



Fire Door and Smoke Door Assembly Inspection & Testing

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Expertly Engineering Safety From Fire®

Introductions



Lennon Peake, P.E.
 • Manager
 • 14+ years industry experience




Allison C. Ellis, P.E.
 • Health Care Specialist
 • 6+ years industry experience



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Applicable Codes and Standards

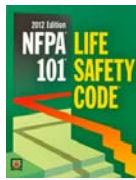
- NFPA® 101®, *Life Safety Code*®, 2012 (LSC)
- NFPA® 80, Standard for Fire Doors and Other Opening Protectives, 2010 Edition
- NFPA® 105, Standard for Smoke Door Assemblies and Other Opening Protectives, 2010 Edition



[3]

Door Types

- NFPA 80 – Fire Doors
- NFPA 105 – Smoke Door Assemblies
- NFPA 101 – Corridor doors in health care occupancies



[4]

Overview

- Review different door types
 - Inspection and testing requirements
- Focus on fire doors
 - Review smoke barrier and corridor doors in health care occupancies

[5]

Annual Inspection and Testing

- LSC 2012 §7.2.1.15.2 references NFPA 80 and NFPA 105
 - Annual inspection and testing required for fire doors and smoke door assemblies
 - Completion of annual survey by July 5, 2017
 - Performance-Based Option permitted where approved by the AHJ
 - Historical data of fire/smoke door failure rates
 - Technical justification for modified maintenance interval

[6]

Smoke Door Assemblies

- **NFPA 105 §3.3.3 Smoke Door Assembly.** Any combination of a door, frame, hardware and any other accessories that together restrict smoke movement through door openings by limiting the amount of air that can pass through the assembly
 - LSC Chapters 18 – 21 do not require smoke barriers door to be smoke leakage-rated



[7]

Inventory and Documentation

- **REQUIRED!**
- Acceptance tests
 - Keep for life of assembly
- Inspection and testing documentation
 - **NFPA 105 §5.2.1.6** Records shall be maintained for not less than 3 years
- Ensure inventory is up-to-date



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Documentation

- Name, date and results of activity
- Signed record of inspection
- Inventory of devices and equipment
- Required frequency of activity
- Name and contact information of person performing activity
- NFPA standards referenced



[9]

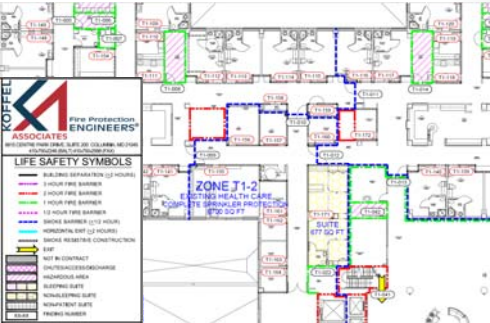
Documentation

- Rely on life safety plans to generate inventory
- Unique identifier for each door recommended on drawings
- Results of inspection/test – pass/fail
 - Reason for fail
- Follow-up actions



(10)

Life Safety Plans



(11)



Fire Doors in Non-rated Barriers

- Doors must be inspected annually or the label must be removed per HITF
- **LSC 4.6.12.3** Existing life safety features obvious to the public, if not required by Code shall either be maintained or removed



(12)


Inspection Checklist

Barrier	Door Requirements
 2-hour fire-rated barrier	<input type="checkbox"/> 90-minute (2-hour barrier) / 45-minute (1-hour barrier) label provided and legible <input type="checkbox"/> Self-closing device required and must close door completely <ul style="list-style-type: none"> Door is not permitted to be propped open unless on magnetic hold open tied to fire alarm system
 1-hour fire-rated barrier	<input type="checkbox"/> Positive latch required <input type="checkbox"/> If coordinator is installed, the inactive leaf closes before the active leaf <input type="checkbox"/> Gasketing and edge seals, where required, are inspected to verify their presence and integrity <input type="checkbox"/> No field modifications to the door assembly that void the label <input type="checkbox"/> Steel Fire Door <ul style="list-style-type: none"> Gap at meeting edges of doors $\leq 1/8$ inch $\pm 1/16$ inch Clearance under door $\leq 3/4$ inch <input type="checkbox"/> Wood Fire Door <ul style="list-style-type: none"> Gap at meeting edges of doors $\leq 1/8$ inch Clearance under door $\leq 3/4$ inch



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Who Performs Functional Testing?

- **2010 NFPA 80 §5.2.3.1** *Functional testing...shall be performed by individuals with knowledge and understanding of the operating component of the type of door being subject to testing.*
- Document staff training
- Inspecting a door  certifying a door



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NFPA 80 2013 Inspection and Testing Qualifications

- **5.2.3.1**testing of fire door and window assemblies shall be performed by a qualified person ~~individuals~~ with knowledge and understanding of the operating components of the type of door being subject to testing.
- **3.3.95 Qualified Person.** A person who, by possession of a recognized degree, certification, professional standing, or skill or who, by knowledge, training, and experience, has demonstrated the ability to deal with the subject matter, the work, or the project



Inspection vs. Testing

- Inspection:
 - Visual inspection testing functionality of door
- Testing:
 - Door release or latch engagement via local smoke detection, etc.



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Visual Inspection

- Performed on both sides of door
 - No holes in door or frame
 - Glazing in tact and secure
 - All parts secured, aligned, in working order
 - No parts missing or broken



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Visual Inspection

- Proper clearances (between leaves and under doors)
- Self-closer operates properly
- Coordinator operates properly
- No field modifications that void fire-rating



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Visual Inspection

- Latch operates and secures door closed
- No auxiliary hardware interfering with operation of door
- Integrity of gasketing inspected



[19]

Door Rating

- Not the same as barrier rating

Wall rating (hours)	Fire Door Rating (minutes)
3	180
2	90
1	45*
1/2	20*



[20]

Door Hardware

- Builders Hardware
 - Door assembly is permitted to assembled in the field
 - Permitted on swinging doors only
- Fire Door Hardware
 - Assembly provided from the manufacturer and shipped with door



[21]

Operation of Fire Doors

- **NFPA 80 §6.1.4** All swinging doors shall be closed and latched at time of fire
 - Self-closing doors
 - Automatic-closing doors
 - Power-operated doors



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Power-Operated Doors

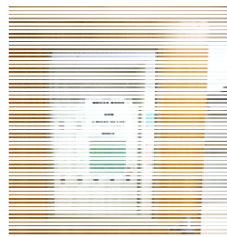
- Local smoke detection required to release power operator
 - Smoke detection within 5 ft of door or corridor smoke detection
- Doors must close and latch regardless of power failure or manual operation



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Fire/Smoke Door Glazing (Glass)

- Wired* or stamped
- Size limitations



16 CFR 1201 CAT. II
ANSI Z97.1-2004 U A
8mm LAMINATED
CLASSIFIED
UL
D-H-NT-45
OH-45
6-259
R-13377
ANSI/UL 910B/10C

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Glazing Limitations

Table 4.4.5 Fire Door Rating

Fire Door Rating (hr)	Maximum Area of Glazing (per Door Leaf ^a)
½, ¾	Limited to maximum area tested
1°	Limited to maximum area tested ^b
1½, 2°	Limited to maximum area tested
3°	100 in. ² (0.065 m ²)

^aSee also requirements in 4.4.4.

^bSee 4.4.5.1.

^cFire protection-rated glazing materials exceeding 100 in.² (0.065 m²) in area are not permitted in temperature rise-rated doors.



(25)

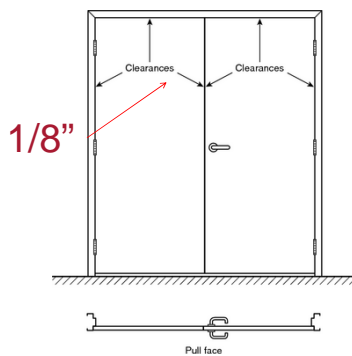
Clearances

- Maximum clearance between door and frame
 - 1/8 inch for wood doors
 - 3/16 inch for steel doors
- Maximum clearance under fire/smoke barrier doors 3/4 inch
- Maximum clearance under smoke resistive doors 1 inch



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Clearances – Metal Doors in Pairs



(27)

Fire Door Latching

- Number of latching points not standard for all doors
- Door assembly must be installed as tested
- Fire pins
 - Permitted by LSC and IBC



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Continuous Hinges

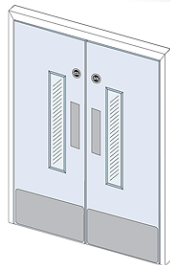
- Label indicating fire-protection rating
- 2013 NFPA 80 §6.4.3.1.6
 - ...continuous hinges shall be within 1 inch of the height of the doors and shall be labeled and shall meet the requirements of ANSI/BHMA A156.26



[29]

Protection Plates

- **Factory installed** = listed
- **Field installed** = labeled and installed in accordance with listing
- Labeling not required if top of the plate is not more than 16 inch (406 mm) above the bottom of the door.



[30]

Fire Exit vs. Panic Hardware

- Fire exit hardware
 - Must always have an operable latch
- Panic hardware
 - Capable of being “dogged down”
 - Required in educational and assembly occupancies



[31]

Holes in Door and Frame

- Install steel fasteners that completely fill the hole
- Fill the hole with like material of door/frame
 - OR material listed for this use and installed per manufactures recommendations



[32]

Fire Door Signage

- Total area of sign limited to 5% of door area
- Attached to door by adhesive
 - Mechanical attachments such as screws not permitted
- Not permitted to be installed on glazing



[33]

Doors Will Not Close Completely

- Adjust self closer tension
- Rubs frame or other door
- Propped in open position



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Decorations

- Not permitted on fire doors
- Distinguishable from adjacent construction so doors are easily recognized and decorations do not obstruct visibility of exits



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NFPA 80 2013 Field modifications

3.3.46 Field modification definition clarified

5.1.5.2.1 In cases where a field modification to a fire door or a fire door assembly is desired..... the laboratory with which the product or component being modified is listed shall be contacted through the manufacturer and a written or graphic document description of the modifications shall be presented to that laboratory.

5.1.5.2.2 Field modifications shall be permitted without a field visit from the laboratory upon written authorization from that laboratory.



Common Fire Door Issues

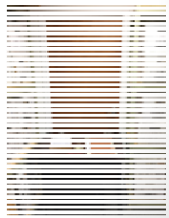
- Self closing or automatic closing
- Functionality of positive latch
- Label on door and frame indicating fire-rating
- Label on continuous hinges indicating fire-rating
- No holes in door or frame
- Maximum clearances
- Glazing properly rated



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Doors No Longer In Use

- **NFPA 80 §5.1.2, NFPA 105 §5.1.1** When a door or opening is no longer in use, the opening shall be filled with construction equivalent to that of the wall



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Common Smoke Door Issues

- Self closing or automatic closing
- No holes in door or frame
- Positive latching not required per *LSC*
- Label indicating fire-rating not required per *LSC*
- Kick plate ≤ 48 – inches (new construction)



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Common Smoke Door Issues

- Kickstands, louvers, and mail slots not permitted
- Vision panels must be fire protection-rated
- Maximum permitted clearance exceeded



[40]

Smoke Resistive Doors

- Must resist the passage of smoke
- Commonly located in corridor barriers, suite boundaries and hazardous areas



[41]

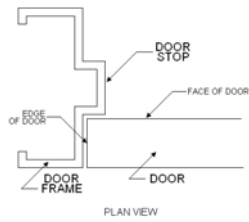
Smoke Resistive Doors

- Positive latch required
- **NOT** required to self-close
- Friction hold open permitted
- Fire-rated label not required
- Kickstands and louvers not permitted
- Mail slots permitted with limitations



[42]

Corridor Doors Clearances



- 1/2 - inch sprinkler protected smoke compartments
- 1/4 - inch in non-sprinkler protected smoke compartments



[43]

Corridor Door Positive Latching

- When a door is pushed or pulled it automatically latches and keeps door closed
- Required on fire-rated doors and corridor doors in health care occupancies
 - Not required on smoke barrier doors
- Existing corridor and new power operated doors permitted without latch, provided door remains closed upon application of 5 lb force and AHJ approval
 - Annual testing required with documentation



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Louvers

- Not permitted in fire/smoke or smoke resistive doors in health care occupancies
- Remediation on the right, below, permitted only on smoke resistive doors in sprinkler protected smoke compartments



[45]

Conclusion

- Proper operation of doors essential to passive fire protection and defend-in-place evacuation strategy
- Maintain accurate door inventory
- Facilities receiving CMS reimbursement
 - Complete survey by July 5, 2017



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**KOFFEL ASSOCIATES, INC.**
Passive Fire Protection ENGINEERS

Questions?

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