PART 1   GENERAL

1.01   Lighting design:

   A. Reference “UAF Facilities Services Guidelines for Average Illumination Levels”.

   B. It is recognized that these standards are updated irregularly and lighting technology is changing rapidly.

   C. Design lighting levels in building with contiguous areas having average illumination levels differing by not more than a factor of 3. Intent is to provide “even” lighting throughout a building.

   D. Nightlights are not required or desired.

   E. Use 32 watt, T8 lamps for general illumination in classrooms, corridors, rest rooms and offices with ceilings 12’ or less.

   F. Use 54 watt, T5 High Output lamps for high bay areas, and areas requiring unusually high levels of illumination. LED fixtures will be considered for areas requiring dimming and/or where lamp replacement is unusually difficult (ex over fixed seating or sloped floors).

   G. Use LEDs controlled by occupancy sensors in walk-in freezers and chillers.

   H. Provide light sensors to extinguish or dim lights when sufficient daylight is present. Coordinate with architects for appropriate windows and window treatments to promote daylight harvesting.

   I. Compact fluorescent luminaires:

      1. Shall not be used in new construction.

      2. In remodels, compact fluorescent luminaires may be reused and renewed by replacing ballasts and lamps.

1.02   Lamp life:

   A. Luminaires located at or less than 12 feet above floor: 36,000 hours or greater.

   B. Luminaires located greater than 12 feet above floor: 50,000 hours or greater.

   C. Luminaires located where lamp replacement is difficult (e.g.: auditoriums with anchored chairs and/or desks) lamps will have a minimum life of 50,000 hours.
1.03 Recessed linear luminaires at the junction of ceiling and walls (cove lights) are not allowed. Ceiling mounted wall wash fixtures are to be mounted no closer than 24 inches from the wall to allow for maintenance.

1.04 In public areas, such as corridors, do not use fixtures with louvers. Intent is to avoid irregular illumination of vertical surfaces ("cave" effect). Use louvered fixtures only where glare control is required.

1.05 Lenses/Louvers:
   A. Simple flat-shape lay-in or framed lenses are preferred. Lenses: Made of minimum \( \frac{1}{8} \) inch virgin acrylic, resistant to discoloration, with an A12 prismatic type diffuser pattern.
   B. Polystyrene lenses are prohibited.

1.06 Restroom Light control:
   A. Provide occupancy sensors.
   B. Where there are interior partitions, use ceiling mounted ultrasonic or dual technology sensors.
   C. Microphonic sensors will be considered.
   D. No sensor off switches to be accessible by users.

1.07 Occupancy / vacancy sensors:
   A. Ceiling mounted ultrasonic, infrared, or dual technology sensors except for small rooms such as partitionless restrooms and storage closets.
   B. Sensors mounted in corners of rooms are discouraged due to shadowing in coverage zones due to obstructions installed during and/or after construction.
   C. Occupancy sensors shall activate lighting immediately upon entry or sensor failure.
   D. Sensors shall have an electronic timer adjustable from 30 seconds to 30 minutes time-out and a separate adjustment for detection sensitivity.
      1. Set sensor timers at 30 minutes for offices, public areas, storage areas, and restrooms.
      2. Where LED luminaires are controlled, this requirement may be waived.

1.08 Directional luminaires such as “can lights”, decorative spotlights, task lights, or other type lighting with directed light: light emitting diode (LED) type luminaire and/or lamp.
1.09 Compact fluorescent lighting:
   A. Use replaceable lamps and permanent ballast.
   B. Lamp life to meet requirements stated elsewhere in this document.

1.10 Provide lighting in crawl spaces, pipe chases, and utilidors.
   A. When control switch is located outside these areas, provide a lighted switch or pilot light to indicate when lights are on. Label switch to indicate that the illuminated state of lighted switch or pilot light indicates whether area lights in illuminated area are on or off.
   B. Provide guards on all luminaires of this category where they are likely to come in contact to personnel or tools moving in the area.

PART 2  PRODUCTS

2.01 Occupancy / vacancy sensors: Hubble, Wattstopper, Leviton, Lutron

2.02 All lamps containing mercury to be the low mercury, “Eco”, type.
   A. General illumination color temperature: 4100 Kelvin.

2.03 T8 and T5 linear fluorescent lamps:
   A. Lamps to be linear (straight) type. U-tubes, such as GE Moduline type, fluorescent lamps not acceptable.
   B. Lamp color temperature: 4100 Kelvin.
   C. Color Rendering Index (CRI) in excess of 85.
   D. 48” lamp wattage rating: 32 watts at a lamp current of 265 milliamperes or better.
   E. Lamp-life for T8 and T5 lamps shall be per requirements stated elsewhere in this document.
   F. Medium bi-pin.
   G. Programmed rapid start for T8 and T5 lamps.
   H. General Electric, Osram/Sylvania, or Phillips.

2.04 Compact fluorescent lamps:
   A. Lamps over 8” in length shall not be used.
B. Lamp color temperature shall be 4100 Kelvin.

C. Color rendering index (CRI) in excess of 85.

D. Minimum life of per requirements stated elsewhere in this document.

E. General Electric, Osram/Sylvania, or Phillips.

2.05 Rapid Start Ballasts:

A. Operating frequency greater than 20 kHz with less than 2 percent flicker.

B. Power factor of .95 nominal or higher. For F32T8 lamps power factor shall be 0.99 or higher.

C. Total Harmonic Distortion (THD) less than 10%.

D. Class A or better sound rating.

E. Rapid Start Ballast: Maximum crest factor of 1.5.

F. A ballast factor of 0.85 or better.

G. A ballast efficacy factor greater than 2.54 for one F32T8 lamp, 1.44 for two F32T8 lamps, 0.93 for three F32T8 lamps, and 0.73 for four F32T8.

H. Listed by UL and certified by CBM or CSA.

I. Warranty for five (5) years against defective materials and workmanship for replacement parts and installation.

J. High performance electronic ballasts: Osram\Sylvania, Advance, or Universal Lighting Technologies, Inc., Alternate Brand Request or Substitution Request required.

K. Ballast is not harmed by operating with a failed or absent lamp.

L. Ballast shall meet applicable FCC regulations.

M. In general, wattage of the ballast and lamp system should not exceed the product of the nominal lamp wattage times the number of lamps used in a normal configuration.

2.06 Compact fluorescent ballasts:

A. Operating frequency greater than 20 KHz.

B. Power factor of 0.95 or higher.
C. THD less than 10%.

D. Class sound rating.

E. Maximum crest factor 1.5.

F. A ballast factor of 0.85 or better.

G. Listed or labeled by UL and certified by CBM or CSA.

H. Ballast is not harmed by operating with a failed or absent lamp.

I. Ballast shall meet applicable FCC regulations.

J. High performance electronic ballasts: Osram\Sylvania, Advance, Universal Ballast, Alternate Brand Request or Substitution Request required.

K. Ballast shall have lamp shutdown circuitry for end of lamp life protection.

L. Warranty for five (5) years against defective materials and workmanship for replacement parts and installation.

2.07 High intensity discharge ballasts shall not be used.

2.08 LED luminaires:

A. Driver life to exceed that of LED components.

B. Automatic compensation for drift of LED color and lumen output.

C. LED and driver components may be replaced without replacing fixture.

2.09 Luminaires with air return path through lamp cavity are not acceptable.

PART 3 EXECUTION

3.01 Lighting switches shall not be reachable by persons within a shower, tub, sauna, or other similar enclosure. Locate switches outside the room or enclosed area, or at least 6’ from a shower or tub.

3.02 Where occupancy sensors control lighting, install them ahead of lighting switches. Intent is to allow occupants to manually control their lighting.

3.03 Light switches illuminated in off position:

A. At least one light switch at the entry(s) to mechanical and electrical rooms.
B. All light switches in utilidor spaces.

3.04 Not allowed: remote ballasts.

3.05 Provide for convenient luminaire cleaning, re-lamping, repair or replacement.

A. Provide catwalks, overhead access, winches or lowering mechanisms for fixtures mounted in hazardous or other locations not readily accessible.

B. Do not install lights where scaffolding must be built for maintenance.

C. Lights in stairwells shall be:

1. Accessible from a 6 foot ladder and no higher than 10 feet above landing.

2. Not be over or near stair treads or railings to avoid personnel working off center of ladder.

3.06 Fluorescent lamps used with dimming ballast will be burned-in for 100 hours at 100% power prior to dimming.

3.07 Pendant mounted luminaires with cords: Use a similar attachment method for cord on all fixtures for uniformity of appearance.

END OF SECTION