SECTION 15170D - MOTORS

A. GENERAL

1. Section Includes:
   a. Common motor requirements, which are integral components of Division 15 equipment.

2. Application
   a. Specify manufacturers standard motor where practical.
   b. In cases where the manufacturers standard conflicts with this guideline, resolve with the University before releasing specification.
   c. Specify motors smaller than 1/2 hp to be single phase and motors 1/2 hp and larger to be poly-phase.
   d. Specify variable-speed motors with solid state, variable frequency controllers to be coordinated with the controller manufacturer, so as to optimize efficiency and minimize noise generation.
   e. Specify “energy efficient” motors, except for intermittent or short operating periods. Refer to NGMA MG 1 for design guidance.

B. QUALITY ASSURANCE:

1. Specify motors, rated 460 volts and below, to be manufactured by one of the following:
   b. Louis Allis Company.
   c. Siemens Energy and Automation, Inc.
   d. U.S. Electrical Motors.
   e. Reliance.
   f. Toshiba.

C. COMPLIANCE SUBMITTALS:

1. Generally standard HVAC equipment will be acceptable with standard motor. However, special equipment and/or special circumstances may require that motors be verified to meet specific requirements as described in submittals.

D. GENERAL DESIGN AND CONSTRUCTION REQUIREMENTS:

1. Specify:
   a. Full voltage starting.
   b. Suitable for operation at an altitude of 800 feet above mean sea level.
c. Indoor motors suitable for continuous operation at ambient temperature to plus 50 degrees C.
d. Squirrel-cage rotors.
e. 1.0 service factor to equal or exceed the horsepower required to drive the connected equipment under design conditions specified and within normal operating ranges.
f. Horsepower required to drive the connected equipment under any operating condition.

E. SINGLE PHASE MOTORS, 1/2 HORSEPOWER AND SMALLER:

1. Specify:
   a. Enclosures to be fabricated of steel.
   b. Horizontal motors to be mounted on common baseplate with driven equipment.
   c. Enclosures to be totally enclosed nonventilated.

F. POLYPHASE MOTORS, 1/2 - THROUGH 399 HORSEPOWER:

1. Specify:
   a. Service factor of 1.15.
   b. Enclosures to be fabricated of cast iron.
   c. Enclosures to be totally enclosed nonventilated or totally enclosed fan cooled.
   d. Bearings to be anti-friction type, with an AFBMA L-10 rating life of not less than 80,000 hours at rated speed, under the radial and/or thrust loadings encountered with normal operating ranges. The thrust loading, corresponding to an AFBMA L-10 rating life of 5,000 hours at rated speed, to not be exceeded under any operating condition of the motor or the driven equipment.
   e. Electrically insulated bearings to prevent damage due to stray shaft currents.
   f. Each horizontal motor to be mounted on a common baseplate with the drive equipment, or to be furnish with separate sole plates and subsole plates to permit removal of the motor without disturbing the alignment of the driven equipment.
   g. Torque characteristics of each motor at all voltages from 90 to 110 percent rated voltage, as required to accelerate the motor and driven equipment to full speed without damage to the motor or the driven equipment.
   h. Insulation to be Class F, with Class B temperature rise at rated horsepower in accordance with NEMA MG 1.
   i. Motor sound levels to be coordinated with driven equipment sound levels to meet the overall sound levels specified. The motor "A" weighted sound pressure level is not, in any event, to exceed 85 dB when measured to conform to IEEE 85 at a reference distance of 1 meter.
   j. Motors to be special high efficiency and high power factor design, including the following design features:
      1. Low loss lamination steel.
2. Increased stator and rotor length.
3. Increased winding cross section.
4. High efficiency cooling fan design.

END