

**SUBMITTED BY:** (Company Name) **Schindler Elevator Corp.**  
(Hereinafter called "Bidder")

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**B. TECHNICAL PROPOSAL**

Technical Proposal for **Elevator** Work as defined by the Contract Documents including the **Elevator** Requisition should be attached hereto.

Please initial each specification section 14210 as you agree to each one verbatim. If you need to qualify your ability to comply with each specification section line item, please reference a note number in the boxes provided.

Please include a numbered list of qualified specification line items attached to your Technical Proposal.

**I. BID INFORMATION LETTERS**

None to date.

**END OF TECHNICAL PROPOSAL BID FORM**

**SECTION 14210**  
**ELECTRIC TRACTION ELEVATORS**  
**(Submitted for Deviation)**

Initials below indicate agreement with the specification line item as written. A reference to a note indicates a qualification for the specification line item that needs to be reviewed and approved prior to final bid.

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes: Electric traction elevators as indicated on drawings and as specified. AR
  
- B. Definitions: Electric traction elevator work is hereby defined to include systems in which cars are hoisted by means of an electric drive machine; with other components of the work including car enclosures, hoistway entrances, control systems, signal equipment, guide rails, electrical wiring, roping, buffers, and devices for operating, dispatching, safety, security, *two-way* leveling, alarm, maintenance and similar required performances and capabilities. AR
  
- C. Related Sections:
  - 1. Section 01352 - LEED Requirements
  - 2. Section 01524 - Construction Waste ManagementSEE ATTACHMENT

**1.2 SUBMITTALS**

- A. Product Data: Submit manufacturer's detailed technical product data and installation instructions for each component or product, and include certified test reports on required testing. List and describe features of control system, performances, and operating characteristics. AR
  
- B. LEED Submittals: Comply with requirements of Section 01352 "LEED Requirements". SEE ATTACHMENT
  
- C. Shop Drawings: Submit plans, elevations, sections and large-scale details indicating service at each landing, coordination with building structure and relationships with other construction, and details of car enclosures, signal fixtures and hoistway entrances. Include elevating diagrams to show service to each level. Provide plan of pit and hoistway indicating equipment arrangement, elevation section of hoistway, machine-room equipment and layout, etc. Provide power and heat data for all equipment and applicable static and impact loads. *Submit drawings to scale at a minimum of 1/2" = 1'-0"*. SEE ATTACHMENT
  
- D. Wiring Diagrams: Provide diagrams detailing wiring for power, signal and control systems differentiating clearly between manufacturer-installed wiring and field-installed wiring. Indicate maximum and average power demands. SEE ATTACHMENT
  
- E. Power Confirmation Sheets: Include motor horsepower, code letter, starting current, full load running current, and demand factor for applicable motors. AR
  
- F. Samples: Submit samples of exposed finishes of car enclosures, hoistway entrances, and signal equipment. Provide 6" to 8" square samples of sheet materials and 10" to 12" lengths of running trim members. AR

G. Certificates and Permits: Provide Owner with copies of all inspection/acceptance certificates and operating permits as required by governing authorities to allow normal, unrestricted use of elevators. AR

H. Maintenance Manuals: Submit three copies of bound manual for elevator, with operating and maintenance instructions, parts listing, recommended parts inventory listing, purchase source listing for major and critical components, emergency instructions, and similar information. AR

### 1.3 QUALITY ASSURANCE

A. Approved Installers: Elevators may be purchased from any of the following pre-approved Installers: AR

1. *Hollister Whitney.*
2. KONE, Inc.
3. Mitsubishi Elevators and Escalators
4. Otis Elevator Company
5. Parkway Elevators
6. Schindler Elevator Corporation
7. Suburban Elevator
8. ThyssenKrupp Elevator Corporation
9. Minnesota Elevator Inc.

B. Regulatory Requirements:

1. Elevator Code: Except for more stringent requirements are indicated or imposed by governing regulations (which must be complied with), comply with applicable requirements of the "American Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks" (ANSI A17.1) published by The American Society of Mechanical Engineers, hereinafter referred to as the "Code." AR
2. Inspectors' Manual, ASME/ANSI A17.2. AR
3. National Electrical Code, No. ANSI/NFPA 70: Comply with applicable NFPA codes, and specifically with sections relating to electrical work and elevators. AR
4. Fire Resistance of Entrances: Comply with NFPA No. 80, and provide units bearing UL labels. AR
5. Accessibility Requirements: Comply with ADA "Accessibility Guidelines for Buildings and Facilities", Federal Register; and, to the extent more stringent, with Illinois Accessibility Code and City of Chicago Code. AR

C. Chicago Code: Comply with all requirements, including special emergency operation by Fire Department. AR

D. Surface Burning Characteristics: Provide cab wall finishes tested in accordance with ASTM E84 by an independent laboratory acceptable to authorities having jurisdiction, complying with the following:

1. Flame Spread: Less than 25.
2. Smoke Developed: Less than 450.

E. Preinstallation Conference: Conduct preconstruction conference at the project site. AR

SEE  
ATTACHMENT

SEE  
ATTACHMENT

AR

#### 1.4 OPERATION PERFORMANCE

A. The control system shall provide smooth acceleration and deceleration with 1/8-inch leveling accuracy at all landings, from no load to full rated load in the elevator, under normal or unloading conditions. The self-leveling shall, within its zone, be entirely automatic and independent of the operating device and shall correct for over travel and under travel. The car shall remain at the landing irrespective of load. Clearance between the car sill and hoistway landing sill shall not exceed 1 1/4-inch.

AR

B. The floor to floor performance time under the above criteria shall be 12.6-seconds, measured from the start of door close at one floor to 3/4 open at the next floor. Performance time is based on 14 foot floor heights with rated speed of 200 fpm and 42-inch, single-speed doors. Performance time shall be adjusted by .3-seconds for each foot of travel above or below 14 foot standard. Adjustments shall also be provided for varying speeds or varying door openings arrangements.

AR

C. The door open time shall be 2.6-seconds for 42-inch and 2.8-seconds for 48-inch, side opening doors. Time is measured from start of door open to fully open.

AR

D. The door close time shall be 3.7-seconds for 42-inch and 4.1-seconds for 48-inch, side opening doors. Time is measured from start of door close to fully closed.

AR

E. Door Dwell Time (Hall Calls): The time doors remain open upon answering a hall call shall be based on code requirements with a door delay feature. The door delay is the minimum acceptable time from notification that a car is answering a call (lantern and audible signal) until the doors of the car start to close. Time shall be calculated by the following equation:

$$T=D/(1.5 \text{ ft/s})$$

T=Total time in seconds

D=Distance from a point in the lobby 60-inches directly in front of the hall station to the centerline of the door opening.

For cars with in-car lanterns, T begins when the lantern is visible from the vicinity of the hall station and the audible signal is sounded.

AR

F. Door Dwell Time (Car Calls): The time doors remain open after answering a car call shall be adjustable. Initial setting shall be 4.0-seconds.

AR

G. The speed of the elevator shall not vary plus or minus 5-percent under loading conditions.

AR

H. Ride quality requirements shall include a horizontal acceleration measured inside of the cab during all conditions to not exceed 12 mg peak to peak within the 1-10 mhz range.

SEE ATTACHMENT

I. Vertical acceleration and deceleration shall be free of bumps, jerk, and sway, and shall be not more than 4 ft sec.<sup>2</sup> with initial ramp of between 0.5 and 0.75-seconds.

AR

J. Limit overall elevator noise emissions to the building to the following maximum A-weighted sound pressure levels in any mode of operation:

1. 70-90 decibels measured anywhere within the machine room, unless more stringent requirements are indicated below.

AR

2. 80-decibels measured 3-feet from any piece of equipment in the machine room.

AR

- 3. ~~50~~ 58-decibels measured ~~5~~ 3-feet above the cab floor near the center during all sequences of operation, exhaust air blower and annunciators. SEE ATTACHMENT
- 4. 45-decibels measured in the elevator lobby 10-feet from the elevator doors. AR

1.5 PROJECT CONDITIONS

- A. Temporary Elevator Use: Not permitted. AR
- B. Coordination: Coordinate installation with other trades and Owner's testing agency to ensure timely, correct installation. AR

1.6 WARRANTY

- A. The elevators and associated equipment shall be free of defective material, imperfect work and faulty operation not due to ordinary wear and tear or improper use or care, for a period of one-year from final acceptance of all elevator work. Defective work shall be repaired or replaced at no additional cost. AR

1.7 MAINTENANCE

- A. Maintenance Service: Provide full maintenance service by skilled competent employees of the elevator Installer for period of 12 months following date of substantial completion or preliminary acceptance as applicable , including monthly preventive maintenance, performed during normal working hours. Include repair/ replacement of worn or defective parts or components and lubrication, cleaning and adjusting as required for proper elevator operation in conformance with specified requirements. Include 24 hour/day, 7-days/week emergency callback services. Exclude only repair/replacement due to misuse, abuse, accidents or neglect caused by persons other than Installer's personnel. AR
  - 1. Instruct Owner's personnel in proper use, operations and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies. Train Owner's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions. Confer with Owner on requirements for a complete elevator maintenance program. AR

PART 2 - PRODUCTS

2.1 LEED REQUIREMENTS

- A. Products to comply with the requirements of Section 01352 "LEED Requirements". SEE ATTACHMENT

2.2 ACCEPTABLE MANUFACTURERS

- A. Manufacturer: Subject to compliance with requirements, provide products of one of the following: AR
  - 1. *Hollister Whitney.*
  - 2. Kone

3. Otis
4. Schindler
5. Thyssenkrupp
6. Minnesota Elevator Inc.

### 2.3 MATERIALS AND COMPONENTS

- A. Provide manufacturer's custom elevator systems, which will comply with and fulfill the requirements of elevator schedule. Where components are not otherwise indicated, provide standard components, published by manufacturer and as required for a complete system. AR
- B. Elevator Machines: Provide ~~gearless~~ *geared* traction hoist machine with variable-voltage, variable-frequency, AC (VVVF-AC) drive. AR
1. Provide regenerative system. AR
  2. Limit total harmonic distortion of regenerated power to 3 percent per IEEE 519. AR
  3. Provide means for absorbing regenerated power when elevator system is operating on standby power. AR
  4. Provide line filters or chokes to prevent electrical peaks or spikes from feeding back into building power system. AR
- C. Fluid for Oil Buffers: If oil buffers are used, use only fire-resistant hydraulic fluid containing antioxidant, anticorrosive, antifoaming, and metal-passivating additives. AR
- D. Inserts: Furnish required concrete and masonry inserts and similar anchorage devices for installing guide rails, machinery, and other components of elevator work where installation of devices is specified in another Section. AR
- E. Machine Beams: Provide framing to support elevator hoisting machine and deflector sheaves from the building structure. AR
- F. Car Frame and Platform: Welded 12 gauge steel units, *for heavy-duty Type C-3 Loading requirements.* AR
- G. Guides: Provide roller guides or polymer-coated, nonlubricated sliding guides at top and bottom of car and counterweight frames. AR

### 2.4 CONTROL SYSTEMS

- A. General: Provide manufacturer's standard microprocessor operation system as required to provide type of operation system scheduled at the end of this section. AR
- B. Single Elevator Control: Provide a Closed-Loop microprocessor control system with "Simplex Selective Collective" operation. AR
1. Momentary pressure of car or hall button, other than landing at which car is parked, shall automatically start the car and dispatch the car to the corresponding floor for which that call was registered. If a call is registered at the floor when the car is idle, the doors shall automatically open. AR

2. When the direction of travel has been established, the car shall answer all calls corresponding to the direction of travel and shall not reverse direction until all car and hall calls, in that direction, have been answered. AR
  3. Calls registered for the opposite direction of car travel shall remain registered and shall be answered after car has completed its calls in the direction of travel. AR
  4. If no car buttons are pressed, and car starts up in response to several down calls, the car shall answer highest down call first and then reverse to collect other down calls. AR
  5. The car shall remain at the arrival floor for an adjustable interval to permit passenger transfer. Doors shall close after a predetermined interval after opening unless closing is interrupted by car door reversal device or door open button in car. AR
  6. Where two entrances are provided at any one landing door operation shall be selective. AR
- C. Single Car Auxiliary Operations: In addition to primary operation system features, provide the following operational features:
1. Fire Service Operation: Provide operation and equipment per local code. Provide relays, wiring and terminal strips to receive signals from the fire alarm system. AR
  2. Ascending Car Overspeed and Unintended Car Movement Protection: Provide operation to prevent the elevator from striking the overhead or unintended car movement per requirements of current ASME A17.1 code. AR
  3. Fan and Light Output Timer: Provide an adjustable timer (Range 1 to 10-minutes), that when activated will turn off the fan and light within the car. The time will start when the car becomes inactive. Fan and light shall automatically turn on when car becomes active. AR
  4. Car Top Operation: Provide per code. AR
  5. Emergency Cab Lighting: Provide car-mounted, battery unit with solid-state charger to operate alarm bell and lighting, per code. Battery to be rechargeable with 5-year minimum life expectancy. Provide test button in service cabinet of car station, which causes illumination of standby lighting bulbs. AR
  6. Standby Power Operation: . On activation of standby power, car is returned to a designated floor and parked with doors open. Car can be manually put in service on standby power, either for return operation or for regular operation, by switches in control panel located at main lobby/fire command station. Manual operation causes automatic operation to cease. AR
  7. Automatic Dispatching of Loaded Car: When car load exceeds 80 percent of rated capacity, doors will begin closing. AR
  8. Nuisance Call Cancel: When car calls exceed a preset number while car load is less than a predetermined weight, all car calls are canceled. Preset number of calls and predetermined weight can be adjusted. AR
- D. Security Features at Garage Level: Provide the following security features. Security features shall not affect emergency firefighters' service.
1. Keyswitch Operation: Push buttons are activated and deactivated by security keyswitches at hall push-button stations. Key is removable in either position. AR
- E. Automatic Two-way Leveling: Two-way automatic with releveling feature to stop car within 1/4" above or below the landing sill. Avoid overtravel, as well as undertravel and maintain stopping accuracy regardless of load in car or direction of travel. *Two-way leveling shall be designed to accommodate Type C-3 loading of car.* AR

## 2.5 CONTROL ROOM EQUIPMENT

- A. Arrange equipment to fit space conditions shown. AR
- B. VVVF-AC Motor Drive: Provide Variable Voltage, Variable Frequency motor drive as follows:
1. Provide regenerative system. AR
  2. The drive shall be capable varying the torque on the motor during acceleration and deceleration. AR
  3. The drive shall be capable of on-site programming the volts per Hertz acceleration and deceleration ride profiles to adjust the ride quality. AR
  4. The flex vector drive shall control AC induction motors through the use of a high resolution, dual channel optical reader. AR
  5. The flux vector drive shall be capable of delivering 100-percent rated motor torque from base speed down to zero speed. AR
  6. The flux vector drive shall not use DC injection for slowdown braking. AR
  7. The flux vector drive shall be adjustable to achieve the required current motor voltage and frequency so as to match the characteristics of the hoist motor. AR
  8. The drive shall not create excessive audible noise in the elevator motor. AR
  9. The drive shall be capable of delivering sufficient current to accelerate the elevator to contract speed at the rated load. The drive shall provide speed regulation within 3-percent during all phases of acceleration, deceleration and leveling. AR
- C. Isolation Transformer: Provide necessary isolation transformers, reactors, capacitors and other devices to limit the overall Distortion Factor at the point of connection of the elevator converter feeders to the electrical distribution system to a maximum of 3-percent. This shall include compensation for the following:
1. Harmonic distortion. AR
  2. Power factor. AR
  3. Flicker. AR
  4. Line notching. AR
- D. Controller: Provide microprocessor control manufactured by one of the following: *Hollister-Whitney*, *KONE*, *Minnesota Elevator Inc.*, *Mitsubishi Elevators and Escalators*, *Motion Control Engineering (MCE)*, *Otis Elevator Company*, *Schindler Elevator Corporation*, or *ThyssenKrupp Elevator Corporation*.
1. The system shall utilize isolated solid-state input/output interface for the majority of signals. It is understood, where required by code, relay contacts are to be utilized for safety and power control considerations. The use of relays as input or output devices are not acceptable. AR
  2. All controller components shall be designed to provide the required operation as herein specified. AR
  3. All assemblies, power supplies, switches, relays and other items shall be securely mounted on a substantial, self-supporting steel frame of angles or channels and shall be totally enclosed with covers in a cabinet. Equipment shall not be mounted on any of the covers. AR
  4. All controller switches and relays shall be magnet operated with contacts of design and material to insure maximum conductivity; long life and reliable operation without overheating or excessive wear and shall provide a wiping action to prevent sticking due to fusion. AR
  5. Each device on all panels shall be properly identified by name, letter, or standard symbol that shall be neatly stencil painted (or otherwise marked), in an indelible and legible AR



- manner, on device or panel. Identification markings shall be coordinated with identical markings used on wiring diagrams. The ampere rating shall be marked adjacent to all fuse holders. All spare conductors shall be neatly formed, laced and identified.
6. System shall provide accurate and reliable car positioning utilizing a position encoder with absolute distance feedback. AR
  7. System memory shall be provided so that data shall not be lost in the event of a power failure or disturbance. AR
  8. Provide extender boards when computing devices are used inside a computer chassis to facilitate access to the printed circuit cards utilized. AR
  9. Use stable capacitor or crystals as the time base for electronic time delay devices. AR
  10. All high-voltage (110-volt or above) contact points inside the controller cabinet shall be protected from accidental contact when the doors are open. AR
  11. Controller shall be separated into two distinct halves, Motor Drive side and Control side. High voltage motor power conductors shall be routed so as to be physically segregated from the rest of the controller. AR
  12. The rate of acceleration and deceleration of the cars under any condition of load shall be as nearly constant as is possible with the method of control specified and shall be independent of the operating devices in the car. AR
  13. The acceleration, deceleration and velocity shall be computer controlled. The detection of velocity and position of the car shall be fed into the computer. The computer shall compare this information with the velocity profile and adjust as necessary to insure a fast and smooth acceleration and deceleration curve. The maximum acceleration/deceleration shall be 4-feet/sec.<sup>2</sup> and shall change uniformly. AR

- E. Diagnostic Tools: Provide all diagnostic tools and documentation required for the adjustment, troubleshooting, and reprogramming of the elevator system upon completion, including:
1. Passwords or identification codes required to gain access to each software program in order to perform diagnostics or program changes. AR
  2. A composite listing of the individual settings chosen for variable software parameters stored in the software programs. AR

## 2.6 HOISTWAY EQUIPMENT

- A. Guide Rails: Planed steel T-sections suitable for elevator travel, car weight, with brackets for attachment to building structure. Provide backing to meet Code requirements.
1. Provide necessary car and counterweight rail brackets and counterweight spreader brackets of sufficient size and design to secure substantial rigidity to prevent spreading or distortion of rails under any condition. AR
  2. Guide rail loads shall be shown on Installer's drawings. Include safety application, running, loading and seismic loads. AR
- B. ~~Gearless~~ **Gearless Geared** Traction Machine: **Geared**, **VVVF-AC** traction type machine with synchronous permanent magnet motor. Provide dual solenoid service and emergency disc brakes. Mount within machine area located ~~in overhead of~~ **adjacent to** hoistway, **as indicated on Drawings**. Provide vibration isolation, of an approved type, which shall effectively prevent transmission of machine vibration to the building structure. Each driving machine shall be assigned a different number, 4-inch high, corresponding to the elevator number. See  
TRENDS
- C. Machine Beams: Provide steel beams, channels and bearing plates to support machine, governors, rope or steel belt hitches. Include any required tie rods, etc. as required. AR

- D. Governor: Overhead self-resetting tension type, car driven, with electrical shutdown switches. Provide counterweight governor where required by code. Provide necessary mounting brackets and indicate required access doors on shop drawings. AR
- E. Encoder: Provide solid-state, optical, digital-count type, mechanically coupled to car, machine or car governor. AR
- F. Sheaves: Provide cast iron machined and grooved for diameter of ropes and supported by steel beams or channels. Provide cable guards designed to withstand shock and prevent ropes or belts from leaving their proper grooves. All bearings are to be shielded or sealed. Provide drip pans under deflector sheaves. Coordinate location of overhead sheaves in order to service sheaves from the top of the elevator car. AR
- G. Sheave Beams: Provide steel beams, channels and bearing plates to support overhead sheaves and rope hitches. Include any required clip angles, tie rods, etc. AR
- H. Counterweights: Structural steel frame with metal filler weights. Provide metal guard as required by code. AR
- I. Counterweight Guide Shoes: Provide roller type guides to provide smooth and quiet ride free of rumbles, bumps, vibrations and excessive sway. Guides shall consist of three or more spring mounted rollers per guide assembly to maintain rail contact and include adjustable stops to control post wide float. Rollers shall be constructed of neoprene or other similar sound deadening material. Rollers shall have high "memory" characteristics, enabling the rollers to quickly regain their round shape after an elevator sits overnight or for a moderate period of time. AR
- J. Counterweight Sheaves: Where applicable, provide cast iron machined and grooved for ropes or belts and adequately supported. Provide cable guards designed to withstand shock and prevent ropes or belts from leaving their proper grooves. All bearings are to be shielded or sealed. AR
- K. Hoist and Governor Ropes: Provide 8 x 19 sealed construction traction steel type hoist ropes or steel belts made of polyurethane coated belt with high-tensile grade, zinc plated steel cords for hoisting car and counterweight and 8 x 25 filler wire type for governor rope. Fasten with adjustable shackles. ***Manufacturer shall verify all sizes, structural loads, and material requirements for hoistway and governor ropes and/or belts for application indicated on Contract Documents.*** AR
- L. Safety: Flexible guide clamp, Type B. Provide car and where required, counterweight safety. AR
- M. Buffers: Oil type with spring or gravity return. Provide struts and braces. Mount on continuous channels secured to guide rails. Provide buffer inspection platform and ladder where required due to deep pit condition. PER ATTACHMENT
- N. Normal and Final Terminal Stopping Devices: Per Code. AR
- O. Electrical Wiring and Wiring Connections:
  - 1. Conductors and Connections: Copper throughout with individual wires coded and connections on identified studs or terminal blocks. Use no splices or similar connections in wiring except at terminal blocks, control cabinets, junction boxes, or condulets. Provide 10% spare conductors throughout. Provide four pairs of shielded communication AR

- 2. wires in addition to those required to connect specified items. Run spare wires from car connection points to individual elevator controllers . Tag spares so they can be identified. AR
- 3. Conduit: Painted or galvanized steel conduit and duct. Conduit size: 1/2" minimum. Do not use flexible conduit exceeding 36" in length. Flexible heavy-duty service cord may be used between fixed car wiring and car door switches for door protective devices. AR
- 4. Traveling Cables: Flame and moisture-resistant outer cover. Prevent traveling cables from rubbing or chafing against hoistway or elevator equipment within hoistway. Provide minimum 4 extra wires for future added features. AR
- 4. Life Safety: Connect smoke sensors, telephones, jacks and speakers to designated point adjacent to hoistway. AR
  
- P. Entrance Equipment:
  - 1. Door Hangers: Two-point suspension with upthrust adjustment. Tire rollers so that no metal-to-metal contact exists. AR
  - 2. Door Tracks: Bar or formed, cold drawn steel with smooth hanger contact surface. Provide removable tracks for replacement. AR
  - 3. Interlocks: Provide type operable without retiring cam. Paint interlocks flat black. AR
  - 4. Closers: Spring, counterweight or spirator type. AR
  
- Q. Pit Stop Switch: Per Code. AR
  
- R. Floor Numbers: Stencil Painted 4" high floor numbers within the hoistway per Code. AR
  
- 2.7 HOISTWAY ENTRANCES
  
- A. Provide manufacturer's standard, hollow metal type, sliding, door- and- frame hoistway entrances; complete with track systems, hardware, safeties, sills and accessories. Match car enclosure doors for size, number of door panels and door panel movement. Provide frame-section size and profile to coordinate with hoistway wall construction as indicated. AR
  
- B. Materials and Fabrication: Provide selections indicated; manufacturer's standards, but not less than the following:
  - 1. Frames: Formed stainless steel sheet, AISI Type 302/304; with manufacturer's standard directional polish or satin finish. AR
  - 2. Panels: Flush stainless steel construction, AISI type 302/304, with manufacturer's standard directional polish or satin finish. AR
  
- C. Sills: Extruded nickel silver, with grooved surface, 1/4" thickness; mill finish. *Sill and supports shall be heavy-duty for Type C-3 loading requirements.* AR
  
- D. Struts: Minimum 3-inch continuous hot rolled or formed steel angle with secure fastening to sill. *Struts shall be heavy-duty for Type C-3 loading requirements.* AR
  
- E. Header: Minimum 3/16-inch thick formed steel designed to support hangers. Header shall be bolted to supporting struts. AR
  
- F. Dust Covers: Removable, full length 14-gauge steel. Covers shall be made in sections for convenient access to hangers. AR

## 2.8 SIGNAL EQUIPMENT

- A. General: Provide signal equipment to comply with requirements indicated below:
1. Provide illuminated hall-call and car-call buttons that light up when activated and remain lighted until call or other function has been fulfilled; fabricated of acrylic or other permanent translucent plastic. AR
  2. Except for buttons and illuminated signal elements, fabricate signal equipment with exposed surfaces of stainless steel with manufacturer's standard directional polish or satin finish. AR
- B. Car Control Stations: Provide car control station in each car with flush-mounted metal faceplates, containing call button for each landing served, and containing other buttons, switches and controls required for specified car operation and control. Mount at height complying with ADA "Accessibility Guidelines for Buildings and Facilities", Federal Register; and, to the extent more stringent, with Illinois Accessibility or Chicago Code. Mount in return panel adjacent to car door. Provide operating device symbols as required by Code. Mark other buttons and switches with manufacturer's standard identification for required use or function.
1. Provide a lockable service cabinet with concealed hinges. Cabinet door shall be flush with the faceplate with hairline joints. Door shall include a flush integral frame for viewing the operating permit. The window shall be constructed of durable Plexiglas or similar material and be accessible from the backside of the cabinet door. Size window to fit local operating certificate. AR
    - a. Cabinet shall contain the following devices: AR
      - 1) Light toggle switch.
      - 2) Two-speed fan switch.
      - 3) Keyed inspection switch.
      - 4) Independent service toggle switch.
      - 5) Emergency light test button.
      - 6) Duplex, GFCI convenience outlet.
- C. Car Position Indicator: Provide segmented digital readout type with 2-inch high (minimum) indications. Locate at top of car control station. Indicator shall provide car position and direction of travel and include an adjustable electronic floor passing chime. As the car passes or stops at a floor served by the elevator, the corresponding designation shall illuminate, and an audible signal shall sound. The audible signal shall be no less than 20-decibels with a frequency no higher than 1500. AR
1. Audible Signal: Provide in addition to visual indicator, to indicate to passengers that car is stopping at each of the floors served. AR
- D. Hall Push-Button Stations: Provide hall push-button station at each landing with buttons matching those provided in car. Station shall be flush mounted with centerline of button(s) at 42-inches from finished floor. Provide code required Pictograph Fire Signs above hall buttons at all floors. AR
1. Provide 1- button station and indicate direction of travel at terminal floors. AR
- E. Hall Lanterns: Provide units with illuminated "up" or "down" signal arrow as applicable. Provide units projecting from face plate for ease of angular viewing. Match materials, finishes and mounting method with hall push-button stations. AR
1. Audible Signal: In conjunction with each hall lantern device, provide an audible signal to indicate that a car is arriving in response to a hall call and to indicate direction of car travel. Signal shall sound once for up direction of travel and twice for down direction. AR

- a. At manufacturer's option, audible signal may be placed on each car. AR
- F. Telephone: Provide telephone hand set in each car, contained in flush-mounted cabinet and complete with identification and instructions for use and ready for final connection. AR
- G. Emergency Lights: Provide fixture below car position indicator in main car control station and auxiliary station, where applicable. AR
- H. Alarm System: Provide emergency alarm bell properly located within building and audible outside hoistways, equipped to sound automatically in response to emergency stops and in response to "Alarm" button at each car control station. AR
- I. Emergency Return Switch and Box: Mount in lobby and identify purpose with permanent engraving. Provide flush-mounted box with lockable hinged cover below call button to contain keys and instructions for emergency use of elevators. Box faceplate material to be similar to call button faceplate and contain engraved legend, "Emergency Only" in 1/2-inch letters. AR
- J. Graphics: Provide graphics required by local authorities and ADA, including but not limited to:
  - 1. No smoking in car.
  - 2. Capacity plate in car.
  - 3. Emergency use of stairways.
  - 4. Floor designations on hoistway jambs.
  - 5. Elevator number in upper section of left jamb.AR

## 2.9 CAR EQUIPMENT

- A. Loading Classification and Requirements: Passenger/Service Elevators shall be designed for Class C3 Freight Loading, as defined in ASME A17.1. AR
- B. Platform: Provide car platform of all steel construction consisting of a welded reinforced steel frame with 12-gage sheet steel flooring welded to the frame and reinforcing members. It shall be equipped with an extruded ~~aluminum~~ heavy-duty, nickel silver threshold capable of withstanding Type C-3 loading requirements. Protect the underside of the platform against fire. AR
- C. Car Frame: Provide car frame fabricated from formed or structural steel members with adequate bracing to support the platform and car enclosure. Isolate the car frame from the platform plate by means of rubber isolation mounts. The buffer striking plate on the underside of the car frame plank members must fully compress the spring buffers mounted in the pit before the plunger reaches its down limit of travel. AR
- D. Work Light and Plug Receptacles: Provide on top and bottom of car with lamp guards. AR
- E. Car Roller Guide Shoes: Provide rubber tired roller guide shoes mounted to top and bottom of the care frame to engage the guide rails. AR
- F. Door Operator: Provide high-speed, heavy duty master electric power door operator to automatically open and close the car and hoistway doors. The operator shall utilize velocity and distance feedback control. The doors shall be capable of smooth and quiet operation without slam or shock. AR

- 1. Opening speed shall not be less than 3.0 feet per seconds with reversal in no more than 2 1/2-inches. AR
- 2. An auxiliary closing device shall automatically close hoistway doors if the car leaves the landing zone. AR
- 3. In case of power interruption, it shall be possible to manually operate the car and hoistway doors from inside the cab, when the car is within the landing zone. AR
  
- G. Car Door Contacts: Electrical contacts shall prevent operation of the elevator by normal operating devices unless car doors are closed or within tolerances allowed by code. AR
  
- H. Door Restrictor: Provide mechanical door restrictor to prohibit the opening of car doors by more than 4-inches when outside unlocking zone. AR
  
- I. Door Reversal System: Provide door detector that projects an infrared curtain of light guarding the door opening. Arrange to reopen doors if one beam of the curtain is penetrated. Unit shall have Transmitters and Receivers spaced at a minimum distance to provide maximum amount of protection within the height of the doorway. Systems which have the ability to turn off individual zones within the curtain will not be allowed. AR
  
- J. Differential Door Timing: Provide adjustable timers to vary the time that the doors remain open in response to a car or hall call. The doors shall remain open for four-seconds in response to a car call and five to eight-seconds for a hall call. This time shall be reduced to two-seconds, if the proximity detector is interrupted. The doors shall remain open as long as passengers are crossing the threshold. AR
  
- K. Nudging: When doors are prevented from closing for 20-seconds due to failure of the proximity device or obstruction, doors shall remain open and an alarm shall sound. AR
  
- L. Car Top Service Guardrail: Provide a 42-inch high railing on the car top with intermediate rail, toe board and stationary posts to protect inspectors or service personnel, *in accordance with authorities having jurisdiction.* AR

2.10 CAR ENCLOSURES

- A. Provide manufacturer's standard pre-engineered car enclosures, of the selections indicated. Include ventilation, lighting, ceiling finish, wall finish, access doors, doors, power door operators, sill (threshold), trim, accessories, and floor finish unless indicated as not work of this section. Provide horizontal sliding doors of manufacturer's standard flush panel type, with operation and number of panels as indicated. Provide manufacturer's standard protective edge trim system for door and wall panels, except as otherwise indicated. Fabricate car with recesses and cutouts for signal equipment. AR
  
- B. Passenger/Service Car:
  - 1. Shell: Reinforced 14 gauge textured stainless steel formed panels using Rigidized Metals 5WL or equal. Apply sound deadening mastic to exterior. AR
  - 2. Canopy: Reinforced 12-gauge furniture steel formed panels with hinged exit operable from car top only. Interior finish white reflective baked enamel. AR
  - 3. Front Return Panel: 14 gage stainless steel, No. 4 finish. AR
  - 4. Entrance Columns and Transom: Reinforced 14 gauge stainless steel, No. 4 finish. AR
  - 5. Car Door Panels: Reinforced minimum 16 gauge stainless steel, 5WL textured finish. Same construction as hoistway door panels. Architectural metal cladding shall wrap AR

around leading and trailing edge of panel and return a minimum of 1/2" on rear side of leading edge of panels.

6. Sills: Extruded, *heavy-duty*, nickel silver with grooved surface, 1/4" thickness; mill finish. *Sills and supports shall be capable of withstanding Type C-3 loading requirements.*
7. Floor: Checkered aluminum plate.
8. Ventilation: Two-speed exhaust blower mounted to car "canopy on isolating rubber grommets. Provide with a diffuser and grille.
9. Side and Rear Walls Plastic Laminate: High-pressure type complying with NEMA LD3, 0.05" thickness; color, texture and pattern as selected by Architect.
10. Lighting: Manufacturer's standard fluorescent lighting for luminous ceiling installation.
11. Ceiling: Ceiling panels of translucent acrylic or other permanent rigid plastic complying with flammability requirements.
12. Handrails: 1- 1/2" diameter cylindrical handrail with capped ends at each wall. Provide stainless steel, No. 4 finish.
13. Pads and pad buttons: Mount stainless steel pad buttons around perimeter of cab. Provide Palmer vinyl quilted pads at each wall and front return. Provide eye type "Adapt-A-Clamp" devices for hanging pads. Provide proper cutout for car control devices.

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## 2.11 ~~HOISTWAY ENTRANCES~~

- ~~A. Provide manufacturer's standard, hollow metal type, sliding, door and frame hoistway entrances; complete with track systems, hardware, safeties, sills and accessories. Match car enclosure doors for size, number of door panels and door panel movement. Provide frame-section size and profile to coordinate with hoistway wall construction as indicated.~~
- ~~B. Materials and Fabrication: Provide selections indicated; manufacturer's standards, but not less than the following:~~
- ~~1. Frames: Formed stainless steel sheet, AISI Type 302/304; with manufacturer's standard directional polish or satin finish.~~
  - ~~2. Panels: Flush stainless steel construction, AISI type 302/304, with manufacturer's standard directional polish or satin finish.~~
- ~~C. Aluminum Sills: Cast or extruded aluminum, with grooved surface, 1/4" thickness; mill finish.~~

## PART 3 - EXECUTION

### 3.1 INSPECTION

- A. Prior to commencing elevator installation, examine hoistways, hoistway openings, and pits and machine rooms, as constructed, and verify all critical dimensions, and examine supporting structure and all other conditions under which elevator work is to be installed. Notify Architect in writing of any dimensional discrepancies or other conditions detrimental to the proper installation or performance of elevator work. Do not proceed with elevator installation until unsatisfactory conditions have been corrected.

AR

### 3.2 INSTALLATION OF ELEVATOR SYSTEM

- A. General: Comply with manufacturer's instructions and recommendations for work required during installation. Provide required facilities and installation equipment including hoist beam if required. AR
- B. Welded Construction: Provide welded connections for installation of elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance and replacement of worn parts. Comply with AWS standards for workmanship and for qualifications of welding operators. AR
- C. Coordination: Coordinate elevator work with work of other trades, for proper time and sequence to avoid construction delays. Use benchmarks, lines and levels designated by Contractor, to ensure dimensional coordination of the work. AR
- D. Sound Isolation: Mount rotating and vibrating elevator equipment and components on vibration-absorption mounts, designed to effectively prevent transmission of vibrations to structure, and thereby eliminate sources of structure-borne noise from elevator system. SEE ATTACHMENT
- E. Lubrication: Lubricate operating parts of systems, including ropes, if any, as recommended by manufacturers. AR
- F. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails, for accurate alignment of entrances with cars. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum, safe, workable dimension at each landing. AR
- G. Sills: Set sill flush with finished floor surface at landings. Coordinate with other trades to facilitate and ensure proper grouting of sills. AR

### 3.3 FIELD QUALITY CONTROL

- A. Acceptance Testing: Upon nominal completion of each elevator installation, and before permitting use of elevator (either temporary or permanent), perform acceptance tests as required and recommended by Code, and by governing regulations or agencies. AR
- B. Operating Tests: Load elevator to its rated capacity and operate continuously for 30 minutes over its full travel distance, stopping at each level and proceeding immediately to the next. Record temperature rise of motor(s) during 30-minute test period. Record failures of elevator to perform as required. AR
- C. In addition to inspection and tests required by local authorities perform all applicable inspections and test contained in ANSI/ASME 17.2. AR
- D. Advise Owner, Architect and inspection department of governing agencies, in advance of dates and times tests are to be performed on elevators. AR



### 3.4 PROTECTION

- A. At completion of elevator work provide suitable protective coverings, barriers, devices, signs or such other methods or procedures to protect elevator work from damage or deterioration. Maintain protective measures throughout remainder of construction period.

AR

### 3.5 FINAL ADJUSTMENTS

- A. Make a final check of each elevator operation, with Owner's personnel present and just prior to date of substantial completion. Determine that control systems and operating devices are functioning properly.

AR

### 3.6 INSTRUCTIONS

- A. Instruct Owner's personnel in proper use, operations and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies. Train Owner's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions. Confer with Owner on requirements for a complete elevator maintenance program.

AR

### 3.7 ELEVATOR SCHEDULE

#### Elevator No. 1

AR

Type: Passenger/*Service* with Class C3 Freight Loading  
Machine Location: Custom Configuration, Side orientation beside hoistway at Roof Level  
Up Pull Loading on  
Machine and Floor: Static -- 17 kps; Doubled for impact -- 34 kips  
Hanging Load on  
Building: Static -- 36 kips; Doubled for impact -- 70 kips.  
Machine Type: ~~Gearless~~—AC-Geared, *VVVF-AC, mounted adjacent to elevator shaft in penthouse.*  
Capacity: 4000\_lbs.  
Speed: 200\_FPM  
Operational Control: Selective-Collective  
Motor Control: AC with Solid State Soft Starting  
Stops: As shown on drawings  
Openings: As shown on drawings  
Floors Served: As shown on drawings  
Travel: As shown on drawings  
Platform Size: As shown on drawings  
Minimum Clear Inside: As shown on drawings  
Entrance Size: *3'-6" W x 7'-0" High As indicated on Drawings.*  
Entrance Type: As indicated on Drawings  
Security Features: Keyswitch Operation at Garage Level.



**Elevator No. 2 (Future Elevator)**

Not in scope

END OF SECTION

**Schindler Elevator Corp.**

**OGDEN SCHOOL**

**Qualifications to the Technical Proposal**

1. Specification 14210, page 1, 1.1, C, 1, Schindler Elevator will provide the LEED documentation for the elevator with respect to the elevator cab finishes and any adhesives or sealants that are used during the installation of the elevator equipment only. Please note: This is not a requirement for the latest version of LEED, version 2.2.
2. Specification 14210, page 1, 1.1, C, 1, Schindler Elevator will provide the LEED documentation for the elevator with respect to the elevator cab finishes and any adhesives or sealants that are used during the installation of the elevator equipment only. Please note: This is not a requirement for the latest version of LEED, version 2.2.
3. Specification 14210, page 1,1.2, C, Layout drawings must be fully dimensioned if they are printed on 11"x17" paper; however, if they are not printed out to a size that is measurable with a standard scale ruler, then the AutoCAD drawing files must be provided simultaneous with the paper copy submittals.
4. Specification 14210, page 2, 1.2, D, Wire diagrams are provided at time of material to the job site.
5. Specification 14210, page 2, 1.3, D, This product meets the ANSI 17.1 code for Elevator code requirement for flame & smoke
6. Specification 14210, page 3, 1.4,H, Please see the attached "Performance Standards Matrix" . This was provided by MEI for the elevator equipment.
7. Specification 14210, page 4, 1.4, J, 3, Please see the attached "Performance Standards Matrix" . This was provided by MEI for the elevator equipment
8. Specification 14210, page 1, 1.1, C, 1, Schindler Elevator will provide the LEED documentation for the elevator with respect to the elevator cab finishes and any adhesives or sealants that are used during the installation of the elevator equipment only. Please note: This is not a requirement for the latest version of LEED, version 2.2.
9. Specification 14210, page 8, 2.6, B, The machine is located at the top landing mounted on the slab to side of the hoistway. With this application no isolation can be provided.
10. Specification 14210, page 9, 2.6, M, Spec is calling for oil buffers. Due to the speed of 200 FPM use of oil buffers are not required by code. Our proposal is based upon spring buffers which meet the ANSI 17.1 code for elevators.
- 10 Specification 14210, page 15, 3.2, D, With this application no isolation can be installed or provided.

## PERFORMANCE STANDARDS MATRIX NEW ELEVATOR INSTALLATION

Performance Standards based on the following:

1. Typical measurements taken with a maximum of two people in the car.
2. Typical measurements for new equipment at prestige office building.
3. Vibration measurements exclude door operation and are maximum peak to peak.
4. All sound measurements with fan "off", unless noted.
5. Heat emission based upon 35 % duty factor for 1 h. An increase above the 35% duty factor will increase heat emission.
6. Geared and gearless applications assume regenerative static dc drive.
7. Typical door sound measurements taken in a stopped car.
8. Ambient noise 50 dBA maximum.
9. Performance time includes door pre-opening.
10. Door closing times are subject to kinetic energy limitation per ASME A17.1.
11. Contract speed regulation for hydraulic elevator takes into account the rated speed and operating speed in the down direction.
12. Hydraulic application assumes direct hydraulic driving machine.
13. Sound in machine room measured with one elevator operating at a time.

TYPE OF ELEVATOR			HYDRAULIC		GEARED		GEARLESS	
UNIT OF MEASUREMENT	METRIC	IMPERIAL	METRIC	IMPERIAL	METRIC	IMPERIAL	METRIC	IMPERIAL
Speed	m/s	ft/m	0.63	125	1.75	350	3.5	700
Capacity	Kg	lb	1000	2500	1600	3500	1600	3500
Stops			3	3	10	10	15	15
Rise	m	ft	7.0	24	33	108	50	168
Floor height	m	ft	3.65	12	3.65	12	3.65	12
SSCO Door (width x height)	mm	ft - in.	1100 x 2100	3-6 x 7-0	1100 x 2100	3-6 x 7-0	1100 x 2100	3-6 x 7-0
<b>MOTION:</b>								
Acceleration (typical)	m/s	ft/s	0.76	2.5	0.85	2.8	1.06	3.5
Deceleration (typical)	m/s	ft/s	0.76	2.5	0.85	2.8	1.06	3.5
Max. Jerk	m/s	ft/s	10.67	35	3.65	12	2.44	8
Contract Speed Regulation	± %	± %	20	20	5	5	5	5
Vertical Vibration Z axis	milli-g	milli-g	30	30	25	25	25	25
Horizontal Vibration (S/S) Y axis	milli-g	milli-g	30	30	25	25	25	25
Horizontal Vibration (F/B) X axis	milli-g	milli-g	30	30	25	25	25	25
Stopping Zone	mm	in.	± 13	± 1/2	±13	± 1/2	±13	± 1/2
<b>TIMING:</b>								
Performance Time (maximum)	s	s	15	15	10	10	9	9
Door Opening Time, Nominal (typical)	s	s	2	2	2	2	2	2
Door Closing Time (typical)	s	s	3	3	3	3	3	3
<b>SOUND: (maximum)</b>								
Door Sound - Opening	dBA	dBA	70	70	67	67	64	64
Door Sound - Closing	dBA	dBA	70	70	67	67	64	64
Door Sound - Reversal	dBA	dBA	70	70	67	67	64	64
Sound In Car At Rated Speed	dBA	dBA	65	65	60	60	60	60
Sound In Stopped Car, Door Closed, Fan On	dBA	dBA	65	65	65	65	65	65
Sound In Machine Room	dBA	dBA	85	85	80	80	80	80
<b>HEAT EMISSION: (maximum)</b>								
Machine Room	W	Btu/h	3,500	12,000	4,500	15,000	6,000	20,000