

ICC-ES Evaluation Report

ESR-1136

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**DIVISION: 07 00 00—THERMAL AND MOISTURE
PROTECTION**
Section: 07 87 00—Smoke Containment Barriers

DIVISION: 08 00 00—OPENINGS
Section: 08 30 00—Specialty Doors and Frames

REPORT HOLDER:

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EVALUATION SUBJECT:

**SMOKE GUARD SYSTEM—MODELS 200, 400, 600, 1500,
M200, M400, M600 AND M1500 SMOKE CONTAINMENT
SYSTEMS**

1.0 EVALUATION SCOPE**Compliance with the following codes:**

- 2012, 2009 and 2006 *International Building Code*® (2012 IBC)
- 2012, 2009 and 2006 *International Fire Code*® (2012 IFC)

Property evaluated:

Smoke containment

2.0 USES

The Smoke Guard® Systems are rolling gasketing smoke containment systems used in conjunction with fire-resistance-rated elevator hoistway door and frame assemblies or in elevator lobbies to provide a smoke and draft control assembly. Models M200, M400 and M600, when installed over elevator openings equipped with a fire-resistance-rated elevator hoistway door and frame assembly are intended for use as an alternative to the requirement for a separated enclosed elevator lobby in accordance with Exception 3 of 2012 IBC Section 713.14.1, 2009 IBC Section 708.14.1 and 2006 IBC Section 707.14.1.

Model M1500, when installed remotely from elevator openings at the intersection of the elevator lobby and a non-fire-resistance-rated corridor, is intended for use as an alternative to the requirement for an enclosed elevator lobby in accordance with Exception 5 of Section 2012 IBC

Section 713.14.1, 2009 IBC Section 708.14.1 and 2006 IBC Section 707.14.1. When installed as described in this report, Model M1500 forms an opening protective in a smoke partition and is an alternative to the smoke and draft control doors required by 2012 IBC Section 710.5.2.2, 2009 IBC Section 711.5.2 and 2006 IBC Section 710.5.2. Models 200, 400, 600 and 1500 are identical to Models M200, M400, M600 and M1500, respectively. Uses, descriptions, installation and conditions of use described in this report for models with the M prefix apply to the corresponding models without the M prefix.

3.0 DESCRIPTION**3.1 General:**

3.1.1 Models M200, M400 and M600: The Smoke Guard® System Models M200, M400 and M600 consist of a reinforced transparent film designed to unroll from a housing unit positioned above the elevator opening, down along the existing elevator frame or auxiliary rails to cover the elevator opening in the event of actuation of the smoke detector(s) or loss of power. Auxiliary rails are used if the elevator frame is nonferrous, beveled, painted, irregular, or if the appearance of rails is desired.

The film protects the elevator opening from smoke migration by creating a smoke and draft control barrier. The Smoke Guard® System is connected to the smoke detection system located in the elevator lobby, or to the building's fire protection system, which initiates deployment within 10 seconds of smoke detector or fire protection system alarm operation. A cabling system allows the film to unwind. Flexible magnetic strips, on the vertical sides of the film, seal the film to the elevator door frame or to the auxiliary rails. The system is capable of sensing an object in its path and will not fully unroll until the object is removed.

For Models M200, M400 or M600, in the event that elevator occupants encounter a deployed Smoke Guard® System, a rewind switch located on both sides of the film can be manually activated, per IBC section 3002.6, to allow the occupants to exit from the elevator. For Model M600, an optional separate manually operated wall switch will also rewind the system. The film will redeploy after egress if the presence of smoke continues to be detected. In the event of a loss of power for Models M200, M400 or M600, a force of less than 15 pounds (66 N) applied at the film boundary is required to push the flexible magnetic strips away from the hoistway frame to allow occupant egress. Model M600 has battery backup and will function as intended in the event of an interruption in the building's electrical power supply.

3.1.2 Model M1500: The Smoke Guard® System Model M1500 consists of ceiling framing, side framing guide assemblies with an edge containment system, a curtain and an overhead curtain housing. Model M1500 is intended to be installed at the junction of the elevator lobby and a non-fire-resistance-rated corridor.

The curtain for Model M1500 is secured continuously along both sides by an edge containment system incorporated into the side framing guide assembly. The side framing guide assembly is installed from floor to ceiling on both sides of the opening to be protected. Pulleys connected to a drive shaft via toothed drive belts move the curtain up and down over guide rods that are part of the edge containment system. The curtain is connected at the bottom to a bar equipped with a pressure sensor that stops deployment when the curtain encounters an obstruction.

The system is deployed upon a signal from either the smoke detection system located in the elevator lobby or in the corridor being protected, or the building's fire protection system. The smoke detection system employs sensors to recognize if the curtain is striking a temporary obstruction and to prevent further travel to the floor. If the controller determines that the curtain has not fully deployed, the curtain will rewind and deployment will be repeated.

Model M1500 has battery backup protection and is designed to function as intended in the event of an interruption in the building's electrical power supply. Occupants egressing the building can retract the deployed curtain using manually operated switches installed on the walls on both sides of the curtain. The curtain will redeploy after egress if the smoke detector, or another device of the building's fire protection system, continues to operate in an alarm condition. After the alarm condition clears, the curtain automatically retracts to the ready position.

3.1.3 Smoke and Draft Control: When tested in accordance with UL 1784, the Smoke Guard® Systems have air leakage ratings that do not exceed 3.0 cfm per square foot (0.015424 m³/s·m²) of opening at a pressure differential of 0.1 inch w.c. (25 Pa) at both ambient and elevated temperatures.

3.2 Components for Smoke Guard® System Models M200, M400 and M600:

3.2.1 Film: The film is a minimum 1.0-mil-thick [0.01 inch (0.025 mm)] polyimide transparent sheet. A minimum 100 denier filament yarn is factory-adhered to the film as reinforcement.

3.2.2 Magnets: Strip magnets, a minimum of 2¹/₂ inches wide by ¹/₈ inch thick (65 mm by 3.2 mm), are attached to the vertical edges of the film with continuous beads of silicone sealant. The strips utilize a multipole flexible magnet consisting of energized ferrite in a nitrile rubber binder which exerts a minimum force of 1.4 MGOe.

3.2.3 Electrically Operated Drive Control System: The drive control system, which controls the deployment and rewind functions of the system, is intended for connection to the building's 120VAC power supply and to either the auxiliary contacts of the smoke detector located in the elevator lobby or to the building's fire protection system. Model M600 is equipped with a 12VDC back-up rechargeable battery and charger. The electrically operated, listed releasing device conforms to UL Standard 864. The thermally protected motor is rated at a minimum of 16 inch-pounds (2.8 N-m) at 100 rpm. Models M200 and M400 are equipped with a gear motor/clutch rated 90VDC with a viscous governor connected to the drive system. Model M600 is equipped with a 12VDC gear motor that is connected to the drive pulley.

3.2.4 Sealant: The sealant must be a low-modulus, silicone sealant, complying with ASTM C 920, Type S, Grade NS, Class 25, Use T, NT, M, G, A and O.

3.3 Components for Smoke Guard® Systems Model M1500:

3.3.1 Curtain Material: The curtain is a minimum 0.0035-inch-thick (0.09 mm) polytetrafluoroethylene (PTFE) coated woven glass fabric.

3.3.2 Electrically Operated Drive Control System: The drive control system, which controls the deployment and rewind functions of the system, is intended for connection to the building's 120VAC power supply and the auxiliary contacts of the smoke detectors located in the elevator lobby and the adjacent corridor. Model M1500 is equipped with two 12VDC backup rechargeable batteries and a charger. The electrically operated, listed releasing device conforms to UL Standard 864. The thermally protected motor operates at 24VDC and is rated at a minimum of 100 inch-pounds (17.5 N-m) torque. The motor powers a drive shaft running the length of the housing through a 90-degree tee-style gear box. Toothed pulleys at each end of the drive shaft engage the drive belts that are enclosed within the edge containment system.

3.3.3 Edge Containment System: The edge containment system extends from the bottom of the overhead curtain housing to the floor on each side of the curtain. The curtain is attached to guide rods encased within the edge containment system. In addition to the guide rods, toothed belts run the full height of the edge containment system to loop over the upper drive pulleys in the overhead curtain housing and the lower idler pulleys near the floor.

4.0 INSTALLATION

4.1 General:

Installation of the system must comply with this report and the manufacturer's published installation and operating instructions. Smoke Guard, Inc.'s installation and operating instructions must be available at the jobsite at all times during installation. See Figure 1 for typical installation details.

4.1.1 Models M200, M400 and M600: The system must be surface-mounted or flush-mounted to the elevator frame. The maximum elevator door opening width must not exceed 72 inches (1829 mm). The frame surrounding the elevator door must be a minimum of No. 14 gage [0.0747 inch (1.9 mm)] steel with a 2-inch-wide (51 mm) flat profile. Narrow, nonferrous or beveled frames require the installation of auxiliary ferrous steel rails.

For Models M200, M400 and M600, the basic installation consists of a sheet metal mounting plate attached to the wall above the elevator hoistway frame. The Smoke Guard System housing is attached to the mounting plate. Joints between the housing and the head of the hoistway frame must be sealed with the silicone sealant noted in Section 3.2.4.

The drive control power leads are connected to a 120 VAC electrical supply. Alarm signal leads are connected to the elevator lobby smoke detector.

The film is unrolled to magnetically adhere to either the elevator hoistway frame or the auxiliary rails. The magnets are adjusted to align with the elevator hoistway jams and the film is stretched tightly across the elevator hoistway opening. The film is adjusted vertically so the bottom threshold is in contact with the floor. After initial adjustment the film must be unrolled again to check the vertical alignment. Line slack must be removed and adjusted to provide equal tension between cables.

4.1.2 Model M1500: The Smoke Guard® System Model M1500 must be attached to the wall of the non-fire-resistance-rated corridor with the curtain housing installed above the elevator lobby opening to be protected or to the ceiling directly above the side guide assemblies. The maximum width and height of the opening must not exceed 144 inches (3658 mm). Installation procedures for the curtain and edge containment system must be in accordance with the manufacturer's installation instructions.

The electrically operated drive control system must be installed in accordance with the manufacturer's published installation instructions, the releasing device listing, and the applicable code. The two wall-mounted rewind switches must be connected to the control system and mounted at the height specified in the manufacturer's installation instructions.

Once the system is installed and energized, the upper and lower travel positions of the curtain are set automatically during calibration by the control system.

4.2 Final Adjustment and Inspection:

After the installation is complete, the installer must perform a final adjustment and inspection of the system. The deployment and rewind motor must be engaged and inspected for proper operation. Travel of the curtain and all moving parts must be inspected and adjustments made as required to the cable tension for Models M200, M400 and M600 and the travel for Model M1500. The operating process, including simulation of the smoke alarm activation of the releasing device, must be repeated five times to verify functionality. After installation, the systems must be maintained in accordance with Section 5.3 of this report.

5.0 CONDITIONS OF USE

The Smoke Guard® smoke containment systems described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1** Installation must comply with this report, Smoke Guard, Inc.'s published installation instructions, and the applicable code.
- 5.2** Installation must be by installers authorized by Smoke Guard®, Inc.
- 5.3** The Smoke Guard® system must be cycle-tested by the building owner of record or owner's representative on a semiannual basis. A permanent record of the cycle tests must be retained by the building owner of record or the owner's representative.
- 5.4** For Models M200, M400, and M600, a smoke detector complying with UL 268 must be installed at the ceiling in front of the elevator hoistway doors. For Model M1500, smoke detectors complying with UL 268 must be installed at the ceiling on both sides of the protected opening. The smoke detectors must be equipped with an auxiliary contact and battery backup (not provided by the Smoke Guard® System control station) or an emergency electrical system. When approved by the building official, or his designated representative, the smoke containment systems may be connected to the building's fire protection system instead of to the smoke detectors at the elevator hoistway doors or at the protected opening.
- 5.5** Models M200, M400, and M600 must be used with fire-resistance-rated elevator doors in order to comply with the "S" label requirements for tight-fitting smoke

and draft control assemblies in accordance with the requirements of Section 715.4.3 of the 2009 and 2006 IBC and Section 716.5.3 of the 2012 IBC, allowing the elevator doors to open directly into the fire-resistance-rated or non-fire-resistance-rated corridor, eliminating the need for an enclosed elevator lobby in accordance with Exception 3 of 2012 IBC Section 713.14.1, 2009 IBC Section 708.14.1 and 2006 IBC Section 707.14.1. In the absence of a corridor, elevator doors equipped with Models M200, M400 or M600 may open directly into an open floor plan.

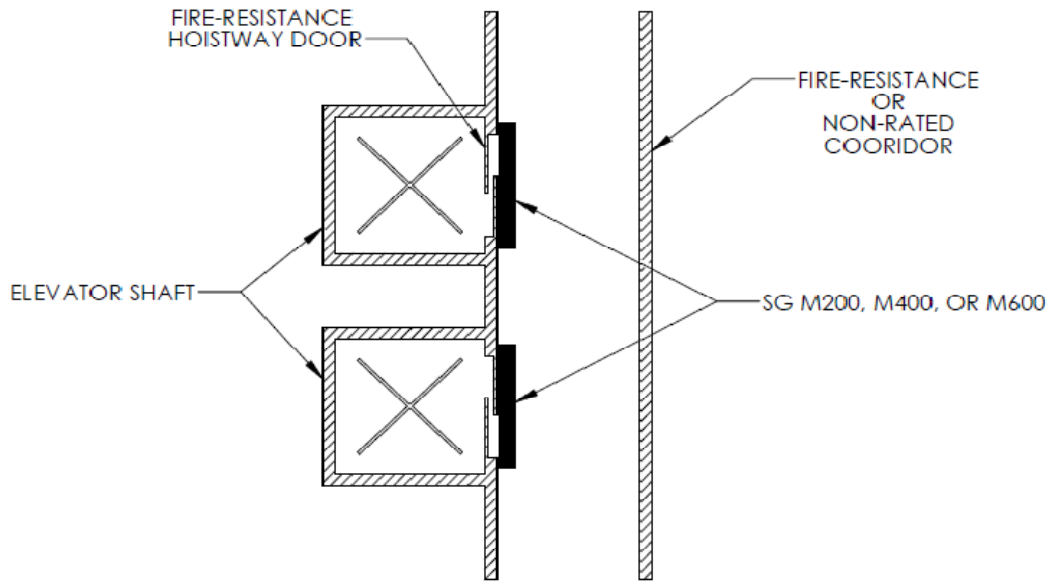
- 5.6** When used as an alternative to the smoke and draft control doors required by 2012 IBC Section 710.5.2.2, 2009 IBC Section 711.5.2 and 2006 IBC Section 710.5.2, Model M1500 must be installed at the opening created by the intersection of the elevator lobby and a non-fire-resistance-rated corridor to allow elimination of the enclosed elevator lobby in accordance with Exception 5 of 2012 IBC Section 713.14.1, 2009 IBC Section 708.14.1 and 2006 IBC Section 707.14.1.
- 5.7** Models M200, M400 and M600 are not intended for use where elevator hoistway pressurization in accordance with 2012 IBC Section 909.21, 2009 IBC Section 708.14.2 and 2006 IBC Section 707.14.2 is provided, except when the products recognized in this report are used in smoke control systems designed by registered professionals in accordance with the applicable requirements of Section 909 of the IBC and the IFC.
- 5.8** Model M1500 may be used in smoke control systems designed by registered professionals in accordance with the applicable requirements of Section 909 of the IBC and the IFC.
- 5.9** Under the 2012 and 2009 IBC and IFC, openings protected with Models M200, M400, M600 and M1500 must be maintained in accordance with Sections 107 and 703.1.2 of the IFC and Chapter 5 of NFPA 105. Annual inspection must be in accordance with Section 5.2 of NFPA 105.
- 5.10** The Smoke Guard® systems are manufactured in Boise, Idaho, under a quality control program with inspections by Intertek Testing Services NA, Inc. (AA-657).

6.0 EVIDENCE SUBMITTED

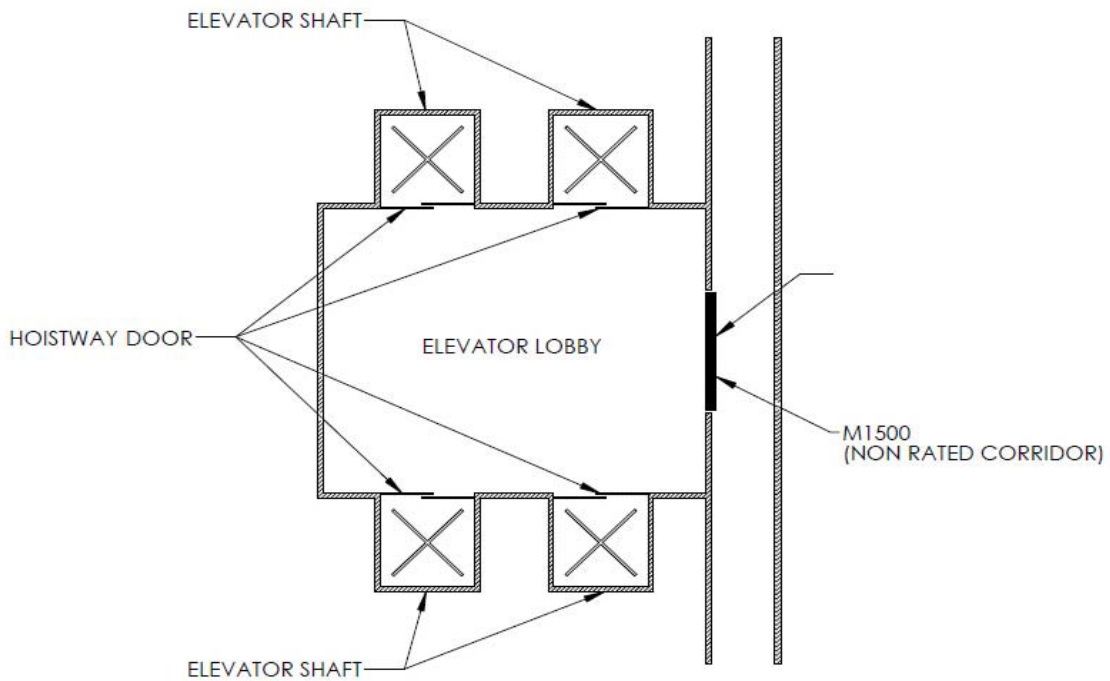
- 6.1** Manufacturer's descriptive literature, specifications, published installation and operating instructions and engineering drawings.
- 6.2** Data in accordance with the ICC-ES Acceptance Criteria for Smoke Containment Systems Used with Fire-resistive Elevator Hoistway Doors and Frames (AC77), dated October 2008 (editorially revised September 2011).
- 6.3** A quality control manual.

7.0 IDENTIFICATION

The Smoke Guard® systems described in this report must bear a label indicating the manufacturer's name (Smoke Guard®, Inc.), the manufacturer's address, the product name, the model number (M200, M400, M600 or M1500), the leakage rating (unless specified in the installation manual), the report number (ESR-1136), and the name of the inspection agency (Intertek Testing Services NA, Inc.).



M200, M400, M600 TYPICAL INSTALLATION



M1500 TYPICAL INSTALLATION

FIGURE 1—TYPICAL INSTALLATION DETAILS