Section 01610 - GENERAL EQUIPMENT STIPULATIONS

1. SCOPE. All equipment furnished and installed under this Contract shall conform to the general stipulations set forth in this section, except as otherwise specified in other sections.

2. COORDINATION. Contractor shall coordinate all details of the equipment with other related parts of the Work, including verification that all structures, piping, wiring, and equipment components are compatible. Contractor shall be responsible for all structural and other alterations in the Work required to accommodate equipment differing in dimensions or other characteristics from that contemplated in the Contract Drawings or Specifications.

3. MANUFACTURER'S EXPERIENCE. Unless specifically named in the Specifications, a manufacturer shall have furnished equipment of the type and size specified which has been in successful operation for not less than the past 5 years.

4. WORKMANSHIP AND MATERIALS. Contractor shall guarantee all equipment against faulty or inadequate design, improper assembly or erection, defective workmanship or materials, and leakage, breakage, or other failure. Materials shall be suitable for service conditions.

All equipment shall be designed, fabricated, and assembled in accordance with recognized and acceptable engineering and shop practice. Individual parts shall be manufactured to standard sizes and gages so that repair parts, furnished at any time, can be installed in the field. Like parts of duplicate units shall be interchangeable. Equipment shall not have been in service at any time prior to delivery, except as required by tests.

Except where otherwise specified, structural and miscellaneous fabricated steel used in equipment shall conform to AISC standards. All structural members shall be designed for shock or vibratory loads. Unless otherwise specified, all steel which will be submerged, all or in part, during normal operation of the equipment shall be at least 1/4 inch thick.

5. LUBRICATION. Equipment shall be adequately lubricated by systems which require attention no more frequently than weekly during continuous operation. Lubrication systems shall not require attention during startup or shutdown and shall not waste lubricants.

Lubricants of the types recommended by the equipment manufacturer shall be provided in sufficient quantities to fill all lubricant reservoirs and to replace all consumption during testing, startup, and operation prior to acceptance of equipment by Owner. Unless otherwise specified or permitted, the use of synthetic lubricants will not be acceptable.

Lubrication facilities shall be convenient and accessible. Oil drains and fill openings shall be easily accessible from the normal operating area or platform. Drains shall allow for convenient collection of waste oil in containers from the normal operating area or platform without removing the unit from its normal installed position.

6. ELECTRIC MOTORS. Unless otherwise specified, motors furnished with equipment shall meet the following requirements:

a. Designed and applied in accordance with NEMA, ANSI, IEEE, AFBMA, and NEC for the duty service imposed by the driven equipment, such as frequent starting, intermittent overload, high inertia, mounting configuration, or service environment.

b. Rated for continuous duty at 40 C ambient, unless the application is well recognized for intermittent duty service as a standard industry practice.

c. Insulated with a Class F insulation system and designed for a maximum Class B temperature rise at service factor load (80 C at 1.0 or 90 C at 1.15), or insulated with a Class H insulation system and designed for a maximum Class F temperature rise at service factor load (145 C at 1.0).

d. Motors used in applications which exceed the usual service conditions as defined by NEMA, such as higher than 40 C ambient, altitude exceeding 3,300 feet, explosive or corrosive environments, departure from rated voltage and frequency, poor ventilation, frequent starting, or adjustable frequency drive applications, shall be properly selected with respect to their service conditions and shall not exceed specified temperature rise limits.

e. To ensure long life, nameplate horsepower shall equal or exceed the maximum load imposed by the driven equipment and carry a service factor rating as follows:

Motor Size	Enclosure	Service Factor
Fractional hp	Open	1.15
	Other Than Open	1.0
Integral hp	Open	1.15
	Other Than Open	1.0

f. Designed for full voltage starting.

g. Designed to operate from an electrical system that may have a maximum of 5 percent voltage distortion per IEEE Standard 519.

h. Clamp-type grounding terminal shall be inside motor conduit box.

i. External conduit boxes shall be oversized at least one size larger than NEMA standard.

j. Totally enclosed motors shall have a continuous moisture drain which also excludes insects.

k. Bearings shall be either oil or grease lubricated.

l. Manufacturer's standard motor may be supplied on appliances, tools, and unit heaters, in which case a redesign of the unit would be required to furnish motors of other than the manufacturer's standard design. However, in all cases, totally enclosed motors are preferred and shall be furnished if offered by the manufacturer as a standard option.

m. Totally enclosed motors shall be furnished on:

1. Outdoor equipment.

2. Equipment for installation below grade.

3. Equipment operating in wet or dust-laden locations.

n. Dripproof motors, or totally enclosed motors at the Supplier's option, shall be furnished on equipment in indoor, above-grade, clean, and dry locations.

o. Motors shall be rated as follows:

1. Below 1/2 hp.

115 volts, 60 Hz, single phase; or 240 volts, 60 Hz, single phase.

2. 1/2 hp and above.

460 volts, 60 Hz, 3 phase.

Where specified or required by the Drawings, motors used on 240 volt systems shall be 230 volts, 60 Hz, 3 phase. Motors used on 208 volt systems shall be 200 volts, 60 Hz, 3 phase.

7. SPECIAL TOOLS AND ACCESSORIES. Equipment requiring periodic repair and adjustment shall be furnished complete with all special tools, instruments, and accessories required for proper maintenance. Equipment requiring special devices for lifting or handling shall be furnished complete with those devices.

8. SHOP PAINTING. All steel and iron surfaces shall be protected by suitable paint or coatings applied in the shop. Surfaces which will be inaccessible after assembly shall be protected for the life of the equipment. Exposed surfaces shall be finished, thoroughly cleaned, and filled as necessary to provide a smooth, uniform base for painting. Electric motors, speed reducers, starters, and other self-contained or enclosed components shall be shop primed or finished with a high-grade, oil-resistant enamel suitable for top coating in the field with an alkyd enamel. Coatings shall be suitable for the environment where the equipment is installed.

Surfaces to be painted after installation shall be prepared for painting as recommended by the paint manufacturer for the intended service, and then shop painted with one or more coats of the specified primer. Unless otherwise specified, the shop primer for steel and iron surfaces shall be Ameron "Amercoat 3153A Universal Primer", Cook "391-N-167 Barrier Primer", Kop-Coat "340 Gold Primer", Tnemec "37-77 Chem-Prime", or Valspar "13-R-28 Chromox Primer".

Machined, polished, and nonferrous surfaces which are not to be painted shall be coated with rust-preventive compound, Houghton "Rust Veto 344".

9. PREPARATION FOR SHIPMENT. All equipment shall be suitably packaged to facilitate handling and protect against damage during transit and storage. All equipment shall be boxed, crated, or otherwise completely enclosed and protected during shipment, handling, and storage. All equipment shall be protected from exposure to the elements and shall be kept dry at all times.

Painted surfaces shall be protected against impact, abrasion, discoloration, and other damage. Painted surfaces which are damaged prior to acceptance of equipment shall be repainted to the satisfaction of Engineer.

Grease and lubricating oil shall be applied to all bearings and similar items.

Each item of equipment shall be tagged or marked as identified in the delivery schedule or on the Shop Drawings. Complete packing lists and bills of material shall be included with each shipment.

10. STORAGE. Upon delivery, all equipment and materials shall immediately be stored and protected until installed in the Work.

Pumps, motors, electrical equipment, and all equipment with antifriction or sleeve bearings shall be stored in weathertight structures maintained at a temperature above

60 F. Equipment, controls, and insulation shall be protected against moisture and water damage. All space heaters furnished in equipment shall be connected and operated continuously.

Equipment and materials shall not show any pitting, rust, decay, or other deleterious effects of storage when installed in the Work.

11. INSTALLATION AND OPERATION. Equipment shall not be installed or operated except by, or with the guidance of, qualified personnel having the knowledge and experience necessary to obtain proper results. When so specified, or when employees of Contractor or his Subcontractors are not qualified, such personnel shall be field representatives of the manufacturer of the equipment or materials being installed.

Qualified field representatives shall be provided by the equipment manufacturers as required to perform all manufacturer's field services called for in the Specifications. Manufacturer's field representatives shall observe, instruct, guide, and direct Contractor's erection or installation procedures, or perform an installation check, as required. The field representative shall revisit the site as often as necessary to attain installation satisfactory to Engineer.

All equipment installed under this Contract, including that furnished by Owner or others under separate contract, shall be placed into successful operation according to the written instructions of the manufacturer or the instructions of the manufacturer's field representative. All required adjustments, tests, operation checks, and other startup activity shall be provided.

Acceptance of Work in connection with the installation of equipment furnished by others will be subject to approval of the field representative. Contractor shall be responsible for planning, supervising, and executing the installation of Work, and the approval or acceptance of Engineer or the field representative will not relieve Contractor of responsibility for defective Work.

End of Section