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Standard Guide for Selecting Volatile Organic Compounds (VOCs) and Semi- Volatile Organic Compounds (SVOCs) Emission Testing Methods to Determine Emission Parameters for Modeling of Indoor Environments¹

This standard is issued under the fixed designation D8141; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide is intended to serve as a foundation for understanding when to use emission testing methods designed for volatile organic compounds (VOCs) to determine area-specific emission rates that are typically used in modeling indoor VOC concentrations and when to use emission testing methods designed for semi-volatile organic compounds (SVOCs) to determine mass transfer emission parameters that are typically used to model indoor SVOC concentrations.

1.2 This guide discusses how organic chemicals are conventionally categorized with respect to volatility.

1.3 This guide presents a simplified mass transfer model describing organic chemical emissions from a material to bulk air. The values of the model parameters are shown to be specific to material/chemical/chamber combinations.

1.4 This guide shows how to use a mass transfer model to estimate whether diffusion of the chemical within the material or convective mass transfer of the chemical from the surface of the material to the overlying air limits chemical emissions from the material surface.

1.5 This guide describes the range of different chambers that are available for emission testing. The chambers are classified as either dynamic or static and either conventional or sandwich. The chambers are categorized as being optimal to determine either the area-specific emission rate or mass transfer emission parameters.

1.6 This guide discusses the roles sorption and convective mass transfer coefficients play in selecting the proper emission chamber and analysis method to accurately and efficiently characterize emissions from indoor materials for use in modeling indoor chemical concentrations.

1.7 This guide gives recommendations on when to choose an emission test method that is optimized to determine either

the area-specific emission rate or mass transfer emission parameters. For chemicals where the controlling mass transfer process is unknown, the guide outlines a procedure to determine if the chemical emission is controlled by convective mass transfer of the chemical from the material.

1.8 This guide does not provide specific guidance for measuring emission parameters.

1.9 Mechanisms controlling emissions from wet and dry materials and products are different. This guide considers the emission of chemicals from dry materials and products. Examples of SVOCs that this guide applies to include flame retardants, plasticizers, antioxidants, preservatives, and coalescing agents (**1**).² Emission estimations for other SVOC classes including those generated by incomplete combustion, sprayed, or applied as a powder (pesticides, termiticides, herbicides, stain repellents, sealants, water repellants) (**1**) may require different approaches than outlined in this guide.

1.10 The effects of the emissions (for example, exposure, and health effects on occupants) are not addressed and are beyond the scope of this guide.

1.11 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.12 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.13 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

¹ This guide is under the jurisdiction of ASTM Committee D22 on Air Quality and is the direct responsibility of Subcommittee D22.05 on Indoor Air.

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² The boldface numbers in parentheses refer to the list of references at the end of this standard.