

SECTION 14 24 00**HYDRAULIC ELEVATORS**

SPEC WRITER NOTE: Delete between //__// and paragraph content not applicable to project and write "not used" after title.

PART 1 - GENERAL**1.1 DESCRIPTION**

- A. This section specifies the engineering, furnishing, and installation of the complete electric hydraulic elevator system as described herein and as indicated on the contract drawings.
- B. Items listed in the singular apply to each and every elevator in this specification except where noted.

SPEC WRITER NOTE: Edit or delete Subparagraphs C, D and E to suit the project. Add elevator schedules as needed.

- C. Passenger Elevator P__ shall be oil hydraulic, microprocessor control system, and power-operated single speed center opening car and hoistway doors. Elevator shall have Class "A" loading.
- D. Service/Passenger Elevator S__ shall be oil hydraulic, microprocessor control system, and power operated two speed side opening car and hoistway doors. Elevator shall have Class "C3" loading.
- E. Freight Elevator F__ shall be oil hydraulic, microprocessor control system, and power operated vertical bi-parting hoistway doors and vertical sliding car gate. Elevator shall have Class "C1" loading.

ELEVATOR SCHEDULE	
Elevator Number	
Overall Platform Size	
Clear Inside Platform	
Rated Load - kg (lb)	
Contract Speed - m/s (fpm)	
Total Travel - m (ft)	
Floors Served	
Number of Openings	

ELEVATOR SCHEDULE	
Entrance Type & Size	
Plunger Size	

1.2 RELATED WORK

- A. Section 01 33 23 SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FAR 52.236-21) and, SPECIAL NOTES (VAAR 852.236-91), in GENERAL CONDITIONS.
- B. Section 07 84 00, FIRESTOPPING: Sealing around penetrations to maintain the integrity of fire-rated construction.
- C. SECTION 09 06 00, SCHEDULE FOR FINISHES: As a master format for construction projects, to identify interior and exterior material finishes for type, texture, patterns, color and placement.
- D. Section 13 05 41, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS: Requirements for seismic restraint of non-structural components.
- E. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General electrical requirements that are common to more than one section.
- F. Section 26 05 19, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW): Low Voltage power and lighting wiring.
- G. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.
- H. Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS: Conduits for cables and wiring.
- I. Section 26 05 73, OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY: Requirements for installing the over-current protective devices to ensure proper equipment and personnel protection.
- J. Section 26 22 00, LOW-VOLTAGE TRANSFORMERS: Low voltage transformers.
- K. Section 26 24 16, PANELBOARDS: Low voltage panelboards.
- L. Section 26 43 13, TRANSIENT-VOLTAGE SURGE SUPPRESSION: Surge suppressors installed in panelboards.
- M. Section 26 51 00, INTERIOR LIGHTING: Fixture and ballast type for interior lighting.

1.3 QUALIFICATIONS

- A. Approval by the Contracting Officer is required for products or services of proposed manufacturers, suppliers and installers and shall

be contingent upon submission by Contractor of a certificate stating the following:

1. Elevator contractor is currently and regularly engaged in the installation of elevator equipment as one of his principal products.
 2. Elevator contractor shall have five (5) years of successful experience, trained supervisory personnel, and facilities to install elevator equipment specified herein.
 3. Elevator Mechanic (Installer) shall have passed a Mechanic Examination approved by the U.S. Department of Labor and have technical qualifications of at least five years of experience in the elevator industry or 10,000 hours of field experience working in the elevator industry with technical update training. Apprentices shall be actively pursuing Certified Elevator Mechanic status. Certification shall be submitted for all workers employed in this capacity.
- B. Welding at the project site shall be made by welders and welding operators who have previously qualified by test as prescribed in American Welding Society Publications AWS D1.1 to perform the type of work required. Certificates shall be submitted for all workers employed in this capacity. A welding or hot work permit is required for each day and shall be obtained from the VAMC safety department. Request permit one day in advance.
- C. Electrical work shall be performed by a Licensed Master Electrician and Licensed Journeymen Electricians as requirements by NEC. Certificates shall be submitted for all workers employed in this capacity.
- D. Approval will not be given to elevator contractors and manufacturers who have established on prior projects, either government, municipal, or commercial, a record for unsatisfactory elevator installations, have failed to complete awarded contracts within the contract period, and do not have the requisite record of satisfactorily performing elevator installations of similar type and magnitude.
- E. Approval of Elevator Contractor's equipment will be contingent upon their providing factory training, engineering and technical support, including all manuals, wiring diagrams, and tools necessary for adjusting, maintenance, repair, and testing of equipment to the VA for use by the VA's designated Elevator Maintenance Service Provider. Identifying an elevator maintenance service provider that shall render services within // one hour // two hours // four hours // of receipt of

notification, together with certification that the quantity and quality of replacement parts stock is sufficient to warranty continued operation of the elevator installation.

- F. Equipment within a group of electric hydraulic elevators shall be the product of the same manufacturer.
- G. The Contractor shall provide and install safety devices that have been subjected to tests witnessed and certified by an independent professional testing laboratory that is not a subsidiary of the firm that manufactures supplies or installs the equipment.

1.4 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification. Elevator installation shall meet the requirements of the latest editions published and adopted by the United States Department of Veterans Affairs on the date contract is signed.
- B. Federal Specifications (Fed. Spec.):
 - J-C-30B.....Cable and Wire, Electrical (Power, Fixed Installation)
 - J-C-580.....Cord, Flexible, and Wire, Fixture
 - W-S-610.....Splice Connectors
 - W-C-596F.....Connector, Plug, Electrical; Connector, Receptacle, Electrical
 - W-F-406E.....Fittings for Cable, Power, Electrical and Conduit, Metal, Flexible
 - HH-I-558C.....Insulation, Blankets, Thermal (Mineral Fiber, Industrial Type)
 - W-F-408E.....Fittings for Conduit, Metal, Rigid (Thick-Wall and Thin-wall EMT Type)
 - RR-W-410.....Wire Rope and Strand
 - TT-E-489J.....Enamel, Alkyd, Gloss, Low VOC Content
 - QQ-S-766.....Steel, Stainless and Heat Resisting, Alloys, Plate, Sheet and Strip
- C. American Society of Mechanical Engineers (ASME):
 - A17.1.....Safety Code for Elevators and Escalators
 - A17.2.....Inspectors Manual for Electric Elevators and Escalators
- D. National Fire Protection Association:
 - NFPA 13.....Standard for the Installation of Sprinkler Systems

specification number and paragraph). All submitted drawings and related elevator material shall be forwarded to the Contracting Officer.

C. Shop Drawings:

1. Complete scaled and dimensioned layout in plan and section view showing the arrangement of equipment and all details of each and every elevator unit specified including:
 - a. Complete layout showing location of storage tank/pump assembly, controller, piping layout, outside diameter of cylinder/plunger assembly, size of car platform, car frame members, and support assembly.
 - b. Car, guide rails, brackets, buffers, and other components located in hoistway.
 - c. Rail bracket spacing and maximum vertical forces on guide rails in accordance with H-18-8 for Seismic Risk Zone 2 or greater.
 - d. Reaction at points of support and buffer impact loads.
 - e. Weight of principal parts.
 - f. Top and bottom clearances and over travel of the car.
 - g. Location of main line switch/shunt trip circuit breaker, switchboard panel, light switch, and feeder extension points in the machine room.
2. Drawings of hoistway entrances and doors showing details of construction and method of fastening to the structural members of the building.
 - a. If drywall construction is used to enclose hoistway, submit details of interface fastenings between entrance frames and drywall.
 - b. Sill details including sill support.

D. Samples:

1. One each of stainless steel, 75 mm x 125 mm (3 in. x 5 in.).
2. One each of baked enamel, 75 mm x 125 mm (3 in. x 5 in.).
3. One each of color floor covering.
4. One each of protection pads, 75 mm x 125 mm (3 in. x 5 in.) if used.
5. One each car and hoistway Braille plate sample.
6. One each car and hall button sample.
7. One each car and hall lantern/position indicator sample.
8. One each wall and ceiling material finish sample.
9. One each car lighting sample.

- E. Name of manufacturer, type or style designation, and applicable data of the following equipment shall be shown on the elevator layouts:
1. Storage tank/pump assembly.
 2. Pump and motor, HP and RPM rating, Voltage, Starting and Full Load Ampere, Number of phases, and Gallons per minute.
 3. Controller.
 4. Starters and Overload Current Protection Devices.
 5. Car Safety Device; Rupture Valve and Manual Shut Off Valves.
 6. Electric Door Operator; HP, RPM, Voltage, and Ampere rating of motor.
 7. Hoistway Door Interlocks.
 8. Car Buffers; maximum and minimum rated load, maximum rated striking speed and stroke.
 9. Cab Ventilation Unit; HP rating and CFM rating.
- F. Complete construction drawings of elevator car enclosure, showing dimensioned details of construction, fastenings to platform, car lighting, ventilation, ceiling framing, top exits, and location of car equipment.
- G. Complete dimensioned detail of vibration isolating foundations for storage tank/pump assembly.
- H. Dimensioned drawings showing details of:
1. All signal and operating fixtures.
 2. Car slide guides/roller guides.
 3. Hoistway door tracks, hangers, and sills.
 4. Door operator, infrared curtain units.
- I. Cut sheets or drawings showing details of controllers and supervisory panels.
- J. Furnish certificates as required under: Paragraph "QUALIFICATIONS".

1.6 WIRING DIAGRAMS

- A. Provide three complete sets of paper and one electronic set of field wiring and straight line wiring diagrams showing all electrical circuits in the hoistway, machine room and fixtures. Install one set coated with an approved plastic sealer and mounted in the elevator machine room as directed by the Resident Engineer.
- B. In the event field modifications are necessary during installation, diagrams shall be revised to include all corrections made prior to and during the final inspection. Corrected diagrams shall be delivered to the Resident Engineer within thirty (30) days of final acceptance.

- C. Provide the following information relating to the specific type of microprocessor controls installed:
1. Owner's information manual, containing job specific data on major components, maintenance, and adjustment.
 2. System logic description.
 3. Complete wiring diagrams needed for field troubleshooting, adjustment, repair and replacement of components. Diagrams shall be base diagrams, containing all changes and additions made to the equipment during the design and construction period.
 4. Changes made during the warranty period shall be noted on the drawings in adequate time to have the finalized drawings reproduced for mounting in the machine room no later than six months prior to the expiration of the warranty period.

1.7 ADDITIONAL EQUIPMENT

- A. Additional equipment required to operate the specified equipment manufactured and supplied for this installation shall be furnished and installed by the contractor. The cost of the equipment shall be included in the base bid.

1.8 TOOL CABINET

- A. Provide a metal parts/tool cabinet, having two shelves and hinged doors. Cabinet size shall be 1200 mm (48 in.) high, 750 mm (30 in.) wide, and 450 mm (18 in.) deep.

1.9 PERFORMANCE STANDARDS

- A. The elevators shall be capable of meeting the highest standards of the industry and specifically the following:
1. Contract speed is high speed in either direction of travel with rated capacity load in the elevator. Speed variation under all load conditions, regardless of direction of travel, shall not vary more than five (5) percent.
 2. The controlled rate of change of acceleration and retardation of the car shall not exceed 0.1G per ft/s/s and the maximum acceleration and retardation shall not exceed 0.2G per ft/s/s.
 3. Starting, stopping, and leveling shall be smooth and comfortable without appreciable steps of acceleration and deceleration.
- B. Passenger/Service door operators shall open the car door and hoistway door at 75 cm (2.5 ft) per second and close at 30 cm (1 ft) per second. Freight door operators shall open and close at 30 cm (1 ft) per second.

- C. Floor level stopping accuracy shall be within 3 mm (.125 in.) above or below the floor, regardless of load condition.
- D. Noise and Vibration Isolation: All elevator equipment including their supports and fastenings to the building, shall be mechanically and electrically isolated from the building structure to minimize objectionable noise and vibration transmission to car, building structure, or adjacent occupied areas of building.
- E. Sound Isolation: Noise level relating to elevator equipment operation in machine room shall not exceed 80 decibels. All db readings shall be taken three (3) feet off the floor and three (3) feet from equipment.
- F. Airborne Noise: Measured noise level of elevator equipment during operation shall not exceed 50 decibels in elevator lobbies and 60 decibels inside car under any condition including door operation and car ventilation exhaust blower on its highest speed.

1.10 WARRANTY

- A. Submit all labor and materials furnished in connection with elevator system and installation to terms of "Warranty of Construction" articles of FAR clause 52.246-21. The one year Warranty shall commence after final inspection, completion of performance test, and upon full acceptance of the installation and run concurrent with the guarantee period of service.
- B. During warranty period if a device is not functioning properly in accordance with specification requirements, more maintenance than the contract requires keeping device operational, device shall be removed and a new device meeting all requirements shall be installed as part of work until satisfactory operation of installation is obtained. Period of warranty shall start anew for such parts from date of completion of each new installation performed, in accordance with foregoing requirements.

1.11 POWER SUPPLY

- A. For power supply in each machine room, see Specification 26 05 19, Electrical specifications, and Electrical drawings.
- B. Main Line Disconnect Switch/Shunt Trip Circuit Breaker for each controller shall be located inside the machine room at the strike side of the machine room door and lockable in the "Off" position.
- C. Surge Suppressors to protect the elevator equipment.

1.12 EMERGENCY POWER SUPPLY

- A. Emergency power supply, its starting means, transfer switch for transfer of elevator supply from normal to emergency power, two pair of conductors in a conduit from an auxiliary contact on the transfer switch (open or close contacts as required by Controller Manufacturer) to terminals in the group elevator controller and other related work shall be provided by the Electrical Contractor.
- B. Upon loss of normal power supply there shall be a delay before transferring to emergency power of 10 seconds minimum to 45 seconds maximum, the delay shall be accomplished through an adjustable timing device.
- C. Prior to the return of normal power an adjustable timed circuit shall be activated that will cause all cars to remain at a floor if already there or stop and remain at the next floor if in flight. Actual transfer of power from emergency power to normal building power shall take place after all cars are stopped at a floor with their doors open.
- D. Car lighting circuits shall be connected to the emergency power panel.

1.13 ELEVATOR MACHINE ROOM AND MACHINE SPACE

- A. Provide a machine room that meets the requirements of ASME A17.1, NEC, and IBC.
- B. Provide stairs and landing for access to the machine room. The landing shall be large enough to accommodate full opening of the door plus 60 cm (24 in.).
- C. Locate the light switch on the lock side of the door inside the machine room.
- D. Locate sprinkler pipes to provide seven 210 cm (7 ft) head clearance. Do not locate sprinkler heads, heat detectors, and smoke detectors directly over elevator equipment.

1.14 HOISTWAY LIGHTING - OPTIONAL

- A. Provide lighting with 3-way switches at the top and bottom of the hoistway accessible from elevator hoistway entrance prior to entering the pit or stepping onto the car top.
- B. Lighting shall illuminate top of elevator cab when it is at the top floor and the pit when at the bottom floor.

PART 2 - PRODUCTS**2.1 MATERIALS**

- A. Where stainless steel is specified, it shall be corrosion resisting steel complying with Fed. Spec. QQ-S-766, Class 302 or 304, Condition A

with Number 4 finish on exposed surfaces. Stainless steel shall have the grain of belting in the direction of the longest dimension and surfaces shall be smooth and without waves. During installation all stainless steel surfaces shall be protected with a suitable material.

- B. Where cold rolled steel is specified it shall be low-carbon steel rolled to stretcher level standard flatness, complying with ASTM A109.

2.2 MANUFACTURED PRODUCTS

- A. Materials, devices, and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items. The elevator equipment, including controllers, door operators, and supervisory system shall be the product of manufacturers of established reputation, provided such items are capably engineered and produced under coordinated specifications to ensure compatibility with the total operating system.
- B. Manufacturers of equipment assemblies which include components made by others shall assume complete responsibility for the final assembled unit. Components shall be compatible with each other and with the total assembly for the intended service.
- C. Mixing of manufactures related to a single system or group of components shall be identified in the submittals.
- D. If key operated switches are furnished in conjunction with component of this elevator installation, furnish four (4) keys for each individual switch or lock. Provide different key tumblers for different switch and lock functions. Each and every key shall have a tag bearing a stamped or etched legend identifying its purpose.

2.3 CONDUIT AND WIREWAY

- A. Install electrical conductors, except traveling cables, in rigid zinc-coated steel or aluminum conduit, electrical metallic tubing or metal wireways. Rigid conduit smaller than 18.75 mm (.75 in.) or electrical metallic tubing smaller than 12.5 mm (.50 in.) electrical trade size shall not be used. All raceways completely embedded in concrete slabs, walls, or floor fill shall be rigid steel conduit. Wireway (duct) shall be installed in the hoistway and to the controller and between similar apparatus in the elevator machine room. Fully protect self-supporting connections, where approved, from abrasion or other mechanical injury. Flexible metal conduit not less than 9.375 mm (.375 in.) electrical trade size may be used, not exceeding 45 cm (18 in.) in

length unsupported, for short connections between risers and limit switches, interlocks, and for other applications permitted by NEC.

- B. All conduits terminating in steel cabinets, junction boxes, wireways, switch boxes, outlet boxes and similar locations shall have approved insulation bushings. Install a steel lock nut under the bushings if they are constructed completely of insulating materials. Protect the conductors at ends of conduits not terminating in steel cabinets or boxes by terminal fittings having an insulated opening for the conductors.
- C. Rigid conduit and EMT fittings using set screws or indentations as a means of attachment shall not be used.
- D. Connect motors or other items subject to movement, vibration or removal to the conduit or EMT systems with flexible, steel conduits.

2.4 CONDUCTORS

- A. Conductors shall be stranded or solid coated annealed copper in accordance with Federal Specification J-C-30B for Type RHW or THW. Where 16 and 18 AWG are permitted by NEC, single conductors or multiple conductor cables in accordance with Federal Specification J-C-580 for Type TF may be used provided the insulation of single conductor cable and outer jacket of multiple conductor cable is flame retardant and moisture resistant. Multiple conductor cable shall have color or number coding for each conductor. Conductors for control boards shall be in accordance with NEC. Joints or splices are not permitted in wiring except at outlets. Tap connectors may be used in wireways provided they meet all UL requirements.
- B. Provide all conduit and wiring between machine room, hoistway, and fixtures.
- C. All wiring must test free from short circuits or ground faults. Insulation resistance between individual external conductors and between conductors and ground shall be a minimum of one megohm.
- D. Where size of conductors is not given, voltage and amperes shall not exceed limits set by NEC.
- E. Provide equipment grounding. Ground the conduits, supports, controller enclosure, motor, platform and car frame, and all other non-current conducting metal enclosures for electrical equipment in accordance with NEC. The ground wires shall be copper, green insulated and sized as required by NEC. Bond the grounding wires to all junction boxes, cabinets, and wire raceways.

- F. Terminal connections for all conductors used for external wiring between various items of elevator equipment shall be solderless pressure wire connectors in accordance with Federal Specification W-S-610. The Elevator Contractor may, at his option, make these terminal connections on #10 gauge or smaller conductors with approved terminal eyelets set on the conductor with a special setting tool, or with an approved pressure type terminal block. Terminal blocks using pierce-through serrated washers are not acceptable.

2.5 TRAVELING CABLES

- A. All conductors to the car shall consist of flexible traveling cables conforming to the requirements of NEC. Traveling cables shall run from the junction box on the car directly to the controller. Junction boxes on the car shall be equipped with terminal blocks. Terminal blocks having pressure wire connectors of the clamp type that meet UL 486A requirements for stranded wire may be used in lieu of terminal eyelet connections. Terminal blocks shall have permanent indelible identifying numbers for each connection. Cables shall be securely anchored to avoid strain on individual terminal connections. Flame and moisture resistant outer covering must remain intact between junction boxes. Abrupt bending, twisting and distortion of the cables shall not be permitted.
- B. Provide spare conductors equal to 10 percent of the total number of conductors furnished, but not less than 5 spare conductors in each traveling cable.
- C. Provide shielded wires for the auto dial telephone system within the traveling cable, five (5) pair shielded wires for card reader, one (1) RG-6 Ethernet cable for Wi-Fi, two (2) pair 14 gauge wires for 110 Volt power, and wire for video display monitor if specified.
- D. If traveling cables come into contact with the hoistway or elevator due to sway or change in position, provide shields or pads to the elevator and hoistway to prevent damage to the traveling cables.
- E. Hardware cloth may be installed from the hoistway suspension point to the elevator pit to prevent traveling cables from rubbing or chafing and securely fastened and tensioned to prevent buckling. Hardware cloth is not required when traveling cable is hung against a flat wall.

2.6 CONTROLLER AND SUPERVISORY PANEL

- A. UL/CSA Labeled Controller: Mount all assemblies, power supplies, chassis switches, and relays on a steel frame in a NEMA Type 1 General

Purpose Enclosure. Cabinet shall be securely attached to the building structure.

- B. Properly identify each device on all panels by name, letter, or standard symbol which shall be neatly stencil painted or decaled in an indelible and legible manner. Identification markings shall be coordinated with identical markings used on wiring diagrams. The ampere rating shall be marked adjacent to all fuse holders. All spare conductors to controller and supervisory panel shall be neatly formed, laced, and identified.

2.7 MICROPROCESSOR CONTROL SYSTEM

- A. Provide a microprocessor control system with absolute position/speed feedback to control dispatching, signal functions, door operation, and pump motor control. Complete details of the components and printed circuit boards, together with a complete operational description, shall be submitted for approval. Provide closed transition SCR soft start.
- B. Controller manufacturer shall provide factory training, engineering and technical support, including all manuals, wiring diagrams, and tools necessary for adjusting, maintenance, repair, and testing of equipment to the VA for use by the VA's designated Elevator Maintenance Service Provider.
- C. Provide a low oil control feature that shall shut off the motor and pump and return the elevator to the lowest landing. Upon reaching the lowest landing, doors will open automatically allowing passengers to leave the elevator, and then doors shall close. All control buttons, except the door open button, alarm bell button, and the call for help button shall be made ineffective.

2.8 EMERGENCY POWER OPERATION

- A. The control system for Elevator(s) shall provide for the operation of at least one car per elevator group on emergency power upon failure of the normal power supply.
- B. Auxiliary equipment on elevator controllers, wiring between associated elevator controllers and wiring between elevator controllers and remote selector panel as required to permit the elevators to operate as detailed, shall be provided by the Elevator Contractor.
- C. Upon loss of normal power supply there shall be a delay before transferring to emergency power of 10 seconds minimum to 45 seconds maximum, the delay shall be accomplished through an adjustable timing

device. Following this adjustable delay the associated elevators shall function as follows:

SPEC WRITER NOTE: Selector switch is not required when Emergency Power is capable of operating all elevators in the group.

1. Selector switch, Automatic position:
 - a. Not more than // one elevator // two elevators // at a time in each group shall be automatically selected and returned to the main floor, at contract speed, cycle its car and hoistway doors and shut down, with "Door Open" button remaining operable.
 - b. As each elevator reaches the designated floor and shuts down, another elevator shall start and return to the designated floor.
 - c. Elevators that have been manually removed from automatic service and are on independent service, fire service or medical emergency shall receive an automatic return signal. Elevators on inspection service or out of service shall not receive a signal.
 - d. When an elevator is given a signal to return and it is unable to start its movement to the designated floor within 30 seconds it shall be by-passed. When an elevator is by-passed, another elevator shall start and return.
 - e. This process shall continue until all elevators have returned to the designated floor and shut down.
 - f. Any elevator or elevators by-passed on initial return signal shall be signaled again.
 - g. When all cars in group have returned to designated floor, //one elevator // two elevators // all elevators // in each group shall be designated for automatic operation. Individual cars in each group shall restart at 5 second intervals.
 - h. If elevator(s) are keyed on to medical emergency service in the car prior to transfer to auxiliary power operation, medical emergency service shall be retained. This elevator shall be the first automatically selected elevator to operate on emergency power operation and complete its selected call demand. The elevator will return to the designated floor after the key switch is reset to normal position.
2. Selector switch, Manual operation:
 - a. Selector switch shall be mechanically and electrically interlocked to prevent the selection of more than // one elevator // two elevators // from operating on auxiliary power.

- b. The selector switch shall have positions marked with the number of each elevator controlled. It shall also have a position marked "Automatic". When the selector switch is set to the automatic position, the medical emergency service car shall operate on emergency power operation, or if none, the last car arriving at the designated floor shall operate on emergency power operation.
 - c. Change in selection of elevators shall be by means of the selection switch and shall occur only when the previous selected elevator is stopped at the designated floor.
 - d. The selector switch shall be locked out of operation when the system is in the normal mode of operation.
 - e. Locate the selector switch above the hall push button at the designated level. The key switch shall be a tumbler type lock furnished with four keys. The enclosure faceplate shall be identified "Emergency Power Control" with 13 mm (.50 in.) engraved letters filled with black paint.
- D. Prior to the return of normal power an adjustable timer circuit shall activate that will cause all cars to remain at a floor if already there or stop and remain at the next floor if in flight. Actual transfer of power from auxiliary power to normal building power shall take place after all cars are stopped at a floor with their doors open.

SPEC WRITER NOTE: If emergency power is not provided delete A-D and use E.

E. Emergency Rescue Operation:

Provide a power source to send the elevator to the lowest landing. After the elevator has leveled at the lowest landing, provide power to open the car and hoistway doors automatically. After a predetermined time the doors shall close. Power shall stay applied to the door open button to reopen the doors from the inside of the elevator. The elevator shall remain shut down at the bottom landing until normal power is restored. Install a sign on the controller indicating that power is applied to emergency rescue operator and door operator during loss of normal power.

2.9 MACHINE ROOM MONITOR

- A. Provide a monitor in each machine room, separate monitors for each passenger elevator group, and each service elevator group. Provide one keyboard for each monitor.

- B. The monitor shall contain indicators to provide the following information:
1. The floor where each elevator is currently located.
 2. The direction that each elevator is currently traveling or is scheduled to travel.
 3. The location and direction of currently registered hall calls.
 4. Elevators that are currently out of service.
 5. Elevators that are currently bypassing hall calls.
 6. Elevators that are currently engaged in passenger transfers.
 7. Operations program under which entire group is currently operating.
 8. Zone divisions of the entire group.
 9. Door positions.
 10. Status indication for elevators on independent service, car top inspection, fire service, earthquake protection, and activated stop switch and alarm bell.
- C. The maintenance terminal shall be suitable for all troubleshooting procedures related to the specific type microprocessor installed on this project.

2.10 FIREFIGHTER'S SERVICE

- A. Provide Firefighter's Service.
1. Main Floor:
 2. Alternate Floor:
 3. Verify main and alternate floors with Contract Officer's Representative.

2.11 INDEPENDENT SERVICE

- A. Provide a legibly and indelibly labeled "INDEPENDENT SERVICE", two-position key operated switch on the face of the main car operating panel that shall have its positions marked "ON" and "OFF". When the switch is in the "ON" position, the car shall respond only to calls registered on its car dispatch buttons and shall bypass all calls registered on landing push buttons. The car shall start when a car call is registered, car call button or door close button is pressed, car and hoistway doors are closed, and interlock circuits are made. When switch is returned to "OFF" position, normal service shall be resumed.

2.12 MEDICAL EMERGENCY SERVICE - PATIENCE CARE FACILITIES ONLY

- A. Provisions shall be made for calling elevator(s) to any floor served by the elevator on an emergency basis, operating independently from the dispatch signals and landing call signals.

- B. Install card reader/key switch in the floor landing push button fixture above the push buttons.
- C. Provide a call registered light indicator adjacent to card reader/key switch. The card reader/key switch at the landings and in the car shall only be operable by authorized personnel with a valid VA ID badge/key.
- D. When card reader/key switch is activated at any floor, the call register light indicator shall illuminate at the call floor and inside the elevator only. The elevator control system shall instantly select an elevator to respond to the medical emergency call. Immediately upon selection, all car calls shall be cancelled. If car is traveling away from the medical emergency call, it shall slow down and stop at the nearest floor, maintain closed doors, reverse direction and proceed nonstop to the medical emergency call floor. If the car is traveling toward the medical emergency call floor, it shall proceed to that floor nonstop. If at the time of selection it is slowing down for a stop, the car shall stop, maintain doors closed, and start immediately toward the medical emergency floor.
- E. Arriving at the medical emergency floor, the car shall remain with doors open for 30 seconds. After this interval has expired and the car has not been placed on medical emergency operation inside the car, the car shall automatically return to normal service.
- F. Provide an LED illuminated indicator light next to the Medical Emergency card reader/key switch the same size as the Fire Service indicator.
 - 1. Locate a "Medical Emergency" card reader/key switch above call buttons in the main car operating panel for selecting medical emergency service. Activation of the card reader will allow the car to accept a car call for any floor, close doors, and proceed nonstop to the floor desired.
 - 2. After medical emergency call has been completed the elevator shall return to normal operation after an adjustable time of 30 to 90 seconds has expired.
- G. In the center of the rear cab panel provide a back lighted "MEDICAL EMERGENCY" LED illuminated display that shall flash on and off continuously when the car is assigned to this operation and until it is restored to normal service. "MEDICAL EMERGENCY" indicator shall be a photographic negative type 1800 mm (72 in.) to center above the floor,

150 mm (6 in.) wide X 75 mm (3 in.) high, with 12.5 mm (.50 in.) high letters legible only when illuminated.

- H. If the car being operated on "Independent Service", the medical emergency service indicator lights in the car operating panel and rear wall shall be illuminated, buzzer shall sound, and the "Audio Voice" system shall direct the attendant to return the car to automatic operation.
- I. If the car is out of service and unable to answer medical emergency calls, the call register light shall not illuminate.
- J. Each card reader/key switch shall have its identity legible and indelible engraved in faceplates. All lettering shall be 6 mm (.25 in.) high, filled with black paint.
- K. When Phase I fire recall is activated it shall over-ride elevators on medical emergency service and return them to the main or alternate fire service recall floor. When the fire emergency floor has been identified the attendants may complete their medical emergency run on Phase II firefighter's operation if life safety is not affected.

2.13 SEISMIC REQUIREMENTS

- A. Meet the requirements of VA Seismic Design Manual H-18-8.

2.14 PUMP, MOTOR, AND VALVE ASSEMBLY

- A. Provide pump assembly for the control of the elevator self-contained in a unit fabricated of structural steel. The unit shall consist of a hydraulic fluid pump, AC motor, oil control valves, muffler, piping, and fittings installed below the tank or in the tank.
- B. Enclose V-belt power unit on four open sides with not less than 16 gauge steel removable panel sections. Provide a 50 mm (2 in.) minimum, 100mm (4 in.) maximum air space between the top of the panels and bottom of tank. Line panels on the interior side with one-inch rigid acoustical insulation board. Install expanded metal sheave/belt guard that can be easily removed with hand tools for servicing and inspection.
- C. Control valves shall be electronically controlled. Hydraulic fluid flow shall be controlled to insure speed variation of not more than five (5) percent under all load conditions in either direction of travel.
- D. Pump shall be designed for hydraulic elevator service, having a steady discharge without pulsation to give smooth and quiet operation. Pump output shall be capable of lifting elevator car with rated capacity, with a speed variation of no more than five (5) percent between no load

and full load. Hydraulic fluid by-pass shall discharge directly into storage tank.

- E. Provide motor specifically designed for elevator service, synchronous speed not in excess of 1800 RPM, not to exceed nameplate full load current by more than 10%, and rated 120 starts per hour without exceeding a rise of 40 degrees C.
- F. Provide isolation units of rubber to prevent transmission of pump and motor vibration to the building.

2.15 HYDRAULIC SYSTEM

- A. Construct the storage tank of sheet steel, welded construction, and a steel cover with means for filling, a minimum one-inch protected vent opening, and a valve drain connection. Tank shall be sized to pass through machine room door as shown on drawings. Provide marked gauge to monitor hydraulic fluid level. Tank shall be sized to hold volume of hydraulic fluid required to lift elevator to stop ring, plus a reserve of not less than ten gallons. Provide a baffle in the bottom of the tank to prevent entry of any sediment or foreign particles into hydraulic system. Baffle shall also minimize aeration of hydraulic fluid. Permissible minimum hydraulic fluid level shall be clearly indicated. Hydraulic fluid shall be of good grade to assure free flow when cool, and have minimum flash point of 380-400 degrees F. Provide initial supply of hydraulic fluid for operation of elevator.
 - 1. Provide a means to maintain the fluid viscosity in the reservoir, pump, and control valve at a recommended operating temperature.
 - 2. Provide a data plate on the tank framing indicating the characteristics of the hydraulic fluid used.
- B. Furnish and install connections between the storage tank, pump, muffler, operating valves, and cylinder complete with necessary valves, pipe supports, and fittings. Pipe shall be minimum schedule 40 steel with threaded, flanged, or welded mechanical couplings. Size of pipe and couplings between cylinder and pumping unit shall be such that fluid pressure loss is limited to 10 percent.
- C. Hydraulic system working pressure shall not exceed 500 psi under any load condition. Do not subject valves, piping, and fittings to working pressure greater than those recommended by the manufacturer.
- D. Support all horizontal piping. Place hangers or supports within 300 mm (12 in.) on each side of every change of direction of pipe line and space supports not over 3.0 m (10 ft) apart. Secure vertical runs

properly with iron clamps at sufficiently close intervals to carry weight of pipe and contents. Provide supports under pipe to floor.

1. Provide all piping from machine room to hoistway, including necessary supports or hangers. If remote piping is underground or in damp inaccessible areas, install hydraulic piping thru PVC sleeve.
- E. Install pipe sleeves where pipes pass through walls or floors. Set sleeves during construction. After installation of piping, equip the sleeves with snug fitting inner liner of fire rated insulation.
- F. Install blowout-proof, non-hammering, oil-hydraulic muffler in the hydraulic fluid supply pressure line near power unit in machine room. Design muffler to reduce to a minimum any pulsation or noises that may be transmitted through the hydraulic fluid into the hoistway.
- G. Locate the manual lowering valve, easily accessible, properly identified, and not concealed within the storage tank. Mark the operating handle in red.
- H. Provide an automatic shut-off valve in the oil supply line at the cylinder inlet. Weld inlet pipe to cylinder, threaded to receive shut-off valve. Activate the automatic shut-off valve when there is more than a ten percent increase in high speed in the down direction. When activated, this device shall immediately stop the descent of the elevator, and hold the elevator. The exposed adjustments of the automatic shut-off valve shall have their means of adjustment sealed after being set to their correct position.
- I. Provide external tank shut-off valve to isolate hydraulic fluid during maintenance operations.
- J. Provide shut-off valves in the pit near the cylinder and in the machine room capable of withstanding 150 percent of design operating pressure. Each manual valve shall have an attached handle.
- K. Provide oil-tight drip pan for assembled pumping unit, including storage tank. Pan shall be not less than 16 gauge sheet steel, with one-inch sides.
- L. Components of the hydraulic system shall be factory certified to withstand pressure equal to twice the calculated working pressure.

2.16 HYDRAULIC PLUNGER ASSEMBLY

- A. Cylinder and plunger shall be sized to lift gross load the height specified. Factory test the plunger assembly at a pressure equal to twice the calculated working pressure, for strength and to insure freedom from leakage. Provide bottom of cylinder head with internal

guide bearing and top of cylinder head with removable packing gland. Victaulic type packing gland head shall not be permitted.

1. Provide a bleeder valve located below the cylinder flange to release air or other gases from the system.
 2. Equip cylinder with drip ring below the packing gland to collect leakage of hydraulic fluid.
 3. Bolt the cylinder mounting brackets to footing channels that support the buffers.
- B. Install a flexible tubing scavenger line with an electrically operated pump between the piston drip ring and oil storage tank. Scavenger line, pump and strainers shall operate independently of hydraulic fluid pressure. Equip scavenger pump with a water float designed to prevent operation of the pump should the pit flood and designed to be manually reset. Secure pump and reservoir to the pit channels.
- C. Plunger shall be heavy seamless steel tubing, turned smooth and true to within plus or minus .38 mm (0.015 in.) tolerance and no diameter change greater than .07 mm (0.003 in.) per-inch of length. Where plunger is multi-piece construction, machine the joints to assure perfectly matching surfaces.
1. Secure plunger to underside of platform supporting beams with fastenings capable of supporting four times the weight of the plunger. The platen plate shall incorporate piston to car vibration isolation.
 2. Provide a stop ring welded or screwed to the bottom of plunger that shall prevent the plunger from leaving its cylinder. //For plunger units that include future travel, locate the stop ring to permit only the actual travel and required runby//.
 3. Isolate plunger head from the platen plate to prevent corrosion or electrolysis.
 4. Protect plunger, repair or replace if gouged, nicked or scored.

2.17 HYDRAULIC CYLINDER CASING AND WELL HOLE

- A. The casing shall be iron or steel not less than 9.375 mm (.375-in.) thick, at least 15 cm (6 in.) larger in diameter than the cylinder.
- B. Provide PVC casing liner to fit inside steel casing. Fabricate liner with watertight bottom and a top flange gasket to seal plunger flange and form a complete, watertight, electrically non-conductive encasement of the entire unit.

- C. Provide suitable well hole to accommodate casing. Coordinate the drilling of well hole and setting of the cylinder with construction of concrete pit. Provide watertight joint between the casing and the pit floor at bottom of pit.
- D. Base bid on drilling hole in dirt, sand, rock, gravel, loam, boulders, hardpan, water, or other obstacles. Include the removal of all dirt and debris.

2.18 CAR BUFFERS

- A. Provide a minimum of two spring buffers for each elevator. Securely fasten buffers and supports to the pit channels and in the alignment with striker plates on elevator. Buffers shall have a permanently attached metal plate indicating its stroke and load rating. Buffer anchorage shall not puncture pit waterproofing.
- B. Furnish pipe stanchions and struts as required to properly support the buffer.

2.19 GUIDE RAILS, SUPPORTS, AND FASTENINGS

- A. Guide rails for car shall be planed steel T-sections and weigh // 27.5 kg/m (18.5 lb/ft) // 22.5 kg/m (15 lb/ft)//.
- B. Securely fasten guide rails to the brackets or other supports by heavy duty steel rail clips.
- C. Provide car rail brackets of sufficient size and design to insure substantial rigidity to prevent spreading or distortion of rails under any condition.
- D. Guide rails shall extend from channels on pit floor to within 76 mm (3 in.) of the underside of the concrete slab or grating at top of hoistway with a maximum deviation of 3.2 mm (.125 in.) from plumb in all directions. Provide a minimum of 19 mm (.75 in.) clearance between bottom of rails and top of pit channels.
- E. Guide rail anchorages in pit shall be made in a manner that will not reduce effectiveness of the pit waterproofing.
- F. In the event inserts or bond blocks are required for the attachment of guide rails, the Contractor shall furnish such inserts or bond blocks and shall install them in the forms before the concrete is poured. Use inserts or bond blocks only in concrete or block work where steel framing is not available for support of guide rails. Expansion-type bolting for guide rail brackets will not be permitted.

- G. Guide rails shall be clean and free of any signs of rust, grease, or abrasion before final inspection. Paint the shank and base of the T-section with two field coats of manufacturer's standard enamel.

2.20 NORMAL AND FINAL TERMINAL STOPPING DEVICES

- A. Mount terminal slowdown switches and direction limit switches on the elevator or in hoistway to reduce speed and bring car to an automatic stop at the terminal landings.
 - 1. Switches shall function with any load up to and including 100 percent of rated elevator capacity at any speed obtained in normal operation.
 - 2. Switches, when opened, shall permit operation of elevator in reverse direction of travel.
- B. Mount final terminal stopping switches in the hoistway.
 - 1. Switches shall be positively opened should the car travel beyond the terminal direction limit switches.
 - 2. Switches shall be independent of other stopping devices.
 - 3. Switches, when opened, shall remove power from pump motor and control valves preventing operation of car in either direction.

2.21 CROSSHEAD DATA PLATE AND CODE DATA PLATE

- A. Permanently attach a non-corrosive metal Data Plate to car crosshead.
- B. Permanently attach a Code Data Plate, in plain view, to the controller.

2.22 WORKMAN'S LIGHTS AND OUTLETS

- A. Provide duplex GFCI protected type receptacles and lamp, with guards on top of elevator car and beneath platform. The receptacles shall be in accordance with Fed. Spec. W-C-596 for Type D7, 2-pole, 3-wire grounded type rated for 15 amperes and 125 volts.

2.23 CARTOP OPERATING DEVICE

- A. Provide a cartop operating device.
- B. The device shall be activated by a toggle switch mounted in the device. The switch shall be clearly marked "INSPECTION" and "NORMAL" on the faceplate, with 6 mm (.25 in.) letters.
- C. Movement of the elevator shall be accomplished by the continuous pressure on a direction button and a safety button.
- D. Provide an emergency stop switch, push to stop/pull to run.
- E. Provide permanent identification for the operation of all components in the device.

- F. The device shall be permanently attached to the elevator crosshead on the side of the elevator nearest to the hoistway doors used for accessing the top of the car.

2.24 LEVELING DEVICE

- A. Car shall be equipped with a two-way leveling device to automatically bring the car to within 3 mm (.125 in.) of exact level with the landing for which a stop is initiated regardless of load in car or direction.
- B. If the car stops short or travels beyond the floor, the leveling device, within its zone shall automatically correct this condition and maintain the car within 3 mm (.125 in.) of level with the floor landing regardless of the load carried.

2.25 EMERGENCY STOP SWITCHES

- A. Provide an emergency stop switch, push to stop/pull to run, for each top-of-car device, pit, machine spaces, service panel and firefighter's control panel inside the elevator. Mount stop switches in the pit adjacent to pit access door, at top of the pit ladder 1200 mm (48 in.) above the bottom landing sill and 1200 mm (48 in.) above the pit floor adjacent to the pit ladder.
- B. Each stop switch shall be red in color and shall have "STOP" and "RUN" positions legibly and indelibly identified.

2.26 MAIN CAR OPERATING PANEL

- A. Locate the main car operating panel in the car enclosure on the front return panel for passenger/service elevators and the front of the side wall for freight elevators. The top floor car call push button shall not be more than 1200 mm (48 in.) above the finished floor. Car call push buttons and indicator lights shall be round with a minimum diameter of 25 mm (1 in.), LED white light illuminated.
- B. One piece front faceplate with edges beveled 15 degrees or swing return panel shall have the firefighter's service panel recessed into the upper section and the service operation panel recessed into the lower section fitted with hinged doors. Doors shall have concealed hinges, be in the same front plane as the faceplate and fitted with cylinder type key operated locks. Secure the faceplate with stainless steel tamperproof screws.
- C. All terminology and tactile symbols on the faceplate shall be on square or rectangular plates recessed into the faceplate with its surface flush with the surface of the faceplate. Use 6 mm (.25 in.) letters to identify all devices in the faceplate. The handicapped markings with

contrasting background shall be 12.5 mm (.50 in.) high raised .075 mm (.030 in.) on the plate. Surface mounted plates are not acceptable.

- D. The upper section shall contain the following items in order listed from top to bottom:
1. Elevator number, 12.5 mm (.50 in.) high with black paint for contrast.
 2. Capacity plate information with black paint for contrast with freight loading class and number of passengers allowed.
 3. LED illuminated digital car position indicator with direction arrows.
 4. Emergency car lighting system consisting of a rechargeable battery, charger, controls, and LED illuminated light fixture. The system shall automatically provide emergency light in the car upon failure or interruption of the normal car lighting service, and function irrespective of the position of the light control switch in the car. The system shall be capable of maintaining a minimum illumination of 1.0 foot-candle when measured 1200 mm (48 in.) above the car floor and approximately 300 mm (12 in.) in front of the car operating panel, for not less than four (4) hours.
 5. Firefighter's Emergency Operation Panel shall be 1650 mm (66 in.) minimum to 1800 mm (72 in.) maximum to the top of the panel above finished floor.
 6. Firefighter's Emergency Indicator Light shall be round with a minimum diameter of 25 mm (1 in.).
 7. Medical Emergency card reader/key switch marked "MEDICAL EMERGENCY" with two positions labeled "ON" and "OFF" and Medical Emergency Indicator Light located next to the card reader/key switch shall be round with a minimum diameter of 25 mm (1 in.). Instruction for Medical Emergency operation shall be engraved below the card reader/key switch and light.
 8. Key operated Independent Service Switch or switch inside service panel.
 9. Provide a Door Hold Button on the faceplate next to the Independent Service Key Switch. It shall have "DOOR HOLD" indelibly marked on the button. Button shall light when activated. When activated, the door shall stay open for a maximum of one minute. To override door hold timer, push a car call button or door close button.

10. Complete set of round car call push buttons, minimum diameter of 25 mm (1 in.), and LED white light illuminated, corresponding to the floors served. Car call buttons shall be legibly and indelibly identified by a floor number and/or letter not less than 12.5 mm (.50 in.) high in the face of the call button.
 11. Door Open and Door Close buttons shall be located below the car call buttons. They shall have "OPEN" and "CLOSE" legibly and indelibly identified by letters in the face of the respective button. The Door Open button shall be located closest to the door jamb.
 - a. Rear Door Open and Rear Door Close buttons shall be located below the Front Door Open and Front Door Close buttons. They shall have "REAR OPEN" and "REAR CLOSE" legibly and indelibly identified by letters in the face of the respective button.
 12. Red Emergency Alarm button that shall be located below the car operating buttons. Mount the emergency alarm button not lower than 875 mm (35 in.) above the finished floor. It shall be connected to audible signaling devices. Provide audible signaling devices including the necessary wiring.
 13. Emergency Help push button shall activate two way communications by Auto Dial telephone system that is compatible with the VAMC's telephone system. Help button shall be LED white light illuminated and flash when call is acknowledged. Legibly and indelibly label the button "HELP" in the face of the button with 12.5 mm (.50 in.) high letters.
- E. The service operation panel, in the lower section shall contain the following items:
1. Light switch labeled "LIGHTS" for controlling interior car lighting with its two positions marked "ON" and "OFF".
 2. Inspection switch that will disconnect normal operation and activate hoistway access switches at terminal landings. Switch shall be labeled "ACCESS ENABLE" with its two positions marked "ON" and "OFF".
 3. Three position switch labeled "FAN" with its positions marked "HIGH", "LOW" and "OFF" for controlling car ventilating blower.
 4. Two position, spring return, toggle switch or push button to test the emergency light and alarm device. It shall be labeled "TEST EMERGENCY LIGHT AND ALARM".

SPEC WRITER NOTE: Freight elevator, provide emergency stop switch in the face of the car operating panel. Passenger or service elevator, provide stop switch inside the service panel.

5. Two position emergency stop switch, when operated, shall interrupt power supply and stop the elevator independently of regular operating devices. Emergency stop switch shall be marked "PUSH TO STOP" and "PULL TO RUN".

2.27 AUXILIARY CAR OPERATING PANEL

- A. Provide an auxiliary car operating panel in the // front return panel opposite the main car operating panel // rear return panel // side wall of the elevator between the handrails immediately adjacent to the front entrance column strike jamb //. The auxiliary car operating panel shall contain only those controls essential to passenger (public) operation. The auxiliary car operating panel faceplate shall match the main car operating panel faceplate in material and general design. Secure the faceplate with stainless steel tamperproof screws.
 1. Complete set of round car call push buttons, minimum diameter 25 mm (1 in.), and LED white light illuminated, corresponding to the floors served. Car call button shall be legibly and indelibly identified by a floor number and/or letter not less than 12.5 mm (.50 in.) high in the face of the call button corresponding to the nu
 2. Mount door "OPEN" and door "CLOSE" buttons closest to the door jamb and mount the alarm button no lower than 875 mm (35 in.) above the finished floor. The Door Open button shall be located closest to the door.
 3. Cross-connect all buttons in the auxiliary car operating panels to their corresponding buttons in the main car operating panel. Registration of a car call shall cause the corresponding button to illuminate in the main and auxiliary car operating panel.
 4. Emergency Help push button shall activate two way communications by auto dial telephone that is compatible with the VAMC's telephone system. Help button shall be LED white light illuminated and flash when call is acknowledged. Legibly and indelibly label the button "HELP" in the face of the button with 12.5 mm (.50 in.) high letters.

- B. All terminology and tactile symbols on the faceplate shall be on square or rectangular plates recessed into the faceplate with its surface flush with the surface of the faceplate. Use 6 mm (.25 in.) letters to identify all devices in the faceplate. The tactile symbols with contrasting background shall be 12.5 mm (0.5 in.) high raised .075 mm (.030 in.) on the plate. Surface mounted plates are not acceptable.

2.28 CAR POSITION INDICATOR

- A. Provide an alpha-numeric digital car position indicator in the main car operating panel, consisting of numerals and arrows not less than 63 mm (2.5 in.) high, to indicate position of car and direction of car travel. Locate position indicator at the top of the main car operating panel, illuminated by light emitting diodes.

2.29 AUDIO VOICE SYSTEM

- A. Provide digitized audio voice system. Audio voice shall announce floor designations, direction of travel, and special announcements. The voice announcement system shall be a natural sounding human voice that receives messages and shall comply with ADA requirements for audible car position indicators. The voice announcer shall have two separate volume controls, one for the floor designations and direction of travel, and another for special announcements. The voice announcer shall have a full range loud speaker, located on top of the cab. The audio voice unit shall contain the number of ports necessary to accommodate the number of floors, direction messages, and special announcements. Install voice announcer per manufacturer's recommendations and instructions. The voice system shall be the product of a manufacturer of established reputation. Provide manufacturer literature and list of voice messages.

2.30 AUTO DIAL TELEPHONE SYSTEM

- A. Furnish and install a complete ADA compliant auto dial telephone that is compatible with the VAMC's telephone system.
- B. Provide a two-way communication device in the car with automatic dialing, tracking and recall features with shielded wiring to car controller in machine room. Provide dialer with automatic rollover capability with two numbers.
- C. "HELP" button shall illuminate and flash when call is acknowledged. Button shall match floor push button design.
- D. Provide "HELP" button tactile symbol signage and Braille adjacent to button mounted integral with car operating panels.

- E. The auto dial system may be located in the main or auxiliary car operating panel. The speaker and unit shall be mounted on the backside of the perforated stainless steel plate cover.
- F. Each elevator shall have individual phone numbers.
- G. If the operator ends the call, the passenger shall be able to redial the telephone immediately.

2.31 CORRIDOR OPERATING DEVICES

- A. Fabricate faceplates for elevator operating and signal devices from not less than 3 mm (.125 in.) thick flat stainless steel with all edges beveled 15 degrees.
- B. Corridor push button faceplates shall be sized to accommodate corridor pictograph on faceplate. The centerline of the landing push buttons shall be 105 cm (42 in.) above the corridor floor.
- C. Elevator Corridor Call Station Pictograph shall be engraved in the faceplate.
- D. Fasten all car and corridor operating device and signal device faceplates with stainless steel tamperproof screws.
- E. All terminology and tactile symbols on the faceplate shall be raised .030 inch with contrasting background, on square or rectangular plates recessed into the faceplate with its surface flush with the surface of the faceplate. The handicapped markings with contrasting background shall be 12.5 mm (0.5 in.) high raised .075 mm (.030 in.) on the plate, square or rectangular in shape. Use 6 mm (.25 in.) letters to identify all other devices in the faceplate. Surface mounted plates are not acceptable.
- F. Provide //one//two// risers of landing call buttons for each elevator or group of elevators as shown on contract drawings.
- G. Each button shall contain an integral registration LED white light which shall illuminate upon registration of a call and shall extinguish when that call is answered.
- H. The direction of each button shall be legibly and indelibly identified by arrows not less than 12.5 mm (.50 in.) high in the face of each button. Provide a corresponding Braille plate on the left side of each button.
- I. Landing push buttons shall not re-open the doors while the car and hoistway doors are closing at that floor, the call shall be registered for the next available elevator. Calls registered shall be canceled if

closing doors are re-opened by means of "DOOR OPEN" button or infrared curtain unit.

- J. Provide emergency power indicator light, medical emergency card reader/key switch and indicator light, fire service recall key switch and indicator light, fire recall instruction, communication failure light, audible enunciator, and reset key switch in a separate fixture at the designated main floor.
- K. Submit design of hall pushbutton fixtures for approval.

2.33 DIGITAL CORRIDOR ARRIVAL LANTERN/POSITION INDICATOR

- A. Provide elevator with combination corridor lantern/position indicator digital display mounted over the hoistway entrances at each and every floor in healthcare facilities. For non-healthcare facilities provide combination fixtures only at main and alternate fire recall floors. Provide each terminal landing with "UP" or "DOWN", minimum 63 mm (2.5 in.) high digital arrow lanterns and each intermediate landing with "UP" and "DOWN" digital arrow lanterns. Each lens shall be LED illuminated of proper intensity, so shielded to illuminate individual lens only. The lenses in each lantern shall be illuminated green to indicate "UP" travel and red to indicate "DOWN" travel. Lanterns shall signal in advance of car arrival at the landing indicating the direction of travel. Corridor lanterns shall not be illuminated when a car passes a floor without stopping. Each lantern shall be equipped with an audible electronic chime which shall sound once for "UPWARD" bound car and twice for "DOWNWARD" bound car. Audible signal shall not sound when a car passes the floor without stopping. Provide adjustable sound level on audible signal. Car riding lanterns are not acceptable.
- B. Install alpha-numeric digital position indicator between the arrival lanterns. Indicator faceplate shall be stainless steel. Numerals shall be not less than 63 mm (2.5 in.) high with direction arrows. Cover plates shall be readily removable for re-lamping. The appropriate direction arrow shall be illuminated during entire travel of car in corresponding direction.

2.34 HOISTWAY ACCESS

- A. Provide hoistway access switches for elevator at top terminal landing to permit access to top of car, and at bottom terminal landing to permit access to pit. Elevators with side slide doors, mount the access key switch 180 cm (6 ft) above the corridor floor in the wall next to the strike jamb.

- B. Exposed portion of each access switch or its faceplate shall have legible, indelible legends to indicate "UP", "DOWN", and "OFF" positions.
- C. Each access switch shall be a constant pressure cylinder type lock having not less than five pins or five stainless steel disc combination with key removable only when switch is in the "OFF" position.
- D. Lock shall not be operable by any other key which will operate any other lock or device used for any other purpose at the VA Medical Center.
- E. Arrange the hoistway switch to initiate and maintain movement of the car. When the elevator is operated in the down direction from the top terminal landing, limit the zone of travel to a distance not greater than the top of the car crosshead level with the top floor. Submit design and location of access switches for approval.
- F. Provide emergency access for all hoistway entrances, keyways for passenger and service elevators.

2.35 HOISTWAY ENTRANCES: PASSENGER/SERVICE ELEVATORS

- A. Provide complete entrances with sills, sill supports, hangers, hanger supports, tracks, angle struts, unit frames, door panels, fascia plates, toe guards, hardware, bumpers, sight guards, and wall anchors.
- B. Provide one piece extruded // aluminum // nickel silver // stainless steel // sills grooved for door guides and recessed for fascia plates. Sills shall have overall height of not less than 19 mm (.75 in.) set true, straight, and level, with hoistway edges plumb over each other, and top surfaces flush with finished floor. Hoistway entrance frames and sills shall be grouted solid full length after installation.
- C. Construct hanger supports of not less than 9.375 mm (.375 in.) thick steel plate, and bolted to strut angles.
- D. Structural steel angles 75 mm x 75 mm x 9.375 mm (3 in. x 3 in. x .375 in.) shall extend from top of sill to bottom of floor beam above, and shall be securely fastened at maximum 45 cm (18 in.) on center and at each end with two bolts.
- E. Provide jambs and head soffits, of not less than 14-gauge stainless steel. Jambs and head soffits shall be bolted/welded construction and provided with three anchors each side. Side jambs shall be curved. Radius of curvature shall be 88 mm (3.5 in.). Head jamb shall be square, and shall overhang corridor face of side jambs by 6 mm (.25 in.). Rigidly fasten jambs and head soffits to building structure and

grouted solid. After installation, protect jambs and head soffits to prevent damage to finish during construction.

- F. Provide raised numerals or letters on cast, rear mounted plates for all openings. Numerals shall be a minimum of 50 mm (2 in.) high, located on each side of entrance frame, with centerline of 150 cm (5 ft) above the landing sill. The number plates shall contain Braille.
- G. Provide unique car number on every elevator entrance at designated main fire service floor level, minimum 75 mm (3 in.) in height.
- H. Provide passenger entrances with single speed center opening horizontal sliding doors and service entrances with two speed side opening horizontal sliding doors.
 - 1. Door panels shall be flush hollow metal construction, not less than 32 mm (1.25 in.) thick, consisting of one continuous piece 16-gauge stainless steel on corridor side wrapped around the leading edge. Separate two plates by a sound-deadening material, and reinforce by steel shapes welded to the plates at frequent intervals. Reinforce panels as required for installation of hangers, power-operating and door-opening devices. Top and bottom of door panels shall have continuous stiffener channels welded in place. Reinforcement of the door panels shall be a minimum of 1.0 mm (0.04 in.) in thickness and of the hat section type.
 - 2. Hang doors on two-point suspension hangers having sealed ball bearing sheaves not less than 75 mm (3 in.) in diameter, made of non-metallic sound-reducing material. Equip hangers with adjustable ball-bearing rollers to take upward thrust of panels. Upthrust rollers shall be capable of being locked in position after adjustment to a maximum of .38 mm (.015625 in.) clearance. Provide the hanger sheaves with steel fire stops to prevent disengagement from tracks. Do not use hangers that are constructed integrally with the door panels.
 - 3. Provide two removable laminated phenolic gibs or other approved material guides and a separate fire gib at the bottom of door panel.
 - 4. Reinforce each door panel for interlock mechanism, drive assembly, and closer. Provide relating devices to transmit motion from one door panel to the other.
 - 5. One door panel for each entrance shall bear a BOCA label, Underwriters' label or labels from other accredited test

laboratories may be furnished provided they are based on fire test reports and factory inspection procedures acceptable to the COR.

6. Fasten sight guard of 14-gauge stainless steel, extending full height of panel, to leading edge of // fast speed panel of two-speed doors // each panel of center opening doors. //
- I. Provide 14-gauge sheet steel fascia plates in hoistway to extend vertically from head of hanger support housing to sill above. Plates shall be three (3) inches wider than door opening of elevator and reinforced to prevent waves and buckles. Below bottom terminal landing and over upper terminal landing provide shear guards beveled back to and fastened to the wall.
- J. Equip each hoistway door with an electrical/mechanical interlock, functioning as hoistway unit system, to prevent operation of car until all hoistway doors are locked in closed position.
- K. Wiring installed from the hoistway riser to each door interlock shall be NEC type SF-2 or equivalent.

2.36 CAR GUIDES

- A. Install on car frame four // adjustable roller guides // flexible sliding swivel guide shoes //, each assembled on a substantial metal base, to permit individual alignment to the guide rails.
- B. Each guide shall consist of not less than three (3) wheels, each with a durable, resilient oil-resistant material tire rotating on ball bearings having sealed-in lubrication. Assemble rollers on a substantial metal base and mount to provide continuous spring pressure contact of all wheels with the corresponding rail surfaces under all conditions of loading and operation. Secure the roller guides at top and bottom on each side of car frame and counterweight frame. All mounting bolts shall be fitted with nuts, flat washers, split lock washers, and if required, beveled washers.
- C. Provide sheet metal guards to protect rollers on top of car and counterweight.
- D. Minimum diameter of car rollers shall be 150 mm (6 in.) unless the six wheel roller guide is used. The entire elevator car shall be properly balanced to equalize pressure on all guide rollers. Cars shall be balanced in post-wise and front-to-back directions. Test for this balanced condition shall be witnessed at time of final inspection.
- E. Equip car with an auxiliary guiding device for each guide shoe/roller which shall prevent the car from leaving the rails in the event that

the normal guides fail. These auxiliary guides shall not, during normal operation, touch the guiding surfaces of the rails. Fabricate the auxiliary guides from hot rolled steel plate and mount between the normal guide shoes and the car frames. The auxiliary guides may be an extension of the normal guide shoe mounting plate if that plate is fabricated from hot rolled steel. The portion of the auxiliary guide which shall come in contact with the rail guiding surfaces in the event of loss of the normal guides shall be lined with an approved bearing material to minimize damage to the rail guiding surfaces.

F. Alternate Guide Shoes for service and freight elevators:

1. Provide each shoe with renewable non-metallic gibs of durable material having low coefficient of friction and long-wearing qualities, when operated on guide rails receiving infrequent, light applications of rail lubricant. Gibs containing graphite or other solid lubricants are not acceptable.
2. Flexible guide shoes of approved design, other than swivel type, may be used provided they are self-aligning on all three faces of the guide rails.
3. Provide spring take-up in car guide shoes for side play between rails.

2.37 CAR FRAME: PASSENGER/SERVICE ELEVATORS

- A. Car frame shall be constructed of channel stiles, crosshead, gussets, and braces securely bolted and/or welded. The entire assembly shall be constructed to withstand unequal loading of platform. Car frame members shall be constructed to relieve the car enclosure of all strains.

2.38 CAR PLATFORM: PASSENGER/SERVICE ELEVATORS

- A. Construct the car platform to meet the requirements of class loading specified. The platform shall be designed to withstand the forces developed under the loading conditions specified. Provide car entrances with extruded // aluminum // nickel silver // sill or better with machined or extruded guide grooves. Cover underside and all exposed edges of wood filled platform with sheet metal of not less than 27-gauge, with all exposed joints and edges folded under. Fire resistant paint is not acceptable. Platform shall have flexible composition flooring not less than 3 mm (.125 in.) thick. For color, see Section 09 06 00, SCHEDULE FOR FINISHES. Adhesive material shall be type recommended by manufacturer of flooring. Lay flooring flush with threshold plate and base.

- B. Provide a platform guard (toe guard) of not less than 12-gauge sheet-steel on the entrance side, extend 75 mm (3 in.) beyond each side of entrance jamb. Securely brace platform guard to car platform, and bevel bottom edge at a 60-75 degree angle from horizontal. Install platform in the hoistway, so that the clearance between front edge and landing threshold shall not exceed 32 mm (1.25 in.).
- C. Isolate the platform from the car frame by approved rubber pads or other equally effective means.
- D. Provide adjustable diagonal brace rods to hold platform firmly within car suspension frame.
- E. Balance car front to back and side to side. Provide balancing frame and weights, properly located, to achieve the required true balance.
- F. Provide a bonding wire between frame and platform.

2.39 CAR ENCLOSURE: PASSENGER/SERVICE ELEVATORS

- A. Car enclosure shall have a dome height inside the cab of 2440 mm (8 ft).
- B. Securely fasten car enclosure to platform by through bolts located at intervals of not more than 450 mm (18 in.) running through an angle at the base of panels to underside of platform.
- C. Front return wall panel, entrance columns, entrance head-jamb, and transom shall be 14-gauge stainless steel. Transom shall be full width of cab. Side and rear walls shall be constructed of 14-gauge cold rolled steel. Coat exterior of walls with mastic sound insulation material approximately 2.5 mm (.10 in.) thick followed by a prime coat of paint.
- D. Side and rear walls of passenger elevators may have raised panels covered in fire rated materials approved for use in elevator interior.
- E. Side and rear walls of service elevators, up to the center line of the top handrail, shall be covered with stainless steel. Side and rear walls to the ceiling shall be covered with // high pressure plastic laminate panels // stainless steel applied directly to the cab walls or raised panels //. Submit a method of fastening panels to steel walls.
- F. Construct canopy of not less than 12-gauge steel.
- G. Provide car top railings.
- H. Provide a hinged top emergency exit cover. Exit shall be unobstructed when open and shall have mechanical stops on the cover. Provide a exit switch to prevent operation of the elevator when the emergency exit is open.

- I. Provide duplex, GFCI protected receptacle in car. Locate flush-mounted receptacle on the centerline of the main car operating panel, 150 mm (6 in.) above the car floor.
- J. Lighting for passenger/service elevators:
 - 1. Provide //stainless steel // aluminum // hanging ceiling frame. Construct frame of 3.125 mm (.125 in.) thick x 37.5 mm (1.50 in.) wide x 37.5 mm (1.50 in.) high "T" and "L" sections, divide ceiling into six panels.
 - 2. Provide LED illuminated car light fixtures above the ceiling panels. Maintain a minimum light level of 50-foot candles at 90 cm (36 in.) above the finished floor.
- K. Optional lighting for service elevators:
 - 1. Provide car with indirect LED lamps mounted front to rear in lighting coves along each side of the cab ceiling, no hanging ceiling.
 - 2. Equip the lighting cove with asymmetrical reflectors having specular finish. Maintain a minimum light level of 50-foot candles 90 cm (36 in.) above finished floor at the car operating panels.
 - 3. Enclose the entire vertical space between the light trough outer edge and the cab canopy with approved opaque white or clear lumicite sheeting. Lumicite sheeting shall be removable for cleaning and re-lamping.
- L. Provide a blower unit arranged to exhaust through an opening in the canopy. Provide a stainless or chrome plated fan grill around the opening. Provide 2-speed fan with rated air displacement of 250 cfm and 400 cfm at respective speeds. Mount fan on top of car with rubber isolation to prevent transmission of vibration to car structure. Provide screening over intake and exhaust end of blower. Provide a 3-position switch to control the unit in the service panel.
- M. Provide car enclosure with two sets of handrails with centerlines 75 cm and 105 cm (30 in. and 42 in.) above the car floor.
 - 1. Locate handrails 37.5 mm (1.50 in.) from cab wall. Install handrails on // side and rear walls // side walls only for front and rear openings //. Conceal all handrail fastenings. Handrails shall be removable from inside the car enclosure.
 - 2. Provide service elevators with flat stock handrails with the ends at the entrance turned back to the wall.

- N. Provide passenger car with single speed center opening horizontal sliding doors and service car with two-speed side opening horizontal sliding doors constructed the same as hoistway doors.
- O. Provide one set of protective pads for service elevator of sufficient length to completely cover two sides, rear walls and front return of cab interior. Pads shall consist of a minimum of 6 mm (.25 in.) thick glass fiber insulation securely sewn between flame resistant vinyl coated coverings. Color of the covering shall be approved by the Resident Engineer. Provide stainless steel pad buttons or hooks, spaced at intervals of not more than 150 mm (18 in.) to adequately support pads.

2.40 POWER DOOR OPERATORS: PASSENGER/SERVICE ELEVATORS

- A. Provide a high-speed heavy duty door operator to automatically open the car and hoistway doors simultaneously when the car is level with the floor, and automatically close the doors simultaneously at the expiration of the door-open time. Provide microprocessor door control with circuitry to constantly monitor and automatically adjust door operation based upon velocity, position, and motor current. Motor shall be of the high-internal resistance type, capable of withstanding high currents resulting from stall without damage to door operator/motor. The door operator shall be capable of opening a car door and hoistway door simultaneously, at a speed of 75 cm (2.5 ft) per second. Closing speed of the doors shall be 30 cm (1 ft) per second. Reversal of direction of the doors from the closing to opening operation, whether initiated by obstruction of the infrared curtain or the door "OPEN" button, shall be accomplished within 37.5 mm (1.5 in.) maximum of door movement. Emphasis is placed on obtaining quiet interlock and door operation; smooth, fast, dynamic braking for door reversals, and stopping of the doors at extremes of travel.
- B. Equip car doors with electric contact that prevents operation of car until doors are closed unless car is operating in leveling zone or hoistway access switch is used. Locate door contact to prevent its being tampered with from inside of car.
- C. Car and hoistway doors shall be manually operable in an emergency without disconnecting the power door operating equipment unless the car is outside the unlocking zone.
 - 1. It shall not be possible for the doors to open by power unless the elevator is within the leveling zone.

2. Provide infrared curtain unit. The device shall cause the car and hoistway doors to reverse automatically to the fully-open position should the unit be actuated while the doors are closing. Unit shall function at all times when the doors are not closed, except during firefighter's operation.
- D. Should the doors be prevented from closing for more than a predetermined adjustable interval of 20 to 60 seconds by operation of the curtain unit, the doors shall stay open, the audio voice message and a buzzer located on the car shall sound only on automatic operation. Do not provide door nudging.
1. If an obstruction of the doors should not activate the photo-electric door control device and prevent the doors from closing for more than a predetermined adjustable interval of 15 to 30 seconds, the doors shall reverse to the fully open position and remain open until the "Door Close" button re-establishes the closing cycle.
- E. Provide door "OPEN" and "CLOSE" buttons. When the door "OPEN" button is pressed and held, the doors, if in the open position, shall remain open and if the doors are closing, they shall stop, reverse and re-open. Momentary pressure of the door "CLOSE" button shall initiate the closing of the doors prior to the expiration of the normal door open time.

SPEC WRITER NOTE: Delete sections 2.41 -
2.47 if freight elevator is not required.

2.41 CORRIDOR OPERATING DEVICES FOR FREIGHT ELEVATORS

- A. Provide one riser of landing call buttons located on the door lock release side of the entrances for each and every freight elevator in this specification.
- B. Fixtures for intermediate landings shall contain "UP" and "DOWN" buttons. Fixtures for terminal landings shall contain a single "UP" or "DOWN" button.
- C. Each button shall contain an integral registration LED white light which shall illuminate upon registration of a call and shall extinguish when that call is answered.
- D. The direction of each button shall be legibly and indelibly identified by arrows not less than 12.5 mm (.50 in.) high in the face of each button.
- E. Provide in each hall station a momentary pressure door "OPEN" button and a continuous pressure door "CLOSE" button. These devices shall be inoperative unless the car is at the respective landing.

2.42 HOISTWAY ENTRANCES: FREIGHT ELEVATOR

- A. Entrances at landings of elevator shall be // manual // power // opened and closed vertical sliding, bi-parting doors, complete with frames, threshold, interlocks and accessories. Door panels shall have Underwriter's label or equal.
- B. Door frames shall be structural steel channels rigidly connected to hoistway with head members reinforced and welded at corners. Extend side frames full floor height to provide fastenings on inside of hoistway for door guides.
- C. Sills shall be metal plates of non-slip type not less than 9 mm (.375 in.) thick, same width as jamb openings, and securely anchored to floor construction. Provide structural steel angles as fastenings required for thresholds.
- D. Construct door panels of not less than 11-gauge formed steel plates welded to frame angles and shaped to develop a maximum strength. Provide lower edge of upper steel plate panel with fire resistant, non-shearing, non-crushing resilient member, minimum 50 mm (2 in.) diameter. Rigid astragal overlapping meeting edge is prohibited. Provide upper edge of each lower steel plate panel with a metal sill supported at each side of door opening by adjustable stops and capable of carrying load equal to capacity of car.
- E. Provide each door panel frame with four fixed or adjustable, malleable iron, mill-grooved, guide shoes not less than 63 mm (2.50 in.). Securely fasten continuous, steel guide rails to hoistway construction.
- F. Connect door panels to each other with adjustable rods and flexible cable chains, running over double race, ball bearing, malleable iron, machined sheaves secured to door guide rail. Upper door panel shall balance the bottom panel.
- G. Where pass type doors are required, attach pivoting metal lintel to the top of upper door panel to close space between door and hoistway wall.
- H. Provide upper panel of each door with one vision panel of polished clear wired glass secured on hoistway side. Area of the vision panel shall reject a ball 150 mm (6 in.) in diameter.
- I. Provide pull straps on inside and outside faces of each manually operated hoistway door for manual opening and closing.
- J. Provide unique car number on every elevator entrance at designated level, minimum 75 mm (3 in.) in height.

2.43 ELECTRIC INTERLOCKS: BI-PARTING HOISTWAY FREIGHT DOORS

- A. Equip each hoistway door with interlocks that shall prevent operating of car until doors are locked in closed position. Interlocks shall prevent opening of door at landing from corridor side unless car is at rest at landing, in the leveling zone, or hoistway access switch is used. Provide tamperproof interlocks and lock both panels of doors together.
- B. Provide retiring cams or other devices for hoistway door interlocks securely fastened to cars and arranged to operate without objectionable noise and vibration.

2.44 CAR FRAME: FREIGHT ELEVATOR

- A. Car frame shall be constructed of steel plates and structural shapes securely riveted, bolted, or welded together. No iron casting will be permitted. The entire assembly shall be rugged construction, and amply braced to withstand unequal loading of platform. Car frame members shall be constructed to relieve the car enclosure of all strains. Balance car front to back and side to side. Provide balancing weights and frames, properly located, to achieve the required true balance.

2.45 CAR PLATFORM: FREIGHT ELEVATOR

- A. Construct car platform of heavy steel frame with stringers, and substantial wood or steel plate under flooring for Class "C1" loading. Cover underside and all exposed edges of wood filled platform with sheet metal of not less than 27-gauge with all exposed joints and edges folded under. Top flooring shall consist of // first quality tongue-and-groove maple not less than 19 mm (.75 in.) thick and given 2 coats of liquid filler // steel or aluminum diamond plate not less than 4.5 mm (.1875 in.) thick //. Provide car entrance with a one piece metal threshold with non-slip surface.
- B. Provide adjustable diagonal brace rods to hold platform firmly within car suspension frame.
- C. Provide a platform guard (toe guard) of not less than 12-gauge sheet-steel on the entrance side, extend 76 mm (3 in.) beyond each side of entrance jamb. Securely brace platform guard to car platform, and bevel bottom edge at a 60-75 degree angle from horizontal. Clearance between front of platform and landing threshold shall not exceed 32 mm (1.25 in.).
- D. Isolate the platform from the car frame by approved rubber pads or other equally effective means.

E. Provide a bonding wire between frame and platform.

2.46 CAR ENCLOSURE: FREIGHT ELEVATOR

- A. Car enclosure walls and return panels from entrance columns to side wall shall be sectional flush panels formed of not less than 12-gauge steel extending from the floor to underside of ceiling. Enclose the top with sectional flush steel panels not less than 12-gauge steel. Provide top of car with hinged emergency exit with a mechanical stop and an electrical contact that will prevent movement of the elevator when exit is open. Provide recess for car operating panel.
- B. Provide car entrance with power operated // one // two // section wire mesh vertical sliding gate. Gate shall extend full width of car, and constructed of not less than 11-gauge wire woven to 37.5 mm (1.50 in.) diameter mesh set in reinforced steel frame. Expanded metal of 10-gauge may be used in lieu of wire mesh.
- C. Equip car gate with guide shoes to run on vertical steel guides securely braced and held in rigid alignment. Connect gate to counterweights with chains running over ball or roller bearing sheaves securely fastened to guides. Counterweights shall equally balance gate. Gate shall not project into hoistway opening when raised. Equip car gate with electric contact.
- D. Provide LED illuminated car lights mounted flush with the inside of the ceiling. Maintain a minimum light level of 20-foot candles at the floor.
- E. Provide two permanently mounted stainless steel signs inside elevator. One sign shall bear the Class loading and markings. The other sign shall bear the legend "THIS IS NOT A PASSENGER ELEVATOR. NO PERSONS OTHER THAN THE OPERATOR AND FREIGHT HANDLERS ARE PERMITTED TO RIDE ON THIS ELEVATOR".
- F. Provide car top railing.

2.47 POWER DOOR OPERATORS: BI-PARTING FREIGHT DOORS AND CAR GATE

- A. Provide door and gate operators with automatic open and // automatic // button operated // controls close the car and hoistway doors when the car is level with a floor. Microprocessor door control shall have circuitry to continuously monitor and automatically adjust door operation based on velocity, position, and motor current. Motors shall have high-internal resistance, capable of withstanding high currents resulting from doors stalling without damage to the motor. Hoistway doors and car gate shall open automatically when the car reaches floor

level with the landing when a stop is made. Provide a timer to hold the car gates and hoistway doors open for an adjustable predetermined period up to 120 seconds.

- B. Operating speed for hoistway doors and car gate shall be 30 cm (1 ft) per second during high speed operation.
- C. Provide re-opening devices, safety shoe and infrared sensor on each car gate that shall, in the event the car gates meet an obstruction while closing, immediately stop and re-open the car gate. Design this device and adjust it to minimize the possibility of injury to persons by the gate.
- D. The hoistway door shall open two-thirds of its travel before the car door or gate starts to open. The car gate shall close two-thirds of its travel before the hoistway door starts to close.
- E. Provide encoded speed control, time control or limit switches to control motors as the doors and gates approach their limits of travel in the opening and closing directions.
- F. Install electric power door operators inside the hoistway rigidly supported. Mount electric gate operator on the car on rigid framed supported members.
- G. Each door and gate shall be manually operable in an emergency without disconnecting the power door operating equipment unless the car is outside the unlocking zone.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examine work of other trades on which the work of this Specification depends. Report defects to the Resident Engineer in writing that may affect the work of elevator contractor.
- B. Examine elevator hoistway openings for plumb, level, in line, and that elevator pit is proper size, waterproofed and drained with necessary access door, and ladder.
- C. Examine machine room for proper illumination, heating, ventilation, electrical equipment, and beams are correctly located complete with access stairs and door.
- D. If the Elevator Contractor requires changes in size or location of trolley beams or their supports and trap doors, etc., to accomplish their work, he must make arrangements, subject to approval of the Contracting officer, and include additional cost in their bid.

- E. Work required prior to the completion of the elevator installation:
 - 1. Supply of electric feeder wires to the terminals of the elevator control panel, including circuit breaker.
 - 2. Provide light and GFCI outlets in the elevator pit and machine room.
 - 3. Furnish electric power for testing and adjusting elevator equipment.
 - 4. Furnish circuit breaker panel in machine room for car and hoistway lights and receptacles.
 - 5. Supply power for cab lighting and ventilation from an emergency power panel specified in Division 26, ELECTRICAL.
 - 6. Machine room enclosed and protected from moisture, with self-closing, self-locking door and access stairs.
 - 7. Provide fire extinguisher in machine room.
- F. Provide to General Contractor for installation; inserts, anchors, bearing plates, brackets, supports and bracing including all setting templates and diagrams for placement.

3.2 ARRANGEMENT OF EQUIPMENT

- A. Arrange equipment in machine room so that major equipment components can be removed for repair or replacement without dismantling or removing other equipment in the same machine room. Locate controller near and visible to its respective hoisting machine.

3.3 WORKMANSHIP, INSTALLATION, AND PROTECTION

- A. Installations shall be performed by Certified Elevator Mechanics and Apprentices to best possible industry standards. Details of the installation shall be mechanically and electrically correct. Materials and equipment shall be new and without imperfections.
- B. Recesses, cutouts, slots, holes, patching, grouting, refinishing to accommodate installation of equipment shall be included in the Contractor's work. All new holes in concrete shall be core drilled.
- C. Structural members shall not be cut or altered. Work in place that is damaged or defaced shall be restored equal to original new condition.
- D. Finished work shall be straight, plumb, level, and square with smooth surfaces and lines. All machinery and equipment shall be protected against dirt, water, or mechanical injury. At final completion, all work shall be thoroughly cleaned and delivered in perfect unblemished condition.
- E. Sleeves for conduit and other small holes shall project 50 mm (2 in.) above concrete slabs.

- F. Hoist cables that are exposed to accidental contact in the machine room and pit shall be completely enclosed with 16-gauge sheet metal or expanded metal guards.
- G. Exposed gears, sprockets, and sheaves shall be guarded from accidental contact.

3.4 CLEANING

- A. Upon completion of installation and prior to final inspection, all equipment shall be thoroughly cleaned of grease, oil, cement, plaster, dust, and other debris.
- B. Clean machine room and equipment.
- C. Perform hoistway clean down.
- D. Prior to final acceptance remove protective coverings from finished or ornamental surfaces. Clean and polish surfaces with regard to type of material.

3.5 PAINTING AND FINISHING

- A. All equipment, except specified as architectural finish, shall be painted one coat of approved color, conforming to manufacturer's standard.
- B. Hoist machine, motor, shall be factory painted with manufacturer's standard finish and color.
- C. Controller, sheave, car frame and platform, counterweight, beams, rails and buffers except their machined surfaces, cams, brackets and all other uncoated ferrous metal items shall be painted one factory primer coat or approved equal.
- D. Stencil or apply decal floor designations not less than 100 mm (4 in.) high on hoistway doors, fascia or walls within door restrictor areas. The color of paint used shall contrast with the color of the surfaces to which it is applied.
- E. Elevator pump/motor machine, controller, main line switch/shunt trip circuit breaker, bolster channel, and cross head of car shall be identified by 100 mm (4 in.) high numerals and letters located as directed. Numerals shall contrast with surrounding color and shall be stenciled or decaled.
- F. Hoistway Entrances of Passenger, and Service Elevators:
 - 1. Door panels shall be given rust resistant treatment and a factory finish of one coat of baked-on primer and one factory finish coat of baked-on enamel.

2. Fascia plates, top and bottom shear guards, dust covers, hanger covers, and other metalwork, including built-in or hidden work and structural metal, (except stainless steel entrance frames and surfaces to receive baked enamel finish) shall be given one approved prime coat in the shop, and one field coat of paint of approved color.

G. Hoistway Entrances of Freight Elevators:

1. Metal surfaces of doors and frames shall receive shop prime coat.
2. Finish painting, after installation, shall be one coat of paint of approved color.

H. Elevator Cabs for Passenger and Service Elevators:

1. Interior and exterior steel surfaces shall be given rust resistant treatment before finish is applied.
2. Interior steel surfaces shall be factory finished with one coat of paint of approved color.
3. Give exterior faces of car doors one finish coat of paint of approved color.

I. Elevator Cabs for Freight Elevators:

1. Give interior of cab one prime coat and a minimum of one coat of paint of approved color.
2. Give exterior of cab one prime coat and one finish coat of paint of approved color.
3. All surfaces of door frames, door panels, and cab interior surfaces that become damaged or marred shall be restored to original condition before final acceptance of work.

3.6 PRE-TESTS AND TESTS

- A. Pre-test the elevators and related equipment in the presence of the Resident Engineer or his authorized representative for proper operation before requesting final inspection. Conduct final inspection at other than normal working hours, if required by Resident Engineer.

1. Contracting Officer shall obtain the services of a third party QEI Certified Elevator Inspector. The QEI must utilize an Elevator Acceptance Inspection Form to record the results of inspection and all testing and to identify safety code and contract deficiencies. Specific values must be provided for all tests required by ASME A17.1, ASME A17.2, and contract documents. Upon completion of inspection and testing, the QEI must sign a copy of the completed form and provide to the Contracting Officer. Within 2 weeks of the

inspection, the QEI must also prepare a formal inspection report, including all test results and deficiencies. Upon successful completion of inspection and testing, the QEI will complete, sign, and provide a certificate of compliance with ASME A17.1.

2. Contractor shall furnish the following test instruments and materials on-site and at the designated time of inspection: properly marked test weights, oil pressure gauge, voltmeter, amp probe, thermometers, direct reading tachometer, megohm meter, vibration meter, sound meter, light meter, stop watch, and a means of two-way communication.
- B. Inspection of workmanship, equipment furnished, and installation for compliance with specification.
 - C. Full-Load Run Test: Elevators shall be tested for a period of one hour continuous run with full contract load in the car. The test run shall consist of the elevator stopping at every floor, in either direction of travel, for not less than five or more than ten seconds per floor.
 - D. Speed Test: The actual speed of the elevator shall be determined in both directions of travel with full contract load and no load in the elevator. Speed shall be determined by certified tachometer. The actual measured speed of the elevator with all loads in either direction shall be within five (5) percent of specified rated speed. Full speed runs shall be quiet and free from vibration and sway.
 - E. Temperature Rise Test: The temperature rise of the pump motor shall be determined during the full load test run. Temperatures shall be measured by the use of thermometers. Under these conditions, the temperature rise of the equipment shall not exceed 50 degrees Centigrade above ambient temperature. Test shall start when all machine room equipment is within 5 degrees Centigrade of the ambient temperature. Other tests for heat runs on motors shall be performed as prescribed by the Institute of Electrical and Electronic Engineers.
 - F. Car Leveling Test: Elevator car leveling devices shall be tested for accuracy of leveling at all floors with no load in car and with contract load in car in both directions of travel. Accuracy of floor level shall be within plus or minus 3 mm (.125 in.) of level with landing floor for which the stop has been initiated regardless of load in car or direction of travel. The car leveling device shall automatically correct over travel as well as under travel and shall

maintain the car floor within plus or minus 3 mm (.125 in.) of level with the landing floor regardless of change in load.

- G. Insulation Resistance Test: The elevator's complete wiring system shall be free from short circuits and ground faults and the insulation resistance of the system shall be determined by use of megohm meter, at the discretion of the Elevator Inspector conducting the test.
- H. Overload Devices: Test all overload current protection devices in the system at final inspection.
- I. Limit Stops:
 - 1. The position of the car when stopped by each of the normal limit switches with no load and with contract load in the car shall be accurately measured.
 - 2. Final position of the elevator relative to the terminal landings shall be determined when the elevator has been stopped by the final limits. The lower limit stop shall be made with contract load in the elevator. Elevator shall be operated at inspection speed for both tests. Normal limit stopping devices shall be inoperative for the tests.
- J. Working Pressure: Verify working pressure of the hydraulic system by pressure gauge placed in the system line. Take readings with no load and full load in car.
- K. Test automatic shut-off valve for proper operation.
- L. Operating and Signal System: The elevator shall be operated by the operating devices provided and the operation signals and automatic floor leveling shall function in accordance with requirements specified. Starting, stopping and leveling shall be smooth and comfortable without appreciable steps of acceleration or deceleration.
- M. Performance of the Elevator supervisory system shall be witnessed and approved by the elevator inspector and a representative of the Resident Engineer.
- N. Evidence of malfunction in any tested system or parts of equipment that occurs during the testing shall be corrected, repaired, or replaced at no additional cost to the Government, and the test repeated.
- O. If equipment fails test requirements and a re-inspection is required, the Contractor shall be responsible for the cost of re-inspection; salaries, transportation expenses, and per-diem expenses incurred by the elevator inspector and the representative of the Resident Engineer.

3.7 INSTRUCTION OF VA PERSONNEL

- A. Provide competent instruction to VA personnel regarding the operation of equipment and accessories installed under this contract, for a period equal to one eight hour work day. Instruction shall commence after completion of all work and at the time and place directed by the Resident Engineer.
- B. Written instructions in triplicate relative to care, adjustments and operation of all equipment and accessories shall be furnished and delivered to the Resident Engineer in independently bound folders. DVD recordings will also be acceptable. Written instructions shall include correct and legible wiring diagrams, nomenclature sheet of all electrical apparatus including location of each device, complete and comprehensive sequence of operation, complete replacement parts list with descriptive literature, and identification and diagrams of equipment and parts. Information shall also include electrical operation characteristics of all circuits, relays, timers, electronic devices, and related characteristics for all rotating equipment.
- C. Provide supplementary instruction for any new equipment that may become necessary because of changes, modifications or replacement of equipment or operation under requirements of paragraph entitled "Warranty of Construction".

3.8 INSPECTION AND MAINTENANCE SERVICE: GUARANTEE PERIOD OF SERVICE

- A. Furnish complete inspection and maintenance service on entire elevator installation for a period of one (1) year after completion and acceptance of all the elevators in this specification by the Resident Engineer. This maintenance service shall run concurrently with the warranty. Maintenance work shall be performed by Certified Elevator Mechanics and Apprentices.
- B. This contract will cover full maintenance including emergency call back service, inspections and servicing the elevators listed in the schedule of elevator. The Elevator Contractor shall be required to perform the following:
 - 1. Bi-weekly systematic examination of equipment.
 - 2. During each maintenance visit the Elevator Contractor shall clean, lubricate, adjust, repair and replace all parts as necessary to keep the equipment in like new condition and proper working order.

3. Furnishing all lubricant, cleaning materials, parts and tools necessary to perform the work required. Lubricants shall be only those products recommended by the manufacturer of the equipment.
 4. As required, motors, controllers, selectors, leveling devices, operating devices, switches on cars and in hoistways, hoistway doors and car doors or gate operating device, interlock contacts, guide shoes, guide rails, car door sills, hangers for doors, car doors or gates, and signal system shall be cleaned, lubricated and adjusted.
 5. Guide rails and bottom of platforms shall be cleaned every three months. Car tops and machine room floors shall be cleaned monthly. Accumulated rubbish shall be removed from the pits monthly. A general cleaning of the entire installation including all machine room equipment and hoistway equipment shall be accomplished quarterly. Cleaning supplies and vacuum cleaner shall be furnished by the Contractor.
 6. Maintain the performance standards set forth in this specification.
 7. The operational system shall be maintained to the standards specified hereinafter including any changes or adjustments required to meet varying conditions of hospital occupancy.
 8. Maintain smooth starting and stopping and accurate leveling at all times.
- C. Maintenance service shall not include the performance of work required as a result of improper use, accidents, and negligence for which the Elevator Contractor is not directly responsible.
- D. Provide 24 hour emergency call-back service that shall consist of promptly responding to calls within two hours for emergency service should a shutdown or emergency develop between regular examinations. Overtime emergency call-back service shall be limited to minor adjustments and repairs required to protect the immediate safety of the equipment and persons in and about the elevator.
- E. Service and emergency personnel shall report to the Resident Engineer or his authorized representative upon arrival at the hospital and again upon completion of the required work. A copy of the work ticket containing a complete description of the work performed shall be given to the Resident Engineer.
- F. The Elevator Contractor shall maintain a log book in the machine room. The log shall list the date and time of all bi-weekly examinations and all trouble calls. Each trouble call shall be fully described including

the nature of the call, necessary correction performed or parts replaced.

- G. Written "Maintenance Control Program" shall be in place to maintain the equipment in compliance with ASME A17.1.

Spec writer note: Delete all spec writer notes including this one.

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