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DIVISION 14 — CONVEYING SYSTEMS

14200 — ELEVATORS

END OF SECTION

PART 1 – GENERAL

1.01 EXTENT OF SECTION:

A. This section contains the requirements for passenger and freight elevators of all types, including cars, entrances, controls, safety equipment, hoist- way equipment, and elevator machinery. Also included are wheelchair lifts and related equipment.

B. The intent of the PCSB STANDARDS is for the DESIGN PROFESSIONAL (DP) to comply with the minimum general project requirements and the specific project specifications shall be generated and provided by the DP.

1.02 REFERENCE STANDARDS

A. Elevator Code: Except for more stringent requirements as indicated or imposed by the Florida Bureau of Elevator Inspection (Florida Administrative Code) regulations (which must be complied with), comply with applicable requirements of the "American Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks" (ANSI A17.1) published by the American Society of Mechanical Engineers.

B. NFPA Code: Comply with applicable NFPA codes, and specifically with sections relating to electrical work and elevators.

C. Fire Resistance of Entrances: Comply with NFPA No. 80, and provide units bearing UL labels with 30-min. temperature rise on labels.

D. NEII Standards for Handicapped: Except as otherwise indicated, comply with NEII "Suggested Minimum Passenger Elevator Requirements for the Handicapped", including clearances, handrails, locations for signal equipment and similar provisions.

E. American with Disability Act of 1990
   1. Comply with all relevant code requirements, including provisions for the Florida Americans with Disability Accessibility Implementation Act, 1993.

F. Wiring from elevator hoist-way to outside alarm bell as required by the Safety Code for Elevators and Escalators (ANSI/ASME A17.1) - (for oil hydraulic elevators only).

1.03 WORK BY THE CONTRACTOR OR OTHER SUBCONTRACTORS

A. A legal hoist-way, properly framed and enclosed, and including a pit of proper depth provided with ladder, sump lights, access doors and waterproofing, as required. Legal machine room, adequate for the elevator equipment, including floors, trap doors, gratings, foundations, lighting, ventilation and heat to maintain the room at an ambient temperature of 50 degrees F maximum.

B. Adequate supports and foundations to carry the loads of all equipment, including supports for guide rail brackets and machine beams or overhead sheaves (if furnished).

If adjacent hoist-ways are utilized, divider beams at suitable points shall be provided for guide rail bracket support.

C. Cutting of walls, floors, etc. and removal of such obstructions as may be necessary for proper installation of the elevator for setting of anchors and sleeves; pockets or block outs for signal fixtures.

D. All sill supports, including steel angles where required, and sill recesses and the grouting of door sills; finish walls after hoist-way frames are installed.

E. Structural steel door frames with extensions to beam above if required on hoist-way sides and sills for freight elevators, including finish painting of these items.

F. Provide and maintain temporary enclosures or other protection from open hoist-ways during the time the elevator is being installed.

G. Proper trenching and backfilling for any underground piping or conduit.

H. Guide rail bracket inserts provided by Elevator CONTRACTOR and installed by CONTRACTOR.

I. Proper location of jack hole from building lines and adequate ingress and egress for mobile well drilling equipment shall occur after final excavation and previous to the pouring of footings or foundation.

J. CONTRACTOR shall remove all dirt and debris accumulated during excavation of the jack hole.

K. Suitable connections from the power mains to each controller or motor generator set starter, signal equipment feeders as required, including necessary circuit breakers and fused mainline disconnect switches.

L. Wiring to controller for car lighting and ventilation. Electric power without charge, for construction, testing and adjusting, of the same characteristics as the permanent supply.

M. Wiring and conduit from life safety panel or any other monitor station to elevator machine room.

N. Heat and smoke sensing devices at elevator lobbies on each floor with electrical conductors terminating at a properly marked panel in the elevator machine room.

O. Telephone connection to elevator hoist-way shall be required.

P. Any governmentally required safety provisions not directly involved in the elevator installation.

Q. All painting, except as otherwise specified.

R. Temporary elevator service prior to completion and acceptance of complete installation.

S. Furnishing, installing and maintaining the required fire rating of elevator hoist-way walls, including the penetration of fire wall by elevator fixture boxes, is not the responsibility of the elevator CONTRACTOR.

1.03 DESIGN REQUIREMENTS

A. Provide one (1) oil hydraulic (Non-Combustible) 2500 lbs. passenger elevator. New installations shall use conventional hydraulic elevators, geared traction elevators driven by AC electric motors, or “hole-less” elevators. Exceptions to this requirement must be approved through the submission in writing to the PROJECT COORDINATOR.

B. Elevator doors shall be provided with infrared safety strips equal to Janus Pana 40. *The use of photo eyes is prohibited.*

C. Support rails on three (3) walls of the elevator cab shall be required.

D. All exposed screws inside the cab shall be tamper proof.

E. Lighted, vandal proof, stainless steel buttons shall be required.

F. Stairways for access to elevator machine rooms shall be of metal and shall conform to the following:
   1. Maximum angle of 60 degrees from the horizontal.
   2. Stair treads shall not be less than 28-inches in length.
   3. Stair treads shall be level and not less than 6-inches in width with slip resistive surface.
   4. The rise shall not be less than 8-inches or more than 10-inches.
   5. There shall be no more than 14-ft. in an unbroken vertical rise.
   6. Stairway floor opening shall be guarded by a metal railing 42-inches in height with intermediate rail and toe board.
   7. Open sides of stairs shall be protected with a metal handrail not more than 34-inches in height from the upper surface of top rail to surface of tread in line with the face of riser at forward edge of tread, and with intermediate rail.

G. All elevators shall be equipped with automatic leveling devices.

I. Standard fluorescent fixtures for cab lighting are required.

J. As-built submittals for both new and renovated elevators and lifts shall include two (2) sets of laminated as-built wiring diagrams, block diagram, and diagnostic data, along with complete service manuals. Provide one (1) diagnostic test, device or service tool, if applicable and Reference Guide, Fault Codes and Service. If any other equipment requires a special tool to perform the proper maintenance, it shall be provided.

K. Provide fireman elevator recall key and elevator door key. Secure within the elevator machine room per NFPA by means of a lockable key cabinet or box. If elevator room is located on the roof 2 sets of keys are required.

L. For all elevator machine rooms:
   1. All elevator machine rooms shall be conditioned and maintain a temperature range of 75-80 F° at all times.
   2. The HVAC equipment for conditioning elevator machine rooms shall be part of and connected to the building's infrastructure system(s).

M. The use of non-proprietary subsystems and parts are required.

O. Chairlift installations are for existing buildings remodel only.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Either the elevator manufacturer or a licensee of the manufacturer who has not less than five (5) years successful experience with the installation of similar elevators.

B. In the interest of unified responsibility, the elevator CONTRACTOR shall be one regularly engaged in the business of manufacturing, installing and servicing elevators of the type and character required by these Standards and he shall manufacture the entire power unit, controller, hydraulic cylinder and all other parts of the equipment including door operators and signal fixtures and he shall so state in his request for approval listing the items manufactured. A representative of a national manufacturer will be considered a qualified CONTRACTOR providing the manufacturer produces the specified items.

C. Prior written approval of the DP is required (for CONTRACTORS other than those listed) before quoting this project. Requests for approval *will not* be considered unless they are submitted ten (10) working days before bid date and are accompanied by the following information:
   1. List of ten (10) similar installations arranged to show name of project, elevator capacity, speed, travel, and date of completed installation. The ten (10) elevators shall be located within fifty (50) miles of the installation described herein.
   2. Complete literature, performance and technical data describing the proposed equipment.
   3. List of twenty (20) service accounts by building name, building manager or OWNER.
   4. Location of closest service office from which this elevator will be maintained.
   5. Location of closest parts inventory for this installation.

1.06 INITIAL MAINTENANCE AND WARRANTY

A. Maintenance: For a period of three (3) months following date of substantial completion, provide full maintenance of elevator work. Correct operational faults and restore/replace

defective/deteriorated components and finishes. Lubricate operational units and supply expendable materials as required for proper operations and maintenance.

B. A five-year Full Maintenance Agreement shall be provided by the Elevator CONTRACTOR for review by the PROJECT COORDINATOR and/ or DP prior to awarding the elevator Contract.

C. Warranty: Provide special project warranty, signed by the CONTRACTOR, Installer and Manufacturer, agreeing to replace/repair/restore defective materials and workmanship of elevator work during warranty period. "Defective" is hereby defined to include, but not by way of limitation, operation or control system failures, performances below required minimums, 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. The warranty period is twelve (12) months starting on date of acceptance of elevator work.
   2. Provide coincidental product warranties where available for major components of elevator work. Submit with maintenance manuals.

PART 2 – PRODUCT

2.01 RECOMMENDED MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

B. Manufacturer: Subject to compliance with requirements, provide products of one of the following:
   1. ThyssenKrupp Elevator,
   2. Schindler USA & Canada,
   3. Otis Elevator Company,
   4. Kone Corp.

2.02 MATERIALS AND COMPONENTS

A. GENERAL REQUIREMENTS: Provide manufacturer's standard pre-engineered elevator systems. Where components are not otherwise indicated, provide standard components, published by manufacturer as included in standard pre-engineered elevator systems, and as required for a complete system.

B. HYDRAULIC PASSENGER ELEVATOR
   1. Control: Oil Hydraulic (Non-Combustible).
   2. Capacity: 2,500 lbs.
   3. Speed: 100 FPM
   4. Operation: Tac 20
   5. Care Size: Platform

6.	Clear Inside:	6-ft. 8-inches Wide by 4-ft. 3-inches Deep
7.	Travel:	Per Plans
8.	Power Supply:	480 Volts, 3 Phase, 60 Cycle, 25 horse power
9.	Machine Location:	Per Plans
10.	Stops:	2
11.	Openings:	2, 2 front
12.	Hoist-way Doors:	3-ft. 6-inches wide by 7-ft. high, single slide
13.	Frame Finish:	Baked enamel
14.	Door Operation:	Horizontal, DC powered, Gearless
15.	Signals:	Car position indicator, illuminated hall and car station push buttons.
16.	Special Features:	Fireman's emergency control, low oil protective device, line strainer, isolation couplings visual and audible handicap features per Chapter 399.035, (including ADA Requirements) photo eye door control, pit ladder installed, sill angles installed, pads and hooks included.
17.	Car Enclosure:	(Non-Combustible).
18.	Walls:	Plastic Laminate.
19.	Canopy:	Made of unitized steel construction, includes emergency exit.
20.	Front & Transom:	Brushed stainless steel front and transom with integral swing return car operating devices.
21.	Doors:	Baked Enamel.
22.	Ceiling:	Baked enamel disc suspended panels and fluorescent lights.
23.	Floor:	Rubber Tile.
24.	Sill:	Aluminum.
25.	Handrail(s):	Continuous cylindrical stainless steel.
26.	Accessories:	Emergency lighting system. Telephone cabinet and hands free vandal resistant phone complying with ADA requirements.
27.	Finishes:	Baked enamel color as selected by the DP.

C. PLATFORM AND SLING: The platform shall have a fabricated frame of formed or structural steel shapes, gusseted and rigidly welded. Flooring shall be a wood subfloor. The underside of the platform will be fireproofed.
   1. The sling shall consist of heavy steel stiles properly affixed to a steel crosshead and bolster, with adequate bracing members, to remove all strain from the car enclosure.
   2. Steel bumper plates shall be affixed to bottom of bolster channels, and a platen plate with clamps and cap screws shall be furnished for fastening sling to plunger.

D. CAR DOORS: The car entrance shall be provided with horizontal sliding doors. Panel rigidity to be obtained by suitable steel reinforcements. Doors shall be hung on sheave

type hangers with polyurethane tires that roll on a polished steel track, and guided at the bottom by non-metallic shoes sliding in a smooth threshold groove.

E. ALARM BELL: An emergency alarm bell shall be connected to a plainly marked push button in the car.

F. GUIDES AND GUIDE SHOES: Guides for the elevator car shall be formed from steel guide rails, omega shaped, properly fastened to the building structure with steel brackets. The car stile shall be fitted at top and bottom with guide shoes of the swivel type, with metal body and removable non-metallic liners.

G. AUTOMATIC GUIDE Rail Lubricators: Lubricators shall be provided and mounted on top of upper guide shoes. Wool felt wiper shall apply an even, uniform flow of oil which shall thoroughly lubricate faces of guide rail from a leak-proof oil reservoir.

H. AUTOMATIC TERMINAL LIMITS: Electric limit switches shall be placed in the hatchway near the terminal landings and be designed to cut off the electric current and stop the car should it run beyond either terminal landing.

I. AUTOMATIC SELF-LEVELING: The elevator shall be provided with a self-leveling feature that will automatically bring the car to the floor landings. This self-leveling shall, within its zone, be entirely automatic and independent of the operating device and shall correct for over-travel or under-travel. The car shall also maintain approximately level with the landing irrespective of the load.
   1. **Buffers**: Substantial buffers shall be furnished and installed in the elevator pit. They shall be mounted on continuous channels fastened to the elevator guide rail or securely anchored to the pit floor and substantial extensions will be provided, if required.
   2. **Car Top Inspection Station**: A car top inspection station with an "emergency stop" switch and with constant pressure "up-down" direction buttons shall make the normal operating devices inoperative and give the inspector complete control of the elevator.
   3. **Interlocks**: Each hoist-way entrance shall be equipped with an approved type interlock tested as required by Code. The interlock shall be designed to prevent operation of the car away from the landing until the doors are locked in the closed position as defined by Code and shall prevent opening the doors at any landing from the corridor side unless the 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.
   4. **Hoist-way Door Unlocking Device**: Hoist-way door unlocking devices as specified by the ANSI/ASME A17.1 Code shall be provided to permit authorized persons to gain access to hoist-way when elevator car is away from the landing.
   5. **Door Operation**: A direct current motor driven heavy duty operator shall be furnished and installed, designed to operate the car and hoist-way doors simultaneously. Door movements shall be electrically cushioned at both limits of travel and the door operating mechanism shall be arranged for manual operation in event of power failure. The leading edge of the car door shall be provided with a retractable reversal edge arranged to automatically return car and hoist-way doors to

the open position in event the doors are obstructed during closing cycle. Doors will then resume closing cycle. Doors shall automatically open when the car arrives at the landing and shall automatically close after an adjustable time interval or when the car is dispatched to another landing. Direct drive geared operators. AC controlled units with oil checks, to other deviations from the above are not acceptable. The door operator microprocessor resides in the door operator and controls all functions of the door. The microprocessor door operator and the DMC-1 selector shall be lined to the main processor through a serial communications link.

a. The doors remain open as long as the electronic detector senses the presence of a passenger or object in the door opening. If door movement is obstructed for a field programmable time value, a buzzer will sound and the doors will close at reduced speed. If the reversing edge contacts a person or object while closing, the doors will stop and resume closing after the obstruction has been removed.
b. When the doors have failed to fully close and are in the recycle mode, the door drive motor shall have increased torque applied. This shall possibly overcome any mechanical resistance or differ.

6. **Automatic Pushbutton Operation**: The elevator control shall be a distributed control system, microprocessor based and software oriented. The main microprocessor and car controller shall be located behind the elevator swing return panel. The microprocessor selector, situated on the car top and the microprocessor door operator, residing in the door operator shall be linked together with the main processor by a serial communications link. 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 by "up-down" push buttons at each intermediate landing and "call" push buttons at terminal landings. The momentary pressing of one or more buttons shall dispatch the car to the designated landings in the order in which the landings are reached by the car, irrespective of the sequence in which the buttons are pressed. Each landing call shall be canceled when answered. When the car is traveling in the up direction, it shall stop at all floors for which car buttons or "*up*" hall buttons have been pressed; it shall not stop at floors when "*down*" buttons only have been pressed, unless the stop for that floor has been registered by a car button, or unless the down call is at the highest floor for which any buttons have been pressed. Likewise, the pressing of an "up" button when the car is traveling in the down direction shall not intercept the travel unless the stop for that floor has been registered by a car button, or unless the up call is the lowest for which any button has been pressed.
   a. When the car has responded to its highest or lowest stop, and stops are registered for the opposite direction, its direction of travel shall reverse automatically and it shall then answer the calls registered for that direction.
   b. Should both up and down calls be registered at an intermediate floor, only the call corresponding to the direction in which the car is traveling shall be canceled upon the stopping of the car at the landing.
   c. An adjustable time delay shall be provided so that after the car has stopped in response to a hall button, the entering passenger may register his car button before the car will reverse to answer calls in the opposite direction.

7. **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; oil reservoir with tank cover and controller compartment with cover; a submerged 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 up start valve; a lowering and leveling valve; and a magnetic controller.
   a. 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 pulsation to give smooth and quiet operation. Output of pump shall not vary more than 10% between no load and full load on the elevator car.
   b. Drive shall be by direct coupling.
   c. 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.
   d. Oil Control Unit shall consist of the following components, all built into a single housing. Welded manifolds with separate valves to accomplish each function shall not be acceptable under PCSB STANDARDS. All adjustments shall be accessible and shall be made without removing the assembly from the oil line:
      (1) Relief Valve shall be externally adjustable, and shall be capable of bypassing the total oil flow without increasing back pressure more than 50% above working pressure.
      (2) 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.
      (3) Check Valve shall be designed to close quietly without permitting any perceptible reverse flow.
      (4) 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 tops. The leveling valve shall be designed to level the car to the floor in the direction the car is traveling when slowdown is initiated.
   e. Power controller shall contain all necessary electrical CONTRACTORS, electro mechanical switches and thermal overload relays. All components shall be mounted in a NEMA I enclosure. Logic control system shall be microprocessor based, integrated solid state circuitry or electro mechanical. If microprocessor based system is used it must be protected from environmental extremes and excessive vibrations.
8. **Jack Unit**: The unit shall be sufficient size to lift the gross load the height specified 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.
   a. The jack unit shall consist of the following parts: a 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 cylinder; an internal guide bearing; packing or seal of suitable design and quality; a drip ring around cylinder made of steel pipe and provided with a pipe connection and air

bleeder. Brackets shall be welded to the jack cylinder for supporting the elevator on pit channels. An auxiliary safety bulkhead shall be provided in the lower end of the cylinder.

9. **Excavation For Jack**: Drill excavation in elevator pit to accommodate installation of plunger-cylinder unit. Install casings with waterproof seals at pit floor, and with waterproof, high pressure seal at bottom of casings.
10. **Jack Cylinder Protection**: The jack cylinder shall be protected by a close ended PVC designed to help protect it from electrolytic and chemical corrosion.
11. **Wiring, Piping And Oil**: All necessary wiring shall be furnished and installed in the hoist-way in accord with the National Electrical Code (NEC), latest edition. All necessary pipe and fittings to connect the power unit to the jack unit and oil of the proper grade shall be furnished.
12. **Automatic Guide Rail Lubricators**: Lubricators shall be provided and mounted on top of upper guide shoes. Wool felt wiper shall apply and even, uniform flow of oil which shall thoroughly lubricate faces of guide rail from a leak-proof oil reservoir.
13. **Failure Protection**: The electrical control circuit shall be designed so that if a malfunction should occur, 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 will automatically open when the car reaches that landing to allow passengers to depart. The doors will then automatically close and all control buttons, except the "door open" button in the car station, shall be made inoperative.
14. **Door Hangers And Tracks**: For each hoist-way sliding door, furnish and install sheave type two point suspension hangers and tracks complete. Sheaves 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, smooth surface and shaped to conform to the hanger sheaves.
15. **Hoist-Way Entrances**: Hoist-way entrances of the hollow metal, horizontal sliding type shall be furnished and installed complete at each of the hoist-way openings.
    a. Three entrances, 2 speed opening.
    b. Entrances will be manufacturer's standard design and shall bear Underwriters' Laboratories "B" labels. They shall consist of frames, extruded bronze sills, doors, hangers, hanger supports, hanger covers, fascia plates, sight guards, and all necessary hardware. Finish to be brush bronze as selected from elevator manufacturer's standard colors.
    c. The entire front wall of the hoist-way shall be left open or a rough opening provided which is 12-inches greater in width and 6-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 the guide rails. Finished walls will then be completed by others.
    d. The interface of the elevator wall with the hoist-way entrance assembly shall be in strict compliance with the Elevator CONTRACTOR'S requirements.
16. **Car Operating Station**: A main car control panel shall be provided in each car and shall contain the devices required for the specified operations. The Panel shall

consist of a series of modules all inclined 20 degrees from vertical for optimum viewing and accessibility. The lowest module shall contain the "*door open*", "*door close*", "*emergency stop switch*" and alarm button. Intermediate modules shall contain illuminated floor buttons which will illuminate when a call is registered and will remain illuminated until the call is answered. The top module shall contain the required switches. All raised floor indications and handicap symbols shall be located immediately adjacent to the floor buttons and fully integrated in the module design. No applied symbols shall be allowed. There shall be no floor indications or symbols on the buttons.

17. **Landing Buttons**: Riser(s) of landing pushbutton stations shall be provided. Each intermediate station shall consist of two illuminated pushbuttons with raised direction arrow, one for the up direction and the other for the down direction. Each terminal station shall contain an illuminated pushbutton with raised direction arrow. The buttons shall be illuminated to indicate that a call has been registered at that floor for the indicated direction. Faceplate shall be bronze finish to match frames and doors.
18. **Car Position Indicator**: An electronic Dot Matrix position indicator shall be provided. The position indicator shall be inclined 20 degrees from vertical and mounted in a module matching the control panel for optimum viewing. As the car travels its' position in the hoist-way shall be indicated by the illumination of the Alpha/Numeric character corresponding to the landing which the elevator is stopped or passing.
19. **Hall Lanterns**: A hall lantern with an audible signal shall be installed at each landing entrance for each elevator. The lanterns, when illuminated, shall indicate the elevator car which shall stop at the landing and in which direction the car is set to travel. At manufacture's option lantern may be placed in the car entrance jamb.
    a. As soon as a car has reached a pre-determined distance from a floor at which it is going to stop, the corresponding hall lantern shall be illuminated and the signal shall sound. The hall lantern shall remain illuminated until the car doors close in preparation for leaving the floor. When Hall Position Indicators are provided, the lantern shall be combined in the face plate of the Position Indicator. Face plate shall have a bronze finish to match frames and doors.
    b. The white translucent lens shall be mounted in a black lens holder for increased contract and visibility, and project for side viewing.
20. **Hall Position Indicator**: An electronic Dot Matrix position indicator shall be provided. The position indicator shall be inclined 20 degrees from vertical and mounted in a module matching the control panel for optimum viewing. As the car travels its' position, the hoist-way shall be indicated by the illumination of the numeric character corresponding to the landing which the elevator is stopped or passing.
21. **Floor Identification Signs**: In addition to the raised numeric floor markings adjacent to each pushbutton in the car control panel(s) shall provide floor identification signs at specified floors. These floor signs shall be integrated with the car control modules and permanently marked. Painted or applied identifications shall not be acceptable. The identifications shall consist of the same material and graphic design as the standard floor markings.
22. **Locked Service Cabinet**: Provide a locked service cabinet containing devices required for control and special operations of the elevator.

23. **Electronic Passenger Sensing Device**: A solid state electronic detector designed to operate as described below shall be provided at the entrance of the elevator car. In addition, an electro-mechanical reversal edge shall be provided on the leading edge of the car door.
    a. After a stop is made, the doors shall remain open for an adjustable time interval. Closing may be initiated instantaneously by registration of a car call.
    b. The doors will remain open as long as the electronic detector senses the presence of a passenger or object in the door opening. If door movement is obstructed for a predetermined time, the doors will resume normal closing operation. If the electro-mechanical reversal edge contacts a person or object while closing, the doors will immediately stop and reopen. Closing will be initiated one-half second after the passenger or object has moved from the opening.
24. **Special Features**
    a. Car shall be equipped with Fire Service to meet the National Elevator code (heat and smoke sensors by mechanical/electrical CONTRACTOR, requirements to meet Florida Handicapped Code and NEII including car station with raised numerals and letters, special car position indicator with audible signal, car riding lantern with one audible signal for up and two audible signals for down and all signal fixture and door jamb markings. Pit ladders and sill support angles furnished and installed by Elevator CONTRACTOR. Manufacturer will certify that both elevator cars will comply with stretcher accommodation provisions of Chapter 399 Florida Statutes.
    b. **Pit Ladder**: Fabricate of galvanized steel, of legal size and dimension acceptable to AHJ over elevator construction, maintenance, and certification.

PART 3 – EXECUTION

3.01 INSPECTION

A. Prior to commencing elevator installation, Installer shall inspect hoist-ways, hoist-way openings, pits and machine rooms, as constructed, shall verify all critical dimensions, and examine supporting structure and all other conditions under which elevator work shall be installed. Notify CONTRACTOR in writing of any dimensional discrepancies or other conditions detrimental to the proper installation or performance of elevator work. Do not proceed with elevator installation until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.02 INSTALLATION OF ELEVATOR SYSTEM

A. GENERAL: Comply with manufacturer's instructions and recommendations for work required during installation.

B. Install plunger-cylinder units plumb and accurately centered for elevator car position and travel; anchor securely in place (Hydraulic only).

C. 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 qualifications of welding operators.

D. COORDINATION: Coordinate elevator work with work of other trades, for proper time and sequence to avoid construction delays. Use benchmarks lines and levels designated by CONTRACTOR, to insure dimensional coordination of the work.

E. SOUND ISOLATION: Mount rotating and vibrating elevator equipment and components on vibration-absorption mounts, designed to effectively prevent transmission of vibrations to structure, and thereby eliminate sources of structure-borne noise from elevator system.

F. INSTALL PIPING: without routing underground, where possible; where not possible, cover underground piping with permanent protective wrapping before backfilling.

G. Lubricate operating parts of systems, including ropes, if any, as recommended by manufacturers.

H. ALIGNMENT: Coordinate installation of hoist- way 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.

I. LEVELING TOLERANCE: ¼-inch, up or down, regardless of load and direction of travel.

J. Grout sills with non-staining, non-shrink grout. Set units accurately aligned with and slightly above finished floor at landings.

3.03 FIELD QUALITY CONTROL

A. ACCEPTANCE TESTING: Upon nominal completion of each elevator installation, and before permitting use of elevator (either temporary or permanent), perform acceptance tests as required

B. OPERATING TESTS: Load each elevator to its rated capacity and operate continuously for thirty (30) minutes over its full travel distance, stopping at each level and proceeding immediately to the next. Record temperature rise of pump motor during thirty (30) minute test period. Record failures of elevator to perform as required.

C. Advise CONTRACTOR, PROJECT COORDINATOR, DP and PCSB Inspector, in advance of dates and times tests are to be performed on elevators.

3.04 PROTECTION

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

B. Provide similar protective measures for elevator units which will be placed in temporary service, including inspection and maintenance service during period of temporary service.

3.05 ADJUST AND CLEAN by CONSTRACTOR and Elevator Installer

A. ADJUSTMENTS: Adjust controllers, oil control valve, leveling switches, limit switches, stopping switches, door operators and related equipment to operate within accepted design tolerances.

B. CLEAN UP:
1. Remove from hoist-way furnaces all loose materials and filings resulting from this work.
2. Clean machine room floor of dirt, oil and grease.
3. Remove crating and packing materials from premises.

3.06 INSTRUCTIONS AND MAINTENANCE

A. Instruct PCSB Personnel in proper use, operations and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures in the event of failure of operation and other building emergencies. Train PCSB Personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions. Confer with PROJECT COORDINATOR on requirements for a complete elevator maintenance program.

B. Make a final check of each elevator operation with PROJECT COORDINATOR present and adjust prior to date of substantial completion. Determine that control systems and operating devices are functioning properly.

C. CONTINUING MAINTENANCE: Installer shall provide a continuing maintenance proposal to the PROJECT COORDINATOR in the form of a standard yearly maintenance agreement with the starting date, Construction Contract Maintenance Requirements, State services, Obligations, Conditions and Terms for Agreement Period, and Renewal Options.

END OF SECTION