

BULLETIN 2000-013-BU/EL

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## LOCKS ON EGRESS AND EXIT DOORS

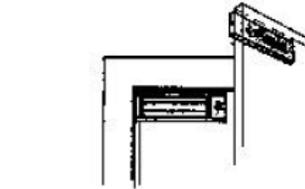
(With emphasis on electromechanical and electromagnetic hardware)

With an increase in the use of electrified door locking hardware over the years, this Bulletin clarifies the complex code issues involved with locks on egress and exit doors and itemizes what is acceptable.

### Terminology

**Electromechanical locking devices** are devices which use an electromagnetic field to control a mechanical component. Examples include electric strikes, electric mortise locks, and electrified lever or knob sets.

An “**electromagnetic lock**”, herein called “**mag lock**” for ease of recognition, has an electromagnet body and an armature plate which are held together by an electromagnetic force *only*. There are no moving parts. (The armature plate is the plate usually mounted on the door. A mag lock is not an electromechanical device.)



*Mag Lock*

A **strikeplate** is a plate on a door frame with a cut-out that receives the door’s latch when the door is closed.

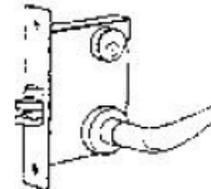
An **electric strike** is an electromechanical strikeplate in which one side can be electrically released such that it does not retain the latch in the door frame. If the door is pushed against a released electric strike, the keeper (or lip) part of the strikeplate folds back and allows the door to open.



*Electric Strike*

**Mortise** means fully recessed. A mortised device is flush mounted or concealed.

An **electric mortise lock** is a recessed lock that electromechanically disables or enables the levers/knobs from retracting the latchbolt.



*Electric Mortise Lock*

An **electric bolt** is an electromechanical deadbolt, latchbolt, pin or other similar device which retracts or extends electromechanically to keep a door in a closed position.

### Permit Application Requirements

A building permit and an electrical permit are required for all electromechanical locks and/or mag locks on doors. Three sets of floor plans showing door locations, which side is the locked side (i.e. the restricted access side), and, in existing conditions, the method of compliance with Section 3 below, "Listing Maintained", shall be included with the Building Permit Application. When applicable, confirmation from door manufacturer(s) shall also be included with the Building Permit Application.

### Installation Requirements

The requirements in the following "Detailed Pages" shall be complied with (i.e. unrestricted exiting, latching maintained, listing maintained, unrestricted access to designated protected areas, and authorized access for the Fire Department). Below is a simplified summary.

For all locking devices,

1. LOCKS SHALL NOT RESTRICT EGRESS BUT MAY RESTRICT ACCESS.
2. Assemblies shall be labelled AFTER preparation for hardware in fire rated door assemblies.
3. Keys/cards shall be placed in the Fire Department lock box.

Note: locks which do not restrict egress may remain locked upon fire alarm or power failure (i.e. not mag locks).

- **Electric strikes** are permitted where there is no fire separation and, under the following conditions, are permitted in fire separations. In fire separations, electric strikes must fail-secure (be in a fixed position around the latch) and shall not be capable of being disabled over periods in a day.
- **Mag locks** are permitted (and may temporarily restrict egress as per the Building By-law). They must be installed in accordance with the Building By-law. [Note: in a fire separation, a latch and strike are required on a door.]
- Certain **electric mortise locks** and other electromechanical devices which only affect the access side door handle and which use only mechanical means to control the latchbolt are acceptable (there is no deadbolt on electric mortise locks). The latchbolt and the egress side handle shall *not* be controlled electromechanically.
- **Electric bolts** and similar devices are NOT permitted since they can restrict egress if they fail electrically.

Refer to the following "Detailed Pages" for further information.

(Original signed by)

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Attachment

## Detailed Requirements

There are five underlying objectives which all must be satisfied for the acceptance of locking devices. They are as follows. Note: prescriptive examples are listed after each objective to illuminate the intent. (Note that references to the Vancouver Building By-law are within Division B)

### 1. Unrestricted Exiting

(A) In the direction of egress and exit travel, doors are NOT permitted to be locked.

#### Exceptions:

- a) Mechanical locks (standard hardware) are permitted subject to the following: they must “permit the door to be readily opened from the inside with not more than one releasing operation and without requiring keys, special devices or specialized knowledge of the door opening mechanism.”
- b) Note that “one releasing operation” is not a requirement for: (i) Part 9 Buildings [Sentence 9.9.6.7.(1)] and (ii) all dwelling units [Sentences 3.3.1.13.(2) & (3)].
- c) mag locks installed on any egress or exit door shall be in conformance with Article 3.4.6.16.
- d) doors that serve banks or retail mercantile floor areas in fully sprinklered buildings (and only during the times these floor areas are not open to the public) [see details in Article 3.4.6.16.]
- e) doors to rooms where persons are under legal restraint [Article 3.3.1.13.(2)]
- f) Note: except for rooms for legal restraint, none of the exceptions to (A) are for electromechanical locks since these locks may restrict egress if they fail. Electromechanical locks are not permitted in the egress travel direction.

(B) In the direction of access travel, doors are permitted to be locked but these locks must not restrict egress or exiting.

In summary, freedom to egress and exit is required at all times from everywhere in a building out to a “protected, exterior open space” or public thoroughfare, whether the locks fail locked or unlocked.

- If a door divides a floor area and egress is required in both directions through the door, “unrestricted exiting” is required in both directions.
- From elevator lobbies, unrestricted access to one exit must be provided at all times (Bulletin 2000-009-BU).
- Electromechanical devices which affect only the access side door handle and maintain a positive latch even when unlocked (such as some electric mortise locks) are acceptable.
- Electric strikes used to restrict access are considered to not restrict egress provided a mechanical release for the door is installed on the egress side (i.e., a door handle which releases the latch).
- An electric bolt into a solid latch is not permitted under any circumstance since it may fail locked in a position which stops egress.

### 2. Latching Maintained

In fire separations, a positive latch is required to hold the door in the closed position after each use [Article 3.1.8.13.].

- Most exterior doors are not in fire separations and thus do not require a latch. A rule of thumb for identifying fire separations in existing situations is if there is a closer on a door; the door is in a fire separation (and thus requires a latch).

- In fire separations, access control systems and time clocks are not permitted to leave an electric strike disabled over periods in a day such that the latch is not held secure.
- Under all failure situations, an electric strike must fail-secure in a way that leaves the door latched. Example failure situations are power failure, defective wiring, etc.

### 3. Door, Frame and Hardware Listing Maintained

In fire separations which have a fire-resistance rating, all parts of a closure must be labelled and must maintain their listings (e.g., door, door frame and hardware) [Sentence 3.1.8.4.(2)].

- The door, frame and hardware shall be listed for use with each other and shall be installed in conformance with their listing.
- A manufacturer's stamp on a door or frame does not confirm fire rating under the Building By-law. A label from an accepted product testing and certification agency is required on the door and frame AFTER they are machined for the hardware (i.e. "prepared" for the hardware). (Note that the requirement for preparation to be under the label's service is from Item 1-3.4, NFPA 80. Chapter 1 from NFPA 80 is now part of the Vancouver Building By-law.
- Defective door assemblies (e.g., vandalism, misalignment, wear and tear, etc.) shall be repaired/replaced in accordance with this Bulletin and the Vancouver Building By-law. The owner *and* the constructor/contractor are both responsible to assure that no unsafe condition is left
- For preparation of **new** fire rated assemblies, the labelling occurs prior to the door and frame arriving on site.
- For preparation of **existing** fire rated doors and frames, the existing assembly shall be replaced with a new assembly (which is prepared and labelled before coming to the site) OR written confirmation shall be provided to the City of Vancouver from the fire door's manufacturer stating that the specifically named hardware installed per the manufacturer's instructions will not void the door's and/or the frame's label OR the assembly may be relabelled by a recognized product testing and certification agency. If one wishes to ship the existing assembly off site to a location which is under the label's service for preparation (i.e. to the manufacturer's location or to a machinist's or pre-hanger's shop who is licensed to apply labels), the existing fire separation must be maintained while the assembly is away.

#### Exceptions:

- a) Note that if the new hardware does not require any drilling/cutting/alteration to the existing frame or door, the respective frame or door is not required to be relabelled. Of course, the hardware must be listed for use in the door assembly (for example, listed for wood doors if used on wood doors and have the specific required fire rating).
  - b) If the preparations are within those permitted as "job site preparation" in NFPA 80 (noted below) and written confirmation from the fire door's manufacturer is provided to the City of Vancouver stating that the specifically named hardware installed per the manufacturer's instructions will not void the label, the assembly is not required to be relabelled.
- Preparation that is permitted on-site for fire rated door assemblies is only for assemblies intended to receive this preparation (hence the requirement for written confirmation from the door manufacturer for existing doors and frames) and is only as follows:

*Job site preparation is permitted for surface-applied hardware, function holes for mortise locks (for the door handles and key receptacle), holes for labelled viewers, undercutting of wood and composite doors to a maximum of 3/4", and installation of protection plates (the top of which shall be a maximum of 16"*

above the bottom of the door). Preparation means round holes drilled through one or both faces of the door. The holes may not exceed 1 inch in diameter except for the holes for cylinders.

This means that, with written confirmation from the door manufacturer, surface applied mag locks may be installed on site without relabelling but recessed mag locks (or any other recessed hardware or other devices named in NFPA 80) shall have their preparation work done at a location which is under the label's service.

#### 4. Access to and through Cross-over Floors (and into Areas of Refuge)

Electromechanical locking devices are NOT permitted where emergency access for occupants is required into floor areas [i.e. unrestricted access is required into and out of "cross-over floors" (in buildings over six storeys) as per Article 3.4.6.18., portions of floor areas designated as *areas of refuge*, and protected floor spaces as per Article 3.2.8.6.]

Alternative approaches may be considered under equivalency submission.

- These access doors shall not be locked in either direction.

#### 5. Fire Department Access

Access is required for the Fire Department into all buildings under fire alarm and non-fire alarm conditions.

- The Fire Department requires the following in their lock box, as required by the Vancouver Fire By-law (the lock box is to be located at the principle entrance of the building or at each Fire Department response point if there is more than one principle entrance)
- Two (or more if required) master keys, each which release *all the* mechanically released *locks*, and
- Two (or more if required) master electronic keys/cards, each which release *all the* electric *locks* and strikes.
- The term "*all the ... locks*" in the last two sentences refers to the main entrance door, which is required to be unlockable by a mechanical release key, all exit doors which provide access to a floor area<sup>i</sup>, roof access doors, and doors to all the common areas including services rooms. Unless specifically required by the Authority Having Jurisdiction or mutually agreed upon by the owner and the Fire Department, keys to high security areas and personal suites shall not be provided. Where no key is supplied, the Fire Department may force entry in an emergency situation.
- Note: if there is an existing lock box, it may need to be replaced with a larger one to fit the electronic cards. To reduce vandalism, the Fire Department requires lock boxes to be recessed such that they are flush mounted.

#### Other Hardware Considerations

Other things to consider when designing the door hardware are:

- a. panic hardware requirements [Sentences 3.4.6.16.(2) & 3.3.2.7.]. Note that panic hardware in rated fire separations is required to be labelled as fire exit hardware and not just labelled as panic hardware (Item 2-8.2.2, NFPA 80).
- b. the required direction of the door swing

- c. no automatic locking devices on doors between residential suites and public corridors [Sentences 3.3.4.5.(1) and 9.9.6.7.(4)],
- d. accessibility of the door opening hardware for persons with disabilities [Clause 3.3.1.13.(10)(c)],
- e. at all pedestrian entrances to residential parking garages with 20 or more parking stalls, security doors shall be provided (i.e. doors locked or otherwise inoperable by unauthorized users from the access side) [4.12.5, Parking By-law No.6059]. Note that doors which are provided for Fire Department access (authorized users) shall be openable by key from the outside.
- f. turnpieces which release a locking bolt on a building=s main entrance door or on exit doors shall release the bolt with not more than a 90 degree turn.

Footnotes:

1. Exceptions are noted under “Exceptions” in “Unrestricted Exiting” on page 3/6.
2. The requirement for a positive latch applies to all fire separations including non-rated fire separations as per the explanatory note in Sentence A-3.1.8.1.(2). There are exceptions for particular occupancies where the code specifically waives latches under certain conditions [i.e., roller latches in hospitals and nursing homes: Sentence 3.3.3.5.(12)]. If the latch requirement is exempted, an electromechanical device is not required to maintain a positive latch.
3. Examples of exterior doors which *are* considered to be in fire separations are those which expose an exit route or are not part of the permitted unprotected openings in a spatial separation exposure. Such doors require latching, their listings to be maintained, etc.
4. All fire doors are required to have a self-closing device (i.e. a closer). Thus, typically “a closer means there is a fire separation” (and, a closer means the door requires a latch). An exception to using the closer as a guide is typically a washroom door. A washroom door is required to have a closer for health reasons but may *not* be in a fire separation. Other exceptional situations are noted in 3.1.8.11.(2) (i.e. institutional corridors, some classroom corridors and some office corridors) where a closer may be exempt but the door *is* in a fire separation. Even if the closer is exempt, a positive latch and strike are still required in all cases when the door is in a fire separation.
5. To provide Fire Department access into locked exit doors without providing keys, one may install a wired glass panel within 300 mm of the door opening hardware as per Sentence 3.2.5.1.(4). Note, if the glass panel is installed in a required fire rated door, the panel must be installed in accordance with Part 3 of this Bulletin (i.e. the panel may *not* be installed on site).