

Exit and Egress Doors

NBC 2015

Egress vs Exit

- Means of egress; path of travel from **anywhere in the building** to;
 - Separate Building
 - Open public thoroughfare
 - Exterior space protected from building exposure
- Exit leads from **the floor area** to;
 - Separate Building
 - Open public thoroughfare
 - Exterior space protected from building exposure

Objective Statements

- NBC 2015 Articles 3.4.6.16 and 3.3.1.13 have the objective of OS 3.7.
- **OS 3.7** states that a person will not be exposed to unacceptable risks due to hazards caused by being delayed from moving to a safe place during an **emergency** (NBC 2015 Div A, 2.2.1.1).

Definition of Emergency

- We most often associate an **emergency** with a fire emergency.
- NBC 2015 A-2.2.1.1(1) defines an **emergency** as **any type of emergency** which requires **rapid evacuation of the building** such as a bomb threat or the presence of intruders.
- We should not differentiate between fire emergencies and other emergencies when developing policy for the release of locking hardware on egress or exit doors.

Door Release Hardware

- Egress doors are intended to be readily openable in the direction of exit travel **without requiring keys, special devices or specialized knowledge of the door opening mechanism**. Most egress doors require **one releasing operation**.
 - NBC 2015 3.3.1.13(2) and 9.9.6.7(2).
- Exit doors are intended to be readily openable in the direction of exit travel with **one releasing operation** and **without keys, special devices or specialized knowledge of the door opening mechanism**.
 - NBC 2015 3.4.6.16(1) and 9.9.6.7(1).

Door Release Hardware

- Exceptions to One Releasing Operation
 - Contained use Area
 - Impeded Egress Zone
 - Single Dwelling Unit
 - Residential Suite
 - Accessory Buildings including Garages to the Single Dwelling Unit

Banks and Mercantile Floor Areas

- **Sprinklered Banks** and **Mercantile** floor areas are **exempt** from the single releasing requirement and no special release devices of NBC 2015 Sentence 3.4.6.16(1) **provided** NBC 2015 Sentences 3.4.6.17(2) to (9) are met.

Electromagnetic Locks

- Can be used in both Part 3 and Part 9 Buildings. **NBC 2005** Articles 3.4.6.15 and 9.9.6.7. In **NBC 2010** these Articles became 3.4.6.16 and 9.9.6.7
- **NBC 2015** has similar requirements to **NBC 2010** 3.4.6.16 but Sentences; h), i), j), and k) have been added. Article 9.9.6.7 remains the same.
- Both NBC Part 3 and Part 9 requirements refer to **NBC 2015** Sentence 3.4.6.16.(4).
- Both **NBC 2015** Part 3 and Part 9 now allow for electromagnetic locks to be used for **both egress and exit doors**.

Electromagnetic Locks

- Electromagnetic locks prevent doors from opening in either direction. As such, they can create a **contained use area** or **impeded egress zone**.
- **Contained Use Areas** have special requirements under NBC 2015 Articles; 1.4.1.2, 3.2.2.19, 3.2.4.1, 3.2.4.8, 3.2.4.11, 3.3.1.13, 3.3.3.7, 3.4.6.11 and 3.4.6.16.
- **Impeded Egress Zones** have special requirements under NBC 2015 Articles; 1.4.1.2, 3.2.2.19, 3.2.4.1, 3.2.4.8, 3.3.1.13, 3.4.6.14 and 3.4.6.16.

NBC 2015 3.4.6.16(4)

- Electromagnetic locks that do not incorporate latches, pins or other similar devices to keep the door in the closed position are **permitted** to be installed on doors other than doors leading directly from a *high hazard industrial occupancy*, provided
 - a) The *building* is equipped with a fire alarm system,
 - b) The locking device release upon actuation of the *alarm signal* from the *building's* fire alarm system,

NBC 2015 3.4.6.16(4)

- c) The locking device released immediately upon loss of power controlling the electromagnetic locking mechanism and its associated auxiliary controls,
- d) Except for locking devices installed in conformance with Sentence (5), the locking device releases immediately upon actuation of a manually operated switch accessible only to authorized personal,
- e) Except as provided in Clause (k), a force of not more than 90 N applied to the door opening hardware initiates an irreversible process that will release the locking device within 15 seconds and not relock until the door has been opened,

NBC 2015 3.4.6.16(4)

- f) Upon release, the locking device must be reset manually by the actuation of the switch in Clause (d). A legible sign is permanently mounted on the *exit* door to indicate that the locking device will release within 15 seconds of applying pressure to the door opening hardware.
- g) A legible sign is permanently mounted on the door to indicate that the locking device will release within 15 seconds of applying pressure to the door opening hardware,
- h) The total time delay for all electromagnetic locks in any path of egress to release is not more than 15 seconds,

NBC 2015 3.4.6.16(4)

- i) Where a bypass switch is installed to allow testing of the fire alarm system, actuation of the switch
 - i. Can prevent the release of the locking device by the fire alarm system, as stated in Clause (b), during the test, and
 - ii. Causes an audible and visual signal to be indicated at the fire alarm annunciator panel required by Article 3.2.4.9 and at the monitoring station specified in Sentence 3.2.4.8(4),
- j) Emergency lighting is provided at each door, and

NBC 2015 3.4.6.16(4)

- k) Where they are installed on door providing emergency crossover access to floor areas from exit stairs in accordance with Article 3.4.6.18,
 - i. The locking device releases immediately upon the operation of a manual station for the fire alarm system located on the wall on the exit stair side not more than 600 mm from the door, and
 - ii. A legible sign with the words "re-entry door unlocked by fire alarm" written in letters at least 25 mm high with a stroke of at least 5 mm permanently mounted on the door on the exit stair side.

NBC 2015 3.4.6.16(5)

- Electromagnetic locks that do not incorporate latches, pins or other similar devices to keep the door in the closed position are **permitted** to be installed on doors in **Group B, Division 2 and Division 3** occupancies, provided
- a) The building is
 - i. Equipped with a fire alarm system, and
 - ii. Sprinklered,

NBC 2010 3.4.6.16(5)

- b) The electromagnetic lock releases upon
 - i. Actuation of the alarm signal from the building's fire alarm system,
 - ii. Loss of its power supply and of power to its auxiliary controls,
 - iii. Actuation of a manually operated switch that is readily accessible at a **constantly attended location within the locked space**, and
 - iv. Actuation of the manual station installed within 0.5 m of each door and equipped with an auxiliary contact, which directly releases the electromagnetic lock,

NBC 2015 3.4.6.16(5)

- c) Upon release, the electromagnetic lock requires manual resetting by actuation of the switch referred to in Subclause (b)(iii),
- d) A legible sign with the words "EMERGENCY EXIT UNLOCKED BY FIRE ALARM" written in letters at least 25 mm high with a stroke at least 5 mm wide is permanently mounted on the door,

NBC 3.4.6.16(5)

- e) The operation of any by-pass switch, where provided for testing of the fire alarm system, sets off an audible signal and a visual signal at the fire alarm annunciator panel and at the monitoring station referred to in Sentence 3.2.4.7(4), and
- f) Emergency lighting is provided at the doors.

NBC 2015 3.4.6.16(5)

- **Examples of B2 occupancies;** Care and Rehab Facilities with treatment, Hospitals, Nursing Homes with treatment, Psychiatric Hospitals without detention, Police Stations with Detention (single storey < 600 m²).
- **Examples of B3 occupancies;** Assisted Living, Care and Rehab without treatment, Group Homes, Nursing Homes without treatment, Reformatories without detention.

Electromagnetic Locks

- In order to satisfy NBC 2015 Sentence 3.4.6.16(4) **all** of the clauses; a), b), c), d), e), f), g), h), i), j) and k) **must be met.**
- In order to satisfy NBC 2015 Sentence 3.4.6.16(5) **all** of the clauses; a), b), c), d), e), and f) **must be met.**

Electromagnetic Locks

- NBC 2010 Sentence 3.4.6.16(4);

Electromagnetic locks that **do not incorporate; latches, pins or other similar devices** to keep the door in the closed position are permitted to be installed, provided;
- What are latches, pins etc.?

Electromagnetic Locks

- 3.4.6.16(4) Electromagnetic locks are **not permitted** in a high hazard industrial occupancy (F-1).
- 3.4.6.16(4)(a) Electromagnetic Locks can only be installed in buildings equipped **with a fire alarm system**
- 3.4.6.16(5)(a) Electromagnetic Locks can only be installed in B2 and B3 buildings **which are sprinklered and have a fire alarm system**.

Electromagnetic Locks

- 3.4.6.16(4)(b) and 3.4.6.16(5)(b)(i) The electromagnetic lock releases upon actuation of the fire alarm signal.
 - Is a fire scenario the only situation where building exiting is required?
 - Should the fire alarm system be used to release locking devices in scenarios which are not fire emergencies?

Electromagnetic Locks

- 3.4.6.16(4)(c) and 3.4.6.16(5)(b)(ii) The electromagnetic lock releases immediately upon loss of power controlling the electromagnetic locking mechanism and its controls.
 - The Code does not specify the power supply for the lock. As such the lock could be on a battery back up but this must operate both the lock and it's controls.

Electromagnetic Locks

- 3.4.6.16(4)(d) The electromagnetic locking device releases immediately upon actuation of a manually operated switch accessible to authorized personnel.
 - Does your jurisdiction enforce this requirement?
 - What are some designs which would accomplish this requirement?
- 3.4.6.16(5)(b)(iii) The electromagnetic lock releases immediately at a constantly attended location within the locked space.
 - What is a constantly attended location within the locked space?

Electromagnetic Locks

- 3.4.6.16(4)(e) A force of not more than 90 N applied to the door opening hardware initiates an irreversible process that will release the locking device within 15 seconds and not relock until the door has been opened.
 - Locks on Cross over floors meeting 3.4.6.16(4)(k) are exempt from this requirement.
 - What are the implications of this requirement?

Electromagnetic Locks

- Implications of 3.4.6.16(4)(e)
 - The release mechanism for the electromagnetic lock must be panic type hardware or other hardware which can sense a force applied to the door in the direction of egress travel.
 - The door must swing in the direction of egress travel.
 - The electromagnetic lock cannot be timed to relock but must remain unlocked until the door has been opened.
 - The electromagnetic lock could release between 0 and 15 seconds after a maximum 90 N force applied to the door hardware.

Electromagnetic Locks

- Implications of 3.4.6.16(4)(e)
 - Does a fire alarm pull station, a different coloured pull station connected to release the lock, or a request to exit button meet the requirements for door opening hardware?
 - Can electromagnetic locks be used on doors which are required to have panic hardware by another code article?
 - What happens when there are multiple doors equipped with electromagnetic locks in the path of egress, can each one have a 15 second delay release? Refer to NBC 2015 3.4.6.16(4)(h).
 - Is the 15 second delay cumulative along the path of egress from the building? Refer to NBC 2015 3.4.6.16(4)(h).

Electromagnetic Locks

- 3.4.6.16(5)(b)(iv) Actuation of the **manual station** installed within 0.5 m of each door and equipped with an auxiliary contact which **directly releases the electromagnetic lock** (B2 and B3 occupancies).
 - Is the **manual station** the same as a **fire alarm pull station**?
 - **Not necessarily as a fire alarm pull station may not be equipped with an auxiliary contact to release the door.**

Electromagnetic Locks

- Implications of 3.4.6.16(5)(b)(iii)
 - There is a supervisor **within** the locked space, created by the electromagnetic locks, **at all times (constantly)** who has access to a manually operated release switch.
- Implications of 3.4.5.16(5)(b)(iv)
 - There is a device (manual station) beside each door which directly releases the electromagnetic lock.

Electromagnetic Locks

- 3.4.6.16(4)(f) and 3.4.6.16(5)(c) Upon release, the locking device must be reset manually by the actuation of the switch described in Clause (d) or Subclause (b)(iii)
 - Once opened for whatever reason an electromagnetic lock can only be reset manually.

Electromagnetic Locks

- 3.4.6.16(4)(g) and 3.4.6.16(5)(d) A legible sign is required on the door to indicate that the locking device will release within 15 seconds of **applying pressure to the door opening hardware.**
 - Does the signage have to be in English and French?
 - What about nuisance openings where someone leans against the hardware and inadvertently opens the door? **You can have door hardware which requires pressure for a given time period before opening but it must be signed as such**

Electromagnetic Locks

- 3.4.6.16(4)(i) and 3.4.6.16(5)(e) A bypass switch preventing the release of electromagnetic locks on fire alarm is permitted provided the activation of this switch causes an audible and visual signal (trouble signal) on both the building annunciator panel and the monitoring station.
 - Does this mean that fire alarm systems in occupancies other than B2 and B3 require fire alarm system monitoring? **Not necessarily unless required by NBC 2015 Article 3.2.4.7.**

Electromagnetic Locks

- 3.4.6.16(4)(j) and 3.4.6.16(5)(f) Emergency lighting is required at doors with electromagnetic locks.
 - Is the emergency lighting required on both sides of the door or just on the side opening in the direction of egress travel? **Both sides of the door based on these clauses and Articles 3.2.7.3 and 9.9.12.3.**
 - How bright does this lighting have to be? **NBC 3.2.7.3 and 9.9.12.3 both require 10 lux at the floor level.**

Electromagnetic Locks

- 3.4.6.16(4)(k) Electromagnetic locks can be used on doors providing access to crossover floors from exit stairs provided they release immediately on activation of the fire alarm system.
 - Should we require the use of the fire alarm system to provide access to cross over floors?
 - Can the door to the crossover floor automatically relock? **No based on Clause 3.4.6.16(4)(f) which requires manual reset.**
 - Why put electromagnetic locks on these doors? Is there a security requirement? **Locks on crossover floor doors are exempt from the 90 N force opening requirement but not fire alarm.**

Electric Strikes

- Acceptable for exit and egress doors provided the latch release hardware can open the door in the direction of egress travel.
- Requires listing for both durability (burglary resistance) and fire when used on a fire rated door. A ULC label on it's own does not indicate compatibility with fire rated doors. It must be listed for use with a fire rated door.

Electric Strikes

- Locked latch release hardware and a locked electric strike in the direction of egress travel is not permitted even with a request to exit button. A request to exit button is considered as specialized knowledge/device as per NBC 2015 Sentence 3.3.1.13(2).
- Electric strikes for fire rated doors or doors in fire separations shall not fail open or be powered to open with the activation of the fire alarm system as doors are required to remain latched while in the closed position as per NBC 2015 Article 3.1.8.15.

Electric Strikes

- Is an electric strike required to release on fire alarm signal? **No as this would negate the requirement for fire rated doors and doors in fire separations to be latched as per NBC 2015 Article 3.1.8.15.**

Panic Hardware

- When is panic type latch release hardware required?
 - Every exit door from a floor area containing an Assembly Occupancy with an occupant load more than 100. NBC 2015 3.4.6.16(2)(a)
 - Every door leading from an exit stair shaft to an exit lobby. NBC 2015 3.4.6.16(2)(b)
 - Every exterior door from an exit stair shaft in a building with an occupant load greater than 100. NBC 2015 3.4.6.16(2)(b)
 - Every exit door from a floor area containing a F-1 occupancy. NBC 2015 3.4.6.16(2)(c)

Panic Hardware

- Does your jurisdiction require panic hardware for any room or suite with an occupant load more than 100 regardless of occupancy classification?

Panic Hardware

- Is panic type hardware required for egress or exit doors in a NBC Part 9 Building?
 - No as Article 9.9.6.8 is worded differently from Sentence 3.4.6.16(2). Article 9.9.6.8 requires the door to open with a 90 N force **after** the latch has been released while Sentence 3.4.5.16(2) requires the latch to release **and** the door to open with a 90 N force.
