

Rated Barriers and Partitions

NFPA 101 and IBC

Definitions:

NFPA 101-

3.3.31 Barrier.

3.3.31.1* *Fire Barrier.* A continuous membrane or a membrane with discontinuities created by protected openings with a specified fire protection rating, where such membrane is designed and constructed with a specified fire resistance rating to limit the spread of fire, that also restricts the movement of smoke.

(**A.3.3.31.1** Fire Barrier. A fire barrier might be vertically or horizontally aligned, such as a wall or floor assembly.)

8.3.1.1 Fire barriers used to provide enclosure, subdivision, or protection under this Code shall be classified in accordance with one of the following fire resistance ratings:

- (1) 3-hour fire resistance rating
- (2) 2-hour fire resistance rating
- (3) 1-hour fire resistance rating
- (4)* 1/2-hour fire resistance rating

3.3.31.2* *Smoke Barrier.* A continuous membrane, or a membrane with discontinuities created by protected openings, where such membrane is designed and constructed to restrict the movement of smoke.

(**A.3.3.31.2** Smoke Barrier. A smoke barrier might be vertically or horizontally aligned, such as a wall, floor, or ceiling assembly. A smoke barrier might or might not have a fire resistance rating. Application of smoke barrier criteria where required elsewhere in the Code should be in accordance with Section 8.3.)

8.5 Smoke Barriers.

8.5.1* General. Where required by Chapters 11 through 43, smoke barriers shall be provided to subdivide building spaces for the purpose of restricting the movement of smoke.

8.5.2* Continuity.

8.5.2.1 Smoke barriers required by this Code shall be continuous from an outside wall to an outside wall, from a floor to a floor, or from a smoke barrier to a smoke barrier, or by use of a combination thereof.

8.5.2.2 Smoke barriers shall be continuous through all concealed spaces, such as those found above a ceiling, including interstitial spaces.

8.5.2.3 A smoke barrier required for an occupied space below an interstitial space shall not be required to extend through the interstitial space, provided that the construction assembly forming the bottom of the interstitial space provides resistance to the passage of smoke equal to that provided by the smoke barrier.

8.5.3 Fire Barrier Used as Smoke Barrier. A fire barrier shall be permitted to be used as a smoke barrier, provided that it meets the requirements of Section 8.5.

3.3.31.3* *Thermal Barrier.* A material that limits the average temperature rise of an unexposed surface to not more than 250°F (139°C) for a specified fire exposure complying with the standard time-temperature curve of ASTM E 119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, or ANSI/UL 263, *Standard for Fire Tests of Building Construction and Materials*.

(A.3.3.31.3 Thermal Barrier. Finish ratings, as published in the UL Fire Resistance Directory, are one way of determining thermal barrier.)

3.3.254* Smoke Partition. A continuous membrane that is designed to form a barrier to limit the transfer of smoke.

(A.3.3.254 Smoke Partition. A smoke partition is not required to have a fire resistance rating.)

8.4 Smoke Partitions.

8.4.1* General. Where required elsewhere in this Code, smoke partitions shall be provided to limit the transfer of smoke.

8.4.2 Continuity. Smoke partitions shall comply with the following:

(1) They shall extend from the floor to the underside of the floor or roof deck above, through any concealed spaces, such as those above suspended ceilings, and through interstitial structural and mechanical spaces.

(2)*They shall be permitted to extend from the floor to the underside of a monolithic or suspended ceiling system where all of the following conditions are met:

- (a) The ceiling system forms a continuous membrane.
- (b) A smoke-tight joint is provided between the top of the smoke partition and the bottom of the suspended ceiling.
- (c) The space above the ceiling is not used as a plenum.

(3) Smoke partitions enclosing hazardous areas shall be permitted to terminate at the underside of a monolithic or suspended ceiling system where all of the following conditions are met:

- (a) The ceiling system forms a continuous membrane.
- (b) A smoke-tight joint is provided between the top of the smoke partition and the bottom of the suspended ceiling.
- (c) Where the space above the ceiling is used as a plenum, return grilles from the hazardous area into the plenums are not permitted.

3.3.287 Wall.

3.3.287.1 Fire Barrier Wall. A wall, other than a fire wall, that has a fire resistance rating.

3.3.106 Fire-Rated Glazing. Glazing with either a fire protection rating or a fire resistance rating.

3.3.23 Assembly.

3.3.23.1 Door Assembly. Any combination of a door, frame, hardware, and other accessories that is placed in an opening in a wall that is intended primarily for access or for human entrance or exit. [252, 2008]

3.3.23.1.1 Fire Door Assembly. Any combination of a fire door, a frame, hardware, and other accessories that together provide a specific degree of fire protection to the opening. [80, 2010]

3.3.23.1.1.1 Floor Fire Door Assembly. A combination of a fire door, a frame, hardware, and other accessories installed in a horizontal plane, which together provide a specific degree of fire protection to a through-opening in a fire resistance-rated floor. [288, 2007]

3.3.23.2 Fire Window Assembly. A window or glass block assembly having a fire protection rating. [80, 2010]

3.3.285* Vertical Opening. An opening through a floor or roof.

(**A.3.3.285 Vertical Opening.** Vertical openings might include items such as stairways; hoistways for elevators, dumbwaiters, and inclined and vertical conveyors; shaftways used for light, ventilation, or building services; or expansion joints and seismic joints used to allow structural movements.)

3.3.65 Draft Stop. A continuous membrane used to subdivide a concealed space to resist the passage of smoke and heat.

Definitions:

IBC (Chapter 2) –

DRAFTSTOP. A material, device or construction installed to restrict the movement of air within open spaces of concealed areas of building components such as crawl spaces, floor/ceiling assemblies, roof/ceiling assemblies and, attics.

SMOKE BARRIER. A continuous membrane, either vertical or horizontal, such as a wall, floor or ceiling assembly, that is designed and constructed to restrict the movement of smoke.

SMOKE COMPARTMENT. A space within a building enclosed by smoke barriers on all sides, including the top and bottom.

FIRE WALL. A fire-resistance-rated wall having protected openings, which restricts the spread of fire and extends continuously from the foundation to or through the roof, with sufficient structural stability under fire conditions to allow collapse of construction on either side without collapse of the wall.

FIRE BARRIER. A fire-resistance-rated wall assembly of materials designed to restrict the spread of fire in which continuity is maintained.

FIRE PARTITION. A vertical assembly of materials designed to restrict the spread of fire in which openings are protected.

FIRE-RATED GLAZING. Glazing with either a fire protection rating or a fire-resistance rating.

FIRE WINDOW ASSEMBLY. A window constructed and glazed to give protection against the passage of fire.

Now that I have listed some definitions from the Life Safety Code, NFPA 101 and the International Building Code (both 2012 edition), Lets discuss the things. As a general rule, a fire wall is the most protective assembly and actual can define the boundaries of a building. A fire wall is footed and structurally independent so that the structure on one side can burn and fall away with pulling down the fire wall. Newer construction techniques will actually allow a horizontal fire wall (pedestal buildings). Generally, fire walls are 3 hour rated but may also be other ratings as allowed by code. Fire walls offer the highest level of protection.

Fire barriers are the next level down of protection. These are typically fire-rated for one and two hour ratings. Barriers are used to enclose exits, shafts, separate occupancies, separate fire areas, separate hazardous materials into control areas, separate vertical shafts, separate stories, separate accessory hazardous areas, separate incidental use areas, and protect exits and means of egress.

Fire partitions are the next step down below fire barriers. As fire walls and barriers, fire partitions are designed to resist the effects of fire and stop/slow the spread of fire. In sprinklered buildings, in many cases the code will allow the requirement for barriers to be reduced to partitions due to the sprinkler protection.

Smoke barriers are the higher of the smoke rated assemblies. These may or may not be fire-rated but usually are 1-hour fire rated.

Smoke partitions are designed to limit the transfer of smoke and are usually rated for 30-minutes or non-rated.

All this stated, fire walls, fire barriers and fire partitions are all designed to limit the spread of fire. Normally this results in the limiting the transfer of smoke but that is not their design. These assemblies will have dampers that are rated and listed for use in fire barriers. Normally, these are dampers that use a heat sensing method of activation, i.e.: fusible link. Opening protectives (doors or glazing) shall be rated and listed for the type assembly that they are located within. These are commonly self-closing or automatic closing protectives that may be held open only by devices that will automatically release the door to close in the event of fire alarm activation or activation of the automatic fire suppression system (sprinklers). Any penetrations must be sealed in an approved manner using listed and rated materials that will return the assembly to the original rating. Penetrations and openings are not generally allowed in fire walls.

Smoke rated assemblies are designed to resist the passage of smoke. They require opening protectives to be self-closing or automatic closing upon the detection of smoke or activation of the fire alarm or automatic fire suppression system.

Chapter 8 of NFPA 101 and Chapter 7 of the IBC cover these rated assemblies. Other parts of the code will refer you to these chapters and in most and in most cases, dictate what is required

and its rating. For example, a two-story building is required by section 7.1.32.1 of NFPA 101 to have one-hour rated stairwells and they have to comply with section 8.2. Then we get bounced around a little bit. And yes, the stair shaft has to be 1-hour fire resistance rated. A 1-hour fire barrier is required to protect the stairway (exit). See table 8.3.4.2 for the requirements of the rating of opening protectives (doors) and fire resistance glazing (not fire protection glazing).

All of these terms are specific and in are NOT interchangeable. The code will tell you what to protect with and then the code will direct you to how it has to be constructed and rated.

NFPA 220 addresses ratings and classifications of types of construction. NFPA 221 addresses fire walls and fire barriers. Also, chapter 7 of the IBC gives some prescriptive methods for constructing rated assemblies. Otherwise, rated assemblies can be found in several places to include the U.L Directory. These listed assembly directories will tell a designer how to build a rated assembly to meet the required rating and type of assembly being required by the code.

Keep in mind, all openings have to be protected to provide the same level of protection that the assembly provided without the opening. See table 8.3.4.2. Any through-penetration has to be sealed back to the same level of protection that the assembly provided prior to the penetration. Of course, there are more detailed rules in the codes and referenced standards about all of this.