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DIVISION 14 - CONVEYING EQUIPMENT

HYDRAULIC PASSENGER ELEVATORS - JBLM

07/21

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-- End of Section Table of Contents --

****
NOTE: Information in brackets [ ] throughout this specification to be completed or confirmed as required.
****

PART 1 GENERAL

Any editing of the non-bracketed requirements in this specification must be approved through the JBLM-DPW VTE Program Manager.

1.1 REFERENCES

****
NOTE: The issue date for the references listed below are current at the date of this publication (07/21). Update all reference issue dates at the time the specification is used as part of a project.
****

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

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M	(2020) Structural Welding Code – Steel

ASME INTERNATIONAL (ASME)

ASME A17.1/CSA B44	(2019, Exception Section 2.27.1) Safety Code for Elevators and Escalators (2016, Section 2.27.1) Safety Code for Elevators and Escalators
ASME A17.2	(2020) Guide for Inspection of Elevators, Escalators, and Moving Walks Includes Inspection Procedures for Electric Traction and Winding Drum Elevators, Hydraulic Elevators, and Escalators and Moving Walks
ASME B16.9	(2018) Standard for Factory-Made Wrought Steel Buttwelding Fittings
ASME B16.11	(2016) Forged Fittings, Socket-Welding and Threaded
ASME QEI-1	(2018) Standard for the Qualification of Elevator Inspectors

ASTM INTERNATIONAL (ASTM)

ASTM A106/A106M	(2019) Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service
ASTM A53/A53M	(2020) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C62.41.1	(2002; Reaffirmed 2008) Guide on the Surge Environment in Low-Voltage (1000V and less) AC Power Circuits

INTERNATIONAL CODE COUNCIL (ICC)

ICC IBC	(2021) International Building Code

NATIONAL ELEVATOR INDUSTRY, INC. (NEII)

NEII-1	(2000; R thru 2020) Building Transportation Standards and Guidelines, including the Performance Standards Matrix for New Elevator Installation

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 101	(2021) Life Safety Code
NFPA 70	(2020) National Electrical Code
NFPA 70E	(2021) Standard for Electrical Safety in the Workplace
NFPA 72	(2019) National Fire Alarm and Signaling Code

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 1-200-01	(2019, with Change 1) DoD Building Code, General Building Requirements
UFC 3-490-06	(2018, with Change 1) Elevators
UFC 3-560-01	(2016, with Change 2) Electrical Safety, O&M
UFC 3-600-01	(2016, with Change 6) Fire Protection Engineering for Facilities
UFC 4-010-06	(2016, with Change 1) Cybersecurity of Facility-Related Control Systems

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

36 CFR 1191	Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines

1.2 SUBMITTALS

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

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

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office.

An "S" following a submittal item indicates that the submittal is required for the Sustainability Notebook to fulfill federally mandated sustainable requirements in accordance with Section 01 33 29 SUSTAINABILITY REPORTING.
****

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submittals with an "S" are for inclusion in the Sustainability Notebook, in conformance with [Section 01 33 29 SUSTAINABILITY REPORTING]. Submit the following in accordance with [Section 01 33 00] SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Elevator System; G [ ]

Elevator Components; G [ ]

Machine and Elevator Controller; G [ ]

Wiring Diagrams; G [ ]

Machine Room HVAC System; G [ ]

SD-03 Product Data

Elevator and Accessories; G [ ]

Elevator Components; G [ ]

Data Sheets; G [ ]

Elevator Microprocessor Controller; G [ ]

SD-05 Design Data

Static Loads; G [ ]

Impact Loads; G [ ]

Horizontal and Vertical Reaction Loads; G [ ]

Heat Loads; G [ ]

Emergency Power Systems; G [ ]

SD-07 Certificates

Elevator Parts and Components Price Lists; G [ ]

Warranty; G [ ]

Endorsement Letter; G [ ]

Welders' Qualifications; G [ ]

Installing Contractor Technical Certificates G [ ]

Elevator Controller Certification; G [ ]

SD-10 Operation and Maintenance Data

Elevator, Data Package 4; G [ ]

Maintenance Control Program (MCP); G [ ]

Software and Documentation; G [ ]

Certification of Elevator after inspection; G [ ]

Submit in accordance with Section [01 78 23 OPERATION AND MAINTENANCE DATA] and [01 78 24.00 20] FACILITY OPERATION AND MAINTENANCE SUPPORT INFORMATION.

1.2.1 Shop Drawing Requirements

Provide assembly and arrangement of elevators, accessories, and elevator components. Show location of machine and elevator controller in elevator machine room. Provide details for materials and equipment, including but not limited to operating and signal fixtures, doors, door and car frames, car enclosure, controllers, motors, guide rails and brackets, layout of hoistway in plan and elevation, and other layout information and clearance dimensions.

1.2.2 Product Data Requirements

Provide manufacturers' product data for all elevator components, including but not limited to the following: elevator controller, hydraulic pump unit, hydraulic pump and motor, hydraulic cylinder, hydraulic piping and fittings, car and hall fixture buttons and switches, cab and machine room communication devices, door operator, door protection system, car roller guides, and buffers. For data sheets, provide document identification number or bulletin number, published or copyrighted prior to the date of contract bid opening. Provide controller manufacturer's published

procedures for performance of each and all testing required by ASME A17.1/CSA B44.

1.2.3 Design Data Requirements

1.2.3.1 Structural Loads

Provide calculations by registered professional engineer for total static loads, impact loads, and horizontal and vertical reaction loads that will be transmitted to machine beams, sheave beams, supports, floors, walls, and foundations. Demonstrate calculations complying with ASME A17.1/CSA B44.

1.2.3.2 Heat Loads

Provide calculations from elevator manufacturer, or by registered professional engineer, for total anticipated heat loads generated by all of the elevator machine room equipment.

1.2.3.3 Emergency Power Systems

Where the facility does have an emergency power system, confirm the elevators that will be connected to the emergency power system. Confirm the complete emergency power system and sequence of operation for all elevators, including operation of the elevator lobby manual selection switch. Provide wiring diagrams for building emergency power interface with elevator controls. For elevators not supplied by an emergency power system, provide manufacturers' product data for auxiliary power systems.

1.2.4 Certificates - Welders' Requirements

Comply with AWS D1.1/D1.1M, Section 5. Include certified copies of field welder’s qualifications. List welders' names with corresponding code marks to identify each welder's work

1.2.5 Operation and Maintenance Data Requirements

For each elevator, prepare and provide a complete, written Maintenance Control Program (MCP) that complies with ASME A17.1/CSA B44 Section 8.6, including written documentation that details the test procedures for each and every test that is required to be performed by ASME A17.1/CSA B44. Assemble all MCP documentation, and supporting technical attachments, in a single MCP package and provide in both electronic and hard copy. Assemble entire hard copy MCP in 3-ring binders. For each elevator provided, the MCP must include only documentation and instruction that apply to the elevator specified.

For each elevator, provide an additional, separate binder that includes all maintenance, repair, replacement, call back, and other records required by ASME A17.1/CSA B44. The records binder must be kept in the elevator mechanical room, maintained by elevator maintenance and service personnel, and be available at all times to authorized personnel.

Provide detailed information regarding emergency service procedures and elevator installation company personnel contact information. Provide a listing of all tools to be provided to the Contracting Officer as components of the elevator system.

1.3 QUALITY ASSURANCE

1.3.1 Qualification

Provide a designed and engineered elevator system by an elevator contractor regularly engaged in the installation of elevator systems. Provide elevator components manufactured by companies regularly engaged in the manufacture of elevator components. Utilize only licensed and certified elevator personnel for the installation, adjusting, testing, and servicing of the elevators.

1.3.1.1 Elevator Contractor's Elevator Technicians

For elevator installations in the United States, including United States territories, perform all elevator related work under the direct guidance of a state certified elevator technician with a minimum of three (3) years of experience in the installation of elevator systems of the type and complexity specified in the contract documents. Provide an endorsement letter from the elevator manufacturer, certifying that the elevator technician is qualified. All elevator technicians must carry a current certification issued by one of the following organizations:

a. National Association of Elevator Contractors (NAEC)

b. National Elevator Industry Education Program (NEIEP)

1.3.2 Manufacturers' Technical Support

Provide elevator components from manufacturers that provide factory training and online and live telephone elevator technical support to any elevator installation, service, and maintenance contractor. Provide elevator components from manufacturers that guarantee accessibility to all replacement and repair parts and components to any elevator installation, service, and maintenance contractor.

1.3.3 Operation and Maintenance Data

Assemble all shop drawing and product data material into O&M Data Packages in accordance with Article SUBMITTALS and UFGS 01 78 23 Operation and Maintenance Data. Provide two (2) complete O&M Data Packages in hard copy and two (2) complete electronic O&M Data Packages on separate CDs, in PDF format. Provide all O&M Data Packages to Contracting Officer. Include controller diagnostic documentation and software as required under Article CONTROL EQUIPMENT.

1.3.4 Wiring Diagrams

Provide complete wiring diagrams and sequence of operations, which show electrical connections and functions of elevator systems. Provide one (1) set 11 inch by 17 inch minimum size of wiring diagrams, to be stored in the machine room cabinet. Provide one (1) additional hard copy set and two (2) complete electronic sets on separate CDs, in PDF format. Provide all wiring diagram sets to the Contracting Officer. Coded diagrams are not acceptable unless fully identified.

1.3.5 Machine Room (MR) Storage Cabinet

For storage of O&M Data Packages and Wiring Diagrams, provide locking metal cabinet with a minimum size to accommodate all O&M Data and hardware required in paragraphs OPERATION AND MAINTENANCE DATA and WIRING DIAGRAMS. Secure cabinet to machine room wall.

1.4 NEW INSTALLATION SERVICE

Provide elevator warranty service in accordance with the manufacturer's maintenance plan, warranty requirements and applicable safety codes, for a period of 12 months after the date of acceptance by Contracting Officer. Perform this work during regular working hours. Provide all labor, supplies, and parts to keep elevator system in operation. Perform service only by licensed elevator mechanics. Provide [monthly services for standard use facilities] [bi-weekly services for high use facilities (example: air traffic control tower or hospital)] to include, but not limited to, monthly Firefighters' Emergency Operation testing, repairs, adjustments, greasing, oiling, and cleaning. As part of the MCP, provide service log in elevator machine room and update [monthly] [bi-weekly] according to the service provided, throughout the one-year warranty period. Provide 24-hour emergency service, with [two (2) hour on-site response time for standard use facilities] [one (1) hour on-site response time for high use facilities] during this period without additional cost to the Government.

1.4.1 Periodic Elevator Certification Inspection and Testing

Provide elevator mechanic to support Government Qualified Elevator Inspector (QEI) in the annual Category 1 elevator certification inspection and testing. Perform Category 1 inspection and testing no greater than 30 days prior to the end of the warranty period. Perform all elevator certification testing in the presence of Government QEI. Schedule so that testing does not interfere with building operations.

1.5 FIRE PROTECTION SYSTEM

****
NOTE: Confirm that sections listed throughout this article are part of project. Add or delete sections as needed for project.
****

Coordinate interface between building fire protection system and elevator controls.

Additional fire protection requirements are located in: [Section 28 31 74.00 20 INTERIOR FIRE DETECTION AND ALARM SYSTEM;][Section 28 31 02.00 20 FIRE ALARM REPORTING SYSTEMS - DIGITAL COMMUNICATORS;] [Section 21 13 13.00 20 WET PIPE SPRINKLER SYSTEM, FIRE PROTECTION;]and Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM.

1.5.1 Fire Alarm Initiating Devices

Fire alarm initiating devices are specified in [Section 28 31 74.00 20 INTERIOR FIRE DETECTION AND ALARM SYSTEM] Specification, including conduit and wiring from each detector to fire protection addressable modules in elevator machine room.

1.5.2 Fire Sprinklers

Provide fire sprinklers in accordance with all applicable safety codes, UFC 3-600-01, and with [Section 21 13 13.00 20 WET PIPE SPRINKLER SYSTEM, FIRE PROTECTION][____]. Provide shutoff valve, check valve, and non-adjustable, zero time-delay flow switch, in each sprinkler line immediately outside of each machine room and hoistway, if applicable. Provide inspectors' test valve for periodic testing of flow switch and shunt trip disconnect. Pipe sprinkler piping serving these spaces in a series manner with no laterals. Locate inspector's test connection at the end of pipe runs such

that operation of the test connection will purge air from system piping.

1.5.3 Shunt Trip Disconnect

Provide flow switches specified in paragraph 1.5.2 FIRE SPRINKLERS to comply with UFC 3-490-06, ASME A17.1/CSA B44, and NFPA 72 for shunt trip of the main line power supply. For each elevator, provide control wiring connecting the flow switch to a shunt trip equipped circuit breaker located in the elevator machine room. Upon flow of water, flow switch will instantaneously cause opening of the shunt-trip circuit breaker and remove power from the elevator. Flow switch must also send a signal to fire alarm control panel to indicate water flow condition.

1.5.4 Machine Room (MR)

MR door and door jamb shall have a one (1) hr or longer fire rating for hoistways and MR’s with a 1 hr fire rating. MR door and door jamb shall have a 1 1/2 hr or longer fire rating for hoistways and MR’s with a two (2) hr fire rating.

PART 2 PRODUCTS

2.1 ELEVATOR DESCRIPTION

Provide elevator system that complies with UFC 3-490-06 in its entirety, ASME A17.1/CSA B44 in its entirety as referenced in Section 1.1, ASME A17.2 in its entirety, and additional requirements specified herein. Provide and install elevators in accordance with all listed codes and requirements.

****

NOTE: Traffic Analysis and Minimum Cab Size: Perform a traffic analysis and conduct interviews with the facility user to determine number, size, and type of elevator(s) necessary to serve the needs of the facility user. Refer to UFC 3-490-06 to determine Design Type and Rated Speed.

Size and capacity configurations are limited to three basic configurations as listed in the subparagraphs below.

****

2.1.1 Elevator Design Parameters

****

NOTE: Emergency Medical Service Accessibility (EMSA): For each building of two stories or greater, provide at least one elevator with a minimum size and arrangement to accommodate an ambulance stretcher 24 inch by 84 inch, with not less than 5 inch radius corners, in the open, horizontal, position. For buildings with multiple elevators, an EMSA elevator must be accessible from <u>all</u> locations in the building; otherwise additional elevator(s) shall also be EMSA. Telescopic plunger and inverted cylinder/plunger elevator designs are not permitted in DoD facilities.

****

[2.1.1.1 Elevator No. [___]- Emergency Medical Service Accessibility (EMSA)

Provide elevator(s) with minimum size and arrangement to accommodate an ambulance stretcher 24-inch by 84-inch with not less than 5-inch radius corners, in the open, horizontal position.

a. Type: [In-Ground Direct Plunger] [Hole-less]

b. Rated load: [3500] [   ] lb.

c. Rated Speed: [125] [150] fpm

1. In-ground Direct Plunger: For an elevator travel distance of less than 16 feet, rated speed must be 125 feet per minute (fpm). For a travel distance between 16 feet and 44 feet, the rated speed must be 150 fpm. Do not exceed a travel length of 44 feet or a maximum of four floors for this type of elevator.

2. Hole-less Direct Plunger: Rated speed must be 125 fpm for this type of elevator. Elevator travel distance is limited by the depth of the hoistway pit and the overhead clearance in the top of the hoistway.

d. Car Door Type: Single-speed side slide.

e. Car Door Opening Width: 3 ft.-6 in minimum.

[2.1.1.2 Larger Capacity (Pallet-Sized) Loading

****

NOTE: Where a larger capacity elevator is required to accommodate light freight, typically pallet-size loading, use this subparagraph. A passenger elevator that will be used to transport material that exceeds 25% of the capacity of the elevator must be designed with a minimum of ASME A17.1 Class C-3 loading. Elevator shall typically be 4000-4500 lb capacity (may be upwards of 6000 lbs in rare instances), single speed center opening, 48 inch door opening width, and will typically be deeper than the 3500 lb. EMSA elevator above.

This larger elevator will also meet the EMSA requirements described above.

****

c. Type: [In-Ground Direct Plunger] [Hole-less]

b. Rated load: [4000] [4500][   ] lb. as specified in project design.

c. Rated Speed: [125] [150]fpm.

1. In-ground Direct Plunger: For an elevator travel distance of 15 feet or less, rated speed must be 125 feet per minute (fpm). For a travel distance between 15 feet and 44 feet, the rated speed must be 150 fpm. Do not exceed a travel length of 44 feet or a maximum of four (4) floors for this type of elevator.

2. Hole-less Direct Plunger: Rated speed must be 125 fpm for this type of elevator. Elevator travel distance is limited by the depth of the hoistway pit and the overhead clearance in the top of the hoistway.

d. Car Door Type: Single-speed center opening, horizontally sliding.

e. Car Door Opening Width: 4 ft.-6 in. minimum.]

[2.1.1.3 Elevator No. [____] – Non-EMSA Elevator

****
NOTE: For smaller elevators where EMSA is not required (covered by one of the two elevator types above), this subparagraph may be used. Typical application would be an elevator bank where one elevator meets EMSA requirements. Elevator shall be 2500 lb capacity, 42 inch door opening width, and either side slide or center opening, typically to match other elevators in the bank.

This elevator will not meet EMSA requirements.
****

a. Type: [In-Ground Direct Plunger] [Hole-less]

b. Rated load: [2500] [ ] lb.

c. Rated Speed: [125] [150] fpm.

1. In-ground Direct Plunger: For an elevator travel distance of less than 16 feet, rated speed must be 125 feet per minute (fpm). For a travel distance between 16 feet and 44 feet, the rated speed must be 150 fpm. Do not exceed a travel length of 44 feet or a maximum of four (4) floors for this type of elevator. Do not exceed rated speed of 150 fpm.

2. Hole-less Direct Plunger: Rated speed must be 125 fpm for this type of elevator. Elevator travel distance is limited by the depth of the hoistway pit and the overhead clearance in the top of the hoistway.

d. Car Door Type: Single speed [side slide][center opening].

e. Car Door Opening Width: 3 ft.-6 in minimum.

2.1.2 Cab Enclosure and Hoistway Entrance Assemblies

Provide finishes as listed below:

a. Floor; [carpet] [vinyl composition tile] [vinyl sheet tile] [ ].

b. Walls; stainless steel. Provide each cab wall with equally spaced and equally sized wall panels. All wall panel fasteners must be concealed.

Wall trim; stainless steel to match walls.

Accessories; Provide hand rails on full length of back wall and side walls of elevator cab.

c. Car doors, car door returns, and wall reveals; stainless steel to match walls.

d. Ceilings; stainless steel.

Ceiling frame; same as ceilings.

e. Hoistway Entrance Assembly Material and Finishes; stainless steel to match walls.

2.2 ELEVATOR OPERATION

Refer to ASME A17.1/CSA B44, Introduction, Section 1.3, Definitions.

****
NOTE: Choose one of the following four types of elevator operation.
****

[2.2.1 Single, Two-Stop, Automatic Operation]

****
NOTE: Choose for single elevator serving two landings.
****

Provide Single Two-Stop Automatic Operation.]

[2.2.2 Selective Collective Automatic Operation]

****
NOTE: Choose for single elevator serving three or more landings.
****

Provide Selective Collective Automatic Operation.]

[2.2.3 Duplex Selective Collective Automatic Operation

****
NOTE: Choose for two adjacent elevators.
****

For two adjacent elevators provide Duplex Selective Collective Automatic Operation. If a car is taken out of service or fails to respond to a landing call within a predetermined adjustable time limit of approximately 40 to 180 seconds, transfer calls to the other car functioning as a single car Selective Collective elevator until the out-of-service car is returned to the system.]

[2.2.4 Group Automatic Operation

****
NOTE: Choose for three or more elevators that serve the same elevator lobby.
****

Provide Group Automatic Operation. If a car is taken out of service, or fails to respond to a landing call within a predetermined adjustable time limit of approximately 40 to 180 seconds, transfer calls to another car until out-of-service car is returned to the system.]

2.3 SPECIAL OPERATION AND CONTROL

Provide the following special operations and control systems:

2.3.1 Keys for Elevator Key Switches

Provide to JBLM-DPW at final commissioning a minimum of four (4) keys per unique cylinder used on all key switches for a single elevator. Provide each key with an identification tag made from a durable material marked on one side with the function of the key and the unique elevator identification on the other side.

2.3.2 Firefighters' Emergency Operation (FEO)

****
NOTE: Coordinate FEO Designated Landing with Fire Protection Designer.
****

****
NOTE: For modernization projects, verify existing building fire alarm system is compatible with elevator operational controller and compliant with current safety and building codes.
****

Provide FEO equipment and signaling devices. The designated level for the FEO Phase I key operated switch is the [ground] [_____] floor. In the FEO Phase I fixture, provide FEO Operating Instructions.

2.3.2.1 Firefighters' Emergency Operation (FEO) Key Box

Provide a locking SupraSafe 2HSR box. Install at a height of six (6) feet above floor level and directly above the FEO Phase I key switch. The box must be within 20 inches of the hoistway entrance assembly. Obtain specifications and key core info for lock boxes from JBLM-DPW lock shop.

2.3.3 Hoistway Access Operation

Provide hoistway access operation with switches at top and bottom terminal landings. Locate switch six (6) feet above floor level, within 12 inches of elevator hoistway entrance frame or with the ferrule exposed when located in the elevator entrance frame.

2.3.4 In-Car Inspection Operation

Provide In-Car Inspection Operation.

2.3.5 Independent Service Operation

Provide exposed key-operated switch in car operating panel to enable independent service and simultaneously disable in-car signals and landing-call responses. Provide indicator light(s) that automatically illuminate during independent service. [For duplex or group operation, if one car is removed from group another car will respond to its hall calls.]

2.3.6 Selective Door Operation

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

[2.3.7 Elevator Emergency Power Operation

****
NOTE: Electrical design shall identify the elevators to be connected to the building emergency power system. Identify and define the complete emergency power system for all elevators.

For new construction and modernization of buildings equipped with an emergency power generator, the emergency power system must provide, at a minimum, the capability for the normal operation of the EMS elevator on emergency power. In addition, the designer must

determine if the client requires additional elevators to be powered by the facility emergency power generator.

For any elevator that is not included in the building emergency power operation, utilize paragraph ELEVATOR AUXILIARY POWER OPERATING SYSTEM.

****

Provide elevator emergency power operation for [all elevators] [elevator(s) 1,2,3...]. Coordinate power supply and control wiring to accomplish initiation and operation of elevators on emergency power. For buildings equipped with an emergency power generator, the emergency power system must provide, at a minimum, the capability for the normal operation of the EMSA elevator on emergency standby power.[All elevators in the same control group as the EMSA elevator must be capable to operate on standby power. In addition, the designer must determine if the client requires additional elevators to be powered by the facility emergency power generator.

The design must address the following:

a. Identify the number of elevators to run simultaneously.

b. Identify elevators and elevator groups to be designed with sequential return operation.]

[2.3.8 Elevator Auxiliary Power Operating System

Provide elevator auxiliary power operating system for [all elevators] [elevator(s) 1,2,3...]. Elevators not designed for building emergency power generator operation must be equipped with an auxiliary power operating system that provides the following operation:

Hydraulic elevators must lower to the FEO Designated Landing, open and close the doors, and be removed from service. If elevator is below the FEO Designated Landing when normal power fails, elevator must open and close the doors at first available landing and be removed from service.]

2.4 ELEVATOR DRIVE SYSTEM

Provide elevator system that is designed for the elevator controller and pump unit to be installed in an elevator machine room. Provide hydraulic elevator drive system, including pump unit, piping, cylinder/plunger assembly, and associated equipment, which will operate at a maximum working pressure of 500 psi or less. Provide complete elevator system that meets or exceeds the NEII-1 Ride Quality Standard, including elevator ride quality and noise levels in car and in elevator machine room.

2.4.1 Hydraulic Pump Unit

Provide self-contained pump unit, including oil-hydraulic elevator pump, electric motor, suction-line oil strainer, and structural steel outer base with tank supports and isolation pads. Provide oil tank capacity for full plunger displacement plus at least 10 gallons. Provide means to maintain oil temperature between 100 and 130 degrees F regardless of ambient temperature by use of a tank heater or viscosity control and an oil cooler. Limit acoustic output in elevator machine room to 85 dbA.

2.4.1.1 Pump Motor

Provide intermittent-duty pump motor rated at [80] [120] starts/hour and with minimum Class F insulation. Provide motor that is sized so that the motor amperage does not exceed the motor data tag amperage in any operating condition, exclusive of acceleration and deceleration. Provide minimum of one (1) megohm insulation resistance between conductors and motor frame. Provide motor and pump nameplate and data tags permanently mounted on the outside of the pump unit frame, with all data viewable without the use of mirrors or other tools.

2.4.2 Hydraulic Controls and Equipment

Provide a control valve, overspeed safety valve, blowout-proof muffler, [dielectric unions for in-ground plungers] and hydraulic pump discharge strainer in the hydraulic oil supply line. Provide 1/4 turn, ball valve type manual shutoff valves in the elevator machine room and in the hoistway pit.

2.4.2.1 Hydraulic Control Valve

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

2.4.2.2 Hydraulic Overspeed Safety Valve

Provide overspeed safety valve in hydraulic oil supply line. [For in-ground designs refer to ASME A17.1/CSA B44, Section 3.19.4.7.3(a).] [For above-ground designs refer to ASME A17.1/CSA B44, Section 3.19.4.7.3(b)(2).] Provide victaulic or threaded pipe connections between the hydraulic cylinder and the overspeed safety valve. Overspeed safety valve must not be equipped with a manual or automatic lowering feature. Provide adjustable valve with means to seal adjustment after inspection and testing by Government QEI.

2.4.3 Hydraulic Piping and Accessories

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NOTE: Retain bracketed sentence for in-ground, direct plunger type elevators.

****

Provide ASTM A53/A53M or ASTM A106/A106M, Schedule 80, black steel piping for supply piping. Extend schedule 80 piping from the pump control valve body, inside the pump unit, to the hydraulic cylinder in the hoistway. [For in-ground direct plunger cylinders, provide dielectric union or isolation couplings at each end of the hydraulic oil supply line.] Provide victaulic or threaded pipe connections in the hydraulic supply lines. Provide hangers or supports for all piping and components.

2.4.3.1 Containment of Hydraulic Oil Supply Line

Protect all portions of hydraulic oil supply line that are installed below ground, including portions encapsulated in concrete or covered by construction, with continuous, Schedule 80, PVC. Inside diameter of PVC must be four (4) inches larger than the outside diameter of the supply line fittings.

2.4.4 Hydraulic Elevator Type

Provide [in-ground direct plunger] [hole-less direct plunger] type hydraulic elevator as specified in project design. Elevator with telescopic or inverted cylinder-plungers are not acceptable and may not be used. Roped hydraulic elevator design is not acceptable and may not be used.

2.4.4.1 Cylinder-Plunger (Jack) Unit

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

[2.4.5 Cylinder Well System

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NOTE: Retain this paragraph and associated subparagraphs for in-ground, direct plunger type elevators only.
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For direct plunger, in-ground type hydraulic elevator, provide a dry, sealed cylinder well system.

2.4.5.1 Well Casing

Locate and drill well for the cylinder well system. Line well with steel casing, minimum 1/4 inch wall with welded 1/2 inch steel bottom. Set casing plumb.

2.4.5.2 PVC or HDPE Liner

Provide Schedule 80 PVC or HDPE liner with bottom cap and couplings; joints sealed watertight using pipe manufacturer's recommended adhesive or heat welding methods. Provide liner inside diameter not less than three (3) inches larger than elevator cylinder maximum outside diameter. Liner may be provided as a cylinder manufacture's applied liner or as a separate component. For separate liner, set liner plumb in well casing, located for cylinder installation. **Provide dry, salt-free sand below and around liner to top of well casing.**

2.4.5.3 Cylinder Installation

Remove all moisture from inside of liner. Install cylinder plumb, inside liner. Provide a 1/4 inch evacuation tube inside the liner. The bottom of the evacuation tube must be within six (6) inch of the bottom of the liner. Top of evacuation tube must extend at least six (6) inch above pit floor. Provide top of test tube with removable cap to exclude foreign matter. Provide air inlet pressure fitting in top of liner and accessible in pit, for performance of air pressure test. Secure Liner/Cylinder Assembly as recommended by cylinder manufacturer.

2.4.5.4 Cylinder Liner Moisture Sensor System

Provide moisture and oil sensors inside the cylinder liner for detection of oil and water at the bottom of the cylinder liner. Provide sensor monitoring system that will actuate audible and visual alarms and identify the presence of water and identify the presence of oil inside the liner.

2.4.5.5 Seal Top of Well Casing

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

2.5 CONTROL EQUIPMENT

Enclose all elevator control equipment in factory-provided sheet-metal cabinets with ventilation louvers and/or circulation fans, and removable or hinged doors. Mount cabinets at a minimum height of 10 inches above machine room finish floor.

2.5.1 Motor Control Equipment

Provide elevator motor control with electronic, soft-start motor starter.

2.5.2 Elevator Microprocessor Controller

For each individual elevator controller, [and for each group controller,] provide a microprocessor controller that complies with the following paragraphs. Provide controller(s) package that includes all hardware and software required for the installation, maintenance, and service of the elevator, in its' entirety. Provide verification of technical support service that the controller manufacturer provides to any licensed elevator installation, service, and maintenance company.

Provide an elevator controller from a manufacturer that provides comprehensive factory training to include controller installation, adjustment, service, and maintenance. The training must be identified as available to any licensed elevator contractor. Provide verification of an established and documented training schedule, for factory training classes that manufacturer has provided for a minimum period of one (1) year prior to contract award date.

The elevator controller must be identified as available for purchase and installation by any licensed elevator contractor. All components, parts, diagnostic tools, and software must be available for purchase and installation and use by any licensed elevator contractor; "exchange-only" provisions for the purchase of spare parts are not acceptable. The elevator controller manufacturer must publish an industry competitive price listing for all controller parts, diagnostic tools, and software.

Provide verification of telephone and internet based technical support service that the elevator controller manufacturer provides to any licensed elevator installation, service, and maintenance company at an industry competitive price. The service must include live telephone based technical support for installation, adjustment, maintenance, and troubleshooting of the elevator controller and related elevator components. The service must be available during standard working hours.

Provide an elevator controller that is designed to automatically reestablish normal elevator operation following any temporary loss of power, regardless of duration.

2.5.2.1 Elevator Controller User Interface System

For each individual elevator microprocessor controller, provide an integrated user interface system. [For group elevator installations, an

interface system with full access to each elevator controller may be utilized.]

2.5.2.1.1 Elevator Microprocessor User Interface Tool (UIT)

The UIT must provide complete elevator controller interface capability and must include the elevator controller manufacturer's comprehensive package of installation and diagnostic software. The microprocessor UIT must provide unrestricted access to all parameters, all levels of adjustment, and all flags necessary for installation, adjustment, maintenance, and troubleshooting of each elevator [and for the elevator group]. All software programming must be stored in non-volatile memory. The elevator controller fault log must provide non-volatile memory fault log storage of all faults, trouble calls, and fault history for a minimum of one (1) year and the ability to download or print the fault log. The UIT must also provide the capability to display and diagnose trouble calls, faults, and shutdowns. Expiring software, degrading operation, and "key" access controls are not acceptable.

2.5.2.2 Software and Documentation

Provide three (3) copies of the manufacturer's maintenance and service diagnostic software, with complete software documentation, that will enable unlimited and unrestricted access to the controller. The software may be serialized to the specific controller installed. Provide signed certification, from the manufacturer's corporate headquarters, that guarantees that the microprocessor software and access system will not terminate the unlimited and unrestricted access at any future date.

2.6 OPERATING PANELS, SIGNAL FIXTURES, AND COMMUNICATIONS CABINETS

For all panels and fixtures, provide identical and uniform panel and fixture design, material, finish, and components for all elevators. For all panels and fixtures, legibly and indelibly identify all buttons, devices, and all operating positions for each device. Use engraving and backfilling, or photo etching, for button and device designations. Do not use attached signs. Provide elevator manufacturers' standard grade for all key switches unless otherwise specified. All illuminating panels and fixture components must utilize LED lighting for energy efficiency.

2.6.1 Car and Hall Buttons

For all cab and landing fixture buttons, provide industry-standard, vandal-resistant push buttons with positive-stop assembly design. Buttons must be minimum 3/4 inch diameter, satin-finish stainless steel, with illuminating LED halo.

2.6.2 Passenger Car-Operating Panel

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NOTE: Choose "two" Car Operating Panels for high traffic passenger elevators in hospital buildings and office buildings. Choose "one" for elevator system where traffic is moderate such as in barracks, warehouses, clinics or shops.
****

Provide each car with [one] [two] car operating panel[s] that contain[s] operation controls and communication devices. Provide exposed, flush mounted buttons for the controls identified in subparagraph PASSENGER CONTROLS. Provide a lockable service cabinet for

the controls listed in subparagraph SERVICE CONTROLS. Use engraving and backfilling or photo etching for button and switch designations. Do not use attached signs.

2.6.2.1 Passenger Controls

In addition to ASME A17.1/CSA B44 requirements, provide the following operating controls, identified as indicated:

a. Illuminating car-call buttons identified to correspond to landings served by the elevator.

b. "DOOR OPEN" and "DOOR CLOSE" buttons. [For front and rear openings at the same floor, include the identification "F" and "R" for each opening.]

c. Illuminating "ALARM" button.

d. Key-operated "Independent Service" switch.

e. "Help" communication device to include communication between elevator cab and elevator machine room.

2.6.2.2 Service Controls

In addition to ASME A17.1/CSA B44 requirements, provide the following operating controls behind a locked service panel:

a. Key-operated, three-position switch for "In car Inspection Operation" and "Hoistway Access". The center switch position will provide normal, automatic operation.

b. Car “Light" switch.

c. Car "Fan" switch with two speed settings identified.

d. 120-volt ac 60 Hz single-phase duplex electrical outlet of ground-fault-circuit-interrupt (GFCI) design.

2.6.2.3 Emergency Signaling Devices

Provide an audible signaling device, operable from the Car Operating Panel button marked "ALARM". The audible signaling device must have a sound pressure rating between 80 and 90 dbA at 10 ft. Provide battery backup power capable of operating the audible signaling device for at least one (1) hour.

2.6.2.4 Telephone and Communications Systems

The elevator emergency communication phone line must provide the capability for the elevator cab automated communication system to connect to an emergency repose desk that is manned 24 hours a day by authorized personnel (911). The phone line must support the elevator cab communication system requirement to automatically identify the elevator location and provide the capability for voice communication between the elevator passenger and authorized personnel. The phone line must also support voice communication between the elevator machine room and the elevator cab.

2.6.2.4.1 Secondary Call Capability

The emergency communication line must provide the capability for the

elevator cab communication device to accomplish the elevator safety code required secondary phone call in the event that the initial call is not answered within 45 seconds. The secondary phone number is the JBLM 911 Call Center's non-emergency number at 253-912-4442.

2.6.3 Elevator In-Car Position Indicators

For all elevators, provide illuminating position indicator in the Car Operating Panel.

2.6.4 [Elevator In-Car Direction Indicators

For 2-stop elevator installations, provide visual direction indicators and audible car arrival signal in the elevator car door jamb, in accordance with ABA Standards. Visual indicators must be visible from the hall call fixture.]

2.6.5 Hall Call Landing Fixtures

Provide a hall call fixture adjacent to each elevator. Provide a single push-button for terminal landings and dual push-buttons, up and down, at intermediate landings.

2.6.5.1 Designated Landing Hall Call Fixture

2.6.5.1.1 Location of COMMUNICATION MEANS FAILURE (CMF) Visual Signal

Provide an elevator CMF audible and illuminating signal and reset switch in the FEO Designated Landing hall call fixture that conforms to ASME A17.1/CSA B44.

2.6.5.1.2 COMMUNICATION MEANS FAILURE (CMF) Visual and Audible Signal Operation

Provide a CMF visual and audible signal system that conforms to ASME A17.1/CSA B44. Provide continuous verification of operability of the telephone line and immediate activation of audible and visual signals when verification means determines that the telephone line is not functioning. Provide illumination of visual signal at one second intervals. Provide a minimum of 65 dbA audible signal at 30 second intervals. A means to silence the audible signal shall be provided and shall be accessible only to authorized personnel.

2.6.5.1.3 Firefighters' Emergency Operation (FEO) Phase I Switch and Visual Signal

Provide an elevator FEO Phase I switch and illuminating visual signal in the FEO Designated Landing hall call fixture. Provide FEO Phase I visual signal that is designed with intermittent, flashing, illumination when actuated by the machine room or hoistway fire alarm initiating device. Locate FEO Phase I key switch above the CMF visual signal with a minimum of six (6) inches vertical between the centerlines of the CMF signal and the FEO Phase I key switch. Locate FEO Phase I visual signal directly above the Phase I switch. In addition, locate Elevator Corridor Call Station Pictograph at top of hall call fixture.

2.6.6 Elevator Car Position and Direction Indicators and Car Arrival Signal

For elevator installations with three or more stops, provide a separate

hall landing fixture that includes the visual elevator position indicator, visual direction indicators, and audible car arrival signal, in accordance with ABA Standards.

[2.6.7 Designated Landing Elevator Identification Fixture

****
NOTE: Use for duplex or group installations only.
****

For duplex and group elevator installations, provide a separate elevator identification fixture for each elevator, with identification engraved and backfilled with a contrasting color. Number elevators from left to right, as seen during primary approach from building main entrance to elevator lobby. For multiple elevator groups, begin numbering with group that is closest to the building main entrance.]

2.6.8 Emergency or Standby Power

When emergency or standby power is provided for elevator operation, provide an elevator emergency power visual indicator that conforms to ASME A17.1/CSA B44. Locate the visual signal in the FEO fixture for each simplex elevator [and for each elevator group]. When an emergency power selector switch is required, provide switch in a separate, flush mounted fixture located at the designated level, in view of all elevator entrances.

2.7 CAR DOOR EQUIPMENT

2.7.1 Car Door Operator

Provide elevator door operator equipment and circuitry that is designed and installed as discreet communication. Serial communication must not be used for this system.

2.7.2 Infra-red Curtain Unit

Provide Infra-red Curtain Unit (ICU) with multiple infra-red beams that protect to the full height and width of the door opening. Provide door nudging operation.

2.8 PASSENGER ELEVATOR GUIDES, PLATFORM, AND ENCLOSURE

2.8.1 Roller Guides

Provide coil-spring loaded roller guide assemblies in adjustable mountings on each side of car in accurate alignment at top and bottom of frames. Mounting assemblies must include integral seismic retainer plates.

2.8.2 Car Enclosure Wall Panels, Return Panels, Doors, Entrance Columns, and Transom

Provide 14 Gauge minimum stainless steel cab wall panels and entrance components. Use same material and finish for all hoistway and car entrance assemblies. Apply sound-deadening material on exterior of all cab wall panels.

2.8.3 Car Enclosure Top

Provide reinforced, 12 gauge minimum steel car enclosure top. Provide

hinged emergency exit with lock that complies with the seismic risk zone three (3) or greater design requirements of ASME A17.1/CSA B44. Locate emergency exit hinge(s) towards the rear of the elevator cab. Design and configure the elevator cab interior ceiling to provide convenient and unobstructed access to, and use of, emergency exit from inside the elevator cab.

2.8.4 Car Door

Provide 16 gauge minimum stainless steel car doors of sandwich construction with flush surfaces on car and landing sides. Provide a minimum of two (2) door guide assemblies per door panel, one guide at leading and one at trailing door edge with guides in the sill groove their entire length of travel.

2.8.5 Car Entrance Sill

Provide one piece nickel silver, stainless steel, or white bronze entrance sill(s). Set sills level and flush with floor finish. Use same material for hoistway and car entrance sills.

2.8.6 Cab Finish Floor

Provide cab finish floor with top of finish floor flush with the cab sill.

2.8.7 Car Fan

Provide 2-speed fan for car enclosure forced ventilation. Fan must be mounted in the car enclosure top.

2.8.8 Car Lighting

Utilize LED lighting for elevator car interior illumination. Provide a minimum illumination of 10 foot-candles, measured at all areas of the car enclosure floor. Provide automatic car lighting operation that will turn off car lights after three (3) minutes of inactivity. Car lights must automatically turn on upon actuation of an elevator car or hall call.

2.8.9 Car Protection Pads and Hooks

Provide fire retardant, hanging car protection pads that provide protection for all car interior wall panels. Provide permanently installed studs in car that are designed for hanging the car protection pads in the car.

2.9 PASSENGER ELEVATOR HOISTWAY DOORS AND ENTRANCES

Provide hoistway entrance assemblies with a minimum 1 1/2 hour fire rating. Use same material and finish for all hoistway and car entrance assemblies.

2.9.1 Hoistway Entrance Frames

Provide 14 gage minimum stainless steel hoistway entrance frames. Solidly grout uprights of entrance ways to height of five (5) feet.

2.9.2 Hoistway Entrance Sills

Provide one-piece nickel silver, stainless steel, or white bronze entrance sills. Set top of landing sill flush with top of finish floor. Solidly grout under full length of sill. Use same material for all

hoistway and car entrance sills.

2.9.3 Hoistway Entrance Doors

Provide stainless steel non-vision construction hoistway entrance doors with flush surfaces on car and landing sides. Provide a minimum of two (2) door guide assemblies per door panel, one guide at leading edge and one at trailing edge with guides in the sill groove the entire length of door travel. Provide one (1) fire tab per door panel located at the center of the bottom door edge with the guide centered in the sill groove. Use same material and finish for all hoistway and car entrance assemblies.

2.9.4 Hoistway Entrance Door Track Dust Covers

Provide sheet metal hoistway door track dust covers at each landing. Dust covers must cover top and hoistway side of door locks and door roller tracks, and extend the full width of the door track and associated hardware. Dust cover sections will not exceed three (3) feet in length.

2.10 HOISTWAY EQUIPMENT

2.10.1 Car Guide Rails and Fastenings

Provide T-section type guide rails for car. Paint rail shanks with one coat of black enamel.

****
NOTE: Delete bracketed phrase for hole-less applications.
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2.10.2 Pit Equipment and Support Channels

If required, provide rail-to-rail pit channels to serve as mounting surface for main guide rails [,hydraulic cylinder] and car buffers. Method of installation of channels, brackets and buffer mounts must be such that pit waterproofing is not punctured.

2.10.3 Pit "STOP" Switches

Provide push-to-stop/pull-to-run configured pit "STOP" switch. If the pit exceeds 67 inches in depth, an additional "STOP" switch is required. Where more than one switch is provided, they shall be wired in series. The “STOP” switches shall be located on the wall adjacent to the pit ladder. A secondary “STOP” switch must be provided within the hoistway pit entrapment protection egress area, at a height between 50 in and 60 in above the pit floor.

2.10.4 Traveling Cables

Suspend traveling cables by means of self-tightening webbed devices or internal suspension members.

2.10.5 Hoistway Pit Ladder

Ladder material shall be galvanized steel. Pit ladder must be provided for all pits with a depth that exceeds 35 inches. In addition to safety code requirements, must provide continuous, non-slip, horizontal rungs every 12 inches for the full height of the pit ladder. Locate ladder on hoistway side wall closest to hoistway door opening. Coordinate recess (ladder pocket depth) in hoistway wall as necessary to meet code and manufacturer’s limitations on ladder

projections into the hoistway.

2.10.6 120 VAC Hoistway Lighting

Design hoistway and pit lighting to provide a minimum of 10 foot-candles at the pit floor in all areas of the pit. A minimum of two (2) LED lighting fixtures must be provided for lighting of the hoistway pit. The fixtures must have a one piece, molded, high-impact clear acrylic diffuser with a secure seal against dust and moisture. A similar fixture must be provided at a minimum of every 10 feet vertically up the hoistway. The fixture at the top of the hoistway may be mounted on the ceiling or hoistway wall depending on construction or clearance considerations. For control of the hoistway lighting circuit, provide two (2) 3-way switches inside the elevator hoistway, at a height of four (4) feet above the top and bottom elevator landings. Mount the switches on the hoistway wall, adjacent to the hoistway entrance strike jamb. The lower level lighting switch must be located adjacent to the hoistway pit access ladder.

PART 3 EXECUTION

3.1 INSTALLATION

Install in accordance with DOD design criteria, contract specifications, manufacturer's instructions, NEII-1 Building Transportation Standards and Guidelines, and all applicable building and safety code requirements.

3.1.1 Structural Members and Finish Materials

Do not cut or alter structural members. Do not alter finish materials from manufacturer's original design. Restore any damaged or defaced work to original condition.

3.1.2 Miscellaneous Requirements

Provide recesses, cutouts, slots, holes, patching, grouting, and refinishing to accommodate elevator installation. Use core drilling to drill all new holes in concrete. Finish work to be straight, level, and plumb. During installation, protect machinery and equipment from dirt, water, or mechanical damage. At completion, clean all work and spot paint.

3.2 FIELD QUALITY CONTROL

The Contractor will utilize a third-party, certified Qualified Elevator Inspector (QEI) to conduct elevator pre-acceptance inspection and testing. The QEI must perform inspections and witness tests to ensure that the installation conforms to all applicable codes, **DoD requirements (UFC and UFGS), contract requirements, and the specifications within this UFGS.** The QEI will be directly employed by the Contractor and independent of the elevator contractor.

Upon completion, the QEI must provide written test data for all ASME A17.1/CSA B44 Acceptance Tests and written certification that the elevator installation is complete and ready for Final Acceptance Inspection, Testing, and Commissioning by the Government.

3.3 ACCEPTANCE INSPECTION, TESTING AND COMMISSIONING

When elevator system installation is complete and ready for Final Acceptance Inspection, Testing and Commissioning, notify the Contracting Officer a minimum of 14 calendar days before the desired Final Acceptance

Inspection, Testing, and Commissioning date. Provide QEI certification of completed installation as specified in Article 3.2 FIELD QUALITY CONTROL.

The JBLM-DPW or NAVFAC certified QEI shall witness Final Acceptance Inspection, Testing, and Commissioning. The Government QEI will utilize the applicable Elevator Acceptance Inspection Form to record the results of Final Acceptance Inspection, Testing, Commissioning, and to identify any applicable code, DoD requirement, contract requirement, or UFGS specification deficiencies. Specific values must be provided for all tests required by ASME A17.1/CSA B44, ASME A17.2, and contract documents. Upon completion of Final Acceptance Inspection, Testing, and Commissioning, the Government QEI will sign a copy of the completed forms and provide the signed copy to the Contracting Officer or representative. Within two (2) weeks of the inspection, the Government QEI will also prepare a formal inspection report, including all test results and deficiencies.

3.3.1 Acceptance Inspection Support

Prime and Elevator Contractors must provide inspection support and perform all required tests, in order to demonstrate proper operation of each elevator system and to prove that each system complies with all applicable codes, DoD requirements, contract requirements, and UFGS specifications. Acceptance inspection procedures in ASME A17.1/CSA B44 and ASME A17.2 form a part of this Final Acceptance Inspection, Testing, and Commissioning. All Final Acceptance Inspection, Testing, and Commissioning must be conducted in the presence of the Government QEI.

If the elevator does not comply with all requirements on the initial Final Acceptance Inspection, Testing, and Commissioning, the Contractor is responsible for all costs involved with re-inspection and re-testing required as a result of contractor delays and discrepancies discovered during the Final Acceptance Inspection, Testing, and Commissioning.

3.3.2 Testing Materials and Instruments

Furnish all testing materials and instruments necessary for Final Acceptance Inspection, Testing, and Commissioning. At a minimum, include calibrated test weights, accelerometer, hydraulic pressure gauge, 600-volt megohm meter, volt meter and ammeter, infrared temperature gauge, door pressure gage, dynamometer, and 25 foot tape measure.

3.3.3 Field Tests

3.3.3.1 Endurance Tests

Test each elevator for a period of one (1) hour continuous, automatic operation, with specified rated load in the elevator cab. During the one (1) hour test, stop car at each floor, in both directions of travel, and allow automatic door opening and closing operation. The requirements for Automatic Operation, Rated Speed, Leveling, Temperature Rise and Motor Amperes must be met throughout the duration of the Endurance Test. Restart the one (1) hour test period from the beginning, following any shutdown or failure.

3.3.3.2 Speed Tests

Determine actual speed of each elevator, in both directions of travel, with rated load and with no load in elevator car. Make Speed tests at the beginning and at the end of the Endurance test. Determine speed by accelerometer, excluding accelerating and slow-down zones. Under all conditions, minimum acceptable elevator speed is the Rated Speed specified.

Maximum acceptable elevator speed is 110 percent of Rated Speed.

3.3.3.3 Leveling Tests

Test elevator car leveling operation and provide a leveling accuracy equal to or less than 1/8 inch at each floor with no load in car, and with rated load in car, in both directions of travel. Determine leveling accuracy at the beginning and at the end of the Endurance tests.

3.3.3.4 Temperature Rise Tests

Determine temperature rise of elevator pump motor and hydraulic fluid during one (1) hour full-load test run. Under these conditions, maximum temperature rise must not exceed acceptable temperature rise indicated on manufacturer's data plate. The temperature of the hydraulic fluid must be maintained between 100 and 130 degrees F. Start test only when equipment is within nine (9) degrees F of ambient temperature.

3.3.3.5 Motor Ampere Tests

At beginning and end of Endurance test, measure and record motor amperage in both directions of travel and in both no-load and rated load conditions.

3.3.3.6 Elevator Performance and Ride Quality Testing

Evaluate elevator performance to ensure compliance with specification requirements related to the NEII-1 Performance Standards Matrix for New Elevator Installations.

3.3.3.7 Hydraulic Overspeed Safety Valve Tests

In order to ensure consistent performance, regardless of hydraulic oil temperature, test the Hydraulic Overspeed Safety Valve twice. Test once before the one-hour endurance test and once immediately after the test. For elevator certification, safety valve must perform to code in both tests.

3.3.3.8 Hydraulic Pressure Tests

Check the hydraulic static pressure and rated-speed operating pressure at the hydraulic control valve, under both no load and rated load conditions.

[3.3.3.9 Pressure Test of Liner/Cylinder Assembly

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NOTE: Retain this paragraph for in-ground direct plunger type elevators only.
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Perform 20 psig pressure test of the completed and installed liner/cylinder assembly. Test liner/cylinder assembly as a sealed unit. Provide safety relief valve set to relieve at 20 psig; 4.5 inch diameter dial pressure gage scaled for 0 to 50 psig and calibrated to 0.5 percent accuracy; and an air pressure admission throttle and shutoff valve. For safety, pressure test must only be performed when liner and cylinder are fully inserted and assembled in the well casing. Perform the test from remote location outside of the elevator pit. Perform test in the presence of, and witnessed by the Government QEI.]

-- End of Section --