

Approval Standard

Skylights

Class Number 4431
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Approval Standard for Skylights

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Foreword

Approvals are intended 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 Approvals Standards is to present the criteria for Approval of various types of products and services, as guidance for FM Approvals personnel, manufacturers, users and authorities having jurisdiction.

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

For examining equipment, materials and services, Approvals Standards:

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

Continuance of Approval and 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 judgment to change or revise its standards, criteria, methods, or procedures.

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1. INTRODUCTION

1.1 Purpose

- 1.1.1 This standard states Approval requirements for skylights. In some jurisdictions, skylights are referred to as roof lights. For purposes of this standard, skylights and roof lights shall be considered as the same product and shall be referred to as skylights.
- 1.1.2 Most skylights are manufactured from glass or plastic and are exposed to a number of hazards, including natural hazards, and must reject rain, wind, hail and other deleterious effects caused from everyday exposure to heat, cold and sunlight.
- 1.1.3 Skylights are also exposed to fire, either from an internal source or an external source, and must be able to limit fire propagation over and/or through the assembly. Common sources of ignition include, but are not limited to, the potential exposure from one or more adjacent buildings or from yard storage. This is particularly important as many potential fire exposures may be on adjacent property where control of the exposure may be outside the influence of the owner of the exposed building. Hot work and flying burning embers can also ignite a plastic skylight. Additionally, when exposed to a fire, skylights need to maintain their structural integrity so that they won't adversely affect sprinkler operation.
- 1.1.4 Approval criteria shall include, but are not limited to, performance requirements, marking requirements, an examination of manufacturing facility(ies), an audit of quality assurance procedures, and a follow-up program.

1.2 Scope

- 1.2.1 This standard sets the performance requirements for skylights under simulated laboratory conditions. They shall be examined for their ability to limit fire propagation over and/or through the assembly when exposed to an ignition source simulating an exterior building fire. This standard also sets the performance requirements for skylights when exposed to various natural hazards such as high wind events, the impact of simulated hail or windborne debris and the possible degradation effects of sunlight. The standard also examines the ability of the skylights to withstand the effects of temporary live loads such as those imposed by foot traffic.
- 1.2.2 Skylights are normally installed in the plane of the roof but they can be installed in numerous orientations and configurations including what are commonly referred to as north lights or saw tooth applications.
- 1.2.3 This standard is intended to qualify skylights when their slope is less than or equal to 45° from the horizontal. This standard is also intended to qualify skylights when installed vertically in a north light or saw tooth configuration. When oriented vertically, as would be the case in a north light or saw tooth configuration, the height of the skylight shall be limited to 10 ft (3 m).
- 1.2.4 This standard is intended to evaluate only those hazards investigated and is not intended to determine suitability for the end use of the product.
- 1.2.5 The results of tests conducted under the controlled conditions required by this standard shall not be used to describe or appraise performance under actual fire or natural hazard conditions as actual fire and natural hazard conditions vary widely.
- 1.2.6 This standard does not examine the product's solar optical values such as transmittance, reflectance or absorbance or other properties such as air leakage, water leakage, solar radiation, insulating properties or other properties related to the resistance of heat flow through the product due to indoor and outdoor temperature differentials.

1.2.7 This standard is not intended to qualify automatic heat and smoke vents. For the Approval requirements of heat and smoke vents, see Approval Standard 4430, *Heat and Smoke Vents*.

1.2.8 This standard is not intended to qualify products that are referred to as wall lights or light bands or when installed in a north light or saw tooth configuration when the vertical component is greater than 10 ft (3 m). Such products would be considered as exterior wall panels. For the Approval requirements of exterior wall panels, see Approval Standard 4881, *Class 1 Exterior Wall Panels*.

1.3 Basis for Requirements

1.3.1 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, jurisdictions and/or loss control specialists was also considered.

1.3.2 The requirements of this standard reflect tests and practices used to examine characteristics of skylights for the purpose of obtaining Approval. Skylights having characteristics not anticipated by this standard may be FM Approved if performance equal, or superior, to that required by this Standard is demonstrated, or if the intent of the standard is met. Alternatively, skylights which meet all of the requirements identified in this Standard may not be FM Approved if other conditions which adversely affect performance exist or if the intent of this standard is not met.

1.4 Basis for Approval

Approval is based upon satisfactory evaluation of the product and the manufacturer in the following major areas:

1.4.1 Examination and tests on production samples shall be performed to evaluate

- the suitability of the product;
- the performance of the product as specified by the manufacturer and required by FM Approvals; and as far as practical,
- the durability and reliability of the product.

1.4.2 An examination of the manufacturing facilities and audit of quality control procedures is made to evaluate the manufacturer's ability to consistently produce the product which is examined and tested, and the marking procedures used to identify the product. These examinations may be repeated as part of FM Approvals' product follow-up program.

1.5 Basis for Continued Approval

Continued Approval is based upon:

- production or availability of the product as currently FM Approved;
- the continued use of acceptable quality assurance procedures;
- satisfactory field experience;
- compliance with the terms stipulated in the Approval report;

- satisfactory re-examination of production samples for continued conformity to requirements; and
- satisfactory Facilities and Procedures Audits (F&PAs) conducted as part of FM Approvals' product follow-up program.

Also, as a condition of retaining Approval, manufacturers may not change a product or service without prior authorization by FM Approvals.

1.6 Effective Date

The effective date of an Approval standard mandates that all products tested for Approval after the effective date shall satisfy the requirements of that standard. Products FM Approved under a previous edition shall comply with the new version by the effective date or else forfeit Approval.

The effective date of this Standard is **October 1, 2006** for compliance with all requirements.

1.7 System of Units

Units of measurement used in this Standard are United States (U.S.) customary units. These are followed by their arithmetic equivalents in International System (SI) units, enclosed in parentheses. The first value stated shall be regarded as the requirement. The converted equivalent value may be approximate. Appendix A lists the selected units and conversions to SI units for measures appearing in this standard. Conversion of U.S. customary units is in accordance with the American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)/American Society for Testing Materials (ASTM) SI 10-02, *Standard for Use of the International System of Units (SI): The Modern Metric System*.

1.8 Applicable Documents

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

FM Approvals/FM Global

Approval Standard 4350, *Windstorm Resistant Fenestrations* (September 2006)

Approval Standard 4430, *Heat and Smoke Vents* (November 1980)

Approval Standard 4470, *Class 1 Roof Covers* (April 1986 with addenda)

Approval Standard 4880, *Class 1 Fire Rating of Insulated Wall or Wall and Roof/Ceiling Panels, Interior Finish Materials or Coatings, and Exterior Wall Systems* (October 2005)

Approval Standard 4881, *Class 1 Exterior Wall Panels* (June 2005)

FM Global Data Sheets

FM Global Property Loss Prevention Data Sheet 1-28, *Design Wind Loads* (September 2005)

FM Global Property Loss Prevention Data Sheet 1-29, *Roof Deck Securement and Above-Deck Roof Components* (January 2006)

American Society for Testing and Materials (ASTM)

ASTM G154-05, *Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure for Non Metallic Materials*.