


An American National Standard



# Laboratory Method for Measuring Fume Generation Rates and Total Fume Emission of Welding and Allied Processes



**American Welding Society®**



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**An American National Standard**

**Approved by the**  
**American National Standards Institute**  
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# **Laboratory Method for Measuring Fume Generation Rates and Total Fume Emission of Welding and Allied Processes**

**6th Edition**

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Prepared by the  
American Welding Society (AWS) Project Committee on Fumes and Gases

Under the Direction of the  
AWS Committee on Safety and Health

Approved by the  
AWS Board of Directors

## **Abstract**

This document outlines a laboratory method for the determination of fume generation rates and total fume emission. A test chamber is used to collect representative fume samples under carefully controlled conditions.



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## Foreword

This foreword is not part of AWS F1.2:2013, *Laboratory Method for Measuring Fume Generation Rates and Total Fume Emission of Welding and Allied Processes*, but is included for informational purposes only.

In 1976, the American Welding Society saw the need to develop a laboratory method to standardize measurement of fume emissions for sampling in the welding workplace. The Project Committee on Fumes and Gases, using expertise in welding as well as industrial hygiene, developed the technique through testing in several company laboratories. Minor modifications and editorial changes were made in the 1985, 1992, 1999, 2006 and the current edition. The current edition allows the use of alternative filter media, if it can be demonstrated to be equivalent in performance to the glass fiber pad.

### *SUGGESTIONS*

Comments and suggestions for the improvement of this standard are welcome. They should be sent to the Secretary, AWS Safety and Health Committee, American Welding Society, 8669 Doral Blvd., Suite 130, Doral, FL 33166.



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# Table of Contents

	<b>Page No.</b>
<i>Personnel</i> .....	v
<i>Foreword</i> .....	vii
<i>List of Tables</i> .....	x
<i>List of Figures</i> .....	x
<b>1. Introduction, Purpose, Scope, and Safety</b> .....	<b>1</b>
1.1 Introduction .....	1
1.2 Purpose .....	1
1.3 Scope .....	1
1.4 Safety .....	2
<b>2. Normative References</b> .....	<b>2</b>
<b>3. Summary of Methods</b> .....	<b>2</b>
<b>4. Sampling Equipment</b> .....	<b>3</b>
4.1 General Description of Suggested Chamber .....	3
4.2 Equipment Specification for the Suggested Chamber shown in Figures 1 and 2 .....	3
<b>5. Preliminary Setup</b> .....	<b>6</b>
<b>6. Calibration</b> .....	<b>6</b>
<b>7. Preparation and Method</b> .....	<b>7</b>
<b>8. Representative Sample for Constituent Analysis</b> .....	<b>9</b>
Annex A (Informative)—Laboratory Method for Measuring Fume Generation Rates and Total Fume Emission of Welding and Allied Processes .....	11
Annex B (Informative)—Guidelines for the Preparation of Technical Inquiries .....	13

## List of Tables

<b>Table</b>	<b>Page No.</b>
1 Calibration Values .....	6

## List of Figures

<b>Figure</b>	<b>Page No.</b>
1 Suggested Test Chamber. ....	4
2 Cutaway View of Suggested Test Chamber .....	5
3 Suggested Format for Recording Data .....	8

# Laboratory Method for Measuring Fume Generation Rates and Total Fume Emission of Welding and Allied Processes

## 1. Introduction, Purpose, Scope, and Safety

**1.1 Introduction.** This AWS laboratory test method describes the recommended procedures to be followed in collecting samples for determining the composition and quantity of fume generated during welding and allied processes. The directions for performing the test include such details as the following:

- (1) Amount of sample to be taken;
- (2) Filter specifications;
- (3) Care needed to attain a constant weight during sample handling and storage;
- (4) Calibration procedure for test equipment to assure satisfactory, comparable, and reproducible data; and
- (5) Sample calculations.

This AWS method is supported by experience and data obtained from cooperative tests. The sampling methods prescribed for breathing zone and general area sampling of fumes for particulate matter are not within the scope of this document. Operator exposure and background sampling methodology are described in detail in AWS F1.1, *Guide for Sampling Fumes and Gases Generated by Welding and Allied Processes*.

### 1.2 Purpose

**1.2.1** Welding and allied processes produce fumes and gases. The amount or rate generated by a particular process and material depends upon the conditions of use. The laboratory sampling procedure described herein is designed to evaluate the effects of variations in materials, processes, and operating conditions on fume generation rate. Fume generation rates can be useful in prescribing adequate ventilation, making process selections, influencing process variables, and calculating air filtering requirements. In order to provide a safe working environment, it may be necessary to compare the fume generation rate and identify the constituents present in the fumes of various processes.

**1.2.2** The samples obtained using the techniques described herein are representative of the fumes present and, if collected on appropriate filters, may be used for fume constituent analyses.

**1.2.3** This procedure is designed for a short testing time, normally two minutes or less, which yields useful results that are reproducible within an acceptable range. The method described in this procedure is suitable for use with the majority of welding and allied processes and allows for variation of selected conditions.

**1.2.4** Fume generation rate data, if collected in accordance with this procedure, can be correlated to and compared with data from different sources.

### 1.3 Scope

**1.3.1** This method describes a laboratory device and procedure for obtaining representative fume samples and determining fume generation rates of welding and allied processes.