DIVISION 14

CONVEYING EQUIPMENT

SECTION 14210
ELECTRIC TRACTION ELEVATORS

1.1 GENERAL

1.2 SCOPE OF WORK

A. This Section specifies electric traction elevators that are gearless and do not require elevator machine rooms.

1. Work Required:
   The work required under this section consists of all labor, materials and services required for the complete installation (including operational verification) of all the equipment required for the elevator(s) as herein specified.

2. All work shall be performed in a safe and workmanlike manner.

3. In all cases where a device or part of the equipment is herein referred to in the singular, it is intended that such reference shall apply to as many of such devices or parts as are required to make complete installation.

B. Related work not specified herein: The following sections contain requirements that relate to this section and are performed by trades other than the elevator manufacturer/installer.

1. Section 01400 – Temporary Construction Facilities and Controls: protection of floor openings and personnel barriers; temporary power and lighting.
2. Section 02200 - Earthwork: excavation for elevator pit.
3. Section 03300 - Cast-In-Place Concrete: elevator pit, and elevator machine foundation.
4. Section 04200 - Unit Masonry: masonry hoistway enclosure, building-in and grouting hoistway doorframes, and grouting of sills.
5. Section 05500 - Metal Fabrications: pit ladder, divider beams, and supports for entrances, rails and hoisting beam at top of elevator hoistway.
6. Section 07100 – Waterproofing and Dampproofing: waterproofing of elevator pit.
7. Section 15500 – Ventilating System and Air Conditioning: ventilation and temperature control of elevator equipment areas.
8. Section 16100 – Basic Electrical Materials and Methods:
   a. Main disconnects for each elevator.
   b. Electrical power for elevator installation and testing.
   c. Disconnecting device to elevator equipment prior to activation of sprinkler system.
   d. The installation of dedicated GFCI receptacles in the pit and overhead.
   e. Lighting in controller area, machine area and pit.
   f. Wiring for telephone service to controller.
9. Section 16610 – Emergency (Standby) Power Supply Systems: emergency generator for elevator operation.

10. Section 16720 - Fire Alarm Systems: The installation of fire and smoke detectors at required locations and interconnecting devices; fire alarm signal lines to contacts in the machine area.
11. Section 16740 - Telephone Systems: ADAAG-required emergency
12. communications equipment.

C. Applicable Codes: Comply with applicable building and elevator 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. ANSI/NFPA 70, National Electrical Code.
3. ANSI/NFPA 80, Fire Doors and Windows.
4. ASME/ANSI A17.7, Safety Code for Elevators and Escalators.
5. ANSI/UL 10B, Fire Tests of Door Assemblies.
6. EN 12016 (May 1998): "EMC Product Family Standards for lifts, escalators, and passenger conveyors Part 2 – immunity"
7. National Building Code of the Philippines and latest implementing rules and regulations
8. National Fire Code of the Philippines, latest version.

1.3 SYSTEM DESCRIPTION

A. Equipment Description: Gen2® gearless traction elevator with Machine Room-less application.
B. Equipment Control : Elevonic® Control System.
C. Drive : Regenerative
D. Quantity of Elevators : Six (Pass A, Pass B, Pass C, Pass D, Serv CLN, Serv DRT)
E. Elevator Stop Designations:
Pass A – LL, UL, G
Pass B – G, 2, 3, 4, 5
Pass C, Pass D – G, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14 (Mech'l Penthouse)
Serv CLN – LL, UL, G, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14 (Mech'l Penthouse)
Serv DRT – G, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14 (Mechanical Penthouse)
F. Stops : 400 fpm, 15
G. Openings : Pass A, Pass B, Pass C, Pass D, Serv DRT – In line
Serv CLN – In line at LL, UL, G, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 – Front and rear opening at 14 (Mech'l Penthouse)
H. Travel (maximum) : 300 ft. (92 m) at 400 fpm
I. Rated Capacity : 5000 lb
J. Rated Speed : 400 fpm
K. Platform Size : Passenger elevators – 4000P front 7' 9 ½ " W x 6' 0 ⅝ " D
: Service elevators – 5000H front 6' ½ " W x 9' 3 ⅛ " D
L. Clear Inside Dimensions: Passenger elevators – 4000P front 7' 8 5/16" W x 5' 5" D
: Service elevators – 5000H front 5' 11 5/16" W x 8' 6" D
M. Cab Height : Passenger elevators – 8'0"
: Service elevators – 9'7"

N. Clear Cab Height : Passenger elevators – 7' 7-¼" with dropped 6 LED
: Service elevators – 10 LED ceiling for 9'-7"

O. Entrance Type and Width: Passenger elevators – Center-Open Doors 48" (1067mm)
: Service elevators – Two Speed Doors at 54" (1371mm)

P. Entrance Height : 8'-0" (2438 mm)

Q. Main Power Supply : 220-240, 440-480 or 600 Volts + or - 5% of normal, three-Phase, with a separate equipment grounding conductor.

R. Car Lighting Power Supply: 120 Volts, Single-phase, 15 Amp, 60 Hz.

S. Machine Location : Inside the hoistway at the top of the hoistway.
Note: Passenger elevator A only serves three stops.

T. Signal Fixtures : Manufacturer's standard with metal button targets.

U. Controller Location Control space or closet. Optional Machine Room/Space. Optional remote controller (max distance 250')

V. Performance:

1. Car Speed: ± 3 % of contract speed under any loading condition or direction of travel.
2. Car Capacity: Safely lower, stop and hold up to 125% of rated load. (code required).
3. Ride Quality:
   a. Vertical Vibration (maximum): 12-17 milli-g
   b. Horizontal Vibration (maximum): 10-15 milli-g
   c. Vertical Jerk (maximum): 4.6 ± 1.0 ft./ sec^3 (1.4 ± 0.3 m/ sec^3)
   d. Acceleration/Deceleration (maximum): 2.6 ft./ sec^2 (0.8 m/ sec^2)
   e. In Car Noise: 50 – 55 dB(A)
   f. Stopping Accuracy: ± 0.2 in. (± 5 mm)
   g. Re-leveling Distance: ± 0.4 in. (± 10 mm)

W. Operation:
Duplex Collective Operation: Using a microprocessor-based controller, the operation shall be automatic by means of the car and hall buttons. In the absence of system activity, one car can be made to park at the pre-selected main landing. The other (free) car shall remain at the last landing served. Only one car shall respond to a hall call. If either car is removed from service, the other car shall immediately answer all hall calls, as well as its own car calls.

X. Operating Features – Standard

1. Full Collective Operation
2. Anti-nuisance.
3. Fan and Light Protection.
4. Load Weighing Bypass.
5. Independent Service.
6. Full Collective Operation.
7. Top of Car Inspection.
8. Zoned Car Parking.
9. Relative System Response Dispatching.

Y. Operation Features – Optional
1. Zoned Access at Bottom Landing.
2. Zoned Access at Upper Landing.
3. *Emergency Hospital Service.*
4. *Automatic Rescue Operation*
5. Automatic Standby Power Operation with Manual Override.

Z. Door Control Features:
1. Door control to open doors automatically when car arrives at a landing in response to a normal hall or car call.
2. 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.
Door protection shall consist of a two dimensional, multi-beam array projecting across the car door opening.
3. Door nudging operation to occur if doors are prevented from closing for an adjustable period of time.

AA. Provide equipment according to Seismic Zone 2

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's product data for each system proposed for use. Include the following:
1. Signal and operating fixtures, operating panels and indicators.
2. Cab design, dimensions and layout.
3. Hoistway-door and frame details.
4. Electrical characteristics and connection requirements.
5. Expected heat dissipation of elevator equipment in hoistway (BTU).
6. Color selection chart for Cab and Entrances.

B. Shop Drawings: Submit approval layout drawings. Include the following:
1. Car, guide rails, buffers and other components in hoistway.
2. Maximum rail bracket spacing.
3. Maximum loads imposed on guide rails requiring load transfer to building structure.
4. Clearances and travel of car.
5. Clear inside hoistway and pit dimensions.
6. Location and sizes of access doors, hoistway entrances and frames.

C. Operations and Maintenance Manuals: Provide manufacturer's standard operations and maintenance manual.

1.5 QUALITY ASSURANCE

A. Manufacturer: Elevator manufacturer shall be ISO 9001 certified.

B. Installer: Elevators shall be installed by the manufacturer.

C. Permits, Inspections and Certificates: The Elevator Contractor shall obtain and pay for necessary Municipal or State Inspection and permit as required by the elevator inspection authority, and make such tests as are called for by the regulations or such authorities. These tests shall be made in the presence of such authorities or their authorized representatives.

1.6 DELIVERY, STORAGE AND HANDLING

A. Should the building or the site not be prepared to receive the elevator equipment at the agreed upon date, the General Contractor will be responsible to provide a proper and suitable storage area on or off the premises.

Should the storage area be off-site and the equipment not yet delivered, then the elevator contractor, upon notification from the General Contractor, will divert the elevator equipment to the storage area. If the equipment has already been delivered to the site, then the General Contractor shall transport the elevator equipment to the storage area. The cost of elevator equipment taken to storage by either party, storage, and redeliver to the job site shall not be at the expense of the elevator contractor.

1.7 WARRANTY

A. The elevator contractor's acceptance is conditional on the understanding that their warranty covers defective material and workmanship. The warranty period shall not extend longer than one (1) year from the date of completion or acceptance thereof by beneficial use, whichever is earlier, of each elevator. The warranty excludes: ordinary wear and tear, improper use, vandalism, abuse, misuse, or neglect or any other causes beyond the control of the elevator contractor and this express warranty is in lieu of all other warranties, express or implied, including any warranty of merchantability or fitness for a particular purpose.

1.8 MAINTENANCE and SERVICE

A. Maintenance service consisting of regular examinations and adjustments of the elevator equipment shall be provided by the elevator contractor for a period of: <twelve (12)> months after the elevator has been turned over for the customer's use. This service shall not be subcontracted but shall be performed by the elevator contractor. All work shall be performed by competent employees during regular working hours of regular working days. This service shall not cover adjustments, repairs or replacement of parts due to negligence, misuse, abuse or accidents caused by persons other than the elevator contractor. Only genuine parts and supplies as used in the manufacture and installation of the original equipment shall be provided.

B. The periodic lubrication of elevator components shall not be required, including: Sheaves, Rails, Belts, Ropes, Car and CWT guides, etc

C. The elevator control system must:
1) Provide in the controller the necessary devices to run the elevator on inspection operation.
2) Provide on top of the car the necessary devices to run the elevator in inspection operation.
3) Provide in the controller an emergency stop switch. This emergency stop switch when opened disconnects power from the brake and prevents the motor from running.
4) Provide in the event of a power outage, means from the controller to electrically lift and control the elevator brake to safely bring the elevator to the nearest available landing.
5) Provide the means from the controller to reset the governor over speed switch and also trip the governor.
6) Provide the means from the controller to reset the emergency brake when set because of an unintended car movement or ascending car over speed
7) Provide the means from the controller to reset elevator earthquake operation.

D. Provide system capabilities to enable a remote expert to create a live, interactive connection with the elevator system to enable the following functions:
1. Remotely diagnose elevator issues with a remote team of experts
2. Remotely return an elevator to service
3. Provide real-time status updates via email
4. Remotely make changes to selected elevator functions including:
a. Control building traffic: Restrict floor access, remove car from group operation, shut down elevator, select up peak/down peak mode, activate independent service
b. Conserve energy: Activate cab light energy save mode, activate fan energy save mode, shut down car(s)
c. Improve passenger experience: Extend door open times, change parking floor, activate auto car full, activate anti-nuisance, advance door opening, door nudging, extend specific floor extended opening time, release trapped passengers

2.1- PRODUCTS

2.2 DESIGN AND SPECIFICATIONS

A. Provide machine-roomless type with the control system and car design based on materials and systems manufactured by internationally known elevator manufacturer. Specifically, the system shall consist of the following components:

1. An AC gearless machine using embedded permanent magnets Machine-roomless mounted at the top of the hoistway.

2. Polyurethane Coated-Steel Belts for elevator hoisting purposes.
3. Regenerative drive that captures normally wasted energy and feeds clean power back into the building's power grid.
4. LED lighting standard in ceiling lights and elevator fixtures.
5. Sleep mode operation for LED ceiling lights and car fan.

B. Approved Installer: certified and trained by elevator system manufacturer

2.3 EQUIPMENT: CONTROLLER COMPONENTS

A. Controller: A microcomputer based control system shall be provided to perform all of the functions of safe elevator operation. The system shall also perform car and group operational control.

1. All high voltage (110V or above) contact points inside the controller shall be protected from accidental contact when the controller doors are open.
2. Controller shall be separated into two distinct halves; Motor Drive side and Control side. High voltage motor power conductors shall be routed so as to be physically segregated from the rest of the controller.
3. Field conductor terminations points shall be segregated; high voltage (>30 volts DC and 110 VAC,) and low voltage (< 30 volts DC)
4. Controllers shall be designed and tested for Electromagnetic Interference (EMI) immunity according to the EN 12016 (May 1998): "EMC Product Family Standards for lifts, escalators, and passenger conveyors Part 2 – immunity"
5. Controller shall be located inside the wall next to the top landing entrance frame. Emergency access shall be provided through an access panel in the entrance frame secured by a key lock.
6. A separate control room or cabinet should not be required.

B. Drive: A Variable Voltage Variable Frequency AC drive system shall be provided. The drive shall be set up for regeneration of AC power back to the building grid.\

2.4 EQUIPMENT: MACHINE AND GOVERNOR

A. Machine: Machine Room-Less <AC gearless machine, with a synchronous permanent-magnet motor, dual solenoid service and emergency disc brakes, mounted at the top of the hoistway.>
B. Governor: Machine Room-Less <The governor shall be a tension type governor.>
C. Buffers, Car and Counterweight: 400 fpm Oil type buffers shall be used.
D. Hoistway Operating Devices:
   1. Emergency stop switch in the pit
   2. Terminal stopping switches.
E. Positioning System: Consists of an encoder, reader box, and door zone sensors.

F. Guide Rails and Attachments: Guide rails shall be Tee-section steel rails with brackets and fasteners. Side counterweight arrangements shall have a dual-purpose bracket that combines both counterweight guide rails, and one of the car guide rails to building fastening.

G. Coated Steel Belts: Polyurethane coated steel belts with-tensile-grade, zinc-plated steel cords.

H. Governor Rope: Governor rope shall be steel and shall consist of at least eight strands wound about a sisal core center.

I. Fascia: Galvanized sheet steel *shall be provided at the front of the hoistway.*

J. Hoistway Entrances:

1. 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 UL fire rated steel.
   Sills shall be nickel silver finish.
2. Doors: Entrance doors shall be of metal construction with vertical channel reinforcements.
3. Fire Rating: Entrance and doors shall be UL fire rated for 1-1/2 hour
4. Entrance Finish: satin stainless steel
5. Entrance marking plates: Entrance jambs shall be marked with 4" x 4" (102 mm x 102 mm) plates having raised floor markings with Braille located adjacent to the floor marking. Marking plates shall be provided on both sides of the entrance.
6. Sight Guards: sight guards will be furnished with all doors painted to match with painted doors, painted black for stainless steel and gold satin doors.

K. [Option selected] Counterweight Safeties: Counterweight safeties shall be applied to the counterweight frame, and shall be either a type "B", flexible guide clamp type.

2.5 EQUIPMENT: CAR COMPONENTS

A. Car frame and Safety: A car frame fabricated from formed or structural steel members shall be provided with adequate bracing to support the platform and car enclosures. The car safety shall be integral to the car frame and shall be Type "B", flexible guide clamp type.

B. Cab

1. Cab Options: Service elevators - Steel Shell Cab with stainless steel vertical removable panels Paints and laminate to be selected from manufacturer's catalog of choices. Brushed Stainless Steel finished base plate located at top and bottom
2. Premium Cab Options (passenger): Steel Shell Cab with raised stainless steel hang on panels. Brushed Stainless Steel finished base plate located at top and bottom

C. Car Front Finish: Satin Stainless Steel.
   Car Door Finish: Satin Stainless Steel.

D. Ceiling Type:
   Service Elevator Brushed Steel Finish with 4 LED lights.
   Passenger: Drop Ceiling LED Perimeter-lit ceiling Brushed Steel Finish

E. Emergency Car Lighting: An emergency power unit employing a 6-volt sealed rechargeable battery and totally static circuits shall be provided to illuminate the elevator car in the event of building power failure.

F. Fan: A two-speed 120 VAC fan will be mounted to the ceiling to facilitate in-car air circulation, meeting A17.1 code requirements. The fan shall be rubber mounted to prevent the transmission of structural vibration and will include a baffle to diffuse audible noise. A switch shall be provided in the car-operating panel to control the fan.

G. Handrail: Handrails shall be provided on the side and rear walls of the car enclosure. Handrails shall be ADA compliant 1 ½" diameter (38.1 mm) Round bar handrail with a Brushed Steel Satin Finish

H. Threshold: Nickel-Silver Finish.

I. Emergency Exit Contact: An electrical contact shall be provided on the car-top exit.

J. Guides: The car shall have 3" diameter roller guides at top and 6 ¼" diameter at bottom and the counterweight shall have 5" diameter roller type guides at the top and the bottom. At speeds above 350fpm, the car shall have 6 ¼" diameter sprung roller guides at top and bottom and an option for 8" sprung roller guides at top and bottom

K. Platform: The car platform surface shall be constructed of metal. Load weighing device shall be mounted on the belts at the top of the hoistway.

L. Certificate frame: Provide a Certificate frame with a satin stainless steel finish.

M. The LED ceiling lights and the fan should automatically shut off when the system is not in use and be powered back up after a passenger calls the elevator and pushes a hall button.

2.6 EQUIPMENT: SIGNAL DEVICES AND FIXTURES

A. Car Operating Panel: A car operating panel shall be provided which contains all push buttons, key switches, and message indicators for elevator operation. The car operating panel shall have a satin stainless steel or gold satin finish. [An optional Luxury Swing COP is available. A second COP is available]

A car operating panel shall be furnished. It shall contain a bank of round stainless steel, mechanical LED illuminated buttons. Flush mounted to the panel and marked to correspond to the landings served. All buttons to have raised numerals and Braille markings with: Vandal-Resistant, Flush satin stainless steel button with blue LED illuminating center jewel

The car operating panel shall be equipped with the following features:
1. Raised markings and Braille to the left hand side of each push-button.
2. Car Position Indicator at the top of and integral to the car operating panel.
3. Door open and door close buttons.
4. Inspection key-switch.
5. Elevator Data Plate marked with elevator capacity and car number.
6. Help Button: The help button shall initiate two-way communication between the car and a location inside the building, switching over to another location if the call is unanswered, where personnel are available who can take the appropriate action. Visual indicators are provided for call initiation and call acknowledgement.
7. Landing Passing Signal: A chime bell shall sound in the car to signal that the car is either stopping at or passing a floor served by the elevator.
8. In car stop switch (toggle or key unless local code prohibits use)

9. Firefighter's hat (standard USA)
10. Firefighter's Phase II Key-switch (standard USA)
11. Firefighter's Phase II Emergency In-Car Operating Instructions: worded according to A17.1 2000, Article 2.27.7.2.
12. Please Exit Symbol: Seismic Zones ≥2 or express priority in the hall.

B. Car Position Indicator: A digital, LED car position indicator shall be integral to the car operating panel.

C. Hall Fixtures: Hall fixtures shall be provided with necessary push buttons and key switches for elevator operation. Integral Hall fixtures shall feature round stainless steel, mechanical buttons marked to correspond to the landings. Hall fixtures to be located in the entrance frame face or the wall. Buttons shall be in vertically mounted fixture. Fixture shall be satin stainless steel finish.

D. Button Options: Vandal-Resistant, Flush satin stainless steel button with blue LED illuminating center jewel.

E. Car Lantern and Chime: A directional lantern visible from the corridor shall be provided in the car entrance. When the car stops and the doors are opening, the lantern shall indicate the direction in which the car is to travel and a chime will sound.

F. Access key-switch at top floor in entrance jamb.

G. Card Reader Provision

H. Emergency (standby) Power key-switch: Manual selection of each elevator in normal operation after automatic return in standby power operation has been initiated.

3.1- EXECUTION

3.2 PREPARATION

A. Take field dimensions and examine conditions of substrates, supports, and other conditions under which this work is to be performed. Do not proceed with work until unsatisfactory conditions are corrected.

3.3 INSTALLATION

A. Installation of all elevator components except as specifically provided for elsewhere by others.

3.4 DEMONSTRATION

A. The elevator contractor shall make a final check of each elevator operation with the Owner or Owner's representative present prior to turning each elevator over for use. The elevator contractor shall determine that control systems and operating devices are functioning properly.

END OF SECTION 14210

Read and accepted as part of the Contract:

Bidder / Contractor

GeN2®

Job Site Requirements for General Contractors

HOISTWAY

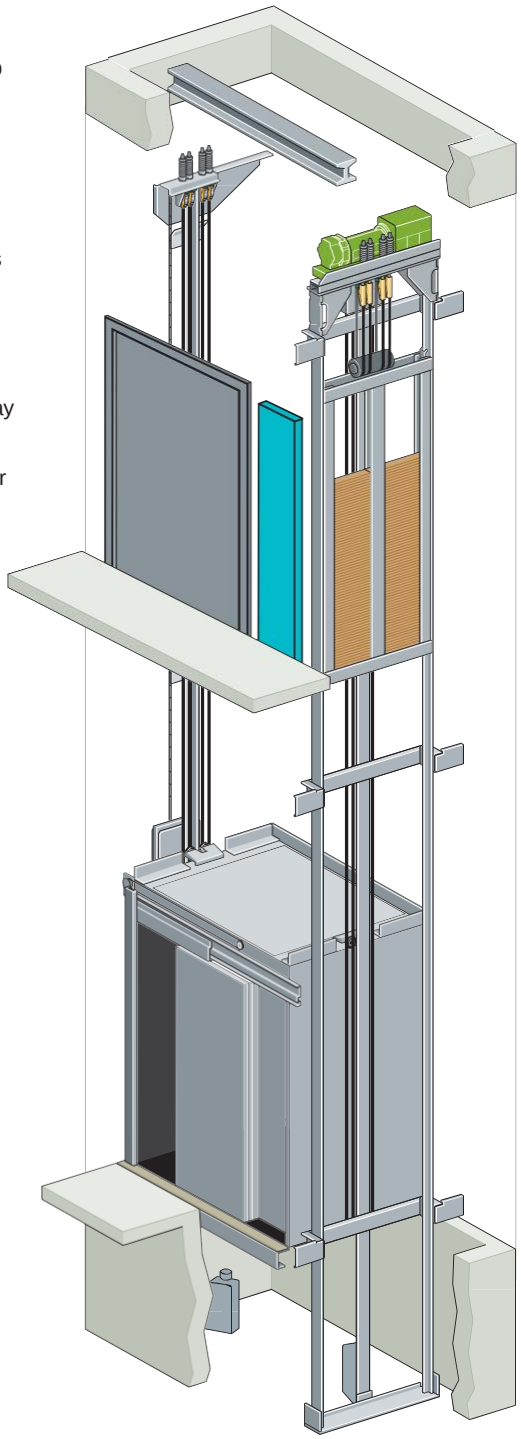
- Hoistway must be constructed per final layout drawings.
- The location of attachment support for the top rail bracket is at a critical elevation called out on the hoistway layout.
- An overhead beam must be provided at the location called out on the hoistway layout and designed to support 7,500 lbs per elevator.
- Provide a clear plumb hoistway with variations from the size shown on the Otis layout not to exceed -0"/+1" (25mm) and not less than the clear dimensions shown on the Otis layout.
- Prior to the start of installation, provide a dry, properly framed, enclosed and vented hoistway in accordance with all applicable codes.
- Front entrance wall at main and top landing, or landing below top landing if the controller is located there, is not to be constructed until or after all elevator equipment is installed in the hoistway.

SMOKE DETECTORS

- Provide smoke detectors, located as required, with wiring from the sensing devices to the controllers designated by Otis.
- If sprinklers are installed in the hoistway or machine space, a means to automatically disconnect the main line power supply upon or prior to the application of water is required (unless prohibited by local code).

PIT

- Pit floor designed to sustain vertical forces on car and counterweight rails and impact loads on car and counterweight buffers as shown on Otis layout.
- Pit must be clean and dry prior to start of installation.
- Fixed ladders in each pit as required by governing code, size of pocket and location shown per Otis layout.
- Light must have an external guard and be located at a point where illumination on the pit ladder base is no less than 10 foot candles.



ELECTRICAL

- For power conditions:
  - ***Three Phase*** *- provide a permanent three phase electrical feeder with separate grounding conductor terminating in controller either at the top landing or landing below before the start of the installation.*
  - ***Single Phase*** *- provide a permanent single phase electrical feeder with a separate grounding conductor terminating in the transformer located at the top of the hoistway before the start of installation.*
- Provide a temporary 220 volt, 30 amp single phase, 4 wire electrical supply for platform operation during construction and available at the start of elevator installation.
- Provide a 125 volt, 15 amp single phase branch circuit for the elevator car/light circuits at the start of the installation of the top landing.
- Provide a temporary 220 volt, 30 amp single phase, 4 wire electrical supply for platform operation during construction and available at the start of elevator installation.
- Provide a permanent light fixture at the top of the hoistway. Illumination specifications and location of the light switch are provided in the Otis layout.
- Install a permanent light fixture at the top landing entrance in the hall. Illumination specifications and location of the light switch are provided in the Otis layout.
- Provide electric power for lights tools, welding, hoisting, etc.
- Provide one dedicated outside telephone line, per elevator, and terminated at the controller.

BARRICADES MUST MEET OSHA MINIMUM REQUIREMENTS

- Provide guarding and protection of the hoistway during construction.
- Hoistway barricades shall be constructed, maintained, and removed by others.
- Provide a freestanding removable barricade at each hoistway opening at each floor.
- Barricades shall be 42" high, have centerboard and kick board and withstand 200 lbs. of lateral force.
- Provide full entrance screening/mesh in front of all hoistway entrances.

OTIS

GEN2-003 (1104)

On the web at: www.otis.com