

# Inspecting and Maintaining Swinging Egress and Fire Doors



# Presented By...

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# Door Safety Doctrine

*"Safe Doors Save Lives."*

# Today's Program...

- Review NFPA 80's safety inspection and testing requirements for swinging doors.
- Discuss work that is or is not permitted on fire-rated swinging doors.
- Look at some common types of deficiencies found on swinging fire door assemblies.

# Principles of Door Safety Inspections

1. Swinging door assemblies, regardless of fire-rating, were installed in accordance with the codes that were in effect at the time of construction.
2. Fire-rated door assemblies provide the appropriate level of fire protection ratings for the openings in which they serve.

# Principles of Door Safety Inspections

3. Door assemblies are required to be maintained in working condition throughout the life of their installation.
4. Capabilities and limitations of today's door assembly components should not be ascribed to older existing components.
5. AHJs and code officials determine when something is acceptable under the codes.

# Who Can Perform These Inspections?

- Inspecting swinging fire doors with builders hardware requires a great deal of knowledge.
  - Many variations of door assemblies and their components.
  - Must understand know how to apply code requirements to door assemblies.
  - Must understand complex door functions:
    - Delayed egress
    - Access-controlled egress doors
    - Electrically controlled egress doors

✓ ***Installation experience helps, but it is NOT sufficient for door safety inspectors.***

# Who Can Perform These Inspections?

## ➤ ***NFPA's "Qualified Person" Standard***

- AHJs need to have confidence in the expertise and experience of the person(s) performing door safety inspections:
  - Professional certification:
    - Door Safety Inspector (DSI)
    - Fire Door Assembly Inspector (FDAI)
    - Certified Fire Door Assembly Inspector (CFDI)
    - Others?



# NFPA 80, Chapter 6

- ***Swinging Doors with Builders Hardware***
  - Most common type of swinging fire door assemblies
  - Subject to annual door safety inspections of Chapter 5, Inspection, Testing, and Maintenance.



***When looking up door requirements in NFPA 80, start with Chapter 6 and Chapter 4 General Requirements; Refer to Chapter 5 for Maintenance, Inspection, and Testing.***

# FREE Online Access to NFPA 80

The screenshot shows the NFPA website interface. At the top, there is a navigation bar with links for Catalog, NEC®, NFCSS, Xchange™, NFPA Journal®, Sparky®, Fire Sprinkler Initiative®, and Firewise USA™. Below this is the NFPA logo and the text "NATIONAL FIRE PROTECTION ASSOCIATION" with the tagline "The leading information and knowledge resource on fire, electrical and related hazards". A red button says "SAVE ON THE 2017 NEC®". A main navigation bar includes "CODES & STANDARDS", "NEC®", "NEWS & RESEARCH", "TRAINING & EVENTS", and "PUBLICATIONS". The main content area is titled "CODES & STANDARDS" and shows the breadcrumb "Codes & Standards / All codes & standards / List of NFPA codes & standards / Code". The main heading is "NFPA 80" with a sub-heading "Standard for Fire Doors and Other Opening Protectives". Below this is a description: "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." It also states "Current Edition: 2016" and "View Document Summary". At the bottom of the main content area, there are three buttons: "FREE ACCESS", "NFCSS FREE TRIAL", and "SUBSCRIBE TO NFCSS NOW". A large yellow starburst callout with a red outline points from the text "Go To: www.NFPA.org/80" to the "FREE ACCESS" button. The footer contains several navigation buttons: "Current & Prior Editions", "Next Edition", "Technical Committee", "Ask a Technical Question", "News & Research", "Purchase Products & Training", and "Related Products".

# How Swinging Doors are Made

- Fire-rated and egress doors are component-based systems.
  
- Comprised of components from multiple manufacturers
  
- On fire-rated doors, the components can be labeled by different testing laboratories:
  - Underwriters Laboratories (UL)
  - Intertek/Warnock Hersey (WHI)
  - FM Global (FM)

# How Swinging Doors are Made

- Installers assemble the components on site.
  
- Frame installation is the single most important step in the process.
  - Affects operational clearances
  - Can affect opening and closing of doors

# How Swinging Doors are Made

- Simple door applications
  - Mechanical hardware operation
  
- Complex door applications
  - Mechanical hardware operation
  - Electrified hardware functions (e.g., delayed egress, electrified locking, and automated door operation)



***Codes require specific door operation and functions, under certain conditions, for egress and fire-rated doors.***

# How Swinging Doors are Made

- Door and frame shop drawings
- Detailed door hardware schedules
- Catalog cut sheets
- Installation and preparation templates
- Product warranties

# How Swinging Doors are Made

- Unit-based swinging door assemblies
  - Integrated swinging door systems (e.g., Total Door Systems, Inc.)
  - Label on the door covers the door leaf and most (if not all) of the door hardware components
  - Proprietary components must be replaced with parts from the manufacturer

# How Long Should Door Assemblies Last?

- Door assemblies are comprised of mechanical components that are subject to the rigors of wear and tear.
  
- Factors that shorten service lives of swinging doors:
  - Poor installation techniques and practices
  - Improper use of individual components
  - Excessive usage and abusive use
  - Accidental damage
  - Incidental acts of vandalism
  - Poor maintenance practices



*Table 3.1: Recommended Monitoring Frequency*

Frequency of Use	Average Cycles/Day	Average Cycles/Year	Door Usage Category	Type A <sup>3</sup> Doors	Type B <sup>4</sup> Doors	Type C <sup>5</sup> Doors	Estimated Service Life <sup>1</sup>
Very Low	Less than 1	Less than 365	1	Annually	Monthly	Weekly	Over 30 years
Low	1 - 3	365 - 1,000	2	Semi-Annual <sup>2</sup>	Monthly <sup>2</sup>	Weekly	25 - 30 years
Ordinary	3 - 100	1,000 - 36,500	3	Bi-Monthly <sup>2</sup>	Monthly <sup>2</sup>	Weekly	20 - 25 years
High	100 - 400	36,500 - 150,000	4	Bi-Weekly <sup>2</sup>	Weekly <sup>2</sup>	Weekly	10 - 20 years
Very High	400 - 1,100	150,000 - 400,000	5	Weekly	2 - 3 days	2 - 3 days	5 - 10 years
Extremely High	Over 1,100	Over 400,000	6	2 -3 days	2 -3 days	2 - 3 days	Up to 5 years

1. Estimated service life assumes the door assemblies are comprised of components, appropriate to the type and area of the building served by the door, which are properly installed, adjusted, and well maintained. Over time, some components will require servicing and/or replacement. *Doors subjected to abusive conditions and usage, incidental or prolonged, have shorten service lives.*
2. Frequency of monitoring should be increased in cases where door assemblies are subjected to abusive conditions and usage.
3. **Type A** doors are comprised of mechanical hardware components and functions only.
4. **Type B** doors are comprised of electrified and mechanical hardware components that include the following functions and systems: automatic-closing doors; power-operated doors; fail-safe (electric lock) and fail-secure (electric unlock) locking functions; alarmed exit doors; delayed egress locking systems; magnetic locking systems; and, pneumatic/electric bolts.
5. **Type C** doors have a high consequence of failure risk that requires more frequent monitoring.

# Door Maintenance Priority Levels

- Assigning priority levels to each type of service and repair work helps you decide how to budget your resources.
- Deficiencies on fire-rated and non-fire rated door assemblies should be treated with the same level of urgency and concern.
- To the extent possible, all problems that affect the operation of doors should be corrected immediately when discovered.

# Door Maintenance Priority Levels

- Replacing major components on swinging doors is permitted.
- Reusing existing door assembly components is permitted, provided they are in working condition and used in accordance with their published listings.

**Table 4.1: Door Assembly Maintenance Priority Levels**

Priority Level	Nature of Repair/Service Work	Comments
<b>Level 1 Critical</b> <i>(Highest Priority)</i>	Replacing door frames and/or entire door assemblies.	This work should be completed before all other maintenance work on the assembly.*
<b>Level 2 Extensive</b> <i>(High Priority)</i>	Repairs involving securely anchoring door frames, replacing large components like door leaves and glazing materials, replacing door hardware with different components (not like-for-like) and repairing non-fastener holes.	This work should be completed before Level 3 work on the assembly.* Some work might be considered to be a field modification in accordance with NFPA 80.
<b>Level 3 Moderate</b> <i>(Ordinary Priority)</i>	Routine repairs involving tightening/ replacing fasteners, replacing (like-for-like) hardware components, and filling unused fastener holes.	This work can be performed at any time, and should be completed before Level 4 work on the assembly.*
<b>Level 4 Minimal</b> <i>(Lowest Priority)</i>	Cosmetic and superficial repairs. Routine maintenance service work, such as lubricating movable hardware components.	This work can be performed at any time. Maintenance and Acceptance Testing records are not required for fire-rated doors in this category.



\* Maintenance and Acceptance Testing records are required upon completion of the work on fire-rated doors.

# Door Assembly Components

- ***Rule #1 – Selecting door assembly components that are appropriate to the type, usage, and function of a door is essential for the service life of the assembly.***
  - Form
  - Function
  - Features



# Which Components Have Longer Service Lives?

- Estimating the service life of any door assembly is, at best, subjective due to specific conditions surrounding a particular door.
- Improper component selection shortens service life of door assemblies.
- Even well made components fail when used in the wrong applications.
- Follow Rule #1.

# What Does the Label Mean?

- Labels provide visible proof that the components are the same as those that were tested by independent laboratories for use on fire-rated doors.
- Labels are applied at the factories and/or in licensed-authorized shops, before the door assembly components are shipped.



***Fire-rating of door assemblies are only valid when all required components are installed and the assemblies function correctly.***

# What Does the Label Mean?

- Whenever you see a label on a door, **STOP!** Read the information on the label.
  - Evaluate the condition and operation of the assembly according to the label.





# NFPA 80's Inspection Points

## Section 5.2.4.2

1. No open holes or breaks exist in the surfaces of either the door or frame.



## NFPA 80's Inspection Points

2. Glazing, vision light frames, and glazing beads are intact and securely in place, if so equipped.



## NFPA 80's Inspection Points

3. The door, frame, hinges, hardware, and non-combustible threshold are secured, aligned, and in working condition with no visible signs of damage.

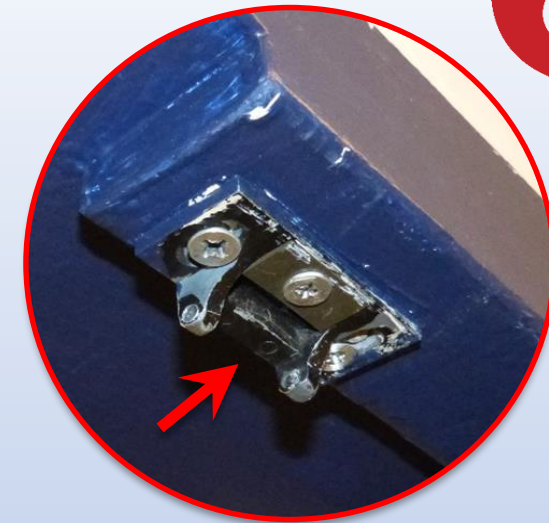
*Note: The codes do not require thresholds for any fire rated door assembly. When thresholds are used, they must be aligned with the door and frame and anchored securely.*





## NFPA 80's Inspection Points

4. No parts are broken or missing.



Top strike for  
Fire Exit Hardware



Missing Cover on Door Closer



Damaged Strike Plate  
for Self-Latching Flush Bolt

## NFPA 80's Inspection Points

### 5. Door clearances do not exceed clearances listed on 4.8.4 and 6.3.1.7.

#### **NFPA 80, 6.3.1.7 Clearances—6.3.1.7.1**

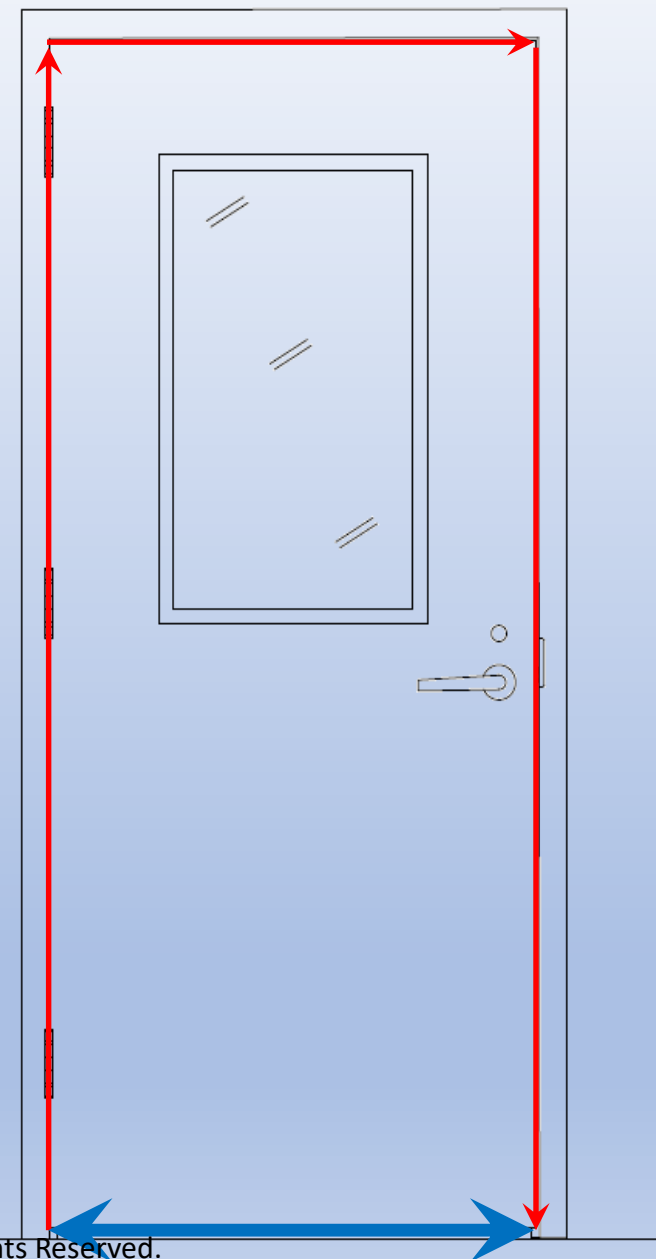
*"...measured on the PULL side of the assemblies."*

- Vertical edges of doors
- Meeting edges of paired doors
- Top edge of doors

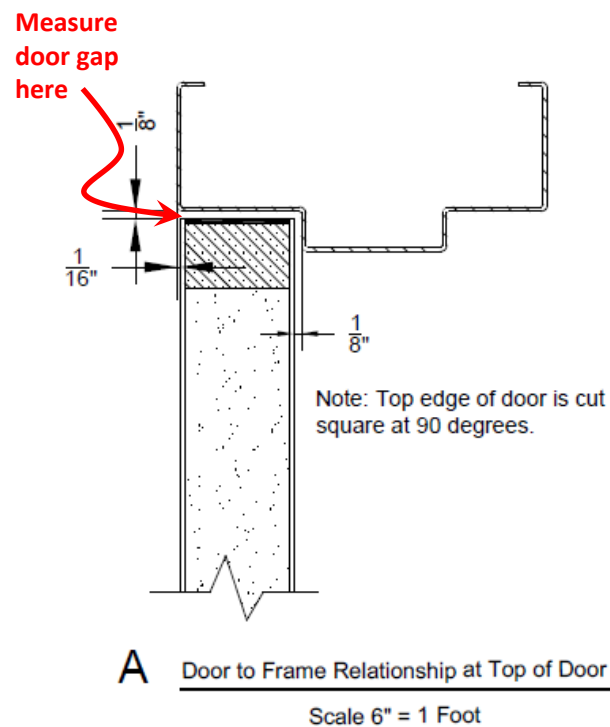
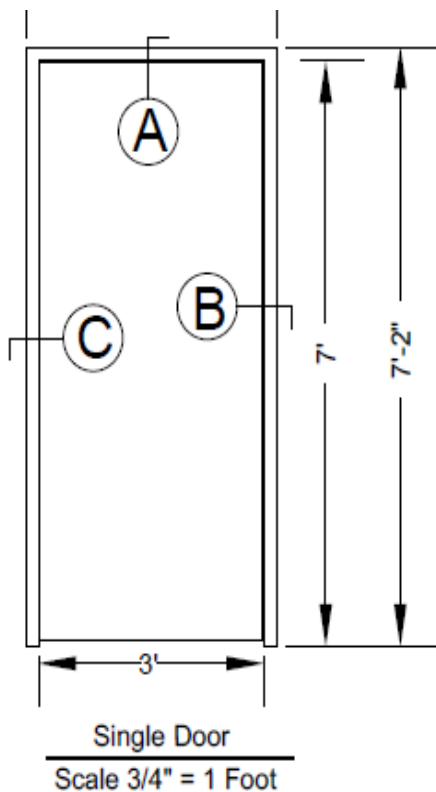
#### **NFPA 80, 4.8.4 Clearances**

4.8.4.1 *"Clearance under the bottom of a door shall be a maximum of 3/4-in."*

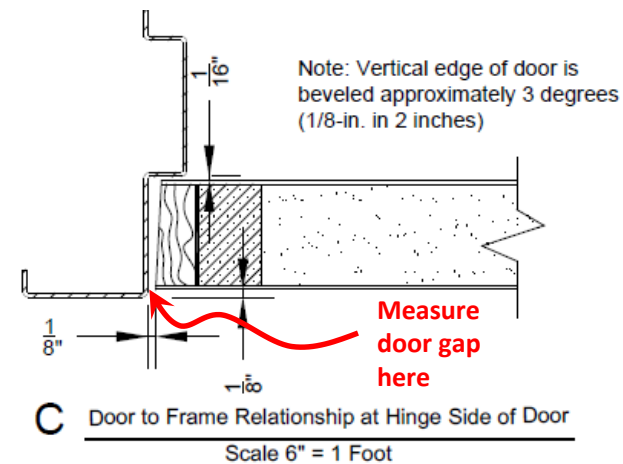
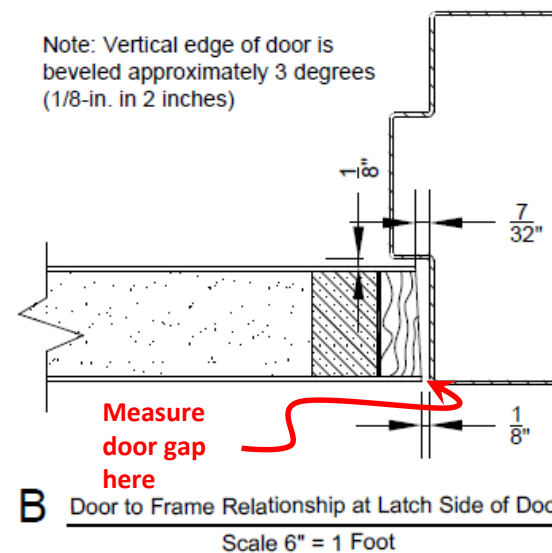
4.8.4.3 *"...shall not exceed 3/8-in."* where the door bottom is more than 38 inches above finished floor.



## NFPA 80's Clearance Dimensions for Swinging Doors

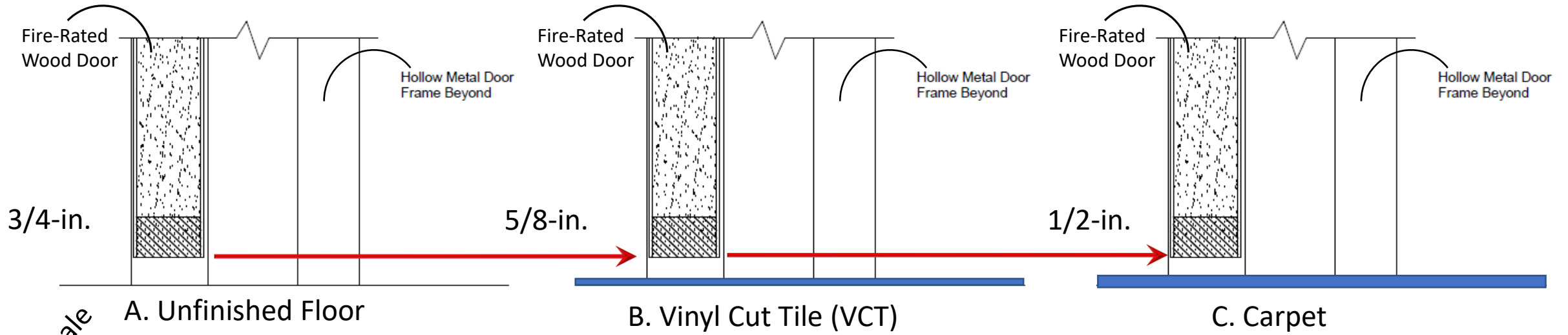


Note: Door leaves are inset into the door rabbet of the frames. Rubber silencers/mutes hold doors off door stops approximately 1/8-in, which results in about a 1/16-in. inset at the latch side. Typical full mortise hinges hold doors off door stop by about 1/16-inch, which results in an inset of about 1/8-in. on the hinge side. In other words, door leaves do not rest directly against any portion of the door frames.

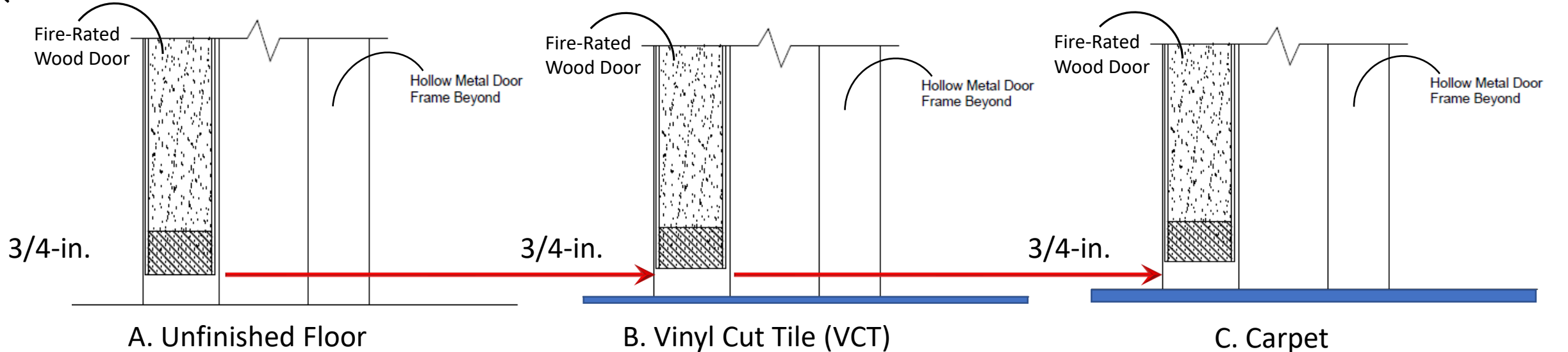


Not to Scale

# NFPA 80's Clearance Dimensions Under Swinging Doors, Immediately Prior to 2007 Edition



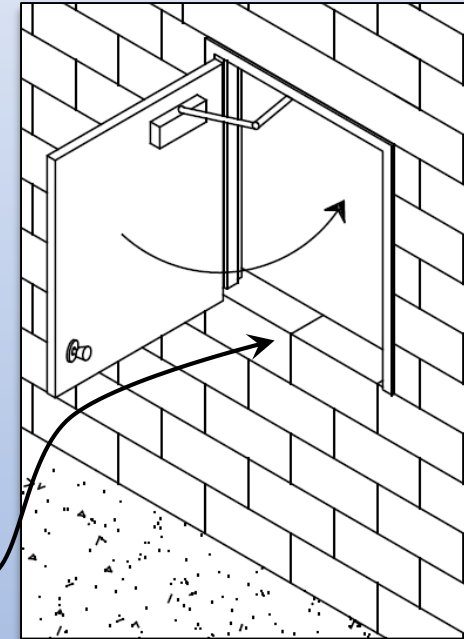
# NFPA 80's Clearance Dimensions Under Swinging Doors, 2007 through 2016 Editions



# Where are Bottoms of Swinging Doors Higher than 38 inches?

- Interior walls where swinging doors are used to access mechanical/utility spaces.
  - Doors might be less than full height or width.
- Clearance under swinging fire doors is limited to 3/8-inch, where the bottom of the door is more than 38 inches above the finished floor.

Bottom of door is more than 38 inches above the floor



- ✓ ***Sill: A structural component of the building that forms the bottom part of an opening over which a door closes.*** (3.3.113, NFPA 80 2016)



## NFPA 80's Inspection Points

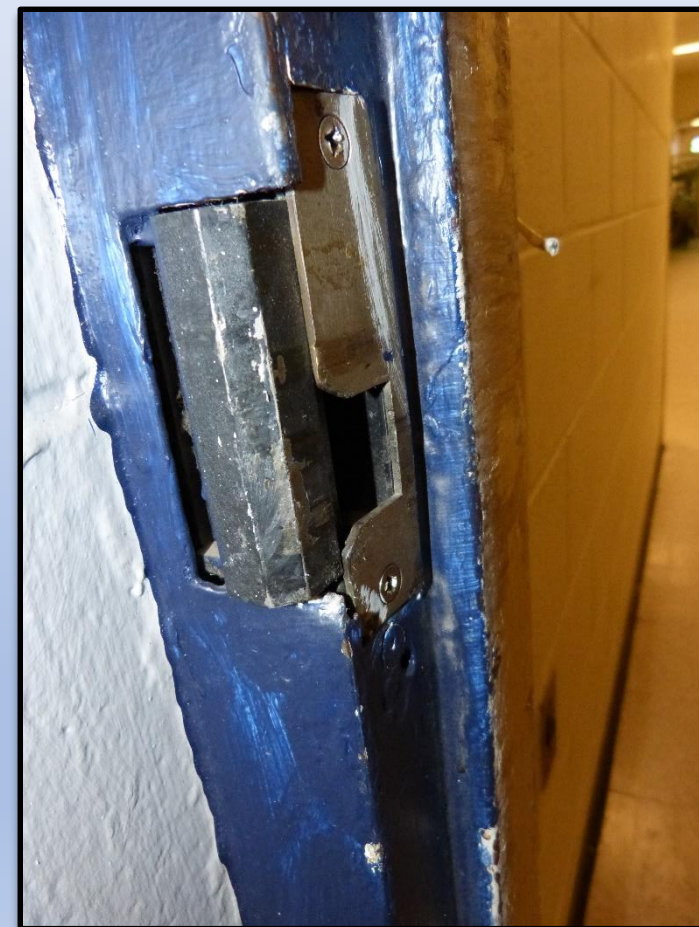
6. The self-closing device is operational, that is, the active door completely closes when operated from the full position.
7. If a coordinator is installed, the INACTIVE leaf closes before the ACTIVE leaf.
8. Latching hardware operates and secures the door when it is in the closed position.
9. Auxiliary hardware items that interfere or prohibit operation are not installed on the door or frame.

## NFPA 80's Inspection Points

10. No field modifications to the door assembly have been performed that void the label.



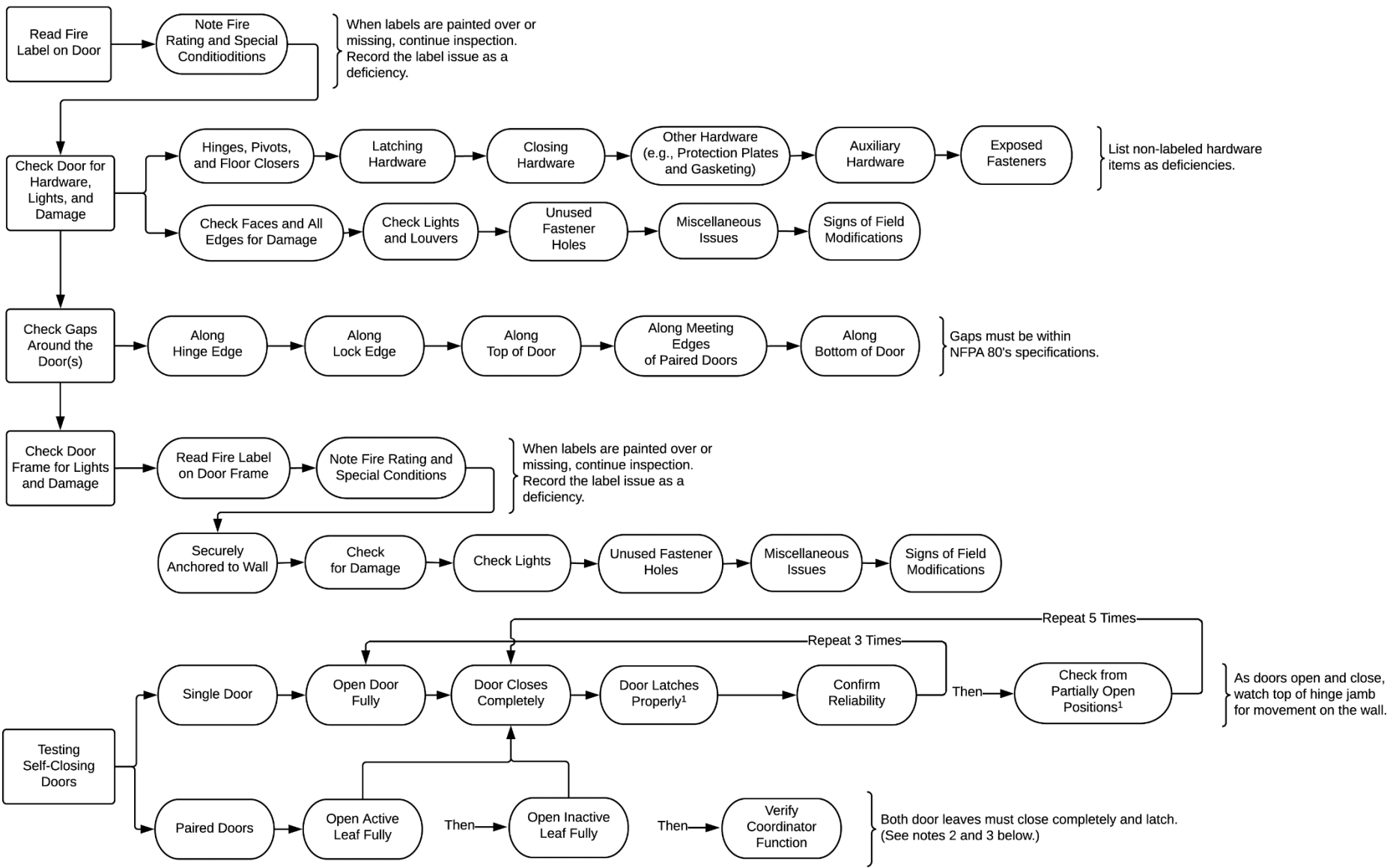
*Unauthorized field modification to the door frame that invalidates the fire rating of the entire assembly.*



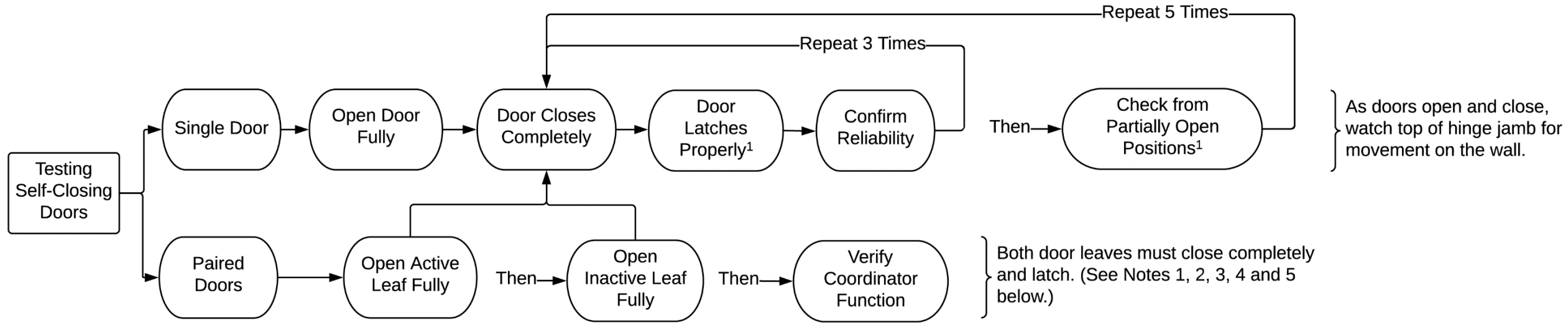
## **NFPA 80's Inspection Points** 2010 Edition

11. Gasketing and edge seals, where required, are inspected to verify their presence and integrity.

- Additional inspection points:
  - Labels must be present and legible.
  - Signage cannot exceed 5% of the surface of the door leaf.



1. Doors must close and latch from any open position.
2. Where inactive leaves are equipped with carry-open bars, 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.
3. Where door coordinators are present, open active leaf far enough to engage door coordinator. Closing of inactive leaf must automatically release active leaf. Active leaf must close and latch.



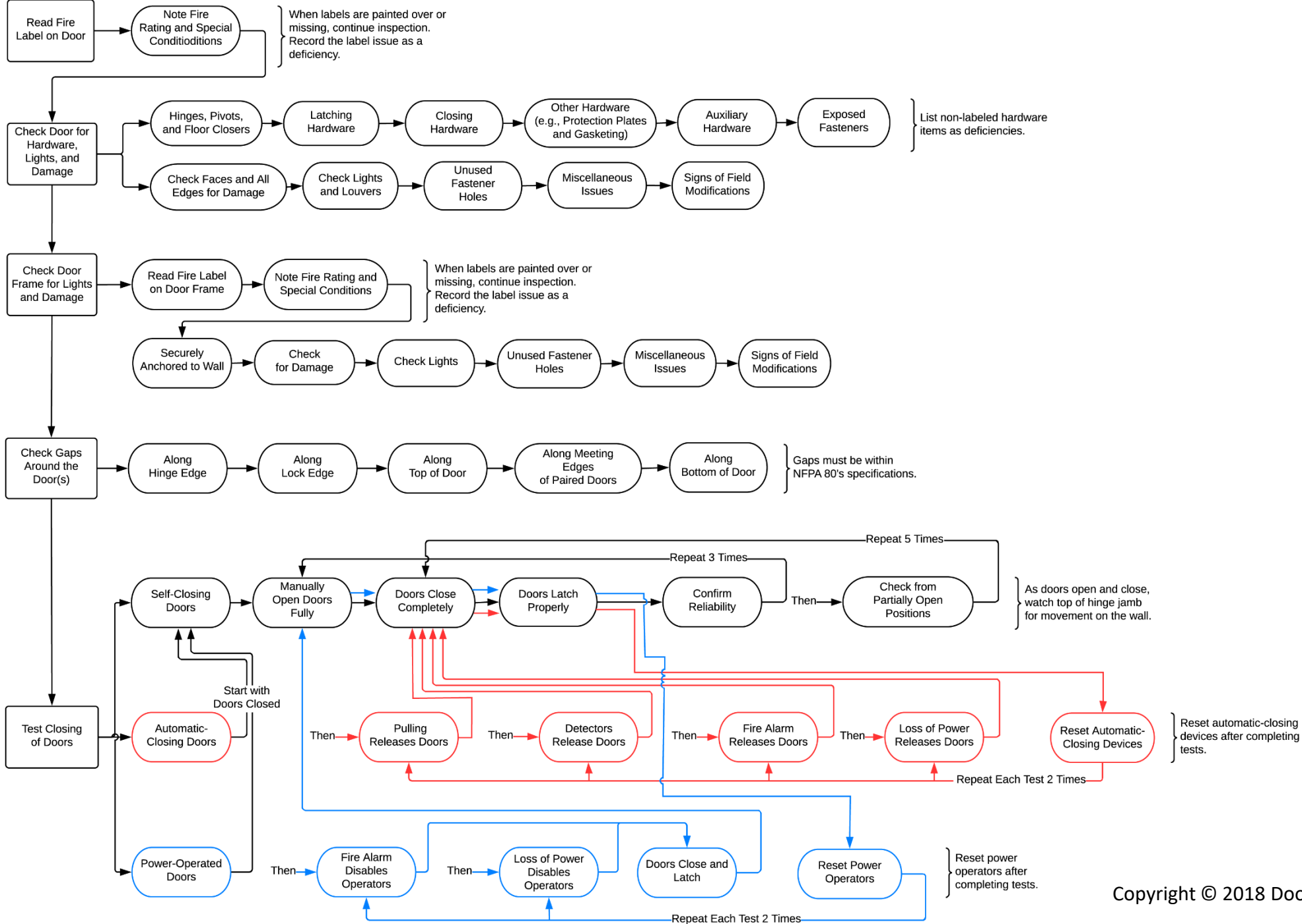
1. Doors must close and latch from **any** open position.

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.



# There's More to Talk About...

- We're almost out of time, and there is a lot more to talk about regarding inspecting swinging fire doors.



# Pop Quiz!

How Well Have You Paid Attention?  
Are You Ready?



# What's Wrong with this Picture?!



# ***Got Questions?***

For more information, contact:

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