

## SECTION 14240

### HYDRAULIC ELEVATORS

#### PART 1 - GENERAL

##### 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

##### 1.02 SUMMARY

- A. This Section includes hydraulic passenger elevators.
- B. Related Sections include the following:
  - 1. Division 2 Section "Earthwork" for removal of drilling spoils from the pit and for trenching and backfilling for underground piping and conduit.
  - 2. Division 3 Section "Cast-in-Place Concrete" for setting sleeves, inserts, and anchoring devices in concrete.
  - 3. Division 4 Section "Unit Masonry Assemblies" for setting sleeves, inserts, and anchoring devices in masonry.
  - 4. Division 5 Section "Metal Fabrications" for the following:
    - a. Structural-steel shapes for subsills at each floor.
    - b. Pit ladders.
    - c. Note: Hoisting beams are not being provided.
  - 5. Division 8 Section "Finish Hardware" for security card access equipment used to restrict elevator use.
  - 6. Division 9 Section "Carpet" for finish flooring in elevator cars.
  - 7. Division 16 Sections for smoke detectors in elevator lobbies to initiate emergency recall operation and heat detectors in shafts and machine rooms to disconnect power from elevator equipment before sprinkler activation and for connection to elevator controllers.
  - 8. Division 16 Sections for telephone service to elevators.
  - 9. Division 16 Sections for electrical service for elevators to and including disconnect switches at machine room door.

##### 1.03 DEFINITIONS

- A. Hydraulic Elevators: Elevators in which cars are hoisted by action of a hydraulic plunger and cylinder (jack); with other components of the Work, including fluid storage tank, pump, piping, valves, car enclosures, hoistway entrances, operation systems, signal equipment, guide rails, electrical wiring, buffers, and devices for operations, safety, security, required performance at rated speed and capacity, and for complete elevator installation.
- B. Defective Elevator Work: Operation or control system failures; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; the need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.

##### 1.04 SUBMITTALS

- A. General: Submit in accordance with Section 01300.
- B. Product Data: Include capacities, sizes, performances, operations, safety features, finishes, and similar information.

- C. Shop Drawings: Show plans, elevations, sections, and large-scale details indicating service at each landing, machine room layout, coordination with building structure, relationships with other construction, and locations of equipment and signals. Indicate variations from specified requirements, maximum dynamic and static loads imposed on building structure at points of support, and maximum and average power demands.
- D. Samples: For exposed finishes of cars, hoistway doors and frames, and signal equipment; 3-inch- (75-mm-) square samples of sheet materials; and 4-inch (100-mm) lengths of running trim members.
- E. Maintenance Manuals: Include operation and maintenance instructions, parts listing with sources indicated, recommended parts inventory listing, emergency instructions, and similar information. Include diagnostic and repair information available to manufacturer's and Installer's maintenance personnel. Submit for Owner's information at Project closeout as specified in Division 1.
- F. Inspection and Acceptance Certificates: Obtain and submit inspection and acceptance certificates as required by authorities having jurisdiction for normal, unrestricted elevator use.

#### 1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Elevator manufacturer or an experienced Installer approved by elevator manufacturer who has completed elevator installations similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Regulatory and Accessibility Requirements: All work shall be performed in accordance with the latest revised edition (as of the date bids are taken) of the American National Standard Safety Code for Elevators, Dumbwaiters, Escalators, and Moving Walks (ANSI A-17), the National Electrical Code, The American Disabilities Act and State and local codes as may be applicable. Elevator shall meet current State laws relating to accessibility to public buildings for the physically handicapped.
  - 1. Seismic Risk Zone: Project is located in Zone 2.
- C. In the interest of unified responsibility, the Elevator package shall be a nationally recognized United States company regularly engaged in the business of manufacturing, elevators of the type and character required by these Specifications, and shall manufacture the entire power unit, controller, hydraulic cylinder and all other parts of the equipment, including door operators and signal fixtures, and shall so state in his request for approval listing the items he manufactures.
- D. Design for Maintenance Requirements: 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.

#### 1.06 COORDINATION

- A. Coordinate installation of sleeves, block outs, and items that are embedded in concrete or masonry for elevator equipment. Furnish templates and installation instructions and deliver to Project site in time for installation.
- B. Coordinate locations and dimensions of other work relating to hydraulic elevators including pit ladders and sumps; entrance subsills; and electrical service, electrical outlets, lights, and switches in pits and machine rooms.

#### 1.07 WARRANTY

- A. General: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

- B. Special Manufacturer's Warranty: Written warranty, signed by manufacturer agreeing to repair, restore, or replace defective elevator work within specified warranty period.
  - 1. Warranty Period: 12 months from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the following:
  - 1. Canton Elevator; local distributor, Pine State Elevator Co.
  - 2. ThyssenKrupp Elevator Group North America; local distributor, Stanley Elevator Co., Inc.

2.02 DESCRIPTION OF EQUIPMENT

- A. Passenger Elevator:
  - 1. Capacity: 2500 lbs. minimum.
  - 2. Speed: 125 feet per minute full load up.
  - 3. Operation: Selective collective with card reader at second level to provide controlled exiting from elevator car. Provide 2 keys; one for Knox box and one for Owner.
  - 4. Clear Car Inside: 6' - 8" wide x 4' - 4" deep.
  - 5. Travel: 26' - 0" ±.
  - 6. Power Supply: 208 volts, 3 phase, 60 cycles.
  - 7. Stops and Openings: 3 stops.
  - 8. Door Size and Type: 3'-6" x 7'-0", single slide.
  - 9. Door Operation: D. C. Power Operation.
  - 10. Signals: Illuminated buttons, alarm bell, position indicator in car with audible signal, hall lantern and gong, with position indicator at each floor, brushed stainless steel.
  - 11. Special Features: Infrared light beam door protection system for full height of door, handicapped requirements (ANSI A117.1), fire-fighters service, emergency lighting with power pack. Battery backup for controlled descent to lowest level of egress in event of power loss.
  - 12. Motor: 30 H.P. maximum. Include closed transition solid state starting.

2.03 PASSENGER ELEVATOR CAR ENCLOSURES

- A. General: Provide manufacturer's standard car enclosures of the selections indicated. Include ventilation, lighting, access doors, doors, power door operators, sills (thresholds), trim, accessories, and wall and ceiling finishes. Provide manufacturer's standard flush-panel horizontal-sliding doors of type indicated. Provide manufacturer's standard protective edge trim system for door and wall panels, except as otherwise indicated.
- B. Materials and Fabrication: Provide selections indicated or, if not otherwise indicated, manufacturer's standard welded steel construction with factory finish of synthetic enamel, and provide other materials and fabrication of not less than the following:
  - 1. Walls: Flush wall plastic laminate pressure bonded to a wood core with a fire-retardant backing sheet. Provide plastic laminate selected by Architect from manufacturer's full range of options.
  - 2. Canopy: 14-gage furniture steel painted white.
  - 3. Front and Transom: Brushed stainless steel.
  - 4. Doors: Hollow metal construction, brushed stainless steel.
  - 5. Ceiling: Suspended panel with circular disc cutouts, stainless steel finish.
  - 6. Lighting: Fluorescent.
  - 7. Sill: Aluminum.
  - 8. Flooring: Carpet specified in Division 9 Section "Carpet."
  - 9. Handrails: Cylindrical metal bar, brushed stainless steel on each side wall and rear wall.
  - 10. Clear Cab Height: 7' - 4".
  - 11. Accessories: Two-speed exhaust fan, brushed stainless steel certificate frame, and ADA compliant, two-way speakerphone, protection pads and stainless steel pad buttons.

## 2.04 PASSENGER HOISTWAY ENTRANCES

- A. General: Provide manufacturer's standard hollow-metal, sliding, door-and-frame hoistway entrances complete with track systems, hardware, sills, and accessories. Match car doors for size, number of panels, and door movement. Provide frame size and profile to coordinate with hoistway wall construction.
- B. Materials and Fabrication: Provide the following materials and finishes for exposed parts of elevator car enclosures, car doors, hoistway entrance doors and frames, and signal equipment; provide manufacturer's standards, but not less than the following:
  - 1. Satin Stainless Steel Frames: Formed stainless-steel sheet, ASTM A 167, Type 302 or 304, with No. 4 satin finish.
  - 2. Satin Stainless Steel Panels: Flush construction, fabricated from ASTM A 167, Type 302 or 304 stainless steel, with No. 4 satin finish.
  - 3. Aluminum Sills: Extruded aluminum, with grooved surface, 1/4 inch (6.4 mm) thick, mill finish.

## 2.05 EQUIPMENT

- A. Passenger Elevator: ThyssenKrupp Marquis 25, or Canton 2500 holed hydraulic elevator meeting the following minimum requirements. Interior car finishes shall match those specified; non-matching finishes shall be reason for rejection.
  - 1. Platform and Sling: Platform shall have a fabricated frame of formed and structural steel shapes, gusseted and rigidly welded. Provide fire-treated wood subfloor prepared for finish flooring. Finished flooring, installed on top of car platform, shall be provided in a Division 9 Section. Fireproof underside of platform. Sling shall consist of heavy steel channel stiles properly affixed to a steel crosshead and bolster, with adequate bracing members, to remove all strain from car enclosure. Steel bumper plates shall be affixed to bottom of bolster channels and a platen plate with clamps and cap screws shall be provided for fastening sling to plunger.
  - 2. Passenger Car Doors: Car entrance shall be provided with horizontal sliding doors with panel rigidity obtained by suitable steel reinforcements. Doors shall be hung on sheave hangers with polyurethane tires and sheaves not less than 3-1/4" diameter, running on a polished steel track, and guided at bottom by non-metallic shoes sliding in a smooth threshold groove.
  - 3. Alarm Bell: Emergency alarm bell shall be located in conformance with ANSI A-17 Code requirements, and connected to a plainly marked pushbutton in the car. Alarm bell shall be connected to the emergency lighting power pack.
  - 4. Guide and Guide Shoes: Guides for elevator car shall be planed steel elevator guide rails, properly fastened to building structure with steel brackets. Car stile shall be fitted at top and bottom with self-aligning, swivel type guide shoes with metal body and removable non-metallic liners.
  - 5. Power Unit (Oil Pumping and Control Mechanism): Shall be compactly and neatly designed with all of the components listed below combined in a self-contained unit; structural steel outer base with tank supports; floating inner base for mounting pump assembly; oil reservoir with tank cover and controller compartment with cover; metal drip pan; an oil-hydraulic pump; an electric motor; an oil control unit with the following components built into a single housing; a high pressure relief valve; a check valve; an automatic unloading upstart valve; a lowering and leveling valve; and a magnetic controller. The pump shall be especially designed and manufactured for oil-hydraulic elevator service. It shall be of the positive displacement type, inherently designed for steady discharge with minimum pulsations to provide smooth and quiet operation. Output of pump shall not vary more than 10% between no load and full load on the elevator car. Motor shall be especially designed for oil-hydraulic elevator service, of standard manufacture, and of duty rating to comply with herein-specified speeds and loads. Oil control unit shall consist of the following components, all built into a single housing. Welded manifolds with separate valves to accomplish each function will not be acceptable under this Specification. All adjustments shall be accessible and shall be made without removing the assembly from the oil line. Relief valve shall be externally adjustable, and shall be capable of bypassing the total oil flow without increasing back pressure more than 10% above that required to barely open the valve. Up start and stop valve shall be externally adjustable, and designed to bypass oil flow during start and stop of motor pump assembly. Valve shall close slowly, gradually diverting oil to or from the jack unit, insuring smooth up starts and up stops. Check valve shall be designed to close quietly without permitting any perceptible reverse flow. Lowering valve and leveling valve shall be externally adjustable for drop-away speed, lowering speed, leveling speed and stopping speed to insure smooth "Down"

- starts and stops. The leveling valve shall be designed to level car to the floor in direction car is traveling when slowdown is initiated. Electric controller shall be microprocessor integrated circuitry. Silver to silver contacts shall be utilized on all relays and contactors (where provided). Provide thermal overload relays to protect motor. All component switches to be mounted in a steel panel designed for mounting on the power unit, wall or floor.
6. Jack Unit: Shall be double post design, designed and constructed in accordance with the applicable requirements of the ANSI A-17.1 Code. It shall be of sufficient size to lift the gross load the specified height and shall be factory tested to insure adequate strength and freedom from leakage. No brittle material, such as gray cast iron, shall be used in the jack construction. Jack unit shall consist of the following parts: plunger of heavy seamless steel tubing accurately turned and polished; a stop ring shall be electrically welded to the plunger to positively prevent plunger leaving the casing; an internal guide bearing; packing or seal of suitable design and quality; drip ring around cylinder top; and cylinder made of steel pipe and provided with a pipe connection and air bleeder. Brackets shall be welded to the jack cylinder for supporting elevator on pit channels. Provide an auxiliary safety bulkhead in lower end of cylinder for limiting down car speed to a safe value in the event of leakage around the external bulkhead.
  7. Mainline Strainer: Shall be self-cleaning type, equipped with a 40-mesh element, for installation in the oil line.
  8. Automatic Guide Rail Lubricators: Provide and mount on top of upper guide shoes. Wool felt wiper shall apply an even, uniform flow of oil to thoroughly lubricate faces of guide rail from a leak-proof oil reservoir.
  9. Failure Protection: Electrical control circuit shall be designed so that in event of malfunction due to motor starter failure, oil becoming low in the system, or the car failing to reach a landing in the up direction within a predetermined time, the elevator car will automatically descend to the lowest terminal landing. If power operated doors are used, the doors shall automatically open when the car reaches the landing to allow passengers to depart. The doors shall then automatically close and all control buttons, except the "door open" button in the car station, shall be made inoperative.
  10. Sound Insulation Panels: Shall be manufactured of reinforced 16-gage steel with a 1-inch thick, 1-1/2 lb. core of fiberglass affixed to interior. Mount on all four open sides of power unit frame.
  11. Sound Isolating Couplings: Provide not less than two installed in oil line in Machine Room between pump and jack.
  12. Oil-Hydraulic Silencer (Muffler Device): Shall be installed in oil line near power unit. It shall contain pulsation-absorbing material inserted in a blowout-proof housing arranged for inspecting interior parts without removing unit from oil line. Rubber hose without blowout-proof features will not be acceptable.
  13. Vibration Pads: Mount under the power unit assembly to isolate unit from building structure.
  14. Automatic Terminal Limits: Electric limit switches, placed in hatchway near terminal landings, shall be designed to cut off electric current and stop the car should it run beyond either terminal landing.
  15. Automatic Self-Leveling: Provide elevator with a self-leveling feature that will automatically bring car to floor landings. Self-leveling shall, within its zone, be entirely automatic and independent of operating device and shall correct for overtravel or undertravel. Car shall be maintained level to within 1/2-inch of landing irrespective of load.
  16. Buffers: Provide buffers, complying with ANSI A-17.1 Code requirements, under car in elevator pit. Mount buffers on continuous channels fastened to elevator guide rail or securely anchored to pit floor; provide substantial extensions, if required.
  17. Car Top Inspection Station: Provide station with an "emergency stop" switch and with constant pressure "up-down" direction buttons that make the normal operating devices inoperative and give the inspector complete control of the elevator.
  18. Door Operation: Provide direct current, motor-driven, heavy-duty operator designed to operate car and hoistway doors simultaneously. Door movements shall be electrically cushioned at both limits of travel and door operating mechanism shall be arranged for manual operation in event of power failure. Provide full height, infrared light beam door sensing device with automatic non-contact reversal of car and hoistway doors if an obstruction enters path of travel for elevators. Doors shall then resume closing cycle. Doors shall automatically open as car arrives at landing and shall automatically close after an adjustable time interval or when car is dispatched to another landing. Direct drive geared operators, AC controlled units with oil checks, or other deviations from the above are not acceptable.
  19. Interlocks: Each hoistway entrance shall be equipped with an approved interlock, tested as required by code. Design interlock to prevent operation of car away from landing until doors are

- locked in the closed position as defined by code and to prevent doors from opening at any landing from the corridor side unless car is at rest at that landing or is in the leveling zone and stopping at that landing. Interlocks shall bear Underwriters' Laboratories "B" label of approval.
20. Hoistway Door Unlocking Device: As specified by the ANSI A-17.1 Code, shall be provided to permit authorized persons to gain access to hoistway when elevator car is away from the landing.
  21. Door Hangers and Tracks: Provide each hoistway sliding door with sheave type two point suspension hangers and tracks complete. Sheaves shall be 3-1/4 inches in diameter and shall have polyurethane tires with ball bearings properly sealed to retain grease. Hangers shall be provided with an adjustable slide to take the up-thrust of the doors. Tracks shall be drawn steel shapes with smooth surfaces and shaped to conform to hanger sheaves.
  22. Passenger Hoistway Entrances: Provide hollow metal, horizontal sliding type entrances at each hoistway opening. Entrances shall be manufacturer's standard design and shall bear Underwriters' Laboratories' "B" labels. They shall consist of frames, sills, doors, hangers, hanger supports, hanger covers, fascia plates, and all necessary hardware. Entire front wall of the hoistway shall be left open or a rough opening provided which is 18 inches greater in width and 12 inches greater in height than the finished opening, until after entrances are installed. After guide rails are set and lined, the entrance frames shall be installed in perfect alignment with guide rails. Finish walls shall then be completed by others.
  23. Passenger Operation (Selective Collective Automatic Pushbutton): Control of elevator car shall be automatic in operation by means of a pushbutton in the car marked for each landing levels served and an "up-down" button at each intermediate landing with a call button at each terminal landing, wherein all stops registered by momentary pressure of landing or car buttons shall be maintained until car answers the call. Provide an emergency stop switch in the car pushbutton station that, when in the off position, will render elevator inoperative, and that will enable attendant or passenger to stop car at any point during its travel. Opening of this switch shall not cancel registered calls, and when the switch is closed, car shall continue to answer calls that have been registered. Each landing station shall contain an illuminated pushbutton that shall "light up" when pressed to indicate that a call has been registered to bring car to that particular landing. A time delay, noninterference feature, shall be incorporated in the control mechanism to allow ample time for opening and closing car and hoistway doors before it is again placed in motion.

## 2.06 SIGNAL EQUIPMENT

- A. General: Provide signal equipment for each elevator or group of elevators with hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Fabricate lighted elements of acrylic or other permanent, nonyellowing translucent plastic.
- B. Car Control Stations: Provide manufacturer's standard semirecessed car control stations. Mount in return panel adjacent to car door, if not otherwise indicated.
- C. Emergency Communication System: Provide system that complies with ASME A17.1 and the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines (ADAAG)." On activation, system dials preprogrammed number of monitoring station and identifies elevator location to monitoring station. System provides two-way voice communication without using a handset and provides visible signals that indicate when system has been activated and when monitoring station has responded. System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.
- D. Fire Department Communication System: Provide in each car and required conductors in traveling cable for fire department communication system specified in Division 16 Sections.
- E. Car Position Indicator: For passenger elevator cars, provide illuminated-signal type, digital-display type, or segmented type, located above car door or above car control station. Also provide audible signal to indicate to passengers that car is either stopping at or passing each of the floors served.
  1. Include travel direction arrows if not provided in car control station.
- F. Hall Push-Button Stations: Provide hall push-button stations at each landing for elevator.
  1. Provide units with flat faceplate for mounting with body of unit recessed in wall.
  2. Provide units with direction-indicating buttons; two buttons at intermediate landings; one button at terminal landings.

- G. Hall Lanterns: Provide units with illuminated arrows, but provide single arrow at terminal landings.
  - 1. Provide units with flat faceplate for mounting with body of unit recessed in wall and with illuminated elements projecting from faceplate for ease of angular viewing.
  - 2. Place lanterns either above or beside each hoistway entrance, unless otherwise indicated. Mount at a minimum of 72 inches (1829 mm) above finished floor.
  - 3. With each lantern, provide audible signals indicating car arrival and direction of travel. Signals sound once for up and twice for down.
    - a. At manufacturer's option, audible signals may be placed on each car.
- H. Hall Position Indicators: Provide illuminated-signal type or digital-display type, located above each hoistway entrance at ground floor. Provide units with flat faceplate for mounting with body of unit recessed in wall.
  - 1. Integrate ground-floor hall lanterns with hall position indicators.
- I. Corridor Call Station Pictograph Signs: Provide signs matching hall push-button stations with text and graphics according to ASME A17.1, Appendix H.

### PART 3 - EXECUTION

#### 3.01 EXAMINATION

- A. Examine elevator areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Examine hoistway, hoistway openings, pits, and machine room, as constructed. Verify critical dimensions, and examine supporting structure and other conditions under which elevator work is to be installed. Proceed with installation only after unsatisfactory conditions have been corrected.
  - 1. If unacceptable conditions are encountered, prepare a written report, endorsed by Installer, listing dimensional discrepancies and conditions detrimental to performance.

#### 3.02 INSTALLATION

- A. Comply with manufacturer's installation instructions and recommendations.
- B. Coordination: Coordinate elevator work with work of other trades for proper time and sequence to avoid construction delays. Use established benchmarks, lines, and levels to ensure dimensional coordination of the Work.
- C. Excavation for Jack: Drill excavation in each elevator pit to accommodate installation of cylinders; comply with applicable requirements in Division 2 Section "Earthwork."
- D. Install plunger-cylinders plumb and accurately centered for elevator car position and travel. Anchor securely in place, supported at pit floor.
- E. Install plunger cylinders in protective PVC cylinder casings. Fill void spaces between cylinder casings and cylinders with sand.
- F. Provide water stop collar on the outside of the earth casing to seal the casing to the pit floor.
- G. Welded Construction: Provide welded connections for installing elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts. Comply with AWS standards for workmanship and for qualifications of welding operators.
- H. Sound Isolation: Mount rotating and vibrating equipment on vibration-isolating mounts designed to effectively prevent transmission of vibrations to structure and thereby eliminate sources of structure-borne noise from elevator system.

- I. Install piping above the floor, where possible. Where not possible, install underground piping in Schedule 40 PVC pipe casing assembled with solvent-cement fittings.
- J. Lubricate operating parts of systems, including ropes, if any, as recommended by manufacturers.
- K. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with cars. Where possible, delay installation of sills and frames until car is operable in shaft. Reduce clearances to minimum, safe, workable dimension at each landing.
- L. Leveling Tolerance: 1/4 inch (6 mm), up or down, regardless of load and direction of travel.
- M. Set sills flush with finished floor surface at landing. Fill space under sill solidly with nonshrink, nonmetallic grout.
- N. Wiring, Piping and Oil: All necessary wiring shall be provided in the hoistway in accordance with the National Electrical Code, to connect the operating buttons and switches to the control board in the power unit. All wiring shall be done in rigid conduit or electric metallic tubing except to movable apparatus, which shall be connected by short lengths of flexible conduit. Provide all necessary pipe and fittings to connect the power unit to the jack unit and oil of the proper grade. All underground conduit and piping shall be adequately protected against corrosion.
- O. Controls: Shall be placed for convenient use of wheelchair operators as required by the State Handicapped Code.

### 3.03 FIELD QUALITY CONTROL

- A. Acceptance Testing: On completion of elevator installation and before permitting use (either temporary or permanent) of elevators, perform acceptance tests as required and recommended by ASME A17.1 and by governing regulations and agencies.
- B. Advise Owner, Architect, and authorities having jurisdiction in advance of dates and times tests are to be performed on elevators.
- C. In addition to the other requirements, inspection, tests and remedies herein provided, upon completion of the elevator installation and before final approval and final payment, the Elevator Subcontractor shall make, in the presence of the Architect or his designated representative, a running speed test with full maximum load on the elevator car to determine whether the elevator equipment, as installed, meets the speed, capacity and all other requirements of the Specifications.
- D. In the event the equipment does not meet all requirements of the Specifications, the Elevator Subcontractor shall promptly remove from the premises, all work condemned by the Architect as failing to conform to the Contract, and shall promptly replace and re-execute his own work in accordance with the Contract without expense to the Owner and shall bear all expense of making good all work of other Contractors destroyed or damaged by such removal or replacement.

### 3.04 DEMONSTRATION

- A. Instruct Owner's personnel in proper use, operations, and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of operational failure and other building emergencies. Train Owner's personnel in procedures to follow in identifying sources of operational failures or malfunctions. Confer with Owner on requirements for a complete elevator maintenance program.
  - 1. Coordinate instruction time with availability of Owner's personnel.
- B. Make a final check of each elevator operation with Owner's personnel present and before date of Substantial Completion. Determine that operation systems and devices are functioning properly.



3.05 PROTECTION

- A. Temporary Use: Do not use elevators for construction purposes.
- B. Provide final protection and maintain conditions, in a manner acceptable to elevator manufacturer and Installer, that ensure elevators are without damage or deterioration at the time of Substantial Completion.

END OF SECTION