

ICS 25.160.10

CCS J 33



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

GB/T 43905.6-2024

**Laboratory method for sampling fume and gases in welding
and allied processes - Part 6: Procedure for quantitative
determination of fume and gases from resistance spot welding**

焊接及相关工艺中烟尘和气体取样的实验室方法 第6部分：电阻点焊中烟尘和气
体的定量化测定

(English Translation)

Issued on: April 25, 2024

Implemented on: November 1, 2024

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

Table of Contents

Preface
Introduction
1 Scope
2 Normative references
3 Terms and Definitions
4 Principle
5 Instruments, Equipment and Materials
6 Test Step
7 Data Processing
8 Test Log
9 Test Report
Appendix A (informative) Example of welding cabin for determining fume emission rate
Appendix B (informative) Example of welding cabin for determining gas emission rate
Appendix C (Normative) Welding Parameters
Appendix D (Informative) Test Report Example
References

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 6 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/T S15011-6:2012 "Health and safety for welding and related processes - Experimental methods for sampling fumes and gases" Chamber method Part 6: Quantitative determination of smoke and gases during resistance spot welding, document type adjusted by ISO technical specifications it is the national standard of our country:

The technical differences between this document and ISO/T S15011-6:2012 and their reasons are as follows:

--- Deleted the normative references of ISO 7708 and CEN/T R14599, and added the normative references of GBZ/T 224 and GB/T 14850 (see Chapter 3) to apply my country's technical conditions;

--- Added the term and definition of "emission rate" (see 3.4) to facilitate the implementation of this document;

--- Added explanations of instruments and materials (see 5.3:4 to 5:3:8) to facilitate the implementation of this document;

--- Deleted the sampling preparation, inductively coupled plasma-atomic emission spectrometry analysis, and inductively coupled plasma mass spectrometry analysis Method (see 6.4:5:2), the relevant documents are moved to references to apply my country's technical conditions;

--- ISO 15011-5 (see 6.5:1) is replaced by the normative reference GB/T 43905.5 to apply my country's technical requirements;

--- Deleted the normative reference ISO 18278-2:2004 (see Appendix C), which conflicts with Table C:2:

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 6: Quantitative determination of smoke and gases in resistance spot welding;

--- Deleted the informative references to ISO 15609-5, ISO 15767 and CEN/T R15230, and added the informative references to GB/T 8366, GB/T 19867.5 (see 5.1), GB/T 27418 (see 6.4:5:1);

--- Deleted the "Notes" in 6:3, 6:4:3 and 6:5:1 of ISO/T S15011-6:2012:

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: They should be kept within the limits prescribed by regulations:

Determination of particle size distribution and qualitative analysis (metallic and organic components, possibly including morphology) of collected dust is a human health risk One of the current methods in evaluation:

Furthermore, the determination of smoke and gas emission rates is essential for proper hazard characterization (qualitative and quantitative analysis):

Emission rates cannot be used directly to assess exposure; generally, materials with a low emission rate will be more effective than materials with a higher emission rate under the same operating conditions:

Materials with lower emission rates will generally result in lower exposure concentrations for welders:

This document can be used to determine the material type, coating category and material thickness while keeping the electrodes, welding equipment and test conditions unchanged:

The possible effects on fumes and gases and the determination of information provided by the product manufacturer for inclusion in the safety data sheet and by the occupational hygienist in Determination of significant emissions from resistance spot welding when performing risk assessments and/or workplace exposure assessments:

Sampling of fumes and gases during welding and related processes Laboratory methods
Part 6: Resistance spot welding Quantitative determination of smoke and gases

1 Scope

This document describes the determination of the contamination of each resistance weld spot in order to determine the smoke and gas emission rates generated by resistance spot welding of coated and uncoated steel sheets:

The laboratory method for the quantity of substances specifies the instruments, materials, test procedures, data processing, test records and test reports:

This paper will apply to the laboratory method for the determination of the emission rates of smoke and gases generated by resistance spot welding of coated and uncoated steel plates: