

SECTION 230513 - ELECTRIC MOTORS, PREMIUM EFFICIENCY TYPE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-01 Specification sections, apply to work of this section.
- B. Division 26 – Electrical.

1.2 SCOPE

- A. This Section describes electric motors which are higher efficiency. These motors require less energy than standard electric motors which do not meet this specification.
- B. This specification covers 3/4 HP or larger horizontal, 3 phase, integral horsepower, drip proof, squirrel cage induction motors in the NEMA frame sizes through 449.

1.3 RELATION TO OTHER WORK

- A. Refer to the section, "General Mechanical Provisions", for related requirements. Refer to other sections of Division-23 and to all other applicable portions of the Drawings and Specifications.

1.4 STANDARDS

- A. All motors shall be in accordance with the latest version of NEMA Standard MG-1. Motors shall also comply with the applicable portions of the National Electric Code.

1.5 SUBMITTALS

- A. Independent motor submittals for motors that are part of air handling unit or pumping equipment shall be provided for all motors 1 HP or greater.

PART 2 - PRODUCTS

2.1 VOLTAGE FREQUENCY

- A. Motors through 100 hp shall be rated 230/460 volts with 200 or 575 volts as optional; motors above 100 hp shall be rated 460 volts with 575 volts as optional. Motors will be rated for operation on a 3 phase, 60 Hertz power supply. Refer to Electrical Drawings.

2.2 COORDINATION

- A. Where variable frequency drives are used to vary the speed and power consumption of electric motors, such motors must be high efficiency type and must be considered with the

actual variable frequency drives which are provided so that optimum matching of variable frequency drive to driven motor is obtained.

2.3 OPERATING CHARACTERISTICS

- A. Torques: Motors shall meet or exceed the locked rotor (starting) and minimum breakdown torques specified in NEMA standards for Design B for the ratings specified.
- B. Currents: Locked rotor (starting) currents shall not exceed NEMA Design B maximum values for the specified rating. Motors shall be capable of a 20 second stall at six times full load current without injurious heating to the motor components.
- C. Efficiency: Motors shall have full load efficiency which will meet or exceed the values for NEMA Premium® efficiency motors as listed in NEMA 1-2006, Table 12-12 when tested in accordance with NEMA test standard MG1-12.53a, IEEE Test Procedure 112, Method B, using accuracy improvement by segregated loss determination including stray load loss measurements. The minimum efficiency shall be guaranteed.

2.4 SERVICE FACTOR AND AMBIENT

- A. Motors shall be rated for a 1.15 service factor in a 40°C ambient.

2.5 INSULATION

- A. For constant speed application motors, provide full Class B insulation system.
- B. For motors with variable frequency drive, provide with Class F insulation suitable for operation down to 10%.

2.6 FRAME SIZE

- A. Horsepower/frame relationship shall conform to the latest NEMA Standard for T frame motors.

2.7 ENCLOSURE

- A. Motors shall be drip proof construction.
- B. Motor frame and endshields shall be of cast aluminum construction using alloys with low copper content.

2.8 BEARINGS

- A. All motors shall have anti-friction bearings, sized for a L-10 life of at least 125,000 hours L-10 life for a direct connected load.
- B. Aluminum endshields shall have a cast-in steel or cast iron bearing insert.
- C. Bearing housing shall be regreasable with provisions for purging old grease.

- D. Bearings shall be preloaded with a bearing loading spring to minimize noise and increase bearing life.

2.9 OTHER REQUIREMENTS

- A. Conduit Box shall be diagonally split and rotatable in 90 degree increments.
- B. External hardware shall be plated to resist corrosion.
- C. External paint shall withstand industrial environments.
- D. Nameplates shall be of stainless steel or aluminum and stamped per NEMA Standard MG1-10.37. Nameplate information shall include the nominal efficiency value per Standard MG1-12.53b and the manufacturer's minimum guaranteed efficiency value.

2.10 SHOP DRAWINGS

- A. In addition to shop drawing requirements of the section entitled, "General Mechanical Provisions", provide motor data including horsepower; rpm; frame size; nominal efficiency and nominal power factor at full load, 75% load and 50% load; guaranteed efficiency and guaranteed power factor at full load, 75% load and 50% load.

PART 3 - EXECUTION

3.1 MOTOR LOCATIONS

- A. Provide NEMA Premium® efficiency motors for the following as provided on this project:
 - 1. Motors for pumps.
 - 2. Motors for AHU fans.
 - 3. Motors for cooling tower fans.

END OF SECTION 230513