NECA PHILADELPHIA
SEPT 29 - OCT 2, 2023

Understanding the Changing Landscape of Fluorescent Lighting

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Lutron Electronics Co., Inc.

TRADE SHOW EDUCATION

Agenda

"How We Got Here"

1. Summary of Fluorescent lamp legislation
2. Summary of US General Service Lamp legislation

"What Do We Do About It"

3. Analysis of critical details and options for upgrading fluorescent lighting, to LED

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For these hours to appear on your certificate, you must:

- Have your badge scanned at the door
- Attend 90% of this presentation
- Fill out the online evaluation for this session

Lamp Legislation

1. Introduction of US legislation affecting fluorescent lamps
   - Energy efficiency
   - Mercury bans
2. US general service lamp legislation

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Intro of legislation affecting fluorescent lamps

US Department of Energy (DOE) is mandated by Congress* to set energy efficiency standards

- Various categories of lamps are included
- Luminaires are not

DOE must review these standards every 6 years and determine whether to update the standards or keep them as they are

** Under the Energy Policy and Conservation Act (EPCA) and the Energy Independence and Security Act (EISA)*

Beyond Efficacy Standards

- States seeing increased pressure to shift to LED technology, but limited options with existing Federal regulatory framework
- States began banning the sale of lamps containing mercury
- No movement at the US federal level to follow

Introduced "Lamps Containing Mercury" Bans

Jurisdiction	Status	Effective Date	Lamp types covered*
Illinois	Introduced Bill	January 1, 2024 January 1, 2025	Screw-base CFL Pin-base CFL and all LFL
Maryland	Introduced DIED IN COMMITTEE	January 1, 2024 January 1, 2025	Screw-base CFL Pin-base CFL and all LFL
Massachusetts	Introduced Bill Hearing on 7/19	January 1, 2024 January 1, 2025	Screw-base CFL Pin-base CFL and all LFL
Minnesota	Introduced Bill	January 1, 2025 January 1, 2026	Screw-base CFL Pin-base CFL and all LFL
Nevada	Introduced Bill VETOED	January 1, 2024 January 1, 2025	Screw-base CFL Pin-base CFL and all LFL

* a person shall not manufacture, distribute, sell, or offer for sale

CFL = compact fluorescent lamp
LFL = linear fluorescent lamp

Current Status of "Lamps Containing Mercury" Bans

Jurisdiction	Status	Effective Date	Lamp types covered*
Vermont	Law	February 17, 2023 January 1, 2024	Screw-base CFLs Four-foot LFLs
California	Law	January 1, 2024 January 1, 2025	Screw-base CFL Pin-base CFL and all LFL
Colorado	Law	January 1, 2025	All linear fluorescent and all CFL (incl. pin-based)
Hawaii	Law	January 1, 2025 January 1, 2026	Screw-base CFL Pin-base CFL and all LFL
Maine	Law – Without Governor's signature	January 1, 2026 January 1, 2026	Screw-base CFL Pin-base CFL and all LFL
New York City	Local Law 88 (amended to #134)	January 1, 2025	Lighting must meet requirements of New York City Energy Conservation Code

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Introduced “Lamps Containing Mercury” Bans

Jurisdiction	Status	Effective Date	Lamp types covered*
New Mexico	Introduced Bill DEAD	December 31, 2023 December 31, 2024	Screw-base CFL Pin-base CFL and all LFL
New York	Introduced Bill	January 1, 2026	All mercury containing lamps
Oregon	SENT TO GOVERNOR 6/21/2023	January 1, 2024 January 1, 2025	Screw-base CFL Pin-base CFL and all LFL
Pennsylvania	Introduced Bill	July 1, 2025	High CRI (>=87) LFL, cold temp and impact resistant LFL
Rhode Island	Sent to Governor 6/19/2023	January 1, 2024 January 1, 2025	Screw-base CFL Pin-base CFL and all LFL
Washington	Introduced Bill Dead for session	January 1, 2026	All mercury-containing lamps

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Status of DOE General Service Lamp rulemaking

- “The backstop”
- “The 45 lm/W standard”
- and “The LED standard”

Current law for general service lamps

45 lm/W efficacy standard for lamps:

- Any ANSI base
- 310-3300 lumens
- Most voltages for integrated lamps; all voltages for non-integrated
- General lighting applications
- ALL technologies including halogen, incandescent, CFL and LED

- MR16s, BR30s, PARs, etc. are covered by Federal law

The forces behind the switch to LED

State Bans
All standard fluorescents

Pending legislation
States & Canada all fluorescents

Building Codes
NYC has an energy code that can only be achieved by LED

Federal legislation
US Federal legislation banning incandescent was signed in 2007
- **MR16 Halogen is included**

*** As of February 2023**

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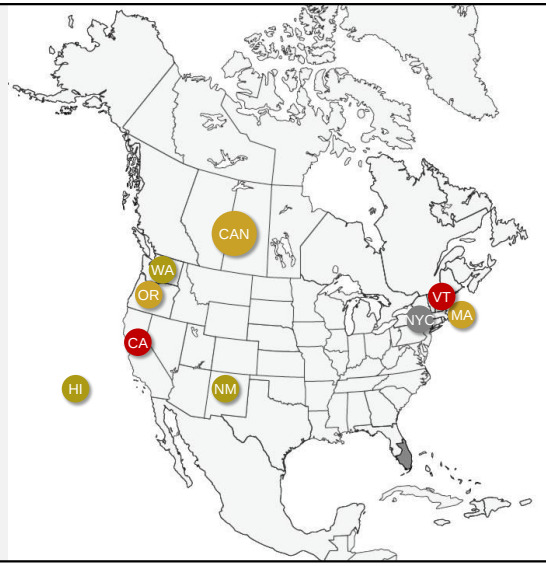

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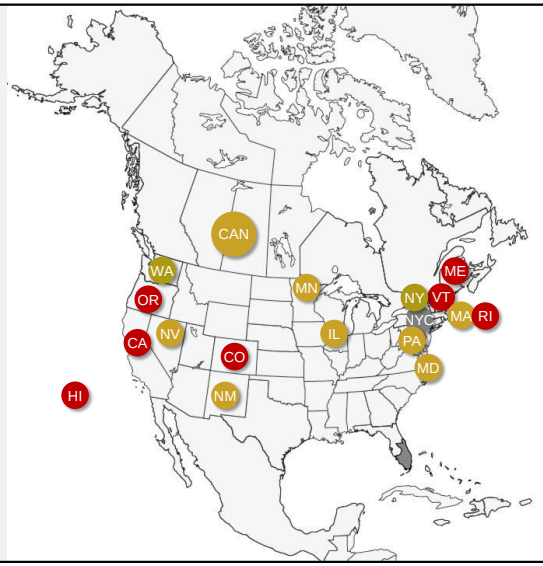

Evolution of Incandescent lamps to LEDs

Incandescent	Fluorescent	LED
Efficacy	Efficacy	Efficacy
Cost	Cost	Cost
Lifespan	Lifespan	Lifespan

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Minimize disruptions. Plan an upgrade

LED TLED Retrofit

Replace your fluorescent lamps w/ LEDs. Don't change the fixture.

Fixture & System Upgrade

Upgrade your control system by replacing some of the hardware.

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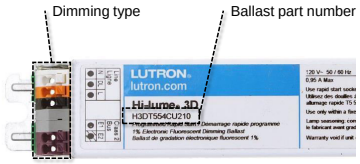
How do I determine what I have?



Lamp
Part number

Ballasts can be found inside the fixture

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Ballasts vs Drivers

Ballasts

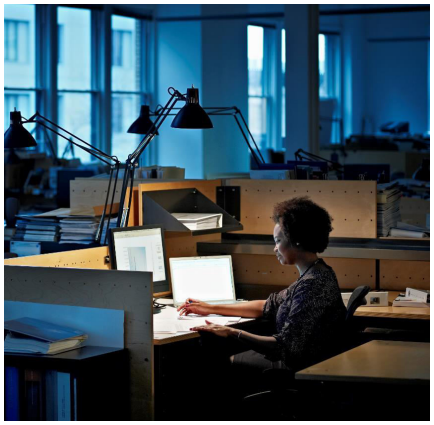
- Ballasts are electrical devices responsible for dimming fluorescent lamps.
- They are typically sold bundled with fixtures.
- Required in fluorescent and high intensity discharge (HID) fixtures that furnish the necessary voltage, current, and waveform for starting and operating the lamp(s)

Drivers

- Responsible for dimming in LED lamps.
- Needed to operate and vary the intensity of light output from LED lamp sources by regulating the voltage and current powering the source
- Responsible for powering LED light sources from distributed power

Multiple lights are out in one room

- Retrofit kit (quick solution to start fixing problem)
- New fixtures
- You're going to need a plan for after 2023



One light out

- Retrofit kit for the one light then slowly plan for new fixtures/system upgrade
- Retrofit kit for one light and then stock up on retrofit kits for remaining lights
- You're going to need a plan for after 2023

No lights out

- Rethink your attic stock plan
- Plan for short term - retrofit kits
- Plan ahead – consider the right time to upgrade your system
- You're going to need a plan for after 2023

Don’t get left in the dark! Here are your options –

If you have LEDs:

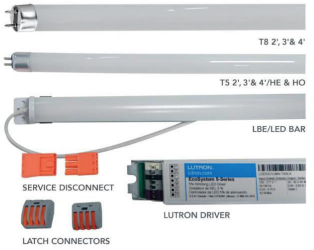
TLED vs New fixture

Ideal for:

- 1:1 replacement
- Keep your control system and fixtures
- Remodeling
  - No new wiring
  - No opening ceilings
- If you have a specialized ballast
- If you have fixtures that are difficult or expensive to replace

Impacts

- Low-cost ballast replacement
- Maintain lighting performance
- Do it on your own schedule
  - Room by room, fixture by fixture



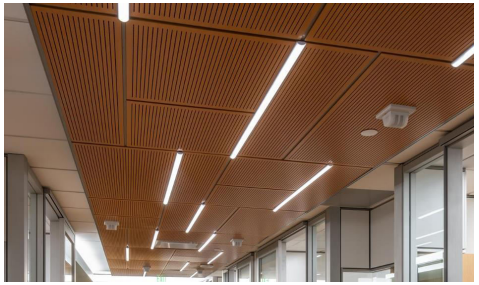
New Fixture

Ideal for:

- Remodeling space
- Minimizing cost and impact
- Achieving latest and greatest technology
  - Tunable white or full color control
  - Wireless control
- Ceilings with fixtures that are easy-access

Impacts

- Modernize the space
- Improve light quality
- Customizable lights for events
  - Change colors and add scenes
- Flexibility



UL Type A

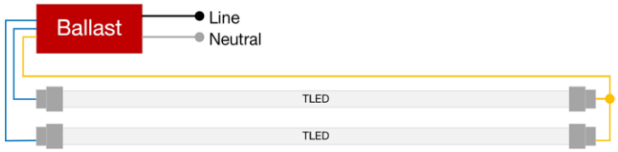


Figure 1: UL Type A TLED wiring example

- TLED lamps wired directly to fluorescent ballast
  - Make **sure** that the ballast will survive the LED load.
  - Will impact dimming performance
  - Too good to be true?

UL Type B

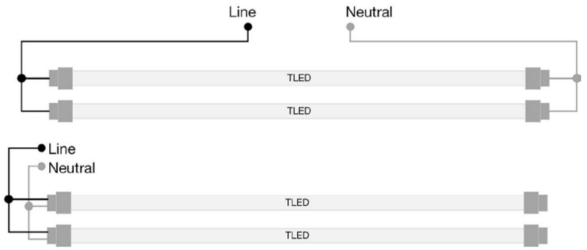


Figure 2: UL Type B TLED wiring examples

- Line voltage wired to sockets directly
  - NO DIMMING!
  - May be overlit
  - What would cause someone to do this?

UL Type C

- Ballast replaced with LED driver
  - Control performance retained
  - Driver and lamps have full warranty

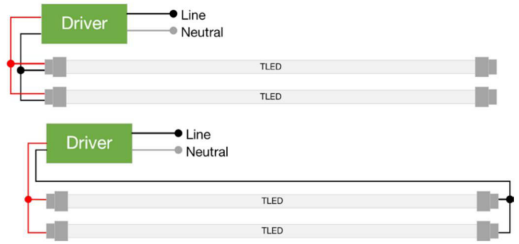
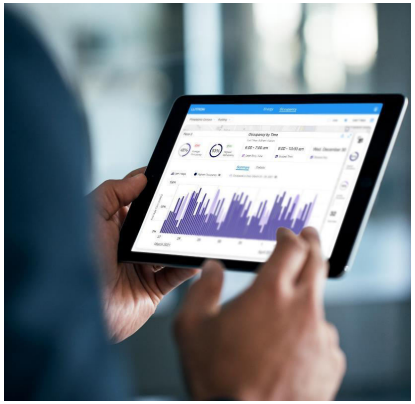


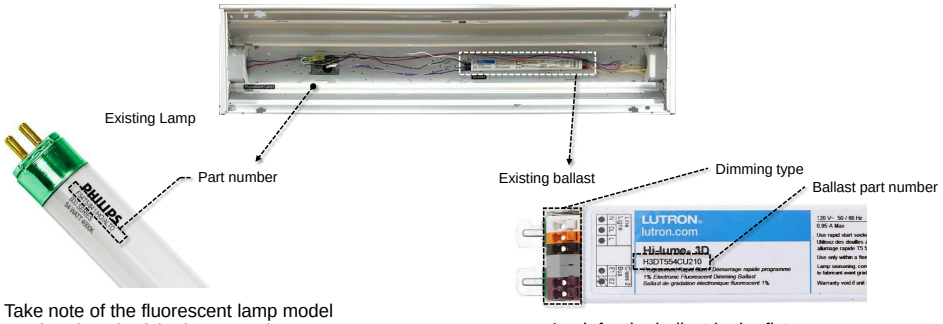
Figure 3: UL Type C TLED wiring examples



Get the latest technology

- **System Upgrades**
- New tools
  - Analytical Dashboard
  - App control
  - Cloud-connected
  - Human Centric Lighting
- Reuse much of your existing lighting control
- Renew warranty

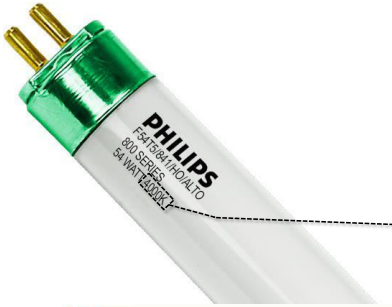
Step #1- Take stock of what you have



Take note of the fluorescent lamp model number, length of the lamp & color temp.

Look for the ballast in the fixture.

Step #2- Know the Color Temperature of the lamps



Common Color Temperatures:

3000K

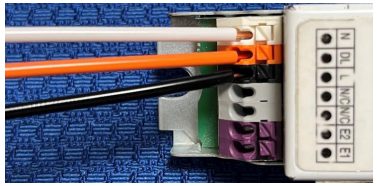
3500K

4000K

Step #3- Is it a system or wallbox product?

Low voltage digital or 0-10V control

Line voltage phase control



Just a few more steps

Step #4- Work with the local controls/lighting Rep to identify system controls job information

Step #5- Before you install, mockup the kit.

Step #6- Purchase and Install

Example of a “phased approach”

1
Keep the lights on –

Maintain lighting with TLED kits instead of ballasts

- Save energy now
- Cost less than ballasts
- Easy drop-in replacement
- No wiring changes
- Looks identical

2
Upgrade the Space

Each site:

- Identify different lighting types and the models of ballasts
- Identify control for each lighting type
- Identify LED upgrade options for each fixture type
- Begin upgrading sections of lighting in your space proactively. You can save still-working ballasts for maintenance in other areas.
- Begin capital budgeting for a lighting renovation

3
Upgrade your spaces

Execute your plan:
Review or create a plan for your building. Do you want to save energy, or improve the experience of the people in the space? Decide if you need to upgrade your lighting control system over the next few years.

Stay Connected!

Booth #1312 to meet with the team

Complete the Online Evaluation