

# Steel Door Institute

## Fire Rated Doors and Frames



Standards As Tough As Steel.™

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# Fire Rated Doors and Frames

Fire rated doors and frames play a vital role in keeping people safe and minimizing property damage during a fire.

Many components of a door assembly can be rated to withstand fire for a specified period of time. A few of the components include:

- Doors
- Door frames
- Window frames
- Hardware
- Transoms
- Sidelights
- Glazing



# Nomenclature

- **Rated**
  - Product that has been approved to withstand fire for a specified period of time
- **Listed or Approved**
  - Having been fire tested and approved through proper listing agencies
- **Labeled**
  - Product that is physically bearing a fire rating label from an approved agency

# Requirements

- Fire ratings are granted by third-party testing agencies and are labeled on the products.
- The doors must meet the requirements of the International Building and International Fire Codes, as well as NFPA 80.
- Building codes dictate the fire rating requirements for the wall. This is based on the location of the wall, building use, and more. The fire rating of the **wall** dictates the required fire rating of the **door**.
- Fire doors are required to be self closing and positive latching.

# Fire Ratings



Fire door assemblies have 5 ratings:

- 20 minute
- 45 minute
- 1 hour
- 1-1/2 hour
- 3 hour

**The rating of a fire door assembly is based on the lowest rated component.**

# Fire Door Frames



- There are not hourly ratings for basic fire door frames unless the label specifically states the frame is rated less than 3 hours.
- Some state and local building codes require hourly ratings up to and including 3 hours for a door frame.
- If a frame bears a recognized label qualifying it as a fire door frame, it may support doors rated 3 hours or less.

# Fire Door Frames

- Frames used in **masonry walls** may be used with a maximum 3-hour fire door, while frames used in **drywall stud walls** are intended to be used with a maximum 1-1/2-hour fire door.
- Consult with individual fire door frame manufacturers listings for fire door frames that can be used in drywall stud walls with a maximum 3-hour rating.
- Grout is not required for fire rated frames installed in either drywall or masonry walls at any hourly rating.




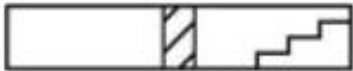



# Sidelights and Transoms Frames

- Sidelights are treated differently than transom frames.
- Sidelights are available only up to 1 ½ hours
- Transom frames can carry up to a 3 hour label, just like 3-sided frames

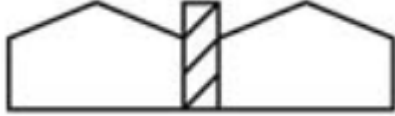


# Fire Rated Walls and Doors

Table 1 in [SDI 118](#) shows the proper door ratings for various types of walls.

Opening	Wall Rating	Door and Frame Rating	Description and Use
	4 Hour	3 Hour (180 minutes)	These openings are in walls that separate buildings or divide a single building into designated fire areas.
	2 Hour	1-½ Hour (90 minute)	Openings of this type are used in enclosures of vertical communication or egress through buildings. Examples of these types of openings include stairwells and elevator shafts.
	1 Hour	1 Hour (60 minute)	These door and frame assemblies divide occupancies in a building.
	1 Hour	¾ Hour (45 minute)	For use where there are openings in corridors or room partitions.
	2 Hour	1-½ Hour (90 minute)	This opening is in a wall where there is the potential for severe fire exposure from the exterior of the building.

# How to Use SDI 118

Opening	Wall Rating	Door and Frame Rating
	4 Hour	3 Hour (180 Minutes)

**Situation:** A door is installed in a 4 hour fire wall and used as a separation between two adjoining buildings. You need to verify what fire door rating is required.

**Solution:** Table 1 of SDI 118 shows the door and frame must bear a 3 hour fire label.

# Types of Fire Rated Doors

SDI manufacturers offer stock and custom fire rated doors. They are available with a variety of cores, such as:

- Honeycomb
- Polystyrene
- Steel stiffened
- Temperature rise



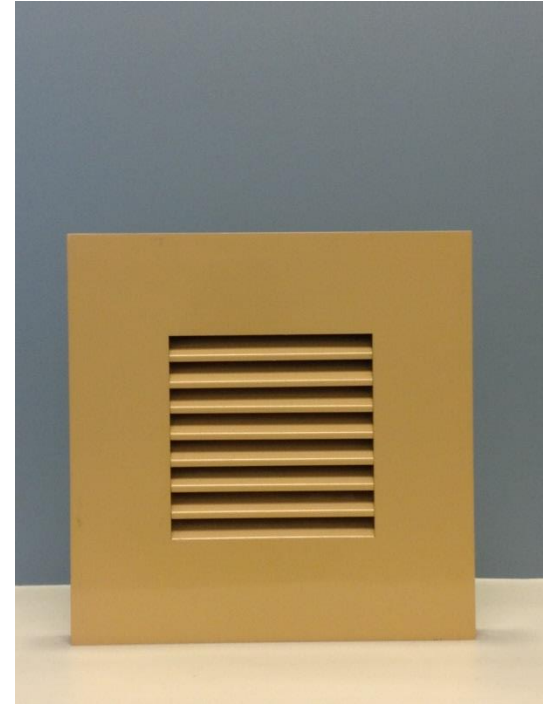
# Temperature Rise Doors



- Temperature rise doors **minimize the transfer of heat** to the cooler side of the door.
- These doors are commonly found in stairwells of high-rise buildings because they allow people to safely pass below the floors with fire.
- Temperature rise doors prevent the unexposed side of the door from reaching:
  - **250°** (least heat transfer)
  - **450°**
  - **650°**

# Louvers

- The maximum rating for louvers is 90 minutes.
- Regardless of the rating, louvers are generally not allowed in corridor openings.
- Only approved louvers can be used in fire rated doors.
- Louvers must:
  - be a maximum of 24" x 24"
  - have a fusible link
  - only be on the lower portion of the door



# Fire Rated Hardware



The door assembly's hardware must also carry the appropriate fire label.

# Fire Rated Hardware



- Hardware has the same fire rating durations as doors and frames.
- Types of fire rated hardware include:
  - Hinges
  - Pivots
  - Locks
  - Closers
- Gasketing materials must be listed to show that their installation does not adversely affect the fire resistance performance of the assembly.



# Fire Rated Hardware

- Limitations on Use of Hardware
  - Size of Armor Plates
  - Door Viewers
  - Door Vision Lites
- A properly sized closing device is the last of the “basic” fire door hardware requirements. A fire door must be in a closed and latched position to serve as a protective barrier in the event of a fire. For this reason, either listed spring hinges or a listed door closer are required to ensure that the door will close properly.
- Conditions of Test Acceptance
  - Assembled hardware must keep the door closed during and after the fire

# Fire Rated Hardware

- Proper hardware selections can be verified by consulting the “**Fire Resistance Directory**” published by Underwriters Laboratories Inc. and “**Listed Product Directories**” published by Intertek Testing (Warnock Hersey).
  - Links are located in section 3 of [SDI 118](#).
- The directories identify hardware and other products that may be used in fire-rated assemblies.



# Fire Tests

- Fire tests must be performed by an independent, internationally recognized laboratory.
- There are 2 two portions of the test.
- The first is the **fire test**. An operable door assembly is installed in front of a furnace and exposed to fire for a specified time.



As the test progresses, the temperature is steadily increased to simulate the conditions of a real fire. The **temperature** and **pressure** of the door are monitored.

# Fire Tests

The second is the **hose stream test**. Once the fire test is complete, the door is sprayed with cold water. The opening must stay secure.



# Fire Rated Specialty Products

Most specialty doors come with a fire rated option. A few of them include:

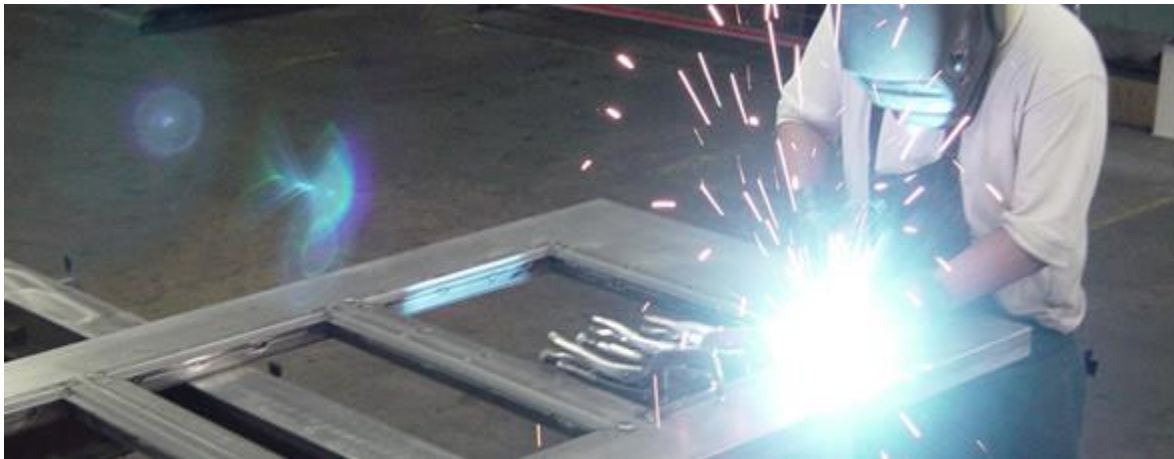
- **Acoustic**



# Fire Rated Specialty Products

Most specialty doors come with a fire rated option. A few of them include:

- Acoustic
- **Blast and Pressure Resistant**



# Fire Rated Specialty Products

Most specialty doors come with a fire rated option. A few of them include:

- Acoustic
- Blast and Pressure Resistant
- **Bullet Resistant**



# Fire Rated Specialty Products

Most specialty doors come with a fire rated option. A few of them include:

- Acoustic
- Blast and Pressure Resistant
- Bullet Resistant
- **Windstorm Resistant**





# Resources

- Hollow metal doors are excellent at limiting the danger and damage of fires. They are the only material widely available with a 3 hour rating.
- For more detailed information on fire rated doors and frames, reference [SDI 118](#) (Basic Fire Door, Fire Door Frame, Transom/Sidelight Frame, and Window Frame Requirements).
- [SDI member manufacturers](#) are also an excellent resource for questions regarding fire rated products.

# SDI Member Companies



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