



DESIGN GUIDELINE 140000

CONVEYING SYSTEMS – GENERAL REQUIREMENTS

Scope

This section defines general requirements for various conveying systems. Refer to individual Division 14 sections for additional requirements.

Consult with the U-M Design Manager for project specific requirements.

Related Sections

Design Guideline Sections:

5.6 [Parking Structures](#)

[DG 101400 Signage](#)

U-M Master Specification Sections:

7.0 MS142123 – [Electric Traction Passenger Elevator](#)

7.0 MS142423 – [Hydraulic Passenger Elevator](#)

7.0 MS144200 – [Wheelchair Lift](#)

7.0 MS146000 – [Hoists and Cranes](#)

Design and Installation Requirements

Preferred Manufacturers and Sub-Contractors

Refer to individual Division 14 Specification Sections.

Operation and Maintenance

On the Ann Arbor Campus, all conveying systems discussed in this section (except as noted) are operated and maintained by the Plant Operations Elevator Shop (734-647-2059) which can be contacted for specific maintenance records, for inspection information or access, and for renovation or replacement recommendations. Most general fund buildings are maintained directly by the Elevator Shop. The elevators at the U-M Hospital are covered under a maintenance contract with an outside contractor, with limited oversight by the Elevator Shop.

The Elevator Shop shall be consulted during the design of all conveying systems, and should assist with review of shop drawing submittals, and O&M manuals for conveying systems.

Inspection and Licensing Requirements

Most conveying systems in the State of Michigan discussed in this section are inspected and certified by the State of Michigan. Refer to 1. Codes and Regulatory Agencies.

Elevators -

Definition

Passenger/service elevators with horizontally sliding door typically for general use of all types, including cars, entrances, controls, safety equipment, and elevator machinery.

Freight Elevators include vertically sliding bi-parting doors with automatic power operation used for transporting food and other equipment.

Application

Passenger elevators are preferred over freight elevators in almost all cases, including "service" applications, where users expect to be moving trash, equipment and materials in the elevator on a regular basis.

Requirements of Regulatory Agencies

Perform all work in accordance with applicable codes, the State of Michigan Elevator Code, the National Electrical Code, and the American Society Mechanical Engineering Code for Elevators, ASME A-17.1 (latest edition accepted by State of Michigan). All tests shall be made in the presence of the authorized representative of such authorities and the Owner's representative.

Comply with U-M Barrier free Elevator Guidelines attached herewith.

Design and Construction Method

The delivery method for elevators specifies installation of specific non-proprietary components with which the University has a successful track record. Installation is done by a pre-qualified **elevator installation contractor**. Installation of "elevator manufacturer's standard" elevator is not acceptable. Refer to Master Specification Sections 142123 and 142423.

Non Proprietary

The non proprietary delivery method shall be evaluated by the design team. A non proprietary elevator allows for maintenance to be done by the elevator shop or an authorized elevator repairman. The components do not require specific manufacturer knowledge or tools for repair. Non proprietary elevator applications may have a higher purchase and installation cost. This higher installation cost may be offset by lower long term maintenance costs.

Proprietary

The proprietary delivery method shall be evaluated by design team. A proprietary elevator is limiting in that only the manufacturer may service the installed elevator and may require special knowledge for repair. Typically a proprietary elevator is purchased with an ongoing

maintenance plan for a specific term. Service by the Elevator Shop is limited. Consideration should be given to lifecycle cost for installation. A smaller up front purchase and installation cost may be outweighed by the long term maintenance contract requirements. Business units considering this application may consider the impact to their annual maintenance budgets versus original construction costs.

Selection of Type of Equipment

Building end use shall determine elevator type traction or hydraulic. Design Professional to evaluate and provide documentation to support decision. Choice shall be included in BOD and OPR documentation,

For Rise Up To 45 Feet: Select hydraulic or traction type elevator machine. Specify a dry pumping unit. That is, the pump, motor and valves should not be located in the hydraulic reservoir. (Note: Piston stabilizers not allowed)

For Rise Above 45 Feet: Select electric traction elevator machines.

Elevator Speed

Electric Traction Elevators Passenger/Service

- Minimum: 200 ft/min.,
- Maximum: 350 ft/min.

Electric Traction Elevator Freight

- Minimum: 200 ft/min.
- Maximum: 350 ft/min.

Hydraulic Passenger

- Minimum: 100 ft/min.
- Maximum: 150 ft/min

Roped Hydraulic

- Minimum: 100 ft/min.
- Maximum: 150 ft/min.

Hydraulic Freight

- Minimum: 100 ft/min.
- Maximum: 150 ft/min.

ElevatorControl/Controller

For both hydraulic and electric traction elevators: Specify non-proprietary microprocessor controls. Specify remote diagnostics shall be compatible with existing U-M system.

Elevator Type: Traction vs. Hydraulic

Hydraulic elevators are often less expensive than electric traction elevators, and don't require an elevator machine room above the hoistway, and are therefore often preferred by AEs.

However, there are limitations and drawbacks to their application. Traction elevators should be installed in lieu of hydraulic elevators where any of the following apply:

- Where total travel exceeds 45 feet.
- High volume applications, where speed of travel is a high priority

Elevator shaft, lobby and machine room location considerations:

Location: Coordinate with the Architect for location in the building for optimum service for the building. elevators should be near stairs

Security: Provide access control at building doors, not with card readers at the elevator landings or in the elevator cars. For security, locate the elevator within the building's access controlled area.

Access to mechanical rooms/ penthouse: Provide access to mechanical rooms/penthouse or basement via a controlled lobby with stair access and a locked keyed to mechanical room in penthouse or in the basement.

Roof access and lighting: Provide a safe access and path from roof access to the elevator machine room.

Elevators Air Lock: An air lock or transition chamber for controlling air pressure during ingress and egress from a multistory building (10) the interior of which is at an elevated air pressure.

Machine Room

Machine Rooms: Elevator machine room may be located overhead, basement or adjacent to hoistway for traditional traction or hydraulic. For machine room less (MRL) it shall be located at the top of the hoistway. The electric driving machine shall be located in a machine space within the elevator hoistway (MRL) or outside the hoistway in an elevator machine room.

Control spaces, and Control rooms: A controller shall be accessible only from a machine room, control room.

Machine/Control Room Lighting: Fluorescent lighting with guard shall be provided in the elevator machine room. Lighting shall be positioned so it does not create shadows while

service personnel are working on major equipment. Minimum of 19 foot candles measured at floor level at any point in the machine room.

Fire Extinguisher: appropriate classification shall be 15 pounds for a fire extinguisher. Mount on the wall of elevator machine room near main entrance.

Machine/Control Room Door: Appropriately fire rated labeled self closing, self locking door.

Machine Room/Control Rooms Door Hardware: Keyed to U-M BEST "ZV" key system.

Elevator Machine Room/Control Rooms Painting: Paint elevator machine room floor with light gray gloss oil based paint. Paint elevator machine room walls and ceiling with white semi-gloss latex paint.

Elevator Machine Equipment: Paint elevator machine light gray with zinc primer paint

Hoist beam: In the elevator machine room above the machine. Size shall be suitable for largest live load.

HVAC: Machine rooms for traction and hydraulic elevators require HVAC systems to maintain temperature between 50F and 95F. System must be capable of operating 24/7/365. Size system for full load (building skin and internal loads, including oil cooler for hydraulic elevators). Ductless split system is generally preferred.

Vents: Many existing, older traction machine rooms include a floor vent that communicates directly with the hoistway. Where found, remove vents and provide 2-hour rated separation in its place.

Area of vents: The area of vents shall not be less than 3.5% of the area of the hoistway nor less than 3 square feet. Control damper with heat sensing.

Pressurization: The elevator machine room serving a pressurized elevator hoistway shall be pressurized upon activation of heat or smoke detector located in the elevator machine.

Plumbing and Mechanical systems: Pipes or ducts conveying gases, vapors or liquid and not used in connection with elevator operation shall not be used in the elevator machine room or hoistway.

Elevator Machine Room Access/Machinery Space: An approved means of access shall be provided to elevator machine rooms and overhead machinery spaces. Access to machine rooms shall not be through restrooms, locker room or associated vestibules. Direct access from a public corridor is strongly encouraged.

Isolation Transformer: Provide isolation transformer per elevator controller manufacturer's recommendation.

Machine Room Less Elevators (MRL)

Control Room Location: The control room shall comply with the code and manufacturer requirements.

Communication: Two-way visual communication shall be installed between the car and the control room. Car position, movement, location and direction shall be monitored from the control room.

Other equipment: No other equipment is allowed in control room.

Signage: A permanent sign shall be placed on the door that will read "MRL ELEVATOR CONTROL ROOM". The letter size shall a minimum of 3/4 " and shall be of contrasting color with that of the background.

Main Floor Signage: A permanent sign shall be mounted on the head jamb of the main floors entrance which shall read "MRL-CONTROL ROOM LOCATED ON _ FLOOR". The letter size shall a minimum of 3/4 " and shall be of contrasting color with that of the background

Working Clearance: A working clearance of at least 3'-6" shall be maintained in front of the elevator controller at all times with the control room door closed.

Disconnect Switch: A heavy duty disconnect switch shall be installed in the control room and in the hoistway within sight of the elevator driving machine and shall be designed so that it can be locked out and tagged out in the open position. When activated, it shall cause power to be removed from the driving machine and brake. It shall also be designed to open a contact in the stop position switch circuit and render the elevator inoperative.

Other Control Room Disconnect Switch and Receptacle: See electrical requirements.

Ventilation: The control room and hoistway must be vented for control of hot smoke and gases. If ventilation is accomplished by means of a horizontal duct, the duct shall have the same rating as the hoistway. Venting may be required by the building code additional make-up air may be required. Design Professional shall evaluate.

HVAC: The control room and hoistway shall be required to maintain at neither a temperature of not less than 55 deg. F. nor more than 90 deg. F. and with manufacturers requirements either by natural air circulation or by an HVAC system.

Hydraulic Elevator Cylinder Unit

Pumping Unit: Pumping unit shall be dry and have the valve and motor located outside reservoir. The unit must be mounted on isolation pads.

Hydraulic Oil Line Access: Provide clear access for hydraulic oil line between machine room and hoistway. No underground piping.

Hydraulic Oil Lines: shall remain in conditioned space from end to end and remain within the building footprint. No buried or counseled lines are allowed.

PVC Pipe: Comply with master hydraulic elevator specs

Cylinder: Comply with master hydraulic master specs.

Cylinder Exterior: Comply with master hydraulic master specs.

Other Hydraulic Elevators

Roped: The car is supported by steel hoist ropes and sheaves, which are moved up and down by a holeless single section piston in a cylinder.

Holeless: The car is connected on each side with a single section position that moves up and down in a cylinder, which mounted on top of the pit floor.

Hoistway

Shaft Enclosures: Comply with SID-F shaft enclosures shall have a fire-resistance of not less than 2 hours where connecting four stories or more and not less than 1 hour where connecting less than four stories. The number of stories connected by the shaft enclosure shall include any basement.

Hoistway Entrance: entrance shall consist of flush hollow metal door panels, bolted unit type frames, sills.

Sills: sills shall be of extruded aluminum or nickel silver construction with non-slip wearing surface. Supported on steel brackets and securely fastened to the floor. If cast sill is in acceptable condition re-use.

Class of Loading for Elevator: Class C1, C2 and C3 loading shall be for sill and platform for all type of elevators.

Shaft Paint: Painting shall include approximately 80% wall coverage with one coat of white paint. Painting required in Housing Building, Parking Structure and Medical School Building. Painting is not required in general fund buildings.

Shaft Lighting: single tube continuous fluorescent light fixture strip (full height of hoistway) with guard. Provide minimum one fixture per floor. Design Professional shall evaluate use of LED in lieu of fluorescent fixtures. This lighting shall be operable from a switch located in the elevator machine room, pit area and at the top floor. Shaft Lighting required in Housing Buildings, Parking Structures and Medical School Buildings. Shaft lighting is not required in general fund buildings.

Hoistway ventilation: Hoistway venting is required per code. Venting of hoistways is not required where the building is equipped throughout with an approved automatic sprinkler system.

Location of Vents: Vents shall be located below the floor at the top of the hoistway and shall open directly to the outer air or through noncombustible ducts to the outer air with back draft damper.

Piping in Hoistway: No piping, duct, electrical conduit, or other materials, etc. for non-elevator related equipment shall be allowed.

Exterior Hoistway: Provide automatically controlled heat in hoistways to provide minimum temperature of 50F, accounting for building envelope losses and infiltration at doors. Finned tube radiation is generally preferred with traps and shut-off valves shall be provided in accessible locations outside the hoistway or use listed/certified electric heaters with disconnect switch for each unit heater.

Pit Area

Construction at bottom of hoistway: Pits extending in the ground shall have noncombustible floors and be designed as to prevent entry of ground water into the pit. The pit floor of any hoistway not extending to the ground shall be of the fire resistive construction having fire-resistance rating at least equal to the required hoistway and have no habitable area under pit.

Pit Lighting: Lighting in pit area shall be a minimum of 10 ft candle measured at any point in the pit area at floor level.

Sump Pumps

- Provide sump pumps in compliance with the Michigan Elevator Code per ASME A-17.1 (latest edition accepted by State of Michigan) and Michigan Plumbing Code.
- Subsoil drains shall not be connected or discharged to elevator pits or sumps.
- Specify a simplex submersible sump pump for each hoistway with a minimum capacity of 3000 gallons per hour.
- Multiple hoistways may be served by a common sump pump sized to remove 3000 GPH per hoistway.
- Provide a union, a check valve, and an isolation valve on the pump discharge.
- Pumps $\leq$ 1 HP should normally be 120 VAC single phase.
- Pumps $>$ 1 HP should normally be 208 VAC three phase.
- Pump voltages greater than 300 VAC are not permitted by code.
- The pump power cord shall be plugged into a non-GFCI power receptacle located in the hoistway. This arrangement shall serve as the pump disconnecting means in the hoistway. Power to this receptacle shall be controlled by the pump controller to cycle the pump on and off. The receptacle and cord cap shall be protected by a weatherproof cover.
- For *new hoistways* indicate that, at the contractors option, the sump may be either (1) cast-in-place and water-proofed with the same sealer used to water-proof the hoistway floor, or (2) a fiberglass sump. In either case, a sump cover shall be provided.
- For *existing hoistways*, the design should typically include a fiberglass sump with cover.

- Pumps shall be controlled by dual non-mercury float switches consisting of a “normal” level float switch and a “high level” float switch. “Oil Smart” or similar level controls shall not be used. The pump controller shall include a dry alarm contact for monitoring by the Owner’s Building Automation System (BAS). This contact shall energize under two conditions: any time the pump runs and any time high level is detected.
 - For elevator hoistways where ground water intrusion into the sump is expected and thus the pump is expected to run frequently, only the high level float shall alarm at BAS (Building Automated System).
- Pump power cord shall not be run in conduit. Float switch, oil level detector cords (where oil separators are used) and any other control wiring shall be run in PVC conduit properly secured to the hoistway wall and floor. Conduit shall be connected to the sump cover and the conduit's inner diameter shall be sealed with sealing putty.
- Pump control panels and oil separators shall not be installed in hoistways or elevator machine rooms.
- Pumps Serving Traction Elevators:
 - Pumps shall discharge to a sanitary drain via an indirect connection.
 - Status lights (pump running, high level) and alarm annunciators associated with pump operation **shall not** be provided. Control panel **shall not** include a pump “on-off” or “hand-off-auto” switch on the panel face.
 - Typical Sequence of Operation for Pump (modify to make project specific): The Pump shall be cycled by the "normal" float switch to maintain normal fluid level in the pit. If high fluid level is detected by the “high level” float, the pump shall start (if not already running). The pump controller shall include a common dry alarm contact (non-latching) for monitoring by the Owner’s Building Automation System. This contact shall energize whenever the pump runs and when high level is detected
- Pumps Serving Hydraulic Elevators:
 - Pumps shall discharge to an oil separator. Oil separator shall discharge to a sanitary drain via an indirect connection. Size the oil separator to contain 110% of the volume of the largest elevator hydraulic circuit.
 - Status lights (pump running, high level) and alarm annunciators *associated with pump operation* **shall not** be provided. Control panel **shall not** include a pump or oil detection system “on-off” or “hand-off-auto” switch on the panel face.
 - Specify controls to monitor “half full” and “full” oil level conditions in the oil separator. Specify an annunciator, silence button, indicator lights, and BAS contacts to provide the sequence of operation indicated below.
 - Typical Sequence of Operation for Pump (modify to make project specific):

The pump shall be cycled by the normal float switch to maintain “normal” fluid level in the pit. If high fluid level is detected by the “high level” float, the pump

shall start (if not already running). The pump controller shall include a common dry alarm contact (non-latching) for monitoring by the Owner's Building Automation System. This contact shall energize whenever the pump runs and when high level is detected.

– Typical Sequence of Operation for Oil Separator Level Alarms:

When the oil sensor detects a "half full" oil condition, it shall energize the Half Full indicator light, the common annunciator, and the Half Full BAS alarm contact. Pushing the alarm silence button shall silence the alarm but the indicator light and BAS contact shall remain energized until the oil level drops below half filled.

When the oil sensor detects a "full" oil condition, it shall energize the Full indicator light, the common annunciator (even if previously silenced), and the Full BAS alarm contact. Pushing the alarm silence button shall silence the alarm but the indicator light and BAS contact shall remain energized until the oil level drops below the full level.

Pit Painting: Paint pit floor and walls (up to sill) with two coats of light gray, gloss, and oil based paint. Paint all exposed metal in hoistway (except Guide-rails) with light gray paints two coats of rust inhibitive paint.

Electrical Receptacles: (1) GFCI duplex at 48" A.F.F., and (1) non-GFCI duplex (for sump pump) receptacle at 24" A.F.F.

Access Ladder: Galvanized steel ladder to be mounted to floor and wall shall have skid resistant rungs.

Elevator Car Enclosure:

Car Lighting: Indirect fluorescent or LED coved lighting minimum of 10 foot candle in car at floor level install fixture equally on both side of elevator cab to balance the light. Lighting shall be easy to access to replace. Downlights or drop ceiling are not acceptable.

Emergency Lighting: provide emergency lighting with a battery unit in compliance with code requirements.

Car Dimension: Based on requirements of ADA Guideline and square footage floor requirements for landing per Michigan Code and ASME A17.1 Elevator Code.

Car Door: Flush hollow stainless steel panel's with sound deadening insulation.

Car Ceiling: Canopy ceiling shall be provided, painted white. Drop ceiling systems are not acceptable.

Car Flooring: Finished floor shall be heavy duty "Rubber tile sheet type vinyl" all shall be class "A" securely connected in place "commercial grade carpeting tile" or heavy duty tile or ¼" thick (minimum) checkered aluminum with matte finish. Materials such as stone or

ceramic tile flooring add significant weight to the elevator car increasing equipment sizing and wear over time on equipment. Stone and ceramic tile flooring materials are strongly discouraged. Coordinate flooring material selection with end user and design manger.

Pads and Pad Hooks-Locks: provide pads and pad hooks with locks on walls near top 12" O.C provide educate size and storage cabinet.

Electrical Receptacle in Car: GFCI type duplex electrical receptacle in car approximately 2" above finished floor below car operating panel.

Ceiling Height in Elevator Car: Minimum of 8'-0" car heights.

Elevator Lobby

Hallway Position Indicator: LED (Light Emitting Diode) digital type and good for minimum of 5-years as part of hallway push button.

Hallway Push Button: Vandal resistant illuminated LED type hall push button shall be installed at each floor, fixture shall have up and down buttons at intermediate floors and single buttons at top and bottom floors, buttons shall be vandal resistant stainless steel with integral arrows and shall illuminate to indicate a call has been registered. Button shall remain illuminated until the call has been answered.

Hoistway Access: Hoistway Access features operable from top and bottom landings mounted on door jamb.

Lobby Lighting: 10 foot candle measured 1 foot from the sill at floor level. Feed the lighting with emergency generator power if the elevator can operate on generator power, or provide emergency egress lighting if the elevator cannot operate on generator power.

Landing System

Landing System: The landing system shall provide high speed stepping signals, one-floor-run stepping signals, leveling, and door zone signals. Shall be compatible with controller manufacturer.

Leveling: The leveling and stopping accuracy of the system shall be within 1/4 inch of the floor level and shall correct for over travel or under travel to within the same accuracy, regardless of load variations or direction of travel.

Electrical Requirements

Disconnect Switch location: Locate all disconnecting means for all elevator(s) on the inside surface of the machine room wall next to the strike jam side of the machine room door. Ensure each disconnect is within sight of the elevator equipment it controls.

Main Disconnect Switch: Provide a 3 pole fused elevator power disconnect switch. Switch shall be lockable in the open position.

Lighting Disconnect Switch: Provide a 2 pole, 240 volt, 30 amp fused elevator car lighting disconnect switch. Switch shall be lockable in the open position and contain 20 amp fuses. Feed the switch with a 20 amp emergency power circuit if generator power is available, or normal power if generator power is not available.

Car Receptacle and Fan Disconnect Switch: Provide a 2 pole, 120 volt, 30 amp fused elevator car receptacle and fan disconnect switch. Switch shall be lockable in the open position and contain 20 amp fuses. Feed the switch with a 20 amp standby power circuit if the elevator can operate on generator power, or normal power if the elevator cannot operate on generator power.

Elevator HVAC: Elevator HVAC unit shall have a dedicated branch circuit with disconnect switch inside the machine room. Feed the switch with standby power if the elevator can operate on generator power, or normal power if the elevator cannot operate on generator power.

Receptacles: Provide 120V GFCI receptacles in each machine room within 6'-0" from the governor location, elevator controller and machine. In the pit area GFCI and non GFCI shall be provided.

Machine Room Light: Machine room light fixtures shall produce a minimum of 19fc at floor level and have lamps protected by wire guards. Light switch shall be located at the point of entry on the lock-jamb side of the access door. Feed the lighting with emergency generator power if the elevator can operate on generator power, or provide emergency egress lighting if the elevator cannot operate on generator power.

Pit Lighting: Locate light with wire guard more than just below (with clearance) the fully compressed buffer. Locate light switch on wall inside the hoistway adjacent to the top of the pit ladder. Feed the lighting with emergency generator power if the elevator can operate on generator power, or provide emergency egress lighting if the elevator cannot operate on generator power.

Isolation Transformer: Individual isolation transformers and individual choke reactors for each hoist motor (controller), and filtering of harmonic distortion when Variable Voltage Variable Frequency (VVVF) AC controllers are utilized.

Electrical Ground Wiring: Ground wire shall be the same size as feeder per Controller Manufacturer requirements.

Emergency Power Operation

Emergency power: Coordinate the need of emergency power with the activity use and project architect. Emergency power is usually needed for high-rise facilities as defined by code.

Standby Power: In building or structure where standby power is required.

Emergency Power Operation: when emergency power is detected, cars shall return to the main lobby one elevator at a time, and remain there with doors open. While each car is being

returned, the other cars shall be shut down so as not to overload the emergency power generator.

One or More Cars: Once all car(s) have been returned to the lobby, one or more cars may be selected to run under emergency power, depending on the capability of the emergency power generator. Selection of the cars that run under emergency power shall be done by the group system. Or If more than one elevator is provided determine with activity input how many elevators are to operate on emergency power

Automatic Selection: the automatic selection may be overridden through manual selection. The actual number of cars allowed to run under emergency power shall be a pre-programmed value and the number of cars allowed to run shall not exceed this value

Disconnecting Means and Panel Location: Must disconnect the elevator from normal lockable power and from emergency power. Automatic transfer switch and disconnect shall be located outside the machine room. The panel for the manual selection switches for each group of elevator will be installed at a location determined by the university.

Override Switch: Manual override switch shall be provided in the main elevator lobby area(s) to override the automatic emergency power selection.

Manual transfer: Standby power shall be manually transferable to all elevators in each bank.

Mechanical Equipment: Where emergency power is connected to elevators, the elevator machine room ventilation, air conditioning equipment and hoistway ventilations shall be connected to the standby power source.

Fire Suppression

Machine Room Sprinkler: In elevator machine room's automatic sprinklers of ordinary or intermediate temperature rating shall be provided with guard. Sprinkler head shall not be installed over any elevator equipment. Provide a supervised shut-off valve with flow tamper switch in the sprinkler line supplying the pit. Locate the valve outside of and adjacent to the elevator machine room.

Pit Area Sprinkler: Sidewall sprinkler(s) with sprinkler guards in the pit area. Locate the sprinkler no more than 2'-0" above the floor. Provide a supervised shut-off valve in the sprinkler line supplying the pit. Locate the valve outside of and adjacent to the pit.

Hoistway Sprinkler: Provide a sprinkler(s) at the top of the hoistway for hydraulic elevators with cylinder or supply piping extending above second finished floor elevation. Provide a supervised shut-off valve, flow tamper switch. These items shall be located outside of and adjacent to the elevator hoistway.

Signage: Provide signage on valve outside of elevator machine room and pit area and shall read "Sprinkler Shut-off Valve for elevator ----"

Test Valve: Provide inspector test connection per code requirements.

Fire Alarms

Fire Alarms Devices: Only visible alarm notification shall be provided in elevator machine rooms.

Fireman Phone Jack: Provide a phone jack in the car as part of COP (Car Operating Panel) for fireman phone jack for high rise building phone jack is required in the elevator machine room.

Fire Alarm: A fire alarm initiating device shall be in the control space and tied in to elevator's fire emergency services.

Smoke Detectors: Stand-alone smoke detectors system shall be installed by elevator contractor

Speakers/Horns For Mass Notification: Speakers shall be mounted in car with a adjustable volume control that shall be adjustable at the elevator car top. Horns shall not be installed inside the car, hoistway or in the elevator machine room.

Hoists and Cranes - Section 146000

Definition

Manual and motor.

Application

Because of the infrequency with which these systems are installed, the University has no established guidelines for these systems. Furthermore, operation and maintenance may not be handled by the Elevator Shop. Consult Project Coordinator.