Emergency Lighting Battery Units and Remote Heads

Inspection, Testing and Maintenance Guide

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⚠ DISCLAIMER

This guide is general technical guidance prepared by Arani Systems Corp., to the best of our knowledge, from the Canadian codes listed in Section 9. It is not engineering or legal advice, and it does not replace the adopted code text or the requirements of the authority having jurisdiction. Codes and local amendments change and vary by province, territory and municipality. The reader is responsible for verifying all requirements with a qualified engineer, the authority having jurisdiction or other competent professional. Arani Systems Corp. accepts no liability for any loss, damage or non-compliance arising from the use of this information.

1. Purpose and scope

Emergency lighting is a life-safety system. It illuminates exits and egress routes so that occupants can evacuate safely in the event of a fire or other hazard. This guide sets out the inspection, testing and maintenance requirements for self-contained battery emergency lighting units and the remote heads they supply.

- **Covered:** self-contained battery emergency lighting units with integral lamp heads, battery units supplying remote heads, and battery-backed exit signs.
- **Not covered:** emergency power supplied by generators, central battery and inverter systems, and emergency lighting in health care facilities, which are subject to separate requirements.
- **Basis:** National Building Code of Canada (NBC), National Fire Code of Canada (NFC), Canadian Electrical Code, Part I (CE Code) and CSA C22.2 No. 141, Emergency lighting equipment. Self-contained emergency lighting units shall conform to CSA C22.2 No. 141 (NBC 3.2.7.4.(2)).
- **Code editions:** the articles cited apply to both the 2020 and 2025 editions of the NBC and NFC, with the same article numbers and requirements; the quoted wording is from the 2025 editions. Each province and territory adopts these editions on its own schedule; verify the edition in force in the jurisdiction. Where a provincial, territorial or municipal code applies, its text governs.
- **Personnel:** inspection and testing shall be performed by qualified personnel; electrical work shall be performed by a licensed electrician.

NBC and NFC wording is quoted in block quotes with the article number.

2. Required duration of emergency lighting

The emergency power supply shall carry the full connected load, including remote heads, for the duration required by NBC Article 3.2.7.4. This duration is the design criterion for the annual test (Section 5).

> **NBC 3.2.7.4.(1)** An emergency power supply shall be ... b) so designed and installed that upon failure of the regular power it will assume the electrical load automatically for a period of ... ii) 1 h for a building of Group B major occupancy classification that is not within the scope of Subsection 3.2.6., iii) 1 h for a building constructed in accordance with Article 3.2.2.51. or 3.2.2.60., and iv) 30 min for a building of any other occupancy.

> **NBC 9.9.12.3.(3)** [emergency lighting] ... designed to be automatically actuated for a period of at least 30 min when the electric lighting in the affected area is interrupted.

Building classification	Minimum duration
Group B major occupancy not within the scope of NBC Subsection 3.2.6	1 h
Building constructed in accordance with NBC Article 3.2.2.51 or 3.2.2.60	1 h
Any other Part 3 building	30 min
Part 9 building	30 min
Building within the scope of NBC Subsection 3.2.6	Refer to NBC Clause 3.2.7.4.(1)(b)(i)

The rated duration marked on the unit shall not be less than the duration required for the building.

3. Installation requirements affecting battery performance

The following rules of the CE Code, Section 46, apply to unit equipment and remote heads. The CE Code is a copyrighted CSA Group publication; the rules are identified below and shall be read in full in the edition adopted in the jurisdiction.

CE Code rule	Subject	Requirement
46-106 1)	Arrangement of lamps	Failure of any one lamp shall not leave the area it normally illuminates in total darkness
46-304 4)	Supply connections	Unit equipment shall be automatically actuated upon failure of the supply to the normal lighting in the area it covers
46-306 1)	Remote lamps: voltage drop	Conductor size to remote lamps shall limit voltage drop to 5% of the unit's marked output voltage, or to the value for which the unit is certified with that remote lamp
46-306 2)	Remote lamps: suitability	Remote lamps shall be suitable for remote connection and included in the list of lamps provided with the unit
46-306 3)	Remote lamps: load	Total lamp load shall not exceed the watts output rating marked on the unit for the emergency period required by the NBC

After remote heads are added, relocated or replaced, verify the total load against the unit rating and perform a full-duration test (Section 5).

4. Monthly inspection and test

Requirement: inspect and test each unit at intervals not greater than one month.

NFC 6.5.1.6.(1) Self-contained emergency lighting unit equipment shall be inspected at intervals not greater than one month to ensure that (a) pilot lights are functioning and not obviously damaged or obstructed, (b) the terminal connections are clean, free of corrosion and lubricated when necessary, (c) the terminal clamps are clean and tight as per manufacturer's specifications, and (d) the battery surface is kept clean and dry.

NFC 6.5.1.6.(2) Self-contained emergency lighting unit equipment shall be tested (a) at intervals not greater than one month to ensure that the emergency lights will function upon failure of the primary power supply, ...

NFC 6.5.1.8.(2) Exit signs provided with a battery back-up shall be inspected at intervals (a) not greater than one month to ensure the exit signs will be visible upon failure of the primary power supply, ...

Monthly procedure

1. Confirm the charging (AC) pilot light is on and that the unit and its heads are not damaged or blocked.
2. With power isolated as required for safe access, check that the battery terminal connections are clean and free of corrosion and that the terminal clamps are tight.
3. Check that the battery surface is clean and dry. Swelling, leakage or corrosion is a deficiency to correct.
4. Simulate a power failure by pressing and holding the test switch, or by switching off the normal supply to the unit.
5. Confirm that every lamp lights, including every remote head connected to the unit, and that battery-backed exit signs stay visible.
6. Restore normal power and confirm the pilot light shows the unit is charging again.
7. Record the result (Section 6).

Holding the test for 30 seconds is common practice.

5. Annual full-duration test and charging check

Requirement: at intervals not greater than 12 months, operate each unit on battery for the full design duration (Section 2), then verify the charging system.

NFC 6.5.1.6.(2) Self-contained emergency lighting unit equipment shall be tested ... (b) at intervals not greater than 12 months to ensure that the unit will provide emergency lighting for a duration equal to the design criterion under simulated power failure conditions.

NFC 6.5.1.6.(3) After completion of the test required in Clause (2)(b), the charging conditions for voltage and current and the recovery period shall be tested to ensure that the charging system is functioning in accordance with the manufacturer's specifications.

NFC 6.5.1.8.(2) Exit signs provided with a battery back-up shall be inspected at intervals ... (b) not greater than 12 months to ensure the exit signs will be visible for a duration equal to the design criterion upon failure of the primary power supply.

NFC 6.5.1.7.(1) Except as provided in Article 6.5.1.6., emergency lights shall be inspected at intervals not greater than 12 months to ensure that they are functional.

Annual procedure

1. Verify that the battery is fully charged before the test (normal power on for at least the recharge time stated in the product documentation).
2. Simulate a power failure with all on-unit and remote heads connected.
3. Maintain the unit on battery for the full design duration: 30 min, 1 h or more, according to the building classification (Section 2).
4. Throughout the test, check that every lamp stays lit. Note any head that dims or goes out before the end.
5. Restore normal power. Measure the charging voltage and charging current and compare them with the values in the product documentation.
6. Confirm the battery recharges within the recharge time stated in the product documentation.
7. Record the results (Section 6). Any failure in steps 4 to 6 is a deficiency to correct (Section 7).

The building has reduced emergency lighting until the batteries recharge. Schedule the annual test when the area is unoccupied, or when other emergency lighting covers the exit path.

6. Posted instructions, battery condition and records

- **Posted instructions:** CE Code Rule 46-102 requires complete instructions for the operation and care of unit equipment, specifying testing at least once every month, to be posted on the premises in a frame under glass.
- **Battery condition:** CE Code Rule 46-104 requires batteries used as an emergency power source to be kept in proper condition and fully charged at all times.
- **Records:** a written record of each monthly and annual inspection and test, its result and any corrective action shall be kept and made available for review by the authority having jurisdiction.

The templates below follow the inspection items of NFC Article 6.5.1.6 and the fields used on municipal fire department inspection records (for example, the Winnipeg Fire Department Annual Emergency Unit Lighting Inspection Record).

Record header (complete for each inspection)

Field	Entry
Building name and address	
Inspection type (monthly / annual / other)	
Required duration for the building (min)	
Inspection date	
Technician name and company	
Signature	

Instructions for use and Templates A and B continue on the next page.

6. Record templates

Instructions for use

- Assign each unit and each battery-backed exit sign a unique number, and label it permanently on the equipment.
- For each remote head, record the number of the unit that supplies it.
- Record the electrical panel and circuit supplying each unit, and confirm that the unit is supplied from the same circuit as the normal lighting in the area it serves (CE Code Rule 46-304 4)).
- Enter P (pass) or F (fail) in each check column. Explain every F in the deficiencies column and record the corrective action and its date.

Template A: Monthly inspection and test log

Date	Unit no. / location	Panel / circuit	Same circuit as area lighting (Y/N)	Pilot light	Terminals and clamps	Battery surface	All heads lit on test	Battery replacement date	Deficiencies / corrective action	Initials

Template B: Annual full-duration test record

Date	Unit no. / location	Manufacturer / model	Unit lamps (qty)	Remote heads (qty)	Required duration (min)	Start voltage (V)	End voltage (V)	Duration achieved (min)	Charging V / A within spec	Recharge time within spec	Deficiencies / corrective action	Initials

Start and end voltage are battery terminal readings taken at the beginning and end of the duration test. Measure at the battery terminals, not at the charger leads.

7. When to replace the battery

Replace the battery, or repair the unit, when any of the following conditions is found:

#	Condition found	Requirement not met
1	A lamp or remote head does not light, or goes out, on simulated power failure during the monthly test	NFC 6.5.1.6.(2)(a)
2	The unit does not keep all lamps lit for the full design duration (Section 2)	NFC 6.5.1.6.(2)(b); NBC 3.2.7.4.(1)
3	Charging voltage or current is outside the product documentation, or the battery does not recharge within the stated recharge time	NFC 6.5.1.6.(3)
4	The battery cannot be kept in proper condition or fully charged	Canadian Electrical Code, Rule 46-104
5	Terminal corrosion that cannot be cleaned, or a battery that is wet, leaking or swollen	NFC 6.5.1.6.(1)(b) to (d)
6	A battery-backed exit sign is not visible for the required duration	NFC 6.5.1.8.(2)(b)
7	Where the battery is marked with a replacement date, that date has been reached	Marked replacement date

Replace the battery only with the battery model specified on the unit marking. After replacement, charge the battery fully, perform a full-duration test (Section 5) and record the replacement (Section 6).

Typical service life (Arani Systems Corp. guidance, not a code requirement)

Battery life depends on battery type, room temperature and how often the battery is discharged. The ranges below reflect general industry practice and are planning figures for budgeting replacement; the test results and the marked replacement date decide when replacement is actually needed.

Battery type	Typical service life
Sealed lead-acid (SLA)	3 to 5 years
Nickel-cadmium (Ni-Cd)	5 to 7 years
Lithium (Li-ion / LiFePO4)	7 to 10 years

A worn battery can pass a short monthly test yet fail before the end of a 30-minute discharge. The annual full-duration test is the main check of battery health.

8. General service practices

- **Commissioning and after battery replacement:** keep the unit connected to its normal supply for at least 24 h, or for the charging time stated in the product specification sheet if longer, before performing the first function or duration test.
- **Planned shutdown of the normal supply:** before a planned shutdown of the normal supply (for example, during renovation or while a building is vacant), disconnect the battery to prevent deep discharge. After the supply is restored, reconnect the battery and recharge it for at least 24 h, or for the charging time stated in the product specification sheet if longer, before testing.
- **Supply circuit:** connect unit equipment to an unswitched circuit so the charger is energized at all times. A switched supply discharges the battery each time the circuit is turned off and prevents the battery from being kept fully charged (CE Code Rule 46-104).
- **Lamp heads and remote heads:** replace or add only the lamp heads and remote heads listed for the unit in its product specification sheet, at the specified voltage and wattage. A higher wattage shortens the runtime below the rated duration and may overload the unit; a lower wattage may not provide the required illumination.
- **Safety during servicing:** isolate the normal supply and disconnect the battery before opening or servicing the unit. When reconnecting, observe the battery polarity marked in the unit.
- **Spare batteries:** store spare batteries in a cool, dry location. Put new batteries into service, or charge them, before the date indicated on the packaging, and recharge stored batteries at the interval recommended by the battery manufacturer (typically not more than 6 months for sealed lead-acid batteries).
- **Disposal:** lead-acid and nickel-cadmium batteries shall not be discarded with general waste. Return them to a battery recycling program in accordance with provincial and municipal requirements.

9. References and limitations

Codes referenced

- National Research Council of Canada. National Building Code of Canada 2020 and 2025, Articles 3.2.7.4 and 9.9.12.3.
- National Research Council of Canada. National Fire Code of Canada 2020 and 2025, Articles 6.5.1.6, 6.5.1.7 and 6.5.1.8.
- CSA Group. CSA C22.1, Canadian Electrical Code, Part I, Section 46 (Rules 46-102, 46-104, 46-106, 46-304 and 46-306). Rules are identified and summarized, not reproduced; refer to the edition adopted in the jurisdiction for the exact text.
- CSA Group. CSA C22.2 No. 141, Emergency lighting equipment (product certification standard for emergency lighting units).
- Winnipeg Fire Department, Fire Prevention Branch. Annual Emergency Unit Lighting Inspection Record (record format reference for Section 6).

Limitations

- This guide summarizes code requirements for information only. Where a provincial, territorial or municipal code applies, its text governs.
- The authority having jurisdiction may require additional or different inspections, tests or records.
- The service-life ranges in Section 7 are Arani Systems Corp. guidance based on general industry practice. They are not taken from a code.

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