PART 1  GENERAL

1.01  SUMMARY

A. Section Includes:
   1. Ballasts and accessories for lighting equipment.

B. Related Sections:
   1. Section 16501 - Lamps
   2. Section 16510 - Lighting Fixtures
   3. Section 16530 - Site Lighting

1.02  REFERENCES

A. Specify Underwriters Laboratories (UL) or Electrical Testing Laboratories (ETL) listed equipment, assemblies and materials.

B. Where appropriate, refer to current ANSI and NEMA Standards for material ratings.

C. All ballasts shall be UL and CBM listed.

1.03  SUBMITTALS

A. Require submittals under the provisions of Section 16010 - Basic Electrical Requirements and 01300 - Submittals.

PART 2  PRODUCTS

2.01  MANUFACTURERS

A. Ballasts in Order of Preference - Electronic
   1. Motorola
   2. Advance
   3. Magnetek
   4. Others only by approval of University

B. Ballasts in Order of Preference: Standard core and coil.
1. Advance

2. Universal

3. Others only by approval of University

C. Use of Ballasts: Electronic ballasts shall be used in all new luminaries on a project, in compliance with manufacturers recommendations. Standard core and coil ballasts will only be allowed as replacements and on individual use by case basis with UCB permission only.

2.02 MATERIALS

A. Fluorescent Ballasts - Electronic Rapid Start Ballasts:

1. Provide electronic ballasts for all four foot rapid start T-8 (and T-12) lamps with voltage as indicated on the plans and luminaire schedule. The ballast shall deliver normal lamp life and must be interchangeable with electromagnetic ballasts. The light output shall not vary in response to an input voltage variance of less than 10% rated voltage. Drive output shall be greater than 25 kHz with lamp flicker less than 2%.

2. The ballast Total Harmonic Distortion shall be less than 10% with the third harmonic (180 Hz) distortion less than 8%.

3. The ballast shall have a crest factor of less than 1.7 and shall have transient protection which meets IEEE 587, category A (ANSI C62.41) requirements.

4. The ballast shall have a power factor of 0.98 or higher and shall have a ballast efficiency of 90% or higher.

5. The ballast shall be UL listed Class P and shall have a sound rating better than A.

6. The ballast electromagnetic interference shall be less than 54 dB from 450 kHz to 30 MHz (FCC CFR 47 Part 18 requirements).

7. The manufacturer shall provide a full five year warranty beginning at time of substantial completion. The manufacturer shall replace any and all failed ballasts within 48 hours of notification. The manufacturer shall provide the labor for warranty replacements, phone number and Fax number to report these outages and updates of those numbers.

8. The ballasts shall be Advance Mark V or Motorola. All other manufacturers shall request prior approval and supply test data from an independent testing laboratory to substantiate compliance with specifications.

B. Instant Start High Ballast Factor Ballasts:

1. The electronic ballast shall be provided with integral leads, color coded to ANSI standard C82.11 (latest version).
2. The “High Frequency” electronic ballast shall operate lamps at a frequency of 20 KHz or higher without visible flicker.
3. The electronic ballast’s input current shall have “Total Harmonic Distortion: (THD) of less than 20% when used with primary lamp.
4. The electronic ballast shall have a “power Factor: greater than 98% when used with primary lamp.
5. The electronic ballast shall have “Lamp Current Crest Factor” of less than 1.7.
6. The electronic ballast shall support a sustained short to ground or open circuit of any output leads without damage to ballast.
7. The electronic ballast shall have an audible noise rating (Class A) or better.
8. Ballast shall meet the requirements of the Federal Communications Commission rules and regulations, part 18, for non-consumer equipment, ANSI C82.11 standards regarding harmonic distortion, ANSI C62.41 Cat. A for transient protection.
9. The electronic ballast shall be Underwriters Laboratories (UL) listed (Class P) and CSA Certified where applicable.
10. The electronic ballast shall carry a five year warranty.

C. Fluorescent Ballasts - Standard Ballast:

1. Magnetic ETL-CBM certified Premium Class P, energy saving, sound level “A” rated, high power factor with built-in auto resetting overload and overheat protective devices. Order of preference is Advance Mark III, Universal type SLH.

2. Low temperature ballasts shall be rated for minus 20 degree F for outdoor application.

C. HID Ballasts:

1. Constant wattage auto transformer type suitable for low temperature operation.

2.03 CONTROLS

A. Load Shed - Luminaires shall be provided with multiple ballasts to allow emergency load shed per 16010.2.03

B. Lighting Controllers - Photocells, time clocks, contactors, etc. shall be of normal proven products of a known manufacturer.

PART 3 EXECUTION

3.01 INSTALLATION

A. Where high output fluorescent ballasts or HID ballasts are used in interior locations which have low ambient sound levels, i.e. libraries, auditoriums, classrooms, offices, etc., remote mount the ballasts in an adjacent area where the noise will not be objectionable. See Section 16160 - Cabinets and Enclosures for requirements
B. All projects which involve remodel of complete rooms or areas, electronic ballasts shall be used. New construction shall use rapid start ballasts. Where energy savings is a concern Instant start my be used with written permission. Low Ballast Factor instant start ballasts may only be used with written University permission.

END OF SECTION