

SECTION 14270 - ELECTRIC SERVICE ELEVATORS
CONSTRUCTION STANDARD

PART 1: GENERAL

1.01 Summary

Section Includes:

1. Electric traction service elevator system.
2. Passenger cab, interior finishes, control panel and facings including cab doors.
3. Fire rated hoistway doors, sills, and frames.
4. Guide rails and brackets, hoisting cables, brake, safety and governor, and counterweights.
5. Pit buffers.
6. Motors, variable voltage variable frequency drive, microprocessor type control system, power supply, and accessories.

1.02 Related Sections:

1. Construction Facilities and Temporary Controls: Temporary power supply.
2. Cast-in-Place Concrete: Reinforced concrete shafts.
3. Unit Masonry System: Masonry for fire rated shafts and hoistway openings.
4. Structural Steel: Structural hoist, divider, and sheave beams and other steel items.
5. Metal Fabrications: Pit ladder and accessories.
6. Plumbing Fixtures: Pit drainage.
7. Panelboards: Electrical power to the machine room including main switch and breaker. Heat and smoke sensing devices.

1.03 Work Required by Other Sections:

1. The contractor shall coordinate all work required by latest applicable codes including fire and smoke rated hoistway enclosures, pits, shaft venting, operable fire alarm systems, etc.
2. The machine room shall be enclosed and conditioned per the elevator manufacturer's required tolerances and have temporary power available for installation work.

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3. Crane service shall be provided for the hoisting of the machine room equipment.
4. All structural beams and rails shall be in place.
5. The elevator pit shall include ladder, guarded light, GFI receptacle and sump pump with cover. Light and sump pump shall each be on separate dedicated circuits.
6. The elevator controls shall include two inputs from the emergency electrical system. One input shall be from a set of Form C contacts , which shall change state when electrical system has switched to emergency operation. A second input shall be from a set of normally open contacts, which shall close 0-50 seconds prior to any controlled change of the emergency electrical system and shall open after the change. This input shall be designated as the pre-transfer signal.

1.04 References

1. American Architectural Manufacturers Association (AAMA):
 - a. AAMA 607.1: Voluntary Guide Specification and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum.
2. American Society of Mechanical Engineers (ASME):
 - a. A17.1: Safety Code for Elevators.
 - b. A17.2.1: Inspector's Manual For Elevators.
3. American Plywood Association (APA): Product Guide-Grades and Specifications.
4. American Society for Testing and Materials (ASTM):
 - a. A36: Structural Steel.
 - b. A167: Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
 - c. A325: High Strength Bolts for Structural Steel Joints.
 - d. A446: Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.
 - e. A480: General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip.
 - f. A490: Quenched and Tempered Alloy Steel Bolts for Structural Steel Joints.
 - g. A500: Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.
 - h. A501: Hot-Formed Welded and Seamless Carbon Steel Structural General Requirements.
 - i. B138: Manganese Bronze Rod, Bar, and Shapes.

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- j. B209: Aluminum-Alloy Sheet and Plate.
- k. B221: Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.Tubing.
- l. A525: Steel Sheet, Zinc Coated (Galvanized) by Hot Dip Process, m. C1048: Heat Treated Flat Glass-Kind HS, Kind FT, Coated and Uncoated Glass.

5. National Electrical Manufacturer's Association (NEMA):

- a. FS L-P-508: Plastic Sheet, Laminated, Decorative, and Nondecorative.
- b. LD-3: High Pressure Decorative Laminates.
- c. MG1: Motors and Generators.
- d. PS-1: Construction and Industrial Plywood.

6. National Fire Protection Association (NFPA):

- a. NFPA 70: National Electrical Code.
- b. NFPA 80: Fired Doors and Windows.

7. Texas Department of Licensing and Regulation (TDLR):

- a. Texas Accessibility Standards (TAS).

8. Other:

- a. MIL-L-1914: Lumber and Plywood, Fire Retardant Treated.
- b. AWS D1.1: Structural Welding Code.
- c. AISC-Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings.
- d. ANSI/IEEE 519: Electrical harmonic requirements.

1.05 System Description

1. Characteristics of Elevator No. (#) as follows:

- a. Type: Electric geared traction. (Select One: Top mounted machine room or Offset mounted machine room.)

- b. Control:

- 1. General Supervisory:

- The supervisory control operation shall be microprocessor based and software oriented. The system shall operate in real time and continuously analyze each car's changing position, condition, and workload. The microprocessor shall continuously scan the system for hall calls. When the hall calls are registered, the control system shall instantly calculate the estimated time of arrival for each car to each assigned hall call. The following factors shall be used in calculating the estimated time of arrival; number of floors to travel from the current position, the time it takes to travel one floor at top speed, calls assigned to a car, and car reversal time to respond to a call in the opposite

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direction of travel. An internal constant shall be set, requiring a maximum time for a car to respond to a call. When a car's status changes or additional hall calls are registered, the estimated time of arrival shall be recalculated and calls reassigned if necessary.

2. Traffic Pattern:

The microprocessor shall provide flexibility to meet well-defined patterns of traffic such as up peak, down peak, and heavy interfloor demands and still adjusts for the many indeterminate variations in these patterns, which occur in buildings.

3. Load Weighing Device:

Each car shall be provided with a load weighing device which, when the particular car is filled to an adjustable percentage of the capacity load, shall cause the car to bypass the landing calls but not the car calls. These passed landing calls shall remain registered for the next following car. The device shall be unaffected by the action of compensating chain or rope. A suitable sensor shall accurately measure the weight of the car. This information shall be inputted into the elevator controller. The device shall be capable of detecting an approximate 15-pound load change under all conditions.

4. Anti-Nuisance Call Control:

The microprocessor control system shall evaluate the number of people on the car and compare that value to the number of car calls registered. If the number of car calls exceeds the number of people by a field programmable value, the car calls shall be canceled after the first call has been answered.

5. Position Selection:

The position selector shall be part of the microprocessor system. The car position in the hoistway shall be digitized through a primary position encoder. The microprocessor control system shall store the floor the position and slowdown points in memory.

6. Motion Control:

The drive control system shall be a system based primarily on car position. The velocity profile shall be calculated by the microprocessor control system producing extremely smooth and accurate stops. The velocity encoder shall permit continuous comparison of machine speed to the velocity profile and to actual car speed. This accurate position/velocity feedback shall permit a fast and accurate control of acceleration and retardation.

7. Door Standing Time Saver:

The system shall be capable of resetting the door open time upon interruption of the electronic detector prior to the expiration of the initial door open time.

- a. Power Characteristics: For elevator drive apparatus: (##) HP, 480 Volt, three-phase 60 Hz. For lighting: 120 Volt, 60 Hz.
- b. Drive System: Variable voltage variable frequency (VVVF).
- c. Rated Net Capacity: (#####) lbs. (#####kg).

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- d. Rated Speed: (###) ft/min (.##m/s).
 - e. Car Interior Dimensions: (#'-# ") wide x (#'-#") deep.
 - f. Cab Height: (#'-#").
 - g. Cab Clear Ht. to suspended ceiling: (#'-#").
 - h. Hoistway and Cab Entrance Frame opening size: (#'-#") x (#'-#").
 - i. Door Type/Operation: Select one: center opening, single slide; center opening, two speed; single slide; single slide, two speed.
 - j. No. of Stops: Number (#) stops; Travel distance: (#'-#").
 - k. No. of Openings: Number (#); (#) at front and (#) at rear.
2. Operation (Select one):
- a. Simplex Collective.
 - b. Duplex Collective.
 - c. Group microprocessor controlled demand allocation.
3. Programmable controls shall allow: When car without registered car calls arrives at floor where both up and down calls are registered, initially respond to hall call in direction of travel. If no car or hall call is registered for future travel in that direction, respond to hall call in opposite direction.
4. Hall lanterns:
- a. A stainless steel vandal proof hall lantern with an audible signal shall be installed at each landing entrance for each elevator. The lanterns, when illuminated, shall indicate the elevator car, which shall stop at the landing and in which direction the car, is set to travel.
5. Door Operation and Control Features:
- a. A direct current motor driven **heavy-duty** operator. Operator shall be compatible with **MCE** Controller and adjustable without the use of proprietary tools. The system shall be designed to operate the car and hoistway doors simultaneously. Door movements shall be electrically cushioned at both limits of travel and the door operating mechanism shall be arranged for manual operation in the event of a power failure. A door protection system using microprocessor controlled infrared light beams (Janis or Microscan or equal) shall be provided. The beams shall project across the car opening detecting the presence of a passenger or object. If door movement is obstructed, the doors shall immediately reopen. A mechanical reopening device shall not be provided. Doors shall automatically open when the car arrives at the landing and shall automatically close after an adjustable time interval or when car is dispatched to another landing. Direct drive geared operators, A.C. controlled units with oil checks, or other deviations of these are not acceptable.
 - b. If the electronic detector is activated when the doors are closing and the doors are more than one-third closed, they shall reverse direction and open only partially. The doors shall begin to reclose when the electronic detector

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is deactivated. The doors shall reopen fully if the electronic detector is activated longer than a fixed time.

c. Nudging:

The doors shall remain open as long as the electronic detector senses the presence of a passenger or object in the door opening. If the door movement is obstructed longer than a field programmable time value, a buzzer shall sound and the doors shall close at a reduce speed.

d. The current door hold time shall be changed to a shorter field programmable time when the door protection system is activated.

e. The microprocessor control system shall provide separate timers for car call door hold open time and hall call door hold open time. The door hold open times shall be field programmable.

6. Electric limit switches shall be placed in the hoistway near the terminal landings and be designed to cut off the electric current and stop the car should it run beyond either terminal landing.
7. The elevator shall be provided with a self-leveling feature that will automatically bring the car to the floor landings. This feature shall be entirely automatic and independent of the operating device and shall correct for overtravel or undertravel. The car shall be maintained level with the landing irrespective of the load.

1.06 Fireman's Service

1. Provide "Firefighter's Operation" in accordance with the latest ASME A17.1.
 - a. Interconnect elevator control system with building fire alarm, and smoke alarm system.
 - b. Designated Landing: Egress Floor.
2. Seismic Design: In accordance with applicable code.

1.07 Independent Service

1. Provide "Independent Service Switch" in service cabinet in car. Toggle switch activation will remove that car from normal operation and cancel all pre-registered car calls and hall calls for that car.
2. Car will respond to selected floor. Car will not respond to any calls from hall call buttons. Car will only respond to calls placed on the car-operating panel. Doors will remain open at last landing requested. Doors will close with a constant pressure on "DOOR CLOSE" button.
3. Toggle switch activation to normal will return car to normal operation.

1.08 Emergency Operation

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1. Interconnect elevator control system with building emergency electrical supply.
 - a. In the event of a normal power failure, the elevator system shall be designed to operate from the emergency electrical supply. The elevator controls shall receive an input indicating that the electrical supply is from the emergency source. The elevator controls shall then allow one unit at a time to be lowered to the egress level, open the doors, and become inactivated.
 - b. After all of the elevators have been lowered and become inactivated, one selected unit shall resume operation on the emergency electrical system. In the event that the selected unit fails, after a set time delay the next elevator in line shall assume operation.
 - c. The elevator controls shall include two inputs from the emergency electrical system. One input shall be from a set of (Form "C") contacts, which shall change state when the electrical system has switched to emergency operation. A second input shall be from a set of normally open contacts, which shall close 0-50 seconds prior to any controlled change of the emergency electrical system and shall open after the change. This input shall be designed as the pre-transfer signal. This may not be used at the time of installation of the equipment but must be available for future use.
 - d. Once normal power is restored, the elevator controls shall return all units to normal operation.

1.09 Submittals For Review

1. Provide a signed copy of The University of Texas ENVIRONMENTAL HEALTH AND SAFETY CONSTRUCTION SITE PROCEDURES FOR CONTRACTORS, prior to commencement of any work
2. Submit under provisions established in the project specifications, Division One requirements:
 - a. Shop Drawings: Include following information:
 1. Motor, brake, drive system, valves, controller, selector, governor, and other component locations.
 2. Car, machine beams, guide rails, buffers, wire ropes, counterweights and other components in hoistway.
 3. Rail bracket spacing and maximum loads imposed on guide rails requiring transfer to structure.
 4. Individual weight of principle components and load reactions at points of support.
 5. Loads on hoisting beams.
 6. Clearances and over travel.
 7. Locations of components in machine room. Show arrangement so that moving elements and other equipment can be removed for repairs without disturbing other components. Arrange equipment for clear passage through doors and access doors.

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8. Location in hoistway and machine room of connections for car light and telephone.
9. Locations of access doors, doors, and frames.
10. Expected heat dissipation of elevator equipment in machine room.
11. Electrical characteristics and connection requirements.

3. Samples: Illustrate cab interior finishes and car and hoistway door and frame finishes.

1.10 Submittals at Project Closeout

1. Contract Close-out: Procedures for submittals.
2. Furnish two copies of bound maintenance manuals for each elevator. Include full maintenance and operating instructions, parts list, recommended spare parts, emergency parts inventory, sources of purchases and wiring diagrams.
3. Include legible schematic of all wiring diagrams of installed electrical equipment and changes made in the Work. List symbols corresponding to identity or markings on machine room and hoistway apparatus.
4. Provide two copies of master electric schematics and one copy of lubrication chart.
5. Tools, electrical prints, parts catalogs, keys, door keys, protective cab pads and other proprietary components shall be turned over to The University of Texas Utilities Service Elevator Inspection Department, upon final inspection of the elevator.

1.11 Quality Assurance

1. Perform Work in accordance with the latest ASME A17.1, AWS D1.1, NFPA 70, AISC, and as supplemented in this section.
2. Fabricate and install door and frame assemblies in accordance with NFPA 80 and UL 10B.
3. Qualifications:
 - a. Contractor:
 1. Maintain a warehouse and maintenance service in the City of Austin, Texas.
 2. Minimum (5) years, prior to bid date of this project, in the business of providing elevator service and having warehouse facilities.
 3. Maintain in Austin, Texas an adequate stock of parts for emergency and replacement purposes.

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4. Qualified personnel available at Austin, Texas to insure fulfillment of maintenance and/or repair service on a 24-hour emergency call basis.

b. Installer: Employees and supervisor on payroll of elevator equipment manufacturer.

c. Equipment: Manufactured and guaranteed by the selling company; manufactured in its entirety (exclusive of cabs and doors) by the designer and manufacturer.

d. Parts, accessories, and appurtenances: Erected, installed, adjusted, tested and placed in operation by competent mechanics skilled in this work and under the direct control and supervision of the Installers experienced foreman.

1.12 Regulatory Requirements

1. Conform to the latest ASME A17.1 code for manufacture and installation of elevator system.
2. Conform to State of Texas Accessibility Standards for provisions for the disabled.
3. Products Requiring Electrical Connection: Listed and classified by Underwriters' Laboratories, Inc.

1.13 Warranty

1. Contract Close-out.
2. Correct defective Work within a one-year period after Date of Substantial Completion.
3. Warranty: Include coverage for elevator operating equipment and devices.

1.14 Maintenance Service

1. Contract Close-out.
2. Provide, service and maintenance of elevator system and components for Ninety Days (90) from Date of Final Acceptance of last elevator.
3. Examine system components Semi-monthly. Clean, adjust, and lubricate equipment.
4. Include systematic examination, adjustment, and lubrication of elevator equipment. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original equipment. Replace wire ropes when necessary to maintain the required factor of safety.

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- a. Include monthly Fire Service, and emergency light Inspections and test.
 - b. Include Hoistway sills and Car sills.
 - c. Include elevator cab handrails.
5. Perform work without removing cars during peak traffic periods.
 6. Maintain in Austin, Texas an adequate stock of parts for replacement or emergency purposes. Have personnel available to ensure the fulfillment of this maintenance service on a 24-hour emergency call basis for this maintenance period.
 7. Perform maintenance work using competent and qualified personnel under the supervision and in the direct employ of the elevator manufacturer.
 8. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

1.15 Extra Materials

1. Contract Close-out.
2. Supply three extra keys for each keyed switch.
3. Submit two (2) copies of bound maintenance manual for each elevator to Owner. Include full maintenance and operating instructions, parts lists, recommended spare parts, emergency parts inventory, sources of purchases and wiring diagrams. Turn over to the owner for their use, all service tools and diagnostic devices required for adjusting and trouble shooting purposes. Include updates or modifications of test equipment for 10 years.

PART 2: PRODUCTS

2.01 Manufacturers

1. Contract Documents are based on (List Model #) by (List Company).
2. Equivalent products by the following are acceptable:
 - a. Motion Control Engineering
 - b. Thyssen/Dover
 - c. KONE Inc.
 - d. Tejas Elevator
 - e. United Technologies Otis Elevator Company.
 - f. Schindler Elevator Corp.
 - g. Elevator Products Corp
 - h. Innovation Industries Corp
 - i. Hollister Whitney Elevator Corp.
 - j. PTL Car & Hall Fixtures

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k. Owner approved equal.

3. Substitutions: Under provisions established in the project specifications, Division Two requirements.

2.02 Materials

1. Steel:
 - a. Shapes: ASTM A 36, ANSI A17.1.
 - b. Sheet: ASTM A 446, galvanized, stretcher leveled, Commercial Grade.
2. Stainless Steel: ASTM A 167, Type 302 or 304, No. 4 satin/brushed finish.
3. Aluminum: Anodizing quality.
 - a. Extrusions: ASTM B 221.
 - b. Sheet: ASTM B 209, alloy 6063.
4. Plywood: APA Structural I, Grade C-D, sanded.
5. Plastic Laminate: NEMA LD-3, General Purpose Type.
6. Paints:
 - a. Primer for steel: Red Oxide.
 - b. Primer for wood: Alkyd primer/sealer.
 - c. Enamel: Semigloss alkyd.

2.03 Components

1. Shall include motors, brake, counterweight guides and guide shoes, ropes, cables, sheaves, counterweights, safety and governor, controller, controls, buttons, rails, wiring as required by NFPA 70, devices, and indicators. Component parts shall be individually specified below.
2. The machine shall be a geared traction type with motor, brake and traction drive. Sound isolation pads shall be mounted beneath the bed plates.
3. The motor shall be of a design suitable for the anticipated traffic and be rated for a high starting torque and low starting current. The motor shall be suitable for use with a variable voltage variable frequency type system and shall meet ANSI 519 requirements for electrical harmonic distortion.
4. The brake shall be spring applied and electrically released.
5. The elevator shall be provided with automatic self-leveling to a tolerance of (+/-) 1/4 inch and shall correct for travel variations and rope stretch.
6. The elevator shall have an overspeed governor and brake system.

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7. Operational Controller:
 - a. Motion Control Engineering Inc. **(MCE) Only.** Controller shall be NEMA 1
 - b. Drive Control: (Select one): (a. PTC), (b. IMC)
8. Landing System: Shall be compatible with MCE controller. (Select one):
 - a. (LS-QUTE) up to 300 fpm
 - b. (LS-QUAD) over 300 fpm

2.04 Electrical System Characteristics

1. Electrical Characteristics:
 - a. 480 volts, three-phase, 60 Hz.
 - b. Motor Drive Characteristics:
 1. Variable voltage variable frequency system shall allow for soft start type operation.
 - c. Refer to Division 16, - Equipment Wiring Systems: Electrical connections.

2.05 Electrical Components

1. Boxes, Conduit, Wiring, and Devices: Required by NFPA 70 and under provisions of Division 16.
2. Fittings: Steel compression type for electrical metallic tubing. Fittings with set screws are acceptable only when a separate grounding conductor is also installed across the joint.
3. Spare Conductors: Include 10 percent extra conductors and two pairs of shielded audio cables in traveling cables. Do not parallel conductors to increase electric current capacity unless individually fused.
4. Do not use armored flexible metal conduit as a grounding conductor.
5. Include wiring and connections to elevator devices remote from hoistway and between elevator machine rooms. Provide additional components and wiring to suit machine room layout.
6. All labeling required by ASME A.17.1 shall be of permanently engraved/embossed and permanently affixed plaques. Plaques may be either plastic laminate or metallic. **“Permanent Marker” or “Labeling Tape” ID’s shall not be used.**

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2.06 Machine

1. The machine shall be a single worm geared traction type with motor, brake, gearing and driving sheave mounted in the proper alignment on a steel bedplate. Sound isolation pads shall be mounted beneath the bedplates.
2. The worm shall be of hardened and ground steel, integral with the worm shaft, and shall be provided with a ball or roller thrust bearing designed to take the end thrust of the worm in both directions.
3. The ring gear shall be hobbled from a bronze rim, which shall be accurately fitted and bolted to the gear spider.
4. The sheave and gear shall be supported by heavy-duty ball or roller bearings. The roller and anti-friction metal bearings shall be provided with an adequate means of lubrication.

2.07 Motor

1. The motor shall be rated A. C., NEMA code letter "G" or as required for the torque and duty requirements. The motor shall be suitable for use with a variable voltage variable frequency type drive.
2. The motor shall be totally enclosed non-ventilated with a class F insulation rating.
3. The armature shall be dynamically balance and supported by ball bearings of adequate capacity.

2.08 Drive Control

1. The elevator drive shall be supplied a variable voltage variable frequency supply from a vector controlled pulse-width modulated alternating current motor drive.
2. The speed control shall be by means of a vector control providing independent excitation and torque current. A digital velocity encoder shall be provided on the motor giving feedback to the controller on motor speed and position.

2.09 Brake

1. The electric brake shall be spring applied. The controller shall actuate the brake and allow smooth, positive stops. The brake shall be designed for automatic application in the event of power supply failure.

2.10 Ropes

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1. Provide suitable traction steel hoist ropes of size and number to insure proper wearing qualities.
2. Adequate compensation for weight of hoist ropes to be furnished when required to maintain proper counterbalance ratio.
3. Governor ropes shall be iron.

2.11 Counterweights

1. Each elevator shall be suitably counterbalanced for smooth and economical operation. Cast iron or steel plate weights shall be contained in a structural steel frame.
2. The counterweight shall be equal to the complete elevator car and approximately 40% of the specified load.

2.12 Safety and Governor

1. The car safety shall be mounted on the bottom members of the car frame and shall be operated by a centrifugal speed governor located over the hoistway. The governor shall be designed to cut off power to the motor and apply the brake whenever the governor indicates the car has excessive speed.

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2.13 Lubrication

1. Grease Fittings: For lubricating bearings requiring periodic lubrication.
2. Lubrication Points: Visible and easily accessible.

2.14 Car Structural Fabrication

1. Frame: Fabricated steel frame of formed or structural steel shapes, gusseted and rigidly welded.
2. Platform: Fire retardant treated plywood subflooring assembly laid over steel stringers and ready to receive floor finish. The platform shall be completely isolated from the car sling and bracing members by vibration absorbing materials.
3. Platform: Aluminum checkered plate, 1/4" thick laid over steel stringers and subflooring. The platform shall be completely isolated from the car sling and bracing members by vibration absorbing materials.
4. Sling: Shall consist of heavy steel stiles, properly affixed to a steel crosshead and safety channels with adequate bracing members to remove all strain from the car enclosure.

2.15 Cab Fabrication

1. Based on (List Model #) manufactured by (List manufacturer).
2. Cab Design: Passenger Elevator:
 - a. Flooring: (Rubber flooring as specified under provisions established in the project specifications, Division Nine requirements.
 - b. Sides and rear walls: Plastic laminate.
 - c. Handrails: Stainless steel, cylindrical profile.
 - d. Front and rear returns and transom: Stainless steel with No. 4 finish.
 - e. Ceiling: Translucent suspended.
 - f. Canopy: Baked enamel on steel.
 - g. Ventilation: 2 speed blower mounted above ceiling, with grille.
 - h. Lighting: Fluorescent with solid lens diffuser.
 - i. Provide wall hooks and removable protective mats for cab walls.
 - j. Provide stainless steel license holders for display of required certificates. Design the holder to use non-visible tamper-proof fastenings. Holder shall enclose an 8 1/2" x 11" sign.

2.16 Car Operating Panel

1. Provide one/two vandal resistant flush mounted operating panel(s) containing illuminated car buttons corresponding to floors served, in car alarm button(s), and DOOR OPEN DOOR CLOSE button(s).

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2. Position alarm button where it is unlikely to be accidentally actuated; not less than 35 inches above cab floor.
3. Include matching service cabinet integral with front return panel, with hinged door and lock in each car containing:
 - a. Independent service switch. (Toggle Sw.)
 - b. Inspection switch. (Toggle Sw.)
 - c. Fan or blower switch. (Toggle Sw.)
 - d. Light switch. (Toggle Sw.)
 - e. Emergency stop switch. (Toggle Sw. or push pull)
 - f. Locate a 110 V, 15 Amp GFI convenience receptacle in service cabinet.
4. Flush mounted Telephone:
 - a. ADA compliant "hands free" type telephone.
 - b. Acceptable manufacturer: Wurtec Inc. Cat. #11-582-VAN, or Owner approved equal.
 - c. Engraved and filled lettering on panel; silk screened lettering not acceptable.
5. Additional operating switches for the special features specified.
6. Elevator identification number, 1/2 inch high, engraved and filled. Locate at top of panel.
7. Include an emergency light mounted above the car-operating panel.
8. DOOR HOLD OPEN PUSH BUTTON to be included. When activated by momentary pressure, the doors shall remain open for an adjustable period of time (1-180 seconds). This extended door open time will be canceled by activation of the DOOR CLOSE button. This circuit shall be rendered inoperative during Fire Service.

2.17 Car and Counterweight Guides and Guide Shoes

1. Guides for the car and counterweight shall be planed steel guide rails, properly fastened to the building structure with steel brackets.
2. Roller guides, consisting of a minimum of three tires, shall be mounted on the top and bottom of the car and counterweight frame, and shall be held in contact with the guide rail by adjustable devices. Roller guides shall run on dry, unlubricated rails.

2.18 Car Top Inspection Station

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1. Provide station device to operate each elevator from on top of the car during adjustment, inspection, maintenance, and repair.
2. Operating means shall conform to the following:
 - a. Device shall be of the continuous-pressure type; operate the car at a speed not exceeding 150 ft/min; operate the car subject to the electrical protective devices required by ASME A17.1 Rule 210.1d.
3. Device shall be used only for the purpose of adjustment, inspection, maintenance, and repair of the elevator or hoistway equipment.
4. Provide each elevator with an electric light protected with a guard and a convenience outlet fixture on the car top.

2.19 Cab Entrances

1. Cab Doors: Stainless steel 0.058 inch (1.5 mm) thick metal, of insulated sandwich panel construction, flush design, rolled profiles, rigid construction. Door shall be hung on sheave type hangers with polyurethane tires that roll on a polished track. The hanger shall be provided with adjustable eccentric rollers to take the up-thrust out of the door. The door shall be guided at bottom by non-metallic shoes sliding in the below listed threshold. Fabricate front return panels same as doors.
2. Cab Door Frames: Stainless steel; 0.058-inch (1.5mm) thick metal, standard design with smooth invisible joints.
3. Thresholds: Nickel Silver “U” shaped saddles.

2.20 Accessibility Provisions

1. Comply with applicable code.
 - a. Locate highest button in the control panel and highest operable part of the telephone a maximum of 48 inches above floor.
 - b. Provide Braille numerals immediately to left of car buttons, DOOR OPEN, DOOR CLOSE, and alarm buttons in the control panel to identify each landing or function.
 - c. Provide handrails on rear of car.
 - d. Sound audible signal in car when car is stopping at or passing landing.
 - e. Provide landing lanterns with audible signal when car is arriving at landing; 1 for up stops and 2 for down stops.
2. Provide 2 inch high raised Braille and numerals on each landing jamb to identify landing number, characters shall be centered 60 inches above floor.

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2.21 Hoistway Entrances

1. Hoistway Doors: Stainless steel; 0.058 inch (1.5 mm) thick metal, of insulated sandwich panel construction, flush design, rolled profiles, rigid construction.
2. Hoistway Door Frames: Stainless steel; 0.058-inch (1.5 mm) thick metal, of rolled profiles, standard design with smooth invisible joints.
3. Door and Frame Construction: 1-1/2 hour fire rating; insulated sandwich panel door construction 1-1/4 inch (32mm) thick, minimum.
4. Door Hangers: Furnish and install sheave type two point suspension hangers and tracks. The sheaves shall have polyurethane tires with ball bearings properly sealed to retain grease. The hangers shall be provided with adjustable eccentric rollers to take the up-thrust of the doors. The tracks shall be drawn steel shapes, smooth surface and shaped to conform to the hanger sleeves.
5. Sills: "U" shaped saddles.
 - a. Material: Extruded aluminum, except provide nickel silver at egress floor.
6. Interlocks: Each hoistway entrance shall be equipped with an approved type of interlock that has been tested as required by the appropriate code. The interlock shall be designed to prevent operation of the car away from the landing until the doors are locked in the closed position, and shall prevent opening the doors at any landing from the corridor side without the use of a special tool. Interlocks shall bear Underwriters' Laboratories "B" label of approval.
7. Hoistway door-unlocking devices shall be provided on all floors and comply with ASME A17.1. These devices shall permit authorized personnel to gain access to the hoistway when the elevator car is away from the landing.

2.22 Landing Controls

1. Landing Buttons: Vandal-resistant stainless steel Illuminating type, one for originating UP and one for originating DOWN calls, one button only at terminating landings; marked with arrows, including indications required by ASME A17.1. Hall button covers to be engraved and filled with pictograph detailing "In case of fire use stairs". Accepted alternate "Cast Appendix H" inset to face plate as manufactured by Stencil Cutting & Supply Company.
2. Landing Position Indicators: Through engraved stainless steel.
3. Car Direction Indicators: Through engraved stainless steel.
4. Screws: All screws to be pin in hex tamper proof.

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2.23 Finishes

1. Structural Metal Surfaces: Clean surfaces of rust, oil or grease; wipe clean with solvent; prime and paint.
2. Machine Room Components: Clean and degrease; prime one coat, finish with one coat of enamel.
3. Galvanized Surfaces: Clean with neutralizing solvent; prime one coat.
4. Aluminum: Mill finish.
5. Wood Surfaces not Exposed to Public View: One coat primer; one coat enamel.
6. Stainless Steel: #4 Satin.

PART 3: EXECUTION

3.01 Site Inspection

1. Examine work of other Sections that affects the Elevator System. Report defects that will affect equipment or system operation to the Architect/Engineer.
2. Before fabrication, take job site measurements and verify that Work Required by Others is complete. Check measurement of space for equipment and means of access for installation and operation.

3.02 Installation

1. Install in accordance with ASME A17.1, manufacturer's instructions, and applicable codes.
2. Arrange equipment in machine room so that elements requiring removal or maintenance are readily accessible without disturbing other components. Arrange for clear passage between components.
3. Set all hoistway entrances in vertical alignment with car openings and true with plumb sill lines.
4. Install machinery, guides, rails, controls, car and all equipment and accessories to provide for a quiet, smooth operation free of sideways movement, oscillation or vibration.
5. Mount machine directly over hoistway on steel beams or (mount machine adjacent to shaft with transfer pulley over opening). Isolate and dampen vibration with properly sized sound-reducing anti-vibration pads.
6. Erect hoistway sills, headers and frames prior to the erection of rough walls and doors; erect fascias and toe guards after rough walls are finished.
7. Grout sills and hoistway entrance frames.

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8. Clean field welds; remove oxidation and residue. Apply touch up primer and paint.
9. Connect equipment to building utilities.

3.03 Erection Tolerances

1. Quality Control: Tolerances.
2. Guide Rail Alignment: Plumb and parallel to each other in accordance with ASME A17.1 and ASME A17.2.1.
3. Cab Movement on Aligned Guide Rails: Smooth movement, with no objectionable lateral or oscillating movement or vibration.

3.04 Field Quality Control

1. Quality Control: Field inspection, testing, adjusting, and balancing.
2. Perform tests required by ASME A17.1 and ASME A17.2.1.
3. Test elevator in presence of Owner and Architect to ensure proper operation and compliance with specified requirements; make final adjustments as appropriate.
4. Obtain inspections and permits and make such tests as are required by governing authorities. Deliver test certificates and permits to Owner.
5. Provide two weeks written notice of date and time of tests.
6. Supply instruments and execute specific tests.

3.05 Tests By Regulatory Agencies

1. QEI Certified Testing in accordance with ASME A17.1 will be performed by Owner.

3.06 Adjusting

1. Contract Close-out: Adjusting installed work.
2. Adjust for smooth acceleration and deceleration of car so not to cause passenger discomfort.
3. Adjust automatic floor leveling feature at each floor to achieve (+/-) 1/8 inch (3mm) from floor level.

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3.07 Cleaning

1. Contract Close-out: Cleaning installed work.
2. Remove protective coverings from finished surfaces.
3. Clean surfaces and components ready for inspection.

3.08 Protection of Finished Work

1. Contract Close-out: Protecting installed work.
2. Do not permit construction traffic within cab after cleaning.

END OF STANDARD 14270