

SECTION 23 05 13 - COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT**PART 1 - GENERAL****1.01 SUMMARY**

- A. Section includes general requirements for single-phase and polyphase, general-purpose, horizontal, small, and medium, squirrel-cage induction motors for use on ac power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

1.02 COORDINATION

- A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:
 - 1. Motor controllers.
 - 2. Torque, speed, and horsepower requirements of the load.
 - 3. Ratings and characteristics of supply circuit and required control sequence.
 - 4. Ambient and environmental conditions of installation location.

1.03 SUBMITTALS

- A. Shop drawing submittals for motorized equipment shall include, but not limited to, the following information on motors provided with equipment.
 - 1. Manufacturer's name and cutsheets.
 - 2. Motor type.
 - 3. Horsepower.
 - 4. Voltage/Phase/Hertz.
 - 5. RPM.
 - 6. Service factor.
 - 7. Insulation class.
 - 8. NEC code number.
 - 9. Motor efficiency and testing method and results.

PART 2 - PRODUCTS**2.01 GENERAL MOTOR REQUIREMENTS**

- A. Comply with NEMA MG 1 unless otherwise indicated.
- B. All materials and equipment furnished shall be installed as per manufacturer's requirements and conform to the requirements of Division 26.

2.02 MOTOR CHARACTERISTICS

- A. Duty: Continuous duty at ambient temperature of 40 deg. C and at altitude of 3300 feet above sea level.

- B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.
- C. Incorporate latest IEEE and NEMA standards.
- D. All copper windings with ball bearings.
- E. Indoors; drip proof, 40 degree C rise.
- F. Outdoors; totally enclosed 55 degree C rise.
- G. Motors over 10 HP to be high efficiency with PF in excess of 0.9.

2.03 POLYPHASE MOTORS

- A. Description: NEMA MG 1, Design B, medium induction motor.
- B. Efficiency: Energy efficient, as defined in NEMA MG 1.
- C. Service Factor: 1.15.
- D. Multispeed Motors: Variable torque.
 - 1. For motors with 2:1 speed ratio, consequent pole, single winding.
 - 2. For motors with other than 2:1 speed ratio, separate winding for each speed.
- E. Rotor: Random-wound, squirrel cage.
- F. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.
- G. Temperature Rise: Match insulation rating.
- H. Insulation: Class F.
- I. Code Letter Designation:
 - 1. Motors 15 HP and Larger: NEMA starting Code F or Code G.
 - 2. Motors Smaller than 15 HP: Manufacturer's standard starting characteristic.
- J. Enclosure Material: Cast iron for motor frame sizes 324T and larger; rolled steel for motor frame sizes smaller than 324T.

2.04 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

- A. Motors Used with Reduced-Voltage and Multispeed Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.
- B. Motors Used with Variable Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.
 - 1. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width modulated inverters.
 - 2. Energy- and Premium-Efficient Motors: Class B temperature rise; Class F insulation.
 - 3. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
 - 4. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.

2.05 SINGLE-PHASE MOTORS

- A. Motors larger than 1/20 hp. shall be one of the following, to suit starting torque and requirements of specific motor application:
 - 1. Permanent-split capacitor.
 - 2. Split phase.
 - 3. Capacitor start, inductor run.
 - 4. Capacitor start, capacitor run.
- B. Multispeed Motors: Variable-torque, permanent-split-capacitor type.
- C. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.

- D. Motors 1/20 HP and Smaller: Shaded-pole type.
- E. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

2.06 MOTOR STARTERS

- A. Fractional with horsepower up to ½ HP; electrical contract.
- B. Polyphase and single phase above ½ HP: this contract.
- C. Electrical contractor shall install all starters except for those provided as an integral part of equipment.
- D. Polyphase starters shall be magnetic combination type, across-the-line electrically operated, electrically held, three pole assemblies, with arc extinguishing characteristics, silver to silver renewable contacts, 3 pole thermal bi-metallic, red run pilot light, individual phase protection, with overload heaters matched to motors installed and with 4 auxiliary contact, Hand-off-Auto switch, and control transformer.
- E. For single phase motors above ½ HP provide magnetic combination single phase motor starters with overloads, non-fusible disconnect switch, red run pilot light, integral 120 volt control transformer with dual primary fusing auxiliary contacts.
- F. Starters shall be as manufactured by G. E., Siemens, Square "D", Cetus or Cutler-Hammer.

PART 3 - EXECUTION

3.01 GENERAL:

- A. Motors shall be leveled, set in true angular and concentric alignment with driven equipment, and bolted firmly to motor base, if not mounted on equipment. Motors's factory-mounted on equipment shall be checked for alignment to driven equipment and mounting bolts shall be checked to ensure bolts are tightly fastened.
- B. Coordination: The Mechanical Contractor shall have the responsibility to provide adequate rough-in information to the Electrical Contractor. Any costs, such as patching and refinishing of walls, resulting from inadequate information shall be the responsibility of the Mechanical Contractor.
- C. For variable frequency drives, refer to Specification 23 09 93.

END OF SECTION

SECTION 23 05 18 - ESCUTCHEONS FOR HVAC PIPING**PART 1 - GENERAL****1.01 SUMMARY**

- A. Section Includes:
 - 1. Escutcheons.
 - 2. Floor plates.

1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS**2.01 ESCUTCHEONS**

- A. One-Piece, Cast-Brass Type: With [polished, chrome plated and rough brass finish and setscrew fastener.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with chrome plated finish and spring-clip fasteners.
- C. One-Piece, Stamped-Steel Type: With chrome-plated finish and spring clip fasteners.

2.02 FLOOR PLATES

- A. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.

PART 3 - EXECUTION**3.01 INSTALLATION**

- A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
- B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
 - 1. Escutcheons for New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One piece, deep-pattern type.
 - b. Chrome-Plated Piping: One piece, cast-brass type with polished, chrome-plated finish.

- c. Insulated Piping: One piece, stamped-steel type.
- d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One piece, cast-brass type with polished, chrome-plated finish.
- e. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One piece, stamped-steel type.
- f. Bare Piping at Ceiling Penetrations in Finished Spaces: One piece, cast-brass type with polished, chrome-plated finish.
- g. Bare Piping at Ceiling Penetrations in Finished Spaces: One piece, stamped-steel type.
- h. Bare Piping in Unfinished Service Spaces: One piece, cast-brass type with polished, chrome-plated finish.
- i. Bare Piping in Unfinished Service Spaces: One piece, stamped-steel type.
- j. Bare Piping in Equipment Rooms: One piece, cast-brass type with polished, chrome-plated finish.
- k. Bare Piping in Equipment Rooms: One piece, stamped-steel type.
- C. Install floor plates for piping penetrations of equipment-room floors.
- D. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
 - 1. New Piping: One piece, floor-plate type.

3.02 FIELD QUALITY CONTROL

- A. Replace broken and damaged escutcheons and floor plates using new materials.

END OF SECTION