# American National Standard for Cleanroom Materials Flammability Test Protocol ANSI/FM Approvals 4910

**ANSI/FM 4910-2013 (2021)**

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# Foreword

**NOTE:** This foreword is introductory only and is not part of American National Standard FM 4910.

This standard is intended to verify that the product as described will meet minimum specific stated conditions of performance, safety and quality, useful in determining the potential suitability for end-use conditions of these products. It describes minimum performance requirements for materials that are intended for use in cleanroom facilities by evaluating the ability of the materials and, in turn, the system components, to limit fire spread and smoke damage resulting from a fire in the cleanroom environment.

This American National Standard has been developed according to the essential requirements of due process for standards development of the American National Standards Institute (ANSI). FM Approvals is an ANSI accredited standards developer (ASD).

ANSI/FM 4910 was originally published in 2004 and revised in 2013. This draft contains editorial corrections in 2.2.1 and 2.4.1 to make references to SDI consistent.

Approval of an American National Standard requires verification by ANSI that the principles of openness and due process have been followed and that a consensus of those directly and materially affected by the standard has been achieved. Consensus requires that all views and objections be considered, and that a concerted effort be made toward their resolution. Consensus is established when, in the judgment of the ANSI Board of Standards Review, substantial agreement has been reached.

The American National Standards Institute does not develop standards nor will it in any circumstances give an interpretation of any American National Standard. Requests for interpretations of this test standard should be addressed to FM Approvals.

ANSI regulations require that this American National Standard shall be revised, reaffirmed or withdrawn within five years of the date of publication.

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# TABLE OF CONTENTS

# 1. INTRODUCTION

## 1.1 PURPOSE

This test standard states test requirements and procedures for the evaluation of materials used in cleanroom occupancies mainly for, but not restricted to, use in the semiconductor industry. The test evaluates the materials' fire propagation behavior, expressed as Fire Propagation Index (FPI), and potential for smoke contamination, expressed as Smoke Damage Index (SDI).

## 1.2 SCOPE

1.2.1 This test standard describes minimum performance requirements for materials which are intended for use in cleanroom facilities. This standard evaluates the ability of the materials to limit fire spread and smoke damage. All requirements in the standard must be met for materials to be acceptable.

1.2.2 This standard is intended to verify that the materials, as described, will meet minimum specific stated conditions of performance, safety and quality useful in determining the potential suitability for end-use conditions of these materials.

## 1.3 BASIS FOR REQUIREMENTS

1.3.1 The requirements of this test standard are based on experience, research and testing, and/or the standards of other organizations. The advice of manufacturers, users, trade associations, jurisdictions and/or loss control specialists was also considered.

## 1.4 APPLICABLE DOCUMENTS

The following standards, test method descriptions and practices are related to this standard:

1. Tewarson, A., ''Generation of Heat and Chemical Compounds in Fires'', Chapter 4, Section 3, pp. 3-82 to 3-161. The SFPE Handbook of Fire Protection Engineering, 3rd Edition. The National Fire Protection Association Press, Quincy, MA, June 2002.

2. Tewarson, A., ''Flammability'', Chapter 42, pp. 577-604. Physical Properties of Polymers Handbook (J.E. Mark, Editor). American Institute of Physics, Woodbury, NY, 1996.

3. ASTM E2058 ''Standard Test Methods for Measurement of Synthetic Polymer Material Flammability Using a Fire Propagation Apparatus (FPA),''American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

4. NFPA 287 ''Standard Test Methods for Measurement of Flammability of Materials in Cleanrooms Using a Fire Propagation Apparatus (FPA)", National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269.

## 1.5 DEFINITIONS

For purposes of this test standard, the following terms apply:

*Chemical Heat Release Rate ($Q_{ch}$)*: energy actually released by chemical reactions during a test

*Critical Heat Flux (CHF):* the maximum heat flux at, or below, which there is no ignition.