



## Division 14. Conveying Equipment

### 14 20 00. Elevators

#### *14 20 50. General Requirements for Elevators*

Both machine room-less (MRL) and traditional traction elevators are acceptable for use in UW Madison campus buildings.

#### **14 20 51. Provisions for Penthouse Access**

All mechanical penthouses shall be accessible by a hospital sized elevator, which can handle an emergency stretcher. This is usually, but does not have to be, a cab designated for freight which is provided with cab pads.

#### **14 20 52. Materials**

1. Wall panels within elevator cabs may be specified to meet the needs and preferences of building occupants and blend with the architecture of the building, however care shall be taken to select materials that are durable, resistant to cart damage, and can be easily cleaned.
2. Flooring within elevator cabs may be specified to meet the needs and preferences of the building occupants however thought shall be given to slip resistance, durability, and cleanability. If elevators are near the building entrance, it is likely the floors of the cab will come in contact with water and salts.
3. Materials to be used for padded protective wall pads or “cab pads” shall conform to ASME A17.1, Rule 204.2a (1) or (2). Cab pads shall be provided for a minimum of one elevator cab in each building. This shall be the elevator designated to go to the penthouse.
4. The floors of all machine rooms and pits shall be either painted with a light color coating or sealed concrete.

#### **14 20 53. Monitoring System**

In terms of monitoring, each elevator controller shall be connected to the building automation system (BAS) for fault reporting. The contractor shall install a 18/2 conductor from each controller to a BAS point that is programmed to see and report the fault contact closure. A fault point on the BAS shall report to both the UW Electric Shop and the building manager via email that the elevator is faulted and is non-operational. (This should be in the HVAC controls specification as well.)

#### *14 21 00. Electric Traction Elevators*

1. Elevator doors shall be a minimum of 40 inches wide and 6 feet-6inches high. The needs of the building occupants shall dictate the requirements for larger or taller opening sizes and/or increased cab heights. In addition, the General contractor shall provide a clear and plumb hoist-way. All freight elevators shall have steel C-channel jambs with steel angle sills. Jambs shall have solid metal extensions 4 feet above and 4 feet below door opening for door track mounting.
2. A list including the location and identification of all over-current devices that feed circuits for elevators or related equipment shall be provided to the UW Electric Shop for review. In addition, an over-current coordination study shall be provided.



3. For an elevator renovation project, the contractor shall notify the UW Electric Shop at least 5 working days before starting the project. The UW Electric Shop will determine which materials and equipment from the original installation shall be returned to the owner. Equipment that will be retained by the owner shall be tagged by the UW Electric Shop, removed by the contractor, and returned to the owner in good working condition unless other arrangements are made. A/E's shall include clear direction to the contractor for the above within the construction documents.
4. A minimum of 4 hours of training, including all that is required to service, adjust, and maintain the equipment, shall be provided for UW Physical Plant personnel prior to substantial completion. Two complete sets of Operations and Maintenance manuals, including parts manuals, shall be provided to the UW Electric Shop prior to the start of training. On multiple building projects, the O and M's shall be separate per building. The mechanical O and M's shall also be per building.
5. All equipment shall be furnished with one-line wiring diagrams that are indexed and cross referenced for all coils and contacts. One set of drawings shall be mounted on rigid board inside the machine room. These drawings shall be made available to the owner at the time of final inspection.
6. The elevator controller shall be of a non-proprietary design that can be serviced by at least three local contractors. Current acceptable manufacturers include: Galaxy (GAL), Motion Control (MCE), Smart Rise controls corporation, and Vertitron (VMI). All equipment monitors and interfaces that are required to interact with the controller shall be provided to the owner at the time of final inspection. This equipment shall become the property of the owner and shall not require renewal by the vendor or manufacturer. The controller information shall include all trouble shooting, start up, fault coding, and full system descriptions. The controller shall include LED indicators and at a minimum, a 32 character display.
7. For energy conservation purposes, install regenerative drives whenever possible. Drives must be made compatible with emergency generators.
8. A heavy duty closed loop design door operator shall be provided for each elevator.
9. At the time of the pre-installation meeting, the contractor shall provide sufficient information to satisfy the owner's representative that the controller design is non-proprietary. If this issue is not adequately resolved by the information that is submitted, the contractor shall demonstrate to the owner's representative on an existing installation that the proposed controller meets the requirements of the specifications.
10. Specification of the campus standard emergency key box, Supra #7199 shall be required.
11. Specification of the campus standard emergency phone, Adams #936-P2 or equivalent, shall be required. It shall be programmed to dial 9-1-1 (Campus Police). Use of a pre-recorded voice message shall be a programmable option although this option is not currently used on campus. Phones shall provide verification of a successful alarm report without requiring special response by Campus Police such as pressing a special button sequence on the dispatcher's phone.
12. Hoist way Lighting - 3-way and 4-way light switches shall be provided in all enclosed shafts and at each floor. One switch that is accessible at the lowest landing and one that is accessible at the highest landing shall also be provided. In addition, a 4 foot fluorescent fixture shall be provided at every other floor and additional lighting and



switching as needed for multiple car hoist ways and to meet code for Machine room-less (MRL) Elevators. For installations with multiple hoist way openings on each floor, a switch shall be accessible from each opening. Any 4 foot fluorescent light fixtures used shall be specified with T-8 lamps.

13. A complete package of building elevator keys shall be turned over to the UW Electric Shop at the time of the COM/Safety inspection. This includes 3 complete sets of keys for each elevator. On modernization projects, all elevators in the building shall be keyed to FEOK 1 fire service keying.
14. An infrared curtain is required for all new construction. A mechanical safe edge or photocell system is not acceptable. If infrared curtains are added to existing installations, the control relay contacts shall be rated to handle the voltage and amperage of the safety circuit. If not, a properly rated auxiliary relay shall be added.
15. The ladder in the pit shall be installed such that no junction boxes or other equipment can be installed behind it in a manner that would interfere with its function. No partial extension ladders or retractable ladders shall be installed.
16. Hoist way equipment: Each elevator shall use 6 inch spring tensioned rollers. Slide guides are not acceptable. Suspension means shall not require replacement at pre-determined intervals. Elevator rails shall have T rail design.
17. A minimum of four spare conductors or 10% of the total count, whichever is greater, shall be run between the controller and the push button station in the car. The conductors shall be tested for shorts, opens, and grounds. They shall be clearly identified on both ends as spares.
18. Each disconnecting means for equipment associated with the elevator shall be legibly marked as required by NEC 110-22 and shall be marked with the location and the source that feeds it. Where the machine room is sprinkled, busman style shunt trip/power modules shall be used. The shunt trip power monitor shall not be wired off the load side of the disconnecting means and shall not put the fire alarm system into supervisory trouble when the disconnect is manually operated.
19. Maintenance during warranty: Warranty service and maintenance work shall be performed by qualified elevator mechanics that are trained to service the equipment on which they will be working. Maintenance services by a helper or apprentice will be allowed only if under the direct supervision of a qualified mechanic. The contractor shall be capable of responding to an emergency call within one hour. The frequency of visits shall be based upon the type of elevator and its usage.
20. Warranty coverage shall begin at the date of substantial completion, rather than the date the elevators received their State inspection approval. Provide one year warranty service with two years parts and labor warranty.
21. A record of warranty maintenance shall be kept in each elevator machine room. The log books shall be provided by the UW Electric Shop. This record shall be kept in plain sight, available for inspection.
22. A means shall be provided to monitor and interpret the output of the load-weighing sensor on the car. At a minimum, a digital position indicator on the main egress floor shall be installed. Load weighers shall be cable tension type.



23. The controller shall have the means to initiate floor calls from the machine room for diagnostic purposes.
24. A list of all programmable functions and variables shall be provided.
25. Information that describes the part number, function, and location of all circuit boards shall be provided. Provide all software updates that become available from the manufacturer.
26. A list of all points that are connected through terminal blocks shall be provided along with a description of the function of each point.
27. Startup and adjustment information shall be provided.
28. A means to examine and modify computer memory shall be provided as well as the adjustable parameters for parking features which allow the owner to enable or disable this function.
29. A list of all computer memory locations and functions shall be provided.
30. A list of all abbreviations and/or mnemonics shall be provided.
31. Serviceable LED cab lighting shall be provided.
32. All cabs shall be provided with a standard GFCI convenience outlet as a part of the operating panel for use by custodians and others.
33. All Class I security key switching shall have separate and unique keying. Key switching for independent service, fan and light, run/stop, fire service, and access shall be installed.
34. All hall and car buttons shall be specified as vandal resistant.
35. All car exhaust fans shall be specified as commercial duty Morrison type.
36. All MRL elevators shall be designed to have at a minimum, a separate control room or space. This space shall be directly adjacent to the hoist way and can be located on any level including the penthouse. Hoist-way or door frame controllers shall not be allowed.
37. An electrical sub-panel shall be installed in each elevator equipment room that will have lockable breakers and will service all of the equipment room, car, and hoist way branch circuits.
38. At the time of substantial completion, each car shall be loaded with its full test weight and run continuously for 30 minutes in the presence of the owner's representative. The test runs shall go from the top to the bottom and stop at every floor in between.
39. All existing elevator related equipment shall be protected against damage, dust and debris during construction.
40. All elevator mechanical areas shall be accessible through normal doorways without requiring the use of hatchways.



41. All parts required to service or maintain this equipment shall be available for purchase without restriction by the owner or any contractor hired by the owner to perform service.
42. The UW Electric Shop shall be advised of the time and date of any and all inspections.
43. All software furnished with the project shall become the property of the owner.
44. Fire alarm modules that supply signals to the elevator controller shall offer a visual indication of both a normal and an alarm condition in the elevator machine room. Refer to *Division 16* for additional information.
45. The elevator machine room shall have both heating and cooling capability in order to maintain a temperature of between 40 and 95 degrees F (non-condensing).
46. If multiple copies of an individual circuit board (such as an I/O card) are used in a controller, at least one spare board of that type shall be supplied as attic stock to the project.
47. A drain or sump pump in the pit shall be provided if the hoist way is to be sprinkled.
48. All equipment must be listed and labeled by the appropriate testing laboratory.
49. 60 days prior to the completion of warranty service, the installer shall contact the UW Electric Shop to inform them that the warranty period is about to end.
50. The header which is used to support the car door operator shall not be used as a raceway unless it is listed by an approved testing laboratory for this purpose.
51. The system shall be free of counters or timers which are designed to disable or interfere with the operation of the car after a certain count or period of time has been reached.
52. All fire alarm detectors shall be rated for the temperature that they can be expected to experience (especially important for parking ramp detectors.)
53. Elevator exhaust fans shall be capable of continuous long-term operation. Fans that are intended for residential use are not acceptable.
54. The Elevator Contractor shall be responsible for all maintenance, service, and callbacks on the equipment covered by the contract from the time that work begins until the end of the warranty period. This includes existing equipment that is to be remodeled.
55. Elevator access shall be provided to the main roof areas. Remote roof areas can be provided with a scuttle and ladder access except for elevator machine room access.

***14 24 00. Hydraulic Elevators (in addition to comments in the above section)***

1. For hydraulic elevators, battery powered lowering during loss of AC power shall be provided if the elevator is not connected to the building's emergency power system.
2. Hydraulic cylinders shall not be inverted. Hydraulic oil line full flow shut offs in both the pit and machine-room shall be provided.
3. All hydraulic control valves shall be Maxton or approved equal.



4. Hydraulic elevators shall be designed such that the controller and pumping unit shall be installed in the machine room only.
5. Provide and install an oil return pump in addition to an oil return line. The oil return line shall be a minimum of 5/16 inch inside diameter.
6. The oil return pump shall be secured in such a fashion that it will not be able to float in the event of a flood.
7. Submersible motor/pump combinations, similar to Dover EP, are unacceptable. No submersible motors in excess of 40 hp are permitted.
8. All water shall be removed from the space between the PVC liner and the metal casing of the ram. The space between the PVC liner and the ram shall be left as empty as possible and not be backfilled with sand. The top of the liner shall be sealed. A leak detection system shall be installed between the hydraulic cylinder and the PVC liner to monitor hydraulic oil leaks.
9. After construction is completed, the hydraulic cylinder packing shall be replaced.

### ***14 28 00. Elevator Equipment and Controls***

#### **14 28 19. Elevator Equipment**

1. Elevator Phones:
  - 1.1. The emergency phone shall be located behind a door rather than out in the open where it is susceptible to vandalism and pranks.
  - 1.2. The location of the phone shall meet ADAAG requirements.
  - 1.3. The Elevator Contractor and Electrical Contractor shall work together to pull the cable to the controller for the phone line and provide the Division of Information Technology (DoIT) with IDF, jack, and elevator numbers for each line. Contractors shall use the DoIT telephone installation template, provided at the end of this section.
  - 1.4. The Electrical Contractor shall install the voice jacks for emergency phones, which shall be USOC configured and located in a 4 sq box with face plate adjacent to the controller in coordination with the Elevator Contractor. Lines shall be tested for opens, shorts, and grounds and a separate cable for each emergency phone with one RJ-11 plug run from the interior of the controller to the splitter, shall be provided. This work shall be coordinated with the Elevator Contractor who shall notify the UW Electric Shop when the work is complete. Please allow at least 2 weeks for phones to be activated.
  - 1.5. The contractor, working through the UW Project Manager, shall enter a request to the UW Electric Shop to provide a dial tone. UW Electric Shop will coordinate the request with DoIT directly.
  - 1.6. Elevator phones must be installed and be available for testing by the UW Electric Shop a minimum of 10 working days before the City of Madison Fire Department inspects the elevators. When the phone has been installed and is ready for testing, the UW Electric Shop shall be contacted at 263-3333.



- 1.7 The following form (Elevator Phone Installation Request Form) shall be completed by the contractor in order to activate a phone line in the elevator cabs.
- 1.8 Provide hoistway lighting in all elevators.
- 1.9 Provide elevator pads and mounting studs for all elevators.
- 1.10 Contractor shall provide all required signage including machine room door signage.

**Elevator Phone Installation Request**

Building Name:  
Building Number/Address:  
Elevator Equipment Room:  
Elevator Number:  
Elevator Shaft Location (Rm Num):  
Telephone Jack Number:

DoIT Tech Provided Info:  
Phone Num  
SNI  
Riser

Building Name:  
Building Number/Address:  
Elevator Equipment Room:  
Elevator Number:  
Elevator Shaft Location (Rm Num):  
Telephone Jack Number:

DoIT Tech Provided Info:  
Phone Num  
SNI  
Riser

**Information filled in by UW Madison-DoIT**

2. Access Control in Elevators:
  - 2.1. Where elevator card readers are installed, the Elevator Contractor shall install a security panel and wire in each car call to a terminal strip inside the installed panel. This is in preparation for card reader installation, which will be completed by the Electrical Contractor.
  - 2.2. It is typical for each elevator cab to include a card reader or at the very least, include the infrastructure for its future installation.
  - 2.3. Provide 3 additional twisted shielded pairs for the elevator card readers in the elevator traveling cable. Provide 2 additional twisted shielded pairs for elevator cameras.