

Swinging Fire Doors: A Constant State of Readiness



FCIA Virtual Fire-Resistance in Existing
Buildings 'DIIM' Symposium Canada



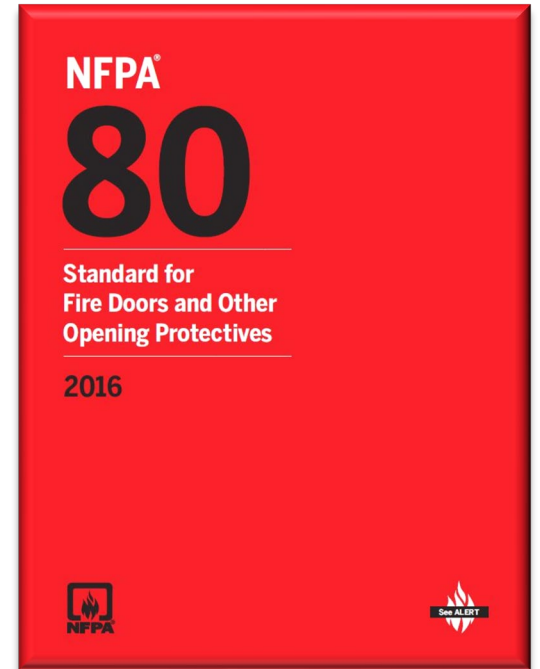
Presented By:

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Founder/CEO
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- Websites:
 - DoorSafety.com
 - PardoeConsultingLLC.com



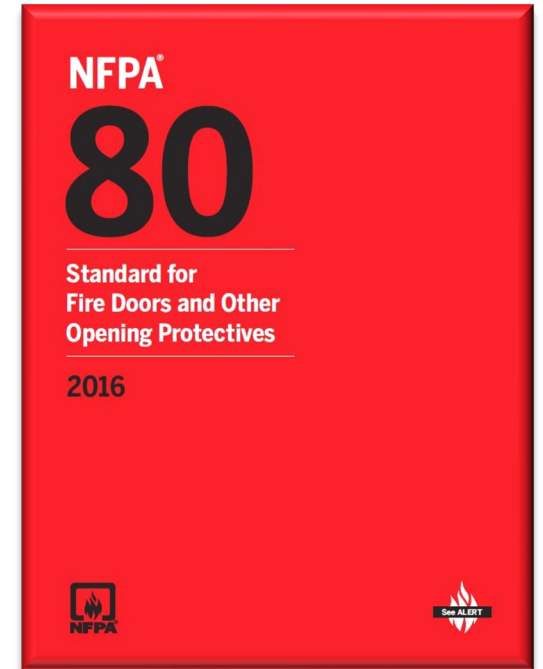
Today's Topics Include

- Introduction to NFPA 80
- NFPA 80 and Canada's National Building Code (NBC) and National Fire Code (NFC)
- Labeling Requirements for Swinging Fire Doors with Builders Hardware



Today's Topics Include

- Repairing Swinging Fire Doors
- NFPA 80's Inspection and Testing Requirements for Swinging Fire Doors
- Older Existing Fire Door Assemblies



Handouts

- Presentation slides (pdf file)
- Door Safety's publication *Recommendations for Measuring Door Gap Dimensions* (pdf file)

A Constant State of Readiness

- ***Fire doors have one job; preventing a fire from spreading.***
 - Swinging doors, in general, also provide:
 - Convenience
 - Security
 - Privacy
 - Protection from equipment (e.g., lead-lined shielding)
 - Environmental control (e.g., heating and cooling, sterile/soiled conditions, and sound control)
- ✓ ***Preventing a fire from spreading takes precedence over all other functions.***

A Constant State of Readiness

- All swinging fire doors must:
 - Swing easily and freely
 - Close completely
 - Positively latch

NFPA 80's functional requirements are the same for each level of fire ratings.

✓ Every swinging fire door must have positive latching hardware; there are no exceptions!

A Constant State of Readiness

- **Self-Closing Door Operation**

- Doors are intended to be kept closed.
- Closing devices on swinging fire doors resist opening by occupants.
- Doors become obstacles to occupants.
 - Occupants block-open, disable, or otherwise tamper with closing devices and latching hardware.

✓ Self-closing doors must close completely from any partially opened position. ALWAYS!

A Constant State of Readiness

- ***Automatic-Closing Operation***

- Electrically held open self-closing doors
- Must close complete and latch
 - Upon actuation of smoke detectors
 - Upon signal from fire alarm system
 - Upon loss of power

✓ ***Automatic-closing swinging fire doors become self-closing upon release of the hold-open device.***

A Constant State of Readiness

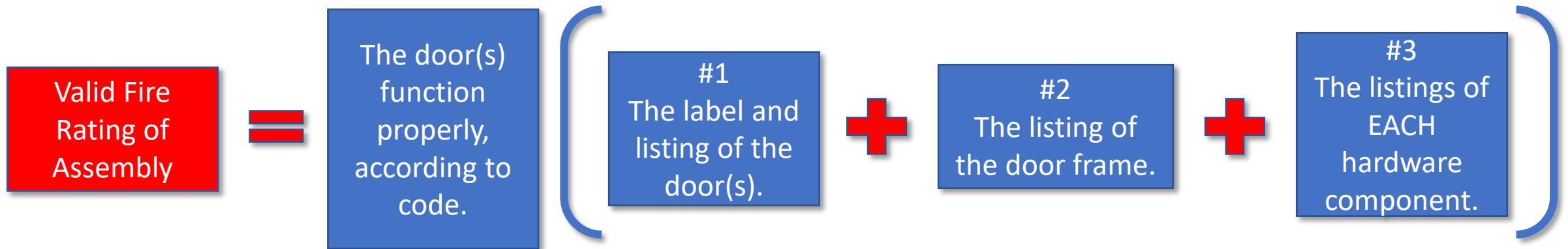
- The fire rating of an assembly is valid **ONLY** when:
 - All the required components are installed in accordance with their listings and installation instructions, and
 - The doors function as required by the codes.

✓ *Listings refer to how the components were tested for use on fire door assemblies.*

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The rating of an assembly is the rating of the door frame or door, whichever is less.

The fire rating of an assembly starts with the door's rating and listing:

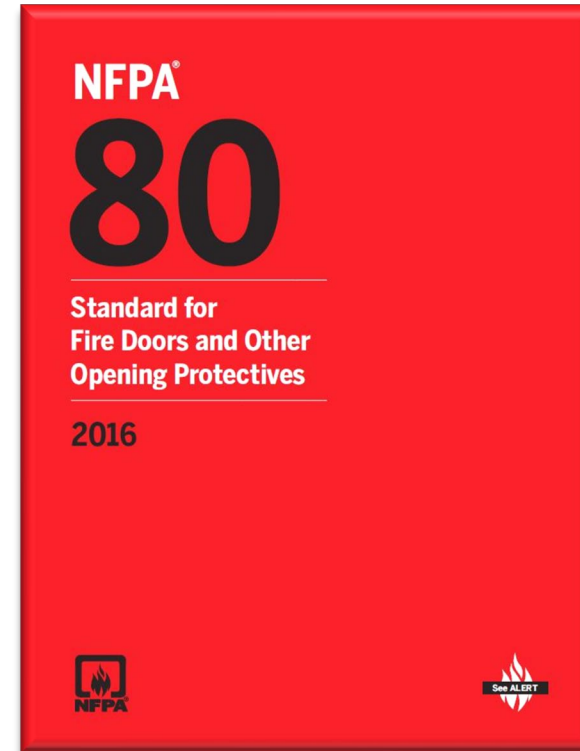


✓ ***ALWAYS in this order. Each component must be labeled or listed and be installed in accordance with it's listing and installation instructions.***

A Constant State of Readiness



Introduction to NFPA 80



Introduction to NFPA 80

- NFPA 80, ***Standard for Fire Doors and Other Opening Protectives***
 - It's a **standard**, not a code
 - It defines what fire doors are, not where they are used
- Building, fire, and life safety codes require fire doors to comply with NFPA 80
 - Codes mandate the placement and minimum fire protection ratings of all types of fire doors.

✓ ***The 2022 edition is available now!***



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Standard for Fire Doors and Other Opening Protectives

This standard regulates the installation and maintenance of assemblies and devices used to protect openings in walls, floors, and ceilings against the spread of fire and smoke within, into, or out of buildings.

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Introduction to NFPA 80

- Consists of 21 chapters and 12 annex sections
- *Base chapters (apply to all door types)*
 - *Chapter 1: Administration*
 - *Chapter 2: Referenced Publications*
 - *Chapter 3: Definitions*
 - *Chapter 4: General Requirements*
 - *Chapter 5: Inspection, Testing, and Maintenance*

Introduction to NFPA 80

- *Opening protectives chapters*
 - **Chapter 6: Swinging Doors with Builders Hardware**
 - *Chapter 7: Swinging Doors with Fire Door Hardware*
 - *Chapter 8: Horizontally Sliding Doors*
 - *Chapter 9: Special-Purpose Horizontally Sliding Accordion or Folding Doors*
 - *Chapter 10: Vertically Sliding Doors*
 - *Chapter 11: Rolling Steel Doors*

Introduction to NFPA 80

- *Opening protectives chapters*
 - *Chapter 12: Fire Shutters*
 - *Chapter 13: Service Counter Fire Doors*
 - *Chapter 14: Hoistway Doors for Elevators and Dumbwaiters*
 - *Chapter 15: Chute Doors*
 - *Chapter 16: Access Doors*
 - *Chapter 17: Fire Windows*
 - *Chapter 18: Glass Block Assemblies*
 - *Chapter 19: Fire Dampers*
 - *Chapter 20: Fabric Fire Safety Curtains*
 - *Chapter 21: Fire Curtains*



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Introduction to NFPA 80

- Today's presentation is an overview of:
 - Chapter 4, *General Requirements*
 - Chapter 5, *Inspection, Testing, and Maintenance*
 - Chapter 6, *Swinging Doors with Builders Hardware*
 - Annex A, *Explanatory Material*

Study these sections of NFPA 80.

✓ ***Chapter 7, Swinging Doors with Fire Door Hardware are NOT USED in most buildings and occupancies!***



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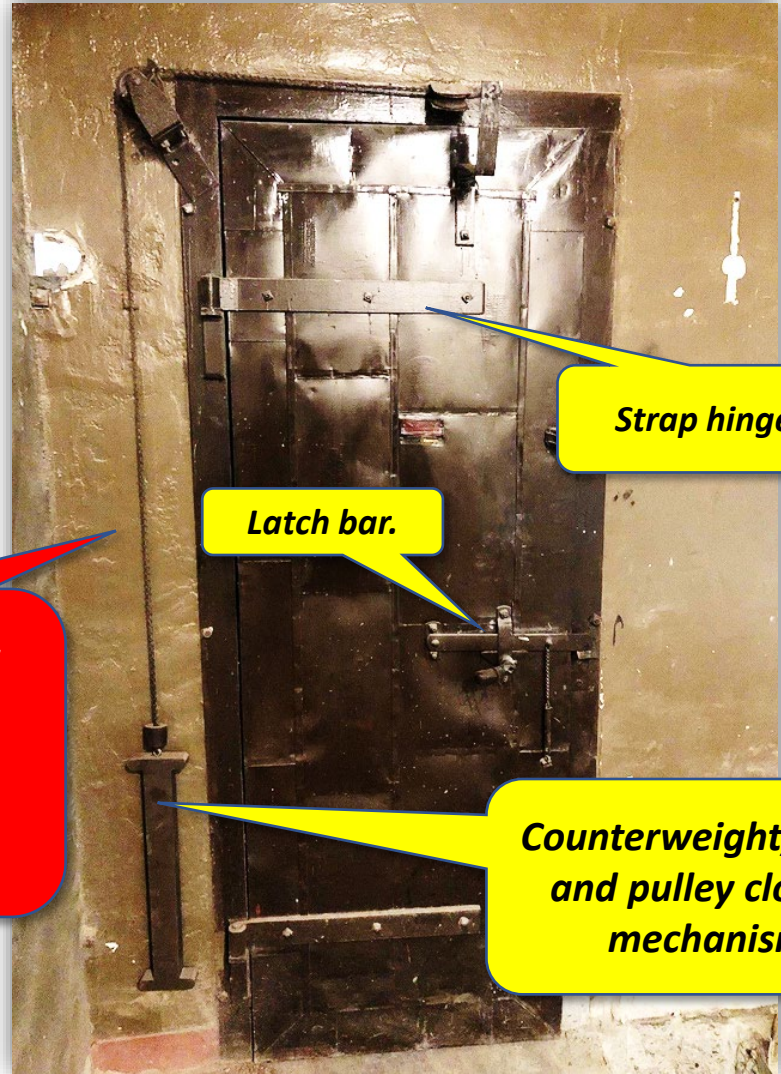


Full mortise hinges and surface-mounted door closer (other side)

Fire exit hardware.

Swinging Door with Builders Hardware (Chapter 6)

Swinging Door with Fire Door Hardware (Chapter 7)



Strap hinges.

Latch bar.

Counterweight, rope, and pulley closing mechanism

Chapter 4: General Requirements

- Contains provisions and requirements for several types of fire doors
- Covers installation work that anyone can do
 - Drilling round holes for fasteners
 - Drilling round holes for surface-mounted hardware
 - Drilling round holes for mortise lock trim and cylinders
 - Prohibits certain types of work
 - Any work ***other than*** drilling round holes for fasteners

✓ ***Installation work can be done for maintenance purposes.***

Chapter 4: General Requirements

- Other topics covered in this chapter:
 - Components
 - Each component must be labeled or listed
 - Components can be products from different manufacturers
 - Components can be labeled by different certification and testing labs (e.g., FM, Intertek/Warnock Hersey, QAI Labs, and UL)
 - Unmarked components are permitted where they comply with NFPA 80's specifications
 - Components must be used according to their installation instructions and listings (how they were tested).
 - Components cannot be used on assemblies requiring higher ratings.

Chapter 4

Labels on Door Frames

- Hollow metal door frames
 - Most labels do not list the hourly rating.
 - Frames in masonry construction can be rated up to 3 hours.
 - Frames in drywall partitions can be rated up to 1-1/2 hours.
 - Standard sidelight frames are rated up to 3/4-hour (fire protection-rated), regardless of wall construction.
 - Special sidelight frames are rated up to 1-1/2 hours (fire resistance-rated), provided they pass ASTM E119 or UL 263 fire tests.
- Door frame of other construction include the hourly ratings on their labels (e.g., 20 minutes, 45 minutes, and 90 minutes)

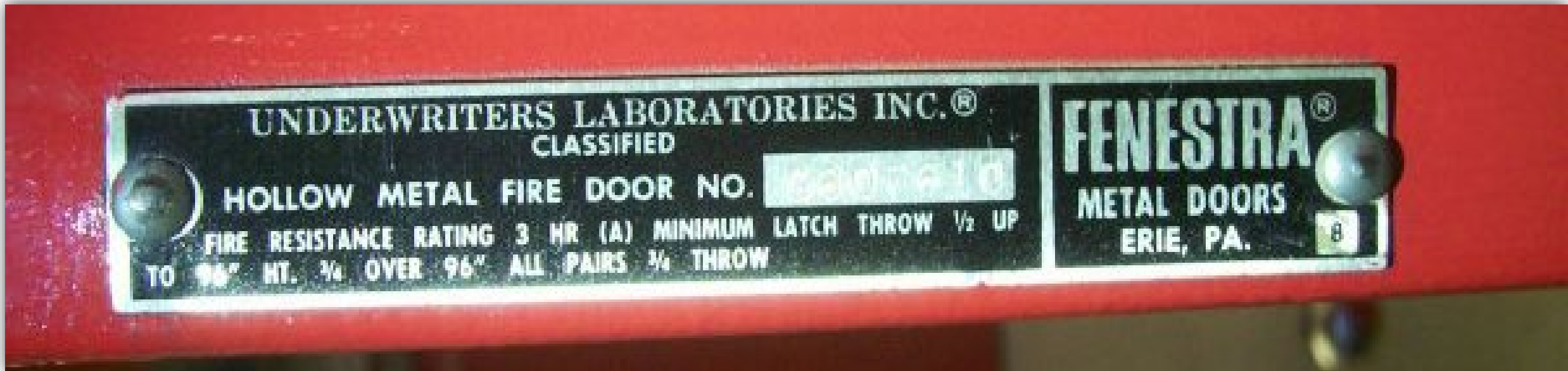
Chapter 4: General Requirements

- Requirements for labels on door frames, doors, and hardware components
- Labels on door frames and doors are not required to match!
- An assembly's rating is the rating of the door frame or door, whichever is less.

Chapter 4: General Requirements

- There are no standard labels!

Fire Door Labels



Fire Door Labels





AMERICAN STEEL PROD. CORP.
FARMINGDALE, N.Y.
1-1/2 HOUR RATED FIRE DOOR
BY ASTM E 152
LATCH THROW 1/2 IN.
SERIAL NO. 05494

FACTORY MUTUAL



APPROVED



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Labels on Door Frames





AMERICAN STEEL PROD. CORP.
FARMINGDALE, N.Y.

FIRE DOOR FRAME

SERIAL NO. 10292

FACTORY MUTUAL



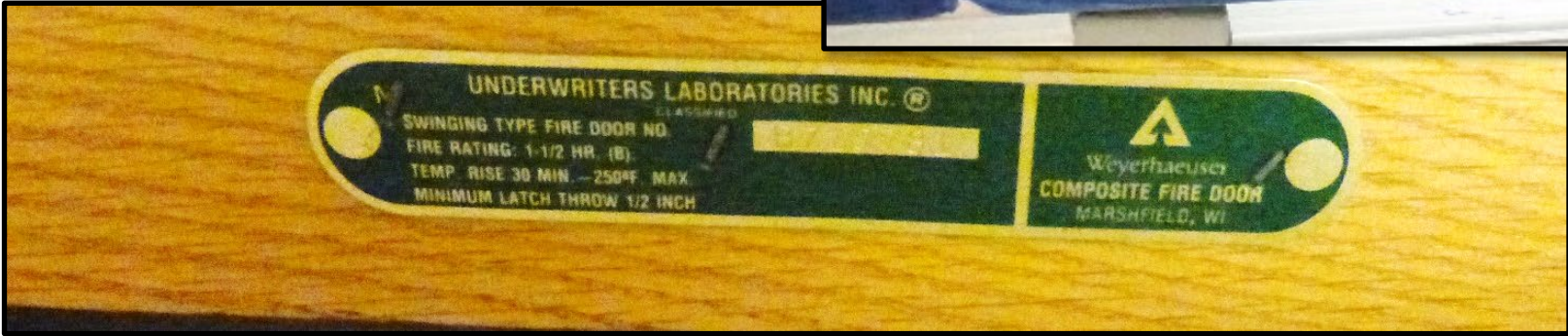
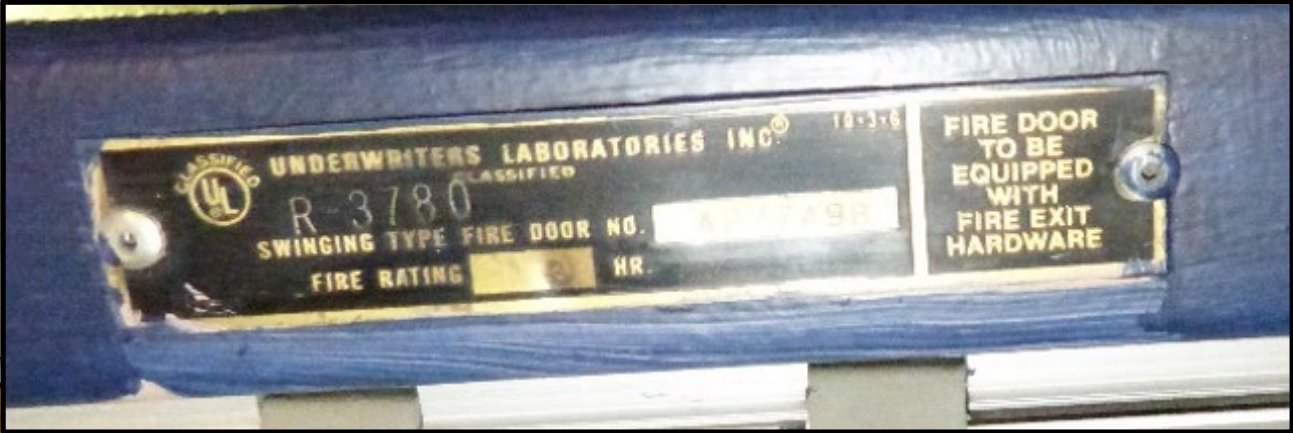
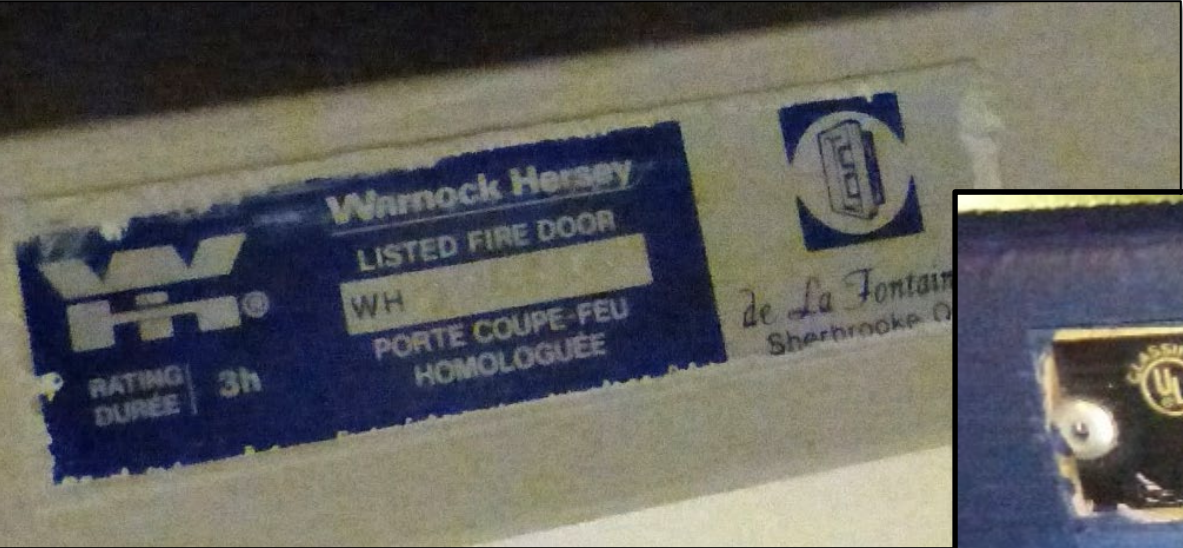
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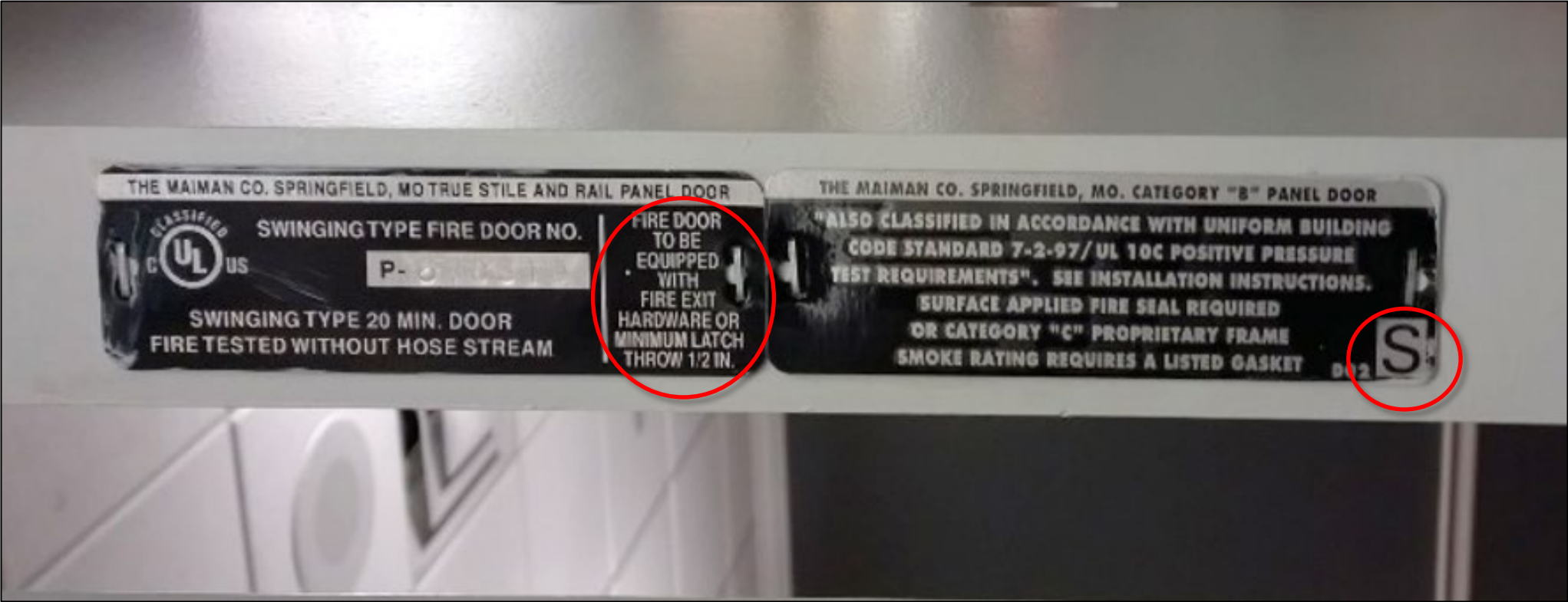
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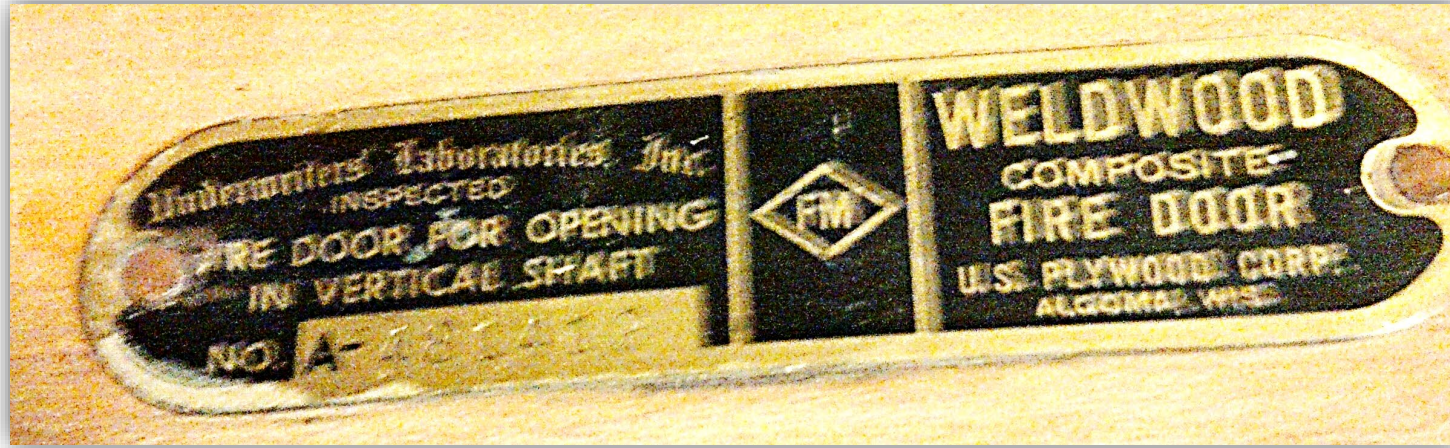
No Standard Fire Door Label



No Standard Fire Door Label



What's Wrong With This Label?



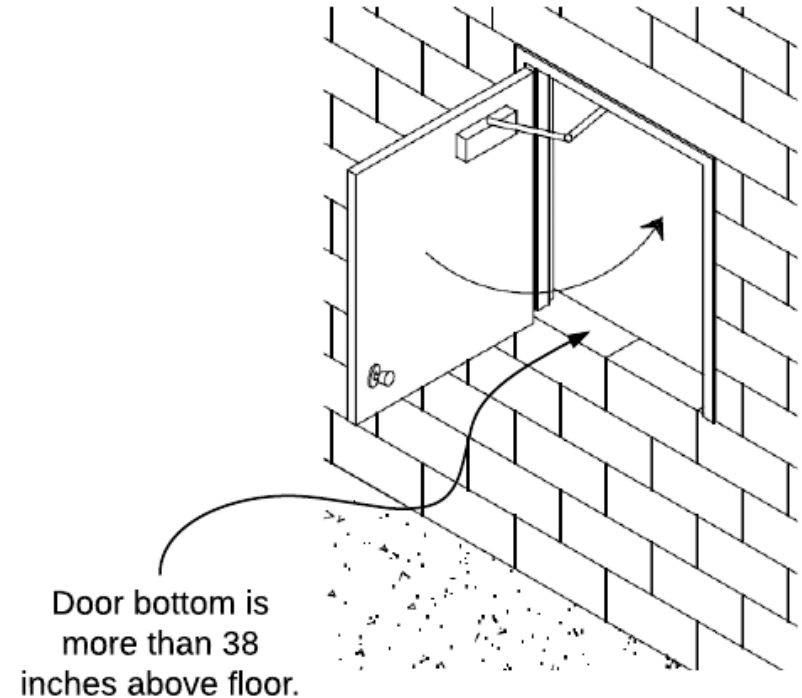
Underwriters' Laboratories Inc
INSPECTED
FIRE DOOR FOR OPENING
IN VERTICAL SHAFT
No. A-489419



WELDWOOD
COMPOSITE
FIRE DOOR
U.S. PLYWOOD CORP.
ALGOMA, WI

Chapter 4: General Requirements

- Clearance dimensions UNDER swinging fire doors.
 - 3/4-inch (19 mm) maximum, unless hardware requires LESS clearance
 - 3/8-inch (9 mm) maximum when the bottom of the door is more than 38 inches above the floor.



Chapter 5: Inspection, Testing, and Maintenance

- Applies to all types of fire door and window assemblies
- New and existing installations
- Covers repair and replacement of fire door assemblies
- Includes inspection checklist for some types of doors
 - **Chapter 6: Swinging Doors with Builders Hardware**

Chapter 5: Inspection, Testing, and Maintenance

- Acceptance Testing
 - Visual Inspection and Functional Testing
 - Upon Installation
 - Upon Maintenance Affecting Operation
 - Records retained for life of installations
 - Each fire door and fire window assembly
- Periodic Safety Inspections
 - Same process as above
 - Records retained for at least three years

Chapter 5: Inspection, Testing, and Maintenance

- Replacement of door assemblies
 - New doors in existing door frames
 - New door assemblies
 - New glass and glazing in existing door assemblies
- Repairing door frames and doors
 - Filling fastener holes
 - Filling other types of holes

Chapter 6: Swinging Doors with Builders Hardware

- Component-based systems and hybrid assemblies (unit-based systems)
 - Fire protection-rated assemblies
 - Fire resistance-rated assemblies

2-hour Fire Resistance-Rated Assembly:
it's tested to **ASTM E119** or **UL 263** as
part of the wall construction.

*It's also an NFPA 80, Chapter 6-Type
Assembly*

Frame, Doors, Glass, and Hinges/Pivots
are covered by the door label. Mortise
lock and door closer are added
separately.



Chapter 6: Swinging Doors with Builders Hardware

- Door operations
 - Self-closing operation
 - Automatic-closing operation
 - Powered operation

Chapter 6: Swinging Doors with Builders Hardware

- Clearance dimensions on the pull-side of the assemblies
 - Between vertical and top edges of doors and door frames
 - Between vertical edges of pairs of doors

✓ *Chapter 4, General, specifies clearances under swinging doors.*

National Research Council Canada (NRC)

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National Building Code of Canada: 2015

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	First printing	PDF	17 MB	2021-08-17
	Second printing. Includes revisions and errata released on September 28, 2018	PDF	16 MB	2021-08-17
	Errata package (September 28, 2018)	PDF	2 MB	2021-04-29

DOI <https://doi.org/10.4224/40002005>

Author [Canadian Commission on Building and Fire Codes](#)

Format Text, Standard or Specification

ISBN 0-660-03633-5

Physical description v. 1, 714 p.; v. 2, 698 p.

Subject Codes & guides; construction; building; NRCCode

Abstract The National Building Code of Canada 2015 (NBC), published by NRC and developed by the Canadian Commission on Building and Fire Codes, sets out technical provisions for the design and construction of new buildings. It also applies to the alteration, change of use and demolition of existing buildings. Over 360 technical changes have been incorporated in this new edition. Thirty-four changes to the NBC and eight changes to the National Fire Code 2015 (NFC) now permit construction of six-storey buildings using combustible construction. As a result, additional



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National Fire Code of Canada: 2015

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	First printing	PDF	2 MB	2021-08-18
	Second printing. Includes revisions and errata released on September 28, 2018	PDF	2 MB	2021-08-18
	Errata package (September 28, 2018)	PDF	415 KB	2021-04-29

DOI <https://doi.org/10.4224/40002009>

Author [Canadian Commission on Building and Fire Codes](#)

Format Text, Standard or Specification

ISBN 0-660-03629-8

Physical description 341 p.

Subject Codes & guides; building; fire; NRCCode

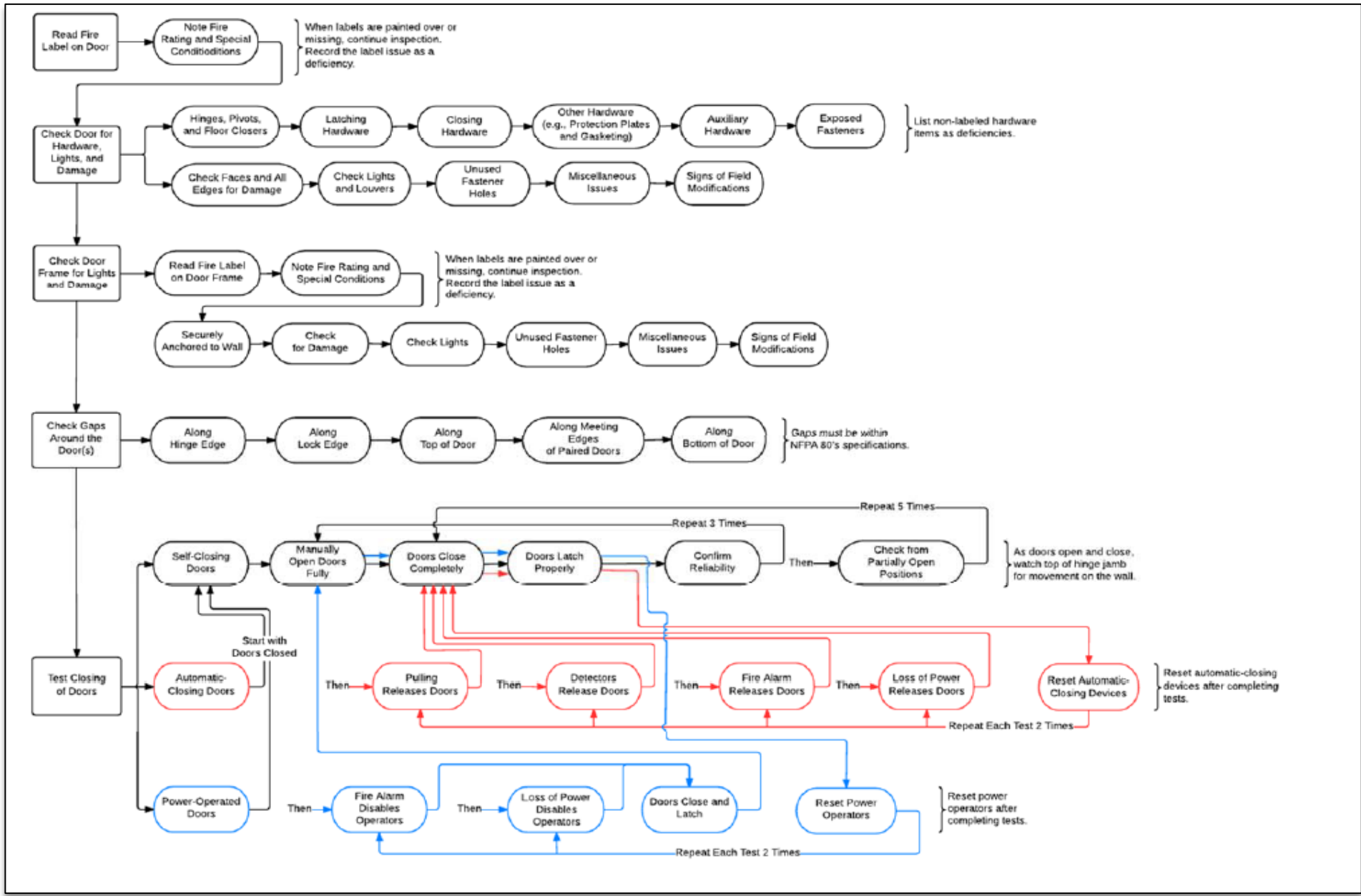
Abstract The National Fire Code of Canada 2015 (NFC), published by NRC and developed by the Canadian Commission on Building and Fire Codes, sets out the technical provisions regulating activities related to the construction, use or demolition of buildings and facilities, the condition of specific elements of buildings and facilities, and the design or construction of specific elements of facilities related to certain hazards as well as the protection measures for the current or intended use of

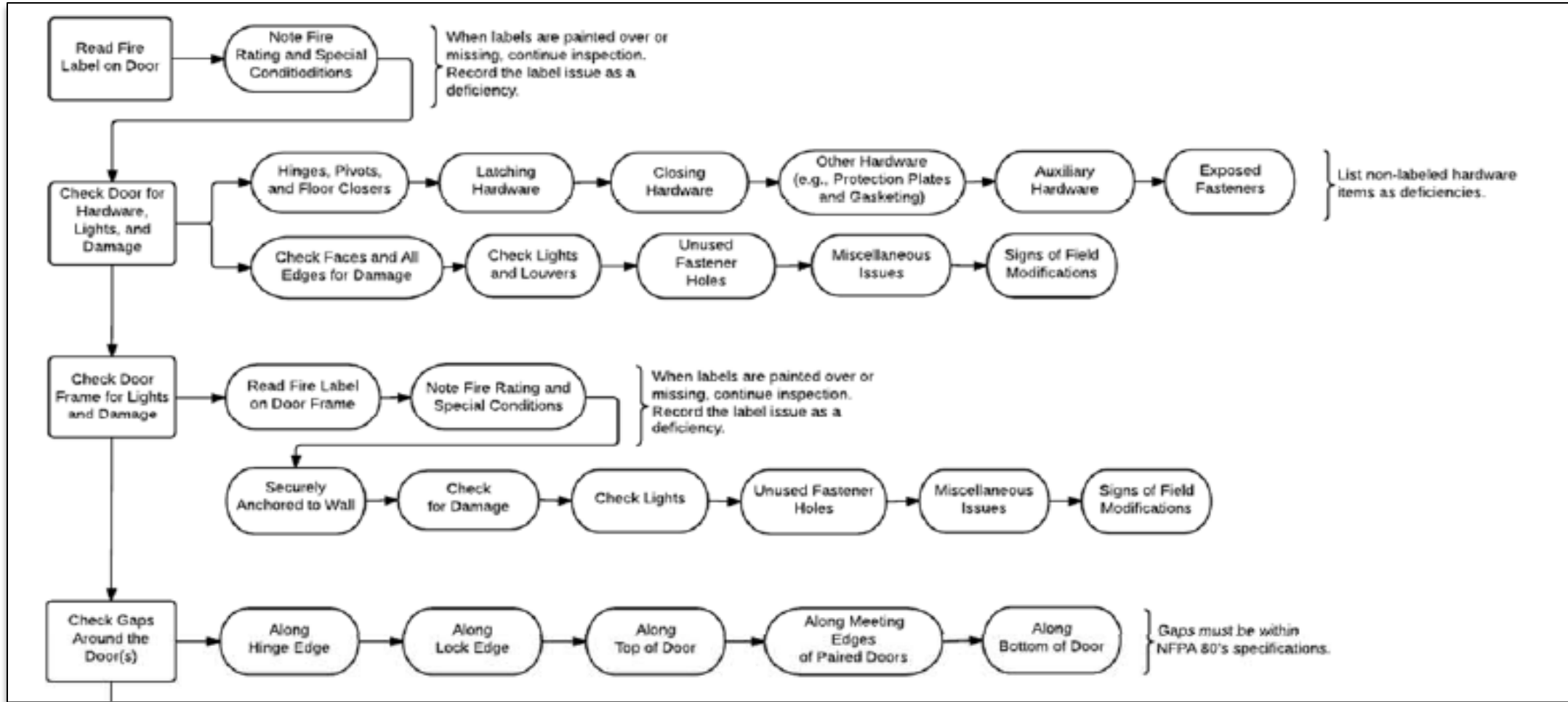
NFPA 80, the NBC, and the NFC

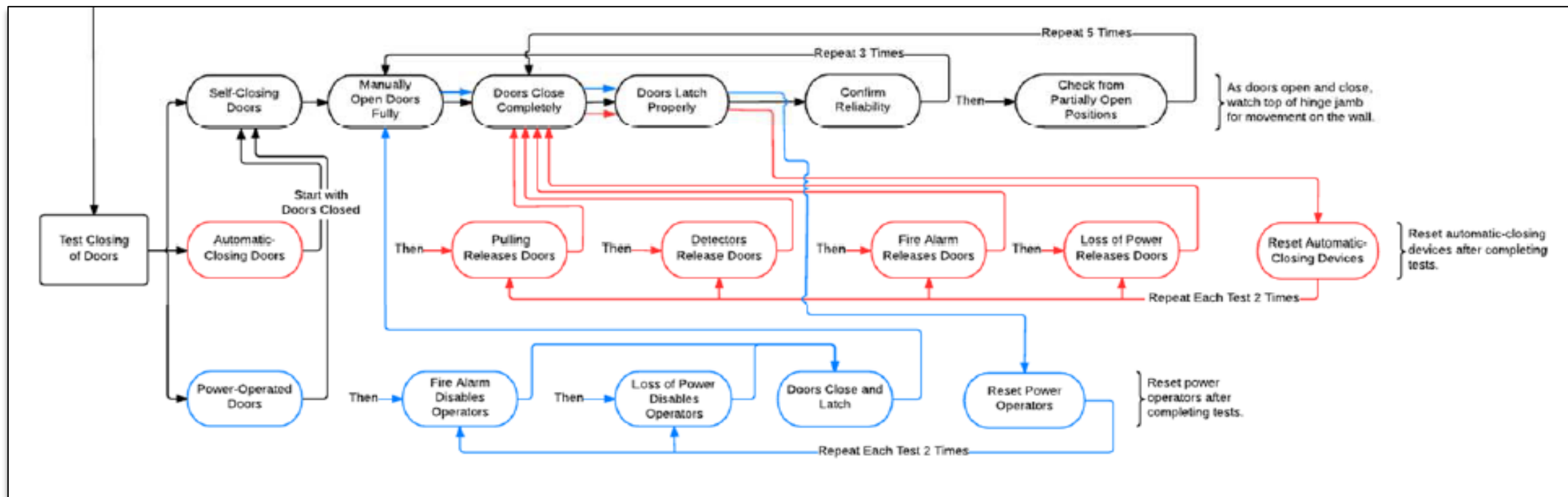
- NBC 2015 requires fire doors to comply with NFPA 80 (2013 edition).
- NFC requires opening closures (aka fire doors) to comply with the NBC
- NFPA 80, specifies the installation, inspection, testing, and maintenance of fire doors and windows.

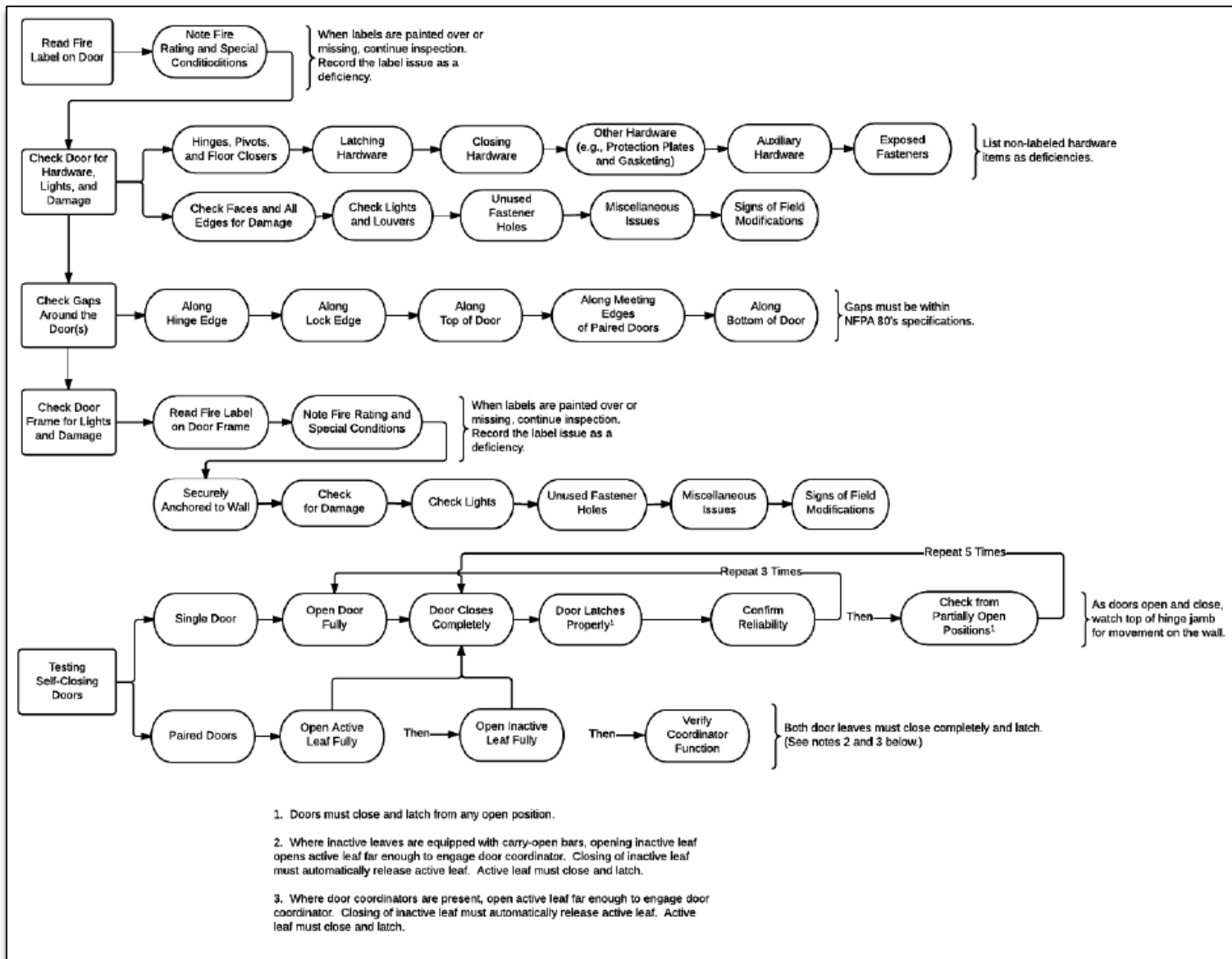
NFPA 80, the NBC, and the NFC

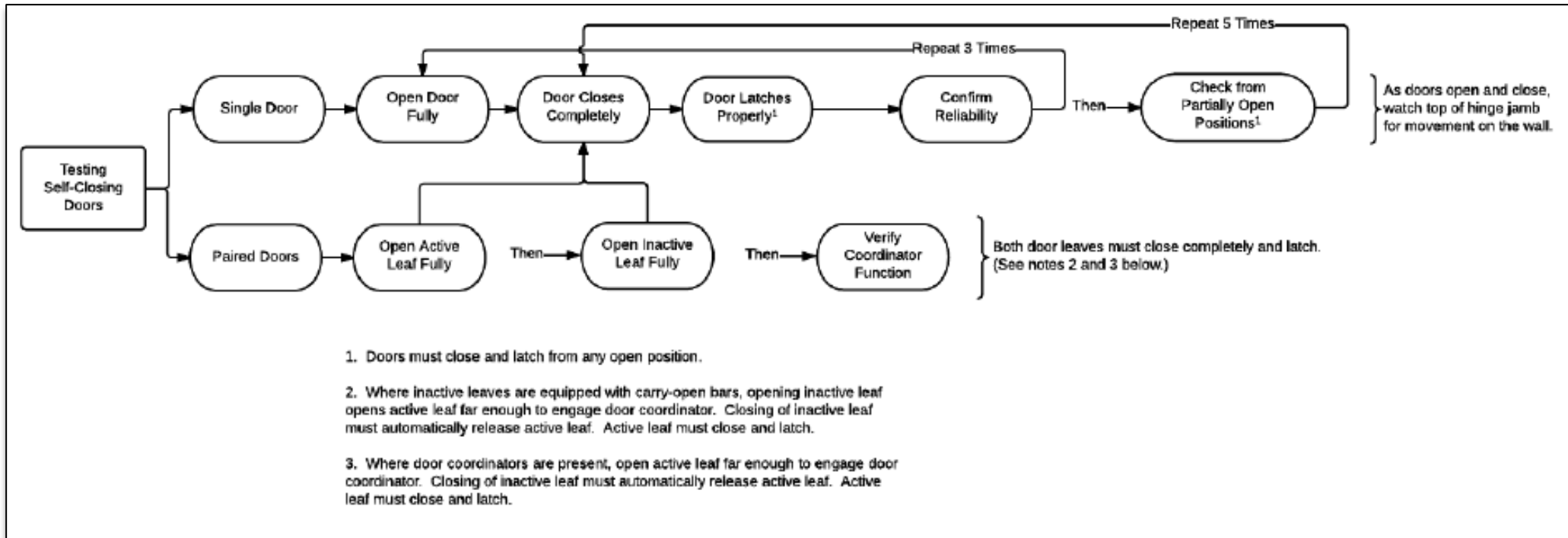
- NBC contains more stringent requirements than NFPA 80.
 - 1/3-hour (20 minute) swinging fire doors
 - Clearance dimensions along vertical edges and across top edges: 3 mm (0.118 inch: less than 1/8-inch allowed in NFPA 80).
 - Clearance dimensions under swinging fire doors: 6 mm (0.236 inch—less than 1/4 inch: less than 3/4 inch allowed by NFPA 80).
- NBC's more stringent requirements take precedence over NFPA 80's requirements.

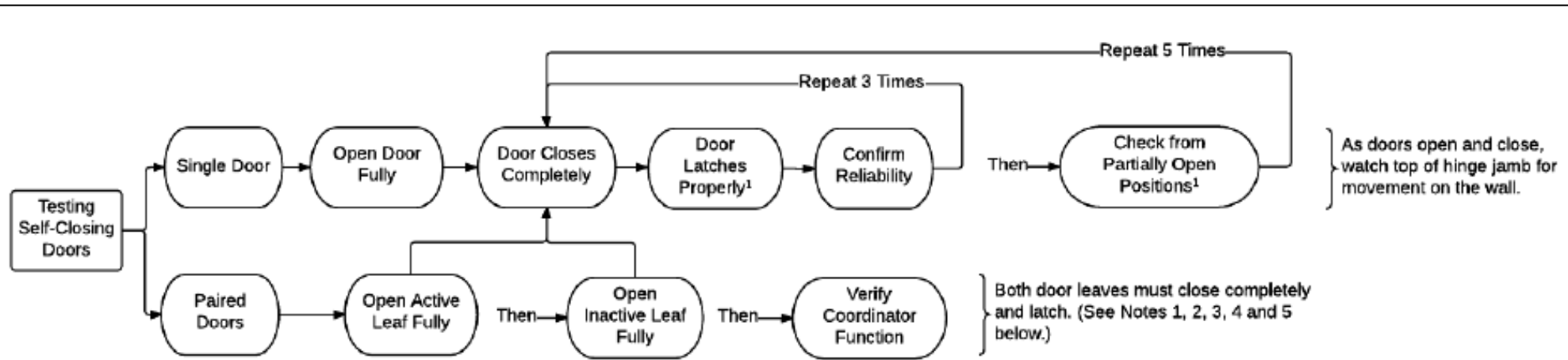












1. Doors must close and latch from **any** open position.

2. Where inactive leaves are equipped with panic hardware (on non-fire rated doors) or fire exit hardware and carry-open bars and a door coordinator is installed on the door frame, opening inactive leaf opens active leaf far enough to engage door coordinator. Closing of inactive leaf must automatically release active leaf. Active leaf must close and latch under its own power.

3. Where inactive leaves are equipped with automatic or self-latching flush bolts and a door coordinator is installed on the door frame, hold open active leaf far enough to engage door coordinator before opening inactive leaf. Open inactive leaf and allow active leaf to be held open by coordinator. Coordinator must hold active leaf open until inactive leaf returns to closed position. Closing of inactive leaf must automatically release active leaf. Active leaf must close and latch under its own power. Closing of active leaf engages automatic flush bolts, causing inactive leaves to latch.

4. Where inactive leaves are equipped with open back strikes, or both door leaves are equipped with vertical rod panic hardware (on non-fire rated doors) or fire exit hardware, both door leaves must open **and** close independently. Door coordinators are not required. Overlapping astragals that interfere with the opening or closing of either door leaf are not allowed.

5. Where inactive leaves are equipped with manually operated flush bolts or surface bolts. For the purposes of functional testing, temporarily hold or block open active leaf. Release flush bolts (or surface bolts) and test closing function of inactive leaf. Upon completion of functional testing, verify flush bolts (or surface bolts) are properly engaged in top and bottom strikes. Allow active leaf to close and latch under its own power.

Summary

- Swinging fire doors are specially engineered systems
 - They have one job; preventing a fire from spreading.
 - They require increased attention during installation, and throughout their service lives.

✓ *Fire doors must be kept in a Constant State of Readiness.*

Questions?