SECTION 22 05 13
PLUMBING COMMON MOTOR REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Single phase electric motors.
B. Three phase electric motors.

1.2 RELATED REQUIREMENTS

A. Section 22 00 00 - Plumbing Common Work Results; for additional administrative requirements
B. Section 22 00 00 - Plumbing Common Work Results; for additional product requirements
C. Section 22 00 00 - Plumbing Common Work Results; for additional closeout submittal requirements
D. Section 22 00 00 - Plumbing Common Work Results
E. Section 23 09 13 - Instrumentation and Control Devices for HVAC.
F. Section 26 05 83 - Wiring Connections

1.3 SUBMITTALS

A. See Section 22 00 00 - Plumbing Common Work Results; for submittal procedures.
B. Start-up Report: Indicate start-up results verifying nominal efficiency, voltages and current.
   1. Refer to section 22 00 00 - Plumbing Common Work Results
   2. Submit as part of individual equipment start-up reports.
C. Product Data: Provide manufacturer's most current catalog data sheet for equipment indicating rough-in size, finish, and accessories. Manufacturer's data sheets on each item of equipment and device, shall be clearly marked up to identify the items, accessories and options to be used on the project.
D. Manufacturer's Installation Instructions: Indicate setting, mechanical connections, lubrication, and wiring instructions.
E. Operation Data: Include instructions for safe operating procedures.
F. Maintenance Data: Include assembly drawings, bearing data including replacement sizes, and lubrication instructions.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect motors stored on site from weather and moisture by maintaining factory covers and suitable weather-proof covering. For extended outdoor storage, remove motors from equipment and store separately.

PART 2 PRODUCTS

2.1 GENERAL CONSTRUCTION AND REQUIREMENTS

A. Electrical Service: Refer to Section 26 05 83 - Wiring Connections for required electrical characteristics.
B. Construction:
   1. Open drip-proof type except where specifically noted otherwise.
   2. Design for continuous operation in 40 degrees C environment.
   3. Design for temperature rise in accordance with NEMA MG 1 limits for insulation class, service factor, and motor enclosure type.
C. Visible Nameplate: Indicating motor horsepower, voltage, phase, cycles, RPM, full load amps, locked rotor amps, frame size, manufacturer's name and model number, service factor, power factor,

efficiency.

D. Wiring Terminations:
   1. Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Enclose terminal lugs in terminal box sized to NFPA 70, threaded for conduit.
   2. For fractional horsepower motors where connection is made directly, provide threaded conduit connection in end frame.

2.2 APPLICATIONS

A. Exception: Motors less than 250 watts, for intermittent service may be the equipment manufacturer's standard and need not conform to these specifications.
B. Single phase motors for shaft mounted fans or blowers: E.C.M.
C. Single phase motors for pumps: Capacitor start, capacitor run type.
D. Motors located in exterior locations, direct drive axial fans, roll filters, and explosion proof environments: Totally enclosed type.
E. Motors located in outdoors and wet environments: Totally enclosed weatherproof epoxy-treated type.

2.3 SINGLE PHASE POWER - SPLIT PHASE MOTORS

A. Starting Torque: Less than 150 percent of full load torque.
B. Starting Current: Up to seven times full load current.
C. Drip-proof Enclosure: Class A (50 degrees C temperature rise) insulation, NEMA Service Factor, prelubricated sleeve or ball bearings.
D. Enclosed Motors: Class A (50 degrees C temperature rise) insulation, 1.0 Service Factor, prelubricated ball bearings.

2.4 SINGLE PHASE POWER - CAPACITOR START MOTORS

A. Drip-proof Enclosure: Class A (50 degrees C temperature rise) insulation, NEMA Service Factor, prelubricated sleeve bearings.
B. Enclosed Motors: Class A (50 degrees C temperature rise) insulation, 1.0 Service Factor, prelubricated ball bearings.

2.5 DC ELECTRIC COMMUTATION TYPE MOTOR (ECM)

A. Permanently lubricated with heavy duty ball bearings to match full load. Pre-wired to the specific voltage and phase with internal power conversion from ac to dc power.
B. Motor shall be controllable down to 20% of full speed with a 0-10 volt DC signal. Motor shall be 85% efficient at all speeds.

PART 3 EXECUTION

3.1 INTERFACE WITH WORK OF OTHER SECTIONS

A. Confirm framing and support members.
B. Confirm rough-in and framing of walls and partitions with supports for equipment and accessories.
C. Confirm rough-in locations and power requirements before rough-in installation. Refer to Section 26 05 83 - Wiring Connections.
D. Confirm rough-in location and signals before rough-in installation. Refer to section 23 09 13 - Instrumentation and Control Devices for HVAC.

3.2 EXAMINATION

A. Verify that surfaces are suitable for installation.
B. Examine areas to receive equipment for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
C. Verify that piping and equipment are ready to receive work.
D. Verify field measurements are as shown on shop drawings.
E. Electrical:
    1. Verify electrical power, voltage, phase and current is available and of the correct characteristics.
    2. Verify rough-in for electrical connections to verify actual locations before installing.
    3. Verify motor type and VFD or disconnect type for compatibility prior to ordering equipment.
F. Controls:
    1. Verify signal power, voltage, phase and current is available and of the correct characteristics.
    2. Verify rough-in for control connections to verify actual locations before installing.
    3. Verify motor type and VFD or disconnect type for compatibility with control sequence and control devices prior to ordering equipment.
G. Maintain clearances to combustibles and service clearances.
H. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. Install in accordance with the following:
    1. Federal, State and local requirements.
    2. National Electric Code requirements.
    3. Manufacturer's Instructions.
    4. NFPA 70.
B. Install securely on firm foundation. Mount ball bearing motors with shaft in any position.
C. Check line voltage and phase and ensure agreement with nameplate.

3.4 START-UP

A. Perform start-up in accordance with Section 22 00 00 - Plumbing Common Work Results
B. Verify system is ready for start-up with visual inspection and sign off from installing personnel.
C. Start-up motor per equipment manufacturer's recommendations.
D. Minimum Data to be Recorded:
    1. Motors location / associated equipment / item rotated.
    2. Manufacturer.
    3. Model/Frame.
    4. HP/BHP.
    5. Phase, voltage, amperage; nameplate, actual, no load.
    6. RPM.
    7. Service factor.
    8. Starter size, rating, heater elements.
    9. Sheave Make/Size/Bore.

END OF SECTION 22 05 13