SECTION 14240

HYDRAULIC ELEVATORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: One Holeless hydraulic elevator.

B. Related Sections:

1. Section 01500 - Temporary Facilities and Controls: Protection of floor openings and personnel barriers; temporary power and lighting.
2. Section 01770 - Closeout Procedures: Requirements for maintenance manuals.
3. Section 03300 - Cast-In-Place Concrete: Framed concrete openings for elevator pit.
4. Section 05100 - Structural Steel: Hoist beam.
5. Section 05500 - Miscellaneous Metal Fabrications: pit ladder, divider beams, support for entrances and rails, and hoisting beam at top of hoistway.
6. Section 07160 - Crystalline Waterproofing: Waterproofing for elevator pit.
7. Section 09680 - Carpet: Finish flooring for passenger cab.
8. Section 09265 - Gypsum Board Shaftwall: Hoistway enclosure.
9. Division 15 and 16: Fire and smoke detectors and machine room ventilation and cooling.
10. Division 16: Electrical services with fused disconnects to each elevator controller, lights and convenience outlets and fire detection and alarm system. ADAAG-required emergency communications equipment

1.2 REFERENCES

A. Comply with applicable codes at the project site, including, but not limited to, the following:

1. ANSI A117.1, Buildings and Facilities, Providing Accessibility and Usability for Physically Handicapped People.
2. ADAAG, Americans with Disabilities Act Accessibility Guidelines.
3. ANSI/NFPA 70, National Electrical Code.
4. ANSI/NFPA 80, Fire Doors and Windows.
5. ASME/ANSI A17.1, Safety Code for Elevators and Escalators.
6. ANSI/UL 10B, Fire Tests of Door Assemblies.
7. IBC 2000
8. Model Building Codes

1.3 DEFINITIONS

A. Coordination: Manufacturer/Installer shall have verified adequacy of structural supports, electric service, machine room size and access, and other related conditions, and to have notified the Architect prior to bidding of any modifications necessary to suit the intended elevator systems. No extra payments will be authorized for other modifications. The Contractor shall coordinate dimensions for hoistways, pits, supports, signal devices, hoistway doors and similar features to suit

equipment actually furnished, which may vary according to elevator manufacturer's requirements.

B. **Singular words** will be interpreted as plural, and plural words interpreted as singular, where applicable and necessary for complete elevator systems in the full context of the Contract Documents.

C. **Elevator schedule** at end of this Section indicates required performance, controls, capacities, features, and finishes for elevators.

1.4 SUBMITTALS

A. **Product Data:** Submit manufacturer's product specifications and data sheets for each principal component or product of each elevator, including certified test reports on required testing. Indicate capacities, sizes, performance and operating characteristics, features of control system, finishes, and similar information. Indicate any variations from specified requirements. Submit expected heat dissipation of elevator equipment in machine room (BTU).

B. **Shop Drawings:** Submit dimensioned drawings showing plans, elevations, sections and large-scale details indicating coordination with building structure, relationships with other construction, and details of car enclosures and hoistway entrances. Include wiring diagrams detailing wiring for power, signal and control systems differentiating clearly between work included under this Section and related work. Indicate maximum and average power demands.

C. **Samples:** Provide 6 inch to 8 inch square samples of sheet materials and 10 inch to 12 inch lengths of running trim members, demonstrating exposed finishes of car enclosures, hoistway entrances, and signal equipment.

D. **Maintenance Manuals:** Submit operating and maintenance instructions, parts listing, recommended parts inventory listing, purchase source listing for major and critical components, emergency instructions, and similar information. Incorporate in maintenance manuals specified in “Section 01770 - Closeout Procedures”.

E. **Certificates and Permits:** Provide Owner with all inspection/acceptance certificates and operating permits as required by governing authorities to allow normal, unrestricted use of elevators.

1.5 QUALITY ASSURANCE

A. **Elevator System Manufacturer:** Subject to compliance with requirements, provide a standard or custom, pre-engineered elevator system, which is marketed by a single manufacturer which is responsible for the coordination and operational performance of the total system. Firm shall have a minimum of 10 years experience in fabrication of elevators equivalent to those specified. Elevator manufacturer shall be ISO9002 Certified. Provide modifications to the standard system if necessary to comply with specified requirements.

B. **Installer Qualifications:** Engage the elevator manufacturer or an installer approved by the elevator manufacturer and who has completed elevator installations similar in material, design, and extent to that indicated for Project, which have resulted in installations with a record of successful in service performance.

1.6 WARRANTY AND MAINTENANCE SERVICE

A. Special Project Warranty: Provide special project warranty, signed by Contractor, Installer, and Manufacturer, agreeing to replace, repair, or restore defective materials and workmanship of elevator work during warranty period. This warranty shall be in addition to, and not a limitation of, other rights the Owner may have against the Contractor under the Contract Documents.

1. "Defective" is hereby defined to include, but not limit, 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.
2. Warranty period is 12 months starting on date of Substantial Completion.

B. Initial Maintenance Service: Provide full maintenance service by skilled, competent employees of the elevator Installer for period of 12 months following Date of Substantial Completion. Include monthly preventive maintenance performed during normal working hours. Include repair or replacement of worn or defective parts or components and lubricating, cleaning, and adjusting as required for proper elevator operation in conformance with specified requirements. Include 24-hours-per-day, 7-days-per-week emergency callback service. Exclude only repair or replacement due to misuse, abuse, accidents, or neglect caused by persons other than Installer's personnel.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Approved Manufacturers: Specifications and Drawings are based on the following elevators as manufactured by Otis Elevator Company:

B. Substitutions: The following manufacturers are approved upon compliance with the requirements of this Section.

1. Kone, Inc.
2. Thyssen Krupp
3. Dover Elevator Corp.

2.2 MATERIALS AND COMPONENTS

A. General Requirement: Provide manufacturer's standard pre-engineered elevator systems that will comply with or fulfill the requirements of this Section or, at manufacturer's option, provide custom-manufactured elevator systems that will fulfill requirements. Where components are not otherwise indicated, provide standard components published by named manufacturer as included in standard pre-engineered elevator systems and as required for a complete system.

1. Provide manufacturer's standard microprocessor-based controller for automatic operation, including all components for car and door operation as specified.
2. Provide manufacturer's standard hydraulic plunger-cylinder unit for each elevator, with electric pump-tank-control system equipment in machine room as indicated.

B. Piping: Provide size, type, and weight piping recommended by manufacturer, and provide isolation couplings to prevent sound/vibration transmissions from power unit. Provide blowout proof muffler and shutoff valve in the piping line.

C. Car Guide Rails: Furnish Tee-section steel rails with brackets and fasteners.

D. Inserts: Furnish required concrete inserts and similar anchorage devices for the installation of guide rails, machinery, and other components of elevator work where installation of devices is required in concrete.

1. Coordinate with drawings for structural components provided. Other framing, attachment, etc. is to be included in this Section.

E. Car Frame and Platform: Manufacturer's standard steel framed units, with aluminum platform threshold. Coordinate platform and threshold positions to suit finish flooring selections.

1. For service elevator, provide special heavy-duty units for power truck loading, designed to withstand impacts and wheel loadings.
2. Provide passenger car with platform designed for Class A Loading. Provide aluminum platform threshold. Coordinate platform and threshold. Coordinate platform and threshold positions to suit finish flooring.

F. Wiring and Electrical Connections: Comply with National Electrical code and regulatory requirements specified under Quality Assurance heading in Part 1. Insulated wiring shall have flame retardant and moisture-resistant outer covering. Install all wiring in conduit, tubing or electrical wire-ways.

1. Traveling cables shall be flexible and suitably suspended to relieve strain on conductors.
2. In addition to strobe light cables furnished by division 16 subcontractor, Incorporate three shielded pairs of #20 AWG spare conductors in traveling cable for communications.

G. Handicapped Markings: Provide raised and Braille markings for car buttons, controls, and hoistway entrances in accordance with ADA Standards.

2.3 CONTROL SYSTEMS

A. General: Provide manufacturer's standard solid-state microprocessor operation system as follows:

1. Single Elevator Control – Passenger and Service: Provide solid-state “Simplex Automatic Operation”, as defined in ASME/ANSI A17.1.

B. Auxiliary Operations/Controls: In addition to primary control system features, provide the following controls or operational features for each elevator, except where otherwise indicated:

1. Car Stall Protective Circuit: A protective circuit shall be provided which will stop motor and pump and return car to its lowest landing in event that car while traveling up does not reach its designated landing within a predetermined time interval. This circuit will permit a normal exit from car but prevent further operation of elevator until trouble has been corrected.
2. Emergency Operations: Provide special emergency service operation in compliance with the Code.

a. Phase I emergency service (initiated by a signal from the fire detection and alarm system specified in Division 16 or by a key switch provided in a lobby fixture included under the work of this Section 14240) shall automatically return the elevators nonstop to the lowest landing. The elevator controller shall be equipped with contacts to receive signals from the fire detection and alarm system.

b. Phase II emergency service, for in-car control of each elevator, shall be provided by a key switch in the car operating panel of each elevator.

c. If an elevator is on independent service when Phase I emergency service is actuated, a buzzer shall sound and a message indicator shall be activated in the car.

3. Leveling Device: An automatic leveling and releveling device (two-way leveling) shall be in controls, to bring car into landing stops at reduced speed, with accuracy of 3/8 inch plus or minus.

4. Independent Operation: Provide for independent operation of the Passenger Elevator, activated by a key switch in the car operating panel, to remove the elevator from group automatic operation and enable operation by car controls.

2.4 SIGNAL EQUIPMENT

A. General: Except as otherwise indicated, provide manufacturer's standard signal equipment for each elevator.

1. Provide illuminated hall-call and car-call buttons that light up when activated and remain lighted until call or other function has been fulfilled; fabricate of acrylic or other permanent translucent plastic.

2. Except for buttons and illuminated signal elements, fabricate signal equipment with exposed surfaces of stainless steel with manufacturer's standard directional satin finish.

B. Car Control Stations: Provide car control station in each car with metal faceplates containing call button for each landing served and other buttons, switches, and controls required for specified car operation and control. Mount at height complying with ADA Guidelines. If not otherwise indicated, mount in return panel adjacent to car door. Provide operating device symbols as required by Code. Mark other buttons and switches with manufacturer's standard identification for required use or function.

1. Integral with return panel, permanent signage stating Elevator No. and Capacity and reading “No Smoking” and “Inspection Certificate on file in Building Engineering Department”.

C. Car Position Indicator: Provide each car with either illuminated-signal type or digital-display type car position indicator, located near top of each car or in car control station. Include direction-of-next-travel signal if not provided in car control station.

1. In addition to visual indicator, provide audible signal to indicate to passengers that car is passing or stopping at one of the floors served.

D. Hall Push-Button Stations: Provide hall station at each landing, with flat faceplate designed for flush-mounting on wall with body of unit recessed in wall. Provide a single pushbutton at terminal landings and “UP” and “DOWN” pushbuttons at intermediate landing.

1. Permanent signage above station pushbuttons reading “In Fire Emergency, Do Not Use Elevator. Use Exit Stairs”.
2. Provide fire service features as required by jurisdiction having authority.

E. Hall Lanterns: Provide units with illuminated directional arrows.

1. Units mounted in both car door jambs.
2. 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.

F. Corridor Call Station Pictograph Signs: Provide signs matching hall push-button stations with text and graphics according to ASME A17.1, Appendix H.

G. Telephone: Provide rough-in for telephone hand set in each car, contained in hinged-door cabinet. Provide a hands free telephone which is designed in response to ADAAG requirements integral with the car operating panel. Extend traveling cable communications wires to the telephone cabinet.

H. Alarm System: Provide emergency alarm bell properly located within building and audible outside hoistways, equipped to sound automatically in response to emergency stops and in response to “Alarm” button on each car control station.

I. Central Security Room: Provide a working phone connection to the central security room

2.5 PERSONAL PROTECTIVE DEVICES

A. Door Protective Device: Provide the following door protective devices standard with the manufacturer:

1. Multi-Beam Light Ray Device: A light-ray type device having a multiple beam array, which will prevent doors from closing if one or more beams are interrupted by a person or object; if one or more beams are interrupted after closing action starts, the door shall stop, the reverse to reopen.

B. Nudging Feature: After car doors are prevented from closing for a predetermined adjustable time period, through activation of detection device or door edge protective device, a loud buzzer shall sound and doors shall begin to close at reduced rate of speed. Doors shall continue to close unless door edge protective device is activated, which shall cause doors to reopen. Process shall repeat continuously until obstruction is removed from entrance.

2.6 ELEVATOR CAB ENCLOSURE

A. General: Provide CabForms standard model series 2000 car enclosure by Forms+Surfaces as shown on Drawings. Include ventilation, lighting, ceiling finish, wall finish, access doors, doors, power door operators, sill (threshold), trim, and accessories. Floor finish is not work of this Section. Provide horizontal sliding doors of manufacturer's standard flush panel type, with operation and number of panels as indicated. Provide manufacturer's standard protective edge trim system for door and wall panels, except as otherwise indicated.

B. Cab Walls: CabForms, as selected by Architect.

C. Car Front: CabForms, as selected by Architect.

D. Finish Flooring: Carpet, see section 09680 – Carpet.

E. Car Top: CabForms, as selected by Architect, see Drawings, including a top exit.

F. Cab Ceiling: CabForms, as selected by Architect, see Drawings.

G. Cab Ceiling Lights: CabForms, as selected by Architect

H. Emergency Car Lighting: An emergency power unit employing a 12 volt, sealed rechargeable battery and totally static circuits shall be provided to illuminate the elevator car and provide current to the alarm bell in the event of building power failure.

I. Exhaust Fan: An exhaust fan shall be mounted on the car top.

J. A 125V 15 ampere utility outlet with ground-fault circuit-interrupter protection shall be furnished.

K. Passenger Cab Rails: CabForms, as selected by Architect, see Drawings.

2.7 PASSENGER HOISTWAY ENTRANCE

A. General: Provide manufacturer's standard, pre-engineered, hollow metal type, sliding, door-and-frame hoistway entrances complete with track systems, hardware, safeties, sills, and accessories. Match car enclosure doors for size, number of door panels, and door panel movement. Provide frame-section size and profile to coordinate with hoistway wall construction as indicated.

1. Where gypsum board wall construction is indicated, fabricate frames with reinforced head sections; provide sufficient strength without support from wall lintels.

B. Emergency Unlocking: Provide door with an emergency unlocking device complying with Code requirements.

C. UL Label: Provide hoistway door with UL label complying with New Orleans Building Code requirements.

D. Materials and Fabrication: Provide selections indicated that comply with manufacturer's standards, but not less than the following:

1. Stainless Steel Frames: Formed stainless steel sheet, AISI Type 302/304 with No. 4 satin finish.
2. Stainless Steel Door Panels: Flush stainless steel construction, AISI Type 302/304 with manufacturer's standard directional polish or satin finish. Architect shall select finish.

E. Entrance Frames: Entrance frames shall be of bolted construction for complete one-piece unit assembly. All frames shall be securely fastened to fixing angles mounted in the hoistway and shall be of 14 gauge (2 mm) sheet material. Sills shall be extruded aluminum.

1. Entrance Frame Finish: Frames shall be formed stainless steel sheet, AISI Type 302/304 with No. 4 satin finish.

F. Entrance Doors: Entrance doors shall be of hollow metal construction with vertical internal channel reinforcements.

1. Entrance Door Finish: Flush stainless steel construction, AISI Type 302/304 with No. 4 satin finish.

G. Passenger Elevator Sills: Extruded aluminum, with grooved surface, 1/4" thick thickness, mil finish. Provide stiffened, formed steel support angle as indicated.

H. Service Elevator Sill: Nickel-silver, with grooved surface, 1/4" thick thickness, mil finish. Provide stiffened, formed steel support angle as indicated.

I. Fire Rating: Entrance frames and doors shall be U.L. fire rated for 1 ½ hour, complying with applicable building codes.

J. Entrance Markings: Entrance jambs shall be marked with 4" x 4" (102 mm x 102 mm) plates having raised floor markings with Braille adjacent. Markings shall be provided on both sides of the entrance.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to commencing elevator installation, examine hoistways, hoistway openings, pits, and machine rooms, as constructed; verify all critical dimensions and examine supporting structure and all other conditions under which elevator work is to be installed. Notify General Building 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.

3.2 INSTALLATION OF ELEVATOR SYSTEM

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

B. Plunger-Cylinder Units: Drill excavation in each elevator pit to accommodate installation of plunger-cylinder unit. Remove and dispose of excavated materials.

1. Install plunger-cylinder units in PVC casings with waterproof seals at pit floor and with waterproof, high-pressure seal at bottom of casings.
2. Install plunger-cylinder units plumb and accurately located for elevator car position and travel; anchor securely in place.

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 ensure 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 to eliminate sources of structure-borne noise from elevator system.

F. Piping: Install piping without routing underground, where possible. Where not possible, cover underground piping with permanent protective wrapping before backfilling.

G. Hydraulic Fluid and Lubricants: Provide initial supply of manufacturer-recommended oil for proper operation. Lubricate operating parts of systems as recommended by manufacturers.

H. 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.

1. Set sills flush with finished floor surface at landings. Coordinate with other trades to facilitate and ensure proper grouting of sills.

I. Leveling Tolerance: 1/4 inch, up or down, regardless of load and direction of travel.

J. Painting: All exposed metal work within hoistway, including guide rails, car frame and car enclosure, installed as part of the work of this Section, shall be painted for corrosion protection as part of the elevator work.

3.3 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 and recommended by Code and by governing regulations or agencies.

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

C. Notification: Advise Contractor, Owner, User Agency, Architect, and inspection department of governing agencies in advance of dates and times tests are to be performed on elevators.

3.4 TEMPORARY USE OF ELEVATORS

A. Do not use elevators for construction purposes unless car is provided with temporary enclosures, either within finished cars or in place of finished cars, to protect finishes from damages.

1. Provide full maintenance service by skilled, competent employees of elevator Installer for elevators used for construction purposes. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper elevator operation at rated speed and capacity. Use same parts and supplies as used in the manufacture and installation of original equipment.
2. Provide protective coverings, barriers, devices, signs and other procedures to protect elevators. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop, make required repairs and refinish entire unit, or provide new units as required. Architect shall determine which items shall be replaced.

3.5 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 that will be placed in temporary service, including inspection and maintenance service during period of temporary service.

3.6 ELEVATOR SCHEDULE

ELEVATOR: Hydraulic Passenger Elevators

A. Performance Requirements and General Characteristics:

1. Type: One (1) Holeless hydraulic passenger elevator.
2. Basis of Specification: “Holeless - Twin direct acting hydraulic cylinder without well holes elevator, as supplied by Otis Elevator Company, or approved equal.
3. Number of Stops: 2
4. Number of Openings: 2 at Front, 0 at Rear.
5. Rise: 14’ 0’’ (4267.2 mm)
6. Rated Load: 2000lbs (908kg)
7. Rated Speed: 100 feet per minute (0.50 m/s)
8. Car Dimensions (inside): 5’ 8” wide x 4’ 3” deep (1727 mm x 1295 mm)
9. Note: height under ceiling: 7’ 4 1/2” (2223 mm)
10. Hoistway Dimensions: 7’ 4” wide x 5’ 9” deep (2235mm x 1753mm)
11. Entrance Dimensions: 3’ 0” (914mm) X 7’ 0” (2134mm)
12. Entrance Type: Single slide

13. Stopping Accuracy: ±1/4" (6.4 mm) under any loading condition or direction of travel.
14. Main Power Supply: 480 Volts ±5% of normal, 3 Phase, with a separate equipment-grounding conductor.
15. Lighting Power Supply: 120 Volts, 1 Phase, 15 Amp, 60 Hz.

B. Simplex Collective Operation: Using a microprocessor-based controller, operation shall be automatic by means of the car and hall buttons. If all calls in the system have been answered, the car shall park at the last landing served.

C. Operating Features:

1. Full Collective Operation
2. Single Speed Fan
3. On/Off Light Switch
4. Solid State Starting
5. Remote elevator monitoring REM® ready
6. Firefighters' Service Phase I & II
7. Top of Car Inspection
8. Car-Stall Protection
9. Emergency return unit
10. Independent service

D. Door Control Features:

1. Closed Loop Door Operator is a closed loop, microprocessor based door operator system. The door operator will facilitate smooth operation under varying environmental influences such as, temperature, wind, friction, and component variation. The processor will monitor the door's actual position and velocity compared to its desired position and velocity. If variations are detected in the profile the command will be automatically corrected. The Closed Loop Door Operator control system shall not require machine room door control equipment.
2. Door noise not to exceed 58dBA.
3. Door control to open doors automatically when car arrives at a landing in response to a normal hall or car call.
4. Door control to open doors automatically when car arrives at a landing in response to a normal hall or car call.
5. Elevator doors shall be provided with a reopening device that will stop and reopen the car door(s) and hoistway door(s) automatically should the door(s) become obstructed by an object or person.
6. Primary door protection shall consist of a two dimensional, multi-beam array projecting across the car door opening. Under normal operation and for any door position, the system shall detect as a blockage an opaque object that is equal to or greater than 1.3 inches (33 mm) in diameter when inserted between the car doors at vertical positions from within 1 inch (25 mm) above the sill to 71 inches (1800 mm) above the sill. Under degraded conditions (one or more blocked or failed beams), the primary protection shall detect opaque objects that are equal to or greater than 4" (100 mm) in diameter for the same vertical coverage. If the system performance is degraded to the point that the 4" object cannot be detected, the system shall maintain the doors open or permit closing only under nudging force conditions.
7. The door reopening device shall also include a secondary, three dimensional, triangular infrared multi-beam array projecting across the door opening and

extending into the hoistway door zone. The door opening device will cause the doors to reopen when it detects a person(s) or object(s) entering or exiting the car in the area between the hoistway doors or the entryway area adjacent to the hoistway doors.

8. The size of the secondary protection zone shall vary as the door positions vary during opening and closing. The width of the zone shall be approximately one-third the size of the separation between the doors (or door and strike plate for single-slide doors) and shall be approximately centered in the door separation. In order to minimize detection of hallway passers-by that are not entering the elevator, the maximum zone penetration into the entryway shall not exceed 20" for any door separation. Normal penetration depth into the entryway from the car doors shall be ~14" for a door separation of 42". The penetration shall reduce proportionally as the doors close. At door separations of 18" or less the secondary protection system may cease its normal operation since the depth of the zone recedes to where it is inside the hoistway doors. The vertical coverage of the secondary protection shall be ~19" (480 mm) above the sill to ~55" (1400 mm) above the sill (mid-thigh to shoulder of a typical adult).
9. The secondary protection shall have an anti-nuisance feature which will ignore detection in the secondary zone after continual detection occurs for a significant time period in the secondary zone without corresponding detection in the primary protection zone; i.e. a person/object is in the entryway but does not enter. Normal secondary protection shall be re-enabled whenever detection occurs in the primary zone.
10. The reaction time of the door detector sub-system shall not exceed 60 milliseconds when both primary and secondary protection capabilities are active; nor 40 milliseconds when the secondary protection is disabled.
11. Door nudging operation to occur if doors are prevented from closing for an adjustable period of time.

END OF SECTION