

## **14000: CONVEYING SYSTEMS**

### **VARIANCE TO CODE**

No variance to code shall be sought from State prior to written approval from the University. Copies of variances approved by the State shall be provided to the University's Representative within 14 days after release.

### **TYPES OF ELEVATORS**

Provide hydraulic elevators for maximum rise of 50 feet. Use traction elevators for travel distance over 50 feet.

Minimum of one (1) car should be designated as a service/freight elevator.

Stainless Steel or other easily maintained surface is the preferred finish.

### **THEORETICAL TRAFFIC ANALYSIS STUDY**

The Architect shall have the elevator consultant submit to the University's Representative a completed theoretical traffic analysis of the anticipated traffic demands to evaluate the handling demands, based on speed, capacity and type of elevators to be incorporated into the building design.

Analysis results shall be reviewed with the University's Representative during the Schematic Design Phase and before proceeding to Design Development Phase.

### **REQUIRED FEATURES AND PRODUCTS**

Each elevator shall be completely described in the Specifications.

Provide elevators with the following:

- LED digital floor indicator light in car operating panel with arrows.

- LED hall position indicator at main lobby floor only landings. Combine with hall lantern.

- Call buttons at all landings with 100,000-hour LED call button lamps.

- LED hall lanterns at all floors with electronic chimes (one for up, two for down).

- Should car-riding lanterns be required, provide LED type (two each car).

- Braille plates on car and entrance frames. Plates shall be flush-mounted and mechanically fastened from rear on all frames. Provide flush-mounted or incised braille plates on car operating panels.

- Provide handicapped provisions. Specify dimensions and mounting heights in accordance with Title 24 and current University of California at Berkeley Access Requirements.

Earthquake safety devices. Provide, at a minimum, dual ring and string and seismic switch on traction elevators. Provide, at a minimum, power unit tie-downs on hydraulic elevators.

An alarm bell at top and bottom of travel and every two floors in between. Alarm to be different tone from classroom or fire alarms.

Provisions for a telephone with telephone conduit and box in Machine Room. Run conduit and telephone wire to telephone terminal. Provide and install speaker phone as manufactured by Ram Tech, Model No. R2A-S with DA1 and PD, consisting of a combination speaker/microphone, amplifier, automatic dialer, push button to activate system and off hook switch (off button). Provide telephone unit in standard telephone back box with four tamper-proof screws. Phone system shall be operational with wiring from elevator car to the electrical equipment room. Automatic dialer shall be programmed as directed by the University. System shall match existing University Ram Tech system without modification.

Handrail on rear wall of elevator cab. Through 3/8-in. bolt handrail to back of enclosure with 1/4-inch backing plate.

Pad hooks and protection pad for all sides of car interior with sectional cut-outs for operating fixtures.

Heavy-duty door operator. Specify door operator as manufactured by GAL or MAC, no equal. Manufacturer recommended diagnostic tools shall be provided.

Electronic scanning type door protection distributed The Fixture Company, Model FCu 47 Detector Edge, no equal.

Fire emergency service and products of combustion detectors where travel is 25 feet or more.

Best key cylinders for all keyed features with the exception of fireman's service (Best does not make a three-position switch for this feature), to match existing University master keying arrangement; coordinate the Project Manager and Division 8. Provide "Adams" Phase I, and Phase II fireman's service switches. To comply with DSA requirements, car floor buttons or hall call buttons shall not be subject to use of a key type switch to register the call.

Machines shall be either Hollister-Whitney or Atlas. Rollers and guides shall be either ElSCO or Elpro, no equal.

Floor-passing gong. Gong shall operate as each floor is passed per code requirement.

Position indicators shall be manufactured by CE Electronics, ERM, and Adams Elevator Co., no equal.

Certificate holders shall be provided by Nylube Products Co, or equal, and mounted above or adjacent to car opening panel.

Confirm with the Project Manager to ensure that the selected car entrance heights and internal cab heights are suitable for the intended movement of materials that require elevator transportation.

Coordinate miscellaneous metals work relating to elevators including machinery guards, pit ladders, machine room steps, guardrails in raised areas and at hazardous roof door entrances to machine rooms, sump pit gratings, and hoistway screens.

Provide door closers and lockset (that cannot be left unlocked) on access door or doors to Machine Room space.

Security:

When a building security system is incorporated into the elevator operation with use of key switches and card readers, security system shall be arranged to allow elevators to operate as intended by code and allowing fireman's override.

To assure compliance, device shall be tested and witnessed by PP-CS representative within 30 days after elevator has been turned over to University.

## **SUBMITTALS**

Submittals shall include:

Dimensioned shop drawings showing relationship to finishes and structure including hoistway plan, hoistway section, machine room plan, car and entrance details, mechanical and electrical connections.

Product data and finish samples.

Before final payment, the following shall be submitted and provided:

Wiring diagrams: Five copies of both full line and schematic diagrams. Include nomenclature definitions and symbols key.

Five copies of operation and maintenance manuals, parts list, warranty, diagnostic documentation, sequence of operation and manufacturer part numbers

Five additional copies of final approved submittals to the University's Representative.

Wall Holder For Diagrams: Contractor shall mount a complete set of wiring diagrams including a definition of all nomenclature and symbols on the Machine Room wall laminated in clear plastic. The mounting method is to be reviewed by the Project Management and PP-CS Representatives.

Wire Pull Sheets: These are to be left at the Project site and shall become the Owner's property for the purpose of future trouble-shooting.

Listing of Maintenance Materials to be Furnished by Contractor:

Traction Elevators:

Expendable Parts: The elevator contractor shall provide a metal cabinet in at least one machine room on project premises containing the following expendable parts required for prompt replacement. The metal cabinet and the un-expendable parts shall become the property of the University and remain at the end of the 12 months warranty/maintenance period.

Two relays and relay bases of each type installed.

Twenty-four lamps of each type installed.

Car and hall buttons with identical graphics installed; six for manufacturer's standard buttons, one of each type for special buttons.

Twelve fuses of each type installed.

Other parts required for prompt replacement.

One digital LED position indicator and one driver board of each type.

One directional lantern and chime of each type.

#### Hydraulic Elevators:

Expendable Parts: The elevator contractor shall provide a metal cabinet in at least one machine room on project premises containing the following expendable parts required for prompt replacement. The metal cabinet and the un-expendable parts shall become the property of the University and shall remain at the end of the 12 months warranty/maintenance period.

Two relays and relay bases of each type installed.

Twenty-four lamps of each type installed.

Car and hall buttons with identical graphics installed; six for manufacturer's standard buttons, one of each type for special buttons.

Twelve fuses of each type installed.

Other parts required for prompt replacement.

One digital LED position indicator and one driver board of each type.

One directional lantern and chime of each type.

#### **CONTRACT DOCUMENT COORDINATION**

The Contract Documents shall be coordinated to comply with and provide the following items:

Mechanical and Electrical:

Light and GFI electric outlet in pit and machine room.

Machine room lighting intensities.

Electric service sizing to equipment.

Emergency power transfer switch prior signal for emergency and normal power operation.

Elevator disconnects.

Smoke detectors, shunt trips, and heat sensors where required.

Telephone provisions in machine room.

Utility piping or ducts in shaft not allowed.

Utility piping in machine room not allowed.

Adequate machine room ventilation to prevent heat build-up, in accordance with CBC-Chapter 30, Section 3005.1. Limit temperature range to 65 F to 90 degrees F.

Shaft and hoistway ventilation.

Drain or provisions for pump in pit including isolation of accumulated waste.

Emergency telephone in elevator cab.

Provide heat sensors where required.

Provide shunt trip device outside machine room and 120 V supply to operate the shunt trip plunger.

Provide auxiliary contacts in hydraulic elevator disconnect, when using battery lowering.

Provide two-way conversation between car and readily accessible point outside the hoistway, which is available to emergency personnel, with standby power back-up.

Elevator Firefighters Service to override all car security systems.

Electrical lights, switches and convenience outlets located below 4'-0" from floor to be NEMA-4 rated equipment.

Architectural:

Shaft venting per code.

Ceiling height in machine room per code.

Clearance between top of car and roof beam per code.

Stairs (not vertical ladders) for access to, or in, machine room.

Miscellaneous metals shown and specified: pit ladders, screens, sill angles, railings.

Telephone provisions in car.

Vandal-resistant handrails and finishes.

Head, jamb, sill details.

Machine room walls/floor/ceiling and hoistway walls minimum STC rating of 50 at occupied spaces. Fire-ratings per code and guideline requirements.

When provided, locate security card readers recessed into car operating panels.

Structural:

Provide structural supports for guide rails for the full height of each hoistway.

Coordinate with Campus Fire Marshal and other jurisdictional agencies.

## **WARRANTY AND MAINTENANCE**

The elevator company shall provide a one-year warranty including parts and labor and a one-year maintenance period conforming to the requirements of the Campus Elevator Maintenance Requirements.

Warranty and maintenance shall cover elevator equipment and controls.

Contractor shall provide one hour of training to University personnel by qualified elevator adjuster.

Starting time for warranty and maintenance periods shall be determined at time of elevator acceptance in coordination with the University Representative and Division 1.

## **SELECTION OF EQUIPMENT**

For University dormitory and housing, consult with University Representative for minimum rated load requirements for passenger elevators due to student tendency to overcrowd cars.

Selection of traction or hydraulic elevators shall be based on an analysis of long-term cost, speed or quality of service, quietness and availability of machine room space. Selection of equipment shall be approved by University departments PP-CS and the Project Manager.

The Architect shall prepare a vertical clearance diagram indicating travel of the car, top and bottom clearances, height of penthouse and depth of pit, all as related to the building structure. Submit this to the University's Representative for approval before proceeding with Contract Documents.

Controls shall be of the solid-state micro-processor type. Specify controls by Motion Control Engineering, Rancho Cordova, CA, no equal. If field tool is required to service any part of the elevator, the tool and its supporting documentation shall be supplied and become the property of the University. Each system shall incorporate internal diagnostics with CRT and keyboard supplied in locked cabinet.

The disconnecting means for the elevator controller shall be a motor circuit switch rated in horsepower. It shall be fused with current limiting dual element fuses.

Signal fixtures shall be of the vandal-resistant type. Specify fixtures by Adams or ERM-CA-93, Survivor Plus type no equal. Buttons shall be raised 1/8". Provide a Best on-off key switch for each floor in the car-operating panel subject to DSA and CRAB approval of the key switch control of car or lobby buttons.

Cab interiors for classrooms and student housing projects shall be vandal-resistant. Plastic, waffle grid type ceilings should be avoided.

Cab lighting shall be long-life, UCB Standard size, fluorescent lamps with easy access for lamp replacement (screw-base styles acceptable).

The following controls shall be supplied:

Gearless: SCR drive (static drive).

Geared: SCR drive or variable voltage, variable frequency.

Hydraulic: Solid state closed transition starter contactor Y-Delta - 25 horsepower or over.  
Across-the-bore - under 25 horsepower.

## **ELEVATOR PIT DRAINS**

Provide sump with water level sensor, remote warning light, and identification signage for monitoring water for possible polluting liquids.

In hydraulic elevator pits, drainage systems shall conform to code and, have an approved containment device so as to capture and isolate contaminants such as oil and sprinklered water from sanitary and storm drain system.

Install accessible backwater valve if required by elevation of piping.

Provide a GFI - type convenience outlet per code for a portable pump and a 3-inch gravity drain line to sanitary sewer system. Provide cap or plug at wall for pump discharge.

Electrical lights, switches and convenience outlets located below 4'-0" from floor to be NEMA-4 rated equipment.

Flood water discharge from elevator pits and sumps shall comply with requirements and procedures included under Division 15.

Elevator pits shall have waterproofing both interior and exterior. Coordinate with Division 7.

## **EQUIPMENT ROOM VENTILATION**

When an elevator is provided with emergency power operation, the machine room mechanical ventilation is to be provided with emergency power.

See additional requirements for ventilation included in Division 15.

## **ELECTRICAL SERVICES**

The amperage requirements for elevator machine motors, isolating transformers and controllers, require higher full load starting and running currents, and, due to distance from power source, are subject to higher voltage drop. These requirements and conditions shall be considered when selecting and sizing conductors.

Obtain the full load current from the elevator manufacturer. Do not exceed voltage drop limitations.

For motor voltage rating see Division 15.

Provide lights, light switches and GFI convenience outlets in pits and all machine room spaces.

The car lighting and power circuit disconnect to incorporate over current protection.

Provide a continuous grounding conductor from the building ground to the elevator controller/isolating transformer as applicable.

## **CONTROLLER CABINETS**

Relay cabinet doors shall have vertical piano hinges and be capable of key locking.

## **HYDRAULIC ELEVATORS**

Installation of hydraulic elevators shall include:

Manual pit shut off valve in the fluid line between the pump and jack. Provide second shut off valve in machine rooms not directly adjacent to hoistway.

Provide seismic shut off valve in fluid line adjacent to jack to shut off line in the event of a sudden loss of pressure or line rupture.

Oil viscosity control.

Roller guide shoes.

Main line strainer.

Low oil control in the electric control circuit. Discuss the function with the Project Manager.

Provisions for noise reduction such as sound insulating panels, sound isolating couplings in oil lines, oil hydraulic silencer (muffler), and vibration pads.

Cathodic protection system for the jack cylinder, 100 psi, PVC liner with sealed bottom, special backfill, and isolated pipe couplings, as required for a complete installation. See Appendix for standard elevator detail.

Jack cylinder protective coating of two layers of tape wrap or fiber glass, outer casing of 10 gauge steel with 0.20 percent copper content, inside diameter 8" greater than outside diameter of buried cylinders, welded steel bottom or concrete plug.

Provide solid state closed transition Wye-Delta start for 25 horsepower or larger pump motor; all starters heavy-duty horsepower NEMA rated regardless of horsepower. IEC method of rating starters is not acceptable.

Electrically-operated scavenger pump to return oil from cylinder head to tank. Provide 3/8-inch copper tubing for return line. Pumps shall be secured to the pit floor to prevent them from overturning if water enters the elevator pit. Scavenger pumps shall be equipped with an external float device that will render the pump inoperable should the pump become submersed.

Telescoping jacks not allowed.

Auxiliary power lowering device shall be provided that will, upon failure of the main power supply, allow a hydraulic elevator to descend to a lower landing and preventing entrapment of passengers.

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