

# SVENSK STANDARD

## SS-EN ISO 15011-4:2018



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### **Hälsa och säkerhet vid svetsning och besläktade förfaranden – Laboratoriemetod för provtagning av rök och gaser – Del 4: Rökdatablad (ISO 15011-4:2017)**

### **Health and safety in welding and allied processes – Laboratory method for sampling fume and gases – Part 4: Fume data sheets (ISO 15011-4:2017)**

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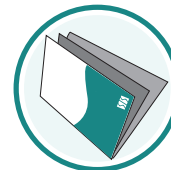
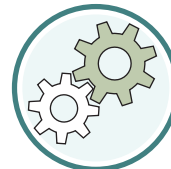
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Europastandarden EN ISO 15011-4:2018 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN ISO 15011-4:2018.

Denna standard ersätter SS-EN ISO 15011-4:2006, utgåva 1 och SS-EN ISO 15011-4:2006/A1:2008, utgåva 1.

The European Standard EN ISO 15011-4:2018 has the status of a Swedish Standard. This document contains the official version of EN ISO 15011-4:2018.

This standard supersedes the Swedish Standard SS-EN ISO 15011-4:2006, edition 1 and SS-EN ISO 15011-4:2006/A1:2008, edition 1.

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EUROPEAN STANDARD

EN ISO 15011-4

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2018

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Supersedes EN ISO 15011-4:2006

English Version

Health and safety in welding and allied processes -  
Laboratory method for sampling fume and gases - Part 4:  
Fume data sheets (ISO 15011-4:2017)

Hygiène et sécurité en soudage et techniques connexes  
- Méthode de laboratoire d'échantillonnage des fumées  
et des gaz - Partie 4: Fiches d'information sur les  
fumées (ISO 15011-4:2017)

Arbeits- und Gesundheitsschutz beim Schweißen und  
bei verwandten Verfahren - Laborverfahren zum  
Sammeln von Rauch und Gasen - Teil 4:  
Rauchdatenblätter (ISO 15011-4:2017)

This European Standard was approved by CEN on 7 December 2017.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

**SS-EN ISO 15011-4:2018 (E)**

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## **European foreword**

This document (EN ISO 15011-4:2018) has been prepared by Technical Committee ISO/TC 44 "Welding and allied processes" in collaboration with Technical Committee CEN/TC 121 "Welding and allied processes", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2018, and conflicting national standards shall be withdrawn at the latest by August 2018.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 15011-4:2006.

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## **Endorsement notice**

The text of ISO 15011-4:2017 has been approved by CEN as EN ISO 15011-4:2018 without any modification.

## **SS-EN ISO 15011-4:2018 (E)**

### **Introduction**

Welding and allied processes produce airborne particles and gaseous by-products that can be harmful to human health. Knowledge of the quantity and composition of the airborne particles and gases emitted can be useful for occupational hygienists in assessing workplace exposure and in determining appropriate control measures.

Welding processes, consumables and parameters give rise to various fume emission rates, which in turn lead to different welder exposures. Emission rate cannot be used directly to assess exposure. However, processes, consumables and welding parameters that give lower emission rates generally result in lower welder exposures than processes with higher emission rates used in the same working situation.

Clear instructions and supporting informative guidance are provided in order to ensure that the welding conditions used are selected thoughtfully according to a standardized procedure. The need to fully report the welding conditions used in the test is emphasized, and an example is provided of how such information should be conveyed on a fume data sheet. This document also gives information about how the data obtained can be used.

It has been assumed in the drafting of this document that the execution of its provisions and the interpretation of the results obtained are entrusted to appropriately qualified and experienced people.



# Health and safety in welding and allied processes — Laboratory method for sampling fume and gases —

## Part 4: Fume data sheets

### 1 Scope

This document covers health and safety in welding and allied processes. It specifies requirements for determination of the emission rate and chemical composition of welding fume in order to prepare fume data sheets.

It applies to all filler materials used for joining or surfacing by arc welding using a manual, partly mechanized or fully automatic process, depositing unalloyed steel, alloyed steel and non-ferrous alloys. Manual metal arc welding, gas-shielded metal arc welding with solid wires, metal-cored and flux-cored wires and arc welding with self-shielded flux-cored wires are included within the scope of this document.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 15011-1, *Health and safety in welding and allied processes — Laboratory method for sampling fume and gases — Part 1: Determination of fume emission rate during arc welding and collection of fume for analysis*

ISO/TR 25901-2, *Welding and allied processes — Vocabulary — Part 2: Safety and health*

ISO/TR 25901-3, *Welding and allied processes — Vocabulary — Part 3: Welding processes*

EN 1540, *Workplace atmospheres — Terminology*

EN/TR 14599, *Terms and definitions for welding purposes in relation with EN 1792*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/TR 25901-2, ISO/TR 25901-3, EN 1540, EN/TR 14599 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

## SS-EN ISO 15011-4:2018 (E)

### 3.1 additive limit value

limit value that, in the absence of specific knowledge of the combined health effects of a mixture of chemical agents, is calculated on the basis that the health effects of the various components are at least additive

Note 1 to entry: For complex substances that are mixtures of chemical agents, such as welding fume, individual substances can have specific, independent health effects or they can have synergistic, additive or antagonistic health effects.

### 3.2 additive welding fume limit value *additive limit value* ([3.1](#)) for welding fume

### 3.3 key component of a welding fume

component of a welding fume that has the greatest occupational hygienic significance and therefore requires the most stringent control measures to ensure that a welder is not exposed to an excessive level of the substance concerned, i.e. it is the component whose limit value is exceeded at the lowest welding fume concentration

### 3.4 key component welding fume limit value

limit value which, if not exceeded, ensures that no component of the welding fume has a concentration above its limit value

### 3.5 principal component of the welding fume component of a welding fume that is of occupational hygienic significance

### 3.6 single component welding fume limit value

limit value calculated for a single component which, if not exceeded, ensures that the component does not have a concentration above its limit value

## 4 Principle

**4.1** Tests are carried out to determine the emission rate and chemical composition of welding fume produced when a welding consumable is used under a defined set of operating conditions. The welding fume is generated in accordance with the procedure described in ISO 15011-1 and under the conditions specified in this document.

**4.2** Emission rate and chemical composition data are reported in a recommended format, and various ways in which the data may be used are described.

## 5 Procedure

**5.1** Determine the fume emission rate and/or collect fume samples for analysis, as required, in accordance with the procedure described in ISO 15011-1. Carry out the tests under the conditions prescribed in [6.2](#), [6.3](#) and [6.4](#) as appropriate.

**NOTE** In practice, emission rates can vary significantly from those determined under the test conditions specified in [6.2](#), [6.3](#) and [6.4](#). This is because the welding conditions used in the workplace can be significantly different from those specified in this document. The conditions specified are typical of common practice and have been standardized to generate comparative data for a welding fume consumable classification.

5.2 Analyse the welding fume samples to generate chemical composition data for all the principal components of the welding fume (see [Table E.1](#)). Identify these, if necessary, by carrying out an initial qualitative analysis of the fume.

5.3 Estimate and report the uncertainty of measurements in accordance with the ISO GUM.<sup>[1]</sup> See [Annex C](#) for examples of performance data obtained in an interlaboratory comparison.

## 6 Test conditions

### 6.1 Generic test parameters

[Table 1](#) lists the test parameters that apply to all the welding processes included in the scope of this document and it also gives cross-references for parameters that are process-specific.

Where it is specified in [Tables 1](#) to [6](#) that a test condition is established by an experienced welder, if possible use the median of test conditions established by a number of experienced welders.

All instruments used for measuring test parameters shall have a calibration traceable to national standards.

**Table 1 — Generic test parameter**

Parameter	Purpose of test	Test parameters
Diameter	FER	For processes other than gas-shielded metal arc welding with solid wires, determine the FER for the smallest and largest diameter in the product range and estimate the FER for other diameters by interpolation. For gas-shielded metal arc welding with solid wires, determine the FER for at least 1,0 mm and 1,2 mm diameter wires.
	CC	Generate chemical composition data by analysis of welding fume generated from any diameter.
Current	FER and CC	For manual metal arc welding, see <a href="#">Table 2</a> . For gas-shielded metal arc welding with solid, metal-cored and flux-cored wires, see <a href="#">Table 3</a> . For self-shielded metal arc welding with flux-cored wires, see <a href="#">Table 6</a> . Measure the current in the return lead.
Voltage	FER and CC	For manual metal arc welding, see <a href="#">Table 2</a> . For gas-shielded metal arc welding with solid, metal-cored and flux-cored wires, see <a href="#">Table 3</a> . For self-shielded metal arc welding with flux-cored wires, see <a href="#">Table 6</a> .
Polarity	FER and CC	For manual metal arc welding, see <a href="#">Table 2</a> . For gas-shielded metal arc welding with solid, metal-cored and flux-cored wires, see <a href="#">Table 3</a> . For self-shielded metal arc welding with flux-cored wires, see <a href="#">Table 6</a> .
Gas type and gas flow	FER and CC	For gas-shielded metal arc welding with solid, metal-cored and flux-cored wires, see <a href="#">Table 3</a> .
Welding speed	FER and CC	Use the optimum welding speed, as established by an experienced welder.
FER = fume emission rate CC = chemical composition		