



JAPANESE
INDUSTRIAL
STANDARD

Translated and Published by
Japanese Standards Association

JIS Z 3930 : 2001
(JWES/JSA)

**Determination of emission rate
of particulate fume in arc welding**

ICS 25.160.01

Descriptors : covered electrodes, fumes, arc welding

Reference number : JIS Z 3930 : 2001 (E)

 **Documents**
Document Sharing Hub

Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee, as the result of proposal for revision of Japanese Industrial Standard submitted by the Japan Welding Engineering Society (JWES)/the Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law. Consequently **JIS Z 3930 : 1979** is replaced with this Standard.

Date of Establishment: 1979-03-01

Date of Revision: 2001-04-20

Date of Public Notice in Official Gazette: 2001-04-20

Investigated by: Japanese Industrial Standards Committee
Divisional Council on Welding

JIS Z 3930:2001, First English edition published in 2001-12

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 2001

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

Determination of emission rate of particulate fume in arc welding

Introduction This Japanese Industrial Standard has been prepared based on **ISO/FDIS 15011-1** *Health and safety in welding and allied processes—Laboratory method for sampling fume and gases generated by arc welding—Part 1 : Determination of emission rate and sampling for analysis of particulate fume*, published in 2000, with partial modification in technical contents.

The dotted-underlined parts in this Standard are the modified items in the original International Standard. The table of deviations is shown in Annex 2, attached with details.

1 Scope This Japanese Industrial Standard specifies the determination of emission rate of particulate fume generated in welding by covered electrode and, solid wire and flux cord wire for gas-shielded metal arc welding (hereafter referred to as “welding consumables”).

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

The symbols to denote the degree of correspondence shall be IDT (identified), MOD (modified) and NEQ (not equivalent), based on **ISO/IEC Guide 21**.

ISO/FDIS 15011-1 : 2000 *Health and safety in welding and allied processes—Laboratory method for sampling fume and gases generated by arc welding—Part 1 : Determination of emission rate and sampling for analysis of particulate fume* (MOD)

2 Normative references The following standards contain provisions which, through reference in this Standard, constitute provisions of this Standard. The most recent editions (including amendments) of the standards indicated below shall be applied.

JIS G 3101 Rolled steels for general structure

JIS G 3106 Rolled steels for welded structure

JIS Z 3001 Welding terms

3 Definitions For the main terms used in this Standard the definitions in JIS Z 3001 apply.

4 Method of measurement

4.1 Welding consumables The covered electrode shall be dried to use under the conditions recommended by manufacturer. The welding consumables, which are stored in the ambient environment capable of preventing dewing and moisture absorption, shall be used.

4.2 Test plate

4.2.1 Kind of test plate For the test plate, SS400 in **JIS G 3101**, SM400A to C in **JIS G 3106** or the equivalent material⁽¹⁾ to those shall be used.

When the welding consumables for nonferrous metal are tested, the test plate with corresponding component shall be used.

Note (1) The equivalent material means the rolled steels with the equivalent chemical composition and mechanical properties to SS400 in **JIS G 3101** or SM400A to C in **JIS G 3106**.

4.2.2 Surface condition of test plate The surface of test plate shall be clean and free from rust and additives which may affect the measurement.

4.3 Fume collecting apparatus The apparatus used for collecting particulate fume shall be composed of the filter material, high volume air sampler (hereafter referred to as "sampler") and fume collecting box, all of which are specified below. An example of fume collecting apparatus is shown in Fig. 1.

4.3.1 Filter material The filter material shall be of glass fiber whose collecting rate is 99 % or more for 0.3 μm particles, and rectangular-shaped (dimensions: approximately 250 mm $\times$ approximately 200 mm).

4.3.2 Sampler The sampler shall have an attracting ability of 1.5 m³/min to 2.0 m³/min with filter material attached before measurement and maintain the attracting ability of at least 0.3 m³/min after collecting fume. The sampler shall show no leakage of air from the area where the filter material attached.

4.3.3 Fume collecting box The fume collecting box shall be approximately 700 mm in length, approximately 700 mm in width and approximately 800 mm in height, shall enable welding with hands inserted from the wall, and shall attract and collect fume with the sampler attached to the upper opening. The collecting box shall be so constructed as not to allow leakage of fume during collection.

4.4 Welding

4.4.1 Welding conditions The welding conditions shall be the appropriate conditions recommended by manufacturer.

Welding current and arc voltage shall be measured with the accuracy of 1 A and 1 V with using of grade 0.5 measuring instrument.

4.4.2 Welding method Welding shall be carried out on a test plate by forming continuous stringer bead with downward posture.

4.4.3 Welding time Welding time shall be 30 s or longer, and measured with the accuracy of 0.1 s.

The upper limit shall be settled to the degree where at least 100 mg fumes are collected and the filter material is not choked. However, when the filter material will be clogged due to much amount of generated fume, the welding time may be shortened to under 30 s.