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Standard Guide for Room Fire Experiments[1]

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INTRODUCTION

This guide has been written to assist those planning to conduct full-scale compartment fire experiments. There are many issues that should be resolved before such an experimental program is initiated, and this guide is written with the objective of identifying some of these issues and presenting considerations that will affect each choice of procedure.

This guide deals with any or all stages of fire growth in a compartment. Whether it is a single- or multi-room experiment, observations can be made from ignition to flashover or beyond full-room involvement.

One major reason for conducting research on room fires is to learn about the room fire buildup process so the results of standard fire test methods can be related to performance in full-scale room fires, allowing the further refinement of these test methods or development of new ones.

Another reason concerns computer fire modeling. Full-scale tests can generate data needed for modeling. Comparisons of modeling with full-scale test results can serve to validate the model.

The various results among room fire tests reflect different experimental conditions. The intent of this guide is to identify these conditions and discuss their effects so meaningful comparisons can be made among the room fire experiments conducted by various organizations.

1. Scope

1.1 This guide addresses means of conducting full-scale fire experiments that evaluate the fire-test-response characteristics of materials, products, or assemblies under actual fire conditions.

1.2 It is intended as a guide for the design of the experiment and for the use and interpretation of its results. The guide is also useful for establishing laboratory conditions that simulate a given set of fire conditions to the greatest extent possible.

1.3 This guide allows users to obtain fire-test-response characteristics of materials, products, or assemblies, which are useful data for describing or appraising their fire performance under actual fire conditions.

1.3.1 The results of experiments conducted in accordance with this guide are also useful elements for making regulatory decisions regarding fire safety requirements. The use for regulatory purposes of data obtained from experiments conducted using this guide requires that certain conditions and criteria be specified by the regulating authority.

1.4 The rationale for conducting room fire experiments in accordance with this guide is shown in 1.5 – 1.8

1.5 Room fire experiments are a means of generating input data for computer fire models and for providing output data with which to compare modeling results.

1.6 One of the major reasons for conducting room fire experiments is as an experimental means of assessing the potential fire hazard associated with the use of a material or product in a particular application. This should be borne in mind when designing nonstandard experiments.

1.7 A rationale for conducting room fire experiments is the case when smaller-scale fire tests inadequately represent end-use applications.

1.8 A further rationale for conducting room fire experiments is to verify the results obtained with smaller scale tests, to understand the scaling parameters for such tests.

1.9 Room fire tests can be placed into four main categories: reconstruction, simulation, research, and standardization.

1.10 *This standard is used to measure and describe the response of materials, products, or assemblies to heat and flame under controlled conditions, but does not by itself incorporate all factors required for fire hazard or fire risk assessment of the materials, products, or assemblies under actual fire conditions*

[1] This guide is under the jurisdiction of ASTM Committee E05 on Fire Standards and is the direct responsibility of Subcommittee E05.21 on Smoke and Combustion Products.

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