SECTION 14 24 23 - MACHINE ROOM-LESS HYDRAULIC PASSENGER ELEVATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes: Machine room-less hydraulic passenger elevators as shown and specified. Elevator work includes:
- ***1. Standard pre-engineered hydraulic passenger elevators.***
- ***2. Elevator car enclosures, hoistway entrances and signal equipment.***
- ***3. Operation and control systems.***
- ***4. Fused disconnect switch.***
- ***5. Jack assembly.***
- ***6. Accessibility provisions for physically disabled persons.***
- ***7. Equipment, machines, controls, systems and devices as required for safely operating the specified elevators at their rated speed and capacity.***
- ***8. Materials and accessories as required to complete the elevator installation.***

B. Related Sections:
- ***1. Division 01 General Requirements: Meet or exceed all referenced sustainability requirements.***
- ***2. Division 03 Concrete: Installing inserts, sleeves and anchors in concrete.***
- ***3. Division 04 Masonry: Installing inserts, sleeves and anchors in masonry.***
- ***4. Division 05 Metals:***
  - ***a. Providing hoist beams, pit ladders, steel framing, auxiliary support steel and divider beams for supporting guide-rail brackets.***
  - ***b. Providing steel angle sill supports and grouting hoistway entrance sills and frames.***
- ***2. Division 09 Finishes: Providing elevator car finish flooring and field painting unfinished and shop primed ferrous materials.***
- ***3. Division 26 Sections:***
  - ***a. Providing electrical service to elevators, including fused disconnect switches where permitted. Note: Fused disconnect switch shall be provided as part of elevator manufacture product. Refer to Part 2 Miscellaneous Elevator Components for further details.***
  - ***b. Emergency power supply, transfer switch and auxiliary contacts.***
  - ***c. Heat and smoke sensing devices.***
  - ***d. Convenience outlets and illumination in control room (if applicable), hoistway and pit.***
- ***4. Division 22 Plumbing***
  - ***a. Sump pit and oil interceptor.***

5. ***Division 23 Heating, Ventilation and Air Conditioning***
   a. ***Heating and ventilating hoistways.***

C. ***Related Work: The following shall be provided in accordance with the requirements of the Ohio Building Code and ANSI A17.1 Code. For specific rules, refer to ANSI A17.1, Part 3 for hydraulic elevators. State or local requirements must be used if more stringent.***

1. ***Elevator hoist beam to be provided at top of elevator shaft. Beam must be able to accommodate proper loads and clearances for elevator installation and operation.***
2. ***Supply in ample time for installation by other trades, inserts, anchors, bearing plates, brackets, supports and bracing including all setting templates and diagrams for placement.***
3. ***Hatch walls require a minimum two hours of fire rating. Hoistway should be clear and plumb with variations not to exceed 1/2'' at any point.***
4. ***Elevator hoistways shall have barricades, as required.***
5. ***Bevel guards at 75° on all recesses, projections or setbacks over 2'' (4'' for A17.1 2000 areas) except for loading or unloading.***
6. ***Provide rail bracket supports at pit, each floor and roof. For guide rail bracket supports, provide divider beams between hoistway at each floor and roof.***
7. ***Pit floor shall be level and free of debris. Reinforce dry pit to sustain normal vertical forces from rails and buffers.***
8. ***Where pit access is by means of the lowest hoistway entrance, a vertical ladder of non-combustible material extending 42'' minimum, (48'' minimum for A17.1-2000 areas) shall be provided at the same height, above sill of access door or handgrips.***
9. ***All wire and conduit should run remote from the hoistways.***
10. ***When heat, smoke or combustion sensing devices are required, connect to elevator control cabinet terminals. Contacts on the sensors should be sided for 12 volt D.C.***
11. ***Install and furnish finished flooring in elevator cab.***
12. ***Finished floors and entrance walls are not to be constructed until after sills and door frames are in place. Consult elevator contractor for rough opening size. The general contractor shall supply the drywall framing so that the wall fire resistance rating is maintained, when drywall construction is used.***
13. ***Where sheet rock or drywall construction is used for front walls, it shall be of sufficient strength to maintain the doors in true lateral alignment. Drywall contractor to coordinate with elevator contractor.***
14. ***Before erection of rough walls and doors; erect hoistway sills, headers, and frames. After rough walls are finished; erect fascias and toe guards. Set sill level and slightly above finished floor at landings.***
15. ***To maintain legal fire rating (masonry construction), door frames are to be anchored to walls and properly grouted in place.***
16. ***The elevator wall shall interface with the hoistway entrance assembly and be in strict compliance with the elevator contractor's requirements.***
17. ***General Contractor shall fill and grout around entrances, as required.***

18. ***All walls and sill supports must be plumb where openings occur.***
19. ***Locate a light fixture (200 lx / 19 fc) and convenience outlet in pit with switch located adjacent to the access door.***
20. ***Provide telephone line, light fixture (200 lx / 19 fc), and convenience outlet in the hoistway at the landing where the elevator controller is located. Typically this will be at the landing above the 1st floor. Final location must be coordinated with elevator contractor.***
21. ***As indicated by elevator contractor, provide a light outlet for each elevator, in center of hoistway.***
22. ***For signal systems and power operated door: provide ground and branch wiring circuits.***
23. ***For car light and fan: provide a feeder and branch wiring circuits to elevator control cabinet.***
24. ***Controller landing wall thickness must be a minimum of 8 1/2 inches thick. This is due to the controller being mounted on the second floor landing in the door frame on the return side of the door. For center opening doors, the controller is located on the right hand frame (from inside the elevator cab looking out). These requirements must be coordinated between the general contractor and the elevator contractor.***
25. ***Cutting, patching and recesses to accommodate hall button boxes, signal fixtures, etc..***

1.02 SUBMITTALS

A. ***Product data: When requested, the elevator contractor shall provide standard cab, entrance and signal fixture data to describe product for approval.***

B. ***Shop drawings:***
   1. ***Show equipment arrangement in the corridor, pit, and hoistway. Provide plans, elevations, sections and details of assembly, erection, anchorage, and equipment location.***
   2. ***Indicate elevator system capacities, sizes, performances, safety features, finishes and other pertinent information.***
   3. ***Show floors served, travel distances, maximum loads imposed on the building structure at points of support and all similar considerations of the elevator work.***
   4. ***Indicate electrical power requirements and branch circuit protection device recommendations.***

C. ***Powder Coat paint selection: Submit manufacturer's standard selection charts for exposed finishes and materials.***

D. ***Plastic laminate selection: Submit manufacturer's standard selection charts for exposed finishes and materials.***

E. ***Metal Finishes: Upon request, standard metal samples provided.***

F. ***Operation and maintenance data. Include the following:***
   1. ***Owner's manuals and wiring diagrams.***
   2. ***Parts list, with recommended parts inventory.***

1.03 QUALITY ASSURANCE

A. ***Manufacturer Qualifications: An approved manufacturer with minimum 15 years of experience in manufacturing, installing, and servicing elevators of the type required for the project.***
   1. ***The manufacturer of machines, controllers, signal fixtures, door operators cabs, entrances, and all other major parts of elevator operating equipment.***
      a. ***The major parts of the elevator equipment shall be manufactured by the installing company, and not be an assembled system.***
   2. ***The manufacturer shall have a documented, on-going quality assurance program.***

B. ***Installer Qualifications: The manufacturer or an authorized agent of the manufacturer with not less than 15 years of satisfactory experience installing elevators equal in character and performance to the project elevators.***

C. ***Regulatory Requirements:***
   1. ***ASME A17.1 Safety Code for Elevators and Escalators, latest edition or as required by the local building code.***
   2. ***Building Code: National.***
   3. ***NFPA 70 National Electrical Code.***
   4. ***NFPA 80 Fire Doors and Windows.***
   5. ***Americans with Disabilities Act - Accessibility Guidelines (ADAAG)***
   6. ***Section 407 in ICC A117.1, when required by local authorities***

D. ***Fire-rated entrance assemblies: Opening protective assemblies including frames, hardware, and operation shall comply with ASTM E2074 and NFPA Standard 80. Provide entrance assembly units bearing Class B or 1 1/2 hour label by a Nationally Recognized Testing Laboratory (2 hour label in Canada).***

E. ***Inspection and testing:***
   1. ***Elevator Installer shall obtain and pay for all required inspections, tests, permits and fees for elevator installation.***
   2. ***Arrange for inspections and make required tests.***
   3. ***Deliver to the Owner upon completion and acceptance of elevator work.***

F. ***Proprietary Components: Processors or other equipment which can only be serviced by the manufacturer are prohibited, unless a non-expiring service/adjustment tool and instructions are provided to Owner at no additional cost.***

1.04 DELIVERY, STORAGE AND HANDLING

A. ***Manufacturing shall deliver elevator materials, components and equipment and the contractor is responsible to provide secure and safe storage on job site.***

1.05 PROJECT CONDITIONS

A. ***Temporary Use: Elevators shall not be used for temporary service or for any other purpose during the construction period before Substantial Completion and acceptance by the purchaser unless agreed upon by Elevator Contractor and General Contractor with signed temporary agreement.***

B. ***Changes to Drawings and Specification:***
   1. ***Review shaft size, machine room size, pit and over-travel dimensions shown on the Drawings and state in a letter with the bid if changes are required to accommodate manufacturer's standard equipment.***
   2. ***Failure to furnish such statements will be interpreted to mean that this Contractor agrees to meet all requirements under this Section, and conflicts with the work of other trades will not result in added expense to Owner.***

1.06 WARRANTY

A. ***Warranty: Submit elevator manufacturer's standard written warranty agreeing to repair, restore or replace defects in elevator work materials and workmanship not due to ordinary wear and tear or improper use or care for 12 months after final acceptance.***

1.07 MAINTENANCE

A. ***Furnish maintenance and call back service for a period of 12 months for each elevator after completion of installation or acceptance thereof by beneficial use, whichever is earlier, during normal working hours excluding callbacks.***
   1. ***Service shall consist of periodic examination of the equipment, adjustment, lubrication, cleaning, supplies and parts to keep the elevators in proper operation. Maintenance work, including emergency call back repair service, shall be performed by trained employees of the elevator contractor during regular working hours.***
   2. ***Submit parts catalog and show evidence of local parts inventory with complete list of recommended spare parts. Parts shall be produced by manufacturer of original equipment.***
   3. ***Manufacturer shall have a service office and full time service personnel within a 100 mile radius of the project site.***

PART 2 PRODUCTS

2.01 MANUFACTURERS

A, Manufacturer: Basis of design is Endura Machine Room-Less hydraulic elevator manufactured by Thyssenkrupp (844-427-5461) Other acceptable manufacturers include:

1. ***Otis Elevator Co. (800-441-6847), Hydrofit.***
2. ***Schindler Elevator Co. (973-397-6500) 3100 MRL.***

2.02 MATERIALS, GENERAL

A. ***Colors, patterns, and finishes: As selected by the Architect from manufacturer's full range of standard colors, patterns, and finishes.***

B. ***Steel:***
   1. ***Shapes and bars: Carbon.***
   2. ***Sheet: Cold-rolled steel sheet, commercial quality, Class 1, matte finish.***
   3. ***Finish: Factory-applied baked enamel for structural parts, powder coat for architectural parts. Color selection must be based on elevator manufacture's standard selections.***

C. ***Plastic laminate: Decorative high-pressure type, complying with NEMA LD3, Type GP-50 General Purpose Grade, nominal 0.050" thickness. Laminate selection must be based on elevator manufacture's standard selections.***

D. ***Flooring. Porcelain tile. Refer to Section 092013 "Ceramic Tiling."***

2.03 HOISTWAY EQUIPMENT

A. ***Platform: Fabricated frame of formed or structural steel shapes, gusseted and rigidly welded with a wood sub-floor. Underside of the platform shall be fireproofed. The car platform shall be designed and fabricated to support one-piece loads weighing up to 25% of the rated capacity.***

B. ***Sling: Steel stiles bolted or welded to a steel crosshead and bolstered with bracing members to remove strain from the car enclosure.***

C. ***Guide Rails: Steel, omega shaped, fastened to the building structure with steel brackets.***

D. ***Guides: Slide guides shall be mounted on top and bottom of the car.***

E. ***Buffers: Provide substantial buffers in the elevator pit. Mount buffers on continuous channels fastened to the elevator guide rail or securely anchored to the pit floor. Provide extensions if required by project conditions.***

F. ***Jack: A jack unit shall be of sufficient size to lift the gross load the height specified. Factory test jack to ensure adequate strength and freedom from leakage. Brittle material, such as gray cast iron, is prohibited in the jack construction. Provide the following jack type: Twin post***

holeless telescopic 2-stage. Two jacks piped together, mounted one on each side of the car with each having two telescopic sections designed to extend in a synchronized manner when oil is pumped into the assembly. Each jack section will be guided from within the casing or the plunger assembly used to house the section. Each plunger shall have a high pressure sealing system which will not allow for seal movement or displacement during the course of operation. Each jack assembly shall have a check valve built into the assembly to allow for automatically re-syncing the two plunger sections by moving the jack to its fully contracted position. The jack shall be designed to be mounted on the pit floor or in a recess in the pit floor. Each jack section shall have a bleeder valve to discharge any air trapped in the section..

G. ***Automatic Self-Leveling: Provide each elevator car with a self-leveling feature to automatically bring the car to the floor landings and correct for over travel or under travel. Self-leveling shall, within its zone, be automatic and independent of the operating device. The car shall be maintained approximately level with the landing irrespective of its load.***

H. ***Wiring, Piping, and Oil: Provide all necessary hoistway wiring in accordance with the National Electrical Code. All necessary code compliant pipe and fittings shall be provided to connect the power unit to the jack unit. theoiltype***

I. ***Pit moisture/water sensor located approximately 1 foot above the pit floor to be provided. Once activated, elevator will perform "flooded pit operation", which will run the car up to the designated floor, cycle the doors and shut down and trip the circuit breaker shunt to remove 3 phase power from all equipment, including pit equipment.***

J. ***Motorized oil line shut-off valve shall be provided that can be remotely operated from the controller landing service panel. Also a means for manual operation at the valve in the pit is required.***

2.04 POWER UNIT

A. ***Power Unit (Oil Pumping and Control Mechanism): A self-contained unit located in the elevator pit consisting of the following items:***
   1. ***NEMA 4/Sealed Oil reservoir with tank cover including vapor removing tank breather***
   2. ***An oil hydraulic pump.***
   3. ***An electric motor.***
   4. ***Electronic oil control valve with the following components built into single housing; high pressure relief valve, check valve, automatic unloading up start valve, lowering and leveling valve, and electro-magnetic controlling solenoids.***

B. ***Pump: Positive displacement type pump specifically manufactured for oil-hydraulic elevator service. Pump shall be designed for steady discharge with minimum pulsation to give smooth and quiet operation. Output of pump shall not vary more than 10 percent between no load and full load on the elevator car.***

C. ***Motor: Standard manufacture motor specifically designed for oil-hydraulic elevator service. Duty rating – motors shall be capable of 80 starts per hour with a 30% motor run time during each start.***

D. ***Oil Control Unit: The following components shall be built into a single housing. Welded manifolds with separate valves to accomplish each function are not acceptable. Adjustments shall be accessible and be made without removing the assembly from the oil line.***
   1. ***Relief valve shall be adjustable and be capable of bypassing the total oil flow without increasing back pressure more than 10 percent above that required to barely open the valve.***
   2. ***Up start and stop valve shall be 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, ensuring smooth up starts and up stops.***
   3. ***Check valve shall be designed to close quietly without permitting any perceptible reverse flow.***
   4. ***Lowering valve and leveling valve shall be adjustable for down start speed, lowering speed, leveling speed and stopping speed to ensure smooth "down" starts and stops. The leveling valve shall be designed to level the car to the floor in the direction the car is traveling after slowdown is initiated.***
   5. ***Provided with constant speed regulation in both up and down direction. Feature to compensate for load changes, oil temperature, and viscosity changes.***
   6. ***Solid State Starting: Provide an electronic starter featuring adjustable starting currents.***
   7. ***A secondary hydraulic power source (powered by 110VAC single phase) must be provided. This is required to be able to raise (reposition) the elevator in the event of a system component failure (i.e. pump motor, starter, etc.)***
   8. ***Oil Type: Provide a zinc free, inherently biodegradable lubricant formulated with premium base stocks to provide outstanding protection for demanding hydraulic systems, especially those operating in environmentally sensitive areas.***

2.05 HOISTWAY ENTRANCES

A. ***Doors and Frames: Provide complete hollow metal type hoistway entrances at each hoistway opening bolted\knock down construction.***
   1. ***Manufacturer's standard entrance design consisting of hangers, doors, hanger supports, hanger covers, fascia plates (where required), sight guards, and necessary hardware.***
   2. ***Main landing door & frame finish: Stainless steel panels, no. 4 brushed finish.***
   3. ***Typical door & frame finish: ASTM A 366 steel panels, factory applied powder coat finish.***

B. ***Integrated Control System: the elevator controller to be mounted to hoistway entrance above 1st landing. The entrance at this level, shall be designed to accommodate the control system***

and provide a means of access to critical electrical components and troubleshooting features. See section 2.09 Control System for additional requirements.

C. ***At the controller landing, the hoistway entrance frame shall have space to accommodate and provide a lockable means of access (group 2 security) to a 3 phase circuit breaker. See section 2.11 Miscellaneous Elevator Components for further details***

D. ***Interlocks: Equip each hoistway entrance with an approved type interlock tested as required by code. Provide door restriction devices as required by code.***

E. ***Door Hanger and Tracks: Provide sheave type two point suspension hangers and tracks for each hoistway horizontal sliding door.***
   1. ***Sheaves: Polyurethane tires with ball bearings properly sealed to retain grease.***
   2. ***Hangers: Provide an adjustable device beneath the track to limit the up-thrust of the doors during operation.***
   3. ***Tracks: Drawn steel shapes, smooth surface and shaped to conform to the hanger sheaves.***

F. ***Hoistway Sills: Extruded metal, with groove(s) in top surface. Provide mill finish on aluminum.***

2.06 PASSENGER ELEVATOR CAR ENCLOSURE

A. ***Car Enclosure:***
   1. ***Walls: Cab type a laminate wall design, durable wood core finished on both sides with high pressure plastic laminate.***
   2. ***Reveals and frieze: Not applicable***
   3. ***Canopy: Cold-rolled steel with hinged exit.***
   4. ***Ceiling: 4 LED Flush, stainless steel..***
   5. ***Cab Fronts, Return, Transom, Soffit and Strike: Provide panels faced with No. 4 brushed stainless steel***
   6. ***Doors: Horizontal sliding car doors reinforced with steel for panel rigidity. Hang doors on sheave type hangers with polyurethane tires that roll on a polished steel track and are guided at the bottom by non-metallic sliding guides.***
      a. ***Door Finish: Stainless steel panels: No. 4 brushed finish.***
      b. ***Cab Sills: Extruded aluminum, mill finish.***
   7. ***Handrail: Provide on side and rear walls on front opening cars and side walls only on front and rear opening cars. Handrails shall have a stainless steel, No. 4 brushed finish.***
   8. ***Ventilation: Manufacturer's standard exhaust fan, mounted on the car top.***
   9. ***Protection pads and buttons: Not required***

B. ***Car Top Inspection: Provide a car top inspection station with an "Auto-Inspection" switch, an "emergency stop" switch, and constant pressure "up and down" direction and safety buttons to make the normal operating devices inoperative. The station shall give the inspector complete control of the elevator. The car top inspection station shall be mounted in the door operator assembly.***

2.07 DOOR OPERATION

A. ***Door Operation: Provide a direct or alternating current motor driven heavy duty operator designed to operate the car and hoistway doors simultaneously. The door control system shall be digital closed loop and the closed loop circuit shall give constant feedback on the position and velocity of the elevator door. The motor torque shall be constantly adjusted to maintain the correct door speed based on its position and load. All adjustments and setup shall be through the computer based service tool. Door movements shall follow a field programmable speed pattern with smooth acceleration and deceleration at the ends of travel. The mechanical door operating mechanism shall be arranged for manual operation in event of power failure. Doors shall automatically open when the car arrives at the landing and automatically close after an adjustable time interval or when the car is dispatched to another landing. AC controlled units with oil checks, or other deviations are not acceptable.***

1. ***No Un-Necessary Door Operation: The car door shall open only if the car is stopping for a car or hall call, answering a car or hall call at the present position or selected as a dispatch car.***
2. ***Door Open Time Saver: If a car is stopping in response to a car call assignment only (no coincident hall call), the current door hold open time is changed to a shorter field programmable time when the electronic door protection device is activated.***
3. ***Double Door Operation: When a car stops at a landing with concurrent up and down hall calls, no car calls, and no other hall call assignments, the car door opens to answer the hall call in the direction of the car's current travel. If an onward car call is not registered before the door closes to within 6 inches of fully closed, the travel shall reverse and the door shall reopen to answer the other call.***
4. ***Nudging Operation: The doors shall remain open as long as the electronic detector senses the presence of a passenger or object in the door opening. If door closing is prevented for a field programmable time, a buzzer shall sound. When the obstruction is removed, the door shall begin to close at reduced speed. If the infra-red door protection system detects a person or object while closing on nudging, the doors shall stop and resume closing only after the obstruction has been removed.***
5. ***Door Reversal: If the doors are closing and the infra-red beam(s) is interrupted, the doors shall reverse and reopen. After the obstruction is cleared, the doors shall begin to close.***
6. ***Door Open Watchdog: If the doors are opening, but do not fully open after a field adjustable time, the doors shall recycle closed then attempt to open six times to try and correct the fault.***

7. ***Door Close Watchdog: If the doors are closing, but do not fully close after a field adjustable time, the doors shall recycle open then attempt to close six times to try and correct the fault.***
8. ***Door Close Assist: When the doors have failed to fully close and are in the recycle mode, the door drive motor shall have increased torque applied to possibly overcome mechanical resistance or differential air pressure and allow the door to close.***

B. ***Door Protection Device: Provide a door protection system using microprocessor controlled infra-red light beams. The beams shall project across the car opening detecting the presence of a passenger or object. If door movement is obstructed, the doors shall immediately reopen.***

2.08 CAR OPERATING STATION

A. ***Car Operating Station, General: The main car control in each car shall contain the devices required for specific operation mounted in an integral swing return panel requiring no applied faceplate. Wrap return shall have a No. 4 brushed stainless steel finish. The main car operating panel shall be mounted in the return and comply with handicap requirements. Pushbuttons that illuminate using long lasting LED's shall be included for each floor served, and emergency buttons and switches shall be provided per code. Switches for car light and accessories shall be provided.***

B. ***Emergency Communications System: Integral phone system provided.***

C. ***Auxiliary Operating Panel: Not Required***

D. ***Column Mounted Car Riding Lantern: A car riding lantern shall be installed in the elevator cab and located in the entrance. The lantern, when illuminated, will indicate the intended direction of travel. The lantern will illuminate and a signal will sound when the car arrives at a floor where it will stop. The lantern shall remain illuminated until the door(s) begin to close.***

E. ***Special Equipment: Not Applicable***

2.09 CONTROL SYSTEMS

A. ***Controller: Shall be integrated in a hoistway entrance jamb. Should be microprocessor based, software oriented and protected from environmental extremes and excessive vibrations in a NEMA 1 enclosure. Control of the elevator shall be automatic in operation by means of push buttons in the car numbered to correspond to floors served, for registering car stops, and by "up-down" push buttons at each intermediate landing and "call" push buttons at terminal landings.***

B. ***Service Panel – to be located outside the hoistway in the controller entrance jamb and shall provide the following functionality/features:***
   1. ***Access to main control board and CPU***
   2. ***Main controller diagnostics***
   3. ***Main controller fuses***
   4. ***Universal Interface Tool (UIT)***
   5. ***Remote valve adjustment***
   6. ***Electronic motor starter adjustment and diagnostics***
   7. ***Operation of pit motorized shut-off valve with LED feedback to the state of the valve in the pit***
   8. ***Operation of auxiliary pump/motor (secondary hydraulic power source)***
   9. ***Operation of electrical assisted manual lowering***
   10. ***Provide male plug to supply 110VAC into the controller***
   11. ***Run/Stop button***

C. ***Automatic Light and Fan shut down: The control system shall evaluate the system activity and automatically turn off the cab lighting and ventilation fan during periods of inactivity. The settings shall be field programmable.***

D. ***Emergency Power Operation: (Battery Lowering 10-DOC) When the loss of normal power is detected, a battery lowering feature is to be activated. The elevator will lower to a predetermined level and open the doors. After passengers have exited the car, the doors will close and the car will shutdown. When normal power becomes available, the elevator will automatically resume operation. The battery lowering feature is included in the elevator contract and does not utilize a building-supplied standby power source.***

E. ***Special Operation: Not Applicable***

2.10 HALL STATIONS

A. ***Hall Stations, General: Buttons shall illuminate to indicate call has been registered at that floor for the indicated direction.***
   1. ***Provide one pushbutton riser with faceplates having a No. 4 brushed stainless steel finish.***
      a. ***Phase 1 firefighter's service key switch, with instructions, shall be incorporated into the hall station at the designated level.***

B. ***Floor Identification Pads: Provide door jamb pads at each floor. Jamb pads shall comply with Americans with Disabilities Act (ADA) requirements.***

C. ***Hall Position Indicator: Not Applicable***

D. ***Hall lanterns: Not Applicable***

E. ***Special Equipment: Not Applicable***

2.11 MISCELLANEOUS ELEVATOR COMPONENTS

A. ***Oil Hydraulic Silencer: Install multiple oil hydraulic silencers (muffler device) at the power unit location. The silencers shall contain pulsation absorbing material inserted in a blowout proof housing.***

B. ***Lockable three phase circuit breaker with auxiliary contact with shunt trip capability to be provided. Circuit breaker to be located behind locked panel (Group 2 security access) at controller landing entrance jamb and should be sized according to the National Electrical Code.***

C. ***Lockable single phase 110V circuit breaker for cab light and fan to be provided. Circuit breaker to be located behind locked panel (Group 2 security access) at controller landing entrance jamb should be sized according to the National Electrical Code***

PART 3 EXECUTION

3.01 EXAMINATION

A. ***Before starting elevator installation, inspect hoistway, hoistway openings, and pits, as constructed, verify all critical dimensions, and examine supporting structures and all other conditions under which elevator work is to be installed. Do not proceed with elevator installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.***

B. ***Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.***

3.02 INSTALLATION

A. ***Install elevator systems components and coordinate installation of hoistway wall construction.***
   1. ***Work shall be performed by competent elevator installation personnel in accordance with ASME A17.1, manufacturer's installation instructions and approved shop drawings.***
   2. ***Comply with the National Electrical Code for electrical work required during installation.***

B. ***Perform work with competent, skilled workmen under the direct control and supervision of the elevator manufacturer's experienced foreman.***

C. ***Supply in ample time for installation by other trades, inserts, anchors, bearing plates, brackets, supports, and bracing including all setting templates and diagrams for placement.***

D. ***Welded construction: Provide welded connections for installation of 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 qualification of welding operators.***

E. ***Coordination: Coordinate elevator work with the work of other trades, for proper time and sequence to avoid construction delays. Use benchmarks, lines, and levels designated by the Contractor, to ensure dimensional coordination of the work.***

F. ***Install machinery, guides, controls, car and all equipment and accessories to provide a quiet, smoothly operating installation, free from side sway, oscillation or vibration.***

G. ***Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with cars. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum safe, workable dimensions at each landing.***

H. ***Erect hoistway sills, headers, and frames before erection of rough walls and doors; erect fascia and toe guards after rough walls finished. Set sill units accurately aligned and slightly above finish floor at landings.***

I. ***Lubricate operating parts of system, where recommended by manufacturer.***

3.03 FIELD QUALITY CONTROL

A. ***Acceptance testing: Upon completion of the elevator installation and before permitting use of elevator, perform acceptance tests as required and recommended by Code and governing regulations or agencies. Perform other tests, if any, as required by governing regulations or agencies.***

B. ***Advise Owner, Contractor, Architect, and governing authorities in advance of dates and times tests are to be performed on the elevator.***

3.04 ADJUSTING

A. ***Make necessary adjustments of operating devices and equipment to ensure elevator operates smoothly and accurately.***

3.05 CLEANING

A. ***Before final acceptance, remove protection from finished surfaces and clean and polish surfaces in accordance with manufacturer's recommendations for type of material and finish provided. Stainless steel shall be cleaned with soap and water and dried with a non-abrasive surface; it shall not be cleaned with bleach-based cleansers.***

B. ***At completion of elevator work, remove tools, equipment, and surplus materials from site. Clean hoistway. Remove trash and debris.***
   1. ***Use environmentally preferable and low VOC emitting cleaners for each application type. Cleaners that contain solvents, pine and/or citrus oils are not permitted.***

3.06 PROTECTION

A. ***At time of Substantial Completion of elevator work, or portion thereof, provide suitable protective coverings, barriers, devices, signs, or other such methods or procedures to protect elevator work from damage or deterioration. Maintain protective measures throughout remainder of construction period.***

3.07 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 failure in operation and other building emergencies. Train Owner's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions.***

B. ***Make a final check of each elevator operation, with Owner's personnel present, immediately before date of substantial completion. Determine that control systems and operating devices are functioning properly.***

3.08 ELEVATOR SCHEDULE

A. ***Elevator Qty. 1***
   1. ***Elevator Model: EnduraMRL Above-Ground (2-Stage)***
   2. ***Elevator Type: Hydraulic Machine Room-Less, Passenger***
   3. ***Rated Capacity: 2500 lbs.***
   4. ***Rated Speed: 125 ft./min.***
   5. ***Operation System: TAC32H***
   6. ***Travel: 22'***
   7. ***Landings: 2 total***
   8. ***Openings:***

a. Front: 2

9. ***Clear Car Inside: 6' - 8'' wide x 4' - 3'' deep***
10. ***Cab Height: 8'-0'' standard***
11. ***Hoistway Entrance Size: 3' - 6'' wide x 7'-0'' high***
12. ***Door Type: Single Speed***
13. ***Power Characteristics: 460 volts, 3 Phase, 60 Hz.***
14. ***Seismic Requirements: Zone 1***
15. ***Hoistway Dimensions: 8' - 4'' wide x 5' - 9'' deep***
16. ***Pit Depth: 4' - 0''***
17. ***Button & Fixture Style: Traditional Signal Fixtures***
18. ***Special Operations: None***
19. ***Car finishes:***

    Floor – Porcelain Tile
    Base – Satin Stainless Steel
    Handrail – Flat Satin Stainless Steel
    Ceiling – 4 LED flush Ceiling, Stainless Steel
    Door – Satin Stainless Steel
    Flush laminate wall panels.

END OF SECTION