



Standard Guide for Fire Hazard Assessment of the Effect of Upholstered Seating Furniture Within Patient Rooms of Health Care Facilities¹

This standard is issued under the fixed designation E2280; 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.

INTRODUCTION

The traditional approach to codes and standards is the specification of individual fire-test-response requirements for each material, component or product placed in a certain environment and deemed important to ensure fire safety. This practice has been in place for so long that it gives a significant level of comfort: a manufacturer knows what is required to comply with the specifications and specifiers apply the requirements. Implicit assumptions, not stated, are that the use of the prescribed requirements ensures an adequate level of safety. There is no need to impose any change on those manufacturers who supply safe systems meeting existing prescriptive requirements. However, as new materials and products are developed, manufacturers, designers, and specifiers often desire the flexibility to choose how the overall safety requirements are to be met. Thus, it is the responsibility of the developer of an alternative approach to state explicitly the assumptions being made to produce the output. The way to generate explicit and valid assumptions is to provide a performance-based approach, based on test methods providing data in engineering units, suitable for use in fire safety engineering calculations, as this guide provides. The resulting fire hazard assessment focuses on upholstered seating furniture items within patient rooms in health care occupancies. This requires developing the fire scenarios to be considered and the effect of all contents and design considerations within the patient room which are potentially able to affect the resulting fire hazard. This offers opportunities for innovation, and ingenuity, without compromising safety.

1. Scope*

1.1 This is a guide to developing fire hazard assessments for upholstered seating furniture, within patient rooms of health care occupancies. As such, it provides methods and contemporary fire safety engineering techniques to develop a fire hazard assessment for use in specifications for upholstered seating furniture in such occupancies.

1.2 Hazard assessment is an estimation of the potential severity of the fires that can develop with certain products in defined scenarios, once the incidents have occurred. Hazard assessment does not address the likelihood of a fire occurring, but is based on the premise that an ignition has occurred.

¹ This guide is under the jurisdiction of ASTM Committee E05 on Fire Standards and is the direct responsibility of Subcommittee E05.15 on Furnishings and Contents.

Current edition approved Dec. 15, 2021. Published January 2022. Originally approved in 2003. Last previous edition approved in 2017 as E2280-17. DOI: 10.1520/E2280-21.

1.3 Because it is a guide, this document cannot be used for regulation, nor does it give definitive instructions on how to conduct a fire hazard assessment.

1.4 This guide is intended to provide assistance to those interested in mitigating the potential damage from fires associated with upholstered furniture in patient rooms in health care occupancies.

1.5 Thus, this guide can be used to help assess the fire hazard of materials, assemblies, or systems intended for use in upholstered furniture, by providing a standard basis for studying the level of fire safety associated with certain design choices. It can also aid those interested in designing features appropriate to health care occupancies. Finally, it may be useful to safety personnel in health care occupancies.

1.6 This guide is a focused application of Guide E1546, which offers help in reference to fire scenarios that are specific to upholstered furniture in health care occupancies, and includes an extensive bibliography. It differs from Guide E1546 in that it offers guidance that is specific to the issue of

*A Summary of Changes section appears at the end of this standard

upholstered furniture in patient rooms of health care facilities, rather than general guidance. **Appendix X11** includes some statistics on the magnitude of the potential problem in the U.S.

1.7 A fire hazard assessment conducted in accordance with this guide is strongly dependent on the limitations in the factors described in **1.7.1 – 1.7.4**.

1.7.1 Input data (including their precision or accuracy).

1.7.2 Appropriate test procedures.

1.7.3 Fire models or calculation procedures that are simultaneously relevant, accurate and appropriate.

1.7.4 Advancement of scientific knowledge.

1.8 This guide addresses specific fire scenarios which begin inside or outside of the patient room. However, the upholstered furniture under consideration is inside the patient room.

1.9 The fire scenarios used for this hazard assessment guide are described in **9.2**. They involve the upholstered furniture item within the patient room as the first or second item ignited, in terms of the room of fire origin. Additionally, consideration should be given to the effect of the patient room upholstered furniture item on the tenability of occupants of rooms other than the room of fire origin, and on that of potential rescuers.

1.10 This guide does not claim to address all fires that can occur in patient rooms in health care occupancies. In particular, fires with more severe initiating conditions than those assumed in the analysis may pose more severe fire hazard than that calculated using this guide (see also **9.5**).

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 fire standard cannot be used to provide quantitative measures.

1.14 *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.*

2. Referenced Documents

2.1 ASTM Standards:²

D123 Terminology Relating to Textiles

E162 Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source

E176 Terminology of Fire Standards

E603 Guide for Room Fire Experiments

E648 Test Method for Critical Radiant Flux of Floor-

Covering Systems Using a Radiant Heat Energy Source
E662 Test Method for Specific Optical Density of Smoke Generated by Solid Materials

E906 Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using a Thermopile Method

E1321 Test Method for Determining Material Ignition and Flame Spread Properties

E1352 Test Method for Cigarette Ignition Resistance of Mock-Up Upholstered Furniture Assemblies

E1353 Test Methods for Cigarette Ignition Resistance of Components of Upholstered Furniture

E1354 Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter

E1355 Guide for Evaluating the Predictive Capability of Deterministic Fire Models

E1472 Guide for Documenting Computer Software for Fire Models (Withdrawn 2011)³

E1474 Test Method for Determining the Heat Release Rate of Upholstered Furniture and Mattress Components or Composites Using a Bench Scale Oxygen Consumption Calorimeter

E1537 Test Method for Fire Testing of Upholstered Furniture

E1546 Guide for Development of Fire-Hazard-Assessment Standards

E1590 Test Method for Fire Testing of Mattresses

E1591 Guide for Obtaining Data for Fire Growth Models

E1740 Test Method for Determining the Heat Release Rate and Other Fire-Test-Response Characteristics of Wall Covering or Ceiling Covering Composites Using a Cone Calorimeter

E2061 Guide for Fire Hazard Assessment of Rail Transportation Vehicles

E2067 Practice for Full-Scale Oxygen Consumption Calorimetry Fire Tests

E2257 Test Method for Room Fire Test of Wall and Ceiling Materials and Assemblies

F1534 Test Method for Determining Changes in Fire-Test-Response Characteristics of Cushioning Materials After Water Leaching

2.2 CA Standards:⁴

CA Technical Bulletin 116, “Requirements, Test Procedure and Apparatus for Testing the Flame Retardance of Upholstered Furniture,” January 1980

CA Technical Bulletin 117, “Requirements, Test Procedures, and Apparatus for Testing the Flame Retardance of Resilient Filling Materials Used in Upholstery Furniture,” January 1980

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard’s Document Summary page on the ASTM website.

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from California Bureau of Household Goods and Services (BHGS), State of California, Department of Consumer Affairs, 3485 Orange Grove Avenue, North Highlands, CA, 95660-5595, <https://bhgs.dca.ca.gov>.