



The Industry Voice for Workplace Solutions

**BIFMA X7.1-2005**

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**Standard for  
Formaldehyde and TVOC Emissions of  
Low-emitting Office Furniture Systems and Seating**

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**Foreword**

The material presented in this standard was developed as a result of the efforts of the members of BIFMA International.

This standard defines the acceptance criteria for VOC emissions from furniture used in offices to be classified as low-emitting product and should be used in conjunction with the BIFMA M7.1-2005 Test Method. The acceptance criteria set forth in this Standard were not independently developed or validated by BIFMA and this is not intended to be a health or safety based standard.

The original work on this standard was completed in June 2005 by the BIFMA Engineering Committee and particularly by its Subcommittee on Furniture Emissions Standards. The Subcommittee conducted reviews of the proposed standard to ensure that the tests accurately describe the proper means of evaluating Volatile Organic Compound emissions from Panel Systems, Desk Type products, Seating and related products. The reviews produced the various test procedures that improve the procedures and provide consistency. BIFMA plans to conduct a public review of this document by interested parties and stakeholders in accordance with the requirements BIFMA maintains as an ANSI accredited standards developer. After completion of the canvass process, the proposed standard test method will be submitted to the American National Standards Institute for approval as an American National Standard. Anyone interested in participation in this public review process contact BIFMA International at [email@bifma.org](mailto:email@bifma.org).

Suggestions for the improvement of this standard are welcome. The suggestions should be sent to email [@bifma.org](mailto:@bifma.org) or BIFMA International, 2680 Horizon SE, Suite A1, Grand Rapids, MI 49546.

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## **BIFMA X7.1-2005**

# **Standard for Formaldehyde and TVOC Emissions of Low-emitting Office Furniture Systems and Seating**

## **1 Scope**

This standard is intended to provide performance requirements for the emissions of volatile organic compounds (VOCs), including Formaldehyde and Aldehydes, from Office Furniture Systems and Seating. This standard specifies acceptance levels that define low-emitting furniture independent of construction materials, manufacturing processes, mechanical designs, or aesthetic designs. This standard is intended to apply to a newly manufactured product and does not apply to products that have been in use.

The acceptance criteria set forth in this Standard were not independently developed or validated by BIFMA, but are the most prevalent criteria in the industry. This Standard is not intended to be a health or safety based standard.

This standard does not purport to address all of the safety, health, comfort (e.g. odor), and performance concerns, if any, associated with the use of this standard. It is the responsibility of the user of this standard to establish appropriate safety, health and other performance conditions and to determine the applicability of regulatory limitations prior to use of this standard.

### **1.1 Compliance of Tested Workstations & Seating**

This standard is used to determine compliance of an individual workstation, and/or seating when tested in accordance with the BIFMA M7.1-2005 test method. Tested products shall be evaluated according to the criteria given in Section 4. The tested product shall be considered as meeting this standard if the product meets all criteria given.

## **2 Definitions**

**Note:** Refer to BIFMA M7.1-2005 Test Method and PD-1 Industry Product Definitions for related terms used in this standard. Otherwise, the common dictionary definition shall be used for terms not defined in the BIFMA M7.1-2005 Test Method or in BIFMA PD-1. In the case of a conflict between the definitions in the BIFMA M7.1-2005 Test Method and PD-1, the definitions in the BIFMA M7.1-2005 Test Method shall apply.

### **3 General**

#### **3.1 Representative (Worst-case) Sample Selection**

For manufacturers wishing to demonstrate compliance for a specific product(s), only that product shall be tested.

A manufacturer may demonstrate compliance of a broad set of products by using the results from a limited number of representative models. A range, series or category of products with varying characteristics may be grouped together for testing purposes if the products can be expected to perform similarly during testing (i.e., having the same general construction, materials, and manufacturing processes). Test samples shall be selected from the model in the group that can be expected to have the highest propensity for emissions. A case-by-case product line analysis by the manufacturer in consultation with the laboratory(ies) and/or certification agency(ies) is required, taking into consideration any special attributes, materials, methods of manufacture/construction, etc. See Appendix 2 of BIFMA M7.1-2005 for additional requirements for open plan workstation and private office product configurations and size.

#### **3.2 Manufacturer's Instructions**

When a manufacturer provides specific assembly/installation instructions, these instructions shall be followed during testing unless otherwise specified by the BIFMA M7.1-2005 Test Method.

### **4 Formaldehyde and TVOC Emissions**

#### **4.1 Evaluation Method**

Products to be evaluated according to this standard shall be tested in accordance with the BIFMA M7.1-2005 Standard Method For Testing VOC Emissions From Office Furniture Systems, Components And Seating.

#### **4.2 Acceptance Level**

##### **4.2.1 Workstation systems & seating:**

The following criteria (Table A1.1) taken from the U.S. Green Building Council (USGBC)'s "Green Building Rating System For Commercial Interiors" (LEED CI Version 2, November 2004) are those required in order to receive the "EQ Credit 4.5 Low-Emitting Materials, Systems Furniture and Seating". They shall be considered the criteria limit for classifying products as meeting the requirements of this standard. These criteria must be met at the seven-day time point specified in the BIFMA M7.1-2005 Test Method:

Table A1.1

**Limits of Indoor Air Concentrations due to Emissions  
from Systems Furniture and Seating**

<b>Chemical/Chemical Group</b>	<b>Workstation Systems (all configuration types)</b>	<b>Seating</b>
TVOC <sub>toluene</sub> <sup>1</sup>	≤0.5 mg/m <sup>3</sup>	≤0.25 mg/m <sup>3</sup>
Formaldehyde	≤50 ppb	≤25 ppb
Total Aldehydes	≤100 ppb	≤50 ppb
4-Phenylcyclohexene	≤0.0065 mg/m <sup>3</sup>	≤0.00325 mg/m <sup>3</sup>

### 5 Laboratory requirements:

The laboratory used to perform the emissions testing and/or provide analytical results shall be independently accredited to ISO/IEC 17025. The laboratory's scope of accreditation must include the BIFMA M7.1-2005 Test Method.

The laboratory shall operate as an independent company or organization not subject to undue influence from a certification agency or product manufacturer. (The laboratory may be part of a certification agency or manufacturer as long as appropriate independence from the parent organization can be demonstrated.)

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<sup>1</sup> TVOC<sub>toluene</sub> is the method of measuring TVOC using the response factor of toluene as defined in the BIFMA M7.1-2005 Test Method.

## **6 Retesting and Timing**

### **6.1 Testing Interval**

For purposes of claiming ongoing compliance to this standard, systems and seating products shall be retested at an interval not exceeding 3 years.

### **6.2 Evaluation factors that determine the need for more frequent testing intervals**

Within the test interval, the emissions test results can be considered valid and useful for supporting claims of low emitting product for as long as the materials and components, manufacturing processes, and packaging methods remain the same.

Significant changes to one or more of these factors shall be evaluated for possible effects on emission characteristics. If it is likely that the product emissions will increase as a result of the change being considered or implemented, test evaluations should be conducted. Changes in material specifications or manufacturer of components such as finish materials, adhesives, core materials, plastic materials, and cushioning materials must be considered and evaluated for potential adverse impacts on VOC emissions. Evaluations may be conducted by engineering calculations from supporting data or may require, at a minimum, component level screening emission testing. Other sources of variability to be considered include the range of in-plant process parameters, differences associated with multiple suppliers of a single component, uncertainties associated with emissions characteristics of recycled materials, etc.

In addition to the previously noted sources of variability, consideration shall be given to the following parameters in determining the test interval; the frequency of significant engineering changes in the product, the frequency in changes of suppliers and/or the historical trend in product emissions.

Testing frequency is influenced by changes in materials, designs, processes and/or supplier changes. A formally documented quality system or quality system registered to ISO 9000 requirements, specific internal requirements specifying product emissions levels, and the manufacturer's level of control of their supply chain are indicators of stable manufacturing systems and should be considered when determining test intervals.

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