

## WAREHOUSING & INDUSTRIAL

High bay – lighting fixtures are mounted above 18 to 20 feet

Low bay – lighting fixtures are mounted no higher than 18 to 20 feet

### Main warehouse

#### High Bay, Open & Staging Areas

- High wattage high pressure sodium or probe start metal halide: use pulse start metal halide, T5 or T8 fluorescent with electronic ballasts. Or LEDs.
- Skylights – use T5 or T8 fluorescent and electronic switchable ballasts with photo sensors to switch off the lamps not needed.

#### High Bay, Aisles

- If high wattage high pressure sodium or probe start metal halide – go to pulse start metal halide, T5 or T8 fluorescent with electronic ballasts
- Occupancy/Vacancy sensors

#### Low Bay, Open & Staging Areas

- Lower wattage high pressure sodium or probe start metal halide – go to pulse start metal halide, T5 or T8 fluorescent with electronic ballasts
- Skylights – use T5 or T8 fluorescent and electronic switchable ballast with a photo sensor to switch off the lamps not needed
- T12 fluorescent – go to T5 or T8 fluorescent with electronic ballast

#### Low Bay, Aisles

- If low-mid wattage high pressure sodium or probe start metal halide – go to pulse start metal halide, T5 or T8 fluorescent with electronic ballasts
- Occupancy/Vacancy sensors

#### Maintenance / Equipment / Utility

- Retrofit kits: T5 or T8 fluorescent with electronic ballasts
- Retrofit kits: LEDs
- Task lighting - LED or CFL
- If high ceiling heights with HID - go to pulse start metal halide, T5 or T8 fluorescent, or LEDs
- Occupancy/Vacancy sensors

#### Restrooms, Corridors, Stairways – some lights always on for egress / safety factor

- Retrofit kits: T5 or T8 fluorescent with electronic ballasts
- Retrofit kits: LEDs
- Bi-level or dimming fluorescent ballasts and lighting controls
- Occupancy/Vacancy sensors
- Recessed or Wall sconces – CFLs or LEDs

#### Exits / Entrances

- Retrofit kits: T5 or T8 fluorescent with electronic ballasts
- Retrofit kits: LEDs
- Motion sensors

#### Service Elevators

- Retrofit kits: T5 or T8 fluorescent with electronic ballasts
- Retrofit kits: LEDs

#### Docks

- LEDs, Pulse Start or High Pressure Sodium



## Lighting Upgrade Checklist for Commercial & Industrial Buildings

*Helping Facility Managers Save Energy and Money*

### Check It Out...

#### ALL BUILDINGS

- Light levels. Have a lighting design professional evaluate all spaces.
- Retrofit T12 fluorescent fixtures with T8 and T5 lamps with electronic ballasts, or LEDs
- Energy-saving lighting control options:
  1. Personal light control (users select preferred light level for tasks)
  2. Light level tuning (setting the appropriate light level for each space)
  3. High-end trim (setting the maximum light level for each space)
  4. Daylight harvesting (automatically dimming electric lights when daylight is present)
  5. Occupancy sensing (turning lights off when space is vacant)
  6. Demand Response/Load shedding (reducing lighting load at times of peak electricity pricing)
  7. Scheduling (automatically turning lights off or dim at certain times of the day)
- Preset scene and zone controls.
- Bi-level switching or continuous dimming using digitally addressable dimming ballasts.
  - Light level tuning (setting the appropriate light level for each space)
  - High-end trim (setting the maximum light level for each space)
  - Daylight harvesting (automatically dimming electric lights when daylight is present)
  - Occupancy sensing (turning lights off when space is vacant)
  - Demand Response/Load shedding (reducing lighting load at times of peak electricity pricing)
  - Monitoring (tracking lighting energy usage)
  - Reporting (running reports on lamp failures or energy usage to improve maintenance and operation)
  - Remote monitoring/management (Managing facilities lighting from anywhere)
- Daylighting
  - Maximize natural daylighting.
  - Use skylights
  - Configure spaces receiving natural daylight so the maximum number of occupants will benefit from the daylight to reduce energy use. This may mean locating open office areas near windows and private offices away from windows.
  - Continuous dimming ballasts can be used to smoothly dim or increase light levels minimizing detection by occupants whether adjusting for changing daylighting or in response to load shedding.
  - Reduce glare and solar heat gain with controllable window shades.
  - Utilize building energy management systems to monitor energy usage for lighting and HVAC.

## **OFFICE BUILDINGS - INTERIOR AND EXTERIOR**

### **Offices**

- Retrofit kits: T5 or T8 fluorescent with electronic ballasts
- Retrofit kits: LEDs
- Daylight harvesting – dimming ballast and controls
- Multi-level lighting (bi-level switching or continuous dimming) ballasts
- Occupancy/Vacancy sensors
- Recessed down lighting - retrofit halogen, CFLs, or LEDs
- Accent lighting - retrofit halogen or LEDs
- Task lighting - retrofit LEDs, linear fluorescent or CFLs
- Wall sconces – retrofit LEDs or CFLs
- Personal light control
- Controllable window shades

### **Conference Rooms or Classrooms (same as offices plus...)**

- Preset scene and zone controls
- Moveable partition walls – digitally addressable dimming ballasts and controls

### **Restrooms, Corridors, Stairways – some lights always on for egress / safety factor**

- Retrofit kits: T5 or T8 fluorescent with electronic ballasts
- Retrofit kits: LEDs
- Bi-level or dimming fluorescent ballasts and lighting controls
- Occupancy/Vacancy sensors
- Recessed or Wall sconces – CFLs or LEDs

### **File Rooms & Storage Areas**

- Retrofit kits: T5 or T8 fluorescent with electronic ballasts
- Retrofit kits: LEDs
- Occupancy/Vacancy sensors
- Bi-level fluorescent ballasts with lighting controls

### **Cafeterias, Multi-purpose, Health & Fitness Rooms**

- Retrofit kits: T5 or T8 fluorescent with electronic ballasts
- Retrofit kits: LEDs
- Bi-level fluorescent ballasts with lighting controls
- Daylight harvesting – dimming ballast and controls where daylight is available and fixed-light output ballast away from the daylight area
- Recessed down lighting: use CFLs or LEDs
- Wall sconces: use CFLs or LEDs
- Track lighting - use halogen, LED or ceramic pulse start metal halide
- Controllable window shades
- Occupancy/Vacancy sensors
- Preset scene and zone controls
- Audio visual / preset scene and zone controls

### **Foyers / Atriums / Reception / Lobbies**

- Signage – go from fluorescent and neon to LEDs
- Replace probe start metal halide with pulse start metal halide lamps and electronic ballasts
- Induction systems for high ceilings
- Cove lighting: use T5 or T8 fluorescent with electronic ballast, or LEDs
- Daylight harvesting
- Track lighting - use halogen IR, LED or ceramic pulse start metal halide with electronic ballasts
- Task lighting – use CFLs or LEDs
- Recessed down lighting - use CFLs or LEDs
- Recessed or surface mounted down lighting at higher mounting heights - LEDs
- Wall sconces - use CFLs or LEDs
- Controllable window shades
- Occupancy/Vacancy sensors
- Astronomical time clock
- Preset scene and zone lighting control

### **Elevators**

- Retrofit kits: T5 or T8 fluorescent with electronic ballasts
- Retrofit kits: LEDs

### **Exits / Entrances**

- Retrofit kits: T5 or T8 fluorescent with electronic ballasts
- Retrofit kits: LEDs

### **Landscaping**

- Use LEDs or pulse start metal halide
- Photo sensors or time clocks for time of day control
- Use bi-level walkway lighting
- Flag lighting - go to pulse start metal halide or LEDs

### **Parking Garage**

- Use LEDs
- Daylight sensors near outside walls
- LED signage for messaging and exits

### **Outdoor Area / Parking / Roadway**

- Use LEDs
- If Probe start metal halide, go to pulse start metal halide
- HPS is energy efficient and cost effective