PLANNING & DEVELOPMENT SERVICES ADVISORY

Door Releasing Hardware & Electromagnetic Lock Requirements from Part 3

FAQ

Question

Where are the requirements for door release hardware found in NBC 2015, Division B, Part 3?

Answer

Egress Doors

Article 3.3.1.13 provides the main requirements for egress door hardware.

Article 3.3.2.7 also provides panic hardware requirements for assembly occupancies where the room or *suite* has an occupant load more than 100 people. Note that Article 3.3.2.7 has also been amended by Saskatchewan's *The Building Code Regulations.*

Article 3.3.4.5 restricts doors that open onto *public corridors* from locking automatically (except for hotels and motels). This rule applies specifically to *residential occupancies.*

Exit Doors

Article 3.4.6.16 provides the main requirements specific to *exit* doors.

Article 3.4.6.17 does provide relaxations for *exit* and egress doors to increase security for banks and mercantile floor areas. This is not being examined in this advisory.

Article 3.4.6.18 provides additional hardware requirements for doors in emergency crossover floors. This is not being examined in detail in this advisory.

Note: this advisory is focused on the main requirements for door releasing hardware operation and the requirements for electromagnetic locks. Therefore, it is not providing details for door sizes, ratings, hardware listings, self-closing hardware, smoke seals, sliding doors, revolving doors, hold open devices, power door operators, direction of door swing, etc.

Question

Article 3.3.1.13 talks about doors in an *access to exit*. How does the City of Regina interpret which doors are considered part of an *access to exit*?

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Answer

Article 3.3.1.13 provided most of the requirements for door hardware for doors that are in an *access to exit*. These doors are commonly referred to as "egress doors". Based on the definitions of *access to exit* and *means of egress*, the door hardware requirements of Article 3.3.1.13 apply to any door that one would travel through in order to get from any point in a *floor area* to an *exit* that serves that *floor area* (Note: *exit* doors have their own requirements based primarily on Article 3.4.6.16). In other words, egress doors include any doors that provide egress from any room or egress from a suite (examples include bathroom doors, service room doors, doors from offices, doors from suites onto public corridors). Therefore, the egress door requirements apply to nearly all doors within a *floor area.*

In summary, any door that would have a person passing through it on the way to an *exit* must meet egress door hardware requirements. These requirements will help ensure that people can get out of a building quickly and safely.

Question

What is a summary of the door hardware requirements, based on the requirements of Article 3.3.1.13 for egress doors?

Answer

Door hardware is a vital component for ensuring that people can get out of a building quickly and safely. Below is a summary of Article 3.3.1.13. Owners and designers are required to ensure designs conform to the requirements of NBC, and so further information should be sought from the Code for specific designs.

In summary, the **basic requirements** for **egress door hardware** in Article 3.3.1.13 state that the doors must:

1. Be readily openable in traveling towards the *exit* without the need for tools or special knowledge (e.g. Keys shall not be required to allow a person to get out),
2. Have hardware that is easily operated with one hand in a closed-fist position as per Clause 3.8.3.8.(1)(b) (e.g. Levers or panic bars are most commonly used),
3. Require not more than one releasing operation for the door to be openable (e.g. Operating a lever handle to release the latching mechanism is considered one releasing operation, after which the door could be swung open), and
4. Be operable at a height between 900mm and 1100 mm above the floor

The points described above are the basic requirements for egress doors, and exceptions do apply as described in Article 3.3.1.13. These exceptions include:

- **Dwelling Units:** Egress doors from a *dwelling unit* or *suite of residential occupancy* are allowed to have door hardware requiring multiple releasing operations (e.g. Separate deadbolt and lever handle permitted for egress doors from apartment units or hotel rooms, etc.). Special tools or knowledge to operate the hardware is not permitted.
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Furthermore, the NBC Notes state that height requirements continue to apply and the hardware "should not require appreciable dexterity".

- ***Contained Use Areas or Impeded Egress Zones:*** Egress doors serving a *contained use area* or *impeded egress zone* are permitted to meet other requirements described in Article 3.3.1.13. These are not being examined in detail in this advisory.
- **Electromagnetic Locks:** In place of the usual hardware requirements, egress doors are allowed to be equipped with electromagnetic locks. This provides owners and designers an opportunity to restrict passage through certain doorways, as is often desired to meet operational objectives. However, the requirements of Sentence 3.4.6.16.(5) or (6) must be met for the electromagnetic locks to meet Code. This will be discussed in more detail in this advisory.

Finally, it is important to note the following additional hardware requirements for egress doors from Part 3:

- Article 3.3.2.7 also provides panic hardware requirements for assembly occupancies where the room or suite has an occupant load more than 100 people. This Article has also been amended by Saskatchewan's *The Building Code Regulations.*
- Article 3.3.4.5 restricts doors that open onto *public corridors* from locking automatically (except for hotels and motels). This rule applies specifically to *residential occupancies.*

Question

What is a summary of the specific door hardware requirements based on the requirements of Article 3.4.6.16 for *exit* doors?

Answer

Exit door hardware has many of the same requirements that egress doors have, with a few additional requirements added. Below is a summary of Article 3.4.6.16. Owners and designers are required to ensure designs conform to the requirements of NBC, and so further information should be sought from the Code for specific designs.

In summary, the **basic requirements** for **exit door hardware** in Article 3.4.6.16 state that the doors must:

1. Be readily openable in traveling towards the *exit* without the need for tools or special knowledge (e.g. Keys shall not be required to allow a person to get out),
2. Have hardware that is easily operated with one hand in a closed-fist position as per Clause 3.8.3.8.(1)(b) (e.g. Levers or panic bars are most commonly used),
3. Require not more than one releasing operation for the door to be openable (e.g. Operating a lever handle to release the latching mechanism is considered one releasing operation, after which the door could be swung open),

4. Panic hardware complying with CAN/ULC-S132 is required for latching or locking doors for the following scenarios (note that Sentence 3.4.6.16.(2) has been amended by *The Building Code Regulations*):
    - All *exit* doors from a *floor area* that contains an *assembly occupancy* with an occupant load more than 100,
    - Doors leading from an *exit* stair shaft into an *exit* lobby and exterior doors leading from an *exit* stair shaft to the exterior in a building with an occupant load more than 100, and
    - All *exit* doors from a *floor area* of Group F, Division 1 occupancy.
5. Have door release hardware installed between 900 mm and 1100 mm above the finished floor.
6. Once released, the door shall be openable without the need for excessive force

The points described above are the basic requirements for *exit* doors, and exceptions do apply as described in Article 3.4.6.16. These exceptions include:

- ***Contained Use Areas or Impeded Egress Zones:*** Egress doors serving a *contained use area* or *impeded egress zone* are permitted to meet other requirements described in Article 3.3.1.13. These are not being examined in detail in this advisory.
- **Security for Banks and Mercantile Uses:** these requirements are given in Article 3.4.6.17 and are not being discussed in this advisory.
- **Electromagnetic Locks:** In place of the usual hardware requirements, *exit* doors are allowed to be equipped with electromagnetic locks. However, the requirements of Sentence 3.4.6.16.(5) or (6) must be met for the electromagnetic locks to meet Code. This will be discussed in more detail in this advisory.

Question

Code permits electromagnetic locks to be used for both egress doors and *exit* doors. What is a summary of the requirements?

Answer

Both egress doors and *exit* doors are permitted to use electromagnetic locks, rather than complying with the usual code requirements for door releasing hardware. The requirements for electromagnetic locks are found in Sentences 3.4.6.16.(5) and (6) and apply to both egress doors and *exit* doors. A summary of the requirements is given below. Owners and designers are required to ensure designs conform to the requirements of NBC, and so further information should be sought from the Code for specific designs.

Sentence 3.4.6.16.(5) Summary

All of the requirements listed below must be met for electromagnetic locks to be compliant with Code. The City of Regina has provided comments and interpretations in the table as well.

NBC Reference	Summary of Requirement	City of Regina Comments

Sentence (5)	Doors with electromagnetic locks are permitted to be used in all occupancies, except for doors leading directly from Group F, Division 1 occupancies.	Note that Group B-2 and B-3 occupancies are also permitted to use Sentence 3.4.6.16.(5), if desired
Sentence (5)	The electromagnetic lock shall not incorporate latches, pins or other similar devices to keep the door in the closed position	Latches, pins, etc. create a potential risk for jamming or may prevent the door from releasing properly in an emergency situation. They are not permitted. Electromagnetic locks must "fail safe".
Clause (a)	The building must be equipped with a fire alarm system	
Clause (b)	Electromagnetic locks shall release upon ***alarm signal*** from fire alarm system	Note that an *alert signal* in a 2-stage fire alarm system does not require release. The City of Regina interprets that manual reset with the switch mentioned in Clause (d) is required upon this release.
Clause (c)	Electromagnetic locks shall release upon **loss of power** controlling the locks	The City of Regina interprets that backup power is permitted for electromagnetic locks, as long as the doors continue to function as Code requires. If backup power is served by a backup generator, the transfer time must not be greater than 15 seconds (if longer than 15 seconds, then all maglocks must release). The City of Regina interprets that manual reset with the switch mentioned in Clause (d) is required upon this release.
Clause (d)	Electromagnetic locks shall release upon activation of a **manually operated switch** by authorized person	The City of Regina interprets this to be one central switch for all electromagnetic locks in the building to be released or reset

		simultaneously. See Appendix A-3.4.6.16.(5) for more details. The City of Regina interprets that manual reset with the switch is required upon this release.
Clause (e)	Electromagnetic locks shall release within **15 seconds** after force is applied to the door opening hardware and no re-locking is permitted until door opens	The City of Regina interprets this release requirement to be specific to the door being pushed. The City of Regina interprets that manual reset with the switch mentioned in Clause (d) is required upon this release.
Clause (f)	Manual reset of electromagnetic locks is required after release, by use of the switch accessible only to authorized persons	The City of Regina interprets this to be one central switch for all electromagnetic locks in the building to be released or reset simultaneously. See Appendix A-3.4.6.16.(5) for more details. This manual reset with the switch is required when the locks are released due to fire alarm signal, loss of power, activation of the manual switch, the 15 second release process, or activation of the pull station serving emergency crossover doors. The City of Regina interprets that one additional releasing device is permitted for electromagnetic locks to allow authorized users to pass through the door (e.g. keypad or card swipe, etc.) and that manual reset upon release of the lock by this device is not required. The door must continue to meet all Code requirements for electromagnetic locks, and this additional releasing device is

		considered an additional feature that shall not negatively impact the proper functionality of the door. This allowance for an additional releasing device is permitted by the City of Regina for Sentence (5), similar to how it is permitted by Code for Sentence (6) as described in A-3.4.6.16.(6)
Clause (g)	Visual signage to be provided with instructions for 15 second unlocking procedure. This sign shall be mounted on the door. Note that this signage must comply with Sentence 3.8.3.9.(1) (which points to CSA B651). Pictures are provided in the Note A-3.8.3.9.(1) and (2).	
Clause (h)	Tactile signage to be provided with instructions for 15 second unlocking procedure. This sign shall be mounted near the door. Note that this signage must comply with Sentence 3.8.3.9.(2) (which points to CSA B651). Pictures are provided in the Note A-3.8.3.9.(1) and (2).	
Clause (i)	If there is more than one door with an electromagnetic lock in a path of egress, the total time delay cannot exceed 15 seconds	
Clause (j)	If a bypass switch is installed for testing the fire alarm system, activation of this switch allows for the electromagnetic lock to remain locked even when an *alarm signal* is issued by the fire alarm panel, BUT while this switch is activated, the fire alarm annunciator and monitoring station	This is a relaxation to allow for testing of the fire alarm system, where the door(s) need to remain locked for operational purposes. While the testing is occurring, a visual and audible signal shall be occurring, so that when testing is complete the switch will be de-

	shall have an audible and visual signal to indicate that it is in testing mode.	activated to return the door(s) to proper function.
Clause (k)	Emergency lighting to illuminate the door and signage	
Clause (l)	If the electromagnetic locks are on the exit stairway side of doors used for emergency crossover floors, the lock must release immediately upon activation of a fire alarm pull station located in the *exit* beside the door. Signage shall be provided with instructions on the *exit* side. Visual signage must be mounted on the door (viewed from the exit-side), complying with Sentence 3.8.3.9.(1). Tactile signage must be mounted near the door (felt from the exit-side), complying with Sentence 3.8.3.9.(2).	The City of Regina interprets that this is a red pull station connected to the fire alarm system and functioning the same as any other fire alarm pull station, in addition to immediately releasing the door it serves (Note that with a 2-stage fire alarm system, an *alert signal* would not release all magnetic locks in the building, but the pull station serving the emergency crossover door must release the door it serves immediately upon activation.) The City of Regina interprets that manual reset with the switch mentioned in Clause (d) is required upon this release.

*** Note:** if an electromagnetic lock is used on a fire door, special care is needed in the design, as fire doors must positively latch, as required by Article 3.1.8.15. A fire door must be capable of latching at all times. An electromagnetic lock alone does not satisfy this requirement.

Sentence 3.4.6.16.(6) Key Points

All of the requirements listed below must be met for electromagnetic locks to be compliant with Code. The City of Regina has provided comments and interpretations in the table as well.

NBC Reference	Summary of Requirement	City of Regina Comments
Sentence (6)	Doors with electromagnetic locks conforming to this Sentence are permitted **only for Group B, Division 2 and 3 *occupancies***	This Sentence provides for additional security in B-2 and B-3 occupancies while also providing an adequate level of safety for occupants. These occupancies may choose to use Sentence 3.4.6.16.(5), if desired, instead
Sentence (6)	The electromagnetic lock shall not incorporate latches, pins or other	Latches, pins, etc. create a potential risk for jamming or may

	similar devices to keep the door in the closed position	prevent the door from releasing properly in an emergency situation. They are not permitted. Electromagnetic locks must "fail safe".
Clause (a)	The building must be equipped with a fire alarm system and must be sprinklered	
Subclause (b)(i)	Electromagnetic locks shall release upon ***alarm signal*** from fire alarm system	Note that an *alert signal* in a 2-stage fire alarm system does not require release. The City of Regina interprets that manual reset with the switch mentioned in Subclause (b)(iii) is required upon this release.
Subclause (b)(ii)	Electromagnetic locks shall release upon **loss of power** controlling the locks	The City of Regina interprets that backup power is permitted for electromagnetic locks, as long as the doors continue to function as Code requires. If backup power is served by a backup generator, the transfer time must not be greater than 15 seconds (if longer than 15 seconds, then all maglocks must release) The City of Regina interprets that manual reset with the switch mentioned in Subclause (b)(iii) is required upon this release.
Subclause (b)(iii)	Electromagnetic locks shall release upon **activation of a switch** by authorized persons from a constantly attended location within the locked space	The City of Regina interprets this to be one central switch for all electromagnetic locks serving the locked space to be released or reset simultaneously. The City of Regina interprets that manual reset with the switch is required upon this release.
Subclause (b)(iv)	Each door controlled by an electromagnetic lock shall have a fire	The City of Regina interprets that this is a red pull station connected

	alarm **manual pull station within 0.5 m of the door**, and the door must release immediately upon actuation of the pull station serving that door.	to the fire alarm system and functioning the same as any other fire alarm pull station, in addition to having an auxiliary contact that immediately releases the door it serves (Note that with a 2-stage fire alarm system, an *alert signal* would not release all magnetic locks in the building, but the pull station serving this door must release the door immediately upon activation.) Appendix A-3.4.6.16.(6) permits the use of a transparent box over the pull station, equipped with an alarm, to reduce false alarms. The City of Regina interprets that manual reset with the switch mentioned in Subclause (b)(iii) is required upon this release.
Clause (c)	Upon release, electromagnetic locks must be manually reset by the switch in Subclause (b)(iii)	This manual reset with the switch is required when the locks are released due to fire alarm signal, loss of power, activation of the manual switch, or activation of the pull station that releases a door. The City of Regina interprets that one additional releasing device is permitted for electromagnetic locks to allow authorized users to pass through the door (e.g. keypad or card swipe, etc.) and that manual reset upon release of the lock by this device is not required. The door must continue to meet all Code requirements for electromagnetic locks, and this additional releasing device is considered an additional feature

		that shall not negatively impact the proper functionality of the door. This allowance is permitted by Code as described in A-3.4.6.16.(6)
Clause (d)	A visual sign must be provided on each door controlled by an electromagnetic lock, indicating the door will unlock when fire alarm activated Note that this signage must comply with Sentence 3.8.3.9.(1) (which points to CSA B651). Pictures are provided in the Note A-3.8.3.9.(1) and (2).	
Clause (e)	A tactile sign must be provided near each door controlled by an electromagnetic lock, indicating the door will unlock when fire alarm activated Note that this signage must comply with Sentence 3.8.3.9.(2) (which points to CSA B651). Pictures are provided in the Note A-3.8.3.9.(1) and (2).	
Clause (f)	If a bypass switch is installed for testing the fire alarm system, activation of this switch allows for the electromagnetic lock to remain locked even when an *alarm signal* is issued by the fire alarm panel, BUT while this switch is activated, the fire alarm annunciator and monitoring station shall have an audible and visual signal to indicate that it is in testing mode.	This is a relaxation to allow for testing of the fire alarm system, where the door needs to remain locked for operational purposes. While the testing is occurring, a visual and audible signal shall be occurring, so that when testing is complete the switch will be de-activated to return the door to proper function.
Clause (g)	Emergency lighting to illuminate the door and signage	

*** Note:** if an electromagnetic lock is used on a fire door, special care is needed in the design, as fire doors must positively latch, as required by Article 3.1.8.15. A fire door must be capable of latching at all times. An electromagnetic lock alone does not satisfy this requirement.

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Question

Can an electric strike be used (instead of an electromagnetic lock) to restrict egress if it provides all the same functions as required for electromagnetic locks?

Answer

No. Electric strikes cannot be substituted for electromagnetic locks where electromagnetic locks are required. This is because electric strikes do not pass the requirement to "not incorporate latches, pins, or other similar devices to keep the door in the closes position". If restricted egress/exiting is desired, electromagnetic locks meeting all requirements must be used.

Note: exceptions apply for designs under Article 3.4.6.17 for the security of banks and mercantile uses, or Sentence 3.3.1.13.(6) and 3.4.6.16.(1) for a *contained use area* or an *impeded egress zone*, which are not being covered in this advisory.

Question

Can an electric strike be used to restrict access to individual rooms, offices or suites or portions of *floor area*?

Answer

Depending on the design. If the individual room, office, or *floor area* does not have an *exit* on the other side of the locked door, then the path into that space would not be considered an *access to exit*. Therefore, this door can be locked with an electric strike to prevent unauthorized entry (similar to how locking this door with a normal key would be permitted). However, from within that space, a person must be able to egress through that door on the way to an *exit* with no special tools/knowledge, not more than one releasing operation, and must be able to operate the hardware with one hand in a closed-fist, etc.

However, if an *exit* exists beyond the locked door, this could be considered a potential *access to exit* and an electric strike would not be permitted (similar to how locking this door with a normal key would not be permitted). If a designer determines that adequate exiting is provided to meet Code, even with such a door locked, this design would have to be submitted and evaluated under an Alternative Solution or written proposal, depending on the complexity of the design.

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Question

Can an electric strike be used to restrict access from an exit stairway (or exterior of a building) into a *floor area*?

Answer

Many building owners/occupants wish to maintain a level of security by restricting access to certain floors. With proper design, this can be accomplished by using electric strikes that prevent unauthorized persons from entering the *floor area* from the *exit* stairway (or by installing electric strikes on exterior doors to prevent a person from entering from outside). HOWEVER, when electric strikes are installed to prevent unauthorized entry from the *exit* stairway to a *floor area*, the professional designer must ensure that the requirements of Article 3.4.6.18 for emergency crossover floors are not compromised. Storeys that are required to meet emergency crossover floor requirements, must use electromagnetic locks meeting all requirements (or nonlocking door hardware meeting the basic requirements). Whenever an electric strike is used, it must ONLY be used to restrict entry and may NOT be used to restrict egress. Except where electromagnetic locks are being utilized, egress and exiting must require no special tools/knowledge, not more than one releasing operation, and a user must be able to operate the hardware with one hand in a closed-fist, etc. Finally, fire doors are required to positively latch. Therefore, designers must also ensure that if electric strikes are used on fire doors, that they 'fail secure' to maintain positive latching, while not negatively impacting egress requirements.

Note: again, exceptions exist for designs that fall under Article 3.4.6.17 for the security of banks and mercantile uses, or Sentences 3.3.1.13.(6) and 3.4.6.16.(1) for a *contained use area* or an *impeded egress zone*, which are not being covered in this advisory.

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