



Member of the FM Global Group

Examination Standard for Fire and Smoke Door Holder and/or Release Devices

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Foreword

This standard is 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 this standard is to present the criteria for examination of various types of products and services.

Examination in accordance with this standard shall demonstrate compliance and verify that quality control in manufacturing shall ensure a consistent and reliable product.

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1 INTRODUCTION

1.1 Purpose

- 1.1.1 This standard states testing and certification requirements for fire and smoke door holder and/or release devices.
- 1.1.2 Fire and smoke doors play an important role in preventing fire, smoke and other products of combustion from spreading and migrating from the room of origin to other compartments within a building. In order to perform their intended function, fire and smoke doors must be closed and securely latched at the time of the fire. In an effort to accomplish this, building codes have specified that pedestrian and vehicular openings in rated walls shall be protected by automatic closing fire and smoke doors.
- 1.1.3 In order to facilitate the movement of people and vehicles, doors are often held in the open position. When kept in the open position to allow for frequent traffic, door holders and release devices must be used. These units are connected to detectors so that when a detector is activated and sends a signal that an alarm condition exists, the door holder and release device perform their function by automatically disconnecting from the door. With the door holder and release device no longer keeping the door in the open position, the door is allowed to close due to the presence of an automatic closing device.
- 1.1.4 The certification criteria contained in this standard 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 surveillance program.

1.2 Scope

- 1.2.1 This standard sets the performance requirements for fire and smoke door holder and/or release devices. They shall be examined for their ability to keep a fire or smoke door in the open position by either electromechanical or electromagnetic means until such time that the unit(s) receive a signal from an external source such as a product of combustion device or a simulated alarm signal meant to test the system.
- 1.2.2 This standard is not intended to be used to determine when or where door holder and/or release devices are used nor is it intended to be used to determine the type of detection devices to be used or where such detection devices are to be located.

This standard is not intended to qualify power operated release devices. Such devices would use this examination standard to assess the door holder and/or release features but must be used in conjunction with other examination standards, as applicable, to assess the power operator and automatic closing functions of the unit.

- 1.2.3 This standard is not intended to qualify self-closing or automatic closing devices. The purpose of the door holder and/or release device is to keep the door in the open position until it receives a signal. Once the door is free to close, the action of getting the door into the closed position is the responsibility of the automatic closing device.
- 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.

1.3 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 door holder and/or release devices for the purpose of obtaining certification. Fire door holder and/or release devices having characteristics not anticipated by this standard may be certified if performance equal, or superior, to that required by this standard is demonstrated.

1.4 Basis for Certification

Certification 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 the certification agency; and as far as practical,
- the 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 the certification agency's surveillance audit program.

1.5 Basis for Continued Certification

The basis for continual certification may include, but is not limited to, the following based upon the certification scheme and requirements of the certification agency:

- production or availability of the product as currently certified;
- the continued use of acceptable quality assurance procedures;
- satisfactory field experience;
- compliance with the terms stipulated in the certification report;
- satisfactory re-examination of production samples for continued conformity to requirements; and
- satisfactory surveillance audits conducted as part of the certification agency's product surveillance program.

1.6 Effective Date

The effective date of this certification standard mandates that all products tested for certification after the effective date shall satisfy the requirements of this standard.

The effective date of this Standard is eighteen (18) months after the publication date of the standard 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. Conversion of U.S. customary units is in accordance with ANSI/IEEE/ASTM SI 10.1.8

1.8 Applicable Documents

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the cited edition applies

FM Approvals

3010, Examination Standard for Fire Alarm Signaling Systems

3260, Examination Standard for Radiant Energy-Sensing Fire Detectors for Automatic Fire Alarm Signaling

National Fire Protection Association (NFPA)

NFPA 72, National Fire Alarm Code

NFPA 80, Standard for Fire Doors and Other Opening Protectives

NFPA 105, Standard for Smoke Door Assemblies and Other Opening Protectives

1.9 Definitions

For purposes of this standard, the following terms apply:

Automatic Closing Device — A device that causes a door to close when activated by a detector.

Automatic Closing Fire Door — A door that is normally open but that closes when an automatic closing device is activated.

Battery Backup — A device that stores and supplies electricity when the main electrical power source fails or drops to an unacceptable voltage level.

Detector — A device that is designed to detect the presence of a fire signature and to initiate action.

Door Holder — A fail-safe device, controlled by a detector and used on an automatic closing door, which holds the door in the open position and releases the door upon receipt of a signal from an external source such as an alarm.

Electromagnetic Device — A device made magnetic by an electrical current.

Electromechanical Device — A mechanical device that is operated by electricity.

Fail-Safe Device — A device that will provide its intended function upon a loss of power.

Fire Door — The door component in a fire door assembly.

Power Operated Release Device — A device that serves the functions of a door holder and/or release device with an automatic closing device. Such devices normally do not disconnect from the door being held in the open position and use an electrical motor to power the door to the closed position.

Release Device — See Door Holder.

Smoke Door — The door component in a smoke door assembly.

Time Delay Device — A device used to delay the release feature of an electromagnetic or electromechanical door holder and/or release device when the control voltage powering the unit drops below an acceptable level. This action prevents the fail-safe feature of the unit from working for a preset period of time.

2 GENERAL INFORMATION

2.1 Product Information

- 2.1.1** Fire and smoke door holder and/or release devices are used to hold doors in the open position. This is often desirable where there is regular and frequent pedestrian and/or vehicular traffic that passes through an opening in a rated wall without the need to open and close the door each time someone or something passes through the opening. While this can be highly convenient, it can compromise the integrity of the rated wall if the door holder and/or release device does not release the fire or smoke door is not securely closed in the event of a fire.
- 2.1.2** Fire and smoke door holder and/or release devices are normally part of a building's fire detection and alarm system although they can also be part of a system designed to close doors upon receipt of a signal from a remote location.
- 2.1.3** There are two (2) different types of door holder and release devices addressed in this examination standard: electromagnetic and electromechanical.
- 2.1.3.1** The electromagnetic units are generally of a simpler design and are used principally on swinging types of doors. The units are securely attached to the supporting structure or door frame and are permitted to be either floor mounted or wall mounted. Upon receipt of a signal or loss of power, the holder disconnects from the door panel. Automatic closure is normally provided by either a door closer or spring hinges. The automatic closing device is not part of the door holder and/or release device.
- 2.1.3.2** The electromechanical units are generally a more complex design and contain more features and options. The units are principally used with rolling steel or sliding doors. Their principal function is to maintain tension in the fusible link/cable arrangement. With the fusible link/cable arrangement held in tension, the door can be opened and closed manually or under power. Upon receipt of a signal or loss of power, the unit releases the fusible link/cable arrangement. With this arrangement no longer in tension, the door's automatic closing device is free to activate which allows the door to automatically close. The automatic closing device is not part of the door holder and/or release device and is generally incorporated as part of the fire door assembly.
- 2.1.4** Door holder and/or release devices shall be permitted to incorporate a battery back-up system.
- 2.1.5** Door holder and/or release devices shall be permitted to incorporate detectors. When present, the detectors shall be examined in accordance with the applicable examination standard.

2.2 Certification Application Requirements

The manufacturer shall provide the following preliminary information with any request for certification consideration:

- A complete list of all models, types, sizes, and options for the products or services being submitted for certification consideration;
- general assembly drawings, complete set of manufacturing drawings, materials list, sales literature, and installation procedures;
- the number and location of manufacturing facilities; and
- all documents shall identify the manufacturer's name, document number or other form of reference, title, date of last revision, and revision level. All documents shall be provided with English translation.

2.3 Requirements for Samples for Examination

- 2.3.1** Following authorization of a certification examination, the project engineer will inform the manufacturer of the number and type of samples that shall be submitted for examination and testing.
- 2.3.2** The manufacturer shall submit samples representative of production. The certification agency, at their sole discretion, shall reserve the right to witness production of test samples and/or any components or raw materials that are deemed to be critical to the performance of the product. Any decision to use data generated using prototypes is at the discretion of the certification agency.
- 2.3.3** Requirements for samples may vary depending on design features, results of prior or similar testing (if applicable), and results of any foregoing tests.

3 GENERAL REQUIREMENTS

3.1 General Information

- 3.1.1** The requirements of this standard shall be used to measure and describe the performance of fire and smoke door holder and/or release devices to simulated normal operating conditions, environmental conditions and electrical conditions that the unit may be exposed to during the life of the product.
- 3.1.2** In order to be eligible for certification, all units shall contain fail-safe devices such that upon a loss of power, the units shall release and not cause the door to remain in the open or partially open position. Units shall be permitted to incorporate a time delay device in order to avoid nuisance closures and false alarms. The time delay device shall be permitted to be adjustable so that the end user or Authority Having Jurisdiction can determine how long of a delay is needed. If the time delay device is not adjustable, it shall release after a maximum ten (10) seconds upon receipt of a signal or loss of power. The units shall be permitted to be connected to a battery back-up device to extend the time period where the door holder and/or release device will not release as a result of a loss of power.
- 3.1.3** Units shall be permitted to be provided with manual release buttons so that the units can be manually disconnected from the door. The units shall also be permitted to incorporate other features not anticipated by this standard provided that the other features do not interfere with the ability of the unit to perform its intended function.
- 3.1.3.1** When present, these additional features shall be evaluated in accordance with the appropriate examination standard, if applicable.
- 3.1.4** Units shall be permitted to operate on AC and/or DC power sources.

3.2 Test Matrix for Obtaining Certification

Performance Requirement	Electromagnetic Devices	Electromechanical Devices
4.1 Normal Operation	Yes	Yes
4.2 Environmental Conditioning	Yes	Yes
4.3 Vibration	Yes	Yes
4.4 Dielectric	Yes	Yes
4.5 Endurance	Yes	Yes
4.6 Equipment Load Rating	Yes	Yes
4.7 Protective Grounding	Yes	Yes
4.8 Voltage Variation	Yes	Yes
4.9 Surge Line Transients	No	Yes
4.10 RFI Immunity	No	Yes

3.3 Markings

- 3.3.1** Marking on the product or, if not possible due to size, on its packaging or label accompanying the product, shall include the following information:
- name and address of the manufacturer or marking traceable to the manufacturer;
 - date of manufacture or code traceable to date of manufacture or lot identification;
 - model number or designation and applicable ratings, as appropriate.

When hazard warnings are needed, the markings should be universally recognizable.

3.3.2 The model or type identification shall correspond with the manufacturer's catalog designation and shall uniquely identify the certification agency's mark of conformity.

3.3.3 The certification agency's mark of conformity shall be displayed visibly and permanently on the product and/or packaging as appropriate and in accordance with the requirements of the certification agency. The manufacturer shall exercise control of this mark as specified by the certification agency and the certification scheme.

3.3.4 All markings shall be legible and durable.

3.4 Manufacturer's Installation Instructions

All fire and smoke door holder and/or release devices shall be installed, maintained and tested in accordance with the manufacturer's written installation instructions, NFPA 80 and/or 105 as applicable, local building codes and Authorities Having Jurisdiction.

3.5 Calibration

3.5.1 Each piece of equipment used to verify the test parameters shall be calibrated within an interval determined on the basis of stability, purpose, and usage. A copy of the calibration certificate for each piece of test equipment is required. The certificate shall indicate that the calibration was performed against working standards whose calibration is certified and traceable to an acceptable reference standard and certified by an ISO/IEC 17025 accredited calibration laboratory. The test equipment shall be clearly identified by label or sticker showing the last date of the calibration and the next due date. A copy of the service provider's accreditation certificate as an ISO/IEC 17025 accredited calibration laboratory should be available.

3.5.2 When the inspection equipment and/or environment is not suitable for labels or stickers, other methods such as etching of control numbers on the measuring device are allowed, provided documentation is maintained on the calibration status of this equipment.

4 PERFORMANCE REQUIREMENTS

4.1 Normal Operation

4.1.1 Requirement

Representative samples of the equipment (system or modules) shall be powered according to the manufacturer's written instructions and programmed (if applicable) for proper operation and application. Re-wiring, re-configuring or programming to satisfy different types of applications is often required. Demonstrations or simulations at maximum rated loads of power supplies, IDC, SLC and NAC will be required.

4.1.2 Test/Verification

Basic operation to NFPA 72 will be verified and documented as specified in the manufacturer's instructional manual.

4.2 Environmental Conditioning

4.2.1 Requirement

It shall be verified that the door holder and/or release device designed so that it is capable of performing its intended normal operational capability and functionality throughout temperature extremes and high humidity conditions that are typical of equipment intended for indoor applications. If the manufacturer specifies a temperature range beyond those typical for indoor/dry locations, the equipment will be tested using the values specified by the manufacturer.

4.2.2 Test/Verification

At a minimum, the test sample(s) shall be subjected to the following environmental extremes. If rated for extremes beyond these values, the equipment shall be tested using those values specified by the manufacturer. The test(s) shall be conducted in accordance with the Environmental Conditioning Test per FM Examination Standard 3010.

- a) For a period of four (4) hours at 32°F (0°C) and 120°F (49°C).
- b) For a period of twenty-four (24) hours at a relative humidity of 90% and an ambient temperature of 100°F (37.8°C).

4.2.2.1 The equipment shall operate as intended and show no signs of instability or false alarms during these exposures.

4.3 Vibration

4.3.1 Requirement

The line connected power supply equipment (enclosure and assemblies) shall be tested to verify its mechanical strength and ability to withstand the vibration as defined in this section. As a result of this testing, there shall be no loosening of parts or visible signs of permanent deformation.

4.3.2 Test/Verification

With the equipment powered and installed in accordance with the manufacturer’s instructions, the equipment shall be subjected to a vertical movement as described below. The test(s) shall be conducted in accordance with the Vibration Test per FM Examination Standard 3260.

Duration	4 hours
Displacement	0.02 in (0.5 mm)
Sweep Frequency Range	10 Hz-30 Hz-10 Hz
Sweep Rate	2 cycles/minute

Following the four (4) hour vibration exposure, the equipment shall:

- 1) not have any loose parts
- 2) not have any visible of permanent deformation that would compromise the electrical safety of the equipment
- 3) operate as intended

4.4 Dielectric

4.4.1 Requirement

The equipment shall withstand the application of approximately 60hz AC voltage or a DC voltage for a period of at least one (1) minute. The voltage shall be applied between live parts and the enclosure and dead metal parts in which it might come in contact with, and live parts of circuits operating at different voltages. The test voltages are described below. The test(s) shall be conducted in accordance with the Dielectric Test per FM Examination Standard 3010.

Circuit Ratings	Dielectric Test Voltage
< 30 Vac (60 Vdc)	500 Vac (707 Vdc)
≥ 30 Vac (60 Vdc)	1000 Vac + 2 x rating (1414 Vdc)

4.4.2 Test/Verification

Upon completion of the test, there shall be no indication of a dielectric breakdown or leakage current greater than 10 mA during the one (1) minute test exposure.

4.5 Endurance Test

4.5.1 Requirement

With the product supply circuit at rated voltage and frequency and with rated devices or equivalent loads connected to the output circuits, a product shall not show a manifestation of a fire or risk of electrical shock and shall be capable of operating in the intended manner after being subjected to repetitive signal operation. In addition, there shall be no electrical or mechanical failure or evidence of approaching failure of the product components.

4.5.2 Verification/Test

Based upon the frequency of expected use, each circuit of the product shall be tested for the number of cycles and at the rate indicated in table below.

Exception: When circuits are not capable of the rate indicated in the table, the test cycle rate shall be the maximum rate permitted by the design of the product.

Frequency of use	Total number of operations	Operations per minute
Daily use	30,000	5
Occasional use	6,000	5

The loads or equivalent loads specified in above shall conform to the power factor loading indicated in the Table below:

Type of the devise tested	Required power factor
Electromagnetic	0.6
Electromechanical	0.4

4.6 Equipment Load Rating

4.6.1 Requirement

The standby or alarm current necessary to power the equipment shall not exceed 110% of the rated value over the entire voltage range that the equipment is rated or intended. The test(s) shall be conducted in accordance with the System Load Rating and Overload Test per FM Examination Standard 3010.

4.6.2 Verification/Test

With the equipment configured for maximum rated current draw (outputs at full rated load), the input voltage shall be varied over the extremes as determined by the Voltage Variation Test (see Section 4.8). At no time shall the current value measured exceed 110% of that rated on the nameplate or the manufacturer's installation instructions.

4.7 Protective Grounding

4.7.1 Requirement

Any equipment that contains or connects to a high voltage circuit shall provide a positive grounding system for all exposed dead metal parts to reduce the risk of electrical shock. The test(s) shall be conducted in accordance with the Protective Grounding/Bonding Test per FM Examination Standard 3010.

4.7.2 Test/Verification

The grounding system shall consist of a dedicated (green head) screw or terminal clearly marked (G, GR, GND, Ground, International Ground Symbol or the like), or dedicated, flexible green (or green and yellow) bonding conductors.

- The bonding resistance shall be measured at ≤ 1.0 ohm
- All bonding conductors shall be 14 AWG minimum

Exception: Metal-foil markings, screws, handles, etc. which are located on the outside of the enclosure and isolated from electrical components or wiring by grounded metal parts so that they are not liable to become energized or those which are positively separated from wiring and un-insulated live parts.

4.8 Voltage Variation

4.8.1 Requirement

It shall be verified that the device maintain the normal operational capability and functionality throughout typical voltage extremes of both the primary and secondary power supplies from which they are powered. The test(s) shall be conducted in accordance with the Voltage Variations Test per FM Examination Standard 3010.

4.8.2 Verification/Test

As a minimum, the normal operation of the equipment shall be verified at 85% to 110% of the rated primary (AC) and secondary (DC) power sources. If the manufacturer specifies a voltage range beyond these extremes, the equipment will be tested using those values specified by the manufacturer. The typical voltage ranges are defined as shown below:

Nominal	+10%	-15%
120 Vac	132 Vac	102 Vac
240 Vac	264 Vac	204 Vac
12 Vdc	13.2 Vdc	10.2 Vdc
24 Vdc	26.4 Vdc	20.4 Vdc

4.9 Surge Line Transient Test

4.9.1 Requirement

Protection against surge line transients shall be a requirement for any low voltage circuit (power, inputs, IDC, SLC or NAC). The test(s) shall be conducted in accordance with the Surge Line Transients Test per FM Examination Standard 3010.

4.9.2 Verification/Test

All field wiring terminals that have a possibility of being subjected to line-induced voltage (ie, initiating device circuits, power circuits and remote/auxiliary connections shall be subjected to this test. One (1) powered sample of the control equipment shall be subjected to transient waveforms having peak values of:

- 100 Vdc
- 500 Vdc
- 1000 Vdc
- 2400 Vdc

The units shall produce:

- No false alarm signals or non-self-restoring trouble signals;
- No evidence of instability during or at the end of the test, and;
- The unit shall operate normally following the test

Exception: Any circuit specified to remain in the same room or 20 ft (6 m) or less in length and in conduit.

4.10 RFI Immunity

4.10.1 Requirement

No false signal will be generated when the equipment is subjected to extraneous transients from sources which are described below. The test(s) shall be conducted in accordance with the Extraneous Transients (RFI Immunity Test) per FM Examination Standard 3010.

4.10.2 Verification/Test

One powered sample of the control equipment shall be subjected to extraneous transients described below at distances as close as 24 inches (0.6 m) to the DUT.

- Radio frequency transmissions with radiation power levels equivalent to 5 watts in the 27 MHz, 150-174 MHz, 450-467 MHz, 850-870 MHz and 900-920 MHz bands.

The unit shall produce:

- No false signals (alarm or trouble) and
- No evidence of instability during or at the end of the test.
- The unit shall operate normally following this test.

5 OPERATIONS REQUIREMENTS

A quality assurance program is required to assure that subsequent door holder and/or release devices produced by the manufacturer shall present the same quality and reliability as the specific products examined. Design quality, conformance to design, and performance are the areas of primary concern.

- Design quality is determined during the examination and tests, and is documented in the certification report.
- Continued conformance to this standard is verified by the Surveillance Audit.
- Quality of performance is determined by field performance and by periodic re-examination and testing.

5.1 Demonstrated Quality Control Program

5.1.1 The manufacturer shall demonstrate a quality assurance program which specifies controls for at least the following areas:

- existence of corporate quality assurance guidelines;
- incoming quality assurance, including testing;
- in-process quality assurance, including testing;
- final inspection and tests;
- equipment calibration;
- drawing and change control;
- packaging and shipping; and
- handling and disposition of non-conforming materials.

5.1.2 Documentation/Manual

There should be an authoritative collection of procedures/policies. It should provide an accurate description of the quality management system while serving as a permanent reference for implementation and maintenance of that system. The system should require that sufficient records are maintained to demonstrate achievement of the required quality and verify operation of the quality system.

5.1.3 Records

To assure adequate traceability of materials and products, the manufacturer shall maintain a record of all quality assurance tests performed, for a minimum period of two years from the date of manufacture.

5.1.4 Drawing and Change Control

- The manufacturer shall establish a system of product configuration control that shall allow no unauthorized changes to the product. Changes to critical documents, identified in the certification report, may be required to be reported to, and authorized by the certification agency prior to implementation for production.
- Records of all revisions to all certified products shall be maintained.

5.2 Surveillance Audit Program

5.2.1 An audit of the manufacturing facility may be part of the certification agencies surveillance requirements to verify implementation of the quality assurance program. Its purpose is to determine

that the manufacturer's equipment, procedures, and quality program are maintained to insure a uniform product consistent with that which was tested and certified.

- 5.2.2** Certified products or services shall be produced or provided at, or provided from, location(s) disclosed as part of the certification examination. Manufacture of products bearing a certification mark is not permitted at any other location prior to disclosure to the certification agency.

5.3 Installation Inspections

Field inspections may be conducted to review an installation. The inspections are conducted to assess ease of application, and conformance to written specifications. When more than one application technique is used, one or all may be inspected at the discretion of the certification agency.

5.4 Manufacturer's Responsibilities

The manufacturer shall notify the certification agency of changes in product construction, components, raw materials, physical characteristics, coatings, component formulation or quality assurance procedures prior to implementation.