

**WVU DESIGN GUIDELINES & CONSTRUCTION STANDARDS**  
**DIVISION 14 – CONVEYING SYSTEMS ELEVATORS**

**SECTION 142000 – CONVEYING SYSTEMS ELEVATORS**

**PART 1 – GENERAL**

1. Any deviance from the following instructions must be approved during design by WVU Facilities Management Project Manager.
2. Use of a holeless hydraulic elevator is preferred in situations with a maximum rise of 40'. In cases where heavy use is anticipated, a traction elevator should be considered.
3. In all cases, where hydraulic elevators are installed, car speed shall not exceed 150 feet per minute.
4. The car capacity for any passenger elevator installed on campus will be a minimum of 2,500 lbs., with a maximum of 5,000 lbs.
5. The manufacturer of the elevator shall have been in business fabricating elevator equipment for a minimum of five (5) years.
6. For overhead machine rooms, install trap door and lifting beam to move motors.
7. The use of machine roomless elevators shall be avoided.
8. All pulleys shall have guards.
9. All service keys shall be OEM keys.
10. Elevator pit, elevator machine room, and elevator corridor lighting shall meet the requirements of the most recently adopted ASME A17.1, Safety Code for Elevators and Escalators.
11. Elevators must service all floors.
12. Elevator access to mechanical rooms shall be key-controlled only.
13. Guarantee and Warranties
  - A. Warrant the equipment installed under these guidelines against defects in material and workmanship, and corrects any defects not due to ordinary wear and tear or improper use of car, which may develop within one (1) year from the date the elevator is completed and placed in permanent operation and accepted by the Owner.

- B. The warranty shall be written and issued at the completion of each unit prior to final payment.
- C. During the one (1) year warranty period, the elevator installer shall provide emergency service on a twenty-four (24) hour basis at no cost to the University. A first response of a qualified University technician shall not void the warranty. A 1 hour response time shall be required from the vendor (matching the current response time required of the University's maintenance contractor).
- D. All service and maintenance shall be by the installing contractor for the first one year warranty period after substantially completed and turned over to WVU.
- E. The installer shall replace all hydraulic cylinder seals six months after the elevator is placed in service.

#### 14. Permits, Testing, and Inspections

- A. File necessary drawings for approval of all authorities having jurisdiction, obtain and pay all required fees for permits and inspections, etc., which may be required for the execution of this work. Copies of all permits shall be forwarded to the WVU Facilities Management Project Manager.
- B. Obtain, arrange, and/or pay for any necessary tests and inspections. Inspections shall include initial acceptance inspection and the first required annual inspection. The first required annual inspection shall take place 11 months after acceptance testing and before the end of the warranty period. Both the acceptance testing and first required annual inspection shall be performed by WVU's current State Elevator Inspection Company. The contractor is responsible for the cost and scheduling for the acceptance test and WVU will pay the Inspector's fee for the first annual inspection. The contractor will be required to supply 2 each licensed elevator mechanics at no additional cost to the University to complete the first required annual inspection.
- C. Furnish all test instruments and materials required at the time of final inspection. The inspection outlines in the ASME A17.2 Inspector's Manual (latest edition) will be followed.
- D. After-hours testing of systems, such as emergency generators or fire service, shall be conducted at no extra cost to the Owner.
- E. WV Division of Labor usage permit required to reach substantial completion.

- F. At substantial completion, the contractor shall provide a minimum of 2 hours training to WVU personnel and WVU maintenance contractor. A sign in sheet shall be submitted to the PM for training to be considered valid.

#### 15. Maintenance and Instruction Materials

- A. WVU shall be provided with three complete sets of all electrical schematics, including printed circuit boards, mechanical drawings, service manuals, and diagnostic/service tools that are available to elevator manufacturer's installers and service personnel. These shall include all control wiring, shall show all solid-state circuits, and shall identify all electric and electronic components as originally installed including all field adjuster notes. The name of the manufacturer and the manufacturer's catalog number shall be provided for all components not manufactured by the elevator installer.
- B. A complete parts list, recommended lubricants and a recommended spare parts list shall also be provided.
- C. The WVU Facilities Project Manager must receive all required drawings, manuals and parts lists before final payment is made to the Contractor. The fact that a drawing, manual or maintenance tool may contain proprietary information is not considered by the University to be sufficient reason for refusing to furnish any drawing or manual.
- D. Furnish one (1) complete set of all diagnostic tools, equipment, and documentation required for the complete maintenance of all aspects of the control and dispatch system. Any diagnostic system shall be an integral part of the controller and provide user-friendly interaction between the serviceman and the controls. The Documentation shall include a description of component function, a hard copy of all as-built schematics, a hard copy set of source codes utilized in developing any control software, and an electronic copy of all source codes utilized. Any and all such systems shall be free from secret codes and decaying circuits that must be periodically reprogrammed by the manufacturer.

16. All national and local codes shall apply especially Federal ADA Standards, ASME A17, National Electric Code, IBC, ANSI A117.1 and 117.2, and the State Fire Code.

17. The elevator shall be on emergency power if required by the West Virginia State Fire Code 87CSR1.

## **PART 2 - PRODUCTS**

### 1. Installers

- A. WVU pre-approved installers: Shall be installed by one of the following:
  - 1. Otis Elevator Co.
  - 2. Schindler Elevator
  - 3. Eastern Elevator
  - 4. ThyssenKrupp Elevator
  - 5. Kone Elevator
- 2. Machine Room
  - A. Hydraulic elevators over 2 stops shall have oil coolers.
  - B. Non-elevator-related equipment or piping may not be run through this room.
  - C. The elevator main line electrical disconnect and the machine room light switch must be located adjacent to the machine room door and arranged so they may be accessed without entering the room. Electrical main disconnect and 110v disconnect must both be fused.
  - D. Clearance shall be provided for all control panels and equipment cabinet doors to open at least 90°, and at least three (3) feet free of obstructions shall be provided on all sides of machinery.
  - E. The machine room must be equipped with a minimum of one (1) wall-mounted fire extinguisher.
- 3. Controls
  - A. Single elevator installations shall be provided with simplex selective collective operation from a riser of hall pushbutton stations. The registration of one or more car calls shall dispatch the car to the designated floor in the order in which the floors are reached by the car, irrespective of the sequence in which the calls were registered. The car shall also respond to registered hall calls in the same direction of travel. Car and hall calls shall be cancelled when answered. When traveling in the up direction, the car shall stop at floors for which car calls or up hall calls have been registered. It shall not stop at floors where a down hall floor is in response to a registered car call, or unless the down hall call is at the highest floor for which any call has been registered. Likewise, a down-traveling car shall not stop at a floor where only an up hall call has been registered unless the stop for that floor is in response to a registered car call, or unless the up call is at the lowest floor for which any call has been registered.
  - B. Where two (2) elevators are installed side-by-side and intended to operate as a group; these installations shall be provided with duplex collective operation from

a riser of hall push-button stations. Elevators shall automatically travel to landings for which a call demand exists. Stops in response to calls that are registered at either the car or corridor push-button stations shall occur in the natural order of progression in which the floors are encountered, depending on the direction of car travel, and irrespective of the order in which calls are registered. Means shall also be provided to periodically review and modify strategies for corridor call assignment in order to improve traffic flow. Only one (1) elevator shall respond to a particular corridor call.

C. A non-proprietary microprocessor-based controller is preferred, including necessary starting switches together with all relays, switches, and solid-state components required for operation. Installer shall supply a hard copy printout of all ladder logic programming as well as one additional set of programmed chipsets. Any proprietary equipment shall be pre-approved by WVU and all equipment, computer programs or tools required to maintain the elevator will be provided to WVU prior to system turnover.

D. Motor Control:

1. Variable frequency AC type motor controllers shall:

- a. Limit total harmonic distortion of regenerated power to 5% Per IEEE 519.
- b. Provide means for absorbing regenerated power when elevator system is operating on standby power.

2. Soft start motor control shall be of the Wye delta, closed transition type.

E. The University insists that each elevator shall be controlled by the fire alarm system as required by the WV Division of Labor or the Fire Marshal.

4. Elevator Car

A. All push buttons are to be vandal resistant stainless steel with 100,000 hours life LED type indicators.

B. Clear inside car dimensions shall be determined by door configuration provided.

1. Where side-opening doors are installed, the minimum dimensions are 5'8" wide x 4'6" deep.
2. Where center-opening doors are installed, the minimum dimensions are 6'8" wide x 4'6" deep.

C. Minimum door openings shall be 3'0" wide x 7'0" high.

- D. Provide stainless steel protective pad hooks in all cars; in freight and combination passenger/freight cars, provide one (1) set of quilted fire-retardant pads.
- E. Provide stainless steel handrails on back and sides of cab, which are thru-bolted to the elevator cab shell.
- F. The car roof hatch shall be removable by thumb screws from the top of the car only.
- G. Provide a ceiling-mounted, two-speed exhaust fan with automatic shutoff during equipment nonuse. The fan shall be controlled from the car control panel via a three (3) position key switch.
- H. Provide a car top-operating device including service light and switch, and a mobile control for inspection and servicing, as well as one (1) 120-volt, 20-amp, GFCI A/C duplex receptacle.
- I. The car lighting shall be connected to a normal and emergency lighting circuit.
- J. Control panel shall be equipped with battery powered emergency light.
- K. Provide Lexan prismatic lenses or egg crate style light diffuser panels for the ceiling or recessed LED down-lighting.

#### 5. Signal Fixtures

- A. All hall and car control stations shall comply with the latest regulations of federal ADA law, WV Department of Labor and Industry, and ASME A17.1 provisions for the handicapped.
- B. All car operating panels shall contain, at a minimum, the following:
  - 1. A call button for each floor served.
  - 2. "Door Open" and "Door Close" buttons.
  - 3. "Alarm" button, connected to a normal and separate emergency circuit.
  - 4. "Emergency Stop" key switch.
  - 5. Car position indicator.
  - 6. Hands-free in-car communications system. This telephone shall operate on a dedicated telephone line.
  - 7. Three (3) position firefighter key-operated switch, call cancel button, and illuminated/visual/audible signal system.

8. Phase II firefighter's service operating procedures engraved directly to the care-operating panel face.
  9. A locked service cabinet containing the key switches required to operate and maintain the elevator, including, but not limited to:
    - a. Light switch
    - b. Independent service key switch
    - c. Fan switch
    - d. Duplex OFT receptacle
  10. The operating panel shall be a surface-mounted type with heavy-duty hinges and secured with tamperproof screws.
  11. Wiring and other such provisions shall be installed to facilitate future installation of video cameras.
  12. Wiring and other such provisions shall be installed to facilitate future installation of a Public Address system.
- C. Hall call stations shall provide a single button at each terminal floor and two (2) button units at all intermediate floors. Faceplates should be engraved, "In case of fire, Do not use elevator." Mounted with tamper-proof screws. Install a firefighter key switch at the main egress floor station. Engrave Phase I firefighter's service operating procedures directly to call station faceplates.
- D. Cab lanterns shall provide a visual and audible signal mounted in the face of the return post on each side of the car with concealed fastenings. The lens shall project a minimum of 1/4" and shall be of solid Plexiglas. Car lanterns shall indicate the direction of the car when doors are 3/4 open. The unit shall sound once for the "up" direction and twice for the "down" direction.
6. Pit and Shaft
- A. Guide rails shall be the "T" type and able to support the weight of the car.
  - B. Car guides shall be of the roller type.
  - C. The pit ladders, pit light switch and emergency stop button shall be arranged so that all can be reached before entering the shaft. There shall be one ladder for each elevator.
  - D. Provide a sump pit, within the elevator pit, covered with a steel grate flush with the floor.

- E. Paint the pit floor and sump with a “battleship gray” waterproof paint, made for the purpose.
- F. Single GFI convenience outlet shall be installed in the pit.
- G. Apply EPA provisions for hydraulic elevators to handle any oil and water. Such things may include an oil/water separator or a switch that shuts of the sump pump if oil is detected.

### **PART 3 – EXECUTION**

- 1. N/A

END OF SECTION 142000