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## PRODUCT: IN-GROUND HYDRAULIC FREIGHT ELEVATOR

- DELTA offers a complete line of CSA B44 Elevator Code compliant In-Ground Hydraulic Freight Elevators for buildings up to 15 m of travel and six floors.
- DELTA In-Ground Hydraulic Freight Elevators are available in various sizes and speeds in order to satisfy specific building requirements.
- A full range of cab and entrance options are available on all DELTA In-Ground Hydraulic Freight Elevators.

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## INSTRUCTIONS

This document includes the information required for specifying an In-Ground Hydraulic Freight Elevator.

These specifications require user input as follows:

- Where a choice must be made, such as in selecting materials, the text indicates **[Select...]**, bolded and bracketed.
  - Where an option is available, the text indicates **(Optional Selection(s))**, bolded and in parentheses. Choose the appropriate item and delete the other item(s).
  - Where additional information must be provided the text indicates **(Specify...)**, bolded and in parentheses.
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# IN-GROUND HYDRAULIC FREIGHT ELEVATOR 14 20 00

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## **SECTION 14 20 00**

### **1. GENERAL**

#### **1.1. INSTRUCTIONS**

- 1.1.1. The Elevator Contractor must report in writing to the General Contractor / Consultant any defects of surfaces or work prepared by other trades which may affect the quality or dimensions of their work. Commencement of the Elevator Contractor's work must imply complete acceptance of all work by other trades.

### **2. QUALIFICATIONS**

#### **2.1. STANDARDS**

- 2.1.1. To establish a standard for tendering purposes, the Drawings and Specifications are based on DELTA Elevator Co Ltd – In-ground Hydraulic Freight Elevator(s) rated at:

**[Select one of the following]**

**1365 kg**

**1815 kg**

**2268 kg**

**2700 kg**

**5400 kg**

**Other kg (Contact DELTA for this option)**

- 2.1.2. Loading Class:

**[Select one of the following]**

**Class A – General Freight Loading**

**Class B – Motor Vehicle Loading**

**Class C1 – Industrial Truck Loading (Fork Lift is carried with the load on the elevator)**

**Class C2 – Industrial Truck Loading (Fork Lift is used only to load and unload only)**

**Class C3 – Other Loadings with Heavy Concentrations**

- 2.1.3. Elevator(s) to be DELTA Freight Elevator(s) or approved equal.
- 2.1.4. Employ only Elevator Contractors who have been satisfactorily supplying and installing similar elevating equipment over a period of at least the immediate past five years.

#### **2.2. QUALITY ASSURANCE**

- 2.2.1. Employ fully trained and licensed mechanics who are regularly employed in this field.

#### **2.3. SHOP DRAWINGS**

- 2.3.1. Submit five (5) copies of all shop drawings for the Architect to review.
- 2.3.2. Do not commence work until reviewed drawings have been returned.

#### **2.4. GUARANTEE**

- 2.4.1. The Elevator Contractor must guarantee the work and materials and must make good all defects (but not those due to ordinary wear and tear or to improper use or care) which may develop within one (1) year from the date of completion provided same has been properly used, oiled, and cared for by a

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registered Elevator Contractor through a Code compliant maintenance agreement, and provided all payments due by the terms of the contract have been made in full when due.

- 2.4.2. Workmanship and any materials supplied and used in this work to be in strict accordance with this specification.

### **2.5. LEED PROJECT**

- 2.5.1. Composite wood resins laminate adhesives must not contain added urea-formaldehyde.

### **2.6. MEASUREMENTS**

- 2.6.1. General Contractor to confirm all hoistway measurements and plumb-ness as per Elevator Contractor shop drawings.

### **2.7. MAINTENANCE**

- 2.7.1. A quality maintenance service consisting of regular examinations at least once a month, adjustments and lubrication of the elevator equipment must be provided by the Elevator Contractor after the elevator has been turned over for the owner's use for a period of:

**[Select one of the following]**

**Three (3) months**

**Twelve (12) months**

- 2.7.2. All work must be performed by competent employees during regular working hours of regular working days and must include emergency 24 hour call back service. This service must not cover adjustments or repairs 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 must be provided.

### **2.8. SCOPE OF WORK**

- 2.8.1. Elevator Contractor shall do all work related to the elevator from the main power disconnect to the finished installation of elevator and accessories except for items listed in **s.2.9. WORK BY OTHERS.**

### **2.9. WORK NOT INCLUDED UNDER THIS CONTRACT BUT SUPPLIED AND/OR INSTALLED BY OTHERS**

- 2.9.1. A properly framed and enclosed legal hoistway, including adequate guards and protection of hoistway during the erection period.
- 2.9.2. Hoistway and control room / control space / machine room (as required) and all applicable fire ratings in accordance with elevator, safety, electrical and building Codes. The hoistway must be plumb within 25 mm and not less than the dimensions shown on this layout. All ledges over 100 mm to be bevelled 75° to the horizontal (top and bottom).
- 2.9.3. No conduit, wiring, or piping other than that pertaining to the elevator(s) is permitted in the hoistway or control room / control space / machine room
- 2.9.4. Sleeves for oil and electric ducts from machine room to hoistway as required. All other blockouts, underpinning, pockets, patching, cutouts, grouting and concrete work where required. For remote machine room, provide fire rated service space around elevator electrical conduit as required by the applicable building code
- 2.9.5. Access to the control room / control space / machine room space as required by the governing Code or Authority Having Jurisdiction.

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- 2.9.6. Suitable control room / control space / machine room space with legal access and ventilation, with concrete floor. Temperature of control room / control space / machine room to be thermostatically controlled and maintained between 10° C and 32° C. Maximum allowed humidity is 95% non-condensing.
- 2.9.7. A lockable fused disconnect switch with auxiliary contact for each elevator in the control room / control space / machine room per the Canadian Electric Code with feeder or branch wiring to controller(s) or starter. Permanent single phase and permanent or temporary three-phase power must be available for elevator equipment installation. Temporary power must meet the specified power requirements.
- 2.9.8. A fused 120 VAC, 15 Amp, single phase, disconnect to each controller for cab lighting. Additional fused 120 VAC, 15 Amp, single phase disconnect for dispatch controller (required for triplex and greater installations), any in-car GFCI duplex receptacles (one disconnect per elevator), oil cooler and / or oil heater.
- 2.9.9. Hoistway ventilation and temperature control required to maintain temperature between 10° C to 32° C. Maximum allowed humidity is 95% non-condensing. Ventilation to be according to local Codes.
- 2.9.10. Adequate supports for buffers, hydraulics, rail brackets, including spreader beams between multiple hoistway if required. Maximum bracket spacing as required by Elevator Contractor. Design for the reaction forces shown on elevator drawings.
- 2.9.11. Front entrance partition walls are not to be constructed until after door frames are in place. If front walls are poured concrete bearing walls, rough openings are to be provided to accept entrance frame and filled in after frames are set. Entrance frames are not designed to support overhead wall loads. Suitable supports for these loads must be provided. If decorative material is applied to listed/certified frames it must conform to the requirements of the certifying organization.
- 2.9.12. Recesses, as required, to accommodate hall signal fixtures.
- 2.9.13. Dry pit reinforced to sustain normal vertical forces from rails and impact loads from buffers and hydraulic jack system. Pit floor not to be poured until cylinder is set in place or adequate clearance provided as per elevator shop drawings. Pit waterproofing, where required.
- 2.9.14. Pit drain always required for elevators with Firefighters' Emergency Operation. Sump pump external to the shaft, where required. Sump hole to be outside hoistway and 600 mm deeper than pit, with trap and backwater check valve. Pit drain/sump pump minimum capacity to be 11.4 m<sup>3</sup>/hr (3000 usg/hr) per elevator. Design to handle possible oil in sump discharge for hydraulic elevators.
- 2.9.15. Where access to a pit over 900 mm in depth is by means of the lowest hoistway entrance, elevator pit ladder(s) extending a minimum of 1220 mm above the sill of the lowest access door, with centreline of rung 115 mm from wall with 300 mm vertically between rungs. Ladder width is 400 mm. Ladder location as shown on elevator shop drawings. Ladder and attachments must sustain a minimum load of 135 kg.
- 2.9.16. Any cutting, patching, and painting of walls, floors, or partitions together with finish painting of entrance doors and frames.
- 2.9.17. Necessary electric power for light, tools, hoists, etc., during erection as well as electric current for starting, testing and adjusting the elevator.
- 2.9.18. A hoist beam must be installed in the hoistway overhead as per drawing requirements for elevator construction and maintenance.

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- 2.9.19. Pit lighting level to be minimum 100 LX. Pit to contain a 120 VAC light fixture, switch and GFCI convenience outlet. Switch to be accessible from pit access. All conduits in hoistway to be EMT. Light and convenience outlet to be on a dedicated circuit
- 2.9.20. A self-closing, self-latching, fire rated machine room, control room or control space door, a minimum of 914 mm wide x 2030 mm high with a minimum of 2286 mm clear height below all equipment.
- 2.9.21. Elevator feeders, dedicated ground wire and lockable, fused disconnects wired to the elevator controller.
- 2.9.22. Control room / control space / machine room lighting level to be 200 LX minimum. Must contain a 120 VAC light fixture, switch and GFCI convenience outlet. Switch to be on the lock jamb side of door. All conduits to be EMT.
- 2.9.23. Elevator signalling device in each car wired to terminals in the elevator controller (by Elevator Contractor). Others to provide communication wiring from the elevator controller to the following:  
1) For buildings with a rise of less than 18 m – single or multiple elevators – Each to have a separate connection to a location staffed by authorized personnel (may be on or off site). Multiple elevators may be connected to an on-site consolidator (by others). 2) For buildings with a rise of 18 m or more – single and multiple elevators – To a connection at a location within the building that is readily accessible to authorized personnel. A communication control station (supplied by Elevator Contractor) to be provided. General Contractor to supply suitable installation location, others to supply and install wiring from the communication station to elevator controller(s). Depending upon communication station model, a 120VAC, 15 Amp power supply may be required (by others).
- 2.9.24. Provide telephone connection except for the wire from the controller in the machine room, control room or control space to elevator.
- 2.9.25. For elevators with hall or car security features, general contractor to provide (1) "NORMALLY OPEN" dry contact per secure hall or car call in the machine room rated for 120 VAC @ 1 Amp.
- 2.9.26. Fire alarm initiating devices (FAIDs) to be smoke or heat detectors not pull stations. All FAIDs to be wired to a building fire panel (by others). Building fire panel to have (4) "normally open" dry contacts rated for 24 VDC @ 1 Amp. Contact #1 - for main recall level lobby. Contact #2 - for other building floor levels combined. Contact #3 - this is a common contact for a) machine room / control room / control space not located at the recall level and / or b) all hoistway FAIDs above the recall level. Contact #4 - this is a common contact for a) machine room / control room / control space at the recall level and / or b) all hoistway FAIDs at or below recall level. Appropriate contact to close when alarm is initiated. If required, additional fire recall switch (supplied by Elevator Contractor) to be installed by others in building fire panel. All wiring and conduit from building fire panel to elevator controller(s) for FAIDs and additional recall switch by others.
- 2.9.27. Where an emergency or standby power system is provided to operate an elevator in the event of normal power supply failure, then (2) "NORMALLY OPEN" dry contacts rated for 120 VAC @ 1 Amp are to be provided from the emergency power transfer switch and wired (by others) to the elevator controller. One contact (E-POWER) to close when emergency or standby power is in effect. Other contact (pending) to close 10 seconds prior to E-POWER testing to allow elevator to stop at nearest landing. In addition, the following is also required during testing (from normal to e-power and vice versa) and prior to switching from e-power to normal power under regular operation: After the (pending) contact time period has elapsed, e-power system to remove all power from the elevator controller for 15 seconds prior to restart.

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- 2.9.28. Install guide rail support concrete wall inserts as provided by Elevator Contractor in the location as specified on the shop drawings
- 2.9.29. Suitable means of access to and egress from location of cylinder well for truck mounted hole drilling rig.
- 2.9.30. Backfill around pit.
- 2.9.31. Provide sand and backfill cylinder.

### **2.10. CODES**

- 2.10.1. Installation, elevator, components, accessories and operation must comply with the CSA B44 Elevator Code currently in effect and all other governing Codes and By-Laws.
- 2.10.2. All welding of elevator components must be done by a CWB certified company according to CSA Standards W47.1 and W59.

### **2.11. PERMIT AND INSPECTIONS**

- 2.11.1. The Elevator Contractor must furnish all licenses and permits and must arrange for and make all inspections and tests required thereby.
- 2.11.2. The General Contractor must complete the TSSA pre-inspection checklist prior to an initial inspection being scheduled.

### **2.12. KNOW SITE CONDITIONS**

- 2.12.1. The Elevator Contractor to be familiar with job conditions on the site.

### **2.13. MAINTENANCE CONTROL PROGRAM**

- 2.13.1. The Elevator Contractor must provide and leave on site a Maintenance Control Program in compliance with the requirements of the CSA B44 Elevator Code. The procedures and logbook of records must be available to the TSSA upon request.

## **3. PRODUCTS**

### **3.1. ELEVATOR**

- 3.1.1. In-Ground Electro-Hydraulic
- 3.1.2. Rated Load:
  - [Select one of the following]**
  - 910 kg**
  - 1134 kg**
  - 1365 kg**
  - 1815 kg**
  - 2268 kg**
  - 2700 kg**
  - 5400 kg**
  - Other kg (Contact DELTA for this option)**
- 3.1.3. Rated Speed: xxx m/s

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**(Contact DELTA for this option)**

3.1.4. Car Inside Dimensions: xxx mm wide x xxx mm deep

**(Contact DELTA for this option)**

3.1.5. Hoistway Size: Refer to Architectural Drawings

3.1.6. Operation: Single Automatic Push Button

3.1.7. Car Controls: Illuminated Type with faceplate in Stainless Steel #4 finish.

3.1.8. Hall Call Stations: Illuminated type. Stainless steel #4 Cover Plates.

3.1.9. Hoistway Entrances Size: xxx mm wide x xxx mm high

**(Contact DELTA for this option)**

3.1.10. Entrance Type: Hoistway entrances to be Peelle Company or approved equal.

**[Select one of the following]**

**Manual Bi-Parting**

**Automatic Bi-Parting**

3.1.11. Entrance Frame: Formed or structural steel entrance frame to be provided and sized to adequately support the loading onto the entrance door sills. Entrance frame to accommodate building wall thickness and to be provided on both sides and top. Bottom to include checker plate and reinforcing steel to support loading.

3.1.12. Travel: Refer to Architectural Drawings.

3.1.13. Stops: Refer to Architectural Drawings.

3.1.14. Openings: Refer to Architectural Drawings.

3.1.15. Power Supply:

**[Select one of the following]**

**208 VAC, 3 phase, 60 Hertz**

**575 VAC, 3 phase, 60 Hertz**

3.1.16. Lighting Supply: 120 Volts, 60 Hertz, 15 Amp

3.1.17. Elevator(s) must comply with the CSA B44 Elevator Code version currently in effect, including Supplements). Elevator(s) must meet the Appendix E Accessibility requirements.

### 3.2. CAR CAB SPECIFICATIONS

3.2.1. Shell Enclosure:

- Car Top: Minimum 14 ga. (2.0 mm) steel, grey enamel finish
- Shell Walls: 14 ga. (2.0 mm) steel, grey enamel finish

**(Optional Selection)**

**Stainless Steel binder channel on raised wall panels**

- Car gate: Vertical slide up wire mesh 1829 mm high

**[Operation must be the same as that selected for the Entrance Type above]**

**Manual**

**Automatic**

3.2.2. Cab Features:

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- Finished Flooring: Steel checker plate
- Bumper Rail: Solid hardwood
- Hoistway Doors and Frames: Finish to be prime coat
- Lighting: LED strip lighting type recessed into ceiling
- Emergency Exit: Top exit in car top in accordance with CSA B44 Elevator Code
- Overall Height: 2438 mm (8' 0") (2286 mm clear inside)  
**(Optional Selections – Shaft Overhead must be increased)**  
**2743 mm (9' 0") (2591 mm clear inside)**  
**3048 mm (10' 0") (2896 mm clear inside)**
- Car Operating Station: Top row of buttons located in compliance with CSA B44 Elevator Code Appendix E for accessibility

### 3.2.3. Other Control Features:

- Emergency Run-Stop key switch
- Door open button, door close button (when automatic door operation is selected)
- Independent Service keys witch
- Phone Button to activate conversation
- Access Key Switch
- Light Key Switch
- Emergency Light Test Switch

3.2.4. Emergency Car Lighting: The emergency power unit must illuminate the elevator car and provide current to the alarm bell in the event of normal power failure. The equipment must comply with the requirements of the current CSA B44 Elevator Code.

3.2.5. Entrances: Must be manufactured in accordance with procedures established by fire testing authorities and must be labelled for a minimum of 1.5 hours.

3.2.6. Car Floor Indicator: One (1) to be installed in each car as part of the car station.

3.2.7. Hall Floor Indicator: One (1) for each elevator to be installed at main landing.

**(Optional Selection)**  
**(Specify quantity) for each elevator to be installed at (specify location) landing.**

3.2.8. Certificate Frame. Mounted on:

**[Select one of the following]**  
**Controller door**  
**Elevator cab wall**

3.2.9. Firefighters' Emergency Operation: Provide all requirements for FEO Phase I and Phase II in each elevator.

3.2.10. Emergency Power Sequencing: Automatic Standby Building Emergency Power Operation to conform to CSA B44 Elevator Code to allow automatic and manual selection of individual cars to run on emergency power.

**(Optional Selection)**  
**Access to all cars at same time requires a generator of sufficient capacity to run all cars at rated load.**

### 3.3. CYLINDER AND PLUNGER (JACK UNIT)

3.3.1. The jack must be designed and constructed in accordance with the applicable requirements of the CSA B44 Elevator Code. It must be of sufficient size to lift the gross load the height specified, and must be factory tested to insure adequate strength and freedom from leakage.



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- 3.3.2. The jack unit must consist of the following parts: A plunger of heavy seamless steel tubing accurately turned and polished; a stop ring electrically welded to the plunger to prevent the plunger from leaving the cylinder; a packing seal of suitable design and quality; a drip ring around the cylinder top; a cylinder constructed of steel pipe complete with a pipe connection and air bleeder.
- 3.3.3. The well for the cylinder, including casing and PVC pipe corrosion protection, must be sunk into the ground. The cavity between the PVC pipe and the cylinder may be optionally filled with a neutral compound whose density is greater than that of water. Means must be provided to check for the absence of water or the level of the compound and top up the level if required.
- 3.3.4. No plunger follower may be used.

### **3.4. PUMPING UNIT**

- 3.4.1. The pumping unit must be a unit of integral design and must include an electric motor connected to a pump, a hydraulic control system, a storage tank, necessary piping connections, and a controller, all compactly designed as a single self-contained unit. The motor and pump assembly must be mounted on a rubber isolated inner base.

### **3.5. PUMP**

- 3.5.1. The pump must be a positive displacement screw type to give smooth operation and must be designed and manufactured for elevator service.

### **3.6. MOTOR**

- 3.6.1. The motor must be of the alternating current, polyphase squirrel cage induction type and must be of a design adapted to electro-hydraulic requirements.

### **3.7. HYDRAULIC CONTROL SYSTEM**

- 3.7.1. The hydraulic control system must be of compact design suitable for operation under the required pressures. The control valve must be a manifold with up, down, and check valve sections. A control section including solenoid valves will direct the main valve and control up and down starting, transition from full speed to levelling speed, up and down stops, pressure relief and manual lowering. Down speed and up and down levelling will be controlled at the main valve sections. All of these functions must be fully adjustable for maximum smoothness and to meet contract conditions. All control systems must be pre-adjusted at the factory.
- 3.7.2. The manual lowering feature must permit lowering the elevator at slow speed in the event of power failure or for adjusting purposes.

### **3.8. LEVELLING DEVICE**

- 3.8.1. The elevator must be provided with an automatic levelling device which brings the car to a stop within 6 mm (1/4") of the landing level regardless of load or direction of travel. Landing level will be maintained within the levelling zone irrespective of the hoistway doors being open or closed.

### **3.9. STORAGE TANK**

- 3.9.1. The storage tank must be constructed of steel, and must be provided with a cover, minimum oil levelling measurement and a filter screen mounted over the suction inlet. Tank design must incorporate a reserve capacity of no less than 45 litres (10 gallons). An initial supply of oil sufficient for proper operation must be provided.

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### 3.10. PIPING

- 3.10.1. Pipe of adequate size and thickness must be installed between the pumping unit and the cylinder head. A shut off valve must be provided for maintenance and adjusting purposes.

### 3.11. CONTROLLER

- 3.11.1. A microprocessor controller must be provided, including necessary starting switches of adequate size together with all relays, switches and hardware required to accomplish the operation specified. Overload protection must be provided to protect the motor against overloading.

### 3.12. CAR STALL PROTECTIVE CIRCUIT

- 3.12.1. A protective circuit must be provided which will stop the motor and the pump and return the car to its lowest landing in the event the car does not reach its designed landing with a predetermined time interval. This circuit will permit a normal exit from the car but prevent further operation of the elevator until the issue has been corrected.

### 3.13. WIRING

- 3.13.1. All wiring and electrical interconnections must comply with the governing codes. Insulated wiring must have flame retardant and moisture proof outer covering, and must be run in conduit, tubing or electrical wire-ways. Travelling cables must be flexible and suitably suspended to relieve strain on individual conductors.

### 3.14. HOISTWAY OPERATING DEVICES

- 3.14.1. Normal terminal stopping devices must be provided. When an emergency terminal stopping device is also required, it must be furnished and the controller switches and circuitry arranged in accordance with the requirements of the CSA B44 Elevator Code.

### 3.15. PIT SWITCH

- 3.15.1. An emergency stop switch must be located in the pit.

### 3.16. PLATFORM

- 3.16.1. The car platform must have a fabricated frame of formed and structural steel shapes, rigidly welded. Flooring is recommended to be steel checker plate. The underside of the platform must be fireproofed. The platform must be manufactured by a CWB certified shop

### 3.17. CAR FRAME

A suitable car frame fabricated from formed or structural steel members must be provided with adequate bracing to support the platform and car enclosure and designed for the class of loading. Cast iron shoe or slipper guides must be mounted on top and bottom of the car frame to engage the guide rails. The crosshead must be of sufficient strength to lift the fully loaded car when slung in the centre.

### 3.18. GUIDES

- 3.18.1. Steel elevator guide rails must be furnished to guide the car, erected plumb and securely fastened to the building structure.
- 3.18.2. Sliding Guides: Cast iron guides must be mounted on top and bottom of the car for car speeds up to 1.0 m/s.

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### **3.19. TELEPHONE**

- 3.19.1. An ADA-approved AUTODIAL telephone must be furnished and installed as part of the car station. A separate phone line to the elevator controller must be provided and located in the elevator machine room under another section of the specifications.

### **4. OPTIONAL FEATURES (DELETE ITEMS NOT REQUIRED)**

#### **4.1. PROVISION FOR CARD READER IN CAR (CARD READER PROVIDED AND INSTALLED BY OTHERS)**

#### **4.2. STANDBY BUILDING EMERGENCY POWER GENERATOR OPERATION**

[Select one of the following]

**Automatic – able to run all elevators simultaneously**

**Manual – selective lowering and running of elevators**

#### **4.3. BATTERY POWERED EMERGENCY LOWERING OPERATION**

#### **4.4. OIL HEATER**

#### **4.5. OIL COOLER**

#### **4.6. PROVIDE EQUIPMENT ACCORDING TO SEISMIC ZONE:**

(Specify appropriate zone for project: **0, 1, 2, 3, or 4**)

#### **4.7. LOBBY PANEL**

- 4.7.1. Provide lobby panel in the central control room. Lobby panel to include for Special Emergency Service Phase I and Phase II, emergency power and one (1) position indicator per elevator.

#### **4.8. NON-PROPRIETARY CONTROLS**

- 4.8.1. Elevating device control equipment must be non-proprietary. If a site specific service tool or on-board diagnostic tool is required to render the control equipment non-proprietary, it must be provided with the elevating device. The tool must allow full access to fault codes and maintenance related parameters and must allow complete and thorough maintenance service to be performed by any properly licensed and qualified Elevator Contractor. The tool must come with a user's manual that also defines and explains all error codes, including required fixes. The service tool must remain property of the building owner.

#### **4.9. PROVISION FOR CARD READER IN CAR (CARD READER PROVIDED AND INSTALLED BY OTHERS)**