

Fluorescent Lamp Bans and Your Church

Are you affected and what can you do?

Steve Jones
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Who Is Steve Jones?

- Steve is a lifelong Congregationalist with a passion for lighting – both energy savings and quality.
- A certified Ergonomist, Steve started his education in Electrical Engineering before switching to Industrial Engineering. Both fields deal with lighting.
- From the first time Steve saw his home church relamped in 1989, he has been relamping churches and friends' homes ever since.
- Steve also spent time working for SmartWatt (now Centrica PLC) out of Albany NY, doing lighting audits and specifying energy efficient replacements for the State of New York, thru the local utility National Grid.
- Churches done so far:
 - First Congregational Church of Naperville IL
 - The Congregational Church of Naugatuck CT
 - First Congregational Church of Washington CT
 - First Church of Christ Congregational of Middletown CT
 - First Congregational Church of Moline, IL
 - Brookmeade Congregational UCC in Nashville, TN
 - First Congregational Church UCC in Lee, NH
 - North Congregational Church in Woodbury CT (2025)
 - First Congregational Church in Oxford MA (2025)
 - First Congregational Church in Littleton NH (2025)
 - South Congregational Church in Middletown CT (2025)
 - First Congregational Church in Buckland MA (2026)
 - Lily Dale Assembly NY (partial, 2023)
 - Roxbury Congregational Church in Roxbury CT (2025)
 - Silver Lake Conference Center / Camp CT (2025)
 - Tower Hill Conference Center / Camp (2025)
 - St Georges Episcopal Church in Middlebury CT (2025)
 - First Church of Christ UCC in East Haddam CT (2026)

Your Lighting Is An Opportunity

Eliminate mercury content - Be "Greener"

Reduce Your Electric Bills

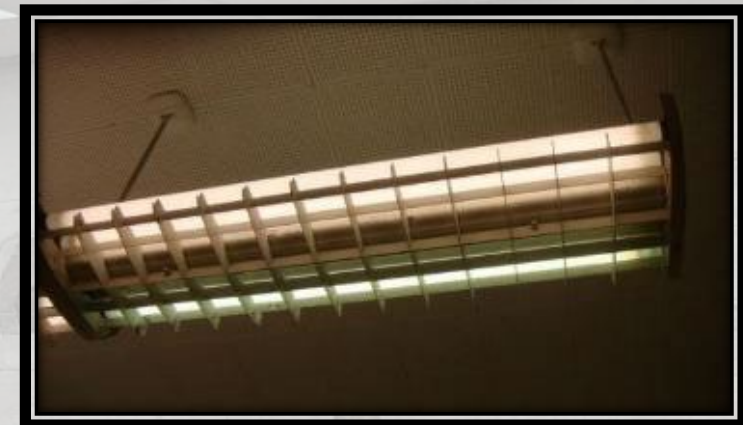
- Lighting can be $\geq 50\%$ of electric use in church buildings

Safety and Visibility Concerns with Older Congregants

- Trouble reading the hymnal, navigating steps & stairs

Create a Welcoming Space for Visitors and Renters

People don't notice it until it's not there!



US Mercury-Based Bulb Bans

 **U.S. STATES WITH FLUORESCENT BANS**

STATE	SCREW-BASE & BAYONET-BASE CFL PHASE OUT DATE	PIN-BASE CFL & FLUORESCENT TUBE PHASE OUT DATE
CALIFORNIA	JANUARY 1, 2024	JANUARY 1, 2025
COLORADO	JANUARY 1, 2025	JANUARY 1, 2025
HAWAII	JANUARY 1, 2025	JANUARY 1, 2026
ILLINOIS*	JANUARY 1, 2026	JANUARY 1, 2027
MAINE	JANUARY 1, 2025	JANUARY 1, 2026
MINNESOTA	JANUARY 1, 2025	JANUARY 1, 2026
OREGON	JANUARY 1, 2024	JANUARY 1, 2025
RHODE ISLAND	JANUARY 1, 2024	JANUARY 1, 2025
VERMONT	FEBRUARY 17, 2023	JANUARY 1, 2024
WASHINGTON	JANUARY 1, 2029	JANUARY 1, 2029

*Awaiting final governor sign-off

Updated July 10, 2024

Minnesota ban includes HID lighting starting Jan 2025

Massachusetts in 2025

Ban the SALE of new lamps; don't need to remove existing lamps

Do You Have Mercury-Based Lighting?



Issues with Fluorescent Lamps

Ceased Manufacture of tubes & magnetic ballasts (2012 & 2014)

Mercury Content

- A single T12 tube contains **20-50 mg** of mercury (Hg)

Lumen Depreciation – bulbs get dimmer over time

- 70% brightness after 10 years; < 50% after 20 years

Temperature sensitive

Filament off-gassing (blackened ends)

Old tube disposal – recycle or haz waste?



Fluorescent Light Types

Prior to 1990 - T12 tubes with magnetic ballasts

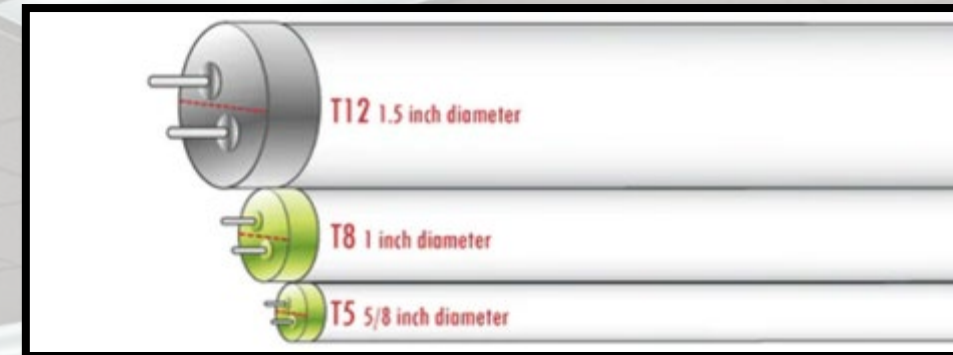
- 1.5" diameter, 4ft @ 40 watts
- 2 tubes – 1 ballast; 4 tubes – 2 ballasts
- Before 1979, magnetic ballasts contained PCBs

After 1990 - T8 tubes with electronic ballast

- 1" diameter, 4ft @ 32 watts
- 1 ballast will do 4 tubes (sometimes 2)

After 1990 - T5 tubes with electronic ballasts (rare in the US)

- 5/8" diameter, 4ft @ 28 watts, T5HO @ 54 watts



Fluorescent Fixture Nomenclature



TROFFER – sits in ceiling grid



**PARABOLIC
LOUVERED
TROFFER**



STRIP (1-4 tubes)



WRAP – surface or suspended

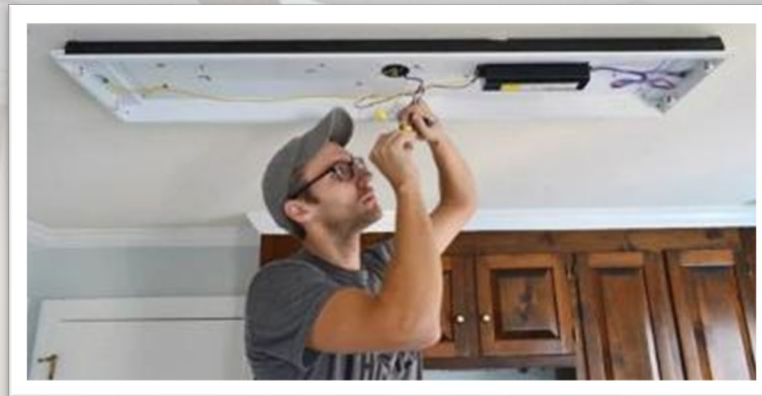


So What Can You Do??



What You Can Do

1. Relamp and/or reballast your existing fixtures yourself
 - or have an electrician update your existing fixtures
2. Replace all of your fixtures with LED



Relamp & Reballast Using LED Tubes

Can do this work yourself if comfortable – “maintenance activity”

LED tubes are **15-17 watts** each (4ft); **40-59 watts** (8ft)

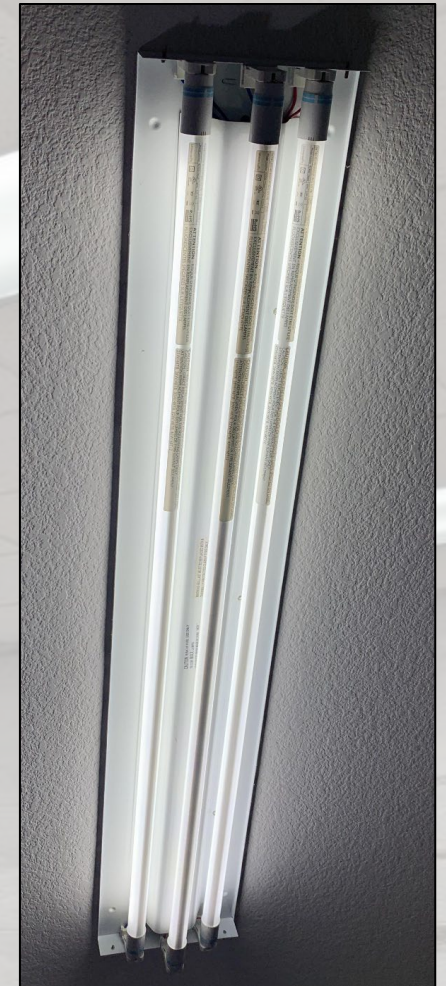
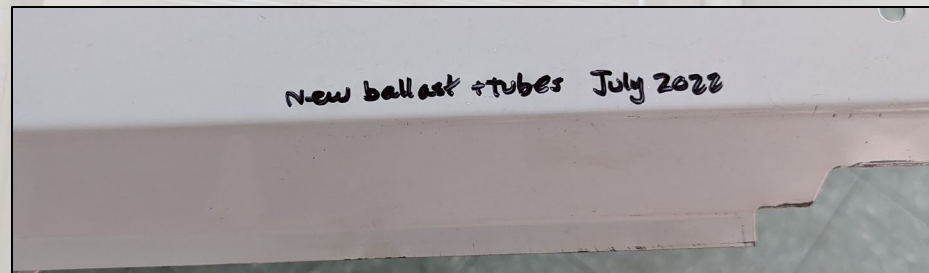
Good wattage savings – **50 to 63%** depending if T8 or T12

Tubes are directional – point them **DOWN >>>**

Tubes are bright enough (2000 lumens), can reduce number of tubes per fixture

Purchase **4000K** or **4100K** “fluorescent cool white”

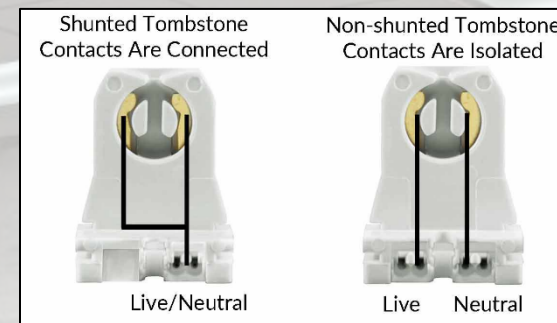
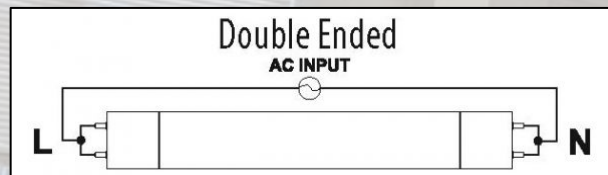
Always label the cover after relamping so people know!



Relamp & Reballast Using LED Tubes

Types of LED Tubes:

- **Type A** – work with electronic ballasts “Plug n Play”
- **Type A “Universal”** – work with ANY ballast “T8 & T12 Replacement”
- **Type B** – direct wire “Ballast Bypass” – must rewire the fixture
 - Two ways to rewire the fixture depending on manufacturer; wiring diagram in box



NOTE: Electronic ballasts older than 10 years MAY not work well with LED tubes. If the fixture does not light up instantly and there is a 30sec-2min delay, it is likely a ballast compatibility issue. Replace the ballast with new.

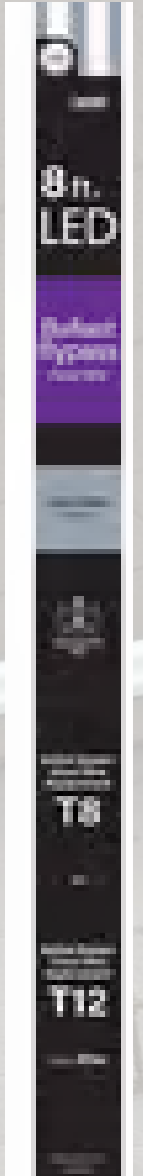
Relamp & Reballast Using LED Tubes

Tube Costs:

Type A or B 4ft - \$4 to \$5 per tube

Type A “universal” tubes around \$19/pair

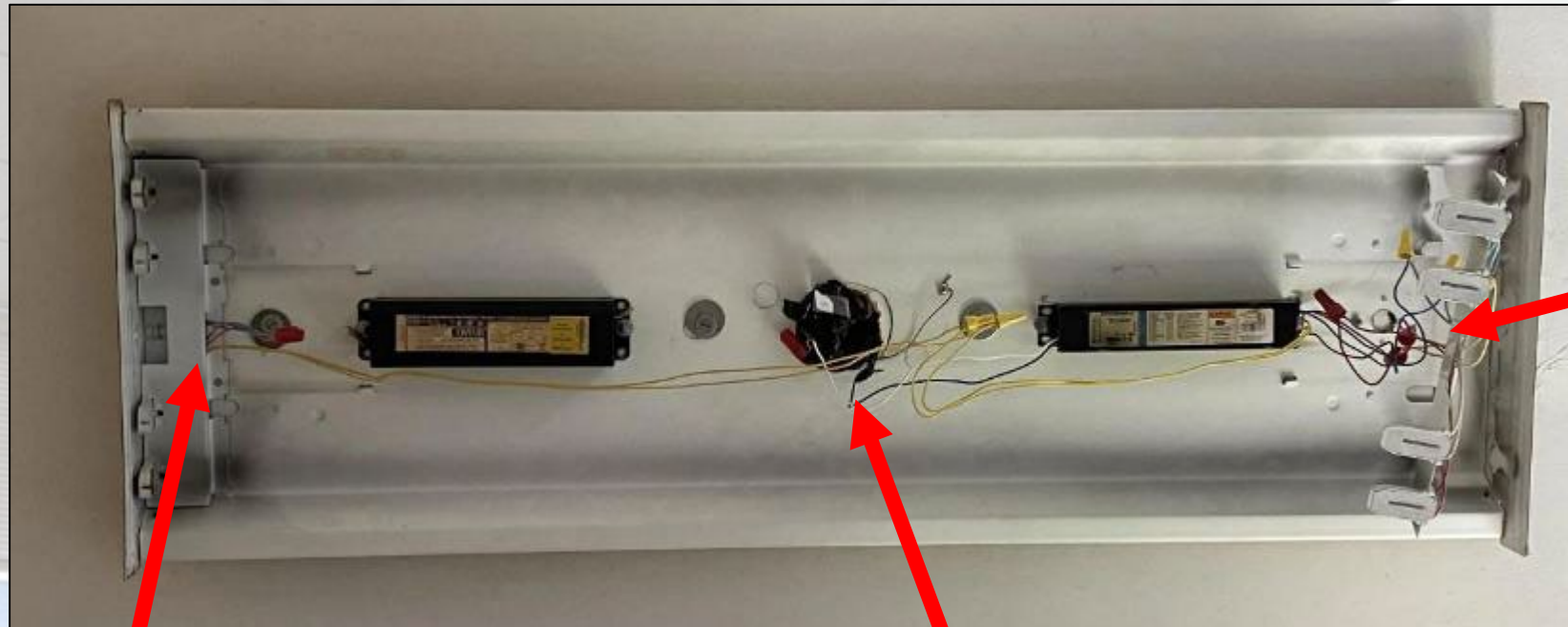
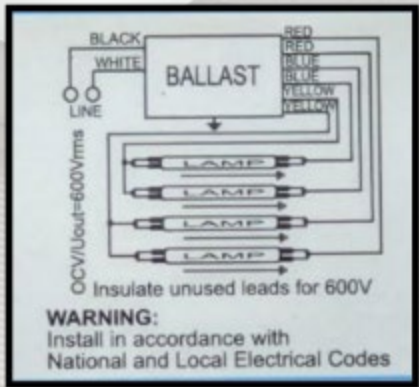
8 ft Type A or B FEIT tubes at ACE - \$35/pair



Check your local Habitat Restore store for LED bulbs, tubes, & fixtures

Wiring Inside A Fluorescent Fixture

- There is a ballast wiring diagram on the ballast label.
- Blue, Red, Yellow are standard wire colors to the tombstones.



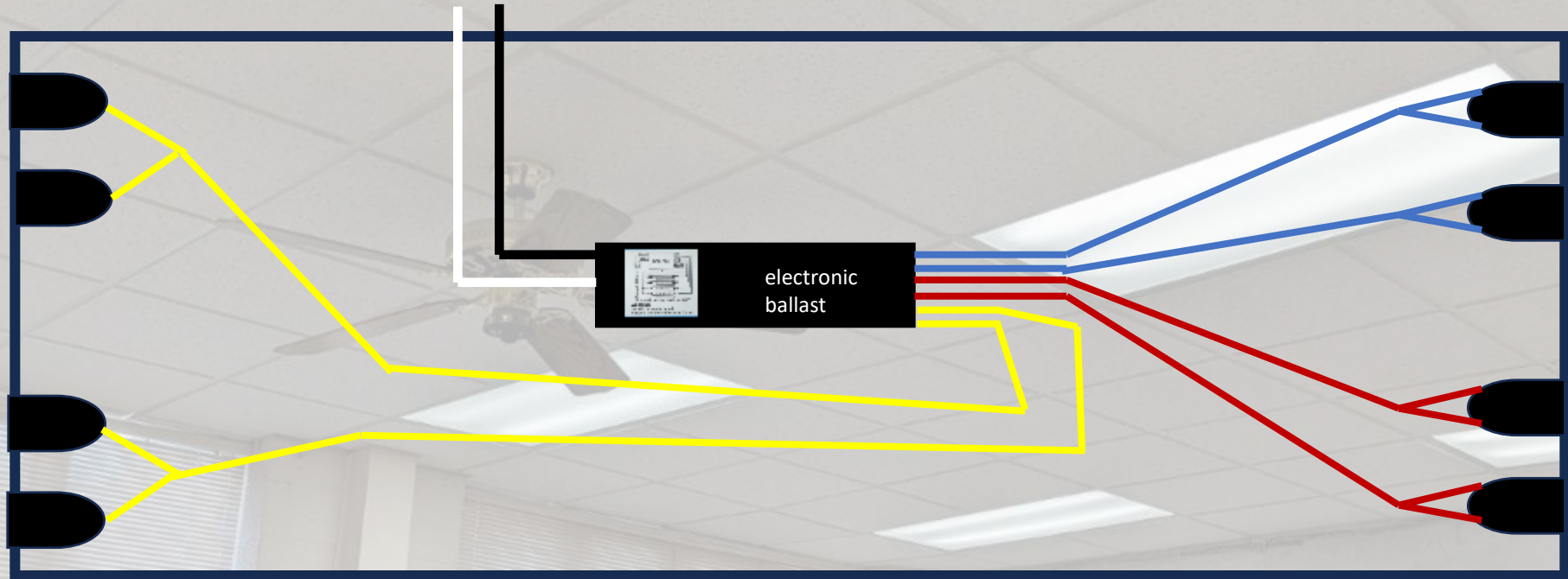
Blue and Red to other set of tombstones

Yellow wires to one set of tombstones

Power comes in the center into the fixture (sometimes an end) – 120v black, white, green/bare copper

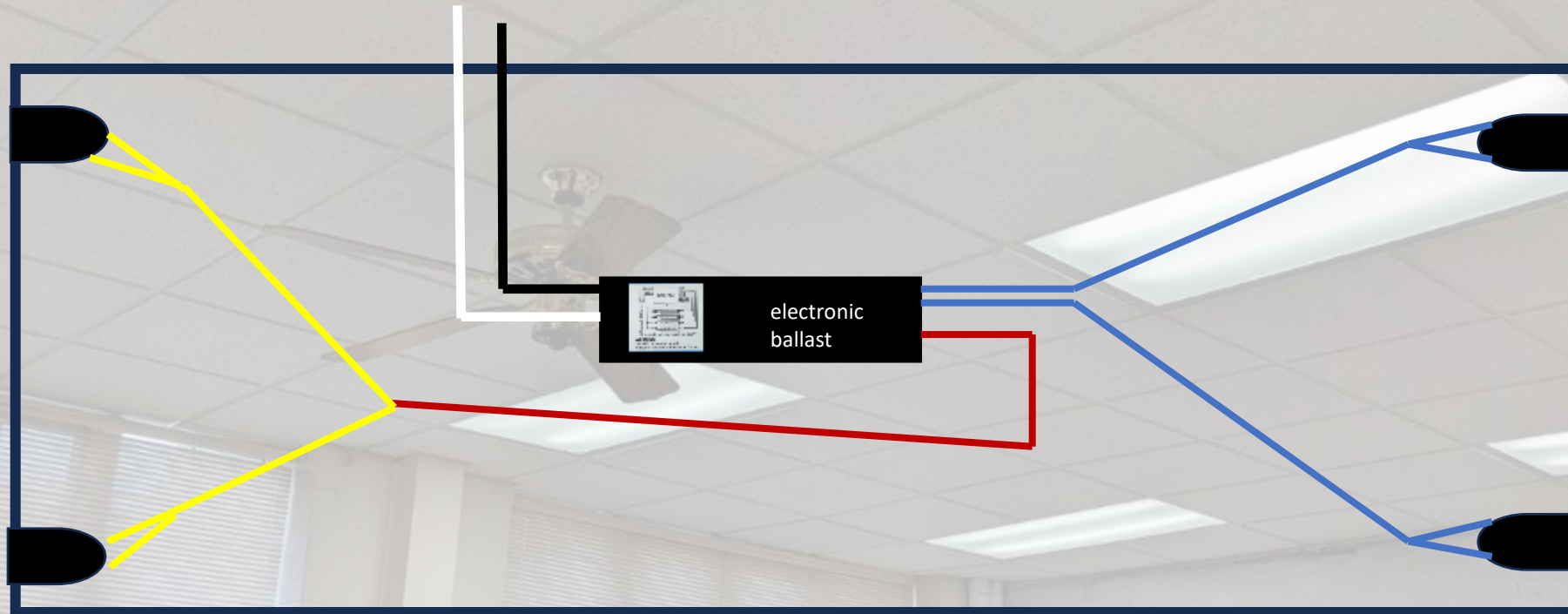
Wiring A 4-Tube Electronic Ballast

120 volts – black = hot/line, white = neutral



Wiring A 2-Tube Electronic Ballast

120 volts – black = hot/line, white = neutral



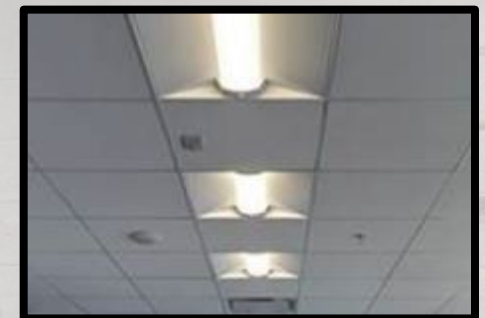
Energy Savings by Fluorescent Retrofit

T12 (4) 40w tubes with (2) T12 **magnetic** ballasts – **172 watts**

T8 (4) 32w tubes & (1) T8 **electronic** ballast – **110 -128 watts**

T8 (4) 15w LED tubes & (1) T8 **electronic** ballast – **62 watts**

New or Retrokit 2x2 or 2x4 LED troffer – **26 to 45 watts**



New LED Fixtures

Center Basket troffers vs. LED (flat) Panels



Center Basket troffers have better light distribution - throw more light to the sides.

LED panels mostly throw light downward.

- They are heavier fixtures – 10-15 lbs per 2x4 panel



High Intensity Discharge (HID) Lamps

HID Lamps

- Include High Pressure Sodium, Metal Halide, Mercury Vapor
- Requires a ballast to operate
- Long warm-up time ~ 10-15 minutes

LED Replacements:

- LED spot and floodlight fixtures
- “Corncob” or “paddle” bulbs
 - **ALL are ballast bypass bulbs; need to rewire fixture**
- “UFO” high bay fixtures
 - Now color and wattage selectable
 - Come with 6ft cord attached (“whip”)



Before & After Examples of Church Relamps



New Fixtures - Brookmeade Cong'l UCC Nashville - Fellowship Room



(8) 4-tube T12 fluorescent vs (8) LED troffers
1300w vs 320w

Lithonia STACK troffers - color and wattage selectable \$84-110 each

8ft Type B (FEIT) LED Tube Retrofits – Tower Hill UCC Camp in MI



Maintenance Room – (6) 60w T12 bulbs to (6) LED 25w T8 bulbs 360w >> 150w total

LED Relamp-Reballast – Offices at Tower Hill UCC Camp in MI



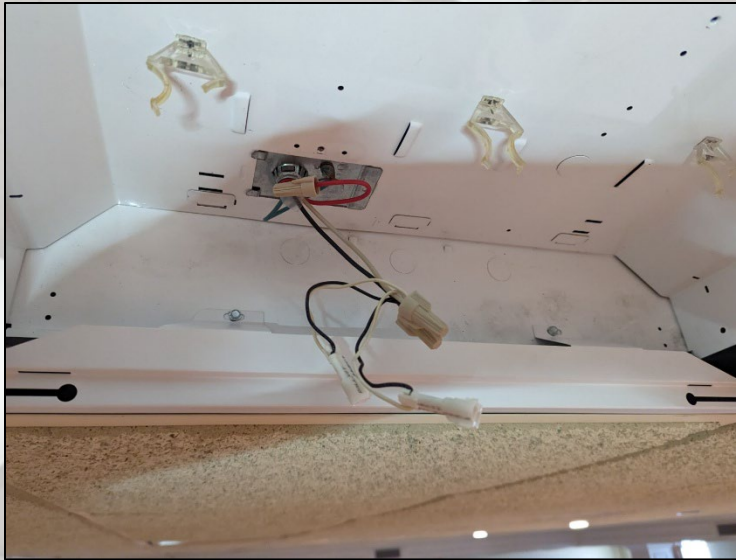
Offices – (4) 40w T12 bulbs to (4) LED 15w T8 bulbs 160w >> 60w total

LED Tube and Ballast Retrofits - First Congregational Moline IL



Music Rm: (21) T12 fixtures >> elec ballasts & Type A LED tubes
1680w down to 714w

Retrofit Kits for Fixtures - FCC Moline IL



Dining Rm – (16) 2x2 louvered troffers (3) 32w bulbs + ballast
e-conolight.com CREE LED 22w retrokits, replaced 10, elim 6

1600w vs 220w

Questions?

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