

SECTION 16501

LAMPS, BALLASTS, ACCESSORIES

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section describes general requirements, products, and methods of execution relating to lamps, ballasts and related products approved for use at ANC.

1.2 QUALITY ASSURANCE

- A. Lamps specified in this Section shall be as manufactured by Osram Sylvania, Philips, General Electric or Venture.
- B. Verify that the fixture types submitted for approval contain components complying with the product specifications of this section.

PART 2 - PRODUCTS

2.1 INCANDESCENT LAMPS

- A. Incandescent lamps installed in air handling units or mechanical spaces shall be extended life (A/99) with a design voltage of 130 volts, suitable for operating between 120 and 130 volts.

2.2 FLUORESCENT LAMPS

- A. Unless otherwise approved by ANC fluorescent lamps shall be tri-phosphor type, 32 watt, T-8, 3500°K, CRI 82 or greater, RE835, 2950 initial lumens. Four foot fluorescent lamps shall be low mercury type and shall meet the requirements for classification as non-hazardous waste when subjected to the Toxic Characteristic Leaching Procedure (TCLP) prescribed by the Environmental Protection Agency at end of life. Low mercury lamps shall be clearly identifiable from other lamp types. Philips "Alto" or as approved.
- B. Unless otherwise approved by ANC, compact fluorescent lamps (long "biax", short "biax", double "biax", triple tube, or 2-D types) shall be amalgam type, 4 pin bases (suitable for operation on electronic ballasts) 3500°K, CRI 82, RE835. To the extent that they are commercially available all compact fluorescent lamps shall be low mercury type as noted in 2.2.A above.
- C. Unless otherwise approved by ANC, low temperature, high output (800ma) fluorescent lamps shall be tri-phosphor type, T-12, 3500°K, CRI 82 or greater, RE835.
- D. Lamps shall comply with all provisions of this specification.

2.3 HIGH INTENSITY DISCHARGE LAMPS

- A. Metal halide lamps shall be Venture "Performance Plus" for lamps greater than 150 watts and Venture "Precision Plus" for lamps less than 150 watts or as approved with pulse start technology. Lamps shall be 3700°K nominal color temperature with lumen maintenance greater than 80%, hot restrike time less than 4 minutes.

2.4 FLUORESCENT BALLASTS - ELECTRONIC HIGH OUTPUT (800MA)

- A. High output fluorescent ballasts shall be electronic type with a power factor greater than 95%, CBM rated, ETL tested and meet applicable UL standards and be so labeled. All ballasts shall be Class "P".
- B. Ballasts shall be sound rated "B" or better, and be so labeled. Ballasts shall meet the requirements of FCC Rules and Regulations, Part 15, Class A.
- C. Ballasts shall have a frequency of operation of 20 kHz or higher and operate lamps without visible flicker. Input current THD shall be below 20% at maximum ballast lamp rating. Ballasts shall withstand transients as defined in IEEE Publication 587, Categories A and B.
- D. Ballasts shall be Advance Electronic type or as approved and shall maintain constant light output over operating ranges of 90V to 145 V (120V ballasts) and 200V to 320V (277V ballasts).
- E. Ballasts installed in unheated areas, freezers, coolers, garages or areas that at some time may approach ambient exterior temperature shall have a minimum starting temperature of -20 degrees Fahrenheit.

2.5 FLUORESCENT BALLASTS - ELECTRONIC NON-DIMMING

- A. Fluorescent ballasts shall be constant wattage electronic type with a power factor greater than 95%, ballast factor between 0.87 to 1.00, crest factor less than 1.55, CBM rated, ETL tested and meets applicable UL standards and be so labeled. The ballasts shall be Class "P".
- B. Ballasts shall be sound rated "A" and so labeled. Ballasts shall meet the requirements of FCC Rules and Regulations, Part 15, Class A.
- C. Ballasts shall have a frequency of operation of 20 kHz or higher avoiding operating frequencies of 33kHz – 40kHz and 66kHz – 80kHz (to minimize Infrared interference). Ballasts shall operate lamps without visible flicker. Input current THD shall be below 10% at maximum ballast lamp rating. Ballasts shall withstand transients as defined in IEEE Publication 587, Categories A and B.
- D. Ballasts shall provide "rapid start" lamp starting, and shall maintain filament heating after starting. "Instant start" is not acceptable.
- E. Ballasts shall have a full 5-year warranty.
- F. Ballasts shall be Motorola, Advance, or MagneTek or as approved, and shall maintain constant light output over operating ranges of 108V to 132V (120V ballasts) and 249V to 305V (277V ballasts).

2.6 COMPACT FLUORESCENT BALLASTS - ELECTRONIC NON-DIMMING

- A. Non-dimming compact fluorescent ballasts shall be electronic type with a power factor greater than 95%, ballast factor greater than 0.87, low inrush current (less than 25 times operating current), CBM rated, ETL tested and meet applicable UL standards and be so labeled. The ballasts shall be Class "P" with automatic reset.
- B. Ballasts shall be sound rated "A" and so labeled. Ballasts shall meet the requirements of FCC Rules and Regulations, Part 15, Subpart J, and Part 18.

- C. Ballasts shall produce a sinusoidal output waveform and have a frequency of operation of 27 kHz or higher. Flicker shall not exceed 3%. Input current THD shall be below 10% with the third harmonic below 5% at maximum ballast lamp rating. Lamp crest factor shall be less than 1.55. Ballasts shall withstand transients as defined in IEEE Publication 587, Categories A and B.
- D. Ballasts shall provide reliable starting down to 0°C.
- E. Ballasts shall provide "preheat start" or "rapid start" lamp starting. "Instant start" is not acceptable.
- F. Ballasts shall provide end of life lamp protection.
- G. Ballasts shall have a full 3-year warranty.
- H. Ballasts shall be Energy Savings, Inc., as approved and shall maintain constant light output over operating ranges of 90V to 145V (120V ballasts) and 200V to 320V (277V ballasts).

2.7 FLUORESCENT BALLASTS – CONTROLLABLE ELECTRONIC DIMMING

- A. Controllable fluorescent dimming ballasts shall be electronic type with a power factor greater than 98% at full light output and greater than 90% throughout the control range. Ballasts shall meet applicable UL standards and be so labeled. The ballasts shall be Class "P".
- B. Ballasts shall be sound rated "A" and so labeled. Ballasts shall meet the requirements of FCC Rules and Regulations, Part 18 RFI/EMI.
- C. Ballasts shall have a frequency of operation of greater than 40 kHz and operate lamps without visible flicker. Input current THD shall be below 10% at maximum ballast lamp rating.
- D. Ballasts shall meet ANSI 62.41 Category A standards for transient voltage protection.
- E. Ballasts shall meet ANSI C82.11 standards for harmonic distortion.
- F. Ballasts shall provide smooth and continuous dimming without flicker down to 5% light.
- G. Ballasts shall be capable of striking lamps at any light level without first flashing to full light.
- H. Ballasts shall be programmed start.
- I. Ballasts shall be controllable via a Class 1 or Class 2 low voltage 0-10VDC control circuit.
- J. Ballasts shall operate from a nominal line voltage of 277 volts (200-305 volts). Ballasts shall maintain a constant light output with a line voltage variation of $\pm 10\%$
- K. Ballasts shall be Advance Mk VII controllable electronic dimming ballasts or as approved.

2.8 HIGH INTENSITY DISCHARGE LAMP BALLASTS

- A. High Intensity discharge lamp ballasts shall be of the regulator type (constant wattage). The ballast shall be high power factor (95%) and operate the lamp satisfactorily with a voltage variation of plus or minus 13%. Provide ballast with an integral ignitor for pulse start Metal Halide lamps.

2.9 TAMPERPROOF-TYPE FIXTURES

- A. Furnish one tamperproof screwdriver to ANC Electrical Shop of each type required by fixtures specified on this project.

2.10 INCANDESCENT DIMMERS

- A. Refer to Section 16140.

2.11 FLUORESCENT DIMMERS

- A. Refer to Section 16140. Dimmers shall be coordinated with ballasts and shall be fully compatible.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Fixtures with integral ballasts shall have the ballast installed and prewired at the factory.
- B. Fixture pendants, canopies, blank sections, corners, tees and other such accessories shall be finished to match their respective fixture.
- C. Fluorescent lamps on fluorescent dimmers shall be aged 100 hours at full brightness prior to operation at reduced brightness.
- D. Fluorescent dimming ballasts shall be installed per manufacturer's recommendations.
- E. Tandem wiring harnesses, receptacles and internal fixture wiring shall be factory assembled and receptacles shall be installed in all pairs of fluorescent fixtures which share a single two-lamp ballast. All wiring harnesses shall include an integral copper grounding conductor, and be approved for use in air plenums.

END OF SECTION