

SECTION 14 21 00

ELECTRIC TRACTION ELEVATORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Traction Elevators as specified

1.02 SUMMARY

- A. Section Includes: Traction Freight Elevators

- B. Products Supplied But Not Installed Under this Section:

1. Hoist Beam. Coordinate with KONE shop drawings and beam supplier.
2. Pit Ladder. Coordinate with KONE shop drawings and pit ladder supplier.

- C. Work Supplied Under Other Sections:

1. Temporary lighting, include in hoistway for machine space with switch located in hoistway on the strike jamb side of top landing door.
2. Hoistway ventilation shall be in accordance with local building code requirements. Temperature within machine and control spaces shall be maintained between 41 degrees F and 104 degrees F. with a maximum allowable humidity of 95% non-condensing.
3. Guide Rail Support shall be structurally adequate to extend from pit floor to top of hoistway, with spans in accordance with requirements of authority having jurisdiction.
4. Removable barricades at all hoistway openings, in compliance with OSHA 29 CFR 1926.502 in addition to any local code requirements.
5. Lifeline attachments capable of withstanding 5000 lb load in accordance with OSHA 29 CFR 1926.502. Provide a minimum of 2 at the top, front of each hoistway.
6. Pit lighting: Fixture with switch and guards. Provide illumination level equal to or greater than that required by ASME A17.1/CSA B44 2000, or applicable version.
7. Control space lighting with switch. Coordinate switch with lighting for machine space as allowable by code.
8. Access Doors: As required for access to governor and machine. Access door shall be self-closing, self-locking if necessary and operable from the inside without a key.
9. Hoistway Entrance Frames and Sills. Coordinate with 2.04 H.

1.03 RELATED SECTIONS

(Specifier Note: ADD/DELETE/MODIFY the section numbers and titles to correspond with specific project requirements)

- A. Section 01 50 00 – Temporary Facilities and Controls
- B. Section 03 30 00 – Cast-in-Place Concrete

- C. Section 04 20 00 – Unit Masonry
- D. Section 05 50 00 – Metal Fabrications
- E. Section 07 16 00 – Cementitious Waterproofing
- F. Section 23 00 00 – Heating, Ventilating, and Air Conditioning
- G. Section 26 00 00 – Electrical
- H. Section 26 30 00 – Electric Power Generating and Storing Equipment
- I. Section 27 30 00 – Voice Communications
- J. Section 28 31 00 – Fire Detection and Alarm
- K. Section 31 00 00 – Earthwork

1.04 REFERENCES

- A. Industry and government standards referenced include the following:
(Specifier Note: SELECT between US and Canadian references. DELETE inappropriate references. ADD references required by jurisdiction having authority)
 1. ICC/ANSI A117.1 Accessible and Usable Buildings and Facilities
 2. ADAAG – Accessibility Guidelines for Buildings and Facilities
 3. ANSI/NFPA 70, National Electrical Code
 4. ANSI/NFPA 80, Standard for Fire Doors and Fire Windows
 5. ASME A17.1/CSA B44, Safety Code for Elevators and Escalators.
 6. CAN/CSA C22.1, Canadian Electrical Code.

1.05 PERFORMANCE REQUIREMENTS

- A. Car Speed \pm 5% of contract speed under any loading condition or direction of travel.
- B. Stopping Accuracy: \pm 1/4 inch under any loading condition or direction of travel.

1.06 SUBMITTALS

(Specifier Note: ADD/DELETE/MODIFY the section numbers and titles to correspond with specific project requirements)

- A. Conform to requirements of Section 01 33 00 Submittal Procedures and Section 01 78 00 Closeout Submittals.
- B. Product Data: Submit manufacturer's product literature for each proposed system.
 1. Freight enclosure design, dimension and layout.
 2. Finishes, accessories and available options.
 3. System capacity and performance.
 4. Controls, signals and operating system.
 5. Color selection charts for cab and entrances
- C. Shop Drawings:
 1. Clearances and travel of car.
 2. Clear inside hoistway and pit dimensions.
 3. Location and layout of equipment and signals
 4. Car, guide rails, buffers and other components in hoistway.
 5. Maximum rail bracket spacing.
 6. Maximum loads imposed on building structure.
 7. Hoist beam requirements

8. Location and sizes of access doors
9. Location and details of hoistway door and frames
10. Electrical characteristics and connection requirements

D. Closeout Submittals:

1. **(Quantity required)** manufacturer's operation and maintenance manuals.
2. Inspection certificates and permits.

(Specifier Note: DELETE special warranty information if special manufacturer warranty is not required- Coordinate with Article 1.09)

3. Special Manufacturer Warranty

1.07 QUALITY ASSURANCE

- A. Manufacturer: Shall have a minimum of 10 years experience in the fabrication, installation and service of elevators. Manufacturer shall be 9001 ISO certified, and have a documented quality assurance program
- B. Installer: Elevator shall be installed by the manufacturer or a manufacturer recommended installer with a minimum 10 years experience in the installation and service of traction and machine-room-less elevators.
- C. Inspection and Testing: In accordance with requirements of local jurisdiction, obtain required permits, inspections and tests.
- D. Prior to beginning work of this section, attend a pre-installation meeting. Owner, design professional, and contractors with adjacent or related work shall attend.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Coordinate delivery of elevator material throughout construction. If the construction site is not prepared to receive the elevator equipment at the agreed upon ship date, the general contractor shall be responsible to provide a safe, dry and easily accessible storage area on or off the premises. Additional labor costs for double handling will be the responsibility of the general contractor.
- B. Store elevator materials in protected environment in accordance with manufacturer recommendations.

1.09 WARRANTY

(Specifier Note: DELETE Warranty information if Special Manufacturer Warranty is not required- Special Manufacturer Warranty is anything beyond the one-year requirement typically indicated in the Owner/Contractor Agreement. MODIFY warranty period to meet specific project requirements. Contact Product Representative to coordinate with standard warranty periods. Extended Maintenance contracts are frequently used in lieu of Special Manufacturer Warranties for elevators)

- A. Provide Manufacturer warranty for a period of {XX} years. Warranty period to begin upon elevator final acceptance. Warranty covers defects in materials and workmanship. Damage due to ordinary use, vandalism, improper or insufficient maintenance, misuse, or neglect do not constitute defective material or workmanship.

1.10 MAINTENANCE SERVICE

(Specifier Note: SELECT project appropriate time intervals for the frequency of examination and the length of the maintenance period, DELETE remaining options. Contact a KONE Product Representative for assistance in selection. If under Owner/Contractor agreement, Contractor is allowed to use an elevator during construction, maintenance period may begin during construction. Contact a KONE Product Representative for recommendations.)

- A. The elevator manufacturer shall provide maintenance service consisting of examinations and adjustments of the elevator equipment for a period of 12 months after date of elevator final acceptance.
- B. Elevator manufacturer recommended service personnel shall provide maintenance service. Manufacturer recommended parts and supplies shall be used in maintenance service as in the original manufacture and installation.
- C. Maintenance service be performed during regular working hours of regular working days and shall include emergency 24-hour call back service
- D. Maintenance service shall not include adjustments, repairs or replacement of parts due to negligence, misuse, abuse or accidents.
- E. Temporary Use: Temporary use for the elevator if required shall be in accordance with terms and conditions of the elevator contractors temporary use agreement.

1.11 SCHEDULE

(Specifier Note: Provide elevator schedule information for each system configuration. SELECT appropriate options and DELETE options not required. Contact Manufacturer Product Representative for assistance.)

- A. Quantity & Elevator Numbers: *(ENTER number of elevators – and related designations)*
- B. Type: Gearless Electric Traction Machine – AC Drive
- C. Number of Landings: *(ENTER number of landings – maximum 6)*
- D. Number of Openings: *(maximum 12 total)*
 - 1. Front: *{XX}*
 - 2. Rear: *{XX}*
- E. Travel: *(ENTER rise up to a maximum of 75'-0" or 23 m)*
- F. Rated Capacity / Speed: *(SELECT capacity / speed combinations and DELETE options not required)*
 - 1. 6000 pounds, 100/150 fpm (2722 kg, 0.51/0.76 m/sec.)
 - 2. 8000 pounds, 100/150 fpm (3629 kg, 0.51/0.76 m/sec.)
 - 3. 10000 pounds, 100/150 fpm (4536 kg, 0.51/0.76 m/sec.) *(Available for class A loading only. See section 2.05 D.)*
- G. Platform Dimensions: *(SELECT dimensions to match selected capacity and DELETE options not required.)*
 - 1. 6000 pound capacity: 8'-4" wide x 10'-0" deep (2540 mm x 3048 mm)
 - 2. 8000 pound capacity: 8'-4" wide x 11'-0" deep (2540 mm x 3048 mm)
 - 3. 10000 pound capacity: 8'-4" wide x 12'-0" deep (2540 mm x 3658 mm)

(NOTE: The above platform sizes are typical. Platform size can be anywhere from 7'-5" to 12'-4" wide x 9'-6" to 12'-0" deep.)
- H. Cab Height: *(SELECT height and DELETE options not required) {8' 0" (2438 mm)} OR {9' 0" (2743 mm)} OR {10' 0" (3048 mm)}*
- I. Door Width: *(Typical door width is 4" (102 mm) less than the platform width.)*
- J. Door Height: *(Typical door height is same as the cab height. The door can be shorter if desired.)*

- K. Main Power Supply: {208, 240, 480, & 575} Volts ± 5% of normal, 3 Phase, with a separate equipment grounding conductor.
- L. Operation Type: *(SELECT Simplex Single Automatic Push Button or selective collective operation. Typical freight operation is Simplex Single Automatic Push Button)*
- M. Control Space Location *(SELECT Integral / Adjacent / Remote):*
- N. Lighting Power Supply: 120 Volts, single Phase, 15 Amp, 60 Hz.
- O. Elevator Equipment shall conform to the seismic requirements in the project contract documents.

PART 2 – PRODUCTS

2.01 MANUFACTURER

(Specifier Note: Article A is for a Proprietary Specification based on products of KONE Inc., DELETE Article B. If project has non-proprietary requirements DELETE Article A and use Article B)

- A. Provide machine-room-less MonoSpace® traction freight elevators by KONE, Inc. One KONE Court, Moline, IL 61265 Tel 800-956-KONE Fax (309)743-5469 www.kone.us

OR

- B. Design for elevator system is based upon products of the first listed manufacturer. Subject to compliance with design and performance requirements, additional manufacturers may include but are not limited to Subject to compliance with requirements, elevator manufacturers may include but are not limited to one of the following:
 1. Basis of Design: MonoSpace® traction freight elevators by KONE, Inc. One KONE Court, Moline, IL 61265 Tel 800-956-KONE Fax (309)743-5469 www.kone.us
 2. Other manufacturers: *(Specifier Note: ADD/DELETE/MODIFY listed manufacturers as required)*
 - a. Otis Elevator Co.
 - b. Schindler Elevator Corp.
 - c. Thyssen Elevator Group North America.

2.02 MATERIALS

- A. Steel
 1. Sheet 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 A569.
 3. Structural Steel Shapes and Plates: ASTM A36 and AISI 1018.
- B. Stainless Steel: Type 304 Series complying with ASTM A167, with standard tempers and hardness required for fabrication, strength and durability.
 1. Supply with mechanical finish on fabricated work in the location shown or specified with texture and reflectivity required (Federal and NAAMM nomenclature). Protect with adhesive plastic film or paper covering.
 2. All finishes specified as “satin” to be manufacturer’s standard directional polish that complies with commercial No. 4 requirements.
 3. Material may vary per specification.
- C. Aluminum: Extrusions per ASTM B221; sheet and plate per ASTM B209.
- D. Paint:

1. Concealed Steel and Iron: Clean metal of oil, grease, scale and other foreign matter and paint one shop coat of manufacturer's standard rust-resistant primer. Galvanized metal need not be painted.
2. Exposed Steel: Clean exposed metal of oil, grease, scale and other foreign matter. Eliminate any dents, scratches, or other defects that would affect the final finish. For material delivered with primer coat only, apply enamel primer. For material delivered with a finish coat, apply two coats enamel.

2.03 EQUIPMENT: CONTROL SPACE COMPONENTS

A. Controller:

1. Provide microprocessor-based control system with V3F AC Drive to perform the functions of safe elevator motion. Included shall be all of the hardware required to connect, transfer and interrupt power, and to protect the motor against overloading. The system shall also perform simplex single automatic push button or selective collective operation.
2. Each controller cabinet containing memory equipment shall be properly shielded from line pollution. The microcomputer system shall be designed to accept reprogramming with minimum system down time.
3. All high voltage (110V or above) contact points inside the controller cabinet shall be protected from accidental contact in a situation where the controller doors are open.

B. Auto-transformer: Provide auto-transformer to adjust the main-line supply to the 400V required by the controller and drive

C. Elevator Operation: *{Simplex Single Automatic Push Button / Selective Collective Operation}*: Using a microprocessor-based controller, operation shall be automatic by means of the car and hall buttons. If all calls in the system have been answered, the car shall park at the last landing served.

D. Provide microprocessor-based control system, which utilizes on-board diagnostics for servicing, trouble-shooting, and adjusting without requiring the use of an outside service tool. (Only required if Section 2.01.B is selected) If an on-board diagnostic system is not provided, a handheld service tool (or laptop), owner's license, operation manual, and tool instructions must be provided in addition to the control system.

E. Car Operating Features

(Specifier Note: The following operating features are standard for each type of operation)

1. On/Off Light Switch
2. Firefighters' Service Phase I and Phase II *(US only) (SELECT from one of the following for Canadian Projects)* Special Emergency Service Phase I and II – Emergency Recall **OR** Special Emergency Service Phase I and II – Emergency Recall and In-Car Emergency Operation.
3. Ascending Car uncontrolled Movement Protection.
4. Top of Car Inspection
5. Rear Door Operation
6. Access at *{Top} OR {Bottom}*

(Specifier Note: The following items are Optional Features. SELECT appropriate options and DELETE those not required.)

7. Exhaust fan.
8. Bumper rails
9. Wheel stops at rear wall.

(Specifier Note: Optional features 8 and 9 require that materials, finishes and locations be specified by the customer).

10. Intercom provisions.
11. Provisions for Card Reader in Car (reader provided and installed by others)
12. Provisions for Elevator Management System

- F. Elevator Control System for Inspections and Emergency
 - 1. Provide devices within controller to run the elevator in inspection operation
 - 2. Provide devices on car top to run the elevator in inspection operation.
 - 3. Provide within controller an emergency stop switch to disconnect power from the brake and prevents motor from running.
 - 4. Provide the means from the controller to mechanically lift and control the elevator brake to safely bring car to nearest available landing when power is interrupted.
 - 5. Provide the means from the controller to reset the governor over speed switch and also trip the governor.
 - 6. Provide the means from the controller to reset the emergency brake when set because of an unintended car movement or ascending car over speed.
 - 7. Provide the means for the control to reset elevator earthquake operation

2.04 EQUIPMENT: HOISTWAY COMPONENTS

- A. Machine:
 - 1. Locate hoisting machine within the hoistway and mount on car guide rail. Mounting of the hoisting machine shall incorporate isolation to minimize the transmission of noise and/or vibration to the building structure
 - 2. Gearless traction type machine, mounted to back of guide rail at top landing. Hoisting machine shall include AC drive motor, direct current electro-mechanical brake and integral traction drive sheave.
 - 3. Motor horsepower shall be in accordance with the duty indicated in Schedule.
 - 4. Brake shall be spring applied and electrically released and designed to hold car at the floor level after coming to rest. The drive sheave shall be accurately turned and grooved for the quantity and size of hoist ropes applicable to service.
- B. Hoist Ropes: 13mm wire ropes of 8x19 Seale construction with a steel reinforced core.
- C. Car Guide Rails: Steel rails with brackets and fasteners.
- D. Buffers: Helical coil spring type for the car and polyurethane for the counterweight
- E. Governor: Friction type over-speed governor rated for the duty of the elevator specified.
- F. Hoistway Operating Devices:
 - 1. Emergency Stop Switch in the pit
 - 2. Terminal stopping switches
 - 3. Emergency stop switch on the machine
- G. Positioning System: System consisting of magnets and proximity switches.
- H. Hoistway Entrances
 - 1. Frames (provided by others): Steel door frames are required. Steel frame requirements include; either a 6-inch or 8-inch channel. Shaft side" flanges of the channel must have a minimum length of 2.50 inches and the flange thickness must be a minimum of 3/16 inches thick.
 - 2. Sills: (provided by others) Steel angles with minimum leg lengths of 4 inches or larger. They must be installed to be within level of 1/8 inch per 8-foot opening width.
 - 3. Doors: UL fire-rated landing doors are either manual bi-parting or power operated landing doors (optional).types. **Optional vision panels must have the locations specified by the customer.**
 - 4. Gates: Car gate is a single section type 6 ft. standard or full-height. (optional)
 - 5. Fire Rating: Landing doors shall be UL fire-rated for 1-1/2 hour.
 - 6. Entrance Finish: Painted (by others).

2.05 EQUIPMENT: CAR COMPONENTS

(Specifier Note: SELECT the desired options in the paragraph and sub-paragraphs below, DELETE the option(s) not selected.)

- A. Frame: Provide car frame with adequate bracing to support the platform and car enclosure.
- B. Safeties: Provide car safeties mounted to the car frame. The safeties are actuated by a centrifugal governor which is designed to actuate according to code requirements.
- C. Guidance: Car slide guides shall be provided and mounted to the top and bottom of both the car and counterweight frame. Each guide shoe assembly shall be arranged to maintain constant contact on the rail surfaces.
- D. Platform, Freight: Provide welded steel construction car platform designed to accommodate
 - 1. Class A general freight loading
 - 2. Class C1 industrial truck loading (truck is carried with load)
 - 3. Class C2 industrial truck loading (truck is not carried with load)
 - 4. Class C3 concentrated loading*(Specifier Note: Contact Manufacturer Product Representative for assistance on available Load Class options.)*
- E. Canopy: Reinforced 14-gauge mild steel.
- F. Cab: Freight type.
 - 1. Walls and ceiling: Painted steel
 - 2. Lighting: Fluorescent light fixtures shall be provided.
 - 3. Flooring: Flooring provided by others.
(Specifier Note: Flooring material and finish requirements to be specified by the customer).
 - 4. Threshold: Steel angle.
 - 5. Provide electrical contact on the car-top exit.
- G. Emergency Car Signals
 - 2. Emergency Siren: Siren mounted on top of cab that is activated when the alarm button in the car operating panel is engaged. Siren shall have rated sound pressure level of 80 dB(A) at a distance of three feet from device. Siren shall respond with a delay of not more than one second after activation of alarm button.
 - 3. Emergency Car Lighting: Provide emergency power unit employing a 12-volt sealed rechargeable battery and totally static circuits shall illuminate the elevator car and provide current to the alarm bell in the event of building power failure.
- H. Ventilation: *{Natural ventilation at the top and bottom of side and rear walls or Power ventilation two-speed fan}*.

2.06 EQUIPMENT: SIGNAL DEVICES AND FIXTURES

- A. Car Operating Panel: Provide car operating panel with all push buttons, key switches, and message indicators for elevator operation.
- B. Fixtures: Heavy-duty.
(Specifier Note: Contact your Manufacturer Product Representative for assistance with specific operating panel requirements.)
- C. Telephone Cabinet with Certificate Frame: A telephone compartment shall be furnished in the return panel below the car-operating panel. Necessary wires for the telephone shall be included in the compartment and connected to the car traveling cable.
(Specifier Note: SELECT appropriate communications system)

1. **{(Standard) Provide ADA compliant communication device.} Or (Telephone by others)** Communications equipment and connections to the building service system shall be furnished and installed by others.}

(Specifier Note: The following items are optional features. EDIT list as appropriate for project. MODIFY the landing designations for the options select.)

- D. Access key-switch at top floor adjacent to entrance
- E. Access key-switch at lowest floor adjacent to entrance
- F. Door Open Bell: A chime bell shall sound tell a passenger that a hoistway door and or gate has been left open
- G. In-Use Light: A light in each hall push button station to indicate to the user the elevator is in use.

2.07 EQUIPMENT: DOOR OPERATION

- A. The door operator shall be arranged so that, in case of interruption or failure of electric power, the doors can be readily opened by hand from within the car, in accordance with applicable code. Emergency devices and keys for opening doors from the landing shall be provided as required by the local code.
- B. Powered Doors shall open automatically when the car has arrived at or is leveling at the respective landings. Doors shall close after a predetermined time interval or immediately upon pressing of a car button. A door open button shall be provided in the car. Momentary pressing of this button shall reopen the doors and reset the time interval.
- C. Electronic Door Safety Device. The elevator car shall be equipped with an electronic protective device extending the full height of the car gate. When activated, this sensor shall prevent the doors from closing or cause them to stop and reopen if they are in the process of closing. The doors shall remain open as long as the flow of traffic continues and shall close shortly after the last person passes through the door opening.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Field measure and examine substrates, supports, and other conditions under which elevator work is to be performed.
- B. Do not proceed with work until unsatisfactory conditions are corrected
- C. Prior to start of Work; verify hoistway is in accordance with shop drawings. Dimensional tolerance of hoistway from shop drawings: -0 inches +2 inches. Do not begin work of this section until dimensions are within tolerances.
- D. Prior to start of Work; verify projections greater than 2 inches (4 inches if ASME A17.1/CSA B44 2000 applies) must be beveled not less than 75 degrees from horizontal.
- E. Prior to start of Work; verify landings have been prepared for entrance sill installation.
- F. Prior to start of Work; verify elevator pit has been constructed in accordance with requirements, is dry and reinforced to sustain vertical forces, as indicated in approved submittal.

1. Verify that sumps or sump pumps located within pit will not interfere with installed elevator equipment.
- G. Prior to start of Work; verify control space has been constructed in accordance with requirements, with access coordinated with elevator shop drawings, including:
 1. Sleeves and penetrations
- H. Verify installation of GFCI protected 15-amp in pit and adjacent to each signal control cabinet in control space.

3.02 REPARATION

- A. Coordinate installation of anchors, bearing plates, brackets and other related accessories

3.03 INSTALLATION

- A. Install equipment, guides, controls, car and accessories in accordance with manufacturer installation methods and recommended practices.
- B. Properly locate guide rails and related supports at locations in accordance with manufacturer's recommendations and approved shop drawings.
- C. All hoistway frames shall be securely fastened to fixing channels mounted in the hoistway. Coordinate installation of sills and frames with other trades.
- D. Lubricate operating system components in accordance with manufacturer recommendations.
- E. Perform final adjustments, and necessary service prior to substantial completion

3.04 CONSTRUCTION

- A. Interface with Other Work
 1. Guide rail brackets attached to steel shall be installed prior to application of fireproofing.
 2. Coordinate construction of entrance walls with installation of door frames and sills. Maintain front wall opening until elevator equipment has been installed.
 - a. Ensure adequate support for entrance attachment points at all landings.
 3. Coordinate wall openings for hall push buttons, signal fixtures and sleeves. Each elevator requires sleeves within the hoistway wall.
 4. Coordinate emergency power transfer switch and power change pending signals as required for termination at the primary elevator signal control cabinet in each group.
 5. Coordinate interface of elevators and fire alarm system.
 6. Coordinate interface of dedicated telephone line.

3.05 TESTING AND INSPECTIONS

- A. Perform recommended and required testing in accordance with authority having jurisdiction.
- B. Obtain required permits and provide originals to Owner's Representative.

3.06

DEMONSTRATION

- A. Prior to substantial completion, instruct Owner's Representative on the proper function and required daily maintenance of elevators. Instruct personnel on emergency procedures

END OF SECTION