



# **American National Standard for Testing Filters Used in Clean Room Facilities**

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# Foreword

**NOTE:** This forward is introductory only and is not part of American National Standard FM 4920.

This Standard is intended to verify that the product as described will meet minimum specific and 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 used as filters 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 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 development organization (SDO).

Approval of an American National Standard requires verification by ANSI that the principals 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 towards 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 the 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ANSI regulations require that this American National Standard shall be revised, reaffirmed or withdrawn within five years of the date of publication.

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# 1 INTRODUCTION

## 1.1 Purpose

This standard states test requirements and procedures for the evaluation of materials used to manufacture filter assemblies for use in cleanrooms. Filter assemblies are used by the semiconductor industry, food preparation industry and pharmaceutical industry to filter incoming air in to the room. Filter assemblies fabricated from materials that do not meet these requirements are considered to be a fire and smoke hazard and require special protection for potential fire scenarios.

## 1.2 Scope

- 1.2.1 This standard applies to filters assemblies for use in clean room facilities. The purpose of this standard is to test the filter assembly for the potential of flame spread and the amount of smoke being released during the Fire Exposure Test. The filter assembly typically consists of frames, filter media, gaskets, sealing gel material and potting compounds.
- 1.2.2 The standard does not assess the filter assembly's ability to filter contaminants during normal operation or in a fire situation.

## 1.3 Basis for Requirements

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

## 1.4 System of Units

Units of measurement are U. S. customary units. These are followed by their arithmetic equivalents in International System (SI) units enclosed in parentheses. Appendix A lists the selected units for qualities dealt with in testing these products; conversions are included. Conversion of U.S. customary units is in accordance with ANSI/IEEE/ASTM SI 10-10, Standard for Use of the International System of Units (SI): The Modern Metric System.

## 1.5 Applicable Documents

The following standard, test methods, and practices are referenced in this standard:

American National Standard for Testing Filters used in Clean Room Facilities.

## 1.6 Definitions

*Pack Height*- The height of the filter media housed in the filter frame

## 2 GENERAL INFORMATION

### 2.1 Product Information

The clean room filter assemblies are normally made from pleated fiberglass or polytetrafluorethylene (PTFE) media and housed within a frame. The filter media is secured and sealed to the frame with an adhesive. The folded portion of the media is typically held in position at the apex of the fold maintaining the pleat spacing by adhesive. The finished filter assembly can be used in the clean room in either a horizontal (ceiling) or vertical (wall) position. In either position, the filter assembly is held in position using a grid system. The filter is sealed against the grid system with either a gasket or silicone gel material. The filters are supplied in a variety of pack heights and widths to fit the application and room size.

Pre-filter assemblies are used upstream of the finished clean room filters and are positioned within the duct work of the air stream. Normally, there are two stages of pre-filtration. The first stage of pre-filters are constructed with a low cost filter media assembled in disposal frames. These filters are located at the intake of the air stream. The second stage pre-filters use a fiberglass media and is secured in a non-metallic frame. Within the air stream, the second stage filters are located downstream of the first stage air filters.

## 3 GENERAL REQUIREMENTS

### 3.1 Review of Documentation

During the initial investigation, and prior to physical testing, the manufacturer's specifications and details shall be reviewed to assess the ease and practicality of installation and use.

### 3.2 Physical or Structural Features

- 3.2.1 The sides and ends of the filter media pack shall be secured to the filter frame in accordance with the manufacturer's written instructions.
- 3.2.2 Each filter assembly shall be supplied with its maximum filter pack media height.
- 3.2.3 A complete grid system with all the necessary gaskets or sealant gel materials shall be supplied for each filter type (style) being tested.
- 3.2.4 If the manufacturer is seeking to test a filter assembly that uses a sealant gel, the Material Safety Data Sheet (MSDS) shall be submitted.
- 3.2.5 Instructions for mixing the sealant gel and required tooling to combine the ingredients of the sealant gel shall be submitted prior to assembling the materials.

### 3.3 Manufacturer's Installation and Operation Instructions

The manufacturer shall provide the user with:

- written instructions for the proper installation, maintenance and operation of the product;
- services to ensure proper installation, inspection or maintenance for products of such nature that it would not be reasonable to expect the average user to be able to provide such installation, inspection or maintenance.