

Assessment Standard for Tools Used in the Semiconductor Industry

Class Number 7701

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Foreword

FM Approvals intends to verify that the products and services described will meet stated conditions of performance, safety and quality useful to the ends of property conservation. The purpose of this Standard is to present the criteria for FM Approvals Assessment of various types of products and services, as guidance for FM Approvals personnel, manufacturers, users and authorities having jurisdiction.

Products submitted shall demonstrate that they meet the intent of this Standard, and that quality control in manufacturing and/or applications shall ensure a consistently uniform and reliable product or service. Standards by FM Approvals strive to be performance-oriented and to facilitate technological development.

For examining equipment, materials and services, Standards by FM Approvals:

- a) must be useful to the ends of property conservation by preventing, limiting or not causing damage under the conditions stated by the Assessment report and product listing; and
- b) must be readily identifiable.

Continuance of the product Listing depends on compliance with the Master Agreement, satisfactory performance in the field, on successful re-examinations of equipment, materials, and services as appropriate, and on periodic follow-up audits of the manufacturing facility or service/application.

FM Approvals LLC reserves the right in its sole judgement to change or revise its standards, criteria, methods, or procedures.

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I. INTRODUCTION

1.1 Purpose

This standard is the basis for FM Approvals Assessment of manufacturing equipment (i.e., “Tools”) used by the Semiconductor Industry in semiconductor cleanroom manufacturing occupancies where the processing of semiconductor components, such as microprocessors, memory components, etc., takes place. This standard provides for listing of semiconductor manufacturing equipment as it relates to promoting the practice of property conservation and business continuity.

FM Approvals Assessment – is defined as Tool products meeting the requirements of this standard.

Headcase – For purposes of this standard is defined as an area directly above the working surface of a wet bench.

Minienvironment – For purposes of this standard is defined as a localized environment created by an enclosure to isolate the product from contamination and people. (www.semiatech.org; SEMI E44-95)

Module – For purposes of this standard is defined as an independently operable unit that is part of a tool or system. (www.semiatech.org; SEMI E21-94)

Tool – For purposes of this standard is defined as any piece of semiconductor fabrication or inspection equipment designed to process wafers delivered in cassettes or cassettes in containers intended for use with an automated material transport system. (www.semiatech.org; SEMI E15-91)

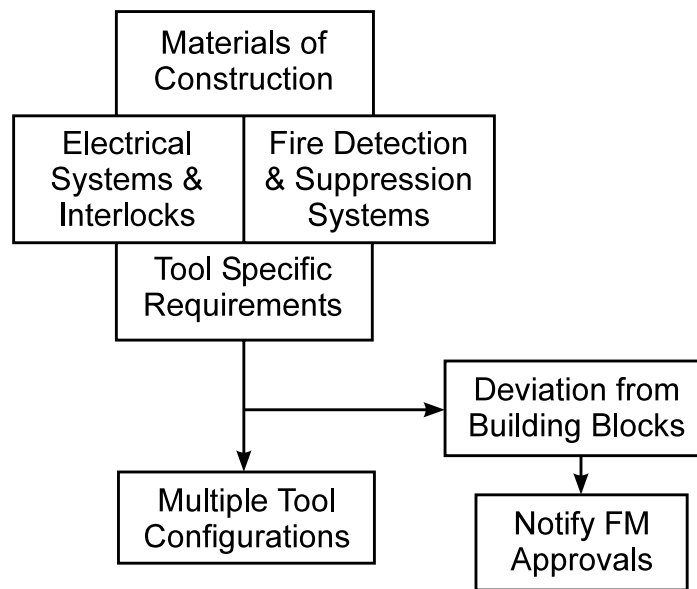
1.2 Scope and Application

1.2.1 This standard addresses equipment design and construction features with regard to the following items:

- Both metallic and non-metallic materials of construction. These materials may be used in ducts, pumps, piping, housings, etc.
- Electrical systems with regard to preventing an electrical incident leading to contamination of the clean room and mitigation of fire.
- Compatibility with regard to potentially flammable or combustible chemicals integral to the equipment operation.
- Installation and operation of fixed fire detection/suppression equipment when applicable and supplied as part of the equipment.
- Ventilation, gas or vapor leak detection and liquid leak detection and containment.
- Assessment of the associated mechanical/electrical engineering controls, limiting devices, emergency off, and/or safety interlocks.

1.2.2 It is a general understanding in the industry that the type of equipment addressed by this standard is custom built rather than mass produced. Therefore this equipment assessment program is based on a building block approach involving sub-assemblies since many of these items are likely to be used in more than one piece of equipment. This approach is intended to reduce efforts involved with future equipment assessment programs which are based on blocks of assemblies previously used and determined to be compliant. It also allows for multiple identical equipment units to be produced without additional examination, as well as addressing only the areas of subsequent modifications.

This concept is also displayed in the following chart.



1.3 Basis for FM Approvals Assessment

FM Approvals Assessment is contingent upon:

- satisfactory results of the analysis of the equipment (compliance with this standard).
- satisfactory examination of the manufacturing facilities and audit of quality control procedures shall be made to evaluate the manufacturer's ability to produce the product which is identical to that which was examined and tested, and the marking procedures used to identify the product. These examinations are repeated as part of FM Approvals' product follow-up program.

1.4 Basis for Continued Assessment

Continued Assessment is based upon:

- production or availability of the product as Assessed, or as acceptably revised;
- the continued use of acceptable quality control procedures;
- satisfactory field experience;
- compliance with the terms stipulated in the Master Agreement; and,
- examination of production samples for continued conformity to the requirements of this standard.

1.5 Basis For Requirements

- 1.5.1 The requirements of this standard are focused on minimizing the possibility of an event occurring which may result in a fire, or contamination of the clean room environment which may lead to business loss or business interruption. The advice of industry members was also considered.

- 1.5.2 These requirements are intended for the purpose of obtaining FM Approvals Assessment of the product. These requirements are intended primarily as guides, and strict conformity is not always mandatory. Equipment having characteristics not anticipated by this standard may be FM Approvals Assessed if performance equal or superior to that required by this standard is demonstrated, or if the intent of the standard is met. Alternatively, equipment which does meet all the requirements identified in this standard may not be FM Approvals Assessed if other conditions which adversely affect performance exist, or the intent of this standard is not met.

1.6 Effective Date

The effective date of this Standard mandates that all products Assessed for evaluation after the effective date shall satisfy the requirements of that standard.

The effective date of this standard is **December 1, 2005** for full compliance with all requirements.

II. GENERAL INFORMATION

2.1 Requirements

The FM Global Loss Prevention Data Sheet 7-7, published May 1999 and revised January 2003, has been used as a reference for the requirements in this document.

2.2 Applicable Documents

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

FM Approvals Standard Class 3972 – “Test Standard for Cable Fire Propagation” (Materials)

FM Approvals Standard Class 4910 – “Cleanroom Materials Flammability Test Protocol” (Materials)

FM Approvals Standard Class 4911 – “Wafer Carriers for Use in Cleanrooms” (Materials)

FM Approvals Standard Class 4922 – “Fume Exhaust Ducts or Fume and Smoke Exhaust Ducts” (Materials)

FM Approvals Standard Class 4924 – “Pipe Insulation” (Materials)

FM Global Data Sheet 4-0 – “Special Protection Systems”

FM Global Data Sheet 4-8N – “Halon 1301 Fire Extinguishing Systems” (Materials)

FM Global Data Sheet 4-11N (NFPA 12,) “Carbon Dioxide Extinguishing Systems”
(Hydraulics – Systems Electric Panel)

NOTE: THE ABOVE STANDARDS AND DATA SHEETS ARE AVAILABLE FROM:
THE FM APPROVALS WEB SITE: <http://www.fmglobal.com/approvals/resources/standards.asp>, or
Order Processing: <http://www.fmglobal.com/scripts/store/>.