



LED Ceiling Lighting Design, Installation & Service

A New Brunswick visual field guide with worked problems, Code navigation, commissioning and apprentice exercises



Representative LED lighting equipment

Conceptual equipment-recognition visual. Verify actual Canadian certification marks, labels, ratings and manufacturer instructions on every project.

AUDIENCE	FIELD CASE	EDITION BASIS
Licensed electricians and registered apprentices	Eight 12 W canless wafers in a Saint John-region renovation	NB adoption of C22.1-24; verify current rules



1. GoRight purpose, scope and learning outcomes

This GoRight New Brunswick field guide establishes a structured learning and conformity process for LED ceiling-lighting work. Electricians and apprentices use it to classify the work, verify approvals, identify every conductor, establish and prove an electrically safe work condition, design the lighting outcome, document calculations, complete the installation, and commission the finished system.

SAFETY AND SCOPE Training use only. This guide is not authorization for unsupervised, energized or unpermitted work. Establish an electrically safe work condition, follow GoRight procedures, the current NB-adopted Code, permit conditions and exact manufacturer instructions.

GoRight mandatory field principles

Field principle	Required practice
Prove isolation	A non-contact indicator may support screening; it is not the sole proof of absence of voltage. Use an appropriate contact instrument, verify it before and after, test all relevant conductors, and control the disconnecting means.
Identify conductor function	Never infer function from colour alone. Identify supply, switched conductors, neutrals, reidentified conductors, multiwire circuits and the bonding path by drawings, circuit tracing and appropriate tests.
Make approved splices	Use an approved connector within its marked conductor range and exactly as instructed. Tape is not a substitute for a correct splice.
Maintain serviceability	Preserve required free conductor length, enclosure capacity and access. Correct the box or wiring method rather than crowding or concealing connections.
Verify mechanical support	Use the box, support and luminaire markings and instructions. Fan support and heavy-luminaire support are separate approval questions.
Classify LED retrofit work	NB classifies lamp replacements, approved retrofit kits and field-modified luminaires differently; re-approval and a permit may be required.

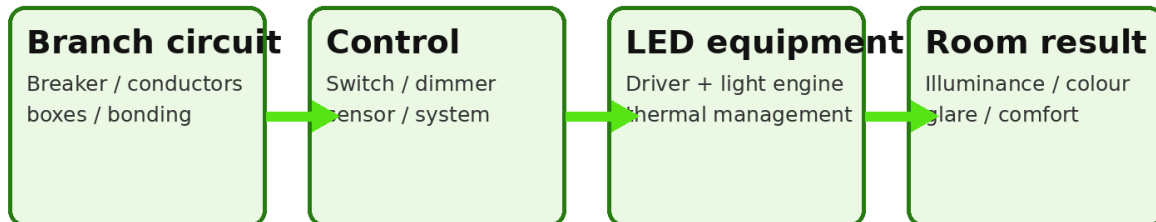
2. New Brunswick regulatory foundation

Authority / reference	Field meaning
NB Regulation 84-165	Adopts CSA C22.1-24, Canadian Electrical Code, Part I, 26th Edition, including errata and NB modifications.
CEC Sections 2 and 30	Approval, markings, instructions, luminaires and lighting equipment.
CEC Sections 4, 8, 10, 12 and 14	Conductors, loading/voltage drop, bonding, wiring methods, protection and control.
NB Bulletin 84-165-3-2	Classifies LED lamps and retrofit work; identifies when re-approval/field evaluation and a wiring permit are required.
NB Bulletin 4-1-0	Requires compatible devices or approved CU/AL pigtail connections when replacing luminaires/devices on aluminum wiring.
NB Regulation 91-191, ss. 286–287.3	Qualified-person, electrically safe work condition, isolation, lockout and absence-of-voltage duties.
NB wiring permits	A licensed electrical contractor obtains the required permit before construction; the published threshold includes work involving more than 10 outlets or 5 kW, subject to the actual project classification.
Manufacturer instructions	The installed product's Canadian instructions control cutout, clearances, location rating, dimmer compatibility, wiring, accessibility and labels.

CODE NAVIGATION Use the complete current NB-adopted Code, NB modifications, inspection bulletins, permit conditions, manufacturer instructions and inspector direction for every conformity decision. The section references in this guide are navigation aids for field study and job planning.

3. System picture and equipment recognition

LED ceiling-light system — design, supply, control and light



Every link must be approved, compatible, accessible as required, and installed to its inst

Figure 3-1 — Lighting is a system

A successful installation is not only “a light that turns on.” Supply, wiring, controls, driver, thermal conditions and the room outcome must all agree.

Component	Verify in the field
Luminaire / retrofit kit	Canadian approval, intended use, ceiling type, support, location rating, IC/AT/fire claims, CCT setting and instructions.
LED driver	Input voltage/frequency, output class, power factor, dimming protocol, temperature limits, accessibility and replacement method.
Dimmer / control	Exact compatibility list, LED watt/fixture-count limit, neutral requirement, phase type, minimum load, derating and multi-location wiring.
Box / enclosure	Approval, size/volume, support rating, bonding, cable entries, covers and accessibility.
Conductors / cable / raceway	Material, size, temperature rating, environment, support/protection and terminal compatibility.
Test instruments / LOTO	CAT rating, condition, known-source verification, correct function/range, lock and identification.

4. LED lighting fundamentals

Term	Plain-language meaning	Field consequence
Lumens (lm)	Total light output.	Compare light quantity, not “equivalent watts” alone.
Illuminance (lux)	Lumens arriving per square metre.	Design the room/task result; measure at the relevant work plane.
Efficacy (lm/W)	Useful light per electrical watt.	Higher can reduce energy, but glare, colour and life still matter.
CCT (K)	Warm/cool appearance.	Coordinate all fixtures and confirm selector position before closing ceiling.
CRI / colour quality	How faithfully colours appear.	Important in kitchens, retail, artwork and finish inspection.
Beam / distribution	Where the light goes.	Spacing and wall/cabinet brightness depend on optics and mounting height.
Flicker / dimming	Driver response over time/control range.	Check compatibility at low and high settings and on camera where relevant.
L70 / life	Projected time to a light-output threshold.	Not a guarantee that the driver or electronics will last that long.

DRIVER REALITY LEDs are electronic loads. Low steady-state watts do not eliminate inrush, power-factor, leakage-current, dimmer, harmonics or compatibility concerns—especially with many drivers.



5. Fixture types and selection

Type	Best use / advantage	Stop-and-verify item
Surface / flush mount	Existing approved ceiling outlet box; easy access.	Box support, canopy coverage, damp/wet rating and weight/support instructions.
Canless wafer	Shallow spaces and flexible layout.	Driver-box access, cable support, IC/AT/fire claims, vapour barrier and exact clearances.
Traditional recessed housing	Serviceable housing/trim architecture.	Housing/trim/lamp combination, insulation contact, remodel/new-work support and fire assembly.
Approved retrofit module	Converts a listed existing housing/luminaire as a complete kit.	Kit approval, exact compatible host, labels and instructions.
Lamp-only replacement	Lowest-intervention change when approved for application.	Ballast/socket/thermal/enclosure compatibility; no modifications.
Commercial panel/troffer	Uniform general lighting.	Support/seismic requirements, emergency circuit, controls, plenum and retrofit classification.

6. NB LED retrofit decision

NB LED retrofit classification — stop before modifying a luminaire

Drop-in LED lamp

No luminaire modification.
Lamp approved for the
ballast/socket application.
NB bulletin: no re-approval;
no wiring permit for this act.

Approved retrofit kit

Use complete approved kit.
Follow all instructions.
Apply supplied labels.
Do not use with shunted
bi-pin lampholders where barred.

Field-modified luminaire

No approved kit, ballast
bypass, line-voltage change,
or custom conversion.
Re-approval/field evaluation
and wiring permit required.

Classify the work from the actual product, modification and NB bulletin—not from appearance.

Figure 6-1 — Three paths under NB Bulletin 84-165-3-2

Do not call a ballast bypass or line-voltage rewiring a “bulb change.” The physical work performed controls the classification.

- ☐ Record the existing luminaire manufacturer/model and approval mark.
- ☐ Record the replacement lamp or kit model, approval and compatibility statements.
- ☐ Determine whether any ballast, lampholder, conductor or internal wiring is modified.
- ☐ For kits, install every supplied component and label exactly as instructed.
- ☐ Do not use retrofit kits in luminaires with shunted bi-pin lampholders where the bulletin/instructions prohibit it.
- ☐ If no approved kit is used, stop and coordinate re-approval/field evaluation and the required wiring permit.

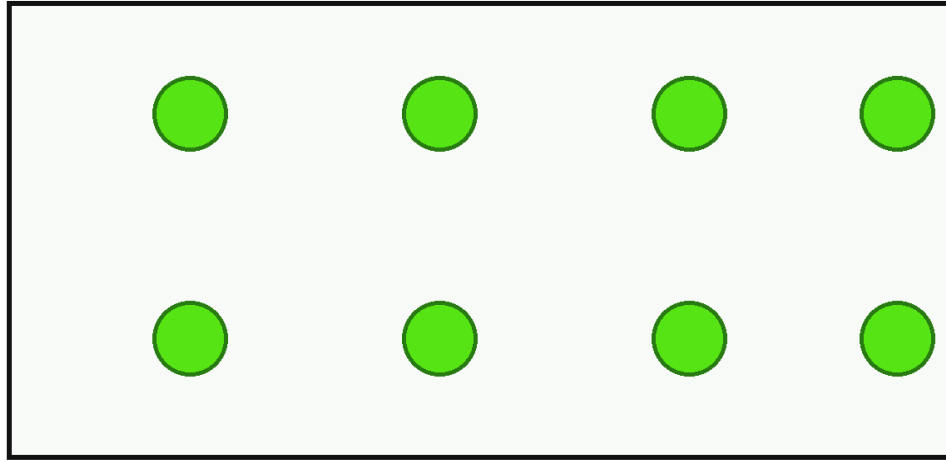


7. Representative NB field case

Item	Training value	Design implication
Site	Kitchen/living renovation, Saint John region	Residential NB jurisdiction; finished insulated ceiling.
Lighting	Eight 4-inch, 12 W, 120 V canless wafers	Total 96 W; exact IC, airtight, location and fire claims verified.
Control	One listed LED dimmer	Must be compatible with the exact fixture/driver and fixture count.
Circuit	Existing 15 A, 120 V lighting branch	Existing load, conductor, protection, AFCI/GFCI context and circuit condition assessed.
Route	25 m one-way to farthest luminaire	Voltage-drop and cable support/protection reviewed.
Ceiling	Insulated wood-frame assembly with vapour barrier	Coordinate penetrations, air sealing, driver access and any fire-resistance requirement.
Permit	Contractor classifies total project before work	Eight fixtures alone do not decide every renovation permit question; assess the full construction scope.

8. Lighting quantity and layout

Lighting layout exercise — eight wafers in a 5 m × 4 m room



Start with photometric intent; then coordinate joists, ductwork, cabinets, sightlines and controls.

Figure 8-1 — Concept layout

A neat grid is only a starting point. Use photometrics when the task, ceiling, finishes or client expectation warrants it.

Worked problem 1 — preliminary lumen method

Room area = 5 m × 4 m = 20 m²

Target average illuminance = 300 lux

Raw lumens at work plane = 300 × 20 = 6,000 lm

Assume utilization × maintenance factor = 0.70

Required fixture lumens ≈ 6,000 / 0.70 = 8,571 lm

Eight fixtures at 1,100 lm = 8,800 lm

Answer: The eight-fixture concept passes this preliminary lumen screen.

Plain-language explanation: Lux is lumens per square metre. Because not all fixture lumens reach or remain on the work plane, divide by a justified combined factor. This is not a substitute for manufacturer photometrics or task-specific design.

Code and standards reference: Lighting design practice; CEC Section 30 for installation; product photometric data.

LAYOUT COORDINATION Before cutting: locate joists, trusses, ducts, plumbing, cabinets, sprinklers, smoke alarms, speakers, vapour barrier, fire separations and driver access. Confirm appearance with the customer.



| NB LED CEILING LIGHTING FIELD LEARNING



9. Load, current and energy worked problems

Worked problem 2 — connected load current

$$8 \text{ fixtures} \times 12 \text{ W} = 96 \text{ W}$$

$$I = P / V = 96 / 120 = 0.80 \text{ A}$$

Answer: The eight luminaires draw 0.80 A at rated real power.

Plain-language explanation: LED lighting is low-wattage, but use nameplate input and consider the complete existing circuit.

Code and standards reference: CEC Sections 8, 14 and 30; product nameplate.

Worked problem 3 — apparent power and power factor

$$\text{Real power } P = 96 \text{ W}$$

$$\text{Assumed power factor } PF = 0.90$$

$$\text{Apparent power } S = P / PF = 106.7 \text{ VA}$$

$$\text{Current} \approx S / V = 106.7 / 120 = 0.89 \text{ A}$$

Answer: The source current seen is about 0.89 A under the stated PF assumption.

Plain-language explanation: Drivers can draw more RMS current than P/V suggests. Use actual product data; this exercise illustrates why watts alone do not describe an electronic load.

Code and standards reference: Product electrical data; CEC circuit-loading review.

Worked problem 4 — energy reduction

$$\text{Previous: } 8 \times 60 \text{ W} = 480 \text{ W}$$

$$\text{New: } 8 \times 12 \text{ W} = 96 \text{ W}$$

$$\text{Reduction} = 384 \text{ W} = 0.384 \text{ kW}$$

$$\text{Use: } 4 \text{ h/day} \times 365 = 1,460 \text{ h/year}$$

$$\text{Annual energy avoided} = 0.384 \times 1,460 = 560.6 \text{ kWh/year}$$

Answer: Approximately 561 kWh/year avoided at the stated use.

Plain-language explanation: Multiply the power difference in kilowatts by annual hours. Cost savings require the customer's actual marginal energy rate; do not promise a generic dollar result.

Code and standards reference: Energy equation; utility tariff/customer bill for cost estimate.



10. Voltage drop and existing-circuit screen

Worked problem 5 — voltage drop to farthest light

One-way length = 25 m = 0.025 km

Loop length = 0.050 km

Exercise conductor resistance = 13.2 Ω /km

Rloop = 0.050 $\times$ 13.2 = 0.66 Ω

Vdrop = 0.89 $\times$ 0.66 = 0.59 V

Percent = 0.59 / 120 $\times$ 100 = 0.49%

Answer: About 0.6 V or 0.5% for the new lighting load using the stated resistance assumption.

Plain-language explanation: Current travels out and back. Real conductor resistance changes with material, size and temperature. Include existing downstream loads and connections when assessing the actual circuit.

Code and standards reference: CEC Section 8 voltage-drop objectives and Appendix B guidance; Section 4.

Worked problem 6 — combined circuit screen

Measured/documentated existing lighting load = 900 W

Added LED real power = 96 W

Total real power screen = 996 W

Simple current screen = 996 / 120 = 8.30 A

Answer: The screen is 8.30 A before power factor, duty classification, other outlets and Code loading rules are evaluated.

Plain-language explanation: A spare breaker handle position or low new wattage does not prove circuit capacity. Trace the circuit and document all connected loads and conditions.

Code and standards reference: CEC Sections 8, 12, 14, 26 and 30.

11. Dimmer and control compatibility

Check	Why it matters
Exact compatibility	Use the fixture/driver and dimmer manufacturers' compatibility lists, not "LED compatible" marketing alone.
LED capacity / fixture count	A dimmer's LED limit may be much lower than its incandescent watt rating; some makers publish a maximum driver count.
Control method	Forward phase, reverse phase, 0–10 V, digital and proprietary methods are not interchangeable.
Neutral / multi-location	Electronic controls may require a neutral and exact companion-device wiring.
Minimum load / low-end trim	Prevents dropout, pop-on, shimmer and poor low-level control.
Derating / ganging	Heat dissipation changes when side sections are removed or devices are grouped.
Inrush / leakage	Many drivers can exceed contact or control limits even when steady-state watts appear small.

Worked problem 7 — dimmer count screen

Fixture input = 12 W

Quantity = 8

Connected LED watts = 96 W

Example dimmer LED limit = 150 W

Example manufacturer fixture-count limit = 10

8 fixtures < 10 and 96 W < 150 W

Answer: The example passes both published screens, subject to exact compatibility and installation conditions.

Plain-language explanation: Use the lowest applicable manufacturer limit. A 600 W incandescent label alone is not permission for 600 W of LED drivers.

Code and standards reference: CEC Sections 14 and 30; dimmer and luminaire instructions.



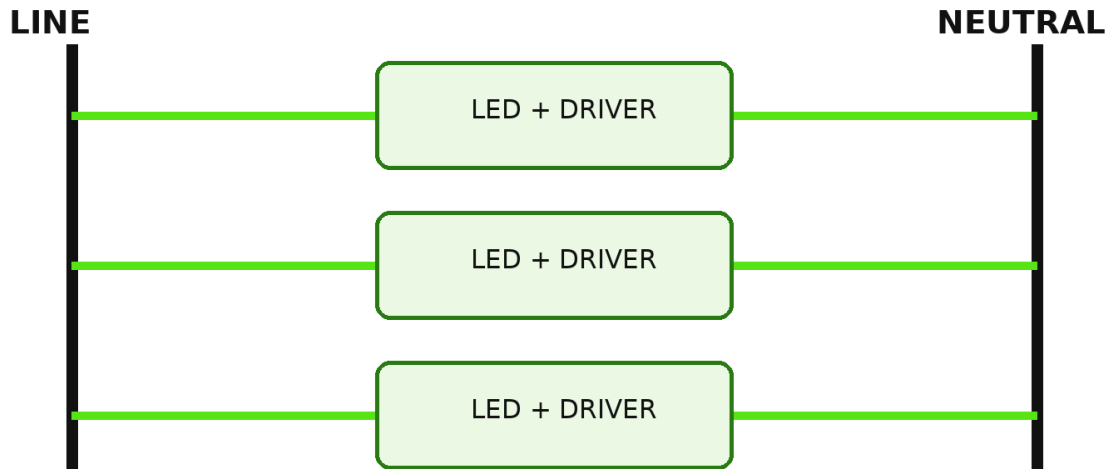
12. Safe isolation and verification

- ☐ Identify every source: branch circuit, multiwire circuit, emergency supply, inverter/UPS, control wiring and possible backfeed.
- ☐ Notify affected persons; shut down connected equipment where needed.
- ☐ Open the correct disconnecting means and apply lockout/tagout under the work procedure.
- ☐ Select an appropriate contact test instrument and inspect leads/case/settings.
- ☐ Prove the tester on a known source.
- ☐ Test every relevant conductor-to-conductor and conductor-to-ground combination.
- ☐ Re-prove the tester on a known source.
- ☐ Control the work area, confirm apprentice roles, and maintain the electrically safe work condition.
- ☐ Before restoration: close boxes/covers, clear persons/tools, account for conductors, remove locks under procedure and test operation safely.

NON-CONTACT INDICATORS Useful for preliminary detection and troubleshooting context, but capacitive indicators can miss voltage or respond to induced fields. They are not the sole proof of an electrically safe work condition.

13. Conductor identification and switching

Correct concept — ceiling lights are parallel loads



Each listed assembly receives its rated supply voltage. Equipment bonding is continuous.

Figure 13-1 — Parallel lighting concept

Concept only. Switching, boxes, cable, bonding and exact conductor identification are omitted. Follow the actual wiring diagram and Code.

Condition	Required reasoning
Old switch loop	A white-insulated conductor may be reidentified and used as ungrounded; do not assume it is neutral.
Multiple cables in ceiling box	May contain feed-through, switched leg, neutral and other circuit conductors. Trace before disconnecting.
Multiwire branch circuit	Identify shared neutral, simultaneous disconnection and circuit arrangement; do not separate casually.
Borrowed neutral / cross-circuit splice	Stop. Correct the unsafe/noncompliant arrangement and coordinate shutdown of all sources.
Aluminum conductor	Use compatible device/fixture terminals or approved CU/AL connector and copper pigtail per NB Bulletin 4-1-0.
Electronic control	Confirm neutral and traveller/companion requirements from the exact instructions.



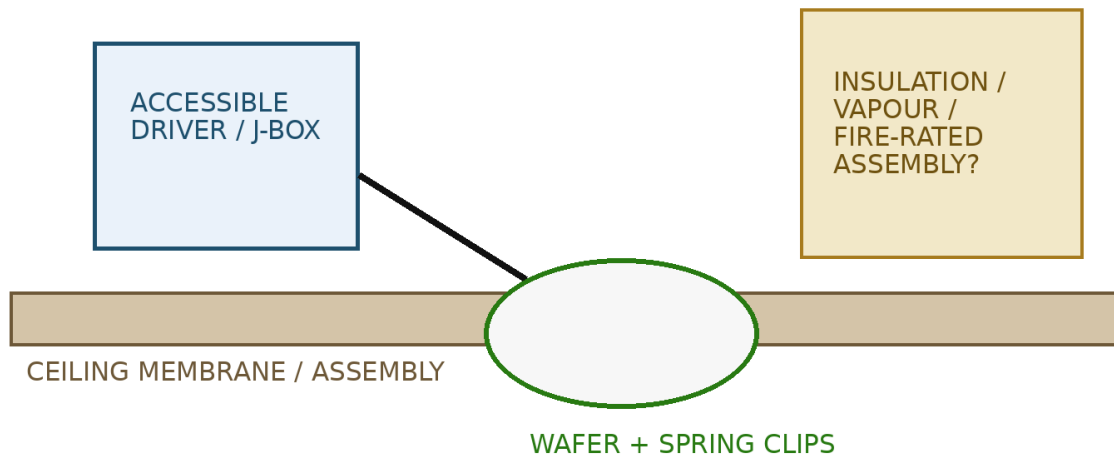
14. Boxes, splices, support and bonding

- ☐ Confirm the outlet box or luminaire support is approved and secured for the actual equipment and mounting method.
- ☐ Verify box volume for conductor count, sizes, internal clamps, devices and bonding components.
- ☐ Maintain required free conductor length; do not shorten conductors to hide an overcrowded box.
- ☐ Use approved connectors within marked conductor material, size and quantity ranges and follow strip/twist instructions.
- ☐ Keep all required splices and driver enclosures accessible; do not bury a serviceable box behind drywall.
- ☐ Bond every metal box, raceway and luminaire part required by the system.
- ☐ Use approved cable entries, bushings/connectors, support and mechanical protection.
- ☐ Do not use electrical tape to compensate for an incorrect connector, damaged insulation or poor workmanship.

HEAVY LUMINAIRES AND FANS Do not use a generic “50 lb box” rule. Read the box/support and luminaire markings. A box suitable for a luminaire may not be fan-rated; a fan-rated box has its own approval and installation instructions.

15. Canless wafers, insulation and fire assemblies

Canless wafer installation — what must be verified above the ceiling



IC-rated does not automatically mean airtight, wet-location suitable, or fire-rated.

Figure 15-1 — Above-ceiling coordination

Exact product clearances and accessibility rules govern. The diagram does not authorize placement in insulation or a fire-rated assembly.

Claim / condition	Meaning to verify
IC-rated	The specific assembly may contact insulation as marked; it does not answer airtightness, wet-location or fire-rating questions.
Airtight / AT	Only products marked/tested as such support the claim; preserve the building air/vapour-control layer.
Damp / wet location	Match the exact ceiling zone and exposure. Shower/bath/outdoor locations need product-specific suitability.
Fire-rated	A normal wafer is not automatically part of a rated ceiling. Use an approved tested system, enclosure or product as required.
Driver/junction box access	Follow Code and instructions; do not place where it becomes inaccessible or thermally unsuitable.
Structural clearances	Maintain joist/truss/duct and product clearances; never cut structural members without authorized design.

16. Special locations

Location	Additional review
Bathroom / shower	Damp/wet suitability, zone over tub/shower, GFCI requirements where applicable, fan/light combinations and ceiling temperature/moisture.
Closet	Luminaire type, enclosure and clearance from storage space/combustibles.
Outdoor soffit / canopy	Wet/damp/corrosion suitability, temperature range, gasket/air sealing, wind-driven moisture and cable/wiring method.
Garage / workshop	Mechanical damage, dust, vapour, task lighting and any hazardous-location classification.
Fire-rated suite separation	Tested assembly, penetrations, boxes, firestop and product fire classification.
Commercial / emergency lighting	Emergency source/transfer, identification, controls, testing, egress illumination and owner records.
Food / healthcare / washdown	Sanitation, cleaning chemicals, ingress, impact and applicable occupancy requirements.



17. Aluminum wiring—NB requirement

NB Electrical Inspection Bulletin 4-1-0 applies when switches, dimmers, ceiling fans, luminaires and similar devices are replaced on aluminum branch-circuit wiring. The connection method must be approved for the conductor materials involved.

- ☐ Identify conductor material before selecting the fixture, dimmer or connector.
- ☐ If the device is marked CU/AL and approved for the exact conductors/application, follow its instructions.
- ☐ A CU-only device requires an approved CU/AL connector to a copper pigtail; do not land aluminum directly on a copper-only lead/terminal.
- ☐ Verify conductor condition, strip length, oxide/corrosion, connector instructions, enclosure volume and torque where specified.
- ☐ Document the connector model and method; do not use ordinary copper-only twist connectors.

STOP CONDITION Heat damage, brittle insulation, repeated loose connections, unknown alloy or extensive aluminum distribution warrants a broader assessment—not only a new light.



18. Installation workflow

- 1. Define scope:** New luminaire, lamp-only replacement, approved retrofit kit, field modification or complete renovation.
- 2. Survey:** Circuit, panel, boxes, wiring method, conductor material, ceiling, insulation, moisture, fire assembly and obstructions.
- 3. Classify approvals/permit:** Apply NB bulletin and permit process before construction.
- 4. Design:** Target light, layout, load, controls, voltage drop, product/location ratings and serviceability.
- 5. Plan safe work:** Sources, shutdown, lockout, test method, roles and restoration.
- 6. Rough-in:** Boxes/enclosures, cable/raceway, support, protection, bonding, vapour/fire control and labels.
- 7. Terminate:** Follow connector, dimmer, driver and luminaire instructions; manage conductors without crowding.
- 8. Close and inspect:** Covers, cutouts, supports, gaskets, labels and accessibility.
- 9. Commission:** Electrical, control and lighting-performance checks.
- 10. Handoff:** Instructions, CCT/dimmer settings, circuit identification, warranty, records and inspection closeout.

19. Commissioning and troubleshooting

Check	Method / acceptance evidence
Supply and polarity/function	Measured voltage and verified conductor functions before connection/restoration.
Load current	Compare measured current with expected system data; investigate material difference.
Bonding	Continuity/connection inspection and required tests under procedure.
Dimming	Stable start, full output, low-end operation, multi-location response, no objectionable flicker/buzz.
CCT consistency	Every selector set and output visually consistent.
Thermal/access	Driver and luminaire installed within ratings; covers secure; no insulation/obstruction conflict.
Lighting result	Observe dark spots, glare, reflections and task levels; measure lux when specified.
Labels/records	Circuit, retrofit labels, permit/inspection, manuals, photos, compatibility and settings recorded.

Troubleshooting pattern

Symptom	Likely categories
Flicker / shimmer	Dimmer incompatibility, low-end trim, loose connection, supply disturbance, driver defect, too many drivers.
Won't turn fully off	Control leakage, illuminated switch, incompatible driver, wiring error.
Trips breaker	Short/ground fault, damaged cable, wrong connection, driver failure, shared/unknown circuit, inrush/quantity issue.
One light different colour	CCT selector mismatch, wrong product/revision, driver/LED defect.
Premature failure	Thermal conflict, buried/inaccessible driver, moisture, overvoltage, poor connection, unsuitable product.
Buzz	Driver/dimmer incompatibility, loose mounting, electromagnetic/mechanical resonance.



20. Apprentice exercises

1. Calculate current for ten 15 W, 120 V LED fixtures.
2. A 6 m × 4 m room targets 250 lux. With combined utilization/maintenance factor 0.65, estimate required fixture lumens.
3. Eight fixtures are 12 W each with PF 0.90. Calculate apparent power and current at 120 V.
4. A dimmer is rated for 150 W LED and a maximum of 8 tested fixtures. Can it control nine 12 W fixtures? Explain.
5. Explain the three NB LED retrofit paths and which one can require re-approval/field evaluation and a wiring permit.
6. Write the complete absence-of-voltage sequence, including tester verification.
7. List five reasons conductor colour alone cannot identify circuit function.
8. Explain why IC-rated is not the same as airtight or fire-rated.
9. A 30 m one-way run carries 2.0 A and the exercise resistance is 13.2 Ω /km. Calculate voltage drop and percent at 120 V.
10. Give six commissioning checks for a dimmed canless-wafer installation.

21. Apprentice answer key

No.	Answer / reasoning
1	$P = 10 \times 15 = 150 \text{ W}$. $I = 150/120 = 1.25 \text{ A}$.
2	Area = 24 m^2 . Work-plane lumens = $250 \times 24 = 6,000 \text{ lm}$. Fixture lumens $\approx 6,000/0.65 = 9,231 \text{ lm}$.
3	$P = 96 \text{ W}$. $S = 96/0.90 = 106.7 \text{ VA}$. $I = 106.7/120 = 0.89 \text{ A}$.
4	No. Watts are 108 W, but nine exceeds the published maximum of eight fixtures. The lowest applicable limit governs.
5	Drop-in approved lamp with no modification; complete approved retrofit kit; field-modified/no-approved-kit conversion. The third path requires re-approval and a wiring permit under the NB bulletin.
6	Identify sources, de-energize, lock/tag, inspect/select contact tester, prove on known source, test all relevant combinations, re-prove, maintain work controls.
7	Old switch loops, reidentified white, multiple feeds, travellers, multiwire circuits, borrowed neutrals/cross-circuit errors, control wiring.
8	IC addresses insulation contact for the marked assembly. Airtightness and fire performance require separate markings/tested assemblies.
9	Loop = 0.060 km . $R = 0.792 \Omega$. Drop = 1.584 V . Percent = 1.32% .
10	Examples: voltage, load current, bonding, dimming range, flicker/buzz, CCT, thermal/access, lux/appearance, labels and records.



22. NB pre-evaluation worksheet

Customer / site: _____

Municipality / utility: _____

Electrician / apprentice: _____

Area	Fixture / driver	Control	Circuit / cable	Location / ceiling
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

- ☐ Adopted Code edition and NB bulletins confirmed.
- ☐ Work classified: new / lamp-only / approved kit / field modification.
- ☐ Canadian approvals, instructions, labels and compatibility records collected.
- ☐ Lighting target/layout and customer approval documented.
- ☐ Existing circuit, loads, conductor material, protection and capacity verified.
- ☐ Dimmer/driver method, LED limit, fixture count, neutral and derating verified.
- ☐ IC/AT/damp/wet/fire/temperature claims matched to actual ceiling/location.
- ☐ Boxes, support, box fill, wiring method, bonding, access, vapour/fire control planned.
- ☐ Permit classification confirmed and required permit obtained.
- ☐ Safe-work and commissioning plans complete.

Permit / inspection reference: _____

Stop-work / field-evaluation questions: _____



23. Commissioning and handoff record

Site: _____

Permit / inspection: _____

Fixture / driver / dimmer models: _____

Circuit / area	V	Expected A	Measured A	Lux / observation	Dimmer test	Result
_____	—	_____	_____	_____	_____	_____
_____	—	_____	_____	_____	_____	_____
_____	—	_____	_____	_____	_____	_____

- ☐ All boxes/enclosures closed and required access maintained.
- ☐ Bonding and connection checks complete.
- ☐ CCT and control settings recorded.
- ☐ Dimming tested through full range; no objectionable flicker/buzz.
- ☐ Circuit and retrofit labels complete.
- ☐ Customer received operating, cleaning, warranty and service information.
- ☐ Photos, calculations, manuals, compatibility and permit/inspection records filed.

Electrician signature / date: _____

Customer acknowledgement / date: _____

24. Code and standards navigation map

Reference	Use
NB Regulation 84-165	Adopted Code, NB modifications, approval, licensing, permits and inspection framework.
CEC Section 2	Approval, markings and manufacturer instructions.
CEC Section 4	Conductors, ampacity and terminal-temperature context.
CEC Section 8	Circuit loading, outlet/load calculations and voltage-drop objectives.
CEC Section 10	Grounding and bonding.
CEC Section 12	Wiring methods, boxes, support, protection and suitability.
CEC Section 14	Overcurrent protection and control.
CEC Section 26	Applicable equipment/device and branch-circuit installation rules.
CEC Section 30	Luminaires and lighting equipment.
CEC Section 46	Emergency power/lighting where applicable.
NB Bulletin 84-165-3-2	LED retrofit classification, re-approval and permit requirements.
NB Bulletin 4-1-0	Aluminum wiring connections to replacement devices/luminaires.
NB Regulation 91-191	Electrical safe-work and qualified-person obligations.
CSA C22.2 No. 250.0 / 250.13	Luminaires and LED equipment product standards—verify certification scope.
Manufacturer instructions	Exact installation, support, clearances, location, controls, labels and tests.

25. GoRight NB conformity and revision basis

Controlled requirement	GoRight verification record
Adopted electrical Code	Confirm the edition adopted by NB Regulation 84-165, applicable errata and NB modifications before design or construction.
NB inspection bulletins	Review the current LED retrofit, aluminum wiring and other project-specific bulletins before determining the installation method.
Permit and inspection	Record the permit classification, permit number, inspection stages, deficiencies and final closure.
Approved equipment	Record the Canadian certification mark, model, ratings, intended location and compatibility of each luminaire, driver, dimmer, connector and enclosure.
Manufacturer instructions	Keep the current Canadian installation, retrofit, control, clearance, thermal, labelling and commissioning instructions in the job file.
Safe-work requirements	Document source identification, isolation, lockout, absence-of-voltage verification, PPE/tools and controlled restoration under NB Regulation 91-191 and the company procedure.
Design calculations	Retain lighting target, layout, connected load, control limits, circuit-loading and voltage-drop calculations.
Installation evidence	Retain rough-in and finished photographs, conductor/connector details, labels, settings and inspection evidence.
Commissioning and handoff	Retain measured results, control tests, customer instructions, warranty information and acceptance record.

REVISION CONTROL Prepared August 2026. Revalidate this GoRight guide whenever New Brunswick changes the adopted Code, regulations, inspection bulletins or permit process, and whenever equipment or control instructions change.

Use of figures

Figures are conceptual training visuals. They explain system relationships and field-verification points; they are not product approvals, manufacturer wiring diagrams or substitutes for actual equipment markings, certification and instructions.