



Designation: D8445 – 22a

Standard Practice for Measuring Chemical Emissions from Spray Polyurethane Foam (SPF) Insulation Samples in a Large-scale Ventilated Enclosure¹

This standard is issued under the fixed designation D8445; 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 practice describes procedures for measuring the chemical emissions of volatile and semi-volatile organic compounds (VOCs and SVOCs) from spray polyurethane foam (SPF) insulation samples in a large-scale ventilated enclosure.

1.2 This practice is used to identify emission rates and factors during SPF application and up to three days following application.

1.3 This practice can be used to generate emissions data for research activities or modeled for the purpose to inform potential reentry and reoccupancy times. Potential reentry and re-occupancy times only apply to the applications that meet manufacturer guidelines and are specific to the tested formulation.

1.4 This practice describes emission testing at ambient room and substrate temperature and relative humidity conditions recognizing chemical emissions may differ at different room and substrate temperatures and relative humidity.

1.5 This practice does not address all SPF chemical emissions. This practice addresses specific chemical compounds of potential health and regulatory concern including methylene diphenyl diisocyanate (MDI), polymeric MDI (MDI oligomeric polyisocyanates mixture), flame retardants, aldehydes, and VOCs including blowing agents, and catalysts. Although specific chemicals are discussed in this practice, other chemical compounds of interest can be quantified (see target compound and generic formulation list in [Appendix X1](#)). Other chemical compounds used in SPF such as polyols, emulsifiers, and surfactants are not addressed by this practice. Particulate sizing and distribution are also outside the scope of this practice.

1.6 Emission rates during application are determined from air phase concentration measurements that may include particle bound chemicals. SVOC deposition to floors and ceilings is

also quantified for post application modeling inputs. SVOC emission rates should only be used for modeling purposes for the duration of data collection.

1.7 Four quantification methods are described for isocyanates. The method chosen should consider safety issues such as flammability, the expected concentration, the presence of isocyanate aerosol during the phase of interest (during and post application), and if the tested SPF is high or low pressure.

1.8 This practice references similar standard practices for design, construction, performance evaluation, and use of full-scale chambers for chemical emission testing.

1.9 This practice references methods for the collection and analysis of air samples.

1.10 This practice applies to two-component open cell and closed cell SPF insulation system formulations that are processed using high-pressure or low-pressure installation processing practices and equipment.

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. The application of SPF in a ventilated enclosure has the potential to generate a hazardous condition putting the individual responsible for spraying inserts at risk. It is the responsibility of the user of this standard to establish appropriate health and safety procedures and require appropriate certified personal protective equipment (PPE) to minimize chemical exposure. Individuals entering the ventilated enclosure during and after SPF application, for any amount of time, are expected to wear appropriate PPE.*

1.13 *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.*

1.14 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the*

¹ This practice 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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