

SECTION 142100 - ELECTRIC TRACTION ELEVATORS

PART 1 - GENERAL

A. M. S. U. ISSUES

1. In situations where an existing elevator system is being modernized or an elevator is being added to an existing building, application of certain of the following standards may be inappropriate. Such issues should be raised with the M.S.U. project representative when discovered.
2. This standard applies to all electric traction elevators, except that certain exceptions apply only to freight elevators. These exceptions are defined in section 2.8.
3. All new and renovated elevators will be prepared for M.S.U. card access system. This will necessitate the addition of six (6) pairs of shielded wires between the machine room and the elevator itself.
4. No hoistway junction boxes shall be used. Car top junction boxes shall be for only those wires necessary for car top operation, all other wires for the COP run directly without any break in the wires. The 110 ac lighting circuit can be spliced between the car top and the Main COP.
5. Each elevator will contain two control panels. The primary control panel will be mounted in the return panel adjacent to the car door. The auxiliary control panel shall be installed in the handrail on the wall opposite the door. If the elevator has front and rear doors, the auxiliary control panel will be installed in the handrail on the wall on the opposite side of the elevator from the main control panel. See Section 2.7 B. of this document.

1.2 SUMMARY

- A. This section includes electric traction passenger and service elevators.
- B. Related sections include the following:
 1. Division 04 Section CAST IN PLACE CONCRETE for setting sleeves, inserts, and anchoring devices in concrete.
 2. Division 04 Section UNIT MASONRY ASSEMBLIES for setting sleeves, inserts, and anchoring devices in masonry and for grouting elevator entrance frames installed in masonry walls.
 3. Division 05 Section PIPE AND TUBE RAILINGS for railings between adjacent elevator pits.
 4. Division 09 Sections for field painting of hoistway entrance doors and frames.
 5. Division 26 Sections for electrical service for elevators to and including disconnect switches at machine room door. Coordination of emergency power (size and requirements) to be performed by elevator and electrical contractors.

1.3 DEFINITIONS

- A. Definitions in ASME A17.1 apply to work of this section.

- B. Defective Elevator Work: Operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.
- C. Service Elevator: A passenger elevator that is also used to carry freight.

1.4 SUBMITTALS

- A. The elevator contractor shall provide M.S.U. with the following:
 - 1. Three sets each of as-built wiring diagrams, definitions of symbols, etc., for each single elevator, duplex, or triplex.
 - 2. Two copies of recommended maintenance parts lists to be stocked for maintenance.
 - 3. Three sets of standard paint, laminate colors, and metal samples for color, quality evaluation, and approval.
 - 4. One copy of the inspection report required by the State of Michigan, Field Testing Data Report.
 - 5. Any and all tools or devices used to adjust any elevator component will be turned over to the M.S.U. Elevator Shop at the completion of the project.
- B. The requirements in 1.4.A. above apply to each type of elevator. The information shall be sufficiently detailed that a skilled elevator mechanic can maintain and adjust the machines and their control systems.
- C. State Certification of Inspection is required upon completion of the work. All of the above documents and accessories shall be supplied to M.S.U. at the time of the State final inspection. Any changes subsequently made in the field shall be reflected on a new set of as-built documents provided to the owner within 30 days after final inspection.

1.5 QUALITY ASSURANCE

- A. Comply with ASME/ANSI A17.1 – Safety Code for Elevators and Escalators, most current edition as adopted and amended by the State of Michigan Bureau of Construction Standards in “Elevator Laws and Rules”; as well as rules and regulations promulgated by the State Elevator Safety Board.
- B. Installer Qualifications: A State of Michigan licensed elevator mechanic who is trained and approved for installation of units required for this project.
- C. Accessibility Requirements: Comply with Section 4.10 in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)" and the latest ICC/ANSI A117.1 standards to allow for barrier free accessibility of mobility and physically impaired users.
- D. All equipment will be U.L. labeled as required by the State inspecting agency.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle materials, components, and equipment in manufacturer's protective packaging.
- B. Store materials, components, and equipment off of ground, under cover, and in a dry location. Handle according to manufacturer's written recommendations to prevent damage, deterioration, or soiling.

1.7 COORDINATION

- A. Coordinate installation of sleeves, block outs, elevator equipment with integral anchors, and other items that are embedded in concrete or masonry for elevator equipment. Furnish templates, sleeves, elevator equipment with integral anchors, and installation instructions and deliver to project site in time for installation.
- B. Coordinate emergency power requirements, where applicable, between elevator and electrical contractors.
- C. Coordinate sump pump discharge line location to prevent conflicts with elevator maintenance contractors.
- D. Coordinate with the fire alarm installer for installation of the smoke detectors in the elevator lobbies, machines rooms, and hoistway to meet applicable fire and elevator codes.

1.8 WARRANTY

- A. Special Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to repair, restore, or replace defective elevator work within specified warranty period.
 - 1. Warranty Period: One year from date of project acceptance. Any elevator controller requiring repair or replacement within the initial 365 day warranty period due to reoccurring problems resulting from faulty original design or installation shall cause the warranty to be extended 365 days from the date of correction.

1.9 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at acceptance of the project, provide 180 days full maintenance service by skilled employees of elevator installer. At least twice a month (biweekly), inspect the total installation accompanied by an IPF employee from the Elevator Shop. Full service shall 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. Provide parts and supplies that are the same as those used in the manufacture and installation of original equipment. The 180 day warranty period shall be extended until a total of 12 biweekly visits have been provided.
- B. It is the responsibility of the MSU IPF Elevator Shop to respond to any emergency regarding elevators. In the event that someone is trapped in an elevator that is under contracted warranty,

the IPF Elevator Shop will respond to free the passengers as soon as possible to minimize the inconvenience to students, staff or guests of the University. The elevator installer shall be called to repair the elevator at that time and any information that is needed will be provided to them. During the warranty period it is the right of the MSU IPF Elevator Shop mechanic, a mechanic licensed by the State of Michigan and employed by the University, (thereby allowing no claim of breached warranty in these incidents) to remove covers, open doors, to install monitoring and/or security equipment..

1. Include 24-hour-per-day, 7-day-per-week emergency callback service with response time of two hours or less.

C. The maintenance service described in 1.9.A. above shall be at no additional cost to M.S.U.

PART 2 - PRODUCTS

2.1 INSTALLER

A. Installers: Subject to compliance with manufacturer requirements, provide installation by one of the following:

1. Detroit Elevator Co.
2. KONE Inc.
3. McNally Elevator Co.
4. Otis Elevator Co.
5. ThyssenKrupp Elevator.

2.2 SYSTEMS AND COMPONENTS

A. General:

1. All elevator equipment shall be the manufacturer's best equipment designed for a minimum service life of 30 years. Passenger elevators shall be the manufacturer's standard sizes and speeds.
2. Minimum speeds shall be manufacturer's nearest minimum standard: Electric Traction – 350 feet per minute (fpm).
3. On existing equipment, maintain current minimum speeds.

B. Hoistway:

1. The general contractor shall exercise care in construction of the hoistway to ensure that ¼” out of plumb allowable tolerance is not exceeded.
2. All projections in wall surfaces exceeding 2” shall be beveled not less than 60 to 75 degrees from horizontal. Omit bevel on beams between elevators in the elevator shafts.
3. Provide one 100W fluorescent light with protected dust proof cover at each landing within hoistway. Put three way switches at top floor and bottom floor.

C. Pit:

1. Provide two 100W lights, one 110V GFI duplex outlet, one light switch at pit entrance, lower limit switch, steel ladder, buffers for car and counterweight, counterweight guard, upper or lower stop switches. Exact locations shall be verified by the elevator contractor and be acceptable to the State Elevator Inspector.
2. Provide one ladder per elevator in each hoistway. The ladder shall be furnished and installed by the elevator contractor in a location acceptable to the State Elevator Inspector.
3. Provide a concrete dry sump and steel cover grate in the elevator pit, of a minimum 20 gallon capacity and the steel grate able to support a 500-lb load. Slope the pit floor at 1/4" per foot toward the sump. When required, provide a sump pump and related piping to comply with the elevator code. Install a check valve and shutoff valve on pump discharge, as close to the pump as possible. Discharge through an air gap into a waste receptor.
4. Provide a moisture sensing device in the pit that will prevent the elevator from answering a car or hall call upon activation of the device.

D. Machine Room:

1. Provide an elevator machine space of sufficient size to conform to elevator code and manufacturer's requirements.
2. In an elevator machine room, provide a minimum of 75 foot-candles of lighting to illuminate all sides of elevator equipment.
3. The door to the machine room or gate to the wire cage shall be self-closing and self-locking, operable from inside without a key, and from outside with a 7 pin Best cylinder key only. The door shall open out.
4. Provide environmental conditions in the machine room to maintain ambient temperature from 55 degrees F to 85 degrees F. Filter all incoming air. Provide screens as necessary to keep insects out, and louvers to prevent rain from entering.
5. Provide clearance around the elevator equipment in the penthouse or machine room in accordance with the National Electrical Code. Separate elevator equipment and utility services, including lights, fire detector, and annunciator panel, from all others of the building by use of a separate room or a wire cage within a room of restricted access. The maximum distances between hoistways and machine rooms are defined by code.
6. Any costs for changes in the building structure or machine room layout necessitated by the proprietary nature of a specific elevator manufacturer's equipment shall be assumed by the manufacturer requiring the change, and included in his bid.
7. The elevator machinery and control panel shall be in the same room at the same level.
8. Two elevators with duplex control shall have their control panels in the same room. If the design of an existing building being renovated makes this impossible, a monitor showing the other car's status shall be installed in each machine room. A portable monitor is acceptable.
9. Provide a storage cabinet in the machine room to house documents, spare parts, special tools, etc. The cabinet shall be Grainger model 1UFD3.

E. Firefighter Services – Smoke Detectors:

1. Firefighter's service shall be installed in each elevator or group of elevators.
2. The key switches in the hall and in the car shall operate using the FEO K1 key and switch.
3. The alternate landing shall be designated by M.S.U.

4. Smoke detectors will be provided by either the Fire Alarm contractor on the project or the MSU IPF Safety and Security department who will also provide the elevator installer with the required number of dry contacts from the building fire alarm system to meet the elevator code requirements.
5. The elevator contractor shall provide an indicator panel which will show the smoke detectors status when in alarm. This panel will be installed by either the Fire alarm contractor for the project or the IPF Safety and Security department and will be placed next to the buildings fire alarm control system.
6. Smoke detectors shall be installed by the elevator contractor as required by applicable state and national codes. The elevator contractor shall use Gentex Model 8240, which is a 24VDC detector the voltage used on the contacts of the detector shall be 24VDC also. The alarm contact of the detector will be wired into the elevator controller, the auxiliary contact shall be used to send a signal to an annunciator panel showing each detector in the system, and each individual detector, which has been activated. The elevator contractor shall furnish the annunciator panel and install it where designated.

F. Electrical Service:

1. Unless specified otherwise, elevator electrical service shall be based on the existing building electrical service. New buildings shall provide 480V/3 phase/60hertz service.
2. For new construction and for renovations, ensure that a ground for the elevator system is provided to the building ground, in accordance with the National Electrical Code and as recommended by the manufacturer.
3. All wiring shall be done in metal conduit, metallic tubing, wire ducts or raceways, except to movable apparatus, which shall be connected by short lengths of flexible conduit in an approved traveling cable. Hoistway wiring shall be stranded copper wire.
4. All receptacles shall be GFI, except the receptacle for the sump which shall have its own dedicated circuit, in the pit.
5. Provide a properly sized and labeled fused disconnect switch with time-delay fuses for each elevator, located near the machine room door, inside the machine room.
6. Provide one Category 5e cable to each controller from nearest network closet.

G. Gearless Hoisting Machine

1. The machine shall be a Permanent Magnet, Synchronous design, AC gearless traction elevator machine.
2. The traction driving sheave and the brake drum shall be mounted to the motor shaft. The machine will be mounted to a structural bed plate of sufficient design for compliance with ASME A17.1 code requirements.
3. The machine shall be totally enclosed, self-cooling without the use of auxiliary fans for cooling.
4. The demountable drive sheave shall be cast form from the best grade of hard cast iron, semi steel or cast steel of approved composition and shall be machined with grooves, providing maximum traction with a minimum of cable and sheave wear. The surface of the sheaves shall be tested individually for hardness and the actual hardness to be plainly stamped next to the grooves on the sheave rim, the hardness must measure between 220 and 240 on the Brinell scale.
5. The motor shall be designed for the elevator service. Motor shall be one hour rated, class F insulation as specified by the elevator controller manufacturer.
6. The brake shall be a spring applied and electrically released electromechanical brake. It must be designed as to be effective to the extent of stopping the car during and

emergency stop and holding the car under all conditions of loading or unloading operations. The brake shoes shall be applied to the braking surface of the drum simultaneously and with equal pressure by means of the compression springs. The brake and its components shall be designed to hold 125% of the elevator rated load. An emergency rope brake shall be provided when called for under the A17.1 elevator code.

7. The gearless hoisting machine shall be placed directly over the hoistway or beside it if it is a basement type installation upon structural steel members fabricated into a rigid bedplate designed to minimize deflection. The bedplate shall rest on isolation pads of proper density to effectively isolate the machine from the building structure to minimize noise carried into the building.
8. The exposed surfaces of the gearless hoisting machine not including the brake drum or rope grooves on the traction sheave, the bedplate, and the governor shall be painted with a rust resisting gloss gray color enamel paint after installation.
9. Accepted manufacturers of the gearless hoisting machine shall be Imperial Electric or Hollister Whitney.

- H. Safety and Governor: Provide car safety on bottom of car and governor at top of traction hoistway in accordance with code, to apply car safety devices whenever the car has excessive speed. Both will be by Hollister-Whitney Elevator Corporation.
- I. Buffers: Provide size and type buffers for car and counterweight in accordance with ANSI A.17.1 code requirements.
- J. Guide Rails: Guide rails for elevator car shall be machined steel, minimum 16 lb. per foot, t-type style, fabricated and installed in accordance with ANSI A.17.1.
- K. Car Frame and Platform: Welded steel units. Use platforms that reflect industry standard size for cars, depending on elevator type, use, and speed. Refer to National Elevator Industry, Inc. (NEII) "Building Transportation Standards and Guidelines", latest edition. Use Hollister-Whitney Elevator Corporation frame and platform.
- L. Guides: Guides shall be roller type on car and counterweights, with six inch minimum diameter car rollers and 3 ¾" minimum diameter rollers on counterweight. Provide rollers for speeds in excess of 50 fpm. The manufacturer shall be Hollister-Whitney Elevator Corporation or ElSCO, Inc.

2.3 OPERATION SYSTEMS

- A. Provide a control system manufactured by Motion Control Engineering (MCE) for each elevator or group of elevators, as required to provide single or group automatic operation of the type indicated as follows, and as defined in the Code as "Operations".
1. Single Elevator Control: Selective Collective Automatic Operation, as defined in ANSI/ASME A.17.1; or
 2. Two-Car Group Control: Group Automatic Operation, as defined in ANSI/ASME A.17.1; or
 3. Multiple-Car Elevator Control: Provide automatic dispatching of selected cars in a regulated sequence in response to hall calls; and with automatic response of system to changes in demand for different traffic conditions.
 4. Any other control system must be approved by M.S.U.

- B. Microprocessor controller power units shall include all diagnostic equipment required to identify malfunctioning processor units, and shall be non-proprietary so that service may be performed by M.S.U. maintenance staff.
- C. Provide all controllers with Central Monitoring System (CMS) capabilities, including all software, firmware, and communication parts, and the ability to print out data, along with black box unit cable and hook-up of monitor to ethernet connection.
- D. Emergency (Standby Power) Operation:
 - 1. In every building that has an emergency generator; one elevator shall operate on emergency power with all normal functions, preferably the one nearest the main entrance.
 - 2. When emergency power is detected, all cars shall sequentially return to the level designated by the owner, one elevator at a time, and remain there with doors open. While each car is being returned, all other cars shall be shut down so as not to overload the emergency power generator. Once all cars have been returned to the designated level, one car may be selected automatically by the group system to run under emergency power. The automatic selection may be overridden through manual selection with a switch located at the point indicated by the M.S.U. Project Representative. The actual number of cars allowed to run under emergency power shall be a pre-programmed value, not to be exceeded.
- E. For all passenger elevators, a platform load-weighing device shall be provided which shall be set to a predetermined fixed percentage of load. The car shall bypass all hall calls when the device is activated, or shall cancel all travel when load limits are exceeded.
- F. For passenger elevators with six stops or more, an anti-nuisance feature shall be provided which will reset car buttons and require re-registration if an excessive number of calls are requested for the measured load or a load weighing device detects no load.
- G. The elevator shall be provided with an MCE LS Quad System automatic leveling device which will bring the car to a stop within 1/8 inch of the landing level regardless of load or direction of travel. The landing level tolerance will be maintained irrespective of the hoistway doors being open or closed.

2.4 DOOR CONTROLS

- A. Passenger Elevators:
 - 1. A closed loop, door operator controller shall be furnished and installed, designed to operate the car and hoistway doors simultaneously, at a maximum speed of two feet per second. Door movements shall be electrically cushioned at both limits of travel and the door operating mechanism shall be arranged for manual operation in the event of power failure. Direct-drive geared operators or AC-controlled units with oil checks, are not acceptable.
 - 2. Replace safety edges and safe-way devices with new Adams Gatekeeper 2000 infrared curtain unit with auxiliary photo-eyes. The infrared sensor system shall be full height on the leading door edge and opposite jamb, to form a complete curtain effect.
 - 3. Manufacturer will be Motion Control Engineering Inc. SmarTraQ or GAL Manufacturing Corp. MOVFR.

2.5 CAR ENCLOSURES

A. General

1. Provide car enclosure constructed of steel shell panels of 16 gauge leveled cold-rolled steel. Include ceiling, car doors, entrance framing and doors.
2. Access panels from the car to the hoistway shall be provided on all cabs. Panels shall be located on the top of the cab and shall be secured in a manner acceptable to the State Inspector.
3. Provide a permanent inspection station in the top of the car for inspection and maintenance. Provide a 20A, 125V duplex GFI receptacle and two incandescent lights with guards, with a standard light switch on top of each cab and also underneath each cab. The inspection station shall have a control fixture with continuous pressure buttons for up and down. The fixture will have an emergency stop button, a toggle switch to make the control operative, and a fire jewel.
4. One elevator in each building which serves all floors will have a minimum depth or width of 6' 8". Single slide doors or center opening with two speed doors shall be used for this elevator. Center opening doors shall be used on additional passenger elevators. Door heights and inside clear cab height should be kept as high as possible. Industry standards will apply.
5. In new construction, elevator service shall be provided to the mechanical penthouse.
6. Provide hooks and protective padding for each wall not having a door. Check with M.S.U. Project Representative for number of pads required.
7. Preferred elevator finishes are stainless steel satin finish or plastic laminate over medium density particleboard. All new interior painted surfaces shall be a gloss baked-enamel selected from the manufacturer's standard colors. Ceilings will be painted white.
8. Furnish an exhaust fan to circulate air through the car enclosure into the hoistway, minimum 100 CFM.
9. Provide 110v duplex GFI receptacles on the wall of the cab 18" from the finished floor and below the control panel, on the car top, and in the machine room and pit. Receptacles to be Hubbell #5362 with stainless steel plate.

B. Materials and Finishes: Provide manufacturer's standards, but not less than the following:

1. Subfloor: Underlayment grade, exterior plywood, 5/8-inch nominal thickness.
2. Floor Finish: Furnish and install a minimum .08 inch seamless resilient non-slip vinyl or rubber.
3. Stainless-Steel Wall Panels: Flush hollow-metal construction; fabricated from stainless-steel sheet.
4. Plastic-Laminate Wall Panels: Over the car walls, the interior wall panels shall be removable, with vandal-proof connections, minimum 5/8" thick medium density particleboard panels faced with smooth surfaced (non-textured) plastic laminate, self edged. Plastic laminate (HPDL) shall meet or exceed NEMA Standard LDI-1964 for Type 1, 1/6", high-pressure general-purpose laminate. The reveal will be Type 304 stainless steel. Provide SS-304 continuous channel above each panel for pad hooks.
5. Fabricate car with recesses and cutouts for signal equipment.
6. Fabricate car doorframe integrally with front wall of car.

7. Stainless-Steel Doors: Car and hoistway doors shall be reinforced hollow metal with interior and exterior faces of 5WL textured, 16-gauge, type 304 stainless steel. Cove fixtures to be T-8 compatible.
8. Lighting: Use cove lighting on each side of car. Do not use egg crate type ceiling.
9. Handrails: Handrails shall be 3/8" thick plate or 1 1/2" wide by 8" high, of minimum 16 gauge, 304 stainless steel, number 4 finish. Ends of rails shall be returned to the walls of the car within 3" of the corner. The handrail nearest the COP shall stop short of the corner as to not interfere with the opening of the hinged COP cover.

2.6 HOISTWAY AND PASSENGER CAR ENTRANCE

A. General:

1. The entire front wall of the hoistway shall be left open or a rough opening provided which is 12" greater in width and 6" greater in height than the finished opening, until after entrances are installed.
2. After guide rails are set and aligned, the entrance frames shall be installed in perfect alignment with the guide rails. Finished wall shall then be completed.
3. Provide mechanical means for release of all landing hoistway doors to enable emergency hoistway access.
4. Hoistway access with 7 pin Best cylinder keyed access switch shall be provided at top and bottom landings as required by code. Do not group the access switches together with the hall push button panels.

B. Materials and Fabrication:

1. Doorframes shall be minimum 16 gauge Type 304 stainless steel. When re-using existing painted frames, strip and refinish with HVLP painting method.
2. For each sliding door, furnish and install sheave type two-point suspension hangers and tracks complete, by GAL Manufacturing. Sheaves shall be a minimum of 3 1/4" in diameter, and have polyurethane tires with ball bearings properly sealed to retain grease. Hangers shall be provided with an adjustable slide to take the up-thrust of the doors. Tracks shall be drawn steel shapes, smooth-surfaces and shaped to conform with the hanger sheaves.
3. The bottoms of the doors shall be guided by nonmetallic shoes in smooth grooves in the thresholds of the cars and landings. Thresholds shall be nickel silver.
4. For painted doors, provide and install Type 304 stainless steel kick plates on the exterior of doors, minimum 10" high and full width, and wrapped around the edges of the doors to the interior side of door.

2.7 SIGNAL EQUIPMENT

A. General:

1. All wiring shall be installed in rigid conduit, flexible conduit or electrical metallic tubing (EMT). All wiring shall have flame retarding, moisture resistant insulation.
2. Voltage shall be 48 volt AC. All lighted features shall be LEDs.
3. Provide and emergency alarm bell in accordance with ANSI A-17-1. Locate the bell on the top of each elevator cab.

4. A keyed switch shall be provided at the car control panel that will remove a car from group and/or normal service and place it under manual control of an operator. The switch will have a 7 pin Best cylinder with a construction core on the Blue- or Pink-Face system.
5. Provide hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled.
6. Each main car operating panels shall have a standard lighted red jewel to indicate when the firefighter's feature/emergency return has been activated. Jewels shall also be located in the hall emergency service switch, and at the car-top inspection station.
7. The state operating certificate will be on file at M.S.U. Physical Plant Elevator Shop. Each car operating-panel shall be etched or engraved with the State serial number, capacity, number of passengers as certified by the State Inspector and the following: "Certificate of Operation on file at M.S.U. Physical Plant Elevator Shop".
8. Elevators with landings at penthouses, mechanical rooms, and/or other restricted areas shall be prepped (by contractor) for security card access system (installed by MSU).
9. All panel covers shall be hinged to provide proper access, with the cover held in place with stainless steel tamper-proof screws.

B. Car Control Stations:

1. The car operating-panel shall be by PTL Manufacturing, Inc. or Innovation Industries, Inc. It will be mounted in the return panel adjacent to the car door. In addition to the buttons indicated below, it shall also include arrows indicating direction of travel, and a position indicator to indicate current location.
2. The car operating panel shall include the following public-operated push buttons:
 - a. One button for each floor.
 - b. Door open (including side or rear door as applicable).
 - c. Door close (including side or rear door as applicable).
 - d. Emergency stop prepared for 7 pin Best cylinder installed by M.S.U.
 - e. Alarm.
 - f. Phase 2 in-car switch for fire service.
 - g. Car call cancel button.
3. The top public-operated button shall be at a maximum of 48 inches above the floor, and the bottom public operated button shall be at 33 ½ inches above the floor. The panel shall be installed at least 24 inches from any corner of the car, unless a barrier free panel is provided to satisfy this requirement. The floor buttons will light when pressed and maintain on until the floor is reached. Tamper-proof tactile words, numbers, and Braille denotations will be provided adjacent to each button. All public-operated buttons shall be flush or raised.
4. The car operating panel shall include the following maintenance personnel operated switches.
 - a. Independent operation.
 - b. Lights on/off.
 - c. Fan on/off.
 - d. Inspection Access on/off.
 - e. Provision for a security card reader, i.e. a Lexan window with mounting behind it for a security card reader. MSU will furnish and install the card reader.
5. The top maintenance personnel operated switch shall be at a maximum of 60 inches above the floor. These switches shall be independently key-operated with 7-pin Best interchangeable core and cylinder, with a construction core on the Best Blue- or Pink-Face system.

6. Provide and install an auxiliary control panel as part of a new 8-inch handrail for handicapped passenger operation. It will be installed on the wall opposite the elevator door. If the elevator has front and rear doors, the auxiliary control panel will be installed on the wall on the opposite side of the elevator from the main control panel. It shall include the following pushbuttons:
 - a. One button for each floor.
 - b. Door open (including side or rear door as applicable).
 - c. Door close (including side or rear door as applicable).
 - d. Alarm.
 - e. Auxiliary control panel buttons shall be arranged horizontally, with the floor buttons on the top row arranged from left to right. Other buttons will be on a second row. Orient button designations to be read vertically. All public operated buttons will be raised or flush.
 - f. The centerline of the bottom buttons shall be at 33 ½ inches above the finished floor, with the top buttons not more than 40 inches above the finished floor. The pushbuttons will light when pressed and maintain on until the floor is reached or the function is complete. Tamper-proof tactile words, numbers and Braille denotations shall be provided adjacent to each button.
7. Emergency Communication System: Provide and install a vandal-proof telephone in each elevator car integrated in the Main COP, connected with the on-campus telephone system, in accordance with code.
 - a. The telephone shall have an FCC registration number, be compatible with the University telephone network, and be dual tone multi-frequency signal type. Operating instructions shall be in English and Braille. Operating button height shall be 48 inches above the cab floor.
 - b. The emergency telephone shall be programmable in the field, be initially programmed to call the campus operator, and be assigned a number for incoming calls.
 - c. The telephone shall be Model TELE-0002N as manufactured by GAL Manufacturing Corp., 50 East 153rd St., Bronx NY 10451.
 - d. Location of telephone will be determined at time of installation.

C. Hall Stations

1. Call Station: Provide a vertical station with call buttons indicating up at bottom of landing, down at top of landing, and up and down at all intermediate landings. All buttons shall be lighted momentary contact type. Elevator call buttons must be centered at 42 inches maximum above the floor and in compliance with ADA. Tamper-proof tactile words and Braille denotations will be provided adjacent to each button. Install only one set of call buttons per landing.
 - a. Hall station(s) shall be by PTL Manufacturing, Inc. or Innovation Industries, Inc.
 - b. On main egress floors, provide a fire service key switch by Adams Equipment WD 01 within main floor fixture. Engrave, etch, or emboss fire service instructions on the fixture cover.
 - c. On all hall fixtures etch "IN CASE OF FIRE USE STAIRS".
2. Position Indicator: Provide 2" in height segmented LED type by CE Electronics lighted indicators, capable of 2 digits or symbols plus an arrow, above or beside the hoistway doors at all landings, to show location of the car in the hoistway. Mechanical indicators are not acceptable. Voltage shall be 48 V AC.
3. Hall Lanterns: Provide direction lanterns at each landing or traveling lantern in each car doorjamb, visible from the hall call button, combined with the position indicator, to show

direction of travel and car location. This must comply with ADA. Voltage shall be 48 V AC.

4. Provide and install car identification tags for all floors per code.

D. Corridor Call Station Pictograph Signs: Provide 2 inch high raised Arabic numeral metal signs at each landing to indicate floor of landing. Mount signs to be visible from inside the car, on the entrance frame 60 inches above the floor on both sides of the door opening. Provide 1-inch tamper-proof Braille denotations next to each raised numeral sign.

2.8 FREIGHT ELEVATORS:

A. Freight or service elevators shall comply with these standards except as modified or superseded by applicable codes or this section.

B. Vertical car doors and hoistway doors shall be hollow metal only. Each door shall include a wired safety glass light of at least 144 square inches, with the car door light and hoistway door light in alignment.

C. Power operated doors shall have high quality operators by The Peelle Company.

D. Provide an electronic edge by The Peelle Company, designed for bi-parting doors.

E. Provide and install a notice as follows: "Freight Elevator is for Use by Authorized Operators Only." Use 2-inch Helvetica letters, white on red background, engraved plastic, adhesive-mounted next to each hoistway entrance at 60 inches above the floor.

F. The maximum height for control button or switch is 60 inches above the floor.

G. Sills shall be of truckable quality. For side slide doors, the sill shall be nickel silver.

H. Platforms shall be steel. Stainless steel diamond plate shall be used for the floor and for the walls up to 42" from the floor. Brushed stainless steel shall be used above 42".

2.9 PROTECTION

A. Temporary Use: Upon arrangements with the general contractor, the elevator contractor shall provide, install and maintain elevators for temporary use. Elevators shall be protected against damage and shall be completely repaired and cleaned before acceptance by the owner. The general contractor shall pay the cost of all work, repairs, etc., required to satisfy this requirement.

END OF SECTION 142100