Presents:

Swinging Fire Door Assemblies with Builders Hardware

Design, Installation, Inspection, and Maintenance
Speaker

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Design

• Swinging Fire Door Assemblies with Builders Hardware
  – Covered in Chapter 6 in NFPA 80

  – Component Based Systems
Design

• Swinging Fire Door Assemblies with Builders Hardware are Comprised of:
  – Labeled door frame
  – Labeled door(s)
  – Labeled or Listed Door Hardware Products
    • Hinges
    • Door Bolts
    • Locks and Latches
    • Door Closers
    • Etc.
Design

• Labeled Door Frames
  – Embossed Labels
  – Physical Labels
    • Mylar
    • Metal
Design

- Labeled Doors
  - Physical Labels
    - Mylar
    - Metal
  - States Hardware Requirements
    - Latch Throw
    - Fire Exit Hardware
    - S-Label for Smoke Door Assemblies
  - States Fire-Protection Rating in Hours or Minutes
Design

• Labeled and Listed Hardware Components
  – Marked with Emblems and Symbols
    • F, f, Ff
    • UL
  – Embossed, Stamped, or Applied
Design

• Glass and Glazing
  – 1/4-inch Clear Wire Glass
  – Fire Resistance Rated Glazing
  – Fire Protection Rated Glazing
Design

• Door Frame and Door Labels
  – Applied at Factory or Authorized Shop BEFORE Door Hardware is Installed

• Door Hardware Labels
  – Marked During Manufacturing
  – Some Products (e.g., Hinges) are only Listed
Design

• NFPA 80 Allows Door Frames, Doors, and Hardware to be Products of Different Manufacturers

• NFPA 80 Allows Doors Frames, Doors, and Hardware to be Labeled and Listed by Different Testing Labs
Design

• Fire Door Ratings
  – 1/3-hour (20 minutes)
  – 1/2-hour (30 minutes)
  – 3/4-hour (45 minutes)
  – 1-hour (60 minutes)
  – 1-1/2 hour (90 minutes)
  – 3 hour (180 minutes)
Design

• Swinging Doors Rated Less than Walls
  – 4-hour walls requires 3-hour door assemblies
  – 2-hour walls requires 1-1/2 hour door assemblies
  – 1-hour walls requires 3/4-hour door assemblies
  • Exception: 1/3-hour door assemblies in some occupancies
Installation

• Component-Based Assemblies
  – Frame, Door, and Hardware Components
  – Virtually Infinite Combinations of Components
  – Each Component is Required to be Labeled or Listed

✓ Typically, the Label on the Door Establishes the Duration of Fire Protection Rating for the Assembly
Installation

- Swinging Fire Doors with Fire Door Hardware
- Horizontally Sliding Fire Doors
- Vertically Sliding Fire Doors
- Rolling Steel Fire Doors
- Access Fire Doors
- More...

✓ The Label on These Types of Fire Doors Cover the Entire Assembly
Installation

• Assemblies Commonly Consist of:
  – Hollow Metal Doors and Frames
  – Hollow Metal Frames and Wood Doors*
  – Pressed Steel Frames and Wood Doors*
  – Aluminum Frames and Wood Doors*
  – Aluminum Frames and Flush Aluminum Doors
  – Wood Composite Frames and Wood Doors*
  – Fiberglass Reinforced Polymer (FRP) Frames and Doors

*Fire Rated Wood Doors can be Flush or Stile and Rail Designs – High Pressure Decorative Laminate (e.g., Plastic Laminate) Fire Doors are a Type of Flush Wood Fire Door
Installation

• NFPA 80 Requires Swinging Doors with Builders Hardware to be Installed within the Following Clearances:
  – Hollow Metal Doors: 1/8-inch (plus or minus 1/16-inch) at Vertical Edges and Top Edges of Doors
  – Wood Doors: 1/8-inch Maximum (No Over- or Under-Tolerance)
  – Doors of Other Materials are Treated the Same as Wood Doors
Installation

• Fire Door Tests Allow 1/8-inch Clearance with No Over- or Under-Tolerance
  – UL 10B, Standard for Safety Fire Tests of Door Assemblies
  – UL 10C, Standard for Positive Pressure Fire Tests of Door Assemblies
  – Other Fire Door Test Standards
Installation

• Clearance Under the Doors
  – Maximum of 3/4-inch Where Bottom of Door is Less than 38-inches Above the Floor
  – Maximum of 3/8-inch Where Bottom of Door is 38-inches or Higher Above the Floor

• Access Doors
Installation

• Common Misconceptions
  – Label on Door(s) Indicates the Assembly is “OK”
  – Fire Doors are “OK” as Long as They Close and Latch
  – All Fire Doors are Inspected by the AHJ
Installation

• Label on Door Establishes Requirements for Hardware Components
  – Dimension of Latch Bolt Throw (Projection)
  – Application of Fire Exit Hardware
  – Temperature Rise (e.g., 650, 450, and 250 degrees)

✓ Some Labeled Hardware Items Have Restricted Applications
Inspection

• Inspectors Need to be Cognizant of Applicable Code Requirements at Time of Installation

• Presumption of Correct Applications

• Practical Application of Inspection Criteria
Inspection

• Only the AHJ has the authority to enforce building and fire code compliance
Inspection

• NFPA 80 Requires Annual Inspection and Operational Testing of Swinging Fire Doors with Builders Hardware
  – Chapter 5, Care and Maintenance
  • List of Inspection Points
  • Requires Qualified Persons
  • Written Records Kept for AHJ’s Inspection

✓ **Deficiencies Required to be Repaired** *Without Delay*
Maintenance

• Door Assemblies are Comprised of Mechanical Equipment that are Subject to Wear and Tear

✓ Failure to Properly Maintain Fire Door Assemblies in Operating Condition is the Action or Inaction that Violates the Building and Fire Codes
Maintenance

• Simple to Complex Functions
  – Fire Safety
  – Life Safety
  – Accessibility
  – Security
  – Access Controlled

✔ Fire Rating Requirements Take Precedence Over Other Code Requirements
Maintenance

• Common Corrective Actions:
  – Tightening Fasteners
  – Replacing Fasteners
    • Builders Hardware Requires Special Fasteners
  – Filling Unused Fastener Holes in Doors and Frames
    • Steel/Stainless Steel Screws, Joint Compound, Wooden Dowels
    • New Caulking-type Products (Designed for Fire Doors)
Maintenance

• Common Corrective Actions:
  – Shimming Hinges to Adjust Door Clearances
    • Steel Shim Material
  – Replacing Small Parts
    • Strike Plates, End Caps, Covers, etc.
  – Replacing Worn Out Hardware
    • Hinges, Locks/Latches, Door Closers, Gasketing, etc.
  – Replacing Broken Glazing Materials
    • Clear Wired Glass, etc.
Maintenance

• Average Lifespan of Doors, Frames, and Hardware
  – Door Assemblies Subject to High Frequency Usage:
    • 400 to 5,000 Cycles per day (118,000 to 1,500,000/yr)
    • 3 to 7 years, Depending on the Hardware

  – Door Assemblies Subject to Ordinary Usage:
    • 50 to 200 Cycles per day (18,000 to 75,000/yr)
    • 7 to 15 years, Depending on the Hardware

  – Door Assemblies Subject to Low Frequency Usage:
    • 1 to 20 Cycles per day (300 to 7,000/yr)
    • Up to the Lifetime of the Building, Depending on the Hardware
For More Information:

• Door Security & Safety Foundation
  – Web Site: www.doorsecuritysafety.org

• Door and Hardware Institute
  – Web Site: www.dhi.org

• On LinkedIn
  – The Door and Hardware Institute’s Fire Door Assembly Inspection Group
For More Information:

• Owner’s Guide

• AHJ’s Guide

• Reference Guide

✓ Available for purchase through DHI or the Foundation’s web sites