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

GB/T 43905.2-2024

**Laboratory method for sampling fume and gases in welding and allied processes
- Part 2: Determination of the emission rates of carbon monoxide, carbon dioxide,
nitrogen monoxide and nitrogen dioxide during arc welding, cutting and gouging**

(English Translation)

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Foreword

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

This document is part 2 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 from ISO 15011-2:2009 "Health and safety for welding and allied processes - Laboratory procedures for sampling fumes and gases":

Method for the determination of carbon monoxide (CO), carbon dioxide (CO₂), nitric oxide (NO) and nitrogen dioxide during arc welding, cutting and gouging Determination of (NO₂) emission rate:

The technical differences between this document and ISO 15011-2:2009 and their reasons are as follows:

--- Deleted the normative reference document ISO/T R25901, and added normative reference documents GBZ/T 224, GB/T 3375 and GB/T 14850 (see Chapter 3) to apply my country's technical requirements;

--- Added the term and definition of "emission rate" (see 3.1) to facilitate the implementation of this document;

--- Deleted the requirements on calibration (see 5.4, 5:5, 5:6, 5:7, 5:8 and 5:9) to conform to the actual situation in my country;

--- The normative reference GB/T 27418 replaces ISO/IEC Guide 98-3 (see Chapter 7) 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" Methods for determination of emission rates of carbon monoxide, carbon dioxide, nitric oxide and nitrogen dioxide from arc welding, cutting and gouging Certainly";

--- Move part of the content in 3:2 definition to Note 1, change the expression of test chamber classification in 3:2, and delete the items;

---5:8, 5:10, 5:11, 6:4:1, 6:4:2, 6:5:1, 6:5:2, 6:6:1, 6:6:3 use itemized expressions;

--- Deleted the "Notes" in 6:1:1 and D:1 of ISO 15011-2:2009;

--- Replaced ISO 6947 with the informative reference GB/T 16672 (see C:2):

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 are harmful to human health if inhaled:

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

The absolute exposure concentration depends on factors such as the position of the welder relative to the fume and airflow and cannot be predicted from emission rate data:

Generally speaking, under the same operating conditions, a higher emission rate is expected to have a higher exposure concentration, and a lower emission rate is expected to have a lower exposure concentration:

Therefore, the emission rate data can be used to predict the relative changes in exposure that may occur in the workplace under different welding conditions and to it is intended to determine measures to reduce such exposure but cannot be used to calculate ventilation requirements:

This document specifies the methods for determining carbon monoxide, carbon dioxide, nitric oxide and nitrogen dioxide in fume hoods during arc welding, cutting and gouging:

The program provides a simple test method, and the user can select the test parameters to evaluate different the impact of variables:

This document can be used to evaluate the effects of welding rods, welding wires, welding parameters, process methods, shielding gases, specimen composition, and specimen surface conditions on the performance of monoxide Impact of carbon, dioxide, nitric oxide and nitrogen dioxide emission rates:

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 2: Arc welding, Carbon monoxide, carbon dioxide, Determination of emission rates of
nitric oxide and nitrogen dioxide

1 Scope

This document describes the determination of carbon monoxide (CO), carbon dioxide (CO₂), nitric oxide (NO) generated during arc welding, cutting and gouging:

Laboratory methods for measuring emission rates of nitrogen oxides (NO) and nitrogen dioxide (NO₂), specifying instruments, materials, test procedures, data processing and test Report:

This document applies to laboratory methods for the determination of emission rates of gases generated during all open arc welding, cutting and gouging processes: