

Lighting



Important Considerations

- Quality of Lighting
- Watts vs. Lumens



Quality of Lighting

- Quality of life issue
- Don't convert poor quality lighting to poor quality energy-efficient lighting



Quality of Lighting Key Factors

- Minimize Glare
- Match Illumination Level to Task
- Keep Light Uniform
- Color Rendering Index of 80 or Greater
 - Definition: ability of light source to show up the colors of the objects being lit.



Quality of Lighting Key Factors

- Color Temperature – personal preference
 - Definition: color of light from light source itself
 - Warm – hot, white light (less than 3300 K)
 - Intermediate – neutral white light (3300 to 5300 K)
 - Cool – cold, white light (above 5300 K)

Watts vs. Lumens

- Watt = amount of **Energy** used
- Lumens = amount of **Light** given off

To avoid dim lighting when upgrading to lower wattage florescent lamps, make sure the LUMENS of replacement lamp match the LUMENS of the original lamp.



Common Problems

- Inappropriate Use of Incandescent Lighting
- Inappropriate Use of T12 Fluorescent Lamps
- Mix of T12 & T8 Fluorescent Lamps in Same Fixture
- Magnetic Ballasts
- Lack of Lighting Control
- Lack of Standardization



Problem: Inappropriate Use of Incandescent Lamps



Incandescent
One 60W
Lamp

Incandescent
Two 60W Lamps



Incandescent
Two 15W
Lamps

Troubleshooting Guide: Inappropriate Use of Incandescent Lamps

Solution: Replace with appropriate
energy efficient options

Example: (Self Install)

Old: Multiple Incandescent Strip
New: T8 or T5 Lamps with Electronic Ballasts



Troubleshooting Guide: Inappropriate Use of Incandescent Lamps

Solution: Replace with appropriate
energy efficient options

Example: (Self Install)

Old: Exit Sign with Incandescent lamps
New: LED lamps



Troubleshooting Guide: Inappropriate Use of Incandescent Lamps

Solution: Replace
with appropriate
energy efficient
options

Example: (Self Install)

Old: Incandescent lamp
in hallway fixture
New: Compact
Fluorescent options



Problem: Inappropriate Use of T12 Fluorescents



**T12 Lamps in
Recessed Ceiling
Application**



Troubleshooting Guide: Inappropriate Use of T12 Fluorescents

Solution:

- Replace with T8 Fluorescent Lamp
 - Higher Quality Light
 - Electronic Ballast
 - Simplifies Re-lamping



**Example: GARAGE T12 Fluorescent Lamps
Operated 24 hours, 7 days a week**

Troubleshooting Guide: Inappropriate Use of T12 Fluorescents

Solution:

- Replace with T8 Fluorescent Lamp
 - Higher Quality Light
 - Electronic Ballast
 - Simplifies Re-lamping



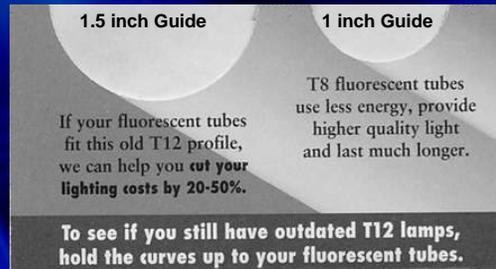
**Example: HALLWAYS
T12 Fluorescent Lamps
Operated 24 hours,
7 days a week**

Troubleshooting Guide: Hard to Tell T12 From T8 Lamps?

Solution:

- T12's are 1.5 inch diameter
- T8's are 1 inch diameter

Use this special business card to check to see if you have T12 or T8 lamps.



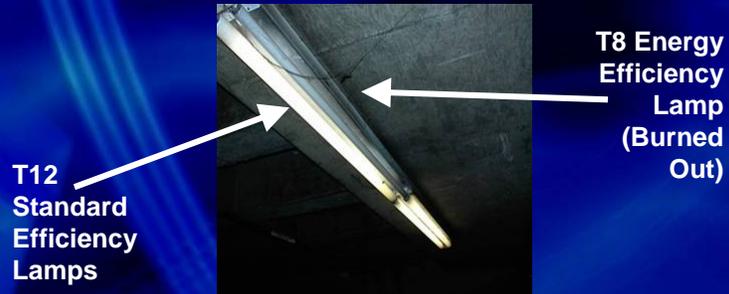
Problem: T12 & T8 Fluorescent Lamps in Same Fixture



**Troubleshooting Guide:
T12 & T8 Fluorescent Lamps in Same Fixture**

Solution

- Replace T8 fixtures with only T8 lamps



**Troubleshooting Guide:
T12 & T8 Fluorescent Lamps in Same Fixture**



Solution:

- Eliminate all T12 Fixtures
- Stock only T8 Lamps

Problem: Magnetic Ballasts

Electronic Ballasts

- 30% less energy use
- Better quality light
- Run cooler
- Last longer



Troubleshooting Guide: Magnetic Ballasts

Solution:

- Check to see if fixtures have magnetic ballasts
- Replace magnetic with electronic ballasts



Magnetic Ballasts



Electronic Ballasts

Troubleshooting Guide: Hard to Tell if Ballasts are Magnetic or Electronic?

Solution:

- Use Flicker Checker to check for magnetic ballast



Flicker Checker is a device that flickers under fixture with magnetic ballast.

Problem: Lack of Lighting Control

Solution:

- Install appropriate controls



Example: Utility Closet

Lights out reminder sign indicates possible application for installation of simple photocell control



Problem: Lack of Standardization



- Different types of fixtures and lamps used for similar applications in same building or complex.
- Additional fixtures installed without reference to existing fixtures.



Troubleshooting Guide: Lack of Standardization

Solution:

- Minimize lamp types in building or complex
 - Eliminate or replace fixtures which use odd, inefficient lamps
 - Standardize remaining fixtures as much as possible
 - Choose efficient, readily available lamp options for all fixtures



Troubleshooting Guide: Lack of Standardization

- Lamp Styles to Choose
 - Compact Fluorescent
 - T8 Fluorescent
 - LED (Exit Signs)
- Lamp Styles to Avoid
 - Incandescent
 - T12 Fluorescent
 - Mercury Vapor



Summary of Benefits

- More Efficient Re-lamping
- Maintenance Staff Time Saved
- Improved Safety/ Security of Building
- Better Quality Light for Tenants
- Reduced Blackouts and Brownouts
- Reduced Energy Use and Costs



Laundry



Common Problems With Laundry

- **Inefficient Laundry Equipment (Vertical Axis Washers)**
 - Excessive water & energy use
 - Not readily accessible to wheelchair tenants
- **Broken or Blocked Dryer Vents**
 - Excessive moisture build-up
 - Potential carbon monoxide threat
- **Lack of Ventilation**

Problem: Inefficient Laundry Equipment

Solution:
Replace with high
efficient washers
and dryers

Conserves BOTH
Water and Energy

Laundry Equipment
Supplied and
Maintained by
Contractor



Troubleshooting Guide: High Efficient Laundry Equipment



- **Tenant Education**
 - Washers require less laundry soap
 - Automatic locking doors on washers

Problem: Broken/Blocked Dryer Vent

Solution:

Repair or clean out dryer vents



Problem: Lack of Ventilation in Laundry Room

Solution:

- Repair existing ventilation
- Install new ventilation



Benefits of Typical Laundry Recommendation Package

- Reduces Maintenance
- Improves Facility Safety
- Better Washing Facility for Tenants
 - Accessibility
 - Less Wear & Tear on Clothes
 - Less Laundry Soap Required
- Reduces Energy Use and Costs



Water Usage



Common Problems with Water Usage

- High Flow Fixtures
- High Water Use Toilets
- System Leaks



Problem: High Flow Fixtures



Solutions:

- Measure flow rate of showers and sinks
- Install flow restrictors/aerators as appropriate
- Tenant Education

**Problem:
High Water Use Toilet**



Solutions:

- Replace high use toilets with water conserving models
- Tenant Education

Problem: Water Leaks

Solutions:

- Annually check all fixtures in building for leaks
- Tenant education
- Repair identified leaks quickly



Summary of Benefits

- **Improved Maintenance**
- **Increased Tenant Satisfaction**
 - Fewer Tenant Complaints
 - Improved Showers
 - More Hot Water Available
- **Reduced Energy Use and Costs**