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USACE / NAVFAC / AFCESA **UFGS-14211A (December 2003)**

Preparing Activity: USACE (CW) **Superseding UFGS-14211A (January 1994)**

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated 25 June 2004

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SECTION 14211A

ELEVATORS, ELECTRIC, FOR CIVIL WORKS

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SECTION 14211A

ELEVATORS, ELECTRIC, FOR CIVIL WORKS
12/03

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NOTE: This guide specification covers the requirements for AC and/or DC electric elevators for dams, powerhouses, and outlet works.

Comments and suggestions on this guide specification are welcome and should be directed to the technical proponent of the specification. A listing of technical proponents, including their organization designation and telephone number, is on the Internet.

Recommended changes to a UFGS should be submitted as a Criteria Change Request (CCR).

Use of electronic communication is encouraged.

Brackets are used in the text to indicate designer choices or locations where text must be supplied by the designer.

****

PART 1 GENERAL

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NOTE: This guide specification has been prepared assuming that the elevator would be one part of a larger construction project and purchased by the General Contractor from an elevator manufacturer who would furnish and install it as a subcontract. This guide specification has been written to include all types of elevators from the very basic to fully appointed ones including multiple unit and freight types. After the designer determines which type elevator to use, delete all references in the guide specification to other types not pertaining to the selection.

a. The elevator can be a passenger elevator, a combination passenger/freight elevator, or a

single-purpose freight elevator required in the operation and maintenance of a structure. A single, standard passenger/freight elevator is considered adequate for most civil works installations. Passenger elevators in larger hydroelectric powerhouses or other facilities open to the general public should be better appointed. For standard commercially available passenger elevators, the normal operating speed range is 1 to 2.3 m/s (200 to 450 fpm) with capacities of 900 to 1800 kg (2000 to 4000 lbs). Elevator costs are in direct proportion to capacity, speed, and platform size.

b. If the elevator is to be used for utility purposes only, the stainless steel decorative material normally used in the cab should be changed to painted steel.

c. Freight elevators should be specified only when larger capacity is required and full-width doors (vertical biparting) are necessary for large specific equipment such as forklifts and motorized carts.

d. Since most installations will be made in dams, powerhouses, outlet works, or similar structures where moisture may be a problem, all electrical wiring in the hoistway and on the elevator car except traveling cable should be specified to be accomplished using water-blocked wire and cable. All push buttons, indicator lights, switches, and limit switches located in or on the car, at each landing, in the hoistway, and in the machine room should be housed in NEMA Type IV enclosures. However, for each contemplated installation, a determination of the moisture conditions that may exist in the hoistway and in the machine room should be made. If it is determined that moisture will not be a problem in either place, the above mentioned equipment may be housed in NEMA Type I enclosures instead of NEMA Type IV enclosures. If, however, it is determined that moisture will be a problem in the hoistway but not in the machine room, the NEMA Type IV enclosure should be used for the equipment located in the hoistway, and a NEMA Type I enclosure can be used for housing the controller which is located in the machine room. In making the above determination, consideration should be given to the location of the machine room with respect to ground or water level and to the amount of heat available to the equipment during cold weather from heaters located in the machine room or in adjacent rooms. Information regarding the above determination should be covered in the appropriate Design Memorandum.

e. It is the intent of this guide specification to permit the furnishing of the standard product, except as otherwise specified, of reputable elevator manufacturers for the capacities and speeds

specified. The specification, except for the special features for moisture proofing, requires that the elevators conform to the requirements of ASME A17.1. Representatives of the Contracting Officer who will be responsible for the administration of the contract should fully familiarize themselves with the provisions of this code.

f. The elevator hoistway should not be used as a forced-air exhaust shaft for the operating galleries in the lower part of the dam. The hoistway will be subject to considerable dampness, and means have been taken in this specification to prevent damage to the elevator. However, the situation should not be exacerbated by using the hoistway as an exhaust shaft.

g. The final painting of the elevator and equipment should be covered in the general contract under the PAINTING section with the appropriate schedule and color specified because the elevator Contractor will furnish his standard paint finish and color only.

h. The Designer should review the requirements of 28 CFR 36, Appendix A, for ADA accessibility design guidelines for elevators. The specifications for elevators accessible to the disabled should be in compliance with the applicable CFR requirements for both new construction and when these specifications are used to replace an existing elevator.

i. The following is a list of work items that are typically performed and/or furnished by the General Contractor. Work items 2, 4, and 7 require close coordination between the elevator subcontractor and the General Contractor. The remaining items should be designed and detailed, with any special instructions to the General Contractor included in the contract documents. The Government estimate should include all elevator equipment supplied by both the elevator subcontractor and the General Contractor.

1. Install a properly framed, enclosed, and vented hoistway.

2. Furnish and install a hoisting beam, with location and size as determined by the elevator subcontractor, as well as beam pockets required for elevator beams and patching of pockets after beams are set in place.

3. Construct suitable machine room on a reinforced concrete slab and with access and ventilation. The slab is not to be poured until the elevator machinery is set in place. Temperature in the machine room must be maintained between 7 and 32 degrees C (45 and 90 degrees F).

4. Furnish and install rail bracket supports. Bracket support design and spacing should be determined by the elevator subcontractor.

5. Construct a dry pit reinforced to sustain vertical forces on car and counterweight rails and impact loads from car and counterweight buffers.

6. Where access to a dry pit more than 1 m (3 ft (foot) deep is by means of the lowest hoistway entrance, install a vertical iron ladder extending a minimum of 1050 mm (42 inches) above the sill of the access door.

7. Provide adequate support for a sill angle across the full width of the hoistway at each landing. Vertical surfaces of the entrance sill supports are to be plumb, one above the other, and square with the hoistway.

8. Design and construct hoistway walls in accordance with the required fire rating, including areas where the walls are penetrated by elevator fixture boxes, and including adequate fastening to hoistway entrance assemblies. Front entrance walls are not to be constructed until after the door frames and sills are in place. If the front walls are poured concrete bearing walls, rough openings are to be provided to accept entrance frames and gaps between the bearing walls, and entrance frames should be filled in after the frames are set.

9. Provide a fused disconnect switch or circuit breaker for each elevator per the National Electrical Code, with feeder or branch wiring to controller, sized to suit elevator.

10. Provide a 120-volt, AC, 15-amp, single-phase power supply with fused SPST disconnect switch for each elevator and with feeder wiring to each controller for car lights.

11. Provide suitable light and convenience outlets in machine room, with light switches located within 450 mm (18 in.) of the lock jamb side of the machine room door.

12. Provide a convenience outlet and light fixture in the pit with a switch located adjacent to the access door.

13. Protect the hoistway during construction with solid panels (a minimum of 1200 mm (48 in.) high) surrounding each hoistway opening at each floor. Hoistway guards are to be erected, maintained, and removed after completion of construction by the General Contractor.

14. Provide all electric power for light, tools, hoists, etc., during erection as well as electric current for starting, testing, and adjusting the elevator.

This guide specification is to be used in the preparation of project specifications in accordance with ER 1110-2-1200 and ER 1110-2-1201.

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1.1 REFERENCES

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NOTE: Issue (date) of references included in project specifications need not be more current than provided by the latest guide specification. Use of SpecsIntact automated reference checking is recommended for projects based on older guide specifications.

****

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.

ASME INTERNATIONAL (ASME)

ASME A17.1	(2002) Handbook on Safety Code for Elevators and Escalators
ASME A17.2.1	(1994) Checklist for Inspection and Test of Electric Elevators

ASTM INTERNATIONAL (ASTM)

ASTM A 666	(2000) Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar

INTERNATIONAL CODE COUNCIL (ICC)

ICC A117.1	(1998) Accessible and Usable Buildings and Facilities
ICC IBC	(2003) International Building Code

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA LD 3	(2000) High-Pressure Decorative Laminates
NEMA MG 1	(2003) Motors and Generators

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2002) National Electrical Code

U.S. ARMY CORPS OF ENGINEERS (USACE)

TI 809-04	(1998) Seismic Design for Buildings

1.2 LUMP SUM PRICES

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NOTE: If Section 01270A MEASUREMENT AND PAYMENT is included in the project specifications, this paragraph titled LUMP SUM PRICES should be deleted from this section and the remaining appropriately edited subparagraphs below should be inserted into Section 01270A.
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1.2.1 Electric Elevator(s)

1.2.1.1 Payment

Payment will be made for costs associated with [furnishing] [installing] [furnishing and installing] Electric Elevators as specified.

1.2.1.2 Unit of Measure

Unit of measure: lump sum.

1.3 SUBMITTALS

****
NOTE: Submittals must be limited to those necessary for adequate quality control. The importance of an item in the project should be one of the primary factors in determining if a submittal for the item should be required.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" 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 projects.

Submittal items not designated with a "G" are considered as being for information only for Army projects and for Contractor Quality Control approval for Navy projects.
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Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are [for Contractor Quality Control approval.][for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Shop Drawings[; G][; G, [_____]]

Prior to placement of the hoistway concrete, shop drawings including dimensioned layouts in plan and elevation of the elevator equipment and showing the arrangement of the elevator equipment with respect to the hoistway. The drawings should indicate changes that need to be made to the hoistway to accommodate the equipment being furnished. Subject to approval, and dependent upon structural considerations, the Contractor will be permitted to enlarge and modify the spaces allotted to install the elevator and appurtenant operating equipment.

SD-03 Product Data

Materials and Equipment

Complete list of equipment and materials, including illustrations, schedules, manufacturer's descriptive and technical literature, performance charts, catalog cuts, installation instructions, brochures, diagrams, and other information required for fabrication and installation of the equipment.

Spare Parts

Spare parts data for each different item of material and equipment specified.

SD-06 Test Reports

Testing

Upon completion and performance testing of the installed system, submit test reports in booklet form showing all field tests performed to adjust each component and all field tests performed to prove compliance with the specified performance criteria.

SD-07 Certificates

Elevator Mechanics

Submit certificates of experience for the Elevator mechanics prior to installation of elevators.

SD-10 Operation and Maintenance Data

Maintenance[; G][; G, [_____]]

Submit [six] [_____] complete copies of operating instructions outlining the step-by-step procedures for system start up,

operation, and shutdown. The instructions shall include the manufacturer's name, model number, service manual parts list, and brief descriptions of all pieces of equipment and their basic operating features. Operating instructions shall be submitted and approved prior to the training course discussed in paragraph MAINTENANCE. The Contractor shall provide the name, address, and phone number of the local representative of the elevator supplier.

Submit [six] [_____] complete copies of maintenance instructions listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides. The instructions shall include equipment layout and wiring and control diagrams of the system as installed. Maintenance instructions shall be submitted and approved prior to the start of the training course described in paragraph MAINTENANCE.

1.4 SYSTEM DESCRIPTION

1.4.1 Design Requirements

The location and dimensions of [the] [each] hoistway [is] [are] indicated in the Schedule. Design and fabrication of the elevator shall be in accordance with ASME A17.1. [The] [Each] car shall have the capacity to lift a live load, exclusive of the car and cable, at a speed as specified in the following schedule. The approximate travel, terminal floors, number of stops and openings, and the car sizes shall be as shown in the schedule. The elevators shall serve the floors with stops and openings in accordance with the requirements indicated below.

a. [Elevator Schedule (Passenger)

****

NOTE: Elevators may be grouped, where practical, for maximum economy and efficiency of operation. Hoisting machinery for electric traction type elevators will be located on tops of shafts, preferably in penthouse-type equipment rooms or adjacent to the hoistway if overhead space is not available. If the elevator is subject to use by the general public then passenger elevator should be selected. If the elevator is not subject to use by the general public but will be used by O&M personnel for O&M purposes then a combination passenger/freight type elevator should be selected.

Capacity should be presented as kilograms (pounds) and speed presented as m/s (fpm).

The type of operator and type of door selected would depend on its intended service, frequency of use, and whether the elevator will be used by the general public. Normally, electrically operated doors are selected (always selected for elevators used by the general public), but the designer should be made aware in the instructions that the choice is that of the designer, based on the specific application.

Repeat schedule for each elevator if applicable.

****

Elevator Designation:	[_____]
Service:	[passenger] [passenger/freight]
Capacity:	[_____]
Speed:	[_____]
Clear Car Inside:	[[_____] wide by [_____] deep] [by [_____] high]
Travel:	[_____]
Landings:	[_____]
Door Clear:	[Front [_____] wide by [_____] high]
Openings:	[Rear [_____] wide by [_____] high]
Entrance Type:	[manually operated] [electrically operated] [single-speed] [two-speed] [single-slide horizontal sliding] [center opening horizontal sliding]

] b. [Elevator Schedule (Freight)

****

NOTE: Elevators may be grouped, where practical, for maximum economy and efficiency of operation. Hoisting machinery for electric traction type elevators will be located on tops of shafts, preferably in penthouse-type equipment rooms or adjacent to the hoistway if overhead space is not available. If the elevator is subject to use by the general public then passenger elevator should be selected. If the elevator is not subject to use by the general public but will be used by O&M personnel for O&M purposes then a combination passenger/freight type elevator should be selected.

Capacity should be presented as kilograms (pounds) and speed presented as meters per second (feet per minute).

The type of operator and type of door selected would depend on its intended service, frequency of use, and whether the elevator will be used by the general public. Normally, electrically operated doors are selected (always selected for elevators used by the general public), but the designer should be made aware in the instructions that the choice is that of the designer, based on the specific application.

Repeat schedule for each elevator if applicable.

See ASME A17.1, Rule 207.2B for proper freight classification for the intended use.

****

Elevator Designation:	[_____]
Loading:	ASME A17.1, Class [A] [B] [C1] [C2] [C3]
Capacity:	[_____]
Speed:	[_____]
Clear Car Inside:	[_____] wide by [_____] deep by [_____] high
Travel:	[_____]
Landings:	[_____]
Door Clear:	Front: [_____] wide by [_____] high
Openings:	Rear: [_____] wide by [_____] high

]

1.4.2 Standard Products

Materials and equipment shall be the standard products of manufacturers regularly engaged in the fabrication of elevators and elevator parts and equipment and shall essentially duplicate items which have been in satisfactory use for at least two years prior to bid opening.

1.4.3 Nameplates

Motor equipment shall have the manufacturer's name, address, type or style, model or serial number, catalog number, and electrical and mechanical characteristics on a plate secured to the item of equipment.

1.4.4 Spare Parts

The Contractor shall submit spare parts data for each different item of material and equipment specified, after approval of the shop drawings, and not later than 3 months prior to the date of beneficial occupancy. The data shall include a complete list of parts and supplies, with current unit prices and sources of supply, and a list of the parts recommended by the manufacturer to be replaced and replacement intervals in months or years as required.

1.5 QUALIFICATIONS

1.5.1 Elevator Mechanics

Elevator mechanics employed to install, supervise personnel involved in installation, and test the elevator shall be certified to have not less than two years experience installing, supervising personnel involved in installation, and testing elevators of the type and rating specified. Helpers or apprentices with less than two years experience will be permitted to work only under the direct supervision of a certified elevator mechanic.

1.5.2 Field Welding

When structural or load bearing members are to be field-welded, welding and qualifications of welders shall be as specified in Section 05090A WELDING, STRUCTURAL.

1.6 PROJECT/SITE CONDITIONS

1.6.1 Field Measurement

The elevator subcontractor shall become familiar with the jobsite, verify all dimensions and space requirements in the field and on shop drawings, and advise the Contracting Officer of any discrepancy before performing any fabrication or installation work.

1.6.2 Electrical Service

Electrical service for elevator machines shall be 460 volt, 60 Hz, 3 phase alternating current, [ungrounded] [neutral grounded] service. Electric service for elevator car lighting and exhaust fan shall be 120-volt, single-phase, 60 Hz grounded service. A 3 phase feeder conforming to requirements in Section 16402 INTERIOR DISTRIBUTION SYSTEM, with circuit breaker or fused disconnect switch located in the elevator machine room, shall be terminated at the control panel for [the] [each] elevator. A telephone junction box and an elevator car lighting junction box conforming to the requirements in Section 16402 INTERIOR DISTRIBUTION SYSTEM, shall be provided adjacent to each controller.

PART 2 PRODUCTS

2.1 STEEL

2.1.1 Stainless Steel

Where stainless steel is specified, it shall be corrosion resisting steel complying with ASTM A 666, Class 302 or 304, Condition A with No. 4 finish (150 grit) on exposed surfaces. Stainless steel shall have the grain of belting in the direction of the longest dimension, and all surfaces shall be smooth and without waves. During erection, all stainless steel surfaces shall be protected.

2.1.2 Cold-Rolled Steel

Where cold-rolled steel is specified, it shall be low carbon steel rolled to stretcher-leveled standard flatness, commercial quality, matte finish, complying with [_____]. Colors shall be as [stated in Section [09900 PAINTS AND COATINGS] [09964 PAINTING: HYDRAULIC STRUCTURES]] [selected by the Contracting Officer].

2.2 [PASSENGER] [PASSENGER/FREIGHT] ELEVATOR CAR

2.2.1 Car Fronts

Fronts shall be combination door post and return panels manufactured from 1.98 mm 14 gage, stretcher-leveled, stainless steel, and with necessary cutouts for operating devices. The operating panel shall be recessed into the front return panel with the operating panel cover surface applied. The position indicator in the door frame header shall be recessed with a surface-applied cover plate.

2.2.2 Walls

****

NOTE: Specify removable panels for office environment and baked enamel enclosures for

utility-type facilities.

****

Walls shall be 2250 mm 7 ft 6 in. high from the floor to the underside of the lighting fixtures. Side [and rear] panels shall be 1.90 mm 14 gage, stretcher-leveled steel panels. [The lower portion of the side [and rear] wall panels shall be provided with a 2.66 mm 12 gage stainless steel wainscoting from the top of the car base to a point 50 mm 2 in. above the top of the handrail. Side [and rear] removable panels shall be applied to car walls and shall be manufactured from 15 mm 5/8 in. thick plywood or composition board finished on the front, back, and edges, with plastic laminate conforming to NEMA LD 3, general purpose type. The panels shall be mounted on the car walls in a manner that permits their being reversed. Panels shall be evenly spaced with not less than two panels on each side [and three panels at the rear] with 10 mm 3/8 in. wide separations backed up with stainless steel dividers. The Contractor shall provide samples of the plastic laminate for selection by the Contracting Officer. Vent slots around the base shall be concealed behind removable panels.]

2.2.3 Canopy

The canopy shall be not less than 150 mm 6 in. high with a drop ceiling and a light fixture to provide a minimum of 55 lx 5 footcandles of light, measured at the landing edge of the car platform with the doors closed. The ceiling shall be 3 mm 1/8 in. thick translucent white plastic fire-retardant light diffuser supported by polished aluminum perimeter frame and dividers to form the drop ceiling light fixture. A part of the car light fixture shall be removable to permit use of the emergency exit in the top of the car. The car top ceiling shall be manufactured from 2.66 mm 12 gage stretcher-leveled steel. The canopy shall be designed and constructed to prevent the entrance of moisture into the car.

2.2.4 Emergency Exit

****

NOTE: Specify side exits when the clear unobstructed space between adjacent elevator platforms is 750 mm (30 in.) or less. Specify emergency exit through interior of car when the elevator will not be used by the general public and when the elevator is subject to flooding.

****

The canopy shall be provided with a hinged emergency exit, opening with and clear of the crosshead and car door operator. The emergency exit cover shall be hinged on the counterweight side and held in place by nonremovable fastening devices at each corner and shall be opened from the [exterior] [interior] top of the car only. A minimum of two sides of the exit panel shall lap the exit opening by 25 mm 1 in.. These exits shall be equipped with electrical contacts which will prevent operation of the car when the exit door is open and cause the alarm bell to ring. [Side emergency exit doors shall be provided on the sides of elevator cars adjacent to each other in a common hoistway. The exit doors shall be provided with a latch type lock, operable from outside the elevator car and operable by means of a specially designed tool from within the car. These doors shall be equipped with electrical contacts which shall cause alarm bells to ring and prevent the operation of the car when the exit door is in the open position.]

2.2.5 Doors

Doors shall be constructed from 1.59 mm 16 gage, cold-rolled, stretcher-leveled stainless steel. Each door shall be reinforced and sound-deadened to receive the required operating mechanism and hardware and shall have two removable door guides per panel. No seams, screws, or binding strips shall be visible from within the car. The threshold shall be extruded aluminum with abrasive insert and grooves for door guides. Car doors shall be equipped with full-length, adjustable, reversing safety edges which shall be fully retractable when the doors are in the fully open position and two complete and independent infrared photoelectric safety eyes directed across the entrance to photoelectric door-control units. The photoelectric door-control units shall be located 125 and 725 mm 5 and 29 inches above the car sill and shall operate as follows:

a. Upon initial opening, doors shall remain open for a predetermined adjustable time (0 to 8 seconds) with an initial setting of 4 to 5 seconds, which shall be sufficient to allow a waiting passenger in the hall to enter the car or a passenger in the rear of a crowded car to exit.

b. Upon initial interruption of the photoelectric light beam, the door reclosing time shall be transferred automatically to a much shorter predetermined adjustable time interval of between 0 to 4 seconds, with an initial setting of 3 seconds. By this means, the doors shall close immediately after the last interruption of the photoelectric light beam.

c. If the doors are closing and either light beam should be interrupted, doors shall automatically reverse and return to the open position, reclosing after the short predetermined time interval.

d. Bypass protection timing circuitry and buzzer shall be automatically activated in the event of photoelectric unit failure or interruption of photoelectric light beam by smoke or other means. Means of bypassing either light beam in case of failure of its components shall be provided to permit normal operation of unaffected beam and safety edge. Individual cut out switches shall be located in the car station.

e. All timing functions shall be controlled by a multiple-mode, adjustable, solid-state timing device.

f. When doors are prevented from closing (for an adjustable time period of 0 to 30 seconds set initially for 15 seconds) due to interruption of either photoelectric light beam or by activation of the car door safety edge, these devices shall be rendered inoperative. The doors shall then proceed to close at reduced speed, activating a loud buzzer until the car doors have closed.

g. If automatic doors are not required, the door shall be constructed from 1.59 mm 16 gage, cold-rolled, stretcher-leveled stainless steel. Each door shall be reinforced and sound-deadened to receive the required operating mechanism and hardware and shall have two removable door guides per panel. No seams, screws, or binding strips shall be visible from within the car. The threshold shall be extruded aluminum with abrasive insert and grooves for door guides. The door shall be a manually operated, horizontal sliding, multisection door constructed of 1.59 mm 16 gage, cold-rolled, stretcher-leveled stainless steel and equipped with a mechanical closer and a vision panel glazed with clear

wire glass. The clear opening shall be the same as that provided by the hoistway entrance door. The car door shall be hung on rubber-isolated or equal-sheave-type hangers and shall be properly guided at the bottom. The sheave track shall be of corrosion resisting material isolated from the track retainer in an approved manner. An electric contact shall be provided on the car door to prevent operation of the elevator until the door is fully closed.

2.2.6 Baseboard

The baseboard shall be 150 mm 6 inch high, cove-type stainless steel.

2.2.7 Handrails

****

NOTE: When side emergency exits are required, the handrail must be cut to permit unobstructed access through the side exit.

****

Stainless Steel handrails shall be 50 by 10 mm 2 by 3/8 inches mounted on each wall. Handrails shall be turned back to wall for elevators with two-speed horizontal slide openings.

2.2.8 Communications

****

NOTE: Emergency communication to an area manned 24 hour per day or to a central telephone service is required. As an alternative, a weatherproof alarm bell located outside the building entrance may be specified. See ASME A17.1, Rule 211.1.

****

A vandal-resistant, speaker-type phone shall be installed in the car station behind a perforated grille and connected to a programmable auto-dialer located in the machine room. The autodialer shall be provided with a solid-state charger unit which will automatically provide emergency power within 10 seconds in the event of failure of the normal power supply. A push button, identified as "Emergency Phone - Push to Activate" shall be provided and located in the car station at the prescribed handicapped height. The entire communication assembly shall be Federal Communication Commission approved.

2.2.9 Hardware Finishes

Exposed hardware shall be stainless steel. Unless otherwise specified, the finish on other exposed parts shall be baked enamel of a color selected by the Contracting Officer.

2.2.10 Exhaust Fan

A two-speed-type intake single-discharge exhaust ventilating unit, mounted in the car ceiling and provided with a stainless steel grille, shall be provided. The unit shall be suitably isolated from the car ceiling and shall distribute not less than 425 L/s 900 cfm (free delivery) at top speed. The discharge of the exhaust fan shall be enclosed and louvered to prevent the entrance of moisture into the car. The switches for the operation of the exhaust unit shall be located in the car station.

2.2.11 Emergency Signal and Car Lighting System

An emergency signal and emergency car lighting system consisting of an emergency power pack on top of the elevator and a remote lighting fixture inside the elevator car located [in] [above] the car operating panel shall be provided.

2.2.11.1 Power Pack

The power pack shall be a sealed-gel cell type, with solid-state controls and an integral regulating charger connected to a normal power supply. This unit shall contain the following:

a. Minimum 150 mm 6 inch diameter alarm bell connected to the elevator alarm and emergency push button.

b. Top of car light fixture with on-off switch and protective wire guard.

c. Testing circuit and pilot light.

d. Low-wattage pilot light indication.

2.2.11.2 Emergency Light Fixture

An emergency light fixture shall be located inside the elevator car in the car station, with flush mounted lens, and shall consist of the following:

a. A minimum of 2 lamps capable of providing a minimum level of illumination of 2 lx 0.2 foot-candle at a point 1200 mm 4 ft above the floor and 300 mm 1 ft in front of the car station.

b. Fixture frame of stainless steel.

c. Lenses of 6 mm 1/4 inch thick frosted acrylic.

2.2.11.3 Remote Light Fixture

Upon interruption of normal power, the remote light fixture shall automatically illuminate within 10 seconds and permit operation of the alarm bell, subject to activation of the emergency stop switch or alarm button. The power pack shall be capable of providing a minimum of 1 hour emergency bell operation and 4 hours of continuous illumination.

2.2.12 Certificate Frame

A stainless steel certificate frame and translucent Plexiglass lens of the appropriate size to receive the certificate issued by the inspecting agency shall be provided. The frame shall be engraved to show the name of the elevator manufacturer, elevator carrying capacity in kg pounds, and the maximum number of persons allowed.

2.3 PROTECTION PADS

****

NOTE: Delete this paragraph in its entirety if building has a freight elevator. If no freight elevator is provided, at least one passenger

elevator with pads and pad hooks should be provided.
****

Car No(s). [_____] [and _____] shall be provided with wall protection pads and pad hooks. Stainless steel pad hooks shall be located near the ceiling as inconspicuously by as possible and spaced not over 450 mm 18 in. apart. Pads shall be heavy-quality, fire-retardant treated canvas with two layers of cotton batting securely sewn, or equal construction as approved. Pads shall have stainless steel metal eyelets spaced to suit pad hooks. Pads shall cover the entire wall surface except operating devices.

2.4 FREIGHT ELEVATOR CAR

****
NOTE: Specify 6 mm (1/4 in.) thick plate when Class B or Class C freight loading is provided.
****

The freight elevator car shall have plain steel panel sides [to top of car, fabricated of 2.66 mm 12 gage steel. Panels shall be not more than 900 mm 36 in. wide] [of 6 mm 1/4 in. thick steel plate from the floor to 1200 mm 4 ft above the floor and not less than 1.90 mm 14 gage panels from the top of the plate to the top of the car]. Top shall be [3.42 mm 10 gage] [25 mm 1 in.] diamond mesh with a removable panel for the emergency exit. The top exit shall have an electric contact which will prevent operation of the elevator when the exit is open.

2.4.1 Bumpers

Two, 150 by 50 mm 6 by 2 inches oak bumper guards , mounted on the rear and sides of elevator car, shall be provided. The bottom edges of the bumpers shall be 150 and 750 mm 6 and 30 inches above the floor. Bumpers shall be beveled back to the side walls at entrance columns.

2.4.2 Gates

****
NOTE; Manual car gate and hoistway door operations are acceptable for light freight use.

Specify two-speed gate arrangement if there is insufficient overhead clearance available when the elevator is at the top landing.
****

Gates shall be provided at each entrance to the car and shall be [heavy-duty, power-operated] [manually operated] wire mesh vertical sliding gates complete with hardware and accessories as required. Gates shall be constructed of minimum 10 gage wire, or of flat expanded metal, attached to the angle frame, and designed to protect the entire width of the car opening to a height of 1800 mm 6 ft above the sill. The gate shall be equipped with guide shoes designed to run on vertical tracks rigidly fastened to the car enclosure and provided with weights for closing or balancing of the gates. When fully raised, the bottom edge of the gate shall not protrude into the clear opening of the hoistway entrance. [The gate sections shall be of the two-speed type arranged to start and reach their limits of travel simultaneously.] The lower edge of the gate panel shall be equipped with a safety edge to stop the downward motion of the gate when it encounters an obstruction.

2.4.3 Light Fixtures

[Incandescent] [Fluorescent] lamps and a fixture shall be provided. The lighting fixture shall be recessed and shall consist of a sheet steel frame and a baked-enamel-finished reflector with enclosed sides and top. The fixture shall mount directly to an outlet box. The bottom of the fixture shall be flush with the car ceiling. [Incandescent fixtures shall be fitted with medium-screw, twin-lamp porcelain sockets with a heavy wire lamp guard or similar device over each light fixture opening in the car ceiling.] [Fluorescent lighting fixtures shall be dual lamp and shall be quick starting with energy efficient ballasts having a power factor to 0.95. Safety lamp guard clamps shall be provided on fluorescent tubes.] Light level shall average at least 35 lx 3 ft candles measured at the landing edge of the car platform.

2.4.4 Car Emergency Lighting Fixture

[A single-unit emergency lighting fixture incorporating a sealed-beam light source, a battery with integral battery charger, and a relay shall be provided. A cord and plug for connection to a nonswitched standard grounding receptacle near the location of the emergency lighting unit shall also be provided.] [A power package as specified for passenger car emergency lighting shall be provided.] Not less than two lamps of approximately equal wattage shall be used to provide a minimum of 2 lx 0.2 foot-candle of illumination at a point 1200 mm 4 ft above the floor and 300 mm 1 ft in front of the main car operating device. The battery shall be capable of operating the emergency lamps continuously for a period of at least 4 hours.

2.4.5 Communications

****

NOTE: Emergency communication to an area manned 24 hour per day or to a central telephone service is required. As an alternative, a weatherproof alarm bell located outside the building entrance may be specified. See ASME A17.1, Rule 211.1.

****

[The Contractor shall provide a recessed telephone compartment in the elevator car, where approved, suitable for the [_____] Company's instrument No. [_____]. The compartment shall be fitted with a corrosion resisting steel door panel with a concealed hinge and doorknob. The upper portion of the door panel shall contain a glass-faced certificate frame with the word TELEPHONE or PHONE etched on the lower portion of the panel or doorknob.] [A vandal-resistant speaker type phone shall be installed in the car station behind a perforated grille and connected to a programmable autodialer located in the machine room. The autodialer shall be provided with a solid-state charger unit which will automatically provide emergency power within 10 seconds of failure of the normal power supply. A push button identified as "Emergency Phone - Push to Activate" shall be provided and located in the car station at the prescribed height for handicapped people. The entire communication assembly shall be Federal Communication Commission approved.]

2.4.6 Freight Signs

Elevator freight identification signs shall be of stainless steel construction and shall be engraved to show the elevator capacity, class of loading, and passenger limitations in the format required by ASME A17.1.

2.4.7 Certificate Frame

A stainless steel certificate frame and translucent Plexiglass lens of sufficient size to encase the certificate issued by the inspecting agency shall be provided. The frame shall be engraved to show the name of the elevator manufacturer and the carrying capacity in pounds.

2.5 [PASSENGER] [PASSENGER/FREIGHT] ELEVATOR ENTRANCES

Passenger elevator entrances shall conform to the following specifications:

2.5.1 Finishes

Exposed portions of the hoistway entrances shall be [finished in baked enamel] [stainless steel].

2.5.2 Doors

Doors shall be the hollow metal type with plain panel design, not less than 32 mm 1-1/4 in. thick with [1.52 mm 16 gage steel] [1.59 mm 16 gage stainless steel] panels. Each door shall be reinforced inside with continuous vertical members and shall be sound-deadened. Doors shall be reinforced to accept the required operating mechanism and hardware. Doors shall have two removable door guides per panel. No seams, binding strips, or screws shall be visible from the landing. Manually operated doors shall have vision panels in accordance with requirements of Rule 110.7 of the ASME A17.1 code. Door operation shall be as specified under paragraph DESIGN REQUIREMENTS.

2.5.3 Frames

Frames shall be made from [1.90 mm 14 gage steel] [1.98 mm 13 gage stainless steel]. The head and jamb section shall be a bolted assembly with bolts, washer, and a locking nut or lock washer. The frame assembly shall be securely fastened to the structure. Frames shall return to the wall. Combination buck and jamb frames may be provided with knockdown back flanges to permit installation in concrete walls.

2.5.4 Symbols

Raised stainless steel symbols, as required by ICC A117.1, of the selected color shall be provided at each floor to indicate the floor location. Symbols shall be attached with concealed fasteners and shall be located where they can be seen by passengers from the open elevator doorway.

2.5.5 Sills

Sills shall be extruded or cast aluminum with nonslip surface and machined grooves for door guides. Sills shall be securely fastened to the floor beams.

2.5.6 Strut Angles

Strut angles, when required, shall be of not less than 76 by 76 by 4.8 mm 3 by 3 by 3/16 in. structural steel extending from the sill to the beam above and securely anchored to building construction. Fastenings and bracings shall be with structural members having a cross section of not less than the strut angles.

2.5.7 Door Hanger

Hanger housing and support shall be of the formed-steel "Z" angle type, not less than 4.8 mm 3/16 in. thick and shall be bolted to the strut angles. Hanger covers shall extend the full door travel and shall be in sections for ease of servicing the door hangers. Dust covers shall be securely fastened to the door hanger housing and building construction. Dust covers shall be provided over the top terminal landing door only.

2.5.8 Guards

Toe guards shall be securely fastened to the sill.

2.5.9 Covers

Hanger covers, dust covers, toe guard, and fascia plates shall be 16 gage reinforced [galvanized] steel [and finished with one prime coat of paint]. Fascias shall be provided between each door hanger housing and the sill above.

2.6 FREIGHT ELEVATOR HOISTWAY ENTRANCES

Freight elevator hoistway entrances shall conform to the following:

2.6.1 Type

****
NOTE: Manual car gate and hoistway door operations are acceptable for light freight use.
****

The hoistway entrance shall be provided with [manually] [power] operated vertical biparting doors, regular, or pass type, as required to suit the floor heights. Before the parts are assembled, all steel surfaces shall be thoroughly cleaned of all rust, oil, grease and dirt by benzine wash or the equivalent and shall then immediately be given a coat of approved rust-inhibiting paint. Exposed surfaces of the doors shall be finished with manufacturer's standard factory prime coat of paint. Surfaces which shall be concealed shall be cleaned and coated prior to assembly or installation.

2.6.2 Hoistway Entrance Door Assemblies

Hoistway entrance frames and sill shall be provided as described in Section 05502A METALS: MISCELLANEOUS, STANDARD ARTICLES, SHOP FABRICATED ITEMS. Each hoistway entrance shall be provided with a complete door assembly, including door panel with truckable sill, guides, guide rails, and accessories. Each door panel section shall be equipped with approved guide shoes designed to slide on substantial steel guides secured to the hoistway side of the door frame.

2.6.3 Door Panels

****
NOTE: Specify 0.55 mm (26 gage) galvanized sheet steel doors with wood core when sound deadening is required.
****

Vertical biparting door panels shall meet the requirements for a 1-1/2 hour fire rating and shall bear the label of an approved testing laboratory. The panels shall be of the counter-balanced, biparting type which shall consist of two sections designed to balance each other and to move simultaneously, one section upward and the other section downward, to open. Panel construction shall be [2.66 mm 12 gage sheet steel with formed edges and vertical reinforcing back ribs spaced 450 mm 18 in. on center] [0.55 26 gage galvanized sheet steel with visible vertical seams clad onto a wood core of two-ply white pine]. Each door shall be reinforced on the periphery by a frame of built-up steel angles or other suitable sections not less than 4.8 mm 3/16 in. thick for mounting of the necessary guide shoes an d the chain suspension system. Frames shall be matched and fully welded at the corners. The door panels shall be securely bolted, riveted, or welded into the door panel frames. Panels for exterior use shall be weather stripped.

2.6.3.1 Upper Panel

The upper panel of each door shall be equipped with a clear wire glass vision panel placed on the side closest to the car operating station. The vision panel shall be sized as required by ASME A17.1. The bottom edge of this panel shall be provided with a fire-resistant, approved safety astragal, which shall be of the nonshearing and noncrushing type, designed to prevent damage to foreign objects 19 mm 3/4 in. or less in diameter when the door is in the closed position. Rubber bumpers shall be provided on the lower edge of this panel near each jamb, mounted to provide the safety action specified. Rubber bumpers and the safety astragals shall be designed for easy replacement.

2.6.3.2 Lower Panel

The lower panel shall be provided with a 13 mm 1/2 in. thick steel toe guard beveled toward the hoistway wall at a 60 degree angle to the horizontal. The upper edge of the lower door panel shall be equipped with a truckable steel sill designed to be level with the landing when the doors are fully open. Truckable sills shall be of sufficient size and adequate strength to bridge the space between the building sill and the car platform and to support a trucking load equal to the rated capacity of the elevator car. The truckable sill shall extend the full width of the door opening and shall be supported by stationary adjustable stops, fastened to each door guide rail when the doors are fully opened. No shearing hazard shall exist on the bottom door panel during the door opening operation.

2.6.3.3 Hoistway Doors

Hoistway doors shall be balanced and shall operate simultaneously. Doors shall be mounted in the hoistway and be connected to each other by means of strong, flexible, flat link chains traveling over heavy, machined malleable iron sheaves running over double-race ball bearings. Sheaves shall be mounted in malleable iron housings fastened to the guide rails.

2.6.4 Hoistway Door Guide Rails

Guide rails shall consist of suitable structural shapes for each door section securely fastened to the door frame and hoistway construction. The guide rails shall be installed in accurate alignment so that the door guide shoes will operate freely upon the rails. Each door frame shall be equipped with four fixed or adjustable steel or malleable iron grooved shoes of proper depth and vertical side contact on each side of the rail. Shoes shall be attached to the vertical structural door frame members and shall be spaced the maximum possible distance apart. Shoes shall be constructed to relieve the door and guide shoe supporting members of all frictional contact with the guide rails.

2.6.5 Hoistway Door Interlocks

Each hoistway door shall be equipped with a tamper-proof interlock which shall prevent operation of the car until doors are locked in the closed position as defined by ASME A17.1 and shall prevent opening of the door at the landing from the corridor side unless the car is at rest at the landing or is traveling through the leveling zone, or unless the hoistway access switch is used. Interlocks shall lock the two door sections together. Retiring cams for hoistway door interlocks shall be provided and securely fastened to supports on the car enclosure. This requirement for hoistway door interlocks applies to passenger elevators also.

2.6.6 Hoistway Door Unlocking Devices

****

NOTE: Specify parking device when manually operated hoistway doors are provided.

****

Hoistway door unlocking devices, as described in ASME A17.1, shall be provided at all floors. Parking device shall be located at a floor elevation of [_____], or as selected by the Contracting Officer. This requirement for hoistway door unlocking devices applies to passenger elevators also.

2.7 [PASSENGER] [PASSENGER/FREIGHT] ELEVATOR OPERATING A ND SIGNAL FIXTURES

2.7.1 General

Elevator fixtures and panels shall be constructed of 3.18 mm 1/8 in. thick stainless steel No. 4, satin finish face plates brushed vertically. Fastenings for all exposed fixtures shall be secured with tamperproof spanner head screws of the same material and finish as the fixture they are securing.

2.7.1.1 Call Buttons

Hall and car call buttons shall be of the call register type, having a low-voltage power supply not to exceed 48 volts. Pressure on a button shall illuminate the button to indicate that a call in the desired direction has been registered. Replacement bulbs shall be readily available from three sources.

2.7.1.2 Fixtures

Car and hall fixtures shall be designed and located at the prescribed

height to accommodate the handicapped, in accordance with ICC A117.1 for passenger elevators. Handicapped markings shall be integral with the face plate. Applied plates are unacceptable.

2.7.1.3 Engraving

Engraving shall be black-filled, with the exception of fire service identification, which shall be red-filled.

2.7.1.4 Fixture Contacts and Lamps

Operating and signal fixture contacts and lamps shall be completely enclosed in steel boxes. Boxes shall have an enamel or galvanized finish. Boxes for hall landing devices shall be designed to permit proper adjustment to the wall. Lamps shall be in light-tight compartments. Cover plates shall be provided with rubber gaskets.

2.7.2 Car Operating Panel

****
NOTE: Specify auxiliary car operating panels for passenger elevators only when moderate to heavy traffic is anticipated.

Specify vandal-resistant operating and signal fixtures for all facilities other than office environments.
****

The car operating panel shall be complete with the necessary raised (0.75 mm 0.03 in.) markings for the handicapped and shall include a series of minimum 19 mm 3/4 in. diameter push buttons numbered to correspond to the floor served, and various additional switches, buttons, and light jewels, including emergency stop, alarm button, DOOR OPEN button, and communication speaker. [Operating buttons shall be of manufacturer's standard design.] [Operating buttons shall be vandal-resistant, metal-encased, and embossed to permit illumination when a call is registered. Buttons shall be designed to seat on the face plate in lieu of the button mechanism, and with 1 mm 1/32 in. operating clearance. Buttons shall have a maximum protrusion of 5 mm 3/1 6 in. beyond the face plate, with beveled edges to prevent damage from side blows.] Buttons and switches not required for automatic or fire service operation shall be located behind a locked cover which will retract into the car operating station when in the open position. The elevator number and "NO SMOKING" shall be engraved on the upper portion of the car station with 25 mm 1 in. high numerals.

2.7.2.1 Operating Panel

****
NOTE: All elevators having a travel of 7.6 m (25 ft) or more will comply with the fire service requirements of ASME A17.1. Also, the appropriate seismic requirements must comply with paragraph SEISMIC REQUIREMENTS.
****

The operating panel in the car shall consist of a flush-mounted panel containing the following operating devices:

a. DOOR OPEN button.

b. DOOR CLOSE button.

c. Key-operated car light switch.

d. Key-operated ventilating blower switch.

e. Communication speaker phone, grille, and push-to-call button.

f. Emergency stop switch (pull to activate) which, when operated, will stop the car independently of the normal stopping devices.

g. Emergency signal switch, connected to a 150 mm 6 in. diameter signal bell to be located outside the elevator hoistway at a floor elevation of [_____], or as directed.

h. Key-operated independent operation switch.

i. Key-operated inspection switch that will render normal operation inoperative for the purpose of using the hoistway access switch.

j. Key-operated upper and lower photoelectric door reversing device cutout switches.

k. Key-operated firemen's service switch and light jewel.

2.7.2.2 Auxiliary Car Station

****

NOTE: Specify auxiliary car operating panels for passenger elevators only when moderate to heavy traffic is anticipated.

****

An auxiliary car station, similar in design to the main car operating panel, shall be provided which shall include all devices necessary for automatic operation, such as emergency stop switch, alarm bell, door open button, and call car buttons.

2.7.3 Hall Call Station

****

NOTE: Specify vandal-resistant operating and signal fixtures for all facilities other than office environments..

****

Hall call operating devices at the landing shall consist of an UP push button at the bottom landing, a DOWN push button at the top landing, and UP and DOWN push buttons at all other landings. Push buttons shall be [of manufacturer's standard design] [vandal-resistant, metal-encased and embossed to permit illumination when a call is registered. Buttons shall be designed to seat on the face plate in lieu of the button mechanism, and with 1 mm 1/32 in. operating clearance. Buttons shall have a maximum protrusion of 5 mm 3/16 in. beyond the face plate, with beveled edges to prevent damage from side blows].

2.7.3.1 Commandeering Switch

A key-operated commandeering switch shall be provided at each landing and located in the landing call button cover plate. The switch shall be the momentary pressure type, with the key removable only in the OFF position, and shall be keyed to match the independent operation switch specified for car operating devices.

2.7.3.2 Fire Service Switch

****
NOTE: All elevators having a travel of 7.6 m (25 ft) or more will comply with the fire service requirements of ASME A17.1. Also, the appropriate seismic requirements must comply with paragraph SEISMIC REQUIREMENTS.
****

A fire service switch shall be located at the [first] [_____] floor lobby.

2.7.4 Direction Lanterns

****
NOTE: Hall lanterns are recommended for two or more elevators operating in a common group. Car lanterns satisfy handicapped design requirements when there is only one passenger elevator.
****

Lanterns shall be designed in accordance with ICC A117.1 and shall be provided [at all floors] [in each car entrance column] and shall be the manufacturer's standard [vandal-resistant] design. Lanterns shall signal the approach of a stopping car when the car is a predetermined distance from the landing.

2.7.5 Car Position Indicator

****
NOTE: Specify vandal-resistant operating and signal fixtures for all facilities other than office environments.
****

[Indicator numerals and directional arrows shall be [25 mm 1 in. high white translucent plastic] [flush-mounted face plate with black-filled engraved numerals not less than 25 mm 1 in. high], and 10 mm 3/8 in. diameter vandal-resistant light jewels directly beneath each number.] As the car travels through the hoistway, its position shall be indicated by the illumination of the light jewel corresponding to the landing at which the car is stopped or passing. Necessary light baffles shall be provided. Floor numerals and letters shall illuminate white. [A position indicator of the digital readout type (minimum 50 mm 2 in. high indication) shall be provided in the car transom panel. The number corresponding to the position of the car shall remain illuminated when the motor drive is shut down. The illumination shall be shrouded in an approved manner to protect against glare from car lighting.]

2.7.6 Audible Signals

****
NOTE: Hall lanterns are recommended for two or more elevators operating in a common group. Car lanterns satisfy handicapped design requirements when there is only one passenger elevator.
****

Direction lanterns [at floor landings] [in car entrance column] shall include an audible signal which shall sound coincident with lantern illumination indicator. A passing car shall not illuminate the hall lantern or activate the audible signal. The audible signal shall sound once for the up direction and twice for the down direction.

2.7.7 Combination Hall Position Indicator and Directional Arrows

****
NOTE: Specify hall position indicators at the main lobby for two or fewer elevators.
****

[Combination hall position indicator and directional arrows shall be located directly over the entrance frame at the main floor landing]. [A position and direction indicator of the digital readout type (minimum 50 mm 2 in. high indication) shall be provided over the first floor entrance. The number corresponding to the position of the car shall remain illuminated when the motor drive is shut down. The illumination shall be shrouded in an approved manner to protect against glare.] Fixture design and operation shall be similar in design to that specified for the car position indicator.

2.8 FREIGHT ELEVATOR OPERATING AND SIGNAL FIXTURES

Freight elevator operating and signal fixtures shall conform to the general requirements for passenger elevator operating and signal fixtures, with the exception that adherence to ICC A117.1 is not required.

2.8.1 Car Operating Panel

****
NOTE; All elevators having a travel of 7.6 m (25 ft) or more will comply with the fire service requirements of ASME A17.1. Also, the appropriate seismic requirements must comply with paragraph SEISMIC REQUIREMENTS.

Omit fan if perforated car top is provided.
****

The operating panel in the car shall consist of a recessed panel near the car gate. The panel shall have the following operating devices:

a. Emergency stop switch (pull to activate), which, when operated, stops the car independently of the normal operating devices and sounds the emergency bell.

b. Key-operated car light [and fan] switch.

c. Emergency signal button connected to a 150 mm 6 in. diameter signal bell located outside the elevator hoistway at the first floor as shown or as directed.

d. Communication speaker phone, grille, and push-to-talk button.

e. Key-operated inspection switch that will render normal operating devices inoperative for the purpose of using the hoistway access switches.

f. Key-operated fire service switch and light jewel.

g. Momentary pressure DOOR CLOSE button and momentary pressure DOOR OPEN push button for power-operated doors.

2.8.2 Car Position Indicator

The car position indicator shall consist of engraved black-filled numerals not less than 25 mm 1 in. high, and 10 mm 3/8 in. diameter vandal-resistant light jewels directly beneath each number. As the car travels through the hoistway, its position shall be indicated by the illumination of the light jewel corresponding to the landing at which the car is stopped or passing. Necessary light baffles shall be provided.

2.8.3 Push Buttons and Face Plates

Push buttons numbered to correspond to the landings served and face plates shall be provided. The operating pushbuttons shall be metal-encased and embossed to permit illumination when a call is registered. Push buttons for both the car and the hall operating stations shall be designed to seat on a face plate in lieu of the button mechanism, and with 1 mm 1/32 in. operating clearance. The face plates shall be engraved and filled with 16 mm 5/8 in. characters or directional arrows adjacent to the right of the floor buttons. The push buttons shall have a maximum protrusion of 5 mm 3/16 in. beyond the face plate, with beveled edges to prevent damage from side blows.

2.8.4 Hall Call Station

Operating devices at each landing shall consist of a recessed momentary pressure car call button [and momentary pressure DOOR OPEN and DOOR CLOSE buttons].

2.8.4.1 IN USE Light

A red jewel IN USE light shall be illuminated when the car is in motion and also when the car is standing at any floor with the hoistway door or car gate open.

2.8.4.2 Fire Recall Key Switch

****

NOTE: All elevators having a travel of 7.6 m (25 ft) or more will comply with the fire service requirements of ASME A17.1. Also, the appropriate seismic requirements must comply with paragraph SEISMIC REQUIREMENTS.

****

A fire recall key switch shall be located in the [first-] [_____-] floor face plate.

2.8.4.3 Hoistway Access Switches

****
NOTE: Access switches and emergency keyways are required at the lower terminal only when pit access is via the bottom terminal access door.
****

Hoistway access switches shall be located in the [lower and] upper terminal floor hall stations.

2.9 AUTOMATIC EMERGENCY POWER OPERATION

The elevator control system shall be so arranged that upon failure of the normal power supply and activation of the emergency power supply, the elevator(s) shall provide the following operation:

a. When the normal power supply fails, [the] [all] cars shall shut down.

b. [The] [One] car shall automatically start and travel at full-rated speed to the main floor. Here [the] [one] car should stop, the car and hoistway doors open, and then [the] [one] car shut down. Elevators operating on dedicated service, such as fire service, will not be required to return to the main floor when emergency power becomes available.

c. [After the first car shuts down, the other cars in the group shall individually operate as described above.]

d. [After all cars have moved to the main floor, a preselected car shall operate at rated speed to serve car and landing calls.] Emergency power selector buttons and light jewels shall be provided in a stainless steel faceplate at the main floor. Emergency power selector buttons shall be operable after automatic return has been completed and shall permit the selection of a maximum of [one] [_____] elevator(s) at a time.

2.10 [AUTOMATIC] ELEVATOR OPERATION

2.10.1 General

Operating devices to supply the operation described herein shall be provided and shall consist of a series of push buttons in the car numbered to correspond to the various landings, up and down buttons at the intermediate landings, and a single button at the terminal landing, all connected electrically to the control system governing floor selection, car selection, direction of travel, acceleration, and retardation.

2.10.2 Operation

****
NOTE: Delete subparagraph "d" if manual doors are specified.
****

Car calls shall be registered by passengers within the car by pressing the buttons corresponding to the floors to which they wish to go. Corridor calls shall be registered by pressing the buttons in the corridor push button fixture. Once the demand for elevator service has been established and the car has received its start signal, the operation shall be as follows:

a. [The doors shall close automatically.] When the doors are fully closed and the interlock circuit established, [the desired floor will be selected] and the car shall start to move in the direction established by the control system. The car shall accelerate and decelerate automatically and stop at the first floor for which a car button has been registered or at the first corridor floor for a demand which has been assigned to the car. The car shall stop at all floors for which car calls are registered in the order in which such floors are reached and shall, in addition, stop for any corridor demands assigned to the cars in the order in which these corridors are reached.

b. [The doors shall start to open automatically only when the car is within the landing zone or leveling zone, and, after a predetermined time, shall close and the car shall then proceed to answer any remaining car or assigned corridor calls. A protective device shall be provided on the car door which, when activated, shall prevent closing of the doors.] [The doors shall be in such a manner that they can be opened only when the car is stopped within the unlocking zone, and the door operator is cut off.] The cars shall become available for assignment at whatever floor the last car demand has been satisfied in the direction in which the car is then traveling.

c. When a car does not receive a demand dispatch at dispatching landing for an adjustable time period up to ten minutes, set initially at five minutes, the motor drive unit shall be switched off. When a demand dispatch is received by a car whose motor drive unit is switched off, it shall automatically restart.

d. [For electrically operated doors, the open dwell time shall be adjustable so that open time for a car call is shorter than for landing calls and for second passengers. If a longer time is needed for passenger entry, doors can be prevented from closing or reversing by the light ray door control, the protective leading edge on car door, or by pressing the DOOR OPEN button in car. Door dwell times shall comply with ICC A117.1.]

2.10.3 Independent Service

The elevator shall be arranged for independent service operation by means of a key switch located in the locked section of the car operating panel which, when placed in the ON position, shall remove the elevator from the group, disconnecting it from hall button operation and permitting operation from the car buttons only. Elevator direction lanterns shall be inoperative when in this mode of operation.

2.10.4 Automatic Load Weighing

Passenger elevator(s) shall be provided with load weighing devices which will cause the elevators to bypass hall calls when the elevator is filled to an adjustable percentage. The corridor calls shall remain registered until the [next available] car responds to the call.

2.10.5 Anti-Nuisance

Passenger elevator(s) shall be provided with a system which will cancel all car calls in the event that between three to five times the number of car calls are registered as there are passengers in the car, allowing 70 kg 150 pounds per passenger.

2.10.6 Door Operation

Double-door operation shall not be permitted for passenger elevator(s). If a car traveling up has a passenger for an intermediate floor and a down call is registered at that floor with no calls above the car, it shall travel to the passenger's selected floor, open the door, and let the passenger out, then light down direction arrow in the hall lantern, and accept the waiting passenger who registered the down call. Doors shall not close and reopen.

2.11 CAR OPERATION (TWO-STOP COLLECTIVE) ELEVATOR NUMBER [_____]

****

NOTE: Select "two-stop collective" when a single elevator is installed and only two floors are served.

****

The operating device at each of the two hoistway landings shall consist of a single illuminating push button. The system shall be designed for operating the elevator from push buttons at the landings and car buttons marked for the corresponding landings. Pressure on a car or landing button shall dispatch or call the car to the other landings if interlock circuits have been established. If a lower floor landing button is pressed while the car is making an upward trip, the call shall remain registered. After the car has reached the upper landing and the interlock circuits have been reestablished, the car shall automatically reverse and respond to the lower landing call. The elevator shall operate similarly for the down direction of travel. A time limit relay shall be provided to hold the car at the landing where it has stopped for a predetermined time. When all calls are completed, the elevator shall park [at the lower floor] [at the upper floor] [at the last floor served]. A landing button pressed momentarily at the same floor at which the car is parked shall automatically open the car and hoistway doors.

2.12 CAR OPERATION (SINGLE-CAR SELECTIVE/COLLECTIVE) ELEVATOR NO. [_____]

****

NOTE: Select "single-car selective/collective" when a single elevator is installed and more than two floors are served.

****

The operating device shall be so arranged that with the pressing of one or more car or landing buttons the car shall start automatically and stop at the first floor for which the button has been pressed corresponding to the direction in which the car is traveling. The car shall stop in the order in which the floors are reached at all floors for which calls have been registered, irrespective of the sequence in which the buttons have been pressed, provided the button for a given floor has been pressed sufficiently in advance of the car's arrival at that floor to permit the stop to be made. If no car buttons have been pressed and the car starts up

in response to several down calls, the car shall travel to the floor of the highest down call first and then reverse to collect other down calls. When the car starts down, up call stops shall be made in the same way, i.e., by first stopping for the lowest up call registered. When a car has stopped in response to the pressing of a landing button and a car button is pressed corresponding to the direction in which the car has been traveling, within a predetermined interval of time after the stop, the car shall continue in that direction, regardless of other landing calls registered. While the car is in motion, landing calls in the opposite direction of the car movement shall not affect the operation of the car, but calls shall remain registered. After the last car call in the direction the car is traveling has been answered, the car shall automatically reverse and answer registered landing calls and all car calls in the order the landings are reached. When all calls have been answered, the car shall park at the [main floor] [_____] with the doors closed.

2.13 CAR OPERATION (TWO-CAR SELECTIVE/COLLECTIVE) ELEVATORS [_____] AND [_____]

****
NOTE: Select "two-car selective/collective" when two elevators are served by a single lobby at each landing.
****

The operating device shall be so arranged that when all calls have been answered, one car shall park at the main entrance floor, and the other car shall remain at the last floor served. A car at the main floor or a car traveling up shall answer all up landing calls, provided the landing buttons are pressed in time to make the stop, and shall answer all down landing calls behind the other car traveling down. A car at the top floor or a car traveling down shall answer all down landing calls, provided the landing buttons are pressed in time to make the stop, and shall answer all up landing calls behind the other car traveling up. When both cars are in operation, landing calls shall be answered by the car nearest the call and set in the direction of the call. Only one car shall answer any one landing call. The operation of each car shall be such that the momentary pressing of one or more car buttons shall close the car doors at an adjustable, predetermined time after the buttons have been pressed and have started the car. The cars shall stop at all landings for which car or landing buttons have been pressed in the order in which the landings are reached, irrespective of the sequence in which the buttons were pressed. If one car is out of service or fails to start, the other car shall automatically answer all calls. When the cars are parked at the home landing with the doors closed, the pressing of a hall button at that landing shall illuminate the lights and open the car doors.

2.14 FREIGHT CAR OPERATION

2.14.1 General

When the car is not in use and the door locking circuit is established, the momentary pressing of a landing call button shall bring the car to that landing. The momentary pressing of a car dispatching button in the car panel shall send the car to the designated landing if the car gate and the hoistway doors are closed and the door locking circuit is established.

2.14.2 Door and Gate Operation

****
NOTE: Manual car gate and hoistway door operations are acceptable for light freight use.
****

The hoistway doors and car gates shall be of the [manually] [power] operated type.

2.14.3 Operation

Elevators shall operate as an automatic [two-stop collective] [single car] [two-car] [selective/collective] elevator, as described for passenger elevators. A nonstop button in the car station shall be provided.

2.14.4 Service-Demand Bell

A service-demand bell shall be provided in the car and shall sound when a landing button is pressed while a door is open.

2.14.5 Inspection and Maintenance Switch

An inspection and maintenance switch shall be mounted in the car control panel to disconnect the landing buttons. When this switch is closed, the car can be operated by continuous pressure on up and down buttons on top of the car which shall operate the car at a reduced speed.

2.15 FIRE SERVICE

****
NOTE: All elevators having a travel of 7.6 m (25 ft) or more will comply with the fire service requirements of ASME A17.1. Also, the appropriate seismic requirements must comply with paragraph SEISMIC REQUIREMENTS.
****

Fire service shall be in compliance with the requirements of ASME A17.1. The elevator control system shall be connected to the fire control system (product of combustion sensing device) in a manner that will provide automatic fire emergency operation. The product of combustion sensing device shall be wired to the nearest controller in the elevator machine room. The emergency main landing shall be the [first] [_____] floor. The designated alternate floor shall be the [basement] [_____] floor.

2.16 LEVELING DEVICES

****
NOTE:
a. Car "start" motion from one floor to the next floor shall be 5.4 seconds for geared equipment based on 3.5 m (11 ft 6 in.) floor heights. Add or subtract 0.17 seconds for each 0.3 m (ft) of change in floor height. For cycle time, add the aforementioned values, plus 0.07 seconds plus the appropriate door open and close times listed below.

b. Passenger door times (seconds) are as follows:

Opening Size, m	0.9	0.95	1.0	1.05	1.1	1.15	1.2
Opening Size, in.	36	38	40	42	44	46	48
Center Opening -Open	1.5	1.6	1.6	1.7	1.8	1.8	1.9
Center Opening -Close	2.1	2.2	2.3	2.4	2.5	2.7	2.9
2-Speed Ctr Open-Open	-	-	-	1.8	1.9	2.0	2.1
2-Speed Ctr Open-Close	-	-	-	2.1	2.2	2.4	2.5
2-Speed Slide -Open	2.1	2.2	2.3	2.4	2.5	2.6	2.7
2-Speed Slide -Close	3.4	3.5	3.6	3.7	3.9	4.2	4.5
Single Slide -Open	2.6	2.7	2.8	2.9	-	-	-
Single Slide -Close	3.6	3.8	3.9	4.1	-	-	-

****

Elevator(s) shall be equipped with a two-way leveling device to automatically bring the car to the floor landings. Car shall automatically relevel at each landing to correct overtravel or undertravel or maintain the level, regardless of load on the car, rope slippage, or stretch of cables. The electric stopping system shall be arranged so the car will stop level with the floor before the brake is set. The stopping accuracy shall not exceed plus or minus 6 mm 1/4 in..

2.17 ELEVATOR MACHINE

****
NOTE: Specify geared elevator up to a maximum speed of 2 m/s (400 fpm).
****

2.17.1 Hoisting Machine

The hoisting machine shall be of the worm-geared traction type with motor, brake, worm gearing, traction sheave, and bearings mounted on a common bed plate. The worm shall be of steel, integral with the worm shaft, and shall be provided with a ball thrust bearing with self-alignment blocks or preloaded thrust bearing designed to take the end thrust of the worm in both directions. The main gear shall be hobbed from a bronze rim which shall be accurately fitted and bolted to the gear spider. Gears shall be so fitted that there shall be minimum noise, vibration, and wear. Roller bearings shall be provided for the drive sheave shaft and equipped with suitable means for lubrication. [The design and construction of the equipment and parts subject to wear shall be such that similar machines and devices provided shall be completely interchangeable.]

2.17.2 Sheaves

The drive sheave shall be of steel or semi-steel, with accurately finished grooves to receive the hoist ropes. Grooves shall be designed to give maximum traction and minimum wear. Grooved nonmetallic inserts on the drive sheave may be provided at the Contractor's option. Deflector and overhead sheaves, suitable sheet metal guards with required service openings, sheave beams, and supports shall be provided as required.

2.17.3 Hoist Motor

The motor shall be of the [direct current] [alternating current] type conforming to the requirements of NEMA MG 1 and designed to develop the required high starting torque with low starting current. The motor shall be of a design especially adapted to requirements of elevator service and

capable of carrying the full-rated load in the car for a period of 1 hour continuous run, starting cold, stopping at all floors up and down, and standing not more than 10 seconds at each floor without overheating. Speed regulation of the car with full-rated load shall not exceed plus or minus 5 percent of the average on a round trip.

2.17.4 Brake Assembly

The brake shall be spring-applied and electrically released and shall be designed for automatic application in the event of interruption of the power supply. The brake drum shall have a wearing surface and edge of flange turned smooth, and the wearing surface shall run within a maximum variation of 125 micrometers 0.005 in.. The brake shoes shall be lined with a fireproof friction material shaped to the shoes so that the drum will run free with normal clearance. Brake springs shall be helical and operated in compression and shall apply the brake when released by the magnet. The brake magnet shall be so designed that the release shall be quick, and the brake application shall be automatically controlled by the magnetic retardation to obtain noiseless, smooth, and gradual stops under all loading conditions. The release magnet coil circuit shall be opened by the various safety devices, power failure, failure of the equipment to function in the proper manner for safe operation of the car, or normal stopping of the car.

2.17.5 Bed Plate

The bed plate shall be one-piece cast iron or steel with stiffening ribs to accurately maintain alignment of parts or shall be heavy rigid structural steel shapes securely welded together. Accurately planed or milled pads shall be provided as seats for parts secured to the bed plate.

2.17.6 Hand Crank

A hand crank shall be provided for manual operation of the elevator in the event of electrical failure.

2.18 SOUND AND VIBRATION ISOLATION

A sound and vibration isolating foundation to effectively prevent the transmission of machine vibration and sound to the building structure shall be provided. The location and deflection characteristics of the isolation units shall produce an approximately uniform and nonexcessive loading on the units under all operating conditions.

2.19 CONTROL SYSTEM

****

NOTE:
a. Car "start" motion from one floor to the next floor shall be 5.4 seconds for geared equipment based on 3.5 m (11 ft 6 in.) floor heights. Add or subtract 0.17 seconds for each 0.3 m (ft) of change in floor height. For cycle time, add the aforementioned values, plus 0.07 seconds plus the appropriate door open and close times listed below.

b. Passenger door times (seconds) are as follows:

Opening Size, m	**0.9**	**0.95**	**1.0**	**1.05**	**1.1**	**1.15**	**1.2**

Opening Size, in.	36	38	40	42	44	46	48
Center Opening -Open	1.5	1.6	1.6	1.7	1.8	1.8	1.9
Center Opening -Close	2.1	2.2	2.3	2.4	2.5	2.7	2.9
2-Speed Ctr Open-Open	-	-	-	1.8	1.9	2.0	2.1
2-Speed Ctr Open-Close	-	-	-	2.1	2.2	2.4	2.5
2-Speed Slide -Open	2.1	2.2	2.3	2.4	2.5	2.6	2.7
2-Speed Slide -Close	3.4	3.5	3.6	3.7	3.9	4.2	4.5
Single Slide -Open	2.6	2.7	2.8	2.9	-	-	-
Single Slide -Close	3.6	3.8	3.9	4.1	-	-	-

****

The control system shall be solid-state DC drive or variable-frequency AC drive.

2.19.1 Performance

The control system shall govern the starting, stopping, and direction of travel of the elevator and provide the operation specified. Control shall be accomplished by a solid-state motor control for each elevator for which the voltage or frequency applied to the hoist motor is variable. Control equipment shall be suitable for the motors and type of operation specified and shall provide smooth acceleration from stop to full speed, deceleration, and landing stops under all load conditions.

2.19.2 Controller

The electric controller shall be of the microprocessor-based logic type. Components required for proper performance of the elevator shall be neatly mounted and wired and completely enclosed in a cabinet with a mechanically latched door.

2.19.3 Solid-State Motor Control

A solid-state motor control unit shall be provided for [the] [each] elevator, with electrical characteristics to suit the power supply. The system shall consist of the necessary three-phase, full-wave bridge rectifiers or other devices and shall be fully regenerative. Necessary isolation transformers shall be provided to completely isolate the system from the normal building power, thereby eliminating any line pollution from the building power supply which would affect any building equipment. The unit shall have the capacity to handle peak currents and contain a balanced, coordinated fault protection system in accordance with the following, as applicable to the type of drive system provided.

a. Complete power circuit, and specifically the power semi-conductors, to preclude failure under short-circuit conditions.

b. Limited faults arising from partial grounds, partial shorts in the motor armature (if a DC system is provided) or in the power unit itself.

c. A drive motor protected from sustained overloads. A solid-state overload circuit shall be used.

d. Motor and power unit protected from instantaneous peak overload.

e. Semiconductor transient protection.

f. Phase sequence protection to ensure that the incoming line is

phased properly.

g. Instantaneous overcurrent.

h. Low power line voltage (less than 75 percent of nominal).

i. Protection from a blown AC input fuse.

j. Protection from a blown DC converter output fuse.

k. Protection from excessive converter output voltage.

l. Protection from excessive open-circuit voltage.

m. Protection from heat sink or transformer overheating.

The occurrence of any of the above fault conditions shall result in the immediate removal of the drive's run command and application of an emergency dynamic brake stop. In addition, the drive system shall notify the car controller of the shutdown via a drive status signal. The car controller shall respond to continuous-drive reset pulses which shall reset the drive as soon as the fault condition clears (if it is not a hard failure such as a blown fuse) and return the elevator to service.

2.20 COUNTERWEIGHTS

****

NOTE: When occupied space occurs beneath the elevator hoistway, counterweight speed governors and counterweight safeties must also be provided.

****

[The] [Each] car shall be provided with counter-weights equal to the weight of the car plus approximately 42 percent of the specified load. Concrete weights are not acceptable. [Counterweight safeties shall be provided.] [A metal counterweight screen at least 1.8 m 6 ft high shall be provided at the bottom of the hoistway as a protective guard.]

2.21 CAR AND COUNTERWEIGHT GUIDES AND GUIDE RAILS

2.21.1 Passenger Elevator Car and Counterweight Guides

Guides shall be of the roller type with not less than 150 mm 6 in. diameter rollers for the car and 75 mm 3 in. diameter rollers for the counterweight. The car guide mounting shall be arranged to keep the car running smoothly and quietly on the guide rails. Rollers shall be metal, tired with a durable resilient oil-resistant material, and shall rotate on precision ball bearings provided with lubricant seals and means for lubrication. When oil buffers are attached to the bottom of the counterweight frame, additional roller guides shall be installed on each side of the buffer frame. Guards fabricated of 14 gage sheet metal shall be provided to protect the wheels on top of the car and the counterweight.

2.21.2 Freight Elevator Car Guide Shoes

Guide shoes shall be accurately machined solid cast iron or welded steel type with approved replaceable liners and shall have positive-feed lubricators on the car sling. The car guide shoes shall be standard heavy duty freight elevator shoes mounted in mechanically equalized pairs on each

side of the car sling at the top and bottom. The mounting shall be arranged to keep the car running smoothly and quietly on the guide rails.

2.21.3 Car and Counterweight Guide Rails

Guide rails shall be planed steel tee sections with structural channel rail backing as required and shall have tongue and groove matched joints reinforced with a fitted splice plate. Guide rails shall be long enough to extend from the bottom of the pit to the underside of the roof over the hoistway.

2.22 ELEVATOR SUPPORTS

Structural steel machine beams, inserts, brackets, bolts, and fastening devices shall be provided for the proper installation of all elevator equipment. Wood plugs shall not be used.

2.23 BUFFERS

****
NOTE: Oil buffers are required for speeds in excess of 1 m/s (200 fpm).
****

The buffers shall be of a design suitable for the pit depth. Buffer anchorage at pit floors shall be provided for each car and counterweight and shall be arranged to avoid puncturing the pit waterproofing. The type of buffer used shall have been previously tested and approved as complying with the service requirements. Pipe struts and steadiers shall be provided as required by the pit conditions. A metal plate with information concerning stroke and load rating shall be permanently fastened to each buffer. Pit-mounted buffers shall have an adequate stroke and be designed to bring the fully loaded car and counterweight to rest from governor tripping speed at an average rate of retardation not exceeding the rate of acceleration due to gravity. The moving portion of the buffer shall be so designed that it can be accelerated by the car without a noticeable peak retardation. [Oil buffers shall be of the spring return type, except that counterweight buffers attached to the counterweight may be of the gravity return type. Means shall be provided for checking the oil level. Switches shall be provided for spring return oil buffers.] [Spring buffers shall be in accordance with ASME A17.1.]

2.24 PASSENGER ELEVATOR PLATFORM AND SLING

2.24.1 Elevator Platform Frame

The platform frame shall be constructed of structural steel shapes that are factory-welded into an integral unit.

2.24.2 Car Platform Floor

The platform floor shall be fabricated from steel plate and formed-steel sections or built up from wood flooring. Steel platforms shall be provided with sound isolation and assembled into a one-piece platform with top and bottom plates mounted in a rigid steel frame and covered with felt. Wood platforms shall be fastened to the frame, and sheet metal fire protection shall be provided on the underside of wood platform stringers. Top flooring shall be not less than 19 mm 3/4 in. thick marine plywood.

2.24.3 Sling

The sling shall be constructed of structural or formed steel shapes welded or bolted together and shall consist of cross head and bolster with channel uprights, gusset plates, and diagonal bracing.

2.24.3.1 Safeties

****

NOTE: Maximum speed for a Type A instantaneous safety is 0.75 m/s (150 fpm).

****

The sling shall be provided with [Type A - instantaneous] [Type B - gradual wedge clamp] safeties which shall be activated by an overspeed governor connected to the safety by a governor cable.

2.24.3.2 Connected to Counterweight Frame

The sling shall be connected to the counterweight frame by steel hoist ropes which run over the hoist machine traction sheave. There shall be enough ropes to obtain the factor of safety required by ASME A17.1, and they shall be provided with rope equalizers.

2.24.4 Finished Flooring

The floor shall be finished with not less than 5 mm 3/16 in. thick rubber tile flooring or not less than 3 mm 1/8 in. thick flexible-type homogeneous vinyl tile. Adhesive material shall be the type recommended by the tile manufacturer. The tile shall be laid flush with the extruded aluminum platform threshold.

2.25 FREIGHT ELEVATOR PLATFORM AND SLING

2.25.1 Sling

The sling shall be constructed of structural or formed-steel shapes that are welded or bolted together and shall consist of double-channel cross head and bolster with channel uprights, gusset plates, and diagonal bracing, all designed for the proper class loading and capacity.

2.25.1.1 Safeties

****

NOTE: Maximum speed for a Type A instantaneous safety is 0.75 m/s (150 fpm).

****

The sling shall be provided with [Type A - instantaneous] [Type B - gradual wedge clamp] safeties which shall be activated by an overspeed governor connected to the safety by a governor cable.

2.25.1.2 Connected to Counterweight Frame

The sling shall be connected to the counterweight frame by steel hoist ropes which run over the hoist machine traction sheave. There shall be enough ropes to obtain the factor of safety required by ASME A17.1, and they shall be provided with rope equalizers.

2.25.2 Steel Stringers

Stringers in the platform frame shall be spaced close by enough to ensure that wheel loads will not deform the floor plate.

2.25.3 Platforms

Platforms shall be of steel construction with a finish floor of raised pattern steel floor plate welded or bolted to the platform members. Bolted platform shall be attached with countersunk flat head bolts. A steel subfloor will not be required if the raised-pattern-steel floor plate is thick enough to accommodate the capacity of the elevator and the type of loading.

2.26 [PASSENGER] [PASSENGER/FREIGHT] ELEVATOR DOOR HANGE RS

[Passenger] [Passenger/Freight] elevator door hangers shall be of the sheave type, suitable for the type of door operation specified. Each door panel shall have no less than two hangers per door panel.

2.26.1 Door Rollers

Rollers shall be made of, or tired with, a sound reducing material and shall rotate on grease-packed ball bearings. The rollers shall be not less than 82 mm 3-1/4 in. in diameter for car doors and not less than 58 mm 2-1/4 in. for hoistway doors. The upward thrust shall be taken by a hardened and ground ball bearing roller assembled on an eccentric stud to provide adjustment.

2.26.2 Hanger Track

Hanger track shall be of high-carbon, cold-drawn steel not less than 50 mm 2 in. high and 13 mm 1/2 in. thick and shall be rounded at the top to receive the door rollers and at the bottom to receive the upthrust rollers, or as approved.

2.27 [PASSENGER] [PASSENGER/FREIGHT] ELEVATOR DOOR OPERA TORS

****
NOTE: When occupied space occurs beneath the elevator hoistway, counterweight speed governors and counterweight safeties must also be provided.
****

The elevator car and hoistway doors shall be operated simultaneously by an electric power door operator. Doors shall operate smoothly in both the opening and closing direction and shall be electrically or hydraulically cushioned to stop at both the full-open and full-closed positions. Operators shall be high-speed, direct-current, heavy-duty-type operators that provide an average door opening speed of 0.75 m/s 2-1/2 fps. The car and hoistway doors shall be opened and closed simultaneously in a maximum time of [_____] seconds. When on automatic operation, the door closing time shall not exceed [_____] seconds, and door closing torque shall not exceed 14 kg 30 lbs. Reversal of the doors when closing shall be accomplished by the DOOR OPEN button, car door safety edge, or interception of the photoelectric light rays. The doors shall be arranged so that they can be opened manually in the event of power failure.

2.28 FREIGHT ELEVATOR HOISTWAY DOORS AND CAR GATE OPERATORS

****
NOTE: Delete this paragraph in its entirety if manual freight doors are selected. If power-operated doors are specified, select either automatic open and close or automatic opening with continuous-pressure close.
****

2.28.1 General

The vertical biparting hoistway doors and vertical sliding car gates shall be motorized for power opening and closing. Separate motors, located in the hoistway or on the elevator car, shall be provided to open and close the car gates at a speed of not less than 0.3 m/s 1 fps, and shall be arranged for sequence operation. A DOOR OPEN and DOOR CLOSE button shall be provided in the car operating panel and the hall call station. The car gate and the hoistway door operators shall be arranged to permit opening from within the car in the event of a power failure. A single-operator motor shall be provided for each car gate, and double-operator motors shall be provided for each hoistway entrance.

2.28.2 Hoistway Doors and Car Gate

****
NOTE: Specify full selective door operation for power-operated hoistway doors when two openings occur at the same floor.
****

The hoistway doors and car gate shall open [automatically when the elevator car arrives at a landing] [automatically in response to a car call but by pressure on the DOOR OPEN button in the car operating panel or hall call station when the elevator is responding to a hall call. A circuit shall be provided which will hold the car at the floor in response to a hall call for sufficient time to allow opening the doors from the hall call station.] The operation shall be [full] [semi] selective. [The closing of the doors and gate in sequence operation shall be obtained by constant pressure on the DOOR CLOSE button in the car operating panel or hall button station. Releasing the pressure on the button shall stop the closing movement of the doors and gate. Momentary pressure of the DOOR OPEN button shall reopen the doors and gate. The doors and gate shall accelerate and decelerate smoothly and shall be checked in both the opening and closing motions.] [All power-operated doors shall be equipped with automatic closers when the system is in automatic operation. The doors shall close automatically after an adjustable time delay (0 to 300 seconds) has expired or when continuous pressure is applied on the DOOR CLOSE button. An alarm bell shall sound during either closing process. The door open time delay will be automatically reset by either momentary pressure of the DOOR OPEN button or by activation of the car gate safety edge.]

2.29 SEISMIC REQUIREMENTS

Seismic protection shall be provided in conformance with TI 809-04 for general guidance and computation of forces (1.0 G horizontal and 1.0 G vertical minimum), ASME A17.1, Rule XXIV, and ICC IBC. The Contractor shall hire a registered engineer to submit the stamped calculations and drawings.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Lubrication Points

Every part subject to movement friction shall have provision for lubrication with oil or grease. All points of lubrication shall be readily accessible.

3.1.2 Elevator Wiring

Wiring shall be provided as necessary for all elevator equipment, and installation shall comply with the requirements of NFPA 70. The minimum size wire permitted shall be No. 18 AWG for control and signal circuits and No. 12 AWG for power and lighting circuits. Work light 150 watt incandescent lamp fixtures and grounded duplex receptacles shall be provided on the top and bottom of the car. Fixtures shall have wire lamp guards and toggle switches. Work light fixtures and traveling cable junction boxes shall be so located that the work lights will provide illumination at the junction boxes.

3.1.2.1 Wiring

All wiring, except short section and traveling cables shall be in rigid conduit, EMT, or duct. Short sections of wire which may require shifting for connection to switches and equipment may be installed in flexible conduit. Conduit or EMT shall terminate in junction boxes. Wires shall be identified and shall match the symbols shown on the wiring diagrams.

a. Control and signal wires shall be brought to accessible numbered terminal blocks on the controller.

b. Intra-panel wiring shall be a flame resisting type.

3.1.2.2 Traveling Cables

Traveling cables shall terminate at numbered terminal blocks in the car and machine room. Traveling cables shall be provided with a separate shielded circuit for the communication system and shall be hung so that the proper size loop can be obtained. Spare traveling cable lengths of the same type and size used for the traveling cables and including an additional ten percent of the conductor lengths for each car shall be provided.

3.2 INSTALLATION

****

NOTE: ASME A17.1 must be consulted for such information as vertical support spacing and loading conditions, and the drawings should indicate positions of the supporting devices.

****

Elevators and equipment shall be installed in accordance with ASME A17.1 and the manufacturer's recommendation. Guide rails shall be set plumb and parallel and attached to guide rail brackets secured to the building framing as indicated and at intervals not exceeding [_____] m ft-in. Alignment, where required, shall be accomplished by the use of steel shim

plates. Joining of sections of guide rails shall be in accordance with ASME A17.1. Guide rails shall be thoroughly cleaned and smoothed before the elevator car is put into operation.

3.3 PAINTING

Except for factory-finished items, corrosion-resistant items, and machined surfaces, finish painting shall be as specified in Section [09900 PAINTS AND COATINGS] [09964 PAINTING: HYDRAULIC STRUCTURES].

3.4 ADJUSTMENTS

After installation is complete, and during the 90 days prior to acceptance tests, the Contractor shall test and adjust the equipment to achieve proper operation. Such testing and adjusting shall be in accordance with the applicable provision of ASME A17.1.

3.4.1 During Warranty Period

Regular adjustments to the elevator(s) shall be performed during the warranty period by competent and trained elevator mechanics during regular working hours of regular working days and shall include adjusting, lubricating, and cleaning of equipment. The Contractor shall furnish required supplies and parts except those parts required because of misuse, accident, or negligence not caused by the Contractor.

3.4.2 Emergency Callback Service

The Contractor shall furnish special adjustments to correct the trouble that develops between regular adjustments. Service shall be available 24 hour per day, 7 days per week, for a period of [_____], with a response time of [_____] hour.

3.5 TESTING

Testing shall be in accordance with the requirements of ASME A17.1 and ASME A17.2.1 and as specified below. The Contractor shall notify the Contracting Officer in writing, [_____] days prior to the time of performing the acceptance test. The Contractor shall furnish all test instruments and material required for final inspection. If any deficiencies are revealed during any test, such deficiencies shall be corrected and the tests reconducted. All costs associated with retesting shall be borne by the Contractor.

3.5.1 Test Period

[The] [Each] elevator shall be tested for a period of 1 hour of continuous run with specified rated load in the car. During the test run, the car shall be stopped at all floors in both directions of travel for a standing period of 10 seconds per floor. A manual test of the final limits (up and down overtravel) shall also be performed.

3.5.2 Speed Load Tests

The actual speed of the elevator car in both directions of travel shall be determined with the rated load and with no load in the elevator car. The actual measured elevator car speed with the rated load in the up direction shall be within 5 percent of rated speed.

3.5.3 Car Leveling Tests

Elevator cars' leveling devices shall be tested in both directions of travel for accuracy of landing at all floors with no load in the car, a symmetrical load in the car, and with the rated load in the car.

3.5.4 Brake Test

The brake test shall be conducted with the rated load in the car. Brakes shall stop and hold the car with the rated load.

3.5.5 Insulation Resistance Tests

The complete wiring systems of the elevator shall be free of short circuits and grounds. Conductors shall have an insulation resistance of not less than 1 megohm between each conductor and ground and between each conductor and all other conductors.

3.5.6 Temperature Rise Tests

Temperature rise tests of the hoistway motor, motor drive, exciter, and booster shall be conducted during the full-load test run for a minimum of 1 hour. Under these conditions, the temperature rise of the equipment shall not exceed 70 degrees C above 40 degrees C ambient temperature. Test shall be started when all parts of equipment are within 5 degrees C of the ambient temperature.

3.6 MAINTENANCE

3.6.1 Training Course

A training course shall be conducted by a qualified individual or individuals employed by the elevator supplier and familiar with the installation for the [_____] members of the operating staff as designated by the Contracting Officer. The training period shall consist of a total of 40 hours normal working time and shall start after the system is functionally completed and tested, but prior to final acceptance. The field instructions shall cover all of the items contained in the operating and maintenance instructions as well as demonstrations of routine maintenance operations. The Contracting Officer shall be notified at least 14 days prior to the date of proposed conduct of the training course.

3.6.2 Posted Instructions

Framed instructions under glass or in laminated plastic, including wiring and control diagrams showing the complete layout of the entire system, shall be posted in the elevator machine room where directed. Condensed operating instructions explaining preventive maintenance procedures, methods of checking the system for normal safe operation, and procedures for safely starting and stopping the system shall be prepared in typed form, framed as specified above for the wiring and control diagrams, and posted beside the diagrams. Proposed diagrams, instructions, and other sheets shall be submitted prior to posting. The framed instructions shall be posted before acceptance testing of the systems is begun.

-- End of Section --