
USACE / NAVFAC / AFCEC / NASA UFGS-14 24 00 (August 2010)

Preparing Activity: USACE Superseding
UFGS-14 24 00 (February 2009)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated October 2013

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HYDRAULIC ELEVATORS

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NOTE: This guide specification covers the requirements for hydraulic passenger and freight elevators.

Adhere to [UFC 1-300-02](#) Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable items(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a [Criteria Change Request \(CCR\)](#).

PART 1 GENERAL

NOTE: For NAVFAC projects, any editing of non-bracketed paragraphs in this specification must be approved through the NAVFAC Elevator Program.

The designer will incorporate the following features into the design and will show in the drawings as applicable.

1. Complete design of the hoistways, pits, machine rooms including all structural requirements, sizing, access, fire-resistant rating, ventilation, waterproofing and drainage.

2. Proper size of openings into hoistway walls for installing hoistway door assemblies.

3. Storage facilities for elevator equipment during construction.
4. Electrical service requirements for elevators, including sizings in compliance with codes and locations for fused and unfused disconnect switches.
5. Sill supports, including steel angles, sill recesses, and grouting of door sills.
6. Structural steel door frames with extensions to beams.
7. Locations for hall stations and hall lanterns.
8. Emergency power supply with automatic time-delay transfer switch and auxiliary contacts with wiring to elevator controller.
9. Telephone and or Intercom connections to elevator hoistway.
10. Location of smoke detectors required for Firefighters' Service. The designer will also indicate wiring of the smoke detectors to the elevator control system and to the building fire alarm system.
11. Wiring to elevator alarm bells and fire-fighters' service.
12. Lighting, ventilation and heat to machine room. Ambient temperature of 10 degrees C (50 degrees F) min., 32 degrees C (90 degrees F) max.

1.1 REFERENCES

NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a RID outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M (2010; Errata 2011) Structural Welding Code - Steel

ASME INTERNATIONAL (ASME)

ASME A17.1/CSA B44 (2010) Safety Code for Elevators and Escalators

ASME A17.2 (2012) Guide for Inspection of Elevators, Escalators, and Moving Walks Includes Inspection Procedures for Electric Traction and Winding Drum Elevators, Hydraulic Elevators, and Escalators and Moving Walks

ASME B16.11 (2011) Forged Fittings, Socket-Welding and Threaded

ASME B16.9 (2012) Standard for Factory-Made Wrought Steel Buttwelding Fittings

ASTM INTERNATIONAL (ASTM)

ASTM A106/A106M (2011) Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service

ASTM A53/A53M (2012) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

INTERNATIONAL CODE COUNCIL (ICC)

ICC IBC (2012) International Building Code

NATIONAL ELEVATOR INDUSTRY, INC. (NEII)

NEII-1 (2000; R thru 2010) Building Transportation Standards and Guidelines, including the Performance Standards Matrix for New Elevator Installation

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 252 (2012) Standard Methods of Fire Tests of Door Assemblies

NFPA 70 (2014) National Electrical Code

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.27 Fixed Ladders

1.2 SUMMARY

Provide a pre-engineered elevator system, by manufacturer regularly engaged in the manufacture of elevator systems, that complies with ASME A17.1/CSA B44 and ASME A17.2 in their entirety, and additional requirements specified herein.

1.2.1 Miscellaneous Requirements

Submit one set of wiring diagrams, in plastic or glass cover, framed and mounted in elevator machine room for revised building electrical system, if needed, to make supplied elevator system function as specified. Deliver other sets to Contracting Officer. Coded diagrams are not acceptable unless adequately identified. Submit calculations for the Reaction Loads imposed on the building by elevator systems that comply with ASME A17.1/CSA B44 and for total anticipated Heat Loads generated by all the elevator machine room equipment. Calculations shall be certified by a Registered Professional Engineer. Do not fabricate materials nor perform construction until approved.

1.2.2 Provisions for Earthquake Protection

NOTE: Provide seismic protection as covered by ASME A17.1/CSA B44, Section 8.4. Provide fastenings, attachments, and restraints for prevention of seismic damage in detail by registered structural engineer whose seal is applied to drawings or sketches. Use forces of 1.0 G horizontal and 1.0 G vertical or heavier.

The facility is located in a seismic zone [3] [4], and shall comply with all ASME A17.1/CSA B44, Part 8.4 requirements.

1.3 SUBMITTALS

NOTE: Review submittal description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project.

The Guide Specification technical editors have designated those items that require Government approval, due to their complexity or criticality, with a "G." Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a "G" to an item, if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army

projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for [Contractor Quality Control approval.] [information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Detail Drawings[; G][; G, [_____]]

SD-03 Product Data

Passenger Elevators[; G][; G, [_____]]
Freight Elevators[; G][; G, [_____]]
Field Quality Control Plan[; G][; G, [_____]]
Logic Control[; G][; G, [_____]]

SD-05 Design Data

Reaction Loads[; G][; G, [_____]]
Heat Loads[; G][; G, [_____]]

SD-06 Test Reports

Field Tests Reports

SD-07 Certificates

Welders' Qualifications[; G][; G, [_____]]

SD-10 Operation and Maintenance Data

Operation and Maintenance Manuals[; G][; G, [_____]]
Maintenance and Diagnostic Tools[; G][; G, [_____]]
Maintenance and Diagnostic Software
Maintenance and Repair Action Plan[; G][; G, [_____]]
Operation and Maintenance Training[; G][; G, [_____]]

1.4 QUALITY ASSURANCE

1.4.1 Elevator Specialist

Perform work specified in this section under the direct guidance of the Elevator Specialist who is regularly engaged in the installation and maintenance of the type and complexity of elevator system specified in the contract documents, and who served in a similar capacity for at least three systems that have performed in the manner intended for a period of not less than 24 months. Provide endorsement letter from the elevator manufacturer certifying that the Elevator Specialist is acceptable to manufacturer. The Elevator Specialist oversees the acceptance inspections and tests, signs and certifies the successful results. Provide the Elevator Specialist's written certification that the installation is in accordance with the contract requirements, after completion of the acceptance inspections and tests. Bring any discrepancy to the attention of the Contracting Officer in writing, no later than three working days after the discrepancy is discovered.

1.4.2 Elevator Inspector

NOTE: Use the first bracketed paragraph where the Elevator Inspector will be provided by the Contractor. Use the second bracketed paragraph for all Navy projects where a NAVFAC Certified Inspector is available (except in Hawaii) or for Army or Air Force projects where the services of a Government furnished Elevator Inspector is available and preferable to the designer and customer. The services of a NAVFAC Certified Inspector may be available for an Army and Air Force project. Use the reference to licensing by the State of [_____] only in the State of [_____].

Note that the source of the Elevator Inspector will impact the funding required, therefore the options should be thoroughly considered and decided upon as early in the design process as possible, preferably at the Predesign Conference.

Where the Elevator Inspector is not required, delete the submittal requirement for Certificates listed under SD-07. Similarly, delete the submittal requirement for under SD-07 for projects not in Hawaii.

- [a. The Elevator Inspector shall be [certified in accordance with the requirements of ASME A17.1/CSA B44] [and licensed by the State of [_____] in elevator repair, except in the State of Hawaii]. The Certified Elevator Inspector shall inspect the installation of the elevator(s) to ensure that the installation conforms with all contract requirements. The Elevator Inspector shall be directly employed by the Prime Contractor and be independent of the Elevator System Manufacturer and the Elevator Specialist, shall witness the acceptance inspections and tests, approve all results and shall sign and certify the successful results. The Elevator Inspector, after completion of the acceptance inspections and tests, shall certify in writing that the

installation is in accordance with the contract requirements. Bring any discrepancy to the attention of the Contracting Officer in writing, no later than three working days after the discrepancy is discovered.]

- [b. The Elevator Inspector will be provided by the Government to inspect the installation of the elevator(s) to ensure that the installation conforms to all contract requirements. The Elevator Inspector will witness the acceptance inspections and tests, approve all results, and shall sign and certify the successful results. The Elevator Inspector, after completion of the acceptance inspections and tests, will provide written certification that the installation is accordance with the contract requirements.]

1.4.3 Welders' Qualifications

Comply with AWS D1.1/D1.1M, Section 4 Qualification. Provide certified copies of welders' qualifications. List welders' names with corresponding code marks to identify each welder's work. Submit [a letter, no later than 14 days [_____] after the Notice to Proceed, providing the name and Statement of Qualifications, including ASME A17.1/CSA B44 Certificate and all required state and local licenses of the individual who will perform the duties specified herein for the Elevator Inspector.] [copies of Elevator Inspectors State of Hawaii Licenses.] A letter of endorsement from the elevator manufacturer certifying that the Elevator Specialist is acceptable to manufacturer, no later than 14 days [_____] after the Notice to Proceed, providing the name and Statement of Qualifications of the individual who will perform the duties specified herein for the Elevator Specialist. Copies of certified welders' qualifications, demonstrating compliance with AWS D1.1/D1.1M, Section 4; list welders' names with corresponding code marks.

1.4.4 Detail Drawings

Submit detail drawings, including dimensioned layouts in plan and elevation showing the arrangement of elevator equipment, accessories, supporting systems, anchorage of equipment, clearances for maintenance and operation; and details on hoistway, doors and frames, operation and signal stations, controllers, motors, guide rails and brackets, cylinder and plunge unit, and points of interface with normal power [fire alarm system] [HVAC or exhaust systems] [and] [interface with emergency power systems]. Provide drawings to show any revised building electrical system required to make supplied elevator system function as specified. Prepare drawings with complete wiring diagrams showing electrical connections and other details required to demonstrate sequence of operations and functions of system devices. Include the appropriate sizing of electrical protective devices on the drawings, which are frequently different from National Electrical Code standard sizes.

1.5 SCHEDULING

Every six months, test systems for [Emergency Power Operation,] [Earthquake Emergency Operations,] [Hospital Emergency Commandeering Service Operations] [and] Firefighters' Service. Schedule to not interfere with building operations. For Firefighters' Service, test monthly in accordance with ASME A17.1/CSA B44, Section 8.6.10.1. Provide written results of each test operation to the Contracting Officer. Document all inspection and testing. Maintain copy of documentation in machine room.

1.6 WARRANTY

NOTE: If elevator is located in remote location,
confirm the necessity for the 1 hour response time
required below with activity.

Provide routine warranty service in accord with manufacturer's warranty requirements, for a period of [12] [_____] months after the date of acceptance by Contracting Officer. [Perform work during regular working hours]. During the warranty service period, include 24-hour emergency service, with [1] [_____] hour response time, without additional cost to the Government. Include adjustments, greasing, oiling, and cleaning. Provide routine inspection and tests of elevators in accordance with ASME A17.1/CSA B44 Section 8.11.3 and ASME A17.2. Provide supplies and parts to keep elevator system in operation. Perform service only by factory trained personnel. Maintain a maintenance log of all service orders performed during the warranty period and submit it to the Contracting Officer [21] [_____] days prior to the end of the warranty period.

1.7 MAINTENANCE AND REPAIR ACTION PLAN

Provide plan of action prepared by the Elevator Specialist for emergency and routine maintenance in accordance with paragraph titled WARRANTY. Provide a list of phone numbers, personnel contacts, and all maintenance and diagnostic tools provided by paragraph "Maintenance and Diagnostic Tools", to the Contracting Officer.

1.7.1 Maintenance and Diagnostic Tools

Provide all special tools and software necessary to service and maintain each elevator delivered at time of final acceptance. Provide one of each tool per group of elevators. Include solid state or microprocessor diagnostic tools unavailable on the open market. Provide necessary diagnostic software in cases where the solid state or microprocessor diagnostic tools are available on the open market

1.7.2 Keys for Elevator Key Switches

Provide a minimum of twelve keys per unique cylinder used on all key switches for single elevator. If there is more than one elevator, additional keys are not required unless there are additional unique cylinders. Provide keys with brass or fiberglass tags marked 'PROPERTY OF THE U.S. GOVERNMENT' on one side with function of key or approved code number on other side.

PART 2 PRODUCTS

2.1 PASSENGER ELEVATORS

2.1.1 Basic Requirements

NOTE: Provide all elevators of size to accommodate
handicapped access as a minimum. For all buildings
of four stories or more in height, provide at least
one elevator of size to accommodate emergency

medical services.

For car door opening of passenger and service elevators, 1065 mm (3 ft. 6 in.) is standard, except with 1800 kg (4000 lb.) passenger cars, use 1200 mm (4 ft. 0 in.). For special purposes, 1525 mm (5 ft. 0 in.) opening may be used.

Use two speed center opening option restrictively for elevators where larger door opening is needed and hoistway space is not available for single-speed. Otherwise, use single-speed side slide, single-speed center opening, or two-speed side slide.

Submit information on motor, pump, gages, piston and cylinder, piping and valves, hall station, and buffer on elevators and accessories. For elevator supporting systems, include information on car control [and emergency power] systems. On data sheets, provide document identification number or bulletin number, published or copyrighted prior to the date of contract bid opening. These requirements apply to Freight Elevators also.

- a. Rated Load: [_____] kg lbs.
- b. Rated Speed: [_____] mps fpm.
- c. Travel Length: [_____] m ft..
- d. Number of Stops: [_____]
- e. Number of Hoist Way Openings: [_____] Front; [_____] Rear
- f. Car Inside Dimensions: [_____] mm ft.-in..wide, [_____] mm ft.-in. deep and [_____] mm ft.-in. high.
- h. Car Door Types: [Single-speed side slide] [Single-speed center opening] [Two-speed side slide] [Two-speed center opening] Horizontal sliding.

2.1.2 Cab Enclosures and Door Finishes

NOTE: Indicate finish colors of elevator materials in finish schedule on drawings.

Use stainless steel door facing and side panels and wall trim in hospital cars and for moist environments such as humid or moist areas such as hydroelectric plants, locks, and dams.

Provide finishes [as indicated.] [as listed below:

2.1.2.1 Floor

[carpet] [vinyl composition tile] [vinyl sheet tile] [_____]

2.1.2.2 Walls

[prefinished steel panels] [laminated plastic on particleboard] [laminated plastic on particleboard with rounded stainless steel angle edges] [stainless steel] [_____]. Provide each cab wall with equally spaced and equally sized wall panels. Conceal all fasteners.

2.1.2.3 Wall Trim

[prefinished steel] [stainless steel] [_____]

2.1.2.4 Accessories

[hand rails] [_____]

2.1.2.5 Interior Face of Door(s)

[prefinished steel panels] [stainless steel] [_____]

2.1.2.6 Ceilings

[supported] [prefinished steel panels] [anodized aluminum] [eggcrate] [_____]

2.1.2.7 Ceiling Frame

[prefinished steel] [stainless steel] [anodized aluminum] [_____]

[2.1.2.8 Hoistway Doors and Frame Finishes

Provide finishes on exterior of hoistway as follows:

2.1.2.8.1 Frame

[prefinished steel] [stainless steel] [_____]

2.1.2.8.2 Exterior Face of door

[prefinished steel] [stainless steel] [_____]

]2.2 FREIGHT ELEVATORS

2.2.1 Basic Requirements

NOTE: For details of loading classes, refer to ASME
A17.1/CSA B44, Sections 2.16.2.2 and 3.23.

- a. Rated Load: [_____] kg lbs.
- b. Rated Speed: [_____] mps fpm
- c. Travel Length: [_____] m ft.
- d. Number of Stops: [_____]
- e. Number of Hoist Way Openings: [_____] Front; Rear [_____]

- f. Car Inside Dimensions: [_____] mm ft.-in. wide, [_____] mm ft.-in. deep and [_____] mm ft.-in. high.
- g. Hoistway Door Type & Size: [Manual] [Power Operated] Vertical [Bi-Parting] [Rising] [_____] mm ft.-in. wide and [_____] mm ft.-in. high.
- h. Car Gate Type: [Manual] [Power Operated] Vertical rising
- i. Loading Type: Class [A] [B] [C]

2.2.2 Cab Enclosures and Door Frame Finishes

NOTE: Indicate finish colors of elevator materials in finish schedule on drawings.

Use stainless steel door facing and side panels and wall trim in hospital cars and for moist environments such as humid or moist areas such as hydroelectric plants, locks, and dams.

Provide finishes [as indicated.] [as listed below:

2.2.2.1 Floor

[mill finish steel diamond plate] [painted steel diamond plate] [aluminum diamond plate] [tongue and groove hardwood] [_____]

2.2.2.2 Walls

[prefinished steel panels] [stainless steel] [_____]

2.2.2.3 Wall Trim

[prefinished steel] [stainless steel] [_____]

2.2.2.4 Accessories

[handrails] [_____]

2.2.2.5 Interior Face of Doors

[prefinished steel] [stainless steel] [_____]

2.2.2.6 Ceiling

[prefinished steel panels] [stainless steel] [anodized aluminum] [_____]

[2.2.2.7 Hoistway Doors and Frame Finishes

Provide finishes on exterior of hoistway as follows:

2.2.2.7.1 Frame

[prefinished steel] [stainless steel] [_____]

2.2.2.7.2 Exterior Face of Door

[prefinished steel] [stainless steel] [_____]

2.3 SPECIAL OPERATION AND CONTROL

Provide all special operations and control systems in accordance with [ASME A17.1/CSA B44](#). Provide special operation key switches with [5] [6] pin cylinder locks with removable cores and a key control lock for each operation system.

2.3.1 Firefighters' Service

NOTE: Firefighter Service is required on all freight and passenger elevators. Coordinate the Firefighters' designated floor level with the local base Fire department and edit following paragraph

Provide equipment and signaling devices. The designated level for Firefighters' key operated switch is the [ground] [_____] floor.

2.3.2 Smoke Detectors

Provide connections directly to elevator controls which will, when smoke is detected by any smoke detector, actuate Firefighters' Service and send each elevator to the correct floor as required by [ASME A17.1/CSA B44](#). Provide dual-contact smoke detectors located in the elevator lobbies and the elevator machine room. Provide dual-contact smoke detector at top of hoistway. Include only these smoke detectors with the circuit for elevator controller actuation of Firefighters' Service. In lieu of dual-contact smoke detectors, use an addressable fire alarm system with listed smoke detectors in the above stated locations. Ensure that all smoke detectors are mounted on finished ceiling.

2.3.3 Fire Sprinklers

NOTE: Virtually all new elevator installations require fire sprinklers in each elevator machinery room. Hydraulic elevators require sprinklers in the hoistway. All hydraulic elevators require sprinklers in the pit, and at the top of the hoistway when the cylinder or supply line extends above the second floor finish.

For each elevator, provide control wiring connecting the flow switch to the shunt trip equipped circuit breaker within the electrical panel serving the main line disconnect. Upon flow of water, equip flow switch to instantaneously send a signal to cause opening of shunt-trip equipped mainline circuit breaker, in compliance with [ASME A17.1/CSA B44](#), Section 2.8.2, and send a signal to fire alarm control panel to indicate water flow condition. Provide machine room sprinkler flow switch actuation to shunt trip all elevator(s) served by the machine room. Provide hoistway sprinkler flow switch actuation to shunt trip all elevator(s) in the hoistway.

2.3.4 Top-of-Car Operating Device

Provide operating device mounted on or from car crosshead, to permit operation of car at 0.75 mps 150 fpm maximum for adjustment, maintenance, testing, and repair. Include integral or remote safety device, continuous pressure "UP" and "DOWN" switches or buttons, emergency stop switch, and inspection switch.

2.3.5 Hoistway Access Switches

Provide key-operated hoistway access switch to permit limited movement of car at terminal floors for car positioning, operative only when "INSPECTION" switch in car operating panel is in the "INSPECTION" position. Locate switch 1800 mm 6 feet above floor level, within 300 mm 12 inches of hoistway entrance frame or with only ferrule exposed when located in entrance frame.

2.3.6 Independent Service

NOTE: Use the last bracketed sentence when there
are two or more cars in group.

Provide exposed key-operated switch in car operating panel to enable independent service and simultaneously disable in-car signals and landing-call responses. Provide indicator lights that automatically illuminate during independent service. [If one car is removed from group, provide other car(s) responding to its hall call.]

2.3.7 Elevator Operation

NOTE: Choose one of the following four types of
operations: Single Two-Stop Automatic, Selective
Collective Automatic, Duplex Selective Collective or
Group Automatic

2.3.7.1 Single, Two-Stop, Automatic Operation

NOTE: Specify for Single, Two-Stop elevator only.

Provide Single Two-Stop Automatic Operation. Provide illuminating push buttons.

2.3.7.2 Selective Collective Automatic Operation

NOTE: Specify for single elevator serving three or
more landings.

Provide Selective Collective Automatic Operation. Provide illuminating push buttons.

2.3.7.3 Duplex Selective Collective Automatic Operations

NOTE: Specify for two adjacent elevators.

Provide Duplex Selective Collective Automatic Operation. Provide a single push button for terminal landings and dual push buttons, up and down, at intermediate landings. In each car operating panel, provide push buttons numbered to correspond to each landing. If a car is taken out of service, or fails to respond to a landing call within a predetermined adjustable time limit of approximately 40 to 180 seconds, transfer calls to the other elevator functioning as a Selective Collective elevator until the out-of-service car is returned to the system. Provide a push-button riser adjacent to each elevator.

2.3.7.4 Group Automatic Operation

NOTE: Specify for three or more adjacent elevators.

Provide Group Automatic Operation. Provide a single push button for terminal landings and dual push buttons, up and down, at intermediate landings. In each car operating panel, provide push buttons numbered to correspond to each landing. If a car is taken out of service, or fails to respond to a landing call within a predetermined adjustable time limit of approximately 40 to 180 seconds, transfer calls to another car until the out-of-service car is returned to the system. Provide a push-button riser adjacent to each elevator.

2.3.8 Parking Switch

NOTE: Specify parking switch if there is a definite reason to change parking station daily or for security purposes. For example, to provide night shut down of a car for security reasons. Indicate parking floor.

Provide two-position parking switch in car station service cabinet. One position causes car to remain parked at floor landing where last used; other position causes car to park at [main] [____] floor.

2.3.9 Hospital Emergency Commandeering Service

NOTE: Commandeering Service can be used for priority service. Duplication of keys by unauthorized persons is possible. The designer must determine whether security of individuals or quickness in obtaining car is governing consideration for each project. Verify with facility personnel that control of key duplication can be maintained.

Provide "ON-OFF" key switch and indicator light at [designated] [all]

landings to cause one elevator to respond directly to the landing activated. Turning switch to "ON" position cancels previously registered "CAR" calls and requires car to bypass hall calls while in route to activated landing. On arrival, car shall remain at landing with hoistway and car doors open for predetermined time to permit car to be placed on emergency service. If the person decides not to use car during predetermined time period, car door closes and car automatically returns to normal service. Provide indicator lights that automatically illuminate during emergency service. Permit Removal of the key only when key is in "OFF" position.

2.4 ELEVATOR DRIVE SYSTEM

Provide hydraulic elevator drive system, including pump unit, piping, cylinder/plunger assembly, and associated equipment, which will operate at a maximum working pressure of 3447 kPag 500 psi or less. Provide complete elevator system that meets or exceeds the NEII-1.

2.4.1 Hydraulic Pump Unit

Provide self-contained pump unit, including oil-hydraulic elevator pump, electric motor, suction-line oil strainer, oil-tight drip pan, and structural steel outer base with tank supports and isolation pads. Provide oil tank capacity for full plunger displacement plus at least 38 liters 10 gallons. Provide means to maintain oil temperature between 27 and 49 degrees C 80 and 120 degrees F regardless of ambient temperature. Limit acoustic output in elevator machine room to 80 dbA.

2.4.1.1 Pump Motor

Provide intermittent-duty pump motor rated at 120 starts/hour. Provide motor that is sized so that the motor amperage does not exceed the motor data tag amperage in any operating condition, exclusive of acceleration and deceleration. Provide minimum of one megohm insulation resistance between conductors and motor frame. Provide motor and pump nameplate and data tags permanently mounted on the outside of the pump unit frame, with all data viewable without the use of mirrors or other tools.

2.4.2 Hydraulic Controls and Equipment

Provide control valve, overspeed (rupture) valve, blowout-proof muffler, and hydraulic pump discharge strainer in the hydraulic oil supply line. Provide 1/4 turn, manual shutoff ball-valves in the elevator machine room and in the hoistway pit. Provide scavenger pump in hoistway pit.

2.4.2.1 Hydraulic Control Valve

Provide constant-velocity, down-speed regulated, control valve. Down-speed regulated control valve allows the car to travel at the same speed in the down direction, regardless of the load on the elevator. In addition, the hydraulic control valve shall have built-in adjustment capability to operate the elevator at 140 percent of rated speed in the down direction to facilitate periodic testing of the overspeed safety valve.

2.4.2.2 Hydraulic Overspeed Safety Valve

Provide overspeed safety valve in hydraulic oil supply line, directly adjacent to the hydraulic cylinder. Provide threaded pipe connections between the hydraulic cylinder and the overspeed valve. Provide valve

equipped with manufacturer's manual shutoff feature. Overspeed valve shall not be equipped with a manual lowering feature. Provide adjustable valve with means to seal adjustment after inspection and testing by certified elevator inspector.

2.4.2.3 Hydraulic Oil Scavenger Pump

Provide a scavenge oil reservoir with strainer and transfer pump. Provide a manual-reset pit flood switch to prevent pump operation if pit is flooded. Anchor pump and reservoir to pit floor.

2.4.3 Hydraulic Piping and Accessories

Provide ASTM A53/A53M or ASTM A106/A106M, Schedule 80, black steel piping with ASME B16.9 or ASME B16.11 fittings for supply piping. Extend schedule 80 piping from the pump control valve body, inside the pump unit, to the hydraulic cylinder in the hoistway. Provide welded or threaded forged pipe fittings for all fittings and components of the hydraulic oil supply line. For direct plunger cylinders, provide dielectric union or isolation couplings at each end of the hydraulic oil supply line. Provide hangers or supports for all piping and components.

2.4.3.1 Containment of Hydraulic Oil Supply Line

Protect all portions of hydraulic oil supply line that are installed below ground, including portions encapsulated in concrete or covered by construction, with continuous, Schedule 80, PVC. Inside diameter of PVC shall be 75 mm 3 inches larger than the outside diameter of the hydraulic oil supply line pipe and couplings.

2.4.4 Hydraulic Elevator Type

Provide a direct plunger type hydraulic elevator. Do not utilize telescopic or inverted cylinder-plunger units. Telescopic and inverted jacks are not acceptable. Do not utilize roped-hydraulic elevator design.

2.4.4.1 Cylinder-Plunger (Jack) Unit

Provide a single-stage plunger of seamless steel construction. Provide cylinder with self-stabilizing mount that will support and hold cylinder plumb without the need for stabilization means at the bottom of the cylinder. Provide a threaded, 6mm 1/4 inch bleeder valve at the top of the cylinder, just below packing gland.

2.4.5 Cylinder Well System

For direct plunger type hydraulic elevator, the cylinder well system consists of a sealed, dry well casing and a PVC liner.

2.4.5.1 Well Casing

Locate and drill well for the cylinder well system. Line well with steel casing, minimum 6 mm 1/4 inch wall with welded 10 mm 1/2 inch steel bottom. Set casing plumb. Provide a dry, sealed well casing.

2.4.5.2 PVC or HDPE Cylinder Liner

Provide Schedule 80 PVC or HDPE pipe liner with bottom cap and couplings; joints sealed watertight using pipe manufacturer's recommended adhesive or

heat welding methods. Provide liner inside diameter not less than 76 mm 3 inches larger than elevator cylinder maximum outside diameter. Liner shall extend above hoistway pit finish floor. Liner may be provided as a cylinder manufacture's applied liner or as a separate component. For separate liner, set liner plumb in well casing, located as necessary for cylinder installation. Provide dry, salt-free sand below and around liner to top of well casing.

2.4.5.3 Cylinder Installation

Remove all moisture from inside of cylinder liner. Install cylinder plumb, inside liner. Provide a 6 mm 1/4 inch copper evacuation tube inside the PVC liner. The bottom of the evacuation tube, shall be within 150 mm 6 inch of the bottom of the liner. Top of evacuation tube shall extend at least 150 mm 6 inch above liner. Provide top of test tube with removable cap to exclude foreign matter. Provide separate air pressure fitting in liner to facilitate pressure test of liner as specified in paragraph PRESSURE TEST OF PVC LINER/CYLINDER ASSEMBLY. Secure Liner/Cylinder Assembly as recommended by cylinder manufacturer.

2.4.5.4 Pressure Test of PVC Liner/Cylinder Assembly

Perform 55 kPag 8 psig pressure test of liner/cylinder assembly. Perform the test of liner/cylinder assembly as a sealed unit. Provide safety relief valve, set to relieve at 69 kPag 10 psig. Provide 114 mm 4.5 inch diameter dial pressure gage scaled for 0 to 175 kPag 0 to 50 psig and calibrated to 0.5 percent accuracy and an air pressure admission throttle and shutoff valve. For safety, pressure test shall only be performed when liner and cylinder are fully inserted and assembled in the well casing. Perform the test from remote location outside of the elevator pit. Perform test in the presence of, and witnessed by, a NAVFAC Certified Elevator Inspector.

2.4.5.5 Cylinder Liner Water and Oil Sensor System

Provide moisture sensor system designed to detect water and/or oil in the bottom of the cylinder liner. Water and oil sensors shall be located inside the cylinder liner and within 150 mm 6 inches of the bottom of the liner. Water and oil sensor system shall include a control and alarm panel, located in the elevator machine room. System shall provide automatic actuation of audible and visual alarms upon detection of either water or oil inside the cylinder liner.

2.4.5.6 Seal Top of Well Casing

Upon successful test and certification of PVC Liner/Cylinder assembly, seal gap between steel well casing and PVC liner with foam insert strong enough to retain and support final grouting. Provide 21 MPa 3000 psi grout to a minimum of 102 mm 4 inch thickness and level top of final grouting with pit floor.

2.5 CONTROL EQUIPMENT

2.5.1 Motor Control Equipment

Provide elevator motor controller with electronic, soft-start motor starter. Enclose control equipment in factory-primed and baked-enamel coated sheet-metal cabinets with removable or hinged doors with ventilation louvers.

2.5.1.1 Electrical Isolation Protection

Provide individual isolation transformers and individual choke reactors for each individual motor. Provide filtering to maintain harmonic distortion below IEEE standards as measured at the elevator machine room disconnect.

2.5.2 Logic Control Equipment

Provide a non-proprietary microprocessor controller for each individual elevator and group controller. Store all programming in non-volatile memory. Provide a microprocessor control system that includes all hardware and software required to service and maintain the elevator and a technical support service that is routinely provided to any elevator service provider.

2.5.2.1 On-Board Diagnostic Panel

- a. Provide, for each individual elevator microprocessor controller, an on-board diagnostic control and LCD display panel that allows unrestricted access to the comprehensive range of adjustable parameters necessary to perform installation, adjusting, service, maintenance, and testing of the elevator.
- b. For each elevator group control, provide a separate on-board diagnostic control and LCD display panel that allows unrestricted access to the comprehensive range of options and adjustments necessary to perform installation, adjusting, service, maintenance, and testing of the elevator group.
- c. For both individual and group controllers, provide fault log capability to store all fault logs for up to 1 year of elevator service history. The on-board LCD display shall provide the capability to display and monitor any and all fault logs, trouble calls, and fault history for up to 1 year of elevator service history. The on-board LCD display shall also provide the capability to display and diagnose trouble calls, faults, and shutdowns.

2.5.2.2 External Port

For each individual elevator microprocessor controller, and elevator group microprocessor controller, provide a USB port or an RS 232 port that allows connection to an on-site or a remote portable laptop computer. Provide unrestricted access as specified in paragraph ON-BOARD DIAGNOSTIC PANEL.

2.5.2.3 Maintenance and Diagnostic Software

Provide three copies of the manufacturer's maintenance and service diagnostic software, with complete software documentation, that shall enable the same level of unrestricted access to all controllers of the same make and model, regardless of the installation date or location. Provide signed certification, from the manufacturer's corporate headquarters, that guarantees that the microprocessor software and access system will not terminate the unlimited and unrestricted access at any future date.

2.5.2.4 Acceptable Controller Suppliers

Provide microprocessor controller from one of the following controller

manufacturers:

Elevator Controls Corporation 3525 La Grande Boulevard Sacramento, CA 95823
G.A.L. Manufacturing Corporation 50 East 153rd Street Bronx, New York 10451
Motion Control Engineering, Inc. 11354 Whiterock Road Rancho Cordova, CA 95742-6522
Virginia Controls, Inc. 2513 Mechanicsville Turnpike Richmond, Virginia 23223

2.6 OPERATING PANELS, SIGNAL FIXTURES, AND COMMUNICATIONS CABINETS

2.6.1 Capacity and Data Plates

Attach faceplates with spanner security screws. On car panel, provide stainless steel capacity and data plates, with name of elevator manufacturer.

2.6.2 Car and Hall Buttons

Provide recessed tamper-proof push buttons of minimum 19 mm 3/4 inch size satin-finish stainless steel, with illuminating jewel center.

2.6.3 Hall Station Door Operating Buttons

NOTE: Use this paragraph for freight elevators with power-operated bi-parting doors. The number and size of hall car stations will be indicated on the drawings.

Identical in size and design to hall call buttons, but not illuminating.

2.6.4 Passenger Car-Operating Panel

NOTE: Use two panels for busy passenger elevators in hospital buildings and office buildings. Use one car operating panel for single or two elevator system where traffic is moderate such as in barracks, warehouses, clinics or shops. For front and rear openings at a floor, provide two floor buttons marked "F" and "R" for operating door open and close.

Provide each car with [one] [two] car operating panel that contains operation controls and communication devices. Provide exposed, flush

mounted buttons for the controls that must be passenger accessible. Provide service cabinet or keyed switches for those switches that should not be passenger accessible. Allow maximum 1200 mm 48 inch height between car floor and center line of top operating buttons. Allow 900 mm 35 inch height between car floor and center line of bottom button. Use engraving and backfilling or photo etching for button and switch designations. Do not use attached signs.

2.7 PASSENGER CONTROLS

2.7.1 Passenger Car-Operating Panel

**NOTE: Omit the paragraph regarding phone jack
unless specifically requested by the activity.**

- a. Illuminating operating call buttons identified to correspond to landings served by elevator car. [For two openings at a floor, provide two buttons, marked "FRONT" and "REAR" above buttons.]
- b. "DOOR OPEN" and "DOOR CLOSE" buttons.
- c. Keyed "STOP" switch in accordance with ASME A17.1/CSA B44, rule 2.26.2.
- d. "ALARM" button in compliance with UFAS, ADA, and ASME A17.1/CSA B44, Rule 2.27.1. Furnish a red alarm button with engraved legend "ALARM." Allow alarm button to illuminate when pushed. Locate "ALARM" button at panel bottom.
- e. "FIRE DEPARTMENT" key switch, with "OFF-HOLD-ON" positions, in that order with key to be removable in all positions. Provide fire sign or jewel, and audible signal device, in accordance with ASME A17.1/CSA B44 Section 2.27.3. Both visual and audible signals are activated when Phase I key switch in hall is activated or when smoke detector activates return of elevator(s) to main fire response floor. Keep visual and audible signal activated until car has reached main or designated alternate fire response floor. Upon arrival at fire response floor visual signal remains illuminated and audible signal becomes silent.
- f. Emergency two-way communication. Provide momentary pressure, single illuminating pushbutton operated communication device that complies with ASME A17.1/CSA B44, UFAS, and the Americans with Disabilities Act.
- [g. Key-operated on-off "HOSPITAL EMERGENCY COMMANDEERING SERVICE" switch.]
- [h. Sound-actuated firefighter phone jack.]

2.7.1.1 Service Controls

- a. Inspection switch that transfers car control to top-of-car inspection operating controls and prevents car operation from in-car control panel.
- b. Independent service switch.
- c. Two car light switches, one for light in car and one for lights on top and bottom of car frame.

- d. Fan switch, two-speed.
- e. 120-volt ac 60 Hz single-phase duplex electrical outlet of ground-fault-circuit-interrupt (GFCI) design.
- f. Device for communication between car and elevator machine room.

[g. Parking switch.]

2.7.1.2 Certificate Window

Provide 100 mm high by 150 mm wide 4 inch high by 6 inch wide certificate window in car operating panel for elevator inspection certificate.

2.7.2 Freight Car-Operating Panel

Provide 3 mm 1/8 inch thick stainless steel face plate with edges relieved. Provide a car operating panel (COP) for each car at each car entrance. Provide exposed, flush mounted buttons for the controls that must be passenger accessible. Provide service cabinet or keyed switches for those controls that should not be passenger accessible. Allow maximum 1200 mm 48 inch height between car floor and center line of top operating button. Allow 900 mm 35 inch height between car floor and center line of bottom button. Use engraving and backfilling or photo etching for button and switch designations. Do not use attached signs.

2.7.2.1 Passenger Controls

**NOTE: Omit the paragraph regarding phone jack
 unless specifically requested by the activity.**

- a. Illuminating operating call buttons identified to correspond to landings served by elevator car. [For two openings at a floor, provide two buttons marked "FRONT" and "REAR" above buttons.]
- b. Manual "STOP" switch.
- c. "ALARM" button in compliance with UFAS, ADA, and ASME A17.1/CSA B44, Section 2.27.1. Furnish a red alarm button with engraved legend "ALARM". Allow alarm button to illuminate when pushed. Locate "ALARM" button at panel bottom.
- d. "FIRE DEPARTMENT" key switch, with "OFF-HOLD-ON" positions, in that order with key removable in all positions. Provide fire sign or jewel and audible signal device. Both visual and audible signals are activated when Phase I key switch in hall is activated or when smoke detector activates return of elevator(s) to main fire response floor. Keep visual and audible signal activated until car has reached designated or alternate fire response floor. Upon arrival at fire response floor visual signal remains illuminated and audible signal becomes silent.
- e. Emergency two-way communication. Provide momentary pressure, single illuminating pushbutton operated communication device that complies with ASME A17.1/CSA B44, UFAS, and the Americans with Disabilities Act.

[f. Key-operated on-off "HOSPITAL EMERGENCY COMMANDEERING SERVICE SWITCH".]

[g. Sound-actuated firefighter phone jack.]

2.7.2.2 Service Controls

- a. Inspection switch that transfers car control to top-of-car inspection operating controls and prevents car operation from in-car control panel.
- b. Independent service switch.
- c. Two car light switches, one for light in car and one for lights on top and bottom of car frame.
- d. Fan switch, two-speed.
- e. 120-volt ac 60 Hz single-phase duplex electrical outlet of ground-fault-circuit-interrupt (GFCI) design.
- f. Communication device between car and elevator machine room.

[g. Parking switch.]

2.7.2.3 Certificate Window

Provide 100 mm high by 150 mm wide 4 by 6 inches, certificate window in car operating panel for elevator inspection certificate.

2.7.3 Semi-Selective Door Operation

NOTE: Use semi-selective operation for elevators with rear openings but no landing with both front and rear openings. Use full selective if, at any floor, there are both front and rear openings. This applies to both passenger and to freight elevators.

For elevator with rear opening at elevations that differ from front opening, provide semi-selective door operation so that only car door or gate opposite hoistway door opens when car stops.

2.7.4 Full-Selective Door Operation

For elevator with one or more rear openings at same level as front opening, provide full-selective operation with car and door operating buttons clearly marked for front and rear openings, front and rear car button for each such floor, and front and rear "DOOR OPEN" and "DOOR CLOSE" buttons. Only door for which button was operated opens or closes.

2.7.5 Switches and Devices

Provide elevator manufacturer's standard grade for switches and devices on car operating panel. Legibly and indelibly identify each device and its operating positions. Locate car dispatching buttons in identical positions in car operating panels for corresponding floors.

2.7.6 In-Car Position and Direction Indicator and Signal

Include in-car direction indicator in the in-car position indicator fixture.

2.7.6.1 In-Car Position Indicator and Signal

Provide horizontal electrical or electronic digital position indicator located minimum of 2135 mm 84 inch above car floor. Arrange indicator to show floor position of car in hoistway and its traveling direction. Indicate position by illuminating of numeral or letter corresponding to landing at which car is passing or stopping. Provide audible signal to alert passenger that elevator is passing or stopping at a floor. Provide audible signals exceeding ambient noise level by at least 20 dbA with frequency not higher than 1500 Hz.

2.7.6.2 In-Car Direction Indicator and Signal

Provide visual and audible car direction indicators in car, indicating car traveling direction. For visual directional signal, provide arrow of minimum 65 mm 2-1/2 inch in size. Use equilateral triangles for arrows, green for upward direction and red for downward direction. Provide audible signal that sounds once for upward direction and twice for downward direction.

2.7.7 Landing Position and Direction Indicator and Signal

Provide a single fixture containing the landing position and direction indicator.

2.7.7.1 Landing Position Indicator and Signal

Provide an electrical or electronic digital position indicator similar to the car position indicator. Arrange position indicator in wall horizontally above the door frame or vertically at the side of the door frame. Indicators to show floor position of car in hoistway. Indicate position by illumination of numeral or letter corresponding to landing at which car is passing or stopping.

2.7.7.2 Landing Direction Indicator and Signal

Provide landing direction indicator with visual and audible signal devices. Provide single direction indicator at terminal floors; "UP" and "DOWN" direction indicator at intermediate floors. Provide equilateral triangles minimum 65 mm 2-1/2 inch in size, green for upward direction and red for downward direction. Provide electronic audible device that sounds once for upward direction and twice for downward direction. Provide audible signals exceeding ambient noise level by at least 20 decibels with frequency not higher than 1500 Hz.

2.8 HOISTWAY AND CAR EQUIPMENT

2.8.1 Guide Rails and Fastenings

Paint rail shanks with one coat black enamel. Only T-section type rail is acceptable.

2.8.2 Car Buffers

Provide buffer data plate on each buffer.

2.8.3 Pit Equipment

2.8.3.1 Pit "STOP" Switch

Provide push/pull type pit "STOP" switch for stopping elevator motor, independent of regular operating device. Locate on same side of hoistway as ladder.

2.8.3.2 Ladders

NOTE: Pits over 900 mm (3 feet) deep require a ladder which is usually included in Section 05 50 13 MISCELLANEOUS METAL FABRICATIONS. Use the first sentence in the following paragraph when Section 05 50 13 is not included in project specification.

Provide galvanized steel ladder conforming to 29 CFR 1910.27 with minimum 178 mm 7 inch distance between rung and wall. Locate ladder on hoistway side wall closest to hoistway door opening.

2.8.3.3 Lighting of Pits

Locate pit light not less than 1800 mm 6 feet above pit floor. Locate switch on same side of hoistway as ladder. Provide GFCI duplex receptacle in each pit.

2.9 TERMINAL STOPPING DEVICES

Provide each elevator with a terminal stopping device.

2.9.1 Wiring and Traveling Cables

Suspend traveling cables by means of self-tightening webbed devices.

2.9.2 Emergency Signaling Device

Provide audible signaling device, operable from Car Operating Panel button marked "ALARM". Mount the audible signaling device in hoistway. [In addition, for freight elevators, operation of the EMERGENCY STOP button must sound an audible signaling device.]

2.10 PASSENGER CAR AND HOISTWAY DOOR ACCESSORIES

ASME A17.1/CSA B44, Sections 2.12, 2.13, 2.14, and 3. Provide infra-red curtain unit (ICU) with multiple infra-red beams that protect to the full height of the door opening. Extend minimum coverage from 50 mm 2 inches off the floor to 1778 mm 70 inch above floor level. Door operation must meet the requirements of ASME A17.1/CSA B44 Rule 2.27.1 and 2.13.5. Provide high-speed electric operator, safety interlocks for car and hoistway doors, and electric safety contact to prevent car operation unless doors are closed. [Provide electrical circuitry that restores car to service at a specified time lapse with time out circuitry as an option for intensive service elevators.]

2.11 PASSENGER ELEVATOR GUIDES, FRAME, PLATFORM, AND ENCLOSURE

NOTE: Use roller guide assemblies on all passenger elevators.

2.11.1 Roller Guides

Provide roller guide assemblies in adjustable mountings on each side of car in accurate alignment at top and bottom of car frame.

2.11.2 Car Enclosure, Car Door, and Car Illumination

NOTE: For hospital service, consider providing separate elevators for routine hospital service and passenger service.

Provide natural and forced ventilation, stainless steel hooks, with fire retardant pads.

2.11.2.1 Return Panels, Entrance Columns, Cove Base, and Transom

Provide 14 gauge minimum non perforated steel. Apply sound-deadening mastic on car shell and all exterior components.

2.11.2.2 Car Top

Provide reinforced 12 gauge minimum steel with hinged emergency exit openable by hand from car top only. Provide electrical contact which prevents operation of elevator when emergency exit is open. Provide sound-deadening mastic on all exterior components.

2.11.2.3 Car Door

Provide 16 gauge minimum steel, sandwich construction without binder angles. Provide a minimum of 2 door guide assemblies per door panel, one guide at leading and one at trailing door edge with guides in the sill groove their entire length of travel.

2.11.2.4 Car Entrance Sill

Provide one piece cast white bronze or nickel silver entrance sill. Set sills level and flush with floor finish. Use same material for hoistway and car entrance sills.

2.11.2.5 Carpet

Unless otherwise specified, install carpet in the elevator.

2.12 PASSENGER ELEVATOR HOISTWAY DOORS AND ENTRANCES

Provide hoistway entrance assemblies which have a minimum 1-1/2 hour fire rating.

2.12.1 Hoistway Entrance Frames

NOTE: Coordinate materials with paragraph PASSENGER ELEVATORS.

Frame of 1.8 mm (14 gauge) 14 gauge thick [stainless steel] [or]
[prefinished carbon sheet steel]. Solidly grout uprights of entrances to
height of 1500 mm 5 feet.

2.12.2 Hoistway Entrance Sills

Provide one-piece cast solid white bronze or nickel silver entrance sills.
After sill is set level and flush with finished floor height, solidly grout
under full length of sill. Use same material for hoistway and car door
sills.

2.12.3 Hoistway Entrance Doors

Provide hoistway entrance door constructed with hollow metal non-vision
construction with flush surfaces on car and landing sides. Provide a
minimum of 2 door guide assemblies per door panel, one guide at leading edge
and one at trailing door edge with guides in the sill groove the entire
length of travel.

2.12.4 Entrance Fascias and Dust Covers

Provide sheet metal hoistway door track dust covers at each landing. Dust
covers must cover door locks and door roller tracks and extend the full
width of the door track and associated hardware.

2.12.5 Hoistway Ventilation

Provide hoistway ventilation directly to outside air by fixed louver
through side wall of hoistway at top of hoistway. The net size of the
louver shall be a minimum of 3.5 percent of the cross section of hoistway.

2.13 FREIGHT ELEVATOR GUIDE SHOES, PLATFORM, AND ENCLOSURE

2.13.1 Roller Guides

Provide roller guide assemblies in adjustable mounting on each side of car
in accurate alignment at top and bottom of car frame.

2.13.2 Car Enclosure

**NOTE: Use two-section car gate if headroom is
insufficient for single section.**

Complete with [two-section] [vertical rising] gate, power gate operator,
emergency exit, emergency light, and lighting fixtures. Paint interior and
exposed surfaces with manufacturer's standard finish. Provide certificate
frame and recessed car station.

2.14 FREIGHT ELEVATOR HOISTWAY DOORS AND ENTRANCES

**NOTE: If hoistway doors are for exterior uses,
weather stripping does not provide practical
protection. In lieu of weather-stripping,
incorporate alcoves to protect edges and bottom**

surfaces of exterior doors from rain, snow, and ice.

Provide hoistway entrance with complete door assembly including door panels with truckable sill, frames, guide rails, and accessories. Provide hoistway entrance assemblies which have a minimum 1-1/2 hour fire rating.

2.14.1 Door Panel

NFPA 252, fire rated door panel, with minimum 100 mm wide by 225 mm 4 inch wide by 9 inch high vision panel at upper door section.

2.14.2 Door Operation

NOTE: Use semi-selective if only one opening at any floor; full-selective if two openings at any floor.

[Semi-selective] [Full-selective].

2.15 HANDICAPPED AND MEDICAL SERVICES ACCESS

2.15.1 Provision For Handicapped

NOTE: Use on all elevators.

Refer to 36 CFR 1191, Sections 4.10 for Elevators, 4.30 for Signage, and 4.31 for Telephones.

2.15.2 Emergency Medical Service

NOTE: Use this paragraph for buildings of four floors or more.

ICC IBC - Chapter 30, for elevators and signage.

2.16 EMERGENCY POWER OPERATION

NOTE: Use in hospitals and buildings in which sufficient standby power is provided to operate one or more elevators.

Upon outage of normal power and initiation of emergency power, provide circuitry and wiring to operate elevator [telephone] [and] [intercom] to accomplish operation sequences. [In multiple elevator system, one elevator travels automatically to the main floor, opens doors, and shuts down. Thereafter, each other elevator in group, one at a time returns automatically to main floor. After all cars have returned to main floor, provide automatically one [passenger] [freight] car in regular service.] [For single elevator system, elevator travels automatically to main floor, opens doors, and automatically places itself in regular service.] During emergency power operation, provide a sign reading "EMERGENCY POWER"

flashing in each car station. [At the same time, provide operable Firefighters' Service.]

PART 3 EXECUTION

3.1 INSTALLATION

Install in accordance with manufacturer's instructions, ASME A17.1/CSA B44, 36 CFR 1191, and NFPA 70.

3.1.1 Traveling Cables

Do not allow abrupt bending of traveling cables.

3.1.2 Automatic Shutoff Valve

Locate in supply-return line, as close as possible to cylinder-plunger unit.

3.1.3 Structural Members

Do not cut or alter. Restore any damaged or defaced work to original condition.

3.1.4 Safety Guards

Completely enclose selector cables or tapes exposed to possibility of accidental contact in machine room with 1.5 mm 16 gage thick sheet metal or expanded metal guards, both horizontally and vertically. Protect exposed gears, sprockets, and selector drums from accidental contact in accordance with ASME A17.1/CSA B44.

3.1.5 Other Requirements

Include recesses, cutouts, slots, holes, patching, grouting, and refinishing to accommodate elevator installation. Use core drilling to drill all new holes in concrete. Finish work to be straight, level, and plumb. During installation, protect machinery and equipment from dirt, water, or mechanical damage. At completion, clean all work, and spot paint. Completion of firefighters' service includes installation and wiring of all smoke detectors in accordance with ASME A17.1/CSA B44, Section 2.27.3.2. Coordinate smoke detector installation for firefighters' service.

3.2 FIELD QUALITY CONTROL

NOTE: Include all bracketed text in all Navy projects.

- a. After completing elevators system installation, notify Contracting Officer that elevator system is ready for final inspection and acceptance test. In conjunction with the notification submit a plan detailing the testing procedures [60] [_____] days prior to performing the elevator tests. [Contracting Officer will obtain services of Naval Facilities Engineering Command certified elevator inspector.]
- b. Perform all required tests and demonstrate proper operation of each elevator system and prove that each system complies with contract

requirements and ASME A17.1/CSA B44. Inspection procedures in ASME A17.2 form a part of this inspection and acceptance testing. Conduct all testing and inspections in the presence of both the Elevator Specialist and the Elevator Inspector. Demonstrate the proper operation of all equipment at various date settings, selected by the Elevator Inspector, ranging from the date of contract award through 1 January 2099.

- c. The Elevator Inspector shall complete, sign and post the results of all tests and inspection results [and form NAVFACENGCOM 9-11014/23 (Rev. 7-88), Elevator Inspection Certificate] after successful completion of inspection and testing. The Contractor is responsible for all costs involved with reinspection and retesting required to correct discrepancies discovered during testing and the subsequent retesting required [,including all costs and expenses incurred by the Government Furnished Inspector.]

3.2.1 Testing Materials and Instruments

Provide testing materials and instruments required for final inspection. Include calibrated test weights, tachometer, 600-volt megohm meter, volt meter and ammeter, three Celsius calibrated thermometers, door pressure gage, spirit level, stop watch, hydraulic pressure test gauge, and a 30 meter 100 foot tape measure.

3.2.2 Field Tests

Submit Field Tests Reports after completing each of the specified tests, as required in the Submittals paragraph.

3.2.2.1 Endurance Tests

Test each elevator for a period of one hour continuous run, with specified rated load in the car. Restart the one hour test period from beginning, following any shutdown or failure. During the test run, stop car at each floor in both directions of travel for standing period of 10 seconds per floor. The requirements for Rated Speed, Leveling, Temperature Rise, and Motor Amperes testing specified herein must be met throughout the duration of the Endurance test.

3.2.2.2 Automatic Shutoff Valve Tests

Test the automatic shutoff valve twice. Once at beginning of acceptance test and again at conclusion of one-hour Endurance test to ensure consistent performance of shutoff valve, regardless of temperature of equipment and oil.

3.2.2.3 Speed Tests

Determine actual speed of each elevator in both directions with rated load and with no load in elevator car. Make Speed tests before and immediately after Endurance test. Determine speed by tachometer reading, excluding accelerating and slow-down zones in accordance with ASME A17.2, Section 2.22.4. Minimum acceptable speed is the Rated Speed as specified. Maximum acceptable elevator speed is 110 percent of Rated Speed.

3.2.2.4 Leveling Tests

Test elevator car leveling devices for landing accuracy of plus or minus 6

mm 1/4 inch at each floor with no load in car, symmetrical load in car, and with rated load in car in both directions of travel. Determine accuracy of floor landing both before and immediately after endurance tests.

3.2.2.5 Pressure Tests

Check operating pressure at pump and cylinder head under no load and rated load. Test pressure at which relief valve operates.

3.2.2.6 Insulation Resistance Tests

Perform tests to ensure wiring systems free from short circuits and grounds. Minimum acceptable insulation resistance for electrical conductors is one megohm between each conductor and ground and between each conductor and other conductors. Prior to megohm meter test, make provision to prevent damage to the electronic devices.

3.2.2.7 Temperature Rise Tests

Determine the temperature rise of the hydraulic pump motor during the full load test run for a minimum of one hour. Under these conditions, do not exceed maximum acceptable temperature rise indicated on the manufacturer's data plate. Start test only when equipment is within 5 degrees C of ambient temperature.

3.2.2.8 Motor Ampere Tests

Measure and record motor amperage when motor is running and elevator is lifting at rated load and speed. Measure and record motor amperage at the beginning and the end of Endurance test.

3.3 OPERATION AND MAINTENANCE TRAINING

The Elevator Specialist shall instruct Government personnel in care, adjustment, and maintenance of elevator equipment for a period of not less than [5] [_____] working days immediately following acceptance of system. Submit data package in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA, [three] [_____] Operation and Maintenance Manuals, [28] [_____] days prior to the Operation and Maintenance Training, proposed Onsite Training schedule, submitted concurrently with the Operation and Maintenance Manuals. Include a list of phone numbers, personnel contacts, and all tools required for operation and maintenance.

-- End of Section --