

● FIRE RATING REQUIREMENT OF STEEL CONSTRUCTION

1. Objective:

The objective of this paper is to provide its user with adequate technical knowledge and guidance on standard fire rating requirement of steel construction in RMG industries of Bangladesh.

2. Building classification & definitions:

- a) Existing Buildings- Buildings which are constructed and occupied prior 24 November 2013.
- b) Interim Construction or Buildings- Buildings which are constructed and occupied from 24 November 2013 to prior 11 February 2021.
- c) New Construction or Buildings- Buildings which are constructed and occupied with approved design from the appropriate building approval authority from 11 February 2021.

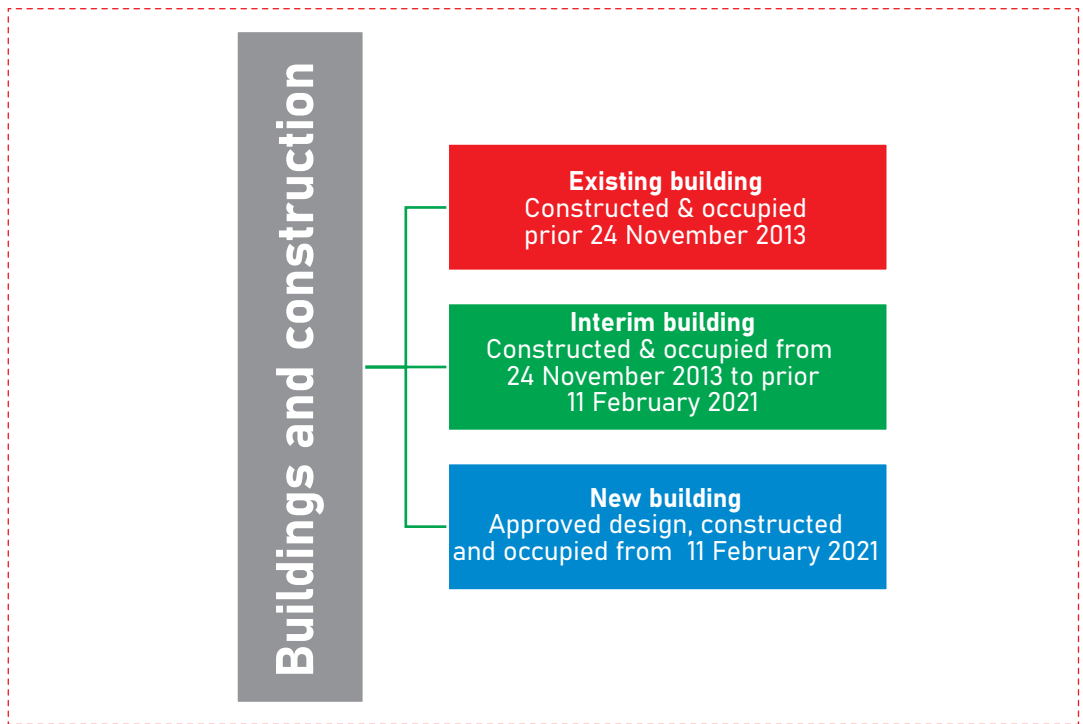


Figure 1: Building classification



3. Protection of existing buildings:

According to the RSC Technical Guidelines (Standard), all existing buildings with non-rated constructions shall follow the below table considering per floor area and building height.

Existing building (occupied prior to 24 November 2013)		
	Per floor area <22,000 sq. feet	Per floor area >22,000 sq. feet
2 Storeys or less	No requirement of sprinkler	No requirement of sprinkler
	No requirement of passive fire protection	No requirement of passive fire protection.
	Mixed occupancy separation according to BNBC 2006 Part 3 table 3.2.1. (Separation wall and floor/ ceiling assemblies)	
More than 2 storeys up to building height 65 ft	No requirement of passive fire protection.	No requirement of passive fire protection.
	Active fire protection required- Standpipe system when building occupied level >33 feet.	Active fire protection required- sprinkler and standpipe system
	Mixed occupancy separation according to BNBC 2006 Part 3 table 3.2.1. (Separation wall and floor/ ceiling assemblies)	
building height more than 65 feet but less than 75 feet.	Passive fire protection required.	Passive fire protection required.
	Active fire protection- Standpipe system	Active fire protection required- Sprinkler and standpipe system
	Mixed occupancy separation according to BNBC 2006 Part 3 table 3.2.1. (Separation wall and floor/ ceiling assemblies)	
Building height more than 75 feet	Passive fire protection required. Active fire protection required- sprinkler and standpipe system.	
	Mixed occupancy separation according to BNBC 2006 Part 3 table 3.2.1. (Separation wall and floor/ ceiling assemblies)	

Table 1: Fire protection requirement of existing buildings in terms of height and floor area.





4. Protection of interim buildings:

- As per the RSC Technical Guidelines (Standard) Part 3 Section 3.3.6- all RMG factories will be considered as occupancy G2. (See BNBC 2006 Part 3 Section 2.1.7)
- All RMG factories must be of type 1 or type 2 construction (See BNBC 2006 Part 3 Section 2.4.3 & Section 3.2.4)
- For type 2 construction, the maximum permissible height of the building shall be 4 storeys or 14 meters. (See BNBC 2006 Part 3, Table 3.1.9)
- Interior bearing walls, bearing partitions, girders, trusses & framings must have minimum fire resistance rating: 2 hr. in type 2 construction & 4 hr. in type 1 construction. (See BNBC 2006 Part 3, Table 3.3.1)
- Floor construction including beams must have a minimum 1.5 hr. fire resistance rating in type 2 & 3 hr. fire resistance rating in type 1. (See BNBC 2006 Part 3, Table 3.3.1)

3 hr.
4 hr.
4 hr.
4 hr.
4 hr.

Figure 2: Type 1 building schematic diagram for fire rating of structural elements

1.5 hr.
2 hr.
2 hr.
2 hr.

Figure 3: Type 2 building schematic diagram for fire rating of structural elements

- Depending on the distance from the building to the property line the fire resistance rating of the exterior wall must meet BNBC 2006 Table 3.2.2.
- If the floor assembly is also a separation between occupancies, then BNBC 2006 Table 3.2.1 must also be considered.

Follow table 2 for the fire protection requirement of interim buildings.

Interim building (occupied from 24 November 2013 to prior 11 February 2021)	
Type- 1 construction (fire rated)	Type- 2 construction (fire rated)
>14 meter of building height.	Permissible height up to 14 meter or 4 stories.
Fire rating requirement- Floor including beam- 3 hours; Interior bearing walls, bearing partitions, girders, trusses & framings must have minimum fire resistance rating- 4 hours.	Fire rating requirement- Floor including beam- 1.5 hours; Interior bearing walls, bearing partitions, girders, trusses & framings must have minimum fire resistance rating- 2 hours.
Active fire protection required- <ul style="list-style-type: none"> ● Standpipe- occupied level >33 feet. ● Sprinkler & standpipe- occupied level >75 feet. 	Active fire protection required- <ul style="list-style-type: none"> ● Standpipe- occupied level >33 feet. ● Sprinkler & standpipe- occupied level >75 feet.
Mixed occupancy separation according to BNBC 2006 Part 3 table 3.2.1. (Separation wall and floor/ ceiling assemblies)	
Proximity between group of occupancies and exterior wall rating shall be ensured according to BNBC 2006 Part 3 Table 3.2.2	

Table 2: Fire protection requirement of interim buildings in terms of height and construction type.

5. Protection of new buildings:

- According to BNBC 2020 Table 3.2.4; group- I: non- combustible construction is permitted for RMG industries.

Group I: Noncombustible, subdivisions are followings-

- Type I-A: 4-hour fire protected
- Type I-B: 3-hour fire protected
- Type I-C: 2-hour fire protected
- Type I-D: 1 hour fire protected
- Type I-E: Unprotected

- According to BNBC 2020 Table 3.1.7; building height and number of storey for non-combustible construction group shall be complied with respect to road width and front open space requirement.
- For Type I-D and I-E of Group I construction, the maximum permissible height of the building shall be 3 storeys or 11 m for values of two times the sum of the width of the front road and the front open space not less than 13.6 m.
- For exterior wall rating and proximity to surrounding occupancies group, BNBC 2020 Table 3.2.2 shall apply.
- Fire rating requirement of opening protectives in exterior wall shall be in accordance with BNBC 2020 Table 3.2.3.
- Fire resistance rating requirements for barrier walls and floor/ceiling assemblies between separated occupancies (hours) i.e. mixed occupancies separation follow BNBC 2020 Part 3 Table 3.2.1.
- Fire rating for structural and non- structural elements of group- I construction shall be in accordance with BNBC 2020 Table 3.3.1 (a).
- In all new buildings, standpipe system shall be required if the highest occupied floor is greater than 10 m height from grade level, and a sprinkler system is required where the highest occupied floor is greater than 23 m.

