

Modify Section 14 20 00 Elevators per the following (deletions are shown struck through and additions are double underlined). Remainder of section is unchanged.

14 20 00 ELEVATORS

.01 General

- A. Contact OPP Design Services for a base specification to include with the contact documents for each project.
- B. The following criteria for installation of elevators on campus must be followed:
 - 1. For two (2) floor structures, with a maximum rise of 14'-0", use of a holeless hydraulic is preferred. In cases where heavy use is anticipated, a traction elevator should be considered.
 - 2. For three (3) to ~~five (5) six (6)~~four (4) floor structures, with a maximum rise of ~~60'0"45'-0"~~, use of a roped hydraulic is preferred. In cases where heavy use is anticipated, a geared/gearless traction elevator should be considered.
 - 3. For all structures containing ~~seven (7)~~five (5) or more floors, with a rise exceeding ~~60'0"45'-0"~~, use of a traction type elevator is preferred.
- C. In no case shall a conventional hydraulic elevator be installed. This means any installation that requires the use of in-ground oil-filled components is strictly prohibited.
- D. Three stage Telescopic holeless hydraulic elevators are prohibited.
- E. In all cases, where hydraulic elevators are installed, car speed shall not exceed 150 feet per minute.
- F. In all cases where geared/gearless traction elevators are installed, car speed shall not exceed 350 feet per minute.
- G. 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. The maximum may be exceeded based on requirements for a special application, but must be reviewed by the University prior to its manufacture.
- H. Elevators, when installed, must service all floors.
- I. Elevator access to mechanical rooms shall be key-controlled only, by (Best Lock System).
- J. The manufacturer of the elevator shall have been in business fabricating elevator equipment for a minimum of fifteen (15) years. ~~Elevators assembled by companies which do not manufacture 60% of the equipment supplied will not be acceptable.~~ The installation contractor is required to provide the University with a listing of at least five (5) comparable installations ~~completed within the last twelve (12) months.~~
- K. If Standby power is a project required requirement for this installation, it shall follow ASME 17.1 2000 w/2002 Addenda.
- L. ~~110v standby~~Elevator emergency power ~~is needed to~~shall feed power the elevator alarm bell.
- M. GAL ~~Master gearless~~Manufacturing Corp, "MOVFR" door operator is preferred as the University standard.

- N. All push buttons are to be vandal resistant stainless steel with 100,000 hours life LED type indicators.
- O. Adams Gatekeeper™ 2000 Adams ICU-47MAX infrared car door protective device is the preferred University standard.
- P. Shunt trip breakers are required if sprinklers are present in hoistway or machine room.
- Q. The University requires that each elevator shall meet the requirements required under ASME A17.1-2000 including all addenda through 2002.
- R. In ~~no~~ case ~~shall a~~ Machine room less elevators (MRL) is to be installed, a Permanent Magnent Gearless 28/40 Pole machine shall be used.
- S. Manufacturers: Subject to compliance with requirements, provide elevators by one of the following:
 1. Canton Elevator, Massillon, OHCEMCOLIFT, Inc. LGIS/Otis, Hatfield, PA
(Basis of specification)
 2. Hollister/Whitney, Quincy, ILPort Elevator Inc, Williamsport, PA
 3. Minnesota Elevator, Mankato MN
 4. ~~Canton Elevator, Massillon, OH~~
 5. ~~Vertical Express, Thyssen Krupp Elevator~~
 6. ~~University Design Services approved equal~~

.02 Machine Room

- A. The elevator machine room shall be adequately ventilated and accessed by means of an outwardly swung fire-rated door measuring at least 3'-0" x 7'-0". The door must be outfitted with a spring closer and lockable storeroom style handset. Ambient room temperature to be maintained between 60 ~~?~~ and to 100 ~~?~~ degrees Fahrenheit, with 95% non-condensing.
- B. Non-elevator related equipment or piping may not be run through this room.
- C. The elevator mainline 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 be~~ a heavy duty type and meet the requirements of NFPA 70E.
- D. Clearance shall be provided for all control panels and equipment cabinet doors to open at least 90 ~~?~~ degrees, and at least ~~three (3) feet eighteen (18) inches~~ 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.
- E.F. The machine room shall have a minimum lighting requirement of 19 FC at the floor.

.03 Controls

- A. Single elevator installations shall be provided with simplex selective collective operation from a riser of hall push-button stations.
 1. 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.

2. 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.
1. 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. The controller shall be of the ~~electro-magnetic-non-proprietary~~ type. ~~Relays shall be of the enclosed "ice-cube" type unit.~~ It shall be designed to control starting, stopping and prevent damage to the motor from overload or excess current and to automatically cutoff the power supply and bring the car to rest in the event of the operation of any of the safety devices. The controller shall be enclosed in a sheet metal cabinet with louvered door, designed for floor or wall mounting.
1. If a microprocessor controller is used it shall meet the following criteria:
 - a. A non-proprietary microprocessor-based controller shall be provided, including necessary starting switches together with all, relays, switches, and solid-state components required for operation.
 - b. ~~Microprocessor shall be a "off the shelf" industrial type programmable controller utilizing ladder logic such as Allen Bradley, Square D, Omron, etc.~~ Microprocessor shall have opto-isolated inputs and outputs. Shall be isolated with Dry Relay contacts.
 - c. Controller shall have all diagnostic and trouble-shooting readouts located directly on the unit.
 - d. Controller shall have the ability to be replaced by a unit of different model or manufacturer without the necessity of replacing any other ~~relater-related~~ items (door operators, selectors, buttons etc.).
 2. ~~Installer shall supply a hard copy printout of all ladder logic programming as well as one additional set of programmed chipsets.~~

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~~used. Refer to PSU VFD specification.

E. The University requires that each elevator shall be controlled ~~Recalled~~recalled by the fire alarm system as required by the Firefighters service requirements outlined in ASME A17.1-2000 with the 2002 addendum. ~~Pennsylvania Department of Labor and Industry Title 34, Section 7.33, "Operation of Elevators under Fire or Other Emergency Conditions."~~

F. Controller manufacturers: Subject to compliance with requirements. Provide controller by one of the following manufacturers:

~~1. Motion Control Engineering~~

~~2.1.~~Elevator Systems Inc.

~~3.2.~~Motion Control Engineering

~~4.3.~~Virginia Controls

~~5. University design professional approved equal~~

G. Remote Monitoring System: Provide and install an interactive system to monitor and manage the elevator equipment, with the following requirements:-

1. The data collection, data storage and real-time monitoring portion of the system shall be based on Microsoft Windows, and able to run on Windows ~~XP-7~~ or later operating system compatible with University systems.
2. The system shall be network-based and be capable of interfacing with all makes and types of elevator control systems. ~~System shall be compatible with any manufacturer, type or age of elevator. The system shall collect data via serial data connections. Where the monitoring system is attached to elevator controllers provided by other manufacturers, it is the responsibility of the customer, working with the third party controller manufacturer, to provide communications protocol information to the monitoring system manufacturer as required by the monitoring system to support the features described below. Where the third party controller manufacturer exposes a limited interface protocol, the monitoring system may display limited information or have only limited control capability.~~
3. The system shall be capable of operating on any TCP/IP based network system. ~~The addition of unlimited monitoring terminals shall be possible on the network. Interfaces to individual elevator controllers shall be via TCP/IP network. Controllers supporting only asynchronous serial interfaces conforming to RS-232 or RS-422 electrical specifications may be connected to the TCP/IP network via interface adapters or gateways.~~

4. Monitoring terminals shall operate ~~“peer to peer” without a single server,~~ independently of one another and the failure of a single network device shall not affect the operation of the rest of the system. Where a database server is used for storage of historical records, redundant, geographically distributable servers shall be provided.
5. The system shall provide multiple ~~banks~~areas, including ~~multiple campuses,~~ buildings, and banks on a single monitoring terminal screen. The system shall be capable of simultaneous monitoring of at least one hundred elevator units on a single monitoring station. The system shall be capable of real-time display of all monitored status points on all monitored equipment.
6. Fault and event notification screens and audible alarms shall be immediately displayed on selected monitoring station, based on ~~Boolean user-specified~~ boolean logical combinations of the monitored status points. Different vault and event tables shall be defined on a per-bank basis.
7. The system shall collect and store all status, fault, and event information for later reporting and analysis.
8. The system shall provide statistical analysis of hall call response times, traffic patterns, fault conditions, service logs and security usage in graphical and tabular format.
9. The system shall maintain a record of ~~every~~ status point change occurring on the monitored equipment, and provide the ability to replay these events in a simulation at a later time in real-time, slow speed, single step, reverse, or fast forward.
10. These features may be revised as the requirements of the building change.
11. Some of these interactive controls may include but are not limited to:
 - a. ~~s~~Security floor lockouts,
 - b. ~~entering~~ Entering car and hall calls,
 - c. Fireman’s return service &
 - d. Medical Emergency Service
 - e. ~~lobby~~ Lobby recall.
- G.12. ~~System shall have the capability to interconnect and monitor all elevator emergency phones.~~ The system shall display and record the following information for each monitored unit: (*Note: The following is intended as a guideline - connections to each status point mentioned on every control system may be impractical. Serial data links may include many more points.*)
 - a. Individual car status - expandable menus - including but are not limited to:
 - i. ~~Direction~~ Direction of travel,
 - ii. Independent service, (Independent, ~~Fire service~~, Medical, Automatic)
 - iii. Position of ~~elevator~~ Elevator,
 - iv. Door ~~status~~ Status (~~open~~ Open, ~~opening~~ Opening, ~~closing~~ Closing, ~~closed~~ Closed),
 - v. Door ~~dwell~~ Dwell time Time, ~~Power on/off~~,
 - vi. Door ~~detector~~ Detector, ~~Safety circuit~~, ~~Door zone~~, ~~Stop switch~~, ~~Alarm button~~, Registered

~~6.vii. Car Calls Load (Light, Heavy, Overweight, Etc.)~~

- ~~2. Data ports—Provide one serial data port for connection of an onsite laptop computer, and one cat5 port for future network connection for each elevator controller.~~
- ~~3. Network wiring to be provided by the University.~~
- ~~4. Laptop computer—One laptop computer is to be provided by the elevator contractor for each elevator.~~

.04 Elevator Car

- A. 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 7'-0" wide x 4'-6" deep.
- B. Minimum door openings shall be 3'-6" wide x 7'-0" high.
- C. Provide stainless steel protective pad hooks in all cars; in ~~freight and combination passenger/freight cars~~ all elevators, provide one (1) set of quilted fire-retardant pads.
- D. Provide stainless steel handrails on back and sides of cab, which are thru-bolted to the elevator cab shell.
- E. The car roof hatch shall be removable by thumb screws from the top of the car only.
- F. 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.
- G. Provide a cartop-operating device including service light and switch, and a mobile control for inspection and servicing, as well as one (1) 120-volt, 20-amp A/C duplex **GFCI** receptacle.
- H. Lighting
 1. The car lighting shall be ~~T8 lamps per 26-00-00, connected to a normal/emergency lighting circuit~~ **LED down lights with cab emergency lighting incorporated into the system.**
 - ~~1. Dimmable fluorescent lighting above luminous ceiling to provide 19 foot candles minimum at the floor level. Provide the following equipment:~~
 - ~~b. Luminaire—Strip light with Lutron "ECO 10 TVE" (0-10 volt electronic dimming ballast), having a range of 100% to 10% light output or approved equal by Advance, Sylvania or Universal.~~
 - ~~c. Lamp—GE High Lumen, Philips Advantage, or Sylvania XPS.~~
 - ~~d. Controls—Wattstopper power pack #FS-PP and sensor #FS-305. Fabricate a 2"x2" "L" stainless steel bracket and integrate the sensor into the center of the ceiling grid. Mount the power pack within one luminaire and connect to the sensor and each ballast. Power pack shall provide a 0-10 volt output to the ballasts so that when no occupancy has been detected for 5 minutes, lighting shall dim to 10% output or a minimum of 5 footcandles at the floor, whichever is higher. Power pack shall fail in the "On" position.~~

2. LED Lighting Manufacturers:

a. CabLite, Cape Canaveral, FL

b. Man-D-Tec, Scottsdale, AZ

~~I. Provide cab wall protective pads.~~

~~J.I.~~ Elevator two-way communications system: Provide and install a two-way communication system to comply with ANSI ASME A17.1 section 2.27. Furnish and install a “hands free” two-way conversation analog telephone system between the elevator car and a location in the building that is readily accessible by emergency personnel. An additional means of communication must be provided between the elevator and University Police Services headquarters. A separate means of two-way conversation must be provided in the elevator machine room for communication to the elevator car.

1. Provide and install an analog ADA compliant, hands-free indoor emergency phone, flush mounted with AUX inputs/outputs and voice location identifier.

a. ~~Suggested manufacturer and model~~Manufacturer: Talk-A-Phone; ETP-100EBV”AUX” phone.

2. Furnish and install a two-way conversation telephone system between the elevator car and a location in the “egress floor level lobby” that is easily accessible by emergency personnel. The telephone must be housed in a secure telephone enclosure outfitted with a “Best” key core and lock set. The contractor must coordinate the enclosure with the Penn State Physical Plant’s lock shop. The cabinet must protrude no more than 4” into the pedestrian corridor as per ICC/ANSI A117.1-1998.

a. ~~Suggested box manufacturer and model: Guardian; WRT series gray telephone enclosure~~ Contractor shall coordinate final device box requirements with University based on phone type selected. Contractor shall provide a single gang metal device box flush mounted in wall at a height as directed by the University at final location of the lobby phone (If total travel is over 60’-0” on University Park Campus only).

b. Suggested telephone manufacturer and model: Talk-A-Phone; 68429 analog panel mount phone.

3. Furnish and install a two-way conversation telephone system between the elevator car and the elevator machine room.

a. Suggested manufacturer and model: Talk-A-Phone; 68429 analog panel mount phone.

4. Additional components: provide and install all necessary peripheral components to complete the elevator two-way communications system.

a. Provide and install an analog telephone line consolidator in the elevator machine room that will connect the analog phone lines going to the elevator car, ~~“lobby” phone, and the~~ “machine room” phone, ~~and the~~ “lobby phone” (Lobby Phone required when total travel is over 60’-0” on PSU University Park Campus).

b. Elevator two-way communications system installed on any PSU Commonwealth Campus to receive a “lobby phone” for each elevator.

b.c. Suggested manufacturer and model: Talk-A-Phone “EC-8 with PSU CHIP” 8 Channel Consolidator

e.d. Raceways between elevator machine room controller and “Lobby” phone location: (Existing Construction): All raceways installed between the elevator controller and lobby phone shall be concealed within the existing building construction where possible. Walls shall be “fished” using a ¾” flexible metal conduit from ceiling to the location of the phone device box. Raceways above ceilings shall be concealed where suspended ceilings are existing, using ¾” EMT conduit with compression type fittings. Where concealment above ceilings is not possible, raceways shall be surface mounted and painted to match surrounding finishes, routed in a neat inconspicuous manner. Raceways shall be installed in accordance with ~~the 2002 National Electrical Code~~ NFPA 70E, as required by the local municipality.

d. ~~Telephone device boxes:~~

- ~~* Contractor shall coordinate final device box requirements with University based on phone type selected. Contractor shall provide a single gang metal device box flush mounted in wall at a height as directed by the University at final location of the lobby phone.~~

f.e. Contractor to provide and install CAT ~~5e-6~~ communication line to connect all three points of contact to the machine room installed consolidator on to the specified telecommunication source in the building ~~(room 110).~~

g.f. Contractor to provide normal emergency power to the elevator machine room mounted telephone consolidator.

- *i. General Contractor to activate, program, and test the system, to ensure proper operation and communication to Penn State Police Services.

h.g. Contractor to coordinate and request telecommunications service and necessary telephone numbers to the telecommunication source in the building. Telecommunications request form must be submitted to the Penn State Physical Plant Financial Support Services Office ROOM 118.

K.J. Ascending car over-speed and unintended car movement protection: A device shall be provided to prevent the car from striking the hoistway overhead structure. Electrical power failure or mechanically operated switch failure shall not render the device inoperative. Once actuated, the device shall remain actuated until manually reset. A device shall be provided to prevent unintended car movement away from the landing when the hoistway door and car door are open.

.05 Signal Fixtures

A. All hall and car control stations shall comply with the latest regulations of federal ADA law, Pennsylvania Department of Labor and Industry, and ASME A17.1 provisions for

the handicapped. Install 'Best' key switches for each elevator car floor button for floor cutouts and independent service.

- B. All car operating panels shall contain, at a minimum, the following:
1. A call button for each floor served. Button to be a vandal resistant LED unit.
 2. "Door Open" and "Door Close" buttons.
 3. ~~Three (3)~~Two (2) position key switches/locks, all floors, except the main landing. The positions shall be lock on, and lock off, ~~spring-loaded~~ "car call" switch ~~position which automatically returns to "lock-off".~~ (Best cores to be used).
 4. "Alarm" button, connected to a normal and separate emergency circuit.
 5. "Elevator Stop" key switch.
 6. Digital Car-car position indicator.
 7. Hands-free two-way in-car communications system. (Talk-A-Phone to be used).
 8. Three (3) position firefighter key-operated switch, all-call cancel button, and illuminated/visual/audible signal system.
 9. Phase II firefighter's service operating procedures engraved directly to the care-operating panel face.
 10. 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
 - ~~e.~~b. Fan switch
 - ~~d.~~c. Duplex ~~GFI~~GFCI receptacle
 11. The operating panel shall be a surface-mounted type with heavy-duty hinges and secured with tamperproof screws.
 12. Control panel faceplates shall have factory-provided knock-outs to receive a "Best" system cylinder and core. All key switches shall match the building lock cylinders ("Best" system).
 - ~~12.~~13. Independent service key shall be a "Best" lock set, key unable to be removed in the on position.
- 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. Vandal resistant LED hall stations shall have a digital position indicator built into each station for each elevator car (minimum of one (1) inch characters required).
- 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~~ tamper-proof fasteners. 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.

.06 Pit & 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 so arranged so that all can be reached before entering the shaft. All devices shall be higher than 24 inches above finished floor. An additional stop switch, accessible from the pit floor, may need installed in the pit if the bottom floor accessible stop switch cannot be reached from the pit floor.
- D. Provide a sump pit, within the elevator pit, covered with a secured steel plate flush with the pit floor.
- E. Provide pump in sump pit. Pump shall have oil sensing device and audible alarm mounted outside the pit/shaft. Pump alarm shall be monitored by CCS. Provide Stancor "Oil-Minder" SE50 or similar.
- F. Paint the pit floor and sump with a "battleship gray" waterproof paint, made for the purpose.
- G. GFCI convenience outlet shall be installed in the pit, higher than 24 inches above finished floor.
- H. Provide a dedicated 20A normal circuit for GFCI receptacle(s) and required lighting fixtures for wet locations. Provide two (2) 2-lamp 48 inch shallow depth (4 inches or less. Williams #91, or similar) lensed T8 luminaires in the pit and one at each landing above the pit. Mount luminaires vertically in a corner, except pit luminaires may be horizontal. Mount all devices higher than 24 inches AFF in the pit. Pit lighting shall be a minimum of ten 10FC at the floor.
- I. Traveling cable must have 2-four (4) shielded pairs of 20AWG 0.5 mm² and 1 coax line RG6/U to support telecommunication requirements. Traveling cable is to contain at least 10% spare wires.
- J. When modernizing or installing traction elevators, any time bearings for a dead shaft on a sheave are to be replaced, use double tapered roller bearings that can support all axial and radial loads imposed on that sheave.
- K. Any time a drive sheave is replaced for an overhead traction elevator, replace the deflector sheave and bearings also.
- L. Any elevator modernization , all car top and counterweight sheaves shall have all bearings and bushings replaced.
- M. Any sprinkler head installed in the elevator pit, shall be installed at a maximum of 24 inches Above Finished Pit Floor. Sprinkler head shall also be guarded and be required to have two (2) initiating devices.
- ~~K.N.~~ Sprinklers that are mounted higher than 24 inches AFF in the pit shall have code required initiating devices.

.07 Guarantee and Warranties

- A. Warrant the equipment installed under these guidelines against defects in material and workmanship, and correct 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. The assigned mechanic shall respond within four (4)two (2) hours of any service call.

- D. A first response of a qualified University elevator technician, of ~~four (4)~~two (2) hours or less, shall not void the warranty.
- E. The installer shall replace all hydraulic cylinder seals six months after the elevator is placed in service.

.08 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 Owner.
- B. Obtain, arrange, and/or pay for any necessary tests and inspections.
- 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.

.09 Maintenance and Instruction Material

- A. The University performs all maintenance with its own staff and must have ~~three (3)~~one (1) 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 University 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, including a "mechanic's" service tool. 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.
- E. Drawings are to be laminated both sides for protection. Prints to be hole punched and bound with metal two metal rings in flip chart fashion. Contractor to provide a metal cabinet to store the as built drawings in the elevator machine room. Cabinet to be Grainger #1ufc1 36"x 30"x 18".

F. The University shall also receive one (1) copy of above O&M manuals, schematics, parts lists, etc. in Adobe PDF format on CD.

E.G. All operation, maintenance, and instruction material shall be received by the University prior to final payment.

.10 Hydraulic Oil

- A. Hydraulic system oil shall be a bio-based oil that is EPA 1311 compliant as well as the more strict Pennsylvania DEP compliance for spills and soil clean up. The oil must be considered a non-toxic waste if land disposed.
- B. Acceptable manufacturer: Agri Tech Brands, a Division of Bunge Oils Corporation. ISO 32.
- C. Other manufacturers will be considered by the University. Submit independent testing showing compliance with paragraph 'A' to Design Engineering Services four (4) weeks prior to project bid date.

END of revision

Update Commentary:

Section was updated primarily for the following reasons:

- 1) *To revise criteria for type of elevator to be used based on the number of floors it serves*
- 2) *To update various references to construction codes and industry standards for work associated with elevators*
- 3) *To revise the lists of manufacturers for elevators, controllers, and miscellaneous accessories*
- 4) *To update requirements for the Remote Monitoring System*
- 5) *To change elevator car lighting from fluorescent to LED*
- 6) *To revise/clarify other miscellaneous requirements*