
PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Escalators as follows: (Architect to enter quantity)
 - 1. Escalator Width: 48" (40" step).
 - 2. Escalator Balustrade: Mullionless Glass.

1.2 ALTERNATES

- A. Refer to Division 01 section "Alternates" for requirements and procedures for acceptance.
- B. Detailed descriptions of Alternates for work of this Section are included in Part 2.

1.3 ACTION SUBMITTALS

- A. Product Data:
 - 1. Include capacities, sizes, performances, operation, control, signal systems operations, safety features, finishes, and similar information.
 - 2. Include product data for lighting systems, demarcation, and combplates.
- B. Shop Drawings:
 - 1. Provide scaled shop drawings and construction drawings of the following:
 - a. Plan and section layouts of well-ways, pits, intermediate support, truss structural support locations and overall rise, to include the following:
 - 1) Location of all equipment.
 - 2) Static and dynamic loads imposed on building structure.
 - 3) Details of equipment isolation.
 - 4) Required clearances around equipment.
 - 5) Power requirements: motor horsepower, code letter, starting current, full load running current, and demand factor.
 - 6) Service connections.
 - b. Well/Pit Equipment:
 - 1) Pit reactions/loads.
 - 2) Stop switches.
 - c. Fixtures:
 - 1) Operational display.
 - 2) Run/Stop switch.
 - 3) Signage.
 - 4) Lighting.
 - 5) Remote panel: Firefighter's Control Panel.
 - 2. All submittals shall be clearly marked and identified with project title and appropriate device identification.
 - 3. All submittals are subject to approval.
 - 4. Corrections requested shall be incorporated onto the submittals.

5. All submittals shall also be submitted to Elevator Consultant via Portable Document Format (.pdf).

C. Samples for Initial Selection: For finishes, including finished metals, materials with involving surface treatments, paint, and color selection.

D. Samples for Verification:

1. For exposed escalator and signal equipment finishes.
2. Samples of sheet materials: 3" (75 mm) square.
3. Running trim members: 4" (100 mm) lengths.

1.4 CLOSEOUT SUBMITTALS

A. Record Documents

1. The following record documents shall be furnished upon completion and before final payment:
 - a. Shop Drawings: Complete sets of as installed plan and section layouts of escalators, well/pits, machinery spaces, and to include requirements contained within submittal drawings.
 - b. Wiring Diagrams:
 - 1) Complete sets of as installed straight-line wiring diagrams, showing the electrical connections of all altered vertical transportation equipment, shall be furnished upon completion.
 - 2) A legend sheet shall be furnished with each set of drawings containing the following information:
 - a) Name and symbol of each relay, switch and other electrical or solid-state apparatus.
 - b) Location on drawings, drawing sheets, number and area of switches and relays, etc., and location of all contacts.
 - c) Location of apparatus whether on controller, in well, or operating devices.
 - c. Maintenance and Operating Manuals:
 - 1) Description and sequence of operation of all equipment installed, including operating use for Building Personnel as well as system troubleshooting manuals for technicians.
 - 2) Maintenance instructions and procedures of all vertical transportation equipment installed, including parts lists, for each elevator system.
 - 3) Lubrication charts indicating all lubricating points and type of lubricant recommended for all equipment.
 - 4) Complete parts catalogs for all replaceable parts.

B. Tools:

1. The following equipment shall be furnished upon completion and before final payment:
 - a. The Elevator Contractor shall provide all the necessary tools, including laptop, hand-held devices, required software and manuals, required to troubleshoot, adjust, synchronize, calibrate, repair and maintain the vertical transportation systems, as

well as perform all necessary procedures to perform all safety tests as required by code and local governing authority.

- b. Owner's equipment and software shall be updated regularly as necessary to properly troubleshoot, adjust, synchronize, calibrate, repair, maintain and test the vertical transportation systems. All equipment and/or software shall be of the same version as issued to technicians maintaining the vertical transportation systems.
- c. The Elevator Contractor shall provide a backup copy of any software that resides on the troubleshooting tool.
- d. Upon cancellation of service agreement, the Elevator Contractor shall provide all upgrades indicated above.

C. Keys:

- 1. Four sets of keys to operate all keyed switches and locks shall be furnished upon completion.
- 2. Keys shall be properly tagged.
- 3. All keying shall be arranged with the Contractor.

1.5 PERMITS, TESTS & CERTIFICATES

A. Permits:

- 1. The Elevator Contractor shall secure the necessary permits required for work to be performed, including work performed by sub-contractors.
- 2. The Elevator Contractor shall also secure the necessary permits required for the work to be performed to remove any existing devices on the premises.
- 3. The Elevator Contractor shall obtain and pay for all municipal and state permits necessary for execution of the elevator work, including fees for renewing permits.
- 4. The Elevator Contractor shall be responsible for posting all permits as required by the AHJ.
- 5. The Elevator Contractor shall be responsible for obtaining final sign-off for each permit filed by them.

B. Tests and Inspections:

- 1. The Elevator Contractor shall perform all necessary tests as required by ASME A17.1 and recommended by A17.2.
- 2. The Elevator Contractor shall be responsible for scheduling the necessary tests as required by the local authorities. Any fees associated with a missed appointment, expediting of test or overtime test due to delays caused by the Elevator Contractor shall be the responsibility of the Elevator Contractor.

C. Certificates:

- 1. Elevator Contractor is responsible for obtaining and providing Contractor with all temporary and final inspection certificates of the proper governing authorities and shall provide the Contractor with such certificates.
- 2. The Elevator Contractor shall pay for all fees necessary for obtaining temporary and final inspection certificates.

- D. Violations: Any violations that exist on devices being removed shall be cleared by the Elevator Contractor prior to final acceptance by the Contractor.

1.6 QUALITY ASSURANCE

- A. Compliance with Regulatory Agencies: Comply with most stringent applicable provisions of codes, laws, and/or authorities, including revisions and changes in effect:
- B. Inspections: The Elevator Contractor is subject to reviews by the Consultant and/or Contractor at any time throughout the project.

1.7 DELIVERY, STORAGE & HOISTING

- A. General:
 - 1. The protection of all equipment and exposed finishes shall be the responsibility of the Elevator Contractor during delivery, handling and installation until completion of project.
 - 2. The Elevator Contractor shall replace damaged materials with new, at no additional cost for material and labor to Contractor.
- B. Delivery & Storage: It is expected that manufacturers' original packing shall adequately protect materials during delivery.
 - 1. Deliver materials to the site ready for use in the accepted manufacturer's original and unopened containers and packaging, bearing labels as to type of material, brand name and manufacturer's name. Delivered materials shall be identical to accepted samples.
 - 2. Store materials under cover in a dry and clean location, off the ground. Remove delivered materials that are damaged or otherwise not suitable for installation from the job site and replace with acceptable materials.
 - 3. It is the responsibility of the Elevator Contractor to properly store and protect all materials in space provided or designated by the Contractor against damage, stains, scratches, corrosion, weather, construction debris and environmental conditions.
- C. Hoisting: All required hoisting and movement of equipment shall be the responsibility of the Elevator Contractor.

1.8 COORDINATION

- A. General: Coordinating the following requirements with the other trades:
- B. Cast-in-Place Concrete:
 - 1. Elevator Contractor to provide support locations requirements for connection for the General Contractor to provide or install.
 - 2. Provide pit requirements, including location of sump pits or drains.
- C. Electric: Electrical service, outlets, lights, switches in elevator machine rooms and pits.
- D. Finishes: Balustrades, skirt panels, fixtures.

1.9 **WARRANTY**

- A. **Manufacturer's Warranty:** Manufacturer agrees to repair, restore, or replace elevator work that fails in materials or workmanship within specified warranty period.
- B. **Warranty Period:** Twelve (12) months from date of Substantial Completion.
 - 1. The Elevator Contractor shall guarantee that the materials and workmanship of the apparatus installed by them and any subcontractor under this contract, shall be first class in every respect and that he will make good on any defects not due to ordinary wear and tear or improper use, which may develop within one year from the date of final acceptance of all equipment.
 - 2. Manufacturer's warranty to repair or replace defective products or their components in the event of defects within a specified period.
 - 3. Neither the final payment nor any provisions of the contract documents shall relieve the Elevator Contractor of the extent and period provided by law and upon written notice he shall remedy any defects due thereto and pay all expenses for any damage to other work resulting there from.
 - 4. The warranty as outlined above, for all devices, shall start from the date of final acceptance of each device, by the Consultant and the Owner, of all work specified and intended under these contract documents.

1.10 **MAINTENANCE**

- A. **General:**
 - 1. All maintenance shall be performed according to the guidelines stated in manufacturer's Maintenance and Operations manuals.
 - 2. Maintenance records for each device, including lubrication logs, check charts, shall be provided in each machine room.
- B. **Warranty Maintenance:**
 - 1. Upon final acceptance of each device, after Construction Maintenance period (if applicable), subsequent to receiving acceptance (sign-off) from the governing authorities and final acceptance, each device shall be accepted for full operation.
 - 2. The warranty maintenance period shall begin for each device when all conditions in the above paragraph are met and will continue for the specified period. Warranty Maintenance Period may begin at the same time for each escalator.
 - 3. The warranty maintenance program shall include the following:
 - a. Monthly examinations, including adjustments, cleaning and lubrication of equipment.
 - b. 24-hour Emergency Call back service shall be provided at no additional cost to Owner.
 - c. Replacement of components as required, using only components produced by the original manufacturer.
 - d. Each machine room or appointed area shall be equipped with a lockable storage cabinet to contain the necessary spare parts. See Specification 01 79 00 for spare parts list.

PART 2 - PRODUCTS

2.1 REFERENCES

- A. Definitions:
 - 1. Terms used are defined in the latest edition of the Safety Code for Elevators and Moving walks, ASME A17.1.
 - 2. Reference to a device or a part of the equipment applies to the number of devices or parts required to complete the installation.
 - 3. Provisions of this specification are applicable to all moving walks unless identified otherwise.
- B. American National Standard Institute (ANSI): A117.1 - Accessible and Usable Buildings and Facilities.
- C. American Society of Mechanical Engineers:
 - 1. ASME A17.1 - Safety Code for Elevators and Moving walks.
 - 2. ASME A17.2 – Guide for Inspection of Elevators and Moving Walks.
 - 3. ASME A17.5 – Elevator and Moving walk Electrical Equipment.
- D. International Building Code (IBC)
- E. National Fire Protection Association (NFPA):
 - 1. NFPA 13 – Installation of Sprinkler Systems.
 - 2. NFPA 70 – National Electric Code.
 - 3. NFPA 101 – Life Safety Code.
- F. Washington Administrative Code, WAC.
- G. Accessibility: American National Standard Institute (ANSI): A117.1 - Accessible and Usable Buildings and Facilities.
- H. 2010 ADA Standards for Accessible Design, Section 407.

2.2 PERFORMANCE

- A. Step Speed: Unit shall be capable of operating at contract speed under any loading condition in either direction of travel.
- B. Handrail Speed: Substantially same as step speed.
- C. Noise and Vibration Control: Provide sound isolation within truss as required to limit noise levels relating to escalator equipment and its operation to no more than 60 dBA.

2.3 ESCALATORS

- A. Escalator System, General:

1. Manufacturer's Public Transportation escalator systems which comply with the items in the Description below.

B. Description:

1. Size: 48" Wide (40" Step) unless otherwise noted.
2. Speed: 100 fpm under normal operations and 20 fpm while idle.
3. Rise: Refer to Contract Drawings.
4. Floors Served: Refer to Contract Drawings.
5. Angle of Inclination: 30°.
6. Operation: Reversible.
7. Drive Motor Gear Box: Worm, Planetary, or Helical.
8. Design Lifetime: 150,000 Hours
9. Step Load: 264 lbs. per step
10. Truss Radius:
 - a. Upper Truss: 2.7 Meters
 - b. Lower Truss: 2.0 Meters
11. Balustrades: Vertical to deck.
12. Balustrade Finish: Clear Glass or Satin finish stainless steel.
13. Deck Configuration: Low inner and outer.
14. Deck Finish: Satin finish stainless steel.
15. Molding and Trim: Match deck finish.
16. Skirt Panels: Match deck material and coat with low friction application.
17. Handrail Type: "V" Type.
18. Handrail Color: Black.
19. Step Tread and Riser: Cleated and meshed with adjacent step with tread demarcation inserts, rear and sides. Demarcation Color: Yellow.
20. Power Supply: 480 Volts, 3 Phase, 60 Hertz.
21. Additional Features:
 - a. Step demarcation lighting.
 - b. Emergency stop buttons.
 - c. Caution signs at each landing.
 - d. Remote Operating Indicator in Fire Control Panel.
 - e. Truss extension to suit structural support locations.
 - f. Truss isolation.
 - g. Oilless step chain.
 - h. Under handrail lighting.
 - i. Balustrade edge lighting.
 - j. Skirt lighting.
 - k. Combplate lighting.
 - l. Anti-slide knobs.
 - m. Floor intersection guards.
 - n. Deck guards.
 - o. Seismic design requirements.
 - p. Monitoring system.

2.4 MATERIALS

- A. General: All materials and finishes are subject to approval by Architect.
- B. Steel:
 - 1. Sheet Steel (Furniture Steel for Exposed Work): Stretcher-leveled, cold-rolled, commercial quality carbon steel, complying with ASTM A366, matte finish.
 - 2. Sheet Steel (for Unexposed Work): Hot-rolled, commercial quality carbon steel, pickled and oiled, complying with ASTM A568/A568M-03.
 - 3. Structural Steel Shapes and Plates: ASTM A36.
- C. Stainless Steel:
 - 1. Type 302, 304 or 316 series complying with ASTM A240, with standard tempers and hardness required for fabrication, strength, and durability.
 - 2. Apply mechanical finish on fabricated work in the locations shown or specified, Federal Standard and NAAMM nomenclature, with texture and reflectivity required to match Architect's sample.
 - 3. Protect with adhesive paper covering.
 - 4. No. 4 Stain finish:
 - a. Directional polish finish.
 - b. Graining directions as shown or, if not shown, in vertical dimension.
- D. Aluminum:
 - 1. Extrusions per ASTM B221; sheet and plate per ASTM B209.
 - 2. Die Cast Aluminum – ASTM B108, Alloy 356.0, T6.
 - 3. Extruded Aluminum – FS QQ-A 200/8, Alloy 6061, T6.
- E. Paint Finishes:
 - 1. General:
 - a. Clean exposed metal parts and assemblies of oil, grease, scale, and other foreign matter and factory paint one shop coat of standard rust-resistant primer.
 - b. Galvanized metal need not be painted.
 - 2. Prime Finish:
 - a. Apply one coat of rust-resistant primer followed by a filler coat over uneven surfaces.
 - b. Sand smooth and apply final coat of primer.
 - 3. All equipment and metal work installed under this contract, which does not have a baked enamel or special architectural finish, and which is exposed in the hoistway, shall be cleaned and painted one field coat of enamel.
 - 4. All machine room equipment shall be painted upon completion of the installation with the manufacturer's standard machinery enamel.
 - 5. Elevator designation (number and/or letter) shall be prominently indicated on all machine room and machinery space equipment, top of car crosshead and pit equipment.
- F. Baked Enamel Finish:
 - 1. Prime finish per above.

2. Unless specified “prime finish” only, apply and bake three additional coats of enamel in the selected solid color.

2.5 OPERATION

- A. Each unit shall be capable of operating smoothly and quietly at rated speed with synchronized step and handrail operation and speed in either direction of travel.

2.6 MACHINE ROOM EQUIPMENT

- A. Driving Machine:
 1. Worm geared, planetary, or helical spur gear reduction unit coupled directly to AC induction or P.M.S.M. drive motor.
 2. Handrail drive shall be directly coupled to drive machine.
- B. Drive Motor:
 1. Three-phase, operating at no greater than 1800 rpm.
 2. Motors shall be designed to operate in confined unvented spaces.
 3. Motor insulation class “F” or greater.
 4. Motor starting shall incorporate SCR soft start with closed transition.
- C. Brake:
 1. Electromechanical brake to safely decelerate, stop, and hold rated load.
 2. Brake shall stop escalator operating in the down direction at a relatively constant rate not greater than 3.0 feet/second².
- D. Controller:
 1. UL/CSA labeled.
 2. Compartment:
 - a. Securely mount all assemblies, power supplies, chassis switches, relays, etc., on a substantial, self-supporting steel frame.
 - b. Completely enclose equipment with covers.
 - c. Provide means to prevent overheating.
 3. Relay Design:
 - a. Magnet operated with contacts of design and material to insure maximum conductivity, long life, and reliable operation without overheating or excessive wear.
 - b. Provide wiping action and means to prevent sticking due to fusion.
 - c. Contacts carrying high inductive currents shall be provided with arc deflectors or suppressors.
 4. Microprocessor Hardware:
 - a. Provide built-in noise suppression devices that provide a high level of noise immunity on all solid-state hardware and devices.
 - b. Provide power supplies with noise suppression devices.
 - c. Isolate inputs from external devices (such as pushbuttons) with opto-isolation modules.
 - d. Design control circuits with one leg of power supply grounded.

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- e. Safety circuits shall not be affected by accidental grounding of any part of the system.
 - f. System shall automatically restart when power is restored.
 - g. System memory shall be retained in the event of power failure or disturbance.
 - h. Equipment shall be provided with Electro Magnetic Interference (EMI) shielding within FCC guidelines.
 - 5. Wiring:
 - a. CSA labeled copper for factory wiring.
 - b. Neatly route all wiring interconnections and securely attach wiring connections to studs or terminals.
 - c. Provide labels for all extra or spare wires, neatly organized at base of controller cabinet.
 - 6. Permanently mark components (relays, fuses, PC boards, etc.) with symbols shown on wiring diagrams.
 - 7. Provide controller with energy saving controls to reduce escalator speed to 20fpm while idle.
 - 8. Monitoring System Interface:
 - a. Provide controller with serial data link through Ethernet connection and install all devices necessary to monitor.
 - b. Escalator Contractor responsible to connect monitoring system interface to machine room monitoring compartment and LAN.
 - c. Wiring from LAN to the machine room monitoring compartment by others.
 - 9. Remote Monitoring and Diagnostics:
 - a. Equip each controller with standard ports, interface boards, and drivers to accept maintenance, data logging, fault finding diagnostic, and monitoring system computers, keyboards, modems, and programming tools.
 - b. The system shall be capable of driving remote LED monitor(s) which continually scan and display the status of each escalator.
- E. Step Drive Assembly:
- 1. Direct or indirect drive.
 - 2. Machine sprockets at each side over which step chains, step chain rollers, or steel cord reinforced polyurethane cog belt shall pass and transmit motion from machine to steps.
 - 3. If indirect chain drive is used between machine and drive sprocket, provide emergency brake on drive assembly to automatically set if drive chain fails.
 - 4. Provide roller-type sealed bearings.

2.7 WELL-WAY EQUIPMENT

- A. Truss:
- 1. Steel truss to safely carry entire load of escalator, including all components, full-capacity load and weight of exterior truss and balustrade covering material; manufacturer's standard (not to exceed 10psf).
 - 2. Provide required factor of safety.
 - 3. Provide clearly identified exterior cladding support attachment locations on exposed sides and bottom of the entire length of truss.

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- B. Drip Pans: Oil-tight, steel pans with sufficient strength to withstand weight of workmen entire width and length of truss.
- C. Step Tracks:
1. Construct from steel.
 2. Tracks shall be bolted sections including transitions to facilitate maintenance and replacement if required.
 3. Track sections, including transitions, shall be factory installed and aligned to ensure smooth, quiet operation of running gear under all conditions.
 4. The individual track section, together with transition section, lower reversing station tension carriage, main drive shaft, and handrail drive shaft shall form a fully independent assembly.
- D. Step Bands:
1. Roller chain constructed of steel links with hardened pins or cast links connecting adjacent steps and engaging step drive assembly.
 2. Provide synthetic composition roller assemblies with sealed bearings.
 3. Escalator design shall permit step band inspection and operation while unit is running with steps removed.
- E. Step Guidance System: Provide a step guidance system to control the horizontal and vertical movement of the steps.
- F. Lower Reversing Station Tension Carriage: Fully independent, floating track system with spring tensioning device to maintain constant step band tension.
- G. Step Assembly:
1. Single piece die-cast aluminum fastened to the step band.
 2. Step rollers shall have sealed bearings and be tired with synthetic composition material.
 3. Treads and riser shall be cleated.
 4. Steps shall be covered on the underside with sound-deadening material.
 5. Steps shall be removable from unit without disassembly of balustrade.
- H. Safety Devices:
1. Provide step and handrail safety devices:
 - a. Broken drive train/step chain.
 - b. Broken drive chain/drive belt.
 - c. Skirt obstruction.
 - d. Missing bridge (if required).
 - e. Reversal stop.
 - f. Step up-thrust.
 - g. Handrail speed.
 - h. Missing step.
 - i. Step level.
 - j. Handrail entry.
 - k. Combplate impact.
 - l. Step Demarcation Lights.

- m. Stop switch.

I. Electrical Wiring:

1. Conductors:

- a. Copper throughout with individual wires coded and all connections identified on studs or terminal blocks.
- b. Provide conduit, junction boxes, connections, and mounting means per requirements of Division 16.
- c. Provide painted or galvanized steel or aluminum conduit.

2.8 HANDRAILS

A. Construction:

- 1. Reinforced rubber running on metal guides.
- 2. Handrail shall be spliced and vulcanized with smooth joint.
- 3. Handrail shall be driven at the same speed as the steps.
- 4. Provide tensioning device and slack-tension switch.

2.9 BALUSTRADE

A. Interior Panel: Glass.

B. Skirt Panels:

- 1. Reinforced 14-gauge metal, if required by Contractor's own design.
- 2. Install to maintain loaded step gap clearance per code.
- 3. Provide panels with skirt brushes.
- 4. Extend skirt panel beyond combplates and wrap around base of newel.

C. Deck Boards:

- 1. Reinforced 14-gauge metal.
- 2. All deck section joints shall abut to provide a smooth surface to surface connection with curved transition, top and bottom, horizontal to incline sections.

D. Newel Ends:

- 1. Continuous metal guides at upper and lower end of the balustrade, matching profile of handrail guides.
- 2. Newel end shall include a multi-roller bearing system to minimize friction and provide smooth return of handrail.

E. Finishes:

- 1. Interior Panels: Provide 1/2" Clear glass vertical to deck.
- 2. Skirt Panels: Satin finish stainless steel.
- 3. Inner and Outer Deck: Same as Skirt Panel.

F. Trim and Moldings: Match deck finish.

G. Anti-Slide Knobs:

1. Provide Low outer deck configuration of immediately adjacent units with anti-slide knobs.
 2. Finish of knobs to match deck finish.
- H. Floor Intersection Guards: Provide clear Plexiglas intersection guards at floor penetrations.
- I. Deck Guards: Provide clear Plexiglas guards between adjacent units at top and bottom of trusses.
- J. Extended Newels: Newels of adjacent escalators shall align at upper and lower landings.
- K. Skirt Lighting: Provide continuous fluorescent strip lighting from upper and lower landings through entire incline.

2.10 LANDINGS

- A. Flat Steps: Provide upper and lower landings with three (3) flat steps.
- B. Step Demarcation Lighting:
1. Provide minimum of two step demarcation lights within the step band at upper and lower landings.
 2. Locate within a maximum of 16" from combplates.
- C. Combplates:
1. Aluminum or other alloy provided with non-slip surface.
 2. Provide removable comb sections.
- D. Combplate Lighting: Provide combplate lighting in skirt panel on both sides of units at both upper and lower landings.
- E. Landing Plates:
1. Aluminum or other alloy with non-slip surface.
 2. Plate shall extend from combplates to equipment access plates at upper and lower ends. Plates shall extend full width of truss.
- F. Equipment Access Plates:
1. Aluminum or other alloy with non-slip surface.
 2. Provide removable access plates to provide for entry into equipment spaces at upper and lower ends.
 3. Plates shall cover entire truss openings.
 4. Access plates shall match material and finish of adjacent landing plates.

2.11 SIGNAL AND CONTROL FIXTURES

- A. Operating Station:
1. Provide upper and lower newel or stanchion mounted operating stations.
 2. Mount on right side when facing unit.

3. Match deck finish.
4. Function and operating positions of switches and buttons shall be identified with engraved characters which are readily visible from a standing position.
5. Each station shall contain the following:
 - a. Red “emergency stop” button.
 - 1) The button shall be covered with a transparent cover which can be readily lifted or pushed aside.
 - 2) When the cover is moved, an audible warning signal shall be activated.
 - 3) The signal shall have a minimum sound intensity of 80 dBA at the button location.
 - 4) The cover shall be engraved “EMERGENCY STOP”; “MOVE COVER” or equivalent legend (i.e. “LIFT COVER,” “SLIDE COVER,” etc.); and “PUSH BUTTON.”
 - 5) “EMERGENCY STOP” shall be in letters not less than 1/2" (13mm) high.
 - 6) Other required wording shall be in letters not less than 3/16" (4.8mm) high.
 - 7) The cover shall be self-resetting.
 - b. Key switch to “start” unit.
 - c. Key directional control switch.

B. Fault Indicator:

1. Provide upper and lower end of truss with fault indicator to display source of fault without removal of equipment access plate.
2. Locate indicator in handrail inlet box or deck board visible from landing plate.

C. Diagnostic Access Port: Provide upper and lower landings with diagnostic access port.

2.12 SIGNS

A. Landing Signs: Provide caution signs at top and bottom landings.

2.13 EXTERIOR WEATHERPROOFING [DESIGN TIME: SECTION TO BE USED FOR EXTERIOR OR UNCONDITIONED SPACES.]

A. Provide exterior weatherproofing package:

1. Handrails: Provide neoprene handrails with Dacron lining.
2. Handrail Guides: Stainless steel.
3. Truss: Hot dipped galvanized including drip pans, turnarounds, and tension carriage.
4. Step Tracks, Sprockets, Axles, and Mountings: Zinc chromate or cadmium plated.
5. Hardware:
 - a. All hardware and fastenings to be stainless steel.
 - b. With substitution approval, zinc chromate or cadmium plated may be accepted.
6. Motor: Drip proof type with moisture resistant class “B” PMR (premium moisture resistant) insulation.
7. Exposed Materials:
 - a. All balustrades, skirt panels, trim, deck boards, and exposed hardware to be stainless steel.

- b. Balustrade and skirt panel backing, if used, to receive a coating of wood preservative and be sealed against moisture penetration at joints with caulking.
 - c. Powder coat steps and combplates to resist corrosion.
- 8. Factory paint drive unit, step tracks, sprockets, axels, and mountings with two coats red zinc chromate primer followed by two coats of Rust-Oleum® weather-resistant enamel.
- 9. Water Diverting:
 - a. Provide landing plate and equipment access plate framing with stainless steel water channels and drain.
 - b. Provide drains in bottom of truss from drip pans.
 - c. Install galvanized or stainless sheet steel gutters and drip covers over controller, machine, drive sprockets, main drive chain, handrail drive, chain, and maintenance control stations.
 - d. Provide galvanized drip pans with drains in bottom of truss.
- 10. Conduit, boxes, and fittings shall be of watertight construction.
- 11. Operating controls and switches shall be provided in NEMA 12 enclosures.
- 12. Safety solenoids and switches shall be approved moisture-proof type.
- 13. Wiring:
 - a. Install weatherproof gaskets under emergency stop button covers.
 - b. Safety solenoids; approved moisture-proof type.
 - c. Electrical material, controller cabinet, and installation to meet NEMA 12 criteria.
- 14. Fasteners: All cotter and replaceable pins to be stainless steel.
- 15. Lubrication:
 - a. Provide oil less type chain or lubricate chain with moisture-proof material.
 - b. Include automatic oiler for all chains and step guides.
- 16. Bearings: Any bearing subject to water infiltration shall be a sealed type.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Prior to beginning installation of equipment, examine well-way and pit areas. Verify no irregularities exist which affect execution of work specified.
- B. Do not proceed with installation until work in place conforms to project requirements.

3.2 INSTALLATION

- A. Install all equipment in accordance with Contractor's instructions, referenced codes, specification, and approved submittals.
- B. Install all equipment so it may be easily removed for maintenance and repair.
- C. Install all equipment for ease of maintenance.
- D. Install all equipment to afford maximum accessibility, safety, and continuity of operation.

- E. Remove oil, grease, scale, and other foreign matter from the following equipment and apply one coat of field-applied machinery enamel, for the following”
 - 1. All exposed equipment and metal work installed as part of this work which does not have architectural finish.
 - 2. Machine room equipment truss.
 - 3. Neatly touch up damaged factory-painted surfaces with original paint color.
 - 4. Protect machine-finish surfaces against corrosion.
- F. Clean all architectural finishes and replace or restore any surfaces damaged during construction to like new condition.

3.3 FIELD QUALITY CONTROL

- A. Acceptance Testing: On completion of escalator installation and before permitting escalator use, perform acceptance tests as required and recommended by ASME A17.1/CSA B44 and by governing regulations and agencies.
- B. Advise Owner, Architect, and authorities having jurisdiction in advance of dates and times that tests are to be performed on escalators.

3.4 ADJUSTING

- A. Track Alignment:
 - 1. Re-align factory installed tracks if required to ensure continuous 4-point contact with step and chain rollers.
 - 2. Secure joints without gaps and file any irregularities to a smooth surface.
- B. Lubricate all equipment in accordance with Contractor’s instructions.
- C. Adjust motors, brakes, controllers, stopping switches, and safety devices to achieve required performance levels.
- D. Adjust brakes and controlled descent devices to stop escalator with variable load. Drive machine brakes shall stop the down running escalator at a rate no greater than three feet/second².
- E. Adjust handrail speed to coincide with step speed.

3.5 CLEANUP

- A. Keep work areas orderly and free from debris during progress of project.
- B. Remove packaging materials and all loose materials on a daily basis.
- C. Clean machine room equipment, truss interior, and pit.
- D. Clean balustrades, deck boards, skirt panels, operating and signal fixtures, and trim.

END OF SECTION 14 31 00