SECTION 14250

FREIGHT HYDRAULIC ELEVATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Special Conditions, apply to this Section.

1.2 SUMMARY

A. Freight hydraulic elevator(s) as shown on the contract documents.

B. Design Requirements: Meet all requirements as described in this specification section.

C. All engineering, equipment, labor, and permits required to satisfactorily complete elevator installation as required by contract documents.

D. Applicable conditions of General and Special Conditions.

E. Preventive maintenance as described herein.

F. Other equipment installed under the vertical transportation sections:

1. CCTV: Wiring inside hoistway and mounting inside car.
2. Access control (card reader): Wiring inside hoistway and mounting inside car for car operating panels and for hall pushbutton stations as specified herein.

G. Materials and Equipment:

1. All materials and equipment incorporated in the Works shall be suitable for the duty specified and shall be new and of first class commercial quality, free from imperfections, and selected for long life and minimum maintenance under the site conditions specified.

H. Design Criteria including Operational, Seismic and Environmental Requirements: All requirements as stated in this specification section shall apply.

I. Reliability Requirements:

1. Hours of operation shall be twenty-four (24) per day, seven (7) days per week.
2. Contractor shall ensure that the elevator system is suitable for its intended use when subject to the climatic conditions and operating environment of the terminal.
3. The elevator system shall achieve a level of safety and reliability that is as high as reasonably practicable.

1.3 RELATED WORK

A. Hoistway and Pit:

1. Clear, plumb, substantially flush hoistway with variations not to exceed 1" at any point.

2. Bevel cants not less than 75° from the horizontal on any rear or side wall ledges and beams that project or recess 4" or more into the hoistway. Not required on hoistway divider beams.
3. Vertical car guide rail support between floors shown on contract documents full height of hoistway.
4. Installation of guide rail bracket supports in concrete. Inserts or embeds, if used, will be furnished under this Section.
5. Wall blockouts and fire rated closure for control and signal fixture boxes which penetrate walls.
6. Cutting and patching walls and floors.
7. Opening in hoistway wall or pit wall for hydraulic piping. Trench and backfill underground piping.
8. Erect front hoistway wall after elevator entrances are installed.
9. Grout floor up to hoistway sills and around hoistway entrances.
10. Lockable, self-closing, fire-rated pit door for walk-in pits with access and warning sign.
11. Pit access for each elevator.
12. Structural support at pit floor for buffer impact loads, guide rail loads, and cylinder loads.
13. Waterproof pit. Indirect waste drain or sump with flush grate and pump.
14. Protect open hoistways and entrances during construction per OSHA Regulations.
15. Protect car enclosure, hoistway entrance assemblies, and special metal finishes from damage.
16. Hoistway venting as indicated on contract documents and as required by local building and elevator code.
17. Seal fireproofing to prevent flaking.
18. Structural steel channel frames, floor to building beam above and structural steel channel header and steel angle sills for vertical bi-parting hoistway entrances.
19. For Direct Plunger Hydraulic elevators: 3'-0" square hole in pit floor to facilitate installation of protective secondary containment casing. Fill hole with concrete after jack installation. Seal pit with non-permeable epoxy.

B. Machine Room and Machinery Spaces:

1. Legal, fire-rated enclosure with access.
2. Self-closing and locking access door.
3. Constant cooling and heating to maintain temperature range between 55 degrees and 90 degrees Fahrenheit. Maintain maximum 80% relative humidity, non-condensing.
4. Paint walls, ceiling and floor.
5. Class “ABC” fire extinguisher in each elevator machine room.
6. Seal fireproofing to prevent flaking.
7. Fire sprinklers where required.
8. Provide chilled water connection in machine room to facilitate hydraulic fluid cooling.

C. Electrical Service, Conductors and Devices:

1. Lighting and GFCI convenience outlets in pit and machine room. Provide one additional non-GFCI convenience outlet in pit for sump pump and oil return pump.

2. Three-phase mainline copper power feeder to terminals of each elevator controller in the machine room with protected, lockable “open,” disconnecting means with auxiliary contacts to electrically interlock battery power lowering unit. Wiring from building power supply to each disconnect, and to each controller in the machine room.
3. Single-phase copper power feeder to each elevator controller for car lighting and exhaust blower with individual protected, lockable “open,” disconnecting means located in machine room. Wiring from building power supply to each disconnect.
4. Emergency public phone service with dedicated line to line to each individual elevator control panel in each elevator machine room.
5. Fire alarm initiating devices in each elevator lobby, for each group of elevators or single elevator and each machine room to initiate firefighters’ return feature. Detector at top of hoistway if sprinklered. Provide means for service access from outside the hoistway. Provide alarm initiating signal wiring from hoistway and/or machine room connection point to elevator controller terminals. Device in machine room and at top of hoistway shall provide a signal for general alarm and a discrete signal for Phase II firefighters’ operation.
6. Temporary power and illumination to install, test, and adjust elevator equipment.
7. Data connection, CAT6A connection and junction box in each elevator machine room(s).
8. Firefighters’ telephone jack and announcement speaker in car with connection to elevator control panel in each elevator machine room and elevator control panel in firefighters’ control room.
9. Conduit from the closest hoistway of each elevator group or single elevator to the firefighters' and main control console. Coordinate size, number and location of conduits.
10. Means to manually and automatically disconnect power to affected elevator pump unit and controller prior to activation of machine room fire sprinkler system, and/or hoistway fire sprinkler system. Manual shut-off means shall be located outside bounds of machine room.
11. When sprinklers are provided in the hoistway all electrical equipment except seismic protection devices located less than 4'-0" above the pit floor shall be identified for use in wet locations.
12. Power feeders to main control console and firefighters’ control panel.
13. Power feeder to each freight elevator power door controller in machine room with protected, lockable “open,” disconnecting means.
14. Single-phase power feeders to machine room elevator control monitor unit with single-phase, protected, lockable “open,” disconnecting means.
15. Single-phase power feeders to controller(s) for CCTV with lockable “open” disconnecting means.

D. Security Systems and Displays:

1. Card Access Reader Security System: Reader control unit, mounting brackets, wiring material, logic circuits, etc. Coordinate requirements with card reader specification section. Card readers shall be installed inside all cars and adjacent to hall pushbuttons as indicated on the contract documents.
2. CCTV System: CCTV unit, system control unit, antenna and all required monitoring hardware, etc. Coordinate requirements with CCTV specification section.

E. Pre-Engineered Elevator Panel Systems: Pre-engineered elevator cab systems as shown on the drawings, fabricated and installed according to Specification Section 10250.

F. Related Sections:

1. Division 5 Section “Metal Fabrications” for machine beams, hoist beams, divider beams, sill angles, and ladders.
2. Division 5 Section “Gratings”.
3. Division 9 Section “Ceramic Tile”.
4. Division 10 Section “Pre-Engineered Elevator Panel Systems”.
5. Division 13 Section “Fire Monitoring System / Building Management Control System”.
6. Division 13 Section “Security System Equipment”.
7. Division 13 Section “Closed Circuit Television System”.
8. Division 14 Sections “Passenger and Service Hydraulic Elevators”, “Freight Hydraulic Elevators”, “Escalators”, and “Moving Walks”.
9. Division 16 Sections for Electrical and Communications systems.

1.4 DEFINITIONS

A. Terms used are defined in the latest edition of the Safety Code for Elevators and Elevators, ASME A17.1.

B. Reference to a device or a part of the equipment applies to the number of devices or parts required to complete the installation.

C. Provisions of this specification are applicable to all elevators unless identified otherwise.

1.5 QUALITY CONTROL

A. Qualifications: Contractor shall be able to demonstrate a successful track record of at least 7 years of similar installations with equipment proposed.

1. Freight Hydraulic Elevator(s):

a. Corbett Elevator Manufacturing Company, Inc. (C.E.M.C.O)
b. KONE
c. Minnesota Elevator
d. Otis
e. Schindler
f. ThyssenKrupp
g. Mitsubishi.

2. Car Enclosure:

a. Hauenstein & Burmeister
b. KONE
c. Otis
d. Schindler
e. ThyssenKrupp

f. Tyler
g. Mitsubishi.
h. Courion

3. Hoistway Entrance:

a. Hauenstein & Burmeister
b. KONE
c. Otis
d. Schindler
e. ThyssenKrupp
f. Tyler
g. Mitsubishi.
h. Courion

4. Freight Vertical Bi-Parting Door:

a. Peele

5. Fixtures: Vandal Resistant

a. EPCO
b. Innovation
c. ERM

6. Textured Stainless Steel:

a. Rimex 5SL
b. Rigid-Tex 6 WL

B. Compliance with Regulatory Agency: Comply with most stringent applicable provisions of following Code and/or Authority, including revisions and changes in effect on date of this specification:

1. Safety Code for Elevators and Elevators ASME A17.1, A17.2.3 and A17.5 (APTA)
2. Inspectors' Manual, ASME A17.2.1
3. Elevator and Elevator Electrical Equipment, ASME A17.5
4. National Electrical Code, NFPA 70
5. Americans with Disabilities Act (ADA)
6. Local fire jurisdiction
7. Requirements of IBC, and all other Codes, Ordinances and Laws applicable within the governing jurisdiction
8. Life Safety Code, NFPA 101.
9. Uniform Federal Accessibility Standard (UFAS)
10. Nevada State and Clark County Elevator Code

C. Warranty:

1. Material and workmanship of the installation shall comply in every respect with contract documents. In accordance with General Conditions, correct defective

material or workmanship which develops within Warranty period to the satisfaction of the Owner at no additional cost.

2. Defective is defined to include, but not limited to, operation or control system failures, performance below required minimum, excessive wear, unusual deterioration or aging of materials or finishes, unsafe conditions, the need for excessive maintenance, abnormal noise or vibration, and similar unsatisfactory conditions.
3. Make modifications, adjustments and improvements to meet performance requirements in Parts 2 and 3.

1.6 DOCUMENT VERIFICATION

A. Contractor must review contract documents for compatibility with its product prior to bidding. Review structural, architectural, electrical, mechanical documents, and elevator specification. Compliance with all provisions of contract documents is assumed and required. Owner will not pay for change to structural, mechanical, electrical, or other systems required to accommodate Contractor equipment

1.7 SUBMITTALS

A. After award of contract and before beginning equipment fabrication, submit shop drawings and required material for review. Allow 30 days for response to initial submittal.

1. Scaled Layout: Plan of pit, hoistway and machine room indicating equipment arrangement, elevation section of hoistway, details of car enclosures, hoistway entrances, and car/hall signal fixtures.
2. Design Information: Indicate equipment lists, reactions, and design information on layouts.
3. Power Confirmation Sheets: Include motor horsepower, code letter, starting current, full-load running current, and demand factor for applicable motors.
4. Fixtures: Cuts, samples, or shop drawings.
5. Finish Material: Submit 3" x 12" samples of actual finished material for review of color, pattern, and texture by Owner. Compliance with other requirements is the exclusive responsibility of the Contractor. Include, if requested, signal fixtures, lights, graphics, Braille plates, and mounting provisions.

B. Acknowledge and/or respond to drawing comments within 10 days of return; promptly incorporate required changes due to inaccurate data or incomplete definition so that delivery and installation schedules are not affected. Revision response time is not justification for equipment delivery or installation delay. Field verify existing conditions and dimensions prior to ordering equipment and verify all sizes.

1.8 PERMIT, TEST AND INSPECTION

A. Obtain and pay for permit, license, and inspection fee necessary to complete the installation.

B. Perform test required by Governing Authority in accordance with procedure described in ASME A17.2 Inspectors' Manual for Elevators and Elevators in the presence of Owner.

C. Supply personnel and equipment for test and final review required by Owner, as indicated in Part 3.

D. Test Specification:

1. Contractor shall submit for review a Test Specification for the Factory Acceptance Tests, Partial Acceptance Tests, System Acceptance Tests and Tests to be conducted on completion. The specification shall detail the methods of conducting the tests and the tools and instruments used. Reference to the documents and drawings reviewed shall be included in this submission. The records/results shall be tabulated in a prescribed format applicable to this Contract and as reviewed by the Owner.
2. The Test Specification shall include the design values of all quantities to be verified, with allowable tolerance or limits. Summary drawings or diagrams shall be verified with the Test Specification to show the dimensions and tolerances of all structural assemblies and sub-assemblies. In the case of welded fabrications, key diagrams giving all weld data shall be provided to enable systematic inspection to take place.
3. Inspection of incoming goods and components and sub-assembly tests, shall be performed in accordance with the Contractor's Quality Plan.
4. Verification of accuracy shall be required for all tools, apparatus, testing jigs, measuring instruments and "go" or "no go" gauges used for the purpose of routine tests.

E. Factory Acceptance Test:

1. The factory acceptance test is a pre-installation activity, the purpose of which is to ensure that equipment has been manufactured in accordance with the Particular Specification as well as the General Specification and that it is able to be commissioned.
2. Contractor shall submit before commencement of manufacture, a proposed Factory Acceptance Test Specification showing the components manufacturing program, quantities of each batch of manufacture, itemized for all major components.
3. All tests shall be carried out in the presence of the Owner, unless the Owner waives such requirements. Contractor shall make available all premises used for manufacture of the Works to the Owner for witnessing.
4. Contractor shall identify those components, both hardware and software, for which no reliable validated performance data exists, including assemblies of components which have no validated data produced specifically for this project.
5. For each component identified, Contractor shall produce a detailed test procedure, acceptance criteria and check sheets.
6. Owner will determine those tests where certification may be acceptable in lieu of Owner witnessed tests.
7. A log (Factory Acceptance Testing Log) shall be kept by Contractor, recording the tests carried out and their results, classified into the levels of acceptability, with copies of all test certification documents.
8. No installation of equipment shall begin until factory acceptance testing has been satisfactorily completed and certified by the manufacturer. Certificates shall be supported by copies of the Factory Acceptance Testing Log and report on faults found and corrective action taken, if any.

F. Tests on Completion:

1. Each unit after completion shall require a site acceptance test, which will be comprised of comprehensive testing of the completely assembled installation, to ensure that every item has been correctly installed and adjusted and that the system operates in every respect in accordance with the requirements of this Particular Specification.
2. These test shall be made by Contractor and, if necessary, the Supplier/Manufacturer and observed by Owner. Any defects, which become apparent in the course of these tests and/or deviations discovered without prior review by the Owner during the tests, shall be made good. The defects shall be entered into a defect list. The Substantial Completion Certificate for the Works will not be issued until these tests have been completed and the Owner considers that the equipment is safe for operation.

1.9 MAINTENANCE

A. The maintenance programs shall be designed to optimize safety, reliability and availability and reduce cost while minimizing disruption to the station daily operation. The levels of planned preventive maintenance shall be as follows:

1. First Line Maintenance: These are the regularly planned, routine inspections and minor associated work, such as greasing, replacing minor worn and faulty parts, checking and re-setting tolerances and reporting on condition. This shall also include the semi-annual and annual testing and examination of all the safety devices of the elevator.
2. Second Line Maintenance: This coves the overhaul of equipment and usually includes the replacement of modules, major parts and assemblies. Used parts or modules could be returned to a central workshop or the manufacturer for repair/overhaul.
3. Third Line Maintenance: This is also known as workshop maintenance where the major components and assemblies are removed during the second line maintenance for maintenance and overhaul.
4. Corrective Maintenance: This covers the repair of defective equipment/systems and can take place at any of the above levels. At times it will be necessary to supplement the regular maintenance staff with more experienced staff and technical support for more complex diagnostic testing required to locate faults.

B. Warranty Maintenance:

1. Provide preventive maintenance and 24-hour emergency callback service for one year commencing on date of final acceptance by Owner with after-hours callback at no additional cost to Owner. Systematically examine, adjust, clean, and lubricate all equipment. Repair or replace defective parts using parts produced by the manufacturer of installed equipment. Maintain elevator machine room, hoistway, and pit in clean condition.
2. Use competent personnel, acceptable to Owner, supervised and employed by Contractor.
3. The warranty maintenance period specified in Item 1 above shall be extended one month for each three month period in which equipment related failures average more than .25 per unit per month.

1.10 RELIABILITY REQUIREMENTS AND PENALTIES

A. Reliability

1. Contractor shall provide elevators that comply with the performance requirements of the Contract documents and that are of the highest market quality available. Contractor shall advise Owner if system performance or manufacturer requirements and/or recommendations conflict with operating parameters and reliability requirements established in the Contract documents.
2. A system failure shall be defined as any interruption of the normal mode of operation of an individual elevator where said unit is not available for Owner use. Interruption of Availability due to scheduled maintenance and inadvertent or automatic engagement of safety systems shall not constitute a system failure.
3. Each elevator shall be capable of operating at full load under normal modes of operation at a level of reliability (availability) of not less than 99 percent (round calculation to nearest whole percentage number) over a period of 365 days.
4. Availability (A) is defined as the portion of normal operational time during which the equipment is available for use, or

$$A = \frac{ATBF}{ATBF + ATTR}$$

Where:

ATBF = Average time between failure in days

$$= \frac{\text{Operating time, t (in days)}}{\text{Number of failures in time (t)}}$$

ATTR = The average time to restore (in days) an elevator to operation after a report of failure.

B. Penalty To Be Assessed Through Warranty Period

1. A level of availability of 99% or more shall not be penalized. If availability is between 96 and 99%, 1% of the value of the bid item for the specific equipment (or scheduled value in the case of a Lump Sum bid) shall be assessed as liquidated damages. If availability is between 90 and 96%, 3% of the value of the bid item for the specific equipment (or scheduled value in the case of a Lump Sum bid) shall be assessed as liquidated damages. If availability is between 80 and 90%, 5% of the value of the bid item for the specific equipment (or scheduled value in the case of a Lump Sum bid) shall be assessed as liquidated damages. If the availability is less than 85%, the equipment shall be replaced at the sole expense of Contractor. The warranty for the new equipment will commence at Owner acceptance of the new installation and will run for the duration specified in the appropriate technical specification.

PART 2 - PRODUCTS

2.1 SUMMARY [*modify as required by project*]

A. [*Insert number and type of elevator(s), repeat for each different type*]:

NUMBER:	[*Insert new elevator number(s)*]
CAPACITY:	[*Insert capacity*]
SPEED:	[*Insert speed*]
OPENINGS:	[*Insert number of openings*]
FLOORS SERVED:	[*Insert all floors served*]
TRAVEL:	[*Insert travel*]
MINIMUM CLEAR INSIDE CAB:	[*Insert dimensions*]
ENTRANCE SIZE:	[*Insert dimensions*]
ENTRANCE TYPE:	[*Insert type*]
OPERATIONAL CONTROL:	SINGLE AUTOMATIC PUSHBUTTON, MICROPROCESSOR BASED SYSTEM NON-PROPRIETARY
MOTOR CONTROL:	SINGLE SPEED AC WITH SCR SOFT START WITH CLOSED TRANSITION
DOOR OPERATION:	HIGH SPEED, HEAVY-DUTY MASTER DOOR OPERATOR, MINIMUM OPENING SPEED 1.5 F.P.S.
DOOR PROTECTION:	INFRARED, FULL SCREEN DEVICE, WITH DIFFERENTIAL TIMING AND NUDGING AND INTERRUPTED BEAM TIME
MACHINE:	HYDRAULIC PUMP
HYDRAULIC TYPE:	DIRECT PLUNGER
GUIDE RAILS:	PLANED STEEL TEES
BUFFERS:	SPRING
CAR ENCLOSURE:	AS SPECIFIED HEREIN AND AS DETAILED ON ARCHITECTURAL DRAWINGS
	CAR CANOPY HEIGHT [__'-__"]
SIGNALS:	VANDAL RESISTANT; ALL CARS
REGISTRATION LIGHTS:	SINGLE HALL PUSHBUTTON RISER
	DUAL CAR OPERATING PANELS ON ALL CARS; MOUNT RECESSED FLUSH ON SIDEWALLS OF CAR; VERIFY DESIGN ON ARCHITECTURAL DRAWINGS
	VANDAL-RESISTANT CAR AND HALL PUSHBUTTONS; VERIFY DESIGN ON ARCHITECTURAL DRAWINGS

POSITION INDICATOR:	DIGITAL WITH DIRECTION ARROWS INSIDE CAR
COMBINATION HALL LANTERN/HALL POSITION INDICATOR:	VANDAL RESISTANT AT ALL FLOORS WITH VOLUME ADJUSTABLE ELECTRONIC CHIME OR TONE. SOUND TWICE FOR DOWN DIRECTION; VERIFY DESIGN ON ARCHITECTURAL DRAWINGS
COMMUNICATION SYSTEM:	SELF DIALING, VANDAL RESISTANT, PUSH TO CALL, TWO-WAY COMMUNICATION SYSTEM WITH RECALL, TRACKING AND VOICELESS COMMUNICATION
ADDITIONAL FEATURES:	
	CAR ROLLER GUIDES
	CAR TOP INSPECTION STATION
	FIREFIGHTERS' SERVICE, INCLUDING ALTERNATE FLOOR RETURN FEATURE
	BATTERY STANDBY POWER TRANSFER
	PROVIDE ALL EQUIPMENT AND WIRING NECESSARY TO INTERFACE WITH THE OWNER'S EXISTING HONEYWELL EBI BUILDING MANAGEMENT AND CONTROL SYSTEM FOR MONITORING EACH ELEVATOR. COORDINATE WITH HONEYWELL.
	STATIONARY CAR OPERATING PANELS RECESSED INTO SIDEWALLS; VERIFY DESIGN ON ARCHITECTURAL DRAWINGS
	HOISTWAY ACCESS SWITCHES AT TOP AND BOTTOM FLOORS
	INDEPENDENT SERVICE FEATURE
	PLATFORM ISOLATION - JACK TO PLATEN CONNECTIONS
	FIREFIGHTERS' CONTROL PANEL AND REMOTE WIRING
	MAIN CONTROL PANEL AND REMOTE WIRING
	THERMAL UNIT TO CONTROL OIL TEMPERATURE
	LOAD WEIGHTING DEVICE
	VANDAL RESISTANT FASTENERS FOR SIGNAL FIXTURE FACEPLATES
	INDIVIDUAL FLOOR LOCK OFF SWITCHES FOR EACH FLOOR LOCATED ON MAIN CONTROL PANEL
	ONE YEAR WARRANTY MAINTENANCE WITH 24-HOUR CALLBACK SERVICE

FIREFIGHTERS' TELEPHONE JACK INSTALLATION

EMERGENCY PAGING SPEAKER INSTALLATION

HYDRAULIC PUMP UNIT AND CONTROLLER SOUND ISOLATION

JACK HOLE, OUTER CASING AND WATERTIGHT PVC SLEEVE

SEISMIC SAFETY VALVE

CARD READERS: PROVISIONS ON THE CAR OPERATION PANELS FOR ALL CARS WHERE INDICATED ON DRAWINGS

PAD BUTTONS AND VINYL-COVERED PADS ON ALL CARS

CCTV PROVISIONS

BATTERY PACK EMERGENCY CAR LIGHTING. PROVIDE SEPARATE CONSTANT PRESSURE TEST BUTTON IN CAR SERVICE COMPARTMENT ILLUMINATE PORTION OF NORMAL CAR LIGHTING

SIGNAGE ENGRAVING FILLED WITH BLACK PAINT

NO VISIBLE COMPANY NAME OR LOGO

WIRING DIAGRAMS, OPERATING INSTRUCTIONS, AND PARTS ORDERING INFORMATION

SYSTEM DIAGNOSTIC MEANS AND INSTRUCTIONS

NON-PROPRIETARY CONTROL SYSTEM AND DIAGNOSTICS PROVISIONS

PROVIDE FAULT FINDING AND MONITORING PANELS IN EQUIPMENT ROOMS AND PROVIDE REMOTE WIRING TO PANELS.

2.2 MATERIALS [*modify as required by project*]

A. Steel:

1. Sheet Steel (Furniture Steel for Exposed Work): Stretcher-leveled, cold-rolled, commercial quality carbon steel, complying with ASTM A366, matte finish.
2. Sheet Steel (for Unexposed Work): Hot-rolled, commercial quality carbon steel, pickled and oiled, complying with ASTM A568 and A569.
3. Structural Steel Shapes and Plates: ASTM A7 and ASTM A36.

B. Stainless Steel: Type 302 or 304 complying with ASTM A167, with standard tempers and hardness required for fabrication, strength and durability. Apply mechanical finish on

fabricated work in the locations shown or specified (Federal Standard and NAAMM nomenclature) with texture and reflectivity required to match Owner's sample. Protect with adhesive-paper covering.

1. No. 4: Bright directional polish (satin finish). Graining directions as shown or, if not shown, in longest dimension.
2. No. 8: Reflective polish (mirror finish).
3. Burnished: Non-directional, random swirl pattern.

C. Aluminum: Extrusions per ASTM B221; sheet and plate per ASTM B209.

D. Paint: Clean exposed metal parts and assemblies of oil, grease, scale, and other foreign matter and factory paint one shop coat of rust-resistant primer. After erection, provide one finish coat of industrial enamel paint. Galvanized metal need not be painted.

E. Prime Finish: Clean all metal surfaces receiving a baked enamel paint finish of oil, grease, and scale. Apply one coat of rust-resistant primer followed by a filler coat over uneven surfaces. Sand smooth and apply final coat of primer.

F. Baked Enamel Finish: Prime finish per Item F. above. Unless specified “prime finish” only, apply and bake 3 additional coats of enamel in the selected solid color.

2.3 CAR PERFORMANCE [*modify as required by project*]

A. Car Speed: +/- 10% of contract speed under any loading condition.

B. Car Capacity: Safely lower, stop and hold up to 125% of rated load.

C. Car Stopping Zone: +/- 3/8" under any loading condition.

D. Pressure: Fluid system components shall be designed and factory tested for 500 p.s.i. maximum operating pressure shall be 400 p.s.i.

E. Sound Isolation:

1. Airborne Noise: Measured noise level of elevator equipment and its operation shall not exceed 50 dBA in elevator lobbies and 60 dBA inside car under any condition including door operation and car ventilation exhaust blower on its highest speed.

2. Limit noise level in the machine room relating to elevator equipment and its operation shall not exceed 60 dBA in the machine room.

3. All dBA readings to be taken 3 feet off the floor and 3 feet from the equipment.

F. Vibration Isolation: All elevator equipment provided under this contract, including power unit, controller, oil supply lines and their support shall be mechanically isolated from the building structure and electrically isolated from the building power supply and to each other to minimize the possibility of objectionable noise and vibrations being transmitted to occupied areas of the building.

G. Radio Frequency Protection: The elevator equipment shall operate properly with a 500 KHZ to 1300 MHZ radio frequency signal, transmitted at a power level of not less than 100 watts effective radiated power (ERP) at a distance of 3 feet. The equipment shall be provided with electro-magnetic interference (EMI) shielding within FCC guidelines and per airport requirements.

2.4 OPERATION [*modify as required by project*]

A. Single Automatic Pushbutton Microprocessor Based:

1. Operate car without attendant from pushbuttons in car and at each landing. When car is idle, automatically start car and dispatch it to appropriate floor when is registered by pressing car or hall pushbutton.
2. Illuminate “in-use” lights in each hall pushbutton station when car is responding to registered car for hall call. Prevent registration of another call until trip is complete including time for passenger transfer and registration of car is responding to a hall call. Extinguish “in-use” light to indicate system is available to respond to next hall call.

B. Other Items:

1. Low-Oil Control: In the event oil level is insufficient for travel to the top floor, provide controls to return elevator to the main level and park until oil is added.
2. Independent Service: Provide controls for operation of each car from its pushbuttons only. Close doors by constant pressure on desired destination floor button or door close button. Open doors automatically upon arrival at selected floor.
3. Car-to-Lobby Feature: Provide the means for automatic return to Level One floor. Return car nonstop after answering pre-registered car calls, and park with doors open until car is returned to normal operation.

C. Firefighters' Service: Provide equipment and operation in accordance with Code requirements.

D. Automatic Stopping Zone: Stop car within 3/8" above or below the landing sill. Avoid overtravel/undertravel, and maintain stopping accuracy regardless of load in car, direction of travel, or distance between landings.

E. Motion Control: Maxton Valve; AC type with unit valve suitable for operation specified and capable of providing smooth comfortable acceleration and deceleration. Limit the difference in speed between full load and no load to not more than +/-10% of the contract speed in either direction of travel.

F. Standby Lighting and Alarm: Car-mounted, battery unit with solid-state charger to operate alarm bell and car emergency light fixture. Battery to be rechargeable with minimum 5-year life expectancy. Coordinate location of light fixture with Owner. Provide constant pressure test button in service compartment of car operating panel. Provide lighting integral with portion of normal car lighting system. Include required transformer.

G. Battery Standby Power Transfer:

1. Upon loss of normal power, provide controls to automatically lower the car nonstop to the designated level. Upon arrival, the elevator doors shall open automatically and remain open until regular door time has expired. The elevator shall then become deactivated. The standby power source shall be provided via 12-volt D.C. battery units installed in machine room, including solid-state charger and testing means mounted in a common metal container. Battery to be rechargeable lead acid or nickel cadmium with a 10-year life expectancy.
2. Upon restoration of normal power, the elevator shall automatically resume normal operation.

H. Card/Proximity Reader Security System: Provide provisions inside all cars and adjacent to hall pushbuttons as indicated on the drawings. Mount reader unit as indicated on architectural drawings and cross connect from car pushbuttons to control module in machine room via five pair of shielded wires and two RG-6/U type coaxial cables. Provide a filler plate to match slot size and car return panel finish including direction of graining where card slot is not initially utilized. Size and requirements as required by Contractor.

2.5 MACHINE ROOM EQUIPMENT [*modify as required by project*]

A. Arrange equipment in spaces shown on drawings.

B. Pump Unit:

1. Assembled unit consisting of positive displacement pump, induction motor, master-type control valves combining safety features, holding, direction, bypass, stopping, manual lowering functions, shut off valve, oil reservoir with protected vent opening, oil level gauge, outlet strainer, drip pan, muffler, all mounted on isolating pads.
2. Provide thermal unit or comparable means to maintain oil at operating temperature. Provide Noreen Cooling Unit or chilled water heat exchanger and oil temperature thermostat for all elevators.
3. Enclose entire unit with removable sheet steel panels lined with sound-absorbing material. Provide closed transition SCR soft start.

C. Encoder: Direct drive, solid-state, optical, digital type. Update car position at each floor and automatically restore after power loss.

D. Controller: UL/CSA labeled.

1. Compartment: Securely mount all assemblies, power supplies, chassis switches, relays, etc., on a substantial, self-supporting steel frame. Completely enclose equipment with covers. Provide means to prevent overheating.
2. Relay Design: Magnet operated with contacts of design and material to insure maximum conductivity, long life and reliable operation without overheating or excessive wear. Provide wiping action and means to prevent sticking due to fusion. Contacts carrying high inductive currents shall be provided with arc deflectors or suppressors.
3. Microprocessor-Related Hardware:

a. Provide built-in noise suppression devices which provide a high level of noise immunity on all solid-state hardware and devices.
b. Provide power supplies with noise suppression devices.
c. Isolate inputs from external devices (such as pushbuttons) with opto-isolation modules.
d. Design control circuits so that one side of power supply is grounded.
e. Safety circuits shall not be affected by accidental grounding of any part of the system.
f. System shall automatically restart when power is restored.
g. System memory shall be retained in the event of power failure or disturbance.
h. Equipment shall operate properly with a 500 KHZ to 1300 MHZ radio frequency signal, transmitted at a power level of not less than 100 watts Effective Radiated Power (ERP) at a distance of 3 feet.
i. Equipment shall be provided with Electro Magnetic Interference (EMI) shielding within FCC guidelines.

4. Wiring: CSA labeled copper for factory wiring. Neatly route all wiring interconnections and securely attach wiring connections to studs or terminals.
5. Provide controller or machine mounted auxiliary, lockable “off” disconnect if mainline disconnect not in sight of controller and pump unit.
6. Permanently mark components (relays, fuses, PC board, etc.) with symbols shown on wiring diagrams.
7. Provide reduced voltage motor starting circuits with solid-state motor starter.
8. Monitoring System Interface: Provide controller with serial data link through RJ45 Ethernet CAT 6 or data connection and install all devices necessary to provide monitoring, which is compatible with the existing Building Management Control System. Provide monitoring for the following:

a. Location
b. Power
c. Safeties
d. Doors and Gates Closed
e. Door Open Signal
f. Door Close Signal
g. Door Fully Open
h. Door Fully Closed
i. Photo Eye Beam Broken
j. Up Direction
k. Down Direction
l. Running
m. Level with Floor
n. In Car Stop Switch Open
o. Car on Automatic
p. Gate Closed
q. Doors Closed
r. On Independent Service
s. On Emergency Power
t. On Earthquake
u. On Fire Phase I
v. On Fire Phase II
w. Top or Bottom Limit Switch Open

x. Car Safeties Set
y. Safety Circuit
z. Power to Controller ON
aa. Safety, Power, and Limits OK

Contractor responsible to connect monitoring system interface to machine room monitoring compartment and LAN.

E. Muffler: Provide in discharge oil line near pump unit. Design shall dampen and absorb pulsation and noise in the flow of hydraulic fluid.

F. Piping and Oil: Provide piping, connections and oil for the system. Buried piping shall be secondarily contained with watertight Schedule 40 PVC sleeves between elevator machine room and pit. A minimum of two sound isolation couplings shall be provided between the pump unit and oil line and the oil line and jack unit. Provide isolated pipe stands or hangers as required.

2.6 HOISTWAY EQUIPMENT [*modify as required by project*]

A. Guide Rails: Planed steel T-sections of suitable size and weight for the application, structural support spacing, car weight, and seismic reactions, with brackets for attachment to building structure. Provide car rail backing to meet Code requirements.

B. Buffers: Spring type with blocking and supports.

C. Hydraulic Jack Assembly:

1. Cylinder: Seamless steel pipe. Design head to receive unit-type packing and provide means to collect oil at cylinder head and return automatically to oil reservoir. Provide secondary containment/cylinder protection.
2. Plunger: Polished seamless steel tubing or pipe. If plunger length exceeds 24', provide two or more sections not exceeding 16' in length, or coordinate installation of longer unit at the jobsite. Join section by internal threaded couplings. Multiple section jack units shall be factory polished while assembled and marked for proper future reassembly. Isolate plunger from car frame.

D. Jack Support and Fluid Shut-Off Valve: Provide steel pit channels to support jack assembly and transmit loads to building structure. Provide intermediate stabilizers as required. Provide manual on/off valve in oil line adjacent to pump unit and jack unit in pit adjacent to jack unit.

E. Well Hole Casing: Well hole is to be provided by Contractor. No additional compensation will be allowed for unforeseen conditions of any kind or spoil removal.

1. Install steel outer casing minimum 18" diameter. The drill casing shall be installed plumb so that the hydraulic jack can be installed perfectly plumb.
2. Install watertight sleeve over jack assembly for secondary containment prior to insertion into the outer casing. Extend PVC sleeve through pit floor slab to underside of jack support beams and seal with non-permeable membrane. Seal

well opening at the pit floor with hydraulic quick setting cement. Provide PVC vision/access ports.

3. Fill the space between the steel casing and the PVC liner with clean dry sand to maintain plumbness and to support the PVC liner.

F. Pit Channels: After centering the jack unit, affix it to the pit channels. Use stainless steel shims to level the pit channels. (APTA)

G. Seismic Safety Valve: Provide a pressure sensitive, mechanically-activated seismic safety valve, conforming to ASME A17.1, Rule 2410.6. Connect valve directly to jack assembly inlet.

H. Normal Terminal Stopping Devices: Per Code.

I. Electrical Wiring and Wiring Connections:

1. Conductors and Connections: Copper throughout with individual wires coded and connections on identified studs or terminal blocks. Use no splices or similar connections in wiring except at terminal blocks, control compartments, junction boxes, or condulets. Provide 10% spare conductors throughout. Run spare wires from car connection points to individual elevator controllers in the machine room. Provide four pairs of spare shielded communication wires in addition to those required to connect specified items. Tag spares in machine room.
2. Conduit: Painted or galvanized steel conduit and duct. Conduit size, 3/4" minimum. Flexible conduit not to exceed 36" in length. Flexible heavy-duty service cord may be used between fixed car wiring and car door switches for door protective devices.
3. Traveling Cables: Cables shall comply with APTA specifications (as referenced herein). In the event of conflict between the specifications and APTA, the more stringent requirements shall prevail. In the case of equal requirements, the APTA requirements shall prevail.
4. Auxiliary Wiring: Connect smoke sensors, emergency telephone system, firefighters' phone jack, paging speaker, CCTV, card reader, intercom, and announcement and/or background music in each car controller in machine room.

J. Entrance Equipment:

1. Door Hangers: Two-point hanger roller with neoprene roller surface and suspension with eccentric upthrust roller adjustment.
2. Door Tracks: Bar or formed, cold-drawn removable steel tracks with smooth roller contact surface.
3. Door Interlocks: Operable without retiring cam. Paint interlocks flat black. Enclose interlock wiring in flexible steel conduit with covering of liquid tight Type “EF” with connectors having nylon insulated throat. Interlock and wiring shall comply with APTA specifications (as referenced herein). In the event of conflict between the specifications and APTA, the more stringent requirements shall prevail. In the case of equal requirements, the APTA requirements shall prevail.
4. Door Closers: Spring, spirator or jamb/strut mounted counterweight type. Design and adjust to insure the smooth quiet mechanical close of doors.

K. Floor Numbers: Stencil paint 4" high floor designations in contrasting color on inside face of hoistway doors at each landing and adjacent to the leading edge of the door.

L. Pit Access: Provide electrical interlocks where walk in pit access doors or emergency hoistway access doors are shown.

M. Hoistway Door Unlocking Device: Provide unlocking device with pull chain under hinged, lockable cover with stainless steel No. 4 finish at all floors.

2.7 HOISTWAY ENTRANCES [*modify as required by project*]

A. Complete entrance assembly to be UL fire rated with UL labels.

B. Vertical Bi-Parting Freight Door Panels: 12 gauge formed steel plates welded into frame angles. Provide with safety astragals, vision panels, and load transfer angles. Panels shall have a textured stainless steel finish.

C. Vertical Bi-Parting Door Cover Frames: Hollow metal, bolted, fabricated from not less than 14 gauge material to form a one-piece unit covering steel channel subframes.

D. Struts and Headers: Provide for vertical support of entrances and related material.

2.8 CAR EQUIPMENT [*modify as required by project*]

A. Frame: Welded or bolted, rolled or formed steel channel construction to accommodate load classification requirements.

B. Platform: Isolated type, constructed of steel which is fireproofed on the underside. Design and construct to accommodate load classification requirements. Minimum class “C” construction for all elevators.

C. Guide Shoes: Solid type with renewable oilless inserts to accommodate freight loading classification.

D. Finish Floor Covering: 3/8” thick steel checker plate over 3/4" thick marine plywood watertight subfloor.

E. Toe Guard: Reinforced and braced to car platform, with flat black finish.

F. Freight Door and Gate Operation: Power door and gate. Provide means to open doors and gate from inside of car in the event of power failure.

1. Closing speed:

a. Doors: Minimum of 0.8 f.p.s.; maximum of 1.0 f.p.s.
b. Gates: Minimum of 1.6 f.p.s.; maximum of 2.0 f.p.s.

G. Car Gate: Power operated, vertical rise, single section minimum 6’-0” high, constructed of 12 gauge welded wire mesh welded into frame angles. Mount car gate lift chains on hoistway side of car gate. Include reversing safety edge device and passenger sequence operation.

H. Door Control Device:

1. Infrared Reopening Device: Black, fully enclosed device with full screen infrared matrix or multiple beams extending vertically along edge of each car gate guide track to a minimum height of 7'-0" above finished floor to a height of 10’-0” above finished floor full height of opening. Include retractable infrared sensor beams positioned at each side of lower edge of gate. Obstruction of beams during gate closing shall cause immediate re-opening.

I. Car Operating Panel:

1. Two (2) car operating panels. Provide with faceplate, recessed flush on side walls consisting of a metal box containing the operating vandal resistant fixtures as detailed on the architectural drawings.
2. Provide minimum 3/4" diameter vandal resistant floor pushbuttons designed to bottom out against the panel plate and not the contacts, key switches or other operating components. Provide with stainless steel caps and halo lighting. Illuminate to indicate call registration. Include 5/8" high designation of the floors served on face of pushbutton. Verify design on architectural drawings.
3. Provide alarm button at bottom of car operating panel to ring bell located on car, and sound distress signal at control panel. Illuminate button when actuated.
4. Provide keyed stop switch with markings to show “run” and “stop.” Locate in panel faceplate or in locked car service compartment. Arrange switch or button to sound main control panel distress signal when actuated.
5. Provide “door open” button to stop and reopen closing doors or hold doors in open position. Button operable only while car is stopped at a floor regardless of special operational features, except firefighters' service.
6. Provide “door close” button to activate door close cycle. Cycle shall not begin until normal door dwell time for a car call has expired, except firefighters’ service.
7. Provide firefighters' Phase II key switch with engraved instructions per Code requirements. Include light jewel, buzzer, and call cancel button.
8. Provide firefighters' telephone jack with bezel matching adjacent controls.
9. Provide card reader slot and filler plate to match finish of car operating panel.
10. Provide lockable service compartment with recessed flush door. Door material and finish to match car return panel or car operating panel faceplate. Include the following controls with function and operating positions identified by engraved signage painted black:

    a. Inspection switch.
    b. Light switch.
    c. 3-speed exhaust blower switch.
    d. Independent service switch.
    e. Constant pressure test button for battery pack emergency lighting.
    f. 120-volt, AC, GFCI protected electrical convenience outlet.
    g. Car lighting dimmer switch.
    h. Card reader override switch.
    i. Stop switch, if allowed by code

11. Provide black paint filled, engraved or approved etched signage with size and style approved by Owner as follows:

a. Phase II firefighters' operating instructions on main operating panel above corresponding keyswitch.
b. Car number on main car operating panel.
c. “NO SMOKING” on main car operating panel.
d. Car capacity in pounds on main car operating panel.
e. All code required verbiage.
f. Building name and address, including terminal designation.
g. Certificate of Inspection on file in Risk Management Office.

J. Car Top Control Station: Per Code. Mount to provide utilization while standing in an upright position.

K. Work Light and Duplex Plug Receptacle: GFCI protected outlet top and bottom of car. Include on/off switch and grounded metal lamp guard.

L. Communication System:

1. “Push to Call,” two-way communication instrument in car with automatic dialing, tracking and recall features with shielded wiring to car controller in machine room. Provide dialer with automatic rollover capability with minimum two numbers.

a. “Push to Call” button or adjacent light jewel shall illuminate and flash when call is acknowledged. Button shall match floor pushbutton design. Provide uppercase “PUSH TO CALL,” “HELP ON THE WAY” engraved signage Sans Serif or simple Serif type.
b. Provide “Push to Call” button tactile symbol engraved signage and Braille adjacent to button mounted integral with car front return panel.

2. Firefighters' telephone jack in car and firefighters' panel, with four shielded wires to machine room junction box. Jack bezel shall match adjacent controls.
3. Install remote speaker in car canopy with shielded wiring to machine room junction box.
4. Provide two-way communication between car and machine room per ASME Code A 17.1, Rule 2.11.1 (c).

2.9 CAR ENCLOSURE [*modify as required by project*]

A. Provide complete car enclosure as specified herein. Provide the following features.

1. Shell: Reinforced 10-gauge furniture steel formed panels no more than 20” wide with light-proof joints. Clad panels with stainless steel textured finish from 48” to ceiling; provide stainless steel checker plate from floor to 48” high on side and rear walls. Reinforce and brace panels to provide rigid structure and securely fasten to car sling and platform. Provide recess in car side wall for recessed mounting of car operating panel.
2. Canopy: Reinforced 12-gauge furniture steel formed panels no more than 20” wide with light-proof joints. Interior finish white reflective baked enamel. Provide hinged emergency exit.
3. Lighting: Recessed 4-tube fluorescent fixtures with on/off switch in car operating panel. Recess mount fixture flush with inside surface of car top. Provide steel

guard on car top over fixture. Provide emergency lighting integral with portion of normal car lighting system.

4. Bumper Rails: Two (2) rows of 2” x 12” oak or maple bumpers mounted on both sides of the car. Locate bottom rail at floor level and top rail at 36” above the car floor. Bolt rails through car walls with bolt and captive nuts on exterior of wall panel sections.

   a. Bumper to be 2” x 12” nominal boards. Select grade or better, laminated together to form a 2-3/4” section with eased corners.
   b. Bumper to be sanded, all sides and sealed.

5. Ventilation: Three-speed exhaust blower mounted on car canopy on isolated rubber grommets. Morrison Products, Model AA with diffuser and grille.

2.10 HALL CONTROL STATIONS [*modify as required by project*]

A. Pushbuttons: Provide a single riser with flush-mounted stainless steel faceplates. Include single call button and “in-use” light which illuminates to indicate call registration. Include approved engraved message and pictorial representation prohibiting use of elevator during fire or other emergency situation as part of faceplate. Provide vandal resistant pushbutton with stainless steel caps. Provide vandal resistant floor pushbuttons designed to bottom out against the panel plate and not the contacts, key switches or other operating components. Provide vandal resistant light assemblies with stainless steel caps and halo lighting with special faceplates. Verify design on architectural drawings.

B. Hoistway Access Switches: Mount in entrance frame side jamb at top and bottom floors. Provide fixture without faceplate.

C. Door Control Buttons: Include vandal resistant “door open” and “stop” buttons for control of power operated vertical bi-parting doors at each landing call button fixture. Provide buttons integral with hall control station. Pushbutton design shall match car operating panel pushbuttons.

2.11 SIGNALS [*modify as required by project*]

A. Combination Hall Lantern and Hall Position Indicator: Provide at each entrance to indicate floor designation and travel direction of arriving car. Illuminate up or down lights and sound tone twice for down direction travel prior to car arrival at floor. Sound level to be adjustable from 20-80 dBA measured at 5'-0" in front of hall pushbutton and 3'-0" off floor. Illuminate light until the car doors start to close. Provide advanced hall lantern notification to comply with ADA hall call notification time. Minimum 2-1/2" in the smallest dimension, arrow lenses with stainless steel faceplates.

B. Car Position Indicator: Alpha-numeric digital indicator type containing floor designations and direction arrows a minimum of 1/2" high to indicate floor served and direction of car travel. Locate fixture in car front return panel . When a car leaves or passes a floor, illuminate indication representing position of car in hoistway. Illuminate proper direction arrow to indicate direction of travel. Provide vandal resistant indicator and light assemblies.

2.12 GROUP CONTROL AND DISPLAY PANEL [*modify as required by project*]

A. Main Control Panel: Provide a control panel and color SVGA with the capability to activate, display, monitor, or control the following functions. Locate as shown on plans.

1. On/Off means to place car in or out of service. When placed in “off” position, return car(s) nonstop to designated floor and park with door(s) open for an adjustable period of 1 to 3 minutes. At expiration of time, restore car to service.
2. Car operating on normal/standby power.
3. Car position and direction of travel.
4. Car calls.
5. Hall calls.
6. Operating mode.
7. Door status.
8. Delayed car.
9. Load weighting and by-pass.
10. Car to lobby feature.
11. Car in/out of service.
12. Seismic operation.
13. Alarm distress signal.
14. Card reader override. Individual car on/off provisions.

Where applicable, identify all indicators and manual switches with appropriate engraving. Provide wiring to control panel. Size and location as detailed on drawings.

B. Fire Fighters' Control Panel: Locate in building fire control room as shown on the architectural drawings. Fixture faceplate, No. 4 brushed finish stainless steel, including the following features:

1. Car position and direction indicator (digital readout or color SVGA display type). Identify position indicator with car number.
2. Indicator showing operating status of car.
3. Wiring to panel.
4. Manual car standby power selection switch and power status indicator.
5. Firefighters' telephone jack.

C. Machine Room Monitoring System: Provide on-site remote monitoring capability.

1. Include accumulation of hall call registration information as part of monitoring capability. Provide memory capacity for at least the preceding five, 24-hour periods, in blocks of 5 or 15-minute segments, running hour to hour (i.e., 2:00 p.m. to 3:00 p.m.) Provide battery backup to prevent loss of accumulated data due to loss of normal power.
2. Accumulate information for retrieval and use as follows:

    a. Visual and printed summary of hall call registration events by floor, direction, and duration, totaled in 5 or 15 minute segments during any 60-minute blocks using an internal clock.
    b. Visual and printed summary of hall call registration duration averaged for 5 or 15 minute and hourly periods.

c. Visual and printed summary of percentage of hall calls answered within 30 and 60 seconds in each minute and hourly period.
d. Visual and printed summary of time periods during which individual cars are not in group operation (operating separately or out of service).

3. Provide printer and interface with elevator microprocessor control in the machine room to download data and/or produce a hard copy of stored data. Provide directions and software to accomplish information retrieval.

2.13 SEISMIC OPERATIONS AND EQUIPMENT

A. Provide design, components, and operation per ASME A17.1, Part XXIV.

PART 3 - EXECUTION

3.1 SITE CONDITION INSPECTION

A. Prior to beginning installation of equipment, examine hoistway and machine room areas. Verify that no irregularities exist which affect execution of work specified.

B. Do not proceed with installation until work in place conforms to project requirements.

3.2 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver material in manufacturer's original, unopened protective packaging.

B. Store material in original protective packaging. Prevent soiling, physical damage, or moisture damage.

C. Protect equipment and exposed finishes from damage and stains during transportation, erection, and construction.

3.3 INSTALLATION

A. Install all equipment in accordance with manufacturer's instructions, referenced Codes, specification and approved submittals.

B. Install machine room equipment with clearances in accordance with referenced Codes and specification.

C. Install all equipment so it may be easily removed for maintenance and repair.

D. Install all equipment for ease of maintenance.

E. Install all equipment to afford maximum accessibility, safety, and continuity of operation.

F. Remove oil, grease, scale, and other foreign matter from the following equipment and apply one coat of field-applied machinery enamel.

1. All exposed equipment and metal work installed as part of this work which does not have architectural finish.
2. Machine room equipment, hoistway equipment including guide rails, guide rail brackets, and pit equipment.
3. Neatly touch up damaged factory-painted surfaces with original paint color. Protect machine-finish surfaces against corrosion.

3.4 FIELD QUALITY CONTROL

A. Have Code Authority acceptance inspection performed and complete corrective work.

3.5 ADJUSTMENTS

A. Install rails plumb and align vertically with tolerance of 1/16" in 100'-0". Secure joints without gaps and file any irregularities to a smooth surface.

B. Static balance car to equalize pressure of guide shoes on guide rails.

C. Lubricate all equipment in accordance with manufacturer's instructions.

D. Adjust motors, power conversion units, brakes, controllers, leveling switches, limit switches, stopping switches, door operators, interlocks, and safety devices to achieve required performance levels.

3.6 CLEANUP

A. Keep work areas orderly and free from debris during progress of project. Remove packaging materials on a daily basis.

B. Remove all loose materials and filings resulting from work.

C. Clean machine room equipment and floor.

D. Clean hoistways, car, car enclosure, entrances, operating and signal fixtures.

3.7 ACCEPTANCE REVIEW AND TESTS

A. General: Furnish labor, materials, and equipment necessary for tests. Notify Owner five (5) days in advance when ready for final review of unit or group. Final acceptance of installation will be made only after all field-quality control reviews have been completed, identified deficiencies have been corrected, all Owner's information and certificates have been received, and the following items have been completed to satisfaction of Owner.

1. Workmanship and equipment compliance with Contract Documents.
2. Contract speed, capacity, floor-to-floor, and door performance comply with Contract Documents.
3. Performance of following is satisfactory:

    a. Starting, accelerating, running
    b. Decelerating, stopping accuracy
    c. Door operation and closing force

d. Equipment noise levels
e. Signal fixture utility
f. Overall ride quality
g. Performance of door control devices
h. Operations of special security features and floor lock-off provisions

4. Test Results:

a. In all test conditions, obtain specified contract speed, performance times, stopping accuracy without re-leveling, and ride quality to satisfaction of Owner.
b. Temperature rise in motor windings limited to 50° Celsius above ambient. A full-capacity, one (1) hour running test, stopping at each floor for ten (10) seconds in up and down directions, may be required.

B. Performance Guarantee: Should test's review identify defects, poor workmanship, variance or noncompliance with requirements of specified Codes and/or ordinances, or variance or noncompliance with the requirements of Contract Documents, Contractor shall complete corrective work in an expedient manner to satisfaction of Owner at no cost as follows:

1. Replace equipment that does not meet Code or Contract Document requirements.
2. Perform work and furnish labor, materials, and equipment necessary to meet specified operation and performance.
3. Perform and assume cost for retesting required by Governing Code Authority, Owner to verify specified operation and/or performance.

3.8 OWNER'S INFORMATION

A. Provide three sets of neatly bound and one CD of written information necessary for proper maintenance and adjustment of equipment and include the following as minimums:

1. Straight-line wiring diagrams of "as-installed" elevator circuits, with index of location and function of components. Provide one set reproducible master. Mount one set wiring diagrams on panels, racked, or similarly protected, in elevator machine room. Provide remaining set rolled and in a protective drawing tube. Maintain all drawing sets with addition of all subsequent changes. These diagrams are Owner's property.
2. Lubrication instructions, including recommended grade of lubricants.
3. Parts catalogs for all replaceable parts including ordering forms and instructions.
4. Four sets of keys for all switches and control features properly tagged and marked.
5. Diagnostic equipment complete with access codes, adjusters manuals and set-up manuals for adjustment, diagnosis and troubleshooting of elevator system, and performance of routine safety tests.

B. Non-Proprietary Equipment Design:

1. Contractor shall submit the following information within 30 days of final acceptance of the installation for Owner's file.

   a. Wiring Diagrams: Three sets of “as installed” straight-line wiring diagrams showing the electrical connections of all equipment and all modifications to control circuits. One set of straight-line wiring diagrams shall be reproducible original. A legend sheet shall be furnished with each set of drawings to provide the following information:

      1) Name and symbol of each relay, switch, or other apparatus.
      2) Location on drawings, drawing sheet number and area, and location of all contacts.
      3) Location of apparatus, whether on controller or on car.
      4) Lubricating instructions, including recommended grade of lubricants.

   b. Parts Catalog: Three sets of complete parts catalogs listing all replaceable parts including Manufacturer's identifying numbers and ordering instructions.
   c. Printed Instructions: Three sets of neatly bound instructions explaining all operating features.
   d. Complete software documentation for all installed equipment.
   e. Diagnostic Test Equipment and Instructions: Provide all diagnostic test devices together with one set of all supporting information necessary for interpretation of test data and troubleshooting of system.
   f. The elevator installation shall be a design that can be maintainable by any licensed elevator maintenance company employing journeymen mechanics, without the need to purchase or lease additional diagnostic devices, special tools, or instructions from the original equipment manufacturer.

      1) Provide on site capability to diagnose faults to the level of individual circuit boards and individual discreet components for the solid state elevator controller.
      2) If the equipment for fault diagnosis is not completely self-contained within the controllers but requires a separate, detachable device, that device shall be furnished to the Owner as part of this installation. Such device shall be in possession of and become property of the Owner.
      3) Installed equipment not meeting this requirement shall be removed and replaced with conforming equipment at no cost to the Owner.

   g. Contractor is responsible for upgrades and/or revisions of software during the progress of the work and warranty period.

3.9 WARRANTY INSPECTION

A. At least 30 days prior to warranty expiration, schedule final inspection and retest with Owner. Requirement shall include close examination of all equipment.

B. Replace, repair or adjust any equipment found defective and covered by warranty prior to expiration of warranty period.

END OF SECTION 14250