

ICS 25.160.10

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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 43905.4-2024

**Laboratory method for sampling fume and gases in welding
and allied processes - Part 4: Welding consumables welding
fume emission limit value**

(English Translation)

Issued on: April 25, 2024

Implemented on: November 1, 2024

**Issued by: State Administration for Market Regulation, China National
Standardization Administration**

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Foreword

This document is in accordance with the rules of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents"

Drafting:

This document is part 4 of GB/T 43905 "Laboratory methods for sampling of fumes and gases during welding and allied processes":

The following parts have been published:

--- Part 1: Determination of fume emission rate during arc welding and collection of fume for analysis;

--- Part 2: Determination of emission rates of carbon monoxide, carbon dioxide, nitric oxide and nitrogen dioxide during arc welding, cutting and gouging;

--- Part 3: Determination of ozone emission rate during arc welding;

- Part 4: Emission limits of welding fume from welding materials;
- Part 5: Identification of thermal degradation products of organic materials during welding or cutting based on pyrolysis-gas chromatography-mass spectrometry;
- Part 6: Quantitative determination of smoke and gases during resistance spot welding:

This document is modified to adopt ISO 15011-4:2017 "Health and safety for welding and allied processes - Laboratory methods for sampling fumes and gases":

Part 4: Smoke Data Sheet:

The technical differences between this document and ISO 15011-4:2017 and their reasons are as follows:

- Replace ISO/T R25901-2, ISO/T R25901-3, EN1540 with normative references GBZ/T 224 and GB/T 3375 and EN/T R14599 (see Chapter 3) to apply my country's technical requirements;
- Added the term and definition of "emission rate" (see 3.7) to facilitate the implementation of this document;
- ISO 15011-1 (see 4.1, 5:1) is replaced by the normative reference GB/T 43905.1 to apply my country's technical requirements;
- Replaced ISO GUM:1993 (see 5.3) with the normative reference GB/T 27418 to apply my country's technical requirements:

The following editorial changes were made to this document:

- According to the content and scope of application of the standard, the name of the standard is changed to "Laboratory Methods for Sampling Fumes and Gases in Welding and Related Processes" Part 4: Limits of emission of welding fume from welding materials;
- Deleted the "Notes" in Table 7 and D:1:2:1 in 3:1, 5:1 and 7:3 of ISO 15011-4:2017;
- Deleted "Note 3" of D:1:2:2 in ISO 15011-4:2017:

Introduction

GB/T 43905 "Laboratory methods for sampling of fumes and gases during welding and allied processes" provides laboratory methods for sampling and analysis of fumes and gases:

GB/T 43905 is a universal standard for the analysis of dust and gas generated by different process methods:

The basic method standard consists of six parts:

- Part 1: Determination of smoke emission rate during arc welding and collection of smoke

for analysis: The purpose is to specify the conditions applicable to welding that is prone to generate smoke:

Laboratory method for determination of welding fume emission rate from open arc welding of fumes and collection methods for analysis:

--- Part 2: Determination of emission rates of carbon monoxide, carbon dioxide, nitric oxide and nitrogen dioxide during arc welding, cutting and gouging:

The purpose is to specify the carbon monoxide, carbon dioxide, nitrogen monoxide, and carbon dioxide generated during arc welding, cutting, and gouging:

Laboratory method for determination of nitrogen emission rate:

--- Part 3: Determination of ozone emission rate during arc welding: The purpose is to specify the ozone emission rate applicable to automatic arc welding process Laboratory method for determination of emission rates:

--- Part 4: Limits of welding fume emissions from welding materials: The purpose is to specify the limits applicable to non-alloy steel, alloy steel and non-ferrous metals:

Method for compiling welding fume emission limits for all welding materials used for manual, semi-automatic or fully automatic arc welding connections or cladding:

--- Part 5: Identification of thermal degradation products of organic materials during welding or cutting based on pyrolysis-gas chromatography-mass spectrometry:

The regulations apply to coatings composed wholly or partly of organic materials that are subjected to thermal degradation during welding, cutting, preheating and straightening:

Laboratory method for identification and semi-quantitative measurement of the components of undefined products:

--- Part 6: Quantitative determination of smoke and gases in resistance spot welding: The purpose is to specify the application of the resistance spot welding of coated and uncoated steel sheets:

Laboratory method for determination of emission rates of fumes and gases generated by welding:

Welding and related processes generate fumes and gases which can be harmful to human health if inhaled:

This information can help occupational health professionals assess worker exposure and determine appropriate control measures:

Welding process, welding materials and welding parameters will cause different emission rates of welding fumes, resulting in different exposure concentrations for welders:

The emission rate cannot be used directly to evaluate the exposure: Generally speaking,

under the same working conditions, the welding process with a higher emission rate will be in comparison, welding processes, welding materials and welding parameters with lower emission rates generally result in lower exposure concentrations for welders:

To ensure that the welding conditions used conform to standardized procedures, this document provides clear instructions and supporting information guidance, emphasizing the need to fully report the welding conditions used in the test is highlighted and an example of how this information can be communicated on a fume data sheet is provided:

The document also provides information on how to use the obtained data:

The execution of this document and the interpretation of the results obtained are the responsibility of qualified and experienced personnel:

Sampling of fumes and gases during welding and related processes Laboratory methods
Part 4: Welding of welding materials Smoke emission limit

1 Scope

This document describes the method for compiling emission limits for welding fumes from welding materials and specifies the procedures for determining the emission rate and chemical composition of fumes:

sequence, test conditions and test report:

This document applies to all manual, semi-automatic or fully automatic arc welding connections or overlays of non-alloy steels, alloy steels and non-ferrous metals:

Welding materials, welding methods including arc welding, solid wire, flux-cored wire (including non-metallic powder type and metallic powder type) and gas shielded arc welding
Arc welding and flux-cored self-shielded arc welding:

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document:

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to this document:

GBZ/T 224 Occupational Health Terminology GB/T 3375 Welding terminology GB/T 27418 Evaluation and Expression of Uncertainty in Measurement (GB/T 27418-2017, ISO/IEC Guide 98-3:2008, MOD) GB/T 43905.1 Laboratory methods for sampling of fumes and gases for welding and allied processes Part 1: Fume emissions from arc welding Collection of smoke for determination of rate and analysis (GB/T 43905.1-2024, ISO 15011-1:2009, MOD)