

**Part 1            General**

**1.1                MOTOR SIZES**

- .1        Motor sizes in this Section are stated in "preferred metric units".

**1.2                PRODUCT OPTIONS AND SUBSTITUTIONS**

- .1        Refer to Division 01 for requirements pertaining to product options and substitutions.

**1.3                SHOP DRAWINGS AND PRODUCT DATA**

- .1        Comply with requirements of Section 01 33 10.
- .2        Submit a schedule of motors for all mechanical equipment, listing the following data:
  - .1        Equipment name and number
  - .2        Motor size
  - .3        Frame size
  - .4        Electrical characteristics, including voltage, phase, full load amps, locked rotor amps and all unique requirements
  - .5        Motor design
  - .6        Insulation class
  - .7        Temperature rise as specified by insulation class
  - .8        Continuous service factor
  - .9        Guaranteed minimum efficiency and power factor at 75% and 100% of full load
  - .10      Enclosure type
- .3        Submit certification from motor manufacturer that air flow cooling the motors used on AC variable speed drives is adequate down to 10% of nameplate rated speed.

**1.4                MANUFACTURING STANDARDS**

- .1        Manufacturer motors to EEMAC Standard for AC induction motors (M1-6 Motors and Generators).
- .2        All motors shall be CSA approved and labelled.

**Part 2 Products**

**2.1 ACCEPTABLE MANUFACTURERS AND PRODUCTS**

- .1 CGE, Westinghouse, Leroy Somer, Toshiba, Lincoln, Baldor

**2.2 DESIGN**

- .1 Single phase and three phase motors to be EEMAC Design B, squirrel cage induction type for general purpose duty.
- .2 Motors suitable for operation with voltages and starters specified in Division 26.

**2.3 ENCLOSURE TOTALLY ENCLOSED FAN COOLED (TEFC)**

- .1 Provide TEFC on motors unless otherwise specified in equipment schedules.
- .2 Provide weather protected motors on all roof mounted equipment.

**2.4 FRAME**

- .1 Construction: "T" frame, rigid and machined to keep all parts in alignment under full load.
- .2 Material: cast iron or steel (no aluminum).

**2.5 END BRACKETS**

- .1 Material: Cast iron or steel (no aluminum).

**2.6 BEARINGS**

- .1 Type: anti-friction deep groove ball or roller bearing. Provide grease lubrication fittings on frame 254T and larger.
- .2 Life: bearing life based on no external radial or axial load as follows:
  - .1 3600 r/min: 30,000 h
  - .2 1800 r/min and less: 60,000 h

**2.7 INSULATION**

- .1 Minimum Class "B" insulation on all motors unless otherwise noted.
- .2 Class "F" insulation with Class "B" temperature rise on motors driven by AC variable speed drive. Motor insulation to NEMA MG-1-1993, Part 31.

**2.8 EFFICIENCY**

- .1 Provide premium efficiency motors on mechanical equipment.

**2.9 SERVICE FACTOR**

- .1 Minimum continuous service factor of 1.15 for all non-explosion proof motors.
- .2 Minimum continuous service factor of 1.0 for all explosion proof motors.

**2.10 THERMAL PROTECTION**

- .1 Provide thermistor including protection, one per phase, with tripping device on the following motors:
  - .1 Motors used with variable frequency drives.
  - .2 Motors 37 kW and larger.

**Part 3 Execution**

**3.1 INSTALLATION**

- .1 Provide factory mounted industrial grade motors on motor driven equipment.
- .2 Allow adequate space for servicing motors and for removal of motors from motor driven equipment.

**3.2 COORDINATION**

- .1 Confirm electrical characteristics and requirements with the Electrical Trade for all motors including voltage, phase and their compatibility with motor control centers.
- .2 Submit motor schedule defined in Article 1.4 as early as possible.

**3.3 EQUIPMENT SCHEDULES AND DRAWINGS**

- .1 Refer to all drawings and schedules of equipment and motor driven equipment listed in Mechanical.
- .2 Refer to electrical specifications for voltage, phase, and cycle.

**3.4 ALIGNMENT**

- .1 Adjust axial and differential alignment of motor with driven equipment to ensure vibration free operation.

**END OF SECTION**