specification and reference lines of double crystal probe	8
8.3 Working sensitivity, nominal frequency and transducer dimension of crystal probe	9
9 Classification and evaluation of flaws	10
9.1 Classification of flaws detected by using double crystal probes	10
9.2 Classification of flaws detected by using crystal probes	10
9.3 Representative flaws	11
9.4 Weighted number of divisions involving flaws	11
9.5 Degree of occupancy	11
9.6 Local degree of occupancy	11
9.7 Classification and acceptance criteria	12
10 Repair by welding	12
11 Test report	12

Annex JA (normative) Type E reference block for double crystal probe (RB-E) 14

Annex JB (normative) Performance of double crystal probe 15

Annex JC (informative) Comparison table between JIS and corresponding
International Standard 17

Foreword

This Japanese Industrial Standard has been revised by the Minister of Economy, Trade and Industry based on the provision of Article 14, paragraph (1) of the Industrial Standardization Act applied mutatis mutandis pursuant to the provision of Article 16 of the said Act in response to a proposal for revision of Japanese Industrial Standard with a draft being attached, submitted by The Japan Iron and Steel Federation (JISF), an accredited standards development organization. This edition replaces the previous edition (**JIS G 0901** : 2010), which has been technically revised.

This **JIS** document is protected by the Copyright Act.

Attention is drawn to the possibility that some parts of this Standard may conflict with patent rights, published patent application or utility model rights. The relevant Minister is not responsible for identifying any of such patent rights, published patent application or utility model rights.

Blank

Classification of structural rolled steel plate and wide flat for building by ultrasonic test

Introduction

This Japanese Industrial Standard has been prepared based on **ISO 17577** : 2016, Edition 2, with some modifications of the technical contents.

Annex JA and Annex JB are unique to **JIS** and not given in the corresponding International Standard. The vertical lines on both sides and dotted underlines indicate changes from the corresponding International Standard. A list of modifications with the explanations is given in Annex JC.

1 Scope

This Standard specifies the classification and acceptance criteria by ultrasonic test on rolled steel plates of thickness 13 mm or over up to and including 200 mm (hereafter referred to as rolled steel plates), and wide flats of thickness 13 mm or over up to and including 200 mm and width 180 mm or over (hereafter referred to as wide flats), which are used for main structural members of steel structures being subjected to remarkably strong stress in the thickness direction.

NOTE The International Standard corresponding to this Standard and the symbol of degree of correspondence are as follows.

ISO 17577 : 2016 *Steel — Ultrasonic testing of steel flat products of thickness equal to or greater than 6 mm* (MOD)

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 21-1**.

2 Normative references

Part or all of the provisions of the following standards, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS B 0601 *Geometrical Product Specifications (GPS) — Surface texture : Profile method — Terms, definitions and surface texture parameters*

JIS G 0202 *Glossary of terms used in iron and steel (Testing)*

JIS G 0203 *Glossary of terms used in iron and steel (Products and quality)*

JIS G 0431 *Steel products — Employer's qualification system for non-destructive testing (NDT) personnel*

JIS G 3103 *Carbon steel and molybdenum alloy steel plates for boilers and pres-*

sure vessels

JIS G 3106 Rolled steels for welded structure

JIS G 4304 Hot-rolled stainless steel plate, sheet and strip

JIS Z 2300 Terms and definitions of nondestructive testing

JIS Z 2305 Non-destructive testing — Qualification and certification of NDT personnel

JIS Z 2344 General rule of ultrasonic testing of metals by pulse echo technique

JIS Z 2345-3 Standard test blocks for ultrasonic testing — Part 3 : Standard test blocks for normal ultrasonic testing

JIS Z 2352 Method for evaluating performance characteristics of ultrasonic pulse-echo testing systems

3 Terms and definitions

For the purpose of this Standard, the following terms and definitions, and those given in **JIS G 0202**, **JIS G 0203**, **JIS G 0431** and **JIS Z 2300** apply.

3.1

internal discontinuity

any flaw lying within the thickness of the rolled steel plates or wide flats

Note 1 to entry Examples are planar or laminar imperfection, single-plane or multi-plane inclusion bands or clusters.

3.2

manual and assisted manual testing

testing by an operator applying an ultrasonic probe to the surface of the rolled steel plate or wide flat, manually executing the appropriate scanning pattern on the surface and visually assessing ultrasonic signal indications on the A-scan display either by direct viewing or by built-in signal amplitude alarm devices

3.3

automated and semi-automated testing

testing using a mechanized means of applying the ultrasonic probe or probes to the surface of the rolled steel plate or wide flat, and executing the appropriate scanning pattern, together with ultrasonic signal evaluation by electronic means

3.4

type E reference block for double crystal probe (RB-E)

testing block for analyzing the distance-amplitude characteristics of double crystal probe

Note 1 to entry It is also used for sensitivity setting.

4 Flaw detection method

The flaw detection method shall be a pulse echo method by a normal beam technique.

General matters other than those specified in this Standard shall be in accordance with JIS Z 2344.

5 Inspection engineer

Automated ultrasonic testing of rolled steel plates and wide flats shall be carried out only by qualified personnel under the responsibility of Level 2 or Level 3 qualified person. Qualification shall include regular training, success in examination, experience and satisfactory vision test. Manual ultrasonic testing of rolled steel plates and wide flats shall be carried out only by personnel qualified at minimum Level 1 and under the responsibility of Level 2 or Level 3 qualified person.

Qualification of the responsible person shall be in accordance with JIS G 0431, JIS Z 2305 or an appropriate standard.

NOTE 1 Level 1, Level 2 and Level 3 qualifications for non-destructive testing (NDT) personnel are specified in JIS G 0431 and JIS Z 2305.

NOTE 2 JIS G 0431, 5.2 specifies that Level 1 NDT personnel may be authorised to record, classify and report results according to NDT instructions under the supervision of Level 2 or Level 3 NDT personnel, but shall not interpret the test results.

6 Flaw detection apparatus

6.1 Composition of flaw detection apparatus

Automated testing apparatus shall be composed of an automated detector, probe, rolled steel plate or wide flat scanning and indexing device, manipulator, automated alarm system, device capable of indicating the position of internal discontinuities, etc. Manual testing apparatus shall be composed mainly of a manual detector and probe.

6.2 Flaw detector

6.2.1 General requirements

The general requirements for a flaw detector shall be as follows.

- a) The pulse echo technique with normal incidence to the scanning surface of rolled steel plate or wide flat shall be used for the ultrasonic testing.
- b) The instrument shall be equipped with time-base regulation and the gain control shall be calibrated in decibels. The electronic equipment shall be appropriate for the ultrasonic probes and frequencies used.
- c) The transmitter pulse repetition frequency shall be appropriate for the applied scanning speed.
- d) The instrument shall detect the ultrasonic signals of internal discontinuities by using a gate function. The output signal shall be provided for devices like display