

SECTION 14 20 00
ELEVATORS
Design Standard

PART 1 GENERAL

1.1 PURPOSE

Elevators are an essential element for providing access to our disabled community, for transporting supplies and equipment vertically through a building, and for convenience. Because elevators are critical to college operations, and because maintenance budgets preclude expensive repairs, it is imperative that new and renovated elevators achieve reliable performance and ride quality, as well as the level of aesthetic quality, operability and maintainability suggested by this design standard.

PART 2 PRODUCT

2.1 ELEVATOR INSTALLER AND MAINTENANCE QUALIFICATIONS

Elevator installation and maintenance company must be a licensed Elevator Contractor in the State of California and must:

- A. Show evidence of successful experience in complete installation and maintenance of proposed manufacturer's elevator equipment.
- B. Directly employ sufficient competent personnel that is California licensed within 50 miles of San Mateo, California to handle construction and maintenance duties.
- C. Maintain local stock of parts adequate for replacement on permanent or emergency basis.
- D. Respond to trouble calls within one hour.

2.2 ELEVATOR TYPES

The buildings at SMCCCD's campuses are generally no taller than 3 stories, and future buildings are not likely to be taller than 3 stories in order to fit aesthetically in our campus environments. SMCCCD's existing elevators are hydraulic type elevators with no greater than 4 stops. Hydraulic elevators are less expensive to construct, and the technology is understood by operating personnel. As such, traditional single-post hydraulic elevators are the preferred elevator type at SMCCCD. Twin-post hydraulic elevators, holeless hydraulic elevators and roped hydraulic elevators are not to be designed or installed without the express written consent of the Vice Chancellor of Facilities. Inverted holeless hydraulic cylinders are not allowed.

Traction elevators would be considered provided the project design team puts forth a justification for such a recommendation and the recommendation is accepted in writing by the Vice Chancellor of Facilities. Machine-room-less (MRL) shall not be considered unless the State of California has adopted the MRL as a viable product in the Group V code additions.

2.3 GUIDE RAILS

Standard steel tees with backs machined for splice plates. Minimum weight shall be 15 pounds per foot.

2.4 CONTROLLERS

Elevators shall use standard, non-proprietary controllers. This allows SMCCCD to have many choices of service providers, rather than being locked into one sole source provider. Acceptable controllers include Motion Control Engineering, or an equivalent controller that can be easily and

economically serviced by an elevator service company other than the installing company. Any and all controllers shall be approved by the Vice Chancellor of facilities.

All diagnostic tools and equipment required for adjusting and troubleshooting shall be an integral / "on-board" feature of the microprocessor controller, and shall not require recharging, reprogramming or be of the automatic destruct type.

2.5 BATTERY EMERGENCY OPERATION

Battery back up is required to prevent entrapment during power outages for buildings without emergency power. In the event of a power outage, the battery power lowers the elevator to the main exit floor and the doors open to allow anyone who would otherwise be entrapped to exit safely.

A. Battery backup should operate as follows:

1. Provide a battery driven unit that will initiate operation of the protective circuits in case of a power failure.
2. Arrange circuitry so that, if the mainline switch is open when the power transfer takes place, the elevator will not respond to the operation of the protective circuit.
3. In case of normal power failure, arrange the elevator system to lower from a battery emergency supply. The emergency power supply shall consist of battery and battery chargers.
4. Upon the failure of normal power, lower the elevator to the main exit floor. Upon arrival at the main exit landing, the elevator doors shall open automatically and remain open until regular door time has expired. The elevator shall then become inactivated.
5. Automatically resume normal operation on restoration of normal power supply to the building.

2.6 DOUBLE-BOTTOM CYLINDERS WITH SEALED PVC CASINGS

To enhance passenger safety and reduce the risk of environmental contamination, SMCCCD requires new hydraulic elevators to have a code compliant double-bottom cylinder (in order to control the descending speed of the car as the hydraulic oil passes through a relief orifice should the bottom plate fail). SMCCCD also requires new hydraulic elevators to have a sealed PVC or HDPE casing with means to monitor and evacuate any moisture within the casing (to surround the entire cylinder and provide additional protection to the double-bottom cylinder investment and against environmental contamination). Provide a pressure type line rupture safety valve to shut off oil between cylinder head and pit valve. Activation of safety valve shall not void operation of lowering valve.

2.7 PUMPING PLANT

Self contained unit with sound reducing cabinet and sound isolated base. IMO, Roper or accepted equal pumping unit designed for biodegradable hydraulic vegetable oil or biodegradable equal, belt driven or submersible. Maximum speed 3600 RPM. Tank capacity equal to plunger displacement plus 25%. Provide strainers, oil level gauge and device to maintain uniform oil temperature. Integral type valve by Elevator Equipment Company, Maxton Company or by elevator manufacturer. Provide conveniently located manual lowering valve accessible without removing pumping plant enclosure panels. General Electric, Imperial, Westinghouse motor or accepted equal; maximum speed 1800 RPM for belt driven and 3600 RPM for submersible. Provide minimum 120 start heavy-duty motor, continuous rated, 50 degrees C. temperature rise, Class A

insulation or 70 degrees C. rise for Class B insulation. Blow-out proof type muffler between pumping plant and cylinder.

2.8 ENVIRONMENTALLY SAFE HYDRAULIC OIL

Provide biodegradable hydraulic vegetable oil or approved biodegradable equal specifically designed and formulated for hydraulic elevator use

2.9 PERFORMANCE, OPERATING QUALITIES, VIBRATION CONTROL AND SOUND CONTROL

A. Performance

1. Contract Speed: Floor to floor time of 8.5 seconds based on 12' floor heights. Allow .4 second variable for every foot variation from the 12'. Maximum ten percent (10%) speed variation under any loading condition in either direction.
2. Hydraulic Pressure: Hydraulic components shall be factory tested for 600 PSI. Maximum operating pressure shall be 425 PSI.
3. Door Open Times: 2.3 - 2.5 Seconds.
4. Door Close Times: 3.0 Seconds or minimum without exceeding kinetic energy and closing force allowed by code.
5. Door Dwell Times: Separate adjustable timers with initial settings at a minimum 5.0 seconds for both car and hall calls. Door dwell times shall be canceled by registration of car calls or by pressing the "door close" button.
6. Nudging Time: Adjustable timer to set activation of nudging when the door edge protector is blocked. Set time to a min. 20 seconds to a max 40 seconds.
7. Leveling: Allow no more than 2 to 3 seconds of stabilized leveling and leveling within three-eighths (3/8) inch under any loading condition. Level into floor at all times, do not overrun floor and level back.

B. Operating Qualities

1. Transition: Starting and stopping shall be smooth and comfortable. Slowdown, stopping and leveling shall be without jars or bumps.
2. Full Speed: Riding shall be free from vibration and sway.

C. Vibration Control

Specify effective sound isolation materials to isolate pumping plant from building structure to prevent objectionable noise and vibration transmission to occupied building spaces. The vibration measured from the operation of an elevator shall be less than human perceptibility within any occupied living space, working space or space that is being used by patrons of museums, libraries, theaters, etc. The vibration level shall be defined as indicated in ANSI S3.29 and shall be measured in only the vertical direction.

D. Sound Control

Maximum acoustical output level shall not exceed:

1. 80 dBA measured 3 feet from any piece of equipment in machine room.
2. 50 dBA measured in center of elevator cars and 5 feet above the cab floor during all sequences of operation.

3. 45 dBA measured in elevator lobbies 10 feet from the elevator doors.

2.10 FINISHES

A. SMCCCD's preferred finishes include:

1. No. 4 Satin Stainless Steel for interior and exterior doors, and for door jams.
2. Interior cab walls wear best with textured, rigidized stainless steel, with its increased impact resistance, graffiti resistance, and reflection control that hides scratches and eliminates oil-canning. Rigidized Metals Corporation's 5.WL is an acceptable textured stainless steel; equivalent textured stainless steel, 6.WL, 1.NA, 2.WL, 1.CS, and 1.HM and #4 swirl patterns are also acceptable.
3. Designers should plan on replacing existing cab finishes that do not conform to these design standards, except in the case of freight-only elevators.

The sill shall be extruded aluminum, recessed to allow for finished floor. The finished flooring shall be the same resilient flooring as adjacent spaces. In no instance is carpet acceptable.

Permit holder shall be displayed within the service cabinet door in the elevator car operating panel.

The hallway signage warning occupants to use the stairway for exit in case of fire should be combined with the hall call button, in one brushed metal placard.

2.11 KEY SWITCHES

Key switches shall be keyed to each College's master key system (Schlage Key Cores). This requirement ensures that operating personnel do not have to carry or duplicate additional keys, and emergency response personnel (particularly fire responders) have the appropriate keys. Each function and/or lock shall be keyed alike.

Coordinate the design of the elevator controls key switches with the work of the security system designer and hardware specifier. Note that the appropriately pinned cylinders will be provided to the elevator contractor for installation.

2.12 CEILINGS AND LIGHTING

SMCCCD goal for elevator lighting includes an evenly and adequately lit cab using energy efficient lamps with long service lives. To that end, designers should specify any of the following lighting options:

- A. Suspended opaque acrylic ceiling grills, acting as lighting diffusers to the L.E.D. strip lights above that or include electronic ballasts and four foot T8 lamps
- B. Suspended silver parabolic lenses, acting as lighting diffusers to the L.E.D. strip lights above that or include electronic ballasts and four foot T8 lamps
- C. No. 4 Stainless steel panels with recessed, L.E.D. down cans

NOTE: Any type lighting system installed shall have the capability to change the light from inside the elevator cab.

Emergency Lighting: Provide an emergency car lighting battery unit mounted on top of car, battery driven and self-rechargeable. Upon outage of normal power the unit shall, within 5 seconds, light two lamps as part of normal car lighting or separate lights mounted above drop ceiling. The unit shall have sufficient capacity to keep the lights in continuous operation for four hours and also the

alarm bell for one hour. Provide a readily accessible means for testing the unit in service cabinet. Light fixtures mounted in car front returns or operating panels are not acceptable. Specify a test button in service cabinet labeled "EM Light Test".

2.13 TELEPHONE

Specify a complete system consisting of a telephone and automatic dialer and push button to activate system. The telephone shall not be on the District's VOIP internal communications system, because category 6 cabling has a bending radius constraint inconsistent with the requirements of the elevator shaft; specify a POTS line. Mount behind a pattern of holes as an integral part of car operating panel. The automatic dialer shall be programmed to call the elevator contractor's telephone monitoring service (see Section 14 Warranty and Service, below).

2.14 FLOOR ACCESS (CARD READERS)

Elevators with exterior access shall be tied to the College's access control and alarm monitoring system (ACAMS), for after-hours access. The ACAMS shall also be used if floors or areas of the building are to be isolated from each other during or after hours. Designer shall incorporate into car operating panel layout a space for a surface mount proximity reader used by the College.

Coordinate the design of the elevator controls with the work of the security system designer. Specify that the elevator contractor is to include required wiring from the cab and elevator lobbies to the demarcation enclosure with terminal strips for interface to ACAMS in the machine room, and that the final connections of the card readers shall be made by the security system integrator. Access control system must be over ridden by emergency operation.

2.15 CAB AND LOBBY VIDEO MONITORING

Provide video monitoring per other sections of the District Standards. Project Team and Contractors shall design, coordinate, procure and install required cabling and devices and deliver functional monitoring prior to hand over to SMCCCD.

2.16 SUMP PIT MONITORING

Dry sump pit and pit cover shall be designed and provided.

Design and install monitoring device for pit to alert SMCCCD personnel accumulation of liquids in the pit. The monitoring device shall report to SMCCCD directed locations via a SMCCCD directed method. Refer to IT and Security Sections of the District Standards also.

2.17 PROTECTIVE PADS

Each cab must have its own set of pads provided in a heavy duty duffel bag with handles. This requirement ensures that each cab can be protected even during concurrent furniture/fixture/occupant moving operations, that maintenance personnel can handily carry the pads from the storage location to the cab for ease of installation, and that the pads are protected during periods of storage.

Pads shall cover all walls with cutout sections for car operating panels. Specify heavy duty stainless steel buttons attached to cab panels for hanging.

2.18 PERMITS

Specify that contractor is responsible for arranging and paying for inspections by governing authorities and obtaining operating permits. The operating permit shall list as the owner: San Mateo County Community College District, 3401 CSM Drive, San Mateo, CA 94402.

2.19 WARRANTY AND SERVICE

The elevator contractor shall warrant the new or renovated elevator for a period of 12 months following substantial completion of the general contractor's contract. Under no circumstances shall the elevator warranty period commence prior to the governing authority issuing an operating permit for the elevator.

SMCCCD typically uses one elevator service company to perform all its elevator service on existing elevators and dumbwaiters, including telephone monitoring service, monthly preventive maintenance service, callback repairs, entrapment rescues and 5-year load testing. However, we require new or renovated elevators to be fully serviced for the first 12 month period by the same elevator contractor who installed and is warranting the unit, and this requirement should be specified in the construction specifications. Specify the following activities and criteria to be included as part of this requirement:

- A. Prior to commencing the 12 month maintenance service period, execute a standard elevator maintenance service agreement with the San Mateo County Community College District, through the office of the Vice Chancellor of Facilities.
- B. Provide complete monthly maintenance on entire elevator system for a period of 12 months. This shall minimally include:
 - 1. Examination: Include systematic examination with monthly adjustment and lubrication of elevator equipment. Whenever required provide replacement of defective parts with parts of same manufacture as required for proper operation. Contractor is not responsible for repairs to car enclosures, door panels, frames, sills or platform flooring resulting from normal usage or misuse, accidents and negligence.
 - 2. Testing: Include any testing required by Code authorities including monthly testing of Firefighters' Service.
 - 3. Performance Standards: Maintain smooth starting, stopping, ride qualities and accurate leveling at all times.
 - 4. Call-Backs: Provide 24 hour emergency call-back service at no additional cost to Owner. Emergency call-back includes trapped passengers and incidents where serious equipment or building damage may occur. Respond to trouble calls within one hour.
 - 5. Telephone Monitoring: The automatic dialer shall be programmed to call the elevator contractor's telephone monitoring service. Coordinate through the District's Office of the Vice Chancellor of Facilities for the College's callback notification protocol.
- C. Final Service and Inspection: Two weeks before expiration of the year's maintenance, the equipment shall be lubricated, fully serviced, adjusted to the standards designated and emergency service operation devices shall be checked. A representative of the District will make a complete inspection.
- D. Elevator Shutdowns:
 - 1. Should the elevator become inoperative, repair or replace minor components within 24 hours of notification of failure and return to service. Complete service and repairs of major components within 72 hours.
 - 2. The District may order the work done by other contractors at the Contractor's expense for failure to comply with the requirements noted above.

3. Extend maintenance and responsibility for correct operation to devices repaired or replaced by others under these circumstances.
- E. Follow-Up Tests: Test all safety devices and emergency operations at 6 month intervals or sooner and submit written report on each test. Perform tests at times that do not interfere with College operations.
- F. Maintenance Tool and Software Manuals: Provide maintenance tools, supporting software, instruction manuals and all documentation required for maintenance of the entire system including trouble shooting, diagnostics and adjusting. All diagnostic tools and equipment required for adjusting and troubleshooting shall be an integral / "on-board" feature of the microprocessor controller, and shall not require recharging, reprogramming or be of the automatic destruct type.
- G. Maintenance Materials: The elevator service contractor shall provide a metal cabinet in the machine room containing a reasonable supply of expendable parts required for prompt replacement. Replenish parts used for routine main-tenance to ensure an adequate supply is available. Cabinet and all contents shall become property of SMCCCD and shall not be removed upon expiration of maintenance period.

2.20 APPROVED MANUFACTURES

- A. Elevator Manufacturers
 1. Otis Elevator Co.
 2. Schindler Elevator Co.
 3. ThyssenKrupp Elevator Corp.
 4. Kone Elevator Company
 5. Mitsubishi Elevator Company
- B. Microprocessor Controllers
 1. Motion Control Engineering
 2. Or equivalent nonproprietary
- C. Cab and Entrance Manufacturers
 1. Elevator manufacturer
 2. Tyler Elevator Products
 3. H & B Elevators
 4. Sterling Corporation
 5. Swiss Dane

PART 3 EXECUTION

3.1 SUBSTITUTES ALLOWED?

Yes, if performance and quality equivalency can be evidenced and approved by the Vice Chancellor of facilities.

3.2 ASSOCIATED DESIGN STANDARDS AND CONSTRUCTION SPECIFICATIONS

n/a

END OF SECTION