Guidelines for Automatic Passenger's Elevators Upgrade and Alteration MODERNIZATION OF HYDRAULIC ELEVATORS

World Plaza Building
268 Luis Muñoz Rivera Avenue
San Juan, P.R.

CRUZ MOYA® Elevator Consultants

MAY 12, 2025

Hydraulic Passenger Elevators Upgrade and Alteration

PART 1 – GENERAL

1.1 PROJECT INFORMATION

Project Name: Hydraulic Passenger's Elevators Upgrade and Alteration

Location: World Plaza Building – Parking Area

Address: 268 Luis Muñoz Rivera Avenue San Juan, P.R.

Seismic zone: 2 or greater

1.2 DESCRIPTION

This specification sets out the minimum requirements for full modernization of the two (2) duplex passenger elevators at World Plaza Building – Parking Area.

The facility has two duplex hydraulic elevators which is the existing passenger elevator included in this specification. The purpose of this specification is to establish the standards required for the building's elevator installations. The scope of work includes replacing all components most affected by wear and tear due to prolonged use. This major modernization is a relatively straightforward process, as key elements such as the car, cylinder, doors, and certain other components will be retained. Upon completion, the building will have a fully modernized elevator with a life expectancy of 20 years, compliant with the current **ASME A17.1-2019** code.

The scope of work should include, but is not limited to, the following:

1. The existing elevator serves six stops. The corridor doors will be reconditioned.
2. Testing and adjustment of elevator-related controls and equipment.
3. The Elevator Contractor shall provide preventive maintenance and service for a three-month period, beginning upon the Owner's written Final Acceptance of the work.
4. The Elevator Contractor shall furnish to the Owner all appropriate certificates, instruction manuals, schematic diagrams, software documentation, and maintenance manuals, within 30 days of final acceptance of the work.

1.3 EXISTING CONDITION

The characteristics of the equipment are as follows:

FEATURES	
Existing control panel	Elevator Controls
Year of modernization	2009
Rated Load – (lbs)	2,500 lbs
Contract Speed - (fpm)	125 fpm
Entrance Type	Single-Speed Side Open
Stops	6
Number of elevators in the building	2
Type	Duplex
Jack	Direct Piston
Shaft	Panoramic
Cab	Panoramic

Below are photos of the existing condition of the equipment.

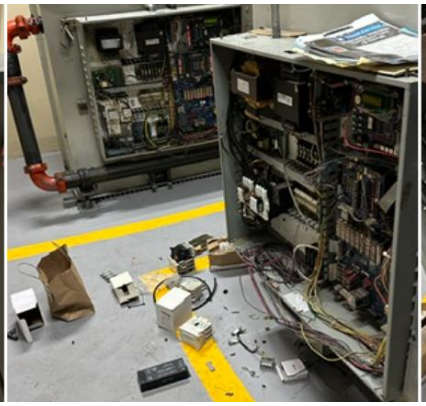
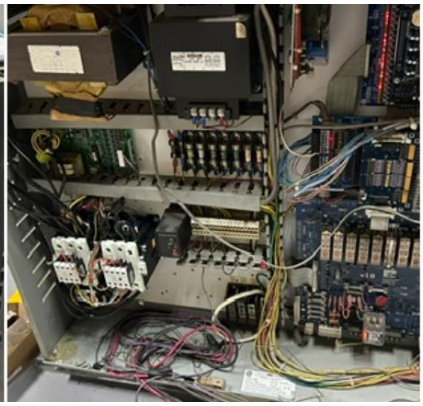



FIREFIGHTERS
OPERATION


PUSH TO TALK

5
6
3
4
*1
2

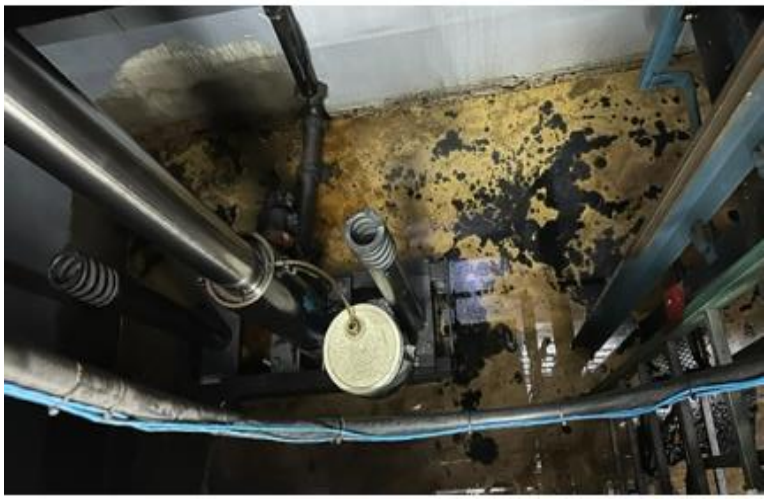


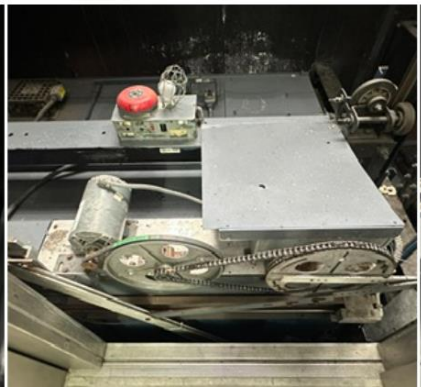





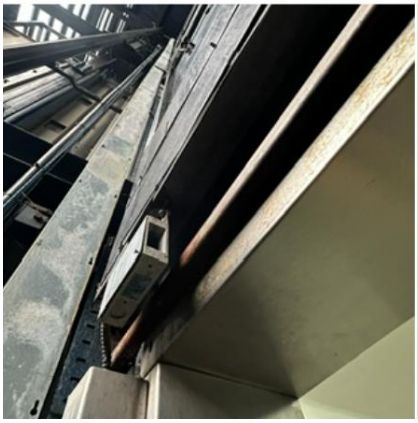
ELEVATOR EC CONTROLS
SACRAMENTO CALIFORNIA
CSA-B44.1/ASME-A17.5
US
ODEL H900 JOB NO. 09-12353
ERIAL 17388 HP 30
OLTAGE 440-480 VAC PHASE 3 HZ 60
YPE P-H-SD-CS-D-MP-FPM-125-CAP-2500-6L
CODE & EDITION APPLICABLE A17.1-2005/B44
SHORT CIRCUIT WITHSTAND 5000 A RMS, 600 VAC
TEST RECORD

ON
OFF
ON
OFF







CAPACITY
2500
FIREFIGHTERS'
OPERATION

1.4 SCOPE OF WORK

This proposal includes the **supply and installation** of elevator equipment as specified below. Its purpose is to provide a general outline of the required equipment, without detailing specific aspects of design and construction. The following is a summary of the scope of work.

RECOMMENDATIONS FOR MODERNIZATION OF HYDRAULIC ELEVATOR

DIRECT PISTON

ASME A 17.1 – 2019

MACHINE ROOM
1. Replace the controller in compliance with **ANSI A17.1-2019**. The **electro-hydraulic elevator pump motor controller** shall be designed to stop the unit and return it to the lowest stop if the system detects operation on a single contactor or if a software failure causes the hydraulic fluid temperature to exceed the maximum operating limit. This system must be included in the controller's order.
2. Provide a new power unit or hydraulic tank with submerged pump.
3. Provide a new hydraulic control valve.
4. Provide Oil Strainer
5. Provide a Low Oil and temperature Control
6. Supply new hydraulic oil.
7. Check and replace the hydraulic piping.
9. Connect smoke detectors to the control panel.
OVER THE CAB (WELL)
1. Refurbish corridor doors by replacing rollers, eccentrics, slippers, door locking system spring and provide fire slippers.
2. Replace final limits, level limits, and selector system. It must have a safety integrity certification (SIL).
3. Replace the inspection box above the cab. It must provide a receptacle and lighting. It must have a safety integrity certification (SIL). It must have a speed sensor device.

4. Replace the car guides.
5. Provide safety switch to emergency hatch.
6. Replacement of travel cables. The traveling cable must be provided to allow the use of cameras inside the cabin, phone line and communication.
7. Replace wiring inside the shaft and cabin.
9. Replace the door operator. Provide a new 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.
10. Replacing corridor door locks.
11. Provide door restrictor. ✓ The car door must be opened from the outside without the use of a special tool. ✓ If a power supply is used for this system, it shall have a 1hr power supply after the power goes out. This power source will have a monitoring that if the battery is low will have an audible signal. The battery should have a date when it expires. ✓ If the cabin is within the unlocking zone, the cabin door shall open without exerting force from the operator, the operator shall cut off the power.
12. Provide standard car top railing on the outside perimeter of the car enclosure top on all sides where a 300 mm (12 in.) ball can pass between the edges of the car enclosure top and the adjacent hoistway enclosure and on sides where there is no hoistway enclosure.
13. Clean shaft, paint over the cabin and the inside of the corridor doors.
PIT
1. As part of the modernization process for the hydraulic elevator with direct piston, a thorough inspection of the piston will be carried out to verify that its surface is free from scratches, pitting, porosity, or any other defects that could compromise the system's performance or sealing integrity. If any damage is found that cannot be properly repaired, the piston cylinder will be replaced, while retaining the piston rod if it is in acceptable condition according to established technical criteria. Replace the piston seal.
2. Provide an emergency stop button in pit.
3. The modernization of the hydraulic elevator will include the installation of an over-speed valve in the hydraulic line between the power unit and the cylinder, with the aim of enhancing system safety. This valve is designed to detect and respond to an abnormal increase in the downward speed of the car by blocking the flow of hydraulic fluid and stopping the car's movement in the event of a control system failure or significant leak, in

accordance with the requirements established by current regulations.

3. Verify the Plunger Stops - Metal stops and/or other means shall be provided at one end of the plunger and at the packing head end of the cylinder to prevent the plunger from traveling beyond the limits of the cylinder.

4. Reconditioning of cabin springs.

5. Remove the accumulated oil from the pit, ensuring its disposal complies with current regulatory requirements; then perform a thorough cleaning of the area and apply protective paint to the pit.

INSIDE CABIN

1. Replace the car operating panel (COP). Must comply with ADA handicapped law including audible signal, emergency lamp, Phase II fire system, inspection, etc. It must comply with the 2019 Code. The stop switch inside the cab must activate the alarm. A visual signal labeled "EARTHQUAKE MODE" shall be provided on the car push button panel. This may be part of an alphanumeric message display panel.

2. Emergency Communication System - Emergency Communication (Telephones) - Communication systems required by ASME A 17.1-2019 shall be provided including and not limited to the following:
   - ✓ The button that actuates the system must have a telephone symbol.
   - ✓ Must have a panel that displays a message that will be activated by authorized personnel to acknowledge that the call has been connected.
   - ✓ The panel shall display messages that allow communication between authorized personnel and the trapped person. This should include any passenger who is unable to communicate verbally or hear.
   - ✓ An automatic answering system is not allowed to be used. The call must be answered by authorized personnel.
   - ✓ The system must have operating instructions.
   - ✓ A video display must be provided to observe passengers inside the cabin anywhere within the cabin.

   If the building is 60 ft or more, a means of communication must be provided within the building so that emergency personnel can communicate with people trapped inside the elevator. This system should not require the intervention of the person inside the car. A message shall be activated on the communication panel indicating that authorized personnel are in the building. The instructions for the use of the system shall be incorporated in the external location where it is placed.

3. Provide cabin door reopening system (infrared curtain). This component, when detecting an object, shall reopen the cabin and corridor doors. It shall be out of operation when a reduction of the closing kinetic energy is detected. It must meet the requirements of detecting objects within 18 inches and be able to self-monitor, among

other functions. This component shall comply with ASME A 17.1-2019.
4. Provide traveling car lanterns and provide an Audio Voice (verbal announcement) system that indicates floors verbally.
5. The visual and audible signal shall be announced when the elevator is in fire, earthquake, and other modes.
6. Cabin decoration. Decoration materials must comply with ASTM E 84, ANSI/UL 723, CAN/ULC-S102, and ASTM E 648. ALLOWENS $15,000.00 PER CABIN
CORRIDOR
1. Provide ASME A 17.1-2019 compliant corridor pushbutton panels - Include a "Do not use elevators in case of fire" sign. This corridor pushbutton panels must include the system that monitors the telephone line (COMMUNICATION FAILURE). In addition, the corridor push-button panel should be provided with a visual signal labeled "ELEVATOR EMERGENCY POWER". This warns that the elevators are operating on emergency floors. The Phase I Fire text should be red on a contrasting background or vice versa.
2. Provide a sign that indicates, "IN CASE OF FIRE DO NOT USE ELEVATORS, USE STAIRS". The same must be engraved on the pushbutton panel.
3. Provide Braille plaque on door frames and elevator identification number.
4. Provide "Access Switches" on end floors. They can be part of the corridor button panel.
OTHER
1. Provide electrical drawings and manuals of the unit.
2. Perform acceptance tests.
3. Apply for installation permit from the Department of Labor.

1.5 QUALIFICATIONS

A. Owner's approval is required for proposed manufacturer, suppliers and installers products or services upon submission by the Elevator's Company, accompany of a certificate stating the following:

i. The Elevator Contractor is currently and regularly engaged in the installation of elevator equipment as one of its principal products.
ii. The Elevator Contractor shall have five (5) years of successful experience, trained supervisory personnel, and facilities to install elevator equipment specified herein.
iii. The Elevator Contractor shall submit a list of five or more prior building installations where all the elevator equipment he proposes to furnish on this project has performed satisfactorily together under conditions of normal use. The list shall include projects that have been in operation for a period of not less than two years preceding the date of these specifications; include the names and addresses of the building and the names of the administrators.

B. The Elevator 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. The elevator installation shall meet the requirements of the latest editions published and adopted by PROSHA on the date the contract is signed.
B. American Society of Mechanical Engineers (ASME):
A17.1 - Safety Code for Elevators and Escalators - 2019
C. A17.2 - Inspectors Manual for Electric Elevators and Escalators - 2019
D. National Fire Protection Association:
E. .... NFPA 13 - Standard for the Installation of Sprinkler Systems
F. NFPA 70 - National Electrical Code (NEC)
G. .... NFPA 72 - National Fire Alarm and Signaling Code
H. NFPA 101 - Life Safety Code
I. NFPA 252 - Fire Test of Door Assemblies
J. International Building Code (IBC).
K. American Society for Testing and Materials (ASTM):

L. Underwriter's Laboratories (UL)
M. ANSI A-117.1 – Accessible and usable Buildings and Facilities Accessible to, and Usable by, the Physically Handicapped.

1.5 SUBMITTALS

A. Before execution of work, furnish information to evidence full compliance with contract requirements for proposed items. Such information shall include, as required: Manufacturer's Name, Trade Names, Model or Catalog Number, Nameplate Data (size, capacity, and rating) and corresponding specification reference. All submitted drawings and related elevator material shall be forwarded to the Owner.

B. Name of manufacturer, type or style designation, and applicable data of the following equipment shall be provided:

i. Power unit
ii. Controller.
iii. Rupture valve
iv. COP and hall buttons
v. Electric Door Operator; HP, RPM, Voltage, and Ampere rating of motor.
vi. Hoistway Door Interlocks.
vii. Cab Ventilation Unit; HP rating and CFM rating.

1.6 WIRING DIAGRAMS AND MANUALS

A. Provide three complete sets of field wiring and straight-line wiring diagrams showing all electrical circuits of the controller. Maintained one set in the elevator machine room. In the event field modifications are found necessary during installation, diagrams shall be revised to include all corrections made prior to and during the final inspection.

B. Provide the following information relating to the specific type of microprocessor controls installed:
   i. Owner's information manual, containing job specific data on major components, maintenance, and adjustment.
   ii. System logic description.
   iii. 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.

iv. Changes made during the warranty period shall be noted on the drawings in an 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.

C. Provide written information necessary for proper maintenance and adjustment of the equipment prior to final acceptance as follows:
   a. Lubricating instructions and recommended lubricant grade.
   b. Parts catalogs and maintenance manuals.
   c. Include any special tools, passwords and manuals that are required for maintenance, trouble shooting, adjustments or performance of safety tests for the Owner's use.
   d. If the Company requires the Owner to sign a lease for a special trouble-shooting tool, a copy of the agreement, with all costs associated with its use, shall be submitted with the bid.

1.7 WORK SCHEDULE

A. Before starting work submit a detailed work schedule for approval and arrange with owner sequence of procedure, means of access to premises, space for storage, use of approaches, corridors, stairways, elevators, location of temporary partitions, disposal of trash and recyclable materials. No work may begin on any elevator until the materials are available. The availability of storage space should be discussed with the Owner's Representative. The phasing of work on the elevators shall be coordinated with the Owner's Representative.

1.8 SAFETY PRECAUTIONS

A. Elevator Contractor Responsibility: The Elevator Contractor shall assume full responsibility and liability for compliance with applicable codes, standards and regulations pertaining to the health and safety of personnel during execution of the Work and shall hold the Government harmless for any action on the Elevator Contractor's part, or that of the Elevator Contractor's employees or sub Elevator Contractors, that results in illness, injury, or death.

B. First Aid and Emergency Response Requirements: The Elevator Contractor shall provide emergency first aid equipment. Additionally, a 110-pound ABC-rated fire extinguisher should be maintained on-site as well as absorbent material of sufficient quantity to collect any spill which might occur during this project.

C. The Elevator Contractor shall provide for site visitors Personal Protective Equipment (PPE) per OSHA for use during their visits.

D. It shall be the obligation of the Elevator Contractor to maintain a free and clear passageway in each elevator lobby. Parts and tools shall be kept within the confines of entrance partitions. Trash and debris shall be removed daily.

E. The Elevator Contractor shall provide protection, barricades and coverings required by local ordinances, and shall maintain lights and/or signals as a warning during the work; removing the same when completed.

1.9 REMOVAL OF MATERIALS AND EQUIPMENT

A. Material and equipment that are not specified to be reused or retained under contract shall be removed daily from the site at the expense of the Elevator Contractor. The Elevator Contractor shall receive title to all material and equipment not specified to be reused as of date of withdrawal from service. Equipment replaced under this specification will become the property of the Elevator Company. The Elevator Company should be responsible for disposing in the correct way the unused equipment from the premises.

1.10 PERFORMANCE STANDARDS

A. The elevators shall meet the highest standards of the industry and specifically the following:
   i. Contract speed is average 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 three (3) percent.
   ii. 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.
   iii. Starting, stopping, and leveling shall be smooth and comfortable without appreciable steps of acceleration and deceleration.

B. Passenger door operator shall open the car door and hoistway door at 2.5-feet per second and close at 1-foot per second. Freight door operators should open and close at 1 foot 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 support and fastening 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 the machine room shall not exceed 80 db. All dB readings shall be taken three (3) feet off the floor and three (3) feet from the equipment.

F. Airborne Noise: Measured noise level of elevator equipment during operation shall not exceed 50 db in elevator lobbies and 60 db inside car under any condition including door operation and car ventilation exhaust blower on its highest speed.

1.11 WARRANTY

A. The One-Year Warranty and 3-month Guarantee Period of Service shall commence and run concurrently after final inspection, completion of performance test, and upon acceptance of each elevator.
B. During the warranty period if a device is not functioning properly in accordance with specification requirements, more maintenance than the contract requires keeping the device operational, the 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. The warranty shall start anew for such parts from the date of completion of each new installation performed, in accordance with the foregoing requirements.

1.12 POWER SUPPLY

A. Main Line Fused 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.
B. Provide Surge Suppressors to protect the elevator equipment.

1.13 EMERGENCY POWER SUPPLY

A. Emergency power supply, its starting means, transfer switch for transfer of elevator supply from normal to emergency power, two pairs of conductors in a conduit from an auxiliary contact on the transfer switch (open or close contacts as required by Elevator Controller Manufacturer) to terminals in the group elevator controller and other related work shall be provided by the Electrical Elevator Contractor.
B. Upon loss of normal power supply there shall be a delay before transferring emergency power of 10 seconds minimum to 45 seconds maximum, the delay shall be accomplished through an adjustable timing device.
C. The emergency or standby power system shall be capable of operating the elevator(s) with a rated load, at least one at a time.
D. Prior to the return of normal power an adjustable timed circuit will be activated and that will cause all cars to remain on the floor if already there or stop and remain on the next floor if in flight. The actual transfer of power from emergency

power to normal building power shall take place after all cars are stopped on the floor with their doors open.

E. Car lighting circuits shall be connected to the emergency power panel.

1.14 ELEVATOR MACHINE ROOM

A. Reuse the existing machine room and meet the requirements of ASME A17.1, NFPA 70, NFPA 101 and IBC. The elevator hydraulic machine and elevator controller shall be in the same code approved machine room.

1.15 ELEVATOR SERVICE

A. To discover and resolve conflicts or lack of definition which might create problems, Elevator Company must review Contract Documents and site conditions for compatibility with its product prior to submittal of quotation. Review existing structural, electrical, and mechanical provisions for compatibility with the Company's products. The owner will not pay for changes to structural, mechanical, electrical, or other systems required to accommodate the Company's equipment.

B. The Elevator Company shall furnish adequate equipment and use great care in the hoisting and handling of materials and equipment so as not to damage adjacent and existing construction. All damage to the existing building, adjacent structures, walks, drives, and facilities caused by the Company's work shall be repaired by the Company, at no additional cost to the Owner.

1.16 ADDITIONAL EQUIPMENT

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

1.17 ELEVATOR ELECTRICAL REQUIREMENTS

All electrical equipment placement and installation shall be coordinated with the elevator Company and shall not be located until elevator equipment is installed or coordination has been arranged with the elevator Company's equipment placement.

A. **The following items are part of the Owner responsibilities:**

a. GFI Receptacles**:** GFI receptacles shall be required in all elevator machine rooms, machinery spaces and elevator pit areas. ASME A17.1 NEC, 620.23(C) & 620.24(C).
b. Lighting Required in Elevator Machine Rooms**:** Fluorescent light fixtures should be provided in elevator machine rooms (and machinery spaces when present). Lighting shall be adequate to work on all equipment without shadowing. ASME A17.1.
c. Lighting Required in Elevator Pits**:** Four foot, 2 tubes, guarded fluorescent light fixtures shall be required in all elevator pits. The location shall be determined after coordination with the elevator Company so that the light fixture is located out of the way of all elevator equipment. ASME A17.
d. Bulls Eye (Simplex) Receptacles: Bulls eye (simplex) receptacle for Sump pumps (not – GFI) on a designated circuit, shall be required in all elevator pits, for the elevator pit sump pump. ¾-inch conduit is required to the sump pump. *(ONLY IF THE PIT HAS SUMP PUMP)*
e. Main Line Breaker or Disconnect (lockable, fused or breaker, a listed device): Shall be supplied in all elevator machine rooms in sight of elevator motor and controller and adjacent to machine room entry door, one disconnects required for the elevator. A label on the disconnect is required stating the location of the overcurrent protection device. NEC 620-51.
f. Car Lighting Disconnect**:** A separate branch circuit shall supply the car lights, receptacles(s), auxiliary lighting power source, and ventilation on each elevator car. It shall be fused/breaker and lockable and shall be supplied in all elevator machine rooms. One disconnects required for each elevator. A label stating the location of the supply side overcurrent protection device is required on the disconnect. NEC 620.22(A) & 620.51(D).
g. Light outlet for the elevator, pit and machine room, as indicated by your elevator Company.
h. Smoke Hole: Is required floor elevators of 5 stops or more if the machine room has air conditioning.
i. The door to access to machine room must be fire rated 1 1/2hr labeling.
j. Lighting, convenient GFCI outlets, cooling and ventilation of machine room. Machine room temperature to be maintained between 55° F and 90° F (13° C and 32° C) or between manufacturing specifications. Relative humidity to be maintained at 95% or less non-condensing.

k. It requires all machine room, ABC type fire extinguisher. This will be accessible from the door that provides access to these rooms.
l. Elevator Firefighter's Service is required per ASME A17.1 Rule 2.27.3. Elevator Firefighter's Service wiring and interconnections to automatic sprinkler systems or heat and smoke sensing devices furnished by others.
m. Emergency Phone and Data Line: Conduit shall be provided by electrical Company in all elevator machine rooms to the elevator controller. Electrical Company shall provide electrical conduits for both the emergency elevator phone and required data line to the elevator machine room, to the elevator controller, and terminated on the elevator controller with coordination from the elevator Company.

B. **The following will be the Company's responsibilities:**

a. **Electrical Component NEC Clearances:** Clearances around all electrical equipment in the elevator machine room shall comply with NEC 110-26 electrical clearances requirements. The electrician's work and equipment placement shall be coordinated with the elevator Company's equipment placement. NEC 620.5
b. **Electrical Piping Runs:** All electrical piping runs provided by the electrical Company and elevator Company to the elevator equipment shall be run overhead or in a manner which does not restrict access to and around any equipment.

1.18 CONTROL OF SMOKE AND HOT GASES (OWNER RESPONSIBILITIES)

A. When required by the building code, the hoistway shall be provided with means to prevent the accumulation of smoke and hot gases.
B. Where hoistway pressurization is provided, it shall be designed, installed, and maintained so as not to impede elevator operation.

1.19 SUBSTANTIAL COMPLETION

A. Elevator Company:

Notify the Owner's Representative in writing that the project, or designated portion thereof, is substantially complete. Upon completion of the preliminary Elevator Consultant punch list, the Elevator Contractor shall submit the following:

i. Operation and maintenance data.
ii. Guarantees and warranties.
iii. Interfacing information.
iv. Keys and Manuals
v. Electrical Drawings.

1.20 CORRECTION OF INSTALLED DEFECTIVE WORK

A. As part of the warranty, the Elevator Contractor is responsible for the following: Repair or remove and replace defective installation.

a. Restore damaged substrates and finishes.
b. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and proper adjustment of operating equipment.
c. Restore permanent facilities used during construction to their specified condition.
d. Remove and replace damaged surfaces that are exposed to view if the surfaces cannot be repaired without visible evidence of repair.

1.21 CHANGES IN SCOPE AND EXTRA WORK

a. The Owner may at any time make changes to the specifications, omit work, and require additional work to be performed by the Elevator Contractor.
b. Each such addition or deletion to the Contract shall require the Owner and the Elevator Contractor to negotiate a mutually acceptable adjustment to the contract price, and, for the Elevator Contractor to issue a change order describing the nature of the change and the amount of price adjustment.
c. The Elevator Contractor shall make no additions, changes, alterations, or omissions or perform extra work except on written authorization of the Owner.
d. Each change order shall be executed by the Elevator Contractor, Owner, and the Consultant.

PART 2 – PRODUCTS

2.1 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 systems, 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 components 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 key shall have a tag bearing a stamped or etched legend identifying its purpose.

E. Pre-approved Equipment Manufacturers

1. The following manufacturers' equipment and materials have been pre-approved for use on this project.
2. Other equipment not specifically mentioned shall be considered for approval on an individual basis.
3. Certain Original Equipment Manufacturers' equipment is acceptable unless otherwise specified.

    a. Controller –Elevator Controls, TKE, or approved equal.
    b. Hangers, Interlocks and Door Operators - G.A.L., ECI or approved equal.
    c. Fixtures (Car Operating Panel, Hall Push Button) Vandal Resistant MAD, PTL, or approved equal.
    d. Door Protective Device: ICU/Gatekeeper 2000 from Adams Elevator Equipment Company, Juans Model 3D.
    e. Hydraulic Machine –Minesota, Vantage or approved equal
    f. Electrical Traveling Cables - Draka, James Monroe
    g. Guide Shoes– ELSCO or approved equal

h. Intercommunications/Telephones - RATH, Three King, Janus, approved equal.

4. Original Equipment Manufacturers may substitute their own branded equipment subject to the following:

a. All requirements of the specifications are met regarding performance, appearance, serviceability, and support.
b. A full stock of all regular and critical replacement parts required for this project are maintained at a facility near the project site. Any parts not stocked at the above-mentioned facility shall be identified with the location of the nearest source and shall be available for next-day delivery upon demand.
c. All parts and software shall be made available for purchase by a qualified elevator maintenance firm with one-business day delivery without direct Owner involvement.
d. All specialized tools, equipment, software, and passwords required to maintain, repair, adjust the operation, and perform code mandated inspections are provided to the Owner as part of the base installation.
e. Technical support for the product(s) should be available to the Owner's elevator service provider.

2.2 CONDUIT AND WIREWAY

A. Reuse existing ones where possible and provide new conduit and wireway where needed. Install electrical conductors, except traveling cable connected to the elevator, in rigid zinc-coated steel or aluminum conduit, electrical metallic tubing or metal wireways. Rigid conduit smaller than .75 inch or electrical metallic tubing smaller than .50-inch 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 protects self-supporting connections, where approved, from abrasion or other mechanical injury. Flexible metal conduit not less than .375-inch electrical trade size may be used, not exceeding 18 inches in length unsupported, for short connections between risers and limit switches, interlocks, and for other applications permitted by NEC.
B. All conduit 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 conduct and EMT fittings using set screws or indentations as a means of attachment shall not be used.
D. Connect motor or other items subject to movement, vibration, or removal to the conduct or EMT systems with flexible, steel conduits.

2.3 CONDUCTORS

A. Remove existing and provide new conductors, excluding the traveling cables. Conductors shall be stranded or solid coated annealed copper. Multiple conductor cables shall have color or number coding for each conductor. Conductors for control boards shall be in accordance with NEC. Tap connectors may be used on wireways provided they meet all UL requirements.
B. Provide all conduct 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 the size of conductor is not given, voltage and amperes shall not exceed limits set by NEC.
E. Provide grounding equipment. 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.

2.4 TRAVELING CABLES

A. Remove existing and provide new 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. 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 on each traveling cable.
C. Provide shielded wires for the auto dial telephone system within the traveling cable, five (5) pair shielded wires for card readers, one (1) RG-6 Ethernet cable

for Wi-FI, two (2) pair 14-gauge wires for 110 Volt power supply, camara and wire for video display monitor if specified.

D. If traveling cables contact 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.

2.5 PROGRAMMABLE CONTROLLERS FOR HYDRAULIC ELEVATOR

A. Remove existing and provide new 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.
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.

C. Controller Description:
   1. The elevator controller shall utilize a microprocessor-based logic system and shall comply with ASME 17.1-2019 safety code for elevators and escalators. The system shall provide comprehensive means to access the computer memory for elevator diagnostic purposes without need for any external devices and shall have permanent indicators to indicate important elevator status as an integral part of the controller. The elevator control equipment shall be provided such that at least three (3) elevator service companies can maintain the equipment. The controller shall be provided with the capability of in-the field changes for certain variables such as door time. These changes should be stored permanently using non-volatile memory. Thus, if the power to the unit is disconnected, the system will maintain the programmed variables.
   2. Failure of any single magnetically operated switch, conductors, or relay to release in the intended manner; or the occurrence of a single accidental ground or short circuit shall not permit the car to start or run if any hoistway door or gate interlock is UNLOCKED or if any hoistway door or car door or gate contact is not in the position. Furthermore, while on car top inspection or hoistway access operation, failure of any single magnetically operated switch, conductors or relay to release in the intended manner; or the

occurrence of a single accidental ground shall not permit the car to move even with the hoistway door locks and car door contacts in the closed or made position.

3. The controller should be designed in such a way that it recognizes the proper function when a door monitor failure occurs, low oil level, shutdown devices, among others.
4. Provide a motor limit timer function which in the event of the pump motor being energized longer than a predetermined time, shall cause the car to descend to the lowest landing, open the doors automatically and then re-close them and the elevator shall then be rendered unresponsive to any automatic operation car door open pushbutton shall remain operational. Operation may be restored by cycling the power disconnect switch or putting the car on access or inspection operation.
5. Provide a valve limit timer function which in the event of the pump motor being energized longer than a predetermined time, shall cause the car to descend to the lowest landing, open the doors automatically and then re-close them and the elevator will then be rendered unresponsive to any automatic operation car door open push button shall remain operational. Operation may be restored by cycling to power disconnect switch or putting the car on access or inspection operation.
6. Low Oil Control:
    - A low oil control feature shall protect the hydraulic components if the elevator fails to complete its upward journey in the normal time.
    - Actuation of the low oil control circuit shall stop the pump and lower the car to the lowest landing. Power-operated doors should open to permit passengers to depart and should then close. The car door open push button shall remain operational. The car shall remain parked at that landing completely removed from demands for service.
    - To return the car to normal service, the malfunction shall be corrected and the elevator controls reset in the machine room.
7. Provide an out-of-service timer (T.O.S.) which will automatically take the car out of service if the car is delayed in leaving the landing while there are calls existing in the building. The car shall not respond to hall calls while in this mode of

operation.

8. Provide door protection timers for both the open and close directions which will help protect the door motor and which will help prevent the car from getting stuck at a landing. The door-opening protection timer shall cease attempting to open the door after a predetermined time if the door is prevented from reaching the open position. The door-closing protection timer will reopen the doors for a short time if the door-closing attempt fails to close the door locks after predetermined time.
9. Phase Protection: Provide 3-phase power monitor for elevator power supply, which monitors phase loss, low voltage, phase reversal, phase unbalance, and has manual and automatic reset. Level in manual position.
10. Elevator controller is to be factory equipped with provisions for emergency power connections.
11. Duplex selective operation.
12. Automatic Operation of the Car Lighting shall be provided meeting the requirements of ASME A17.1-2019. The Feature shall allow the car lights to be turned off when the following conditions exist for not less than five minutes: the car is on the floor, the doors are closed, there is no demand for service and the car is in automatic operation. Momentary interruption of any of these conditions will cause the car lights to be turned on. The Automatic Operation Feature shall be able to be turned on or off as desired by the owner of the Elevator Controller.
13. The controller shall perform all functions required by ASME A 17.1 -2019.

2.6 HYDRAULIC ELEVATOR

A. Oil Hydraulic Machine: The power unit shall be of a compact, self-contained design including pump, drive motor, oil control unit assembly, oil storage tank, removable drip pans a rigid structural steel frame with storage tank and neoprene vibration isolators.

B. Pump: The pump shall be a positive displacement screw type, for maximum smoothness and quietness and shall be belt drive by the motor. Do not use pumps mounted in the oil and shall be belt driven to the motor.

C. Motor: The drive motor shall be of premium efficiency meeting NEMA 12.6C table and have a duty rating use with hydraulic elevator systems.

D. Oil Control Unit: The oil control unit shall consist of electrically actuated and hydraulically operated valves with adjustments accessible without removing the assembly from the oil lines. An automatic bypass valve shall provide smooth starting and stopping in the up direction and shall give regulated up leveling speed under varying load conditions in the car. The lowering and down leveling valve shall be fully adjustable for smoothness and speed of operation and shall be designed to close automatically if the power fails. Operation of a manual valve shall permit the car to be lowered at slow speed in the event of power failure. A safety check valve shall hold the car when the pump is at rest and a relief valve shall be provided which can bypass the entire output of the pump without increasing the system pressure more than 25% above the normal working pressure. Permanently install a liquid filled pressure gage on oil control unit.

E. Oil Storage Tank: The oil storage tank shall be of sufficient capacity for the full travel of the car with a reserve of not less than 10 gallons and shall have a drain connection, means of isolating oil in the tank for servicing of pump and valves, an effective pump suction strainer and a removable cover. The cover shall be designed for low velocity breathing with a protected vent opening to prevent entry of liquids or debris into the tank. Tanks with single small vent openings shall be guarded against accidental blockage, which may cause collapse of the tank during operation of the elevator in the up direction.

F. Oil: Sufficient specially prepared hydraulic oil with greater than 400 degrees F. flashpoint and of proper viscosity and lubricating qualities shall be provided.

G. Sound Reduction with Isolating Panels and Muffler: In addition to selection of individual components to minimize noise generation, a blow-out proof muffler for absorption of hydraulic pulsations shall be installed in the oil line between the pump and the cylinder, and the hydraulic machine shall be provided with rubber isolation pads to prevent transmission of noise and vibration to the building structure. Sheet steel panels lined with sound- deadening material shall enclose the motor and pump location area of the hydraulic machine for reduction of air-borne noise.

H. All Hydraulic Supply Piping: Shall be at least schedule 40 black steel pipe. The system must be free from seepage at joints. All Hydraulic Supply Piping will be verified. It will include those sections of piping necessary for the new configuration of the hydraulic unit. Shut-Off Valve: Manually operated valves shall

be provided and installed in the oil supply line to isolate the cylinder and plunger unit from the hydraulic machine, if necessary.

I. Shut-Off Valve: Manually operated valves shall be provided and installed in the oil supply line to isolate the cylinder and plunger unit from the hydraulic machine. Provide two valves-one in pit near jack assembly and another one in the Machine Room near machine.

J. Oil Strainer: A self-cleaning strainer shall be provided and installed in the oil line between the hydraulic machine and the cylinder plunger unit to protect the oil control valves during downward travel of the elevator. The strainer shall have a 40-mesh screen for removal of solid particles and a magnetic drain plug for removal of ferrous materials. The strainer assembly shall be constructed for at least 600 psig. working pressure.

K. Isolation Coupling(s): Isolation coupling(s) shall be provided to abate the transmission of noise produced by the vibration of the pumping unit. Proper location of the isolation coupling(s), in the oil delivery line, shall be determined by the elevator subcontractor.

L. Manual Lowering Valve: A manually operated valve, located on or adjacent to the control valves, shall be provided and identified, which permits lowering the car at a speed not exceeding 0.10 m/s (20 ft/min). This valve shall be marked to indicate the lowering position.

M. Anticreep Operation: Each elevator shall be provided with an anticreep operation to automatically correct a change in car level.

2.7 FIREFIGHTER'S SERVICE

A. Provide Firefighter's Service.
   1. Main Floor:
   2. Alt. Floor:
   3. Verify main and alternate floors with owner.
   4. Smoke Detectors: Smoke detection devices that are designated for actuation of Elevator Phase I "FIRE SERVICE" response in each elevator lobby, and machine room shall be NEW by others. **Owner responsibilities**

      i. Elevator lobby smoke detectors shall activate only the elevators sharing the corresponding or common lobby.

ii. An elevator or group of elevators serving separate isolated areas of the same floor shall have an independent smoke detection system.
iii. Machine room smoke detectors shall activate fire recall for each elevator with equipment located in that machine room.

B. If the Phase I Emergency Recall Operation is activated while the elevator is responding to any of the following devices, the car shall return to the recall level:
1. low oil protection
2. Plunger-follower guide protection, provided the car
3. is capable of being moved.
4. auxiliary power lowering
5. oil tank temperature shutdown (
6. If the elevator is incapable of returning to the recall
7. level, the car shall descend to an available floor. Upon
8. arrival, automatic power-operated doors shall open,

2.8 INDEPENDENT SERVICE

A. Provide an INDEPENDENT SERVICE key 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 should 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 the switch is returned to the “OFF" position, normal service shall be resumed.

2.9 LOAD BYPASS OPERATION

A. To automatically delete hallway calls when the car is loaded to its limit. Load bypass operation shall be adjustable from the controller to adjust the load at which to bypass hall calls and not delete them.

2.10 ANTI-NUISANCE FEATURE

A. If the weight in the car is not commensurate with the number of registered car calls, cancel car calls. Systems that employ either load weighing or door protective device for activation of this feature are acceptable.

2.11 SEISMIC REQUIREMENTS

A. Meet the requirements ASME A 17.1-2019 for alteration.
B. Support and maintain hydraulic machines, controllers, supervisory panels, and piping.

2.12 CAR SPRINGS

A. Recondition springs for each car. Securely fasten and support the pit channels and align with striker plates on car and counterweight.

2.14 PLUNGER AND CYLINDER

A. As part of the modernization process for the hydraulic elevator with direct piston, a thorough inspection of the piston will be carried out to verify that its surface is free from scratches, pitting, porosity, or any other defects that could compromise the system's performance or sealing integrity. If any damage is found that cannot be properly repaired, the piston cylinder will be replaced, while retaining the piston rod if it is in acceptable condition according to established technical criteria.

B. Replace the piston seal.

2.15 RUPTURE VALVE

A. Provide an Overspeed Valve. It shall be in the pressure piping within 300 mm (12 in) of the hydraulic jack. Overspeed valve shall be by EECO, Maxton or similar.

The work performed must comply with the following rule.

Hydraulic elevators not provided with car safeties complying with 3.17.2 shall be provided with either (a) or (b).

(a) an overspeed valve(s) conforming to 3.19.4.7

(b) a plunger gripper(s) conforming to 3.17.3, except as modified by (1) and (2)

(1) Requirement 3.17.3.2 applies as modified. The primary actuation means shall be mechanical or hydraulic. Electrical means are permitted as a secondary actuation means.

(2) The plunger gripper shall be capable of withstanding inertia effects of the elevator masses without operational failure when subjected to seismic forces acting separately, as defined in 8.4.13 or 8.4.14, or equal to

(-a) for zone 3 or greater, or $Fp > 0.25Wp$ with $z/h =$ 1 (or $hx/hn = 1$)

(-1) Wplgr horizontally

(-2) $1/2(W\text{plgr} + Wp)$ vertically

(-b) for zone 2 or $Fp \leq 0.25Wp$ with $z/h = 1$ (or hx/hn

= 1)
(-1) 1⁄2*W*plgr horizontally
(-2) 1⁄4(*W*plgr + *Wp*) vertically
where *W*plgr = the weight of the plunger

2.16 GUIDE RAILS, SUPPORTS, AND FASTENINGS

A. Retain existing car guide rails and brackets.
B. Thoroughly clean all guide rails of dust, grease, oil, rust, and other foreign substances. File and remove all rough edges and surfaces and tighten bracket bolts and guide clips for smooth and quiet operation of car.
C. Elevator Contractor may provide new roller guide assemblies, of equal or greater quality, in lieu of rebuilding the existing, as part of the base bid subject to the approval of the Consultant. Costs associated with replacement shall also be included in the base bid cost.

2.17 NORMAL AND FINAL TERMINAL STOPPING DEVICES

A. Mount new 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 125 percent of rated elevator capacity at any speed obtained in normal operation.
    2. Switches, when opened, shall permit the operation of the elevator in the reverse direction of travel.
B. Mount new final terminal stopping switches in the hoistway.
    1. Switches should be positively open 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 the hoist motor, apply hoist machine brake, and prevent operation of car in either direction.

2.18 CROSSHEAD DATA PLATE AND CODE DATA PLATE

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

2.19 WORKMAN'S LIGHTS AND OUTLETS

A. Provide new duplex GFCI protected type receptacles and lamps with guards on top of each elevator car. The receptacles shall be in accordance with NEC, rated as 15 amperes and 125 volts.

2.20 CARTOP OPERATING DEVICE

A. Provide a new 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 continuous pressure on the 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.

2.21 CAR LEVELING DEVICE

A. Car shall be equipped with a new 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.

2.22 EMERGENCY STOP SWITCHES

A. Provide an emergency stop switch, push to stop/pull to run, for the top-of-car device, pit, machine space, service panel and firefighter control panel inside the elevator. Mount stop switches in the pit adjacent to pit access door, at top of the pit ladder 1220 mm (48 in.) above the bottom landing sill and 1220 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.

2.23 MAIN CAR OPERATING PANEL

A. Provide a new main car operating panel in the car enclosure on the front return panel for passenger elevators. The top floor car call push button shall not be more than 1220 mm (48 in.) above the finished floor. Car call push buttons and indicator lights shall be LED illuminated, round with a minimum diameter of 25 mm (1 in.). 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.

B. One-piece tilt 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 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 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.
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 contrasting the freight loading class and the 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 maintain 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 167.6 mm (66 in.) minimum to 1830 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. Key operated Independent Service Switch or toggle switch inside service panel.
    8. 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 light when activated. When activated, the door shall stay open for a maximum of one minute. To override the hold timer, push the car call button or door close button.
    9. 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.

10. 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.
11. Red Emergency Alarm button that shall be located below the car operating buttons. Mount the emergency alarm button not lower than 888 mm (35 in.) above the finished floor. It shall be connected to audible signaling devices. Provide audible signaling devices including the necessary wiring.
12. Emergency Help push button shall activate two-way communications by Auto Dial telephone system that is compatible with the Recuse Entity telephone system. The 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”.
   5. Two-position toggle switch labeled “Independent Service” with its positions marked “ON” and “OFF”.
   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”.

2.24 AUDIO VOICE SYSTEM

A. Provide a 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 loudspeaker, 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 a list of voice messages.

1. Fire Service Message.
2. "Please do not block doors".
3. Seismic Operation.
4. Others

2.25 CAR EMERGENCY SIGNALING DEVICES

A. Furnish and install a complete ADA compliant auto dial telephone.

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.

A means of communication shall be provided in or adjacent to a car operating panel. **The push button shall be visible and permanently** identified with the "PHONE" symbol (see 2.26.12.1). The identification shall be on or adjacent to the phone push button. The communications mean shall be initiated when the push button is actuated.

C. On the same panel as the phone a message shall be displayed push button that is activated by authorized personnel to acknowledge that communications are established. The message shall be extinguished permitted to be where necessary to display a new message [see 2.27.1.1.3 (d) and (e)] or when the communications are terminated.

D. On the same panel as the phone push button, messages shall be displayed which permit authorized personnel to communicate with and obtain responses from a trapped passenger(s) including a passenger(s) who cannot verbally communicate or cannot hear.

E. On the same panel as the phone push button a message shall be displayed that is activated by authorized personnel to indicate when help is on the way. The message shall continue to be displayed until a new message is displayed [see 2.27.1.1.4 (c)] or the communications are terminated.

F. A means to display videos to observe passengers at any location on the car floor to authorized personnel for entrapment assessment shall be provided.

G. Operating instructions shall be incorporated with or adjacent to the means of communication outside the car. Instructions shall conform to 2.27.7.3.

2.26 CORRIDOR OPERATING DEVICES

A. Provide new 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 15- to 48 inches above the corridor floor.

C. Elevator Corridor Call Station Pictograph shall be engraved on 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 by 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 .030 inch on the plate, square or rectangular. Use 6 mm (.25 in.) letters to identify all other devices in the faceplate. Surface mounted plates are not acceptable.

F. 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.

G. The direction of each button shall be legibly and indelibly identified by arrows not less than 12.5 mm (.50 in.) high on the face of each button.

H. Landing push buttons should 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.

I. Provide a separate fixture above the hall button fixture for emergency power indicator light, fire service recalls key switch and indicator light, fire recall instruction, communication failure light, communication audible enunciator, and reset key switch at the designated main floor.

J. Remove old fixtures, repair, and refinish walls.
K. Submit design of hall pushbutton fixtures for approval.
L. Remove old fixtures, repair, and refinish walls.

2.27 CAR LANTERN

A. Provide elevators with new car lantern indicators mounted on the car door entrances.
B. Provide means to indicate direction of elevator travel in response to a call. Lanterns shall light with the door open movement and shall stay lit until doors begin to close. Audible signal shall sound when the lantern is lit and shall sound once for up travel and twice for down travel.
c. Remove old fixtures, repair, and refinish walls.

2.28 HOISTWAY ACCESS

A. Provide new hoistway access switches for elevators at the top terminal landing to permit access to the top of car, and at bottom terminal landing to permit access to pit. Elevators with side slide doors, mount the access key switch 1830 mm (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. 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.
E. Provide emergency access for all hoistway entrances, keyways for passengers and service elevators.

2.29 HOISTWAY ENTRANCES: PASSENGER ELEVATORS

A. Verify the existing entrance frames. Hoistway doors and Door frames should be stainless steel plated.
B. Clean and reuse existing hoistway sills, hanger supports, strut angles, fascia plates and toe guards.
C. Replace all damaged or missing dust covers.
D. Refurbish corridor doors by replacing rolls, eccentrics, slippers including fire retainer and yo-yo's.

E. Provide new hardware, tracks, gibs, separate fire gibs, door rollers, door locks, drive roller assemblies and still mounted closes.
F. Provide **Braille plates** on both sides of door frame entrances located 152.3 cm (60 in.) to center above finished floor. Replace damaged or missing Braille plates.
G. Provide **unique car numbers** on every elevator entrance at designated main fire service floor level, minimum 76 mm (3 in.) in height.
H. Equip each hoistway entrance with a new **electrical/mechanical interlock**, functioning as a hoistway unit system, to prevent operation of cars until all hoistway doors are locked in closed position.
I. Wiring installed from the hoistway riser to each door interlock shall be NEC type SF-2 or equivalent.
K. **Provide door restrictor and door monitor.**

2.30 CAR GUIDES

A. Install four new adjustable roller guides, 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 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 metal sheet guards to protect rollers on top of cars.
D. 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. A test for this balanced condition shall be witnessed at the time of final inspection.

2.31 CAR FRAME: PASSENGER ELEVATORS

A. Reuse the existing car frame. Tighten bolts and replace missing bolts.

2.32 CAR PLATFORM: PASSENGER ELEVATORS

A. Provide a platform guard (toe guard) of not less than 12-guage sheet-steel on the entrance side, extending 76 mm (3 in.) beyond each side of the entrance jamb. Securely brace platform guard to car platform and bevel bottom edge at a 60-75-degree angle from horizontal. Install the platform in the hoistway, so that the clearance between front edge and landing threshold shall not exceed 32 mm (1.25 in.).

2.33 CAR ENCLOSURE: PASSENGER ELEVATORS

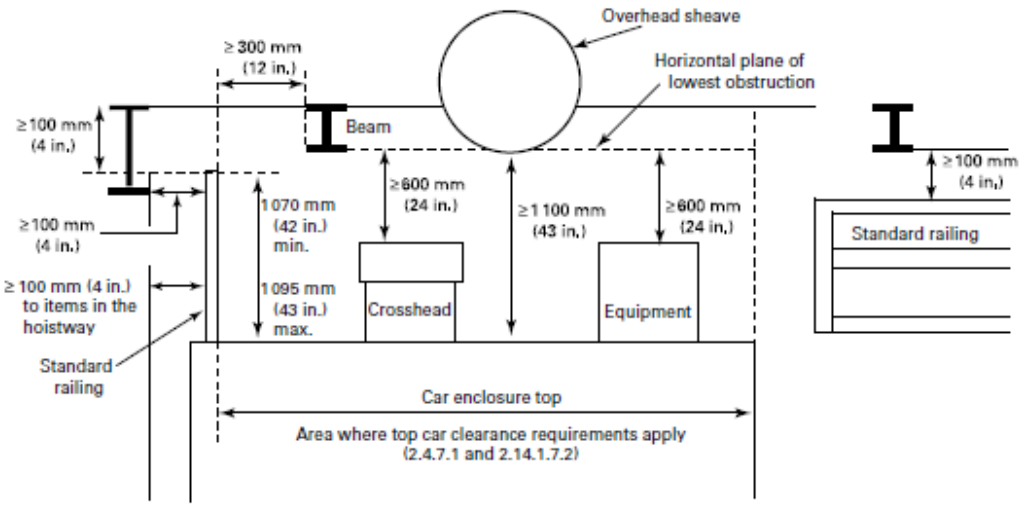
A. Front return wall panel, entrance columns, entrance head-jamb and transom shall be 14-gauge stainless steel. Transom shall be full of cabs. Side and rear walls shall be constructed of 14-gauge cold rolled steel. Coat exterior of walls with mastic sound insulation material approximately 2.5 mm (.09375 in.) thick followed by a prime coat of paint.
B. The side and rear walls of passenger elevators may have raised panels covered in fire rated materials approved for use in elevator interior.
C. Side and rear walls of service elevators, up to the center line of the top handrail, shall be covered with stainless steel. The side and rear walls to the ceiling shall be covered with high pressure plastic laminate panels.
D. Provide car top railings.
E. Provide a hinged top emergency exit cover. Exit shall be unobstructed when open and shall have mechanical stops on the cover. Provide an exit switch to prevent operation of the elevator when the emergency exit is open.
F. Lighting for passenger/service elevators:
G. Provide a hanging ceiling frame.
H. Provide LED illuminated car light fixtures above the ceiling panels. Maintain a minimum light level of 50-foot candles at 914 mm (36 in.) above the finished floor.
I. Provide car enclosure with two sets of handrails with centerlines 762 mm and 1067 mm (30 in. and 42 in.) above the car floor.
J. Provide car door and new hardware, tracks, gibs, separate fire gibs, gate switch, door drive clutch assemblies and door restrictor.
K. Provide one set of protective pads for service elevators of sufficient length to completely cover two sides, rear walls and front return of the 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. Provide stainless steel pad buttons or hooks, spaced at intervals of not more than 457 mm (18 in.) to adequately support pads.
L. Provide an exhaust fan.
M. Provide flooring.

THE OWNER WILL CHOOSE THE DECORATION IN ITS ENTIRETY. WHAT IS PRESENTED HERE IS A GUIDE.

2.34 TOP OF CAR STANDARD RAILING

A. **Top Rail.** The top rail shall have a smooth surface, and the upper surface shall be located at a vertical height not less than 1 070 mm (42 in.) and not more than 1 095 mm (43 in.) from the working surface.

Figure G-1 Top-of-Car Clearance Requirements (2.4.7.1 and 2.14.1.7.2)



452

2.35 POWER DOOR OPERATORS: PASSENGER ELEVATORS

A. Provide a new 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 open the car door and hoistway door simultaneously, at a speed up to 76.2 cm (2.5 ft) per second. The closing speed of the doors shall be 305 mm (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 38 mm (1.50 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 the car until doors are closed unless the car is operating in a 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. Units shall function when the doors are not closed, except during firefighters' operation.
D. Should the doors be prevented from closing for more than a predetermined adjustable interval of 15 to 30 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 doors with the "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 opening time.

2.36 HOISTWAY DOOR INTERLOCK

Replace hoistway door locks. The hoistway door locks shall comply with all applicable requirements of **ASME A17.1-2019**, specifically those outlined in **Section 2.11** regarding locking and interlocking devices. The locks must be certified and designed to prevent the hallway door from opening unless the elevator car is properly positioned at that landing, and to ensure the door is securely closed before the car is permitted to move. The locking devices shall be **fully compatible with the proposed door operator**, both electrically and mechanically, allowing proper and secure engagement with the door clutch mechanism. Locks shall be designed for heavy-duty operation, vandal resistance, and easy inspection and maintenance, and shall meet all safety, retention force, and redundancy requirements as applicable.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine the work of other trades on which the work of this section depends. Report defects to the owner in writing that may affect the work of the Elevator Contractor.

B. Examine machine room for proper illumination, ventilation, electrical equipment, and beams are correctly located complete with access stairs and door.

C. Before fabrication, take necessary job site measurements. Check measurement of space for equipment and means of access for installation and operation. Obtain dimensions from site for preparation of submittals.

D. Work required prior to the completion of the elevator installation:
   a. Supply of electric feeder wires to the terminals of the elevator control panel, including circuit breaker.
   b. Provide light and GFCI outlets in the elevator pit and machine room.
   c. Furnish electric power for testing and adjusting elevator equipment.
   d. Furnish circuit breaker panel in machine room for car and hoistway lights and receptacles.
   e. Supply power for cab lighting and ventilation.
   f. Machine room enclosed and protected from moisture, with self-closing, self-locking door, and access stairs.
   g. Provide a fire extinguisher in the machine room.

E. ACCEPTABLE ELEVATOR INSTALLERS

Acceptable installers: Subject to compliance with the requirements specified herein, installers offering products approved by the owner are limited to the following listed companies. The elevator installer for the project must provide the equipment as specified.

a. Otis Elevator Co.
b. Schindler Elevator Inc.
c. TKE Elevator.

3.2 ARRANGEMENT OF EQUIPMENT

A. Arrange equipment in the 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 Trained Mechanic and Apprentices to the best possible industry standards. Details of the installation shall be mechanically and electrically corrected. 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 Elevator Contractor's work. All new holes in concrete shall be drilled.
C. Structural members shall not be cut or altered. Work in a 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. On completion, all work shall be thoroughly cleaned and delivered in perfect unblemished condition.
E. Sleeves for conduct 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. Clean machine room and equipment.
B. Perform hoistway clean down.
C. Prior to final acceptance remove protective coverings from finished or ornamental surfaces. Clean and polish surfaces regarding type of material.

3.5 PAINTING AND FINISHING

A. All equipment shall be painted one coat of approved color, conforming to manufacturer's standard.
B. Hoist machine, motor, shall be factory painted with manufacturers’ 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 hoisting machine, controller, governor, main line shunt trip circuit breaker, safety plank, and crosshead 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 Elevators:
    1. Door panels, except stainless steel surfaces, 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. Elevator Cabs for Passenger Elevators:
    1. Interior and exterior steel surfaces shall be given rust resistant treatment before the 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.
H. Elevator Cabs for Passenger:
    1. Interior and exterior steel surfaces shall be given rust resistant treatment before the 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.

3.6 ELEVATOR GUARANTEE PERIOD OF SERVICE: MAINTENANCE SERVICE

A. Furnish complete maintenance service on each elevator installation for a period of one (1) year after completion and acceptance of each elevator in this specification by the Owner. This maintenance service shall run concurrently with the warranty. Maintenance work shall be performed by Elevator Mechanics and Apprentices.
B. This contract will cover full maintenance including emergency callback service, inspections, and servicing the elevators listed in the schedule of elevators. The Elevator Contractor shall perform the following:
    1. Monthly systematic examination of equipment.

2. During each maintenance visit the Elevator Contractor shall clean, lubricate, adjust, repair, and replace all the parts necessary to keep the equipment in new condition and proper working order.
3. Furnishing all lubricants, 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. Equalizing tension, shorten or renew hoisting ropes.
5. 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, signal system, car safety device, governors, tension sheaves, and buffers shall be cleaned, lubricated and adjusted.
6. Guide rails, overhead sheaves and beams, counterweight frames, and the bottom of platforms shall be cleaned every three months. Car tops and machine room floors should 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 Elevator Contractor.
7. Always maintain smooth starting and stopping and accurate leveling.

C. Provide 24-hour emergency callback service that should consist of promptly responding to calls within two hours for emergency service should a shutdown or emergency development between regular examinations. Overtime emergency call-back service shall be limited to minor adjustments and repairs required to protect the immediate safety of people and equipment in and about the elevator.

E. Service and emergency personnel shall report to the Owner or his authorized representative upon arrival at the building 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 Owner or his authorized representative.

F. The Elevator Contractor shall maintain a logbook in the machine room. The log shall list the date and time of all 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.

3.7 BIDDER’S QUALIFICATIONS

Each bidder must submit literature of the equipment it intends to furnish. Bids submitted without the equipment’s literature will not be considered. To qualify

each bidder, they must submit a list of clients to whom similar work has been performed in the last ten years. The list must include names, addresses and the contact person telephone number, for each job.

- - - E N D - - -